Construction Soil and Water Management Sub-Plan

Narrabri to North Star (N2NS)

2600-0018 N2NS SP1
SUBMISSION BY TRANS4M RAIL

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Document Control

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H	15/03/2021	Issued to DPIE with rev G comments addressed

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Glossary

TERM / ACRONYM / ABBREVIATION	DEFINITION
AMS	Activity Method Statement
ARTC	Australian Rail Track Corporation
BMP	Biodiversity Management Plan
CAD	Computer-Aided Design
CEMP	Construction Environmental Management Plan
CIZ	Construction Impact Zone
CoA	Conditions of Approval
CSEMP	Community and Stakeholder Engagement Management Plan
CSSI	Critical State Significant Infrastructure
DPIE	Department of Planning Industry and Environment
ECM	Environmental Control Map
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	Environmental Protection Authority
EPBC	Environmental Protection and Biodiversity Conservation Act
EPL	Environment Protection Licence
EPO	Environmental Protection Outcome
EP&A	Environmental Planning and Assessment Act (1979)
ER	Environment Representative
ESCP	Erosion and Sediment Control Plan
GIS	Geographic Information System
GMR	Global Mandatory Requirement
HSEQS	Health, Safety, Environment, Quality and Sustainability
IMS	Integrated Management System
IR	Inland Rail
ISCA	Infrastructure Sustainability Council of Australia
N2NS	Narrabri to North Star (Separable Portion 1)
NVMP	Noise and Vibration Management Plan
RMM	Revised Environmental Management Measure
RTS	Response to Submissions
SEARs	Secretary's Environmental Assessment Requirements
SEMP	Site Establishment Management Plan
SPIR	Submissions Preferred Infrastructure Report
SuMP	Sustainability Management Plan
TRA	Task Risk Assessment
TTAMP	Traffic, Transport and Access Management Plan
TfNSW	Transport for NSW

TERM / ACRONYM / ABBREVIATION	DEFINITION
WRA	Workplace Risk Assessment

Compliance Matrix

Table 0-1: Ministers Conditions of Approval

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED
A1	The CSSI may only be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the Inland Rail – Narrabri to North Star Environmental Impact Statement, Volumes 1-7 (prepared by GHD and dated November 2017), the Inland Rail – Narrabri to North Star Submissions Preferred Infrastructure Report (ARTC, dated December 2019) and (updated BDAR, RtS on the SPIR and RFI responses).	CEMP Sub-Plans ECM Progressive ESCP
A2	The CSSI must be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in in the documents listed in Condition A1 unless otherwise specified in, or required under, this approval.	CEMP Sub-Plans ECM Progressive ESCP
A3	In the event of an inconsistency between the documents listed in Condition A1 or any other document required under this approval, and a term of this approval, the term of this approval prevails to the extent of the inconsistency. Note: For the purpose of this condition, there will be an inconsistency between a term of this approval and any document if it is not possible to comply with both the term and the document.	Noted
A4	The Proponent must comply with the written requirements or directions of the Planning Secretary, including in relation to: a) the environmental performance of the CSSI; b) any document or correspondence under the terms of this approval in relation to the CSSI (including the provision of such documentation or correspondence); c) any independent appointment or dismissal made in relation to the CSSI; d) any notification given to the Planning Secretary under the terms of this approval; e) any audit of the construction or operation of the CSSI; f) the terms of this approval and compliance with the terms of this approval (including anything required to be done under this approval); g) the carrying out of any additional monitoring or mitigation measures; and h) in respect of ongoing monitoring and management obligations, compliance with an updated or revised version of a guideline, protocol, Australian Standard or policy required to be complied with under this approval.	CEMP
A5	Where the terms of this approval require a document or monitoring program to be prepared or a review to be undertaken in consultation with identified parties, evidence of the consultation undertaken must be submitted to the Planning Secretary with the document. The evidence must include: a) documentation of the engagement with the party identified in the condition of approval that has occurred before submitting the document for approval	CEMP Sub-Plan

<table>
<tr><th>REQUIREMENT REFERENCE</th><th>DETAILS</th><th>WHERE ADDRESSED</th></tr>
<tr><td></td><td>b) a log of the dates of engagement or attempted engagement with the identified party and a summary of the issues raised by them
c) documentation of the follow-up with the identified party where engagement has not occurred to confirm that they do not wish to engage or have not attempted to engage after repeated invitations
d) outline of the issues raised by the identified party and how they have been addressed
e) a description of the outstanding issues raised by the identified party and the reasons why they have not been addressed.</td><td></td></tr>
<tr><td>A6</td><td>Any document that must be submitted, or approval that must be obtained, within a timeframe specified in or under the conditions of this approval may be submitted within a later timeframe agreed with the Planning Secretary. This condition does not apply to the immediate written notification required in respect of an incident under Condition A41. The Proponent must provide supporting evidence so that the Secretary can consider the need, environmental impacts and consistency of any request.
Note: Inaction and/or expedience will not be supported as justifications for need unless it can be demonstrated that there are beneficial environmental impacts associated with the request.</td><td>Noted</td></tr>
<tr><td>A21</td><td>Facilities including lunch sheds, office sheds, material lay down sites, stockpile areas, areas used to assemble infrastructure, and portable toilet facilities can be established and operated where they satisfy the following criteria:
iii) no impacts on biodiversity, soil and water, and heritage items beyond those already approved under other terms of this approval.</td><td>Section 4
Progressive ESCP</td></tr>
<tr><td>C4</td><td>The following CEMP Sub-plans must be prepared in consultation with the relevant government agencies and relevant Councils identified for each CEMP Sub-plan and be consistent with the CEMP referred to in the EIS.
<table>
<tr><th></th><th>Required CEMP Sub-plan</th><th>Relevant government authorities to be consulted for each CEMP Sub-plan</th></tr>
<tr><td>(d)</td><td>Soil and water</td><td>Relevant Councils, Water Group and EES</td></tr>
</table></td><td>This plan</td></tr>
<tr><td>C5</td><td>The CEMP Sub-plans Listed in Condition 0 must state how:
(a) the environmental performance outcomes identified in the documents listed in Condition A1, as modified by these conditions, will be achieved;
(b) the mitigation measures identified in the documents listed in Condition A1, as modified by these conditions will be implemented;
(c) the relevant terms of this approval will be complied with; and
(d) issues requiring management during construction (including coordination of concurrent activities of other projects as well as concurrent activities in this CSSI), as identified through ongoing environmental risk analysis, will be managed.Ce</td><td>Section 3.3
Section 4.3
Section 6
Section 7</td></tr>
<tr><td>C6</td><td>The CEMP Sub-plans must be developed in consultation with relevant parties identified in Condition C4. Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-plan.</td><td>Section 2
Appendix A</td></tr>
<tr><td>C7</td><td>Any of the CEMP Sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP, but in any event, no later than one (1) month prior to construction.</td><td>Section 1.1</td></tr>
<tr><td>C10</td><td>The Soil and Water Management Sub-plan must include:</td><td>Section 5</td></tr>
</table>

<table>
<tr><th>REQUIREMENT REFERENCE</th><th>DETAILS</th><th>WHERE ADDRESSED</th></tr>
<tr><td></td><td>a) a draft water balance for the project;
b) information demonstrating that the required construction water resources are legally and physically available; and
c) mitigation measures to address construction water resource shortages that arise.</td><td></td></tr>
<tr><td>C13</td><td>Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Secretary. The CEMP and CEMP Sub-plans, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to commence until the relevant CEMP and sub-plans have been endorsed by the ER and approved by the Secretary.</td><td>Section 1.1</td></tr>
<tr><td>C14</td><td>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies and relevant councils identified for the Construction Monitoring Programs to compare actual performance of construction of the CSSI against performance predicted in the documents specified in Condition A1.
<table>
<tr><th></th><th>Required Construction Monitoring Programs</th><th>Relevant government authorities to be consulted for each Construction Monitoring Program</th></tr>
<tr><td>(b)</td><td>Water usage</td><td>Water Group</td></tr>
<tr><td>(C)</td><td>Air Quality</td><td>Nil</td></tr>
</table></td><td>Section 5
Section 7.2
Appendix A
Appendix D</td></tr>
<tr><td>C15</td><td>Each Construction Monitoring Program must provide:
a) details of baseline data available;
b) details of any baseline data to be obtained and when;
c) details of all monitoring of the CSSI to be undertaken;
d) the parameters of the CSSI to be monitored;
e) the frequency of monitoring to be undertaken;
f) the location of monitoring;
g) the reporting of monitoring and analysis results against relevant criteria;
h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and
i) any consultation required in relation to the monitoring programs.</td><td>Section 5
Section 7.2
Appendix D</td></tr>
<tr><td>C16</td><td>The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C14 of this approval and must include information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.</td><td>Section 2
Appendix A</td></tr>
<tr><td>C17</td><td>The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one month before the commencement of construction.</td><td>Section 2
Appendix A</td></tr>
<tr><td>C18</td><td>Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs, and all relevant baseline data for the specific construction activity has been collected.</td><td>Section 1.1
Appendix D</td></tr>
<tr><td>C19</td><td>The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.</td><td>Section 5
Section 7
Appendix D</td></tr>
</table>

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED
C20	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program. Note: *Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.*	Section 2 Section 7.2.1 – 7.2.3 Appendix A Appendix D
E35	The CSSI must be designed, constructed and operated so as to: a) maintain the NSW Water Quality Objectives where they are being achieved as at the date of this Approval; b) contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with; c) ensure all drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) new or modified surface water drainage (including cess drains) and depressions are designed and constructed in accordance with relevant guidelines; d) locate all scour protection works associated with replacement culverts or the construction of new culverts within the rail corridor, or as agreed to by the relevant landowner; e) not result in changes to the direction of watercourses or the direction of flood flows except within the rail corridor, other than as agreed with the landowner; f) ensure that there is no permanent interception of, and/or connection with, groundwater; g) ensure all discharges from new or modified surface drainage (including cess drains) adjacent to the new and upgraded track are released at a controlled rate to prevent scour; h) ensure works on waterfront land are undertaken in accordance with the NRAR guidelines for controlled activities on waterfront land; i) ensure that any recycled wastewater (including recycled/treated water) proposed for use by the CSSI, is fit for purpose and does not pose a risk to human health or the receiving environment.	ECM Section 3.1 Section 4.3 Section 5.2.4 Section 7.1.2 SW01 – SW33 RR01 – RR11 Section 7.2.3 Appendix B
E36	The Proponent must consult with TfNSW in relation to stormwater and drainage management to coordinate drainage infrastructure with the Newell Highway Upgrade.	Section 2.2
E37	Prior to the installation of a new culvert, the Proponent must consult with the landowner that is located immediately downstream of the new culvert to determine the potential for impacts on agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, the Proponent must consult with the affected landowner on the management measures that will be implemented to mitigate the impacts.	Section 2.2 Section 7.1.2
E60	Permanent spoil mounds are to be located: a) within the existing rail corridor; b) at least 50 metres from any watercourse or culvert or where the rail formation is predicted to be overtopped during a flood event; c) at least 500 metres from any residence; and d) outside the drip lines of trees located on private property.	Section 7.1.2 Table 7-2 SP01 Appendix E

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED
	Note: For the purpose of Condition E60(d), the Proponent must not affect trees outside of the rail corridor for the purpose of preventing those trees' driplines overhanging spoil mounds.	
E61	Spoil mounds are to comply with the following requirements: a) maximum height must not exceed the top height of the upgraded rail line; b) not result in the clearing or covering of native vegetation beyond that described in the documents listed in Condition A1; c) not result in heritage impacts beyond that described in the documents listed in Condition A1; d) not result in additional changes to the upstream flooding regime beyond those described in the documents listed in Condition A1; e) not affect the downstream flood regime; f) not impede the flow of water through culverts; g) not contain any contaminated soil classified as unsuitable for the proposed land use, acid sulphate soils or green waste; h) are to be stabilised during construction of the CSSI; and i) are to be stabilised prior to operation of the CSSI.	Section 7.1.2 Table 7-2 SP01 SP04 SP05 Appendix E
E80	All reasonably practicable erosion and sediment controls must be installed and appropriately maintained to minimise any water pollution. When implementing such controls, any relevant guidance in the Managing Urban Stormwater series must be considered.	Section 7.1.2 SW7 SW9 SW17 Primary ESCP Progressive ESCP
E81	In the event that soils suspected to be contaminated are unexpectedly found, the Proponent must engage a suitably experienced and qualified contaminated land consultant to undertake further investigations to determine the type and extent of any contamination. The investigation must be undertaken in accordance with guidelines made or approved under the Contaminated Land Management Act 1997 (NSW). The results of the investigation must be documented in a Site Contamination Assessment Report.	Section 7.1.2 Table 7-2 CL02 Appendix C
E82	Where the results of site investigations required by Condition E81 indicate that the contamination poses unacceptable risks to human health or the environment under either the present or proposed land use, the Proponent must engage a suitably experienced and qualified contaminated land consultant to develop and implement any necessary remediation measures. The remediation measures must be documented in a Remediation Report.	Section 7.1.2 Table 7-2 CL04 Appendix C
E83	If remediation is required under Condition E82, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement determines the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with.	Section 7.1.2 Table 7-2 CL05 Appendix C
E84	Nothing in Conditions E81 to E83 prevents the Proponent from preparing a single Site Contamination Report or Remediation Report or obtaining a single Site Audit Statement and Site Audit Report for the entire CSSI.	Section 7.1.2 Noted in CL05 Appendix C
E85	An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared before the commencement of construction and must be followed should unexpected contaminated land or asbestos (or suspected contaminated land or asbestos) be excavated or otherwise discovered during construction.	Section 7.1.2 Table 7-2 CL02 Appendix C

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED
E86	In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1, all practicable measures must be implemented to minimise the emission of dust and other air pollutants during the construction and operation of the CSSI.	Section 7.1.2 Table 7-2 – Air Quality & Dust

Table 0-2: RMMs

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED
Air Quality		
C5.1 General air quality impacts	An air quality management sub-plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for air quality impacts on the local community and environment, and would address all aspects of construction, including: • spoil handling • machinery operating procedures • soil treatments • stockpile management • haulage • dust suppression • monitoring.	This plan Section 7.1.2 Section 7.2.2 Appendix D ECM
C5.2 Construction activities and earthworks that may cause dust impacts.	Where sensitive receivers are located within 150 metres of construction works, or visible dust is generated from vehicles using unsealed access roads, road watering would be implemented.	This plan Section 7.1.2
Soil and Contamination		
C6.1 General soil and erosion management	A soil and water management sub-plan would be prepared as part of the CEMP. It would include a detailed list of measures that would be implemented during construction to minimise the potential for soil and contamination impacts, including: a) Allocation of general site practices and responsibilities; b) Material management practices; c) Stockpiling and topsoil management, including prompt stabilisation of spoil mounds (for example, through mixing of gypsum); and d) Surface water and erosion control practices that take into account site specific soil types (for example, dispersive soils).	This plan
C6.2 Contamination	A contamination and hazardous materials sub-plan would be prepared and implemented as part of the CEMP. It would include: Measures to minimise the potential for contamination impacts on the local community, workers, and environment; and Procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol).	This plan Section 7.1.2 Table 7-2 Contaminated sites, Asbestos and Acid Sulfate Soil Appendix C
Hydrology and **Flooding**		

C7.1 **Flooding**	Construction planning and the layout of construction work sites and compounds would be carried out with consideration of overland flow paths and flood risk, avoiding flood liable land and flood events where possible.	This plan Section 7.1.2 Table 7-2 SW29
C7.2 **Water usage**	Consultation would be undertaken with relevant stakeholders (including landowners/occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by license requirements and/or private landholder agreements are not exceeded.	This plan Section 2 Section 7.1.2 Table 7-2 SW30 Section 7.2.1
Water Quality		
C8.1 discharge to surface water	Discharge to surface water would be undertaken in accordance with the environment protection license for Inland Rail and would consider the hydrological attributes of the receiving waterbody.	Section 7.1.2 Table 7-2 SW31 ECM Water Discharge Permit
C8.2 monitoring	Water quality would be monitored during construction in accordance with the surface water monitoring framework.	ECM Section 7.2.3
C8.3 Works within watercourses	Works within or near watercourses would be undertaken with consideration given to the Guidelines for Controlled Activities on Waterfront Land (Office of Water, 2012).	Section 7.2.1 Table 7-2 SW 22
Landscape and visual		
C11.2 Spoil mounds	If required, spoil mounds would be shaped to reduce their angular profile and ensure that they are integrated within the landscape. Sharp transition angles in the surface profile would be avoided, and rounded profiles would be used to provide a more natural form. Grass cover would be established over the surface area in accordance with the rehabilitation strategy.	This plan Section 7.1.2 Table 7-2 SP02 RR01 – RR11 Appendix E Appendix G
Land use and property		
C12.2 Rehabilitation	The rehabilitation strategy (item D3.5) would include measures to restore disturbed sites as close as possible to the pre-construction condition or better, or to the satisfaction of landowners. Rehabilitation of disturbed areas would be undertaken progressively, consistent with the rehabilitation strategy and individual property agreements (where relevant).	This plan Section 7.1.2 Table 7-2 RR01 – RR11 Appendix E Appendix G
Health and safety		
C16.1 Storage and handling of dangerous good	Hazardous materials and dangerous goods would be stored, handled, and transported in accordance with relevant regulatory requirements and relevant Australian Standards, including SEPP 33 thresholds. This would include a requirement to provide a minimum bund volume of 110% of the largest single stored volume within the bund. A risk management strategy would be developed to manage the potential for risks in situations where the minimum distance from sensitive receivers cannot be achieved, or the quantity of hazardous materials exceed SEPP 33 threshold levels.	This plan Section 7.1.2 Table 7-2 CL18

Table 0-3: Environmental Performance Outcomes

REQUIREMENT REFERENCE	DETAILS	WHERE ADDRESSED

5 Air Quality	The project is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent practicable. • The proposal is designed to minimise the potential for vegetation clearance and associated dust impacts. • The proposal is constructed and operated in accordance with the requirements of the POEO Act and relevant environmental protection licences. • Dust generated during construction will not exceed the relevant criteria in the National Environment Protection (Ambient Air Quality) Measure and the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Department of Environment and Conservation, 2005).	This plan Section 3.1 Section 7.1.2 Table 7-2 SW10 Section 7.2.2 Appendix D
9 Health and Safety	The project avoids, to the greatest extent possible, risk to public safety. • Construction targets zero safety incidents. • All dangerous goods are stored, handled and transported in accordance with relevant regulatory requirements and Australian Standards.	This Plan Section 7.1.2 Table 7-2 CL16 CL17 CL18 ECM
15 soils	The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination. • Site-specific soil, subsoil and landform characteristics are taken into consideration during detailed design and construction. • Any contamination is managed in accordance with relevant regulatory requirements. • Any soil waste is assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014).	Section 7.1.2 Table 7-2 SW1 – SW30 RR1 – RR11 CL1 – CL18 SP01 - SP05 Appendix B Appendix C Appendix E ECM (CEMP Appendix G)
20 Water hydrology	Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised. The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved). Sustainable use of water resources. • The proposal avoids long-term impacts to surface water. • Opportunities to reuse water resources are considered during the design process. • The use of water during construction is minimised.	This Plan Section 5 Section 7.1.2 Table 7-2 SW1 – SW33 RR1 – RR11 SP01 - SP05 Section 7.2.1 Section 8
21 water quality	The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable). • The proposal is designed and constructed such that changes to water flows in watercourses are minimised. • Water discharged does not exceed the ANZECC 2000 guidelines for protection of aquatic ecosystems or water quality trigger values. • Impacts to water quality during construction and operation are minimised.	This Plan Section 7.1.2 Table 7-2 SW1 – SW33 Section 7.2.3 Appendix B ECM

1 Introduction

1.1 Purpose and Scope

This Construction Soil and Water Management Plan (CSWMP) forms part of the Construction Environmental Management Plan (CEMP) for the Narrabri to North Star (Separable Portion 1) (N2NS) Project and details the key mitigation measures that will be implemented by Trans4m Rail in order to minimise and manage the soil and water impacts associated with construction of the N2NS project. This CSWMP outlines potential soil and water impacts and corresponding mitigation measures likely during the construction phase of the N2NS project which will be undertaken by Trans4m Rail.

This CSWMP addresses the relevant requirements of the Project Approval and all applicable guidelines and standards specific to soil and water management during the Project. It has been developed based on the findings of the Environmental Impact Statement (EIS) and the Submissions Preferred Infrastructure Report (SPIR) and describes how construction impacts on soil and water can be avoided, minimised and managed by addressing, as a minimum, the following as outlined in the EIS and SPIR:

- Erosion and Sediment Control Plans for all stages of construction;
- Considerations of soil erodibility;
- At-source erosion controls;
- Sedimentation basin construction and management;
- Protection of waterways;
- Water quality monitoring;
- Minimise demand for and use of potable water; and
- Detailed consideration of measures to prevent, where possible, or minimise any water quality impacts.

The CSWMP also identifies and proposes management measures to control risks associated with known and unknown contaminated land, asbestos containing materials, acid sulfate soils and salinity.

The CSWMP is consistent with the ARTC Inland Rail Environment and Sustainability Policy, ARTC Environmental Policy and Trans4m Rail's Environment and Heritage Policy (Appendix A of the CEMP).

Construction will not commence until the CEMP and sub-plans and the Construction Monitoring Programs are endorsed by the Environmental Representative (ER) and approved by the Secretary of the Department of Planning, Industry and Environment (DPIE) as required by CoA C13. The CEMP and Construction Monitoring Programs will be submitted to the Secretary for approval no later than one month prior to the commencement of construction as required by Conditions of Approval (CoAs) C7 and C17.

The key objective of this CSWMP is to ensure that all CoAs, Revised Environmental Management Mitigation Measures (RMMs) and licence/permit requirements relevant to soil and water are adhered to, thus protecting environmental values. Supporting objectives and targets to achieve this are outlined below.

1.2 Objectives and Targets

The following soil and water management objectives will apply to all construction activities:

- Prevent and minimise pollution of surface and ground waters through appropriate erosion and sediment control measures;
- Ensure the appropriate management of soil resources for reuse during reinstatement and rehabilitation;
- Maintain existing water quality of surrounding surface and ground waters;
- Minimise demand for and use of potable water;

- Undertake early and progressive rehabilitation of disturbed surfaces in accordance with landholders requirements and best practice rehabilitation measures;
- Appropriate management of any known and unknown contaminated soils and acid sulfate soils and saline soils; and
- Comply with the NSW Water Quality Objectives.

The following soil and water management targets will apply to construction:

- Site-specific soil, subsoil and landform characteristics will be taken into consideration during construction;
- Soil and water management training is included in induction material and provided to all Trans4m Rail team, including sub-contractors;
- Site specific soil and water toolbox talks provided prior to works commencing in high risk areas (e.g. within or adjacent to waterways);
- No controlled release of retained site water will occur until compliance with water quality values is verified through use of Dewatering Permit;
- Minimise use of water for construction and ancillary facilities;
- Conformance with provisions of all regulatory and other requirements to be achieved throughout construction phase; and
- Avoid long term impacts to surface water.

The implementation of the mitigation measures will ensure the performance targets are achieved. This will be managed through project inductions, specialised training, toolbox talks, inspections, and environmental monitoring and auditing. Project inductions will inform Trans4m Rail personnel (including subcontractors) of the management measures, while toolbox talks and specialised training will ensure they are reinforced throughout the construction program.

1.3 Environment and Heritage Policy

Trans4m Rail believes that respect for the Project location, its surroundings and the communities in which it operates is essential for project success, as well as compliance with all environmental, sustainability and community requirements. This commitment is described in Trans4m Rail's Environment and Heritage Policy which can be found in Appendix A of the CEMP.

1.4 Project Description

The N2NS Project is one of 13 projects that make up the Inland Rail Project. The route is within the Narrabri, Moree Plains and Gwydir Local Government Areas (LGAs) in north west NSW. N2NS extends approximately 171km from north of Narrabri Junction, terminating at North Star and the project is generally within the existing rail corridor. Works over the Gwydir Floodplain are excluded from the N2NS Project. This construct only contract will be delivered by Trans4m Rail (an unincorporated Joint Venture between SEE Civil Pty Ltd and John Holland Pty Ltd). Further detail on the project, including construction scope of works and construction schedule can be found in Section 4 of the CEMP.

2 Community and Stakeholder Engagement

Trans4m Rail's Community and Stakeholder Engagement Management Plan (CSEMP) provides a clear framework for active communication and stakeholder engagement management. The CSEMP outlines how Trans4m Rail will meet best practice community and project outcomes by keeping the community and other stakeholders informed, minimising potential impacts and responding to the needs and requirements of stakeholders. The CSEMP contains procedures and strategies to manage community and stakeholder engagement activities as they align to the Project delivery program. To the extent practicable, Trans4m Rail will provide stakeholders with open and transparent consultation.

CoA A5 and C4 require that the CSWMP be prepared in consultation with:

- The Department of Planning, Infrastructure and Environment's (DPIE) Environment, Energy and Science (EES) group;
- DPIE's Water Group and the Natural Resources Access Regulator (NRAR);
- Narrabri Shire Council;
- Moree Plans Shire Council; and
- Gwydir Shire Council.

As required by CoA C6, details of all information requested by an agency is to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies can be found in Appendix A. Appendix A also provides an assessment of where these comments have been addressed in the CSWMP.

2.1 Consultation Summary

Introductory video conference meetings were held with the three Local Governments on 8th September 2020 and DPIE Environment, Energy and Science on 1st September 2020. The purpose of these meetings was to:

- Introduce Trans4m Rail and provide an overview of the N2NS project;
- Provide an overview of the CoA requirements for the CSWMP, Construction Environmental Management Plan and associated sub-plans for N2NS;
- Provide an overview of the CoA conditions regarding consultation for the above plans; and
- Provide an indicative schedule as to when the plans would be sent to the respective Local Governments.

Follow up meetings were held with Narrabri (9th October 2020) and Gwydir (23rd October 2020) Councils to provide Council Officers with an updated indicative schedule. Trans4m Rail personnel also met with Moree Plains Shire Council on a weekly basis throughout October and November 2020 on a range of planning and approvals topics including the SEMP, Construction Environmental Management Plan and associated sub-plans.

NRAR were also contacted and offered the opportunity to meet prior to being sent the draft CSWMP however they declined the opportunity and advised they would provide comment once the Sub-Plan was issued for review.

A copy of the draft CSWMP was sent electronically to all stakeholders listed above on 18th November 2020. Table 4 summarises stakeholder feedback on the CSWMP.

Table 2-1: Stakeholder Consultation

STAKEHOLDER	REQUIREMENT	STATUS	RESPONSE	DATE
DPIE - Environment, Energy and Science (EES)	Consultation	Completed	Email / Letter with comments received from BCS Directorate.	18th November 2020 02nd December 2020

STAKEHOLDER	REQUIREMENT	STATUS	RESPONSE	DATE
DPIE NRAR	Consultation	Completed	Email / Letter with comments received	18th November 2020 09th December 2020
DPIE Water Group	Consultation	Completed	Contact could not be made, no comments received*	Refer below
Narrabri Shire Council	Consultation	Completed	Narrabri Shire Council provided response on the 05/02/2021.	18th November 2020 05th February 2021
Moree Plains Shire Council	Consultation	Completed	Email with comments received.	18th November 2020 03rd December 2020
Gwydir Shire Council*	Consultation	Completed	Comments provided on the 09th Feb 2021	23rd October 2020 18th November 2020 05th February 2021 09th February 2021

*Should comments be received from the DPIE - Water Group these will be considered, and updates made in future revisions of the Sub-Plan.

The below summarises the efforts made to consult with DPIE's Water Group.

- 02/09/20 – ARTC Representative emailed the following; *landuse.enquiries@dpi.nsw.gov.au*; *water.enquiries@dpie.nsw.gov.au* and *nrar.enquiries@nrar.nsw.gov.au* seeking a contact for the Water Group. Automatic response received.
- 07/09/20 - Response to above email from DPI Landuse Enquiries, with instruction to redirect query.
- 09/09/20 – ARTC Representative contact NRAR based on the above advice.
- 17/09/20 - Response from NRAR with instruction to redirect query.
- 17/09/20 - Email from ARTC to NRAR outlining attempts to make contact to date (in response to a phone call with NRAR in relation to the matter). Automatic response received.
- 18/09/20 – NRAR responded to the above email.
- 01/10/20 – ARTC Representative emailed NRAR Officer. Out of Office received.
- 02/10/20 – NRAR Officer responded to above.
- 02/10/20 – NRAR Officers contact details shared from ARTC to Tran4m Rail.
- 20/11/20 – CSWMP issued to NRAR and email advising the document had been issued via Aconex.
- 28/1/21 – Officer from DPIE (BCD/NRAR) contacted by Project personnel regarding DPIE Water Group contact details. The Officer had no contact details for this department.
- 28/1/21 – Project personnel contacted an Officer from Department of Water NSW. There was no answer and a voicemail left.

- 4/2/21 – The Officer from Department of Water NSW responded to the voice message left by Project personnel. The Officer stated that DoW in NSW was purely water approvals and licencing and they are not the “Water Group”. The Officer also mentioned that they also have difficulty in contacting the “Water Group” and they had no contacts. The Officer suggested that Project personnel call DPIE Dubbo.
- 4/2/21 – Project personnel contacted DPIE Dubbo. The Receptionist had no knowledge of the “Water Group”.
- 5/2/21 – Project personnel contacted the DPIE Water Enquiries number (as listed on Water Group page on DPIE website). This was a general DPIE number and the receptionist had no knowledge of the Water Group and couldn’t find any contact details on their phone listing.

On the 13th February 2021, the N2NS Project’s Environmental Representative (ER) endorsed the CSWMP in accordance with the requirements of Coa C17. Refer to Appendix A for the letter of endorsement.

2.2 Additional Consultation

A number of CoA and RMMs require consultation in relation to specific aspects or construction activities as follows:

CoA E36

The Proponent must consult with TfNSW in relation to stormwater and drainage management to coordinate drainage infrastructure with the Newell Highway Upgrade.

ARTC have confirmed TfNSW have been consulted through the development of stormwater and drainage design process including the design outcomes detailed in Appendix E of the SPIR (Flood Study Report). ARTC have confirmed the final consultation outcomes will be documented in the Flood Design Verification Report required by CoA E28

Trans4m Rail will continue consultation with TfNSW as required throughout the construction phase.

CoA E37

Prior to the installation of a new culvert, the Proponent must consult with the landowner that is located immediately downstream of the new culvert to determine the potential for impacts on agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, the Proponent must consult with the affected landowner on the management measures that will be implemented to mitigate the impacts.

The primary responsibility for this consultation is with ARTC, Trans4m Rail will request written confirmation from ARTC that this condition has been be met prior to undertaking culvert works.

RMM C7.2 Water usage (private bores and surface water)

Consultation would be undertaken with relevant stakeholders (including landowners/occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water.

At the pre-construction phase, Trans4m Rail have undertaken consultation and secured agreements with the initial water sources outlined below. This process of consultation and seeking approvals and agreement would continue through the construction phase as water sources are required.

Moree Council – Public Water Point

Julian Smith Transport – WAL11543

Australian Food and Fibre - WAL11567

3 Legal and Compliance Requirements

This section details the relevant legal and compliance requirements for the N2NS project including the Minister's CoAs, RMMs and the Secretary's Environmental Assessment Requirements (SEARs) environmental performance outcomes (EPOs) and where they are addressed within this Plan.

3.1 Legislation

Legislation relevant to soil and water management associated with construction of the project include the:

- *Environment Protection and Biodiversity Conservation Act (1999) (C'wth);*
- *Environmental Planning and Assessment Act (1979);*
- *Protection of the Environment Operations Act (1997);*
- *Biodiversity Conservation Act (2016);*
- *Fisheries Management Act (1994);*
- *Water Management Act (2000);*
- *Water Act (1912);*
- *Contaminated Land Management Act (1997); and*
- *Biosecurity Act (2015).*

3.2 Guidelines

Guidelines and standards relating to soil and water management associated with construction of the project include:

- Managing Urban Stormwater: Soils and Construction 4th Edition (the "Blue Book") (Landcom, 2004)
- Best Practice Erosion and Sediment Control (IECA, 2008)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Approved Methods for Sampling and Analysis of Water Pollutants in NSW (EPA, 2004)
- Handbook for Sediment Quality Assessment (CSIRO, 2005)
- Department of Environment and Conservation (DEC): Bunding & Spill Management.
- Guidelines for vegetation management plans on waterfront land (NSW Office of Water, 2012)
- Guidelines for controlled activities on waterfront land – riparian corridors (Department of Primary Industries, 2018)
- RMS Technical Guideline (11-068) – Temporary stormwater drainage for road construction (2011)
- RMS Code of Practice for Water Management, the RMS Erosion and Sedimentation Procedure (1999)
- Water Discharge and Re-use Guideline (TfNSW, 2016)
- Why do Fish Need to Cross The Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003)
- Landscape and Rehabilitation Framework (0-0000-900-ELE-00-GU-0001) (Inland Rail, 2018).

3.3 Conditions of Approval, Mitigation Measures and Performance Outcomes

As discussed in Section 4 of the CEMP, the N2NS Project is a Controlled Action under the EPBC Act (1999) and a CSSI under the EP&A Act (1979). Under Section 45 of the EPBC Act (i.e. the bilateral agreement between the NSW and Federal Governments), the Project has been assessed by DPIE for both State and Federal approvals. The Project has been approved with conditions by both the NSW Minister for Planning and Public Spaces and the Federal Minster for Agriculture, Water and Environment. These conditions of approval relevant to the construction phase and where they have been addressed in this CSWMP can be found in the Compliance Matrix at the beginning of this document.

Soil and water management and mitigation measures were identified in the Project EIS. Following consideration of the issues raised in the stakeholder and community submissions on the EIS and additional assessments undertaken, mitigation measures were updated and included in the SPIR. RMMs relevant to soil and water and where they have been addressed in this CSWMP can also be found in the Compliance Matrix at the beginning of this document.

The SEARs identified a number of desired performance outcomes (EPOs) for the N2NS project. Based on the outcomes of the EIS and the implementation of the RMMs, EPOs have been established for the proposal. EPOs relevant to soil and water and where they have been addressed in this CSWMP can also be found in the Compliance Matrix at the beginning of this document.

4 Environmental Risk Assessment

A summary of the key findings from the EIS and SPIR are outlined below. Further detail can be found in the N2NS EIS and associated Technical Report 6 (Hydrology and Flooding) and Technical Report 7 (Water Quality Assessment).

4.1 Soils and Contamination

- Published soil units for the project site include deep reactive clays, including black earths, occurring on flat alluvial and undulating plains west of the Goondiwindi Fault. East of the fault are variable soil conditions including deep reactive clays, basaltic soils, red and brown sandy and silty clay soils. Of the soils present in the project site, the main potential issue relates to dispersive alluvial and residual soils, which were found in a significant proportion of the tested soils.
- The erosion potential of the alluvial and residual soils was assessed to be moderate to high. Construction of the project has the potential to result in erosion and sedimentation and contamination of soils and surface waters.
- Contamination assessment was undertaken at 111 test pits along the N2NS alignment for contamination assessment. All samples, except one, had laboratory results either below the limit of reliability or below the relevant human health-based screening criteria.
- One site recorded the presence of chrysotile asbestos in gravel fill material consisting of ash and slag (site TP305 – located on the rail corridor directly south of the crossing with Gurley Creek). This ash fill layer was found beneath the ballast at the majority of locations, at depths between 0.4 and 1.6 metres below top of rail.
- Soils in the vicinity of location TP305 would be classified as Special Waste (Asbestos). Soils sampled at other test pit locations along the rail corridor are consistent with a General Solid Waste classification.
- The contamination assessments confirmed that the soils are considered suitable to remain within the proposal site for the use proposed (that is, for railway purposes).
- Based on the findings of the contamination assessment, the proposal site does not contain gross contamination and does not meet the criteria requiring it to be notified to the EPA under section 60 of the CLM Act.
- There are six sites listed on the EPA's Contaminated Sites Register and 11 sites on the list of contaminated sites. The majority of these properties are service station sites located in Moree. Eleven sites located in the townships of Narrabri, Bellata, North Star and Moree have been listed on ARTC's contaminated sites register. The majority of these sites have been leased from ARTC for use as either service stations, grain storage or fuel storage.
- Generally no saline soils were evident at sample locations in the vicinity of the project site (within 1 kilometre).

4.2 Water Quality

- There is no existing water quality data for the watercourses crossing the project site.
- The National Water Quality Assessment (SKM, 2011) classified the water quality in the Gwydir River and Namoi River catchments as being relatively poor, exceeding the ANZECC 2000 guidelines for a number of criteria. Refer to Table 5 below.
- The potential impacts of construction relate mainly to erosion and sedimentation, and release of entrained contaminants (particularly during watercourse crossings, construction of new culverts/underbridges and construction of the proposed new rail bridge over Croppa Creek) and pollution associated with any spills or leaks.
- Construction is not anticipated to impact on groundwater resources. Excavation would be relatively shallow compared to the likely depth of the water table and is not likely to intercept groundwater aquifers or their flow systems. In locations where piling is required (such as for

bridge piers), the detailed design would consider methods to minimise or avoid the potential requirement for dewatering where perched groundwater is encountered.

- Water quality guidelines are contained in Technical Report 7 (Water quality assessment).
- Standard erosion and sediment control measures are recommended.

Table 4-1: Assessed Water Quality (Source: Table 4.4 Project EIS (SKM, 2011))

Parameter	Namoi River catchment	Gwydir River lower catchment	Trigger value (refer to Table 3.1)
Turbidity	Fair 31% of samples exceeded guideline values	Fair Median values ranged from 4 to 190 NTU 52% of samples complied with ANZECC/ARMCANZ guideline value of 50 NTUs	6 - 50 NTU
Salinity	Fair 50% of samples exceeded guideline values	Poor 53% of samples exceeded the ANZECC/ARMCANZ guideline value Median values were generally higher in the tributaries and several were close to, or exceeded 1,000 µS/cm	125 - 2200 µS/cm
pH	Poor	Poor	6.5 – 8.5
Total Nitrogen	Very poor 91% of samples did not meet guideline values	Very poor 90% of samples exceeded guideline values	500 µg/L
Total Phosphorus	Poor 95% of samples did not meet guideline values	Very poor 95% of samples exceeded guideline values	50 µg/L

4.3 Risk Assessment and Management

Section 6 of Trans4m Rail's CEMP contains a project risk assessment including an assessment of risk from construction activities to soil and water. Soil and water risk is summarised in Table 6.

Table 4-2: Soil and Water Risk Assessment

CONSTRUCTION ACTIVITY/ ASPECT	POTENTIAL IMPACT	RISK LEVEL PRIOR TO MITIGATION	INDICATIVE MITIGATION MEASURES	RISK LEVEL FOLLOWING MITIGATION	DOCUMENTS / PROCEDURES / TRAINING REQUIRED
▸ Clearing and grubbing ▸ Earthworks ▸ Storage of fuels, chemicals and other dangerous goods ▸ Stockpile Management ▸ Maintenance of plant and equipment, including servicing and refuelling ▸ Sediment basin management ▸ Drainage works ▸ Water use/extraction ▸ Concrete works ▸ Temporary access road construction/ removal from waterway areas.	Impacts associated with the disturbance of contaminated soil or soil salinity/saline soils during construction	Medium	▸ Sediment and erosion control devices would be installed to minimise mobilisation and transport of sediment in accordance with Managing Urban Stormwater, Soils and Construction (Landcom, 2004). ▸ Maintenance and checking of the erosion and sedimentation controls would be undertaken on a regular basis and any subsequent records retained. Sediment would be cleared from behind barriers/sand bags on a regular basis as required and all controls would be managed to ensure they work effectively at all times. ▸ The area of exposed surfaces would be minimised. Disturbed areas would be stabilised progressively to ensure that no areas remain unstable for any extended length of time. ▸ Soil and sediment that accumulates in erosion and sediment control structures would be reused where practicable during site reinstatement, unless it is contaminated or otherwise inappropriate for reuse. ▸ Work would cease where practicable during heavy rainfall events when there is a risk of sediment loss off site or ground disturbance due to waterlogged conditions. ▸ Equipment, plant and materials would be placed in designated lay-down areas where they are least likely to cause erosion. ▸ Erosion control devices would be removed as part of the final site clean-up. This would include removing any sediment in drainage lines that has been trapped	Low	▸ Construction Soil and Water Management Plan ▸ Environmental Control Maps ▸ ESCP ▸ Environmental Sensitive Area Plans ▸ Basin management procedure ▸ Bluebook Vol 2D training ▸ Practical ESC training ▸ RMS mulch and tannin protocol ▸ RMS Stockpile Management Protocol and Stockpile Site Management Guideline ▸ Unexpected discovery of contamination land procedure ▸ Induction ▸ Toolbox Talk – ESC ▸ Waste Management Procedure (T4MR-MPR-ENV-007) and
	Disturbance of soils and subsequent loss or degradation of soil quality during earth works at construction compound sites	Low		Low	
	Disturbance of landforms during earthworks reducing the stability of landforms	Low		Low	
	Increased erosion and sedimentation due to excavation activities and vehicle movement	High		Medium	
	Contamination of soils/groundwater due to spills and leaks during construction	Medium		Low	
	Reduced water quality (increased suspended solids and turbidity) due to earthworks and	Medium		Low	

▸ Waterway crossings ▸ Spill Management ▸ Landscaping ▸ Contamination and hazardous materials	erosion and sedimentation near watercourses.		by erosion control devices and restoring disturbed areas. ▸ Exposed surfaces would be stabilised, and final landscaping implemented, as soon as practicable. ▸ Stockpiles would be managed by implementing sediment and erosion control devices in accordance with Managing Urban Stormwater, Soils and Construction.		▸ Waste and Resource ECM(T4MR-FRM-ENV-001-10) ▸ Water quality, Erosion and Sediment ECM (T4MR-FRM-ENV-001-11) ▸ Hazardous Chemical ECM (T4MR-FRM-ENV-001-07) ▸ Water Discharge Permit (T4MR-FRM-ENV-001-01)
	Impacts on water quality from contamination from spills and leaks during construction	Medium		Low	
	Impacts on groundwater quality and quantity during drawdown/extraction	Medium	▸ No stockpiles of materials or storage of fuels or chemicals would be located within high/ medium flood risk areas or flow paths. ▸ Spill kits would be maintained on-site at all times. ▸ Machinery would be checked daily to ensure that no oil, fuel or other liquids are leaking. ▸ Refuelling of plant and equipment would be undertaken within designated areas with appropriate controls. ▸ Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) would be undertaken on a regular basis to identify any potential spills. ▸ Vehicle wash down and/or cement truck washout would occur in a designated bunded area or off-site ▸ Any groundwater encountered during construction would be managed and disposed of in accordance with the Waste Classification Guidelines. Groundwater would be managed to ensure it does not cause pollution of waters in accordance with Section 120 of the POEO Act. ▸ If dewatering is required during construction: ✓ Ground/stormwater would be pumped into a holding tank or water truck. Pump out events would be supervised at all times, and the pump would be positioned to prevent the discharge of sediment-laden water settled at the bottom of the trench. ✓ Groundwater for discharge to surface water would be tested prior to discharge. ✓ Conditions of discharge are likely to include:	Low	

			▪ No visible sheen or odour is noted. ▪ Water pH is between 6.5 and 8.5. ▪ Total suspended solids are less than 60 mg/L (approximately equivalent to a turbidity level of 50 NTU). Water may be dosed with gypsum, alum or a similar product to reduce sediment levels if required. ✓ All litter and debris must be filtered out and removed prior to discharge. ✓ Water quality would be checked regularly during discharge events to ensure the pH and suspended solids remain within the allowable levels. ✓ Consideration would be given to the hydrological attributes of the receiving water body prior to discharge (i.e. is sufficient water present to allow dilution etc.). ✓ Wastewater that does not meet the criteria in the EPL would be disposed of off-site by a licensed liquid waste contractor in accordance with the Waste Classification Guidelines. ▸ Discharge to surface water would be undertaken in accordance with the EPL for Inland Rail and would consider the hydrological attributes of the receiving waterbody. ▸ Water quality would be monitored during construction in accordance with the surface water monitoring framework. ▸ Works within or near watercourses would be undertaken with consideration given to the Guidelines for Controlled Activities on Waterfront Land (Office of Water, 2012).		

Section 26.3 of the N2NS EIS provides a summary of the potential residual impacts for the project with a description of how these potential residual impacts would be managed. No residual soil or water management impacts have been identified.

Recommended mitigation measures identified in Table 6 are incorporated in Trans4m Rail's management and mitigation measures detailed in Section 7. In addition, a Primary Erosion and Sediment Control Plan (ESCP) for N2NS has been developed by the NSW Soil Conservation Services (Trans4m Rail's Erosion and Sediment Control Specialists) and can be found in Appendix B.

Trans4m Rail will maintain an environmental risk register to address risks specific to soil and water. Risks will be required to be reviewed at least 6 monthly and will also be reviewed in response to incidents, changes in legal requirements, change in Project scope, findings of inspections and audits, and management reviews.

The process for ongoing management of environmental risk is explained in detail in Section 7.2 of the CEMP. In summary, it includes the preparation of a series of documents (i.e. Workplace Risk Assessments, Activity Method Statements and Environmental Control Maps) prior to works commencing on-site. These documents are pivotal to the identification and ongoing management of all activities and associated risks throughout delivery of the Project. These documents are reviewed on a regular basis (as frequently as daily) to ensure all new risks are identified and suitably managed.

5 Construction Water

Trans4m Rail have undertaken a detailed assessment of the estimated construction water requirements for the N2NS project based on:

- Construction methodology and phasing proposed.
- Anticipated climatic conditions (i.e. temperature, wind and corresponding evaporation rates), including seasonal variation.
- Geotechnical data (specifically moisture content) of in situ formation material and quarry sourced materials.
- Similar projects (Inland Rail - Parkes to Narromine).
- Previous experience.

In accordance with CoA C10, the following section provides:

- A draft water balance for the project;
- Demonstration that the required construction water resources are legally and physically available; and
- Mitigation measures to address construction water resource shortages that could arise.

It should be noted that at the time of writing, contractual arrangements for the procurement of construction water were in progress and not finalised for all sources.

A construction water usage monitoring program can be found in Section 7.2.

5.1 Draft Water Balance

As discussed in Section 4.2 of the CEMP, construction will occur in three phases as follows:

- Penney's Road to Moree – Substantial construction scheduled to commence in March 2021 and be completed by the end of October 2021;
- Narrabri to Penney's Road – Substantial construction scheduled to commence in March 2022 and be completed by the end of October 2022; and
- Camurra to North Star – Substantial construction scheduled to commence in June 2021 and be completed by March 2023.

Trans4m Rail estimate that the following volumes construction water will be required for the project:

- Construction water = 477 ML
- Water for dust suppression = 171 ML
- TOTAL = 648 ML

This estimated total water volume is spread across the three phases (for both construction water and dust suppression) is as follows:

- Penney's Road to Moree – 196 ML;
- Narrabri to Penney's Road – 183 ML; and
- Camurra to North Star – 269 ML.

While the above water usage figures differ from those estimated in the Project EIS, noting Section 3.4 of the Project EIS estimates the water demand to be in the order of 150ML for the construction phase of the Project. It must be acknowledged that this is an estimate only and the actual water sources and demand were to be confirmed at the time of construction and will be highly dependent upon matters including the final design, moisture content of material, weather and the adopted construction methodology. Much of this information was not known at the time the EIS was prepared.

In order to address discrepancies, ARTC is currently developing a consistent approach to construction water estimating for the Inland Rail Program to be applied during the design phase. In

general terms, the use of between 648ML and 1215ML of water to construct the CSSI is not considered a significant volume when compared to the regional irrigation industry, stock water use and other industrial uses of water. However, monitoring will provide data on actual water use and will allow informed management decisions to be made.

Section 7.2.1 and Section 5.2.4 of the CSWMP also notes that water saving measures will be identified as part of Trans4m Rail's Continuous Improvement Process and implemented to reduce the Project's water usage requirements identified above.

5.2 Potential Water Sources

At the time of writing, the construction of the N2NS project is in the pre-construction phase and therefore all water supplies have not been formalised. Consultation to date to date with local Councils and prospective landowners with WALs indicates that reliable water supply is available to meet project demands.

In accordance with CoA C10 (b), Trans4m Rail have confirmed that initial construction water resources are legally and physically available:

- Email correspondence between Trans4m and Moree Plains Shire Council on 19 February 2021 confirms water availability through overhead filler to service the first stage of the project from Penny's Road to Moree.
- Email correspondence between Trans4m Rail and a local landowner dated 27 November 2020 confirms water is legally and physically available from Bore GW029428 / WAL11543 through water licence 90AL805162
- Water Agreement for WAL 11567 with Australian Food and Fibre
- Water Agreement for WAL15914 with Spring Creek Santa Gertrudis

The following section provides indicative construction water sources that Trans4m Rail have investigated. All construction water sources will be confirmed to comply with CoA C10(b) prior to extraction. New water extraction points are not proposed.

5.2.1 Penney's Road to Moree

Table 7 outlines the water strategy for Penney's Road to Moree.

Table 5-1: Penney's Road to Moree Water Strategy

ITEM	COMMENT
Water source	• Non-potable/raw groundwater from Moree Plains Shire Council. • Water shortages/alternate supply will be groundwater from local landholder/s.
Licence requirements	• Subject to the development of a water management plan with Council. • Alternate supply holder has an existing Water Allocation Licence (WAL) (annual allocation unknown at this stage). A WAL holder may transfer their WAL to another body for a set period of time (not less than six months).
Available water/day	~0.5 ML
Supply rate	~15l/s

5.2.2 Narrabri to Penney's Road

Table 8 outlines the water strategy for Narrabri to Penney's Road.

Table 5-2: Narrabri to Penney's Road Water Strategy

ITEM	COMMENT
Water source	• Non-potable/raw groundwater from Narrabri Shire Council. • Water shortages/alternate supply will be groundwater from local landholder/s.
Licence requirements	• Subject to the development of a water management plan with Council. • Alternate supply holder has an existing WAL with an annual allocation of 480ML. A WAL holder may transfer their WAL to another body for a set period of time (not less than six months).
Available water/day	~0.5 ML
Supply rate	~13l/s

5.2.3 Camurra to North Star

Table 9 outlines the water strategy for Narrabri to Penney's Road.

Table 5-3: Camurra to North Star Water Strategy

ITEM	COMMENT
Water source	• Non-potable/raw groundwater from a private landholder. • Water shortages/alternate supply will be groundwater from an alternate local landholder.
Licence requirements	• Both the preferred and alternate supply holders have existing WALs with annual allocations of 1,000ML. A WAL holder may transfer their WAL to another body for a set period of time (not less than six months).
Available water/day	~0.5 ML
Supply rate	~13l/s

5.2.4 Supplementary Water Sources and Savings

During times of drought and to reduce the N2NS Project's overall reliance on Council's potable water sources, the following alternative water sources and savings will be investigated and implemented where suitable:

- Harvesting rainwater captured on site from within excavations, sediment basins and other areas.
- Opportunistically sourcing water from within roadside drains, borrow pits and other excavations with the necessary approval of TfNSW.
- Reuse of treated, municipal wastewater with the correct health and environmental measures in place, with the necessary approval of Council/s.
- Use of environmentally friendly dust suppressants / polymers that do not require continual watering for dust control. Ground disturbance, dust control, erosion control and rehabilitation will be managed in a progressive and integrated manner.
- When water must be used for dust suppression and/or conditioning of material, the methodology will be adjusted to ensure a sustainable use of water. This may include applying water in the early morning (with the correct out of hours approval) when water will infiltrate

into the surface applied, rather than apply in the middle of the day when water is largely lost to evaporation.

- As part of sustainable site facilities initiatives, implementation of low water use appliances (e.g. toilet cisterns, washing devices) and auto-shut off taps.
- Temporary stabilisation of areas with no scheduled work for >20 days - Stabilisation of non-active construction areas with a higher quality polymer. The rate of application would be adjusted depending on the timeframe and risk profile. This temporary stabilisation and permanent revegetation will be managed in an integrated manner to ensure resource efficiency and cost-effectiveness.
- Smart water meters could be used to remotely track water consumption trends and high use activities in terms of estimated construction water volumes to ensure water is being used effectively and efficiently. Sub-metering of critical water infrastructure (e.g. stand-pipes at water filling stations, water level sensors on construction water storage tanks, water input to concrete batching plants, etc.) will provide insights into events such as increased consumption trends, water leaks, inefficiencies, etc. Smart water metering and monitoring will ensure Trans4m Rail have a wholistic appreciation of water across the project.
- Reducing water demand during the rehabilitation and revegetation phase of the project by:
  - ✓ Selecting a product that (a) provides immediate and short-term stabilisation of a surface, (b) requires less water to apply, and (c) selecting drought tolerant species; and
  - ✓ During times of drought where water resources are scarce, undertake watering of rehabilitated areas on a risk-based approach, focusing on areas of high risk (i.e. areas of channelised flow, steep batters, etc).
- Education of all project personnel on sustainable water supply and use.

6 Environmental Management Framework

6.1 Trans4m Rail Environmental Management System

Trans4m Rail will be utilising an Environmental Management System (EMS) (which is certified to ISO AS/NZS14001) to ensure compliance and enhance its' environmental performance. This is discussed in detail in Section 6.1 of the CEMP.

6.2 Roles and Responsibilities

Section 8.4 of Trans4M Rail's CEMP details roles and responsibilities for environmental management (including soil and water management). Trans4m Rail's Environment Manager has overall responsibility for the implementation of environmental matters on the Project and the Site Supervisor is responsible for field implementation of environmental requirements and control measures (including soil and water requirements and control measures). It is important to note that all personnel are responsible for ensuring environmental values are protected through appropriate soil and water management.

In addition, Trans4m Rail have engaged the NSW Soil Conservation Service to:

- Review and comment on draft erosion and sediment control plans prepared by Trans4m Rail Environmental personnel;
- Provide advice and guidance to manage and minimise potential impacts to any soil and water values; and
- Undertake erosion and sediment control inspections.

In the event that soils suspected to be contaminated are unexpectedly found, Trans4m Rail will engage a suitably experienced and qualified contaminated land consultant to undertake further investigations to determine the type and extent of any contamination. This consultant will also develop and oversee implementation of any necessary remediation measures. If remediation is required Trans4m Rail will also engage a NSW EPA Accredited Site Auditor to prepare a Site Audit Statement and Site Audit Report.

6.3 Competence, Training and Awareness

All personnel performing environmental management activities for and on behalf of Trans4m Rail will be trained, qualified and competent. Personnel performing specified assigned tasks shall be qualified on the basis of appropriate education, training, skills and/or experience, as appropriate. Section 8 of the CEMP details competence, training and awareness and includes:

- Inductions;
- Tool box talks;
- Daily pre-start meetings;
- Resource planning; and
- Trans4m Rail's Environment Training Program.

6.4 Hold Points

Hold Points will be implemented on this Project for the purpose of minimising the likelihood of an incident when undertaking specific construction activities that have a greater environmental risk. Section 8 of the CEMP discusses Hold Points. Hold Points specific to soil and water management include:

ACTIVITY	RELEASING AUTHORITY
Ground disturbing activities cannot commence/ recommence until an Erosion and Sediment Control Plan (ESCP) is developed/ reviewed and implemented.	Trans4m Rail Environment Manager
Permit to Discharge is required prior to any active water discharge from the site, to confirm water is suitable for discharge.	Trans4m Rail Environment Manager
Prior to water reuse on the site, contact the Environment Manager to confirm water quality criteria has been met.	Trans4m Rail Environment Manager

Trans4m Rail will meet the requirements of relevant Hold Points and submit this prior to works commencing. The works will not commence until the Hold Point has been approved or released.

6.5 Environmental and Sustainability Inspections

Section 8 of Trans4m Rail's CEMP details environmental and sustainability inspections, including inspections related to the CSWMP. Table 6-1: Inspection Schedule lists the details of each type of environmental and sustainability inspection to be undertaken on the Project.

Table 6-1: Inspection Schedule

ACTIVITY	FREQUENCY	RESPONSIBILITY	RECORD
Site inspection	Daily	Supervisor/s	Site Diary
Environmental and Sustainability	Weekly	Environment Coordinator/s	Environmental and Sustainability checklist
Post-rainfall inspections	During/post rainfall causing runoff at the site as required by the project EPL	Environment Coordinator/s	Erosion and Sediment Control Checklist
High Risk Activity Inspections	As required	Construction Manager	High Risk activity inspection checklist
Subcontractor HSEQ Deliverables	Pre-mob and monthly thereafter	Commercial Representative	Subcontract Management Pack

6.6 Compliance Monitoring and Reporting

The Trans4m Rail Environment Team will undertake environmental inspections, audits and reporting to develop and evaluate the effectiveness of environmental controls. This will include:

- General observations for the daily management of erosion and sediment controls shall be documented in site dairies by the Site Supervisor;
- Regular inspection of erosion and sediment controls shall be undertaken by the Environmental Coordinator and Site Supervisor using the Weekly Environmental Management Inspection Checklist and uploaded to Project Pack Web;
- Effectiveness of erosion and sediment controls shall be regularly reviewed by the Environmental Coordinator for adequacy having regard for changing circumstances;
- Prior to any off-site discharge, water to be tested using a calibrated WQ meter by the Environmental Coordinator and adjusted as appropriate to meet WQO limits. Records to be maintained in Project Pack Web;
- Water quality monitoring results to be maintained by the Environmental Coordinator in Project Pack Web, and made available to relevant parties upon request;
- Monthly reporting to Inland Rail on soil and water management will be recorded through Project Monthly Reports;
- Six monthly independent audits by a suitably qualified professional;
- ER regular monitoring of the implementation of the documents listed in the CoA;
- The broader EMP auditing process is discussed further in Section 6.10 of Trans4m Rail's CEMP.

6.7 Reporting and Communication

Reporting will include monthly internal project reports and six-monthly compliance reports as required by the conditions of approval. The six-monthly reports will track compliance against the conditions and the revised environmental management measures and will be reported in accordance with, the relevant Compliance Reporting requirements (DPE 2018) as per, Schedule 4, Conditions 7 and 8.

Reporting requirements and responsibilities are summarised below:

- Monthly environmental reporting as part of the Construction Monthly Environmental Report to ARTC; and
- Six monthly compliance tracking reports to DPIE, submitted 1 month prior to ARTC.

Compliance monitoring and reporting are discussed in further detail in Section 8 of Trans4m Rail's CEMP.

6.8 Environmental Control Maps

Trans4m Rail will use Environmental Control Maps (ECMs) to aid in the identification and protection of significant environmental features associated with the project. The ECMs will include:

- Specific measures included in the relevant work method statements to prevent adverse environmental impacts; and
- Relevant drawings showing:
  - ✓ Location and scope of works to be managed,
  - ✓ Environmental constraints and 'no go' zones,
  - ✓ Location and nature of environmental controls,
  - ✓ Nature and frequency of monitoring for identified potential adverse impacts, and
  - ✓ Procedures for notification of incidents or hazards.

ECMs are further discussed in Section 8 of the CEMP.

6.9 Environmental Management Procedures, Forms and Other Documents

The Project's EMS procedures, project specific procedures, forms and other documents provide instructions and records related to both environmental and non-environmental activities throughout the Project. These are discussed in detail in Section 8 of the CEMP.

6.10 Communication and Complaints Management

Trans4m Rail's CSEMP and Section 9 of the CEMP details communication and complaints management processes and procedures. The CSEMP identifies key stakeholder groups that will be consulted and engaged with during the Project and outlines the communication tools that will be used to consult and engage with these groups. During construction, any comments, feedback or complaints relating to soil or water management issues will be addressed through the Complaints Management System. The Complaints Management System includes a complaints register within the stakeholder database Consultation Manager. The complaints register will be developed in accordance with AS 4269: Complaints Handling.

6.11 Incidents, Emergencies and Non-Conformity

In the event of an environmental, social performance, sustainability heritage or other incident, an Incident and Emergency Response Plan will be implemented. Environmental incidents will be required to be reported to Inland Rail (Project Manager and Environmental Manager) and managed in accordance with the Inland Rail event management system. Incidents, emergencies, response plans and non-conformities are discussed in detail in Section 10 of the CEMP.

6.12 EMP Review and Revision Process

This CSWMP is a 'live' and 'working' document. As required by Trans4m Rail's EMS requirements, the Environment Manager will conduct regular reviews of the CSWMP at intervals of not less than six months and ensure that the CSWMP is formally reviewed and updated at least annually, or earlier as change requirements dictate. The CEMP and sub-plans review and revision process is discussed in detail in Section 12 of the CEMP.

7 Risk Management

7.1 Risk Management

7.1.1 Primary and Progressive Erosion and Sediment Control Plans

A Primary ESCP has been developed for the N2NS Project (see Appendix B). This Primary Plan describes the erosion and sediment control intentions and principles for the length of the project. Progressive ESCPs will be developed at a more detailed level prior to any construction work commencing and will be modified as required. These will generally be consistent with the Primary Plan. Progressive Plans provide a practical guide to manage soil and water risks and may be produced in conjunction with an Environmental Control Map and/or an Environmental Work Method Statement. Progressive ESCPs will generally be prepared in accordance with the "Blue Book" and contain the locations of any licensed discharge points.

CoA C35(g) requires the proponent to:

ensure all discharges from new or modified surface drainage (including cess drains) adjacent to the new and upgraded track are released at a controlled rate to prevent scour;

To the extent that CoA C35(g) applies to construction, this would be addressed be ensuring ESCPs are prepared and implemented with the "Blue Book".

Preparation, implementation and update of Progressive ESCPs may also be informed by pre-inspections such as pre-clearing surveys of biodiversity values. Erosion and sediment control structures would be suitable designed and implemented to provide suitable mitigation in the instance of high biodiversity in a waterhole beneath or adjoining the rail line.

7.1.2 Soil and Water Mitigation Measures

Table 7-1: Soil and Water Mitigation Measures details soil and water mitigation measures to be implemented for the N2NS Project.

Table 7-1: Soil and Water Mitigation Measures

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
General				
SW1	A CSWMP and surface water quality monitoring program will be prepared and implemented as part of the CEMP in consultation with the relevant government agencies. The CSWMP will include measures to manage, minimise and mitigate potential impacts on soil and water by the Project.	CSWMP Surface Water Monitoring Program	Pre-construction Construction	Environment Manager Construction Manager
SW2	All employees and contractors working on site will be provided with training with regards to soil and water awareness, key mitigation and management	N2NS Project Induction	Pre-construction	Environment Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	requirements and their responsibilities pertaining to the CSWMP prior to commencing works on site. Training will include: ▸ Erosion and sediment control risks, and potential impacts on receiving waters ▸ Requirements of Progressive Erosion and Sediment Control Plans ▸ Erosion and sediment control devices used ▸ Mitigation measures ▸ Strategies and protocols relating to control installation, management of surface water and construction water ▸ Permit requirements (e.g. EPL and Water Discharge Permit).	Toolbox Talks Progressive ESCP	Construction	
SW3	Targeted erosion and sediment control training will be provided to Supervisors, personnel responsible for the installation and maintenance of erosion and sedimentation controls and those involved in water discharge and dewatering activities.	Progressive ESCP ESC Specific Training Toolbox Talks	Pre-construction Construction	Environment Manager Construction Manager
SW4	Site personnel must notify either the Supervisor or a member of the Project's Environmental Team if any erosion and sediment control failures are identified or if maintenance is required. The issues identified will be noted and corrected as per the monitoring and maintenance requirements.	N2NS Project Induction Progressive ESCP Toolbox Talks	Construction	All site personnel
SW5	Notification of soil and water incidents is to be made to ARTC and any relevant statutory authorities such as NSW EPA, DPIE, DPI Fisheries, etc. Any communication required with ARTC and statutory authorities shall be limited to the Environment Manager (or suitable delegate) and/or the Construction Manager.	N2NS Project Induction Progressive ESCP Toolbox Talks	Construction	Environment Manager Construction Manager
SW6	Progressive ESCPs will be developed by Trans4m Rail Environmental Coordinators and reviewed by a CPESC throughout the construction planning and delivery phase.	Progressive ESCP	Pre-Construction Construction	Environmental Coordinator Certified Professional Erosion and Sediment Control (CPESC)
SW7	At a minimum, Progressive ESCPs will be developed in general accordance with the NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008) and address the following key issues: ▸ Identify the designated work area and no-go zone areas on-site. ▸ Specify the size, indicative locations and types of erosion and sediment control and drainage devices on-site.	Trans4m Rail's Global Management Requirement (GMR) 10.2, 10.3 Progressive ESCP Toolbox Talks	Pre-Construction Construction	Environmental Coordinator Certified Professional Erosion and Sediment Control (CPESC) Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	▸ Specify the design criteria for all erosion and sediment control measures (i.e. 80th percentile 5-day rainfall event, as per the manufacturer's specifications, etc). ▸ Ensure upslope "clean" water will be diverted around the construction site using diversion bunds, drains or otherwise. This water will be discharged so as not to impact neighbouring properties or cause erosion. ▸ Establish progressive clearing and rehabilitation requirements, including temporary vegetation measures. ▸ Establish topsoil stripping and stockpile management requirements. ▸ Identify the inspection and maintenance regime associated with erosion and sediment control devices.			
SW8	Stabilised site access will be provided at all access / egress locations in accordance with NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008) to prevent tracking of mud onto public roads. Construction gates will be inspected on a regular basis and where mud tracking is occurring, road sweeping will be undertaken as required.	Trans4m Rail's GMR 9.1 and 9.9 Progressive ESCPs ECMs	Pre-construction Construction	Environment Manager Construction Manager
SW9	Prior to ground disturbance works commencing on-site, all erosion, sediment and drainage control devices will be installed in accordance with the Progressive Erosion and Sediment Control Plan relevant for that stage of works and where relevant the NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008) and / or Best Practice Erosion and Sediment Control (IECA, 2008). All controls must be installed with the intent of minimising sediment generation and migration offsite and pollution of waters.	Progressive ESCPs Trans4m Rail's GMR 10.4 Progressive ESCPs ECMs Toolbox Talks	Pre-Construction Construction	Environment Manager Construction Manager Site Supervisor
SW10	Clearing limits (incl. vegetation to be retained) must be clearly identified and physically demarcated on-site. Ground disturbance activities must not occur outside these areas unless otherwise approved in writing by the Environment Manager, or suitable delegate.	Trans4m Rail's GMR 10.1 Progressive ESCPs ECMs	Construction	Environment Manager Construction Manager
SW11	Construction personnel must obtain a Water Discharge Permit (approval provided by the Environment Manager or suitable delegate) for any activities requiring the discharge of construction water from site. Prior to the Permit being provided, the water must be tested and treated (if required) to ensure it meets the water discharge criteria detailed in the Project's Environment Protection Licence.	Progressive ESCP Water Discharge Permit ECM Toolbox Talk	Construction	All site personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	All discharge events and water quality monitoring must be documented.			
SW12	Throughout the planning and construction phases of the Project, suitable planning and coordination will be undertaken to ensure the following: ▸ Erosion and sediment control requirements are raised in regular planning meetings ▸ Adequate time in the program is allowed for installation and maintenance of controls ▸ Sequence construction works to allow for the progressive installation of erosion and sediment control measures, and limit the amount of exposed, uncovered soil ▸ Adequate resources are allocated for the installation and maintenance of controls.	Progressive ESCP Toolbox Talks Project Planning and Coordination Meetings and Programs	Pre-Construction Construction	Environment Manager Construction Manager Project Engineer Planning Personnel
SW13	Any problematic soils (i.e. dispersive/sodic soils as found along the N2NS alignment) are to be managed via chemical amendment (e.g. gypsum) or via encapsulation under 300mm of stable topsoil. The suitable soil amelioration method is as directed by the Environment Manager.	Progressive ESCP	Construction	Environment Manager Construction Manager
SW14	Permanent or temporary longitudinal and transverse drainage works will be installed and stabilised as early as practical in the construction program to minimise uncontrolled drainage and associated erosion and flooding issues.	Trans4m Rail's GMR 10.1 Progressive ESCPs ECMs IFC Design	Construction	Environment Manager Construction Manager
SW15	Temporary stockpiling of topsoil (and other construction materials) will generally be undertaken in accordance Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and the following: ▸ Stockpiles will be located where they will not be impacted or disturbed by other construction activities. ▸ Stockpiles will be located and utilised as close as possible to where the material was sourced. ▸ Stockpiles will not be located against fence lines, in waterways, drainage lines or other flow paths or within the tree protection zone/s of retained vegetation. ▸ Where possible, long-term stockpiles will be located outside the area impacted by the 1% AEP local and regional flood events.	Landcom, 2004 Trans4m Rail's GMR 10.4 ECM	Construction	All personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	▸ Topsoil stockpiles will have batters not steeper than 3:1 or greater than 2m in height. ▸ Where topsoil (or other construction materials) will be stockpiled for >1month, temporary revegetation will occur in accordance with the Temporary Revegetation & Stabilisation (High Risk Areas) measures detailed below. For short-term (<1 month) stockpiling of topsoil, stabilisation and / or protection will occur in accordance with the site-specific Erosion and Sediment Control Plan. All stockpiles should be located within the approved Construction Impact Zone (CIZ)			
SW16	Temporary Revegetation & Stabilisation (High Risk Areas) Where reasonable and feasible, all high-risk areas (i.e. stockpiles, batters and areas of concentrated flow) that have no scheduled work for more than 1 month will be revegetated and / or stabilised using the following process: ▸ Light scarification or surface roughening across the entire area to be revegetated. ▸ Application (i.e. hand seed, drill seed or hydraulically applied) of the following seed mix: ✓ Japanese Millet 25kg/ha (spring and summer months); or ✓ Rye 15kg/ha (autumn and winter months); and ✓ Creeping Blue / Indian Blue 10kg/ha; and ✓ Seca Stylo Legume 2kg/ha. In lieu of the above revegetation, soil binder (or other suitable stabilisation method) may be used to stabilise areas of high erosion risk.	Progressive ESCP Trans4m Rail's GMR 10.4 ECM	Construction	Environment Manager Construction Manager
SW17	All erosion, sediment and drainage control devices must be inspected in accordance with the Progressive ESCPs and Environment Control Maps (ECM). This will typically include; before, during and after rainfall events causing runoff, during the weekly environmental inspection, prior to any shutdown periods or following an incident. The inspection will assess the implementation, suitability and effectiveness of the erosion and sediment controls in place, compliance with the Progressive ESCP and determine any maintenance requirements or opportunities for improvement.	Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	In the event that controls are inadequate or absent, immediate and appropriate action will be taken to ensure that suitable controls are in place.			
SW18	Topsoil stockpiles will be monitored regularly throughout the construction phase of the Project for weed growth and controlled appropriately.	Weekly Environmental Inspection	Construction	Environment Coordinator
SW19	Erosion and sediment controls shall remain in place until groundcover or stabilisation equally or exceeding 70% cover across 90% of the catchment has been achieved and all erosive processes are suitably managed.	Trans4m Rail's GMR 10.4 Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor
SW20	During times of heavy rainfall or predicted heavy rainfall, work activities will be adjusted or will cease when there is a risk of sediment loss off site.	Trans4m Rail's GMR 10.4	Construction	Site Supervisor
SW21	The water quality within waterways and wetlands positioned along the construction alignment will be monitored in accordance with the Water Quality Monitoring Program (Section 7) to monitor the impacts on surface water quality and wetlands.	Water Quality Monitoring Program (Section 7)	Construction	Environmental Coordinator Site Supervisor
SW22	Works within or near watercourses would be undertaken with consideration given to the Guidelines for Controlled Activities on Waterfront Land (Office of Water, 2012).	n/a	Pre-construction Construction	Environment Manager Environmental Coordinator Site Supervisor
SW23	If groundwater is intercepted or likely to be intercepted during construction works, NRAR must be consulted to determine if licensing and / or approval is required under the *Water Management Act 2000*	Water Quality Monitoring Program (Section 7) Weekly environmental inspection	Construction	Environmental Coordinator Site Supervisor
SW24	Works on waterfront land are to be undertaken in accordance with the NRAR guidelines for controlled activities on waterfront land NOTE: Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary	Trans4m Rail's GMR 10.4 Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor
SW25	All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) new or modified surface water drainage (including cess drains) and depressions are designed and constructed in accordance with relevant guidelines;	Trans4m Rail's GMR 10.4 Primary and Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor
SW26	Prior to the installation of a new culvert, the Proponent must consult with the landowner that is located immediately downstream of the new culvert to	ARTC Landowner consultation	Construction	ARTC Community Consultation Team

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	determine the potential for impacts on agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, the Proponent must consult with the affected landowner on the management measures that will be implemented to mitigate the impacts.			
SW27	Tran4m Rail will construction the CSSI in accordance with the "Blue Book" and CPESC approved Erosion and Sediment Control Plans as well as the IFC design ensure all discharges from new or modified surface drainage (including cess drains) adjacent to the new and upgraded track are released at a controlled rate to prevent scour;	Design report ECM Trans4m Rail's GMR 10.4 Primary and Progressive ESCPs	Pre-construction Construction	ARTC Design Manager Environmental Coordinator Site Supervisor
SW28	To ensure compliance with CoA E35(i), where any recycled wastewater is proposed for use, it will be managed in accordance with the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (2006) so as to not pose a risk to human health or the receiving environment.	Trans4m Rail's GMR 10.4 Primary and Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor
SW29	Construction planning and the layout of construction work sites and compounds would be carried out with consideration of overland flow paths and flood risk, avoiding flood liable land and flood events where possible.	Trans4m Rail's GMR 10.4 Primary and Progressive ESCPs ECM	Construction	Environmental Manager Construction Manager
SW30	Consultation would be undertaken with relevant stakeholders (including landowners/occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by license requirements and/or private landholder agreements are not exceeded.	Consultation records Water extraction records	Construction	Construction Manager Environmental Coordinator
SW31	Discharge to surface water would be undertaken in accordance with the environment protection license for Inland Rail, and would consider the hydrological attributes of the receiving waterbody.	Trans4m Rail's GMR 10.4 Primary and Progressive ESCPs ECM	Construction	Environmental Coordinator Site Supervisor
SW32	Trans4m Rail will review the IFC design and ensure all scour protection works associated with replacement culverts or the construction of new culverts are located within the rail corridor, unless agreed to by the relevant landowner;	IFC Design drawings Consultation records	Construction	ARTC Design Manager Environmental Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
SW33	Trans4m Rail will review the IFC design request evidence of landowner agreement prior to undertaking works that could result in changes to the direction of watercourses or the direction of flood flows except within the rail corridor	IFC Design drawings Consultation records	Construction	ARTC Design Manager Environmental Manager Construction Manager
Contaminated Sites, Asbestos & Acid Sulfate Soils				
CL01	Tran4m Rail's N2NS Project Induction (and subsequent ECM toolbox talks and pre-starts) will include the following material to ensure that all project personnel are aware of their environmental obligations: ▸ Details of sites or areas of known contamination along (or adjacent) the construction alignment. ▸ Field identification of contaminated soils, asbestos containing materials (ACM) and acid sulfate soils. ▸ Duty to report any unexpected finds of contaminated soils, asbestos containing materials or acid sulfate soils. ▸ Immediate response measures detailed in Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils). ▸ Spill response procedures, reporting and the use of spill kits.	N2NS Project Induction ECM Toolbox Talks Prestarts	Pre-construction Construction	Environment Manager Construction Manager
CL02	In the event that contaminated material or asbestos containing materials (ACM) are discovered or suspected on-site, then all works affecting these materials must cease immediately, the area secured and Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils) must be followed. Refer to Appendix C for this procedure. Trans4m Rail's Environmental Manager (or delegate), ARTC and the Project ER must be immediately notified of any unexpected finds. Other stakeholders (i.e. NSW EPA, OEH, DPIE, WaterNSW, Council, local landholders, etc) may also be notified depending on the nature and scale of the unexpected find. A suitably qualified and experienced contaminated land consultant will be engaged to undertake further investigations to determine the type and extent of contamination. All assessment work will be undertaken in accordance with the Contaminated Land Management Act 1997 and the National Environment Protection (Assessment of Site Contamination) Measure 1999.	Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils)	Construction	All personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	The findings of any subsequent investigations must be documented in a Site Contamination Assessment Report.			
CL03	Any unexpected finds of potentially asbestos containing materials must also be managed in accordance with Trans4m Rail's Potential Asbestos Containing Soil Contamination Management Procedure. Refer to Appendix C for this procedure.	Trans4m Rail's Potential Asbestos Containing Soil Contamination Management Procedure	Construction	All personnel Environmental Manager Construction Manager
CL04	Where the results of the subsequent site investigations indicate that the contamination poses an unacceptable risk to human health and / or the environment under either current or proposed use, then a suitably qualified and experienced contaminated land consultant must be engaged to develop and oversee appropriate remediation measures. All remediation measures must be documented in a Remediation Report.	Contaminated Land Consultant	Construction	Environment Manager
CL05	If remediation works are required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. NOTE: Contaminated material must not be reused onsite for the construction of the CSSI until a Site Audit Statement determines the material is suitable for its intended use. NOTE 2: the CoA does not prevent preparation of a single Site Contamination Report or Remediation Report or obtaining a single Site Audit Statement and Site Audit Report for the entire CSSI.	NSW EPA Accredited Site Auditor	Construction	Environment Manager
CL06	Consultation will be undertaken with the Cwth Department of Defence (Cwth DoD) in the unlikely event that unexploded ordnance are encountered during the construction works.	Cwth Department of Defence	Construction	Environment Manager
CL07	In the event that actual or potential acid sulfate soils or monosulphidic black ooze (MBO) are identified (or suspected) on-site, then all works affecting these materials must cease immediately, the area secured and Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils) must be followed. Refer to Appendix C for this procedure. Trans4m Rail's Environmental Manager (or delegate), ARTC and the Project ER must be immediately notified of any unexpected finds. The assessment and management of actual and potential acid sulfate soils will be undertaken in accordance with Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid	Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils)	Construction	All personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	Sulfate Soils) and the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, August 1998).			
CL08	If temporary stockpiling of actual or potentially contaminated material or acid sulfate soils is required on-site, this material will be stockpiled in a bunded area on an impermeable surface, outside the area impacted by the 1% AEP flood event. If significant rain (>100mm in 24hrs) or prolonged rain is forecast, this material must be covered using an impermeable material to avoid water ingress into the material. This material must be clearly delineated and signposted to avoid any inadvertent mixing with other materials.	ECM Trans4m Rail's Unexpected Finds Procedure (Contaminated Land, Asbestos Containing Material & Acid Sulfate Soils)	Construction	Construction Manager
CL09	Any spills or leaks of chemicals, fuels, oils, cementitious water, effluent or any other hazardous substance that occurs during construction must be managed and reported in accordance with Trans4m Rail's Environmental Incident Response and Reporting Procedure.	Trans4m Rail's Environmental Incident Response and Reporting Procedure	Construction	All personnel Environment Manager Construction Manager
CL10	Suitably sized and maintained spill kits will be strategically located on-site to ensure they are readily available to personnel undertaking potentially contaminating activities i.e. operating plant and equipment, refuelling, plant and equipment maintenance, etc. Project personnel will be trained in the use of spill kits.	Spill Kits Spill Kits Training	Construction	Environment Manager Construction Manager
CL11	Refuelling and maintenance activities should be undertaken within a designated refuelling or maintenance area with appropriate bunding and an impermeable surface. Where field refuelling and maintenance is required, a drip tray (or other suitable control/s as agreed with Trans4m Rail's Environmental Personnel) must be used under the filling point.	Designated refuelling area ECM	Construction	All personnel Environment Manager Construction Manager
CL12	Field refuelling will be undertaken on level ground and at least 50 metres from drainage lines, waterways and/or environmentally sensitive areas.	ECM	Construction	All personnel Environment Manager Construction Manager
CL13	Refuelling activities must always be closely supervised. Plant and equipment being refuelled must not be left unattended for any period of time.	ECM	Construction	All personnel
CL14	Designated impervious bunded facilities will be provided for washout of concrete trucks and cleaning of other vehicles, plant or equipment. These facilities will be located at least 50 metres away from waterways and other drainage lines.	Designated refuelling area ECM	Construction	All personnel

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
CL15	Storage of hazardous materials on-site will be limited to only that considered necessary. All hazardous and flammable materials will be stored in secure, bunded and well-ventilated facilities (i.e. self-bunded chemical storage container or equivalent) and in accordance with "AS1940 The storage and handling of flammable and combustible liquids". Safety Data Sheets, adequate firefighting equipment and spill kits will also be located in close proximity to the storage area.	ECM AS1940 The storage and handling of flammable and combustible liquids	Construction	All personnel Environment Manager Construction Manager
CL16	The storage, handling and use of the chemicals and fuels will be in accordance with the Work Health and Safety Act 2000 and Workcover's Storage and Handling of Dangerous Goods Code of Practice (WorkCover, 2005).	Workcover's Storage and Handling of Dangerous Goods Code of Practice (WorkCover, 2005)	Construction	All personnel Environment Manager Construction Manager
CL17	The contamination assessment undertaken during the Project EIS identified one site containing chrysotile asbestos in gravel fill material consisting of ash and slag (Test Pit Site TP305 – located on the rail corridor directly south of the crossing with Gurley Creek). Where ground-disturbance activities are to be undertaken within 50m of TP305, the following mitigation measures must be applied to ensure that any risks associated with the disturbance of this material is suitably managed. 1. Prior to works commencing, a site-specific Activity Method Statement (AMS) will be prepared for undertaking ground disturbance activities in areas where known or suspected asbestos impacted material is present. The AMS will include the anticipated work methodology, the environmental risks associated with the works, the relevant mitigation measures and any monitoring and reporting requirements. 2. Prior to works commencing, all relevant site personnel will participate in a Toolbox Talk (based on the abovementioned AMS and relevant SWMS) to ensure that all staff and contractors are adequately trained to recognise environmental risks and OH&S issues. The toolbox talk will discuss the work methodology and mitigation measures required to manage contamination issues as detailed in this CSWMP and the Project's Health and Safety Management Plan. 3. If a fragment of suspected ACM is found, works in the vicinity of the find will cease and a temporary exclusion area will be	N2NS Project EIS AMS Toolbox Talk	Construction	Relevant personnel Environment Manager Construction Manager Licensed Asbestos Contractor Occupational Hygiene Consultant

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	established. Trans4m Rail's Environmental Manager will be immediately notified who will determine the appropriate management measures to be implemented. 4. Once deemed appropriate by the Environmental Manager (or delegate) a suitably qualified person (i.e. a 'competent, licensed person') will be engaged to collect any fragments and place it in polythene bag for later disposal at an appropriate waste facility. A detailed visual inspection of the area will be carried out by the competent person, which will involve wet raking of the areas to a depth of 100 mm for any further fragments. If no further fragments are identified, works may continue. 5. If several fragments (i.e. less than 10 fragments per square metre), are found, the competent person is to direct the collection of the fragments and place them in a polythene bag for later disposal at an appropriate waste facility. A detailed visual inspection of the area will be carried out by the competent person, which will involve wet raking of the areas to a depth of 100 mm for any further fragments. If no further fragments are identified, works may continue. 6. If suspected ACM continues to be identified during excavation works or a large amount of fragments are identified in a localised area (i.e. above 10 fragments per square metre) and/or if it is thought that any uncovered material might be considered friable asbestos, works will cease and a suitably qualified and experienced occupational hygiene will be engaged to assess the situation and determine an appropriate course of action. 7. The occupational hygiene consultant must determine and report: ▸ If the asbestos is non-friable or friable ▸ The extent of the contamination ▸ Options for the appropriate remediation of the area 8. Continuous airborne asbestos fibre monitoring and personal exposure asbestos fibre air monitoring for workers may be carried out if deemed necessary by the hygienist. The monitoring should be completed daily in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003(2005)], April 2005 and How the Safely Remove Asbestos Code of Practice (Safe Work Australia, December 2011).			

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	9. Any asbestos remediation work associated with TP305 will be documented in a Remediation Report.			
CL18	Hazardous materials and dangerous goods would be stored, handled, and transported in accordance with relevant regulatory requirements and relevant Australian Standards, including SEPP 33 thresholds. This would include a requirement to provide a minimum bund volume of 110% of the largest single stored volume within the bund. A risk management strategy would be developed to manage the potential for risks in situations where the minimum distance from sensitive receivers cannot be achieved, or the quantity of hazardous materials exceed SEPP 33 threshold levels.	ECM AS1940 The storage and handling of flammable and combustible liquids Workcover's Storage and Handling of Dangerous Goods Code of Practice (WorkCover, 2005)	Construction	All personnel Environment Manager Construction Manager
Rehabilitation & Revegetation				
RR01	Where practicable, areas disturbed for the construction of the CSSI will be progressively rehabilitated and revegetated throughout the construction phase of the Project. Wherever possible, permanent landscaping and rehabilitation works will take place progressively in accordance with the Project's "Issued for Construction" Design and Rehabilitation Strategy.	Progressive ESCP Project's "Issued for Construction" Design Rehabilitation Strategy	Construction	Environment Manager Construction Manager
RR02	Prior to topsoil stripping commencing, adequate training and planning will be undertaken and space allocated to ensure that topsoil is not contaminated with subsoil, mulch, fill or any other materials during any topsoil stripping and stockpiling activities.	Trans4m Rail's GMR 10.4 ECM Toolbox Talks	Construction	Environment Manager Construction Manager
RR03	During the removal of vegetation, suitable timber (i.e. hollow bearing) will be identified and stockpiled separately for reuse as habitat and woody debris during rehabilitation works. NOTE: This is subject to landholder approval.	ECM	Construction	Environment Manager Construction Manager Clearing sub-Contractor
RR04	All topsoil stockpiles will be signposted identifying the following: ▸ Stockpile ID number ▸ Material type ▸ Source location (incl. landscape type) ▸ Date of stripping ▸ Approx. quantity (m3) ▸ Any other comments or observations (i.e. if topsoil is sourced from a Threatened Ecological Community, weed presence, etc).	ECM N2NS Project Stockpile Register	Construction	Environment Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	These details will also be captured in a N2NS Project Stockpile Register.			
RR05	The land on which ancillary facilities, laydowns areas, access tracks and all other temporary works are located shall be rehabilitated to at least their pre-construction condition or better, unless otherwise agreed by the landowner.	Pre-Construction Condition Report	Construction	Environment Manager Construction Manager
RR06	Prior to permanent rehabilitation works commencing, topsoil resources will be sampled and tested by a NATA Accredited laboratory for the following: ▸ pH ▸ Conductivity ▸ Moisture Content ▸ Cation Exchange Capacity ▸ Exchangeable Cations ▸ Exchangeable Sodium Percent ▸ Nitrite + Nitrate, Total Kjeldahl Nitrogen and Total Nitrogen ▸ Total Phosphorus ▸ Total Organic Carbon The results will be assessed byTrans4m Rail's Environmental Manager (or suitable delegate) and soil ameliorants recommended to address any deficiencies identified in the topsoil. Soil amelioration techniques that may be used include: ▸ Addition of organic or inorganic fertilisers ▸ Addition of gypsum or lime ▸ Incorporation of mulch, feedlot manure, compost or other organic matter NOTE: Soil testing and amelioration for areas within the rail formation or subject to permanent design will occur in accordance with the Project's "Issued for Construction" Design and Rehabilitation Strategy.	ECM NATA Accredited Laboratory	Construction	Environment Manager
RR07	<u>Permanent Rehabilitation (Areas impacted by temporary works)</u> The following process would be used for permanent rehabilitation of areas disturbed by ancillary facilities, laydowns areas, access tracks, piling pads and all other temporary works. ▸ Remove all construction materials, plant, equipment, waste, services and/or imported fill that are not required for rehabilitation works.	ECM Toolbox Talk Field Inspection Checklist: Demobilisation, Reinstatement and Rehabilitation	Construction Decommissioning	All personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	▸ Undertake soil sampling and analysis in any areas where potentially contaminating activities have occurred (i.e. refuelling, workshop, concrete batching, etc). This will be directed by Tran4m Rail's Environmental Manager. ▸ Re-establish the natural land surface ensuring its consistent with the surrounding land natural features. This will also include the reinstatement of any drainage lines. ▸ Prior to topsoil spreading, subsoil will be scarified to at least 100mm deep. In heavily trafficked areas (i.e. laydowns, access tracks) or where lime stabilisation has occurred, cross-ripping or deep ripping to 300mm may be required. This will be directed by Tran4m Rail's Environmental Manager. ▸ Ameliorated topsoil will be respread over ripped subsoil in even layers at an approx. thickness of 100mm. Thicker topsoil layers will be used where excess topsoil is available. ▸ Scarification of the topsoil will be undertaken along the contour or in a figure eight (or zigzag) in flat or low gradient areas. ▸ Application (i.e. hand seed, drill seed or hydraulically applied) of the following seed mix*: ✓ Japanese Millet 25kg/ha (spring and summer months) ✓ Rye 15kg/ha (autumn and winter months) ✓ Creeping Blue / Indian Blue 5kg/ha ✓ Seca Stylo Legume 2kg/ha ✓ Queensland Bluegrass (Dichanthium sericeum) 5kg/ha ✓ Mitchell Grass (*Astrebla spp.)* 5kg/Ha *This seed mix is subject to availability and agreement with the landholder. ▸ Temporary erosion and sediment controls will remain in place where immediate stabilisation is not provided by this process. ▸ All demobilisation, reinstatement and rehabilitation works will be captured on the "*Field Inspection Checklist: Demobilisation, Reinstatement and Rehabilitation*".			
RR08	Watering of rehabilitated areas will only occur where water of suitable quality is readily available. If available, watering of rehabilitated areas will be	ECM Toolbox Talk	Construction	Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	on a priority basis focusing on high risk areas i.e. steep batters and areas of channelised flow.			
RR09	Following completion of rehabilitation works, suitable signage, demarcation and / or physical barriers shall be installed to identify areas where rehabilitation has been commenced or completed to restrict access and inadvertent damage of rehabilitated surfaces.	ECM Toolbox Talk	Construction	Environment Manager Construction Manager
RR10	Rehabilitation Monitoring Competed rehabilitation works will be monitored in accordance with the following requirements: Areas impacted by temporary works will be monitored fortnightly until the rehabilitation criteria detailed below has been achieved: • Landforms remain stable. • No subsidence or significant erosion is occurring. • Stormwater runoff from the rehabilitated areas does not negatively affect the environmental values of any receiving waters. • Groundcover equally or exceeding 70% cover across 90% of the catchment has been achieved. • Vegetation shows healthy growth and recruitment is occurring. • Declared weed species are absent from the rehabilitated area. Rehabilitation monitoring, inspection and assessment against the above criteria will be captured on the Project's "*Field Inspection Checklist: Environmental Rehabilitation Monitoring*". Any non-compliances or ongoing issues will be captured on the Project's Environmental Actions Register and addressed in consultation with the landholder.	Environment Inspection checklist	Post - Construction	Environment Manager
RR11	Where possible, rehabilitation should be undertaken using locally occurring native species	Construction" Design Rehabilitation Strategy	Construction	Environment Manager Construction Manager
Spoil Mounds				
SP01	Prior to the establishment of a permanent spoil mound, approval must be sought from Trans4m Rail's Environmental Manager (or delegate) and	N2NS Permanent Spoil Mound Approval Checklist	Construction	Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	ARTC via the N2NS Permanent Spoil Mound Approval Checklist (Appendix E). Approved spoil mounds must comply with the following: ▸ Be located within the existing rail corridor. ▸ Be located at least 100m from any watercourse, wetland or culvert and not within an area where the rail formation (or proposed spoil mound location) is predicted to be overtopped or inundated during a 1% AEP flood event. ▸ Be located at least 500 metres from any residential receiver. ▸ Be located at least 200 metres from any environmentally sensitive area i.e. threatened species suitable habitat (incl. mapped Koala Habitat), mapped Threatened Ecological Community/s or area/s or item/s of Aboriginal or non-Aboriginal Heritage. ▸ Be located outside the drip lines (or nominated TPZ) of any trees. ▸ Not result in the clearing or covering of native vegetation beyond that described in the documents listed in Condition A1 (refer to BMP) NOTE: Habitat trees and hollow bearing trees must not be directly or indirectly impacted by the establishment of a permanent spoil mound. ▸ The maximum height of the spoil mound must not exceed 2 metres or the height of the upgraded rail line, whichever is less. ▸ Not result in heritage impacts beyond that described in the documents listed in Condition A1; ▸ Not result in additional changes to the upstream flooding regime beyond those described in the documents listed in Condition A1; ▸ Not affect the downstream flood regime; ▸ Not impede the flow of water through culverts; ▸ Not significantly impact the existing visual amenity of surrounding residences. * NOTE: In the event that the proposed spoil mound (and any vegetation clearing requirements) is located outside the Construction Impact Zone, a Consistency Assessment may need to be undertaken to ensure the proposed works are consistent with the approved project. Should the proposed spoil mound (and associated clearing requirements) be found not to be consistent then a modification to the project may be required.			ARTC Representative

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
SP02	Permanent spoil mounds would be shaped to avoid any sharp or angular profiles. Alternatively, rounded, natural profiles must be used to ensure they integrate into the existing landscape and surroundings.	ECM	Construction	Construction Manager
SP03	Any permanent spoil mounds must be free draining and not result in any ponding or pooling of surface water.	ECM	Construction	Construction Manager
SP04	Spoil materials in permanent mounds must not contain any of the following: ▸ Any contaminated soil classified as being unsuitable for the proposed land use (i.e. exceeding the HIL-D Commercial / Industrial Guidelines) ▸ Fragments of asbestos containing materials (ACM) ▸ Acid sulfate soils ▸ Waste, other than virgin natural materials (VNM) and/or excavated natural materials (ENM) as defined by the POEO (Waste Regs) ▸ Construction or demolition waste or materials ▸ Green waste	ECM	Construction	Environment Manager Construction Manager
SP05	Spoil mounds must be progressively stabilised during the construction of the CSSI and stabilised (in accordance with this CSWMP) prior to the operation of the CSSI.	Progressive ESCP ECM	Construction	Environment Manager Construction Manager
Air Quality & Dust				
AQ01	Training will be provided to all project personnel (including relevant sub-contractors) on appropriate dust and air quality control practices and the requirements from this CSWMP. This training will be provided through the N2NS Project Induction, Toolbox Talks, prestart meetings and via targeted training.	N2NS Project Induction Toolbox Talks Prestarts	Pre-construction Construction	Environment Manager Construction Manager
AQ02	Dust and air quality control measures from this CSWMP will be included in all relevant Environmental Control Maps (ECM) and site-specific Progressive Erosion and Sediment Control Plans (ESCP).	ECM Progressive ESCP Trans4m Rail's GMR 10.4	Construction	Environment Manager
AQ03	Weather forecast will be reviewed daily (via http://www.bom.gov.au/) and additional measures implemented where unfavourable weather conditions (i.e. hot, dry weather, high wind speed (>10m/s)) are anticipated. Measures to be implemented during unfavourable weather conditions may include a modified construction methodology, alternative plant and equipment,	http://www.bom.gov.au/ ECM Toolbox Talk	Construction	Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
	altering the scheduled works or program for the day, additional water carts or ceasing dust generating activities until conditions are more favourable.			
AQ04	The Air Quality Monitoring Program (Appendix D) for the Project will be implemented to assess the impact the N2NS Project is having on the local air quality and to surrounding sensitive receivers. The results of the monitoring will be captured on a monthly basis and reported to ARTC, the Project ER and the NSW EPA along with any exceedances and corrective actions taken.	Air Quality Monitoring Program incl. Depositional Dust Monitoring Procedure Australian Standards	Pre-construction Construction	Environment Manager
AQ05	Automated weather station/s (AWS) will be established at representative locations to record weather conditions along the construction alignment. Rainfall at the premises will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that construction works commence on the CSSI. Wind speed and other atmospheric conditions will be provided and recorded in real-time to allow up to date and adaptive management of dust and other potential air quality issues.	Automated weather station/s (AWS) Procedure	Pre-construction	Environment Manager
AQ06	Where possible, vegetation clearing and removal of groundcover will be staged to minimise the area and duration that surfaces are exposed.	ECM Progressive ESCP	Construction	Environment Manager Construction Manager
AQ07	The following dust control measures will be utilised to suppress dust being generated from earthworks activities, stockpiles, haul roads, laydown areas, ancillary facilities and all other exposed surfaces; water application via watercarts and alternative means (i.e. sprinklers, hoses), sealing or stabilisation of highly trafficked areas, dust screens, application of geofabric or jute mat or the application of soil binding agents. The frequency of use will be modified depending on the prevailing wind and weather conditions.	ECM Progressive ESCP Trans4m Rail's GMR 10.4	Construction	Environment Manager Construction Manager
AQ08	Heavily utilised and trafficked areas such as ancillary compounds, laydown areas, carparks and administrative areas will be sealed or sheeted with a low fines material (i.e gravel, road base or DGB material) to avoid dust generation and mud tracking issues.	ECM Progressive ESCP	Construction	Environment Manager Construction Manager
AQ09	Alternative water sources (i.e. recycled water, stormwater captured in basins and excavations, etc) will be utilised, where feasible and reasonable, in preference to potable water for dust suppression and construction purposes.	ECM	Construction	Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
AQ10	Exposed surfaces with no scheduled work for 20 days will receive additional treatment to minimise dust generation. These exposed surfaces will be stabilised using the most practical site-specific methods, such as watering, compaction or soil binder application for short term exposure and geofabic, jute mat or revegetation for longer term exposed areas or finished surfaces. Alternative controls may be implemented as agreed with Trans4m Rail's Environment Manager (or delegate).	ECM Progressive ESCP	Construction	Environment Manager Construction Manager
AQ11	Disturbed areas will be progressively rehabilitated as soon as reasonably practical.	ECM Progressive ESCP	Construction	Environment Manager Construction Manager
AQ12	Stabilised site access, rumble grids and large aggregate will be utilised at construction (and laydown) entry and exit points to avoid mud being tracked onto public roads. These control measures will be inspected on a regular basis and maintained as required.	Progressive ESCP	Construction	Environment Manager Construction Manager
AQ13	Construction gates and all entry and exits points will be monitored on a regular basis for spillages of material or tracked material. A street sweeper (or alternative suitable equipment) will be used to remove any material tracked or spilt onto public roads.	Progressive ESCP	Construction	Environment Manager Construction Manager
AQ14	Vehicle movements will be confined to designated haul roads and construction areas only. Internal haul roads will have speed limits of 40km/h (or less) in order to reduce dust generation. Reduced speed limits may be implemented where dust generation persists.	N2NS Project Induction TTAMP Traffic Control Plans Toolbox Talks Progressive ESCP	Construction	All project personnel
AQ15	All loaded haulage trucks must be covered when travelling on public roads.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager
AQ16	Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specifications to ensure that emissions do not exceed EPA regulations. Periodic visual checks will be undertaken daily.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
AQ17	Haul trucks, plant and other equipment will be switched off when not in use for periods of more than 20 minutes.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager
AQ18	Engines of plant parked next to residents will be switched off when not in use.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager
AQ19	Any plant, equipment or machinery emitting significant smoke will be switched off immediately. This plant must not be reinstated for use until the necessary maintenance has been performed on it.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager
AQ20	Where practical, crushers will be positioned in protected areas (i.e. within cuts), to reduce wind dispersion of dust particles.	ECM	Construction	Environment Manager Construction Manager
AQ21	Dust suppression systems (i.e. water sprays) will be installed and used on crushing and screening plants to minimise generation of dust from these activities.	ECM Toolbox Talks	Construction	Environment Manager Construction Manager
AQ22	Concrete batch plants will be fitted with dust filters or similar controls to minimise air quality impacts from batching operations.	ECM Toolbox Talks	Construction	Environment Manager Construction Manager
AQ23	Waste will be segregated and collected on a regular basis to ensure odours associated with waste do not become an issue to surrounding sensitive receivers.	N2NS Project Induction ECM Toolbox Talks	Construction	Environment Manager Construction Manager
AQ24	The application of pesticides and herbicides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area. Any application of pesticides and / or herbicides will be undertaken by a suitable trained and licensed person/s.	N2NS Project Induction ECM Toolbox Talks	Construction Post-construction	Environment Manager
AQ25	There will be no burning off of waste, including vegetative waste matter on-site.	N2NS Project Induction ECM Toolbox Talks	Construction	Environment Manager Construction Manager

ID	MEASURE/ REQUIREMENT	RESOURCES	WHEN TO IMPLEMENT	RESPONSIBILITY
AQ26	Where sensitive receivers are located within 150 metres of construction works, or visible dust is generated from vehicles using unsealed access roads, road watering would be implemented.	N2NS Project Induction ECM Toolbox Talks	Construction	Relevant project personnel Environment Manager Construction Manager

NOTE: Responsibilities identified above may be delegated to other suitable Project personnel at the discretion of the Project Director and the responsible person/s listed above. The nominated person/s above remains accountable for ensuring the measure is completed in accordance with this, and any other relevant, document.

7.2 Construction Monitoring Program

Environmental monitoring will be undertaken throughout the construction phase of the Project to confirm the environmental impacts predicted for the work, to measure the effectiveness of management controls and the implementation of this CSWMP and to address CoA C14 - C20. The Project wide monitoring programs are detailed in the CEMP, with monitoring requirements specific to soil and water detailed below.

In addition to the environmental inspections, audits and assurances activities identified in Section 1.8, the following environmental monitoring programs will be undertaken to confirm the impacts to soil, water and air quality along the alignment.

7.2.1 Water Usage

Monitoring of construction water usage is required under CoA C14 (b) and RMM C7.2 and is outlined below. Water use and management will be undertaken as part of the broader environmental monitoring program detailed in Section 8 of Trans4m Rail's CEMP.

Baseline Data

The Inland Rail Construction Water Plan Narrabri to North Star (Golder Associates, January 2020) identified specific water supply options and reported construction water estimates. A total of approximately 1,215ML of construction water was estimated by ARTC for the N2NS project. As noted in Section 5, Trans4m Rail have already developed strategies to significantly reduce this baseline estimate. The Trans4m Rail have developed a draft water balance model at the pre-construction phase provided in Appendix F estimates approximately 477ML is required for construction water and 171ML is required for dust suppression. This water balance baseline is considered sufficient at the pre-construction phase. Initial water usage monitoring over the first 3 – 6 months of the project would inform whether further water usage baseline development is necessary.

Monitoring

Smart water meters will be used to remotely track water consumption trends across each stage of the project. A smart water meter device enables the collection, transmission and analysis of water use data by the project team through a digital portal. Smart water meters will be located at water extraction points. Where extraction points change during construction, smart meters will be installed prior to commencement of extraction at the new location. Water usage will be able to be tracked in a near real-time manner.

Metering of critical water infrastructure (e.g. stand-pipes at water filling stations, water level sensors on construction water storage tanks, water input to concrete batching plants, etc.) will also provide insights into events such as increased consumption trends, water leaks, inefficiencies, etc.

As water will be moved around the project via trucks, water truck numbers, volumes and associated water use will also be recorded.

Water meter data (i.e. input) and water truck data (i.e. output) will be analysed to identify any issues (e.g. leaks). Water usage data will be compared against Trans4m Rail's construction water balance (Section 5). Opportunities for further water savings measures will be identified as part of Trans4m Rail's continuous improvement process (see Section 12 of Trans4m Rail's CEMP).

The Water Usage monitoring program will be undertaken for the duration of construction and in accordance with CoA C15(a) to (i) as outlined in Table 7-2:

Table 7-2: Water usage monitoring program requirements

COA C15 REQUIREMENT	DETAIL
(A) **Details of baseline data available:**	The Inland Rail Construction Water Plan Narrabri to North Star (Golder Associates, January 2020) identified specific water supply options and reported construction water estimates. A total of approximately 1,215ML of construction water was estimated by ARTC for the N2NS project.

COA C15 REQUIREMENT	DETAIL
(B) Details of any baseline data to be obtained and by when:	Trans4m Rail have developed strategies to significantly reduce this baseline estimate as detailed in section 7.2.1 and the water balance model outlined in Section 5 and provided in Appendix F of this plan
(C) details of all monitoring of the CSSI to be undertaken:	Water meter data (input) Truck water data (output)
(D) the parameters of the CSSI to be monitored	Water usage volume
(E) the frequency of monitoring to be undertaken	Data collected daily and reported internally/to ARTC monthly
(F) the location of monitoring	Water extraction points throughout the project
(G) the reporting of monitoring and analysis results against relevant criteria	Actual water usage against baseline reported: • monthly to ARTC; and • 6-monthly to the Planning Secretary and relevant regulatory agencies in accordance with CoA C20
(H) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory	Water usage data would be reviewed on a monthly basis (minimum) to determine if any additional mitigation measures are required to be implemented. Where monthly actual usage significantly exceeds the projected baseline quantity or where water input differs significantly from output data, Trans4m Rail would investigate the cause and determine any rectification/mitigation measures to be implemented (e.g. repair of leaks).
(I) any consultation required in relation to the monitoring programs	Consultation Water Usage monitoring program detailed in Section 2.1 of this plan

7.2.2 Air Quality

Monitoring and management of air quality along the construction alignment is required under CoA C14 (c), E86 and RMM C5.1. The Air Quality Monitoring Program (Appendix D) for the N2NS Project, along with any mitigation measures found in Section 7.1 of this CSWMP, the Progressive ESCP and the Water ECM have been developed to address and achieve the outcomes detailed in CoA C14 (c), E86 and RMM C5.1.

Baseline Data

Section 13.2 of the N2NS Project EIS describes the existing air quality within the subject area to be mainly influenced by rural activities, vehicle emissions and limited industrial or processing activities. The National Pollutant Inventory (NPI) lists five sources of emissions between Narrabri and North Star. Two of these are feedlots from which the primary emissions are likely to be odour. Three industries are associated with mineral, metal and chemical wholesaling, where volatile organic compounds may be released. There is no publicly available air quality monitoring data for the study however the nearest air quality monitoring station that provides publicly available data is operated by OEH at Tamworth, 135 kilometres to the south-east of Narrabri.

Background air quality was derived using particulate matter (PM10) average and 70th percentile PM10 values for the last five years for Tamworth. A conservative approach was adopted for the assessment, and the highest 70th percentile PM10 value was used to represent background air quality for the study area. The highest 70th percentile PM10 was 19.1 µg/m^3, which is below the NSW annual average criteria of 30 mg/m^3. Annual average and 70th percentile PM_{10} levels used to derive the background levels were provided as Appendix F to the EIS and are replicated in Table 7-2. This air quality baseline is considered sufficient at the pre-construction phase. Initial air quality monitoring

over the first 3 – 6 months of the project would inform whether further air quality baseline development is necessary.

Table 7-3:Annual average and 70th percentile PM_{10} levels at Tamworth

YEAR	AVERAGE PM10 (µG/M³)	70TH PERCENTILE PM10 (µG/M³)
2011	13.9	15.3
2012	15.9	18.3
2013	16.6	19.1
2014	15.8	18.1
2015	14.1	16.2
Used background level	-	19.1

Monitoring

Air quality along the construction alignment will be monitored via the installation, analysis and assessment of depositional dust gauges and static air quality monitoring photometer/s.

Air quality monitoring would be established at locations representative of the closest proximity sensitive receivers. Monitoring locations would be selected with due regard for:

- Typical environmental conditions and prevailing weather conditions;
- Scope of works in the catchment; and
- Sensitive receivers present.

The process for managing changes in locations would include a review of the above factors as a minimum and would include updating the project Air Quality Monitoring Register. A copy of the updated register would be provided to the EPA in the subsequent EPL monthly report.

Where required or justified, air quality monitoring may also be undertaken at 'control' locations away from construction activities to provide a representation of background levels.

Depositional dust gauges (DDG) will be established at representative locations at least one month prior to the commencement of construction, remain in place for the duration of construction and be removed at the completion of construction or where sufficient stabilisation has been achieved across the site.

Static air quality monitoring photometer/s will be established at selected location/s along the alignment that represent the greatest impact based on the scope of works and the density of surrounding sensitive receivers i.e. Moree. These photometer/s will be installed 1 month prior to construction works commencing and remain in place for the initial phase of construction i.e. 3 months. Following this, the results will be assessed against the adopted air quality criteria (detailed below) and additional monitoring undertaken, if deemed necessary. After the initial phase of airborne particulate monitoring to ensure effectiveness of management measures and construction practices, static air monitoring frequency will be undertaken for the duration of construction in response to dust complaints, where DDG data are not deemed sufficient to close out complaints.

Pollutant	Averaging period	Criteria[1]
PM_{10}	24 Hours	50 µg/m³

1. Based on the Air NEPM and the Approved Methods

The installation, monitoring and analysis of the dust gauges will be undertaken in accordance with the Depositional Dust Monitoring Procedure (Appendix D), the relevant Australian Standards and the N2NS Environment Protection Licence (EPL). Air quality monitoring locations will be determined with consideration for the proximity to sensitive receivers, typical wind direction, scale of construction activities and the proposed establishment of ancillary facilities.

Following receipt of the lab results, an assessment will be undertaken by the Trans4m Rail Environment Manager (or suitable delegate) against the adopted air quality criteria:

Pollutant	Averaging period	Criteria[1]

Dust Deposition	Annual	2 g/m^2/month^2

1. Based on the Air NEPM and the Approved Methods
2. Maximum increment. Maximum cumulative impact of 4 g/m^2/month

Exceedances of the abovementioned air quality criteria will be investigated by Trans4m Rail's Environment Manager (or suitable delegate) to determine the validity of the results and adjust management practices, if required.

The results and any exceedances and associated corrective measures will be reported to ARTC, the Project ER and the NSW EPA on a monthly basis and 6-monthly to DPIE in accordance with Condition C20.

7.2.3 Surface Water Quality

Maintaining and/or contributing towards achieving the *NSW Water Quality Objectives* for the watercourses surrounding the N2NS Project is required under CoA E35 (a) and (b). In addition to this, a surface water quality monitoring framework is required under RMM C8.2. The Surface Water Quality Monitoring Program for the N2NS Project, along with any mitigation measures (SW01 - SW30 and RR01 – RR11) found in Section 7.1 of this CSWMP, the Progressive ESCP and the Water ECM have been developed to address and achieve the outcomes detailed in CoA E35 (a) and (b) and RMM D7.2.

The potential water quality impacts of the N2NS Project were qualitatively assessed as part of the Project EIS. A full list of the findings of this assessment can be found in the N2NS CSWMP and the Project EIS (Technical Report 7: Water Quality Assessment), however the assessment identified that the majority of the impacts to water quality would largely be associated with the construction phase of the Project.

Baseline Data

As part of the above-mentioned water quality assessment, existing water quality monitoring data for watercourses within the study area was reviewed. The National Water Quality Assessment (SKM 2011) classified the water quality within river catchments impacted by the proposal and compared it to the ANZECC/ARMCANZ (2000) default trigger values for slightly disturbed aquatic ecosystems. The assessment identified that in both the Namoi and Gwydir River catchments the water quality was relatively poor quality (refer to Table 4.4 of Technical Report 7: Water Quality Assessment).

No baseline water quality sampling data was collected as part of this assessment due to the ephemeral nature of many watercourses within the study area.

Water Quality Objectives

Water Quality Objectives for the Gwydir, Namoi and Macintyre (Border) Rivers have been obtained from the NSW Environment Protection Authority (DECCW 2006a, 2006b & 2006c) and are included in the Project EIS (Table 3.1 of the Technical Report 7: Water Quality Assessment). These WQO's along with upstream and downstream comparisons would be used for assessment purposes during the construction phase of the Project. The relevant mitigation measures (SW01 - SW30 and RR01 – RR11) detailed in Section 7.1 will contribute towards achievement of the NSW WQO in accordance with CoA E35 (a -b) unless the project EPL contains different requirement, in which case those requirements will be complied with.

Monitoring

Baseline and construction phase surface water quality monitoring will be undertaken at nominated locations prior to and during the construction phase of the Project.

Baseline water quality monitoring will be undertaken at the perennial watercourses nominated in the Project EIS prior to construction commencing. These locations have been identified to be:

- Namoi River
- Gwydir River
- Mehi River

- Macintyre (Border) River

The sampling location would be immediately downstream of the proposal or downstream of the associated confluence and include the sampling, analysis and assessment against the Water Quality Objectives detailed in Table 3.1 of Technical Report 7: Water Quality Assessment (Project EIS).

Where possible, baseline water quality monitoring will also be undertaken at the ephemeral watercourses identified in Table 4.3 of the Project EIS (Technical Report 7: Water Quality Assessment). Baseline monitoring and assessment would include field parameters (i.e. pH, Electrical Conductivity, Turbidity, DO (mg/L and % sat.), temperature and visible oil and grease) only.

Monitoring of the perennial watercourses nominated above will occur bi-annually and results assessed against the WQO's detailed in Table 3.1 of the Technical Report 7: Water Quality Assessment (Project EIS).

Monitoring of the ephemeral watercourses would be undertaken monthly following rain generating runoff. Monitoring at each watercourse would include an upstream location (no impact from construction) and a downstream location for the field parameters detailed above. Assessment of the upstream and downstream results would be undertaken and any significant (>10% variation) deterioration of water quality will be investigated.

Any non-compliances with the nominated WQO's within the perennial waterways or significant changes (>10% variation) to water quality within the ephemeral watercourses will be immediately investigated and corrective actions taken to address any non-compliances or opportunities for improvement.

The findings of the bi-annual water quality monitoring of the perennial watercourses and any significant changes (>10% variation) to the water quality within the ephemeral watercourses will be reported to ARTC, the Project ER, NSW EPA and DPI Fisheries as per the Reporting requirements detailed within the Monitoring Program found in the Water ECM. The report will also identify any non-compliances, possible causes and corrective actions taken by the Project.

Table 7-4: Soil and Water Monitoring Program

COA	CONSTRUCTION MONITORING PROGRAM	CONSULTATION AND REPORTING REQUIREMENTS
C14 (b)	Water Usage Monitoring Program – Water usage will be monitored during construction at representative locations along the construction alignment. Water meter data (i.e. input) and water truck data (i.e. output) will be analysed to identify any issues (e.g. leaks). Water usage data will be compared against Trans4m Rail's construction water balance	ARTC, Project ER & Water Group
C14 (c)	Air Quality Monitoring Program - Local air quality will be monitored prior to, during and following construction at representative locations along the construction alignment. Monthly dust monitoring will be undertaken in accordance with the Air Quality Monitoring Program (incl. Depositional Dust Monitoring Procedure) (refer Appendix D) and in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines.	ARTC, Project ER
E35 (a) & (b)	Water Quality, Erosion And Sediment Environmental Control Map (Water ECM) - Water quality within waterways positioned along the construction alignment will be monitored in accordance with the Water ECM to monitor the impacts on surface water quality as a result of construction of the CSSI.	ARTC, Project ER

8 Sustainability

The N2NS Project will pursue a rating under the IS Rating Scheme V1.2. This plan relates to Dis-1 Receiving Water Quality, Lan-2 Conservation of on-site resources and Lan-3 Contamination and Remediation. Trans4m Rail will be aiming for a credit response Level 2 for Dis-1 and Lan 3 and Level 3 for Lan-3. ISCA benchmarks are shown in Table 8-1: ISCA Scorecard Receiving Water Quality Benchmarks 13.

Table 8-1: ISCA Scorecard Receiving Water Quality Benchmarks

	LEVEL 1	LEVEL 2	LEVEL 3
BENCHMARK	**DIS-2 RECEIVING WATER QUALITY**		
	Measures to minimise adverse impacts to receiving water environmental values during construction and operation have been identified and implemented. AND	The requirements for Level 1 are achieved. AND	NA
	Monitoring of water discharges and receiving waters is undertaken at appropriate intervals and at times of discharge during construction.	Monitoring and modelling of water discharges and receiving waters demonstrates no adverse impact on receiving water environmental values. AND	
		The infrastructure does not increase peak stormwater flows for rainfall events of up to a 1.5 year ARI event discharge.	
	LAN-2 CONSERVATION OF ON-SITE RESOURCES		
	Conservation of topsoil and subsoil has been considered.	The requirements for Level 1 are achieved AND	The requirements for Level 2 are achieved AND
		All subsoil and topsoil impacted by the project is separated and protected from degradation, erosion or mixing with fill or waste AND	Opportunities to improve topsoil productivity of previously disturbed areas have been identified and incorporated into the project.
		95% of all topsoil (by volume) retains its productivity and is beneficially re-used on or nearby to the project	
	LAN-3 CONTAMINATION AND REMEDIATION		
	Site assessment follows the recommended approach in Schedule A 'Recommended general process for assessment of site contamination' of National Environment Protection (Assessment of Site Contamination) Measure 1999 AND	The requirements for Level 1 are achieved AND	NA
	Remediation options are identified and selected using a sustainability hierarchy.	Sustainability appraisal of remediation options is undertaken against the sustainability indicators in Table 1 of 'A Framework for Assessing the Sustainability of Soil and Groundwater Remediation'	

Appendix A : Stakeholder Response

Moree Plains Shire Council – CSWMP (correspondence provided to DPIE)

Moree Plains Shire Council – Water Access (correspondence provided to DPIE)

Gwydir Shire Council (correspondence provided to DPIE)

Narrabri Shire Council (correspondence provided to DPIE)

DPIE – BCS (correspondence provided to DPIE)

DPIE – NRAR (correspondence provided to DPIE)

DPIE – Water Group (correspondence provided to DPIE)

WAL11543 (correspondence provided to DPIE)

WAL11567 (correspondence provided to DPIE)

WAL15914 (correspondence provided to DPIE)

Consultation response table

DPIE - Biodiversity, Conservation and Science				
No	**Comment**	**Page No**	**Addressed**	**Response**
1	Clarity should be provided in item SW15 in Table 7 that all stockpiles should be located within the approved construction impact zone (CIZ)	32	Addressed	Table 7-2 (SW15) - Stockpiles to be located within the approved Construction Impact Zone
2	Item SP01 in Table 7 states that clearing of mapped native vegetation should not occur unless approved by Trans4m Rail's Environment Manager. Clarity is required in this item regarding whether this clearing refers to native vegetation within or outside the CIZ. If it refers to vegetation outside of the CIZ, BCS would welcome further discussion on whether this activity would require a project modification.	43	Addressed	Included in SP01 NOTE: In the event that the proposed spoil mound (and any vegetation clearing requirements) is located outside the Construction Impact Zone, a Consistency Assessment may need to be undertaken to ensure the proposed works are consistent with the approved project. Should the proposed spoil mound (and associated clearing requirements) be found not to be consistent then a modification to the project would be required.
3	Where possible, rehabilitation works should be undertaken using locally occurring native species.	40	Addressed	Table 7-2 RR11 – Where possible, rehabilitation will be undertaken using locally occurring species and local provenance seeds.
4	It may already have occurred, but the management plan should be provided to the Environment Protection Authority (EPA) for review and comment.	N/A	Noted	NOTE: Consultation with key stakeholders has occurred in accordance with CoA C4(d). The NSW EPA will be provided with various Environmental Management documentation as part of the EPL application.
Moree Plains Shire Council				
No	**Comment**	**Page No**	**Addressed**	**Response**
1	No comments on the plan from an environmental perspective	N/A	Noted	Noted
2	No comments on the plan from a water perspective	N/A	Noted	Noted

3	Similar to the noise and vibration sub plan, can we request that the environmental monitoring results and complaints register and procedure be made publically available.	N/A	Noted	The Complaints Procedure on the Project is detailed in the Project CEMP, Communication Strategy and the Community and Stakeholder Engagement Management Plan. A copy of these documents will be provided and publicly available on the Project Website. Due to privacy issues, the Project cannot make the complaints register publicly available. However, the complaints will be summarised (with no personal information included) on a monthly basis on the ARTC Monthly Scorecard that will be distributed to all key stakeholders (incl. the Community). Copies of the Construction Monitoring Programs will be provided on the Project Website in accordance with CoA B11 and the results of the monitoring made available to relevant regulatory agencies (incl. Council/s) in accordance with CoA C20.
Natural Resources Access Regulator (NRAR) - Date 09/12/2020				
1	It is understood this SWMP applies to Phase 1 of the project, otherwise known as SP1, which excludes that portion of rail line between Moree and Camurra North subject to the Floodplain Management Plan for the Gwydir Valley Floodplain 2016. This SWMP is a draft document which the principal contractor will be required to develop and finalise prior to commencement of construction.	N/A	Noted	General comment, no change required.

2	The SWMP Draft Water Balance (Section 5.1) indicates total estimated water required for project construction is 648 ML (construction water 477 ML and dust suppression 171 ML) over a two year period. This is in the order of four times greater than estimated in the EIS (EIS Section 15.3.2 shows 150ML over two years) and differs from the construction requirement estimate (1,215ML over 51 months) provided in the Response to SPIR Amendment Report (ARTC REF: 3-0000-260-EAP-00-LT-0007). It is recommended that a clear understanding of project water requirements be determined to enable sourcing of adequate, reliable and appropriately licensed water supplies for the project. It is understood a preliminary assessment has been undertaken to assess potential water supply sources within a 50km wide buffer of the project corridor, with a review of existing Water Access Licences (WALs), wastewater and other water sources. This information will be documented in an individual Construction Water Supply Plan for the project.	24	Addressed	ARTC is currently developing a consistent approach to construction water estimating for the Inland Rail Program to be applied during the design phase. As noted in Section 5 of the CSWMP, Trans4m Rail have undertaken detailed construction water use assessments and are confident with our estimates. Section 7.2.1 of the CSWMP also notes that water savings measures will be identified as part of Trans4m Rail's Continuous Improvement Process. As required by RMM C7.2 - Consultation would be undertaken with relevant stakeholders (including landowners/ occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by license requirements and/or private landholder agreements are not exceeded.

3	Section 5.2 references "potential water sources" non-potable/raw groundwater from Moree Plains Shire Council and Narrabri Shire Council which are subject to the development of a water management plan with each Council. Water shortages/alternate supplies are referenced to come from groundwater from a local landholder. The availability of water and any approval or WAL requirements therefore remains uncertain and a potential risk to this project. WALs are not excluded from approved SSD projects. Hence where required, a WAL needs to be obtained prior to the take of water. Further to this, where new extraction points are proposed or where the proposed volume to be extracted is greater than currently approved new approvals and/or impact assessments will be required. It is recommended this be confirmed and additional assessments carried out for new works and extractions as part of the SSD management plan process to enable exclusion of approval requirements under the Water Management Act 2000 where applicable.	24	Addressed	Due to the project currently being in the pre-construction phase, all water supplies have not been formalised as yet. As noted in Section 5.2, Trans4m Rail appreciate that WALs are required for relevant water extraction. New water extraction points are not proposed. As required by RMM C7.2 - Consultation would be undertaken with relevant stakeholders (including landowners/ occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by license requirements and/or private landholder agreements are not exceeded.
4	It is understood that ARTC wishes to put the burden of water supply upon the principal contractor and ARTC will review the results of the preliminary water supply assessment with the contractor. It is recommended the water demands be clearly defined and viable options for water supply and the relevant approval process be identified and confirmed as soon as possible to minimise delays in the project timeline into the future.	N/A		Noted. Water demands have been defined (Section 5.1) and viable options identified (Section 5.2)

5	Numerous mitigation measures previously committed to are not currently present in the SWMP, including pre-construction and construction measures related to contamination, riparian buffers to construction compounds, hydrology and flooding, culvert scour protection, riparian buffers, water quality, water supply and monitoring. The SWMP mitigation measures need to be carefully reviewed against the full suite of mitigation measures committed to in the EIS, SPIR and Response to SPIR Amendment that relate to soil and water issues.			Section 6.2 of the Project EIS (Technical Report 7 - Water Quality Assessment) was reviewed and all construction phase mitigation measures are addressed with the exception of Section 6.2.3 (Culvert Construction). This has now been included. SPIR RMMs reviewed and summarised below: D6.1 - D6.3 & D7.1: Not applicable to the Construction Soil and Water Management sub-Plan, as they are design related considerations. D6.4, D7.2, C6.1, C6.2: Relevant and addressed in Section 7.1.2, 7.2.3, Appendix B and Appendix C C7.1, C7.2, C8.1 and C8.3 – Added and addressed in Section 7.1.2, 7.23 and Appendix B Culverts (incl. scour protection) will be installed in accordance with the IFC Design. The design is outside the scope of this Construction Soil and Water Management sub-Plan.
6	SWMP Mitigation measure E35(h) states that the CSSI must be designed, constructed and operated so as to "ensure works on waterfront land are undertaken in accordance with the NRAR guidelines for controlled activities on waterfront land", which is supported. This is supported by NRAR.	35	Amended	Amended - Mitigation measure SW24 added - Works on waterfront land are to be undertaken in accordance with the NRAR guidelines for controlled activities on waterfront land. NOTE: Waterfront land includes the bed and bank of any river, lake or estuary and all land within

				40 metres of the highest bank of the river, lake or estuary.
7	Results from further detailed modelling of hydrological impacts of proposed culverts and bridge upgrades should be incorporated where appropriate in the SWMP as pre-construction and construction mitigation measures. NRAR recommends erosion be mitigated through appropriate culvert/bridge design and adherence to the "Guidelines for Controlled Activities on Waterfront Land".	35	Amended	Amended - Mitigation measure SW24 added - Works on waterfront land are to be undertaken in accordance with the NRAR guidelines for controlled activities on waterfront land. NOTE: Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary. Note: Design considerations are outside the scope of the Construction Soil and Water Management sub-Plan.
8	Primary Erosion and Sediment Control Plans (ESCP's) have been prepared by qualified professionals (CPESCs from the Soil Conservation Service) with potential locations of sediment basins. This provides a good starting level of detail of erosion and sediment control for the project. Progressive ESCPs are yet to be prepared and will be updated throughout the project as per mitigation measure SW6 and AQ02. This is supported. Further definition of terms (e.g. wet versus dry catchment) would be helpful to include in the ESCP legend.	N/A	Noted	Request sent to CPESC, regarding all future Progressive ESCPs prepared - In terms of the Project's Progressive ESCP's, can the CPESC please provide a definition of some of the key terms frequently used thankyou?
9	If groundwater is likely to be intercepted consultation with NRAR is required to determine licensing and approval requirements under the Water Management Act 2000.	35	Amended	Amended - Mitigation measure SW23 added: If groundwater is intercepted or likely to be intercepted during construction works, NRAR must be consulted to determine if licensing and

				/ or approval is required under the Water Management Act 2000.
Narrabri Shire Council				
1	Section 6.4 could potentially include another clause relating to re-assessment of the 14 control measures and new permissions provided by the EM after storms or other severe rainfall events, as this is not mentioned in Section 6.5 – Environmental and Sustainability Inspections.		Addressed	Section 6.4 relates to Hold Points for commencing: ground disturbing activities, discharging water; and reusing stormwater onsite. No formal Hold Point is considered necessary for the process of commencing work after storm events, however Section 6.5 has been updated with additional detail included for post-rainfall inspections. These inspections will include assessment of performance of ERSED controls following runoff from the site and will detail: any actions required; Implementation time frame; and responsibility
2	The CSWMP does not identify a relationship with biodiversity within watercourses and the preservation of such. It is assumed that this is dealt with elsewhere in other Plans, however some assessment should occur of aquatic flora and fauna as part of pre-inspections and development of specific site erosion and sediment control structures in the instance of high biodiversity in a waterhole beneath or adjoining the rail line.		Addressed	Biodiversity requirements (including pre-inspection requirements and preservation/management of aquatic biodiversity values) are detailed in Section 6 of the Construction Biodiversity Management Plan. Additional detail provided in 7.1.1 outlining the rigourous development of ESCPs and implementation of Erosion and Sediment Controls in accordance with the principles identified in the CSWMP will provide reasonable

				and feasible mitigation for aqautic biodiversity.
3	The first comment relates to a review of soil and water control measures, or additional requirements deemed necessary by the EM following severe, high rainfall events to be included in Section 6.4 of the CSWMP. Such events may generate excess run-off and undermine existing controls' integrity, which would need to be appropriately managed at the sites. Review of controls specifically following high rainfall events may be outlined in other management plans, however it is not included in this CSWMP.		Addressed	As per the above comment No formal Hold Point is considered necessary for the process of commencing work after storm events, however Section 6.5 has been updated with additional detail included for post-rainfall inspections. These inspections will include assessment of performance of ERSED controls following runoff from the site and will detail: any actions required; Implementation time frame; and responsibility
4	The second comment is made in relation to the CSWMP and identification of aquatic biodiversity values in the watercourses to be crossed by the rail. It is assumed that most bridges and large culverts will be replaced during the project and therefore a high level of disturbance is expected at such locations. The CSWMP does not specifically relate to such habitats as it presents a construction engineering approach to soil and water management. The relationship between aquatic ecosystems may be identified in other management plans. This is not identified in this CSWMP.		Addressed	As per above comment Biodiversity requirements (including pre-inspection requirements and preservation/management of aquatic biodiversity values) are detailed in Section 6 of the Construction Biodiversity Management Plan. Additional detail provided in 7.1.1 outlining the rigorous development of ESCPs and implementation of Erosion and Sediment Controls in accordance with the principles identified in the CSWMP will provide reasonable and feasible mitigation for aquatic biodiversity.
5	A separate plan has been prepared to outline the process of engaging with the community and stakeholders either involved or potentially impacted by the project. All three Shires impacted by the project are to be consulted prior to, during and post		Noted	

	construction. The Shire may therefore be the point of contact for community engagement other than one on one engagement with landholders adjoining the project or within impact distance of the project.			
6	Section 3 includes a listing of legislation and guidelines that establish the scope and requirements of the CSWMP. Importantly, the guidelines include the "Blue Book" which is the primary guideline used across NSW for determining the correct processes for soil and water management works.		Noted	
7	Section 4 provides a summary of findings related to soil contamination, water quality and a risk assessment process adopted from the EIS investigation based on the results of soil and water surveys along the rail route. The risk assessment list presented in Table 5 is extensive and includes mitigation measures such as maintenance and checking of structures built to reduce soil and water impacts.		Noted	
8	It is noted that NSW Soil Conservation Service was engaged to prepare a Primary Erosion and Sediment Control Plan. This is presented in Appendix B of the CSWMP. This document includes detailed aerial images along the route of the rail to show specific sites of culverts, creeks, waterways and other locations where water may flow beneath the rail line. An extensive range of structures are presented in the document.		Noted	
9	Section 5.1 provides an estimation of total water required for dust suppression and construction purposes. A total of 648 ML of water is required for the whole project. The section within Narrabri Shire is estimated to require 183 ML. Section 5.2.2 discusses the water supply between Narrabri and Penney's Lane. The source of this water is from Narrabri Council. If Council cannot supply this water, alternate supplies		Addressed	Section 5.2 Consultation to date to date with Councils and prospective landowners with WALs indicates that reliable water supply is available to meet project demands.

	of groundwater would be used. The daily rate of use is identified as 0.5 ML. No further detail is offered in relation to reliability or impact of extracting this water. It is assumed that such matters were agreed to with Council prior to development of the CSWMP.			
10	Section 6 outlines responsibilities and training, etc, in relation to developing appropriate soil conservation works during the project. Section 6.4 states that works are on Hold until: o ➢ An Erosion and Sediment Control Plan is developed for specific construction activities prior to work commencing and subject to approval of this plan by the Tran4m Rail Environmental Manager (EM). o ➢ If water is to be discharged, an appropriate permit is to be obtain prior to any discharge occurring. o ➢ Prior to reuse of water on the site, confirmation must be obtained from the EM The process is considered satisfactory for checking any permissions where the use or discharge of water is controlled.		Noted	
11	Section 6.4 could potentially include another clause relating to re-assessment of the control measures and new permissions provided by the EM after storms or other severe rainfall events, as this is not mentioned in Section 6.5 – Environmental and Sustainability Inspections.		Addressed	As per the above comment No formal Hold Point is considered necessary for the process of commencing work after storm events, however Section 6.5 has been updated with additional detail included for post-rainfall inspections. These inspections will include assessment of performance of ERSED controls following runoff from the site and will detail: any actions required; Implementation time frame; and responsibility
12	Section 7 presents a risk management process for the CSWMP. Table 7 provides the details and processes to occur, including the requirement for		Noted	

	Toolbox Talks on a daily basis. The document covers all foreseeable occurrences and conforms to major project standards.			
13	Section 7.2.1 relates to monitoring of water usage. This is noted to be of concern to parts of the community, following the drought which commenced in early 2017 and the lack of freely available water in the region until December 2020. An external report identified the potential to use 1,215 ML of water for the whole N2NS project, but Trans4m Rail has identified potential water savings to reduce this. There is a significant difference between 658 ML and 1,215 ML as presented in the water balance in Section 5.1. However, Section 7.2.1 provides a monitoring process. Use of water will be highly variable for dust control. Water use may increase substantially in a dry period of construction.		Addressed	Drought concerns are noted and Section 5.2.4 proposes supplementary water sources and savings for investigation and implementation during periods of drought
14	In general terms, the use of between 648 ML and 1,215 ML of water is not considered a significant volume when compared to the regional irrigation industry, stock water use and other industrial users of water. However, the monitoring will need to concentrate on smaller water sources.		Noted	
15	Section 7.2.2 presents an outline of air monitoring for the project. It is noted that background data was generated from the Tamworth air quality monitoring station as this is the only local source of air quality data. Air quality monitoring is to include deposited dust gauges and static air quality monitoring photometers to be established along the route of the rail project. The location of these monitors is not identified, other than representative locations. This is considered satisfactory. Some dust will be generated from haul roads and during construction if insufficient moisture is applied. The dust will become a safety issue and therefore should be dealt with under daily		Noted	

	operations procedures. Dust management by either water suppression or gravel pavement of dusty areas may be implemented to limit the adverse impacts associated with dust generation.			
16	Section 7.2.3 describes the requirements for water monitoring. Importantly, monitoring includes both permanent and ephemeral streams. After a rain event, the monitoring will include upstream and downstream samples on a range of ephemeral watercourses. There is a substantial number of ephemeral watercourses to be crossed by the development and being smaller systems, the impact of silt resulting from the disturbed area of the rail corridor would have a more significant impact when compared to a minor silt incident in one of the local, major riversystems. The standard for a noncompliance issue is identified as a >10-percent variation in water quality parameter. This is considered as a standard approach. The CSWMP does not identify a relationship with biodiversity within watercourses and the preservation of such. It is assumed that this is dealt with elsewhere, however some assessment should occur of aquatic flora and fauna as part of pre inspections and development of specific site erosion and sediment control structures in the instance of high biodiversity in a waterhole beneath or adjoining the rail line.		Addressed	As per above comment Biodiversity requirements (including pre-inspection requirements and preservation/management of aquatic biodiversity values) are detailed in Section 6 of the Construction Biodiversity Management Plan. Additional detail provided in 7.1.1 outlining the rigorous development of ESCPs and implementation of Erosion and Sediment Controls in accordance with the principles identified in the CSWMP will provide reasonable and feasible mitigation for aquatic biodiversity.
17	Section 8 deals with relevant sustainability standards. This section provides principal standards based on referrals to relevant agencies and principles to be adopted for the construction project.		Noted	
18	A protocol has been developed for dealing with contamination, principally asbestos, encountered during the project. It is noted that only one site was identified to contain asbestos issues. The protocol follows standard processes and importantly,		Noted	

	engagement of an asbestos specialist if asbestos is encountered at a level of more than 10-fragments per square metre. This is considered an acceptable approach.			
Gwydir Shire Council				
1	The only comment Gwydir Shire Council has on the Soil and Water Management Sub-Plan is that table 5.3 in the Soil and Water Management Plan, which describes where they will get water between Camurra and North Star, is missing. There is 269 megalitres as a minimum required for this section but it has not been identified where it is coming from.	25&26	Yes	Section 5.2.3 and Section 5.2.4 describe where water will be sourced from.

ER Endorsement Letter

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13 February 2021

Sam Blanco
Senior Environment Advisor - N2NS Project
Inland Rail - Australian Rail Track Corporation
Level 16, 180 Ann Street
Brisbane QLD 4000

Dear Sam,

Inland Rail: ER Endorsement of SWMP for Narrabri to North Star Project (SSI-7474) - Condition A28

SSI 7474 Condition of Approval (CoA) A28 (d) requires the Environmental Representative (ER) to endorse the Soil and Water Management Sub Plan (SWMP) - prepared in accordance with CoA C4, C5, C6, C10, C14, C15 and C16 of the SSI Approval for the Project - prior to its submission to the Secretary for approval.

The table below sets out where and whether, in our view, each of the mandatory SWMP content requirements of the SSI Approval have been addressed (*some conditions in the table below have been paraphrased to better suit the context of this letter but their intent remains unchanged*).

CoA Requirements	Where addressed in SWMP	ER Comments
C4: The SWMP must be prepared in consultation with the relevant government agencies and relevant councils identified for each CEMP Sub-plan and be consistent with the CEMP referred to in the EIS. *The SWMP must be prepared in consultation with relevant councils, Water Group, and EES.*	Section 2.1 and Appendix A	Satisfactorily addressed, subject to the Plan being amended to make environmental monitoring results publicly available as per Moree Shire Council's request. We note that the Water Group of DPIE has not provided comments on the Plan, although NRAR has provided wide ranging comments across the water management and regulation space. The Project appears to have made numerous attempts to obtain comments from the Water Group over a considerable period of time. We agree

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CoA Requirements	Where addressed in SWMP	ER Comments
		with the note in Section 2.1 of the Plan that in the event comments are received from the Water Group, that this would automatically trigger a review of the Plan.
C5: The SWMP must state how:		
a) the environmental performance outcomes identified in the documents listed in Condition A1, as modified by these conditions, will be achieved	Compliance Matrix, Table 3 Section 3.3	Satisfactorily addressed
b) the mitigation measures identified in the documents listed in Condition A1, as modified by these conditions will be implemented	Table 2 Sections 3.3, 6, 7	Satisfactorily addressed
c) the relevant terms of this approval will be complied with	Table 1	Satisfactorily addressed
d) issues requiring management during construction (including coordination of concurrent activities of other projects as well as concurrent activities in this CSSI), as identified through ongoing environmental risk analysis, will be managed	Section 4.3, 7 Table 11	Satisfactorily addressed
C6: The CEMP Sub-plans must be developed in consultation with relevant parties identified in Condition 0. Details of all information requested by an agency to be included in a CEMP Subplan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-plan	Section 2.1 Appendix A	See comment in C4 above
C10: The SWMP must include:		
a) a draft water balance for the project	Section 5.1	Satisfactorily addressed. We note that while the construction water estimate of 648ML is significantly higher than the 150ML in the EIS, the higher figure is more consistent with the level of actual construction water

CoA Requirements	Where addressed in SWMP	ER Comments
		use recorded on the Parkes to Narromine Project and is therefore more realistic.
b) information demonstrating that the required construction water resources are legally and physically available	Section 5.2	Satisfactorily addressed
c) mitigation measures to address construction water resource shortages that arise	Section 5.2.4	Satisfactorily addressed
C14: The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies and relevant councils identified for the Construction Monitoring Programs to compare actual performance of construction of the CSSI against performance predicted in the documents specified in Condition A1: *Water usage – Water Group*	Section 2.1	See comment in C4 above.
C15: Each Construction Monitoring Program must provide:		
a) details of baseline data available	Section 7.2	Satisfactorily addressed
b) details of any baseline data to be obtained and when	Section 7.2	Satisfactorily addressed
c) details of all monitoring of the CSSI to be undertaken	Section 7.2	Satisfactorily addressed
d) the parameters of the CSSI to be monitored	Section 7.2	Satisfactorily addressed
e) the frequency of monitoring to be undertaken	Section 7.2 Appendix D	Satisfactorily addressed
f) the location of monitoring	Section 7.2 Appendix D	Satisfactorily addressed
g) the reporting of monitoring and analysis results against relevant criteria	Section 7.2 Appendix D	Satisfactorily addressed, subject to the Plan being amended to make environmental monitoring results publicly available as per Moree Shire Council's request.

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CoA Requirements	Where addressed in SWMP	ER Comments
h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory	Section 7.2	Satisfactorily addressed
i) any consultation required in relation to the monitoring programs	Section 7.2	Satisfactorily addressed
C16: The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C14 of this approval and must include information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program		See comment in C4 above
C17: The Construction Monitoring Program must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one month before the commencement of construction.	Section 7.2 Appendix D	Satisfactorily addressed

In accordance with the requirements of CoA A28 (d) we hereby endorse Revision E of the SWMP (dated 11 February 2021), for its submission to the Secretary for approval subject to the following:

- The Plan being amended to make environmental monitoring results publicly available as per Moree Shire Council's request; and
- In the event that comments are received from the Water Group of DPIE, the Plan be automatically reviewed and revised as necessary.

Should you have any queries or require further information please do not hesitate to contact Derek Low or I on the details below.

Yours sincerely,

Steve Fermio
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1 of 2
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Appendix B : Primary Erosion and Sediment Control Plan

PRIMARY EROSION AND SEDIMENT CONTROL PLANS
NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING LIST:

ECS-000 - ESC-001	COVER SHEET AND NOTES
ESC-002 - ESC-028	TYPICAL ARRANGEMENT (ESC) OF RAIL CORRIDOR
ESC-029 - ESC-031	EROSION RISK ASSESSMENT
ESC-032 - ESC-041	STANDARD DETAILS
ESC-042 - ESC-045	TYPICAL EROSION AND SEDIMENT CONTROLS

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED TO INCLUDE DRAWING LIST	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
COVER SHEET

North

0km 5km 10km 20km

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-000
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

This Primary Erosion and Sediment Control Plan has been prepared, reviewed and approved by suitably trained and experienced personel.
CPESC certification relates to:

James Trevillion: CEPSC8726
Brett Hanley: CPESC 7060

This Management Plan has been prepared in accordance with the following documentation:

Managing Urban Stormwater: Soils and Construction – Volume 1 (4th edition), Landcom 2004
Best Practice Erosion and Sediment Control, IECA 2008

NOTES:

1. This plan has been prepared to provide guidance in preventing erosion and capturing sediment laden runoff throughout all phases of construction on the Narrabri to North Star Inland Rail Separable Portion 1 project. It should be read in conjunction with the overarching Construction Environmental Management Plan, Soil and Water Management Plan and Progressive Erosion and Sediment Controls Plans.
2. The Erosion and Sediment Control Plan has been structured according to the following framework. Consideration has been given to multiple stages of construction.
   a. Standard detail for the installation of drainage, erosion and sediment control for low risk or typical portions of the alignment, including cut, fill and balance sections.
   b. Standard detail for stockpile and laydown areas
   c. Site specific detail for high risk, or complex areas of construction, including:
      - Bridges
      - Culverts
      - Site access points
      - Level crossings
      - Typical cut and fill
      - Temporary sediment basins (Type D)
      - Earth Bunds
3. Controls indicated on plans are indictive only and the exact location of controls can and should be adjusted to suit conditions on ground. More significant changes (including removal of controls or change of standard) should be conducted in consultation with Soil Conservation Service.
4. Where possible, activity disturbing the ground should be limited to areas of active works, with existing ground cover retained as long as possible.
5. Dust shall be managed in accordance with the air quality requirements within the Soil and Water Management Plan, including but not limited to:
   - Minimising disturbance
   - Applying ground cover, particularly in high traffic areas
   - Active dust suppression (water, mulch polymer options)
   - Limiting disturbance activities during high winds
6. Sediment loads on public roads are to be monitored and removed appropriately (street sweeper for sealed or alternative adopted method for unsealed)

MONITORING AND MAINTENANCE:

* Inspect all controls prior to anticipated rainfall and before end of day following rain during normal work hours; or
* If rain falls outside normal working hours, inspect within 24 hours of the start of all rainfall events that cause runoff to occur, or whenever rainfall exceeds 10mm in a 24 hour period, and during periods of prolonged rainfall.
* Rectify any major defects as soon as practicable:
* - Sediment fence – check and repair tears, holes, dislodged or sagging, silt load.
* - Sediment traps/sumps – check capacity, leakage, functionality during rainfall.
* - Tracks – excessive rutting and scouring; mud tracking; shakedown areas; adequate cross-fall and flow directed to sumps; weakness in any runoff control banks.
* - Waterway crossings – pipe blockages, crossing stability if overtopped, related runoff and sediment controls
* In addition, inspect all sediment controls weekly and clean out and maintain as required.
* Any stockpile sites to be inspected and maintained at least weekly; rectify any defects to erosion and sediment controls immediately. Keep a register of all inspections performed and of maintenance or repairs carried out.
* Maintain sediment control structures (sed fences, traps, sumps etc) so that no more than 30% of their design capacity is lost to accumulated sediment; repair/replace when controls lose function or show risk of failure.
* Maintain all erosion controls, repairing torn or damaged fabrics and reapplying binders where applicable
* Dispose of removed material (silt, slurry, dirty water) so as to prevent pollution to down slope lands and waterways.
* Excessive dust
* - Trucks entering and exiting the project to be covered (excluding log trucks)
* - Use water carts to dampen haul roads, stockpiles and cleared catchments as required (entry and exit)

LEGEND

Bridge

Level Crossing

Culvert

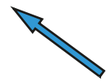
Indicative Wet Catchment Boundary

Indicative Catchment Boundary

C12

Catchment Lable

Indicative Loop



Indicative Direction of Runoff

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REARRANGED DRAWING ORDER, MINOR CHANGES TO NOTES AND UPDATED LEGEND	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
NOTES

North

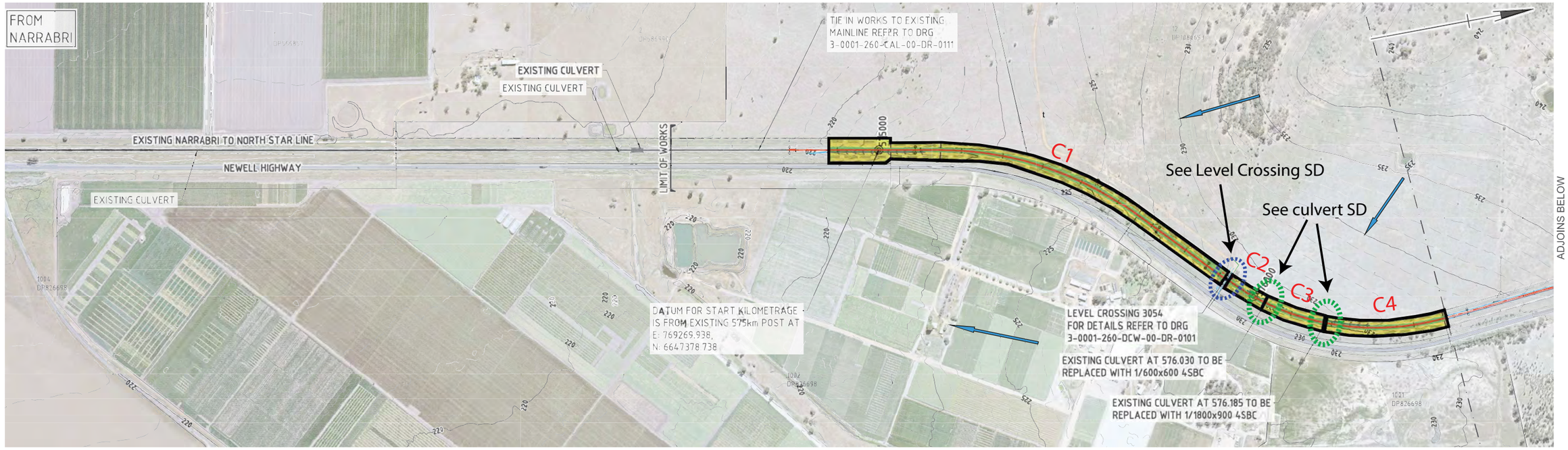
-km -km -km -km

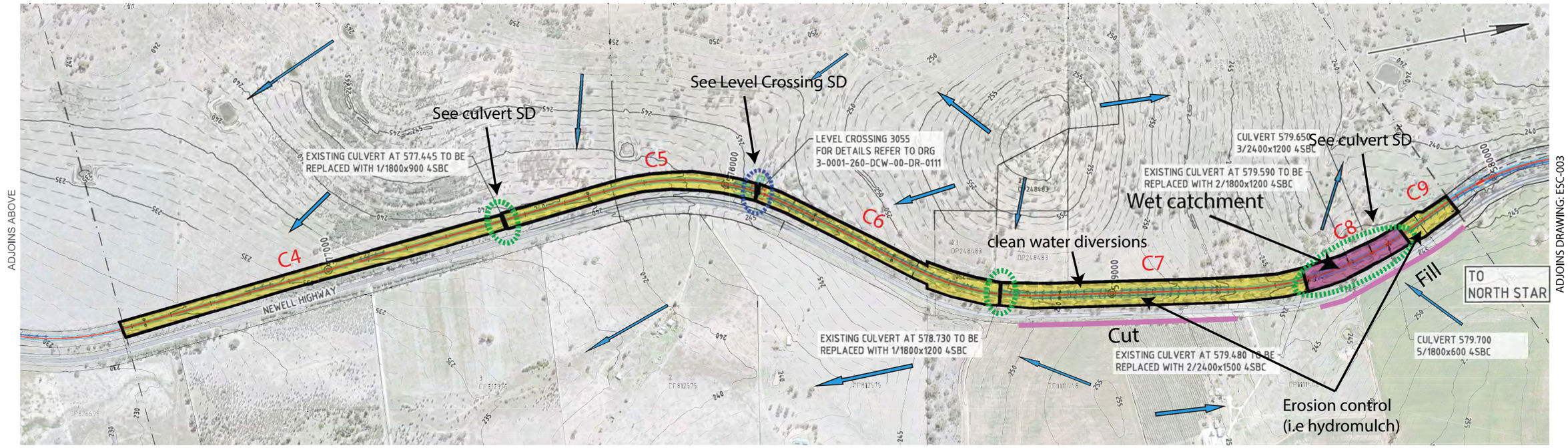
SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732
DRAWING NO. ESC-001
REVISION B
DRAWN BY SCS DATE 01/10/2020
APPROVED BY SCS DATE 01/10/2020
CPESC CPESC: 8726
CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN CATCHMENTS C1 - C9

North

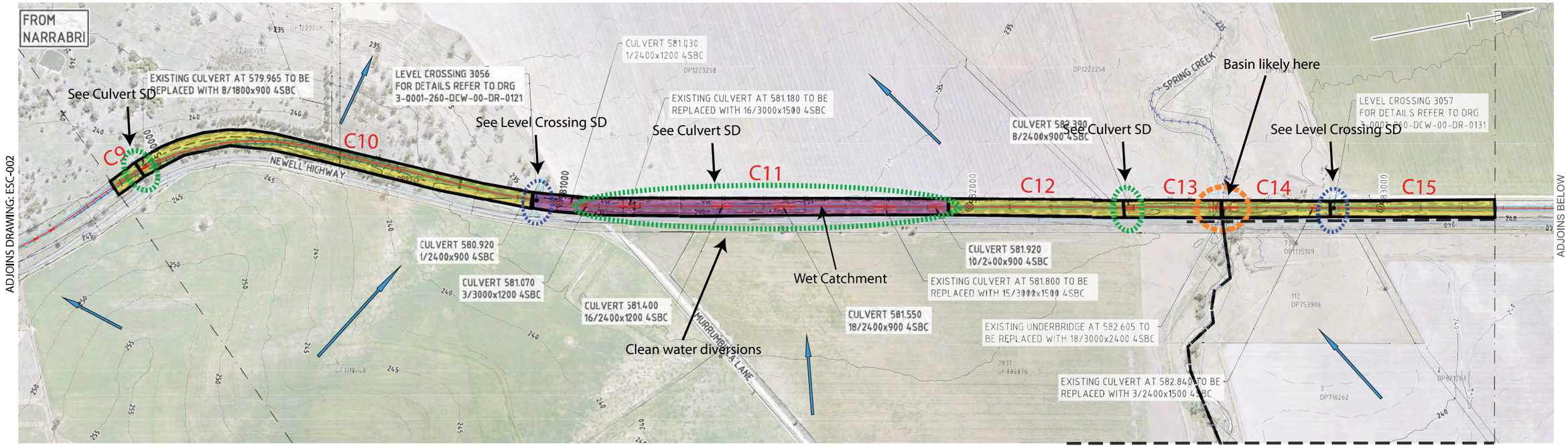
0m 100m 200m 400m 600m

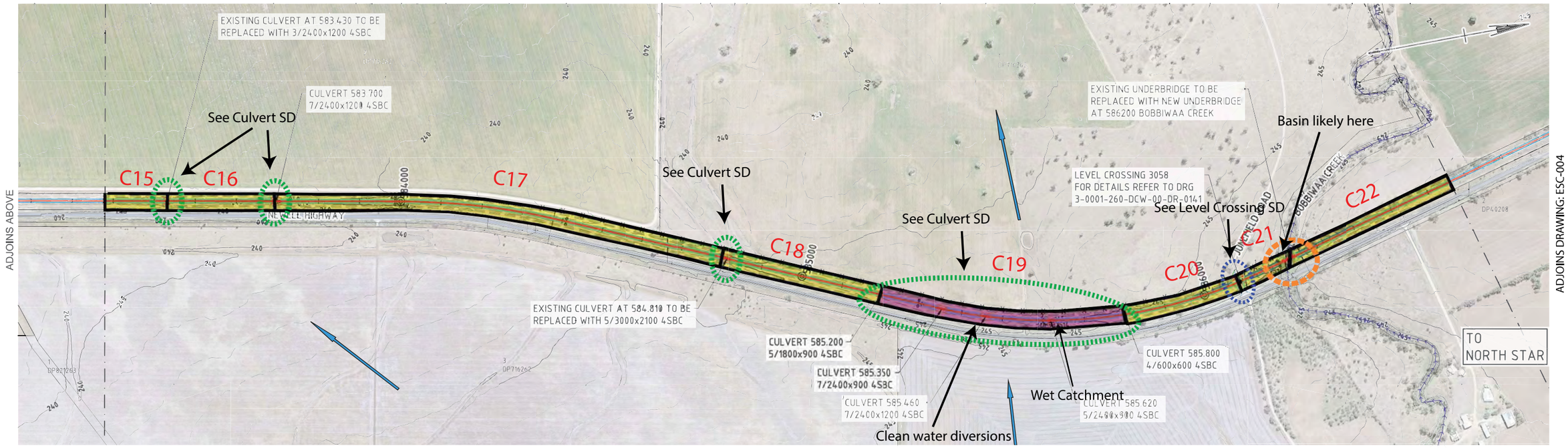
SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-002
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C9 - C22

North

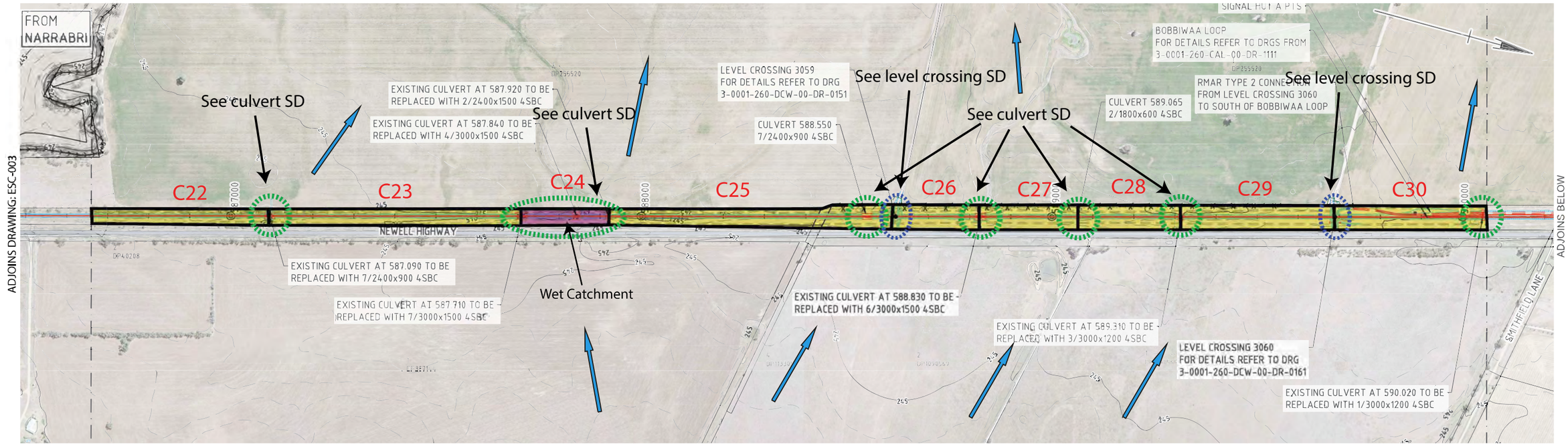
0m 100m 200m 400m 600 m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-003
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN CATCHMENTS C22 - C36

North

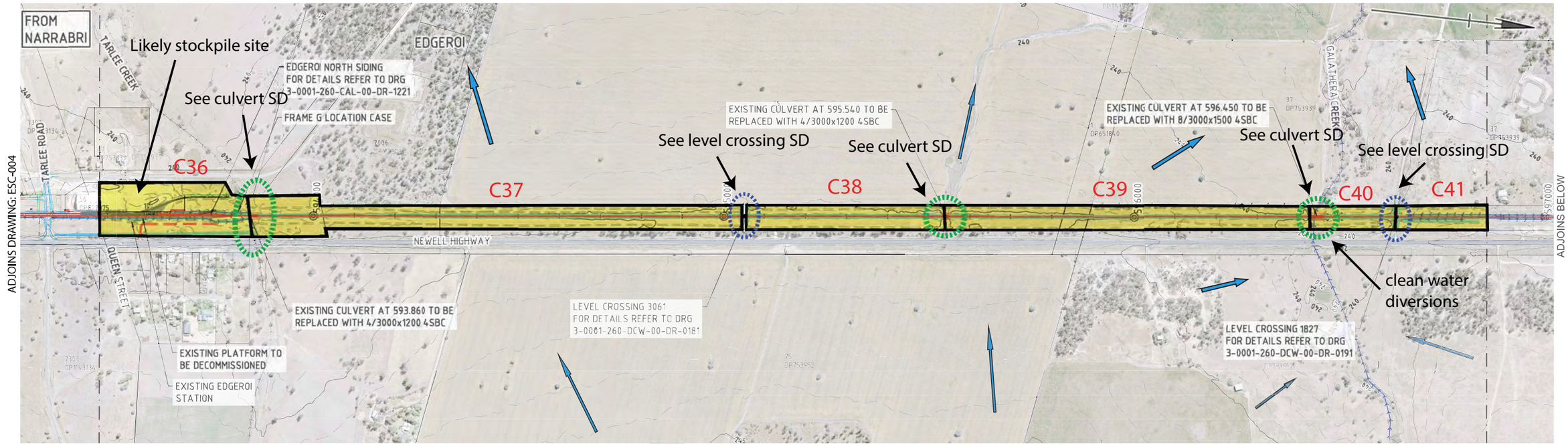
0m 100m 200m 400m 600m

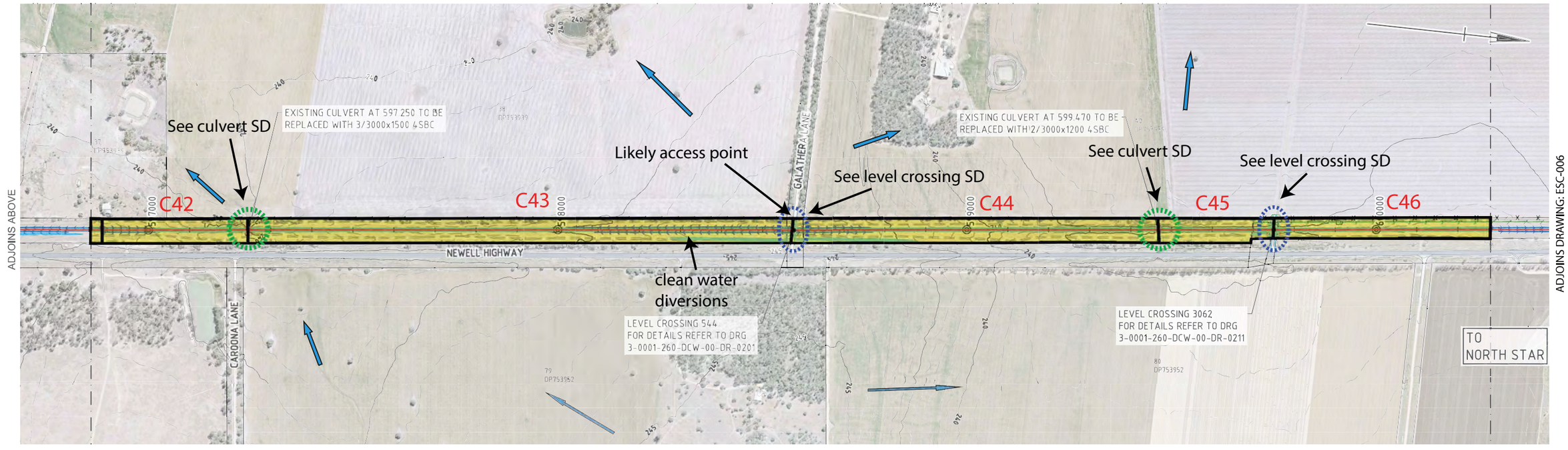
SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-004
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT
Trans4m Rail

PROJECT
NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE
PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C36 - C46

North

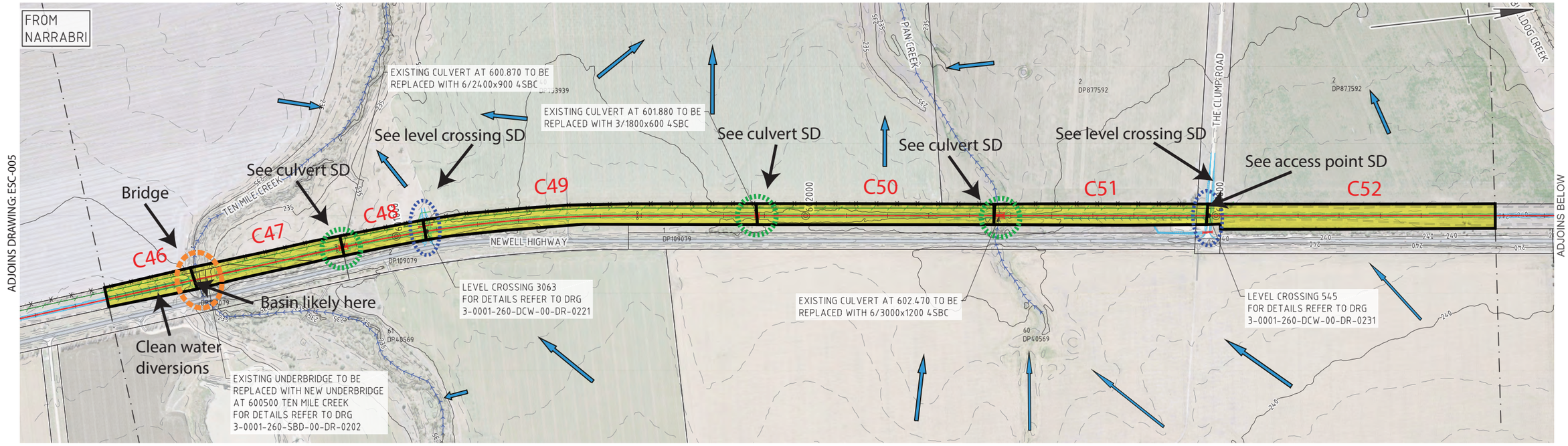
SCALE 1:10,000

AT A3

0m 100m 200m 400m 600m

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-005
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C46 - C54

North

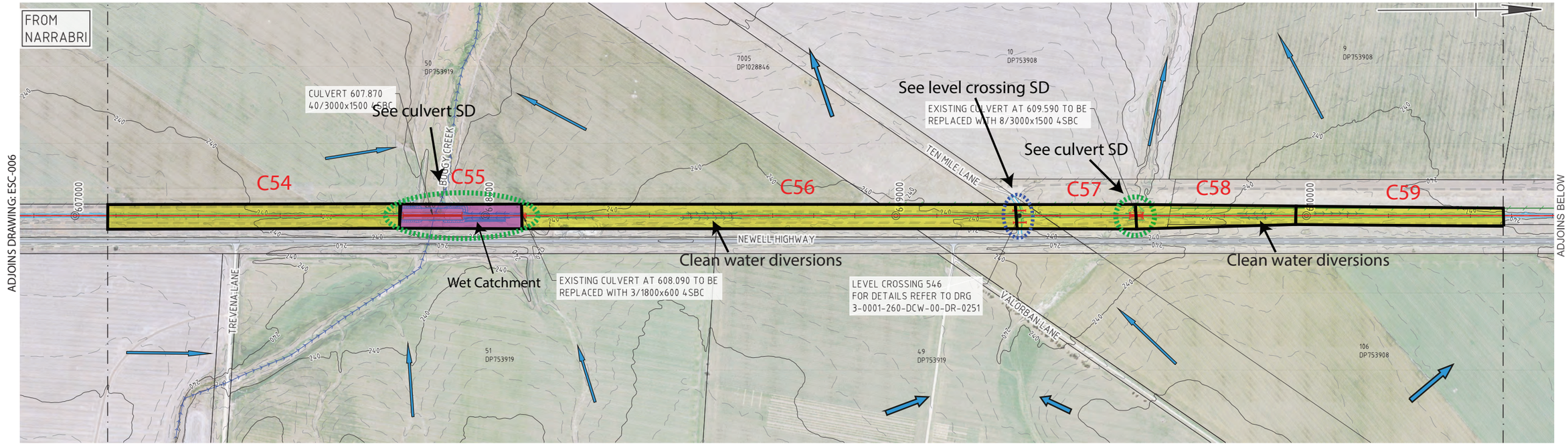
SCALE 1:10,000

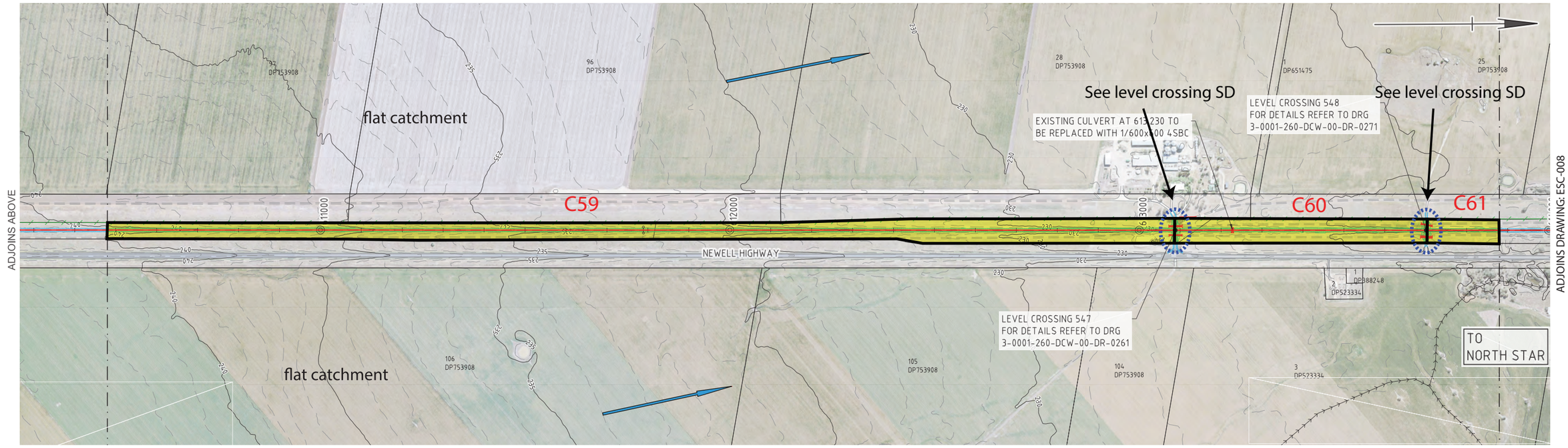
0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-006
REVISION	B
DRAWN BY SCS	DATE 30/09/2020
APPROVED BY SCS	DATE 30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C54 - C61

North

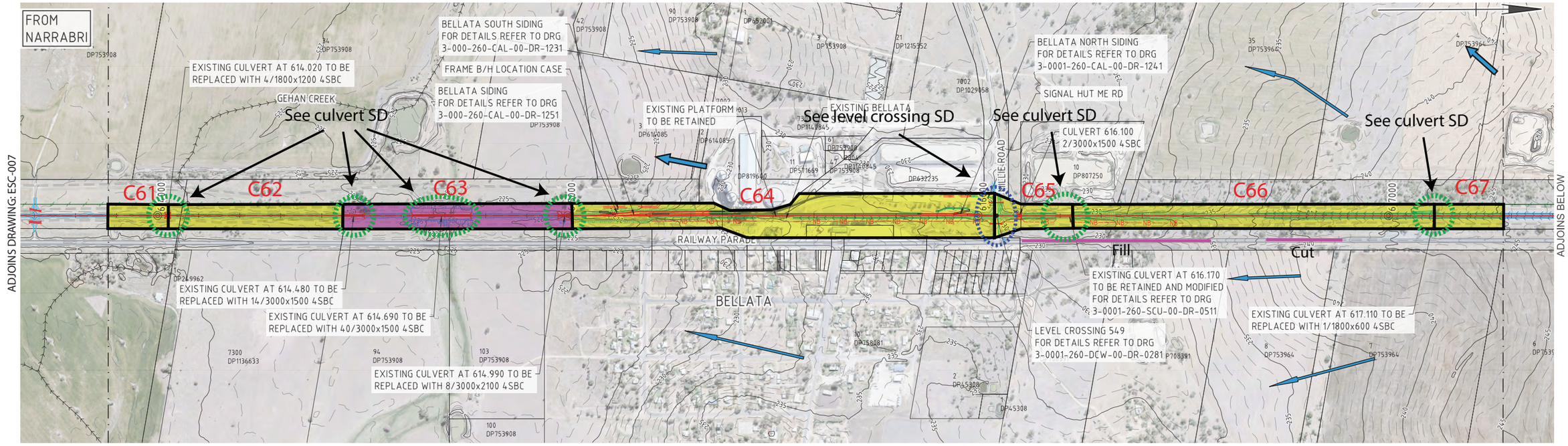
SCALE 1:10,000

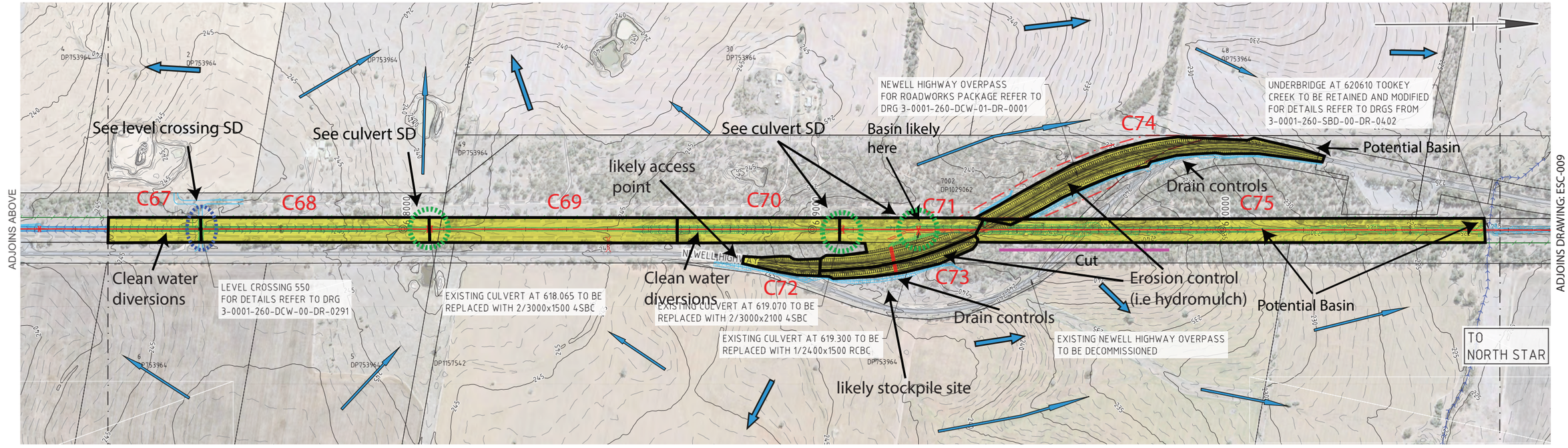
AT A3

0m 100m 200m 400m 600m

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-007
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN CATCHMENTS C61 - C75

North

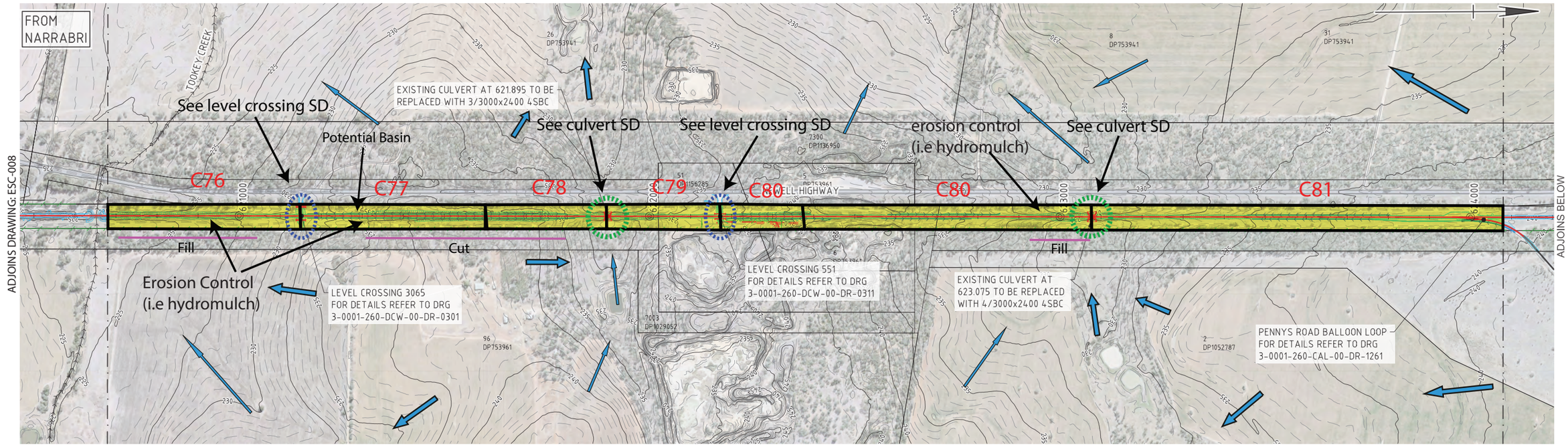
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-008
REVISION	B
DRAWN BY SCS	DATE 30/09/2020
APPROVED BY SCS	DATE 30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN CATCHMENTS C76 - C84

North

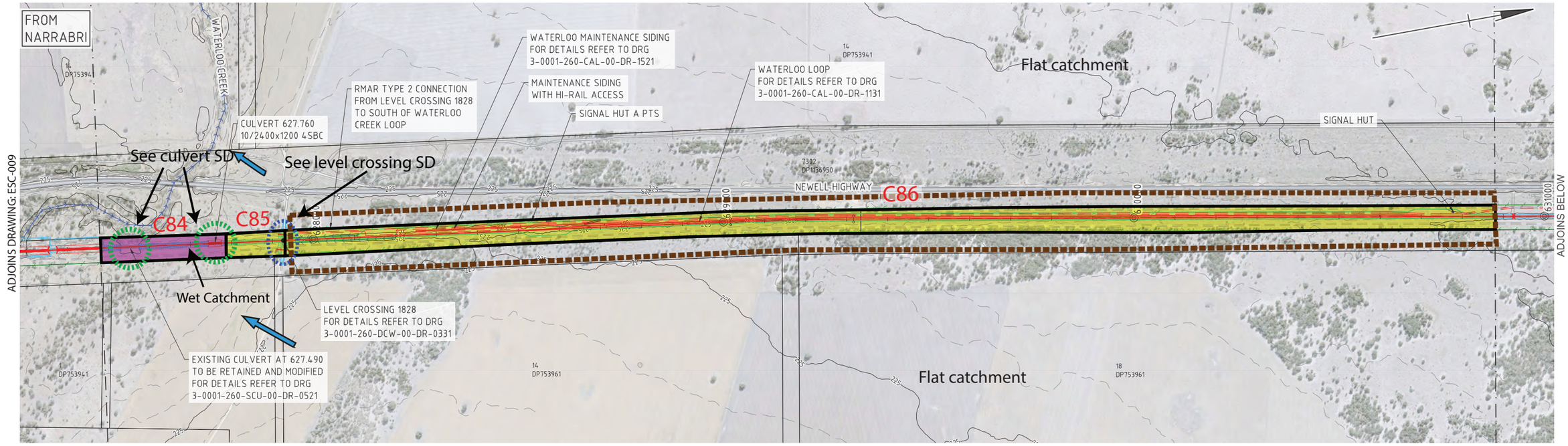
0m 100m 200m 400m 600m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-009
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C84 - C89

North

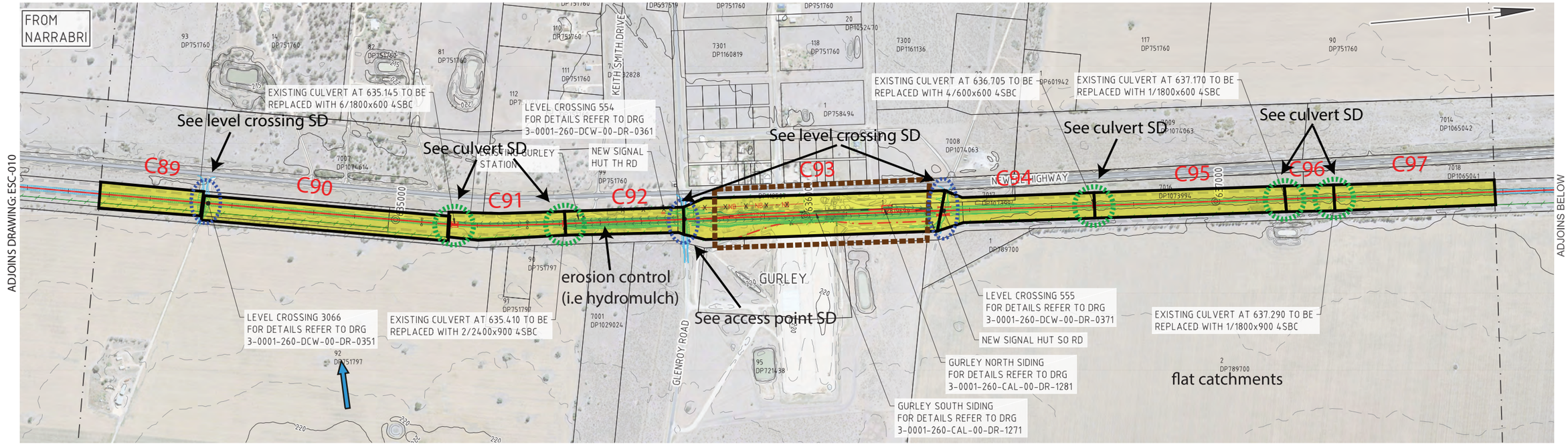
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-0010
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C89 - C102

North

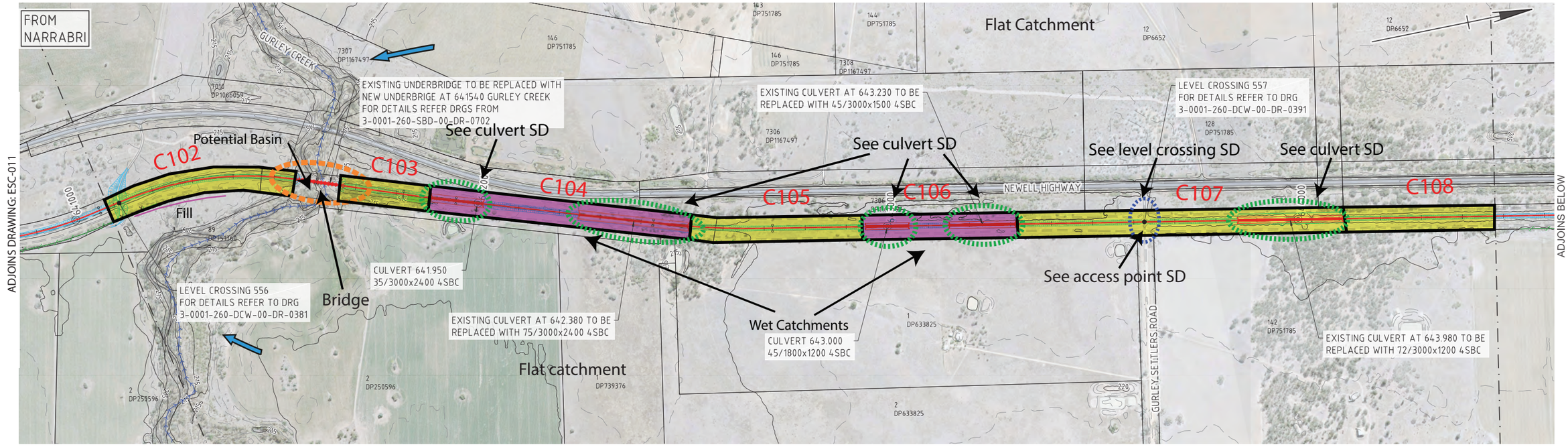
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-011
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
A	ORIGINAL ISSUE	SCS	25/09/2020
A	REVISION	SCS	30/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN CATCHMENTS C102 - C116

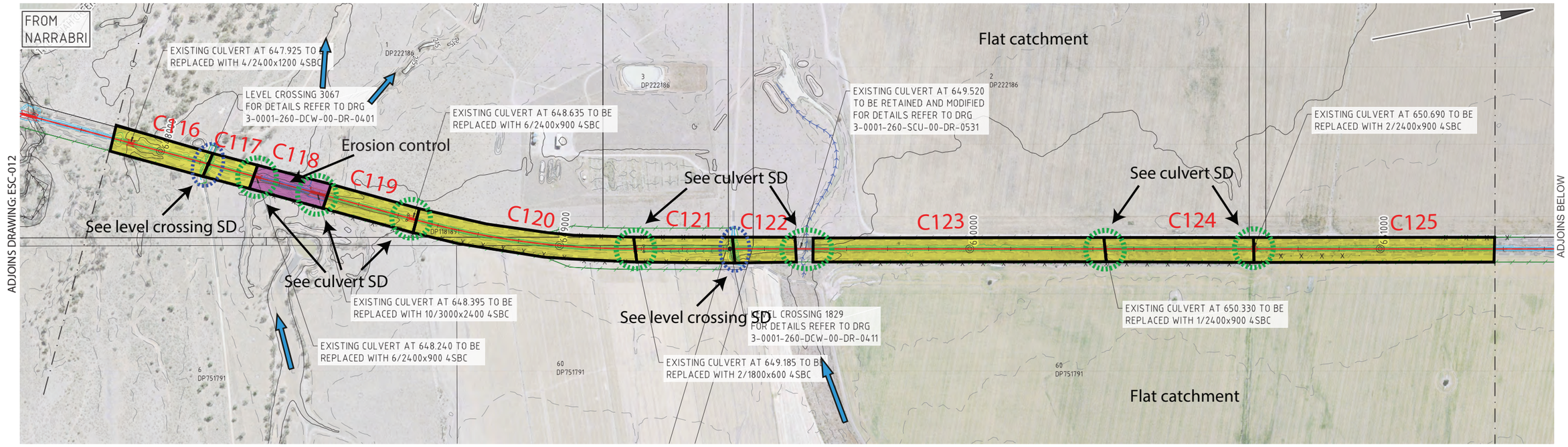
0m 100m 200m 400m 600m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-012
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C116 - C130

North

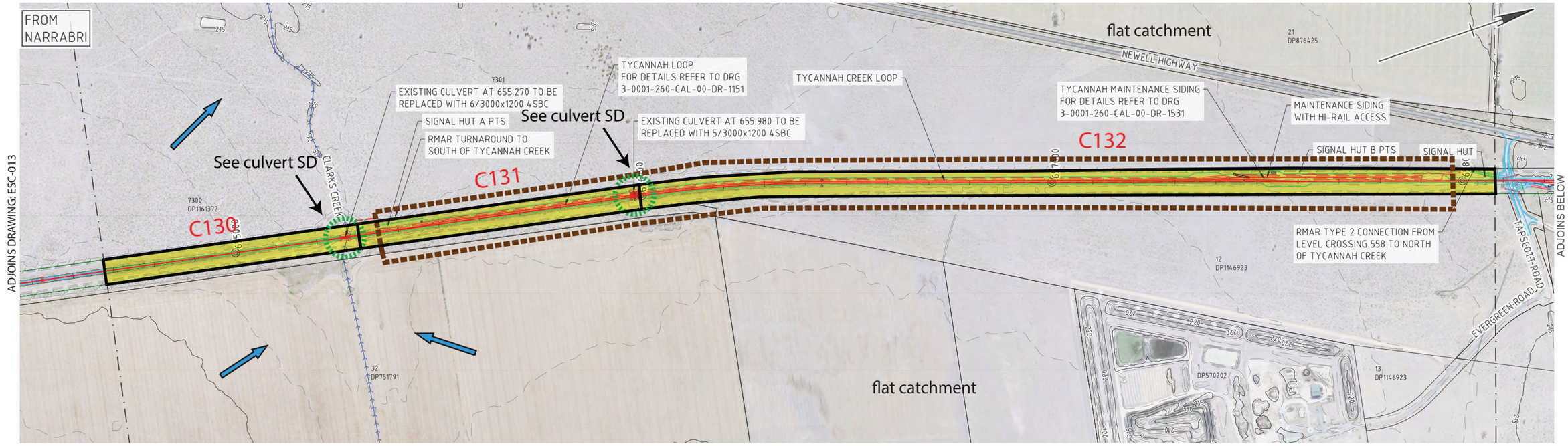
0m 100m 200m 400m 600m

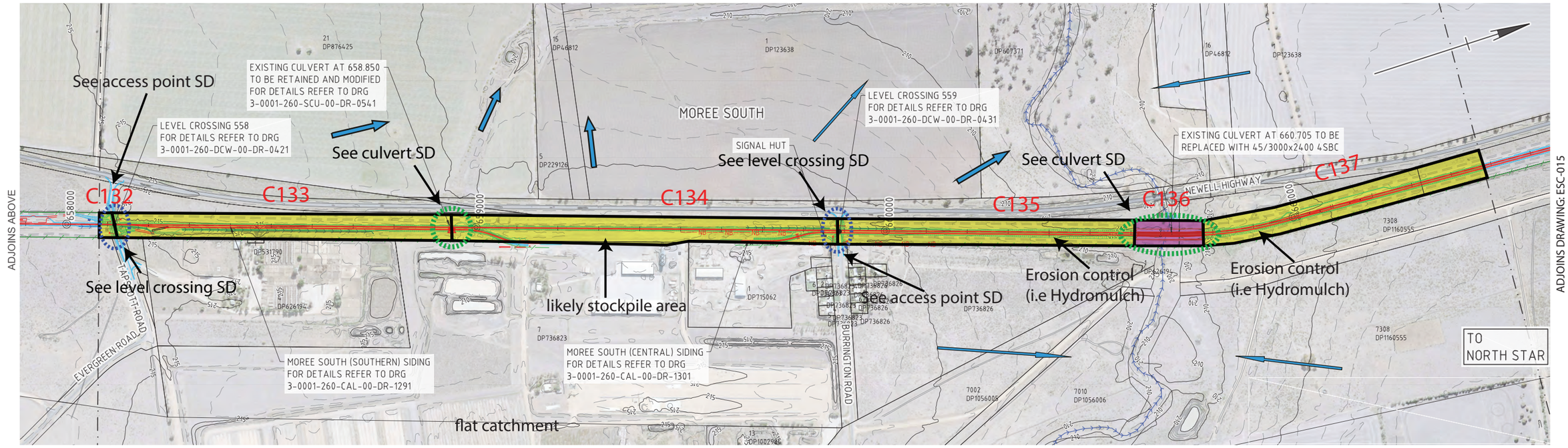
SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-013
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
A	REVISION	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT
Trans4m Rail

PROJECT
NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE
PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C130 - C137

North

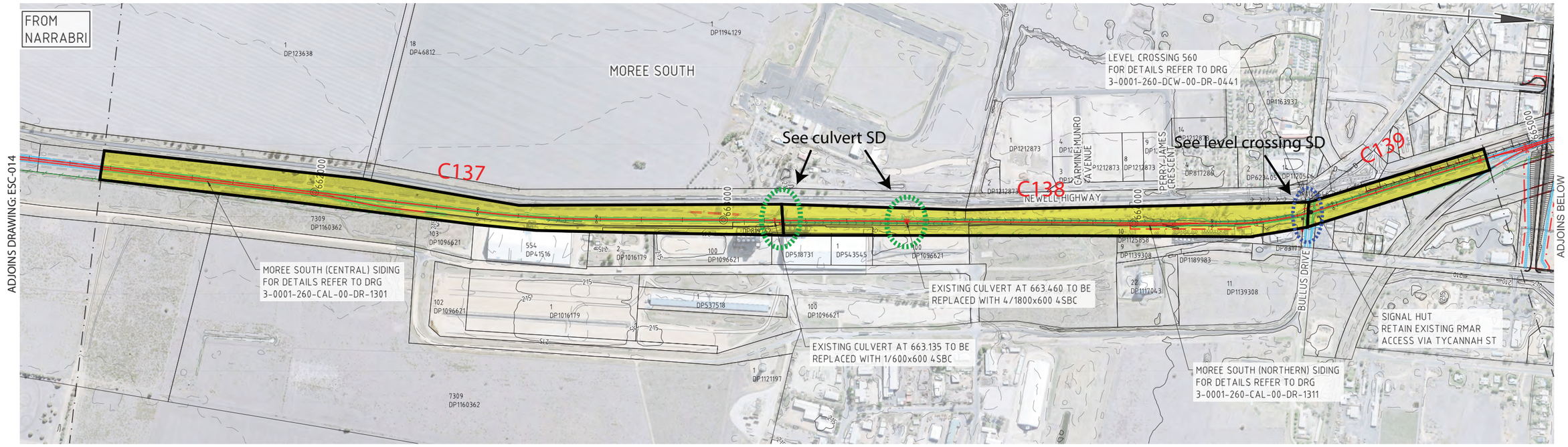
SCALE 1:10,000

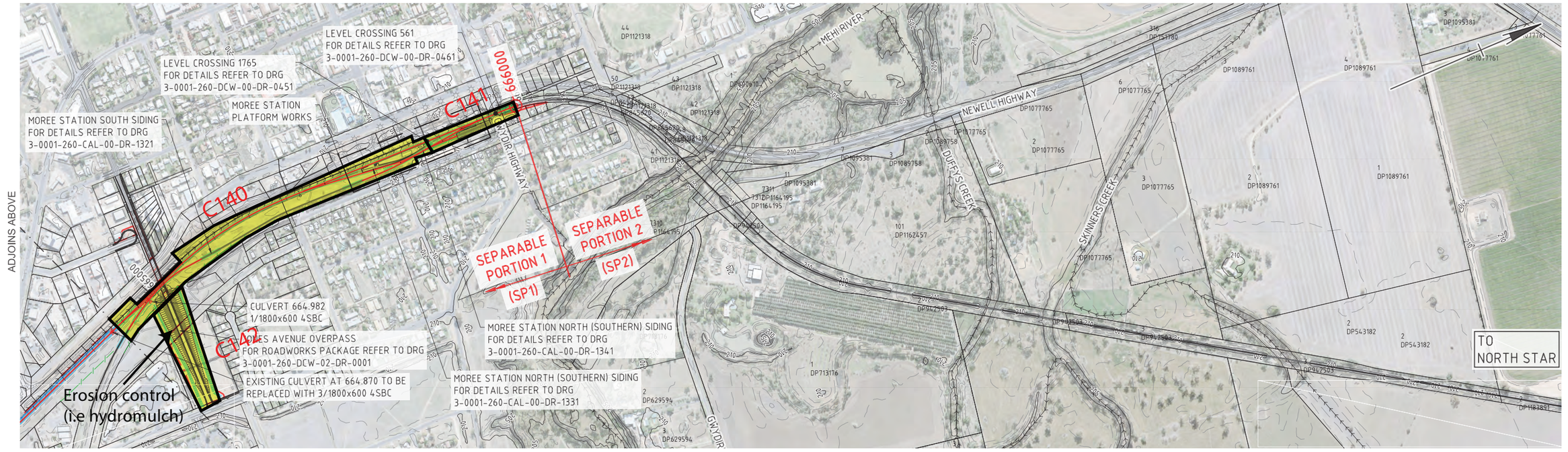
0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-014
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	30/09/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C137 - C142

North

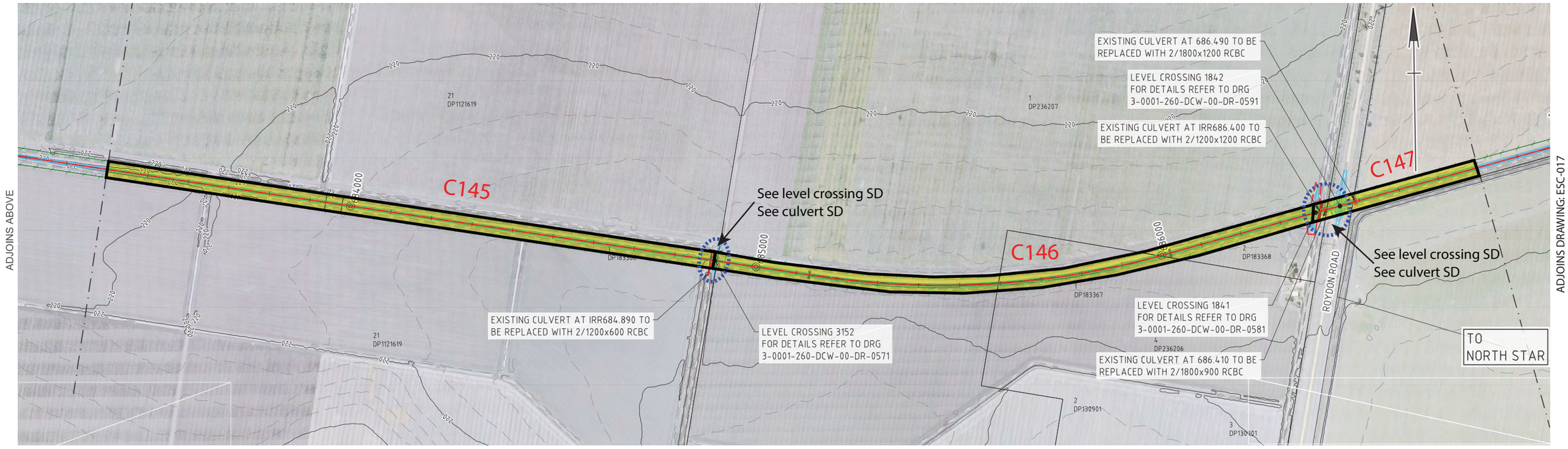
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-015
REVISION	B
DRAWN BY	SCS
DATE	30/09/2020
APPROVED BY	SCS
DATE	30/09/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT
Trans4m Rail

PROJECT
NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE
PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C143 - C147

0m 100m 200m 400m 600m

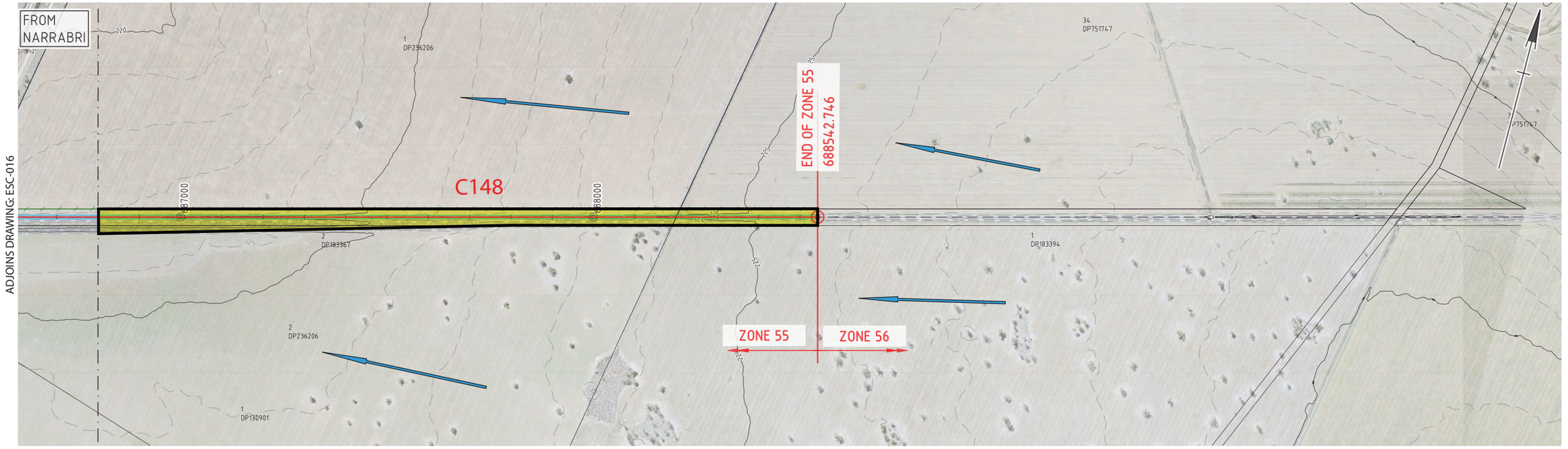
North

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-016
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C148 - C151

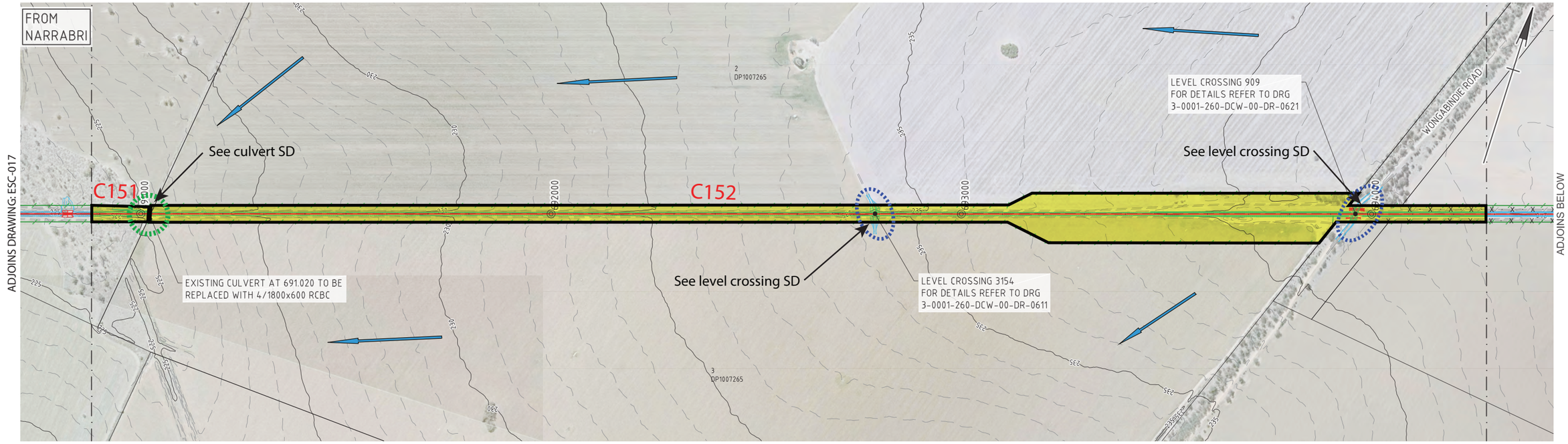
0m 100m 200m 400m 600m

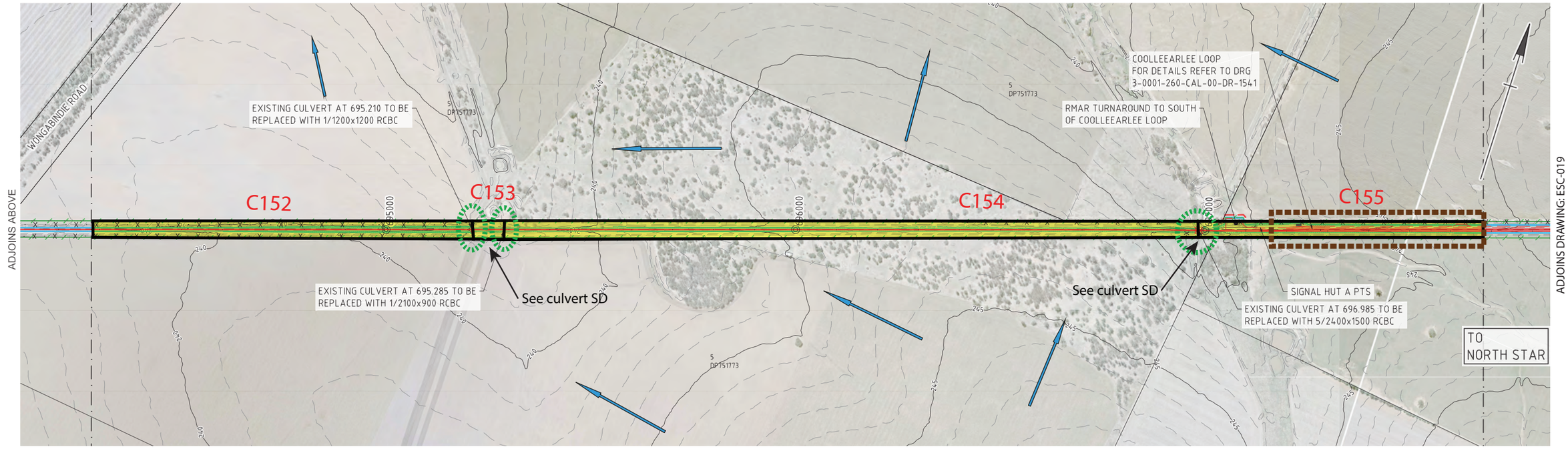
SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-017
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C151 - C155

North

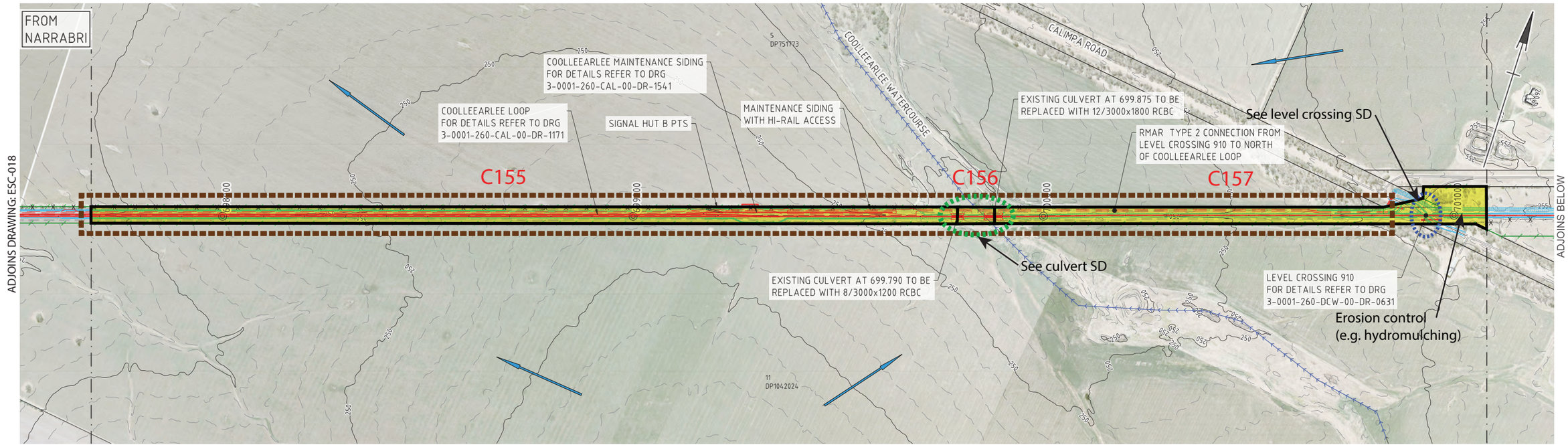
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-018
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT
Trans4m Rail

PROJECT
NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE
PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C155 - C160

North

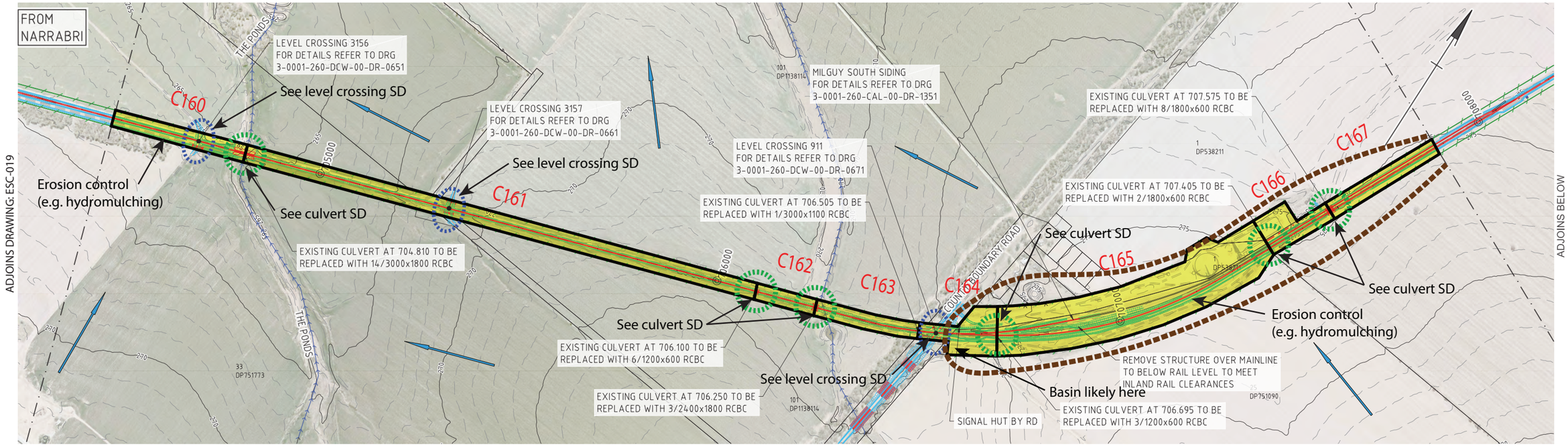
SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-019
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C160 - C169

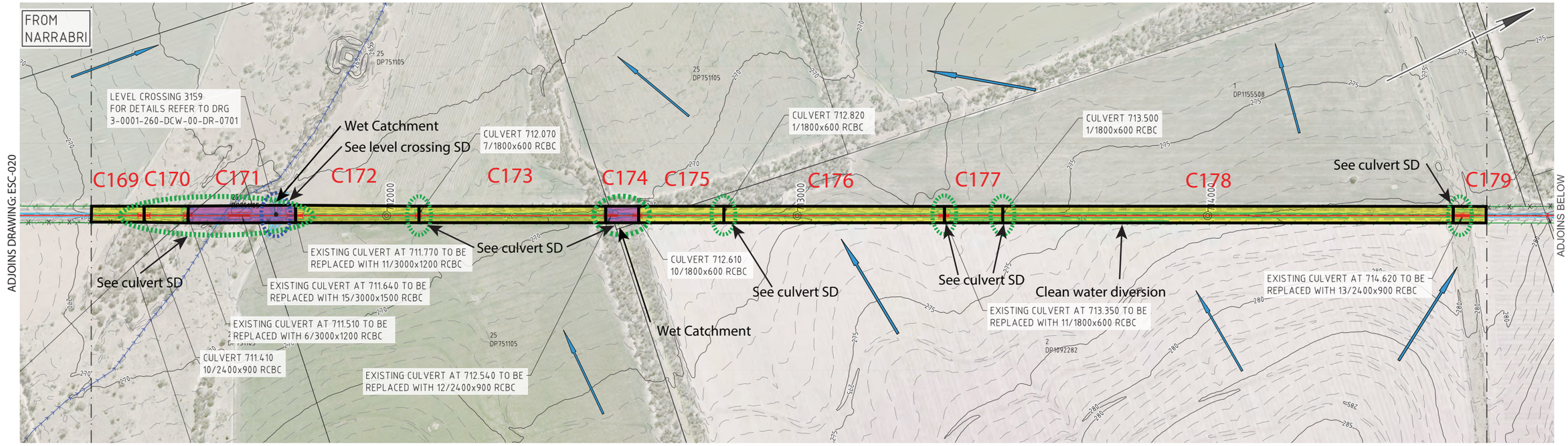
0m 100m 200m 400m 600m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-020
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT

Trans4m Rail

PROJECT

NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE

PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C169 - C184

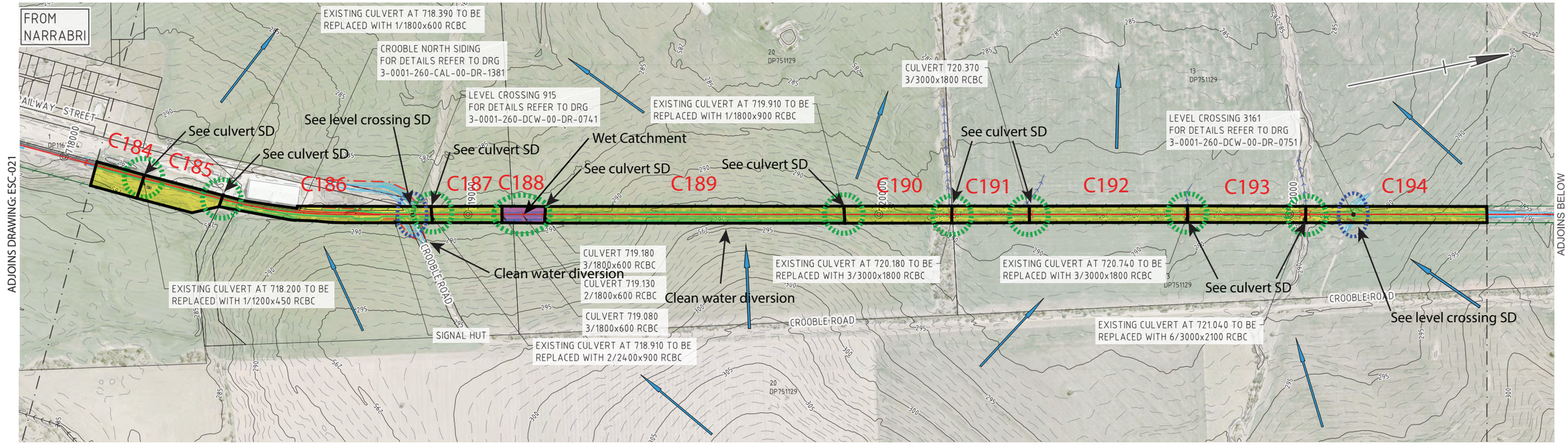
0m 100m 200m 400m 600m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-021
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISED	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C184 - C200

North

0m 100m 200m 400m 600m

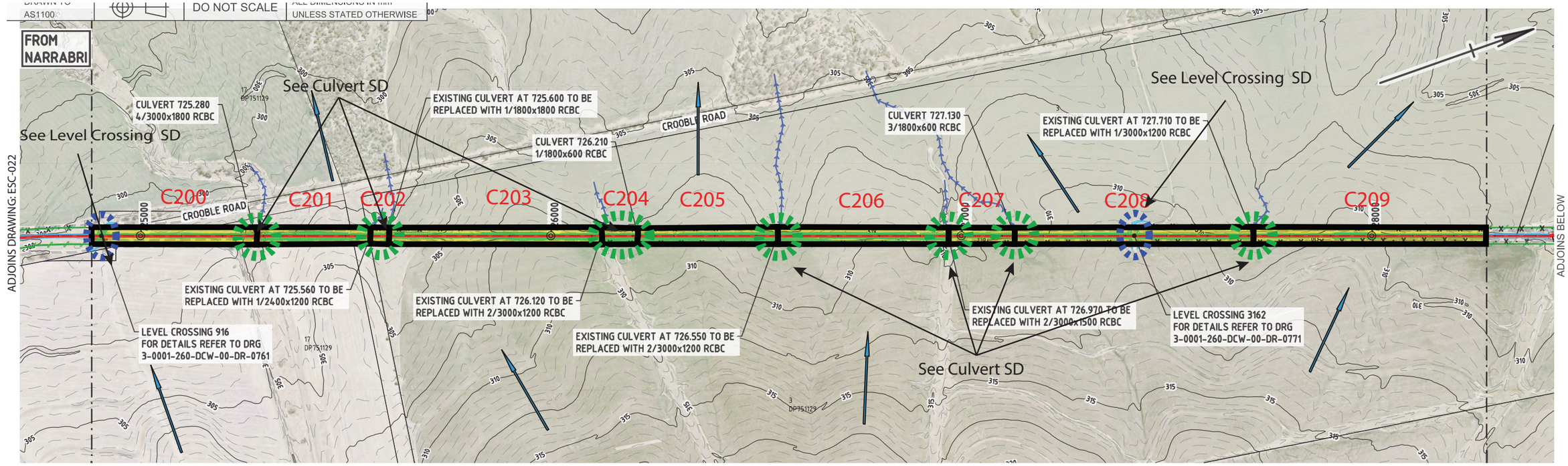
SCALE 1:10,000

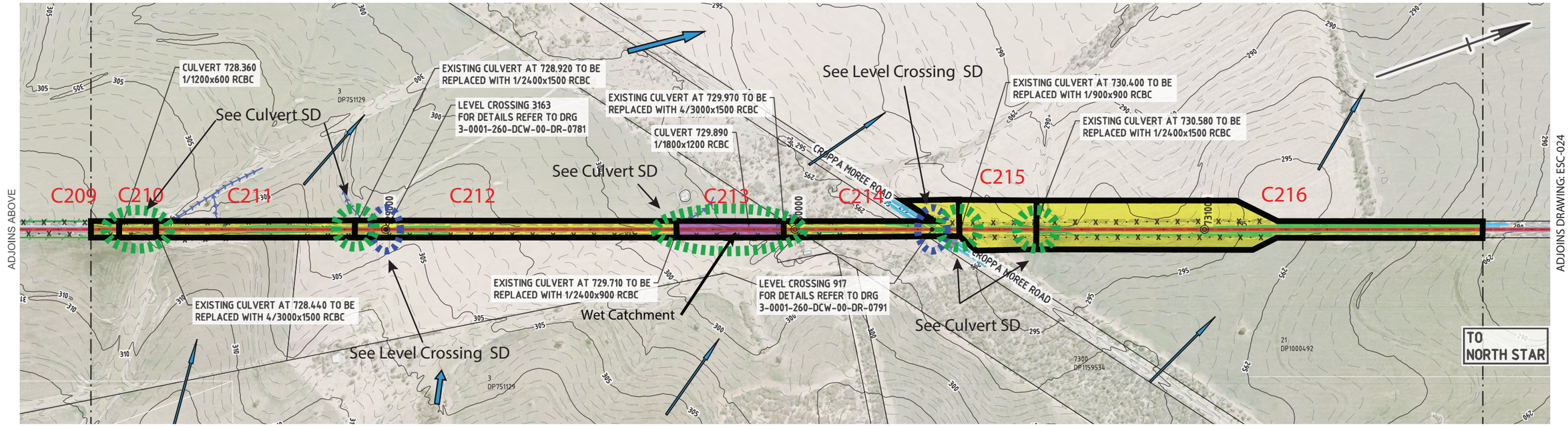
AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-022
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

AS1100 | DO NOT SCALE | UNLESS STATED OTHERWISE





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C200 - C216

North

0m 100m 200m 400m 600m

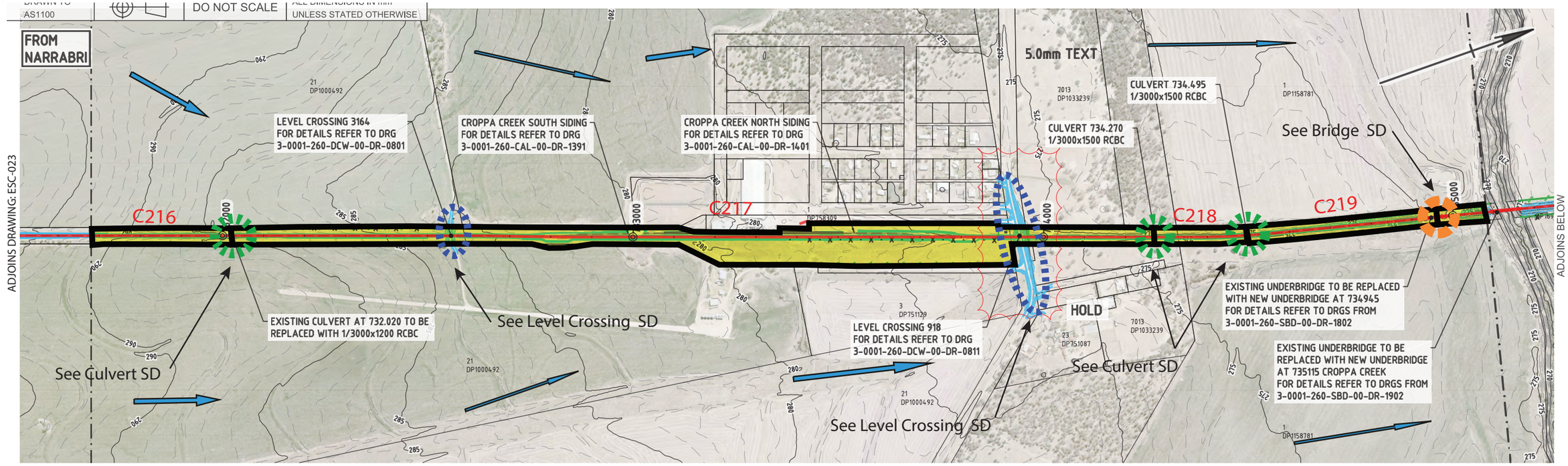
SCALE 1:10,000

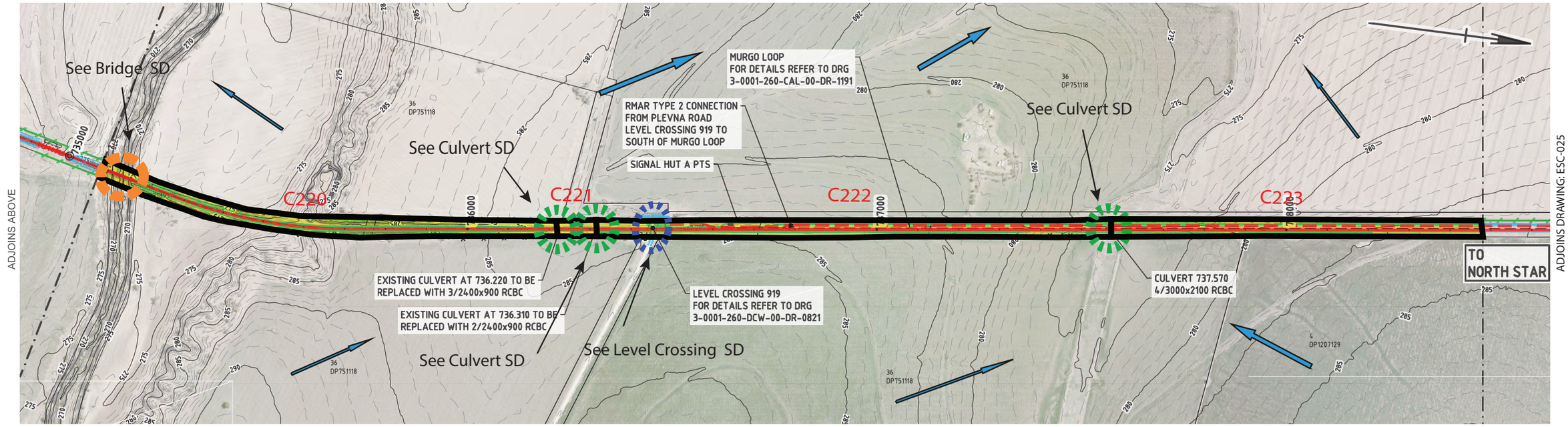
AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-023
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

AS1100 | DO NOT SCALE | ALL DIMENSIONS IN mm UNLESS STATED OTHERWISE





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C216 - C223

North

0m 100m 200m 400m 600m

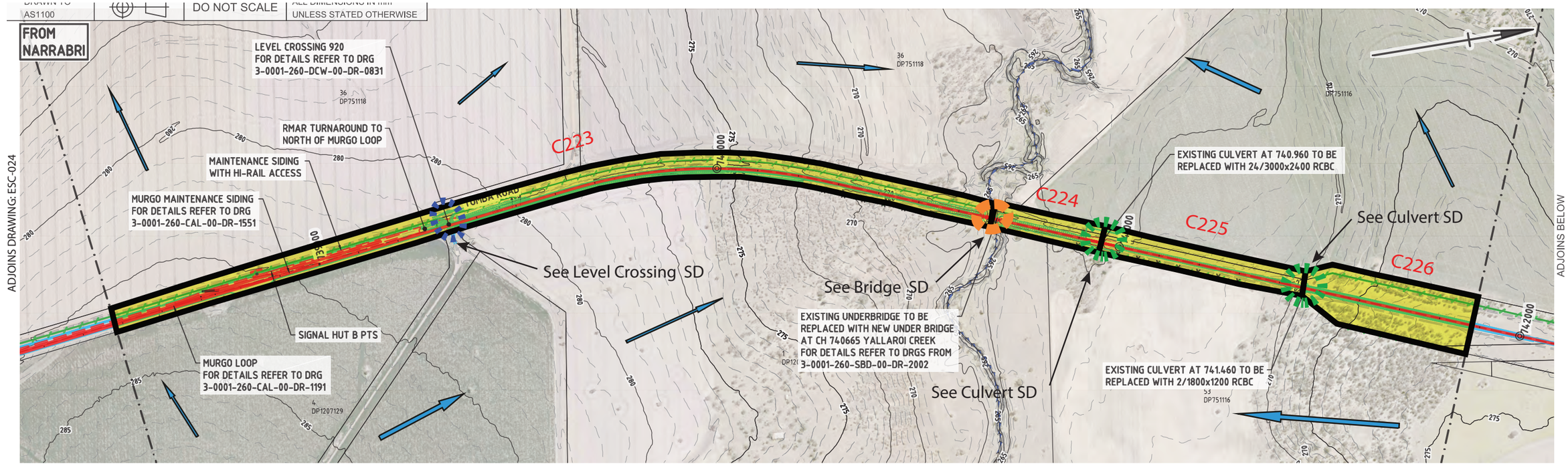
SCALE 1:10,000

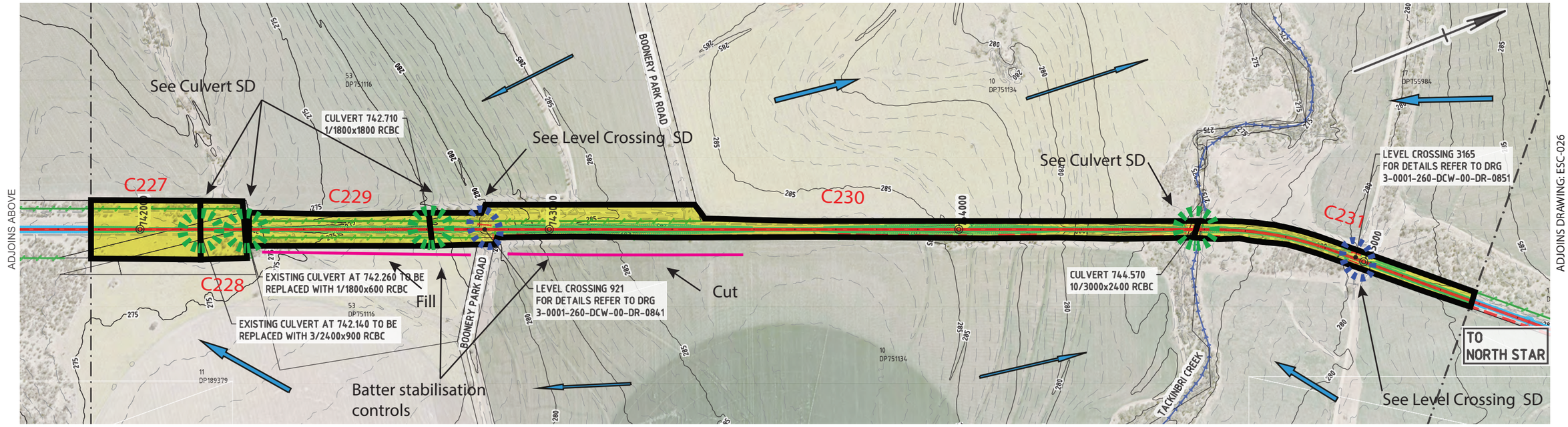
AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-024
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

AS1100 | DO NOT SCALE | ALL DIMENSIONS IN mm UNLESS STATED OTHERWISE





REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C223 - C231

North

0m 100m 200m 400m 600m

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-025
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

AS1100 | DO NOT SCALE | UNLESS STATED OTHERWISE

FROM NARRABRI

ADJOINS DRAWING: ESC-025

ADJOINS BELOW

See Culvert SD

EXISTING CULVERT AT 745.430 TO BE REPLACED WITH 1/1800x1200 RCBC

See Level Crossing SD

EXISTING CULVERT AT 747.910 TO BE REPLACED WITH 2/1800x900 RCBC

See Culvert SD

C231

C232

C233

C234

C235

C236

Cut

Fill

EXISTING CULVERT AT 748.430 TO BE REPLACED WITH 2/2400x2400 RCBC

TIKITERE SIDING
FOR DETAILS REFER TO DRG
3-0001-260-CAL-00-DR-1411

LEVEL CROSSING 3166
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0861

EXISTING CULVERT AT 746.600 TO BE REPLACED WITH 2/1800x900 RCBC

EXISTING CULVERT AT 746.040 TO BE REPLACED WITH 1/1800x900 RCBC

See Culvert SD

Batter stabilisation controls

See Level Crossing SD

LEVEL CROSSING 3167
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0881

CULVERT 750.970
8/3000x2100 RCBC

See Culvert SD

BUSHES ACCESS ROAD

MUNGLE CREEK

C236

C237

C238

C239

EXISTING CULVERT AT 749.460 TO BE REPLACED WITH 1/2400x1500 RCBC

See Level Crossing SD

LEVEL CROSSING 4378
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0871

Cut

Fill

See Bridge SD

EXISTING CULVERT AT 751.140 TO BE REPLACED WITH 1/3000x2100 RCBC

Batter stabilisation controls

MUNGLE CREEK

TO NORTH STAR

ADJOINS ABOVE

ADJOINS DRAWING: ESC-027

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVISION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C231 - C239

North

SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

DRAWING NO. ESC-026

REVISION B

DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

CPESC CPESC: 8726
CPESC: 7060

AS1100 | DO NOT SCALE | UNLESS STATED OTHERWISE

FROM NARRABRI

See Culvert SD

See Level Crossing SD

See Culvert SD

See Culvert SD

LEVEL CROSSING 3168
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0891

BUSHES ACCESS

C239

C240

C241

C242

752000

753000

754000

755000

EXISTING CULVERT AT 752.500 TO BE
REPLACED WITH 1/1500x600 RCBC

EXISTING CULVERT AT 753.120 TO BE
REPLACED WITH 7/3000x1500 RCBC

CULVERT 755.440
1/2400x1200 RCBC

EXISTING CULVERT AT 755.250 TO BE
REPLACED WITH 1/3000x1200 RCBC

ADJOINS DRAWING: ESC-026

ADJOINS BELOW

EXISTING CULVERT AT 755.490 TO BE
REPLACED WITH 3/3000x1500 RCBC

LEVEL CROSSING 922
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0901

CROPPA CREEK ROAD

See Level Crossing SD

See Level Crossing SD

See Level Crossing SD

See Culvert SD

See Culvert SD

NORTH STAR SOUTH SIDING
FOR DETAILS REFER TO DRG
3-0001-260-CAL-00-DR-1431

LEVEL CROSSING 923
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0921

NORTH STAR

C243

C244

C245

C246

753000

754000

755000

EXISTING CULVERT AT 755.980 TO BE
REPLACED WITH 2/1800x1200 RCBC

LEVEL CROSSING 3169
FOR DETAILS REFER TO DRG
3-0001-260-DCW-00-DR-0911

EXISTING CULVERT AT 757.040 TO BE
REPLACED WITH 16/2400x900 RCBC

EXISTING CULVERT AT 758.230 TO BE
REPLACED WITH 2/1200x450 RCBC

EXISTING CULVERT AT 758.270 TO BE
REPLACED WITH 2/900x450 RCBC

REMOVE STRUCTURE OVER MAINLINE

NORTH STAR ROAD

ADJOINS ABOVE

ADJOINS DRAWING: ESC-028

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10//2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAILSEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C239 - C246

North

SCALE 1:10,000

0m 100m 200m 400m 600m

AT A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

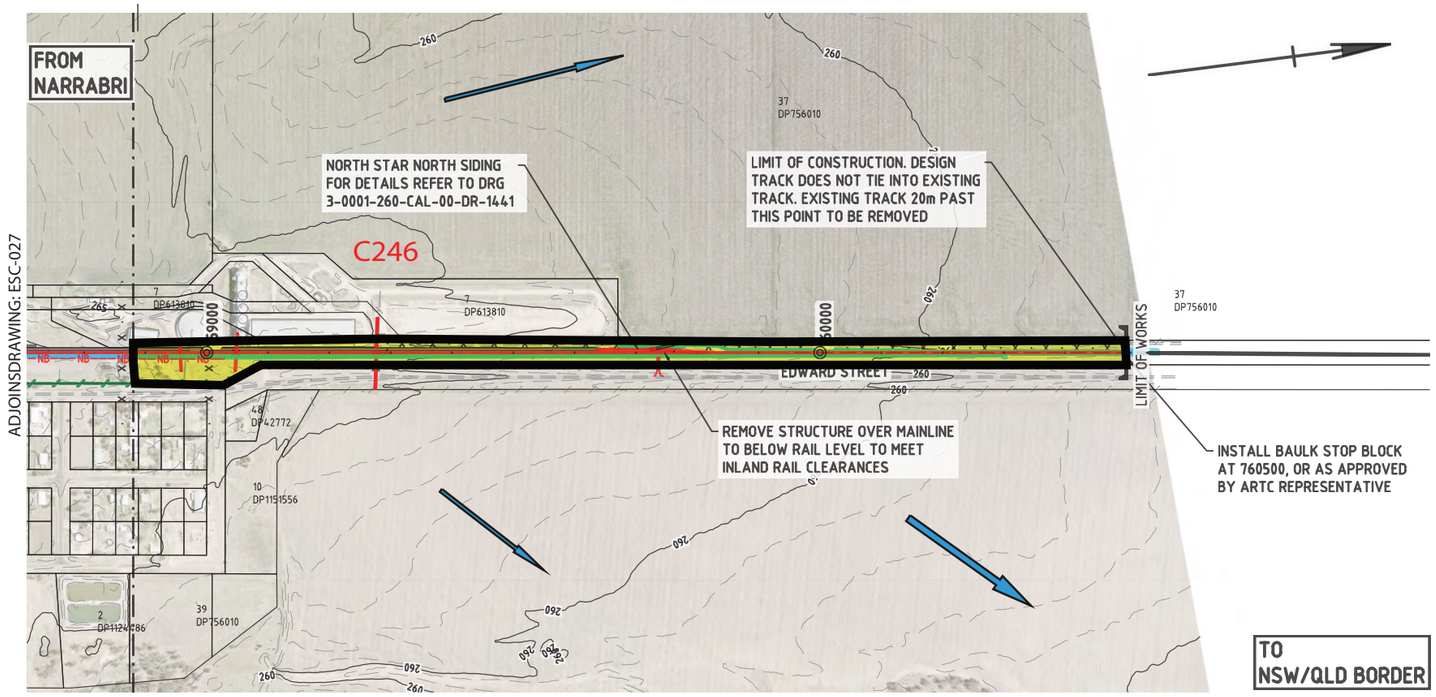
DRAWING NO. ESC-027

REVISION B

DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 201/10/2020

CPESC CPESC: 8726
CPESC: 7060



LIMIT OF WORKS

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/102020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
CATCHMENTS C246 - C246

0m 100m 200m 400m 600m

North

SCALE 1:10,000

AT A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-028
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

Erosion Hazards

ID	Area	R-factor	K-factor	LS-factor	C-factor	P-factor	RUSLE (t/ha/yr)	Soil Loss (m3/yr)	Erosion Hazard	ID	Area	R-factor	K-factor	LS-factor	C-factor	P-factor	RUSLE (t/ha/yr)	Soil Loss (m3/yr)	Erosion Risk
C1	4.38	1250	0.055	0.19	1	1.3	17.0	46.5	Very Low	C47	1.870813	1250	0.04	0.19	1	1.3	12.4	14.4	Very Low
C2	0.38	1250	0.055	0.19	1	1.3	17.0	4.1	Very Low	C48	0.992895	1250	0.04	0.19	1	1.3	12.4	7.7	Very Low
C3	0.59	1250	0.055	0.19	1	1.3	17.0	6.2	Very Low	C49	4.026701	1250	0.04	0.19	1	1.3	12.4	31.1	Very Low
C4	4.93	1250	0.055	0.19	1	1.3	17.0	52.3	Very Low	C50	2.929802	1250	0.04	0.19	1	1.3	12.4	22.6	Very Low
C5	2.59	1250	0.055	0.19	1	1.3	17.0	27.4	Very Low	C51	2.644728	1250	0.04	0.19	1	1.3	12.4	20.4	Very Low
C6	3.06	1250	0.055	0.19	1	1.3	17.0	32.4	Very Low	C52	5.534375	1250	0.04	0.19	1	1.3	12.4	42.7	Very Low
C7	4.50	1250	0.055	0.19	1	1.3	17.0	47.7	Very Low	C53	9.298199	1250	0.04	0.19	1	1.3	12.4	71.8	Very Low
C8	1.54	1250	0.055	0.19	1	1.3	17.0	16.4	Very Low	C54	13.82546	1250	0.04	0.19	1	1.3	12.4	106.7	Very Low
C9	1.06	1250	0.055	0.19	1	1.3	17.0	11.3	Very Low	C55	1.752344	1250	0.04	0.19	1	1.3	12.4	13.5	Very Low
C10	3.99	1250	0.055	0.19	1	1.3	17.0	42.3	Very Low	C56	7.147051	1250	0.04	0.19	1	1.3	12.4	55.2	Very Low
C11	4.21	1250	0.055	0.19	1	1.3	17.0	44.7	Very Low	C57	1.729399	1250	0.04	0.19	1	1.3	12.4	13.3	Very Low
C12	1.76	1250	0.055	0.19	1	1.3	17.0	18.6	Very Low	C58	2.036421	1250	0.04	0.19	1	1.3	12.4	15.7	Very Low
C13	1.03	1250	0.055	0.19	1	1.3	17.0	10.9	Very Low	C59	14.14346	1250	0.04	0.19	1	1.3	12.4	109.2	Very Low
C14	1.09	1250	0.055	0.19	1	1.3	17.0	11.6	Very Low	C60	3.653336	1250	0.04	0.19	1	1.3	12.4	28.2	Very Low
C15	2.26	1250	0.055	0.19	1	1.3	17.0	24.0	Very Low	C61	1.893011	1250	0.04	0.19	1	1.3	12.4	14.6	Very Low
C16	1.08	1250	0.045	0.19	1	1.3	13.9	9.4	Very Low	C62	2.534489	1250	0.04	0.19	1	1.3	12.4	19.6	Very Low
C17	4.67	1250	0.045	0.19	1	1.3	13.9	40.5	Very Low	C63	3.414153	1250	0.04	0.19	1	1.3	12.4	26.4	Very Low
C18	1.80	1250	0.045	0.19	1	1.3	13.9	15.7	Very Low	C64	8.645248	1250	0.04	0.19	1	1.3	12.4	66.7	Very Low
C19	2.61	1250	0.045	0.19	1	1.3	13.9	22.7	Very Low	C65	1.288943	1250	0.04	0.19	1	1.3	12.4	9.9	Very Low
C20	1.22	1250	0.045	0.19	1	1.3	13.9	10.6	Very Low	C66	5.195928	1250	0.04	2.81	1	1.3	182.7	593.1	Low
C21	0.57	1250	0.045	0.19	1	1.3	13.9	5.0	Very Low	C67	2.393574	1250	0.04	0.19	1	1.3	12.4	18.5	Very Low
C22	3.36	1250	0.045	0.19	1	1.3	13.9	29.1	Very Low	C68	3.390958	1250	0.04	0.19	1	1.3	12.4	26.2	Very Low
C23	2.53	1250	0.045	0.19	1	1.3	13.9	22.0	Very Low	C69	3.709952	1250	0.04	0.19	1	1.3	12.4	28.6	Very Low
C24	0.88	1250	0.045	0.19	1	1.3	13.9	7.6	Very Low	C70	2.408039	1250	0.04	0.19	1	1.3	12.4	18.6	Very Low
C25	3.26	1250	0.045	0.19	1	1.3	13.9	28.3	Very Low	C71	3.219615	1250	0.04	2.81	1	1.3	182.7	367.5	Low
C26	1.28	1250	0.045	0.19	1	1.3	13.9	11.2	Very Low	C72	0.629008	1250	0.04	2.81	1	1.3	182.7	71.8	Low
C27	1.46	1250	0.045	0.19	1	1.3	13.9	12.7	Very Low	C73	1.009356	1250	0.04	2.81	1	1.3	182.7	115.2	Low
C28	1.51	1250	0.045	0.19	1	1.3	13.9	13.1	Very Low	C74	4.011487	1250	0.04	2.81	1	1.3	182.7	457.9	Low
C29	2.23	1250	0.045	0.19	1	1.3	13.9	19.3	Very Low	C75	7.154533	1250	0.04	2.81	1	1.3	182.7	816.7	Low
C30	2.18	1250	0.045	0.19	1	1.3	13.9	18.9	Very Low	C76	2.808839	1250	0.04	0.19	1	1.3	12.4	21.7	Very Low
C31	1.02	1250	0.045	0.19	1	1.3	13.9	8.9	Very Low	C77	2.703339	1250	0.04	2.81	1	1.3	182.7	308.6	Low
C32	8.72	1250	0.045	0.19	1	1.3	13.9	75.7	Very Low	C78	1.743615	1250	0.04	0.19	1	1.3	12.4	13.5	Very Low
C33	1.49	1250	0.045	0.19	1	1.3	13.9	13.0	Very Low	C79	1.70346	1250	0.04	0.19	1	1.3	12.4	13.1	Very Low
C34	6.77	1250	0.045	0.19	1	1.3	13.9	58.8	Very Low	C80	1.238812	1250	0.04	0.19	1	1.3	12.4	9.6	Very Low
C35	2.55	1250	0.045	0.19	1	1.3	13.9	22.1	Very Low	C81	4.201785	1250	0.04	0.19	1	1.3	12.4	32.4	Very Low
C36	6.06	1250	0.045	0.19	1	1.3	13.9	52.6	Very Low	C82	10.28187	1250	0.04	0.19	1	1.3	12.4	79.4	Very Low
C37	7.68	1250	0.045	0.19	1	1.3	13.9	66.7	Very Low	C83	10.13472	1250	0.04	0.19	1	1.3	12.4	78.2	Very Low
C38	2.89	1250	0.045	0.19	1	1.3	13.9	25.1	Very Low	C84	3.68526	1250	0.04	0.19	1	1.3	12.4	28.4	Very Low
C39	5.25	1250	0.045	0.19	1	1.3	13.9	45.6	Very Low	C85	0.856718	1250	0.04	0.19	1	1.3	12.4	6.6	Very Low
C40	1.19	1250	0.045	0.19	1	1.3	13.9	10.3	Very Low	C86	19.20969	1250	0.04	0.19	1	1.3	12.4	148.3	Very Low
C41	1.51	1250	0.045	0.19	1	1.3	13.9	13.1	Very Low	C87	12.90016	1250	0.04	0.19	1	1.3	12.4	99.6	Very Low
C42	2.14	1250	0.045	0.19	1	1.3	13.9	18.6	Very Low	C88	1.558055	1250	0.04	0.19	1	1.3	12.4	12.0	Very Low
C43	7.98	1250	0.045	0.19	1	1.3	13.9	69.3	Very Low	C89	3.039292	1250	0.04	0.19	1	1.3	12.4	23.5	Very Low
C44	5.36	1250	0.045	0.19	1	1.3	13.9	46.5	Very Low	C90	3.613431	1250	0.04	0.19	1	1.3	12.4	27.9	Very Low
C45	1.63	1250	0.045	0.19	1	1.3	13.9	14.2	Very Low	C91	1.75409	1250	0.04	0.19	1	1.3	12.4	13.5	Very Low
C46	3.78	1250	0.04	0.19	1	1.3	12.4	29.2	Very Low	C92	1.722415	1250	0.04	0.19	1	1.3	12.4	13.3	Very Low

REVISION	DESCRIPTION	APPROVED BY	DATE
B	UPDATED DRAWING NUMBER AND PROJECT TITLE	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
EROSION HAZARD

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

DRAWING NO. ESC-029

REVISION B

DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

CPESC CPESC: 8726
CPESC: 7060

Erosion Hazards

ID	Area	R-factor	K-factor	LS-factor	C-factor	P-factor	RUSLE (t/ha/yr)	Soil Loss (m3/yr)	Erosion Hazard
C93	1.084428	1250	0.055	0.19	1	1.3	17.0	147.5	Very Low
C94	1.78739	1250	0.055	0.19	1	1.3	17.0	198.5	Very Low
C95	0.679389	1250	0.055	0.19	1	1.3	17.0	72.4	Very Low
C96	0.420573	1250	0.055	0.19	1	1.3	17.0	45.8	Very Low
C97	2.973428	1250	0.055	0.19	1	1.3	17.0	340.1	Very Low
C98	1.080428	1250	0.055	0.19	1	1.3	17.0	117.1	Very Low
C99	0.766176	1250	0.055	0.19	1	1.3	17.0	87.2	Very Low
C100	1.549078	1250	0.055	0.19	1	1.3	17.0	182.3	Very Low
C101	1.151769	1250	0.055	0.19	1	1.3	17.0	128.0	Very Low
C102	2.417517	1250	0.055	0.19	1	1.3	17.0	397.1	Very Low
C103	4.738014	1250	0.055	0.19	1	1.3	17.0	520.5	Very Low
C104	1.625395	1250	0.055	0.19	1	1.3	17.0	299.9	Very Low
C105	1.513601	1250	0.055	0.19	1	1.3	17.0	199.4	Very Low
C106	1.108428	1250	0.055	0.19	1	1.3	17.0	147.6	Very Low
C107	3.069221	1250	0.055	0.19	1	1.3	17.0	337.4	Very Low
C108	2.759458	1250	0.055	0.19	1	1.3	17.0	704.3	Very Low
C109	1.136305	1250	0.055	0.19	1	1.3	17.0	121.0	Very Low
C110	0.183315	1250	0.055	0.19	1	1.3	17.0	17.8	Very Low
C111	2.127205	1250	0.055	0.19	1	1.3	17.0	226.6	Very Low
C112	0.351417	1250	0.055	0.19	1	1.3	17.0	37.4	Very Low
C113	1.377234	1250	0.055	0.19	1	1.3	17.0	146.6	Very Low
C114	1.704289	1250	0.055	0.19	1	1.3	17.0	181.4	Very Low
C115	0.641728	1250	0.055	0.19	1	1.3	17.0	68.3	Very Low
C116	2.376628	1250	0.055	0.19	1	1.3	17.0	253.0	Very Low
C117	2.596842	1250	0.055	0.19	1	1.3	17.0	276.5	Very Low
C118	0.36264	1250	0.055	0.19	1	1.3	17.0	38.6	Very Low
C119	1.984544	1250	0.055	0.19	1	1.3	17.0	211.3	Very Low
C120	3.218368	1250	0.055	0.19	1	1.3	17.0	342.7	Very Low
C121	1.05001	1250	0.055	0.19	1	1.3	17.0	111.8	Very Low
C122	2.156885	1250	0.055	0.19	1	1.3	17.0	229.6	Very Low
C123	2.224475	1250	0.055	0.19	1	1.3	17.0	236.8	Very Low
C124	10.09057	1250	0.055	0.19	1	1.3	17.0	1074.1	Very Low
C125	13.47455	1250	0.055	0.19	1	1.3	17.0	1434.0	Very Low
C126	0.890887	1250	0.055	0.19	1	1.3	17.0	94.8	Very Low
C127	1.814946	1250	0.055	0.19	1	1.3	17.0	193.1	Very Low
C128	4.841768	1250	0.055	0.19	1	1.3	17.0	515.4	Very Low
C129	0.373863	1250	0.055	0.19	1	1.3	17.0	39.8	Very Low
C130	5.196676	1250	0.055	0.19	1	1.3	17.0	553.2	Very Low
C131	17.18125	1250	0.055	0.19	1	1.3	17.0	1828.8	Very Low
C132	1.729149	1250	0.055	0.19	1	1.3	17.0	184.0	Very Low
C133	3.192679	1250	0.055	0.19	1	1.3	17.0	339.8	Very Low
C134	5.554838	1250	0.055	0.19	1	1.3	17.0	591.2	Very Low
C135	3.818904	1250	0.055	0.19	1	1.3	17.0	406.5	Very Low
C136	1.526639	1250	0.055	0.19	1	1.3	17.0	162.5	Very Low
C137	3.485794	1250	0.055	0.19	1	1.3	17.0	370.9	Very Low
C138	10.24495	1250	0.055	0.19	1	1.3	17.0	1090.3	Very Low
C139	2.548968	1250	0.055	0.19	1	1.3	17.0	271.3	Very Low
C140	2.165204	1250	0.055	0.19	1	1.3	17.0	230.4	Very Low
C141	0.852724	1250	0.055	0.19	1	1.3	17.0	90.8	Very Low
C142	1.998348	1250	0.055	0.19	1	1.3	17.0	212.7	Very Low
C143	2.436958	1250	0.055	0.19	1	1.3	17.0	259.4	Very Low
C144	2.598345	1250	0.055	0.19	1	1.3	17.0	276.6	Very Low
C145	4.369837	1250	0.055	0.19	1	1.3	17.0	465.1	Very Low
C146	6.006506	1250	0.055	0.19	1	1.3	17.0	639.3	Very Low
C147	5.978882	1250	0.055	0.19	1	1.3	17.0	636.4	Very Low
C148	1.682015	1250	0.055	0.19	1	1.3	17.0	179.0	Very Low
C149	7.931569	1250	0.055	0.19	1	1.3	17.0	844.2	Very Low
C150	3.755709	1250	0.055	0.19	1	1.3	17.0	399.8	Very Low
C151	5.346823	1250	0.055	0.19	1	1.3	17.0	569.1	Very Low
C152	0.263423	1250	0.055	0.19	1	1.3	17.0	28.0	Very Low
C153	23.39053	1250	0.055	0.19	1	1.3	17.0	2489.5	Very Low
C154	0.347588	1250	0.055	0.19	1	1.3	17.0	37.0	Very Low
C155	6.340503	1250	0.055	0.19	1	1.3	17.0	674.8	Very Low
C156	11.28474	1250	0.055	0.19	1	1.3	17.0	1200.8	Very Low
C157	0.367628	1250	0.055	0.19	1	1.3	17.0	39.1	Very Low
C158	16.51134	1250	0.055	0.19	1	1.3	17.0	1757.2	Very Low
C159	0.068587	1250	0.055	0.19	1	1.3	17.0	7.3	Very Low
C160	2.748233	1250	0.055	0.19	1	1.3	17.0	292.4	Very Low
C161	7.055268	1250	0.055	0.19	1	1.3	17.0	750.9	Very Low
C162	5.366523	1250	0.055	0.19	1	1.3	17.0	571.0	Very Low
C163	0.604067	1250	0.055	0.19	1	1.3	17.0	64.3	Very Low
C164	1.036292	1250	0.055	0.19	1	1.3	17.0	110.3	Very Low
C165	1.491463	1250	0.055	0.19	1	1.3	17.0	158.7	Very Low
C166	8.578905	1250	0.055	0.19	1	1.3	17.0	912.9	Very Low
C167	1.225843	1250	0.055	0.19	1	1.3	17.0	130.4	Very Low
C168	3.579761	1250	0.055	0.19	1	1.3	17.0	380.8	Very Low
C169	5.224859	1250	0.055	0.19	1	1.3	17.0	555.8	Very Low
C170	6.681904	1250	0.055	0.19	1	1.3	17.0	710.9	Very Low
C171	0.427237	1250	0.055	0.19	1	1.3	17.0	45.5	Very Low
C172	1.088668	1250	0.055	0.19	1	1.3	17.0	115.8	Very Low
C173	1.241805	1250	0.055	0.19	1	1.3	17.0	132.1	Very Low
C174	1.824922	1250	0.055	0.19	1	1.3	17.0	194.2	Very Low
C175	0.321737	1250	0.055	0.19	1	1.3	17.0	34.2	Very Low
C176	0.836267	1250	0.055	0.19	1	1.3	17.0	89.0	Very Low
C177	2.154141	1250	0.055	0.19	1	1.3	17.0	229.2	Very Low
C178	0.571395	1250	0.055	0.19	1	1.3	17.0	60.8	Very Low
C179	4.438225	1250	0.055	0.19	1	1.3	17.0	472.2	Very Low
C180	0.918821	1250	0.055	0.19	1	1.3	17.0	97.8	Very Low
C181	5.731408	1250	0.055	0.19	1	1.3	17.0	609.8	Very Low
C182	1.22285	1250	0.055	0.19	1	1.3	17.0	130.1	Very Low
C183	1.669541	1250	0.055	0.19	1	1.3	17.0	177.6	Very Low
C184	6.449704	1250	0.055	0.19	1	1.3	17.0	686.3	Very Low
C185	0.855721	1250	0.055	0.19	1	1.3	17.0	91.1	Very Low

REVISION	DESCRIPTION	APPROVED BY	DATE
B	UPDATED DRAWING NUMBER AND PREOJECT TITLE	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
EROSION HAZARD

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

DRAWING NO. ESC-030

REVISION B

DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

CPESC CPESC: 8726
CPESC: 7060

Erosion Hazards

ID	Area	R-factor	K-factor	LS-factor	C-factor	P-factor	RUSLE (t/ha/yr)	Soil Loss (m3/yr)	Erosion Hazard
185	1.084428	1250	0.055	0.19	1	1.3	17.0	11.5	Very Low
186	1.78776	1250	0.055	0.19	1	1.3	17.0	19.0	Very Low
187	0.679389	1250	0.055	0.19	1	1.3	17.0	7.2	Very Low
188	0.420503	1250	0.055	0.19	1	1.3	17.0	4.5	Very Low
189	2.973448	1250	0.055	0.19	1	1.3	17.0	31.6	Very Low
190	1.080438	1250	0.055	0.19	1	1.3	17.0	11.5	Very Low
191	0.766183	1250	0.055	0.19	1	1.3	17.0	8.1	Very Low
192	1.549076	1250	0.055	0.19	1	1.3	17.0	16.4	Very Low
193	1.151769	1250	0.055	0.19	1	1.3	17.0	12.2	Very Low
194	2.417517	1250	0.055	0.19	1	1.3	17.0	25.7	Very Low
195	4.738014	1250	0.055	0.19	1	1.3	17.0	50.3	Very Low
196	1.625395	1250	0.055	0.19	1	1.3	17.0	17.3	Very Low
197	1.51366	1250	0.055	0.19	1	1.3	17.0	16.1	Very Low
198	1.108621	1250	0.055	0.19	1	1.3	17.0	11.8	Very Low
199	3.069221	1250	0.055	0.19	1	1.3	17.0	32.6	Very Low
200	2.759456	1250	0.055	0.19	1	1.3	17.0	29.3	Very Low
201	1.136305	1250	0.055	0.19	1	1.3	17.0	12.1	Very Low
202	0.183315	1250	0.055	0.19	1	1.3	17.0	1.9	Very Low
203	2.127205	1250	0.055	0.19	1	1.3	17.0	22.6	Very Low
204	0.351417	1250	0.055	0.19	1	1.3	17.0	3.7	Very Low
205	1.377234	1250	0.055	0.19	1	1.3	17.0	14.6	Very Low
206	1.704208	1250	0.055	0.19	1	1.3	17.0	18.1	Very Low
207	0.641728	1250	0.055	0.19	1	1.3	17.0	6.8	Very Low
208	2.370628	1250	0.055	0.19	1	1.3	17.0	25.2	Very Low
209	2.596842	1250	0.055	0.19	1	1.3	17.0	27.6	Very Low
210	0.36264	1250	0.055	0.19	1	1.3	17.0	3.8	Very Low
211	1.984544	1250	0.055	0.19	1	1.3	17.0	21.1	Very Low
212	3.218368	1250	0.055	0.19	1	1.3	17.0	34.2	Very Low
213	1.05001	1250	0.055	0.19	1	1.3	17.0	11.1	Very Low
214	2.156885	1250	0.055	0.19	1	1.3	17.0	22.9	Very Low
215	2.224475	1250	0.055	0.19	1	1.3	17.0	23.6	Very Low
216	10.09057	1250	0.055	0.19	1	1.3	17.0	107.1	Very Low
217	13.47455	1250	0.055	0.19	1	1.3	17.0	143.0	Very Low
218	0.890887	1250	0.055	0.19	1	1.3	17.0	9.5	Very Low
219	1.814946	1250	0.055	0.19	1	1.3	17.0	19.3	Very Low
220	4.841768	1250	0.055	0.19	1	1.3	17.0	51.4	Very Low
221	0.373863	1250	0.055	0.19	1	1.3	17.0	4.0	Very Low
222	5.196676	1250	0.055	0.19	1	1.3	17.0	55.2	Very Low
223	17.18125	1250	0.055	0.19	1	1.3	17.0	182.3	Very Low
224	1.729149	1250	0.055	0.19	1	1.3	17.0	18.4	Very Low
225	3.192679	1250	0.055	0.19	1	1.3	17.0	33.9	Very Low
226	5.554328	1250	0.055	0.19	1	1.3	17.0	58.9	Very Low
227	3.818943	1250	0.055	0.19	1	1.3	17.0	40.5	Very Low
228	1.52663	1250	0.055	0.19	1	1.3	17.0	16.2	Very Low
229	3.485734	1250	0.055	0.19	1	1.3	17.0	37.0	Very Low
230	10.24495	1250	0.055	0.19	1	1.3	17.0	108.7	Very Low
231	3.41964	1250	0.055	0.19	1	1.3	17.0	36.3	Very Low
232	2.423004	1250	0.055	0.19	1	1.3	17.0	25.7	Very Low
233	2.427244	1250	0.055	0.19	1	1.3	17.0	25.8	Very Low
234	5.988548	1250	0.055	0.19	1	1.3	17.0	63.6	Very Low
235	2.125958	1250	0.055	0.19	1	1.3	17.0	22.6	Very Low
236	4.369637	1250	0.055	0.19	1	1.3	17.0	46.4	Very Low
237	6.420274	1250	0.055	0.19	1	1.3	17.0	68.1	Very Low
238	0.652702	1250	0.055	0.19	1	1.3	17.0	6.9	Very Low
239	5.607452	1250	0.07	0.19	1	1.3	21.6	75.7	Very Low
240	2.43722	1250	0.07	0.19	1	1.3	21.6	32.9	Very Low
241	8.030955	1250	0.07	0.19	1	1.3	21.6	108.5	Very Low
242	0.750221	1250	0.07	0.19	1	1.3	21.6	10.1	Very Low
243	1.993522	1250	0.07	0.19	1	1.3	21.6	26.9	Very Low
244	4.186322	1250	0.07	0.19	1	1.3	21.6	56.5	Very Low
245	6.141934	1250	0.07	0.19	1	1.3	21.6	83.0	Very Low
246	12.47916	1250	0.07	0.19	1	1.3	21.6	168.6	Very Low

REVISION	DESCRIPTION	APPROVED BY	DATE
B	UPDATED DRAWING NUMBER AND PROJECT TITLE	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
EROSION HAZARD

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

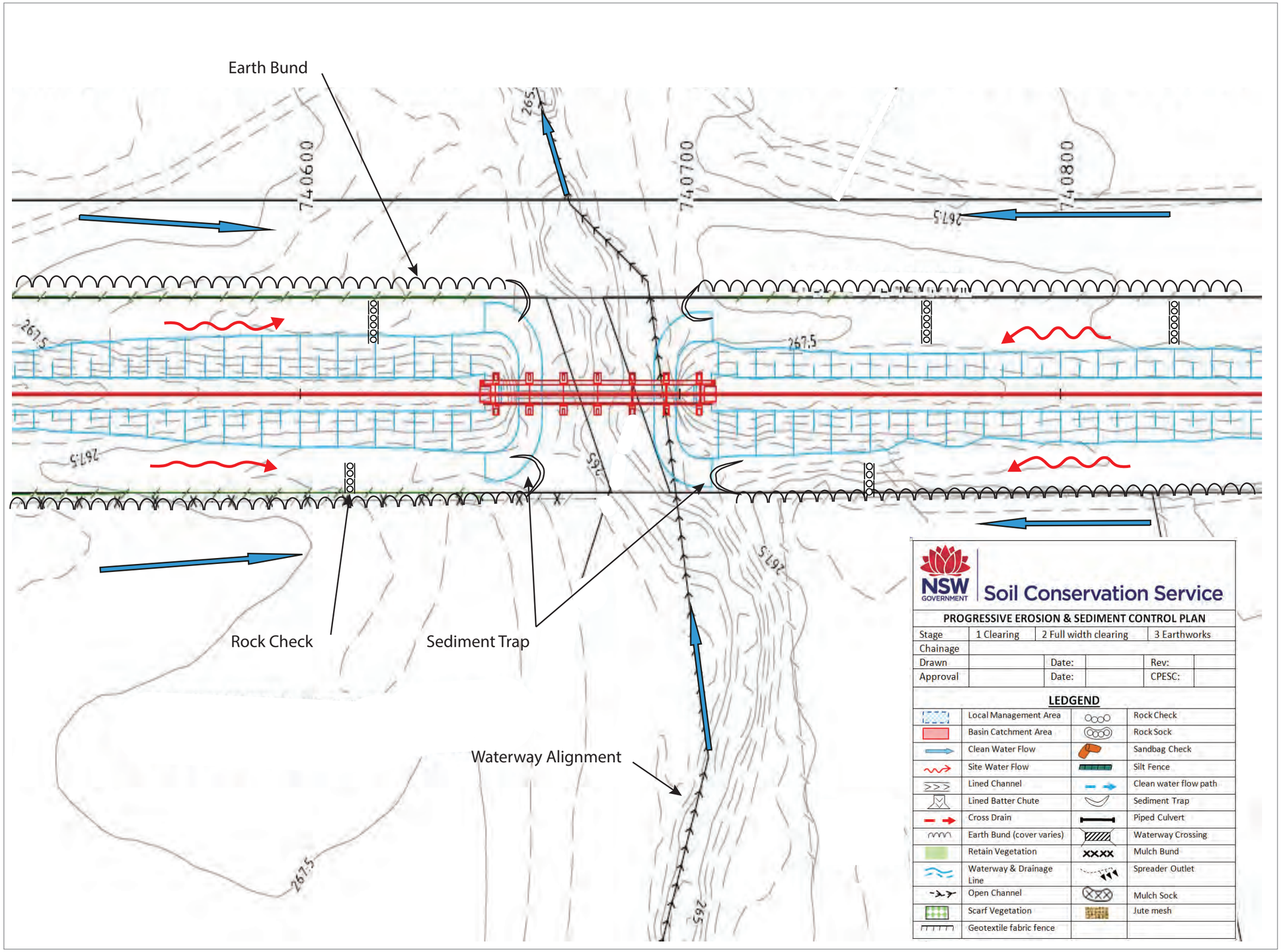
DRAWING NO. ESC-031

REVISION B

DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

CPESC CPESC: 8726
CPESC: 7060



NSW GOVERNMENT Soil Conservation Service

PROGRESSIVE EROSION & SEDIMENT CONTROL PLAN

Stage	1 Clearing	2 Full width clearing		3 Earthworks	
Chainage					
Drawn		Date:		Rev:	
Approval		Date:		CPESC:	

LEDGEND

	Local Management Area		Rock Check
	Basin Catchment Area		Rock Sock
	Clean Water Flow		Sandbag Check
	Site Water Flow		Silt Fence
	Lined Channel		Clean water flow path
	Lined Batter Chute		Sediment Trap
	Cross Drain		Piped Culvert
	Earth Bund (cover varies)		Waterway Crossing
	Retain Vegetation	XXXX	Mulch Bund
	Waterway & Drainage Line		Spreader Outlet
	Open Channel		Mulch Sock
	Scarf Vegetation		Jute mesh
	Geotextile fabric fence		

INSTALLATION:

1. Refer to plans for location, extent and construction details. Design to factor in expected peak discharge, sediment load and debris load.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Ensure structure locations will not interfere with future construction activities.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Do not operate within flowing water and excavations should be undertaken by pulling the soil away from the channel.
9. Check the channel and spillway alignments to ensure correct drainage and that they drain to a stable outlet.
10. Take all care to minimise the amount of material entering the channel.

MAINTENANCE:

1. Inspect weekly or after runoff producing rain or change in stream flow
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

REMOVAL:

1. When the soil disturbing activity upslope of the structure is completed and the area is sable the structure should be removed, unless it is to remain as a permanent structure.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION1

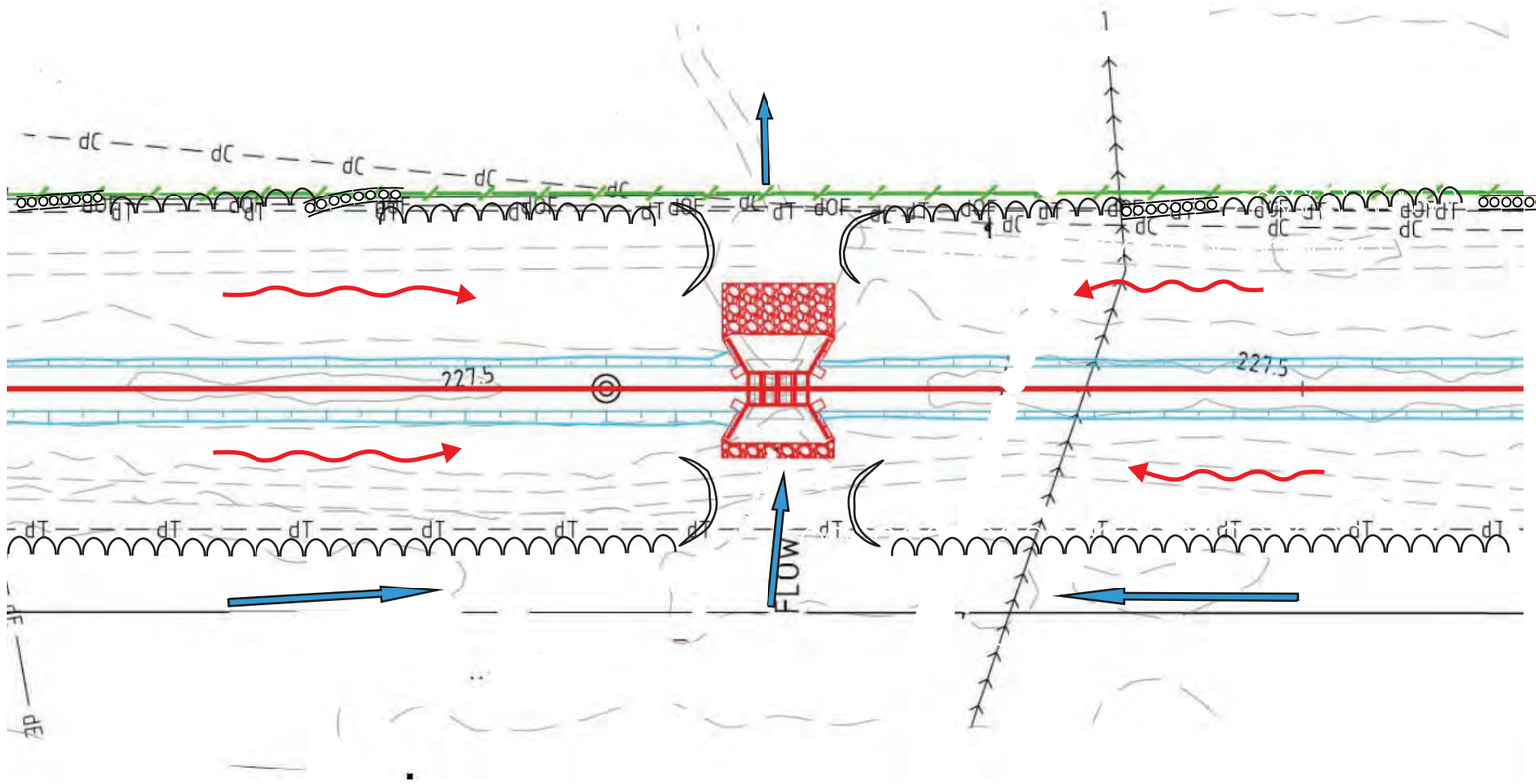
DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT- BRIDGE

SCALE

AT

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-032
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



INSTALLATION:

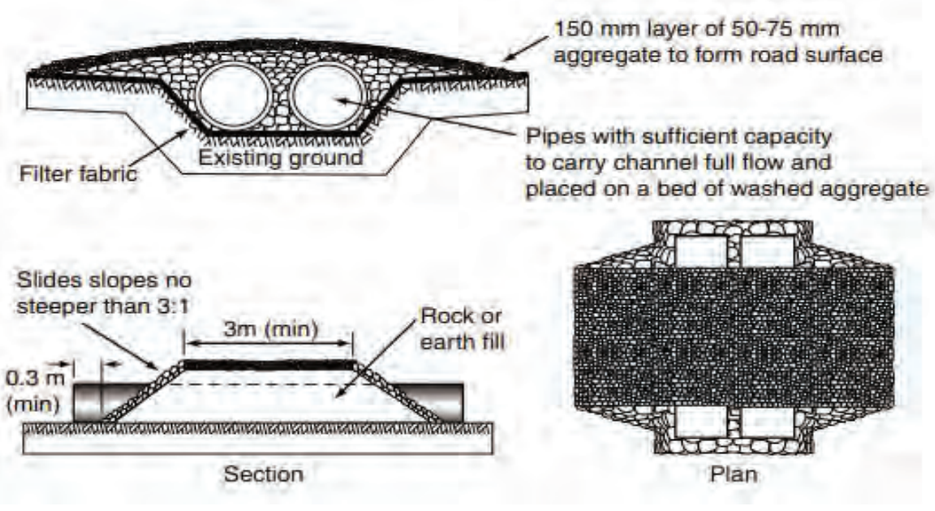
1. Refer to plans for location, extent and construction details. Design to factor in expected traffic loads, peak discharge and debris load.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Ensure crossing location will not interfere with future construction activities.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Do not operate within flowing water and excavations should be undertaken by pulling the soil away from the channel.
9. Place the specified size and number of culverts ensuring pipes extend at least 300mm past the proposed rock fill. Fill between the pipes and cover with sufficient materia to satisfy load requirements.
10. Form the road surface to specified design.
11. Check the pipe alignment to ensure correct drainage and that the pipe drains to a stable outlet.
12. Take all care to minimise the amount of material entering the channel.

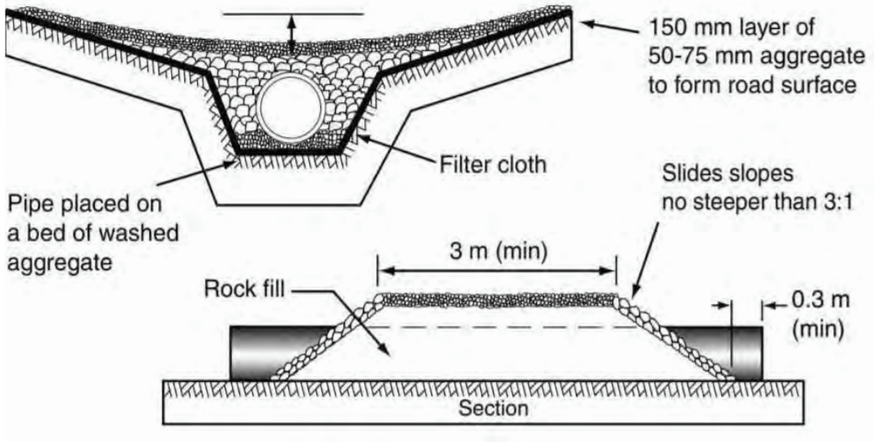
MAINTENANCE:

1. Inspect weekly or after runoff producing rain or change in stream flow
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.
4. Debris trapped on upstream of the crossing should be removed

REMOVAL:

1. Crossings should be removed as soon as possible after alternate access has been established or the crossing is no longer needed.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.





Standard Drawings Sourced From Best Practice Sediment & Erosion Control

NSW GOVERNMENT Soil Conservation Service

PROGRESSIVE EROSION & SEDIMENT CONTROL PLAN

Stage	1 Clearing	2 Full width clearing		3 Earthworks	
Chainage					
Drawn		Date:		Rev:	
Approval		Date:		CPESC:	

LEDGEND

	Local Management Area		Rock Check
	Basin Catchment Area		Rock Sock
	Clean Water Flow		Sandbag Check
	Site Water Flow		Silt Fence
	Lined Channel		Clean water flow path
	Lined Batter Chute		Sediment Trap
	Cross Drain		Piped Culvert
	Earth Bund (cover varies)		Waterway Crossing
	Retain Vegetation	XXXX	Mulch Bund
	Waterway & Drainage Line		Spreader Outlet
	Open Channel		Mulch Sock
	Scarf Vegetation		Jute mesh
	Geotextile fabric fence		

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN TYPICAL RAIL ARRANGEMENT - CULVERT

SCALE:

AT:

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO. 9732

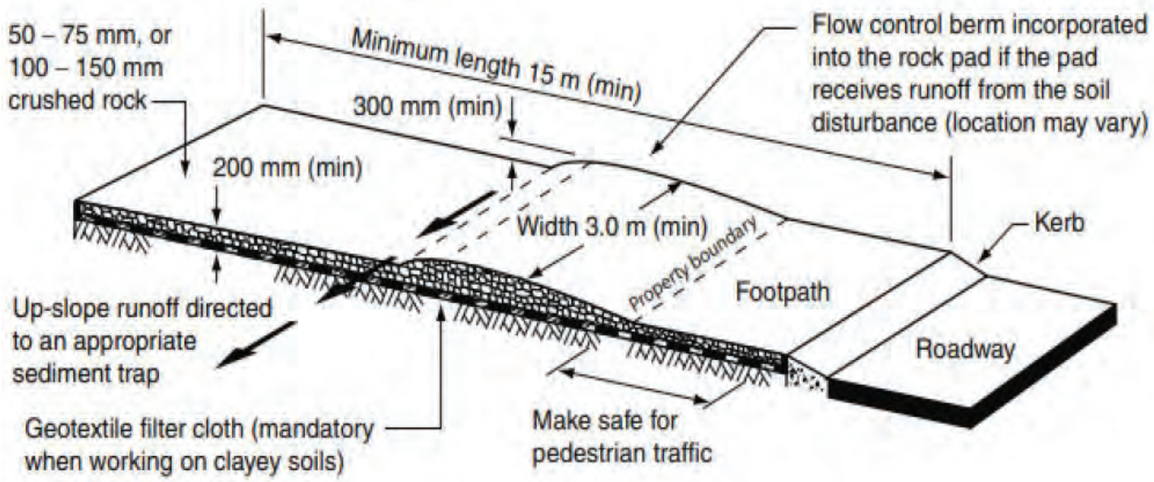
DRAWING NO. ESC-033

REVISION B

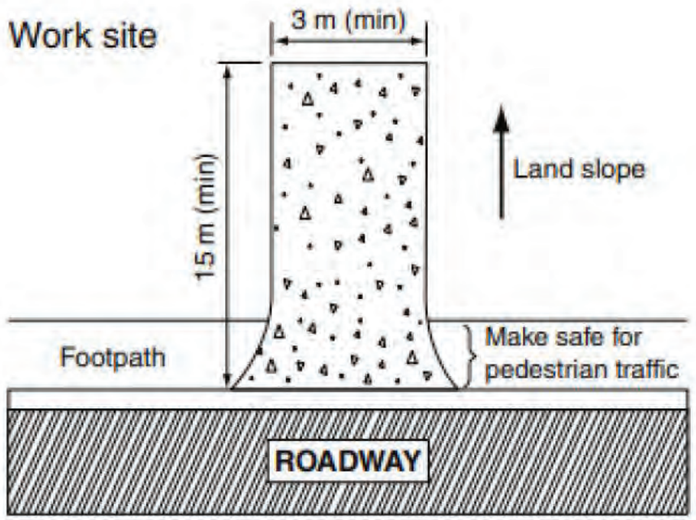
DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

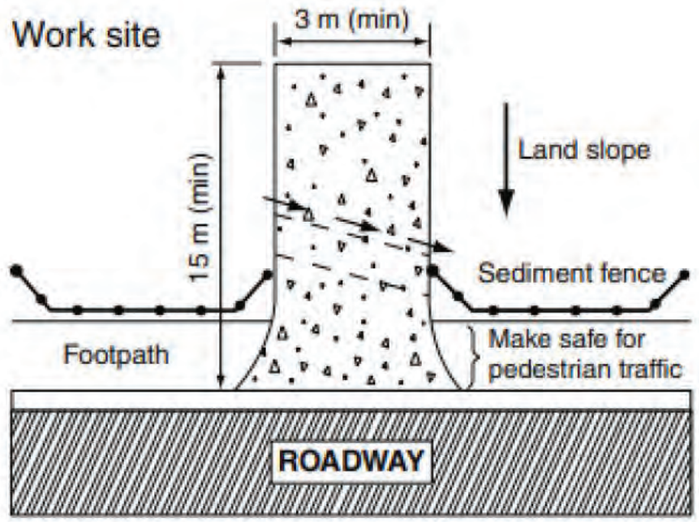
CPESC CPESC: 8726 CPESC: 7060



Entry / Exit - Rock



Entry / Exit - Rock (Sloping away from road)



Entry / Exit - Rock (Sloping towards road)

Standard Drawings Sourced From Best Practice Sediment & Erosion Control

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

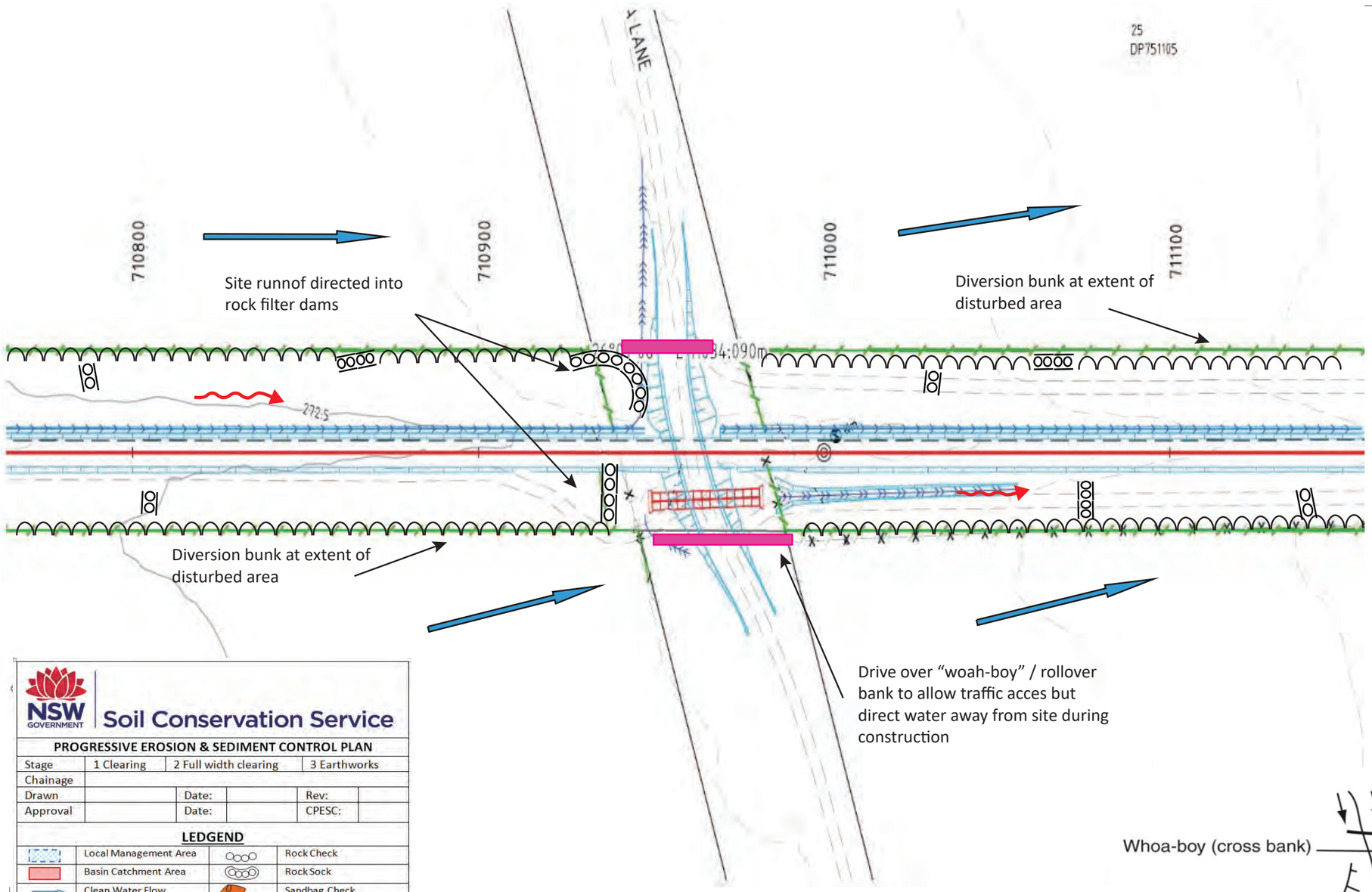
DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT- ACCESS POINTS

SCALE

AT

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-034
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
APPROVED BY SCS	DATE 01/10/2020
CPESC	CPESC: 8726 CPESC: 7060



INSTALLATION:

1. Refer to plans for location, extent and construction details. Design to factor in expected traffic loads, peak discharge and debris load.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Place the specified size and number of culverts ensuring pipes extend at least 300mm past the proposed rock fill. Fill between the pipes and cover with sufficient material to satisfy load requirements.
9. Form the road surface to specified design.
10. Check the pipe and channel alignment to ensure correct drainage and that the pipe drains to a stable outlet.

MAINTENANCE:

1. Inspect weekly or after runoff producing rain.
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

REMOVAL:

1. Remove all materials and dispose in a manner that will not cause erosion or pollution.
2. Rehabilitate all disturbed areas.

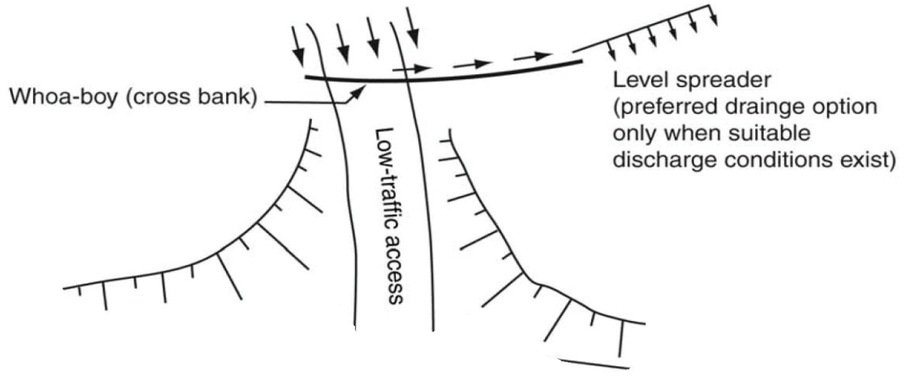
NSW GOVERNMENT Soil Conservation Service

PROGRESSIVE EROSION & SEDIMENT CONTROL PLAN

Stage	1 Clearing	2 Full width clearing	3 Earthworks		
Chainage					
Drawn		Date:		Rev:	
Approval		Date:		CPESC:	

LEDGEND

	Local Management Area		Rock Check
	Basin Catchment Area		Rock Sock
	Clean Water Flow		Sandbag Check
	Site Water Flow		Silt Fence
	Lined Channel		Clean water flow path
	Lined Batter Chute		Sediment Trap
	Cross Drain		Piped Culvert
	Earth Bund (cover varies)		Waterway Crossing
	Retain Vegetation	XXXX	Mulch Bund
	Waterway & Drainage Line		Spreader Outlet
	Open Channel		Mulch Sock
	Scarf Vegetation		Jute mesh
	Geotextile fabric fence		



Standard Drawings Sourced From Best Practice Sediment & Erosion Control

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

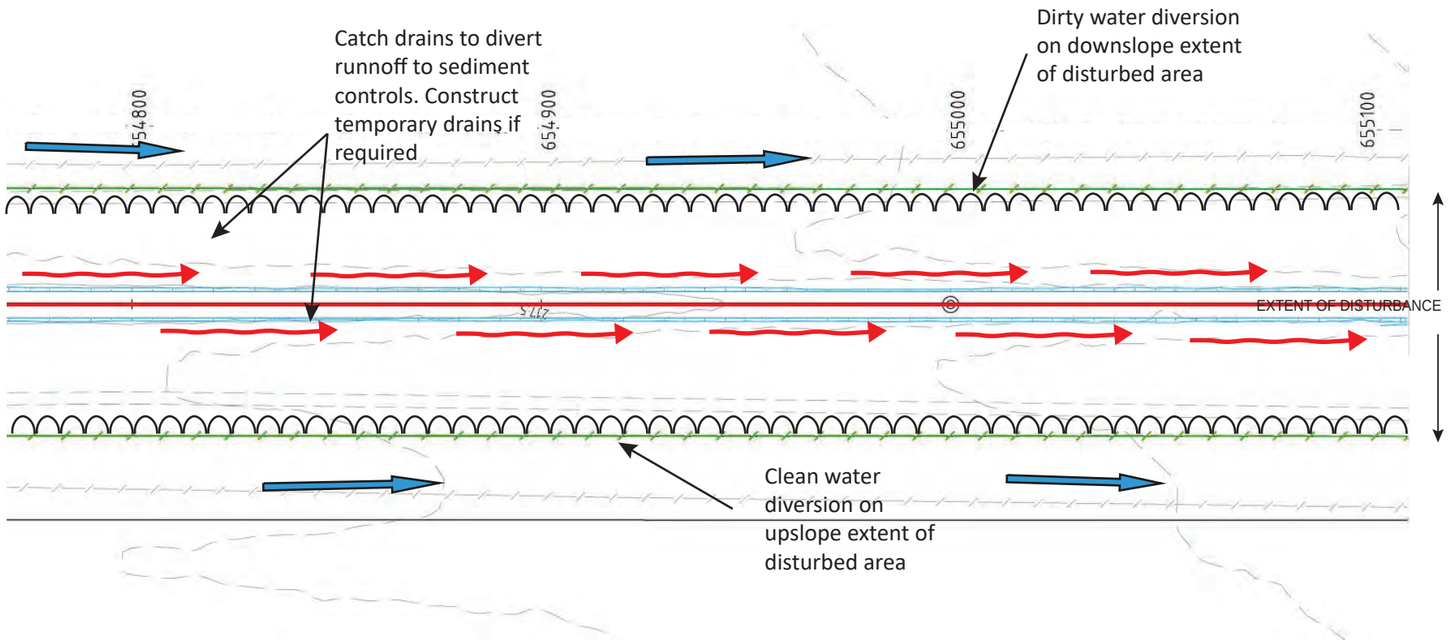
DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT - LEVEL CROSSING

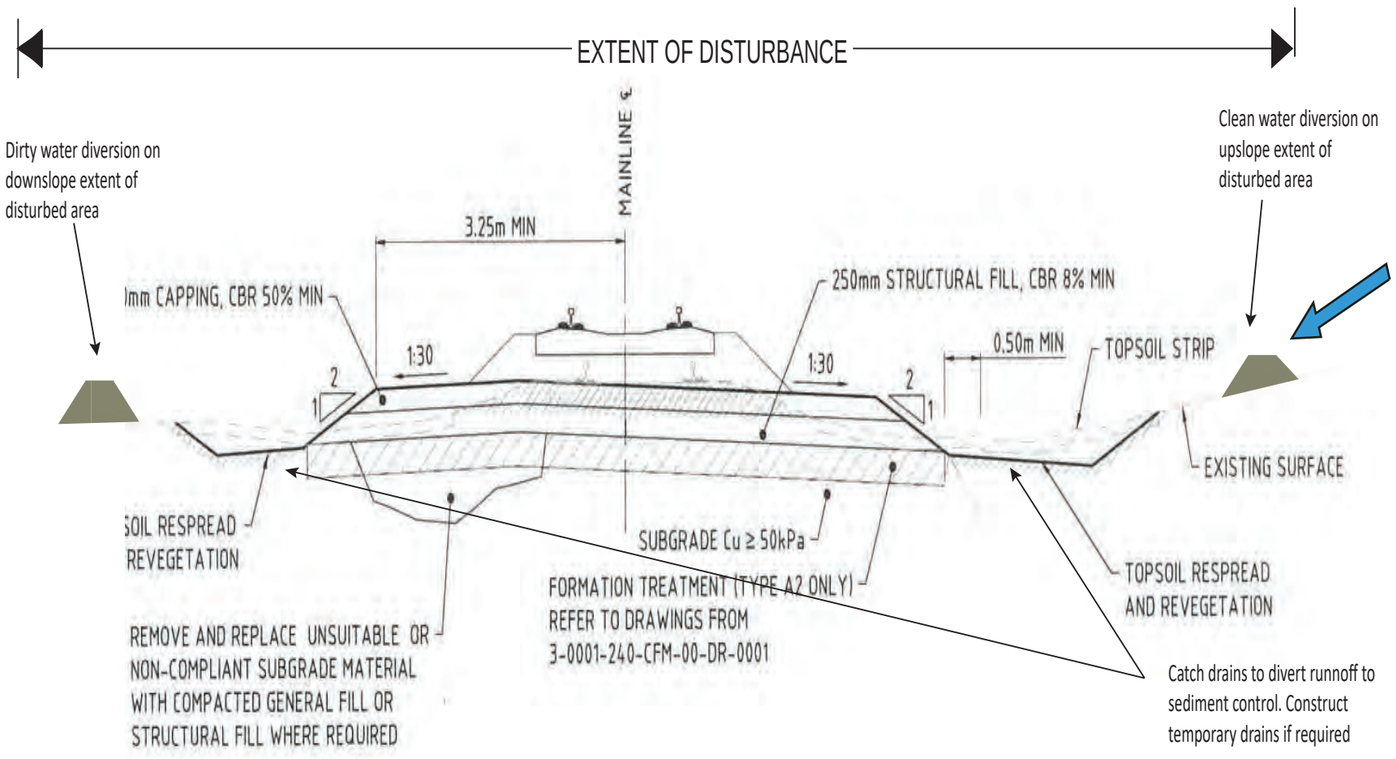
SCALE:

AT:

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-035
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060





INSTALLATION:

1. Refer to plans for location, extent and construction details.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Ensure structure locations will not interfere with future construction activities.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Form windrow or bund on the limit of disturbed area. Make sure formed bund is stable, add soil amelioration if required.
9. The upslope bund acts as cleanwater diversion with the downslope bund acting as a dirty water diversion directing water to sediment controls. Cess drains on both sides of the alignment will direct water to sediment controls.
10. Where the site intersects overland or concentrated flow paths apply the typical or site-specific details provided.
11. Provide rock checks, sandbags or mulch bunds on catch and diversion drains as required.
12. Where runoff is confined as channelised flow, channels will be protected with concrete, rock, geotextile, plastic or biodegradable products (eg. jute) to prevent erosion. This applies to both clean water diversion and site water diversion. Batter chutes may be used throughout the project to divert site runoff down steep grades. These will be constructed from materials including geotextile, rock and plastic with the incorporation of a rock/sandbag dissipation area.
13. Where soil disturbance is undertaken, but it is not feasible to construct sediment control measures or implement final rehabilitation, the potential for erosion will be minimised by covering the site with geotextile, heavy duty plastic or similar as temporary measure. This is particularly relevant to those areas which drain directly into clean water diversions/watercourses.
14. Refer to typical and site-specific drawings where the alignment reaches sidings, culverts, bridges, access points, level crossings, laydown or stockpile areas.
15. Check the channel alignment to ensure correct drainage and that they drain to a stable outlet.
16. Re-establish groundcover via temporary or permanent means as soon as possible after the completion of works.

MAINTENANCE:

1. Inspect weekly or after runoff producing rain.
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

REMOVAL:

1. When the soil disturbing activity upslope of the structure is completed and the area is sable the structure should be removed, unless it is to remain as a permanent structure.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.

Standard Drawings Sourced From Best Practice Sediment & Erosion Control

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

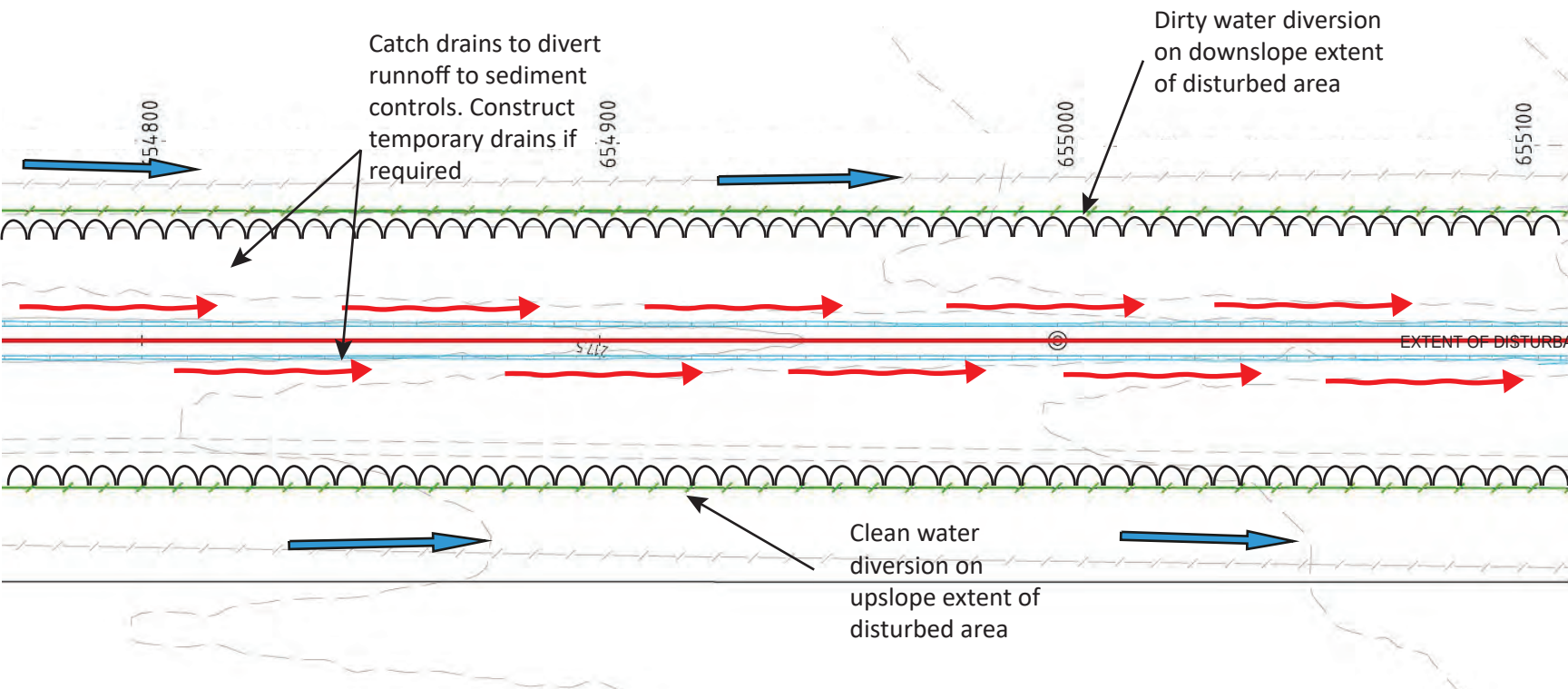
DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT- CUT

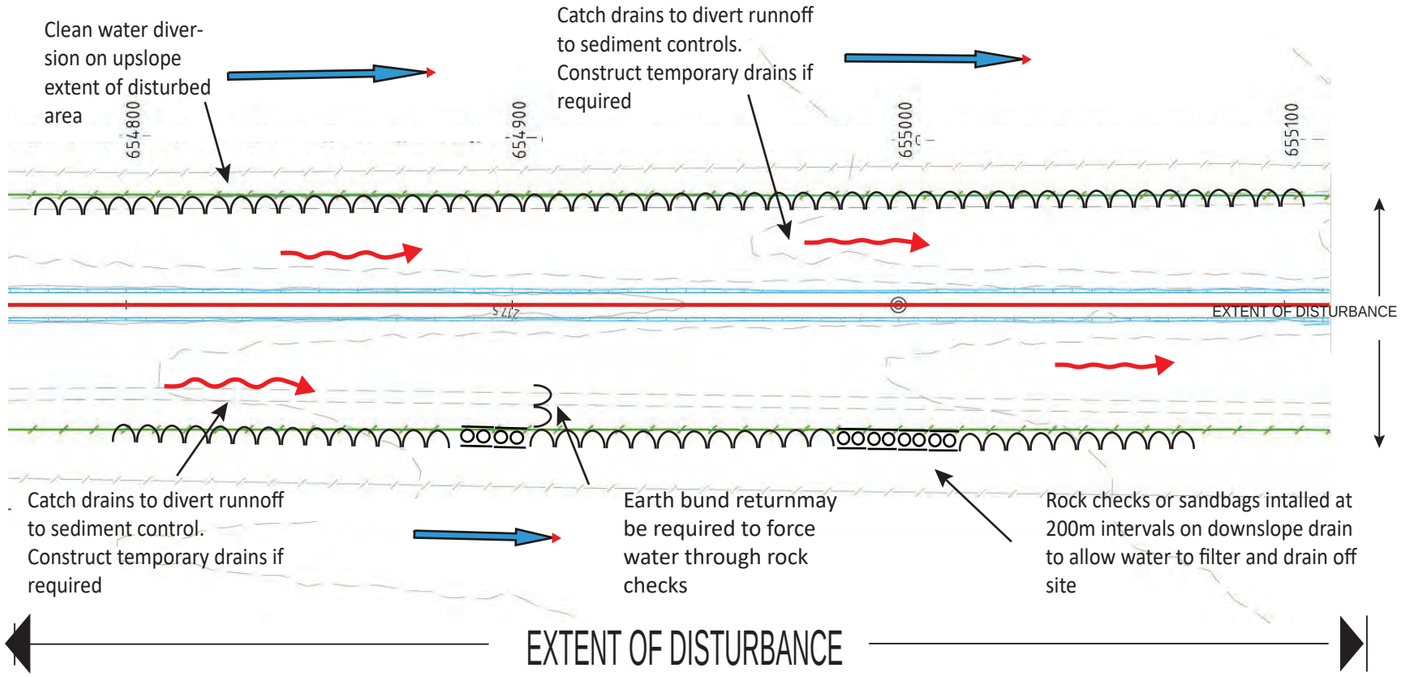
SCALE

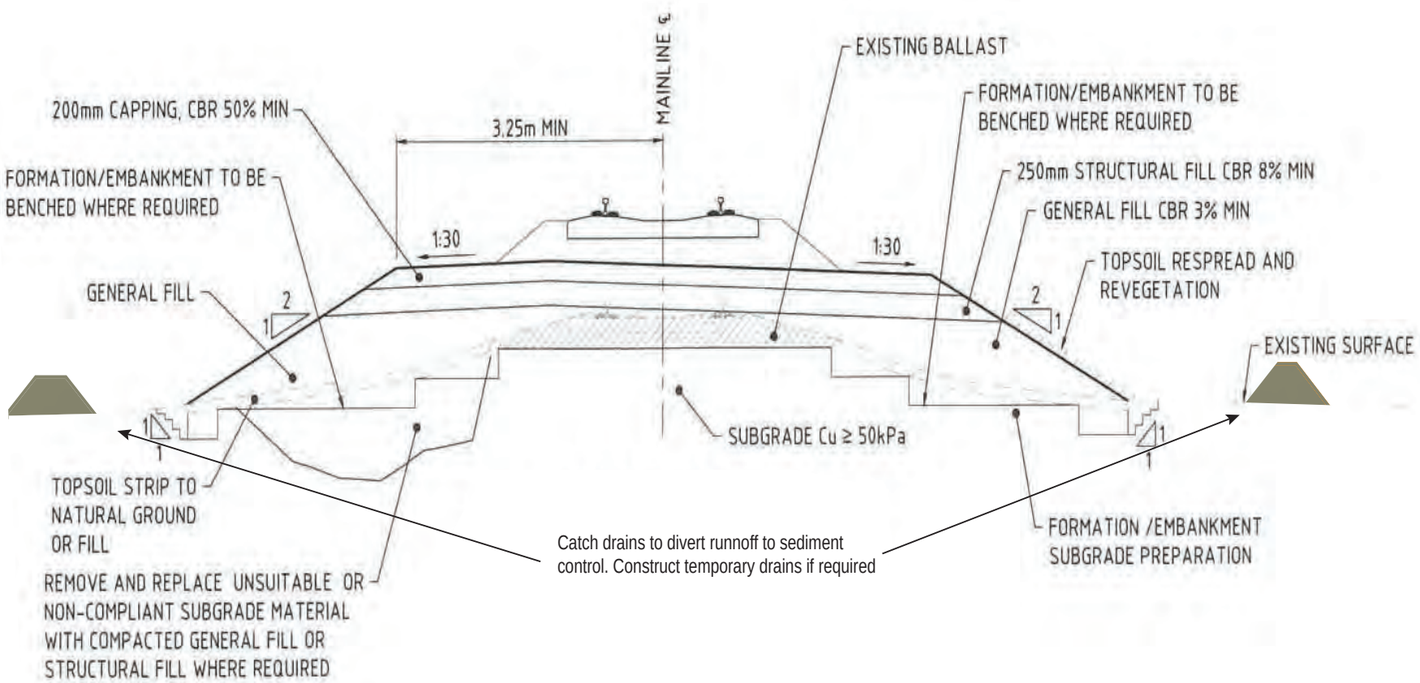
AT

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-036
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
APPROVED BY	SCS
DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060


Catch drains to divert runnoff to sediment controls. Construct temporary drains if required
Dirty water diversion on downslope extent of disturbed area
654800
654900
655000
655100
EXTENT OF DISTURBA
Clean water diversion on upslope extent of disturbed area





INSTALLATION:

1. Refer to plans for location, extent and construction details.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Ensure structure locations will not interfere with future construction activities.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Form windrow or bund on the limit of disturbed area. Make sure formed bund is stable, add soil amelioration if required.
9. The upslope bund acts as cleanwater diversion with the downslope bund acting as a dirty water diversion directing water to sediment controls. Cess drains on both sides of the alignment will direct water to sediment controls.
10. Where the site intersects overland or concentrated flow paths apply the typical or site-specific details provided.
11. Provide rock checks, sandbags or mulch bunds on catch and diversion drains as required.
12. Where runoff is confined as channelised flow, channels will be protected with concrete, rock, geotextile, plastic or biodegradable products (eg. jute) to prevent erosion. This applies to both clean water diversion and site water diversion. Batter chutes may be used throughout the project to divert site runoff down steep grades. These will be constructed from materials including geotextile, rock and plastic with the incorporation of a rock/sandbag dissipation area.
13. Where soil disturbance is undertaken, but it is not feasible to construct sediment control measures or implement final rehabilitation, the potential for erosion will be minimised by covering the site with geotextile, heavy duty plastic or similar as temporary measure. This is particularly relevant to those areas which drain directly into clean water diversions/watercourses.
14. Refer to typical and site-specific drawings where the alignment reaches sidings, culverts, bridges, access points, level crossings, laydown or stockpile areas.
15. Check the channel alignment to ensure correct drainage and that they drain to a stable outlet.
16. Re-establish groundcover via temporary or permanent means as soon as possible after the completion of works.

MAINTENANCE:

1. Inspect weekly or after runoff producing rain.
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

REMOVAL:

1. When the soil disturbing activity upslope of the structure is completed and the area is sable the structure should be removed, unless it is to remain as a permanent structure.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.

Standard Drawings Sourced From Best Practice Sediment & Erosion Control

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN TYPICAL RAIL ARRANGEMENT- FILL

SCALE:

AT:

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO. 9732

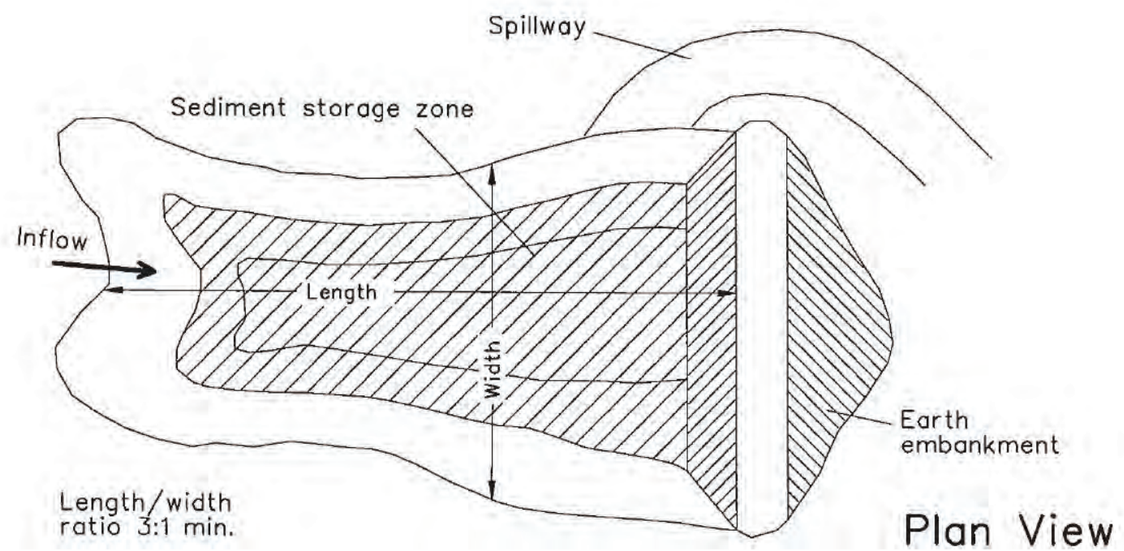
DRAWING NO. ESC-037

REVISION B

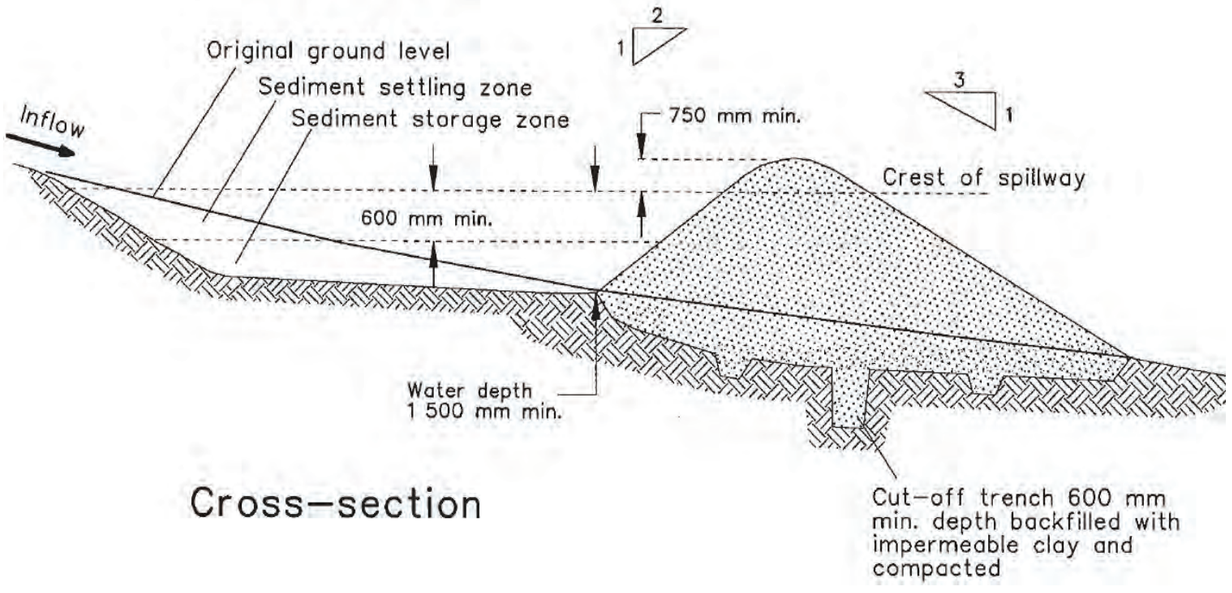
DRAWN BY SCS DATE 01/10/2020

APPROVED BY SCS DATE 01/10/2020

CPESC CPESC: 8726 CPESC: 7060



Plan View



Cross-section

INSTALLATION:

1. Refer to plans for location, extent and construction details. Sizing of basins will be determined by catchment size, topography and rainfall data. Consideration also needs to be given to accessing the basin for maintenance and the need for safety structures.
2. Clearly demarcate the proposed boundary of the disturbance footprint
3. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure.
4. The extent of clearing should be kept to a minimum
5. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
6. Construct the basin to the dimensions specified.

a. Minimum recommended depth of the settling zone is 600mm

b. The desired length to width ratio is 3:1. Baffles maybe installed in situation where the 3:1 ratio can not be achieved.

c. If earth is to be used batters are not to exceed 2:1 (H:V) slope internal and 3:1 slope external. Ensure sufficient moisture of material to achieve desired compaction and place fill in layers no more than 150 to 250mm in depth then compact.

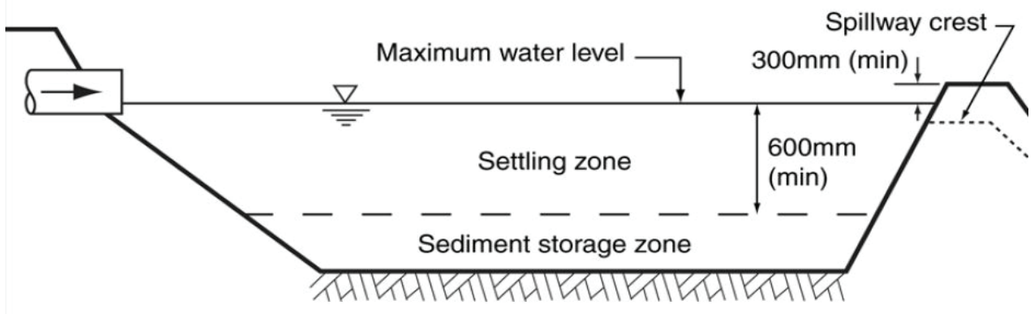
7. Check the inlet and spill height to ensure correct drainage.
8. Place marker to indicate depth at which sediment is to be removed.
9. The banks should be stabilised immediately, unless it will operate for less than 30 days.

MAINTENANCE:

1. Type D basins are typically designed for a maximum 5 day cycle – that being filling, treatment and discharge within 5 days.
2. Inspect weekly or after runoff producing rain. Inspect daily during rainfall events or during de-watering.
3. Desirable that then basin be fully drained before a rainfall event.
4. Inspect for any leaks, slumps, damage or loss of freeboard and make repairs if necessary.
5. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

REMOVAL:

1. When the soil disturbing activity upslope of the bank is finished and the area is sable the structure should be removed, unless it is to remain as a permanent basin.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.



Standard Drawings Sourced From Best Practice Sediment & Erosion Control

REVISION	DESCRIPTION	APPROVED BY	DATE
B	REVSION	SCS	01/10/2020
A	ORIGINAL ISSUE	SCS	25/09/2020

CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS) INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY EROSION AND SEDIMENT CONTROL PLAN TYPICAL RAIL ARRANGEMENT - TEMPORARY SEDIMENT BASIN

SCALE:

AT:

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-038
REVISION	B
DRAWN BY	SCS
DATE	01/10/2020
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DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

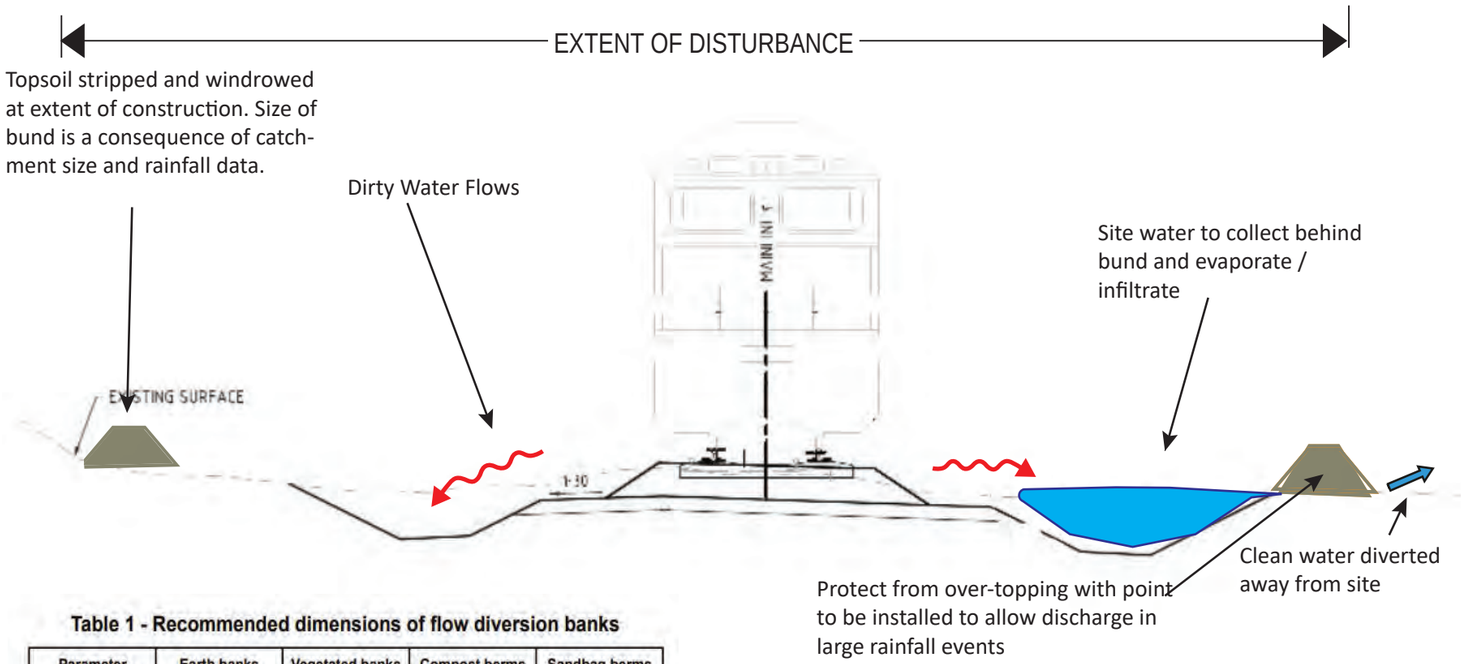

Table 1 - Recommended dimensions of flow diversion banks

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

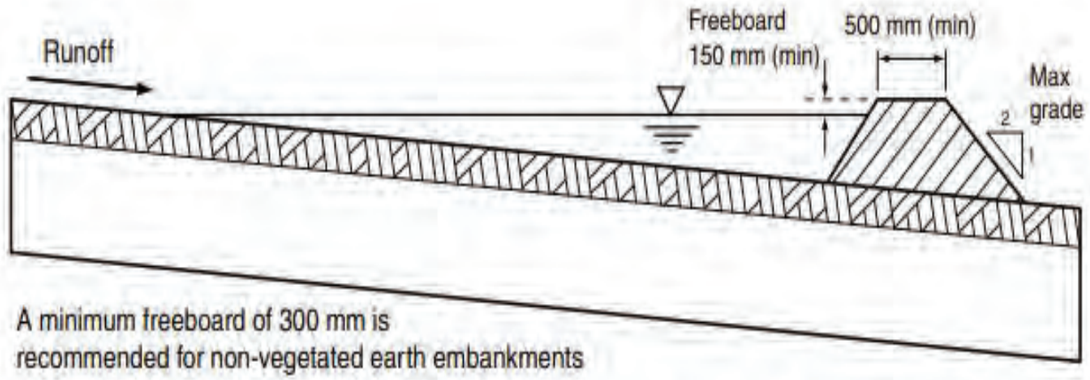

Figure 1 - Typical profile of flow diversion bank formed from earth

INSTALLATION:

1. Refer to plans for location, extent and construction details.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infra-structure. Ensure structure locations will not interfere with future construction activities.
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
8. Form windrow or bund on the limit of disturbed area. Make sure formed bund is stable, add soil amelioration if required.
9. Construct the bank to the dimensions specified. If earth is to be used batters are not to exceed 2:1 (H:V) slope with the completed bank to be a minimum of 500mm in height
10. The upslope bund acts as cleanwater diversion with the downslope bund acting as a dirty water diversion directing water to sediment controls. Cess drains on both sides of the alignment will direct water to sediment controls.
11. Where the site intersects overland or concentrated flow paths apply the typical or site-specific details provided.
12. Provide rock checks, sandbags or mulch bunds on catch and diversion drains as required.
13. Where runoff is confined as channelised flow, channels will be protected with concrete, rock, geotextile, plastic or biodegradable products (eg. jute) to prevent erosion. This applies to both clean water diversion and site water diversion.
14. Where soil disturbance is undertaken, but it is not feasible to construct sediment control measures or implement final rehabilitation, the potential for erosion will be minimised by covering the site with geotextile, heavy duty plastic or similar as temporary measure. This is particularly relevant to those areas which drain directly into clean water diversions/water-courses.
15. Refer to typical and site-specific drawings where the alignment reaches sidings, culverts, bridges, access points, level crossings, laydown or stockpile areas.
16. Check the channel alignment to ensure correct drainage and that they drain to a stable outlet.
17. Re-establish groundcover via temporary or permanent means as soon as possible after the completion of works.

MAINTENANCE:

1. Inspect weekly or after runoff producing rain.
2. Inspect for any slumps, damage or loss of freeboard and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimen-tation. Dispose of sediment in a safe manner.

REMOVAL:

1. When the soil disturbing activity upslope of the structure is completed and the area is sable the structure should be removed, unless it is to remain as a permanent structure.
2. Remove all materials and dispose in a manner that will not cause erosion or pollution.
3. Rehabilitate all disturbed areas.

Standard Drawings Sourced From Best Practice Sediment & Erosion Control

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INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT - EARTH BUND

SCALE:

AT:

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-039
REVISION	B
DRAWN BY SCS	DATE 01/10/2020
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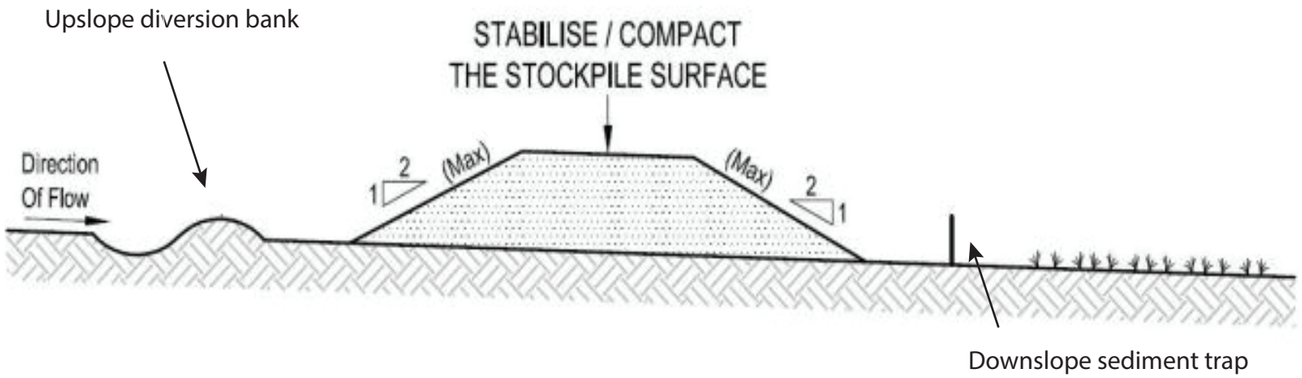
CPESC	CPESC: 8726 CPESC: 7060

STOCKPILE



INSTALLATION:

1. Refer to plans for location, extent and construction details.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Place stockpiles more than 2 (preferably 5) metres away from existing vegetation, concentrated water flows, roads, rail line and hazardous areas
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. All stockpile should be located within the approved boundary.
8. Construct on the contour as low, flat elongated mounds.
9. Where there is sufficient area, stockpiles should not be more than 2 metres in height.
10. When a stockpile is to be in place for more than 10 days, they must be stabilised to reduce the C-Factor to less than 0.10 (>60% grass cover)
11. Where necessary a diversion bank upslope of the stockpile should be placed to divert water around the stockpile. In general, if monthly rainfall is expected to be 45mm or greater and or the upslope catchment is greater than 1500m2.
12. Water runoff originating from stockpiles needs to be directed to and/or controlled by a suitable sediment trap such as sediment fencing / compost berm / rock filter bund
13. All stockpile should remain free draining.
14. Material should be removed from the stockpile in a manner which avoids travelling over the stockpile.

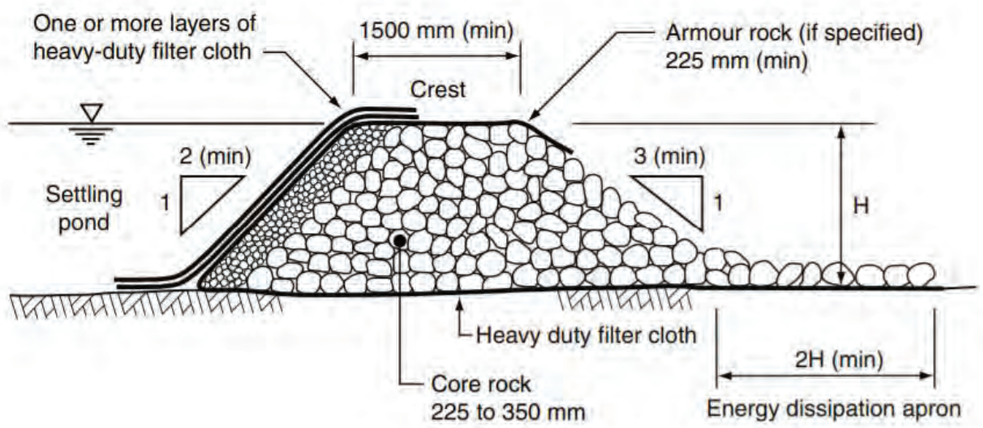
MAINTENANCE:

1. Inspect weekly or after runoff producing rain.
2. Inspect for any slumps and damage and make repairs if necessary.
3. Inspect for any erosion or sedimentation. Repair any erosion and remove any sedimentation. Dispose of sediment in a safe manner.

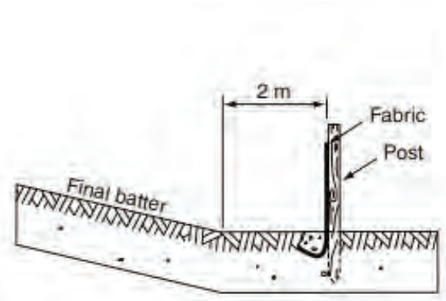
REMOVAL:

1. Stockpile areas should be rehabilitated as soon as possible after the material has been removed.
2. Rehabilitate all disturbed areas.

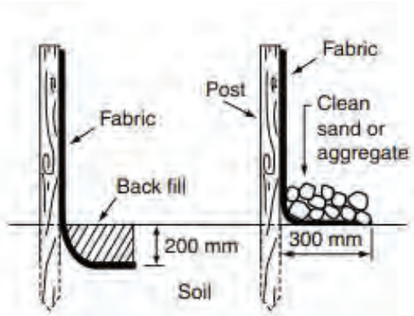
SEDIMENT TRAP -ROCK FILTER BUND



SEDIMENT TRAP - SEDIMENT FENCING



Location of Sediment Fence relative to base of slope



Anchoring of Sediment Fence

Standard Drawings Sourced From Best Practice Sediment & Erosion Control

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CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT - STOCKPILE

SCALE

AT

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-040
REVISION	A
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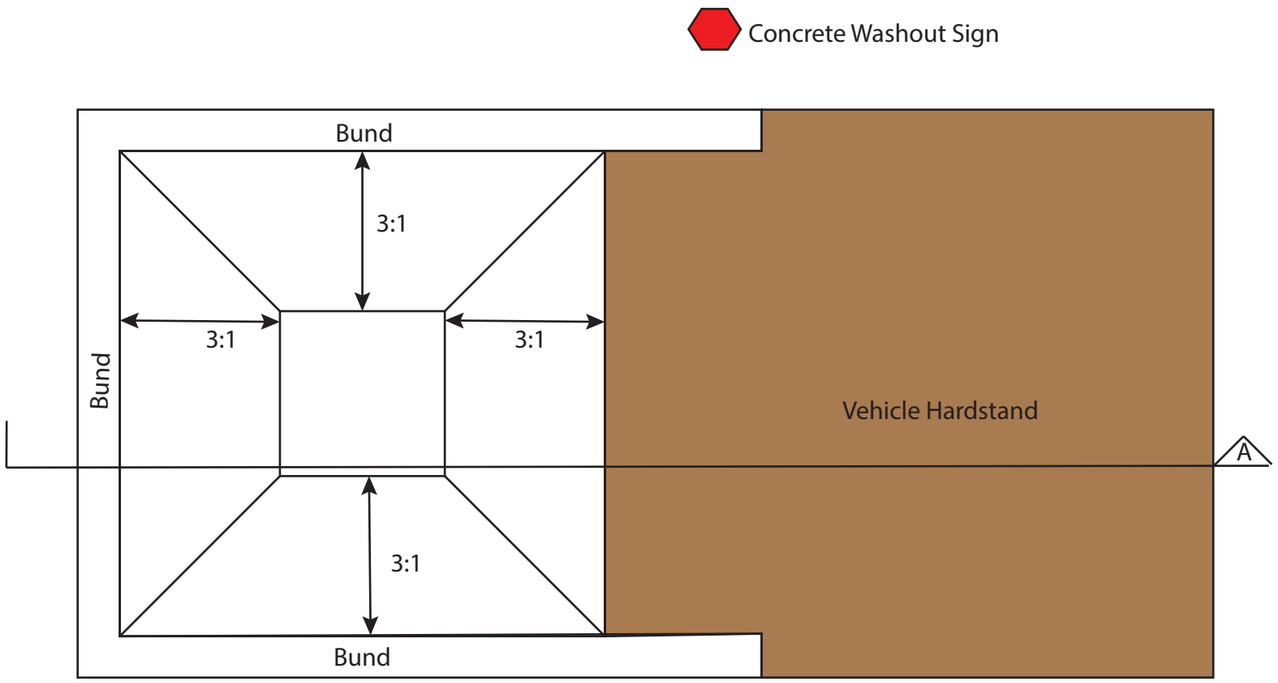
CPESC	CPESC: 8726 CPESC: 7060



INSTALLATION:

1. Refer to plans for location, extent and construction details.
2. Prior to commencing works ensure all necessary approvals have been obtained.
3. Clearly demarcate the proposed boundary of the disturbance footprint
4. Identify site constraints such as dispersive soils, nearby sensitive receptors and infrastructure. Place concrete washout areas away from existing vegetation, concentrated water flows, roads, rail line and hazardous areas
5. The extent of clearing should be kept to a minimum.
6. Prior to clearing works establish necessary sediment control measures.
7. All washout areas should be located within the approved boundary.
8. Remove any vegetation and unsuitable material and dispose of in a correct manner. Do not use unsuitable material in construction.
9. The washout area should be located away from drainage lines, storm water drains and water bodies.
10. All wash down water is to be contained within the designated impervious bund.
11. Concrete washout areas are generally not designed for the collection of excess concrete. Excess concrete waste should be returned to the local batching plant for treatment and re-use or placed in a site receptacle designated for concrete and masonry and allowed to set.

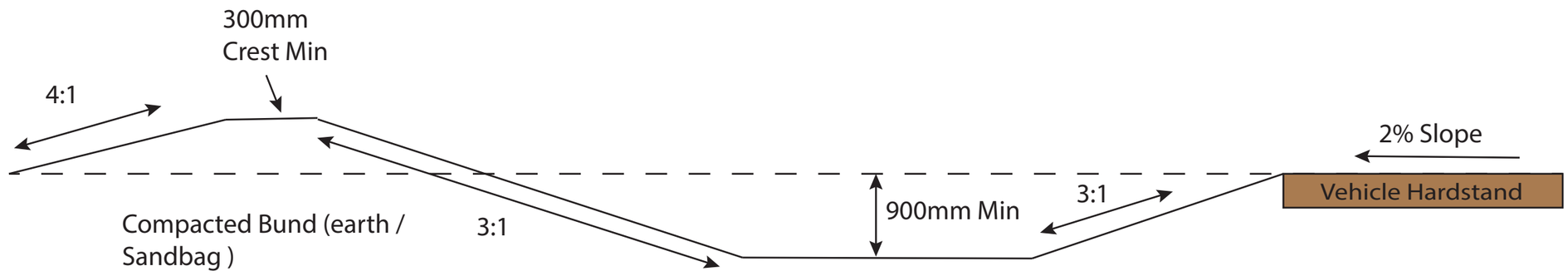
MAINTENANCE:

1. Inspect weekly, prior to and after runoff producing rain.
2. Inspect for any slumps and damage and make repairs if necessary.
3. Dispose of concrete in a safe manner.

REMOVAL:

1. Once the concrete washout area is no longer needed the area should be removed and the site rehabilitated.
2. Rehabilitate all disturbed areas.

Section A



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PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

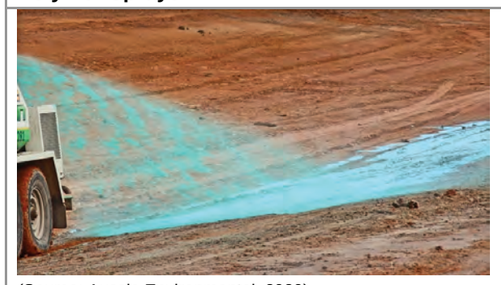
DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL RAIL ARRANGEMENT - CONCRETE WASHOUT

SCALE:

AT:

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO. 9732
DRAWING NO. ESC-000
REVISION A
DRAWN BY SCS DATE 01/10/2020
APPROVED BY SCS DATE 01/10/2020
CPESC CPESC: 8726
CPESC: 7060

Control Type	Application	Advantages/Disadvantages
Check Bunds		
	Check bunds are primarily used as drainage control devices for the control of flow velocity, and subsequently will also collect small quantities of sediment. There are three common types of check bunds: sandbags, rock and coir logs.	• Quick and inexpensive to install and maintain • Effective in channels with a gradient <10% • Sandbags suitable for shallow drains (<500mm deep) • Rock suitable for deeper drains (>500mm deep) • Coir logs not suitable where flows will overtop or flow around the logs • Rock check bunds should be avoided in dispersive soils
Hydromulching		
 (Source: Catchment & Creeks Pty Ltd, 2017)	Hydromulch is generally seed, fertiliser and cellulose mulch uniformly mixed and agitated in a solution with water. The slurry is sprayed directly onto the soil surface. Hydromulching can be used for grass establishment and the protection of newly seeded areas.	• Best used on slopes <10% and slopes with a vertical fall <3m • Hydromulched areas generally have higher watering requirements than surfaces treated with straw mulch • Trackifers incorporated into the mix are normally water soluble and thus easily disturbed by heavy rainfall and concentrated overland flows • Soil ameliorates may be included (lime, granular fertiliser) • Access by hose to inaccessible areas
Polymer Sprays		
 (Source: Aussie Environmental, 2020)	Polymer sprays are generally an environmentally friendly spray on which penetrates the top layer of the soil and forms a durable layer that is bonded to the underlying surface.	• Improves soil stability • Can be applied quickly with minimal soil preparation required • Provides quick stabilisation where vegetation has yet to be established • No continual maintenance requirements • Appropriate for steep slopes • Not effective when applied to pure sand or gravel with no fine silts or clays • Not suitable for trafficked areas

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INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL EROSION AND SEDIMENT CONTROLS

-km -km -km -km

North

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-042
REVISION	B
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DATE	01/10/2020
CPESC	CPESC: 8726 CPESC: 7060

Control Type	Application	Advantages/Disadvantages
Upslope Diversions		
	Upslope diversions capture runoff that would otherwise enter a disturbed area and divert the 'clean' water away from or around the site, limiting the water on site required to be treated and minimising erosion downslope.	• Quick and easy to establish or re-establish if disturbed • If constructed at appropriate gradients, flow velocities usually small enough to avoid channel linings • Can cause significant erosion issues and flow concentration if overtopped during heavy storms
Batter Drains		
 (Source: Catchment & Creeks Pty Ltd, 2012)	Batter drains are used to transport concentrated flow down the face of a slope, usually >10%. The drainage channel is usually lined with geotextile, turn, rock or rock-filled mattresses.	• Suitable for slopes >10% • Relatively quick and cheap to construct • Some linings have a short service life • Not suitable for use on dispersive soils • Placement of rock on the soil can result in erosion problems if significant lateral inflows occur • Prone to failure if water not directed into entry appropriately • Erosion can occur at the base if inadequate energy dissipation available
Sediment Fencing		
 (Source: Catchment & Creeks Pty Ltd, 2017)	Sediment fences are one of the most common techniques used on small disturbed areas to capture sediment from overland water flows. They are built down slope of areas disturbed by construction activities. They are designed to form a temporary barrier to sheet flow such that a silting basin is formed behind.	• Reasonably easy to install • Removes sediment and prevents downstream damage from sediment deposits • Reduces the speed of runoff • Minimal clearing required for installation • Most fabrics have an effective service life of ~6 months • Not practical where large flows of water expected • Easily damaged by construction equipment • Not adequate for anything deeper than sheet or overland flows

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PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL EROSION AND SEDIMENT CONTROLS

-km -km -km -km

North

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO. 9732
DRAWING NO. ESC-043
REVISION B
DRAWN BY SCS DATE 01/10/2020
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CPESC CPESC: 8726
CPESC: 7060

Control Type	Application	Advantages/Disadvantages
Sediment Traps		
 (Source: Catchment & Creeks Pty Ltd, 2010)	Sediment traps refers to a broad range of sediment capture devices (including excavated sediment traps, sediment basins (refer *Sediment Basins*), rock/timber filters lined with geotextile or unlined (refer C*heck Bunds*), coir logs or filter socks and sediment fence). Excavated sediment traps allow sedimentation to occur as water passes through/over the formed settling pond. Coir logs and filter socks are used as a 'supplementary' sediment trap on mild-sloping earth slopes and around field inlets. They can also be used to form *Check Dams* in minor drainage channels. Sediment fencing can be used to form a U-shape, causing ponding between the two wing walls.	• Excavated sediment traps are relatively quick and easy to install • Excavated sediment traps provide limited capture of fine sediments, may represent a safety risk to site workers and the public and not suitable for use in dispersive soils • Coir logs and filter socks are light and easy to transport into difficult locations, generally coir logs can be left to biodegrade • Coir logs and filter socks can be difficult to move when wet, easily damaged and can wash away in large rain events • Sediment fence traps are reasonably easy to install • Sediment fence traps can be prone to failure if the spill-through weir is incorrectly installed or the bottom of the fabric is not buried appropriately.
Sediment Basins		
 (Source: Catchment & Creeks Pty Ltd, 2010)	Sediment basins capture and store sediment-laden runoff and retain most sediment and other materials and allow the sediment to settle due to gravity. Sediment basins generally unnecessary on sites with average annual soil loss <150m^3/year	• Very high capture rate for coarse sediments • Even when full of water, it can still be effective in removing coarse sediment from any flows passing through the basin • Require designing prior to construction to determine size and applicability • Generally large areas required to construct the sediment basin • Will require periodic desilting • Sediment basins should not be constructed in line on a watercourse
Stabilised Site Access		
 (Source: Catchment & Creeks Pty Ltd, 2010)	Stabilised site access is a designated site entry and exit point that is designed to reduce the tracking of sediment off-site and provide all-weather access. The primary use is to remove soil from vehicle tyres.	• Prefabricated units can be hired • Shaker grids can be reused on multiple access points or sites • A combination of shaker grid and rock pad is more effective than rock pad in isolation • Rock pad access points prone to compaction, reducing void space and therefore effectiveness • Shaker grid (in isolation) are not effective in removing cohesive soil from vehicle tyres • Requires ongoing maintenance (additional rock added, periodic sediment removal if using shaker grid)

REVISION	DESCRIPTION	APPROVED BY	DATE
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CLIENT: Trans4m Rail

PROJECT: NARRABRI TO NORTH STAR (N2NS)
INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL EROSION AND SEDIMENT CONTROLS

North

-km -km -km -km

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SCS SINCE 1938

PROJECT NO. 9732
DRAWING NO. ESC-044
REVISION B
DRAWN BY SCS DATE 01/10/2020
APPROVED BY SCS DATE 01/10/2020
CPESC CPESC: 8726
CPESC: 7060

Control Type	Application	Advantages/Disadvantages
Vegetative Buffers		
 (Source: Catchment & Creeks Pty Ltd, 2017)	Strips of vegetation left or constructed downslope from earthworks provide a simple method of trapping coarse sediment in most storm events. This assumes that, where the vegetation is retained, it will have sufficient time to 'recover' before the next load of sediment-laden water exits the site.	• Native vegetation in riparian zones should not be used as vegetative buffers • The best vegetation cover is one that provides a relatively uniform dense ground cover and may not be applicable on this site. • Low maintenance requirements • Low cost when using existing vegetation

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INLAND RAIL SEPARABLE PORTION 1

DRAWING TITLE: PRIMARY
EROSION AND SEDIMENT CONTROL PLAN
TYPICAL EROSION AND SEDIMENT CONTROLS

-km -km -km -km

North

SCALE: NTS

AT: A3

SOIL CONSERVATION SERVICE SINCE 1938

PROJECT NO.	9732
DRAWING NO.	ESC-045
REVISION	B
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CPESC	CPESC: 8726 CPESC: 7060

Appendix C : Unexpected Discovery of Contaminated Land Procedure (Contaminated Land, Asbestos Containing Material and Acid Sulfate Soils)

Background

Chapter 14 of the N2NS EIS describes the existing soil environment including the identification of potential contamination, assesses the impacts from construction and provides recommended mitigation and management measures.

The targeted site investigations found no visual or olfactory evidence of contamination in any of the test pits.

All samples, except one, had laboratory results either below the limit of reliability or below the relevant human health-based screening criteria.

One site recorded the presence of chrysotile asbestos in gravel fill material consisting of ash and slag (site TP305 – located on the rail corridor directly south of the crossing with Gurley Creek).

The EIS also notes the following:

"This ash fill layer was found beneath the ballast at the majority of locations, at depths between 0.4 and 1.6 metres below top of rail. Soils in the vicinity of location TP305 would be classified as Special Waste (Asbestos). Soils sampled at other test pit locations along the rail corridor are consistent with a General Solid Waste classification."

Purpose

This Procedure details the actions to be taken when potential contaminated soil/material is encountered during excavation/construction activities.

Induction/ training required

All personnel are to be inducted on the identification of potential contaminated soil/material along with this Procedure during the inductions and Toolbox Talks.

Scope

This Procedure is applicable to all activities conducted by all Contractors and personnel that have the potential to uncover/encounter contaminated soil/material.

Procedure

	PROCEDURE	MEASURE / REQUIREMENTS
1)	**Potential Contaminated soil/material encountered during construction activities**	If potential contaminated soil/material is encountered during excavation/construction activities: • STOP ALL WORK in the immediate/affected area • Immediately notify the Trans4m Rail Environment Manager (EM) • Recommence works in an alternative area where practicable
2)	**Undertake a site/area contamination investigation**	The EM (or delegate) is to assess the situation and if considered necessary, commission a suitably qualified contamination specialist to undertake a contamination investigation in the area of the find as per management measures CL1, CL3, CL3, CL4 and/or CL5 of Table 7-2 of this CSWMP. If necessary, the EM (or delegate) will liaise with the relevant authorities to determine the appropriate management options. The EM (or delegate) (in consultation with specialists) will determine the appropriate management measures to be implemented. This may include leaving contamination undisturbed, capping of contamination, treatment or offsite disposal. If the material is to be disposed of offsite, ensure the waste facility is appropriately licensed. Contaminated material requiring off-site disposal is to be classified in accordance with the Waste Classification Guidelines – Part 1: Classification of Waste, NSW EPA 2014. If the material is determined to be Acid Sulfate Soil (ASS) or Potential Acid Sulfate Soil (PASS), an Acid Sulfate Soil Management Plan would be prepared and implemented in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, August 1998).
3)	**Environmental management and work health safety management**	Prior to any contamination investigation, management or remediation activities appropriate work method documentation encompassing safety and environmental risk management will be prepared for review and approval by the EM (or delegate).
4)	**Remedial action**	If required a Remedial Action Plan (RAP) will be prepared in accordance with the EPA on contaminated land management and CL5
5)	**Recommence works**	Recommence works once remedial works have been implemented. The EM (or delegate) will be required to give approval prior to works recommencing

UNEXPECTED DISCOVERY OF CONTAMINATED LAND FLOW CHART

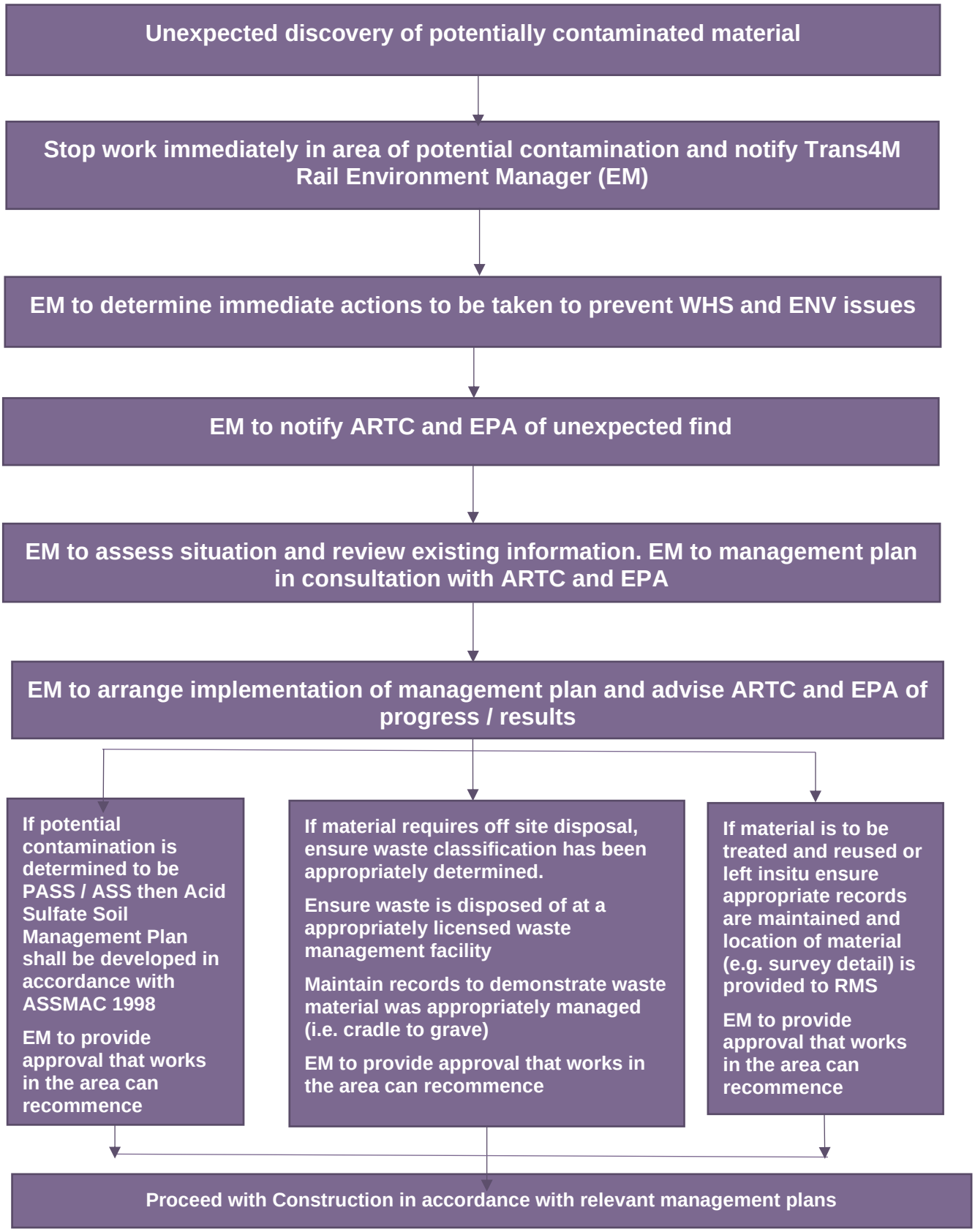


Figure 1: Unexpected discovery of contaminated land flow chart

Potential Asbestos Containing Soil: Management Procedure

Asbestos Containing Soil Management

Trans4m Rail proposes the following to clarify the approach to potential Asbestos Containing Soil (ACS). Where ground-disturbing works are to be undertaken within 50m of TP305 or where asbestos fragments are suspected/ unexpectedly encountered, the following measures should be put in place to reduce the risk of potential exposure:

1. Prior to excavation works all relevant site personnel will undertake a Toolbox Talk to ensure that staff and contractors are adequately trained to recognise environmental aspects and OH&S issues. The toolbox talk will incorporate the activities required to manage contamination issues as detailed in this plan.
2. If a fragment of suspected ACS is identified, works in the vicinity of the find will cease and temporary exclusion area identified. The EM will be notified and will determine the appropriate management measures to be implemented.
3. Once deemed appropriate by the Environmental Manager (or delegate) a suitably qualified person (i.e. a 'competent person') will collect any fragments and place it in a 200 mm polythene bag for later disposal at an appropriate waste facility. A detailed visual inspection of the area will be carried out by the competent person, which will involve wet raking of the areas to a depth of 100 mm for any further fragments. If no further fragments are identified, works can continue.
4. If several fragments (i.e. less than 10 fragments per square metre), the competent person is to direct the collection of the fragments and place them in a 200 mm polythene bag for later disposal at an appropriate waste facility. A detailed visual inspection of the area will be carried out by the competent person, which will involve wet raking of the areas to a depth of 100 mm for any further fragments. If no further fragments are identified, works can continue.
5. If suspected ACS continues to be identified during excavation works or a large amount of fragments is identified in a localised area (i.e. above 10 fragments per square metre) and/or if it is thought that any uncovered material might be considered asbestos containing and friable, works will cease and a consultant in occupational hygiene will be engaged to assess the situation and determine an appropriate course of action.
6. The occupational hygiene consultant must determine and report:
    - If the asbestos is non-friable or friable
    - The extent of the contamination
    - Options for the appropriate remediation of the area on site.
7. The consultant may recommend that as a precaution during asbestos removal works, continuous asbestos fibre monitoring should be carried out at the perimeter of the area and if deemed necessary by the hygienist, personal exposure asbestos fibre air monitoring for workers in area. The monitoring should be completed daily in accordance with *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC: 3003(2005)], April 2005 and *How the Safely Remove Asbestos Code of Practice* (Safe Work Australia, December 2011).
8. Any asbestos finds will be reported to Inland Rail and DPIE. The Environment Manager will report asbestos to ARTC and EPA in accordance with the N2NS environmental incident procedure.

ACS FLOW CHART

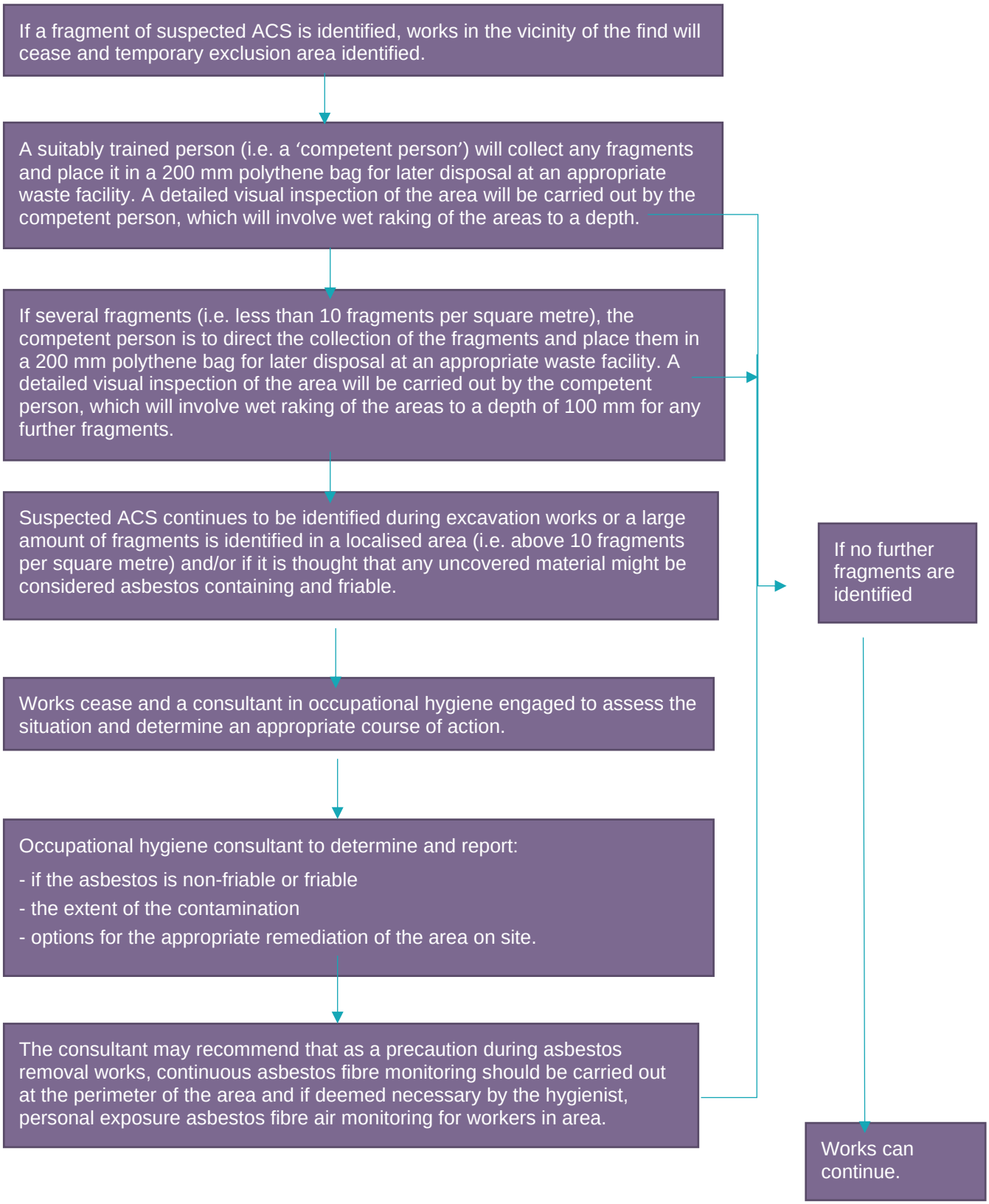


Figure 2: ACS Flow Chart

Appendix D : Air Quality Monitoring Program (incl. Depositional Dust Monitoring Procedure)

This Air Quality Monitoring Program for the N2NS Project, along with any mitigation measures found in Section 7.1 of the CSWMP, the Progressive ESCP and the Water ECM have been developed to address and achieve the outcomes detailed in CoA C14 (c), E86 and RMM C5.1.

This Air Quality Monitoring Program generally consists of the following monitoring activities:

- Airborne particulate matter (PM_{10}) will be monitored via the installation of static air quality monitoring photometer/s at selected location/s along the alignment that represent the greatest impact based on the scope of works and the density of surrounding sensitive receivers.

- Monthly dust monitoring will be undertaken in accordance with the Depositional Dust Monitoring Procedure (refer below) and in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines.

Airborne Particulate Matter (PM_{10}) Monitoring

Airborne particulate matter will be monitored along the construction alignment via the installation, analysis and assessment of static air quality monitoring photometer/s.

Static air quality monitoring photometer/s will be established at selected location/s along the alignment that represent the greatest impact based on the scope of works and the density of surrounding sensitive receivers i.e. Township of Moree. These photometer/s will be installed 1 month prior to construction works commencing and remain in place for the initial phase of construction i.e. 3 months. Following this, the results will be assessed against the adopted air quality criteria (detailed below) and additional monitoring undertaken if deemed necessary.

Pollutant	Averaging period	Criteria1
PM_{10}	24 Hours	50 µg/m^3

1. Based on the Air NEPM and the Approved Methods

Throughout the monitoring period, any exceedances of the abovementioned air quality criteria will be investigated by Trans4m Rail's Environment Manager (or suitable delegate) to determine the validity of the results and adjust management practices, if required.

The results and any exceedances and associated corrective measures will be reported to ARTC, the Project ER and the NSW EPA on a monthly basis.

Depositional Dust Monitoring Procedure

This Depositional Dust Monitoring Procedure forms part of the Construction Soil and Water Quality Management Plan (CSWMP), a sub plan of the Construction Environment Management Plan for SP1 of the N2NS Project.

Various activities to be undertaken during construction have the potential to cause an increase in dust that can impact sensitive receivers within the vicinity of the Project. The purpose of this procedure is to outline the method for monitoring and assessing changes to air quality adjacent to the Project alignment.

Any changes to air quality or exceedances of the adopted air quality criteria will be thoroughly investigated and if required, additional or amended air quality control measures will be implemented to ensure dust is being suitably managed on-site.

Depositional dust gauges (DDG) will be established at least one month prior to the commencement of construction, remain in place for the duration of construction and be removed at the completion of construction or where sufficient stabilisation has been achieved across the site.

The installation, monitoring and analysis of the dust gauges will be undertaken in accordance with this procedure, the Australian Standards specified below and the N2NS Environment Protection Licence (EPL).

Results will be captured monthly and reported to ARTC, the Project ER and the NSW EPA along with any exceedances and corrective actions taken.

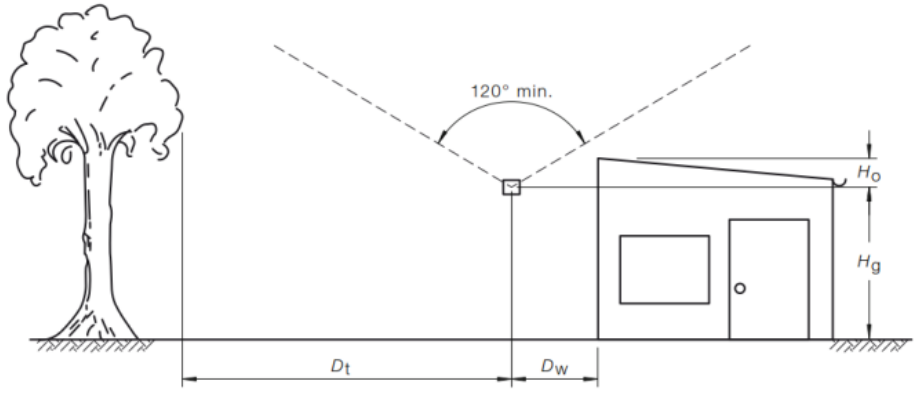
Site Selection and Positioning of Depositional Dust Gauges

The depositional dust gauges (DDG's) will be positioned in accordance with the *A/NZS3580.1.1:2007: Methods for sampling and analysis of ambient air, Part 1.1: Guide to siting air monitoring equipment*.

The following will also be considered when selecting monitoring locations:

- General dust catchment areas will be established along the alignment based on the scale and nature of the construction activities occurring in the area and the density, location and proximity of surrounding sensitive receivers.
- The local meteorological data and wind roses provided in the Project EIS.
- The selected DDG positions will be considered representative of the surrounding location, taking into account all environmentally sensitive areas in the receiving environment.
- Locations will be avoided where:
  - ✓ Airflow is restricted, such as behind trees or structures. DDG's should have a minimum clear sky angle of 120º, refer to Figure 1 below.
  - ✓ Surrounding and / or overhanging objects that might alter the dust deposition rate, such as leafy vegetation, buildings and other structures.
  - ✓ Interference that may occur from surrounding land uses i.e. farming, industry or unsealed access roads, etc.
  - ✓ Locations that are visible and accessible by the public to avoid DDGs being tampered with.

If DDG's are located on private property, permission must be granted by the landowner to access the gauges on a monthly basis.



LEGEND:

H_g = Height of sampling inlet above ground — 2 to 5 m for ground based sampling sites and up to 15 m for roof top sampling sites.
H_o = Height of nearby obstacle above sampling inlet — $2H_o \leqslant D_w$
D_t = Distance to nearby tree — $\geqslant$ 10 m
D_w = Distance to wall (supporting structure) — minimum 1 m
120° = Minimum clear sky angle above sampling inlet

Figure 1: Generalised DDG sampling site (Source: A/NZS 3580.1.1:2007: Methods for sampling and analysis of ambient air – Part 1.1: Guide to siting air monitoring equipment)

The locations of DDGs will be recorded on a register and maintained throughout the construction program.

Equipment

DDG's measure dust deposition rates by passive deposition and capture of dust using a funnel and bottle arrangement. The equipment required for DDG's includes:

- Grade A volumetric glassware (glass bottle, preferably a minimum volume of 4L), complying with AS2164 and its use complying with AS2162.1.
- Glass deposition gauges consisting of a 150 ± 10mm diameter funnel (with a 60ºangle of cone sides). The internal diameter of the funnel stem needs to be sufficient to permit passage of particulate matter during washing. It will be supported in the bottle neck by means of a rubber or plastic stopper with a groove or outlet pipe to allow water overflow under excessive rainfall

conditions. The funnel diameter shall be known to the nearest millimetre when used in calculating results.

- Tight fitting, impermeable, non-reactive lid for deposition gauge collection and transportation.
- A stand supporting the horizontal plane of the funnel at a height of 2 ± 0.2 metres above the ground. The stand generally incorporates a container to protect the bottle contents from sunlight. A hole at the base should be provided to prevent rainwater build up. This stand will include a sign displaying: "**Environmental Monitoring Equipment – Please Don't Touch**" **For Information Contact: Trans4m Rail Environmental Manager - 1800 732 761**
- Filtration apparatus consisting of silica crucibles with porous filter bases (porosity 3) or Gooch crucible of porcelain, silica or alundum with filter pads of equivalent retention are acceptable for separation of the insoluble fraction from the soluble fraction. Alternatively, Buchner funnels with an appropriate filter pad of glass, quarts or ashless filter paper and membrane filters may be used. NOTE: Analysis must be undertaken by a NATA Accredited Laboratory.
- A bird ring made of inert or corrosion-resistant metal wire (diameter 4mm-6mm) with a suitable design to prevent birds perching on the funnel (optional).
- A test sieve with a 1mm aperture complying with AS 1152.

Refer to Figures 2 and 3 below for equipment set-up.

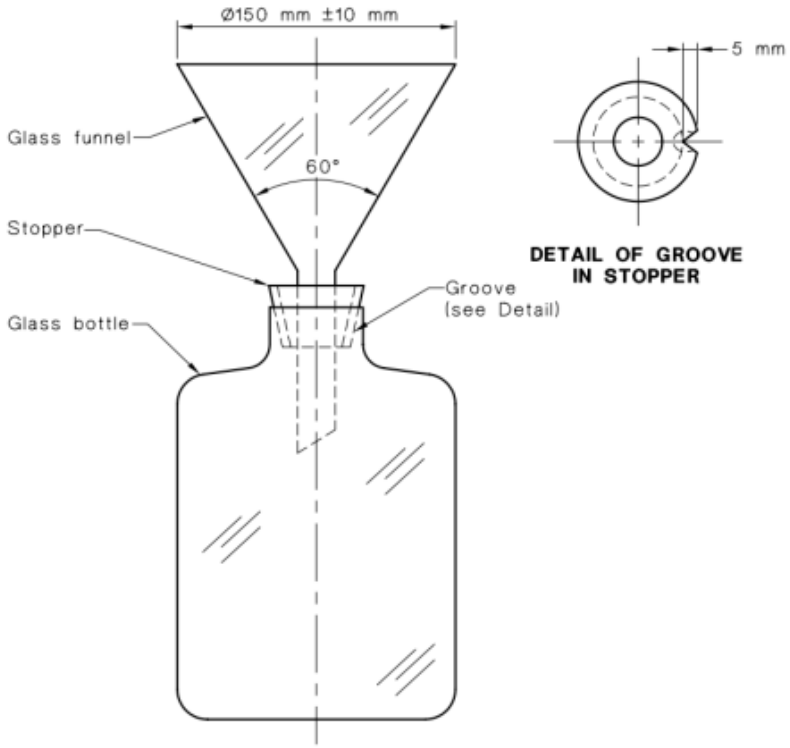


Figure 2: Typical standard DDG (Source: A/NZS 3580.1.1:2007: Methods for sampling and analysis of ambient air – Part 1.1: Guide to siting air monitoring equipment)

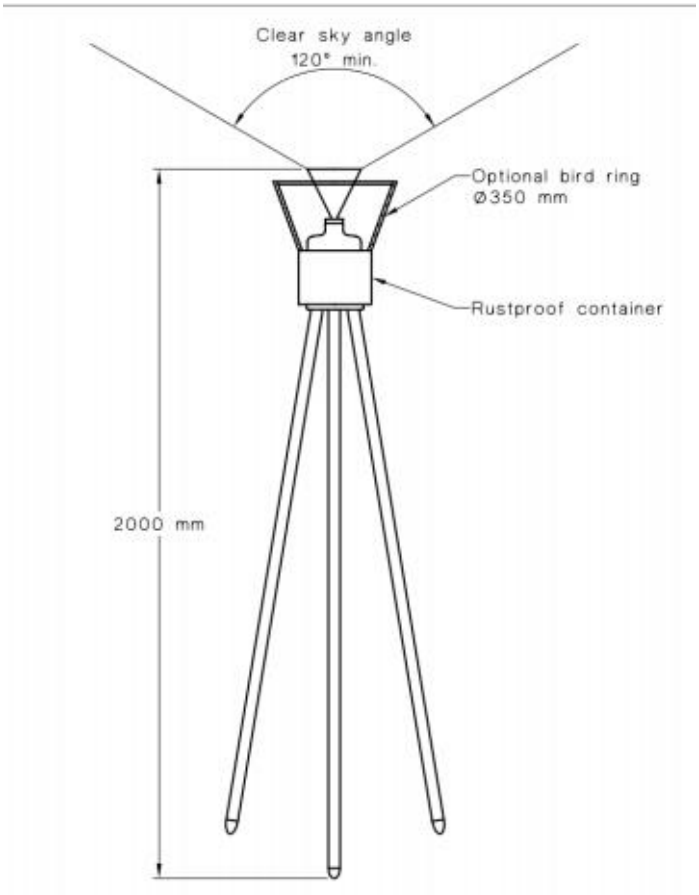


Figure 3: Typical DDG stand

Methodology

Preparation and installation of the DDGs includes the following:

- Where permission is required to enter privately owned land for access, bottle installation and / or change over property owners will be contacted in advance for approval. Approval for the duration of the monitoring period (i.e. construction duration) must be discussed and approval captured in writing.
- The depositional dust gauge for a nominated dust receiving catchment will generally be installed at least 1 month (i.e. 1 monitoring period) prior to construction personnel mobilising to a site. The intent is to capture the background air quality prior to construction works commencing.
- Once erected the DDG will remain in-situ for the duration of the project or until there is sufficient stabilisation across the adjacent work areas.
- All equipment will be labelled for traceability of each sample as it proceeds through the analytical process.
- The DDG bottle will be prepared in accordance with AS/NZS 33580.10.1.
- Each new bottle will be labelled with:
  - ✓ Monitoring Location ID
  - ✓ Sample type (depositional dust)
  - ✓ Date and time sampling commenced

DDG Exchange Procedure

Ensure that the Monitoring Location ID on the bottle matches the Monitoring Location ID on the stand.

- A photo of the condition of each DDG shall be taken prior to the removal of each sample.
- At the end of the monitoring period, wash any deposited matter adhering to the inside of the funnel into the DDG bottle using a minimal volume of distilled water.
- Do not remove any collected rainwater, bugs, leaf litter, bird faeces or any other material from the glass bottle.
- Remove the funnel and attached stopper and seal the bottle with the specified lid.
- Fill in the DDG sampling field sheet (below), noting any contamination (or surrounding land uses) to assist in identifying anomalies.
- Ensure the following information is on the bottle label:
  - ✓ Location ID
  - ✓ Date sampling commenced and ended
  - ✓ Funnel diameter (to the nearest mm)
  - ✓ Recent activities in the area which may contribute to recorded dust fall out.
- Complete Chain of Custody (CoC) and return bottles to the laboratory for analysis (NOTE: Analysis must be undertaken by a NATA Accredited laboratory).
- Label the new bottle as described above.
- Insert the clean funnel with attached stopper into a fresh bottle containing algicide and leave exposed for the next sampling period. Ensure that the funnel is firmly held in the neck of the bottle and that the funnel aperture is horizontal.

Monitoring frequency, sample collection and analysis of sample

DDGs must be exposed for 30 (±2) days. AS/NZS 3580.10.1 recommends that DDGs are changed over the first day of each month.

- The weather and any visible land use conditions adverse to local air quality shall be noted on DDG sampling field sheet and included in the monthly monitoring report.
- When samples are collected, new laboratory prepared bottles will be taken to replace the old bottles to continue sampling for the next 30 days.

- Analysis of the sample should be performed as early as possible and within 30 days of collection. During storage, DDGs shall be tightly sealed and stored in a cool, dark environment to prevent the growth of algae, fungi or other microorganisms.
- The following information must be supplied to the laboratory:
  - ✓ Location of DDG's, surrounding land use (e.g. industrial, residential, agricultural or urban), height above ground level at the given location and any other observations
  - ✓ Date sampling commenced and ended
  - ✓ Recent activities in the area which may contribute to recorded dust fall out (eg meteorological conditions, proximity to bushfires, agricultural activities, traffic on unsealed roads, etc).
  - ✓ The following will be determined from analysis carried out by laboratory staff in accordance with procedures outlined in AS/NZS 3580.10.1:
    - Total Solids
    - Insoluble Solids
    - Soluble Solids
    - Ash and combustible matter

Recording, Assessment and Reporting

Following receipt of the lab results, an assessment will be undertaken by the Trans4m Rail Environment Manager (or suitable delegate) against the adopted air quality criteria:

Pollutant	Averaging period	Criteria[1]
Dust Deposition	Annual	2 g/m^2/month^2

1. Based on the Air NEPM and the Approved Methods
2. Maximum increment. Maximum cumulative impact of 4 g/m^2/month

- Exceedances of the abovementioned air quality criteria will be investigated by Trans4m Rail's Environment Manager (or suitable delegate) to determine the validity of the results and adjust management practices, if required.
- The results and any exceedances and associated corrective measures will be reported to ARTC, the Project ER and the NSW EPA on a monthly basis and 6-monthly to DPIE in accordance with Condition C20.

Attachment A: DDG Sampling Field Sheet

Gauge ID	Bottle installation		Collection		Total number of days	Funnel diameter (mm)	Collected by (name)	Comments – adjacent activities(harvesting), weather conditions, bushfires, contamination, signs of overflow	Date sent to lab
	Date	Time	Date	Time					

Appendix E : N2NS Permanent Spoil Mound Approval Checklist

Narrabri to North Star (N2NS)
Permanent Spoil Mound Approval Checklist

1. Criteria for Permanent Spoil Mounds

As outlined in the N2NS Construction Soil and Water Management Plan, prior to the establishment of a permanent spoil mound, approval must be sought from Trans4m Rail's Environmental Manager (or delegate) and ARTC via this N2NS Permanent Spoil Mound Approval Checklist.

This checklist must be completed and signed by both Trans4m Rail's Environmental Manager (or delegate) and a delegate from ARTC prior to works commencing on the proposed spoil mound.

Once approved, this permanent spoil mound must be constructed in accordance with the mitigation measures detailed in Table 1 below and any relevant mitigation measures from the Project CEMP, any relevant sub-Plans and ECM and the site specific ESCP.

Permanent Spoil Mound ID:	
Stage:	
Chainage / Location:	

Table 1: Locational Criteria for Permanent Spoil Mounds

CRITERIA	COMPLIANT (Y) YES / (N) NO	COMMENTS
Be located within the existing rail corridor.		
Be located at least 100 metres from any watercourse, wetland or culvert and not in an area where the rail formation (or proposed spoil mound location) is predicted to be overtopped or inundated during a 1% AEP flood event.		
Be located at least 500 metres from any residential receiver.		
Be located at least 200 metres from any environmentally sensitive area i.e. threatened species suitable habitat (incl. mapped Koala Habitat), mapped Threatened Ecological Community/s or area/s or item/s of Aboriginal or non-Aboriginal Heritage.		
Be located outside the drip lines (or nominated TPZ) of trees located on private property.		
Not result in the clearing or covering of native vegetation beyond that described in the documents listed in Condition A1 (refer to BMP) **NOTE: Habitat trees and hollow bearing trees must not be directly or indirectly impacted by the establishment of a permanent spoil mound.**		
The maximum height of the spoil mound must not exceed 2 metres or the height of the upgraded rail line, whichever is less.		
Not result in heritage impacts beyond that described in the documents listed in Condition A1;		

Not result in additional changes to the upstream flooding regime beyond those described in the documents listed in Condition A1;		
Not affect the downstream flood regime;		
Not impede the flow of water through culverts		
Not significantly impact the existing visual amenity of surrounding residences.		

Refer to Appendix A for permanent spoil mound Figure showing location, access, design, environmentally sensitive areas and other locational criteria.

2. Mitigation Measures

In addition to the criteria detailed above, mitigation measures specific to the establishment of all permanent spoil mounds are provided in the table below. Additional mitigation measures can be added if deemed necessary.

Table 2: Spoil Mount Mitigation Measures

	MEASURE/REQUIREMENT	RESP.	TIMING	REFERENCE
1)	Spoil materials in permanent mounds must not contain any of the following: Any contaminated soil classified as being unsuitable for the proposed land use Fragments of asbestos containing materials (ACM) Acid sulfate soils Waste, other than the virgin natural materials (VNM) or excavated natural materials (ENM) as defined by the POEO (Waste Regs) Construction or demolition materials Green waste	Construction Manager Site Supervisor	Construction	CSWMP CoA E60 & E61 SPIR
2)	Spoil mounds must be progressively stabilised during the construction of the CSSI and stabilised (in accordance with the rehabilitation strategy) prior to the operation of the CSSI.	Construction Manager Site Supervisor	Construction	CSWMP CoA E60 & E61 SPIR
3)	Any permanent spoil mounds must be free draining and not result in any ponding or pooling of surface water.	Construction Manager Site Supervisor	Construction	CSWMP CoA E60 & E61 SPIR
4)	Permanent spoil mounds would be shaped to avoid any sharp or angular profiles. Alternatively, rounded, natural profiles must be used to ensure they integrate into the existing landscape and surroundings.	Construction Manager Site Supervisor	Construction	CSWMP CoA E60 & E61 SPIR

3. Certification

This Permanent Spoil Mound Approval Checklist provides an accurate assessment of the proposed spoil mound against CoA E60 and E61, the Project EIS and SPIR and the mitigation measures specified in the N2NS Construction Soil and Water Management Plan.

Signed_____

Name_____

Position: Trans4m Rail Environmental Manager Date_____

Signed_____

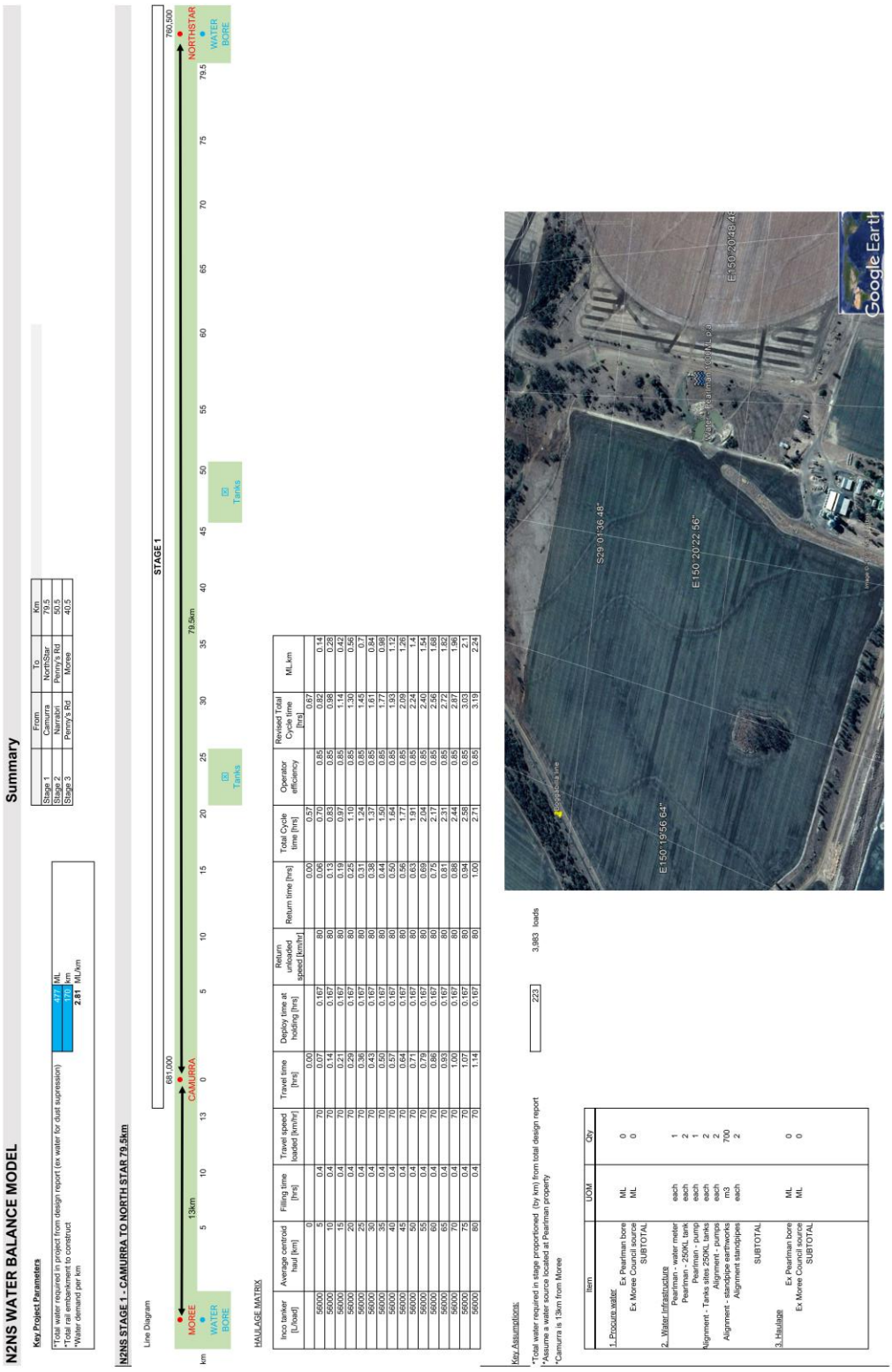
Name_____

Position: ARTC Representative Date_____

Appendix A

Permanent spoil mound Figure showing location, access, design, environmentally sensitive areas and other locational criteria.

Appendix F : N2NS Water Balance Model



N2NS WATER BALANCE MODEL

Summary

Key Project Parameters

*Total water required in project from design report (ex water for dust supression)	417 ML
*Total rail embankment to construct	170 km
*Water demand per km	2.81 ML/km

	From	To	Km
Stage 1	Camurra	NorthStar	79.5
Stage 2	Narrabri	Penny's Rd	50.5
Stage 3	Penny's Rd	Moree	40.5

N2NS STAGE 1 - CAMURRA TO NORTH STAR 79.5km

Line Diagram

HAULAGE MATRIX

Incr tanker [L/load]	Average centroid haul [km]	Filling time [hrs]	Travel speed loaded [km/hr]	Travel time [hrs]	Depisy time at hauling [hrs]	Return unloaded speed [km/hr]	Return time [hrs]	Total Cycle time [hrs]	Operator efficiency	Revised Total Cycle time [hrs]	ML.km
	0			0.00			0.00	0.57		0.67	
56000	5	0.4	70	0.07	0.167	80	0.06	0.70	0.85	0.82	0.14
56000	10	0.4	70	0.14	0.167	80	0.13	0.83	0.85	0.98	0.28
56000	15	0.4	70	0.21	0.167	80	0.19	0.97	0.85	1.14	0.42
56000	20	0.4	70	0.29	0.167	80	0.25	1.10	0.85	1.30	0.56
56000	25	0.4	70	0.36	0.167	80	0.31	1.24	0.85	1.45	0.7
56000	30	0.4	70	0.43	0.167	80	0.38	1.37	0.85	1.61	0.84
56000	35	0.4	70	0.50	0.167	80	0.44	1.50	0.85	1.77	0.98
56000	40	0.4	70	0.57	0.167	80	0.50	1.64	0.85	1.93	1.12
56000	45	0.4	70	0.64	0.167	80	0.56	1.77	0.85	2.09	1.26
56000	50	0.4	70	0.71	0.167	80	0.63	1.91	0.85	2.24	1.4
56000	55	0.4	70	0.79	0.167	80	0.69	2.04	0.85	2.40	1.54
56000	60	0.4	70	0.86	0.167	80	0.75	2.17	0.85	2.56	1.68
56000	65	0.4	70	0.93	0.167	80	0.81	2.31	0.85	2.72	1.82
56000	70	0.4	70	1.00	0.167	80	0.88	2.44	0.85	2.87	1.96
56000	75	0.4	70	1.07	0.167	80	0.94	2.58	0.85	3.03	2.1
56000	80	0.4	70	1.14	0.167	80	1.00	2.71	0.85	3.19	2.24

223 3,983 loads

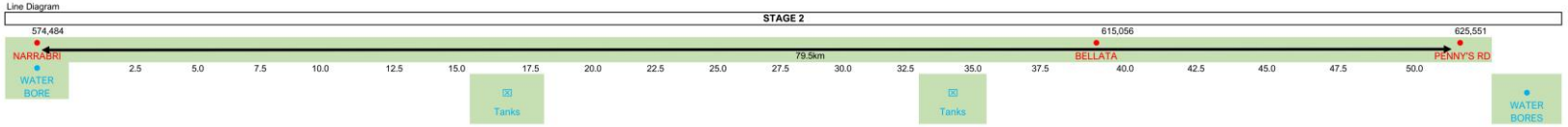
Key Assumptions:

*Total water required in stage proportioned (by km) from total design report
*Assume a water source located at Pearlman property
*Camurra is 13km from Moree

Item	UOM	Qty
1. Procure water		
Ex Pearlman bore	ML	0
Ex Moree Council source	ML	0
SUBTOTAL		
2. Water Infrastructure		
Pearlman - water meter	each	1
Pearlman - 250KL tank	each	2
Pearlman - pump	each	1
Alignment - Tanks sites 250KL tanks	each	2
Alignment - Water meter chambers	each	2
Alignment - standpipe enclosures	m3	700
Alignment standpipes	each	2
SUBTOTAL		
3. Haulage		
Ex Pearlman bore	ML	0
Ex Moree Council source	ML	0
SUBTOTAL		

NS STAGE 2 - NARRABRI TO PENNY'S ROAD 51km

Line Diagram



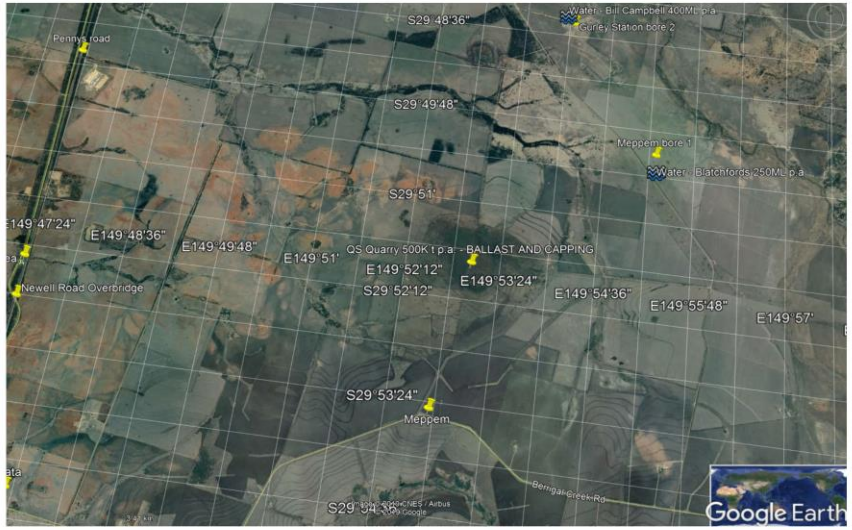
HAULAGE MATRIX

Inco tanker [L/load]	Average centroid haul [km]	Filling time [hrs]	Travel speed loaded [km/hr]	Travel time [hrs]	Deploy time at holding [hrs]	Return unloaded speed [km/hr]	Return time [hrs]	Total Cycle time [hrs]	Operator efficiency	Revised Total Cycle time [hrs]	ML.km
	0			0.00			0.00	0.57		0.67	0
56000	2.5	0.4	70	0.04	0.167	80	0.03	0.63	0.85	0.75	0.07
56000	5.0	0.4	70	0.07	0.167	80	0.06	0.70	0.85	0.82	0.14
56000	7.5	0.4	70	0.11	0.167	80	0.09	0.77	0.85	0.90	0.21
56000	10.0	0.4	70	0.14	0.167	80	0.13	0.83	0.85	0.98	0.28
56000	12.5	0.4	70	0.18	0.167	80	0.16	0.90	0.85	1.06	0.35
56000	15.0	0.4	70	0.21	0.167	80	0.19	0.97	0.85	1.14	0.42
56000	17.5	0.4	70	0.25	0.167	80	0.22	1.04	0.85	1.22	0.49
56000	20.0	0.4	70	0.29	0.167	80	0.25	1.10	0.85	1.30	0.56
56000	22.5	0.4	70	0.32	0.167	80	0.28	1.17	0.85	1.38	0.63
56000	25.0	0.4	70	0.36	0.167	80	0.31	1.24	0.85	1.45	0.7
56000	27.5	0.4	70	0.39	0.167	80	0.34	1.30	0.85	1.53	0.77
56000	30.0	0.4	70	0.43	0.167	80	0.38	1.37	0.85	1.61	0.84
56000	32.5	0.4	70	0.46	0.167	80	0.41	1.44	0.85	1.69	0.91
56000	35.0	0.4	70	0.50	0.167	80	0.44	1.50	0.85	1.77	0.98
56000	37.5	0.4	70	0.54	0.167	80	0.47	1.57	0.85	1.85	1.05
56000	40.0	0.4	70	0.57	0.167	80	0.50	1.64	0.85	1.93	1.12
56000	42.5	0.4	70	0.61	0.167	80	0.53	1.71	0.85	2.01	1.19
56000	45.0	0.4	70	0.64	0.167	80	0.56	1.77	0.85	2.09	1.26
56000	47.5	0.4	70	0.68	0.167	80	0.59	1.84	0.85	2.16	1.33
56000	50.0	0.4	70	0.71	0.167	80	0.63	1.91	0.85	2.24	1.4

Assumptions:

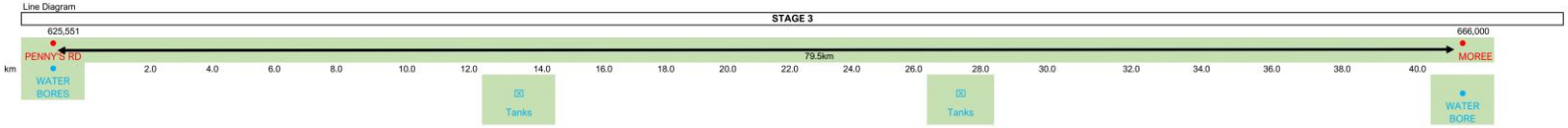
al water required in stage proportioned (by km) from total design report — 143 — 2,555 loads
ume water sources located at Blatchford and Campbell properties
perty bores are 25km and 28km from Penny's Road
npbell and Blatchford required tanking, electrical and line infrastructure

Item	UOM	Qty
1. Procure water		
Ex Blatchford bore	ML	64
Ex Campbell source	ML	71
Ex Narrabri Council source	ML	71
SUBTOTAL		
2. Water Infrastructure		
Blatchford - 250KL tank	each	1
Blatchford - pump	each	1
Blatchford pump line	m	50
Blatchford - hardstand area	m2	400
Campbell - 250KL tank	each	1
Campbell - pump	each	1
Campbell pump line	m	50
Campbell - hardstand area	m2	400
Campbell - electrical	SUM	1
Alignment - Tank sites 250KL tanks	each	2
Alignment - pumps	each	2
Alignment - standpipe earthworks	m3	700
Alignment - standpipes	each	2
SUBTOTAL		
3. Haulage		
Ex Blatchford bore	ML	
Ex Campbell bore	ML	1270
Ex Narrabri Council source	ML	1270
SUBTOTAL		



N2NS STAGE 3 - PENNY'S ROAD TO MOREE 40.5km

Line Diagram



HAULAGE MATRIX

Inco tanker [L/load]	Average centroid haul [km]	Filling time [hrs]	Travel speed loaded [km/hr]	Travel time [hrs]	Deploy time at holding [hrs]	Return unloaded speed [km/hr]	Return time [hrs]	Total Cycle time [hrs]	Operator efficiency	Revised Total Cycle time [hrs]	ML.km
	0			0.00			0.00	0.57		0.67	0
56000	2.5	0.4	70	0.04	0.167	80	0.03	0.63	0.85	0.75	0.07
56000	5.0	0.4	70	0.07	0.167	80	0.06	0.70	0.85	0.82	0.14
56000	7.5	0.4	70	0.11	0.167	80	0.09	0.77	0.85	0.90	0.21
56000	10.0	0.4	70	0.14	0.167	80	0.13	0.83	0.85	0.98	0.28
56000	12.5	0.4	70	0.18	0.167	80	0.16	0.90	0.85	1.06	0.35
56000	15.0	0.4	70	0.21	0.167	80	0.19	0.97	0.85	1.14	0.42
56000	17.5	0.4	70	0.25	0.167	80	0.22	1.04	0.85	1.22	0.49
56000	20.0	0.4	70	0.29	0.167	80	0.25	1.10	0.85	1.30	0.56
56000	22.5	0.4	70	0.32	0.167	80	0.28	1.17	0.85	1.38	0.63
56000	25.0	0.4	70	0.36	0.167	80	0.31	1.24	0.85	1.45	0.7
56000	27.5	0.4	70	0.39	0.167	80	0.34	1.30	0.85	1.53	0.77
56000	30.0	0.4	70	0.43	0.167	80	0.38	1.37	0.85	1.61	0.84
56000	32.5	0.4	70	0.46	0.167	80	0.41	1.44	0.85	1.69	0.91
56000	35.0	0.4	70	0.50	0.167	80	0.44	1.50	0.85	1.77	0.98
56000	37.5	0.4	70	0.54	0.167	80	0.47	1.57	0.85	1.85	1.05
56000	40.0	0.4	70	0.57	0.167	80	0.50	1.64	0.85	1.93	1.12
56000	42.5	0.4	70	0.61	0.167	80	0.53	1.71	0.85	2.01	1.19
56000	45.0	0.4	70	0.64	0.167	80	0.56	1.77	0.85	2.09	1.26
56000	47.5	0.4	70	0.68	0.167	80	0.59	1.84	0.85	2.16	1.33
56000	50.0	0.4	70	0.71	0.167	80	0.63	1.91	0.85	2.24	1.4

Key Assumptions:

*Total water required in stage proportioned (by km) from total design report 114 2,029 loads

*Property bores are 25km and 27km from Penny's Road. It is not viable to supply from these locations relative to Moree due to excessive haulage.

Item	UOM	Qty
1. Procure water		
Ex Moree Council source	ML	113
SUBTOTAL		
2. Water Infrastructure		
Moree - extended hardstand area	m2	600
Alignment - Tank sites 250KL tanks	each	2
Alignment - pumps	each	2
Alignment - standpipe earthworks	m3	700
Alignment - standpipes	each	2
SUBTOTAL		
3. Haulage		
Ex Moree Council source	ML	113
SUBTOTAL		
4. Total Costs		

Appendix G : ARTC Landscape and Rehabilitation Framework (Rehabilitation Strategy)

INLAND RAIL

Landscape and Rehabilitation Framework

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

0-0000-900-ELE-00-GU-0001_1

Document Control

DOCUMENT TITLE	**LANDSCAPE AND REHABILITATION FRAMEWORK**
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Revision History

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A	18/06/2019	Draft for review
B	16/08/2019	Revised draft following receipt of comments
0	10/09/2019	Approved for Issue
0.1	24/04/2020	Issued for review. Updated stage gate terminology.
1	18/05/2020	Updated to include PleaseReview comments. Issued for Use.

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Appendices

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Glossary

Specific terms and acronyms used throughout this strategy are listed and described in the table below.

TERM / ACRONYM / ABBREVIATION	DEFINITION
Accountable Entity	Formerly called the Delivery/Construction Manager, this term is used to cover all potential delivery scenarios (i.e. Design and Construct, Construct only and Public-private partnership).
ARTC	Australian Rail Track Corporation (ARTC) is an Australian Government-owned corporation tasked with developing a 10-Year Program to implement Inland Rail.
AS	Australian Standard
Blue Book	Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom).
Conditions of Approval	The Conditions of Approval may include the Qld Coordinator-Generals conditions and recommendations, NSW Minister for Planning conditions and recommendations or the conditions stipulated in the Victorian Planning Scheme Amendment or Victorian Minister (DELWP) conditions. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Approval conditions and the relevant Environmental Impact Assessment report (such as EIS for NSW and QLD, EES for Victoria) for each Project including the EMP and Proponent Commitments.
CPESC	Certified Professional in Erosion and Sediment Control.
CEMP	Construction Environment Management Plan (CEMP) includes Plans and subplans prepared by the relevant contractor for each Project to implement the environmental management measures during the construction stage and establish the compliance reporting processes to demonstrate compliance with the Project commitments and Conditions of Approval.
CPTED	Crime Prevention Through Environmental Design
EES	Environmental Effects Statement
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
IECA	International Erosion Control Association (Best Practice Erosion and Sediment Control)
ISCA	Infrastructure Sustainability Council of Australia (ISCA) is an independent third party that administers the IS rating tool which is an industry-compiled voluntary sustainability performance rating scheme.
Inland Rail (IR) Program	The Inland Rail Program encompasses the design and construction of a new inland rail connection between Melbourne and Brisbane, via Wagga, Parkes, Moree, and Toowoomba and associated works. The Inland Rail route, which is approximately 1 700 kilometres (km) long, will involve: Using the existing interstate rail corridor through Victoria and southern NSW; upgrading approximately 400 km of existing corridor, mainly in western NSW and providing approximately 600 km of new corridor in northern NSW and southeast QLD.
ISO	International Organisation for Standardisation
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical process.
NATA	National Association of Testing Authorities
NEPM	National Environmental Protection Measure

PMO	Program Management Office
Pre-disturbance condition	For revegetation, the pre-disturbed condition of an area will need to be determined in accordance with the Conditions of Approval and subsequent management plan. This will be particularly relevant where there is a commitment for ongoing monitoring to demonstrate success against the original reference position.
Primary Approval	Projects delivered under the Inland Rail Program require environmental assessment and approval. As the process varies depending on State or Commonwealth jurisdiction, this approval is collectively referred to as the 'primary approval'. The term 'Primary Approval Document' is to collectively refer to any of the following: - Environmental Impact Statement (New South Wales and Queensland). - Review of Environmental Factors (New South Wales). - Impact Assessment Report (Queensland). - Planning Scheme Amendment (Victoria). - Environmental Effects Statement (primary assessment) (Victoria). - Documentation prepared for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
Rehabilitation	Rehabilitation is the process of making a former site stable and self-sustaining.
Revegetation	The process of assisting the re-establishment and development of vegetation, on cleared land and areas disturbed during construction. Revegetation seeks to reinstate and restore vegetation cover to highly modified areas. The vegetation can also assist in soil stabilisation, particularly when pioneering species are used, such as grasses and legumes. Most often native plants are used in revegetation. Revegetation can be achieved by applying either a Naturalistic Planting Approach or a Structured Planting Approach, or a combination of both.
Reinstatement	The manipulation of a disturbed habitat or landscape to a desired condition. This is typically associated with revegetation works.
SEARs	When an application for approval of a declared Critical State Significant Infrastructure/State Significant Infrastructure Project is made, the Secretary of the Department of Planning and Environment is required to issue Environmental Assessment Requirements (SEARs).
SME	Subject Matter Expert (SME) is a specialist in a specific discipline. They provide specialist advice / assistance to Inland Rail when requested.
TA	Technical Advisor (TA) provides assurance to Inland Rail, especially through the Design and Primary Approval review process. The TA acts on behalf of Inland Rail as an embedded representative within the Inland Rail Project team.
TfNSW	Transport for NSW. Formerly called Roads and Maritime Service.
TOR	Terms of Reference outlines the general and specific matters the Project proponent must address when preparing the Environmental Impact Statement. The TOR are prepared by the Coordinator-General.
TMR	Department of Transport and Main Roads – Qld.
QA/QC	Quality Assurance / Quality Control.

1 Introduction

The Melbourne to Brisbane Inland Rail (IR) Program comprises an alignment of approximately 1 700 kilometres of rail linking Melbourne and Brisbane, via Parkes, Moree and Toowoomba. IR will connect regional Australia to domestic and international markets, transforming the way we move freight around the country.

IR contains sections of varying levels of intervention and complexity in work types including:

- Enhancement works to enable double stacking;
- Missing links to provide standard gauge rail link, predominately in greenfield where there is currently no track and / or rail corridor protection; and
- Upgrade Projects to provide major upgrades to existing track within current rail corridor.

It is anticipated that IR will be constructed and operational by 2025, with sections progressively transitioning to operation during this period.

1.1 Purpose and Scope

This Landscape and Rehabilitation Framework (the Framework) aligns with the vision and commitments outlined within the Inland Rail Environment and Sustainability Policy, ARTC Environmental Policy, the *Inland Rail Programme Environmental Management Plan (0-0000-900-EEC-00-PL-0001)* and the *IR Environmental Assessment Procedure (2-9000-PEN-00-RP-1001).*

This Framework, (formerly called the draft Landform Construction Specification), supports the *Landscape and Rehabilitation Strategy (the Strategy) (0-0000-900-ELE-00-ST-0001)* and must be read in conjunction with the Strategy.

The Strategy establishes governing landscape objectives and principles and describes the overarching approach to meeting landscape obligations and commitments. This Framework provides further guidance for IR Projects in detailed design and construction but may be used as a reference document for Projects in earlier phases of delivery.

Performance outcomes outlined in this Framework are to inform subsequent Project specific completion criteria, which are to be developed by Service Providers during detailed design. In developing the completion criteria, Service Providers must take account of the Strategy, Framework, Primary Approval documents and Conditions of Approval (when available).

The Design of Landscape Treatments (Appendix A) provides guidance for Projects to deliver a consistent approach in relation to environmental design solutions and landscape rehabilitation and establishment. It provides direction on the selection of treatments which are complementary to the surrounding environment, have been adequately evaluated and assessed, are feasible, and cognisant of constructability, costs and on-going management during Project handover. Appendix A is particularly relevant to Stage 3 (Market Readiness) of IR Project delivery (refer to Section 3, Delivery mechanism overview and milestone requirements).

The Construction and Operational Requirements (Appendix B) defines the process and responsibility for the reinstatement, rehabilitation and revegetation of areas disturbed or cleared during construction, such that the landform is returned to the pre-disturbance condition or achieves other stated outcomes. This is particularly relevant to Stages 5 (Construction and Commissioning) and 6 (Close-out and Operations) of IR Project delivery.

Individual IR Projects will be subject to different Project delivery mechanisms, such as design and construction, public-private partnership (PPP), or construction only. Expected deliverables for each IR Program stage is discussed further in Section 3. This Framework is intended to inform these delivery processes, providing Program-wide guidance, however, it does not override individual Project Conditions of Approval, Primary and Secondary Approvals, management plans, etc (discussed in Section 1.3), which, by law, take precedence over, and may vary the requirements identified in this Framework. Therefore, the user must refer to the relevant Project documentation, current for that Project's stage of delivery.

1.2 Framework Objectives

The objectives of this Framework are to:

- Support the Objectives and Principles of the Landscape and Rehabilitation Strategy, with respect to 'Conserve and connect', 'Self-sustaining solutions', 'Integrated outcomes', and 'Beyond delivery';
- Capture the landscape and rehabilitation measures in the Primary Approval Document, Conditions of Approval and operational requirements for implementation and maintenance, discussed in Appendix B, Section 4;
- Support compliance with the relevant Project Conditions of Approval (when available);
- Provide the framework for the development of completion criteria that can be applied consistently Program wide as well as be tailored to individual Projects to achieve the required outcomes for reinstatement, rehabilitation and revegetation of disturbed areas, meeting statutory requirements;
- Define a list of contractual requirements for the design and implementation of landscape/rehabilitation treatments. Contractual requirements to be incorporated into Project schedules, forecasts and bill of quantities; and
- Ensure collaboration across multiple disciplines, such as engineering and environment (including noise, ecology, heritage, sustainability, geotechnics, etc), as well as Construction and Operations Teams, to deliver a sensitive, informed and integrated outcome.

1.3 Framework Context

This Framework has been structured as follows:

- Section 1: General information regarding purpose and structure, framework context, roles and responsibilities and relationships with other documents
- Section 2: Relevant standards and guidelines
- Section 3: Delivery mechanism overview and milestone requirements
- Appendix A: Design of Landscape Treatments (including rural landscape, ecological sensitive areas and township)
- Appendix B: Construction and Operational requirements (including soil preparation and management and landscape and revegetation application).

The following order of precedence shall be adopted for this Framework:

- Project Conditions of Approval;
- Project Primary Approval Documentation;
- Approved management plans, or other documents required under a Project's Condition of Approval, secondary and subsequent approvals, licences and permits;
- Other Project-specific documents and procedures (i.e. the services brief, Basis of Design, TOR, SEARs, design drawings and Bill of Quantities, Project Construction Environmental Management Framework (CEMF));
- Design drawings (where applicable);
- Landscape and Rehabilitation Strategy and Landscape and Rehabilitation Framework;
- Australian Standard requirements, regulations and industry guidelines including the NSW "Blue Book" (further discussed in Section 2); andWhere there is a discrepancy, clarification must be sought in writing from the 'Accountable Entity' prior to proceeding with the works containing the discrepancy.

Note that site-specific requirements are applicable where landowner agreements are in place for certain properties (e.g. temporary works areas such as construction access, site compounds, workforce camps, borrow pits or other enabling works). Where requirements differ between this Framework and the landowner agreement, the landowner agreement or responsible entity takes precedence. However, if these contradict or do not align with any statutory, licence or compliance requirements, the statutory, licence and compliance requirements take precedence.

1.4 Responsibilities / Accountabilities

The Inland Rail (IR) Program Environment Manager is the owner of the Landscape and Rehabilitation Framework. In addition, the following table outlines the roles and responsibilities related to landscape and rehabilitation.

Table 1 – Roles and Responsibilities

ROLE	RESPONSIBILITIES
Project Director / Project Manager	▸ Overall responsibility to ensure implementation of this Framework for all works within the scope of this document; ▸ Ensure suitably experienced and qualified person/s are engaged in design processes, with input from disciplines as required (e.g. landscape architects, ecologists, heritage, sustainability, and noise specialists); ▸ Ensure review of landscape assessment and landscape designs prepared is conducted by a suitably qualified professional, and other personnel as required; ▸ Ensure ISCA requirements are addressed in the design and implementation of landscape treatments; ▸ Ensure appropriate landscape treatments are costed appropriately in design and tender documentation and discussions held with ARTC Operations Team; and ▸ Ensure design milestones and performance outcomes are developed appropriately in accordance with Project Conditions of Approval, commitments in the Primary Approval Document/s and subsequent management plans, with involvement from the wider ARTC as required.
Senior Environment Advisor / Environment Advisor	▸ Ensure the proposed mitigation measures are appropriate to the impacts identified in the preparation of the Primary Approval Documents; and ▸ Ensure environmental management measures, commitments and approval conditions are appropriately addressed in the design and construction of the landscape design.
Program Environmental Team	▸ Communicate the requirements contained within this Framework, and ensure they are captured in Project contractual information (such as plans, drawings, specifications). ▸ Provide advice on the requirements contained within this Framework; ▸ Ensure that periodic reviews of measures contained within this Framework and updates occur as required; and ▸ Check compliance to stated landscape objectives and agreed outcomes.
Design Managers	▸ Support the development of the landscape design and lead design innovation; ▸ Support landscape design collaboration across multiple design disciplines, such as engineering, sustainability, noise, ecology, geotechnics, heritage, etc. Ensure discussions held with ARTC Operations Team regarding ongoing management/maintenance of landscape treatments; ▸ Ensure landscape design treatments/solutions are sustainable, practical and feasible; and ▸ Competency in, and awareness of, landscape design for rail Projects.
Accountable Entity (i.e. IR Project Manager, Delivery Manager, and/or	▸ Ensure environmental management measures, commitments and Conditions of Approval are appropriately addressed in the delivery of the landscape design; and ▸ Ensure the appropriate programming and coordination of landscape works to ensure the landscape design is undertaken during Stage 5 (Construction and Commissioning) and Stage 6 (Close out and Operations).

Construction Managers)	
Service Provider	▸ Ensure that appropriately qualified landscape architects are appointed to deliver landscape design packages; ▸ Undertake field investigation and environmental assessment (including landscape design) to inform Primary Approval Documents; ▸ Design must respond to the requirements of the relevant basis of assessment (SEARs, TOR or other guidelines) and the requirements of the IR Environmental Assessment Procedure (i.e. Stages 2 and 3); and ▸ Deliver detailed design to ensure that the objectives and principles of the Landscape and Rehabilitation Strategy and Performance outcomes of the Framework are incorporated into design documentation (Stage 3). Landscape and Rehabilitation contractual information (in the form of plans, drawings and specifications) to be provided.
ARTC Corporate, Interstate and Hunter Valley	▸ Operational responsibility for Inland Rail Projects. To be engaged in decisions where performance outcomes or subordinate completion criteria are incorporated into the environmental management system and documentation and is compliant with relevant legislation and individual Project Conditions of Approval and permits.
Technical Advisor (TA), including Landscape Subject Matter Expert	▸ Review Service Provider deliverables and provide technical advice to Project teams.
Operations Team	▸ Consideration of Project handover to commence during the design stage. Liaison on landscape design treatments to be undertaken as early as possible; ▸ Ensure works are undertaken in accordance with the *Project Handover guidelines (0-0000-900-PMA-00-GU-1000)* and handover plan; ▸ Handover plan to detail the requirements to the Operations team for efficient and safe handover of assets to prevent additional costs, delays and safety risks. Handover plan to be prepared by the Accountable Entity and forwarded to ARTC for review and agreement; and ▸ Where rehabilitation is on land that ARTC will not manage into the future, the ultimate Asset Owner to be involved in the design process, construction works and the handover plan.

1.5 Relationship with other documents

Table 2 lists key supporting documents relevant to this Framework. Additional standards and guidelines to support this Framework are detailed within Section 2.

Table 2 – Supporting Documents

DOCUMENT NUMBER / TITLE	DOC. TYPE	DESCIRPTION
ARTC Environment Policy (COR-PO-007)	Policy	Provides a framework for continual improvement of ARTC's Environmental Management System and sets out commitments for managing potential environmental risks.
Inland Rail Environment and Sustainability Policy (0-0000-900-ESS-00-PO-0001)	Policy	Policy statement outlines ARTC's commitment to sustainable delivery of the IR Program.
Programme Environmental Management Plan (0-0000-900-EEC-00-PL-0001)	Management Plan	Provides a framework for environmental management across all IR Projects.
Environmental Assessment Procedure (2-9000-PEN-00-PR-1001)	Procedure	Outlines ARTC's requirements for preparation of Primary Approval Document for Projects in the IR Program.
Inland Rail Landscape and Rehabilitation Strategy (0-0000-900-ELE-00-ST-0001)	Strategy	Provides guidance to both IR and service providers to deliver a consistent approach to the integration of environmental management measures and design treatments through landscape design and establishment across all delivery stages of individual IR Projects and the Program.
Infrastructure Sustainability Technical Manual Version 1.2 (Infrastructure Sustainability Council of Australia, 2016)	Technical Manual	Outlines what is required to achieve ISCA credits. The relevant credits to be considered include Urb-1 Urban design and Urb-2 Implementation, Lan-2 Conservation of on-site resources, Was-1 Waste Management, Was-2 Diversion from landfill (of spoil), Wat-1 Water use monitoring and reduction and Eco-1 Ecological Value (Maintenance and enhancement of ecological value).
Rail Sustainability Strategy (0-0000-900-ESS-00-RP-0003)	Strategy	Governs the sustainability approach for Inland Rail. The strategy describes how the Inland Rail team will establish and achieve both Program and Project sustainability objectives and targets.
IR Program Infrastructure Sustainability Rating Implementation Plan (0-0000-900-ESS-00-PJ-0001)	Project Plan	Outlines ongoing Infrastructure Sustainability management, knowledge sharing and reporting requirements across the Program and for the individual Projects.
Beyond the Pavement (NSW Roads and Maritime Services, 2014)	Policy	Establishes the policy, principles and approach to urban design for infrastructure Projects, and is not limited to roads or urban environments.
ARTC Project Handover Guidelines Function: Inland Rail construction (0-0000-900-PMA-00-GU-1000)	Guidelines	Details the requirements for efficient and safe handover of assets, and to prevent additional costs, delays and safety risks arising from the asset handover. It will also set out the requirements for the Accountable Entity to develop and deliver an approved "Handover Plan" during the Project planning period.
Contamination, Spoil and Waste Strategy (0-0000-900-EEC-00-ST-0002)	Strategy	This strategy documents IR's approach to meeting obligations and establishes governing contamination, spoil and waste objectives and principles. This strategy also outlines contamination, spoil and waste design and management processes to inform appropriate management measures throughout the delivery of IR Projects.

DOCUMENT NUMBER / TITLE	DOC. TYPE	DESCIRPTION
Standard Environmental Management Measures (ENV-WI-004)	Work Instructions	Establishes the Standard Environmental Management Measures developed to support the management of potential and actual environmental impacts associated with ARTC activities.
ARTC Pesticide Application (ENV-PR-003)	Procedure	Procedure provides instruction to ARTC staff and contractors on pesticide use, licensing and record keeping for the control of pests (plant and animal).
ARTC Noise Prediction and Mitigation Guideline (ENV-GL-007)	Guidelines	The purpose of this Guideline it provides guidance on noise modelling and abatement (including noise wall/barrier) for the ARTC network.
ARTC Spoil Guideline (ENV-GL-010)	Guidelines	Outlines the regulatory controls and requirements that apply to management of spoil ballast in each state. Where applicable, criteria for utilising relevant exemptions that facilitate beneficial re-use are also presented in conjunction with associated tracking and record keeping requirements.
ARTC Waste Timber Management Guideline (ENV-GL-011)	Guidelines	The purpose of this Guideline is to provide information and advice to ARTC staff on managing ARTC waste timber sleepers, turn-outs and transoms (referred to collectively as ‘waste timbers’ or ‘timbers’).

2 Relevant Guidelines and Standards

The following guidelines and standards shall be appropriately referred to and considered for the Project (current versions as applicable) for all design, materials, equipment, workmanship and installations.

The Accountable Entity is responsible for identifying any additional requirements under the relevant jurisdiction, Conditions of Approval or other agreements with State Agencies, Councils, etc.

It is noted that there are other rail infrastructure standards and guidelines to be considered, such as Queensland Rail, Department of Transport and Main Roads, etc, which interface with Inland Rail infrastructure. As such, relevant guidelines and standards include, but are not limited to, the following:

ARTC:

- *Earthworks Materials Specification (ETC-08-03)*
- *Earthworks Construction Specification (ETC-08-04)*
- *Boundary Fencing. (ETM-17-02)*
- *Right of Way – Fencing (STD-T0193 to STD-T0202)*
- *Right of Way – Fauna (TD-T0172 to STD-T0175)*
- *ARTC Track and Civil Code of Practice*

Note: Latest ARTC Engineering Standards and Codes of Practice available from extranet.artc.com.au .

International Standards

- Various standard drawings provided by the International Erosion Control Association (https://www.austieca.com.au/publications/best-practice-erosion-and-sediment-control-bpesc-document)

Australian Standards:

- *AS 1158 Lighting for roads and public spaces*
- *AS 1289 Methods of testing soil for engineering purposes*
- *AS 1725 Chain-Link Fabric Security Fences and Gates*
- *AS 2303 Tree stock for landscape use*
- *AS 2758 Aggregates and rock for engineering purposes*
- *AS 3706 Geotextiles – Methods of test*
- *AS 4282-1997 Control of the obtrusive effects of outdoor lighting*
- *AS 4373 Pruning of Amenity Trees.*
- *AS 4419 Soils for Landscaping and Garden use*
- *AS 4454 Compost, soil conditioners and mulches*
- *AS 4489 Test methods for limes and limestones*
- *AS 4843 Synthetic weed blocking fabric*
- *AS 4970 Protection of Trees on Development Sites*
- *AS 5100 Bridge Design Set - Noise Barriers (Clause 17)*
- *AS 5101 Methods for preparation and testing of stabilised materials*
- *AS/RISSB 7637 Railway Infrastructure - Hydrology and Hydraulics*
- *AS 7638 Railway Earthworks*

- *AS/NZ ISO 9001:2008 Quality management systems – Requirements*

Other relevant guidelines and standards, which may inform the works, depending on the jurisdiction and Conditions of Approval include but are not limited to:

National:

- *Australian Soil and Land Survey Handbooks (CSIRO)*
- *Austroads AP-G17/04, Pavement Design – A Guide to the Structural Design of Road Pavements*
- *Austroads AGPT06-09, Guide to Pavement Technology Part 6: Unsealed Pavements*
- *Austroads Guide to Road Design - Part 5: Drainage General and Hydrology Considerations*
- *Austroads Guide to Bridge Technology - Part 8: Hydraulic Design of Waterway Structures*
- *Australia and New Zealand (ANZECC/ARMCANZ) Guidelines for Fresh and Marine Water Quality.*

Queensland:

- *Technical Specification (MRTS 16) Landscape and Revegetation Works (Queensland Department of Transport and Main Roads (Department of Transport and Main Roads (DTMR), 2017)*
- *Roads Landscape Manual. A Guide to the Planning, Design, Operation and Maintenance of Road Landscape Infrastructure (DTMR, 2013)*
- *Queensland Government Crime Prevention through Environmental Design Guidelines for Queensland*
- *Crime prevention and the assessment of development applications (DUAC, 2001)*
- *Fauna Sensitive Road Design Volume 1 and 2, (DTMR, 2010)*
- *Accepted development requirements for operational work that is constructing or raising waterway barrier works, (Department of Agriculture and Fisheries (DAF), 2017)*
- *What is not a waterway barrier work? (DAF, 2017)*
- *What is a waterway? (DAF, 2017)*
- *Energex safe tree planting guide where the Project Works interface with utilities.*

NSW:

- *NSW "Blue Book": Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom)*
- *Landscape Guideline (New South Wales Roads and Maritime Services (RMS))*
- *Landscape planting (RMS, R179)*
- *Vegetation (RMS, 178)*
- *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW (RMS, 2012)*
- *Beyond the pavement: Urban design policy, procedures and design principles (RMS, 2014)*
- *Technical guideline for Urban Green Cover in NSW (OEH, 2015)*
- *Dark Sky Planning Guideline Protecting the observing conditions at Siding Spring (DEP, 2016)*
- *Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries)*
- *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)*
- Requirements for Waterway Crossings (NSW Fisheries, 2003)

Victoria:

- *CCF Environmental Guidelines for Civil Construction (Civil Contractors Federation, Victoria)*
- *Fauna Sensitive Road Design Guidelines, (VicRoads, 2012)*
- *Victorian Planning provisions*
- *Urban Design Guidelines for Victoria (DELWP, 2017)*
- *Crime Prevention Through Environmental Design, (Victoria Police)*
- *Good Design + Transport, Issue 05, (Office of the Victorian Government Architect, 2012)*
- *A Guide to Healthy Parks Healthy People, (Parks Victoria, 2017)*
- *Healthy Waterways Strategy 2018-2028, (Melbourne Water)*
- *Plan Melbourne 2017–2050 Metropolitan Planning Strategy, Victorian Government*
- *Urban Design Charter, (Victorian Government, 2009)*

3 Delivery Mechanism Overview and Milestone Requirements

As discussed earlier, individual IR Projects will be subject to different Project delivery models (such as design and construction, public-private partnership (PPP), construction only, etc). Table 3 shows an outline of milestones for IR Program delivery stages. The Strategy and Framework provide guidance for IR Projects in detailed design (Stage 3), construction and operation (Stages 5 and 6), but may be used as a reference document for Projects in earlier stages of delivery. Please note that the below Program stage process is currently being reviewed by PMO. Figure 1: Delivery mechanism overview (IR Program Stages).

Table 3 – IR Program Delivery Stages

IR PROGRAM STAGES		MILESTONE REQUIREMENTS (DELIVERABLES)
Stage 1	Concept Design	Identification of preliminary environmental risks and issues, route selection and concept design, identification of applicable primary approval pathway for each Project.
Stage 2	Reference Design	Preparation of primary approval documents and feasibility design, field assessments and investigations, consultation with stakeholders and community, initial ISCA assessments.
Stage 3	Market Readiness	Exhibition / public notification / consultation on primary approval documents, finalisation of primary approval documentation (unless undertaken in Stage 2), progression of detailed design including further field assessments and investigations to inform detailed design, ISCA assessments and verification where applicable.
Stage 4	Delivery Readiness	Obtain secondary and subsequent approvals from relevant State and Commonwealth agencies, local governments and other stakeholders/ entities.
Stage 5	Construction and Commissioning	Construct and commission Projects or Project elements in accordance with the Conditions of Approval and close out construction activities in accordance with Conditions of Approval.
Stage 6	Close-out and Operations	Operate in accordance with Conditions of Approval and applicable licences.

Milestone requirements (i.e. deliverables) relevant to landscape and rehabilitation for each IR Program stage are outlined in Table 3. Service Providers are to provide evidence provided in Table 3.

Given the current status of IR, the initial stages (i.e. Concept Design and Reference Design) are no longer relevant, however, they have been included for completeness.

Please note that the below Program stage process is currently being reviewed by PMO. Updates may be required to this table following the proposed PMO stage amendments.

Table 4 - Deliverables required for Landscape and Rehabilitation for IR Program stages

IR PROGRAM STAGES		MILESTONE REQUIREMENTS (DELIVERABLES)
Stage 1	Concept Design	▸ Desktop studies to collect baseline information (including review of past reports, policies, scoping studies); and ▸ Site visits
Stage 2	Reference Design	To provide evidence within EIS or equivalent document of complying with the following: ▸ TOR, SEARs, etc; ▸ Landscape and Visual amenity requirements listed in the Programme Environmental Assessment Procedure document; ▸ Stage 2 Technical and approvals Consultancy Services briefs and contracts; and ▸ Consideration of ISCA credit weightings relevant to the scope and influence of the IR Project in accordance with the Program Infrastructure Sustainability Rating Implementation Plan.
Stage 3	Market Readiness	To provide evidence of complying with the following: ▸ Landscape design commitments and rehabilitation treatments required to deliver mitigation and management measures defined for each specific Project location; ▸ List of relevant landscape design commitments and rehabilitation treatments from the approved Primary Approval Documents and Reference Design documentation (i.e. EIS or equivalent); ▸ List of Project specific Conditions of Approval (when available) relevant to the landscape design commitments and rehabilitation treatments; ▸ List of Project specific standards, policy, legislation, relevant to landscape design commitments and rehabilitation treatments; ▸ Landscape design commitments and rehabilitation treatments to be documented in accordance with ARTC data management specification to account for ongoing management; ▸ Agreement with ARTC Operations Team regarding operational management and maintenance of landscape design commitments and rehabilitation treatment; ▸ Bill of quantities to detail cost of landscape design commitments and rehabilitation treatments; ▸ Outcomes of Detailed Design to inform the development of completion criteria for incorporation into construction contract documentation, such as, Landscape and Rehabilitation Management Plan, Reinstatement and Rehabilitation Plan, Soil Management Plan, Clearing and Vegetation Management Plan, Clearing and Grubbing, Erosion and Sediment Control Plan, Pest and Weed Management Plan, Urban and Landscape Design Plan, Site Plans, landscape specifications, landscape drawings (supported by typical details and cross sections), landscape planting schedules, etc. Plans to be completed in accordance with Conditions of Approval, Primary and Secondary Approvals;

IR PROGRAM STAGES		MILESTONE REQUIREMENTS (DELIVERABLES)
		▸ Provide site constraint drawings (scale of 1:4000 at A3) for the rail alignment and proposed Licenced Construction Area, illustrating 'understanding of the landscape' including site characteristics, constraints and opportunities; and ▸ Provide 1:1000 drawings illustrating application of landscape treatments outlined within Appendix A.
Stage 4	Delivery Readiness	▸ Obtain Secondary Approvals and other approvals; ▸ Document landscape design commitments and rehabilitation treatment changes as a result of consultation with Commonwealth and State Agencies or Local Councils; and ▸ Outcome of this stage to inform the development of completion criteria for incorporation into construction contract documentation (such as plans listed above).
Stage 5	Construction and Commissioning	▸ Completion of relevant plans, such as Landscape and Rehabilitation Management Plan, Reinstatement and Rehabilitation Plan, Soil Management Plan, Clearing and Vegetation Management Plan, Clearing and Grubbing, Erosion and Sediment Control Plan, Pest and Weed Management Plan, Urban and Landscape Design Plan, Site Plans, landscape specifications, landscape drawings (supported by typical details and cross sections), landscape planting schedules, etc. Plans to be completed in accordance with Conditions of Approval, Primary and Secondary Approvals; ▸ Update of site constraint drawings, as required (scale of 1:4000 at A3) for the rail alignment and proposed Licenced Construction Area, illustrating 'understanding of the landscape' including site characteristics, constraints and opportunities. Provide 1:1000 drawings illustrating application of landscape treatments outlined within Appendix A; ▸ Agreement with ARTC Operations Team regarding defect liability period, operational management and maintenance of landscape design commitments and rehabilitation treatment; ▸ Documented evidence provided on landscape monitoring criteria, key performance indicators, etc.; ▸ Land that is temporary occupied during construction to be returned to meet conditions of any landowner agreement and/or regulatory approvals; ▸ Landscape treatments to be classified by type and documented in accordance with ARTC data management specification to account for ongoing management; and ▸ ISCA verification and certification as detailed in the IR Program Infrastructure Sustainability Rating Implementation plan.
Stage 6	Close-out and Operations	▸ Undertake monitoring prior to handover to ARTC Operations Team in accordance with contract requirements; ▸ State Environment Manager shall work with Compliance and EMS Manager and ARTC Business Units to ensure all relevant Conditions of Approval and requirements are delivered and completed ahead of handover to the ARTC Operations Team and Project Close Out; ▸ Document evidence of compliance with Conditions of Approval, applicable licences, permits etc. and ▸ Ongoing management to be captured in Asset Management System and agreed with Operating Business Unit.

Appendix A: Design of Landscape Treatments - Performance Outcomes

1 Typical Landscape Scenarios

Typical landscape scenarios (outlined in the Landscape and Rehabilitation Strategy) are discussed further below. These illustrate common landscapes which IR and associated works will pass through, including:

- **Rural landscapes** – general rural corridor which IR will pass through;
- **Ecologically sensitive areas** – ecological features (such as watercourses and vegetation corridors) that IR may intersect;
- **Townships** –the urban rail corridor elements; and
- **Temporary treatments** – such as hoarding and screening for site compounds and rehabilitation of borrow pits.

These landscape scenarios provide opportunities for innovation and landscape and environmental enhancement/improvement, while satisfying regulatory requirements/approvals.

For each landscape scenario, relevant performance outcomes provide guidance to Service Providers to inform subsequent delivery stages and Project specific completion criteria. In developing the completion criteria, Service Providers must consider of the Strategy, this Framework, Primary Approval documents and Conditions of Approval.

All the proposed treatments detailed below will require agreement and approval from the IR Project Managers. Discussion must also be undertaken with the ARTC Operations Team to ensure ongoing management/maintenance of landscape treatments are documented and agreed.

1.1 Rural Landscape Performance Outcomes

LANDSCAPE TREATMENT
Landform contouring: ▸ The alignment shall aim to utilise the existing contours and topography, where possible; ▸ Where there are extensive cuttings along the alignment, the landscape design to look at opportunities for revegetating, steepening to reduce extent, rounding earthworks to allow vegetation to establish at the crests, and/or exposing of geology; ▸ The alignment shall look to provide a cut and fill balance, where possible, utilising fill (where appropriate) through the delivery of an integrated landscape design response (e.g. noise mounds/bund, rehabilitation); ▸ The alignment is to create a safe and stable landform that is maintainable and non-polluting, utilising appropriate material on slopes that does not cause additional erosion and sediment run-off and is in keeping with any future vegetation maintenance requirements; and ▸ Stormwater will be managed to clean water principals, including clean water diversions where appropriate.
Minimising footprint: ▸ Minimise vegetation clearance where possible while ensuring adequate room is provided for temporary and permanent works, including laydown and stockpile areas; and ▸ Respond to treatments which go beyond the Project boundary, for example, for temporary and permanent erosion and sediment control measures, landowner agreements and/or pollution control measures.
Planting and revegetation ▸ Tree and plant species shall be suitable for their location having consideration for the local species and landscape character, climatic condition, soil conditions, security, surveillance, sight lines, height limitations, root structure impact and public safety at the plants' full anticipated size; ▸ Tree and plant species shall be designed and position at safe planting distances from infrastructure and minimise falling debris on rail infrastructure and all public areas; ▸ The seeding application type (e.g. drill seeding, broadcast seeding, hydromulch, hydro-compost, organic blanket, seeded mesh) shall be appropriate for plant establishment and appropriate to the local context; and ▸ Reuse of mulch to be in accordance with Appendix B (Section 2.8) of this document. ▸ Reinstatement of watercourses to be undertaken in accordance with Appendix B, (Section 3.1.2) of this document.

Fencing (excluding fauna fencing)

- The fencing shall extend to the adjacent owner or occupiers of lands adjoining the railway corridor, except where boundaries are shared between road and rail corridors. Note in some locations, fencing of the rail corridor from the road may be necessary where the road is used as a stock route;
- The fencing shall connect to existing fencing where appropriate;
- The fencing shall allow for drainage channels and waterways;
- Clearing for fence lines will be compliant with Project requirements and regulations;
- The fencing will be applied such that it doesn't present an entanglement or entrapment hazard to stock or wildlife. For example, avoid double strands, non-tensioned wires, ground wires, mesh sizes matching livestock heads or high chain-wire dead-ends that force wildlife back towards the rail corridor;
- The fencing shall include gates in the boundary fence at new private level crossings, and as agreed with landowners; and
- The position of fencing shall be given careful consideration to allow the fencing to be a discrete element in the landscape.

Integration with roads and access tracks

- Liaise with Local Councils, relevant State Agencies (e.g. DTMR, TfNSW, Vic Roads) and Rural Fire Services regarding existing access tracks, local roads, level crossings, etc, to understand who will own and manage the asset and on-going maintenance requirements once operational; and
- Liaise with Local Councils (as relevant) on the integration of landscape treatments, ensuring the delivery of appropriate landscape design solutions that respond to local Council objectives.

1.2 Ecological Sensitive Areas Performance Outcomes

LANDSCAPE TREATMENT

Ecological connectivity

- Identify key habitat linkages within the landscape which require connection (utilising State and Regional biodiversity corridor mapping, or equivalent), and identify target fauna which may utilise crossings;
- At bridges and viaducts – fauna passage shall be accommodated where practical and aligned to fauna movement corridors or reinstate habitat connectivity across the rail line. Typically, this constitutes a minimum width of 5 metres dry passage under a structure, with sufficient clearance to allow light penetration and vegetation cover on the approaches;
- At culverts – fauna culverts shall be provided where a bridge or viaduct structure are not feasible, and the rail line impacts fauna movement corridors or habitat connectivity. Sizing of the fauna culvert shall be based on the target species. A 3m x 3m box culvert is generally considered suitable to accommodate macropods, koalas and flightless birds. Fauna culverts shall not be co-located with drainage culverts and be designed to provide dry passage;
- When revegetating, planting to be of the appropriate species along these ecological movement corridors; and
- Additional hydrological studies may be required if underpass travels along a waterway which intersects beneath a railway.

Fauna furniture

- Fauna furniture is to be provided at fauna culverts intended to facilitate arboreal or non-ground dwelling terrestrial fauna movements. Typically, this includes koala refuge poles, and fauna logs erected at a height of at least 1m above ground, to minimise risk of predation with sufficient clearance to allow the fauna to freely pass;
- Fauna escape mechanisms – constituting a ramp or other arrangement that allows one-way egress from the corridor for target fauna species;
- Utilise furniture (e.g. logs, fauna poles) as well as planted vegetation to link fauna corridors to adjacent vegetation. This will further aid fauna movement and reduce predation;
- Arboreal overpasses (i.e. rope bridges/ladders) – these are to be considered where arboreal fauna passage provision is required including such species as possums and gliders. Typically, these are used to provide linkage between vegetated areas and connect in with adjacent vegetation. Need to consider clearance zones above railway;
- During clearing and grubbing, look to reuse timber for habitat logs, koala poles and nest boxes; and
- When proposing fauna furniture treatments, consider maintenance requirements when IR is operational.

Fauna fencing

- The target species will inform the type, dimensions and inclusions for each Project and location;
- Typically, fauna fencing shall be specified in locations adjacent to known habitat, or fauna movement corridors;
- Generally, fauna fencing shall extend at least 200 metres beyond known fauna crossings (such as underpasses);

- Look at opportunities to provide temporary fauna fencing during construction at key ecological corridor locations to reduce fauna mortality or look to install permanent fauna fencing earlier during the construction Program;
- Consider fauna exclusion or barrier devices on rail infrastructure to limit fauna mortalities (e.g. anti-climbing devices, or lids and covers); and
- Ensure appropriate clearance zones either side of the fence to minimise fauna trying to jump or climb from adjacent vegetation.

Watercourses

- Reinstatement of watercourses post construction to be undertaken in accordance with Appendix B, (Section 3.1.2) of this document;
- Consider temporary creek crossings required during construction and regulatory compliance including bed-level fish passage requirements. Also consider if such structures could be made compliant permanent structures at the time of the initial installation;
- Applying measures or controls to mitigate sediment, nutrient or contaminant loading into local waterways during and after construction;
- Provision for fish passage to be designed in accordance with relevant guidelines and standards (Section 2), Primary Approval documentation and Conditions of Approval. Note that the type of waterways may dictate the fish passage design requirements. Waterway type will be defined in the EIS (or equivalent document);
- Consider specific fish passage requirements when selecting culvert type. Consider stream hydrology, drown out characteristics and target species;
- Culvert structure and placement to allow for fish movement in high and low water flows;
- Ensure erosion and scour management is adequate upstream and downstream of the crossing;
- Ensure embankment treatments and plantings are consistent with requirements;
- Stream simulation design recommends burying the base of culvert, installing multicell culverts as the same level as the waterway bed profile, having the cell width as wide as bank full waterway width and the cell area as large as the bank full waterway area; and
- Sediment control debris deflector walls can be used to reduce the impact of debris blockages on fish passage while also reducing maintenance costs.

1.3 Townships Performance Outcomes

LANDSCAPE TREATMENT

Integration with bridges and structures

- Maintain function of existing structures and look to enhance features (where possible) which complement the surrounding environment through appropriate treatments (i.e. vegetation planting, lighting);
- Ensure a bridge's form, proportion, symmetry and materials make a positive visual contribution to the landscape character;
- Ensure the material/colour selected for structures does not detract the visual aesthetics and landscape character of the area;
- New bridge deck drainage shall not discharge directly onto railway lines, traffic lanes, cycle paths, shared use paths or footpaths;
- The surfaces of all concrete bridges and culverts that are within 3m of an adjacent, accessible surface shall be treated with an anti-Graffiti coating; and
- Liaise with relevant asset owners if structures/bridges owned by Local Council or State Agencies.

Noise walls/barriers

- Material selected for noise wall/barrier is appropriate to the landscape character of the area and complies with Operational noise criteria;
- Consider absorptive barrier materials where reflective materials may exacerbate or be perceived to exacerbate other noise impacts;
- Look at opportunities to utilise noise wall/barrier, noise mound or combination of both depending on the location and meeting the Operational noise criteria;
- Noise wall/barrier selected to account for on-going operational/maintenance requirements;
- Where required, noise walls/barriers to be designed to reduce the visual impacts to sensitive receptors (including surrounding properties, rail passengers) by incorporating design aesthetics, treatments and/or landscaping elements such as massed planting and/or earth mounding.
- Look at opportunities to use clear or transparent materials to maintain existing expansive views beyond the rail corridor, subject to security and maintenance considerations;
- Adequate separation between noise wall/barrier and vegetation to avoid potential damage; and
- Hydrological and hydraulic conditions should be considered to ensure that noise wall/barrier does not impact natural flow of water.

Lighting, Crime Prevention Through Environmental Design (CPTED) and Disability

- Ensure lighting does not detract from a structure/bridge but looks to enhance its features;
- Use appropriate lighting ensuring it does not cause additional light pollution to sensitive receptors;
- Temporary lighting to be designed and sited, so it complies with ***Australian Standard AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting and Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring (Department of Planning and Environment, 2016);***
- Complete a CPTED Assessment for all bridges/tunnels, Use CPTED recommendations such as lighting or throw screens to reduce safety risks;
- Look to identify areas requiring application of the ***Disability Discrimination Act 1992 (Cth)*** equitable access provisions including but not limited to tunnel and facilities; and
- Relevant road authorities and emergency services to be consulted in relation to the design of level crossings, pedestrian movement and community safety issues associated with the rail corridor.

Planting and revegetation

Refer to performance outcomes discussed above (i.e. under rural landscapes). Planting to be as appropriate for an urban landscape appropriate to the township.

Water Sensitive Urban Design

- Permanent water quality drainage design to comply with Water Quality Objectives;
- Look to include additional width at public road realignments to allow for the inclusion of stormwater treatment devices to comply with the water quality requirements of the relevant Road Authority;
- Drainage impacted by the Project Works shall meet the standards of the Asset Owner;
- Look to reduce the area of impervious surfaces through minimising hard surfaces;
- Allow drainage to discharge directly to planted areas and design cross falls to direct run-off to localised treatment elements;
- Consider incorporating swales to carry minor flows, with major storm events bypassed to larger basins.
- Look to incorporate the collection, treatment and/or reuse of stormwater runoff; and
- Look to reuse treated wastewater and reduce the amount created, where possible.

1.4 Temporary Features Performance Outcomes

LANDSCAPE TREATMENT

Site compounds (temporary fencing/hoarding)

- Within an urban environment, look at opportunities to utilise different material for fencing/hoarding. This may include use of art-based treatments or plantings to assist in screening the works to reduce visual impact to sensitive receptors or passing visitors. Alternatively, look to provide information on fencing/hoarding, such as contact information, construction timeframes, etc. Viewing platforms could also be provided to actively involve the public
- Fencing colour to suit the landscape character of the area. Ensure it is not too brightly coloured or reflective.
- Consider position of temporary fencing if the site requires early establishment of planting;
- Ensure appropriate diversion is provided to pedestrians/cyclist, as required, if site compound/fencing impacts on existing footpaths/cycleway. Engage with Local Council and cycling group, as required; and
- Look to retain existing vegetation around the perimeter of site compounds as much as possible.

Borrow pits

- Fill imported from borrow areas shall comply with the Earthworks Materials and Construction Specification (ETC-08-03 and ETC-08-04);
- Appropriate Approval Authority to carry out borrow pit works (this may include, for example, extractive industry licence, etc);
- Borrow areas shall be maintained in a tidy, graded and formed condition such as to drain into natural watercourses and avoid soil erosion. Their design must also meet the water quality objectives;
- The Accountable Entity shall comply with conditions for the particular activity. They shall remove only such materials and excavate to such levels documented in Project approvals. If the Accountable Entity removes material without approval, they shall fill, compact and rehabilitate the area at their own cost and be responsible for any regulatory o other actions undertaken by the regulating authority as a result of their activities/actions;
- Prior to excavation, topsoil is to be removed and stockpiled to a maximum of 2.5metres to ensure the seed bank is preserved during stockpiling. Topsoil shall be respread over the excavated area as shown on Drawings, as directed by the IR Project Manager and in accordance with approved site rehabilitation arrangements; and

- At completion, the Accountable Entity shall leave the borrow areas in a tidy and safe condition. Unless otherwise approved, carry out restoration of borrow areas as shown on the Drawings and in agreement with landowner (as relevant).

Appendix B: Construction and Operational Requirements – Performance Outcomes

1 Introduction

This section discusses the performance outcomes for soil preparation and management, reinstatement, rehabilitation and revegetation of areas disturbed or cleared during construction. Landform reinstatement is to be carried out in conjunction with other work such as earthworks, surface and subsurface drainage works and environmental control measures.

Performance outcomes outlined in this Framework are to inform subsequent Project specific completion criteria, which are to be developed by Service Providers during detailed design. In developing the completion criteria, Service Providers must take account of the Strategy, Framework, Primary Approval documents and Conditions of Approval.

Requirements for landscaping and rehabilitation include areas appropriately defined within the site design, layout, drawings and CEMP, including any sub-documentation, and any relevant conditions or requirements of Project approvals, licenses or permits. The minimum standard to be achieved, unless stated otherwise, as set out in the order of precedence (refer to Framework Context, Section 1.3).

Works under this Framework comprise the supply of all labour, materials and plant for the proposed landscaping and rehabilitation required for the construction of the Project.

The works include (but are not limited to) the following items that are be carried out in accordance with the Contract:

- Testing and application of topsoil;
- Soil amendment and/or amelioration;
- Seeding;
- Establishment of vegetation cover;
- Permanent rehabilitation controls;
- Establishment, fertilising and watering;
- Measurement and monitoring to demonstrate compliance; and
- Compliance with the Construction Environmental Management Plan.

All the proposed treatments detailed below will require agreement and approval from the IR Project Managers. Discussion must also be undertaken with the Operational ARTC Business unit to ensure ongoing management/maintenance of landscape treatments are documented and agreed.

1.1 Private Property

No private property shall be removed, relocated or altered without the approval of the ARTC Project Manager.

1.2 Services

All work areas are to be subject to a services search as per the *Earthworks Construction Specification (ETC-08-04).*

1.3 Construction Water

Construction water is to be sourced in accordance with the Project water supply strategy, the requirements of the *Earthworks Construction Specification (ARTC document ETC-08-04)* and relevant Project Conditions of Approval.

The Accountable Entity is to evaluate the suitability of using recycled water (wherever possible). Should this not be an option, the suitability of non-potable water by field and laboratory testing to be investigated, as required, at the discretion of, and as approved by the Project Manager. This includes, but is not limited to ensuring the water:

- Does not contain toxins, pollutants or any substance which would adversely affect vegetation establishment;
- Does not contribute to an environment exceeding any adjoining structure's design exposure classification (including via leachates or runoff);
- Does not cause adverse impacts to ecosystems at or adjacent to the site and is applied in a lawful manner that does not cause any pollution;
- Is applied in such a way as to not cause runoff or erosion at or adjacent to the site in accordance with the NSW "Blue Book" and Erosion and Sediment Control plans; and
- Is suitable for the structure design exposure classification.

2 Soil Preparation and Management Performance Outcomes

2.1 Material

The Accountable Entity shall supply information on all proposed materials for the approval and records of the Project Manager prior to bringing to site and implementing the works. Approval from the IR Project Manager must be received before progressing with these works. This may include (but is not limited to) technical specifications, material safety data sheets, supply dockets, compliance certificates, treatment receipts, certifications, quality reports, materials lists, verification records etc.

2.2 General Reuse of Material

The reuse of spoil material is to be undertaken in accordance with the *Inland Rail Contamination Spoil and Waste Strategy (0-0000-900-EEC-00-ST-0002)*. The *Earthworks Materials Specification (ETC-08-03)* is also to be followed and defines regulatory environmental processes in accordance with legislation. This defines the objectives and principles for management of contamination, spoil and waste, in particular, criteria for the beneficial reuse of spoil materials generated from the Program. The *Spoil Guidelines (ENV-GL-010)* outlines the regulatory controls and requirements that apply to management of spoil ballast in each state.

ARTC are not licensed for resource recovery, waste storage or waste application to land. ARTC must therefore look to beneficially reuse or dispose of waste timbers and avoid stockpiling within the corridor. ARTC have a reuse hierarchy for waste timbers, with reuse for architecture, construction and rail applications being the preferred options, followed by use of unprocessed Landscaping and processed landscaping, then energy recovery and finally disposal being the least preferred. Unprocessed landscaping refers to the reuse of timbers in landscaping applications without processing for example as retaining walls or garden borders, while processed landscaping refers to the recycling of timbers via the process of mulching or shredding to render the timber suitable for end use as mulch or compost. The ARTC *Waste Timber Management Guidelines (ENV-GL-011)* currently documents permissible regulatory options for disposal and management of ARTC waste timbers, such as a timber sleeper resource recovery order and exemption. It provides information and advice to ARTC staff on managing ARTC waste timber sleepers, turn-outs and transoms (referred to collectively as 'waste timbers' or 'timbers').

2.3 Topsoil

2.3.1 Topsoil stripping and handling

Topsoil refers to the upper most layer of the soil (the A horizon) usually dark in colour and rich in organic material. Preferred topsoils for revegetation are typically loose and friable. The Accountable Entity should be aware of the requirement to strip and manage topsoils as part of the contracted works. Operator awareness

regarding locations and required depth of topsoil salvage is important, as is topsoil stockpiling locations and demarcation. Stripping should only be carried out during the right soil moisture conditions and stockpiles should be height limited to 2.5metres, free draining and outside tree drip lines. Weed classified areas/topsoils should be managed separately and in accordance with any relevant weed management strategy.

2.3.2 Topsoil sampling and testing

Topsoils should be classified and agronomically tested as soon possible for planning and topsoil stripping reasons. At a minimum, topsoil sampling and testing must occur before re-spreading in accordance with relevant applicable industry standard/s (i.e. *NSW "Blue Book", AS 1289, DTMR MRTS 16*), to determine its stability and viability as a growing medium. These works shall be undertaken and verified by a suitably qualified person, and records retained for submission of relevant 'as constructed' reports, information and drawings.

If the site topsoil fails to conform to the site-specific requirements (i.e. existing conditions and Project approval requirements), the material may be ameliorated, in accordance with the recommendations of appropriate laboratory or agronomy report, or as per the relevant Specification/standard, to reach the relevant site-specific requirements.

If the material is deemed unsuitable for amelioration, imported topsoil (meeting the below requirements) or a weed/pest/pathogen free topsoil medium, shall be used in landscape construction, following notification to, and approval by the IR Project Manager.

2.3.3 Topsoil requirements

Site topsoil is to be used in preference to imported topsoil and is to be stored separately from subsoil.

Topsoil is to achieve the following minimum requirements:

- Free of contaminants (i.e. at a level that does not pose any unacceptable risk of harm to human health or ecological receptors);
- Reuse of site topsoil is to be undertaken only where soils are confirmed suitable for reuse and meet contaminant concentration criteria as specified within applicable State or Federal statutory requirements;
- Achieving a topsoil pH within ± 0.5pH units of the nominated requirement;
- Free from weeds at a greater density then pre-disturbance conditions, and, in any case, free of prohibited or restricted biosecurity matters (including restricted weeds & pests);
- A volume of stone no greater than the pre-disturbance topsoil;
- Have a texture similar to the pre-disturbance condition; and

Should imported soil be required, the subsoil is to be ripped and cultivated to a suitable depth to combine with the existing soil/base, and mimic existing pre-disturbance natural conditions.

The Accountable Entity shall provide quality assurance documentation from the supplier to the IR Project Manager, to demonstrate the imported topsoil is in accordance with the requirements of this Clause, prior to delivery to site.

2.3.4 Soil treatments

Soil amelioration is to be implemented where recommended in a Soil Assessment or Agronomy Report, or where necessary to achieve revegetation, or to reduce/manage soil dispersion potential, including but not limited to the following amelioration agents:

- Agricultural lime, dolomite and gypsum;
- Fertiliser;
- Organic soil conditioner;
- Microbial inoculants; and

- Soil wetting and holding agents.

2.3.5 Placement of topsoil

- Topsoil to be placed within three days (weather permitting) of subsoil ground preparation works described below;
- Topsoil shall be spread to the depths required for the vegetation and consistent with the pre-disturbance condition and allow for settlement after placement. Where depths aren't indicated, aim for 40-60mm on steeper slopes (> 4H:1V) and 75-100mm on lesser slopes;
- Amelioration and/or amendment shall be added during topsoil placement depending on the landscaping treatment being applied; and
- Seeding may also occur at the time of topsoil placement. Ensure any crusted or compacted topsoils are cultivated to depth prior to applying seed.

2.4 Subsoil

2.4.1 Subsoil sampling and testing

Subsoil refers to the B horizon which occurs beneath the A horizon (topsoil). Subsoil is to be sampled and tested prior to spreading in accordance with industry standards ((i.e. *NSW "Blue Book", AS 1289, DTMR MRTS 16*), and a Soil Assessment Report prepared by a suitably qualified person provided for approval prior to use.

Subsoil to be ameliorated where required in accordance with the relevant Project plans and design.

2.4.2 Ground Preparation

Prior to the commencement of ground preparation operations, the area shall be in a weed free condition (where possible).

The following is to occur as part of site preparation prior to rehabilitation, topsoil reinstatement or landscaping treatments:

- If necessary, reinstatement areas to be treated to remove weeds at least four weeks prior and then again two weeks prior to applying turf or other topical landscaping applications;
- All rubbish, debris and loose maintenance obstructions are to be removed from the surface;
- Deep ripping (to 300mm) heavily compacted soils in areas to be revegetated with slopes ≤ 4H:1V or as per site design drawings, but not for dispersive subsoils);
- Lightly scarifying subsoils (to 100mm) in areas to be revegetated with slope ≤ 4H:1V (or as per site design drawings);
- Roughening shall be used in areas to be vegetated with slope > 4H:1V (approximately 50mm depth, or as per site design drawings);
- Consider increasing deep ripping followed by roughening, depending on timing of works and if environment is particularly dry;
- Amelioration agents to be applied where specified in relevant plans and spread over the subsoil surface to the specified rates. Ground preparation to occur immediately after the application of amelioration rates;
- Topsoil is to be evenly spread where required, graded to drain freely and lightly compacted; and
- Take particular note of treating dispersive subsoils and covering them as soon as possible with less erosive media such as topsoil and mulch.

2.5 Turf

Where turf is proposed to be used by the Accountable Entity for revegetation purposes, it shall be consistent with the species composition as per the pre-disturbance condition on site, this Framework or as agreed to by Inland Rail Project Manager, as per the Project Contract.

A proposal for the use of turf must be captured in the relevant Project plans and design.

Turf shall meet any relevant applicable industry specifications and be handled, applied and maintained in a manner to ensure that it will achieve the desired outcomes (refer Section 2 – Guidelines and standards). Where turf is to be applied to drains, ensure that calculated flow velocities are appropriate for turf application, and that pinning is considered if prevailing weather conditions warrant it. The Accountable Entity shall identify the requirements within submitted methodology.

2.6 Soil Wetting Agent

If a soil wetting agent is used, it is recommended that it meets the following requirements:

- Have a life of at least 3 months;
- Work to reduce soil wetting repellence and surface tension of soil particles;
- Allow for water penetration into the soil;
- Be free from matters toxic to plant growth; and

Any proposal for the use of a wetting agent must be captured in the relevant Project plans and design.

2.7 Fertiliser

If fertiliser is to be used, it must be suitable to the species and location to ensure surface water run-off doesn't cause nutrient loading and dissolved oxygen drawdown situations in nearby aquatic ecosystems. It must also be applied in accordance with manufacturer's recommendations and Conditions of Approval. These shall be utilised in accordance with the relevant recommendations as per any soil monitoring, soil condition or agronomy reports for establishment of the desired vegetation.

Any proposal for the use of fertilisers must be captured in the relevant Project plans and design, approved by the IR Project Manager.

2.8 Mulch and Compost

If mulch or compost is proposed to be used on site, it shall preferably be manufactured on site, or if this is not viable, alternatively imported. Suitability of cleared vegetation for mulching / erosion protection will be assessed on a site by site basis. Any vegetated material containing or with the potential to contain weed seed material will not be used for on-site mulching or erosion protection. Any mulch generated as part of the Project shall be re-used within appropriate timeframes and manners as specified in the Erosion and Sediment Control Plan and the Reinstatement and Rehabilitation Plan.

Any mulch or compost used on site must be:

- From a licensed facility (if imported);
- Free from contaminants, rubbish and deleterious material (i.e. at a level that does not pose any unacceptable risk of harm to human health or ecological receptors);
- Free from weeds, including prohibited or restricted biosecurity matter; and
- In accordance with AS 4454 and applicable State regulations including but not limited to the *NSW Protection of the Environment Operations Act 1997* (POEO Act), *Queensland Environmental Protection Act 1994* (EP Act) and the *Victorian Environment Protection Act 1970.*

For imported mulch, the Accountable Entity shall provide quality assurance documentation from the supplier to demonstrate material is in accordance with the requirements of this clause, prior to delivery to site.

Mulch type and size shall be appropriate for rehabilitation and/or plant protection purposes.

2.9 Herbicides and Pesticides

Where the proposed use of pesticides triggers requirements for licensing of the persons conducting the work, the Accountable Entity shall ensure licenses are in place.

Any herbicides and pesticides proposed to be used must be currently registered for their intended use by the Australian Pesticides and Veterinary Medicines Authority (APVMA) that are approved for the intended situation and used in accordance with the *ARTC Pesticide Use and Recording Procedure (ENV-PR-003)*, relevant Material Safety Data Sheet, and regulatory requirements.

The proposed use of these shall be captured in the relevant Project plans (i.e. CEMP) and procedures, approved by the IR Project Manager.

Liaison with adjacent landowner shall be undertaken should they be operating a certified organic farm.

2.10 Hydromulch, Hydroseed and Binders

If a bonded fibre matrix (BFM), hydromulch, hydroseed or soil binder application is proposed to be used it shall be captured in the relevant Project plans (i.e. CEMP), procedures and designs. These plans, procedures and designs shall document how the use of these product/s help achieve the required landform outcomes.

- BFM, hydromulch, hydroseed or soil binder application proposed shall meet any relevant statutory requirements (i.e. free of contaminant at a level that does not pose any unacceptable risk of harm to human health or ecological receptors);
- It is recommended that they shall also be free from:
    - matter toxic to plant growth / seed germination;
    - plant propagules;
    - cationic emulsions;
    - Soil;
    - Rubbish; and
    - other deleterious materials.
- Be comprised of materials adhering to relevant quality standards and mixing rates, with pre-treatment requirements applied (supplier or Accountable Entity to verify);
- Be applied and utilised as per the manufacture's guidelines and/or recommendations. Verification of constituent quantities at the time of mixing is encouraged; and
- Hydromulch binders may be pre-packaged with fibre, which shall be free from matter toxic to plant growth, prohibited or restricted biosecurity matter, plant propagules, soil, rubbish, seed germination inhibitors and other deleterious materials.

2.11 Seed Mix

Cover crop, perennial and seed and native seed used must:

- Have a species selection appropriate to the region and locale being revegetated, including consideration of landholder and seasonal requirements (as directed and/or agreed to with IR Project Manager / Accountable Entity); and
- Have any pre-treatments or coatings applied in accordance with the relevant applicable Australian and/or Industry Standard, (refer to Relevant Guidelines and Standards, Section 2);

And shall:

- Be cleaned to remove extraneous matter and/or verified weed/pest/pathogen free;
- Be tolerant to drought conditions where required;
- Be of moisture content suitable for optimal germination for the species;

- Have a purity of seed not less than National Seed Quality Standards for Basic and Certified Seed; and
- Be applied at a rate and time that is conducive to achieving key desired outcomes, such as 70% ground cover densities.

3 Landscape and Revegetation Performance Outcomes

3.1 Rehabilitation Performance Outcomes

The selection and application of appropriate rehabilitation measures will be informed, as a minimum, by the relevant Conditions of Approval, regulatory requirements and guidelines (such as the NSW "Blue Book" or IECA Best Practice Erosion and Sediment Control guidelines), soil assessments and an erosion risk assessment, and documented in the Reinstatement and Rehabilitation Plan (or similar plan) for each stage or element of the works.

Permanent erosion and scour protection shall be provided (where required) in accordance with ETC-08-04, detailed design and drawings. These shall be constructed in a progressive manner over the course of the works, thus minimising the use of temporary erosion and sediment control works where possible. Progressive rehabilitation of work areas should be made clear within Erosion and Sediment Control Plans.

3.1.1 General

The following outcomes are to be achieved as a minimum at completion of the works:

- Achieving contractually defined sign-off criteria for handover at Project completion (e.g. minimum 75% groundcover at Project completion);
- Land stability and erosion rates to be the same as, or less, than the pre-disturbance condition, or reference locations, as agreed to by Inland Rail;
- No slumping, gullying or tunnelling of the material present;
- No contaminated or waste materials present that pose an unacceptable risk of harm to human health/ecological receptors;
- Pre-existing weeds at acceptable densities, and no new restricted weed outbreaks, or as stipulated by statutory obligations; and
- All treatments, structures and erosion and sediment control measures that are no longer required have been removed.

3.1.2 Watercourses

In addition, for reinstatement of watercourses, the following are to be achieved as a minimum at completion of the works:

- Reinstatement in accordance with relevant applicable state guidelines, Conditions of Approval, etc.;
- As per design and relevant standards;
- Placement of remaining structures or materials appropriate to the location of watercourses, hydrology design and velocity at discharge;
- Temporary structures, such as at creek crossings to be removed, stabilised and rehabilitated;
- No noticeable scour events or high-risk scour potentials; and
- Reinstatement consistent with natural stream channel morphology, ecology and terraces, where feasible.

3.1.3 Temporary disturbance areas

Site-specific requirements are applicable where landowner agreements are in place for certain properties (e.g. temporary works areas such as construction access, site compounds, workforce camps, borrow pits, level crossings or other enabling works). Likewise, the CEMP and subplans may have key visual amenity criteria that needs to be met. Where requirements differ between this Framework and the landowner agreement, the

landowner agreement takes precedence. However, if these contradict or do not align with any statutory, licence or compliance requirements, the statutory, licence and compliance requirements take precedence.

3.1.4 Removal of erosion and sediment control measures

A well completed Erosion and Sediment Control (ESC) Plan will have a decommissioning sequence for ESC measures. Where this is absent, and advice is required, Certified Professional ESC accredited advice should be sought. ESC device decommissioning shall not be attempted unless the site catchment has achieved rehabilitation criteria, and the site is stable. Device cleanout must occur prior to decommissioning, with removed sediment being treated, buried or removed off site.

3.1.5 Materials

Permanent rehabilitation materials (such as stabilisation matting, mesh, binder, aggregates) are to be placed in accordance with detailed design drawings, construction and manufacturers specifications and with consideration of the relevant design velocity, relevant industry specifications or standards.

3.2 Revegetation Performance Outcomes

Details regarding landscape and revegetation works shall be included in the Accountable Entity's CEMP, relevant management plans, contract specifications, drawings and Planning Approval document.

The Accountable Entity shall include appropriate identification of the objectives for revegetation, so that the performance outcomes are achieved.

Key considerations, to be included to deliver successful revegetation include:

- Unless otherwise indicated or accepted in writing, a minimum 75% vegetative ground cover protection at the time of Project handover. Where this is not achievable, other landscaping treatments shall be considered and applied as noted below;
- At least 90% plants applied to be healthy, appropriate size and suitable for the context;
- Species to be chosen to replicate the pre-disturbance condition and species composition, (excluding any weed species);
- Ground to be prepared prior to planting, including topsoil placement where required, ripping or planting holes;
- Planting density to be optimised to achieve rapid ground coverage; and
- Mulching, weeding and watering to be implemented as needed to contribute to revegetation success.

Note that rehabilitation of final landform may be achieved without revegetation (i.e. through other forms of permanent ground cover), subject to compliance with the drawings, the Project Contract and the rehabilitation performance outcomes.

3.2.1 Maintenance

Revegetated/grassed areas are to be maintained up to practical completion and beyond if a defects liability period applies. This maintenance shall include (but is not limited to) the following activities to achieve the performance outcome:

- Watering (using water of suitable quality and via a method that doesn't induce erosion or contamination of the site, and in suitable quantities for the species requirements;
- Fertilising;
- Reseeding;
- Weed control;

- Pest and disease control;
- Vegetation control and management;
- Repair or reinstallation of failed treatments;
- Topping up of mulch;
- Protection of vegetation works from surface water flows through installation of appropriate temporary measures; and
- Removal of any rubbish or contamination.

3.2.2 Weeds

Weed management shall include the following activities to achieve the performance outcome:

- Pest plant (weed) densities no greater than the pre-disturbance condition, or reference locations, as agreed to by IR;
- No new outbreaks of restricted weeds (as defined by statutory requirements);
- To validate the above condition, post construction weed surveys will apply to the Accountable Entity. Such surveys should be initiated during favourable growing conditions and be passed onto Operational ARTC Business Unit for consideration of maintenance requirements; and
- Operational ARTC Business Unit to be advised in writing of any targeted weed treatment areas such as on-corridor washdown sites or weed incident locations.

3.2.3 Seeding treatments

Seeding treatments shall include the following activities to achieve the performance outcome:

- Have a cover of perennial and cover crop grasses so that performance outcome will ultimately be achieved;
- Show no signs of nutrient deficiency;
- Show no signs of water deficiency (unless cover crop targets have been met); and
- Have erosion and ground cover rates as per the performance outcome.

3.2.4 Turfing treatments

Turfing treatments shall include the following activities to achieve the performance outcome:

- Show no signs of nutrient deficiency; and
- Show no signs of water deficiency.

3.2.5 Planting treatments

Planting treatments shall include the following activities to achieve the performance outcome:

- Have a species composition (excluding pest plants (weeds)) of ground cover similar to (at least 75% consistency of species) the pre-disturbance condition, or reference locations, as agreed to by IR;
- Show no signs of nutrient deficiency;
- Show no signs of water deficiency;
- Show no signs of pests or disease;
- Are established and well formed, showing evidence of growth; and
- Have a mulch depth in accordance with the site conditions and species requirements.

4 Operational Management and Maintenance

Performance outcomes outlined in this Framework (Appendix A and B) are to inform subsequent Project specific completion criteria, which are to be developed by Service Providers during detailed design. In developing the completion criteria, Service Providers must take account of the Strategy, Framework, Primary Approval documents and Conditions of Approval (when available).

Consideration of Project handover commences during the design stage as there will be aspects that require addressing prior to finalising solutions that may have a cost, risk, and delay implication. This is particularly relevant to design of landscape treatments discussed in Appendix A. Discussions may also be required with State Agencies and Local Council should they be the remaining asset owner.

Information to be collated in the form of a handover plan, which is prepared by the Accountable Entity and forwarded to IR and relevant ARTC Operations Team for review and agreement. Further information is contained within *ARTC Project handover guidelines (0-0000-900-PMA-00-GU-1000).*

Prior to handover for operational management, the site is to comply with the Conditions of Approval, handover criteria and applicable licences/permits.

There shall be a monitoring activity of scope and duration approved by IR and outlined in the handover plan, to ensure that an approved minimum standard of establishment is achieved. Ongoing monitoring, as defined in Operational Handover requirements to ensure that the established landscape strategies, that are being achieved and implemented, continue to be successful. Additional maintenance or intervention works may be required if monitoring demonstrates that landscape and rehabilitation completion criteria are not being achieved.

Inspections of reinstated, landscaped or revegetated areas shall occur as otherwise specified in the CEMP, Project Contract requirements or Planning Approval including the management of defects and/or punch list items. Reporting shall include information on reinstatement, landscaping and revegetation or as specified by the Project Contract.

For any IR Project, following practical completion of required construction works and agreed defect liability period, individual Project areas shall be handed over, in accordance with any applicable agreements and/or procedures, to the relevant Operations Team (nominated by IR) for ongoing operational management and maintenance. The Operations Team to be responsible for managing the reinstated areas to ensure the long-term landscape completion criteria are achieved in accordance with the handover plan. Any long-term commitments post-handover to be clearly defined and documented in the IR/ARTC EMS for the corridor.

IR and its Accountable Entity shall ensure long-term management and monitoring commitments are reasonable and appropriate for an operational railway corridor, in liaison with a suitably qualified Landscape professional, and can be adequately budgeted and captured in asset management systems and agreed upon with the ARTC Operations Team.

The ongoing maintenance of sites shall include management of weeds, pests and vegetation (e.g. for bushfire and safe access), fauna furniture and fencing, and other infrastructure as well as ensuring an ongoing safe and stable non-polluting landform. These works shall be managed in accordance with operational environmental management documentation.

ABOUT THE ARTIST:

ANN JOHNSON

I am Ann Johnson, I am a Gamilaroi woman. I am the Eldest of ten children and the mother of four. A grandmother too.

I have always loved art. When I left school I did a Ticket writing traineeship in Newcastle and worked a David Jones. Soon after that I got married and had a family. We moved back to Moree in the early 1980s.

In the early 1990s I did an art course at Moree, which lead to a group of us setting up the Yurundiali Aboriginal Corporation. Janelle Boyd played a pivotal role in the setting up of Yurundiali, which designed and printed fabrics with Aboriginal designs.

In 1993 Janelle and I started 'Spirit Lines', we designed and printed them on t-shirts, tights, towels, ironing boards, and cooking mits, these were sold through Amnesty International. In 1995 we had a big exhibition in Moree called 'Sisters under the Skins', we also had an exhibition and fashion parade with Ken Done in Moree.

I produce art most days and if I am not practicing my art I am tossing around design ideas in my head. I like all types of art; I produce a variety of designs, do screen printing, make jewellery and sculpture amongst other things. At the moment I am exploring digitising my designs and then hand painting them using mixed media.

BEYOND THE TRACK: FOR OUR COVER ARTWORK, TRANS4M RAIL IS SUPPORTING AND FEATURING LOCAL MOREE ARTISTS

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