E2G Infrastructure Sustainability Annual Report

April 2020 – April 2021

Cairns Southern Access Stage 3 (E2G)

Rev	Date	Prepared by	Remarks
0	20/04/2021	Aaron Sacagio	Submission
1	25/04/2021	Aaron Sacagio	T Ryzak Comments

Table of Content

1. About This Report 4

2. Project Objectives and Targets 5

3. Project Overview 10

3.1. Scope of the Project 10

4. Governance 12

4.1. Our Values 12

4.2. Our Sustainability Approach 12

4.3. Our Policy 12

4.4. Our Strategy 13

5. Measuring Sustainable Performance 15

5.1. ISCA Infrastructure Sustainability Rating 15

5.2. Management Systems 15

5.3. Procurement and Purchasing 15

6. Environmental Aspects and Performance 17

6.1. At a Glance 17

6.2. Biodiversity 18

6.2.1. Mitigating Environmental Impacts 18

6.2.2. Monitoring and Management 19

6.3. Water Use and Efficiency 21

6.3.1. Water Use During Construction 21

6.3.2. Water Use During Operation 21

6.4. Energy and Carbon 23

6.4.1. Construction Energy Use 23

6.4.2. Embodied Energy 23

6.4.3. Operational Energy 24

6.5. Waste and Recycling 25

6.5.1. Construction Waste Management 25

6.5.2. Spoil Management 25

6.5.3. General Waste Management 26

6.6. Climate Change 26
6.6.1. Early Identification of Climate Change Risks 27
6.6.2. Our Approach 27
6.7. Heritage 28
6.7.1. Indigenous Heritage 28
6.7.2. Non-Indigenous Heritage 28
6.8. Environmental Management 30
6.8.1. External Stakeholders 31
6.8.2. Tendering 32
6.8.3. Monitoring and Reporting 32
7. Socio-Economic Aspects and Performance 34
7.1. At a Glance 34
7.1.1. Legacy Aspects 34
7.1.2. Community & Stakeholder Engagement 35
8. Innovations and Initiatives 36
9. Awards and Recognition 37
10. Review and Comments 38

1. About This Report

The Bruce Highway—Cairns Southern Access Corridor—Stage 3: Edmonton to Gordonvale (the Project) Annual Infrastructure Sustainability Report has been prepared by HSA Group and outlines the Project's sustainability performance by providing ongoing data of the Project between April 2020 and April 2021.

This report has been prepared to satisfy reporting requirements of the Infrastructure Sustainability Council of Australia (ISCA) Technical Manual v1.2 and embodies the principles of the Global Reporting Index (GRI) focusing on environmental and socio-economic outcomes.

The report demonstrates how sustainability requirements are helping to shape the delivery of the Project's program of works.

2. Project Objectives and Targets

The Project has established sustainability objectives, considering the risks, opportunities and compliance obligations. The sustainability objectives are detailed in Table 1 below

Table 1: E2G Targets and Objectives

E2G Project Objectives	E2G Project Targets	IS Credit Target	Status
Our business (TMR Sustainability Framework) · Building a transport system that is resilient in face of long term environmental and resource impacts. · Striving to innovate to design and provide long term solutions to connecting Queensland. · Understanding the economics of our business in providing efficient and value for money outcomes in delivering on our vision. · Investing for long term resilience to key drivers of change.			
Attain an ISCA Design and As Built Rating. Support the UN Sustainable Development Goals	• Achieve an 'Excellent' ISCA Rating.	Excellent rating	Not yet assessed Targeting • Design October 2021 • As-Built January 2023
Decision making to integrate economic, social, environmental and governance aspects, and seek to achieve positive outcomes in each	• Decisions are driven by sustainability (incorporating economic, social and environmental aspects)	Sustainability MCA applied to at least 2 significant issues	MCA has been applied to all subcontracts and particular significant issues, including Recycled Glass, Carbon Neutral Concrete, Water Supply Sources
Source sustainably and ethically, including prioritising local industry participation, social procurement initiatives and a commitment to avoiding modern slavery.	• Consideration of environmental and sustainability aspects in the procurement process. • Prioritise local material procurement.	Pro-1 Level 3	The Projects Sustainability Policy and Targets and Objectives have been posted on both the TMR and JH Websites TMR Web Site JH Web Site
		Pro-2 Level 3	E2G Tendering Workshop held on the 06/03/2020
		Pro-3 Level 3	Tender MCA is being completed for all Subcontracts
		Pro-4 Level 2	Subcontractors' environmental objectives and targets are monitored Sustainability Objectives and Targets are to be included in new contracts and retrospectively in existing high material contracts Where poor performance or non-compliance is identified it will be actively managed
Minimise whole of life asset impact by future proofing our	• Implement adaptation options to treat 25-50% of all	Cli-1 Level 2	Credit has been through internal quality assurance and

assets and responding to climate change	medium priority climate change risks identified in a climate change risk assessment.	Cli-2 Level 2	is being updated to include more evidence of adaptations.
Manage all activities ethically, measuring and reporting the sustainability performance of the project	• Ensure regular comprehensive and transparent sustainability reporting and review is carried out.	Man-5	IS Audit completed Quarterly with reports being supplied to the client. Weekly IS inspections being completed Quarterly IS Reports completed IS Report will be publicly reported annually Stakeholders will be provided an opportunity to review IS Report
Our people (TMR Sustainability Framework) · Valuing and developing the competence and capability of our people. · Encouraging a dynamic, safe and healthy workplace environment with a vibrant culture. · Retaining employees and cultivating our reputation as an employer of choice.			
TMR are a leader in sustainability Govern for sustainability by implementing project systems and processes to ensure the effective and efficient delivery and operation of the project Encourage innovation amongst our delivery teams and supply chain to achieve sustainable outcomes.	• Sustainability commitments are made in the sustainability strategy and policy documents. • The objectives in the sustainability policy are reflected in project contracts. • Knowledge sharing, and lessons learnt within the project, between projects, from outside the project, with key stakeholders and to the wider industry is formally conducted. • Innovation is a priority for the project. • Enhance workforce health and wellbeing and inclusion and diversity, through employee empowerment to deliver sustainable outcomes	Man-1 Level 2	SWTC Appendix 26 requires HSA Group to obtain a rating of “Excellent” under ISCA V1.2
		Man-6 Level 3	Project Erosion and Sediment Control and Sustainability Industry Day was completed on the 15th March 2021. With presenters from ISCA.
		At least one Innovation point	The Project is Targeting a number of innovation points, • ISupply Challenge • ISCA V2.0 Sta Credits • ISCA V2.0 Eco Credit • EMesh being used on Cycleway • Topsoil Trial
Our stakeholders (TMR Sustainability Framework) · Partnering with our clients and key stakeholders to create and find innovative products and processes for leading sustainable transport solutions. · Recognising the importance of our key partners, Federal, state and local agencies and industry and the community.			
Create a sense of place for communities, by making a positive and meaningful difference to the community by genuinely engaging with	• A comprehensive and inclusive stakeholder engagement strategy is developed and implemented.	Sta-1 (v2.0) Level 2	The Community and Engagement Management Plan has been developed and not rejected by the Administrator.

the community and stakeholders		Sta-2 (v2.0) Level 2	Stakeholder input is being sort to influences a majority of the priority project 'negotiables' detailed in the Community and Engagement Management Plan. Meringa West stakeholders to be surveyed to determine if their input has influenced the Project
Our society (TMR Sustainability Framework) · Meeting the basic access and equity needs of individuals and society. · Safe, secure and healthy transport system. · Ensuring that Queensland has a safe and healthy transport system that the community can afford to construct, access and maintain. · Delivering on infrastructure that connects our cities, towns and regions for current and future prosperity · Recognising the significance of different cultures and the importance of managing Indigenous, historical, shared and natural heritage.			
Be recognised as an industry leader in making our workplaces safer through innovation, collaboration and effective planning and management of risks. Work closely with our customers to achieve optimal and resilient outcomes for users and society	• Project improves road safety and traffic impacts • The project contributes to local employment and education with training specific to sustainability in addition to regular apprenticeship training and job opportunities.	Hea-1 Level 3	Initiatives • One of the aims of the Project is to increase road safety in the region. • The project includes a cycleway/shared path to facilitate healthy modes of transport and recreation • The Project plans on donating resources to the Alley Park construction on the site of the main compound. Monitoring The Project will monitor community health and wellbeing indicators
		Hea-2 Level 2	Design and construction CPTED assessment to be completed.
Natural and cultural heritage is protected, enhanced and managed.	• Adverse impacts to heritage during construction and operation are minimised and opportunities to enhance heritage are implemented.	Her-1 Level 2 Her-2 Level 3	Project is engaged with the Traditional Owners to develop legacy projects and enhance heritage values at Stoney Ck and Wrights Ck achieving Her-1 Level 3 Heritage modelling demonstrates enhancements to heritage values and monitoring is being completed.

Our environment (TMR Sustainability Framework) · Limiting pollution and waste and consumption of resources. · Looking for efficiencies in our transport operations. · Reducing our greenhouse gas emissions. · Reducing the impact of our transport operations on the natural flora and fauna of the state			
Address environment considerations in a manner that is sensitive to the needs of our stakeholders and the environment, creating enhanced environmental outcomes wherever practical	• Have no adverse impact on the receiving water environmental values. • No divergences from noise management processes during construction and no exceedances of noise goals for operation. • No exceedances of vibration goals for structural damage to buildings and structures during construction or for human comfort criteria for operation. • Minimise adverse impacts to local air quality. • Light spill is prevented during construction and operation.	Dis-1 Level 3	Dis-1 Level 1 only achievable due to design modelling results.
		Dis-2 Level 3	Dis-2 Level 1 only achievable due to design modelling results
		Dis-3 Level 3	Dis-2 Level 1 only achievable due to design modelling results
		Dis-4 Level 1	Dis-2 Level 1 only achievable due to design modelling results
Minimise the energy use and greenhouse gas emissions across the lifecycle of the project	• Reduce greenhouse gas emissions in construction and operation through energy-efficient lights and construction plant, and offsets using renewable energy technology.	Ene-1: 10% reduction against Base Case	The Base Case is being drafted and this assessment is to be completed.
		Ene-2: 5% substitution of energy from renewable sources	The Main Office electricity is being sourced from Ergon's Clean Energy Program where 100% of power is sourced from carbon neutral sources. Satellite compound renewable energy sources is being investigated.
Minimise water use across the lifecycle of the project	• Reduce water demand and maximise use of non-potable water.	Wat-1: 10% reduction against Base Case	The Base Case is being drafted and this assessment is to be completed.
		Wat-2: 100% substitution of potable water from non-potable sources.	Multiple non-potable water sources have been identified and are being used on the Project. However, given the length of the Project not all water sources can be non-potable. Due to this this 100% target cannot be achieved.
Minimise embodied energy and GHG emissions of materials across the lifecycle of the project	• Reduce project material use and reliance on virgin materials through footprint reductions and material substitutions.	Mat-1: 15% reduction against Base Case	The Base Case is being drafted and this assessment is to be completed.

Protect, manage and enhance the natural environment	• Rehabilitate degraded land along road corridor and implement measures to improve local habitats. • Rehabilitate impacted watercourses. • Creating passageways that allow fauna to safely move across the roadways.	Eco-1: The ecological value of infrastructure site is enhanced by 5%	The design eco credits are being reviewed to determine the actual ecological impact of the Project. Currently, the scores are shown no net impact or improvement.
		Eco-2 Habitat connectivity	

3. Project Overview

3.1. Scope of the Project

The Project is located 15 km south of Cairns city between the townships of Edmonton and Gordonvale. The Project's objective is to deliver a total transport solution, long-term improvements to traffic flow and road safety through reducing congestion, reducing highway travel time and improving highway access. The Project will duplicate a 10.5 km section of the highway to create a 4-lane highway from Edmonton south to Gordonvale.

The Project passes primarily through existing sugar cane farmland. The Project alignment crosses four creeks that form part of the Mulgrave River and Cairns Inlet catchments. The Project will be completed in proximity to a number of sensitive receptors, including Matters of State Environmental Significance, Cultural Heritage Sites (both indigenous and non-indigenous heritage), local residences, places of worship and local businesses.

The specific scope of the Project includes:

- Duplication of all existing 2 lane sections of the Bruce Highway between Edmonton and Gordonvale to 4 lanes.
- A new alignment for the Bruce Highway to the eastern side of the existing highway between Petersen Road and Warner Road.
- A new signalised intersection at Petersen Road and upgraded signalised intersections at Draper Road and Riverstone Road.
- Over 10km of new service roads to remove local trips from the highway.
- Realignment and upgrade of 4.5 kilometres of the Queensland Rail North Coast Line to accommodate the duplicated highway.
- Removal of multiple at grade rail crossings and upgrade of boom gates at other crossings.
- New road and rail bridges at Wrights Creek and Stoney Creek.
- New Bruce Highway road overpass south of Maitland Road connecting Pine Creek-Yarrabah Road and Maitland Road.
- Relocation of existing cane rail lines at locations to accommodate the duplicated highway.
- A new pedestrian overpass south of Draper Road, a new pedestrian overpass north of Draper Road and pedestrian path on the Bruce Highway road overpass south of Maitland Road.
- A dedicated off-road high-speed cycleway from Riverstone Road to tie into the existing pathway at Thompson Road.
- Several intersections and direct accesses to the existing Bruce Highway will either be partially closed or removed to improve traffic flow and increase road safety on the highway.
- Changes to the highway completed through this project will allow the posted speed to be 100km/hr from north of the Draper Road intersection to south of Petersen Road intersection.


Artist's Impression
CAIRNS
MOUNT PETER
EDMONTON
GORDONVALE
Bruce Highway — Cairns Southern Access Corridor — Stage 3:
Edmonton to Gordonvale

4. Governance

4.1. Our Values

HSA Group is up for the challenge of transforming lives. Developed by our people, our values capture the essence of who we are and where we're heading.

Caring	We think deeply about what we do and how it affects lives
Empowering	We gain trust through action
Imaginative	We push the boundaries
Future-focused	We're in it for the long, long term

We also respect the values of our client, Queensland Department of Transport and Main Roads (DTMR), and ensure we effectively collaborate by integrating our client's values into our behaviours that we live by every day.

Customers first	know your customer, deliver what matters and make decisions with empathy
Ideas into action	challenge the norm and suggest solutions; encourage and embrace new ideas and work across boundaries
Unleash potential	expect greatness; lead and set clear expectations and seek, provide and act on feedback
Be courageous	own your actions, successes, and mistakes; take calculated risks and act with transparency
Empower people	lead, empower and trust; play to everyone's strengths and develop yourself and those around you

4.2. Our Sustainability Approach

This project is committed to sustainability and creating lasting benefits through an integrated consideration of social, environmental, and economic aspects in all its activities. It is registered for an Infrastructure Sustainability rating and obliged to achieve at least an IS Design Rating and IS As-Built Rating of Excellent. The project has developed a Sustainability Management Plan which specifies the sustainability requirements the project must meet in order to enhance its sustainability performance.

Overall responsibility for Sustainability sits with the Project Manager with responsibility delegated to a number of discipline leads including Sustainability, Environment, Commercial, Design, Construction, Community and Stakeholder Engagement.

4.3. Our Policy

The Projects Sustainability Policy (see Appendix A) outlines our commitment to integrating economic growth, environmental resilience, and social progress as priorities into decision-making at every level of the business, with the ambition to create long-term value. This commitment is supported by the project sustainability strategies, which ensure sustainability is embedded in all aspects of project activities and seamlessly integrated into the design, procurement and delivery processes.

HSA Group is committed to delivering reliable and innovative infrastructure and best practice in sustainability. Sustainability underpins our core values, with a holistic approach that considers the environment, safety, wellbeing and socio-economic benefits to the community.

4.4. Our Strategy

The Project has determined external and internal stakeholders that are relevant to its purpose and that affect its ability to achieve its intended sustainability outcomes. The client (DTMR) is a State Government department whose role is to lead the development of a safe, efficient, integrated transport system in Queensland.

DTMR has developed a Strategic Plan for years 2019 - 2023.

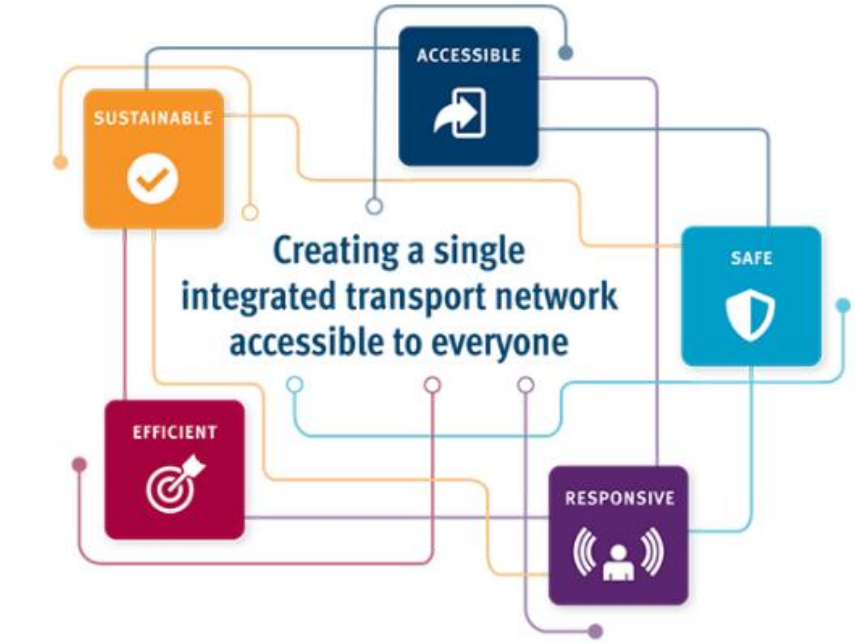

Figure 1: DTMR Strategic plan 2019–2023 (revised for 2020-21) Framework

DTMR's strategic plan details four strategies to achieving their sustainable goal of "Planning, investment and delivery outcomes support a more liveable and prosperous Queensland":

- Encourage active and shared transport modes
- Enhance network resilience to minimise the impacts of climate change and incidents
- Prioritise planning and investment decisions that enhance benefits realisation
- Support low and zero emission transport technologies, modes and materials

HSA Group is committed to incorporating our Sustainability Framework into the Project to complement our client's framework. The framework is designed to leverage our people and diverse expertise by encouraging a thoughtful, collaborative, interconnected approach to decision making, centred around building resilience. Each component of the framework is interconnected – each of the four pillars and their 12 elements define our approach to decision-making that we see as a 'whole of business' challenge.

Why Resilience?

Delivering our projects using a sustainability approach enables us to build resilience in our business, for our customers, for our people and for our supply chain.

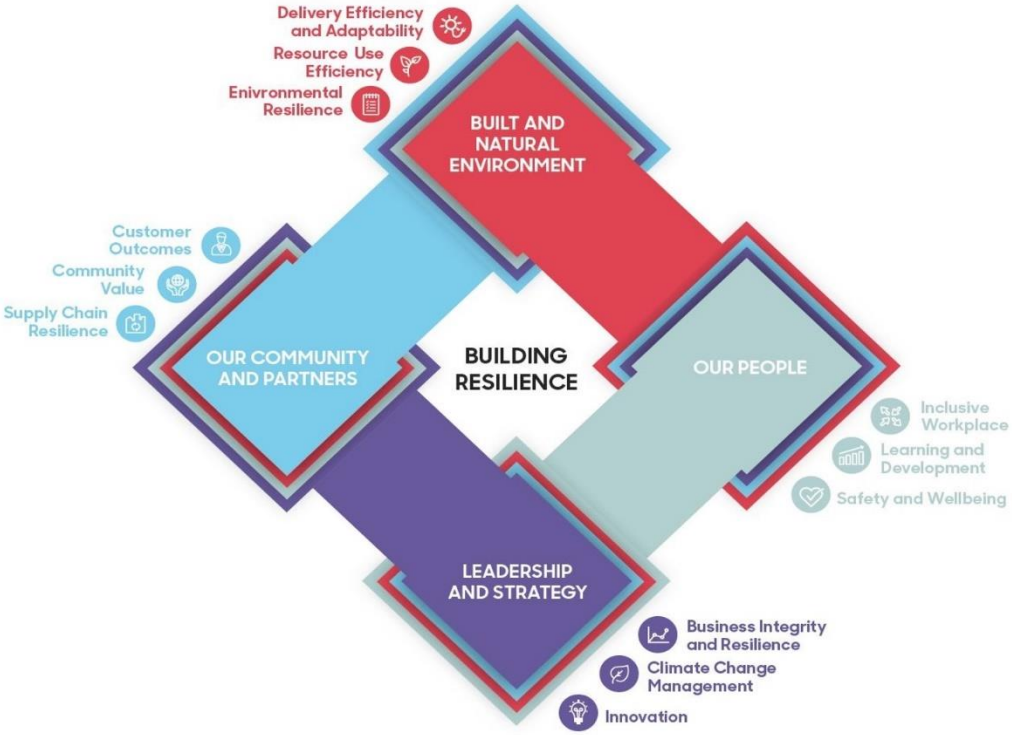

Figure 2: HSA Group Sustainability Framework

5. Measuring Sustainable Performance

5.1. ISCA Infrastructure Sustainability Rating

ISCA is a not-for-profit industry council with the mission to 'improve the productivity and liveability of industry and communities through sustainability in infrastructure'. ISCA has developed an IS rating scheme which provides a consistent evaluation of sustainability across the design, construction and operation of infrastructure. To achieve an IS rating, the infrastructure project or asset is assessed based on a variety of Sustainability themes including:

- Management and Governance
- Using Resources
- Emissions
- Pollution and Waste
- Ecology
- People and Place
- Innovation

Within each theme are multiple categories in which credits may be achieved based on how successfully the infrastructure supports or achieves sustainable guidelines. DTMR requires that the rating be achieved, with the ISCA v1.2 Rating to be obtained within the 'Excellent' rating band.

Target Rating	Design Rating	As-built Rating
'Excellent' >50	Not yet assessed – targeting October 2021	Not yet assessed – targeting March 2023

5.2. Management Systems

The Project as implemented a sustainability Policy that is endorsed by Project management and is publicly displayed on both the Project's DTMR website and on the John Holland website. The policy informs the E2G team on the actions and standards that are mandated by the HSA Group.

5.3. Procurement and Purchasing

The Project has implemented a Multi Criteria Assessment (MCA) to consider multiple aspects when considering subcontractor's submissions.

The MCA is weighted for each sustainability aspect that is considered when analysing tender submissions, with 55% of the weighting on Price and 45% on non-price components, like HSE performance, sustainability performance, proximity to the Project, training of personnel quality of work etc, Refer Figure 3.

Selection Criteria		Weighting Percentage (WP)*	
1	**Price**	**55.0%**	
	1.1 Price		55.0%
2	**Commercial**	**5.0%**	
	2.1 Prior performance		2.5%
	2.2 Conditions / qualifications		2.5%
3	**Project Management / Systems**	**15.0%**	
	3.1 Safety		5.0%
	3.2 Environment & Cultural Heritage & Sustainability		5.0%
	3.3 QA		2.5%
	3.4 Community & Social		2.5%
4	**Local Benefits**	**20.0%**	
	4.1 Jobs		8.0%
	4.2 Supply chain		4.0%
	4.3 Apprentices / trainees		4.0%
	4.4 ATSI Jobs		4.0%
5	**BPP** (where not considered elsewhere)	**5.0%**	
	5.1 Best Practice IR		2.5%
	5.2 History of compliance with procurement, tendering and other govt policy		2.5%
	Total	100%	100%

Figure 3: Subcontractor Analysis MCA

6. Environmental Aspects and Performance

6.1. At a Glance

Aspects	Total for Project
Clearing planned (ha)	TBC
Actual clearing to date (ha)	72.6
Rehabilitation/revegetation planned (ha)	TBC
Actual rehabilitation/revegetation to date (ha)	0
Total Water Consumption to date (kL)	40,778.30
Total Non-Potable Water Used to date (kL)	39,848.51
Total fuel consumption to date (kL)	811.67
Total waste generated by project (t)	1,444.65
Total Inert Non-hazardous waste diverted from landfill (t)	1179.76
Total Office waste diverted from landfill (t)	95.71
Electricity used to date (kWh)	48,230.00
Renewable electricity to date (kWh)	48,198.00
Total imported quarry materials used in project (t)	418,018.55
Concrete to date (m3)	7,211.50
Reinforcement to date (t)	134.81
Asphalt to Date (t)	90
Bitumen to Date (kL)	12

The Project is focused on minimising impacts to the environment during construction and operation through:

- avoiding and reducing energy demand, while maximising energy efficiency
- maximising carbon offsetting, and mitigating climate risk
- minimising the wastage of water
- minimising impact on the physical environment.

6.2. Biodiversity

This section looks at measures to sustain and enhance biodiversity. The Project has employed a range of methods to mitigate impacts on biodiversity

Key Targets	Status
Enhancing ecological values	TBC
Offset impacts to biodiversity	TBC

6.2.1. Mitigating Environmental Impacts

Project has implemented a Flora and Fauna Environmental Control Plan that incorporates the Species Management Programs (SMP) for Tampering Breeding Places-Low Risk and Micro Bat and Bird Breeding". In addition to the ECP and SMPs, the project is planning biodiversity offsets to offset the loss of native vegetation and creek bed restoration works.

6.2.1.1. Ecological Assessments

Ecological assessments were undertaken before construction commenced. These assessments helped to verify the findings of the Review of Environmental Factors (REF) and Species Impact Statements. These assessments helped to confirm ecological mapping in the REF, vegetation type boundaries, and vegetation condition and species composition.

The REF and the assessments were used to assess the impacts of the design in the Environmental Design Reports. Each design package was assessed for the environmental outcomes and mitigation measures included in the design to offset environmental aspects.

6.2.1.2. Pre-Clearance Surveys

Pre-clearance surveys are undertaken before clear and grub works commenced and throughout construction. These surveys helped to identify significant species, habitat trees and nesting fauna within the areas to be cleared. Where areas of significance were identified during the surveys, the area was cordoned off as a No Go Zone and mitigation measures were investigated. These measures included changing the design, relocating the nesting fauna or significant species. No works within the area occurred until the mitigation measures were implemented.

During the pre-clearance surveys at QR South a nesting pair of Macleay's Fig Parrot (Vulnerable under *Nature Conservation Act*) was identified. The tree was flagged, sign posted and remained until the fledgling had left the nest. The Project inspected the nest and confirmed the fledgelings had left using a drone prior to clearing the tree.

6.2.1.3. Fauna Crossings

One of the key elements of the ecological assessment was the habitat connectivity for fauna to cross the Bruce Highway. The region is highly fragmented with limited opportunities for fauna movement both terrestrial and aquatic. To allow terrestrial fauna passage through the riparian zones fauna paths were included under the bridges, refer Figure 4. The paths will be furnished with logs, hollows and rocks retained during the clearing works to provide shelter for the fauna during movement.

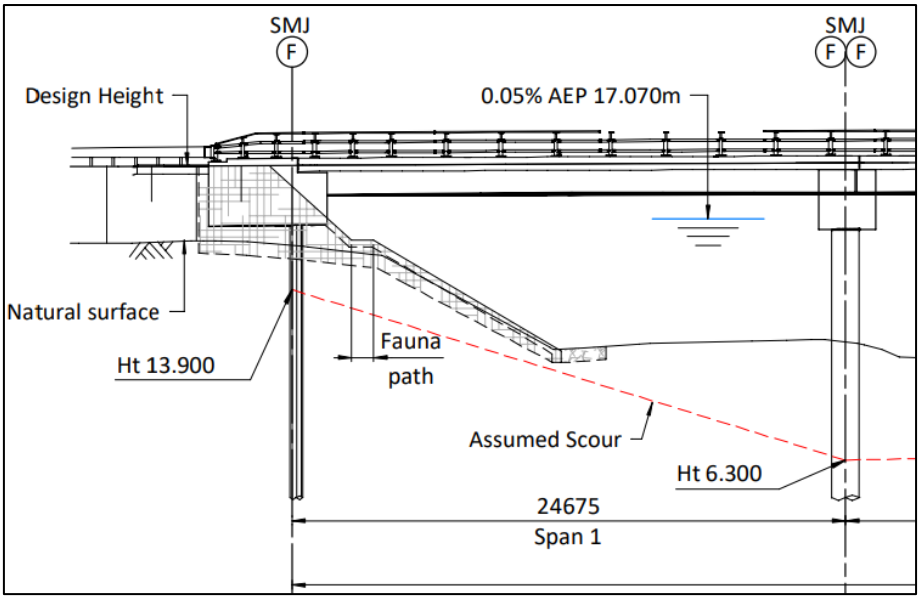

Figure 4: Wrights Ck Bruce Highway Bridge General Arrangement Exert

6.2.1.4. Biodiversity Offsets

The Project is investigating two biodiversity offset initiatives. The first initiative's plan to restore the natural condition of the creek bed within Wrights Ck. Due to the long-term agriculture within the region the creek bed has become silted up changing the morphology of the creek. the elders to the Gimuy Walubara Yidinji and the Dulabed Malanbarra Yidinji who swam in Wrights Ck as children have informed the Project that the creek's morphology was similar to other creeks in the region with rocky beds and riffles and pool morphology, refer Figure 5

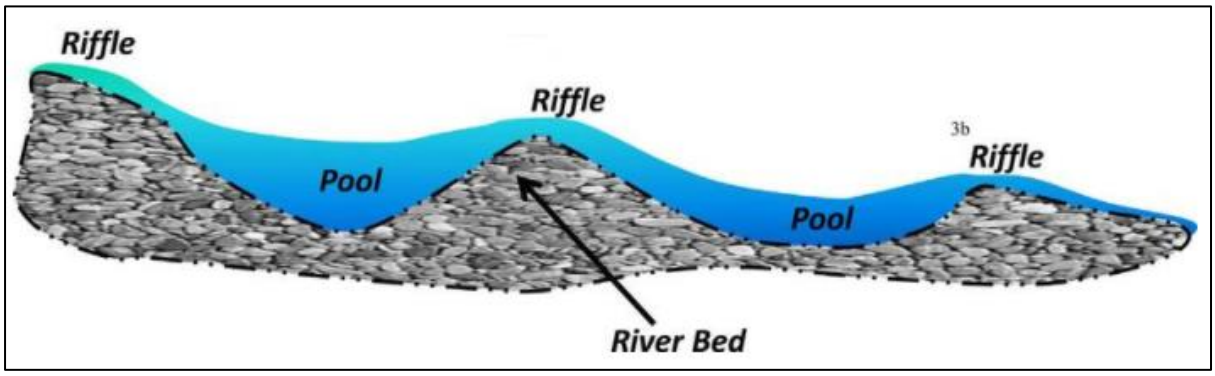

Figure 5: Longitudinal Depiction of Wet Tropics Creek Morphology

The second offset incitive plan is to revegetate with native flora species disturbed areas within the vicinity of the Project. Native plants were donated to the Project from another TMR project in the region to reuse on the E2G Project. These plants will be used to offset some cleared areas within and adjacent to the Project footprint.

6.2.2. Monitoring and Management

Weekly environmental site inspections incorporate ecological monitoring and management activities. Project Environmental Representatives (PER) inspect the ecological conditions of

the Project and address issues ranging from pest control, weed management and native species monitoring, to erosion and sediment control

6.3. Water Use and Efficiency

The Project seeks out new ways to reduce water consumption and encourages contractors to reduce water usage and use non-potable water (non-drinking water) sources for suitable construction and operational activities.

Water efficiency measures are incorporated into all designs, to ensure potable water and non-potable water savings are realised. This section looks at how water efficiency targets have been met for the Project.

Key Targets	Status
Reducing water use by 10% compared to a base case design footprint	Base Case TBC
Maximising the proportion of water from non-potable sources (substituting for potable) – Design (operational prediction)	TBC
Maximising the proportion of water from non-potable sources (substituting for potable) during construction	The Project is sourcing non-potable water from a number of locations, including rainwater, creeks and sediment basins across the Project.

6.3.1. Water Use During Construction

Infrastructure construction involves significant use of both potable and non-potable water especially during major civil works. Since the commencement of construction works in the Project has sourced 97% of water usage from non-potable water sources, with over 40,700kL kilolitres of total water consumed.

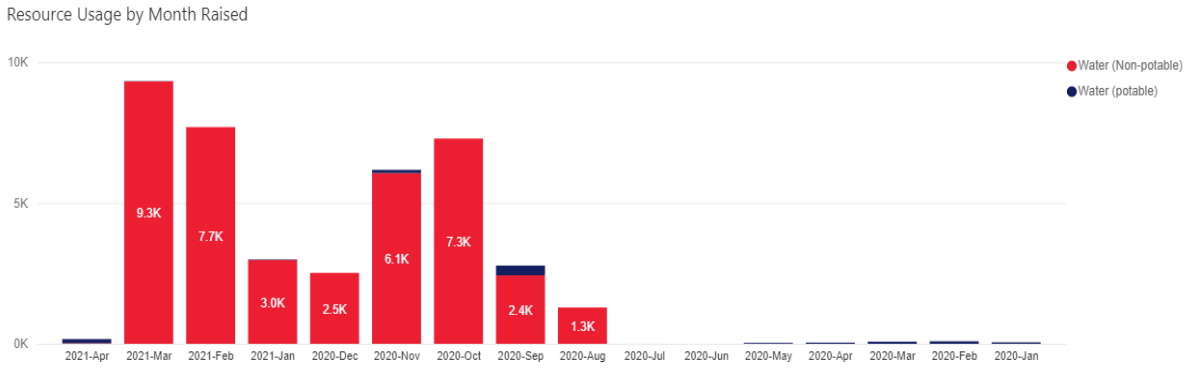

Figure 6: E2G Water Usage Graph

Key initiatives to reduce potable water use in construction activities include:

- use of rainwater for amenities
- re-use of stormwater captured by basins for dust suppression
- use of creek water

6.3.2. Water Use During Operation

Water use during operation of this portion of the Bruce Highway will be negligible. The design does not include vegetation irrigation or any intensive use of water.

6.4. Energy and Carbon

The Project is committed to:

- reducing operational, construction and embodied carbon emissions where feasible
- identifying low carbon energy generation and procurement solutions.

Key Targets	Status
Reducing GHG emissions by 10% compared to a base case footprint (covering at least Scope 1, Scope 2 and land clearing)	Base Case TBC
Reducing material lifecycle impacts by 15% compared to a base case footprint	Base Case TBC
Ensuring greater than 9% of materials/products by value have ISCA approved environmental labels	

6.4.1. Construction Energy Use

The Project encourages the use of alternate fuels and renewable energies where feasible. The Gordonvale compound is sourcing electricity from the Clean Energy Program offer by Ergon. This Program sources 100% of its power from carbon neutral sources. The Project's satellite compounds currently rely on petroleum based powered generators; however alternative electricity sources are being investigated.

The Project has investigated the use of biodiesel (B5 and B20 blends) for use in plant and equipment, which has the potential to reduce carbon emissions by up to 15% compared to a standard diesel fuel. However, due to the current unavailability of diesel B5 and B20 blends in the Cains region the use of these products is not feasible. Alternatively, the project is targeting plant that meet the US EPA Tier 4 emission standards. These newer machines are more fuel efficient compared to older machinery.

6.4.2. Embodied Energy

Embodied energy' refers to the energy that goes into producing manufactured materials, such as concrete and steel. The energy used to manufacture these key building materials produces greenhouse gases and leaves behind a carbon footprint.

Quarry products, concrete, steel and asphalt/bitumen comprise the majority of materials used on the project by volume.

The amount of cement used has been reduced to minimise embodied carbon emissions, with a focus on using low environmental impact alternatives and recycled cementous material. Portland cement is a key greenhouse gas intensive material used in concrete, and the proposed quantities used have been reduced on average by 30%. This reduction was achieved through the use of supplementary cementitious material such as fly ash, which is a waste by-product from other industries

Imported Material	Total for Project
Total imported quarry materials used in project (t)	418,018.55
Concrete to date (m3)	7,211.50

Reinforcement to date (t)	134.81
Asphalt to Date	TBC
Bitumen to Date	TBC

Imported Material	Total for Project To Date
Sand (quarried) (t)	211.42
Recovered glass sand (t)	Nil
Fly Ash (t) (recycled)	4,326.90
Ballast (t)	24.98
Aggregate (t)	70,303.46
Fill material (t)	415,689.25
Road base (t)	21,955.89
Asphalt (t)*	TBC
Concrete (m3)*	7,211.50
Drainage pre-cast concrete (reinforced) (t)	5,058.89
Structures pre-cast concrete (reinforced) (t)	TBC
Reinforcing steel (t)	134.81
(Rail) (t)	960
Timber (t)*	TBC

Due to reporting timeframes, only 6 monthly data is available. Full figures will be supplied in the 2021 Annual Sustainability Report.

6.4.3. Operational Energy

The Project is committed to reducing energy requirements where feasible within the design of the highway, consequently decreasing the carbon footprint of the road. The key measures incorporated into the design include:

- Energy efficient street lighting
- Energy efficient signal lighting

6.5. Waste and Recycling

The Project is committed to the efficient management of materials and waste, minimising the number of materials used in projects where possible, and there is a heavy focus on recovering, reusing and recycling construction and demolition waste

Key Targets	Status
Ensuring 100% of all spoil is diverted from landfill	Nil spoil removed from site
Ensuring 90% of inert and non-hazardous waste is diverted from landfill	100%
Ensuring 60% of office waste is diverted from landfill	41.3%

**to increase waste diversion rates in the office, increased employee engagement will be implemented in the form of education sessions*

6.5.1. Construction Waste Management

To date, The Project has generated 1,444.65 tonnes of construction waste. Of this, 1,239.64 tonnes have been recycled (85.8% overall).

Waste Types	Diversion Stream	Tonnes
Inert non-hazardous (Building waste, Concrete waste, Timber waste, Steel waste)	Landfill	Nil
	Recycled	1,179.77 t
Spoil	Landfill	Nil
	Recycled	Nil
Office Waste (Comingled waste, Food waste, Mixed Solid waste, Paper & Cardboard, Printer Cartridges)	Landfill	136.07t
	Recycled	95.71t
Hazardous Waste (Asbestos Contaminated Material)	Landfill	131m3
	Recycled	Nil
Liquid Waste (Effluent and Non-destructive)	Wastewater Treatment	12,830 L
	Recycled	Nil
Plastic Collection	Recycled	0.1t
ReCollect (Cash for Containers)	Recycled	0.152t

6.5.2. Spoil Management

The classification of spoil is based on the Environmental Protection Act's classification process. The project has completed preliminary contamination assessment and geotechnical investigations to determine areas of suitable natural material, unsuitable natural material or

contaminated material within the Project footprint. Material classified as ‘suitable’ meet the engineering and contamination requirements for the Project and are being reused within the Project. Material classified as ‘unsuitable’ don’t meet the engineering requirements for the Project. This material will be reused/recycled where opportunities allow and comply with Planning legislation. Material classified as contaminated will be managed in accordance to Environmental Protection Act and where able rehabilitated and recycled/reused in a sustainable method.

6.5.3. General Waste Management

The Project is working under the Global Mandatory Requirements (GMR) which mandates the implementation of the waste hierarchy as a foundation of reducing waste and diversion of waste from landfill.

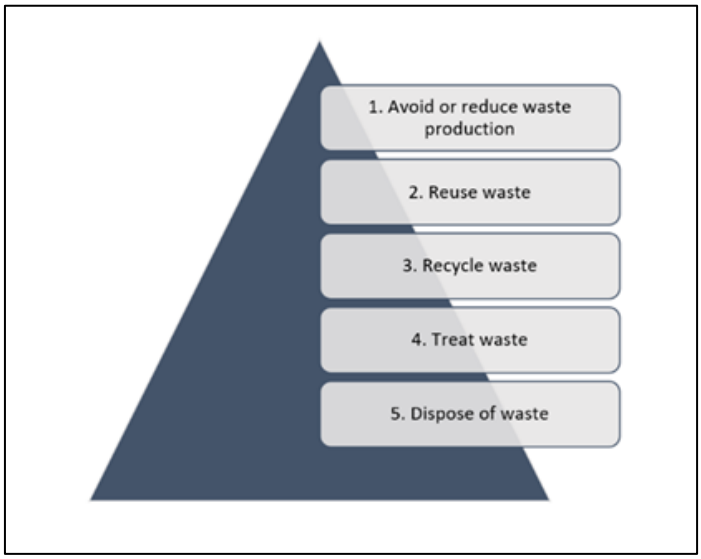

Figure 7: Waste Hierarchy

Based on this principle the Project has been able to recycle or reuse 85.8% of the waste generated to date.

6.6. Climate Change

The effects of a changing climate present complex challenges to the built environment and transport infrastructure due to the projected changes in intensity and frequency of severe climate events. Climate change can increase the exposure of the road and rail infrastructure to risks including structural asset damage, service interruption, productivity losses and reduced customer satisfaction. Recognising the importance of understanding projected climate impacts, HSA Group is committed to mitigating the risks of climate change to the road and rail corridor between Edmonton and Gordonvale.

Key Targets	Status
Undertake climate change risk assessment	Complete
Identify and implement adaptation measures	Complete
Address all extreme, high and medium climate change risks	Complete

6.6.1. Early Identification of Climate Change Risks

The Project is committed to take effective action on climate change in order to make the road and rail corridor between Edmonton and Gordonvale resilient. Accordingly, the design and build of the Project addresses the likely impacts of climate change risk over the life of the infrastructure and incorporates appropriate mitigation measures.

Climate change risks have been identified and addressed from early-stage design, with risks being revisited on an ongoing basis through project delivery.

6.6.2. Our Approach

The Project has taken a forward-looking approach toward climate risks, such as increased sea level, flooding, and extreme temperature events. For example, the design process for the Project has factored in a sea level change of 0.8m and up to 1:2000 year flood events, refer Figure 8. These design factors allow for adaptability and resilience of the road corridor for its designed life of 100 years.

The Project undertook an assessment of climate change risks early in project development. The aim was to understand potential risks and impacts to determine appropriate measures to manage and mitigate identified risks during construction and operation. HSA Group have developed and implemented adaptation measures to address risks identified as extreme, high and medium including designing the Project to cope with flood events up to a 100 year ARI to maintain resident access to the Bruce Highway and North Coast Rail Corridor during extreme flooding.

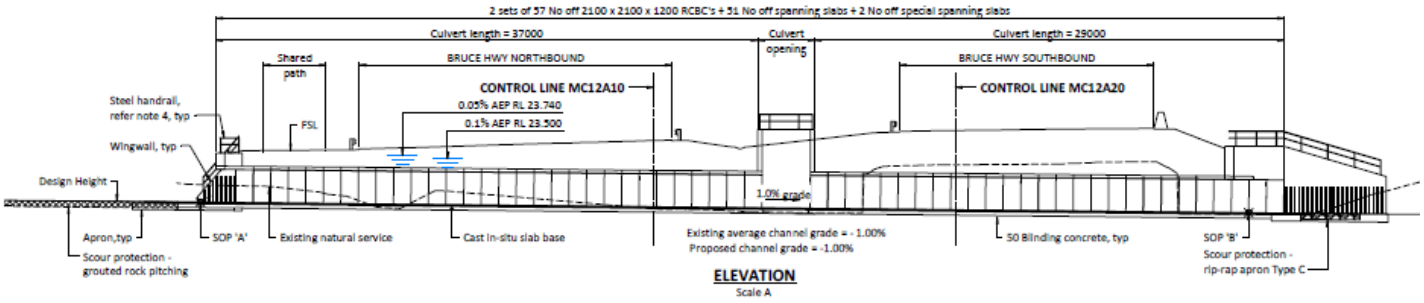

Figure 8: Mackey Ck Culvert Cross Section detailing 0.1%AEP (1:1000 year) and 0.05%AEP (1:2000 years)

6.7. Heritage

The Project is committed to heritage conservation and identifying opportunities to enhance heritage value within the region. The heritage assessment for the Project identified a number of significant Aboriginal heritage items within the Project footprint, including indigenous burials and a sacred tree and the potential for further indigenous finds. Opportunities to enhance heritage value are under investigation.

6.7.1. Indigenous Heritage

The Project engaged with the Traditional Owners of the region, the Gimuy Walubara Yidinji and the Dulabed Malanbarra Yidinji people, and undertook a Cultural Heritage Field Assessment (CHFA). This assessment identified

- The entire project area is significant to the Traditional Owners.
- The entire project area is a Significant Aboriginal Area, in accordance with the Aboriginal Cultural Heritage Act.
- The six creek crossings and the cultivated area between Collinson Creek and Stoney Creek, have a high cultural heritage significance to the Traditional Owners and there is a potential for items and object of cultural heritage value to be identified in these areas during construction activities.

Based on the assessment's findings the Project entered into a Cultural Heritage Management Agreement (CHMA) with the Traditional Owners. The agreement details the methods to avoid harm to Aboriginal Cultural Heritage and, if harm cannot be reasonably and practicably avoided, to minimise the potential impacts on Aboriginal Cultural Heritage Finds within the Project Works Area through collaboration with the Traditional Owners.

Through this collaborative process nine indigenous burials and 12 indigenous artefacts have been identified on the Project. Four of the identified burials were within the Project's footprint and required relocation. Through close consultation with the Traditional Owners, the burials were relocated by the traditional owners.

To commemorate the indigenous heritage of the area the Project is investigating a legacy project at the locations of the relocated burials.

6.7.2. Non-Indigenous Heritage

Portions of the Meringa Sugar Experiment Station are identified as State Heritage on the Queensland Heritage Register. Initially established in 1917 as an entomological station investigating insect pests, the Meringa Sugar Experiment Station has housed research into disease-resistance, farming techniques, and technological innovation.

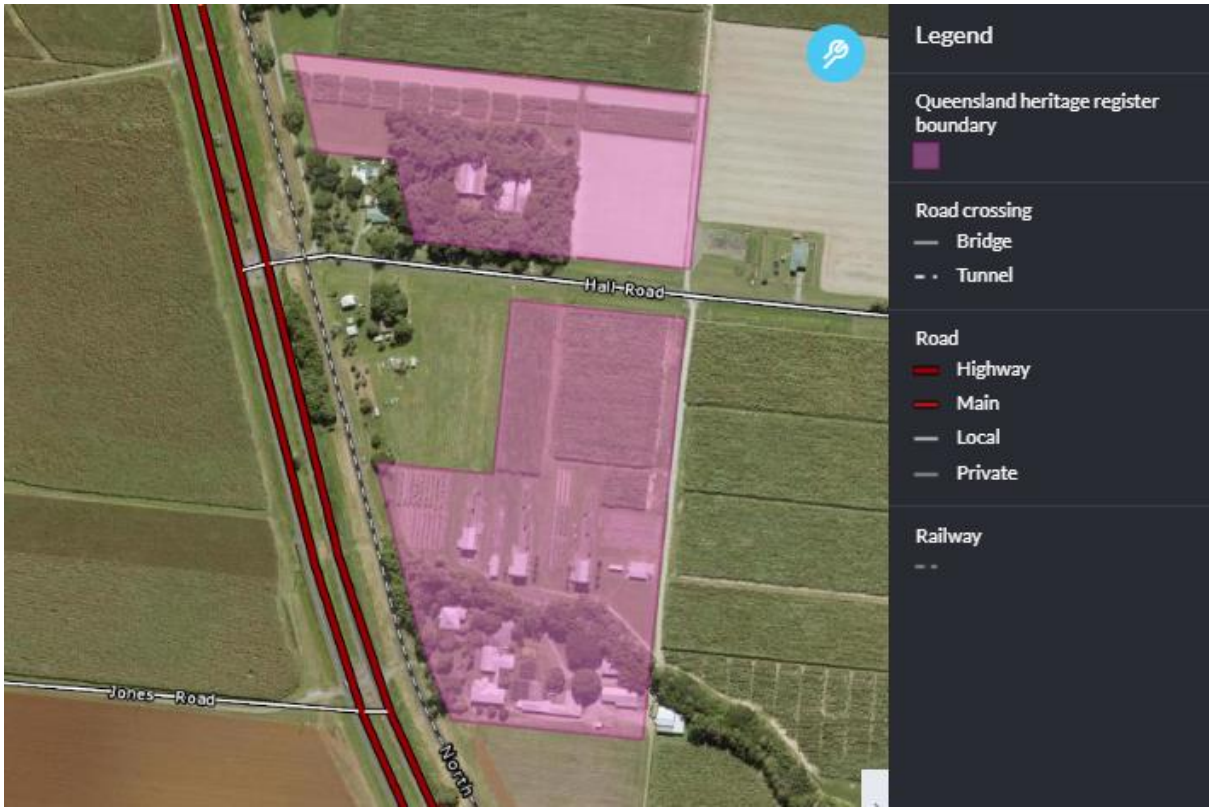

Figure 9: Queensland Globe Mapping of Heritage Register Areas

To increase road safety on this portion of the Bruce Highway the design requires the closure of the existing Meringa Sugar Experiment Station access, which is directly off the highway. Due to this, the Project is collaborating with Sugar Research Australia, the operators of the Experiment Station, to design and construct an alternative access.

6.8. Environmental Management

Key Targets	Status
No major pollution incidents (Class 1)	On track – zero to date

**Class 1: Environmental discharges, environmental pollution or degradation which has high severity impacts on the community and/or environment (>3 months) or may have irreversible detrimental long term impacts.*

The Project is being delivered under the relevant environmental and planning acts, including but not limited to the *Environmental Protection Act 1994, Water Act 2000, Fisheries Act 1994, Planning Act 2016, Nature Conservation Act, Biosecurity Act 2015*. The conditions contained within these legislations create hundreds of environmental compliance requirements that need to be adhered to by the Project within the construction and operational phases of the Project. Our Construction Environmental Management Framework encompasses a range of strategies / management plans that characterise our approach to environmental management during construction and are outlined below. These have been successfully implemented and have resulted in zero major pollution events to date.

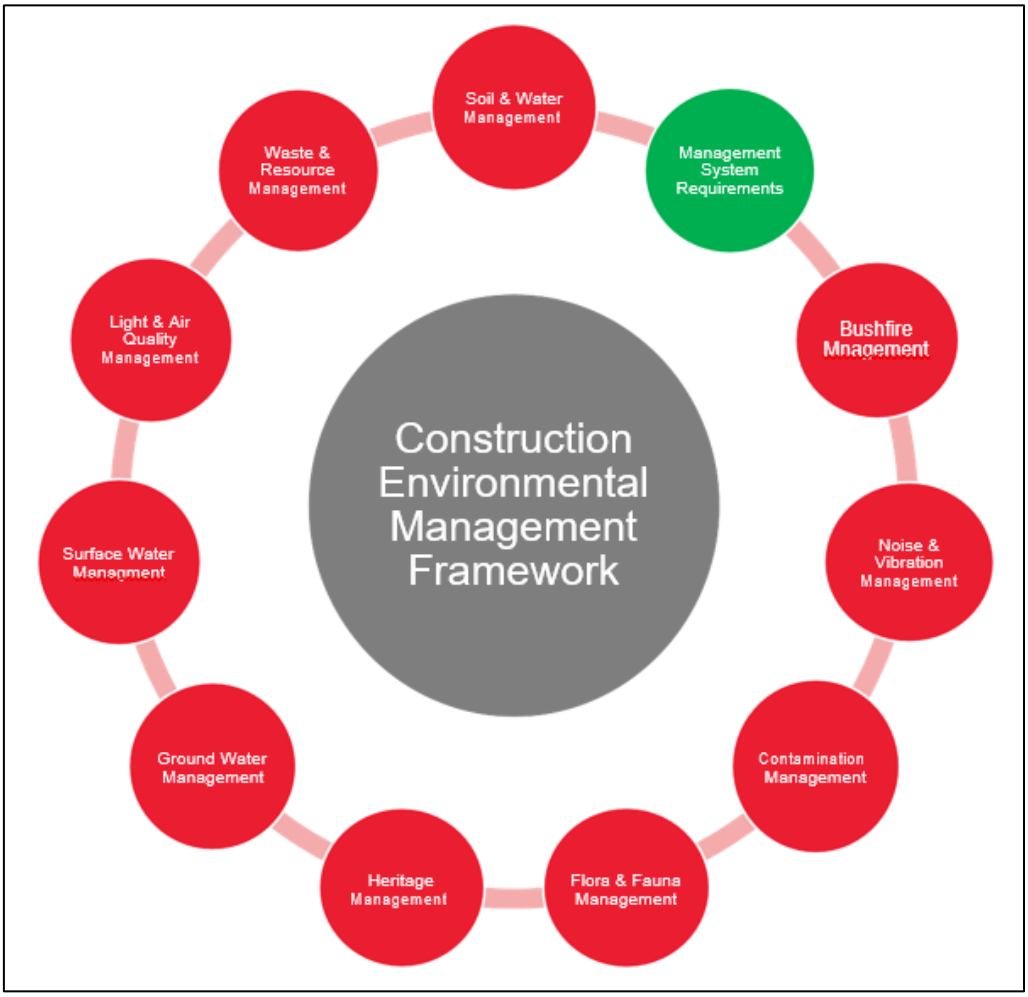

Figure 10: HSA Group Environmental Management Framework

6.8.1. External Stakeholders

The Project is required to liaise with numerous external stakeholders that influence how we manage environmental aspects on site. These include:

- DTMR
- Department of Environment and Science
- Department of Agriculture and Fisheries
- Department of Natural Resources, Mining and Energy
- Cairns Regional Council

The Project engages with these stakeholders as required to ensure the project is effectively managing its environmental impact in accordance with regulatory conditions.

One of the stakeholder engagements the Project has completed was the Erosion and Sediment Control and Infrastructure Sustainability Industry Day, Figure 11.

Figure 11: E2G Industry Day Invitation

The attendees of the Industry Day included representatives from Cairns Regional Council, DTMR, Department of Environment and Science and Local Contractors.

6.8.2. Tendering

Environmental considerations are a key component to the procurement of delivery and supply contracts. Tenderers need to respond to a high standard of environmental performance while complying with our construction environmental management framework. Tender submissions include questionnaires that determine the subcontractor's construction readiness. These are thoroughly assessed to help ensure the best outcome for the project and the environment.

6.8.3. Monitoring and Reporting

To ensure a level of assurance that we are appropriately managing environmental risks during construction, environmental monitoring and surveillance programs are implemented to pre-empt our impact and facilitate proactive management initiatives. This involves a combination of community consultation, environmental inspections, auditing of environmental management systems and incident response processes. There are also targeted monitoring programs in place.

6.8.3.1. Water Quality Monitoring

The Project is required to undertake water quality monitoring in accordance with the Project's Water Monitoring Plan. This is to ensure that the project does not negatively impact on the surrounding creeks and river ecosystems that flow to Trinity Inlet Estuarine Conservation Zone and the Great Barrier Reef Marine Park. In accordance with the various HSA Group, DTMR and legislated requirements, the Project also undertakes water quality monitoring for all construction water discharges which occur during construction. This also includes water quality monitoring of nearby water bodies outside the project footprint.

6.8.3.2. Noise, Vibration and Light Escape

The Project has developed and implemented a Construction Noise, Vibration and Light Escape Environmental Control Plan to ensure emission impacts associated with the Project are appropriately managed in accordance with DTMR and legislated requirements. The below initiatives have been implemented to minimise noise and vibration disturbance to the community:

- Only conducting works during standard construction hours i.e. Monday to Saturday 7am to 6pm, where feasible. Any construction works conducted outside these times require further assessment and approvals.
- Conducting noise, vibration and lighting monitoring to confirm that the level of emissions from the Project do not exceed approved levels.
- Completing light assessment post installation of lighting towers to ensure no light escape to sensitive residents
- Conducting high noise and/or vibration generating activities during specific times periods to reduce impact on sensitive receptors.
- The Project is consulting with the community to inform them of the activities being completed
- Noise attenuation measures, like noise mats, implemented at specific sensitive receptors, i.e. schools and places of worship.

6.8.3.3. Air Quality

The Project has developed and implemented an Air Quality Environmental Control Plan to ensure that air quality is appropriately managed throughout construction. In particular, dust is monitored utilising a number of dust gauges located within the local area. To minimise the dust generation during construction, the Project has adopted the following measures:

- Progressive vegetation clearing to minimise the amount of exposed surfaces
- Progressive stabilisation of exposed areas by revegetation, use of geofabrics, polymer, effective stockpile management and mulch blankets
- Utilising water carts to wet down haul roads, exposed areas and stockpiles.

7. Socio-Economic Aspects and Performance

7.1. At a Glance

Key Targets	Status
Total number of suppliers engaged	Suppliers – 16
	Sub-contractors – 52
	Hire – 15
	Consultants – 19
% of expenditure in Queensland	91.35%
% of expenditure on Local suppliers (125km radius)	56.3%
% of expenditure on Region suppliers (FNQ)	15.10%
Indigenous Enterprises engaged	6
Social Enterprises engaged	0

Social Aspect	Target	Achieved	Maintained Since Last Report?
% of women in workforce	10%	6%	↓
% indigenous in workforce	5%	10%	↑
Hours of the Workforce vocational training placements	90,025 hours	4%	↓
Hours of the Workforce engaged in Workforce Skills Development Training.	60,016 hours	48%	↑
% of the workforce, and identify as Indigenous Persons, engaged in Workforce Skills Development Training	5%	15%	↑

7.1.1. Legacy Aspects

The Project is committed to positively contributing to communities in which it operates and creating outcomes that support community priorities. The Project will actively pursue outcomes identified as Priority Issues by the community and Cairns Regional Council. The priority issues and treatments identified included:

Priority Issues	Treatment
Health and Wellbeing	Donate resources to CRC for the development of Alley Park detailed in the Alley Park Master Plan

Recognise, encourage and respect diversity	Minimum 5% aboriginal workers within total workforce
	Minimum 5% of the workforce, and identify as Indigenous Persons, engaged in Workforce Skills Development Training
Enhance Community safety	Create safe access for residents during flood events – flood access road
Promotes healthy lifestyles	Increase active transport facilities – Shared Pathways/Cycleways

7.1.2. Community & Stakeholder Engagement

To ensure the impacts of the project on the community are appropriately managed a Community and Engagement Management Plan has been implemented on the Project. The plan aims to foster communication and co-operation with the community and stakeholders, including DTMR, Cairns Regional Council, MSF Sugar and the local community. The plan is aligned with DTMR Standard Requirements.

8. Innovations and Initiatives

The project is targeting a number of innovations and initiatives, particularly focusing on value engineering and closing the loop. These include:

- Emesh
- Glass sand bedding material
- Alternate fill materials – Recycled glass sand
- ISCA Innovation Challenges
- DTMR Waste Tracking
- Topsoil Trial
- Reuse of Street Lighting

9. Awards and Recognition

Nil to Date

10. Review and Comments

This report was reviewed by HSA Group Senior Management (Contractor) and Department of Transport and Main Roads (Client). Management & Stakeholder Review allows reviewers to take a holistic and strategic approach at the continuing suitability, adequacy and effectiveness of the projects sustainability management system and consequently the sustainability performance of the project.

Date	Reviewed by	Signature	Comments
4/5/21	Tom Ryzak Project Manager HSA Group		Summary of E2G sustainability performance to date the project team is working well to achieve & better.
09/05/21	Sumit Khadka Principal Engineer (Civil) DTMR		The project is managing items directly and indirectly related to sustainability performance well. Industry day was positively received. Great opportunity to set the standard for the local industry.
10/6/21.	Mike Tate Administrator DTMR (St. George Project Services)		The Constructor continues to seek and incorporate efficiencies into the project works to meet targets and enhance delivery.
05/07/21	~~Cameron Slack~~ Ben Carroll Environment and Sustainability Officer DTMR		Potential Mitigation measures around Noise and vibration may improve DIS 1-5 categories. Add HES Basin use as a first or mitigation enviro impacts notable activity.