Great Northern Highway Muchea to Wubin Stage 2 Upgrade: Annual Project Sustainability Report 2019

This annual report covers the period from July 2018 to June 2019. A previous annual sustainability report was prepared for the project for 2014/15, 2015/16, 2016/17 and 2017/18 financial years.

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About this Report

This report has been prepared by the Great Northern Highway Muchea to Wubin Stage 2 Upgrade (GNHM2W) (the Project) Integrated Project Team (GNH IPT) on behalf of Main Roads Western Australia (Main Roads). This report is linked to Main Roads' Annual Financial Report and Annual Sustainability Report. The content of this report has been collated and aligned with Infrastructure Sustainability Council of Australia (ISCA) Design and As Built Rating frameworks and prepared in accordance with Global Reporting Initiative (GRI) principals.

Introduction

The Project comprises a program of works to upgrade sections of the existing Great Northern Highway (GNH) to improve road safety, increase freight efficiency, improve network reliability, enhance travel wellbeing, contribute to sustainable and viable communities and enhance the environment. Sustainability has been incorporated into the Project by identifying key priority areas in safety, ecology, community and resourcing during the planning stage of the Project. This has included incorporating efficiencies into the design, developing and implementing sustainability clauses for construction contracts, trial of Aboriginal employment targets, engagement with local communities and investing in local businesses during the construction phase.

The Project is registered with ISCA as a program of works for an Infrastructure Sustainability rating (IS rating) for both the Design and As Built phases. These IS ratings will incorporate each of the individual construction contracts (also termed packages) delivered under the Project. The Project is the first registered IS rating for Main Roads that is applying the IS rating framework to 'construct only' contracts as part of an overall program of works. The targeted IS rating is 48 (commended) and Project tracking indicates that the program of works will achieve this.

An overview of the Project packages and their progress at the time of reporting is provided in Table 1 below.

Table 1 Overview of the Project Packages and their Current Progress Status

Package	Contract Number	Progress Status
New Norcia Bypass	WP06/CN01	Construction completed 2016. Final completion July 2019.
Miling Straight	WP09/CN02	Construction completed 2017. Landscaping undertaken in the 2018/19 financial year.
Pithara	CN04	Construction completed June 2019
Miling Bypass	CN05	Construction completed April 2019
Muchea North	CN03	Currently under construction.
Dalwallinu to Wubin	CN06	Construction Deferred except for Wubin Town Works.
Walebing	CN07	Construction anticipated to commence September 2019

2018/2019 Sustainability Overview

The sustainability focus for the 2018/2019 financial year has primarily been to support contractors to execute sustainability on site during construction to meet the GNH project objectives and effectively contribute to an IS As Built Rating. The GNH IPT is monitoring outcomes from the early development and trial of contractual specifications and procurement initiatives particularly around Aboriginal Participation, Buy Local, Revegetation and Rehabilitation and Sustainability Management Systems. The monitoring has included monthly reports, site visits and site audits. This was a busy year for construction with three construction contracts in execution phase – Miling Bypass, Pithara and Muchea North.

Highlights

The GNH Project is doing very well on many sustainability aspects. Key sustainable highlights for the 2018/19 year include:

T**he Project is achieving >99% non-potable water use** by using non-potable water for all layers of the road construction, where typically potable water is required and used. The water is being sourced from groundwater bores and natural soaks of varying quality and blended to match the water quality requirements for construction. This saves precious drinking water from being used for construction.

The Project is achieving >65% waste diversion from landfill by working with local landowners to utilise spoil from the project. This is over and above the waste avoidance strategies in place on the project including optimised cut/fill requirements for construction, re-using green waste on site for mulch, and leaving old road sections in place as access roads and revegetation areas.

Interpretive Panels have been installed on the rest stop on the New Norcia Bypass. The panels were developed in conjunction with the Yued Working Party, New Norcia Aboriginal Corporation and local Benedictine Community to present history of the area to travellers.

Aboriginal Participation initiatives are delivering results. This financial year Muchea North construction package has proceeded with a significant component of the works awarded to an Aboriginal owned business under an incentivised sub-contracting arrangement. The Dadaru Garli Joint Venture (DGJV) is sub contracted to the main Contractor and is responsible for the construction of works to the value of approximately $ 6.3 million. The incentivised sub contract arrangement replaces the contractual targets and incentives originally tendered on the package and is providing significantly greater economic and employment outcomes than planned.

Pithara construction package has exceeded expectations in diversity. The Main Roads Pithara Project Management Site Team tipped the balance in gender representation by comprising two out of three management roles fulfilled by women. This is further bolstered by the construction contractor exceeding contractual requirements by employing and developing two Aboriginal trainees in a supportive environment. Highway Construction/Albem Operations Joint Venture (HAJV) won an industry award for 'Team/Crew of the Year' for supportive approach of its trainees, their workforce diversity and engagement with The Yued traditional owners.[1]

The sustainability highlights are listed in Table 2 below.

[1] Nudge Training Awards - https://project.mainroads.wa.gov.au/home/Documents/Pithara%20-%20Project%20Update%20-%20December%202018.pdf

Table 2 2018/19 Sustainability Highlights for the Project

Measurement	Achievement – Project to Date
Replace 20% (as a minimum) of potable water use demand with suitable quality non-potable water sources.	>99%
Diversion of waste from landfill: • Spoil - 70-80% by volume • Inert and non-hazardous waste - 25-50% by volume • Office waste - 25-40% by volume	>65%
% Women in Main Roads Site Management Teams	38%
Aboriginal Enterprise Spend (to date – local and non-local)	$7,032,565
No. of Aboriginal development employees and apprentices on the project	7

Overview

In 2014, the Australian and Western Australian governments announced that detailed planning was underway for a $384.75 million upgrade of the 218 km section of Great Northern Highway (GNH) between Muchea and Wubin. The current budget is $385 million. An additional $29.8 million was funded separately for the New Norcia Bypass. The Great Northern Highway Muchea to Wubin Stage 2 Upgrade (GNHM2W) project is a planning, design and construction program being delivered collaboratively by an Integrated Project Team (IPT), comprised of Main Roads and industry partner, the Arup Jacobs Joint Venture (ASJV).

The Project is a program of works that has prioritised a series of road upgrade packages over a 218km stretch through the Western Australian Wheatbelt, with several of these construction packages already completed or underway. The scope of the GNHM2W includes contract packages for upgrades for New Norcia Bypass, Miling Straight, Miling Bypass, Pithara, and Walebing. Construction for Dalwallinu to Wubin has been deferred except for Wubin town works.

Key stakeholders have been identified for this project and are listed in Appendix 3 – List of Stakeholders to the project.

This program of works will improve road safety, increase freight efficiency, improve network reliability, enhance travel wellbeing, contribute to sustainable and viable communities and enhance the environment. The GNH IPT has set objectives to measure the success of the project. These are listed in Table 3 below. In delivering these objectives, the GNH IPT and construction contractors are pursuing sustainable and environmentally sensitive initiatives that achieve the best value for money and meet community expectations.

Table 3 Project Objectives

Objective	Measure
Improve road safety	Safer route that reduces the risk of death, serious injury and damage
Increase freight efficiency	Increased efficiency in terms of vehicle loads (mass and size) and reduced delays for all traffic
Improve network reliability	Improved reliability with more consistent and predictable travel times and improved network access
Enhance travel wellbeing	Improved roadside amenities for rest and driver information
Contribute to sustainable and viable communities	Balance community concerns against the economic, community safety and network access issues
Enhance the environment	Undertake practices to help retain and enhance the environmental values of roadsides

The project webpage can be found at www.m2w.com.au.

Overall approach to Sustainability

The GNH IPT has developed a sustainability strategy for the project that centres on the application of the ISCA Infrastructure Sustainability (IS) rating tool, which provides a framework for integrating sustainability across the project. The project is registered with ISCA as a program of works, for an IS rating for both Design and As Built phases. This rating will incorporate all of the individual construction packages to be delivered under the project. The Project is the first registered rating for Main Roads that is applying the IS rating framework to 'construct only' contracts as part of an overall program. The targeted rating is 48 (commended), and project tracking indicates that the program is expected to achieve this rating.

The Project's sustainability strategy recognises and aligns with the Main Roads' Sustainability Policy and the GNHM2W project objectives (Table 3 Project Objectives*)*.

The GNHM2W project objectives were used in early project planning to identify key areas of focus. From this early planning the GNH IPT developed a Sustainability Management Plan with targets and objectives mapped to GNHM2W project objectives (Table 3 Project Objectives*)*. Across program delivery, from planning through design and construction, the GNHM2W project has focussed on achieving sustainable outcomes through:

- Incorporation of efficiencies into design and material selection;
- Developing and implementing sustainability clauses for construction contracts;
- Trialling of Aboriginal employment targets;
- Engagement with local communities; and
- Investing in local businesses during the construction phase.

Design work for the program has been completed and supporting this an IS Design Rating submission has been made and is currently under review by ISCA. At the time of writing, three construction packages have been completed, a fourth construction package is open to traffic, and a fifth construction package is under construction.

Environmental Aspects Performance

At a glance

Table 4 Snapshot of the Project Environmental Aspects Performance to Date

Aspect	FY 2018/19	Total for Project
Planned native vegetation clearing (ha)	-	117.8
Actual native vegetation clearing to date (ha)	53.3	86.5
Planned rehabilitation/revegetation (ha)	-	423.61
Actual rehabilitation/revegetation to date (ha)		261.3
Environmental offset via Monetary contribution actual ($)	-	$333,372.00
Total Water Consumption to date (kL)	237,843	520,684
Total GHG emissions (scope 1 & 2) to date (t CO_2-e)	7,238	17,103
Total energy consumption to date (MJ)	102,223,052	240,742,390
Total quantity of recycled content used in project (t)	65,246	65,426
Total imported materials used in project (t)	1,040,355	2,416,281
Total waste generated by project (t)	149,044	212,505

Environmental context

The Project extends into the Western Australian (WA) Wheatbelt between Muchea and Wubin which has historically been subject to high rates of vegetation clearing, primarily for agricultural purposes. Remnant vegetation in this region is, therefore, of an elevated ecological value and the ecological communities present are protected by both State and Commonwealth legislation; the Biodiversity Conservation Act 2016 (BC Act) and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) respectively. Some clearing of this remnant vegetation has been required for the Project, however, impacts have been minimised during the planning stage. EPBC Act and BC Act listed flora and fauna species and ecological communities that will be impacted by the Project are listed in Appendix 1.

The GNH is also adjacent to a number of protected areas including State managed reserves which are listed in Appendix 2. Direct Project related impacts to these protected areas are not anticipated. Indirect Project related impacts that may occur include those due to storm water run-off, potential contamination of run-off, dust generated during construction and accidental (i.e. unplanned) clearing of vegetation within the boundary of the protected area. These potential indirect impacts are/have been considered and subsequently managed as part of the asset design (e.g. drainage design) and Project environmental management systems applied during construction.

The highway spans a number of waterways which are not expected to be impacted by Project works. Beds and Banks permits have been obtained from the Department of Water and Environmental Regulation (DWER) for areas located within proclaimed water source areas. This includes the Muchea North, Miling Straight and Pithara packages.

Environmental Management

Figure 1 Banksia menziesii.

The importance of environmental management to the Project is reflected by the Project objective of 'Enhance the Environment - Undertake practices to help retain and enhance the environmental values of roadsides'. Environment is a key component of the project delivery structure and an integral part of the design development.

The GNH IPT has been involved in driving optimal environmental outcomes through the following:

- Collaboration of all disciplines to achieve Project environmental objectives;
- Establishment of due diligence practices to ensure that ecological values were maintained throughout early works, environmental studies and geotechnical investigations;
- Identification of environmental constraints to inform route selection;
- Designing offline sections of road to reduce clearing of roadside vegetation (including protected flora and ecological communities);
- Liaison with environmental regulators and other stakeholders to inform planning inputs and management;
- Development and implementation of rehabilitation and revegetation documentation;
- Development of specifications and Environmental Management Plans for inclusion in Contract documents; and
- Establishment of a compliance advisory role within the GNH IPT to support construction through the provision of technical advice, auditing and statutory reporting.

Preliminary Environmental Impact Assessments (EIAs) have been prepared for all contract packages in the planning stages of the Project. Detailed EIAs were also completed for each contract package as detailed environmental studies were concluded. These EIAs have supported approval applications for the Project, including referrals under the EPBC Act and applications for Permits to Clear Native Vegetation (Environment Protection Act 1986 Part V).

The EIAs undertaken to support the referral under the EPBC Act of the New Norcia Bypass, Miling Straight, Muchea to Wubin and Muchea North packages are publically available via the Commonwealth Department of the Environment and Energy website - http://epbcnotices.environment.gov.au/referralslist/

Construction contractors are subject to an environmental and sustainability contractual specifications that require management measures to be undertaken to meet environmental legal obligations and implement efficiency measures to reduce energy, water, materials and waste footprints. The contractors must submit Environmental Management Plans and Sustainability Management Plans for review and approval prior to commencement of work. The Contractors are audited by GNH IPT on behalf of Main Roads to ensure compliance to the specifications and management plans. Contractors are also required to undertake weekly inspections and internally audit their performance for both environment and sustainability onsite.

Vegetation Clearing

A key environmental success of the GNHM2W project to date has been the integration and consideration of environmental values in both selecting preferred upgrade alignment options and in finalising the detailed design scope for each contract package. This has resulted in a smaller native vegetation clearing footprint for the project to date and reduced levels of impact to key biodiversity values such as Carnaby's Black Cockatoo breeding and foraging habitat, leading to more sustainable environmental outcomes.

The native vegetation clearing statistics for the Project, both for the current financial year and for the length of the Project, are listed in Table 5 below.

Table 5 Native Vegetation Clearing Statistics for the Project

Activity	Site	FY 2018/19	Total for Project
Native Vegetation Clearing (ha)	New Norcia Bypass	0.36	4.55
	Miling Straight	-	18.85
	Miling Bypass	3.58	9.48
	Pithara	0.32	4.62
	Muchea North	49	49
	Walebing	Not Started	N/A

Landscaping and Revegetation

The Project recognises the opportunity roadside verges presents in restoring habitat connectivity and ecological values, especially in areas that have been historically overcleared. The Project's landscaping and revegetation strategy has sought to enhance habitat connectivity and ecological value aligned with the Project Objective 'Undertake practices to help retain and enhance the environmental values of roadsides'. Main Roads has retained the land from old sections of GNH to incorporate into the landscaping and revegetation activities. An Ecological Impact Assessment has been undertaken using an ecological values calculator to assess the predicted enhancements in environmental values and habitat connectivity. Once revegetation and offsets have been taken into account in the design work, the project expects to achieve enhancements of 7% in environmental values and 31% in habitat connectivity. These numbers will be validated after the construction of all packages.

Landscape and revegetation designs have been prepared for each of the contract packages. The landscape and revegetation design provides species mixes (either seed and/or planting) that are unique to each contract and reflect pre-construction vegetation types and flora species and where possible pre-European vegetation types. Adjacent to areas where Threatened Ecological Communities (TEC) 'Eucalypt Woodland of the WA Wheatbelt' are present, the Project has identified an opportunity to rehabilitate vegetation with the following species mixes for these areas:

- An overstorey mix which includes *Eucalyptus kochii*, *E. erythronema*, *E. tenera*, *E. leptopoda* and *E. armillata*
- A second overstorey mix which includes *E. loxophleba* and *E. salmonophloia*

- An understorey mix which includes *Allocasuarina acutivalvis*; *Melaleuca adnata*; *M. hamata*; *Enchylaena lanata / tomentosa* complex; *Maireana brevifolia* and *Rhagodia preissii*

During this financial year, revegetation of Miling Straight has been completed and is currently underway for the Miling Bypass and Pithara packages. Revegetation has been previously completed for New Norcia Bypass.

Table 6 Landscaping and Revegetation (ha) for the Project Packages

Activity	Site	FY 2018/19	Total for Project
Landscaping and Revegetation (ha)	New Norcia Bypass	Completed	41.6
	Miling Straight	119	119
	Miling Bypass	35	35
	Pithara	65.7	65.7
	Muchea North	Not Started	N/A
	Walebing	Not Started	N/A

Environmental Offsets

The Project has identified environmental offsets for clearing on the Project. The offsets are a combination of both monetary and habitat environmental offsets. These are detailed in Table 7 below. Adaptive environmental management practices were also developed for the Walebing to Wubin and Muchea North EPBC Approvals, which ensured offset management criteria were met for the establishment of revegetated Carnaby's black cockatoo foraging habitat, and to ensure that monitoring and reassessment of the breeding success associated with the installation of artificial nesting boxes would be undertaken.

Table 7 Environmental Offsets To Date for Each of the Project Packages

Activity	Site	Environmental Offset To Date
EPBC Approval - Environmental Offsets	New Norcia Bypass	Monetary contribution to DWER - $157,263
	Miling Straight	Monetary contribution to DWER - $98,109
	Walebing to Wubin (Global approval)	Monetary contribution to DWER - $78,000
		Carnaby's black cockatoo habitat – 159 ha
		Eucalypt Woodlands threatened ecological community (TEC) - 134.1 ha
	Muchea North	Carnaby's black cockatoo Habitat – 381.34 ha (from two land purchases of 121.6 and 259.74 ha)
		Revegetation of 19.69ha of foraging and breeding habitat

Activity	Site	Environmental Offset To Date
		Carnaby's black cockatoo Nesting boxes – 39

Water Management

Managing water consumption across the program is critical, particularly due to the limited availability of potable water in the Wheatbelt region. In aligning to the GNHM2W project objective to 'contribute to sustainable and viable communities', contractors are required to scope and implement water efficiency initiatives. Contractors report monthly on their water usage, including sources of water for their contract.

To support water efficiency and use of suitable water sources during the construction phase, early water source investigation was undertaken by the GNH IPT. The investigation report which was shared with contractors as an information document to assist their own water source investigation and selection.

Water balance estimates have also been completed by GNH IPT for each contract, to establish a benchmark and reference case from which to measure contractor improvement of water use. The main water uses on the project are:

- Embankment construction
- Pavement construction; and
- Dust suppression.

The water balance calculations were provided as information to contractors to inform their water use and planning for water efficiency in the construction phase.

During construction, contractor's have sought and gained approval for a relaxation in the water quality specification from Main Roads. This has allowed contractors to utilise local non-potable water sources to create 'fit for use' water. The contractors achieved this by blending/diluting non-potable water of varying salinity levels with fresher non-potable water so that the water was at an acceptable level of salinity to be used in construction.

Muchea North are using fresh non-potable water for plumbing at the site offices, excluding drinking water which is bottled water. No scheme water is connected to the site offices.

Construction water sources and consumption for each of the packages are summarised in

Table 8 below.

Table 8 Volumes of Water Used (kilolitres, kL) by Each Package from Various Water Sources

Water Source	Package	FY 2018/19	Total for Project
Water purchased from the scheme (kL)	New Norcia Bypass	N/A	513
	Miling Straight	N/A	202
	Muchea North*	0	0
	Pithara	2019	2,379
	Miling Bypass	70	101

Water Source	Package	FY 2018/19	Total for Project
Water pumped from bores (kL)	New Norcia Bypass	N/A	82,914
	Miling Straight	N/A	144,430
	Muchea North	59,725	59,725
	Pithara	86,019	94,568
	Miling Bypass	85,255	91,954
Water pumped from rivers, lakes or harvested (kL)	New Norcia Bypass*	N/A	N/A
	Miling Straight	N/A	37,051
	Muchea North	11,807	11,807
	Pithara*	N/A	N/A
	Miling Bypass*	N/A	N/A

**Water source not utilised for this package.*

Carbon Emissions & Energy

A carbon footprint has been estimated for the project prior to construction of the packages based on the road design, materials selection and source, construction equipment emissions, vegetation clearing, road operations and maintenance over a 50 year asset life.

The GNH IPT and construction contractors have sought to reduce carbon emissions and energy use across the asset lifecycle through three key areas of focus:

1. **Increased freight efficiency through design**: Main Roads identified the need to improve the freight efficiency of the existing GNH as part of the program of works. Improving freight efficiency through road design will have the flow on effect of reducing emissions associated with freight movements for the life of the asset. The design of each Project package aims to achieve reductions in operational carbon emissions and energy use by designing for a maximum desirable grade of 3% over longer uphill distances, which improves road user fuel efficiency.

2. **Minimisation of vegetation clearing**: a significant focus on minimising vegetation clearing during the design of the Project has reduced the amount of lost carbon sink that results from vegetation removal during construction.

3. **Construction contractor initiatives**: energy reduction initiatives have been identified by contractors during the construction phase to reduce their energy footprint. These include:

    a. Reducing the impact of their materials by selecting closer sources (reduced haulage) and choosing gravel over crushed rock (lower embodied energy)

    b. Choosing work camp locations and worker transport options that reduce fuel use including work camps close to the construction site and carpooling.

    c. Choosing energy sources with less emissions such as higher quality diesel, and grid

electricity over diesel generators

d. Selecting construction methods that improves construction efficiency

At the end of construction of all of the packages, the carbon footprint will recalculated based on the energy consumed during construction, the final as built road design and traffic forecast.

The energy consumed during construction of the Project to date is summarised in Table 9.

Table 9 Energy Use by Each Package (MJ)

Source	Construction Package	FY 2018/19	Total for project
From Fuel (MJ)	New Norcia Bypass	N/A	30,056,807
	Miling Straight	N/A	89,579,638
	Pithara	36,014,147	42,749,423
	Miling Bypass	33,674,236	45,548,074
	Muchea North	32,279,018	32,279,018
From Electricity (Grid) (MJ)	New Norcia Bypass	Diesel generation (incl fuel use above)	
	Miling Straight	N/A	214,132
	Pithara	Diesel generation (incl fuel use above)	
	Miling Bypass	208,307	267,955
	Muchea North	47,344	47,344

Materials and Recycled Materials

Sourcing of construction materials is a key consideration for the Project due to the rural location of the construction sites and associated haulage distances. The use of naturally occurring and/or locally sourced materials is a key consideration in all contracts on the project.

Estimates of material use (footprint) have been developed for each package in order to guide the development of materials-saving initiatives during the detailed design and construction phases.

During design of the project, initiatives were identified to reduce the sustainability impact of the construction materials.

1. Designing the earthworks to achieve a cut to fill balance for each contract package to minimise the requirement to import fill material, and reduce the requirement to dispose of excess fill material.

2. Substituting local natural gravel in place of crushed rock. Local natural gravel has lower embodied energy than crushed rock, has less distance to travel to site than crushed rock and creates spend with local landowners.

3. Reusing old sections of GNH as local access roads, where required to maintain Shire and landowner access. This reduced the requirement for constructing new local access roads,

therefore less materials are required.

4. All green waste generated from clearing is to be mulched, stockpiled and re-used on the project for revegetation.

Contract specifications require Contractors to assess opportunities to improve their materials footprint by assessing ways to reduce materials use, select different material types and material sources, and reduce haulage of materials. An initial geotechnical report for materials available in the local area was provided to Contractors to assist in their local materials sourcing.

Construction contractors have developed initiatives to source materials locally to reduce the haulage of materials used on site. Some of these initiatives include:

1. *Pithara* – Approximately 47,000m3 of basecourse pavement material made from 50% crushed rock and 50% natural gravel. The crushed rock was sourced from the local Pithara East Gold Mine overburden stockpile. This had multiple benefits:

    - reusing waste rock;
    - local spend with the landowner and rock crushing company;
    - reduced haulage compared to the nearest rock quarry;
    - blending crushed rock with natural gravel to raise the quality of the natural gravel the right specification so that the gravel could be used in construction;
    - less natural gravel is required, therefore reduces the impact on local topography and the environment.

2. *Muchea North* – The contractor sourced recycled crushed rock and recycled fencing to build their temporary site offices.

3. *Miling Bypass* – Concrete was sourced from a local supplier to reduce haulage. The contractor's company name changed during the construction project. To avoid buying new uniforms, uniforms were re-embroidered with the new company logo.

4. *New Norcia Bypass* – Approx. 50m^{3}excess concrete was used for construction of pedestrian pathways in New Norcia town. Locally sourced embankment and fill materials reduced vehicle haulage, with 40% of gravel coming from within 3km of the site, and the remainder coming from within 15km of the site.

5. *Miling Straight* – Geogrid fabric was used as an engineering solution to unsuitable material under the road. Use of the fabric avoided excavation of 7,067m^3 material that would have been disposed of and replaced with virgin material. 36,048m^3 of unsuitable material was diverted from landfill and used to rehabilitate borrow pits on farmer's properties. The contractor was able to reuse excavated rock onsite for drainage protection. To reduce haulage, basecourse material was blended from two sources, one 3km from site with lower quality material and the other 20km from site with higher quality material.

The Project has imported a total 2,486,367t of material for construction. A breakdown of the materials are below in Table 10 Materials Use for Each of the Construction Packages by tonne.

Construction contractors have identified opportunities to import recycled materials on the Project. Two initiatives that replace 3% of virgin material with recycled materials included:

- 63,921t crushed rock sourced from the local Pithara East Gold Mine overburden stockpile.
- 1,300t recycled road base sourced from Westmore

Steel supplied as re-bar to the project was often from recycled sources.

Table 10 Materials Use for Each of the Construction Packages by tonne

Material	Construction Package	FY 2018/19	Total for Project
Sand (t)	New Norcia Bypass	N/A	381,400
	Miling Straight	N/A	232,332
	Pithara	78,860	94,457
	Miling Bypass	54,835	108,944
	Muchea North	0	0
Gravel (t)	New Norcia Bypass	N/A	145,600
	Miling Straight	N/A	534,448
	Pithara	414,270	414,270
	Miling Bypass	353,695	367,457
	Muchea North	107,514	107,514
Crushed Rock (t) (Recycled material)	New Norcia Bypass*	N/A	N/A
	Miling Straight*	N/A	N/A
	Pithara	63921	63921
	Miling Bypass*	N/A	N/A
	Muchea North	1300	1300
Aggregate (t)	New Norcia Bypass*	N/A	4,983
	Miling Straight	N/A	4,000
	Pithara	4,151	4,184
	Miling Bypass	1582	1582
	Muchea North	0	0
Asphalt	New Norcia Bypass	N/A	100
	Miling Straight*	N/A	N/A
	Pithara*	N/A	N/A
	Miling Bypass*	N/A	N/A
	Muchea North	0	0
Concrete (t)	New Norcia Bypass	N/A	2340

Material	Construction Package	FY 2018/19	Total for Project
	Miling Straight	N/A	3130
	Pithara	408	619
	Miling Bypass	1502	1666
	Muchea North	332.8	332.8
Steel (t)	New Norcia Bypass	N/A	180
	Miling Straight+	-	-
	Pithara	16	25
	Miling Bypass	64	72
	Muchea North	0	0
Precast concrete (t)	New Norcia Bypass+	-	-
	Miling Straight	-	1,963
	Pithara	397	587
	Miling Bypass	810	1297
	Muchea North	882	882
Emulsion (t)	New Norcia Bypass+	N/A	N/A
	Miling Straight	N/A	154
	Pithara	209	209
	Miling Bypass*	N/A	N/A
	Muchea North	0	0
Bitumen cutter (t)	New Norcia Bypass+	N/A	N/A
	Miling Straight	N/A	98
	Pithara	1	1
	Miling Bypass	99	99
	Muchea North	0	0
Bitumen (t)	New Norcia Bypass	N/A	479
	Miling Straight	N/A	383
	Pithara	184	184

Material	Construction Package	FY 2018/19	Total for Project
	Miling Bypass	186	186
	Muchea North	0	0
Cement Stabiliser (t)	New Norcia Bypass+	-	-
	Miling Straight+	-	-
	Pithara	2196	2196
	Miling Bypass	1,796	2,142
	Muchea North	650	650

* Material not used by the construction package
+ Due to changes in material reporting over time, data may be incomplete

Waste and Recycling

The construction contractors focused on diverting waste from landfill. The most significant waste on the construction project is spoil – material unsuitable for constructing the road or waste from old sections of GNH. Many of the initiatives identified to reduce the import of materials (as described in the previous section) have additional benefits of avoiding, reducing or re-using waste. The Project achieved 101730.36t of waste diverted from landfall this financial year. The waste data is in Table 11.

Table 11 Construction Waste Date (t)

Waste	Year to 30 June	Total for Project
Landfill (t)	4731	47371.19
Diverted from landfill (t)	101730.36	165134.33

Waste Avoidance

At the top of the waste hierarchy[2] is **Avoidance**. Avoiding generating waste is a high priority through design and construction. This was achieved on the project through the following design initiatives:

- Balancing the Project cut/fill requirements in design;
- Using geotextile fabric to stabilise unsuitable (wet) ground conditions, and allow overlying road construction (avoiding excavation and disposal of unsuitable material);
- Revegetating old sections of road by leaving the old section of road in place, ripping and seeding the surface; and
- Retaining old sections of road for Shire and landowner access

Construction waste reduction initiatives included:

- Using lunch boxes, crockery and metal utensils instead of disposable items for site offices and crib rooms;

[2] Waste hierarchy based on the WARR Act

- Electronic solutions such as using ipads and software in the field for inspections, reporting daily activities etc; and
- Re-embroidering uniforms when the company branding changed.

Waste Recovery

Next on the waste hierarchy[3] is **Recovery** including reuse, reprocessing and recycling. Recovery initiatives diverted >65% of inert material (spoil, construction and demolition, and site office waste) from landfill disposal. These initiatives included:

- Reusing green waste on site as mulch during revegetation;
- Utilising spoil to rehabilitate borrow pits and other land surfaces on local landowner properties; and
- Demolition waste eg. bricks, fencing etc, made available to the local community for reuse.

Contaminated Waste

In FY18/19, the Project generated contaminated waste while undertaking rehabilitation of contaminated sites at Muchea North. These sites were contaminated with asbestos. The asbestos was removed and disposed of appropriately.

[3] Waste hierarchy based on the WARR Act

Economic Aspects Performance

At a glance

Table 12 Economic Aspects Performance at a Glance

Economic Aspect	FY 18/19	Total for Project
Funding	-	$385m
'Buy Local' Spend (to date)	$14,109,928	$15,193,424
Aboriginal Enterprise Spend (to date – local and non-local)	$5,035,533	$7,032,565

Economic Context

The GNH is a part of the Perth to Darwin National Highway which is a major transport route from Perth to Darwin that experiences heavy usage by road freight trains, tourists and the local community. The Project alignment is 218 km in length between the towns of Muchea and Wubin, which includes the regional towns of Bindoon, New Norcia, Miling, Pithara and Dalwallinu. The upgraded road between Muchea and Wubin will provide for better network connectivity for heavy freight vehicles travelling between Perth and Darwin, as well as improved road safety for the community.

The Project delivery to date has spanned across key phases of planning (including statutory approvals), pre-construction (design, procurement, land acquisition) and construction (major and minor works, including a program of early works). Throughout these phases the Project has provided opportunities for multiple suppliers, subcontractors and businesses to be engaged in delivery, including:

- Major construction work management and delivery;
- Minor construction work management and delivery (such as fencing or service relocation);
- Supply of specialist technical services (i.e. geotechnical investigations);
- Supply of materials, plant and equipment;
- Office support services (i.e. printing, catering); and
- Construction support services (e.g. waste management).

Delivery of the main construction phases of the Project is being undertaken via the procurement and execution of individual construct only contracts using the Main Roads Major Works (AS2124) contract model. The Project is also trialling the New Engineering Contract (NEC3) on the Pithara package; the NEC3 contract model aims to promote a collaborative working approach between the Employer (Main Roads) and the contractor. This approach is traditionally limited to larger alliance style contracts, whereas in this instance smaller contractors can utilise this collaborative approach.

A Sustainable Procurement Initiative (SPI) has been established by the GNH IPT where local suppliers have been able to register their services. The GNH IPT has also been delivering a program of 'early works' managing smaller construction lead items such as service relocations, fencing and farm accommodation works. This has increased local engagement, with local contractors identified through the SPI having been invited by the GNH IPT to tender for early works scopes.

The Project has also focused on increasing engagement of Aboriginal businesses, both local and non-local. Aboriginal business spend targets have been incentivised in the Major Works contracts for each package.

Key Economic Outcomes

Key economic outcomes of the Project include:

- Upgrade to the National Highway Network;
- Improved freight efficiency (including catering for 53.5m vehicles);
- Local job creation; and
- Opportunities for local contractors and businesses.

Sustainable Procurement and Buy local

By adopting the WA Buy Local Policy (which aims to generate economic growth within WA through a requirement for government agencies to consider local content in Projects in excess of $750,000) and implementing a sustainable procurement approach through the SPI, the project has prioritised sourcing local products and services, not just from within WA, but from the local communities neighbouring the Project packages. As shown in Table 12 above, in excess of $15 million has been invested in local businesses by the Project in the 2018/19 financial year alone.

Economic Initiatives

Construction contractors are constantly encouraged to seek and propose initiatives that could have economic benefits for those communities local to the Project. These initiatives are also taken into consideration for the program's IS rating with ISCA. Contractors regularly explore new opportunities for utilising local resources such as labour, plant, and materials. Flow on benefits of local procurement initiatives include:

- Providing work opportunities to the local workforce;
- Minimising the transport overheads associated with mobilising/demobilising;
- Minimising haulage time and costs; and
- Minimising travel time for the workers and stimulating the local economies by building camps close to the project sites.

Specific examples of local business engagement/opportunities on the Project during the 2018/19 financial year include:

- The Pithara workforce was housed in a camp constructed adjacent to Pithara Tavern providing synergies the private business operating within the town;
- The Miling Bypass workforce stayed in Miling and Moora. The Miling accommodation included a Fly Camp on a local property, the Miling Hotel, and Miling Campgrounds providing multiple opportunities to benefit the local businesses;
- Use of local haulage companies;
- Use of natural gravels sourced from local landowners rather than importing crushed rock;
- Rock was purchased from a local landowner looking to rehabilitate a spoil heap at the former Pithara Gold Mine. A local company was sourced to crush the rock to the required specifications;
- Purchase of water from local landowners and licenced boreholders; and
- Muchea North site compound hardstand built from material sourced from local recycling plant.

Aboriginal Enterprise

Each of the construction contracts includes targets for Aboriginal business spend. This has helped to drive the sourcing of local labour/services. These targets aim to increase local Aboriginal business expenditure on the Project. These targets have been tailored to each contract (and their associated local communities) and have evolved based on the feedback received and lessons learnt during the execution of previous contracts.

This financial year Muchea North construction package has proceeded with a significant component of the works awarded to an Aboriginal owned business under an incentivised sub-contracting arrangement. The Dadaru Garli Joint Venture (DGJV) is sub contracted to the main Contractor and is responsible for the construction of works to the value of approximately $6.3 million. The incentivised sub contract arrangement replaces the contractual targets and incentives originally tendered on the package and is providing significantly greater economic and employment outcomes than planned.

As shown in Table 13 below, in excess of $4 million was spent on Aboriginal business services in the 2018/19 financial year.

Aboriginal Participation targets for increasing the number of local and non-local Aboriginal persons employed on the Project are discussed in further detail in the Social Aspects Performance section below.

Table 13 Aboriginal business spend

Economic Aspect	Package	FY 18/19	Total for Project
Total spent on local and non-local Aboriginal businesses	Miling Straight	N/A	$1,758,057
	Miling Bypass	$610,655	$849,630
	Muchea North	$3,667,419	$3,667,419
	Pithara	$757,458	$757,458

Climate Change Assessments

The Project undertook a climate change risk assessment during the planning phase which has been used to inform the design of each construction package. This assessment identified three key aspects of climate change considered to be high risk to the design; rising air temperatures (which may impact bitumen surface seal flushing), more frequent and/or severe fires (affecting visibility due to smoke and requires consideration of road side vegetation), and increased intensity of high rainfall events (potentially affecting surface runoff).

Key climate change adaptation measures which have subsequently been implemented on the Project are:

- Corridor wide safety improvements that will assist in reducing the risk of vehicle collisions in periods of reduced visibility due to bushfire;
- Implementation of a “clear zone” strategy which includes vegetation set-back from the road edge, improving safety in the event of a bushfire; and
- Factoring increased rainfall intensity projections due to climate change into the drainage design parameters.

Sustainable Transport

There is limited public transport and no public rail infrastructure within the Project Area. This is largely due to the remote location of the GNH. Where there are public transport facilities opportunities have been taken to increase user accessibility. This includes a regional bus parking area in Pithara and the incorporation of existing informal school bus stopping areas into the Muchea North alignment (with appropriate pull-off distances and turn-around areas where necessary). Footpaths have also been upgraded within several towns as part of the Project, and pedestrian access and a scenic outlook have been incorporated into the New Norcia Bypass package.

On the project, the construction contractors have utilised and/or upgraded local camp sites and other accommodation facilities in proximity to work sites during construction. This supports local business and increases local amenity, as well as reduces travel time/length of journey to Project sites, subsequently reducing carbon emissions. In addition, contractors have been encouraged to consider carpooling initiatives to reduce the number of vehicles travelling to site.

Social Aspects Performance

At a glance

Table 14 Social Aspects Performance at a Glance

Social Aspect	Total for Project
Lost Time Injury Frequency Rate (LTIFR)	1.47
% Aboriginal Workforce	14%
% Local Aboriginal Workforce	9%
No. of Aboriginal development employees and apprentices on the project	7
% Women gender representation	Refer to **Error! Reference source not found.**

Social context

Given the length of the Project alignment (218 km), GNH spans a number of communities and towns. These communities range from the smaller land holdings and mixed agricultural businesses surrounding Bindoon at the southern end of the alignment (approximately 60km from Perth) to communities surrounded by broadacre pastoral and cropping properties at the northern end of the alignment. The Project area extends across five Local Governments; Shire of Chittering, Shire of Moora, Shire of Gingin, Shire of Victoria Plains and Shire of Dalwallinu. The various communities within the vicinity of the Project area vary greatly with regard to employment opportunities, community demographic, type of work found locally, concern for the environment and desire to upgrade the GNH. An indicative list of community stakeholders in provided in Appendix 3.

Common concerns raised by Project stakeholders to date include:

- Consideration of environmental impacts such as noise, light, water runoff and vegetation clearing;
- Consideration of social impacts due to land acquisition and property severance;
- Potential Local Government road maintenance costs;
- Potential ongoing viability of towns that may be bypassed; and
- Opportunities for local and Aboriginal employment on the Project packages.

The communities have a good understanding of the potential benefits of the highway construction; however, as individuals, they are challenged with balancing the potential impacts to their property and lifestyle with the wider community benefits of improved road safety and freight efficiency.

Community & Stakeholder Engagement

Consultation and stakeholder engagement is vital to all public infrastructure projects. As such, early consultation was undertaken for the Project with a number of stakeholders to obtain input and feedback to inform the initial corridor alignment review and planning activities. The purpose of many of the early consultation activities was to identify issues of importance to the community and other stakeholders.

A Project wide communication and stakeholder management strategy has been implemented. This identifies key stakeholders and communication strategies, as well as mitigation strategies for stakeholder risk. In addition to a regularly updated webpage (available at: https://project.mainroads.wa.gov.au/home/gnhmucheatowubin/Pages/about.aspx) detailing key project objectives, milestones and progress, regular updates are provided to different communities along the alignment through development of brochures, council meetings, and targeted stakeholder meetings.

The type of engagement processes has evolved significantly over the length of the Project as different construction packages have progressed from concept, to design, to construction and ultimately to completion and handover. Accordingly, different community groups across the length of the Project area have widely different expectations for communications depending on the status of the road upgrades in the vicinity of their communities.

Addressing community concerns

During the design of the road for each of the packages, the GNH IPT worked closely with the local communities to understand their concerns and listen to their ideas. The GNH IPT has collaborated with the local community and the shires, to identify opportunities for improving town infrastructure, including additional roads, footpaths, community parks and other facilities being proposed and upgraded.

As an example, the completion of the New Norcia Bypass has resulted in significant improvements to the community of New Norcia through the reduction of noise, vibration and visual impact of the heavy vehicles passing through the monastic centre. The new lookout area, complete with interpretation panels, provides a stunning view for tourists and local residents.

Issues raised by the community and stakeholders have been considered as part of the design process. A key concern raised by the communities adjacent to the Project area was the continued viable access to the GNH by the community, which has been addressed by careful consideration of the placement of intersections and driveways along the alignment to facilitate ongoing farm vehicle and stock movements. Other impacts which were considered in planning and design include reducing the number and impacts of land severance, accommodation works undertaken to replace affected infrastructure, protection or replacement of government and privately owned utilities and services, and planning for changes of access to properties and towns. Ongoing liaison continues with all stakeholders (landowners, local shires, government agencies) to make sure that individual impacts are minimised during design and construction.

Heritage

The GNH IPT has engaged with the Whadjuk and Yued Traditional Owners through the South West Aboriginal Land and Sea Council (SWALSC) coordinated claimant group meetings throughout the Project. Topics discussed at these meetings and engagement sessions reflect common issues raised by the traditional owners for development projects, including:

- The preservation of documented heritage sites;
- Opportunities for indigenous advancement through contracting and work opportunities;
- Participation in heritage studies;
- Section 18 approvals process/progress; and
- Project updates and progress reports.

The New Norcia Bypass bridge name, Mourin Bwoora, was endorsed by the Yued Working Party after a period of engagement in December 2016. Consultation has also been undertaken with the Yued Working Party and New Norcia Aboriginal Corporation regarding the development of interpretation panels at the New Norcia Bypass scenic lookout. These panels have since been finalised and installed.

Heritage sites in and around Miling and Pithara townships were identified prior to construction. These sites were demarcated as no-go zones during construction. Historical buildings that were potentially affected had dilapidation surveys conducted prior to the commencement of works to establish a baseline condition for the buildings.

An Aboriginal Heritage Management Plan has been established to streamline the engagement of heritage monitors during construction of the Walebing package (for ground disturbing activities in proximity to the Walebing Reserve).

Road Safety

Safety in Design

Road safety is a key part of the Project as reflected by the Project objective to 'Improve road safety'. Improving road safety has been an integral part of the planning and design phase, and a number of strategies and design approaches impacting road safety have been developed across the Project. These include:

- Safety in Design workshops - these are held for each contract package at three stages of the design phase (15%, 85% and 100%);
- Constructability workshops – these are held for each package to consider constructability aspects and potential design optimisation; and
- Road Safety Audits – these are undertaken at 15%, 85% and post construction and are a requirement for each package.

The specific safety design elements that have been adopted across the Project include:

- Alignment improvements;
- Wide centreline treatment;
- Truck stopping bays/rest areas;
- Overtaking lanes;
- Pavement marking;
- Access to properties adjacent to GNH; and
- Stock crossings of GNH.

Workforce Safety

The Project has a Health Safety and Environmental (HSE) Management Plan (MP) that applies to all activities and staff (including GNH IPT, contractors, sub-contractors etc.) involved in Project delivery. Some of the key requirements of the HSE MP are that all parties have a designated project HSE representative, that weekly toolbox talks are held on safety, that regular safety forums are held (approximately every 6 months), and that Leadership Safety Walks are undertaken to observe safe behaviours and encourage safety conversations. In addition, the HSE MP stipulates the need for a HSE audit schedule and details the incident management framework.

All members of the GNH IPT are represented and supported by formal health and safety committees through their respective parent organisations. Safety during construction works is managed by the construction contractor in accordance with the applicable Main Roads Major Works (AS2124 or NEC3) contract. This includes traffic management. Safety Stand-downs have also been held with the

superintendents' and project manager's teams to raise overall awareness of safety on-site.

Driving is one of the most critical risks on the project and the GNH IPT have implemented procedures to ensure the safety of Project personnel whilst driving to/from site and whilst driving onsite. Specifically:

- A project induction package for the GNH IPT is in use and construction contractors have developed site specific induction packages
- The 'Step Back' tool has been introduced to the GNH IPT for use on site for personal risk assessments.
- All journey management plans (JMPs) for GNH IPT staff must be reviewed by the GNH IPT Management;
- To combat driver fatigue there must be a minimum of two drivers for each vehicle; and
- Drivers must have emergency communication devices (e.g. satellite and Telstra phones).

Community Amenity

A Project wide strategy was developed to incorporate aspects of community amenity such as providing rest areas and landscape designs which provide nature surveillance/lookouts, enhance the local landscape and providing inviting stopping/rest areas. As mentioned above in 'Heritage' (Economic Aspects Performance section), a scenic lookout was designed in consultation with the Yued Working Party for the New Norcia Bypass which provides views of the town of New Norcia and features interpretation panels. This area provides amenity through parking for light vehicles, benches/seating and information on the town's European and Aboriginal history.

During bushfire season, the construction contractors have been able to assist with bushfire emergency response in areas adjacent to the project area by using their water trucks to supply water to fire trucks and firefighting units controlling bushfires.

The Pithara construction contractor workforce was housed in facilities constructed adjacent to the existing Pithara Tavern. To accommodate the workers camp and site office, upgrades were made to the existing sewage system of the tavern to prevent overflow or disruption to the existing facilities. These upgrades serve to enhance the ongoing amenity of the existing facility.

The Pithara construction contractor ran a simulated emergency response exercise with the local fire, ambulance and police, most of which were volunteers. The simulated incident involved a loader driving into a public vehicle with four causalities requiring attention. The exercise took over an hour to cut the doors and roof of the vehicle and extract the "injured". The exercise was a great community event and was followed by a classic Aussie BBQ.

Diversity

The GNH IPT has committed to promoting workforce diversity across the Project. Two focus areas include increasing opportunities for Aboriginal people (both local and non-local), and for increasing gender representation for women.

Aboriginal Participation

Employment targets and incentives for construction contractors were developed in the early planning phase for each package to ensure Aboriginal workers and trainees were hired and retained on the Project. These were developed in collaboration with not for profit, purpose charity Nudge to identify the skill base available in the local community. This approach has been progressively implemented over the length of the Project; incorporating learnings from earlier contracts.

Muchea North have engaged Dadaru Garli Joint Venture (DGJV) as an incentivised sub contract to the main contractor. This arrangement replaced the contractual targets and incentives originally tendered for employment of local and non-local Aboriginal people. This arrangement is providing far greater employment opportunities than expected.

The Miling Bypass contractor held a NAIDOC week BBQ, an indigenous food feast, in July 2018 to celebrate NAIDOC week and raise cultural awareness with the work crew.

Specific employment statistics for each package for the 2018/19 financial year are shown in Table 15 below.

Table 15Project Workforce Statistics – Aboriginal Participation

Activity	Site	Total for Project (%)
% Aboriginal Workforce	Muchea North	23%
	Miling Straight	14%
	Miling Bypass	16%
	Pithara	11%
	New Norcia Bypass	9%
% Local Aboriginal Workforce	Muchea North	13%
	Miling Straight	6%
	Miling Bypass	11%
	Pithara	7%
	New Norcia Bypass	3%

Gender Diversity

Indicatively, Engineers Australia have measured the industry norm for women's gender representation as only 12%[4]. Women's gender representation has varied across the various stages of the program cycle and within individual packages on the Project. Table 16**Error! Reference source not found.**below breaks down the different teams and % gender diversity by stage and package.

Over the life of the Project (Planning, Design, Construction Execution), the GNH IPT has consistently performed well on gender balance within the team.

The representation of women in management/senior positions, while better than the industry benchmark, is still far from desired. The construction workforce is lagging in gender diversity.

An outstanding achievement for the Project was the Main Roads Pithara Project Management Site Team, achieving two out of three management roles fulfilled by women (Figure 2).

[4] *Diversity in Engineering: 12% of women is not enough*. Engineering Australia (2019). https://www.engineersaustralia.org.au/News/diversity-engineering-12-women-not-enough

Table 16 Project Workforce Gender Diversity Statistics

Measure	Site	Total for Project
% Women in Construction Workforce	New Norcia Bypass	8%
	Miling Straight	10%
	Muchea North	11%
	Miling Bypass	6%
	Pithara	9%
% Women in Main Roads Site Management Teams	New Norcia Bypass+	-
	Miling Straight+	-
	Muchea North	33%
	Miling Bypass	20%
	Pithara	60%
% Women in GNH IPT (Planning, Design and Construction Execution)	GNH IPT	34%
% Women in management / senior positions	GNH IPT	16%

+ Data not collected.

Figure 2 Main Roads Pithara Project Management Site Team: from left – Emma Shore – Project Manager Delegate, Eric Cragan – Surveillance Officer, Ruwani Tennakoon – Quality Management Representative.

Workforce Development

All employees within the GNH IPT are part of the larger organisations of Main Roads, Jacobs or Arup. Through their respective home companies, 100% of personnel engaged in the GNH IPT have access to career development pathways, appraisals and training opportunities. In addition, training has been provided for specific Project requirements (i.e. first aid course, 4WD course and NEC3 contract training).

Muchea North, Miling Bypass and Pithara contractors have incorporated training programs to provide work opportunities to local Aboriginals new to the workforce. These training programs are being delivered with the support of organisations such as Nudge and Midwest Training Group. The program participants are mentored and supported by colleagues on the project, as well as the support organisations.

Table 17 Workforce Development Statistics

Activity	Site	Total for Project
Number Aboriginal Trainees	Muchea North	2
	Miling Bypass	2
	Pithara	2
	GNH IPT	1

Nudge Training Award – Team of the Year

In 2018, Nudge launched the inaugural Nudge Training Awards which are designed to acknowledge, recognise and celebrate the efforts and commitment of trainees and employers training. Highway Construction ALBEM Joint Venture (HAJV), construction contractor for the Pithara package, were awarded 'Team of the Year' in November 2018 as recognition of their commitment and focus to Aboriginal training and employment through their supportive approach toward trainees, their workforce diversity, and their engagement with the Yued Traditional Owners as part of the GNH Project. This is a significant achievement and recognition for HAJV and for the Project.

Figure 3 Pithara Trainees and HAJV at Nudge Awards

Appendix 1 - Protected fauna and flora species and habitat

- Barracca Nature Reserve (A Class reserve managed by the Department of Parks and Wildlife);
- Reserve 209 (C Class reserve managed by the Shire of Chittering);
- Nugadong Nature Reserve (A Class reserve managed by the Department of Parks and Wildlife);
- Buntine-Marchagee Recovery Catchment (not formally protected);
- Crown Reserves 248, 24671 and 17262 (C Class reserve managed by the Department of Water);
- Nugadong Nature Reserve (Class A);
- Crown Reserve 248;
- Crown Reserve 4484;
- Crown Reserves 24671 and 17262.

Appendix 2 - List of Protected Areas Project interfaces with:

Protected fauna species and habitat:

- Carnaby's Black Cockatoo breeding and foraging habitat;

- Forest Red-tailed Black Cockatoo foraging habitat;

Protected flora species and habitat:

- *Acacia isoneura* subsp. *nimia* (P3);

- *Acacia scalena* (P3);

- *Chamelaucium* sp. Wongan Hills (P3);

- *Frankenia glomerata* (P3);

- *Grevillea asparagoides* (P3);

- *Stylidium squamellosum* (P2);

- *Acacia drummondii* subsp. *affinis* (P3);

- *Verticordia serrata* var. *linearis* (P3);

- *Verticordia lindleyi* subsp. *lindleyi* (P4);

- *Acacia drummondii* subsp. *affinis* (P3);

- *Eucalyptus caesia* (Caesia) (P4);

- *Haemodorum loratum* (P3);

- *Eremophila pinnatifida* (Critically Endangered)*;*

- *Acacia isoneura* subsp. *nimia* (P3);

- *Chamelaucium* sp. Wongan Hills (P3);

- *Chamelaucium* sp. Wongan Hills (P3);

- *Chamelaucium* sp. Wongan Hills (P3);

- *Frankenia glomerata* (P3);

- *Grevillea asparagoides* (P3)

- Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (Critically Endangered).

- Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Critically Endangered)

Appendix 3 – List of Stakeholders to the project

Great Northern Highway Upgrade Project: Stakeholder List	
Minister for Transport, Western Australia	• Through Strategy and Communications Directorate
Main Roads Western Australia	• Commissioner • Infrastructure Delivery Directorate • Strategy and Communications Directorate • Planning and Technical Services • Heavy Vehicle Operations • Property Management Branch • Wheatbelt Region • Mid West – Gascoyne Region
State and Federal Elected Members	• Agricultural Region of the WA Legislative Council • WA Legislative Assembly –Moore • Federal Electorate of Durack • Federal Electorate of Pearce
Local Governments (CEOs and Presidents) and Associations	• Shire of Chittering • Shire of Gingin • Shire of Dalwallinu • Shire of Moora • Shire of Victoria Plains • WALGA Avon-Midland Country Zone
Local Environmental Advocacy Groups	• Chittering Landcare Group • Wildflower Association
Transport Industry	• Heavy Vehicle Liaison Group • Western Roads Federation • Arc Infrastructure • Selective Individual Transport companies
Landowners	• Directly and indirectly affected
Community Groups	• Bindoon Bypass Reference Group • Wheatbelt Development Commission • Chittering Tourist Association • Safe Roads Committee
Selective Major Businesses	• CBH • Feedlots • Higher intensity agriculture

Great Northern Highway Upgrade Project: Stakeholder List	
State Government Agencies	• Department of Planning/WAPC • Department of Water and Environmental Regulation • Environmental Protection Authority • Department of Primary Industries and Regional Development • Public Transport Authority
Federal Government Agencies	• Department of Infrastructure, Regional Development and Cities • Department of Industry, Innovation and Science • Department of Environment and Energy
Traditional Owners	• SWALSC • Yued Working Group
Emergency Response Agencies	• Council Emergency Management Groups • Police • Department of Fire and Emergency Services/Bushfire Control • Ambulance
Construction Companies	• Various