



MORANBAH SOUTH
MORANBAH

REPORT
FOR
DA - ESD

THE MAC

Client

EMF GRIFFITHS
Sustainability Consultants

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 29 / 5 / 12

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EMF GRIFFITHS – SUSTAINABILITY CONSULTANTS

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Moranbah South
DA ESD Report –Issue C
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EMF GRIFFITHS – SUSTAINABILITY CONSULTANTS

EXECUTIVE SUMMARY

The MAC, Australia's largest owner/operator of remote area mining accommodation services proposes to develop an accommodation village approximately 2km south of Moranbah Village in Moranbah. The site is approximately 50ha and is bound by Goonyella Road and Moranbah Railway Station Road. The village will consist of 3600 accommodation rooms and a vast array of community facilities including a gymnasium, pools, sport courts, tavern, training and conference facilities, active path networks and BBQ facilities.

The development is subject to planning assessment by the Urban Land Development Authority (ULDA). When undertaking assessment activities, the ULDA is guided by their ULDA Guideline no. 14: **Environment and Natural Resources Sustainability Guideline**, which goes beyond ecological sustainability and considers energy efficiency, climate change and urban design.

This report demonstrates the proposed development complies with and exceeds these principles by delivering measurable outcomes in the six key sustainability elements.

As shown in **Table 1**, the proposed design meets 70% of the all ULDA sustainability initiatives specified in the guidelines.

Sustainability Score* (%)	ULDA Key Sustainability Elements						Overall Score
	Ecological Processes & Natural Systems	Wetlands & Waterways	Climate Change	Pollution	Energy & Water	Materials & Waste	
% met	70%	100%	60%	100%	50%	40%	70%
% met and partially met	100%	100%	90%	100%	100%	90%	95%

*Expressed as proportion of ULDA initiatives detailed in ULDA Draft Guideline no. 14: Environment and Natural Resources Sustainability Guideline.

Table 1: Compliance with ULDA Sustainability Initiatives

Furthermore, the proposed design meets or partially meets 95% of those initiatives. That is to say, the proposal comprehensively addresses the majority of the specified sustainability outcomes for each principle and in particular cases the outcomes exceed the Guideline's Requirements.

This development substantially adopts the goals identified by the ULDA and is consistent with its vision of sustainable communities.

Moreover the Development is targeting a 'good' rating under the Infrastructure Sustainability Rating Framework of the Australian Green Infrastructure Council.

In the areas below the proposed development design has been shown to exceed the requirements of the ULDA sustainability policy in the following areas:-

- **Material & Waste:** Use of modular units has significantly reduced the overall volume of construction waste.
- **Community recreation:** the extent of public and private recreation spaces is considered to exceed normal standards, and includes accessible open space.
- **Urban design and sense of place:** the proposal is considered to exceed requirements for design.

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The feature sustainability metrics for the proposed development are detailed in **Table 2**. Compliance elements that exceed the requirements have been highlighted. **Tables 3 to 8** summarise the compliance of the proposed design with each of the sustainability criteria of the Guideline no. 14: **Environment and Natural Resources Sustainability Guideline**

Element	Principle	Compliance
Ecological Processes & Natural Systems	• Minimise impacts on remnant and high value regrowth vegetation and significant biodiversity values. • Maximise ecological connectivity. • Avoid impacts on threatened and priority species. • Implement sustainable landscaping practices. • Manage pest plants and animals. • Minimise bush fire risk.	• Introduction of extensive landscaping area providing habitats and biodiversity where none exist at present. • Drought tolerant and native plant species are to be used.
Wetlands & Waterways	• Wetland protection. • Waterway protection. • Discharges to wetlands and waterways. • Erosion and Sediment Control.	• An integrated water management strategy will be implemented.
Climate Change	• Minimise climate change impacts on community • Minimise greenhouse gas emissions	• Passive Energy Efficient design.
Pollution	• Avoid impacts on human health from site contamination. • Avoid impacts of hazardous materials on the community and the environment. • Avoid impacts from erosion and sediment laden waters during construction and operation. • Avoid noise related impacts on communities and the environment. • Avoid air quality related impacts on communities and the environment. • Avoid impacts of light pollution on the environment.	• Sediment and erosion control plan to be implemented. • The development will minimise, in construction and operation the noise leaving the site. • The development will minimise, in construction and operation the dust leaving the site. • The development will minimise, in construction and operation light pollution and all other emissions leaving the site. Efficient lighting and services design with minimal light spill
Energy & Water	• Minimise Water Use. • Maximise recycling and reuse of water. • Minimise energy in construction and operation of the development. • Reduce heat island effects.	• Site will utilise available purple pipe reused water supply for WC flushing and irrigation requirements. • Use of modular construction and pre-fabricated architectural elements significantly reduces energy required at the site. • Extensive landscaping throughout the site minimise heat island effects. • Air Conditioning units to comply with NCC 2012 - 2015 performance requirements for Energy Efficiency Ratios for packaged air conditioning equipment.
Materials & Waste	• Incorporate sustainable building materials • Minimise waste during construction	• Minimal on site construction waste generated. (exceeds requirements) • Design for dematerialisation through self surfaced finishes. • Design for disassembly using modular construction

→ be a minimum 3 stars under MEPS rating 17

Table 2: Key ULDA sustainability principles and key development performance metrics.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			
		Yes	Partially	No	
Minimise impacts on remnant and high value regrowth vegetation and significant biodiversity values. Significant biodiversity values include (but are not limited to): • endangered regional ecosystems • identified and potential threatened species • habitat areas of high and general • ecological significance (DERM mapping) • areas of state and regional • significance (DERM biodiversity planning mapping) • areas of local significance (local government mapping) • regional corridors (DERM mapping)	Identify significant biodiversity values by robust field surveys (appropriately timed and conducted for expected biodiversity) and desk-top assessments using local (if available), state and national environment databases.			✓	
	Avoid or minimise clearing of remnant and high value regrowth vegetation.	✓			
	Avoid or minimise impacts on significant biodiversity values.	✓			
	Provide adequate buffers between development and significant biodiversity values.	✓			
	Offset clearing of remnant vegetation.	✓✓			
Maximise retention of existing habitat trees in landscaping and parks and, where appropriate, ensure that they are not isolated from adjacent suitable habitat.	Maximise retention of existing habitat trees in landscaping and parks and, where appropriate, ensure that they are not isolated from adjacent suitable habitat.	✓			
Maximise ecological connectivity.	Identify priority vegetation patches in and beyond the UDA.		✓		
Avoid impacts on threatened and priority species.	Retain vegetation connections between priority vegetation patches (as functioning wildlife corridors e.g. minimum 200m for major corridors) to provide ecological connectivity.	✓			
	Rehabilitate and revegetate areas to improve or create by functioning corridors (where appropriate.)	✓✓			
	Identify habitat for threatened species under federal and state legislation or significant species recognised at the local level.		✓		
	Avoid impacts on habitat for threatened or significant species	✓			
	Rehabilitate habitat for threatened or significant species and implement strategies targeting management of these species		✓		
Implement sustainable landscaping practices.	Incorporate biodiversity friendly urban design principles and practices such as retaining habitat trees in streets and parks	✓✓			
Manage pest plants and animals.	Implement pest plant and animal management strategies consistent with state legislation and local government requirements	✓			
Minimise bush fire risk.	Protect significant biodiversity values from risk of bushfire	✓			

Table 3: Ecological Processes & Natural Systems (✓✓ = exceeds requirement)

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			
		Yes	Partially	No	
Wetland protection.	Identify wetlands of high ecological significance and referable wetlands.	✓			
	Avoid or minimise impacts on wetlands i.e. avoid clearing remnant vegetation adjacent to wetlands.	✓			
	Provide adequate buffers between development and wetlands that are in an adjacent to the UDA.	✓			
	Recommended buffers • minimum 50 m from wetland boundary (DERM wetland SPP) where surrounding land is largely cleared • minimum 100 m where land surrounding the wetlands is vegetated				
Waterway protection.	Identify waterways	✓			
	Provide adequate buffers between development and waterways to provide waterway protection.	✓			
	Identify waterways to be used as wildlife corridors and provide vegetated setbacks to deliver both corridor and waterway protection functions (see buffers for wetlands.)	✓			
	Minimise disturbance to natural drainage	✓			
Discharges to wetlands and waterways.	Ensure water discharge to onsite and adjacent wetlands and waterways (freshwater, estuarine and marine) meets water quality standards under Queensland environment legislation.	✓			
	Identify acid sulfate soils in coastal lowlands and appropriately manage soil disturbance to avoid acid leachate entering adjacent wetlands.		✓		
	Identify nutrient hazard areas and appropriately manage soil disturbance to avoid or minimise nutrient mobilisation that may increase the risk of coastal algal blooms.	✓			
	Avoid or minimise waste water discharge from the site in accordance with a waste water management plan prepared by a suitably qualified person.	✓			
Erosion and Sediment Control.	Avoid areas with highly permeable soils or a high water table when locating waste disposal activities or facilities.		✓		
	Minimise erosion risk and ensure development is guided by an approved sediment and erosion control plan that demonstrates release of sediment laden water from the site is avoided during construction and operation phases.	✓			
	To minimise erosion risk, development plans should demonstrate that land is suitable for its intended purpose or demonstrate that the land can be managed or treated to make it suitable for its intended purpose. Issues may include dispersive soils, subsidence, tunnel erosion, load bearing capacity, soil reactivity and bulk earthwork operations.				
	Incorporate storm water flow control measures to manage frequent flows and peak flows.	✓			

Table 4: Wetlands & Waterways (✓✓ = exceeds requirement)

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Strategy	Sustainability Criteria	Assessment		
		Yes	Partially	No
Minimise climate change impacts on community	Locate and design infrastructure with regard to predicted sea level Rise.			✓
	Incorporate design and construction elements that are responsive to changing climate that is likely to cause more intense storms, stronger winds, higher temperatures and sea level rise.		✓	
	Retain and improve the extent of native vegetation and address other heat island management strategies in precinct and building design and construction.		✓	
	Adopt subdivision and lot layouts that optimise solar orientation and natural ventilation.		✓	
Minimise climate change impacts on community	Maximise public and active transport use.	✓		
	Use building design that encourages energy, water and materials conservation elements.	✓		
	Comply with the Queensland Building Code in relation to energy Efficiency.	✓		
	Use local and renewable energy where economically feasible, including but not limited to, solar hot water and heat pumps.	✓		
	Promote public transport systems that reduce dependence on private motor vehicles.	✓		

Table 5: Climate Change (✓✓ = exceeds requirement)

EMF GRIFFITHS – SUSTAINABILITY CONSULTANTS

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)		
		Yes	Partially	No
Avoid impacts on human health from site contamination.	Investigate and remediate contaminated land to ensure the site is fit for purpose. Site contamination will be identified and assessed when considering land uses and precinct design. This applies specifically to land that is subject to notifiable activities or is listed on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR).	✓		
Avoid impacts of hazardous materials on the community and the environment.	Manage sensitive land uses in relation to hazardous industries according to acceptable standards.	✓		
	Demonstrate the health and wellbeing of people in the encroaching communities is not adversely affected by adjacent industrial uses, if development is located closer than distances recommended in the state planning policy.	✓		
Avoid impacts from erosion and sediment laden waters during construction and operation.	Be based on an approved sediment and erosion control plan that demonstrates release of sediment laden water from the site is avoided during the construction and operation phases. The sediment and erosion control plan will be in accordance with current best practice relevant to the region to minimise the risk of harm to environmental values of receiving waters. The plan should focus on controlling erosion rather than managing sediments resulting from avoidable erosion. The construction phase of development where sediment and erosion control are relevant includes: - Civil works such as cutting and filling, vegetation clearing, road construction, stormwater works etc, and - Built form phase works involving construction of buildings on specific lots	✓		
Avoid noise related impacts on communities and the environment.	Manage sensitive land uses according to acceptable standards.	✓		
Avoid air quality related impacts on communities and the environment.	Manage land uses that may have an adverse air quality impact on development through appropriate site planning and design and according to acceptable standards.	✓		
	Avoid or limit exposure and risk (to an accepted standard) associated with air pollutants that could have a potentially adverse effect on human health and adversely affect public amenity.	✓		
Avoid impacts of light pollution on the environment	Ensure air quality standards are met.	✓		
	Consider the impacts of light pollution through land use and urban design.	✓		
	Avoid lighting near ecologically sensitive areas or locate and orient lighting to minimise negative impacts on flora and fauna	✓		
	Ensure vertical illumination from permanent lighting measured at the boundary of an ecologically sensitive area is less than 1 lux.	✓		

Table 6: Pollution (✓ = exceeds requirement)

EMF GRIFFITHS – SUSTAINABILITY CONSULTANTS

Strategy	Sustainability Criteria	Assessment (does the development meet the criteria)			
		Yes	Partially	No	
Minimise Water Use.	Work with partners to implement Total Water Cycle Management to ensure the most effective and efficient use of water.		✓		
	Install smart water meters in highly visible and frequently used areas.		✓		
	Adopt demand management options like incorporating water efficient appliances and fittings into the design (minimum 4 star WELS rating.)	✓			
	Implement current best practice Water Sensitive Urban Design (WSUD) principles for Queensland. Consider implementing water reuse measures like rainwater and stormwater harvesting for reuse on gardens or in toilet and laundries. Consider implementing water recycling measures like home grey water or treated water from off site sources such as treatment plants or sewer mining for toilets and laundry or landscaping and parks.	✓			
Maximise recycling and reuse of water.					
Minimise energy in construction and operation of the development.	<i>Exceed</i> Comply with the Queensland Building Code in relation to energy efficiency (6 star rated dwellings.)	✓✓			
	Ways of complying with the code include (but are not limited to) the following: • Maximise the passive thermal design of buildings to minimise use of artificial heating and cooling systems. • Incorporate energy efficient plant and equipment (ensure appliances are rated at the highest relevant National Minimum Energy Performance Standards (MEPS.) • Use gas, solar or heat pump hot water systems as standard with insulated pipes. • Centrally locate internal services such as water where possible. • Maximise the use of natural light and energy efficient lighting. • Promote renewable energy and local or on-site energy generation. • Implement demand management strategies to reduce energy consumption. • Consider construction and fit out materials with low embodied energy.				
	-Meet or exceed the regulated energy efficiency requirements for Queensland at the time of the development proposal	✓			
	Install smart meters to monitor lighting, heating / ventilation and air conditioning systems and large electrical systems. Meters should be in highly visible areas and should show current period and previous energy use and costs.		✓		
Reduce heat island effects.	Use heat island reduction strategies to minimise urban ambient temperature increases. Heat island reduction strategies include: • Retaining existing vegetation and/or increasing vegetation area throughout the development. • Including street trees and pocket parks and promoting garden vegetation to provide shading to buildings and pavements. • Using building materials (particularly for roofs and pavements) with high reflectance and emissivity to reduce solar radiation absorption.		✓		

Table 7: Energy & Water (✓✓ = exceeds requirement)

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Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)		
		Yes	Partially	No
Incorporate sustainable building materials	Use standardised materials.	✓✓		
	Use materials from sustainable and renewable resources e.g. timber from sustainable forestry operations.		✓	
	Use locally available materials where possible.		✓	
	Use materials manufactured in an environmentally responsible Manner.		✓	
	Use non toxic and low emission products.		✓	
Minimise waste during construction	Implement a waste management plan covering construction, operation and demolition.	✓		
	Reduce waste to landfill to address Toward Q2 Carbon Target.	✓		
	Demonstrate the efficient use of resources by reusing existing materials and using materials that minimise the development carbon footprint.			✓

Table 8: Materials and Waste (✓✓ = exceeds requirement)

SECTION 1 INTRODUCTION

EMF Griffiths have been engaged by The Mac to assess the sustainability credentials of their proposed development at Moranbah South. The purpose of this report is to demonstrate how the proposal complies with the Guideline no. 14: *Environment and Natural Resources Sustainability Guideline*

This report will illustrate the project's compliance with the criteria noted in the UDLA Requirements of the Draft Guideline and will focus on the specific measures that contribute to a sustainable development.

1.1 DEVELOPMENT DESCRIPTION

The development proposal comprises 3675 Units and supporting community facilities including a gymnasium, pools, sport courts, tavern, training and conference facilities, active path networks and BBQ facilities. 2663 car parking spaces are distributed around the site in several car parks.

The proposed scheme contains a mix of single storey and two storey blocks of modular construction containing the accommodation units. A broad landscaped boulevard runs through the site as an avenue for connectivity between the unit blocks and central facilities.

Figure 1 below illustrates the proposed site plan.





SECTION 2 COMPLIANCE WITH ULDA

2.1 THE ULDA

The Urban Land Development Authority was "established in 2007 as part of the Queensland Housing Affordability Strategy with the specific purposes of facilitating the provision of a range of housing options to address diverse community need and to facilitate planning principles that promote ecological sustainability and best practice urban design." (ULDA Guideline No.1, March 2010.)

The *Urban Land Development Authority Act 2007* defines ecological sustainability as a balance that integrates:-

- (i) Protection of ecological process and natural systems at local, regional, State and wider levels;
- (ii) Economic development; and
- (iii) Maintenance of the cultural, economic, physical and social wellbeing of people and communities.

The Act outlines the core functions of the ULDA as being to facilitate, among other things "planning principles that give effect to ecological sustainability and best practice urban design".

2.3 ULDA SUSTAINABILITY CRITERIA

This section of the report will explore the key environmental sustainability strategies outlined by the ULDA's Draft Policy, and details the extent to which the proposed development complies with the specific measures in the Guideline no. 14: *Environment and Natural Resources Sustainability Guideline*.

ELEMENT: ECOLOGICAL PROCESSES & NATURAL SYSTEMS

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Minimise impacts on remnant and high value regrowth vegetation and significant biodiversity values.	Identify significant biodiversity values by robust field surveys (appropriately timed and conducted for expected biodiversity) and desk-top assessments using local (if available), state and national environment databases.		✓		Moranbah Urban Development Area, Development Scheme constraints map indicates the site does not contain remnant vegetation containing threatened species nor is it in area of high value regrowth. LEGEND: - UDA Boundary - Groves Creek - Gully / Drain (CERMA) - Q100 flood affected land - Pitstop - Danger Zone - Railway line 100m railway buffer - Mineral Development Licences - Electricity & Water Pipeline easements 20m easement buffers - Anticipated all rights impacts (within 100m to 500m) from the approved Coral Ridge Mine project, at year 20 of mine operation - Sewage Treatment Plant (STP) 300m STP Buffer - Water Treatment Plant (WTP) - New Zone Substations - High value regrowth vegetation containing endangered regional ecosystems - Remnant vegetation containing endangered regional ecosystems - subdominant (extract from Moranbah Development Scheme)

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Avoid or minimise clearing of remnant and high value regrowth vegetation.	✓			Moranbah Urban Development Area, Development Scheme constraints map indicates the site does not contain remnant vegetation containing threatened species nor is it in area of high value regrowth.
	Avoid or minimise impacts on significant biodiversity values	✓			The proposed landscaping plan introduces high value species and borrows from the palette of native flora. Noise pollution and light spill effects are minimal due to equipment selection and building services design. Water quality impacts are minimised through incorporation of integrated Urban Stormwater Quality Management with best practise stormwater quality management devices consisting of bio-retention basin and swales constructed across the proposed development to treat stormwater runoff prior to discharge. Water Quality measures during construction shall be as per the sediment and erosion control measures identified in the Site Based Stormwater Quality Management Plan during the pre-development, bulk earthworks, construction and post-development phases to limit soil erosion and control sediment discharge from the proposed development.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Provide adequate buffers between development and significant biodiversity values	✓			The distance to the nearest site with significant biodiversity values (High value regrowth vegetation along the creek to the north) is over 300m which is an adequate buffer to protect biodiversity values. The site incorporates a mass native planted buffer with predominant dry land species on outer fringes which caters for aesthetic screening, wind and dust break, shade and shelter.  Plan Scale 1:500
	Offset clearing of remnant vegetation	✓			Vegetation clearing has been offset with the extensive and enhanced landscaping as detailed in the landscaping plan [refer - Cardno SPLAT landscape Intent Report dated: 15 November 2011 issue: B. Key features are: - • Mass native planted buffer with predominant dry land species on outer fringes for transition to adjoining landscape with lush native species on inner buffer. • Softscape elements have been determined based on appropriateness of planting for sub-tropical rural Queensland. • Large shade trees and smaller clusters of flowering trees.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Maximise retention of existing habitat trees in landscaping and parks and, where appropriate, ensure that they are not isolated from adjacent suitable habitat.	✓			No existing habitat trees.
Maximise ecological connectivity.	Identify priority vegetation patches in and beyond the UDA.		✓		The distance to the nearest site with significant biodiversity values (High value regrowth vegetation along Grosvenor Creek to the north) within the UDA is over 300m which is an adequate buffer to protect biodiversity values.
	Retain vegetation connections between priority vegetation patches (as functioning wildlife corridors e.g. minimum 200m for major corridors) to provide ecological connectivity.	✓			There are currently no existing vegetation connections on the site. However, the site incorporates a mass native planted buffer which provides a corridor to allow wildlife to travel through and connect with any priority vegetation patches beyond the site boundary.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
					Typical Section Scale 1:200
	Rehabilitate and revegetate areas to improve or create by functioning corridors (where appropriate.)	✓			The Landscaping Plan includes significant revegetation and though the buffer creates a functioning corridor for wildlife. Key features are: - • Mass native planted buffer with predominant dryland species on outer fringes for transition to adjoining landscape with lush native species on inner buffer. • Softscape elements have been determined based on appropriateness of planting for sub-tropical rural Queensland. • Large shade trees and smaller clusters of flowering trees.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Avoid impacts on threatened and priority species.	Identify habitat for threatened species under federal and state legislation or significant species recognised at the local level.		✓		No species identified
	Avoid impacts on habitat for threatened or significant species	✓			No species identified
	Rehabilitate habitat for threatened or significant species and implement strategies targeting management of these species		✓		The proposed landscaping plan introduces high value species and borrows from the palette of native flora. Where lush vegetation is proposed, irrigation and soil improvers are to be provided to allow these species to develop and fulfil their ecological function.

Principle	UDLA Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Implement sustainable landscaping practices.	Incorporate biodiversity friendly urban design principles and practices such as retaining habitat trees in streets and parks	✓			Large shade trees and smaller clusters of flowering trees have been incorporated into the site landscaping plan. These trees will also provide habitat for wildlife. Minimal existing topography disturbance on site (average earthworks depth 120mm);
Manage pest plants and animals.	Implement pest plant and animal management strategies consistent with state legislation and local government requirements	✓			Pest plant and animal management strategies to be employed as per state legislation and local government requirement.
Minimise bush fire risk.	Protect significant biodiversity values from risk of bushfire	✓			The site has a bushfire management plan in place.

ELEMENT: WETLANDS AND WATERWAYS

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Wetland protection.	Identify wetlands of high ecological significance and referable wetlands.	✓			No wetlands of high ecological significance and referable wetlands on site.
	Avoid or minimise impacts on wetlands i.e. avoid clearing remnant vegetation adjacent to wetlands.	✓			No wetlands of high ecological significance and referable wetlands on site or adjacent to the site. Minimal existing topography disturbance on site (average earthworks depth 120mm);
	Provide adequate buffers between development and wetlands that are in an adjacent to the UDA. Recommended buffers:- • minimum 50 m from wetland boundary (DERM wetland SPP) where surrounding land is largely cleared. • minimum 100 m where land surrounding the wetlands is vegetated.	✓			No wetlands of high ecological significance and referable wetlands on site or adjacent to the site.
Waterway protection.	Identify waterways.	✓			Grosvenor Creek some 350m to the north of site
	Provide adequate buffers between development and waterways to provide waterway protection.				Adequate buffers provided –refer Yeats Stormwater management plan
	Identify waterways to be used as wildlife corridors and provide vegetated setbacks to deliver both corridor and waterway protection functions (see buffers for wetlands.)	✓			A stormwater management strategy has been developed to manage potential stormwater impacts • Best practice stormwater quality management devices consisting of bio-retention basin and swales constructed across the proposed development to treat stormwater runoff prior to discharging from the subject site; and • Sediment and erosion control measures are to be installed during the pre-development, bulk earthworks, construction and post-development phases to limit soil erosion and control sediment discharge from the proposed development.
	Minimise disturbance to natural Drainage.	✓			Minimal existing topography disturbance on site (average earthworks depth 120mm)
Discharges to wetlands and waterways.	Ensure water discharge to onsite and adjacent wetlands and waterways (freshwater, estuarine and marine) meets water quality standards under Queensland	✓			The Environmental Protection (water) Policy 2009, State Planning Policy 4/10 - Healthy Waterways 2010 and DERM's water quality objectives for Central Queensland (South) Region have been adopted for the development. Design of the drainage system and structures has been undertaken in accordance with the requirements of the Queensland Urban Drainage Manual (QUDM). In addition, the design requirement of the Isaac Regional Council will be incorporated in to the design of

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	environment legislation.				the stormwater system. Stormwater harvesting and treatment through the use of vegetated swales incorporated biological filtration media.
	Identify acid sulfate soils in coastal lowlands and appropriately manage soil disturbance to avoid acid leachate entering adjacent wetlands.		✓		Not applicable as subject site is not in a coastal lowland area.
	Identify nutrient hazard areas and appropriately manage soil disturbance to avoid or minimise nutrient mobilisation that may increase the risk of coastal algal blooms.	✓			Landscaping employs macrophyte planting in the detention zones for increased nutrient management; The site plan requires minimal existing topography disturbance on site (average earthworks depth 120mm)
	Avoid or minimise waste water discharge from the site in accordance with a waste water management plan prepared by a suitably qualified person.	✓			A standard gravity sewerage system is proposed for the development for the internal system. It is proposed to gravitate the wastewater to the north within the site where a connection shall be made to the on-site sewerage system for recycled water harvesting purposes as well as a proposed regional sewerage pump station. Refer Yeats YC0315 R001 Engineering Report
	Avoid areas with highly permeable soils or a high water table when locating waste disposal activities or facilities.		✓		STP to located away from highly permeable soils
Erosion and Sediment Control.	Minimise erosion risk and ensure development is guided by an approved sediment and erosion control plan that demonstrates release of sediment laden water from the site is avoided during construction and operation phases. To minimise erosion risk, development plans should demonstrate that land is suitable for its intended purpose or demonstrate that the land can be managed or treated to make it suitable for its intended purpose. Issues may include dispersive soils, subsidence, tunnel erosion, load bearing capacity, soil reactivity and bulk earthwork operations.	✓			Sediment and erosion control measures are to be installed during the pre-development, bulk earthworks, construction and post-development phases to limit soil erosion and control sediment discharge from the proposed development. A Compliant sediment erosion plan has been completed Refer Yeats YC0315 R001 Engineering Report

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Incorporate storm water flow control measures to manage frequent flows and peak flows	✓			A stormwater management strategy has been developed to manage potential stormwater impacts due to the proposed accommodation village. Conclusions of this report detail the stormwater management strategy to have the following components: • No stormwater quantity detention measures are required as modelling has demonstrated that there will be no increase in storm flows discharging from the subject site during a Q₁₀₀ storm event; • Two drainage channels and associated culvert crossings are to be constructed to convey storm flows from the large upstream catchments through the subject site; • Best practise stormwater quality management devices consisting of bio-retention basin and swales constructed across the proposed development to treat stormwater runoff prior to discharging from the subject site; and • Sediment and erosion control measures are to be installed during the pre-development, bulk earthworks, construction and post-development phases to limit soil erosion and control sediment discharge from the proposed development.

ELEMENT: CLIMATE CHANGE

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Minimise climate change impacts on community	Locate and design infrastructure with regard to predicted sea level rise.			✓	
	Incorporate design and construction elements that are responsive to changing climate that is likely to cause more intense storms, stronger winds, higher temperatures and sea level rise.		✓		Modular construction technique allows for flexible upgrading of units. Air conditioning units are also modular and allow for additional capacity to be added as required.
	Retain and improve the extent of native vegetation and address other heat island management strategies in precinct and building design and construction.		✓		Reflective roofs to be incorporated into development.
Minimise climate change impacts on community	Adopt subdivision and lot layouts that optimise solar orientation and natural ventilation.		✓		Units are fully air conditioned with fixed windows
	Maximise public and active transport use	✓			Bus services. two bus interchange points are proposed, as well as a dedicated bus parking area. Extensive on site service facility provision to reduce vehicle trips. Green spine central to the development with integrated pedestrian and cycle network
	Use building design that encourages energy, water and materials conservation elements.	✓			Modular construction minimises on- site construction waste. Design meets latest BCA Section J efficiency provisions of BCA with insulation in ceiling, walls, floors and reflective roof construction
	Comply with the Queensland Building Code in relation to energy efficiency.	✓			Development to comply with BCA Section J – refer report 103162-r5-rev2 from BCA Logic
	Use local and renewable energy where economically feasible, including but not limited to, solar hot water and heat pumps.	✓			Solar schemes being considered where economically feasible
	Promote public transport systems that reduce dependence on private motor vehicles.	✓			Bus services. Two bus interchange points are proposed, as well as a dedicated bus parking area.

ELEMENT: POLLUTION

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Avoid impacts on human health from site contamination.	Investigate and remediate contaminated land to ensure the site is fit for purpose. Site contamination will be identified and assessed when considering land uses and precinct design. This applies specifically to land that is subject to notifiable activities or is listed on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR).	✓			No site contamination – site is not listed on any registers.
Avoid impacts of hazardous materials on the community and the environment.	Manage sensitive land uses in relation to hazardous industries according to acceptable standards.	✓			The immediate land uses adjoining the subject development area are rural, utilised primarily for small-scale grazing. The onsite activities within the development are non-hazardous.
	Demonstrate the health and wellbeing of people in the encroaching communities is not adversely affected by adjacent industrial uses, if development is located closer than distances recommended in the state planning policy.	✓			Not applicable - The immediate land uses adjoining the subject development area are rural, utilised primarily for small-scale grazing.

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Avoid impacts from erosion and sediment laden waters during construction and operation.	Be based on an approved sediment and erosion control plan that demonstrates release of sediment laden water from the site is avoided during the construction and operation phases. The sediment and erosion control plan will be in accordance with current best practice relevant to the region to minimise the risk of harm to environmental values of receiving waters. The plan should focus on controlling erosion rather than managing sediments resulting from avoidable erosion. The construction phase of development where sediment and erosion control are relevant includes: - Civil works such as cutting and filling, vegetation clearing, road construction, stormwater works etc, and - Built form phase works involving construction of buildings on specific lots	✓			The following measures will be undertaken to mitigate water quality impacts during construction phase: - Sediment fences to be erected at the base of all batters and stockpiles to prevent sediment transportation off site; - Grass filter strips to be placed along all road verges; - Re-vegetation of all disturbed areas within two weeks of completion; - All sediment control structures to be maintained in an effective manner and inspected after each storm event. No structure is to accumulate sediment above 40% of its capacity; and - Regular monitoring of water quality to determine the effectiveness of the sediment and erosion control measures
Avoid noise related impacts on communities and the environment.	Manage sensitive land uses according to acceptable standards.	✓			Pedestrian routes are separated from accommodation areas to minimise noise. Noise, light and other impacts on adjoining areas will be minimized given the location of streets and car parking areas.
Avoid air quality related impacts on communities and the environment.	Manage land uses that may have an adverse air quality impact on development through appropriate site planning and design and according to acceptable standards.	✓			The proposed accommodation areas are setback from the primary and secondary internal road networks. Landscape buffers as well as pedestrian paths surround the accommodation areas to reduce noise, dust and light from adversely impacting on the occupant's well-being. Dust control measures will be dealt with throughout each design and documentation stage to ensure compliance.
	Avoid or limit exposure and risk (to an accepted standard) associated with air pollutants that could have a potentially adverse effect on human health and adversely affect public amenity.	✓			Dust control measures will be dealt with throughout each design and documentation stage to ensure compliance

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Ensure air quality standards are met.	✓			Dust control measures will be dealt with throughout each design and documentation stage to ensure compliance
Avoid impacts of light pollution on the environment	Consider the impacts of light pollution through land use and urban design.	✓			All external lighting will be directional or include appropriate screening in order to minimise any adverse impacts on adjoining properties. Light impacts on adjoining areas will be minimized given the location of streets and screening of car parking area lighting.
	Avoid lighting near ecologically sensitive areas or locate and orient lighting to minimise negative impacts on flora and fauna.	✓			Not applicable
	Ensure vertical illumination from permanent lighting measured at the boundary of an ecologically sensitive area is less than 1 lux.	✓			To be confirmed

ELEMENT: ENERGY AND WATER

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Minimise Water Use.	Work with partners to implement Total Water Cycle Management to ensure the most effective and efficient use of water.		✓		Integrated water management plan completed -
	Install smart water meters in highly visible and frequently used areas.		✓		Overall site smart water to be installed to allow for remote monitoring.
	Adopt demand management options like incorporating water efficient appliances and fittings into the design (minimum 4 star WELS rating.)	✓			- Laundry facilities to incorporate the use of recycled water to minimise potable water supply consumption; - Toilets and other uses such as landscape irrigation re-using onsite treated waste water
Maximise recycling and reuse of water.	Implement current best practice Water Sensitive Urban Design (WSUD) principles for Queensland. Consider implementing water reuse measures like rainwater and stormwater harvesting for reuse on gardens or in toilet and laundries Consider implementing water recycling measures like home grey water or treated water from offsite sources such as treatment plants or sewer mining for toilets and laundry or landscaping and parks.	✓			Feasibility of off-site 'purple pipe' supply under assessment as an alternative to Stormwater Harvesting.

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment																																				
		Yes	Partially	No																																					
Minimise energy in construction and operation of the development. <i>Exceed</i>	Comply with the Queensland Building Code in relation to energy efficiency (6 star rated dwellings.) Ways of complying with the code include (but are not limited to) the following:- • Maximise the passive thermal design of buildings to minimise use of artificial heating and cooling systems. • Incorporate energy efficient plant and equipment (ensure appliances are rated at the highest relevant National Minimum Energy Performance Standards (MEPS).) • Use gas, solar or heat pump hot water systems as standard with insulated pipes. • Centrally locate internal services such as water where possible. • Maximise the use of natural light and energy efficient lighting. • Promote renewable energy and local or on-site energy generation. • Implement demand management strategies to reduce energy consumption. • Consider construction and fit out materials with low embodied energy.	✓			There are 5 types of building on the South Moranbah Development, classified as follows under the BCA 2011:- <table><tr><td>Accommodation Rooms</td><td>- Class 3</td></tr><tr><td>Central Facilities</td><td>- Class 6</td></tr><tr><td>Gymnasium</td><td>- Class 9b</td></tr><tr><td>Administration Areas</td><td>- Class 5</td></tr><tr><td>Tavern</td><td>- Class 9</td></tr><tr><td>Other</td><td>- Class 10</td></tr></table> The buildings are to be designed to comply with the applicable Section J provisions of the BCA 2011 with high levels of passive design features including optimised glazing, high levels of insulation, reflective roofs. The MAC are installing only instantaneous gas hot water systems to accommodation units. No hot water storage units are to be installed in any new works. The village unit projects aim to provide the following energy efficient appliances which are preferably at or within one point of the highest rating, but at least a minimum of three points from the highest available rating to minimise energy use associated with these fixtures:- • Refrigerators; • Freezers; • Washing machines; • Dryers (or alternative provide clothes drying lines); and • Dishwashers. All selected appliances to be readily available and serviced. (refer Design Guidelines Part 4 section 4.3.3.4) Air Conditioning units to comply with requirement of NCC 2012 – Section J5: Energy Efficiency Ratios for Packaged Equipment: <i>be a minimum 3 star rating under MEPS.</i> <table><tr><th>Equipment</th><th colspan="2">Minimum E.E.R.</th></tr><tr><td></td><td>65-95 kW_r</td><td>>95kW_r</td></tr><tr><td>A/C Cooling</td><td>2.7</td><td>2.8</td></tr><tr><td>Heat Pump - Cooling</td><td>2.6</td><td>2.7</td></tr></table> Energy Efficiency Ratios for Refrigerant Chillers up to 350kW_r: <table><tr><th>Equipment</th><th colspan="2">Minimum E.E.R.</th></tr><tr><td></td><th>Full Load</th><th>Part Load</th></tr><tr><td>Water Cooled Chiller</td><td>4.2</td><td>5.2</td></tr><tr><td>Air cooled/ Evaporatively Cooled Chiller.</td><td>2.5</td><td>3.4</td></tr></table>	Accommodation Rooms	- Class 3	Central Facilities	- Class 6	Gymnasium	- Class 9b	Administration Areas	- Class 5	Tavern	- Class 9	Other	- Class 10	Equipment	Minimum E.E.R.			65-95 kW _r	>95kW _r	A/C Cooling	2.7	2.8	Heat Pump - Cooling	2.6	2.7	Equipment	Minimum E.E.R.			Full Load	Part Load	Water Cooled Chiller	4.2	5.2	Air cooled/ Evaporatively Cooled Chiller.	2.5	3.4
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DA ESD Report –Issue C
S212617b DA ESDRevC – gbr – May 8 2012

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
	Meet or exceed the regulated energy efficiency requirements for Queensland at the time of the development proposal	✓			There are 5 types of building on the South Moranbah Development, classified as follows under the BCA 2011:- Accommodation Rooms - Class 3 Central Facilities - Class 6 Gymnasium - Class 9b Administration Areas - Class 5 Tavern - Class 9 Other - Class 10 The buildings are to be designed to comply with the applicable Section J provisions of the BCA 2011 with high levels of passive design features including optimised glazing, high levels of insulation, reflective roofs.
	Install smart meters to monitor lighting, heating / ventilation and air conditioning systems and large electrical systems. Meters should be in highly visible areas and should show current period and previous energy use and costs.		✓		Single site based smart meter to be installed to allow for remote monitoring of site electricity use.
	Use heat island reduction strategies to minimise urban ambient temperature increases. Heat island reduction strategies include:- - Retaining existing vegetation and/or increasing vegetation area throughout the development. - Including street trees and pocket parks and promoting garden vegetation to provide shading to buildings and pavements. - Using building materials (particularly for roofs and pavements) with high reflectance and emissivity to reduce solar radiation absorption.		✓		Extensive Landscaping plan provides for increasing quality of vegetation including shade trees. High reflectance roofs incorporated into the design.

ELEMENT: MATERIAL AND WASTE

Strategy	Sustainability Criteria	Assessment (does the development meet the Criteria)			Justification/ Notes on Assessment
		Yes	Partially	No	
Incorporate sustainable building materials	Use standardised materials.	✓			Modular construction uses high level of standardised materials
	Use materials from sustainable and renewable resources e.g. timber from sustainable forestry operations.		✓		The MAC Design Guidelines recommended to use the following materials when constructing new sites: • Replace cement with industrial waste products or oversized aggregate; • Source structural and reinforcing steel used in the building's structure from a responsible steel manufacturer; • Use recycled timber and/or Forest Stewardship Council's (FSC) certified timber or Programme for the Endorsement of Forest Certification (PEFC) accredited timber; and • Minimise PVC in flooring, cable, pipe and conduit. Where necessarily applied to the project, all materials must be installed to meet the Best Practice Guidelines as specified by the Green Building Council of Australia's (GBCA) Green Star PVC credit. (refer Design Guidelines Part 4, 4.3.6)
	Use locally available materials where possible.		✓		
	Use materials manufactured in an environmentally responsible Manner.		✓		If relevant to the chosen HVAC system all HVAC refrigerants not to have an Ozone Depleting Potential (ODP) of zero in accordance with HB40.1-2001: The Australian Refrigeration and Air conditioning Code of Good Practice (Appendices 3 and 40 or AIRAH Refrigerant Selection Guide 2003. (refer Design Guidelines Part 4, 4.3.3.2 Air-Conditioning)
	Use non toxic and low emission Products		✓		The MAC Design Guidelines recommended to use the following materials when constructing new sites: • Use low volatile organic compounds (VOC) indoors to reduce health risks to the occupants. • Utilise mechanical fixing instead of adhesives throughout the construction and fit out phase because glues are the major source of VOC indoors. • Use low formaldehyde engineered wood products including particleboard, plywood, veneer, Medium Density Fibre board (MDF) and decorative overlaid wood panels. (refer Design Guidelines Part 4, 4.3.3.7)
Minimise waste during construction	Implement a waste management plan covering construction, operation and demolition	✓			Waste Management Plan to be developed for the site
	Reduce waste to landfill to address Toward Q2 Carbon Target	✓			Pre fabrication techniques for modular building significantly reduce waste to landfill
	Demonstrate the efficient use of resources by reusing existing materials and using materials that minimise the development carbon footprint			✓	

Appendix A: IS Provisional Points Score.



Infrastructure Sustainability Rating Tool Credit Summary

Design
40
GOOD

Project/asset: **The Mac**

Location: **Moranbah South**

Submission date:

