SECTION 21

ENVIRONMENT

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Version	Date	Authors	Summary of Changes
	12/03/15	Manager, Environment	First Edition
V1	17/07/18	Manager, Infrastructure Services	2018 general review updates

21.0 ENVIRONMENT

This document is a sub-section of the James Cook University (JCU) Design Guidelines and is not to be read in isolation. Consultants and Contractors are required to comply with all sections of the JCU Design Guidelines.

21.1 Approvals Required during Design

Approval shall be obtained from the Estate Directorate, Deputy Director, Planning and Development for:

- Any changes to, or deviations from these requirements.

Approval shall be obtained from the Estate Directorate, Manager, Environment for:

- The initial and updated SEMP(s), to be received prior to DD and with CD
- Species mix for disturbed ground coverage and grass species for open drain coverage at DD,
- A reinstatement plan for works being undertaken on, near or within a waterway at DD,
- Any discharge of water to sewer or any other source,
- Any disturbance to wildlife or its habitat (including nesting areas or hollows), and
- Environmental reporting requirements.

21.2 Introduction

JCU has made a clear commitment to environmental sustainability through the inclusion of sustainability in its Statement of Strategic Intent and its University Plan, and most recently, by becoming the first University to sign the University Commitment to the Sustainable Development Goals.

Sustainability is a University *value* identified in the Strategic Intent and developed further as an *Institutional Priority* in the 2018 - 2022 University Plan. Together these documents define the JCU Sustainability vision:

"We are committed to the principles of sustainability, we will ensure that our actions today do not limit the range of social, cultural, environmental and economic options open to future generations.

We are a University signatory to the United Nations Sustainable Development Goals and have agreed to play our role in understanding and responding to challenges facing the world and contributing to a sustainable future"

Our campuses and sites are uniquely biodiverse and we aim to maintain and enhance this biodiversity by minimising disruption during construction works. In order to realise these commitments we expect our contractors to implement and uphold environmental best practice at all times whilst working on JCU campuses and sites.

21.3 Environmental Site Management

All JCU contractors are expected to develop and implement a project specific **Site Environmental Management Plan (SEMP)** including, as a minimum:

- SEMP objectives
- SEMP Structure and Responsibilities – addressing the Environmental Specifications outlined in 21.4 of this document
- Environmental Policy Approval and Licensing Requirements
- Reporting Requirements
- Environmental Training
- Emergency Contacts and Response

ISO 14001 **Environmental Management System (EMS)** accreditation or equivalent should be held by all Head Contractors that manage projects prior to, and throughout projects. All sub-consultants must conform to the Head Contractor's EMS.

The SEMP must be completed using the official JCU SEMP form (available with this Design Guideline on the JCU webpage) and submitted to the Manager, Environment for approval prior to DD and in CD.

21.4 Environmental Specifications

The following environmental specifications have been developed to ensure all construction work at JCU follows best environmental practice and does not compromise the environmental values of our campuses and sites. Deviations from these specifications shall be avoided and any deviations require written permission to be granted from the Estate Directorate, Deputy Director, Planning and Development.

The specifications below cover the following areas of environmental site management and these must be addressed when completing the SEMP.

- Erosion and sediment control
- Dust management
- Noise
- Energy management
- Water management
- Air quality
- Flora and Fauna Protection
- Waste Management
- Heritage protection

21.4.1 Erosion and Sediment Control

Effective erosion and sediment control is essential on all sites where earth works are to be conducted. JCU's campuses and sites contain sensitive waterways and JCU aims to be a good community citizen by minimising loss of any soil from its construction sites.

Queensland Government legislation is clear in regard to pollution from sediment discharges from construction sites and heavy fines can result if sediment and erosion control has not been adequately carried out during construction.

Contractors have a legal responsibility under the Environmental Protection Act 1994, and the subordinate Environmental Protection (Water) Policy (2009), to minimise or prevent environmental harm. By law, local councils are responsible for investigating incidents of environmental harm. On-spot-fines can be issued to contractors that allow the runoff of sand, sediment, silt, rubbish or building materials into gutters, stormwater drains and waterways.section 21.10

JCU requires contractors to comply with the following processes for sediment and erosion control:

- All construction sites where soil disturbance occurs must have an erosion and sediment control plan (ESCP) prepared for the site in accordance with TCC guidelines.
- In particular the ESCP must include the following:
  - location of property boundaries;
  - existing contours and water movement paths for each stage of the development;
  - general soil description as identified in the soil investigation for the site; copies of any chemical analyses of topsoil and subsoil samples;
  - location of existing and new vegetation and grass buffer zones;
  - locations of erosion and sediment control structures
- The ESCP must be carried out by a *Suitably Qualified Person* (SQP)[1]and the SQP should be named in the plan.
- The site must be managed by the *Responsible Person*[2], who has undertaken the relevant TCC (or equivalent) accreditation.
- Discharge limits of 250mg/L suspended sediment are strictly adhered to. For sensitive sites the discharge limit may be reduced.
- Clean storm water must be directed away from all disturbed areas of a site.
- No water flowing across a disturbed surface shall leave the site without passing through a sediment control structure or process that is suitably designed.
- Concentrated flow discharged from disturbed areas of the site must be trapped by a sediment basin, or similar structure, to remove its sediment load prior to water leaving the site.
- A sediment basin should be used whenever:
  - Water flows over disturbed land and leaves the site as concentrated water in a channel
  - When more than 0.5ha of soil has been disturbed
  - When there is a need to control the turbidity of discharge water
  - When the area has dispersive soils
- A sediment basin must be designed by a Registered Professional Engineer (RPEQ).
- Contractors are responsible for implementation and maintenance of ESC works while managing a site.
- Sites should be stabilised using recognised methods for any prolonged stop work periods (>14 days).

[1] The *Suitably Qualified Person* must have Townsville City Council or equivalent IECA endorsed accreditation (6-day training course).
[2] The *Responsible Person* must have Townsville City Council or equivalent IECA endorsed accreditation (2 day training course).

- Sites must be remediated to ensure no disturbed soil is left exposed and in keeping with best practice for sediment and erosion control prior to handover to JCU through revegetation, mulching or other acceptable method, which must be approved by the Manager, Environment.

21.4.2 Sediment fences and drain protection

Sediment fence design and drain protection methods should meet the standards outlined in the Townsville City Council Sediment and Erosion information sheet. Link in section 21.10.

Sediment fences must not be used for concentrated run-off.

21.4.3 Revegetation guidelines (for non-maintained areas)

All earth surfaces that have been disturbed by the construction work must be revegetated to provide a stable landscape with a density of at least 60% living ground coverage prior to being accepted as off-maintenance. Species mix is to be suitable for the purpose, approved by JCU Manager, Environment through the JCU Project Manager, and may reflect the vegetation naturally grown on the land.

Open drains must be grassed with species approved by JCU Manager, Environment through the JCU Project Manager. The species mix must include Indian Blue Couch sown at a rate of 10-20kg/ha. Revegetated areas must be established such that 95% of the area has a total living grass cover of 80%, and the Indian Blue Couch cover is a minimum of 60% at the end of the establishment period and prior to being accepted off-maintenance.

21.4.4 Working in waterways and floodplains

Various Queensland Government departments must be consulted where works will impact on a waterway. Changes to the physical nature of a waterway require prior approval from the responsible authorities and relevant legislation must be met. At the design stage, consider all options to avoid working in or adjacent to natural waterways.

21.4.5 Waterway works

Where it is not possible to avoid working in a stream, then additional precautions should be taken.

- Minimise the time during which work in a waterway is required, and the extent of works.
- Schedule works for the dry season wherever possible.
- Establish protocols to minimise downstream damage.
- Stabilise any disturbance to a levee or any other bank so that erosion is avoided.
- Minimise disturbance to vegetation.
- Comply with all relevant legislation.

21.4.6 Reinstatement plan

Prior to works being undertaken on, near or within a waterway, a reinstatement plan should be prepared and submitted for approval to the Manager, Environment. The plan should include:

- Proposed changes to the waterway.
- Photographic evidence of the state of the site before works commence.

- The impact on adjacent vegetation.
- The proposed timeline for works.
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- The type and form of flood protection works.
- Erosion and sediment run-off controls.
- Proposed methods for reinstatement of the waterway bed and banks.
- A revegetation plan addressing a period of no less than 12 months and including proposed species and locations, methods for weed control and ongoing maintenance until a satisfactory level of established plants is achieved.
- Photographic evidence of the site should be provided as soon as possible following completion of works.

21.4.7 Dust Management

Dust production on construction sites must be minimised as much as possible. Excess dust can block air handler units and cover buildings, resulting in significant cleaning and maintenance costs for JCU. Dust can present a respiratory hazard to some individuals. Dust can also be washed into waterways during rainfall where it can have environmental impacts.

For sites where dust is expected to be produced it is important to develop a dust prevention strategy at the project planning stage and implement it during construction.

Many of the measures taken to reduce dust problems are the same as those taken to minimise erosion and sediment run-off. Additional measures, not mentioned previously, are outlined below.

- Prevent the generation of dust in preference to applying dust suppression measures.
- Water haul roads. The frequency of watering will be determined by weather conditions and the erosion potential of the soil. If additives are used in the water to increase dust suppression, the chemical should have no adverse environmental impact on adjacent water bodies. Water should not be allowed to run into drains or waterways.
- Water areas other than haul roads if they are a source of dust.
- Construct wind fences where appropriate.

21.4.8 Management of stockpile and batters

Stockpiles and batters are a potential source of dust and sediment run-off.

Additional controls to those covered previously are outlined below.

- Locate stockpiles away from drainage lines to where they are protected from wind.
- Minimise the number and size of stockpiles.
- Keep topsoil separate from subsoil when stockpiling soil.

- Construct the stockpile with a slope less than 2:1 (horizontal to vertical). A less steep slope may be required where the erosion risk is high.

- Mulch, roughen and seed with sterile grasses any batter or topsoil stockpile which is to be maintained for longer than 28 days.
- Treat subsoil stockpiles in the same way, but check whether they need a layer of topsoil to provide a media for grass seeds before seeding.

- Circle all unstabilised stockpiles and batters with silt fences or a drainage system that will prevent loss of soil to waterways.

- Ensure stockpiles are a minimum of ten metres from a waterway. Permission must be requested for any stockpiles less than 10 metres from a waterway.

- Hand water or install temporary sprinklers to suppress dust from unstabilised stockpiles and batters.

- Finish and contour any stockpiles located on a floodplain so as to minimise loss of material in a flood or rainfall event.

21.4.9 Noise

All construction, demolition and maintenance activities will be conducted in accordance with *AS 2436:2010 – Guide to noise and vibration control on construction, demolition and maintenance sites*, in particular *Section 3 – Noise and vibration impacts external to the site*.

The SEMP should outline how noise impacts will be managed on the site. Where significant or extended noise impacts are expected, a noise and vibration management plan should be provided.

Due to the nature of JCU's operations, additional noise restrictions may apply during teaching and exam periods or at other specified times. These conditions will be outlined by the JCU Project Manager.

Noise and vibration impacts must be managed to ensure minimal disruption to local native fauna. At sensitive sites, where more stringent specifications are stipulated (such as the Daintree Rainforest Observatory EMP), these must be consulted and adhered to.

JCU's Noise on University Sites Policy - http://www.jcu.edu.au/policy/safety/JCUDEV_010032.html

21.4.10 Energy Management

JCU aims to minimise its energy consumption and expects contractors to comply with its efforts to keep energy use to a minimum. JCU requires contractors to meter electricity consumption for construction sites in order to effectively manage consumption and ensure wastage is kept to a minimum.

The use of energy efficient equipment, infrastructure and appliances during construction is encouraged.

Contractors should outline in their SEMP how they plan to minimise energy consumption at their construction site.

21.4.11 Water Management

JCU aims to minimise its water consumption and expects contractors to comply with its efforts to keep water use to a minimum. JCU requires contractors to separately meter water consumption for construction sites in order to effectively manage use and ensure wastage is kept to a minimum.

The use of water efficient equipment, infrastructure and appliances during construction is encouraged. Where appropriate, and in line with relevant legislation and health and safety considerations, the use of non-potable water is encouraged.

Contractors should outline in their SEMP how they plan to minimise potable water consumption at their construction site.

Fire hydrants must not be used for any reason other than for fire management. Failure to comply may result in significant fines.

Discharge of water to sewer must meet the relevant local council regulations and prior approval must be sought from the JCU Project Manager. The contractor should outline in the SEMP details of the expected volume and type of discharge to sewer.

Disposal of water to any other source is not permitted without prior approval from the Manager, Environment.

For stormwater design specifications please refer to Section 32 of the JCU Design Guidelines.

21.4.12 Air Quality

Air quality must be maintained to the highest standards whilst working on JCU sites. The major sources for air pollution on construction sites are exhaust gases from vehicles and machinery. Dust is addressed in section 21.4.7 of this document.

Contractors must ensure there is no health risk or loss of amenity due to emission of exhaust gases to the environment.

Contractors must ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications.

Smoke from internal combustion engines should not be visible for more than ten seconds.

Placement and operation of fuel storage, generators and exhaust emissions must comply with the requirements of AS3010, AS1019, AS1940 and AS2790.

21.4.13 Flora and Fauna Protection

JCU's sites are biodiverse and unique and protection of its flora and fauna is critical during any construction works.

21.4.14 Tree protection

Removal of vegetation (other than recognised weed species) must be avoided where possible and removal of any trees may only be done with permission from the Director, Estate Directorate in line with the JCU Tree Protection Procedure.

Existing trees within construction sites must be protected in accordance with *AS 4970-2009 – Protection of trees on development sites*, with contractors required to submit a tree protection plan submitted prior to works commencing.

21.4.15 Weeds and pests

The introduction of weeds or feral animals is not permitted on any JCU sites. Vehicles, machinery and equipment should be washed down prior to commencing work at any JCU sites to ensure no weeds or pests are introduced. See the Queensland Biosecurity: Weed out the seeds video for more information.

No animals are permitted to be brought onto JCU campuses or sites. Contractors must ensure this is strictly adhered to by all staff and sub-contractors.

Contractors should indicate in the SEMP their procedure for wash-down of vehicles and machinery before commencing works at the JCU site and how they intend to keep the site weed and pest free during construction.

21.4.16 Fauna protection

Wildlife must be protected at all time and any disturbance to wildlife or its habitat (including nesting areas or hollows) may only be done in compliance with relevant legislation and with permission from the Director, Estate Directorate. The site should be inspected prior to handover for any visible wildlife habitat or nesting areas, and where these are identified the Manager, Environment should be notified for advice on protection measures.

The JCU Manager, Environment should be consulted in the first instance where any wildlife disturbance is expected. Where wildlife habitat exists, appropriate barriers must be installed to ensure no unintended damage results during construction works.

The contractor should outline in the SEMP how they plan to ensure wildlife is protected on the site during construction.

21.4.17 Waste Management

JCU aims to minimise waste production as part of its sustainability commitment. Contractors must submit a waste minimisation plan as part of their SEMP and reporting on waste volumes and percentage of materials recycled may be required.

When choosing between waste minimisation options, the following hierarchy for waste management is preferred:

(i) waste avoidance and/or reduction

(ii) reuse

(iii) recycling

Diverting the waste stream in these ways means that waste treatment and waste disposal options can be reduced and environmental impacts are minimised. Construction sites must pursue this hierarchy and seek out waste reduction opportunities. To identify opportunities it is necessary to consider all aspects of the project and the wastes it generates.

Waste can be minimised by using improved technology, recycled or reused on-site, or by making purchasing decisions that favour recycled products.

Wherever possible, include performance measures and targets for reduction, reuse and recycling options in the SEMP.

No waste materials may be disposed of in JCU skips or bins without prior approval from the Manager, Environment. Contractors should dispose of waste off-site or ensure a suitable waste contractor is

engaged for recycling or disposal of wastes. Recyclable materials should be separated from general waste. Asbestos materials or materials suspected to contain asbestos must be disposed of in the correct manner by qualified contractors.

The following table outlines the preferred disposal method for various grounds materials.

Table 1- Guidelines for clean fill, vacuum truck sludge and green waste

Waste type	Disposal method	Comments
Soil and rocks (clean fill)	Reuse on site	All uncontaminated soil and rocks should remain on site unless approval has been given to remove it. The JCU Project Manager can advise on appropriate locations for storage of soil and rocks.
Vacuum truck sludge	Dispose in designated site (permission required)	Vacuum truck sludge must be disposed of in a designated area. Please contact your JCU Project Manager to obtain permission to dispose of vacuum truck sludge. No dumping is permitted anywhere on campus other than the designated site. JCU will report all incidences of dumping to the relevant authorities.
Green waste	Reuse or mulch	Any mature trees removed can have the main trunks reused on campus for various purposes. Hollow logs should be kept to provide wildlife habitat. Contact the Environment Manager for more information – 4781 5060. Remaining green waste should be mulched and reused on campus. Contact the Grounds Supervisor to arrange access to the mulch storage site – 4781 5100 (TSV), 4232 1296 (CNS). For other JCU sites, contact your JCU Project Manager for disposal details.

21.4.18 Heritage Protection

The proximity of JCU's campuses and sites to the Great Barrier Reef World Heritage Area and the Wet Tropics World Heritage Area and its long history of Australian Aboriginal and Torres Strait Islander cultural activites mean that heritage protection is essential when carrying out any construction works on JCU sites, particularly for green field sites. Heritage protection must comply with the relevant legislation, which includes:

- Environment Protection and Biodiversity Conservation Act 1999
- Queensland Heritage Act 1992
- Aboriginal Cultural Heritage Act 2003

Where it is expected that heritage sites will be impacted, appropriate measures must be taken to ensure compliance with legislation and this should be outlined in the SEMP. In the event of heritage artefacts being uncovered during construction, works must be stopped immediately and the relevant authorities contacted for further advice.

JCU does not currently have any heritage listed buildings however some buildings and collections have significant cultural and/or heritage values, including:

- Eddie Koiki Mabo Library – Townsville Campus
- The Australian Tropical Herbarium – Cairns Campus

21.5 Environmental Policy

The contractor should provide a copy of their organisation's Environmental Policy as an attachment to the SEMP or indicate that one does not exist.

21.6 Environmental Management System

ISO 14001 **Environmental Management System (EMS)** accreditation or equivalent should be held by all Head Contractors that manage projects over $5 million in value. All sub consultants must conform to the Head Contractor's EMS.

21.7 Reporting Requirements

JCU may require regular or one-off reporting on various environmental aspects of a project. As this may vary significantly between projects, reporting requirements will be agreed between the JCU Project Manager and the contractor, with input from the Manager, Environment, prior to commencement of a project.

21.8 Environmental Training

The contractor should outline in the SEMP how they intend to undertake environmental training and/or inductions with all staff and sub-contractors entering the site.

21.9 Emergency Contacts

At least two emergency contacts must be listed for the site for environmental issues or incidents. Any changes to the emergency contacts must be registered with the JCU Project Manager immediately.

21.10 Links

- http://ap-unsdsn.org/regional-initiatives/universities-sdgs/university-commitment/
- https://www.townsville.qld.gov.au/__data/assets/pdf_file/0010/12232/GUIDELINES_Complete.pdf
- https://www.townsville.qld.gov.au/__data/assets/pdf_file/0015/8700/Sedimentation-and-Erosion.pdf
- https://www.ehp.qld.gov.au/licences-permits/business-industry/pdf/lawful-water-release-construction-sites-summary-sheet-em1137.pdf
- http://www.jcu.edu.au/policy/safety/JCUDEV_010032.html
- https://www.jcu.edu.au/policy/estate-and-facility-management/tree-protection
- https://www.youtube.com/watch?v=dTNDecjTVfI
- https://www.legislation.gov.au/Details/C2014C00506
- https://www.legislation.qld.gov.au/browse/inforce
- https://www.legislation.qld.gov.au/view/html/inforce/current/act-2003-079