

5. Environmental Safeguards and Management

5.1 Environmental Management Plan

An Environmental Management Plan will be developed to manage the potential environmental impacts of the proposal outlined in the PER.

An EMP will be developed for each issue identified in the PER and will define:

- ❑ Management objective
- ❑ Management strategy, responsibility and timing
- ❑ Performance indicators
- ❑ Monitoring required
- ❑ Corrective actions and contingency plans

The EMP will cover both construction and operational phases of the project.

Commitment:

An Environmental Management Plan will be developed, detailing the management strategies which will be implemented to address potential impacts.

5.2 Monitoring Program

Environmental monitoring to be undertaken during construction and operational phases of the project is detailed below:

5.2.1 Construction Phase

Dust: The site will be visually monitored by construction contractor for dust generation during construction. Dust control measures will be implemented in the event of high dust generation during construction.

Noise: Ambient noise monitoring will be implemented in response to noise complaints.

Water quality: Monitoring of water quality will be undertaken to ensure water run-off from the construction site is not harmful to the surrounding environment.

Soils – surface runoff and erosion: The downstream drain will be regularly inspected for evidence of high turbidity or sedimentation.

Acid sulphate soils: Testing will be undertaken prior to construction to confirm the absence of acid sulphate soils.

Flora and Fauna – weeds and introduced species: The site will be regularly visually inspected for the spread or establishment of weed species during construction.

Flora and Fauna - biting insects: Regular site inspections for potential biting insect breeding areas will be conducted during construction.

Flora and Fauna – bats: The occurrence of bats at outlet of main drain pipes will be visually monitored by construction contractor.

5.2.2 Operation Phase

Surface Hydrology and Water Quality: A water monitoring program will be developed to ensure that lake water does not become contaminated or depleted in oxygen.

Flora and Fauna – fishes: During periods of water quality monitoring, the fishes in the lake will be surveyed to determine the extent of entrapment upstream of the weir.

Flora and Fauna – bats: A monitoring program will be implemented following construction to determine the impact of the development on roosting bat communities.

Flora and Fauna – biting insects: The lake and surrounds will be monitored regularly following construction to identify any potential biting insect breeding habitat.

Flora and Fauna – weeds and pests: The site will be regularly visually inspected for the spread or establishment of terrestrial or aquatic weed species during operation.

5.3 Summary of Environmental Commitments

This proposal involves the construction of a commemorative lake and ceremonial entrance to the Northern Territory University. The proposal will improve the Casuarina Campus and surrounds both aesthetically and environmentally. The potential impacts to the environment during construction and operation have been identified and management procedures developed to eliminate, minimise or ameliorate the impact.

The proponent has proposed the following commitments for the construction and operational phases of the project to ensure an environmentally sound project.

5.3.1 Construction Phase

An Environmental Management Plan will be developed, detailing the management strategies which will be implemented to address potential impacts.

Dust

Appropriate dust control measures will be implemented should dust levels prove to be an issue.

Noise

Any complaints related to noise will be investigated and appropriate corrective action implemented to rectify the situation.

Surface and Subsurface Hydrology and Water Quality

All construction activities will be undertaken during the Dry Season. Water quality of surface water run-off during construction will be maintained to appropriate Australian standards.

Soils – Acid Sulphate Soils

Testing will be undertaken prior to construction to confirm the absence of acid sulphate soils.

Should acid sulphate soils be encountered prior to construction or at any time during construction, an acid sulphate soil management plan will be developed and implemented with approval from the DLPE.

Vegetation clearance, landscape and rehabilitation

Clearance of vegetation will be limited to the extent necessary for construction works and trees and plants to be retained will be clearly identified and protected during construction.

Construction will be managed so as to avoid impacts to mangrove communities.

Flora and Fauna – weeds and pests

Coffee Bush and any other noxious weeds will be removed wherever possible during construction.

The site will be regularly visually inspected for the spread or establishment of weed species during construction.

Flora and Fauna – biting insects

Regular site inspections for potential biting insect breeding areas will be conducted during construction. Larvicides will be used where necessary to control breeding.

Flora and Fauna - bats

Further research to confirm the existence of the bat colonies will be carried out prior to final design and commencement of construction.

If the existence of bats is confirmed then:

- ❑ The presence and potential impact on them will be carefully monitored during the construction phase; and
- ❑ Timing of construction works will take account of potential impacts on bats. The presence and potential impact on bats will be carefully monitored through surveys during the construction phase.

Storage and handling of materials and waste

All hazardous materials will be stored and disposed of in accordance with relevant standards and legislation.

All waste materials will be removed from sites and disposed of in a manner acceptable to the DLPE.

Social and Recreational

Local residents and NTU employees will be kept informed of any disruptions to access, traffic deviations, or changes to parking arrangements during construction.

Any complaints will be investigated and responded to promptly.

Aboriginal Heritage

In the event that a site of potential Aboriginal heritage significance is discovered during construction, all works will cease in the vicinity of the site pending

consultation with the Aboriginal Areas Protection Authority and the Heritage Conservation Branch of the DLPE.

5.3.2 Operation Phase

Surface water hydrology and water quality

A water monitoring program will be developed to ensure that lake water does not become contaminated or depleted in oxygen.

Stormwater management

Gross pollutant traps will be used to ensure stormwater entering the lake is free from litter and other gross pollutants.

Flora and Fauna – vegetation clearance

All cleared areas will be rehabilitated and landscaped in accordance with the Landscape Master Plan.

Flora and Fauna – aquatic fauna

The weir will be built to a height that allows tidal intrusion thus permitting fish movement, aiding water mixing and assisting in the maintenance of a brackish habitat.

Flora and Fauna - bats

A monitoring program will be implemented following construction to determine the impact of the development on roosting bat communities.

Flora and Fauna – biting insects

The lake and surrounds will be monitored regularly following construction to identify any potential biting insect breeding habitat.

Flora and Fauna – weeds and pests

The site will be regularly visually inspected for the spread or establishment of terrestrial or aquatic weed species during operation.

■ Table 5-1 Summary of Commitments

Pre-construction and Construction

Issue	Objective	Commitment	Timing	Performance Indicator
Environmental Management	To ensure environmental management in accordance with key objectives.	An EMP will be prepared following receipt of environmental approval.	Prior to commencement of construction	EMP approved by DLPE and implemented
Dust	To protect the surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity.	Appropriate dust control measures will be implemented should dust levels prove to be an issue.	During construction	Dust complaints register established, all complaints investigated and corrective action taken.
Noise	To protect the surrounding land users such that construction related noise will not adversely impact upon their welfare and amenity.	.Any complaints related to noise will be investigated and appropriate corrective action implemented to rectify the situation.	During construction	Noise complaints register established all complaints investigated and corrective action taken.
Surface and Sub surface Hydrology and Water Quality	To maintain existing quality of surface waters during construction	All construction activities will be undertaken during the Dry Season. Water quality will be monitored during construction to ensure it meets appropriate Australian water quality standards.	During construction	No contamination of downstream surface water due to construction activities. Water quality guidelines met.
Soils – Acid Sulphate Soil	To prevent acid generation in soils due to the disturbance during construction	Testing will be undertaken prior to construction to confirm the absence of acid sulphate soil. Should acid sulphate soils be encountered prior to construction or at any time during construction, an acid sulphate soil management plan will be developed and implemented with approval from DLPE.	Prior to construction During construction.	Acid Sulphate Soils testing has been undertaken and results are available. An Acid Sulphate Soil Management Plan is in place if required.
Flora and Fauna – vegetation clearance	To minimise vegetation clearing associated with construction.	Clearance of vegetation will be limited to the extent necessary for construction works and trees and plants to be retained will be clearly identified by the Parks and Wildlife Commission of the NT and protected during construction. Construction will be managed so as to avoid impacts to mangrove communities.	During construction During construction	No damage to vegetation outside the immediate vicinity of construction works. No impacts to mangroves as a result of construction.

Issue	Objective	Commitment	Timing	Performance Indicator
Flora and fauna – weeds and introduced species	To prevent the introduction or spread of introduced species during construction	Coffee Bush and other noxious weeds will be removed wherever possible during construction and burnt to kill seeds and prevent potential re-growth. A weed control program will be developed prior to construction for the duration of the construction phase. As part of this program, the site will be regularly visually inspected for the spread or establishment of weed species.	During construction During construction	Coffee Bush has been removed or is being progressively removed from the construction site. No weeds have established or spread as a result of construction.

Issue	Objective	Commitment	Timing	Performance Indicator
Flora and fauna – biting insects	To ensure breeding habitat for biting insects is not created during construction.	Regular site inspections for potential biting insect breeding areas will be conducted during construction. Larvacides will be used where necessary to control breeding.	During construction During construction	No biting insect breeding areas have developed as a result of construction.
Flora and Fauna - bats	Minimise the impact to bats during construction.	Further research to confirm the existence of the bat colonies will be carried. If the existence of bats is confirmed then: ☐ The presence and potential impact on them will be carefully monitored during the construction phase; and ☐ Timing of construction works will take account of potential impacts on bats. The presence and potential impact on bats will be carefully monitored through surveys during the construction phase.	Prior to final design and before construction During construction	Monitoring results indicate no significant impact to bats as a result of construction.
Storage and Handling of Materials and Waste	To ensure hazardous materials and waste are handled, stored and disposed of appropriately.	All hazardous materials will be stored and disposed of in accordance with relevant standards and legislation. All waste materials will be removed from sites and disposed of in a manner acceptable to the DLPE	During construction During construction	Hazardous materials are stored and disposed of in accordance with regulations.
Social and Recreation	To minimise impacts to the surrounding community and employees of NTU.	Local residents and NTU employees will be kept informed of any disruptions to access, traffic deviations, or changes to parking arrangements during construction. Any complaints will be investigated and responded to promptly	During construction During construction	No complaints are received from local residents or employees related to disruption during construction.
Aboriginal Heritage	No impact on Aboriginal heritage sites.	In the event that a site of potential Aboriginal heritage significance is discovered during construction, all works will cease in the vicinity of the site pending consultation with the Aboriginal Areas Protection Authority and the Heritage Conservation Branch of the DLPE.	Prior to construction	Sacred site certification has been received for the site. No Aboriginal sites disturbed.

Operation

Issue	Objective	Commitment	Timing	Performance Indicator
Environmental Management	To ensure environmental management in accordance with key objectives.	An EMP will be prepared following receipt of environmental approval.	Prior to commissioning of lake	EMP approved by DLPE and implemented
Surface Hydrology and water quality	To prevent contamination of surface and lake waters	A water monitoring program will be developed to ensure lake water does not become contaminated or depleted in oxygen.	Operation	A water monitoring program is in place.
Stormwater Management	To prevent contamination of the lake and downstream areas as a result of stormwater flow	Gross pollutant traps will be used to ensure stormwater entering the lake is free from litter and other gross pollutants.	Operation	Gross pollutant traps are in place, working effectively and cleared regularly.
Flora and Fauna – vegetation clearance	Provide appropriate rehabilitation of the site following construction.	All cleared areas will be rehabilitated and landscaped in accordance with the Landscape Master Plan.	Operation	Landscaping is progressing and cleared areas have been rehabilitated.
Flora and Fauna – aquatic fauna	Not to impact on movement of aquatic fauna into and out of lake.	The weir will be built to a height that allows tidal intrusion thus permitting fish movement, aiding water mixing and assisting in the maintenance of a brackish water habitat.	Operation	Fish migrating in and out of lake with tide.
Flora and Fauna - bats	To minimise impacts of operation of the proposal on bats	A monitoring program will be implemented following construction to determine the impact of the development on roosting bat communities.	Operation	A bat monitoring program is in place.
Flora and Fauna – biting insects	To minimise potential for creation of breeding areas for biting insects	The lake and surrounds will be regularly inspected following construction to identify any potential biting insect breeding habitat.	Operation	No biting insect breeding habitat has been created due to the proposal.
Flora and Fauna – weeds and pests	To prevent the spread or establishment of weed species due to construction	The site will be regularly visually inspected for the spread or establishment of terrestrial or aquatic weed species during operation.	Operation	No terrestrial or aquatic weed species have established as a result of the proposal.

6. Glossary

AHD	Australian Height Datum
DCC	Darwin City Council
DLPE	Department of Lands, Planning and Environment, NT Government
DT&W	Department of Transport and Works, NT Government
GPT	Gross Pollutant Traps
PER	Public Environmental Report
ha	hectare

7. References

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