

2025 Project Update

AROWS Water Supply Project

Adelaide River Off-stream Water Storage (AROWS)

The long term solution to securing Darwin's water supply.



An aerial photograph of a river winding through a lush, green forest. The water is a dark, muted green, and the surrounding trees are vibrant green. A small, light-colored boat is positioned in the middle of the river, near the top center of the frame. The text is overlaid on the lower half of the image.

Acknowledgement

The Department of Logistics and Infrastructure respectfully acknowledges the Aboriginal communities surrounding the AROWS basin area and acknowledges the continuing connection to lands, waters, sky and communities, and the evolving cultures of all First Nations peoples. The Department also recognises and values the cultural, social, environmental, spiritual connection of Aboriginal peoples to the Adelaide River and its wetlands and floodplains.

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The planning and approvals phase of the Adelaide River Off-stream Water Storage (AROWS) Project is jointly funded by the Australian and Northern Territory governments, delivered in partnership with the Power and Water Corporation.

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AROWS Overview

Water is one of our most precious resources.

There is an emerging risk to water security in the greater Darwin region with our current infrastructure operating at capacity. The Adelaide River Off-stream Water Storage (AROWS) Project offers a sustainable, reliable and adaptable water source solution for the Darwin region, future proofed for the next 100 years.

Current modelling shows that AROWS can double our water supply, providing an additional 60 gigalitres per year to the network, enabling economic opportunities and maintaining the Territory lifestyle.

AROWS would join Darwin River Dam, Manton Dam and groundwater as part of the multi-source water supply system for Darwin.

By having multiple sources of water, Darwin's supply will have a greater resilience to a changing climate to supply safe and secure drinking water for Darwin over the long term.



Capacity for growth



Resilient to climate change



Sustainable solution



Endorsed by Infrastructure Australia

Darwin Region Water Supply Program

The current water supply sources in Darwin are operating at or above capacity. Even with current demand management programs, investment in new water infrastructure is required to ensure water availability does not limit social and economic growth in the Darwin region.

After a comprehensive and detailed assessment of water supply options for the Darwin region, a Detailed Business Case (released in 2022) confirmed Manton Dam Return to Service and AROWS (also known as the Darwin Region Water Supply Program) as the most cost effective and economically viable infrastructure solution to meet Darwin's future water supply needs.

Manton Dam: Manton Dam was previously Darwin's main water source but has been in care and maintenance since Darwin River Dam came online in 1972. Infrastructure upgrades will return Manton Dam to service by 2026, to provide an additional 7.3 gigalitres a year into the Darwin region water supply system. More information on Manton Dam can be found online at powerwater.com.au/mantondam

AROWS: Located north of Lake Bennett, AROWS proposes to utilise a naturally occurring basin within a ridge formation that can hold water next to Adelaide River. Dam walls would be constructed at low points of the basin so that water can be stored.

After over a decade of feasibility studies, the proposed AROWS Project is still in its early stages of project development. The Power and Water Corporation commenced early planning and feasibility studies for the AROWS Project in 2011. Key outcomes of these studies include a detailed understanding of site geology, hydrogeology, and the challenges ahead for infrastructure design. Importantly, studies confirmed the water tightness of the basin and ranges ensuring water pumped in will remain in the reservoir.

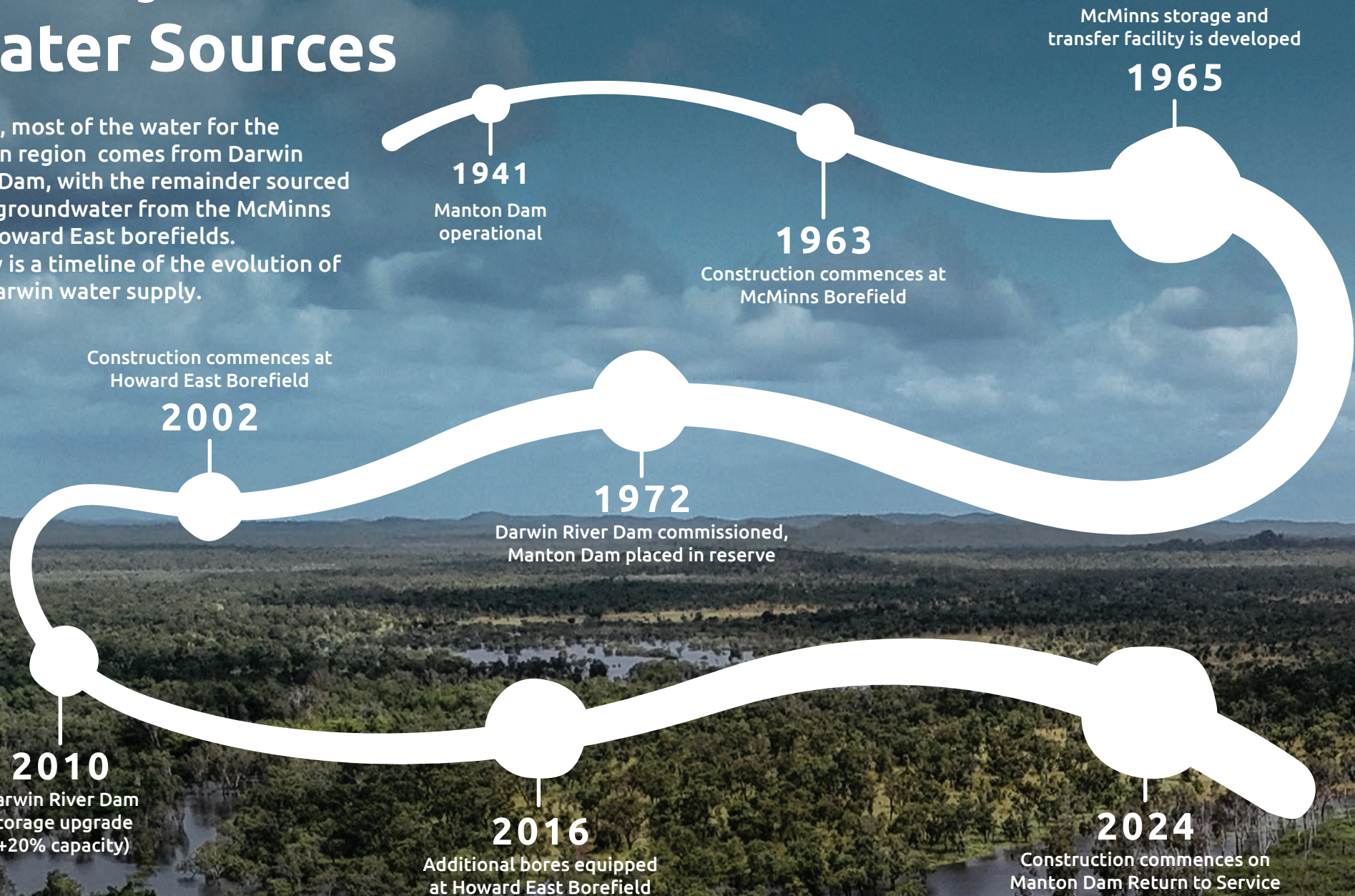
AROWS has moved past feasibility and is now currently undergoing a robust planning and approvals phase. The planning and approvals phase includes environmental studies and assessment, technical engineering studies and design, stakeholder and community engagement, water resource modelling, water system modelling and water demand forecasting. This phase will continue for the next 1-2 years.



This project would be the largest infrastructure project undertaken in the Territory since the Alice Springs to Darwin Railway.

History of Darwin's Water Sources

Today, most of the water for the Darwin region comes from Darwin River Dam, with the remainder sourced from groundwater from the McMinns and Howard East borefields. Below is a timeline of the evolution of the Darwin water supply.

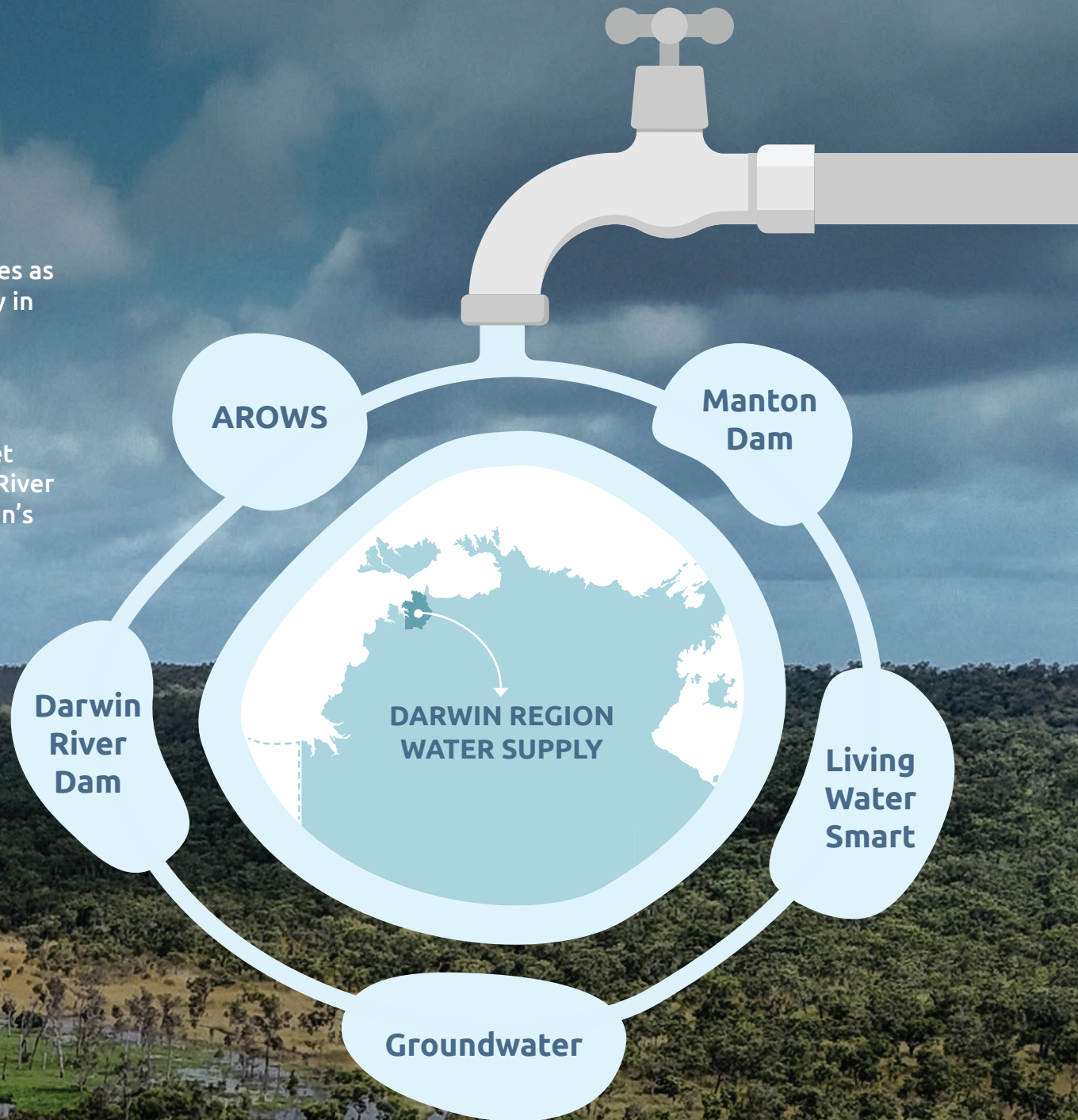


Looking to the future

As a tropical city, Darwin uses up to two to three times as much water per household than any other capital city in Australia.

The Darwin region water supply system is strongly influenced by climate, including the seasonal nature of rainfall in the wet/ dry tropics. A series of poor wet seasons could mean insufficient recharge to Darwin River Dam, causing water levels to fall steadily in the region's primary water supply source. This would place the continuity of supply at risk.

The future of Darwin's water supply will be a multi-source supply system including Darwin River Dam, Manton Dam, groundwater and the proposed AROWS Project. Living Water Smart and 'That's My Water', are Power and Water Corporation initiatives that help the Darwin region reduce water use through education. By having multiple sources of water, as well as using water efficiently, Darwin can rely on a safe and resilient water supply.



The detailed business case

A detailed business case looked at a range of options to increase water supply in the Darwin region. This comprehensive assessment identified the Darwin Region Water Supply Program as the best solution to meet the short and long term water needs of the Territory.

The program will be delivered in 2 stages:

Stage 1: Manton Dam to Return to Service

- Returning Manton Dam to service and delivering stage one of the Strauss Water Treatment Plant will provide an additional 20% capacity to boost our short term water supply by 2026.

Stage 2: AROWS Water Supply Project

- Construction and commissioning of AROWS can double our capacity to secure a long term water supply within the next 7 to 10 years. Stage 2 also involves delivering stage 2 of the Strauss Water Treatment Plant.



Options explored

Options Longlist

- | | |
|--|------------------------------------|
| 1. Do minimum | 5. Manton Dam RTS and medium AROWS |
| 2. Recycled water | 6. Desalination |
| 3. Do minimum and disaggregated supply | 7. AROWS large |
| 4. Manton Dam RTS and small AROWS | 8. In-stream dams |
| | 9. Manton Dam RTS and large AROWS |

↓ Quantitative Multi Criteria Analysis ↓

Options Shortlist

- | | |
|--|-----------------------------------|
| 1. Do minimum and disaggregated supply | 4. Upper Adelaide River Dam |
| 2. Manton Dam RTS and medium AROWS | 5. Manton Dam RTS and large AROWS |
| 3. Large AROWS | |

↓ Rapid Cost Benefit Assessment ↓

Progressed to DBC

1. Manton Dam RTS and AROWS

2. Desalination and Water Recycling

Recommended as best solution to meet the Darwin region's water needs

The detailed business case

Detailed Business Case Process

PART A REPORT Preliminary Assessment



Water Demand
& Supply Assessment



Request for
Information (RFI)
Process and Market
Consultation



Stakeholder
Engagement Plan



Establish Base
Case and Reference
Project & Technical
Gap Analysis

PART B REPORT Detailed Business Case



Strategic Alignment
& Context, Legal &
Regulatory



Market Sounding,
Public Interest



Social Impact
Analysis,
Environmental
Assessment



Economic Appraisal,
Financial Modelling



Delivery Model,
Conclusions &
Recommendations



Infrastructure Australia's assessment of the business case can be found online here

More information on the options assessed can be found in the Detailed Business Case available online at watersecurity.nt.gov.au

Project Status

A project of this scale and complexity will develop over many years.

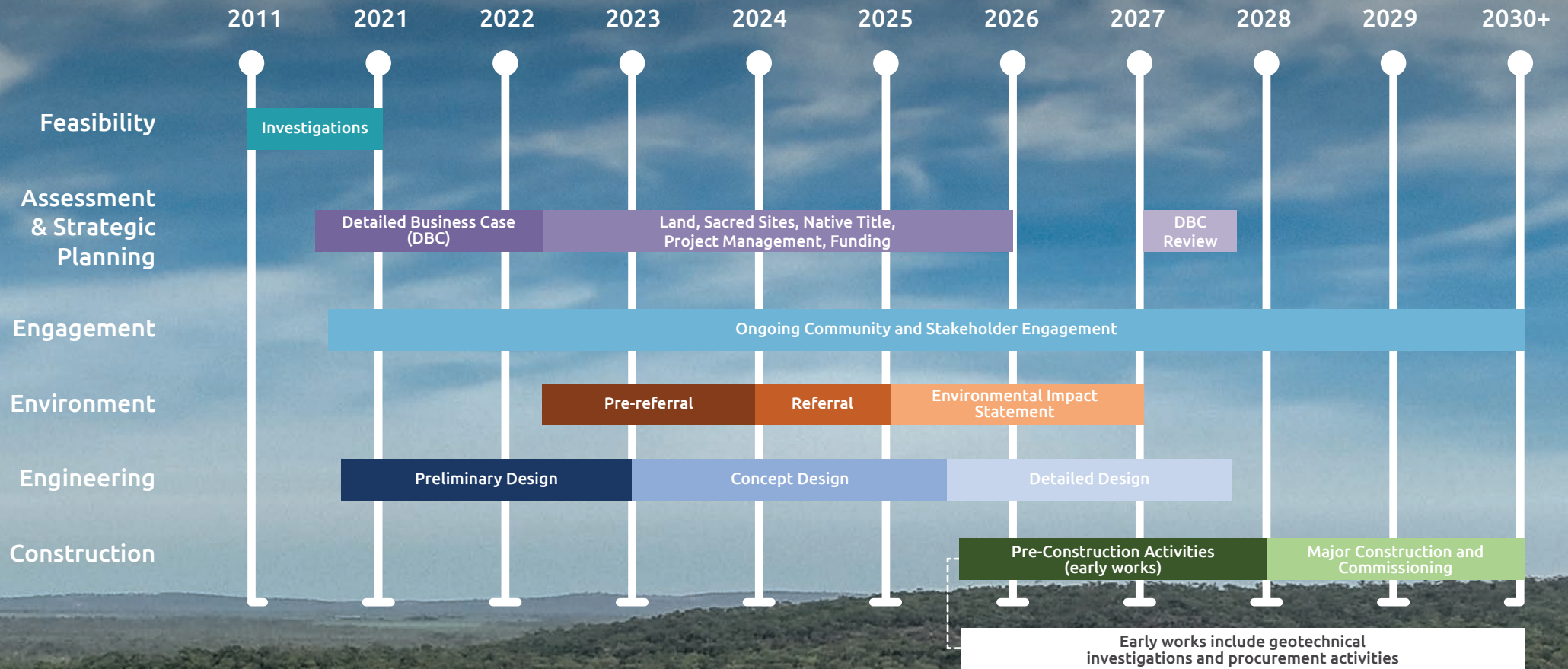
We are currently in the planning and approvals phase which includes environmental studies and assessment, technical engineering studies and design, stakeholder and community engagement, water resource modelling, water system modelling and water demand forecasting. This phase will continue for the next 1-2 years.

AROWS Progress

Feasibility 2011-2021 <input checked="" type="checkbox"/>	Planning & Approvals 2019-2026*	Pre-construction 2025-2028*	Construction & Commissioning from 2028**	Operations TBD**
<p>Technical and environmental studies were undertaken to understand the feasibility of the project including geology, hydrology, terrestrial ecology and preliminary infrastructure design.</p>	<p>This phase progresses planning activities, statutory approvals, stakeholder and community engagement, and de-risking activities to better define the cost, delivery model and project schedule.</p>	<p>Activities in this phase include targeted geotechnical surveys, detailed design, procurement and construction planning to inform a Final Investment Decision.</p>	<p>This phase will include infrastructure construction, environmental monitoring, ongoing community and stakeholder engagement, commissioning and testing.</p>	<p>The operation of AROWS would support Darwin's water security by delivering an additional 60 gigalitres annually to local residents. The AROWS Project supports an environmentally sustainable approach to meet our water demands.</p>

* Time overlap relates to concurrent activities in each phase
 ** Estimate only. Subject to receipt of final approvals and funding

Project Timeline



Project timeline estimate only. Subject to final approvals and funding

What is an off-stream reservoir?

In contrast to in-stream dams (like Darwin River Dam and Manton Dam), the AROWS Project would be an innovative *off-stream* water storage initiative.

An in-stream dam usually involves a barrier (dam) being built across a waterway, the water then floods the surrounding area behind the dam to create a reservoir.

An off-stream reservoir like AROWS removes the need for river blocking dam infrastructure, maintaining the natural flow of the Adelaide River.

To fill the reservoir, water is proposed to be extracted from the Adelaide River during the wet season at times of high flows (December to April).



Benefits of off-stream reservoirs



Rivers can flow freely



Reduce impacts to the environment (in comparison to in-stream dams)

Operator can control when water is extracted from the river (this will be subject to independent licensing and regulation)



Extraction times can be adapted to ecosystem needs (e.g. avoiding the 'first flush' of the wet season)

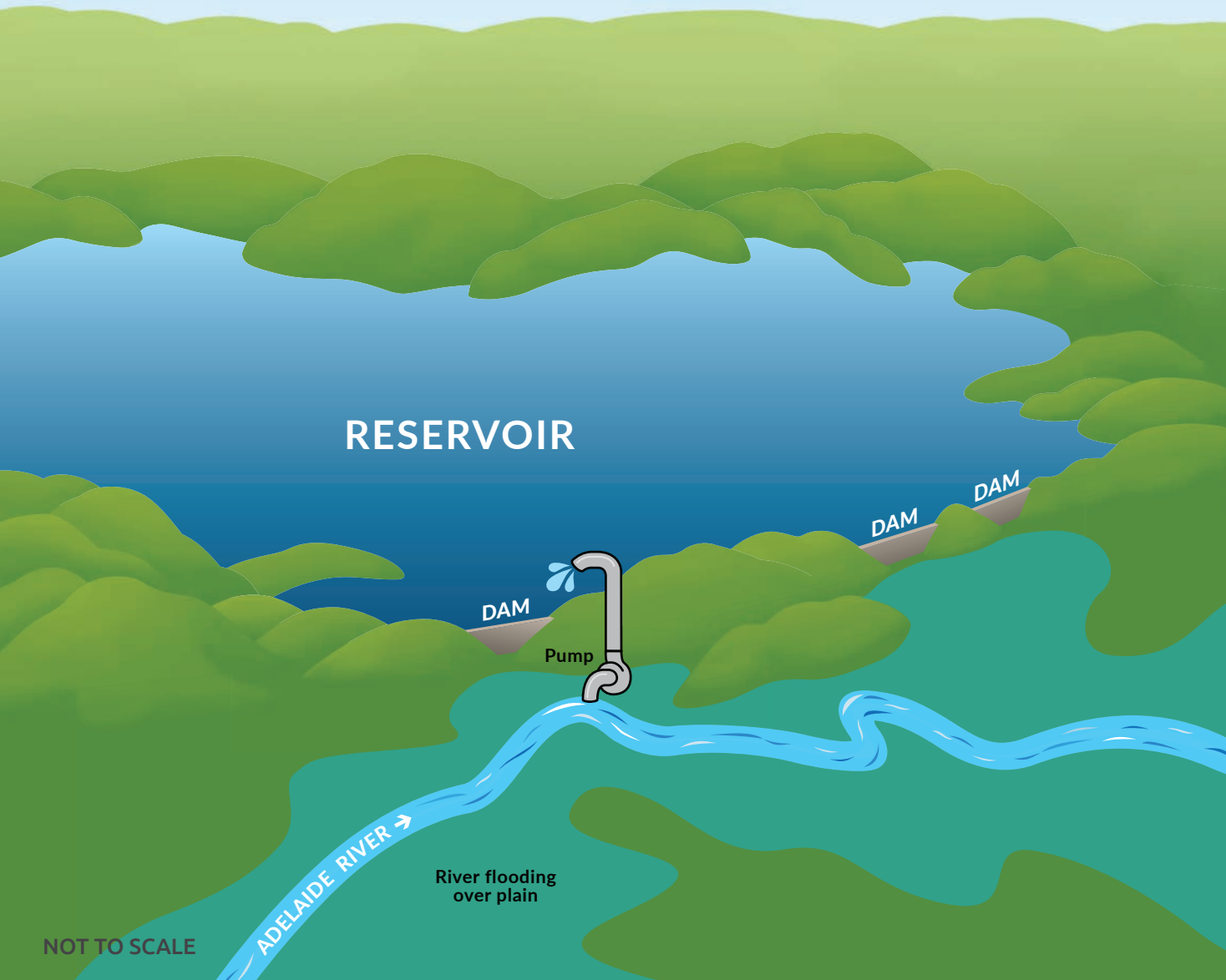


Climate adaptable - reduce or stop extraction in dry years, respond to weather events



Water sampling can tell us the best time to extract from the river to maximise water quality

AROWS reservoir
Conceptual illustration of off-stream reservoir
250 gigalitres



Darwin River Dam
303 gigalitres



Manton Dam
14 gigalitres



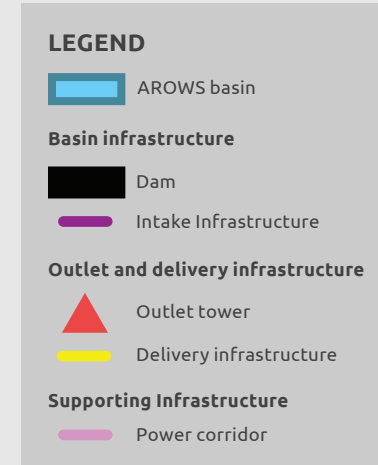
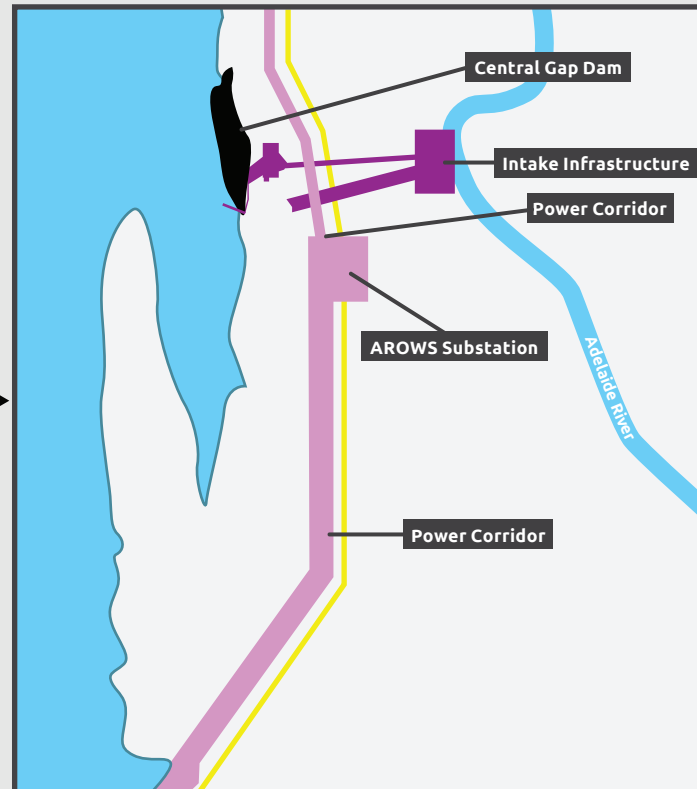
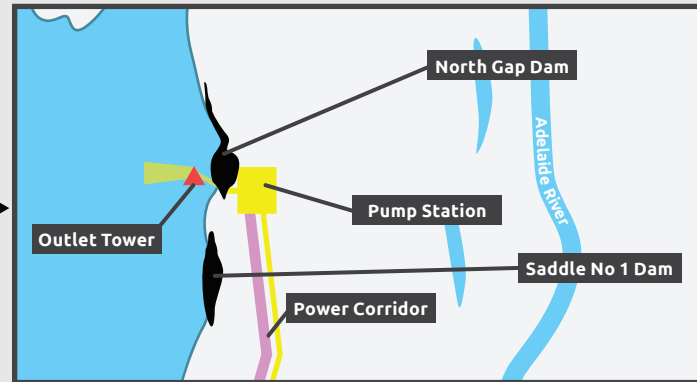


AROWS Infrastructure Components

The AROWS Project comprises of 5 overarching infrastructure components with different functions

Intake infrastructure	River intake, pump station and transfer pipeline. The intake infrastructure moves water from the Adelaide River into the basin during the wet season.
Basin infrastructure	Dams and a spillway. This infrastructure holds water in the naturally occurring basin and stops the water from flowing out at low points in the ridges.
Outlet and delivery infrastructure	Outlet, pump station and delivery pipeline. The outlet infrastructure moves water from AROWS to the Strauss Water Treatment Plant.
Supporting infrastructure	Temporary works and permanent utilities/facilities. This infrastructure is to support the construction and operation of the AROWS Project (access tracks, laydown areas, site facilities, electricity substation, telecommunication facilities).
Connecting infrastructure	Pumps, pipeline, and a balance tank that will help move water from the delivery infrastructure to the future Strauss Water Treatment Plant.

Proposed locations of Infrastructure



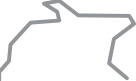
What would the water from AROWS be used for?

AROWS is planned as a public drinking water supply source for the Darwin region with the primary focus on the production of safe drinking water for the community, enabling Darwin to grow. As well as providing secure drinking water, growing our water supply will enable ongoing benefits to Territorians through economic opportunities and jobs.


In 2021, the greater Darwin region's total demand for water was approximately 42 gigalitres per year. It is expected to more than double by 2050 to around 100 gigalitres per year.

Water from AROWS would enter the existing water supply system, meeting the forecasted future industrial, horticultural and urban demand.


The AROWS Detailed Business Case identified that forecast annual water demand in 2050 is estimated to be more than double today's demand:




42 gigalitres
2021 base demand



an additional 11 gigalitres
Future urban demand (population growth)

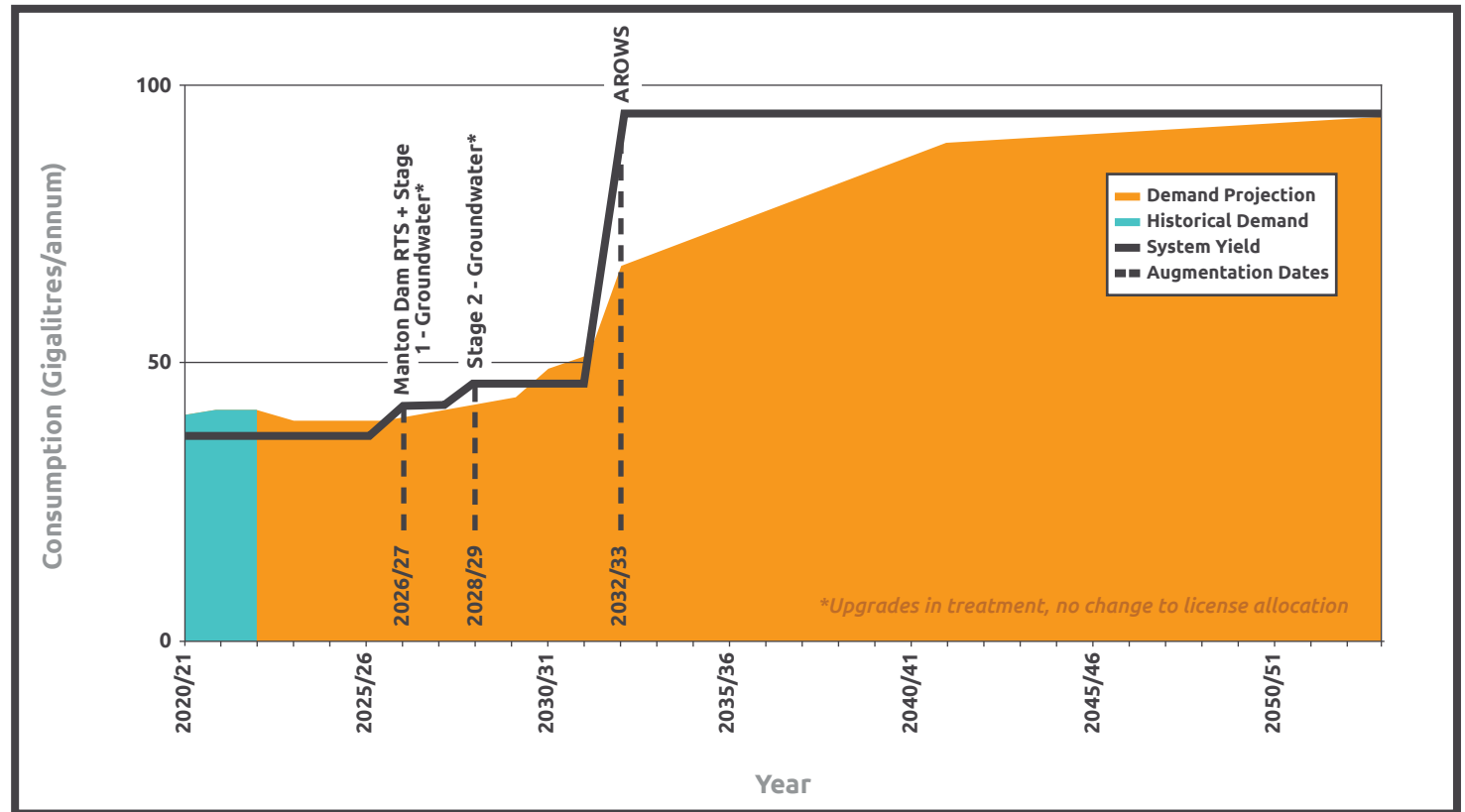


17 gigalitres
Future agriculture and horticulture demand



27 gigalitres
Future industrial demand

Water Supply demand forecasting for the Darwin Region - Power and Water Corporation



Making sure we have safe drinking water

Open catchments like the Adelaide River Catchment are used all around the world to supply water to communities and have been for decades.

Sophisticated monitoring and treatment processes ensure drinking water meets high standards as set by the Australian Drinking Water Guidelines.

There would be multiple critical control points to ensure safe drinking water:

- Control extraction timing to maximise quality water being extracted
- Maintain reservoir levels to ensure a high level of dilution and buffering
- Test, and treat water at the future state of the art Strauss Water Treatment Plant
- Continuous monitoring and testing of water throughout the water supply system.



How would water be extracted from Adelaide River?

As an off-stream storage, AROWS would have a unique ability to control how and when water is extracted from Adelaide River to fill the reservoir (under strict licensing conditions).

The Adelaide River catchment covers 7,640 km² and typically receives significant rainfall each year.

Water would only be extracted from the river during the wettest months of the year - December, January, February, March and April.

The proposed extraction approach is influenced by a range of factors, including:

- Time of year
- River height and rainfall
- AROWS reservoir levels
- Behaviours of aquatic species (e.g. migration cycles)
- Level of demand for water from the Darwin region.

In the AROWS Project's Environmental Impact Statement, all of these factors will be assessed in detail to determine the optimal approach.

A water allocation plan is being delivered by the Department of Lands, Planning and Environment. This plan will determine how much water is required for environmental and cultural flows firstly and then how much is available for use in the whole Adelaide River Catchment.

The water allocation plan will be used to inform licence conditions for AROWS that protect the environment, and ensure sustainability.

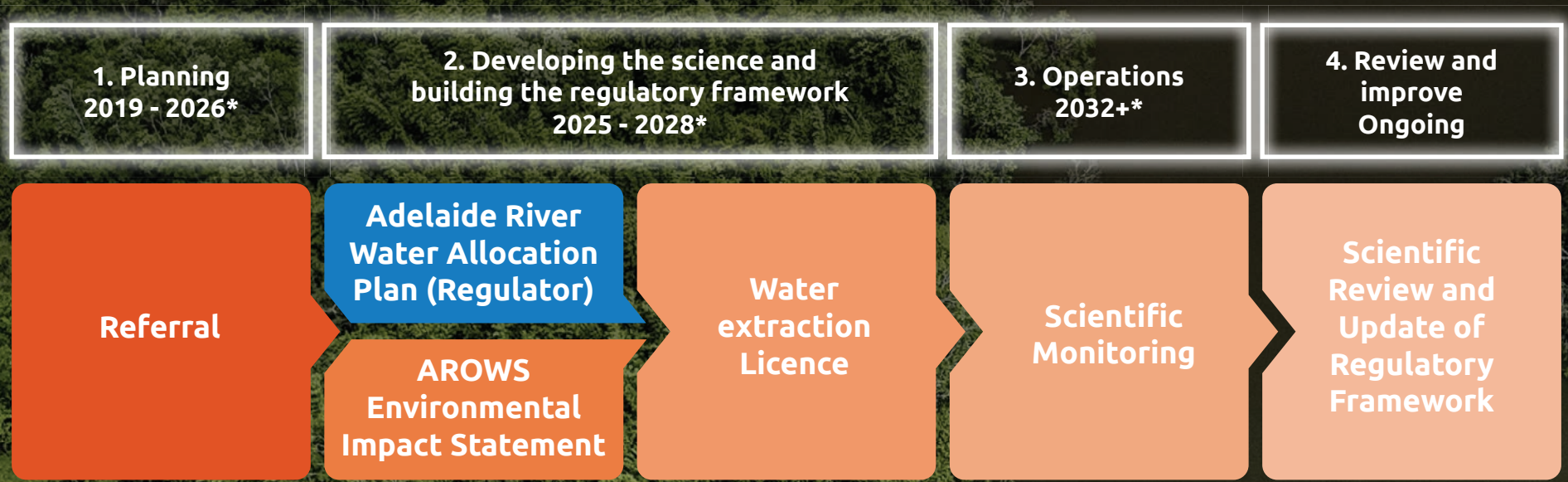
Information on water allocation planning can be found: nt.gov.au/environment/water/management-security/water-allocation

How we will determine the best water extraction approach:

- **Using a range of data (e.g. rainfall geography and river flow rates) a scientific model will be developed.**
- **The model will then be used to run a high, medium and low extraction scenario from the river under assumed regulatory rules.**
- **Climate change predictions will then be run over the extraction scenarios.**
- **A 3D model will then be used to determine the nature and extent of change in the downstream flows and potential changes to floodplains and supporting environments.**
- **All of these results will be submitted to the NT Environmental Protection Authority (EPA) and will be available for public comment.**
- **Beyond assessment and for the long term operation of the AROWS Project, environmental monitoring would continue. This would enable the ongoing measurement and detection of any change in environmental conditions as a result of the Project.**
- **Measurements will be used to review and adapt extraction methods to changes observed in the environment to ensure a flexible approach for continual improvement as illustrated in the AROWS water extraction: A continuous improvement approach underpinned by science as shown in the graphic on the next page.**

AROWS water extraction:

A continuous improvement approach underpinned by science



**Timing indicative and subject to approvals and final investment decision*

Understanding the environment

Working with the environment is at the core of the AROWS Project, providing an alternative to in-stream dams.

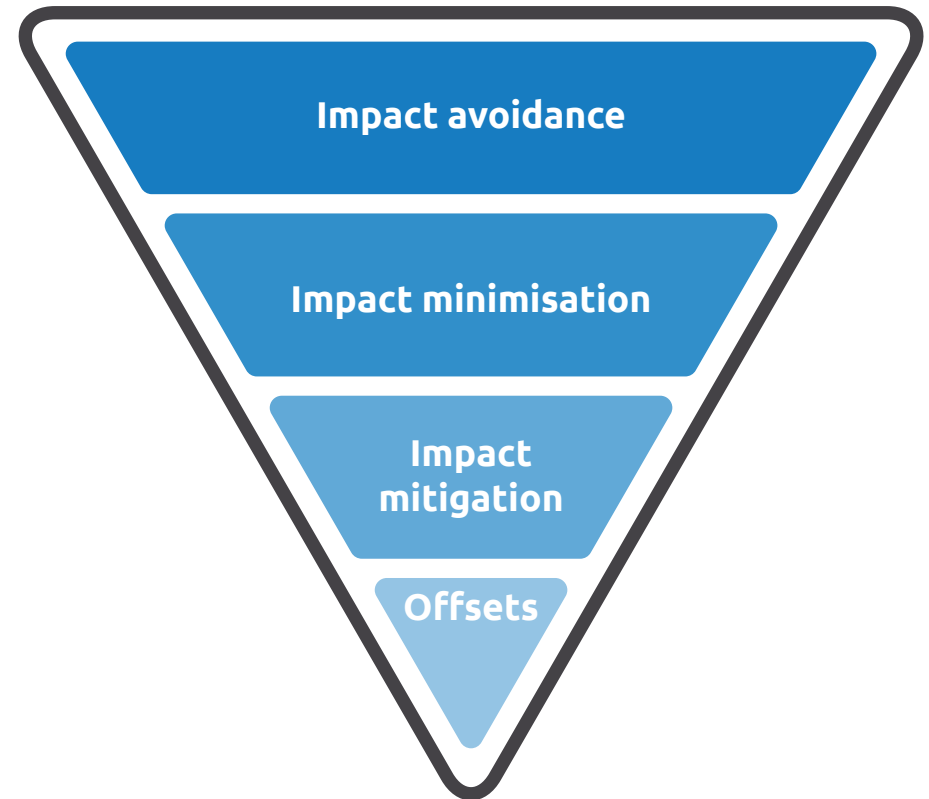
The engineering design work for the infrastructure components is happening concurrently with the environmental assessment, allowing the NT Government to directly feed environmental and stakeholder feedback outcomes into the design process.

Principles of ecologically sustainable development (ESD) have been a key focus in the development of AROWS. ESD principles will be applied to optimise the project design and implementation from the concept design phase and into detailed design.

The NT Government will spend the next 2-3 years working with scientists, Aboriginal people, the local community and other experts to better fill any information gaps and determine how to mitigate any impacts identified.



Mitigation Hierarchy



The AROWS Project will implement an overarching mitigation hierarchy to manage potential impacts to the environment, in line with best practice infrastructure development.

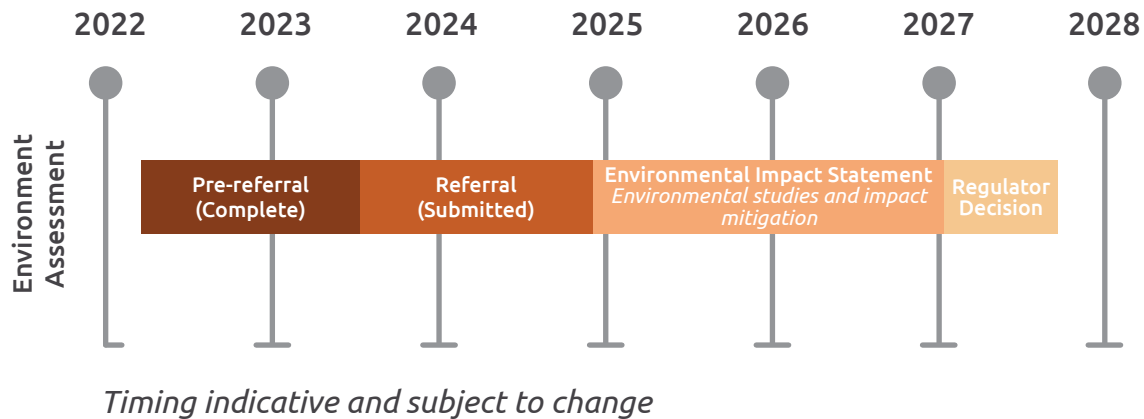
What is an Environmental Referral?

Projects that have the potential to have a significant impact on the environment require an Environmental Referral to the Environment Protection Authority (NT EPA) and to the Commonwealth Government.

The Referral document outlines what we know about the AROWS Project, what information gaps we have, any potential impacts and how we will mitigate these impacts.

It is important for us to understand your thoughts, issues and concerns as they will play an important role in shaping the AROWS Project.

The Referral and the Environmental Impact Statement documents will be open for public comment via the NTEPA website.



Pre-referral

A pre-referral screen checklist is used to predict and define the potential for environmental impacts from the project. If a project has the potential to have a significant impact on the environment it will move onto the next stage.

Referral

The referral report presents the project, existing environmental values, potential impacts and protection measures, and describes the outcomes from early community and stakeholder engagement. It also presents the Terms of Reference.

We are here

Environmental Impact Statement

This is the longest stage and involves undertaking technical environmental studies and extensive community engagement. At the end of this stage, a report is published and submitted to the NT EPA for assessment and public comment.

Supplementary Environmental Impact Statement

Following the NT EPA assessment and public exhibition of the report, the project team reviews and presents supplementary information to address any comments made by the NT EPA or general public.



Threatened Species

What we know

The AROWS Project would change the landscape of the AROWS basin, filling it with water.

Desktop reviews* and field surveys have identified the following threatened species as occurring or have the potential to occur in or near the AROWS basin:

Threatened flora



- *Cycas armstrongii*
- *Helicteres macrothix*
- *Typhonium praetermissum*

Threatened fauna



- Black-footed tree rat
- Northern brush-tailed possum
- Merten's water monitor
- Gouldian finch
- Partridge pigeon (potential only, more information required)

Aquatic ecology

The desktop review* of Territory and Commonwealth listed species together with the aquatic ecology surveys completed to date have found that there are threatened and/or protected species within the Adelaide River or likely to be:



Threatened species within the Adelaide River

- Northern river shark
- Spertooth shark
- Largetooth sawfish
- *Crocodylus johnstoni* (freshwater crocodile)
- *Crocodylus porosus* (estuarine crocodile)

* A desktop review is a method of study that involves using existing and historical documents and evidence to make an assessment.

Land

- Cultural values impact assessment
- Geomorphology assessment
- Sediment transport modelling
- Contaminated land assessment
- Geotechnical investigations
- Baseline surveys (including habitat condition and quality assessment) and vegetation mapping
- Significant impact assessment of NT and Commonwealth protected matters
- Offsets strategy (if required)

Water

- Census of registered groundwater bores
- Additional baseline monitoring (e.g., surface water levels and flows, groundwater levels, bathymetric surveys)
- Hydrologic and hydraulic modelling
- Hydrogeological modelling
- Sediment transport modelling
- Water quality modelling
- Bathymetry and channel geometry targeted surveys
- Baseline aquatic ecology surveys
- Significant impact assessment of NT and Commonwealth protected matters

Studies and assessments we plan to undertake to understand the gaps

Air

- Emissions inventory update in line with latest engineering design and operational functions

People

- Stakeholder consultation and engagement
- Social impact assessment study
- Economic impact assessment
- Cultural values impact assessment study
- Heritage assessment surveys
- Dam break/ failure assessment
- Traffic impact study
- Biting insects assessment
- Crocodile population increase assessment

Key community issues raised so far

Human Health

What we have heard

- Concerns regarding potential increase in saltwater crocodiles travelling to Lake Bennett
- Increase in mosquito breeding in new water source (AROWS basin).

These concerns will be investigated during the next stage of the environmental assessment along with impacts to human health associated with construction activities and the unlikely safety risks from unplanned conditions (dam failure).

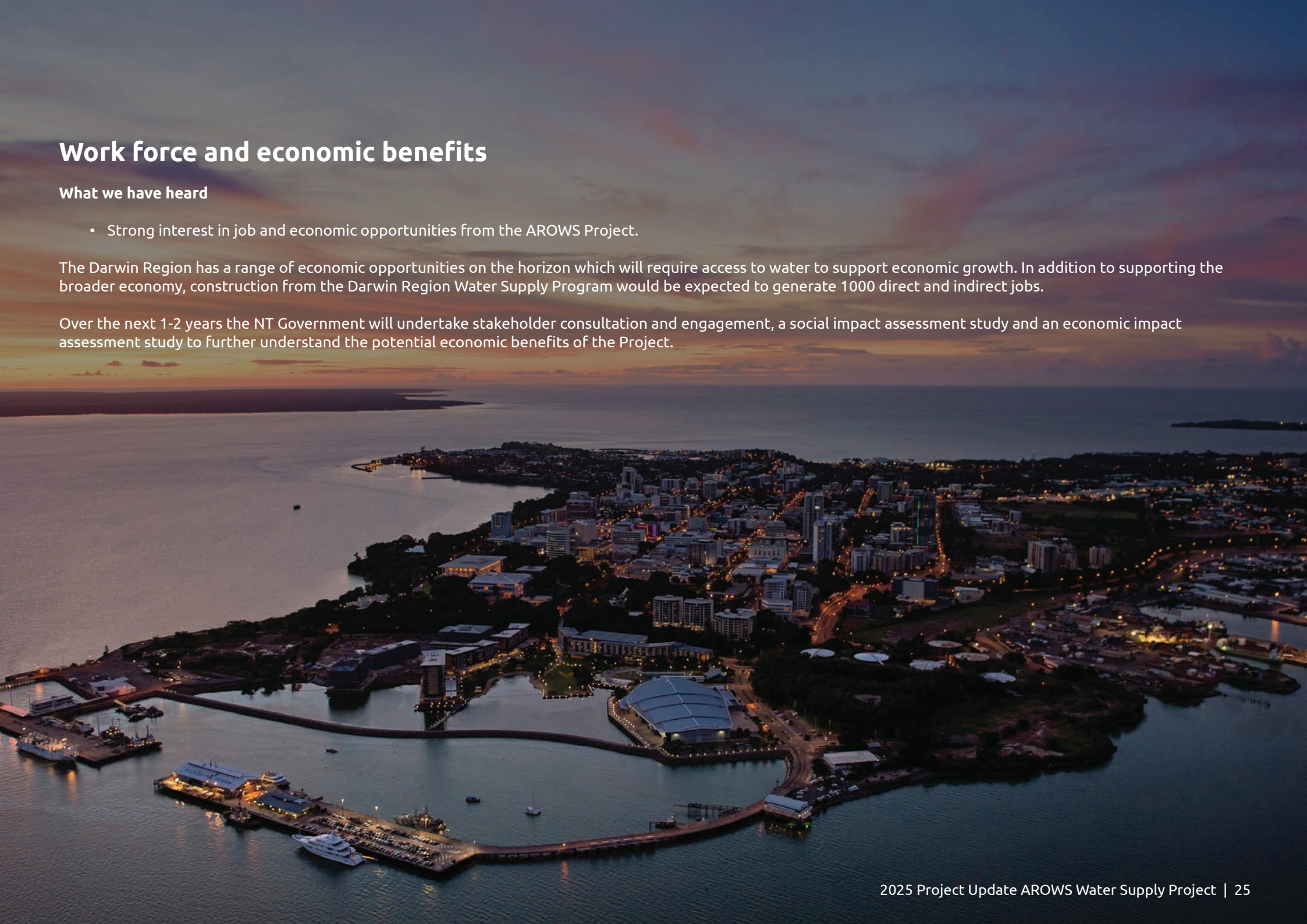
Work force and economic benefits

What we have heard

- Strong interest in job and economic opportunities from the AROWS Project.

The Darwin Region has a range of economic opportunities on the horizon which will require access to water to support economic growth. In addition to supporting the broader economy, construction from the Darwin Region Water Supply Program would be expected to generate 1000 direct and indirect jobs.

Over the next 1-2 years the NT Government will undertake stakeholder consultation and engagement, a social impact assessment study and an economic impact assessment study to further understand the potential economic benefits of the Project.



Land Use

What we have heard

- Concerns that the AROWS Project may result in land use changes.

The Adelaide River catchment has a range of land uses and supports farming, tourism and recreational and commercial fishing practices. Open drinking water catchments are typical across Australia and the world. The NT Government will undertake baseline land use assessments to understand the potential risk to the drinking water supply.

There are a range of existing protections and regulations on land use that work to protect river water quality.

Further consultation on land use will be undertaken in 2025 with a priority for this Project to be designed to minimise any impacts on existing land use.

An Indigenous Land Use Agreement (ILUA) is likely to be required for the Project.



Recreation

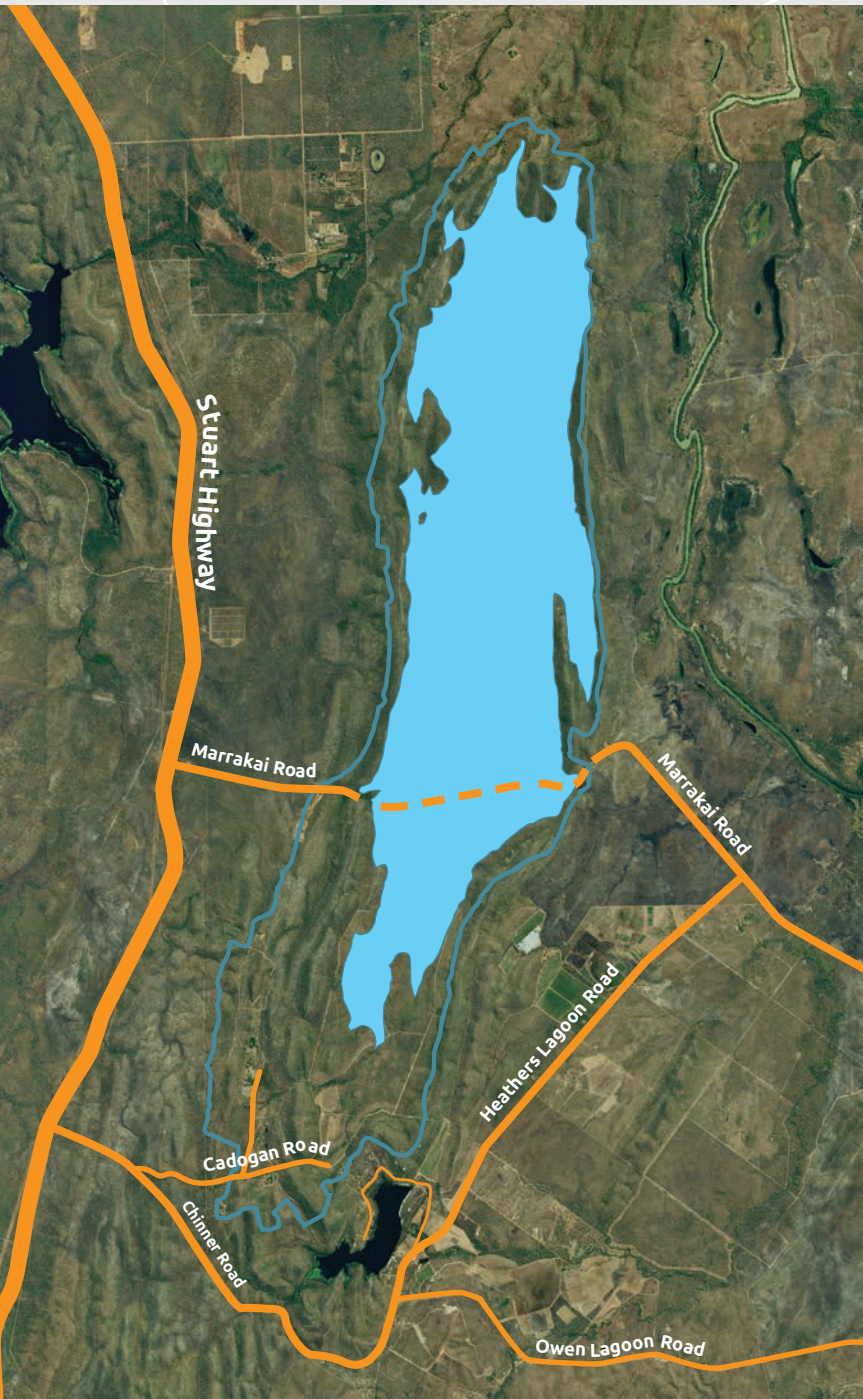
What we have heard

- Strong interest in recreational activities in the AROWS basin once filled with water
- Concerns regarding potential changes to fishing in the Adelaide River
- Access to areas for hunting and recreational driving.

AROWS is planned as a public drinking water supply source for the Darwin region, so the primary focus is on the production of safe drinking water for the community, and potable water for other users connected to the water supply network.

As the Project is in the planning and approvals phase, a better understanding of the infrastructure is required before a decision on recreational activities within the basin can be made.

A part of the environmental assessment will be to ensure that the plants and animals are still able to thrive, including those associated with recreation and culture. The health and sustainability of crocodiles, barramundi, crabs and the ecosystems they rely on, will be investigated in the next stage of environmental assessment.



Roads

Roads and how people use them play an important part in both the environmental assessment and the development of the design of any major project.

To understand how the existing road network is utilised, by who and how often, the NT Government will undertake traffic count assessments and community consultation in the region.

The proposed AROWS Project is likely to impact a section of Marrakai Road between the Stuart Highway and the Adelaide River.

Environmental, social, economic, and constructability factors are being considered for the re-routing of Marrakai Road to ensure local traffic could still move from the Stuart Highway to the Arnhem Highway.

We are also considering what roads the infrastructure components might need including:

- Temporary access roads
- Permanent access roads
- Road upgrade requirements
- Social, health and safety impacts to changes in routes and construction
- Intersection upgrade requirements
- Construction detour requirements
- Road closures and realignments.

Decisions on roads will be informed by former progress on the design and communication consultations through 2025.

You can provide feedback on how you use roads around the AROWS Project area at any time either through the Community Reference Group or directly to the Project team using the contact information on final page.



What's next

The AROWS Project will spend the next 3-4 years completing the planning, approval and pre-construction activities including environmental studies and assessment, technical engineering studies and design, stakeholder and community engagement, water resource modelling, water system modelling and water demand forecasting.

Your feedback is important to us. We will continue to undertake community consultation on issues and concerns including but not limited to:

- Roads - to understand how you use them now and how changes during construction and operation may affect you.
- Catchment management - to understand how you use your land in the catchment area now and what that means for water quality.
- Water extraction - understanding what is important to you so we can extract water from the river at the right time.

The public will be able to provide comment directly to the NT EPA at both the Referral and Environmental Impact Statement stage.



There are multiple ways to provide feedback on the AROWS Project

① Anytime

Contact the Project team at any time via the email address or phone number on the next page and provide your feedback. This feedback be used by the Project team to understand what matters to you.

② Community Reference Group (CRG)

The CRG provides a direct line of communication between community representatives and the NT Government in relation to the Project.

The CRG members can:

- voice community views
- provide community feedback on the Project and its delivery
- be provided with information firsthand by the NT Government that can be relayed back to the wider community.

View CRG members on our website and contact them via email at CRG.waterinfrastructure@nt.gov.au

③ Environmental Referral

The Referral will provide information to the public on the proposed AROWS Project.

The Referral is an opportunity for the community to raise any concerns with the Project.

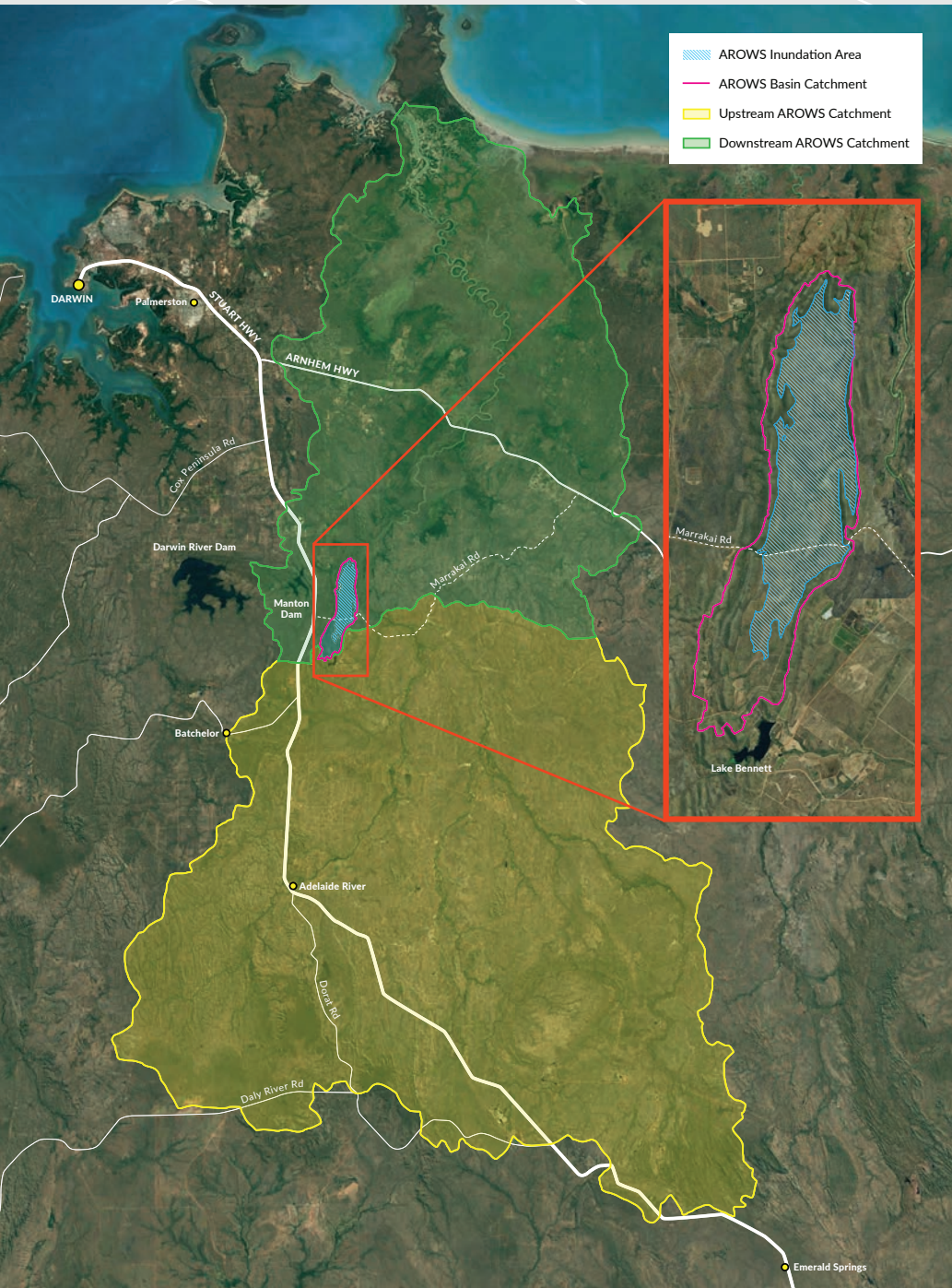
Feedback provided through the EIS Referral will be considered by the Project team into the next phases of the design and environmental processes.

④ AROWS Environmental Impact Statement (EIS)

The EIS is a further opportunity for the community to raise any remaining concerns with the Project.



Sign up to our newsletter for all the latest updates





The AROWS Project represents a new way of thinking to deliver reliable, sustainable and safe drinking water

By securing water for the Darwin region our economy can grow, providing more jobs for Territorians.

 watersecurity.nt.gov.au

 waterinfrastructure.dli@nt.gov.au

 (08) 8999 5106

 CRG.waterinfrastructure@nt.gov.au



PowerWater

