

# **Water Allocation Plan**

## **Tindall Limestone Aquifer, Katherine**

## Part 1 Introduction

For hundreds of years, people from the clans of Jawoyn, Wardaman and Dagoman have lived on the lands surrounding Katherine. These people today still have an important connection to the many springs, sinkholes, streams and rivers, used for fishing, swimming, camping and dreaming.

This Water Allocation Plan acknowledges the traditional owners that live within the Plan area, and recognises a deep cultural connection to the many water features, which are interconnected with the Tindall Limestone Aquifer.

All community groups are encouraged to contribute to assist NRETAS to develop and improve future management of the Tindall Limestone Aquifer, through the Tindall Limestone Aquifer (Katherine) Water Implementation Strategy.

### 1. Name of Plan

This Plan is the Water Allocation Plan for the Tindall Limestone Aquifer, Katherine 2009 - 2019 (hereafter **this Plan**).

### 2. Legal relevance of this Plan

- (i) This is a Plan under section 22B of the NT *Water Act* (hereafter **the Act**).
- (ii) This Plan refers to the current regulations of *the Act*.
- (iii) This Plan relates to the Daly Roper Water Control District declared under section 22 of *the Act*.

### 3. Date of commencement

This Plan takes effect when declared by the Minister under *the Act*. The Plan will be reviewed within 5 years and cease to have effect 10 years from its commencement or upon declaration of a new plan covering the Tindall Limestone Aquifer within the Katherine River catchment, whichever occurs first.

### 4. Scope of this Plan

#### a. Area to which this Plan applies

The area to which this Plan applies is that part of the Tindall Limestone Aquifer bounded by the Katherine River Catchment (hereafter **this water source**) as shown in the map in Schedule 3.

#### b. Waters to which this Plan applies

- (i) This Plan applies to management of water contained within the unconfined and confined Tindall Limestone Aquifer within the Katherine River Catchment.
- (ii) This Plan does not directly apply to the management of surface water extractions from the Katherine River but a range of groundwater management provisions are made which aim to achieve environmental and cultural outcomes which depend on groundwater discharge to the river.

*Note: to achieve equity and to uphold the environmental, Indigenous cultural and other instream public benefit outcomes provided for in this Plan, licensed surface water extraction from the Katherine River (accessing base flow) may be subject to restrictions under s96 of the Act.*

*Restrictions to surface water extraction will be consistent with the announced allocation for high security groundwater licences (see Part 7). A Water Allocation Plan encompassing the Katherine River, formalising the above arrangements will be made within the life of this Plan.*

### **c. Purpose**

The purpose of this Plan is to initiate strategies for sustainably allocating and managing water from this water source. These strategies, as detailed in Clause 18 were created by assessing:

- (i) water availability in the context of climatic variability and community, environmental and Indigenous cultural needs;
- (ii) community response to the economic opportunities associated with the use of this water source, including consumptive uses such as agriculture, industry and public water supply and non consumptive uses such as tourism and recreation;
- (iii) opportunities and needs arising from growth in existing and emerging activities, including economic development opportunities for Indigenous landowners.

## **5. Interpretation**

- (i) Where new terms and concepts are introduced, notes have been included to provide clarification. These do not form part of this Plan.
- (ii) Terms used in this Plan which are not used within *the Act*, are defined in Schedule 1.
- (iii) Schedules do form part of this Plan.
- (iv) Appendices do not form part of this Plan.

## **6. Effect on statutory instruments administered under the Act**

From commencement, management of the Tindall Limestone Aquifer within the Katherine River Catchment in the Daly Roper Water Control District is to be in accordance with this Plan.

## **7. Relationship to other Plans**

- (i) This Plan contributes towards achieving relevant targets in the Northern Territory Integrated Natural Resource Management Plan (March 2005) as outlined in Schedule 6.
- (ii) If, following commencement of this Plan, other Water Allocation Plans are made for water resources connected to this water source, they will be complementary to the objectives and strategies stated in this Plan.

## **8. Consultation**

- (i) The Katherine Water Advisory Committee was announced on 21 February 2007 under section 23 of *the Act* to incorporate community values and beliefs into the development of this Plan.
- (ii) Prior to finalisation, drafts of this Plan were released for formal public comment periods on 26 June 2008 and on 18 December 2008.
- (iii) A public information session was held in Katherine following the release of the first draft Plan on 16 July 2008.

*Note: Clause 8 refers only to formally advertised consultation that was carried out during the two year planning process. Details of the complete consultation process are available in the Consultation Report for the Tindall Limestone Aquifer (Katherine) Water Allocation Plan (2009).*

## Part 2 Planning Context

### 9. Basis for water allocation planning

#### a. NT Water Act

This is a Plan under section 22B of *the Act*.

#### b. National Water Initiative

This Plan is made in accordance with the Northern Territory's commitments under the Intergovernmental Agreement on a National Water Initiative as signed on 25 June 2004.

### 10. Description of this water source

#### a. Hydrogeology and Recharge

- (i) This water source originates from the Tindall Limestone formation which is a fractured and cavernous aquifer system.
- (ii) Within the Plan area, groundwater within the Tindall Aquifer flows towards the Katherine River, where it discharges via springs.
- (iii) As shown in Schedule 3, the Tindall Aquifer is confined where it is overlain by younger geologic formations and unconfined where it outcrops around Katherine.
- (iv) Within the Plan area, recharge only occurs in the unconfined area.
- (v) Based on historic climatic data, stream gauging data, calculated stream flows and hydrologic modelling as described in Part 2 clause 15, the average annual recharge to the Tindall Aquifer within the Plan area is estimated to be 74,000 megalitres (ML).

*Note: Modelling using interpolated long term rainfall data has revealed that this estimated recharge may change. The Tindall Limestone (Katherine) Water Resources Report (2009) provides further detail on the hydrogeology, recharge characteristics and modelling of this water source.*

#### b. Current Licences and Extraction

Immediately prior to the commencement of this Plan, water was allocated from this water source under licences as outlined in table 1. The estimated actual water use for the water accounting year 1 May 2006 to 31 April 2007 is also given in Table 1.

**Table 1: Licensed volumes immediately prior to the commencement of this Plan and estimated use for the 2006/07 water accounting year**

Purpose	Licensed volume (ML)	Estimated current use (ML)
Public Water Supply	7590	1085
Agriculture (inc. Horticulture)	18750	12456
Aquaculture	108	0
Industry	96	1195
Rural Stock and Domestic	0	1128

*Note: Groundwater extraction for stock and domestic purposes is not required to be licensed under the Act. Estimated use for industrial purposes exceeds the licensed volume because groundwater extraction not exceeding 15L/s was not required to be licensed prior to the declaration of the Katherine Water Control District that preceded the Daly Roper Water Control District.*

### c. Relevant Research Reports

Details of research reports that were considered during the development of this Plan are provided in Appendix 3.

## 11. Regional population and employment profile

Following the 2006 census of population and housing the Australian Bureau of Statistics estimates that;

- (i) 9,031 people reside in the town of Katherine
- (ii) 20.2% of residents in Katherine township and 50.2% of residents in the Katherine region were identified as Indigenous
- (iii) The largest employment sectors in the Katherine region include defence (28.2%), retail trade (9.2%), health and community services (9.2%), agriculture, forestry and fishing (7.6%) and education (6.9%)

*Note: Reported statistics are for the Katherine region which includes Katherine township, Eley, Victoria River and Gulf statistical areas.*

## 12. Benefits associated with this water source

### a. Environmental and Cultural

Water from this water source contributes to the perennial nature of surface water flows in the Katherine and Daly Rivers which is critical for maintaining:

- (i) environmental integrity, recreational opportunities and aesthetic appeal;
- (ii) the condition of places that provide physical and spiritual fulfilment to Indigenous people.

### b. Public Water Supply

Water from this water source, in conjunction with surface water sourced from the Katherine River at Donkey Camp Weir, supplies the reticulated public water supply system for the town of Katherine and the Tindal RAAF base.

### c. Rural Stock and Domestic and other Small Volume Groundwater Uses

- (i) Water from this water source is used for domestic purposes and watering of stock on rural properties that are not connected to the reticulated public water supply system.
- (ii) Water from this water source is also available for other purposes without the requirement for a licence, where total annual use does not exceed 5ML.

*Note: An exemption to the Act has been declared for the Daly Roper Water Control District to allow water to be extracted from this water source without a groundwater extraction licence for any purpose providing annual use does not exceed 5ML. This is to provide for rural stock and domestic requirements and light industrial uses such as wash down facilities.*

### d. Agriculture, Horticulture and Industry

At the commencement of this Plan;

- (i) The greatest consumptive demand for water from this water source was for irrigated agriculture and horticulture.
- (ii) Fruit crops irrigated, or intended to be irrigated, from this water source included mangoes, grapefruit, paw paw, bananas, watermelons and pumpkins.
- (iii) Other crops irrigated, or intended to be irrigated, from this water source include hay, sorghum, forage sorghum, cavalcade, rhodes grass and peanuts.
- (iv) Irrigated forestry is limited to small areas of African mahogany plantation.
- (v) Industrial use from this water source is mainly for the purpose of irrigating large areas of lawn for community benefit such as golf courses, sporting fields and green space inc. public parks & gardens.

### e. Economic Growth

This water source is critical to the success of tourism and agricultural industries and contributes to economic growth in the Katherine region.

Within the Katherine region:

- (i) About 270,000 tourists visited each year from 2000 to 2005<sup>1</sup>.
- (ii) Visitors spend an average of \$330 per person, equivalent to \$101 million per year<sup>2</sup>.
- (iii) Tourism expenditure is estimated to grow by around 4.6% annually<sup>3</sup>.
- (iv) Fruit and vegetable production represents about 20% of Northern Territory's production by value whereas field crops account for 41% by value<sup>4</sup>.
- (v) Horticulture production has an estimated worth \$33.8 million in 2005/06<sup>5</sup>.
- (vi) Hay, silage and crop production had an estimated worth \$6.4 million in 2005/06<sup>6</sup>.
- (vii) Pastoral production had an estimated worth of \$91 million, producing 37% of the Territory's stock in 2005/06<sup>7</sup>.
- (viii) Water made available through the review process as specified in Part 8, will provide a Strategic Indigenous Reserve (SIR) to enable access to the

<sup>1</sup> ABS regional statistics 2006: NT 1362.7

<sup>2</sup> Territory Tourism Selected Statistics, TourismNT

<sup>3</sup> Northern Territory Tourism Forecasts 2006/07 to 2008/09

<sup>4</sup> Crops, Forestry & Horticulture Information Service, Department of Regional Development, Primary Industry, Fisheries and Resources

<sup>5</sup> *ibid*

<sup>6</sup> *ibid*

<sup>7</sup> *ibid*

consumptive pool by Indigenous people for the purpose of Indigenous economic development in this planning area<sup>8</sup>.

*Note: Reported statistics are for the Katherine region which includes Katherine township, Eisey, Victoria River and Gulf statistical areas*

### 13. Groundwater Dependant Ecosystems

This Plan makes provision to protect ecosystems that depend on this water source.

Specifically, this Plan allocates water in a manner that ensures:

- (i) that the Katherine and Daly Rivers do not cease to flow as a result of extractions from this water source;
- (ii) that flows at the Katherine Railway Bridge are not reduced below the lowest recorded flow as a result of extractions from this water source; and
- (iii) that the Katherine Hot Springs do not cease to flow as a result of extractions from this water source.

*Note: This Plan cannot prevent the cessation of river flows or spring discharge caused by natural variability in climate. In the absence of research that quantifies the required environmental flows to provide for specific ecosystem processes, the Plan ensures flows in the Katherine River are not reduced beyond the lowest recorded flow at the Katherine Railway Bridge as a result of extraction from this water source. Other groundwater dependant ecosystems, such as riparian and terrestrial vegetation, are assumed to be maintained through the protection of discharge to the Katherine River, however specific provisions for these ecosystems may be introduced upon review of the plan should their specific water requirements become known through monitoring and research.*

### 14. Assumptions

#### a. Climatic Variability

- (i) This Plan recognises climatic variability and therefore that the annual and instantaneous discharge from this water source to the Katherine River will vary.
- (ii) To give effect to subclause (i), this Plan contains provisions to manage discharge from this water source to the Katherine River on an annual basis.
- (iii) All analyses in this Plan have been based on historic climatic data obtained between 1961 and 2007. It is therefore assumed that future climate will exhibit similar characteristics.

#### b. Climate Change

- (i) The licence limits and reliabilities stated in Part 6 of this Plan have been determined based on historic climatic data only and do not consider the possible effect of climate change on the long term availability of water from this water source.
- (ii) At such times when this Plan is reviewed as specified in Part 8, the period of record will be extended to include the latest climatic data and to take account of any available information on projected future changes to climate.

---

<sup>8</sup> Rules surrounding the provision of water to Indigenous people from this reserve will be developed in partnership with Indigenous people, and documented in the implementation strategy.

### c. Protection of Environmental and Indigenous Cultural Values

- (i) This Plan assumes that the provision of discharge from this water source to maintain flows in the Katherine and Daly Rivers will maintain aquatic ecosystems and groundwater dependant riparian and terrestrial vegetation;
- (ii) Despite subclause (i), it is recognised that specific environmental water requirements may be required in addition to the maintenance of river base flows and any research that becomes available in this regard will be considered as part of the review process specified in Part 8;
- (iii) This Plan assumes that provision of discharge for environmental protection will also maintain the condition of places that are valued by Indigenous people for cultural purposes;
- (iv) Despite subclause (iii), it is recognised that cultural flow requirements may not align entirely with environmental requirements and any research that becomes available in this regard will be considered as part of the review process specified in Part 8.

## 15. Modelling

- (i) A numerical model (hereafter **modelling**) was used to determine the average annual discharge from the Tindall Aquifer to the Katherine River using the historic rainfall record.
- (ii) Modelling will be used to predict the annual discharge to the Katherine River for the proceeding water accounting year to determine announced allocations as described in Part 7.

*Note: in this Plan, modelling is used as the basis for determining annual and instantaneous discharge for environmental, Indigenous cultural and other instream public benefit outcomes as specified in Part 4, and the extraction limit as specified in Part 7. The model used for these annual calculations may be refined to better reflect actual conditions as required resulting from knowledge improvements.*

## 16. Beneficial uses

- (i) In accordance with section 22B of *the Act*, this Plan allocates water within estimated extraction limits to the following beneficial uses:
  - a. Environment and Cultural
  - b. Public Water Supply
  - c. Agriculture, Aquaculture and Industry
  - d. Rural Stock and Domestic
- (ii) Water allocated to the beneficial uses of environment and cultural, is referred to in this Plan as water for environmental, Indigenous cultural and other instream public benefit outcomes and is specified in Part 4 in terms of groundwater discharge to be maintained from this water source to the Katherine River.
- (iii) Water allocated for the beneficial uses of public water supply, agriculture, aquaculture and industry is specified as a volume for licence security categories, further distributed to entities holding licences of that security category as specified under Part 6, clause 24.

## Part 3 Outcomes, Objectives, Strategies and Performance Indicators

### 17. Vision

Ensure that this water source is managed sustainably with a balance between the environment and all other users.

### 18. Outcomes, Objectives, Strategies and Performance Indicators

*Note: Further details of strategies and performance indicators will be developed in an Implementation Strategy, to this Plan.*

Outcomes	Objectives	Strategies	Performance Indicators
1. Ecosystems dependent on the Tindall Aquifer, which are important for biodiversity, tourism, aesthetics, recreation and Indigenous cultural values, including springs and the Katherine and Daly Rivers, are preserved in good condition.	<p>To preserve the following proportions of annual discharge from the Tindall Aquifer to maintain base flow in the Katherine River:</p> <ul style="list-style-type: none"> <li>• During very dry years at least 87%;</li> <li>• During dry years at least 80%;</li> <li>• During normal or wet years at least 70%</li> </ul> <p><b>(Part 4)</b></p> <p>Protection of water quality within this water source and the Katherine River against degradation through extraction or bore construction</p>	<p>Annual extraction limits to be applied in accordance with Table 3, where the estimated un-impacted 1 Nov Katherine River flow is to be calculated at the beginning of each dry season using a model. <b>(Part 7)</b></p> <p>Annual extraction limits in Table 3 may be adjusted following the review. <b>(Part 7)</b></p> <p>To manage increases in extraction through water trading towards the Katherine River through water management zones. <b>(Part 7, CL34)</b></p> <p>No new licences associated with bores able to take more than 20L/s within 100m of the Katherine River to be granted. <b>(Part 6, CL25)</b></p> <p>Bores must not be drilled within 100m from potential sources of contamination. <b>(Part 6, CL25)</b></p> <p>Bore construction permits will not be issued to properties that have access to reticulated water. <b>(Part 10, CL39)</b></p> <p>Continue partnerships with research organisations to improve knowledge of ecosystem water requirements</p> <p>Undertake consultation and research to improve understanding of Indigenous water issues and options to address them</p>	<p>River health assessment parameters and ranges consistent with national guidelines will be developed in an implementation strategy to this Plan.</p> <p>Annual discharge from this water source to the Katherine River relative to other years and annual extraction from this water source</p> <p>Water quality in the Katherine River and Tindall Aquifer (Parameters and ranges consistent with national guidelines will be developed in an implementation strategy to this Plan.)</p> <p>Identification of methodology to quantify water requirements for Indigenous cultural purposes.</p> <p>Identification of specific environmental water requirements that maintain ecological processes in the Katherine and Daly Rivers.</p>

The Plan: Water Allocation Plan - Tindall Limestone Aquifer, Katherine

Outcomes	Objectives	Strategies	Performance Indicators
<p>2. Communities, including Katherine, Tindall RAAF base, other rural communities and rural properties, have access to water sufficient in quantity and quality for essential needs and for commercial development.</p>	<p>In all years except very dry years:</p> <ul style="list-style-type: none"> <li>• Rural stock and domestic use to have access to sufficient water, plus additional amount should there be growth in lawful exercise of water rights under s14 or the s47 exemption. <b>(Part 5)</b></li> <li>• Katherine town, Tindall RAAF base and rural stock and domestic users to have access to sufficient water. <b>(Part 6)</b></li> </ul> <p>Protection of water quality within this water source and the Katherine River against degradation through extraction or bore construction</p>	<p>Water made available under this Plan to rural properties in accordance with s14 and s47 of <i>the Act</i> <b>(Part 5)</b></p> <p>Total security licence issued for public water supply will have first priority in allocation of water up to the annual extraction limit each year. <b>(Part 6)</b></p> <p>Bores must not be drilled within 100m from potential sources contamination <b>(Part 6, CL25)</b></p> <p>Bore construction permits will not be issued to properties that have access to reticulated water. <b>(Part 10, CL39)</b></p> <p>No new licences will be given where bores of &lt;20L/s are within 100m of an existing bore. <b>(Part 6, CL25)</b></p> <p>Monitor number of bores for rural stock &amp; domestic and other small volume groundwater uses as part of the Implementation strategy to this Plan.</p>	<p>Number and level of water restrictions applied within Katherine and Tindall RAAF Base</p> <p>Reports of contamination or interference of bores.</p> <p>Restrictions to total security licences, stock &amp; domestic and other small volume groundwater uses.</p> <p>Water quality in the Katherine River and Tindall Aquifer (Parameters and ranges consistent with national guidelines will be developed in an implementation strategy to this Plan.)</p> <p>Estimated volume of water being extracted for rural stock and domestic and other small volume groundwater uses.</p>
<p>3. Indigenous people have access to water from the Tindall Aquifer for commercial development.</p>	<p>At the 5 year review, or sooner if practicable, aim to have sufficient water available from the consumptive pool to satisfy identified requirements on Indigenous owned land. <b>(Part 8)</b></p>	<p>Reclaim water from licences that have not developed as proposed at the 5 &amp; 10 year review of this Plan, and reallocate to purposes including Indigenous economic development. <b>(Part 8)</b></p> <p>Allow up to 680ML to be made available for Indigenous Commercial Development upon successful Native Title claim <b>(Part 8)</b>.</p>	<p>Development of water reliant enterprises by Indigenous people</p> <p>Volume of water rights held for or issued to Indigenous people</p>

The Plan: Water Allocation Plan - Tindall Limestone Aquifer, Katherine

Outcomes	Objectives	Strategies	Performance Indicators
<p>4. Subject to outcomes 1 &amp; 2 defined in this Section, economic benefits from agricultural and other uses of water from the Tindall Aquifer are maximised.</p>	<p>To achieve the following long term licence reliability levels:</p> <ul style="list-style-type: none"> <li>• High security licences able to access their full licensed entitlement in 70% of years;</li> <li>• Low security licences able to access their full licensed entitlement in 30% of years. <b>(Part 8)</b></li> </ul> <p>Aim to improve licence reliability levels through the review process <b>(Part 8)</b></p> <p>New or expanded commercial developments can obtain access to water without impacting existing water users. <b>(Part 6)</b></p>	<p>Annual extraction limits to be applied in accordance with Table 3, where the estimated un-impacted 1 Nov Katherine River flow is to be calculated at the beginning of each dry season using a model. <b>(Part 7)</b></p> <p>Reclaim water from licences that have not developed as proposed at the 5 &amp; 10 year review of this Plan, and retire as needed to contribute to achieving reliability objectives. <b>(Part 8)</b></p> <p>No new licences will be given where bores of &lt;20L/s are within 100m of an existing bore. <b>(Part 6, CL25)</b></p> <p>Temporary and permanent trading of issued annual allocations to be made available subject to application processes. <b>(Part 7, CL34)</b></p>	<p>Value of production from irrigation and other water reliant enterprises.</p> <p>Announced allocations for each category of water licence.</p> <p>Water trading activity.</p>
<p>5. Water dependent sites with identified Indigenous cultural importance, including the Katherine Hot Springs, are preserved.</p>	<p>Annual Tindall Aquifer discharge to the Katherine Hot Springs, Katherine River and other sites identified of Indigenous cultural importance to have essential water requirements met. <b>(Part 4)</b></p>	<p>Annual extraction limits to be applied in accordance with Table 3, where the estimated un-impacted 1 Nov Katherine River flow is to be calculated at the beginning of each dry season using a model. <b>(Part 7)</b></p> <p>Through engagement and research identify sites of Indigenous cultural importance which are dependent on water from the Tindall Aquifer, and assess essential water requirements. To be detailed in an Implementation strategy to this Plan.</p> <p>At mid term review, adjust water management rules as needed to meet the assessed essential water requirements at identified sites.</p> <p>Through engagement increase understanding of the importance of the Tindall Aquifer to Indigenous people. To be detailed in an Implementation strategy to this Plan.</p>	<p>Number of sites identified as having Indigenous cultural importance identified by this process.</p> <p>Percentage of identified sites with water requirements for Indigenous cultural purposes assessed.</p> <p>Percentage of identified sites with assessed essential water requirements met.</p> <p>Level of engagement and knowledge of sites of Indigenous cultural importance.</p>

## Part 4 Water for Environmental, Indigenous Cultural and other Instream Public Benefit Outcomes

*Note: the Katherine and Daly Rivers rely on groundwater discharge to maintain their perennial nature, the protection of these river base flows is critical to maintain ecosystem function as well as to protect instream public benefit outcomes, including the social and cultural values intrinsically linked to these rivers such as; fishing, boating, aesthetics and spiritual fulfilment. The following provisions ensure adequate flows from this water source contribute to the maintenance of recommended environmental flows for the Daly River as described in Erskine et al, 2003.*

### 19. Protection of discharge to surface waters during very dry years

- (i) During very dry years, 87% of annual groundwater discharge from this water source to the Katherine River will be reserved for environmental and other instream public benefit outcomes.
- (ii) Very dry years are defined as those years for which modelling predicts that the flow in the Katherine River at Katherine Railway Bridge on November 1, will be less than or equal to 0.6 cumecs.
- (iii) In very dry years, no extraction is permitted, other than for rural stock and domestic, other small volume users and total security licences as specified under Part 5 and Part 7 of this Plan.

*Note: in recognition of the importance of groundwater discharge to environmental, Indigenous cultural and other instream values, during very dry years a greater proportion of discharge from this water source is reserved for environmental and other instream public benefit outcomes, whilst providing water for essential services. Modelling indicates that at a November 1 instantaneous flow of 0.6 cumecs, 87% of annual discharge from this water source represents 29,043ML.*

### 20. Protection of discharge to surface waters during dry years

- (i) During dry years, 80% of annual groundwater discharge from this water source to the Katherine River will be reserved for environmental and other instream public benefit outcomes.
- (ii) Dry years are defined as those years for which modelling predicts that the flow in the Katherine River at Katherine Railway Bridge on November 1 will be greater than 0.6 cumecs and less than or equal to 1 cumec.
- (iii) In dry years, extraction is permitted by rural stock and domestic, other small volume users and licence holders as specified under Part 5 and Part 7 of this Plan.

*Note: modelling indicates that at a November 1 instantaneous flow of 0.7 cumecs, 80% of annual discharge from this water source represents 31,088ML, and that at a November 1 instantaneous flow of 1 cumec, 80% of annual discharge from this water source represents 44,511ML.*

### 21. Protection of discharge to surface waters during normal and wet years

- (i) During normal and wet years, 70% of annual groundwater discharge from this water source to the Katherine River will be reserved for environmental and other instream public benefit outcomes.

- (ii) Normal and wet years are defined as those years which modelling predicts that the flow in the Katherine River at Katherine Railway Bridge on November 1 will be greater than 1 cumec.
- (iii) In normal and wet years, extraction is permitted by rural stock and domestic, other small volume users and licence holders as specified under Part 5 and Part 7 of Plan.

*Note: modelling indicates that at a November 1 instantaneous flow of 1.1 cumecs, 70% of annual discharge from this water source represents 42,842ML, and that at a November 1 instantaneous flow of 2 cumecs, 70% of annual discharge from this water source represents 77,895ML.*

## Part 5 Water for Rural Stock and Domestic and Other Small Volume Groundwater Uses

### 22. Water for Rural Stock and Domestic and Other Small Volume Groundwater Uses

- (i) At the commencement of this Plan the estimated use of water from this water source for rural stock/ domestic and other small volume groundwater uses is 1,128ML/yr, as follows.
  - a. 950ML for unlicensed rural domestic and other small volume groundwater uses,
  - b. 75ML for unlicensed rural stock watering, and
  - c. 103ML for the rural stock and domestic use component of existing licences.
- (ii) 1,128ML/yr has been allocated for rural stock and domestic purposes in addition to the licence limits stated in Part 6.
- (iii) Access to water for stock and domestic purposes is given the same priority as total security licences and is subject to Clause 33.

*Note: rural stock and domestic use is exempt from licensing under the Act. Small volume groundwater users (<5ML/yr/property) and stock water use within the Daly Roper Water Control District are not required to be licensed under an exemption to the Act.*

*For properties where groundwater is used for rural domestic and other small volume groundwater uses is estimated at 5ML/yr/property. Water for rural stock is estimated using a maximum carrying capacity of suitable land overlying this water source at 50L/head/day, where bores extracting from this water source exist. For licensed properties, water for rural stock and domestic purposes is estimated using actual stocking rates (50L/head/day), the number of residents in communal living arrangements (200L/person/day) and the number of houses (4.5ML/house/year). An increase in water required for rural stock/ domestic and other small volume groundwater uses may occur as a result of increased landholdings overlying this water source, or as a result of the increase in the exercise of these rights by existing landholders.*

## Part 6 Licences to Take Groundwater

### 23. Licence Security Categories and Reliability

- (i) There are four security categories for licences each representing a different level of reliability, being:

- a. Total security;

*Note: Total security licence holders can expect to be able to access their maximum annual volume in all but extreme circumstances.*

- b. High security;

*Note: If all total and high security licences were fully utilised, high security licence holders could expect to be able to access their maximum annual volume in about 70% of years.*

- c. Medium security, and

*Note: if all total, high and medium security licences were fully utilised, medium security licence holders could expect to be able to access their maximum annual volume in about 30% of years. If there is under-development, the reliability of this security category will be higher.*

- d. Low security;

*Note: If all licences were fully utilised, low security licence holders could expect to be able to access their maximum annual volume in about 15% of years. If there is under-development, the reliability of this security category will be higher.*

- (ii) Reliability represents the percentage of years, based on the stated period of record, that the stated extraction limits would have been equalled or exceeded, and is depicted in Table 1. The historic extraction limits are calculated using the lowest annual daily flow recorded for the Katherine Railway Bridge and an average annual recharge of 74,000ML.

**Table.1** The following table provides context of licence security and reliability.

Security Category	Total	High			Medium			Low		
Demand	100%	60%	80%	100%	60%	80%	100%	60%	80%	100%
Equivalent required extraction limit (ML)	3004	12091	15120	18149	25221	27579	29937	33353	34492	35631
Period of record	Reliability									
1961-2007	100%	87%	84%	72%	40%	37%	28%	21%	17%	14%
1961-1975	100%	45%	38%	30%	0%	0%	0%	0%	0%	0%
1975-2007	100%	100%	100%	86%	52%	48%	36%	27%	23%	17%
1996-2007	100%	100%	100%	86%	77%	75%	73%	72%	71%	60%

*Note: Reliability figures are approximated from flow exceedance curves using the lowest annual recorded flows at the Katherine Railway Bridge for the periods of record stated in table 1. It is assumed that the lowest annual recorded flow at the Katherine Railway Bridge is sourced entirely from Tindall Aquifer discharge.*

*All reliability figures take into account an additional 1,128ML demand for rural stock and domestic purposes. Rural stock and domestic use is treated as per total security licences whereby access will not be restricted unless the announced allocation to high security licences is calculated to be zero.*

## 24. Limits to licences

- (i) Table 2 specifies limits to licenses for beneficial uses, and each security category in this water source.
- (ii) The licence limit of this Plan is 34,503 ML/yr,
- (iii) The licence limit is the maximum volume of water that may be extracted under licences in any single water accounting year and is subject to an annual extraction limit as specified in Part 7

**Table 2**

Beneficial Use	Security Category (ML/yr)				Total (ML/yr)
	Total	High	Medium	Low	
Public Water Supply	1,876	483	0	1,717	4,076
Agriculture, Aquaculture and Industry	0	14,662	11,788	3,9787	30,427
<b>Total</b>	<b>1,876</b>	<b>15,145</b>	<b>11,788</b>	<b>5,694</b>	<b>34,503</b>

## 25. Rules for granting licences

- (i) This clause is made in accordance with sections 60 and 71 of *the Act*.

- (ii) The taking of groundwater without a licence from this water source is prohibited unless provided for in Part 5 of this Plan.
- (iii) From the commencement of this Plan, no additional licences will be granted for any beneficial use, in any security category prior to the five year review.
- (iv) Notwithstanding subclause (iii) new licence/s may be granted upon approval of a trade in accordance with Clause 34 or as a result of a property sale or subdivision as detailed in Clause 27 and 28 respectively.
- (v) The maximum annual announced allocation, as described in Part 7, must not be exceeded without prior approval from the NT Controller of Water Resources (hereafter Controller).

*Note: the Controller refers to an officer appointed under section 18 of the Act.*

- (vi) 30% of the annual announced allocation must not be exceeded in any one month unless approved by the Controller.
- (vii) The granting of licences will not be permitted where bores constructed within 1km of the Katherine River, equipped to supply in excess of 20L/s are proposed for use.
- (viii) The granting of licences will not be permitted where bore/s proposed to pump in excess of 20L/s have been constructed within 100m of an existing operational bore.
- (ix) The Controller may on application by a licensee, reduce the distance/s specified in subclauses (vi) or (vii) if studies undertaken by the licensee, and assessed as adequate and approved by the Controller, demonstrate minimum potential for impact on other users or spring discharge and location, as well as the other environmental and instream public benefit outcomes provided for in this Plan.
- (x) All applications for licence/s from this water source will be published in a newspaper circulating throughout the Territory and also may be published in a newspaper circulating in the general Katherine community, in accordance with section 71B of *the Act*.
- (xi) All decisions on applications for licence/s to take groundwater will be published in the same newspapers as stipulated in the subclause above, and a copy of the full decision will be publicly available including the reasons for the decisions and how these were taken into account, in accordance with sections 71C and 71D of *the Act*.
- (xii) The details of licence/s will be contained on a register posted on the Northern Territory Government website in accordance with section 95 of *the Act*.

*Note: a hard copy of the register may be viewed at either the Katherine or Darwin offices (see locations at appendix 1).*

- (xiii) The mandatory conditions as specified in the *Water Regulations* will be imposed on licence/s granted, in addition to any specific conditions imposed by the Controller on a case by case basis.

- (xiv) Licence/s, excluding those licences arising from approved annual trades, will remain in force for the period for which this Plan is in force, not exceeding 10 years.
- (xv) Rules surrounding the provision of water to Indigenous people from this reserve will be developed in partnership with Indigenous people, and documented in the implementation strategy.

*Note: a licence to take groundwater includes maximum volumes as well as conditions relating to the use of the licence and obligations of the licensee. Allocations to licences will be made on an annual basis in accordance with the extraction limit in Part 7, implemented through clause 32 of this Plan.*

## 26. Licence applications

*Note: this water source is fully allocated at the commencement of this Plan. New licences may only be issued in accordance with trades, sales or subdivision or following the five year review of this Plan.*

- (i) No new applications for licence/s to extract water from this water source will be accepted, prior to the five year review.
- (ii) All licence applicants are required to complete and submit the approved form under *the Act*.
- (iii) The Controller may require a licence applicant to undertake hydrogeological investigations if unacceptable interference between proposed production bores and existing production or stock and domestic bores is suspected.
- (iv) The Controller may require a licence applicant to undertake hydrogeological and/or cultural and ecological investigations if it is suspected that proposed development shall compromise the environmental and other instream public benefit outcomes provided for in this Plan.
- (v) New licence applicants, excluding trades, must provide supporting information for the proposed development including any information required or requested by the Controller specifically that:
  - a. without limitation, supporting information must demonstrate access to the resource and a capacity to undertake the proposed development within resource constraints;
  - b. where applicable, stated water requirements accompanying an application must not exceed the maximum figures for specified crops, at Schedule 7;
  - c. without limitation, for public water supplies, supporting information must:
    - i. substantiate demand for the water supply through, population projections and estimates of water use per capita; and
    - ii. establish a water quality target in accordance with the Australian Drinking Water Guidelines, 2004.

## 27. Transfer of water licenses through property sales

- (i) In situations where an NT Portion is sold, the volume specified on the existing licence at the time of sale is transferred, subject to any water trades that may have taken place in accordance with Part 7 clause 34 of this Plan.

- (ii) Subject to the above clause (i), a new licence will be issued to reflect the change of ownership only once the sale of a property is confirmed with the NRETAS Water Resource Branch.
- (iii) All agricultural licences including those transferred through property sales or subdivision are subject to the 5 and 10 year review, as specified in Part 8 of this Plan.
- (iv) In situations where an NT Portion is sold and new owner's property development water demands are greater than the volume specified on the existing licence, additional water may be traded to meet any additional demand, as specified in Part 7 of this Plan.

## 28. Subdivision

- (i) In situations where an NT Portion with a valid water licence attached is subdivided, and/ or re-zoned:
  - a. The attached water licence expires, however, one or more of the owners of land to which the expired licence related, may apply for one or more licences to replace the expired licence.
  - b. The volume of water issued under new licences will not exceed the requirement for the level of development existing prior to the subdivision taking place.
  - c. Any forfeited water will be allocated as described in Part 8 of this Plan.

## 29. Assignment of Risk

- (i) Water licence holders are to bear the risks of any reduced or less reliable water allocation, under their licence arising from reductions to water availability as a result of:
  - a. seasonal or long term changes in climate; and
  - b. periodic natural events such as drought or contamination.
- (ii) The risk of any reduced or less reliable water allocation under a water licence, arising as a result of bona fide improvements in the knowledge of the water systems capacity to sustain particular extraction levels are also to be borne by the users for the duration of this Plan.

*Note: this Plan ensures that the reliability of licences is not eroded as a result of management decisions i.e. through rules which prohibit issue of additional licences which would degrade reliability, and to establish local management and trading rules.*

## Part 7 Rules for management of licences to take groundwater

### 30. Extraction Limits

- (i) The maximum annual extraction limit under this Plan is 35,631 ML including any extraction that is authorised to take place without a licence described in Part 5.
- (ii) The long term average annual extraction limit under this plan based on the period of record from 1961 to 2004 is 22,200ML.
- (iii) Notwithstanding subclauses (i) and (ii), the extraction limit for this water source is dynamic and will vary from year to year in response to variable discharge from this water source to the Katherine River.

*Note: this water source and the Katherine River are highly connected systems, and Katherine River base flow is dominated by water discharged from this water source. Environmental and other instream public benefit outcomes are highly dependent on these base flows, and extraction will be managed in such a way as to protect its critical elements. Extraction Limits referred to in this Plan are an estimation of Sustainable Yield, a requirement of Water Allocation Plans declared under the Act.*

- (iv) Column B of Table 3 specifies the annual extraction limit permitted under this Plan when modelling undertaken prior to the commencement of the water accounting year predicts that the flow in the Katherine River at Katherine Railway Bridge on November 1 (of that year) will be that specified in Column A of Table 3.

**Table 3**

Column A	Column B
Modelled Katherine River flow at Katherine Railway Bridge (cumecs)	Extraction limit (ML/yr)
≤ 0.6	4,340
>0.6, and ≤ 0.7	7,772
>0.7, and ≤ 0.8	8,902
>0.8, and ≤ 0.9	10,015
>0.9, and ≤ 1.0	11,128
>1.0, and ≤ 1.1	18,361
>1.1, and ≤ 1.2	20,030
>1.2, and ≤ 1.3	21,699
>1.3, and ≤ 1.4	23,369
>1.4, and ≤ 1.5	25,038
>1.5, and ≤ 1.6	26,707
>1.6, and ≤ 1.7	28,376
>1.7, and ≤ 1.8	30,005
>1.8, and ≤ 1.9	31,714
>1.9, and ≤ 2.0	33,383
>2.0, and ≤ 2.1	35,052
>2.1	35,631

*Note: If the modelled flow at Katherine Railway Bridge on 1 Nov is less than 2 cumecs, it is assumed there is 0 (measurable) inflow from the Katherine River upstream of Ironwood gauging station.*

*No adjustment has been made to the extraction limits to provide for licensed surface water demand from Katherine River. In very dry years, surface water extraction may be subject to restrictions under s96(2) of the Act, and will correspond with any restrictions on groundwater extraction licences.*

### 31. Announced allocation accounting

- (i) The accounting for announced allocations begins May 1 and continues for 12 months (hereafter **water accounting year**).
- (ii) The annual licensed volume for the relevant year, as specified on individual licence entitlements (hereafter **annual licensed volume**) is the maximum volume of water that may be accessed (extracted or traded) in each water accounting year.
- (iii) Once a licensee has reached full development, the annual licensed volume will be the maximum water entitlement stated on the licence.

*Note: The annual licensed volume is based on the proposed level of development for each year as specified in the licensee's property development plan. A property development plan was submitted as supporting information to each licensee's application for grant of licence to take or use groundwater from this source.*

- (iv) Debit to announced allocation accounts will be made following the receipt of pumpage returns on a monthly basis.
- (v) The carrying over of yearly announced allocations from one water accounting year to the next is not permitted.
- (vi) An announced allocation account shall remain above zero at all times.

### 32. Announced allocations

This clause is made pursuant to section 70 of *the Act* with respect to the power to give direction.

- (i) The announced allocation is the percentage of the annual licensed volume that may be accessed (extracted or traded) each year.

*Note: Announced allocations are necessary to adjust the volume of water extraction from this water source to accommodate natural variations in water availability i.e. annual extraction limit.*

- (ii) Announced allocations shall be determined prior to the beginning of each water accounting year to ensure total extractions from this water source remain within the extraction limits specified in Part 7 of this Plan.
- (iii) Announced allocations will consider the proposed annual water extraction regime for the following water accounting year calculated using:
  - a. The combined annual licensed volume of all licenses assigned to the beneficial use of public water supply, agriculture, aquaculture and industry for the relevant water accounting year.
  - b. water assigned for rural stock and domestic and other small volume groundwater uses, as specified in Part 5 of this Plan; and

- (iv) Announced allocations will be made based on the following criteria:
- a. In this section, **total security demand** means:
    - i. the volume of water assigned for rural stock and domestic and other small volume groundwater uses specified in clause 22; and
    - ii. the total security licence volume for public water supply as specified in clause 24.

*Note: The licence limit is the combined total of maximum water entitlements, as specified on individual licences.*

- b. If the extraction limit is greater than or equal to the sum low, medium and high annual licensed volumes and the total security demand, the announced allocation for each individual licence will be 100% of the annual licensed volume.
- c. If the extraction limit is less than the sum of low, medium and high annual licensed volumes and total security demand, but greater than or equal to the sum of the annual licensed volume for low, medium high security licences and total security demand, excluding the volume allocated for public water supply in low security then:
  - i. the announced allocation will be 100% of the annual licensed volume for all total, high, medium and low security licences excluding the low security licence for public water supply; and
  - ii. the announced allocation for low security public water supply will be a percentage of the maximum water entitlement volume, not exceeding 100%.
- d. If the extraction limit is less than the sum of the annual licensed volume for low, medium and high security licences and total security demand but greater than or equal to the sum of the annual licensed volume for medium and high security licences and total security demand then:
  - i. the announced allocation will be 100% of the annual licensed volume for medium, high and total security licences; and
  - ii. the announced allocation for low security licences, excluding the volume for public water supply, will be a percentage of the annual licensed volume, not exceeding 100%; and
  - iii. the announced allocation for low security public water supply will be reduced to zero.
- e. If the extraction limit is less than the sum of the annual licensed volume for medium and high security licences and total security demand but greater than or equal to the sum of the annual licensed volume for high security licences and total security demand then:
  - i. the announced allocation will be 100% of the annual licensed volume for high and total security licences; and
  - ii. the announced allocation for medium security licences will be a percentage of the annual licensed volume, not exceeding 100%; and
  - iii. the announced allocation for all low security licences will be reduced to zero.

- f. If the extraction limit is less than the sum of the annual licensed volume for high security licences and total security demand but greater than or equal to the sum of the annual licensed volume for high security licences and total security demand, excluding the volume allocated for public water supply in high security then:
  - i. the announced allocation will be 100% of the annual licensed volume for total and high security licences, excluding the high security licence for public water supply; and
  - ii. the announced allocation for high security public water supply will be a percentage of the maximum water entitlement volume, not exceeding 100%.
  - iii. the announced allocation for all medium and low security licences will be reduced to zero.
- g. If the extraction limit is less than the sum of the annual licensed volume for high security licences and total security demand, excluding the volume allocated for public water supply in high security then:
  - i. the announced allocation for total security licences will be 100%; and
  - ii. the announced allocation for high security licences, excluding public water supply, will be a percentage of the maximum annual licence volume, not exceeding 100%.
  - iii. the announced allocation for high security public water supply and all medium and low security licences will be reduced to zero.

*Note: If announced allocations under subclause (iv) are required, an early indication of proposed allocations shall be estimated as soon as possible preceding the final announced allocations by 1 May*

- (v) Licensees shall be notified of the announced allocations in writing prior to the commencement of the water accounting year, a notice shall be placed in a newspaper circulating in the general Katherine community, and a report which includes reasoning for the decision, shall be available on the Northern Territory Government website.

### **33. Emergency Powers to Limit Rights to Take Water**

This clause is made pursuant to section 96 of *the Act* with respect to emergency powers to limit the right to take water

- (i) In times of severe water scarcity, the Controller may place water restrictions on total security licence holders as well as rural stock/ domestic and other small volume groundwater users to achieve the outcomes provided for in Part 4 of this Plan.

*Note: severe water scarcity refers to a flow at Katherine Railway Bridge of less than 0.6 cumecs.*

- (ii) In times of severe water scarcity, restrictions may be applied to users supplied within the Katherine Urban Water Reticulation Area.

### **34. Water trading**

- (i) Water management zones

- a. The following water management zones have been defined for this water source:
    - i. Zone 1 - short term lag between extraction and impact; and
    - ii. Zone 2 - medium to long term lag between extraction and impact.
  - b. The locations of these zones are included at Schedule 5.
- (ii) Temporary trades
- a. Temporary trades refer to the transfer of announced allocations on an annual basis from one licence to a new licence which expires at the end of the water accounting year.
  - b. The volume of water available to be traded for the duration of the relevant water accounting year will not exceed the seller's annual licence volume or the volume of water required by the seller's current level of development, as determined based on crop water use requirements specified in Schedule 7, for that particular water accounting year.
  - c. In addition to subclause (b) the volume of water that may be temporarily transferred will be in accordance with demonstrated improvements in efficiency and must be ratified by the Controller
  - d. Temporarily transfer of water allocated for proposed development which has not eventuated is not permitted.
  - e. Trading from water management zone 2 into water management zone 1 can only occur within the annual limit defined for this zone under subclause (ii) f below.
  - f. The annual limit for extractions from zone 1 is equal to 15% of the annual extraction limit.
- (iii) Permanent trades
- a. Permanent trades can only be made once full property development as proposed by the licensee has been achieved to the satisfaction of the Controller.
  - b. The volume of water traded will not exceed the maximum entitlement volume and is subject to monthly limits as specified in Part 6, subclause 25 (v).
  - c. Permanent trades are made in perpetuity subject to Parts 6, 7, 8 and 9 of this Plan.
  - d. Trading from water management zone 2 into water management zone 1 can only occur within the annual limit defined for this zone under subclause (iii) e below.
  - e. The annual limit for extractions from zone 1 is equal to 15% of the annual extraction limit.
- (iv) Approvals
- a. All trades require the approval of the Controller, with any such approval being subject to the provisions in this clause and Clause 25.

- b. Applications for trades must be lodged in accordance with the approved form/s and requirements of *the Act*.
- c. Following the approval of a trade, notification of the change in allocation will be served on the person trading water and a new licence will be issued to the purchaser of the water.

## Part 8 Review of this Plan

### 35. General

In accordance with section 22B of *the Act*, the Controller must ensure:

- i. that a review of this Plan (hereafter **the review**) is conducted at intervals not longer than 5 years;
- ii. that the review considers the extent to which the Plan has achieved its outcomes and objectives;
- iii. that the provisions of section 18 of this Plan are fully carried out;
- iv. that the review is informed by the outcomes of the monitoring program, and research findings as well as consultation with a relevant Water Advisory Committee and the broader Katherine Community; and
- v. that all public submissions as well as any Territory or regional policies or agreements coming into force after the initial declaration and with relevance to this Plan are considered at the review.
- vi. If the existence of Native Title (under application NTD6002/00) is recognised within five years of the commencement of this Plan, the Controller must amend the relevant Parts of the Plan to include 680ML for Indigenous commercial development, including:
  - a. Licence Security Categories and Reliability defined in Part 6 of the Plan;
  - b. Limits to Licences defined in Part 6 of the Plan.
  - c. The maximum extraction Limit defined in Part 7 of this Plan

*Note: There will be no reduction to environmental allocations described in Part 4 of this Plan if water is required to be allocated as described in Clause 35 (vi). If water for Indigenous commercial development is allocated prior to the 5 year review, this will result in a small reduction in reliability for licence holders. However, it is intended that any water allocated for Indigenous commercial development be offset during the 5 year review process described in clauses 36 and 37.*

### 36. Review of extraction limit

- i. If following the review of this Plan, if it is necessary to increase the provisions for environmental, Indigenous cultural and other instream public benefit outcomes, the extraction limits specified in clause 30 may be modified to increase these provisions. As far as possible, the amendments to licences as provided for under clause 37 will offset the reduction of extraction limits.
- ii. Subject to subclause 'i', any water made available for consumptive purposes following the review of the Plan, either through amendments to licences under clause 37 of this Plan, or through an increase in the extraction limit, may be re-assigned at the review of this Plan in accordance with the order of below priorities:
  - a. to account for an increase in demand from rural stock/ domestic and other small volume groundwater uses;

- b. to hold up to 680ML in trust for Indigenous commercial development at the security level from which it is recovered; and
  - c. to achieve the following reliability targets for licence security categories at full licence development:
    - i. Medium security = 50%
    - ii. Low security = 30%
  - d. to issue new licences, by means of the market or other processes established by the Controller.
- iii. If at the 5 year review, outcomes of the monitoring program and research findings indicate more water is available than prescribed under this Plan, and the risk associated with licence reliability has been significantly reduced, water entitlements may not be actively reclaimed as part of the review process.
  - iv. If at the 5 year review, outcomes of the monitoring program and research findings indicate, less water is available, than prescribed under this Plan, the average discharge for this Plan will be reduced, resulting in reductions of annual extraction limits, impacting all allocations from this water source.

### 37. Rules for amending and renewing licences

- (i) During years 5 and 10 of this Plan, the Controller shall review and amend all medium and low security licences using the methodology specified below:
  - a. For the review year, licence entitlements may be reduced by the difference between actual **on-ground development** and the licensee's **proposed development**, submitted as a property development plan.
    - i. All estimated water requirements will be based on the standardised water requirements at Schedule 7
    - ii. If on-ground development results in estimated water requirements, that are within 10% of the licensee's water requirements for the proposed development, then the licence volume will not be reduced, subject to subclause (ii) a;
    - iii. If on-ground development results in estimated water requirements that are not within 10% of the licensee's water requirements for the proposed development, then the licence will be reduced.
    - iv. If subclause iii applies, licenses will be reduced by the volume equal to the difference between estimated water requirements for on ground development and the licensee's water requirements for the proposed development.
    - v. Despite subclause iv, the Controller may not reduce the licence entitlement in cases where the Licensee can provide evidence that:
      - 1. works have physically started toward progressing the proposed property development; or

2. if construction has not physically started, a contract has been entered into to start construction.
  3. In this section, *works* means operations of any kind and all things constructed, erected or installed for the purposes of progressing the proposed property development plan.
- vi. Non-discriminative influences that affect the general community will not be considered as justification for retaining original licensed entitlements, otherwise reduced under subclause (i) a iii.
- (ii) Notwithstanding the provisions in subclause (i), the Controller may amend all licences during years 5 and 10 of this Plan to account for:
- a. any required changes to the extraction limits specified in this Plan; and
  - b. failure to achieve within 10% of an individual proposed extraction for all or part of licences not captured under subclause (i).
- (iii) Providing the requirements of *the Act*, its regulations and the conditions of the licence have been met, subject to any amendments provided for in subclause (i) and (ii), licences shall be renewed at the commencement of the next Water Allocation Plan for this water source.

*Note: the ability to review licences in response to development, is an interim measure employed under this Plan to achieve the equitable distribution of water among licensees. Following this Plan, it is anticipated that this clause will be altered to remove the ability for licences to be amended in response to development. The next Water Allocation Plan for this water source may see licences separated from land allowing them to become permanently tradeable, subject to the rules of the relevant Water Allocation Plan.*

## Part 9 Licence conditions

### 38. General

- (i) All licences must meet the requirements of *the Act* and its Regulations and associated Approved Forms.
- (ii) Mandatory licence conditions will be imposed by the Controller to achieve the provisions in this Plan.
- (iii) Mandatory conditions are outlined in the Water Regulations and associated Approved Forms

## Part 10 Bore Construction Permit Conditions

### 39. General

- (i) Bore construction permits (hereafter **Permits**) are required for the construction of all bores in this water source, irrespective of their intended use or capacity.
- (ii) Permits shall not be issued to properties that have access to reticulated water, when the intended purpose/s of the proposed bore is unlicensed rural stock/ domestic or other small volume groundwater uses.

*Note: a map of the Power Water Corporation reticulated supply scheme around Katherine (Schedule 4).*

- (iii) Mandatory conditions will be imposed by the Controller on all bore construction permits issued in this Plan area to achieve the provisions in this Plan.
- (iv) Mandatory conditions are outlined in the Water Regulations and associated Approved Forms.

*Note: That all construction activities are in accordance with the minimum construction requirements for water bores in Australia and other requirements as referred to by the Controller.*

## Part 11 Monitoring and Evaluation

### 40. General

- (i) The monitoring of the performance indicators specified in Part 3 shall be directed by the Controller as specified in Appendix 2.

### 41. Implementation of this Plan

- (i) The strategies as outlined in Part 3 will be implemented upon commencement of this Plan.
- (ii) Announced allocations to licences will be made immediately upon commencement of this Plan for the water accounting year from 1 May 2009 to 30 April 2010 in accordance with Clause 32 (ii – iv)
- (iii) The Controller will establish an Implementation Strategy to this Plan that outlines how objectives and strategies made in this Plan will be achieved.

*Note: An announced allocation to licences must be made upon declaration of this Plan for the 2009/2010 water accounting year as the Plan was declared following 1 May 2009.*

*It is intended that the Implementation strategy will be developed as a separate process to be completed following the formal declaration of this Plan.*

## Schedule 1 Glossary of Terms

*Note: terms defined in Part 1 of the Act, have not been repeated in this Schedule. The same definitions detailed in the Act apply to this Plan.*

**Announced allocation:** is the percentage of the annual licensed volume that may be accessed (extracted or traded) each year

**Aquifer:** refers to a geological formation, group of formations, or part of a formation that stores and/ or allows movement of groundwater.

**Base flow:** refers to the part of total flow in a river or stream derived from groundwater discharge.

**Climatic variability:** refers to changes in discharge from the Tindall Limestone Aquifer to the Katherine River within the Plan area resulting from a change in rainfall recharge to the aquifer.

**Cumec:** cubic meters per second - a unit of measurement used to describe flow in surface water systems; one cumec is equal to one thousand litres per second.

**Extraction limit:** refers to the volumetric limit of water made available for extraction from the system on an annual basis.

**Groundwater:** refers to water stored underground in rock fractures, cavities and pores.

**Katherine Railway Bridge:** refers to the old railway bridge currently used for pedestrian traffic only, approximately 50 metres down-stream from the Stuart Highway (high level) bridge.

**Licence security category:** refers to a licence group for which the rules relating to annual allocation announcements are similar.

**Reliability** for a licence category is the percentage of years during a simulated period when all licences of a licence security category would receive a hundred percent of licensed entitlement as an announced allocation, as determined using a numerical model of the Tindall Aquifer using climatic data from 1960 to 2007, and assuming all licences are fully developed.

**Numerical model:** refers to a mathematical representation of a physical system intended to mimic the behaviour of a real system, allowing description about empirical data and prediction about untested states of the system.

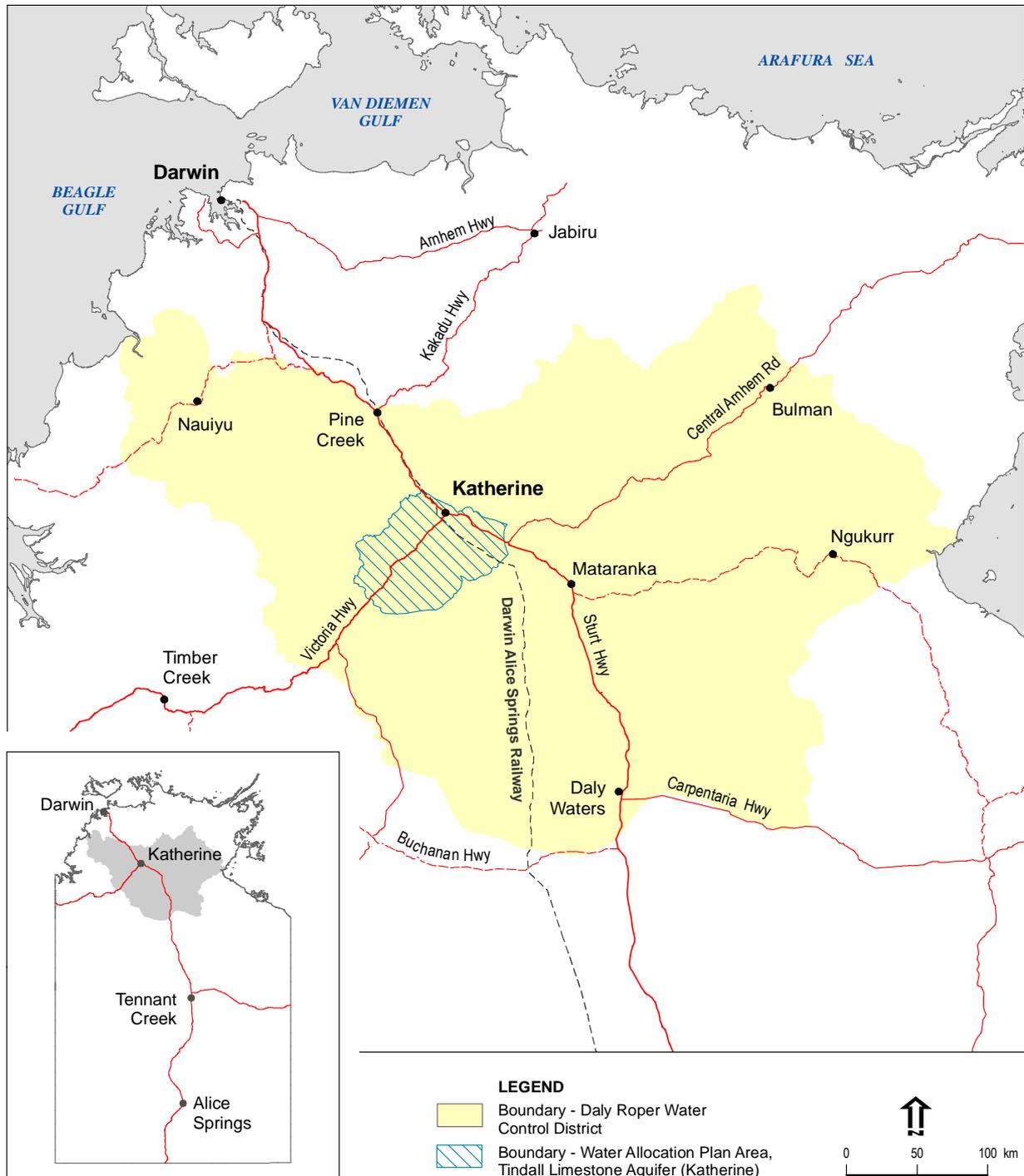
**Severe water scarcity:** refers to a flow in the Katherine River at Katherine Railway Bridge of less than 0.6 cumecs.

**Standardised water figures:** refer to the predicted water requirements of the various crops grown in the Katherine Region assuming a D10 rainfall event (655mm/yr).

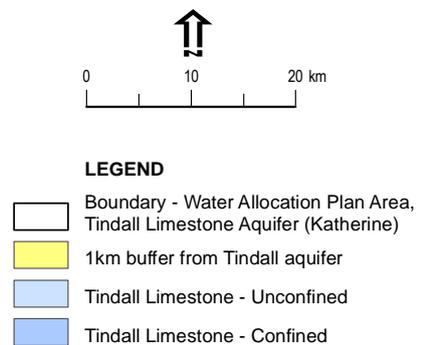
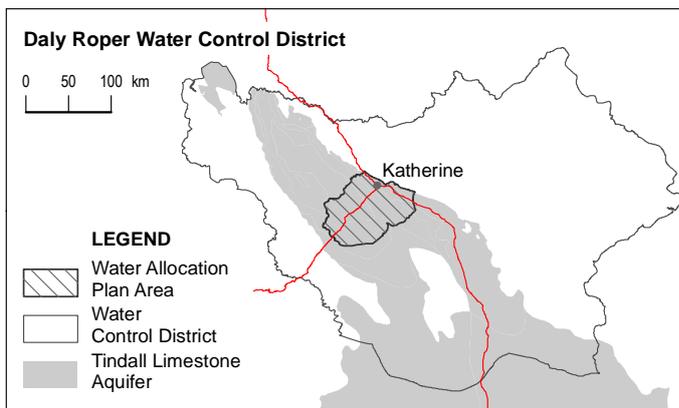
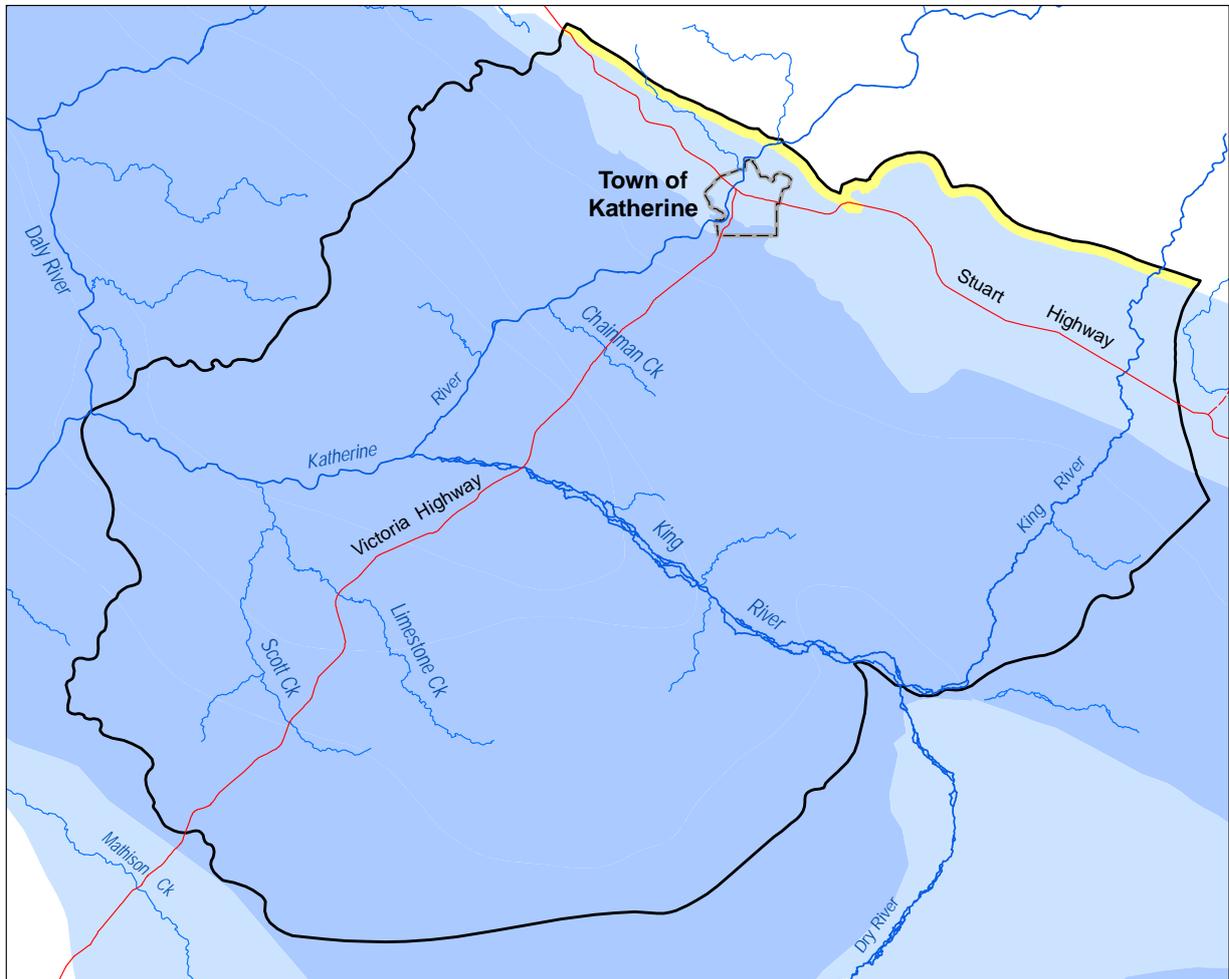
**Unimpacted flow** in the Katherine River at Katherine Railway Bridge is the flow which it is estimated would occur were there no extraction of water, as determined using a numerical model.

**Water management zone:** refers to part of an aquifer system that is treated as a single unit for water trading and other regulatory purposes.

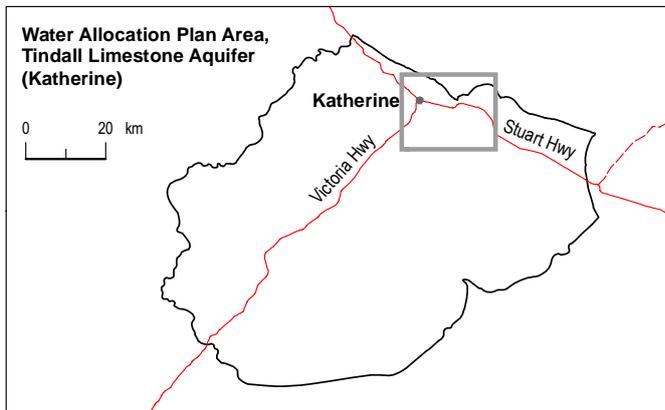
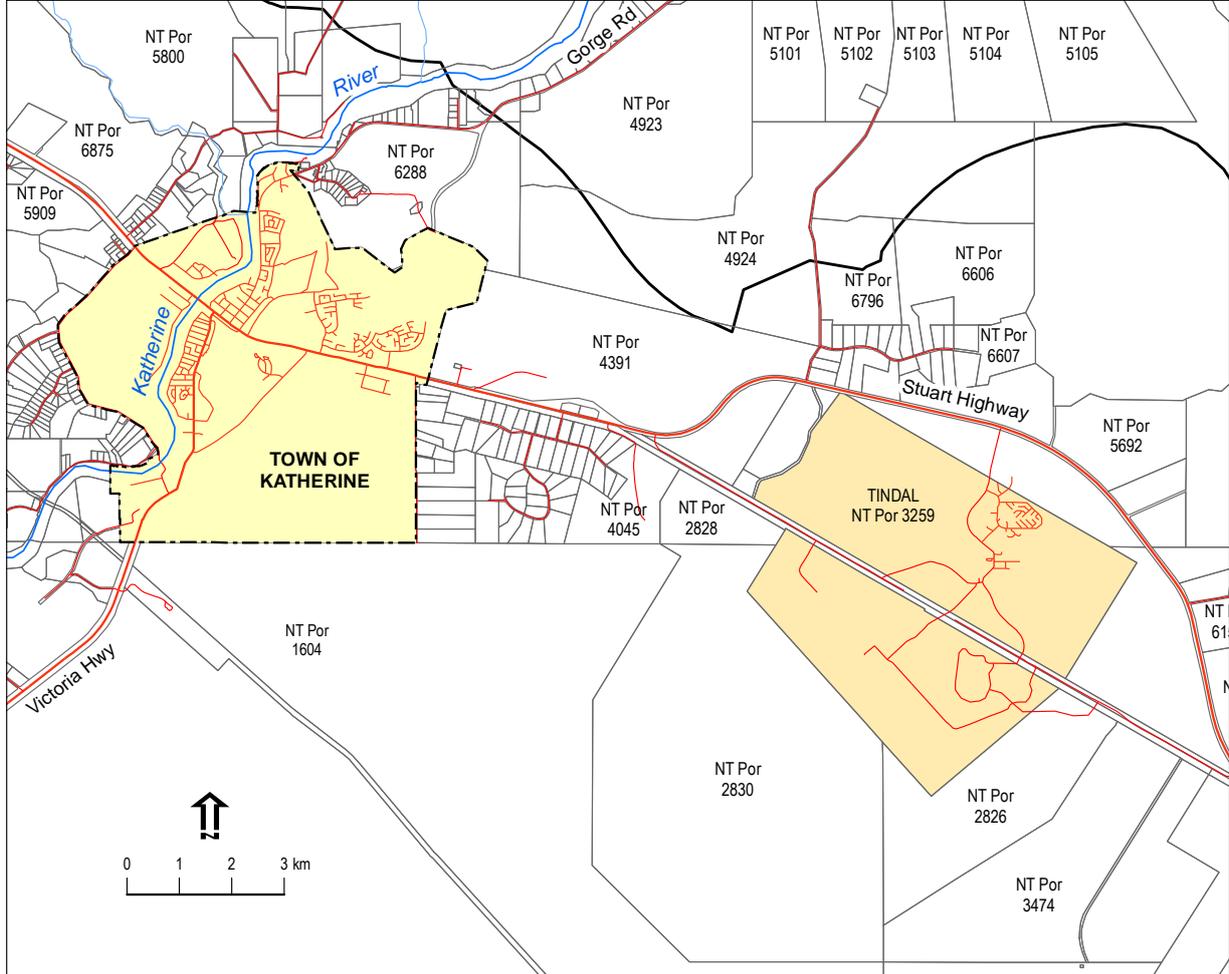
# Schedule 2 Daly Roper Water Control District



### Schedule 3 The Plan area - Defined by the extent of Tindall Limestone within the Katherine River Catchment



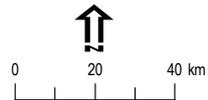
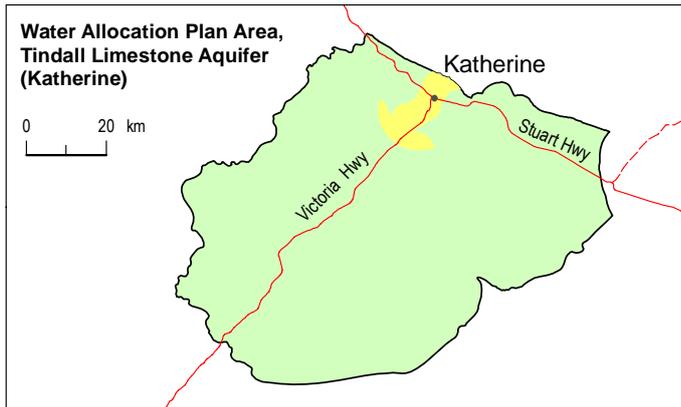
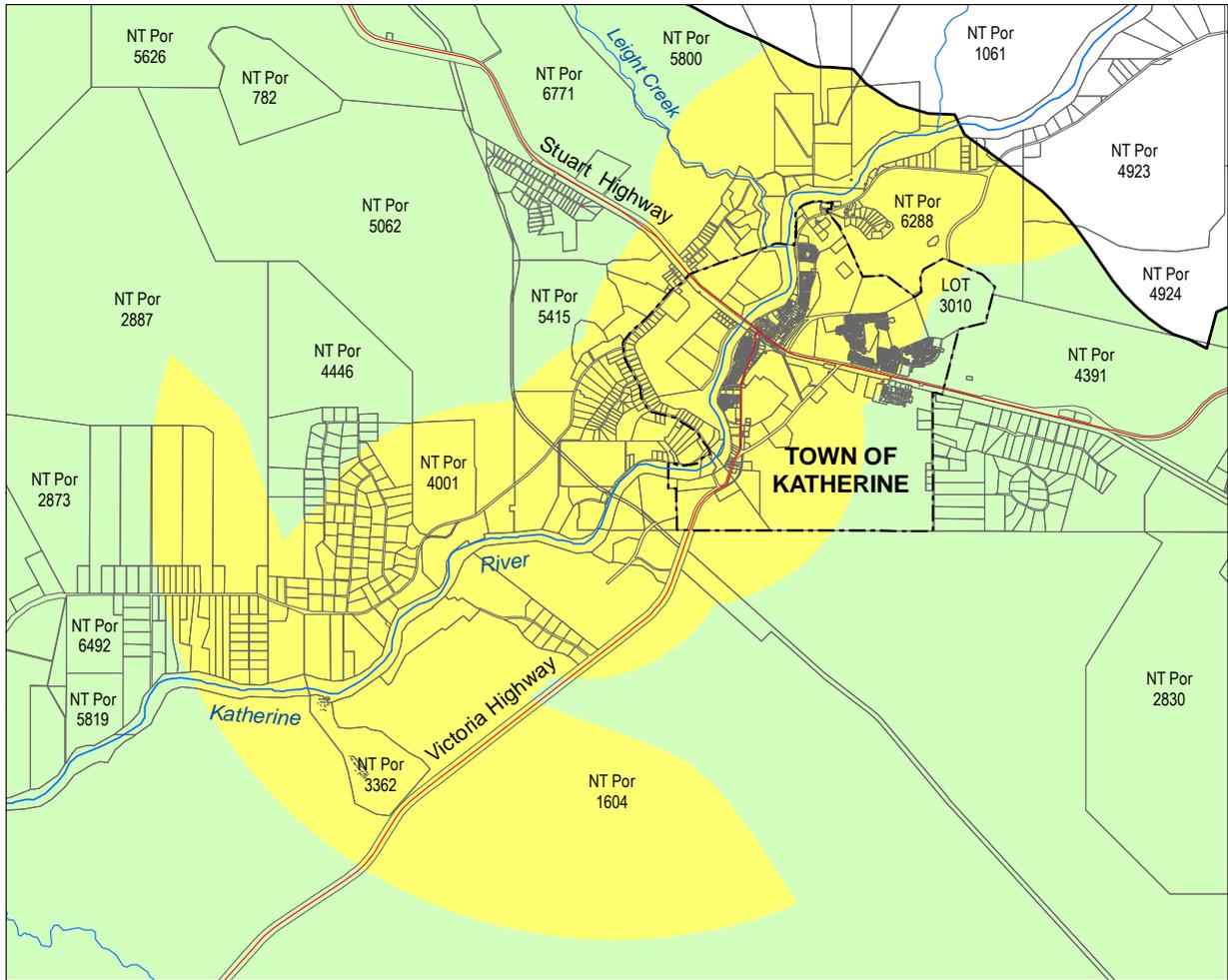
# Schedule 4 Katherine Urban Water Reticulation Area



- LEGEND**
- Boundary - Water Allocation Plan Area, Tindall Limestone Aquifer (Katherine)
  - Katherine Town Boundary
  - Tindal RAAF Base - Commonwealth Land
  - Cadastral property boundaries

**NOTE:**  
Extent of reticulated water supply is generally within the Katherine Town Boundary and Tindal RAAF Base. Reticulated water may also be supplied to other locations beyond these areas.

# Schedule 5 Water Management Zones



**LEGEND**

- Boundary - Water Allocation Plan Area, Tindall Limestone Aquifer (Katherine)
- Zone 1 (< 1 year)**  
Short term lag between extraction and impact on the Katherine River
- Zone 2 (> 1 year)**  
Medium to long term lag between extraction and impact on the Katherine River
- Cadastral property boundaries

## Schedule 6 Contribution to Relevant Targets in the March 2005 Integrated Natural Resource Management Plan

### Assessed levels of contribution:

FULL	contributes to the target in full
HIGH	a significant but not full contribution to the target
PARTIAL	goes part way to contributing to the target
LOW	only a slight contribution to the target

Management Action Targets	Level of Contribution	Comments
MAT 5-6 In collaboration with local stakeholders monitor with community involvement and participation, and report in water dependent ecosystems in at least 5 catchments subject to increasing development pressure and model biophysical responses to groundwater extraction.	High	This water allocation planning process and its implementation has and will continue to involve the participation of the community and peak stakeholder bodies in order to achieve sustainable water resource use in a catchment under considerable development pressure.
MAT 5-8 review current inland aquatic information, determine gaps in critical information for planning and sustainable resource use, and prioritise research and monitoring work to fill these gaps, taking into account the technical forum identified in MA5-41	High	NRETAS Technical Expert group and KWAC are responsible for reviewing existing information, as well as the identification of knowledge gaps and monitoring programs. This will be an ongoing task with progress updates annually and their findings incorporated into WAP review.
MAT 5-9 Undertake an annual program of regional rainfall, stream flow, groundwater levels and water quality monitoring in all Water Control Districts to inform water allocation planning and management.	High	Monitoring the impacts on this water source is a key component of the implementation of this Plan, it is also required to test conceptualisation and modelling of this water source and to inform reviews.
MAT5-10 Determine the sustainability of all towns and community public water supplies.	High	This Plan ensures diversity of supply to the Katherine municipality and provides adequate access for the duration of this Plan.
MA5-13 Develop or finalise Water Allocation Plans for Alice Springs, Darwin, Gove, Katherine, Tennant Creek and Ti Tree regions, and prioritise other regions for similar planning processes.	High	This Plan is a Water Allocation Plan for the water source under most pressure within the Katherine Region.
MA5-14 Implement Water Allocation Plans for all Water Control Districts.	High	As above
MA5-41 Establish a cross-sectoral, community inclusive forum with technical expertise to recommend planning decisions, policy development and management for inland water adheres to ESD principles.	High	The main route of consultation used in the formation of this Water Allocation Plan was through a statutory stakeholder based water advisory committee appointed under the NT <i>Water Act</i> .
MA5-44 Develop data sharing arrangements between Government agencies, resource users, landholders, and local communities to ensure water quality data, biological data, environmental flow requirements, and groundwater abstraction data are available for all regional and property based planning.	Medium	This information is freely available, public reports displaying and interpreting this data will be produced periodically by the Department as specified in Appendix 2 of this Plan. It is envisaged that the Bureau of Meteorology will compile and make publicly available all water resource information including extractions on a resource by resource basis, within the life of this Plan.

## Schedule 7 Standardised Crop Water Use Figures

### (i) Perennial Crops

Crop Type	Stage of Growth	ML/Ha/Yr
Avocados	Mature	9.6
Bananas	Mature	19.6
Citrus	1 yr	0.3
	2 yr	1.6
	3 yr	3.6
	4 yr	5.7
	Mature (5+ yrs)	9
Leucaena	1 yr	2.1
	2 yr	4.1
	3 yr	6.7
Mahogany Trees	1 yr	1.3
	2 yr	2.6
	3 yr	2.8
	4 yr	0
Mangoes	1 yr	0.3
	2 yr	0.9
	3 yr	2
	4 yr	3.1
	5 yr	4.8
	6 yr	7.4
	Mature (7+ yrs)	8.6
Paw Paws	Mature	18.5

### (ii) Annual Crops

Crop Type	Growing Time-Frame	ML/Ha/Yr
Rhodes Grass	March – Dec	12.3
Forage Sorghum/Millet	April – Nov	10.5
	May - Dec	10.7
Lawn	March - Nov	3.9 (0.5ha)
Lucerne	March - Nov	10.3
Maize	April – Aug	5.8
Melons	Mar - May	2.9
	April – June	2.9
	May – July	3
	June – Aug	3.4
	July – Sept	3.8
	Aug – Oct	4.5
	Sept - Nov	3.8
Nursery/Shade house	N/A	1.74 (0.1ha)
Onions	Apr – Aug	5.4
	May - Sept	5.9
Peanuts	Mar – Aug	7.2
	April – Sept	7.9
	May - Oct	8.8
	May - Nov	10.1
Potatoes	16 weeks	4.7
	18 weeks	5.8

## Appendix 1 Location of Maps

The maps created for this Plan may be inspected at:

Darwin Head Office

Department of Natural Resources, Environment, The Arts and Sport

Goyder Centre, Chung Wah Terrace

PO Box 30, Palmerston NT 0830

Phone 08 8999 4892

Fax 08 8999 4403

Katherine Regional Office

Department of Natural Resources, Environment, The Arts and Sport

32 Giles Street, Katherine

PMB 123, Katherine NT 0852

Phone 08 8973 8115

Fax 08 8973 8122

## Appendix 2 Monitoring Program

The monitoring program for this Plan will be finalised in an implementation strategy to this Plan. The monitoring programs presented in the following table may be reviewed and expanded during the development of the implementation strategy.

<i>The Monitoring Program is based upon the Performance Indicators stipulated in this Plan</i>			
Performance Indicator	Related Outcome	As Measured By	Reporting Type and Frequency
River health	1	Assessment parameters and ranges consistent with national guidelines will be developed in an implementation strategy to this Plan	Annual written report
Annual discharge from this water source to the Katherine River relative to other years and annual extraction from this water source.	1	Stream flows at gauging stations located at Ironwood and Wilden Stations. Pumpage returns from all licensed bores on a monthly basis under licence condition. A network of monitoring bores comprising bores fitted with continuous loggers and others monitored manually.	Annual written report. Telemetered data will be available from gauging stations in real time.
Water quality in the Katherine River and Tindall Aquifer	1 & 2	Parameters and ranges consistent with national guidelines will be developed in an implementation strategy to this Plan.	Annual written report.
Identification of methodology to quantify water requirements for Indigenous cultural purposes.	1 & 5	Desk top analysis to review the application and assessment methodology developed through a social study.	Written report prior to the review.
Identification of specific environmental water requirements that maintain ecological processes in the Katherine and Daly Rivers.	1	In addition to 'River Health' (previously mentioned in this table); Fish, macroinvertebrates, aquatic plants and physical habitat in the Katherine River downstream of Knott's Crossing, and sites in the Daly River - to be determined.	Annual written report.
Number and level of water restrictions applied within Katherine and Tindall RAAF Base.	2	Desktop analysis to be completed in partnership with Power and Water Corp.	Written report prior to the review.
Reports of contamination or interference of bores.	2	Desktop analysis of compliance reports detailing cases of contamination or interference of bores.	Written report prior to the review.
Restrictions to total security licences, stock & domestic and other small volume groundwater uses.	2	Desktop analysis to review details of restrictions.	Written report prior to the review.
Estimated volume of water being extracted for rural stock and domestic and	2	Desktop review of changes to land use zoning that may impact on the utilisation of water for rural stock &	Written report prior to the review.

The Plan: Water Allocation Plan - Tindall Limestone Aquifer, Katherine

other small volume groundwater uses.		domestic purposes, and other small volume groundwater uses.	
Development of water reliant enterprises by Indigenous people.	3	Desktop review of Indigenous owned/ managed water reliant enterprises, using groundwater from the Tindall Aquifer.	Written report following the 5 year review, but prior to the 10 year review.
Volume of water rights held for or issued to Indigenous people.	3	Desktop analysis of water held in trust and issued to Indigenous people.	Written report following the 5 year review, but prior to the 10 year review.
Value of production from irrigation and other water reliant enterprises.	4	Desktop review in association with ABS and other NT Govt Departments i.e. RDPIFR.	Written report prior to the review.
Announced allocations for each category of water licence.	4	Desktop review comparing announced allocations and demand based on estimated property development.	Written report prior to the 5yr review.
Water trading activity.	4	Desktop analysis of all trading activity.	Written report prior to the review.
Percentage of known sites identified of Indigenous cultural importance identified by this process	5	A social study, detailing the social and cultural importance of sites dependant on groundwater from the Tindall Aquifer, with references made to other existing Indigenous studies of the Katherine area.	Written report prior to the review.
Level of engagement and knowledge of sites of Indigenous cultural importance.	5	A social study, detailing the social and cultural importance of sites dependant on groundwater from the Tindall Aquifer, and input from Indigenous groups into the process.	Written report prior to the review.