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To Whom it May Concern,

Draft Georgina Wiso Water Allocation Plan - submission

The Environment Centre NT (**ECNT**) is the peak community sector environmental organisation in the Northern Territory. Thank you for the opportunity to provide a submission on the draft Georgina Wiso Water Allocation Plan (**Draft WAP**).

ECNT submits that the Minister should not declare the Georgina Wiso Water Allocation Plan because:

(a) It unacceptably risks important environmental and cultural values, including significant aquatic ecosystems such as the Roper River, Mataranka and Bitter Springs, Flora Springs, Flora/Daly River, Elsey Creek, and Warloch Ponds;

(b) It does not allocate water to an estimated sustainable yield to beneficial uses as required by s22B(5) of the Water Act.

As an overarching comment, ECNT notes that the Draft WAP represents a significant departure from the previous practice of the Northern Territory with respect to water planning, and the National Water Initiative (**NWI**). It has not been developed in consultation with relevant stakeholders and the community on the basis of best scientific and socio-economic assessment as is required by the NWI (Schedule B(i)) of the NWI).[1] It contains no environmental or cultural objectives, nor does it ascertain the limits of acceptable change to these values. It provides no information about how secure ecological outcomes and resource security for users will be maintained or achieved. No water

[1] The NWI states that water plans should be "developed in consultation with all relevant stakeholders on the basis of best scientific and socio-economic assessment, to provide secure ecological outcomes and resource security for users".

advisory committee has been appointed by the Minister which would enable stakeholder input into the development of the plan. This process is essential for ascertaining environmental and cultural objectives for a water plan, and the limits of acceptable change to environmental and cultural values. Nor has scientific or socio-economic assessment been made available to stakeholders or to the public. The development of a water allocation plan without the input of a water advisory committee is unprecedented in the Northern Territory. The approach taken represents a serious and unacceptable regression in water planning by the Northern Territory Government. We **attach** a letter from 18 academics highlighting the risks of proceeding to declare the plan without a water advisory committee, or public/community input. We urge the Department, and the Minister, to take these concerns seriously.

The appropriate and lawful course for the Minister is to defer declaration of the Georgina Wiso Water Allocation Plan until:

(a) The groundwater model being developed for the region and the Strategic Regional and Environmental Baseline Assessment are both completed, as per the recommendations of the Pepper Inquiry, in order to ensure that the plan is based on the best available science;

(b) In consultation with all relevant stakeholders, Traditional Owners and relevant First Nations organisations, cultural and environmental objectives are developed for protecting the cultural and environmental values of rivers and groundwater dependent ecosystems;

(c) A water advisory committee has been established which provides opportunities for community members and stakeholders to have extensive input, and ensure that there is a valid free, prior and informed consent process for Traditional Owners.

Our substantive arguments are set out below.

1. Requirements of the Water Act

Section 22 of the *Water Act* ("**the Act**") empowers the Minister to declare part of the Northern Territory to be a "water control district" ("**WCD**"), by notice in the *Gazette* for a purpose specified in the notice and to allocate a name to the district. By instrument dated 30 September 2022, the Minister declared the Daly Roper Beetaloo Water Control District (**Daly Roper Beetaloo WCD**) to the district.

Section 22A(1) of the *Water Act* empowers the Administrator to declare the beneficial uses of water in a water control district. Section 22A(2) provides that the "environment" and "Aboriginal economic development" are beneficial uses in all water control districts. Section 4(3) defines the "environment" beneficial use as "to provide water to maintain the health of aquatic ecosystems".

Section 22B(1) of the Act empowers the Minister to declare, by notice in the Gazette, a water allocation plan in respect of a WCD. Section 22B(4) provides that "water resource management in a water control district is to be in accordance with the water allocation plan declared in respect of the district." The power to declare a WAP is conditioned by the requirements in ss22B(5)-(7), which

provides that a water allocation plan is to ensure (inter alia) that water is allocated within the estimated sustainable yield to beneficial uses.

2. Groundwater dependencies (including aquatic ecosystems) of the Cambrian Limestone Aquifer

The Draft Plan allocates water to different beneficial uses within a defined area (the Georgina and Wiso Basins) within the Daly Roper Beetaloo WCD from the Cambrian Limestone Aquifer (**CLA**). It should be noted that the Daly Roper Beetaloo WCD is vast, and contains a range of interconnected groundwater and surface water systems, including the Cambrian Limestone Aquifer, the Roper River, Flora River, Daly River, Katherine River, Dry River, Elsey Creek, and a number of wetlands, springs and billabongs including Longreach waterhole, Warloch Ponds, Mataranka Thermal Pools, Red Lily Lagoon, and Bitter Springs. This should be considered a single interconnected system.

The CLA is one of the most valued water resources in the Northern Territory. It is an extremely important and extensive carbonate aquifer underlying much of the Northern Territory to the north of Alice Springs and south of Katherine, encompassing most of the Barkly Tableland and Sturt Plateau. The aquifer system occurs within three major sedimentary basins: Daly, Georgina and Wiso, which are interconnected.

ECNT commissioned a report by Professor Matthew Currell and Dr Christopher Ndehedehe to synthesis available scientific research regarding the hydrogeology of the CLA, and identify risks to key environmental and cultural dependencies/values of the CLA from proposed water management, including the Draft WAP (**attached**, "**Currell Report**").

The Currell Report states that groundwater from the CLA:

> flows from the southern parts of the Barkly Tableland, Sturt Plateau and Wiso Tableland (within the Georgina and Wiso basins) to the north, following the gentle decline in topography... Flow patterns within the Daly Basin continue this northerly-directed flow-path within the Tindall Limestone, towards the Roper River and Mataranka Springs on the east of the basin (eg Top Springs). In the Daly Basin, there is also flow form the northern margins (near Katherine) towards the south, with groundwater flows again converging upon and discharging to the Mataranka Springs and Roper River. At the northern extent of the Daly Basin, there is further northward-directed groundwater flow in the Tindall Limestone, which discharges into the Daly River through many springs.

Thus, groundwater from the CLA, recharged by rainfall, flows to the surface via springs, wetlands and the channels of the Roper and Flora/Daly rivers and associated tributaries. The Roper and Daly rivers are two of the most valued fishing and tourism areas in the Northern Territory. The dry season flows in both rivers are dependent on adequate levels of water in the CLA. These groundwater flows support significant vegetation communities and aquatic ecosystems within spring pools, groundwater dependent sections of streams, and downstream waterbodies. Wildlife drinks from groundwater-fed pools and terrestrial vegetation utilises groundwater where the CLA water table is shallow. Groundwater and surface water systems within the plan area, and more broadly within the Daly Roper Beetaloo WCD, are interconnected and should be treated as a single system. The

cultural, social, environmental and economic importance of the CLA and its dependencies cannot be underestimated. Caution must be exercised in allocating water from the CLA, and must ensure that aquifer discharges, storage and throughflow are maintained to ensure the ecological functioning of the system.

The Currell Report notes that the extent of connectivity along regional groundwater flowpaths remains a significant knowledge gap, which "has significant implications for how the CLA is likely to respond to groundwater extraction in different regions – ie, the extent of localized v regional impacts." Nonetheless, Currell notes that:

> "the mapping of stygofauna assemblages recently by Rees et al (2020) and Operprieler (2021) indicated there is a high degree of connectivity within the CLA across the three basins – if this was not so, more localised endemic stygofauna communities would be expected. This is further supported by similarities in the hydrochemistry of groundwater along flow paths that cross the basin boundaries (Evans et al, 2020).

The Currell Report states that discharge of groundwater from the CLA occurs to the Roper River and its southern tributaries (eg Elsey Creek) via springs (including Mataranka Thermal pools) and diffuse discharge to the river channel along a significant length within the upper catchment. Currell notes that "these flows make up a very significant proportion of the Roper and its tributaries' flow in the upstream section of the catchment, and support important Groundwater Dependent Ecosystems and cultural values (Jolly et al, 2004; Karp, 2008; Barber and Jackson, 2011; Bruwer and Tickell, 2015; Lamontagne et al 2021)." Currell also notes that the timescales of flow and aquifer response times are not well understood, including "how long the system may take to reach a new equilibrium in response to significant disturbance., such as a major and rapid increase in groundwater extraction rates, or a step-change in the regional climate conditions."

The Currell Report discloses the following significant environmental and cultural values/dependencies of the CLA, including a number of aquatic ecosystems which are dependent on groundwater from the CLA:

(a) The upper catchment of the Roper River: discharge of water from the Tindall Limestone to the Roper River is a significant proportion of the river's flow in the upper catchment. There is diffuse discharge to the river channel along a significant length within the upper catchment. Per the Currell Report, "these groundwater flows sustain the river and its tributaries through dry periods – ie the river is fully dependent on groundwater following periods of low rainfall";

(b) Elsey Creek;

(c) Mataranka Thermal Pools: per the Currell Report, "discharge from the CLA is the predominant source of water sustaining the Mataranka Springs, which flow to the Roper River in its headwaters."

(d) Waterhouse River and Roper Creek: Karp (2008) states:

> The springs in the Roper start from the upstream junction of the Waterhouse River and Roper Creek (which join to become the Roper River) and extend east to the edge of the limestone basin. This region is the most significant in terms of groundwater and surface water interactions with the Mataranka Basin providing much of the base-flow in the Roper River."

(e) Swamps and wetlands, such as Red Lily Lagoon and 57 Mile Waterhole (see also Karp (2008);

(f) Downstream reaches of the Roper River; Karp (2008):

> Analyses of data collected during a comprehensive survey in October 1980 show only small change in water quality in the non-tidal sections of the Roper River extending some 200 kilometres from the junction of Roper Creek and Waterhouse River to Roper Bar … This suggests that during the dry season, the limestone aquifers in the Mataranka basin provide the main supply of water flow in the Roper River. Thus, the management of the groundwater resources in the Mataranka Basin is crucial to the viability of the downstream reaches of the Roper River.

(g) Wetlands and spring pools located within Elsey National Park;

(h) Warloch Pond Spring (Lamontagne et al, 2021);

(i) Longreach waterhole;

(j) Springs along the Flora River on the western side of the Daly Basin;

(k) (possibly) Top Springs on the western side of the Wiso Basin, although further research is needed to ascertain this;

(l) Red Lily Wetlands: Barber and Jackson (2012) document the importance of Red Lily Lagoons (20km downstream of Salt Creek and the eastern extent of Elsey National Park;

(m) Barlyurra sacred site complex, which straddles the Roper River in the vicinity of Red Lily Lagoon and upstream;

(n) Livistonia rigida (palms) dependent on groundwater flows to the Roper River, its tributaries and springs, which require shallow steady water tables (less than 2 metres below the surface) before they become stressed and vulnerable to fire;

(o) Flying Fox Creek, Mainoru River and Wilston River (Knapton (2009));

(p) Large (particularly riparian trees): per Jackson and Barber (2013), Indigenous peoples of the Roper believe that large trees – often located near important water sites – embody individuals from current or recently deceased generations;

(q) Stygofauna communities are a groundwater dependent ecosystem. Stygofauna have been identified in the CLA dominated by crustaceans, including the blind shrimp Parisia unguis (Rees et al (2020 and Oberprier et al (2021).

The above-described aquatic ecosystems are not identified as dependencies of the CLA in the Draft Plan. The Draft Plan fails to acknowledge, much less provide any mechanisms for maintaining or protecting, the significant aquatic ecosystems dependent on groundwater from the CLA mentioned above.

The Background Report accompanying the Draft Plan (which does not form part of the Plan to be gazetted, and therefore will have no legal effect), lists some of these dependencies, however, no information is provided regarding how the ESY might impact these dependencies (or otherwise). No modelling is provided showing the impacts (or otherwise) of the proposed extraction on aquatic ecosystems. Of note, Section 4 of the Background Report purports to outline "the water needs of natural ecosystems related to the water resources managed through the plan." It is noted that "predominantly the groundwater resources in the plan area are greater than 40m below the ground and have limited dependency with groundwater dependent ecosystems (GDEs)" and that "identifying the key environmental values to be maintained and managed through the plan will occur during implementation of the plan." This is an inaccurate summation of the extent of groundwater dependencies of the CLA, and is not reflected in the scientific evidence highlighted above.

3. **Risks to groundwater dependencies and aquatic ecosystems from the Draft Plan**

The Draft Plan proposes an estimated sustainable yield (**ESY**) of 292.6 GL/year, estimated to be 40% of long-term averaged recharge. This is a very large allocation, approximately 13 times the current water use in the plan area. The Draft Plan does not set environmental or cultural objectives, but says these will be developed during "implementation". It does not delineate management zones (beyond a broad division between the Wiso and Georgina Basins). No information is provided regarding whether key environmental assets, ecosystem functions or the productive base of the resource will be impacted. No scenario modelling is provided to show the impacts of the proposed extraction. As mentioned above, the Draft Plan makes no reference to key dependencies.

The Currell Report discloses a range of serious risks to aquatic ecosystems listed above associated with an increase in groundwater extraction rates from the CLA, including:

(a) reduced flows of groundwater to the Roper River, Mataranka Thermal Pools and other streams, springs and wetlands of the region. Currell notes that "if these groundwater discharge flows and/or CLA groundwater levels were to decline below key thresholds, complete loss of springs and baseflow to rivers may occur. This would lead to the loss of vegetation communities and animal habitat, and incalculable loss and damage to the cultural values associated with both specific sites (eg springs, waterhols, and wetlands) and the health of 'country".;

(b) stygofauna (an aquatic ecosystem) may lose their habitat if extensive drawdown occurs in regions of the aquifer they inhabit;

(c) interference to existing water users and water supplies in the region, including that existing extraction bores used for stock/pastoral water supply may lose pressure or run dry. Also, in

dry periods this could result in saltwater ingress affecting the Ngukurr Aboriginal community (Jolly et al, 2004; Zaar, 2009). Non consumptive uses of water (eg tourism, fishing and hunting) may also be impacted;

(d) land subsidence and compaction of the aquifer;

(e) degradation of water quality.

With respect to the Draft Plan specifically, the Currell reports notes:

(a) It is unclear how or why the value of 40% of recharge was determined to represent a sustainable level of extraction;

(b) In the Georgina and Wiso Basins, knowledge of the water balance, hydrogeology and groundwater dependent ecosystems are currently not sufficient to fully understand the effects of such extraction;

(c) There is considerable uncertainty associated with the recharge for the Georgina and Wiso Basins:

> The 660 GL/year value is based on updated coupled surface water-groundwater modelling – the same model reported in Knapton (2020). The estimate however is nearly double the recharge reported for the Georgina Basin in the previously documented modelling. This is likely due to the use of the most recent 50 year period of data (1970 to 2020, a relatively wet period), as opposed to the full length of available climate records – Knapton (2020) used the longer period of 1900 to 2019 climate data. Notably, the majority (two thirds of the recharge contributing to the overall total over the revised modelled conducted for the draft WAP occurred during 1974, an extremely wet year which saw an estimated 21,280GL of recharge. There is very little data to indicate the mechanism or geographic extent of this large, episodic recharge event nearly fifty years ago, for which data are mostly lacking. This is critically important when assessing whether extracting a fraction of the averaged recharge rate derived using the model – eg 40% as proposed in the plan – can be considered appropriate as a sustainable yield…

(d) The current data indicates that recharge is considerably lower than the long-term average in most years (and may be negligible under the current climate), except for rare events where rainfall and recharge far exceeds the long-term average. Such periods have likely occurred only three or four times over the past century;

(e) Under the proposed ESY, in most years, "significant aquifer overdraft may occur for many consecutive years (or decades) before the next episodic recharge event occurs."

(f) Drawdown associated with consecutive years (or decades) of aquifer overdraft in the Georgina and Wiso basins would endanger stygofauna communities and reduce cross-basin discharge fluxes within the CLA (eg to the Tindall, upon which key aquatic ecosystems listed

above depend). These GDEs may suffer reduced access to groundwater for extended periods between recharge events due to extraction at the proposed ESY, "threatening their survival";

(g) the proposed ESY (calculated at 40% of recharge, averaged over a 50 year period) would mean that in most years extraction would far exceed recharge (as recharge is rare and episodic). In this scenario, a significant level of storage depletion is likely to occur between major recharge events, effectively tantamount to water mining;

(h) the "depletion of water in storage that occurs during the early phases of groundwater extraction – which, in large aquifer systems with long response times, may continue for hundreds of thousands of years, will inevitably cause changes to groundwater levels and flow gradients". Groundwater dependent ecosystems "may be lost entirely";

(i) Climate change is likely to exacerbate these impacts since "groundwater extraction at rates that exceed recharge even temporarily (due to its episodic nature) could coalesce with prolonged droughts, to deplete storage faster than expected, lowering the water table and ultimately damaging GDEs and their unique biodiversity."

(j) The extraction of volumes of water proposed each year in the Draft Plan would likely have flow-on effects for the rest of the CLA water balance and associated values: "the adoption of the proposed ESY/extraction rates in the Draft WAP may seriously jeopardise environmental and cultural values. Of further considerable concern is the fact that cultural and environmental values supported by the CLA groundwater in this region (encompassing appropriate stakeholder engagement) appear not to have been effectively documented and considered in the setting of the ESY, and this is not proposed to be addressed until half wau through the life of the plan."

(k) The sites most at risk in the Daly Basin would be the Roper River and Mataranka Springs (on the east), and to the west, Flora River and its associated springs: "even if significant extraction rates are permitted a long distance from the GDEs (eg groundwater extractions focused near Larrimah, or Daly Waters, above the Beetaloo sub-basin), the most likely *long-term* consequences of increasing groundwater extraction rates within the Daly basin is the capture of discharge that ultimately sustains these critically important GDEs (Ponce, 2007);

(l) The depletion of storage in the Georgina and/or Wiso basins to the south would result in throughflow from these basins no longer sustaining the Tindall Limestone, and a change to net loss of groundwater throughflow, with groundwater form the Tindall Limestone instead flowing south (rather than north);

(m) Ecohydrological and modelling studies have yet to determine the threshold groundwater elevations required to sustain the Mataranka Springs, Roper River and other springs and groundwater dependent streams and vegetation above the CLA, nor have they determined the extent of reduction in baseflow and/or associated environmental impacts that would likely be caused at different extraction rates in different areas."

(n) Reductions in flow to springs and/or base flows int eh Roper would cause declines in river flows downstream, including near Ngukurr Aboriginal community.

These risks to aquatic ecosystems and other dependencies are not identified in the Draft Plan, nor is any allocation made to maintain aquatic ecosystems.

ECNT notes that the Currell Report gives extensive consideration to the possibility of groundwater extraction changing the direction of flow of the CLA. The Draft Plan contains no safeguards to prevent such impacts from occurring. For example, there are no management zones within the plan area (beyond the split between the Wiso and Georgina Basin). This means that a considerable proportion of the ESY could be extracted at one point, leading to significant localised drawdown and impacting hydraulic gradients and flow rates towards the ecosystem. This would have potentially catastrophic impacts on the aquatic ecosystems described above. The Draft Plan does not consider these possible impacts or provide any mechanisms for their management.

4. Estimated sustainable yield

The key task of the Minister is, in declaring a water allocation plan, to ensure that water is allocated within an estimated sustainable yield to beneficial uses (including the environment). It is clear from the Currell report, and the scientific evidence it synthesises, that the Draft Plan does not meet this threshold legal requirement.

While the term "estimated sustainable yield" is not defined in the Water Act, there is a considerable body of policy and scientific research in Australia suggesting how to approach the task of ascertaining a sustainable level of extraction.

The NWI defines "environmentally sustainable level of extraction" to mean "the level of water extraction from a particular system which, if exceeded would compromise key environmental assets, or ecosystem functions." Thus, the Draft Plan should not compromise key environmental assets or ecosystem functions to be sustainable.

The Currell report provides a useful synthesis of different policy approach to sustainable groundwater management in the CLA suggesting a combination of both volume and trigger-level based rules that encompass:

(a) Volumetric extraction rates which in the long term ensure:

(i) Groundwater flows do not decline in such a way as to compromise the health of the groundwater dependent ecosystems sustained by these flows. This requires:

a. Careful analysis of recharge and discharge flux rates, environmental dependencies on these flows, and the extent of 'capture' by pumping at different rates in the different CLA basins;

b. Consideration of the connectivity of CLA flows to rivers (eg the Roper, Flora and Daly) and throughflow across sub-regions and basin boundaries (eg the

dependence of flows within the Daly basin on inflow from the Georgina and Wiso Basins);

c. Sustainable yields to be set within a given management area to be shown to be sustainable cumulatively, in conunction with those set in adjacent WAP areas.

(ii) The renewability of groundwater resources, preventing ongoing storage depletion and or detriment capture of storage flows, in recognition of the high value of groundwater to the maintenance of aquatic ecosystems such as the Roper River, Mataranka Springs and other GDEs and communities.

(b) Clearly defined and well monitored water level triggers/thresholds, which are determined to be the groundwater elevations required to sustain environmental and cultural values of key groundwater dependent sites and ecosystems.

It is clear that the Draft Plan does not adopt such an approach, or even attempt to. It does not even mention, let alone provide mechanisms to maintain, key aquatic ecosystems identified in the Currell Report. It facilitates groundwater depletion or "mining" that will endanger key environmental and cultural dependencies. By definition, this is not sustainable. The Draft Plan does not allocate water within an estimated sustainable yield to beneficial uses, including the environment and aquatic ecosystems. It does not meet the requirements of the Water Act.

Yours faithfully,

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