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Attention: Coordinator General
c/- EIS Project Manager, Burdekin Falls Dam Raising project
Office of the Coordinator-General
PO Box 15517
City East QLD 4002 Australia

Re: Submission to the draft Terms of Reference for an Environmental Impact Statement for the Burdekin Falls Dam Raising Project

Dear Sir or Madam,

North Queensland Conservation Council welcomes this opportunity to provide the following comments regarding the draft Environment Impact Terms of Reference (TOR) for the Burdekin Falls Dam (BFD) Raising Project.

Introduction

The ToR is comprehensive in addressing the main issues and quite detailed in indicating specific points that should be included. The main concern then is that the proponents address the ToR in a rigorous manner, and that their EIS draft be available for expert and public comment and review.

General comments

1.1 The early sections of the TOR focus on the dam and river. This could allow the proponent to ignore the 'secondary' or indirect impacts caused for instance by additional agricultural production which the dam aims to enable.

1.2 Similarly, while it may be embedded in some sections, it could be easy for the proponent to overlook upstream dam effects in the inundation areas.

Thus, to ensure both these aspects (1.1 and 1.2) are not overlooked, they could be emphasised by adding to Part B "General approaches and requirements of the EIS", something to the effect of:

> *'all sections should be considered to apply to the dam, construction and operation, the river flow, inundation areas and the GBR lagoon, in terms of both directs effects on these areas, and any indirect impacts of activities arising from use of water the dam, including expanded areas of agriculture".*

1.3 The proponents ae required to conduct public consultation and to report on this (#7.6 and Section #14). To ensure adequate inputs are gained from stakeholders (irrigators, coastal communities, various agencies, etc) a clear consultation process should be defined. Thus, something to the effect could be added Section 14#:

> *"to ensure effective consultation process, the proponents should within 90 days of the final ToR make public, a draft of their consultation plan (issues/stakeholders /provisional schedule), and subsequently consult with the stakeholders for dates of consultation so that the key stakeholders will be available, and publish the agreed program 10 days in advance. These consultations should be scheduled in the first quarter of the EIS so that they are not an afterthought to the EIS, but make a contribution to achieving an effective EIS".*

1.4 Many earlier documents from dam proponents have assessed water availability in terms of 'mean flows. This can cover years of low flows where water users would struggle to obtain water they expect. Median flows will better give an indication of consistent water availability across years. Thus, to ensure this more suitable parameter is used, this could be emphasised by adding to Part B "General approaches and requirements of the EIS", something to the effect of:

> *'The proponents should in general use the parameter of 'median flows' in assessing water flows, unless they are attempting to make a specific point, and then they should note and justify the use of a different parameter".*

Specific areas of concern.
There are a range of concerns of the effects of dams on the Burdekin, some already becoming evident. These are stated here along with section of the ToR that could be strengthen to ensure the proponent is aware of these and thus responds to the sections adequately.

1.0 Increased volume of water applied for irrigation in the Lower Burdekin will further contribute to the rise of the water table, salination of the soils and degradation of the wetlands.

With abundant water provided from the BFD, the water table has risen steadily since construction of BFD, with some areas already affected by salinity. Further expansion of irrigated agriculture, with application of additional water could:

(a) accelerate the rise in water table and salination, with the effect of compromising the productivity of the main Priority Agriculture Area as designated in the North Queensland Regional Plan (2020).
(b) Increase the run-off (surface and sub-surface and estimated to be 50-400,000 ML per year[1]) water onto the GBR, carrying with its nutrients and fine colloidal solids. This will potentially increase reproduction of COTS and inhibit the regeneration of young corals.

This issue is covered in section 15.17 but could be strengthened as follows:
Section 15.17 (new section)
(i) Historic behaviour of the aquifer, in particular the water table levels and salination; the effects of continued irrigation at current rates; and with likely rates with increased water availability from the project, both in the existing irrigation areas and any proposed new irrigation areas.

These sections should flag the risk of water table rise and salination are key areas of concern, and that they must respond to these specifically and substantially.

3.0 Increased extraction of water from the Burdekin (150,000 ML at 2m rise in dam wall) and effects of this on sediment transport, and increased risk of flooding in the Lower Burdekin. (NOTE; This will be compounded if construction of Urannah Dam resulting extraction of an additional 150,000 ML and also if Hells Gates Dam is constructed with extraction of ~ 500,000 ML).

Raising the height of the BFD, will have several effects:

(a) reduce the volume of water flowing below the dam, affecting the aquatic life that remains in the river. This need to be assessed.
(b) reduce occurrence of large 'flushing events' or 'floods' when the dam spills. This will further reduce the transport of sediment (still coming from the Bowen/Broken river catchment) from the river out to Cape Bowling Green, and

[1] "A new horizon for irrigation in the Lower Burdekin, Discussion paper", and personal communication, Sugar Research Australia (2020)

potentially accelerate erosion of the Cape. This will have the same impacts noted above.

(c) Reduced flow rates through the lower reach of the Burdekin and thus increasing sand depositing in the Burdekin. Current evidence suggests the bed level has risen 1-2 m since the dam constructed. This will reduce the capacity of the river to discharge water quickly in extreme rain events and consequently risk of catastrophic flooding in the Lower Burdekin areas and the communities of Ayr and Home Hill.

These should be covered variously in sections 10.19 (e) iii, 15.10, 15.12(f), 15.18 (c) iii, 15.24 and 16.10.

Section 15.18 (c) could be strengthened "including both upstream and downstream areas and including change to river bed levels".
These sections should flag the potential changes in river bed morphology and transport of base lad sediment to Cape Bowling Green are key areas of concern, and that they must respond to these specifically and substantially.

3.0 Capture of coarse, or base-load, sediment by the dam resulting erosion of Cape Bowling Green and potential damage to the RAMSAR area of Bowling Green Bay.

The BFD captures an estimated 95-98% of coarse sediment from the Upper Burdekin catchment. There is strong evidence that since construction, erosion of approximately 30m has occurred along the length of Cape Bowling Green, with at least one point likely to breach (about 5 km back for the tip). Such a breach would accelerate erosion of the Cape, and expose Bowling Green Bay to drastic change. Such exposure would also affect the coastal communities of Cungalla and Jerona. *This is covered in: section 15.10 (b) and 16.10, but without sufficient emphasis given the extreme impact possible.*

These sections should flag that bed-load starvation and erosion of Cape Bowling green with consequent changes to coastal morphology and impacts on Bowling Green Bay are key areas of concern, and that they must respond to this specifically and substantially.

4.0 Persistent Turbidity;

Since construction of BFD, the river below the dam runs turbid for the full 12 mth of the year. This was not predicted by any researchers prior to construction. This turbidity affects all aquatic life: abundance of feed, access of fish to feed; spawning etc. No assessment of the status of the Burdekin below the dam has been made since its construction. Raising the BFD can be expected to increase the capture of colloidal sediment and thus increase downstream turbidity.

This is covered in general terms in Section 15.22 – 15.36 (water quality) and Section 15.164 (effects on aquatic biota)

The water discharged onto the GBR has further impacts. Recent research suggests that the levels of turbidity and sediment transported onto GBR may be related to outbreaks of COTS and low coral recruitment.

Section 16.17 (effect on RAMSAR Bowling Green Bay, and GBR)

All these sections should be flagged to the proponents, that turbidity is a key area of concern, and that they must respond to this specifically and substantially.

5.0 Assessment of dam safety

The existing BFD is under-designed both in terms of (a) its weight and (b) ability to reduce water ahead of extreme rain events[2]. Sunwater is currently proposing a Dam

[2] Burdekin Falls Dam 2020 – Testing the boundary of hydrology, 8 pages (2009), Authors: Ayre, B., Gillespie, S.

Improvement Project (DIP) at a cost of about $200M. With climate change extreme rain events will become more extreme and more frequent. Increasing dam height will arguably increase the risk for failure through (a) mechanical failure with greater weight of water, (b) piping under the dam due to greater hydrostatic pressure; and (c) side erosion due to low capacity to discharge water during extreme rain events. These issues have been relevant in recent events for dams in Queensland, (Wivenhoe, Paradise and Ross River).

> *This covered in sections: 15.145, 15.148, and then Sections: 15.157 15.158 and 15.159. However, these do not appear to take into account 'failure', including mechanical failure as noted above.*
> *These sections should flag the risk of dam failure also. However, it might be preferable that this component of the EIS is carried out by a contracted independent entity, contracted through DNR.*

6.0 Inundation

The increase in dam wall by from 2m to 6 m will increase the inundated area by 13,500 ha and 18,000 ha, respectively. It is often claimed that land has already been purchased for dam raising and as a result inundation is not of concern. The additional inundation will particularly affect the Suttor river, which is recognised as containing areas of vegetation communities of high conservation value[3].

The importance of this is recognised in Section 11.4 and 11.5. They are recognised in the notes ahead of Section 16, (16 (a)). As well as the general alert proposed for Part B "General approaches and requirements of the EIS", these sections could be strengthened:

Section 11.4:

(a) "Map the location and boundaries of the project footprint, including the inundation areas

(b) "Map, the location and boundaries of the project footprint, including all infrastructure .....(as is currently 11.4)

Section 11.5

..... National Parks, matter of national and state significance (with particular reference to notes to Section 16 (a)), the location of ……

7.0 Assessment of project rationale and economics of

The rationale and economics of the need for additional water yield are doubtful to say the least.

- existing allocation of water for irrigation in the Lower Burdekin is under-utilised, (recent surveys by NEConomics/DNRME), and large volumes of water are lost or un-accounted for by Sunwater.
- Funds for new construction must be recovered through increased water charges to farmers thus reducing competitiveness of agriculture in the Lower Burdekin
- Recent studies by Sugar Research Australian (Brandon) indicate cane farmers could reduce water applied by up to 50%[4]. This would save close to 150,000 across the Lower Burdekin the yield of raising BFD by 2m. The cost of this options, roughly $300 M would be low compared to estimated $502 for raising BFD by 2m[5]. More importantly this would simultaneously address the issue of rising water table and salination, and substantially reduce run-off to the GBR.

Earlier studies by the proponents have noted the option of investing in changes to the irrigation system, but discounted them without real assessment. The proponents should

[3] "An initial environmental assessment of water infrastructure options in the Burdekin Catchment, Burrows D., (1999)
[4] "A new horizon for irrigation in the Lower Burdekin, Discussion paper", and personal communication, Sugar Research Australia (2020)
[5] "Initial Advice Statement – Burdekin Falls dam Raising", Sunwater (2020)

be notified that this is a key area of concern. This is covered in sections: Section 12: Project rationale and alternatives, and also in Economic Section 15.111 to 15.116

These sections should flag that the rationale and economics are key areas of concern, and that the proponent should respond to issues of water demand and the economics of water efficiency specifically and substantially in the two sections.

8.0 Climate Change

This section (11.9 and 11.10) is quite minimal and requires the proponent to articulate the climate changes but not the effects that these may have on the operation of the dam and viability of proposed activities for the water users. This should be strengthened by specific reference to:

Section 11.9 Describe the changes in weather patterns

(a) Changes in magnitude (intensity) and seasonal variability of rain fall, and flow-on effects such change would have on sediment generation and transport and consequent user activities in particular agriculture

(b) Air temperatures, wind and humidity, and in particular transpo-evaporation and its effect on water storage availability, and on agricultural production (i.e., plant growth) and water use required. In respect to these, they must be related back to the rationale and economic viability in sections 12 and 15.111-15.116

(c) Any other special factors such as temperature inversion that may affect management of the project