

# Border Rivers and Moonie Draft Water Plan Submission

## Submitter: Stanthorpe and Granite Belt Chamber of Commerce (SGBCC)

### Part A – General

#### ***1. What aspects of current or proposed Border Rivers and Moonie water management Plan do you support?***

The Stanthorpe and Granite Belt Chamber of Commerce Community (SGBCC) supports the current Border Rivers water plan ('current water plan') setting a cap on the total mean annual diversion volume that may be taken under existing and new water entitlements in the plan area.

This means that there are two ways that volumes of water entitlements may be secured to underpin the Emu Swamp Dam (ESD) project. These are:

- Developing and allocating the strategic reserves of unallocated surface water that are set aside in the water plan for the Stanthorpe water management area
- Moving un-supplemented water allocations from elsewhere in the Border Rivers plan area to the project's location and changing them to supplemented water allocations.

The current water plan sets out strategic reserves of unallocated water in the Stanthorpe water management area that represent a total increase in mean annual diversions of 4,500 ML in the area. This total is retained within the recently released new draft water plan ('draft water plan').

The SGBCC commends the government for identifying an allocation for indigenous/community purposes.

#### ***2. Do you have any other suggestions about how surface water could be better managed in the Border Rivers and Moonie water plan area?***

The SGBCC has signed a funding Grant Deed with the Queensland Government, with the support of the Australian Government to develop a detailed business case for the ESD project. The detailed business case is scheduled for completion and submission to the Queensland Government on 30 November 2018.

It is essential for the future economic development of the region covered by the Border Rivers and Moonie Water Plan, specifically the Stanthorpe Water Management Area that water in the area is developed in such a manner that there is sufficient certainty and reliability of the water products available and the ESD project can provide this certainty and reliability. The ESD project has been identified as a project worthy of State

significance by the Qld Government and by the State and Federal Governments with granting of EIS approvals. The project has received further support by the granting of NWIDF funding. . It is vitally important therefore that a project aimed at providing supplemented water supplies to the region is able to access suitable and adequate quantities of water in the Water Plan and Water Management Protocol. The project in all likelihood will not proceed on an economic basis unless adequate volumes are available for it in the draft water plan.

**3. Do you have any other suggestions about how groundwater could be better managed in the Border Rivers and Moonie water plan area?**

The SGBCC supports the position adopted by the Stanthorpe Community Reference Panel, as represented in their submission in relation to Groundwater.

***Are you submitting on the draft water plan, the draft water management protocol and/or the draft water entitlement notice?***

The SGBCC is submitting on both the draft Water Plan and the draft Water Management Protocol as they pertain to the viability of the ESD Project.

**4. Do you have any comments about how the proposals could be implemented**

The SGBCC in developing the detailed business case for the ESD project have engaged specialists in the area of water planning to inform this submission. Implementation aspects of this submission are addressed within the overall context of supporting the availability of water for the project.

The SGBCC would like to commend the department for providing access to the SOURCE hydrologic modelling so that it can form the basis of this response.

## Part B – Draft Water Plan

### 1. *What features of the draft water plan do you agree with?*

The SGBCC supports the current water plan which sets out strategic reserves of unallocated water in the Stanthorpe water management area. These are specified in terms of maximum allowable mean annual diversions for particular purposes as follows:

- 3,000 ML of mean annual diversions for irrigation and associated industry<sup>1</sup>
- 1,500 ML of mean annual diversions for town water supply.

The SGBCC also supports the recently released draft water plan also specifies a total average annual volume of unallocated surface water for the Stanthorpe water management area of 4,500 ML.

The SGBCC supports the objective of the water plan to define the long-term availability of water for different purposes including environmental and consumptive water uses. The water plan includes:

- outcomes or aspirational targets that represent what government and the community want to achieve over time
- strategies and requirements to guide the management of environmental flows
- environmental flow objectives, water allocation security objectives and associated performance indicators to be considered when making water allocation and management decisions
- strategies that specify the groups, types and volumes of water allocations (authorities to take water) that may exist within the plan area
- strategic and general water reserves that establish volumes, locations and allowable uses of unallocated water available in the plan area and which may be issued as new water allocations.

A new draft water plan that is proposed to cover both the Border Rivers and Moonie catchments has been prepared by DNRME and was released on 11 April 2018 for public review and comment. A new hydrologic model (developed on the Source modelling platform) was also made available by DNRME that allows assessment against the proposed requirements and provisions of the draft water plan

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<sup>1</sup> In 2003, the water plan originally identified a strategic reserve of 3,500 ML of unallocated water for irrigation and associated industry use. This was reduced to 3,000 ML in November 2008 when 500 ML was granted to the Commonwealth Environmental Water Holder ('CEWH'). An un-supplemented water allocation with a nominal volume of 500 ML located at Farnbro is now held by the CEWH.

The scope of issues that have been considered in preparing the new water plan are outlined in a Statement of Proposals that was issued by the Minister for DNRME in July 2016.

As foreshadowed in the Statement of Proposals, the new water plan proposes to:

- amalgamate the existing Border Rivers and Moonie water plans
- incorporate significant new science and knowledge such as:
  - updating hydrologic models using extended hydrological data to include the Millennium drought and recent significant flood events
  - data from several new stream gauges including in the Stanthorpe area
  - new studies on the implications of flows on fish migration and spawning, wetland filling and watering requirements for floodplain vegetation
- recognise Aboriginal social, spiritual and cultural values and uses for the water that they hold
- improve the management of, and conversion to water allocations, of existing groundwater and area licences including in the Stanthorpe area
- be reviewed to ensure consistency with the Murray-Darling Basin Plan 2012.

In relation to unallocated water in the current water plan, the Statement of Proposals also stated that:

The Stanthorpe region is an important area for horticultural production and water availability is limited while demand is growing. It is important to note that no change is proposed in relation to the unallocated water in the current plan

and that:

No changes are proposed for unallocated water available for future consumptive use in the Border Rivers catchment as part of the development of the new plan. This unallocated water includes strategic reserves from the Stanthorpe water management area available for irrigation and related industrial purposes, and for town water supply.

Notably, the draft water plan does not propose to change the total volume of strategic reserve of unallocated surface water that is proposed be made available in the Stanthorpe water management area. However, the draft water management protocol (that was released for public review and comment at the same time as the draft water plan) sets out a proposed breakdown of the volumes and purposes of unallocated surface water strategic reserves which is discussed later in this submission.

## ***2. How do you think the draft water plan could be improved?***

The SGBCC's rationale and recommendations on improvements to the Water Plan are contained within this submission and relate specifically to progressing the Emu Swamp Dam Project.

## Part C – Draft water management protocol

### 1. *What features of the draft water management protocol do you agree with?*

The SGBCC supports the ability for the Water management protocols to generally includes specific rules and requirements in order to achieve the outcomes stated in the water plan. A protocol is developed by DNRME and approved by its chief executive. The SGBCC supports the ability of the Water Management Protocols to be amended by the Department.

SGBCC supports that the following key matters be included within a water management protocol:

- (where applicable) the processes for releasing specified water volumes of unallocated un-supplemented water for stated purposes and locations
- water sharing rules for un-supplemented water in order to provide equitable sharing of water between water users
- permanent water trading rules and seasonal (temporary) water assignment rules for un-supplemented water allocations, and other water dealing rules, in order to facilitate the efficient use of water while ensuring trading does not adversely affect water allocation security or environmental flow objectives.

As the proponent for the detailed business case for the ESD project the SSBCC supports the need for an operations manual to be prepared under the Water Act where required as a condition of a resource operations licence or distribution operations licence. A manual needs to be developed by the operator of a scheme in consultation with stakeholders but must be approved by the chief executive of DNRME. It includes the day to day operation rules for supplemented water schemes like that proposed by the ESD project such as:

- water releases from dams to ensure that infrastructure is operated efficiently providing flows for industry, agriculture and town water supply
- water sharing rules for supplemented water in order to provide equitable sharing of water between water users supplied by the scheme
- permanent water trading rules and seasonal (temporary) water assignment rules for supplemented water allocations, again to facilitate the efficient use of water within the scheme while ensuring trading complies with water allocation security or environmental flow objectives.

### 2. *How do you think the draft water management protocol could be improved?*

As the proponent of the detailed business case for the ESD project the SGBCC has identified that securing adequate water for the project is of primary importance.

For the project to be economically and financially viable modelling suggests a minimum 3,900 ML of nominal volume (yield) would need to be sold to customers to fund 50% of the

project costs. Government funding sources, particularly the National Water Infrastructure Development Fund, would be sought for the balance of the project capital costs. Customers of the project, predominately irrigators would fund all ongoing annual operating costs.

Using the Department of Natural Resources, Mines and Energy's (DNRME's) latest Source hydrologic modelling, it is concluded that:

- the project is able to yield a total nominal volume of around 3,900 ML at a monthly reliability of at least 90% – this equates to around 3,510 ML of mean annual diversions from the dam
- increasing the volume of water taken at the dam above 3,900 ML per annum would result in reduced water supply reliabilities unlikely to be acceptable to project customers
- transferring unused or under-utilised upstream un-supplemented irrigation water entitlements and incorporating them within the project yield of 3,900 ML would improve the performance of the project's water allocations – although not transferring any such allocations would still achieve a monthly reliability of 90%, the percentage of days that orders from the project were simulated as being met would be reduced
- the results were relatively insensitive to changing the maximum capacity of the pipeline to take water from the dam and the associated timing of demand for water supplied via the pipeline
- reliabilities were very sensitive to changing the full supply volume and/or minimum operating volume (maximising the useable volume of the dam significantly improved the reliability of project water allocations).

To provide a total nominal volume of 3,900 ML of 90% reliable water allocations for the project will require a total mean average diversion volume of 3,510 ML to be secured. The following strategies are alternative methods of securing water for the project:

Option 1: (listed in order of decreasing priority)

- That 1,740 ML of mean annual diversions from strategic water infrastructure reserve be allocated to the project (which equates to a nominal volume of 1,933 ML of supplemented water allocations from the dam)
- That 405 ML of mean annual diversions from unusable Storm King Dam allocations be transferred and incorporated within the project (which equates to a nominal volume of 450 ML)
- That up to 765 ML of mean annual diversions be secured through the transfer of unused or under-utilised upstream un-supplemented irrigation water entitlements (through the local water market) and incorporated within the project yield (which equates to a nominal volume of up to 850 ML)
- That up to 1,350 ML of mean annual diversions from the urban strategic reserve be allocated for irrigation purposes supplied by the project (which equates to a nominal volume of 1,517 ML)

- That, subject to the success in securing water through the preceding means, the extent to which mean annual diversions are allocated from the general reserve to the project be minimised in order to provide for other economic benefits from growth in agriculture and associated industry elsewhere in the region including Pike and Accommodation creek areas.

Option 2: (listed in order of decreasing priority)

- That 1,740 ML of mean annual diversions from strategic water infrastructure reserve be allocated to the project (which equates to a nominal volume of 1,933 ML of supplemented water allocations from the dam)
- That 405 ML of mean annual diversions from unusable Storm King Dam allocations be transferred and incorporated within the project (which equates to a nominal volume of 450 ML)
- That 1,350 ML of mean annual diversions from the urban strategic reserve be reallocated for irrigation purposes supplied by the project (which equates to a nominal volume of 1,517 ML)
- That up to 400 ML of mean annual diversions from the general reserve is utilised by the project (to make up any shortfall allocated from the preceding sources), which would leave between 660 ML to 1060 ML of mean annual diversions to provide for other economic benefits from growth in agriculture in the Pikes Creek and Accommodation Creek catchments.

Both options

- retain a reserve of 200ML mean annual diversions for Community/Indigenous purposes
- retain a reserve of 135ML mean annual diversions for urban purposes based on our assessment of Stanthorpe's future water needs. This concludes that Council's plans for meeting Stanthorpe's current and future water needs (including piping water from Connolly Dam) are sound but would be strengthened even further by our proposal that the project provides Council with a binding contract to be able to take a volume of water from Emu Swamp Dam in emergency situations in exchange for transferring 405 ML MAD (nominal volume of 450 ML) of currently unreliable water allocation at Storm King Dam to the project (**see Additional Supporting Information Section below**).

The SGBCC submit that implementing Option 1 may better balance the competing priorities within the Stanthorpe Water Management Area and maximise the potential economic benefits within the region. However, as Option 1 may incur additional costs to the project associated with the purchase of irrigation water entitlements, it is possible that the project's viability may ultimately rely on needing to implement Option 2.

Council's future bulk water supply plans for Stanthorpe involve taking water from Storm King Dam and piped from Connolly Dam, and do not involve holding (or require the holding of) water allocations from the Emu Swamp Dam project.

Under Council's bulk water plans, DNRME modelling shows that achieving an appropriate level of service for Stanthorpe's future water supply security will not be reliant on accessing any of the urban strategic surface water reserve that is currently proposed in the draft water management protocol. However, the volume of water that may be taken from Storm King Dam for Stanthorpe should be limited to 700 ML/a to achieve an appropriate level of service from this source. This means that that 450 ML of the 1,150 ML water entitlement held by Council at Storm King Dam is effectively unusable i.e. there is currently a surplus of 450 ML of effectively unusable water entitlement located there.

It is considered that Council securing an option to access water from the proposed Emu Swamp Dam scheme (as/if needed and only to the extent necessary) as an emergency water supply for Stanthorpe in the future is an appropriate contingent strategy for mitigating against the unlikely event that low water levels are experienced simultaneously in Connolly and Storm King dams.

With these considerations in mind, it is therefore concluded that it will be unnecessary to continue to lock up 1,500 ML of unallocated surface water strategic reserve proposed by the draft water plan for Stanthorpe's urban water supply. It is therefore recommended that the bulk of this volume (1,350 ML) should instead be made generally available to the project in order to:

- increase the total volume of water allocation for, and water available to be supplied by, the project and hence:
  - secure the financial viability of the project
  - deliver significant economic benefits from growth in the agriculture and associated industry in the region
- minimize the extent to which water is allocated to the project from other strategic reserves proposed in the draft water plan (i.e. minimize the call of water being taken by the project from the general reserve or the reserve for community or aboriginal purposes).

In Attachment A to their draft submission on the draft water plan, Council indicate their support for releasing 90% of the town water strategic reserve for to drive economic development in the agricultural sector<sup>2</sup>. This suggests that retaining 150 ML of the 1,500 ML strategic reserve may be appropriate.

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<sup>2</sup> SDRC draft submission,

[http://southerndowns.infocouncil.biz/Open/2018/05/CO\\_23052018\\_AGN\\_398\\_AT.PDF](http://southerndowns.infocouncil.biz/Open/2018/05/CO_23052018_AGN_398_AT.PDF), p 106.

## Recommendations

Based on the high economic returns to water likely from this project and the consideration outlined above and in the Additional Supporting Information Section below, the SGBCC recommends that:

- The strategic infrastructure reserve be increased from 1,740 ML of MAD to 3090 ML MAD
- The urban strategic reserve be reduced from 1,500 ML MAD to 150 ML MAD
- The general 'any' purpose reserve remain at 1,060 ML MAD. However, to the extent that the above sources cannot reach 3,510 ML of MAD, it is recommended that a corresponding portion of the 1,060 ML general reserve may also need to be converted to strategic infrastructure reserve for the Emu Swamp Dam, to achieve a total of 3,510 ML of MAD
- The community/aboriginal purpose reserve remain at 200 ML MAD.

Further information on the rationale supporting this proposition is included in '**Additional Supporting Information**' which includes a review and modelling of Stanthorpe Urban Water needs.

## Part D – Draft water entitlement notice

The SGBCC is not the holder of a water entitlement notice.

- What is your authorisation number?
- Please identify any details associated with your water entitlement that you believe are incorrect.

## Additional Supporting Information

### SECURING WATER FOR THE PROJECT

#### Introduction

The detailed business case for the Emu Swamp project is not due to be completed until December 2018.

Given the timing and the importance of this project to the economic resilience of the area, it is essential that sufficient water reserves are made available in this Water Plan for the future development of the Emu Swamp project.

On current indications the project looks economically very promising and has strong support from over 50 irrigation customers to date – mostly existing commercial agribusinesses in the Stanthorpe WAM

The project is likely to offer the highest economic and employment returns on the Queensland Government’s water resources in the Stanthorpe Water Management area.

The project is expected to deliver

- An increase of between \$50 and \$70 million per annum of on-farm gross revenue
- Between \$10 and \$14 million per annum of additional on-farm net margin
- A net present value of between \$75 and \$110 million for the project. Without the project, assuming all the unallocated water allocations are purchased by individual farmers, the net present value would be only between \$15 and \$20 million.
- A benefit-cost ratio ranging from 2 to 2.8. As a result, for every dollar spent on the project and on-farm the benefits will be more than doubled.
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Detailed enterprise gross revenue and net margin (\$/ML) breakdown

	Gross Revenue (\$/ML)	Net margin (\$/ML)
Apples	16,200	3,800
Tomatoes & Capsicums	19,700	3,800
Strawberries	42,600	6,100
Wine grapes	7,800	2,800
Strawberry runners	9,100	1,400
Green vegetables	13,600	3,100

## Hydrologic constraints to the volume of water available to the project

Hydrologic modelling was undertaken by Jacobs to determine the volume of water allocations that might be available to the project based on analysing the sensitivity of a range of assumptions and project parameters on yield and reliability estimates including the effect of:

- various combinations of volumes secured for the project from the range of sources discussed above
- increasing the volume of water taken by the project
- changing the maximum capacity of the pipeline to take water from the dam and the associated timing of demand for water supplied via the pipeline
- changing the full supply volume and/or minimum operating volume which changes the useable volume of the dam
- operationalising bypass flow rules through the dam (for environmental flow and downstream water users).

Two hydrology models were used by Jacobs to assess potential alternatives:

- DNRME's previous IQQM model which underpins the provisions of the current water plan (and GHD's previous analyses and strategic business case findings) – the IQQM model was initially used to assess the volume of water allocation that might be available to be taken by the project as well as to examine the sensitivity of a number of the above assumptions and parameters
- DNRME's new Source model which replaces the IQQM model and underpins the proposed provisions of the new draft water plan including the proposed strategic reserves – the Source model was used to undertake more detailed and up to date assessment of the volume of water allocation that might be available to be taken by the project as well as the sensitivity of a number of the above assumptions and parameters

Both the IQQM and Source models (and the current and new draft water plans) assume full entitlement modelling. This means that modelled streamflows and water entitlement performance represent the 'worst-case' as they are based on all water entitlements taking the maximum volume of water that they are allowed to under their entitlement terms and conditions.

It was found that modelling results changed between the IQQM model and the Source model. This is because the newer Source model:

- incorporates updated inflow data, hydrologic assessments and techniques throughout the catchment
- more accurately represents how existing un-supplemented water users will be entitled to take water under the proposed provisions in the draft water plan.

These factors contributed to the Source modelling resulting in less estimated stream inflows into Emu Swamp Dam during critically prolonged dry periods than was estimated using

IQQM. This, in turn, means that Source modelling reported lower monthly reliabilities for any given volume of project water allocations than had previously been reported in IQQM.

Source modelling found that:

- the project is able to yield a total nominal volume<sup>3</sup> of around 3,900 ML at a monthly reliability of at least 90% – this equates to around 3,510 ML<sup>4</sup> of mean annual diversions from the dam
- increasing the volume of water taken at the dam above 3,900 ML per annum would result in reduced water supply reliabilities unlikely to be acceptable to project customers
- transferring unused or under-utilised upstream un-supplemented irrigation water entitlements and incorporating them within the project yield of 3,900 ML would improve the performance of the project's water allocations – although not transferring any such allocations would still achieve a monthly reliability of 90%, the percentage of days that orders from the project were simulated as being met would be reduced
- the results were relatively insensitive to changing the maximum capacity of the pipeline to take water from the dam and the associated timing of demand for water supplied via the pipeline
- reliabilities were very sensitive to changing the full supply volume and/or minimum operating volume (maximising the useable volume of the dam significantly improved the reliability of project water allocations).

Based on the above, to provide a total nominal volume of 3,900 ML of 90% reliable water allocations for the project will require a total mean average diversion volume of 3,510 ML to be secured by the project.

### **Impacts on other water entitlements**

The potential impacts of the project on the availability of water to existing water entitlements have been examined in terms of the changes in modelled mean annual diversions of existing water entitlements<sup>5</sup>.

DNRME's Source model was used by Jacobs to model the mean annual diversions for existing water entitlements within the reaches impacted by the project (including the ponded area of the dam and the downstream reaches of the Severn River to Farnbro). This modelling found that under a scenario with the dam supplying a total water allocation nominal volume of 3,900 ML there would be negligible (<1%) overall impact on downstream

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<sup>3</sup> Supplemented water allocations are specified in terms of "nominal volumes" that generally represent the maximum volume of water that may be taken within a water year (subject to exceptions spelt out within a scheme's water sharing rules). At a monthly reliability of at least 90%, Source modelling indicates that the total mean annual diversion volume from the project is around 90% of the total nominal volume for the project.

<sup>4</sup> Compared to IQQM which indicated a mean annual diversion volume of 3,700 ML/a for a nominal volume of 3,900 ML.

<sup>5</sup> The water plan states that the water allocation security performance indicators are to be calculated on the assumption that the unallocated water is already being taken.

water entitlements although there may be minor local impacts on some water harvesting entitlements in the reach immediately downstream of the dam. The scale of this impact is small because daily dam inflows of up to 30 ML per day are modelled as being released through the dam for downstream environmental flows and un-supplemented water entitlements.

Any potential impacts on water harvesters at and immediately downstream of the dam are expected to be able to be mitigated by making minor adjustments either to:

- the flow thresholds of those entitlements, or
- the way that the bypass flow releases from the dam are operationalised and managed on a day-to-day basis.

### **How water may be secured to underpin the project**

The Border Rivers water plan sets a cap on the total mean annual diversion volume that may be taken under existing and new water entitlements in the plan area. This means that there are two ways that volumes of water entitlements may be secured to underpin the project. These are:

- Developing and allocating the strategic reserves of unallocated surface water that are set aside in the water plan for the Stanthorpe water management area
- Moving un-supplemented water allocations from elsewhere in the Border Rivers plan area to the project's location and changing them to supplemented water allocations.

These are discussed below.

### **Water available from strategic reserves**

The current water plan sets out strategic reserves of unallocated water in the Stanthorpe water management area. These are specified in terms of maximum allowable mean annual diversions for particular purposes as follows:

- 3,000 ML of mean annual diversions for irrigation and associated industry<sup>6</sup>
- 1,500 ML of mean annual diversions for town water supply.

The recently released draft water plan also specifies a total average annual volume of unallocated surface water for the Stanthorpe water management area of 4,500 ML. However, the draft water management protocol that accompanies the draft water plan proposes changes that suggest that this unallocated surface water reserve might be made available as follows:

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<sup>6</sup> In 2003, the water plan originally identified a strategic reserve of 3,500 ML of unallocated water for irrigation and associated industry use. This was reduced to 3,000 ML in November 2008 when 500 ML was granted to the Commonwealth Environmental Water Holder ('CEWH'). An un-supplemented water allocation with a nominal volume of 500 ML located at Farnbro is now held by the CEWH.

- 1,740 ML of average annual volume for strategic water infrastructure purposes
- 1,500 ML of average annual volume for town water supply purposes
- 200 ML of average annual volume for community or aboriginal purposes
- 1,060 ML of average annual volume for any purpose.

The potential availability of each of these volumes to the project are discussed below.

- **Strategic reserve for strategic water infrastructure**

It is recommended that the 1,740 ML of average annual volume that is proposed in the draft water management protocol for strategic water infrastructure purposes be made available to the project.

It is observed that the Statement of Intent that accompanied the draft water plan and draft water management protocol incorrectly implies that this is equal to the quantum of water required by the project for irrigation:

The volume proposed for the strategic infrastructure reserve aligns with the irrigation and industry requirements identified in the Emu Swamp Dam proposals<sup>7</sup>.

This is incorrect and warrants correction.

- **Strategic reserve for town water supply purposes**

Both the current and the proposed new water plan currently reserve an additional 1,500 ML of mean annual diversions for urban water supply.

As part of the development of the business case, a separate review has been undertaken of:

- Stanthorpe's current and future water demands
- Council's future plans for meeting those needs (which are focussed on taking water from Storm King Dam and piped from Connolly Dam as/if needed and do not involve Council holding water allocations, or routinely taking water, from the Emu Swamp Dam project) and
- DNRME's stochastic analysis of the water supply security implications of Council's plans

The review of Stanthorpe's needs is summarised in Attachment A. It concluded that:

- Council's future bulk water supply strategy for Stanthorpe is sound as it will significantly improve Stanthorpe's current and future level of service without impacting on Warwick's current or future level of service, as well as utilize diversified water sources given that Storm King and Connolly dams are located in different catchments

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<sup>7</sup> Border Rivers and Moonie draft water plan and supporting documents – Statement of intent 2018, DNRME, p21

- it is not necessary to continue to lock up 1,500 ML of unallocated surface water strategic reserve proposed by the draft water plan for Stanthorpe's urban water supply.

Accordingly, the review recommends that the bulk of this volume (1350 ML) should instead be made generally available to the project in order to:

- secure the financial viability of the project
  - deliver significant economic benefits from growth in the agriculture and associated industry in the region
  - minimize the extent to which water might be allocated to the project from other strategic reserves proposed in the draft water plan.
- **Strategic reserve for community or aboriginal purposes**

The draft water plan proposes that a volume of 200 ML of average annual volume be set aside from the surface water strategic reserve in the Border Rivers for community or aboriginal purposes. This proposal represents a change from the provisions of the current water plan and has not previously been considered by the project.

DNRME has indicated once the final plans are released, they will design a process (in consultation with Aboriginal people in the catchments) to release the unallocated water set aside for Aboriginal people. Following this, DNRME have proposed that traditional owners will be able to apply for water entitlements from these reserves<sup>8</sup>.

It is assumed that the volume that is proposed to be reserved for such purposes will be allocated and developed separately to the project.

- **Remaining strategic reserve (for 'any' purpose)**

The draft water management protocol proposes that the remaining 1,060 ML of strategic reserve of unallocated surface water from the Stanthorpe water management area be made available for 'any' purpose.

In the past, DNRME have given consideration to allocating new un-supplemented water allocations from the strategic reserve to irrigators in other sub-catchments within the Stanthorpe water management area. However, the hydrologic performance of this type of water entitlement was found likely to be very unreliable due to the relatively high flow threshold conditions that are likely to be necessary in order to avoid impacting existing un-supplemented water entitlements. It is because of these limitations that the Stanthorpe community as represented by the Stanthorpe Community Reference Panel and the Chamber of Commerce settled on ESD as a more reliable and viable way for irrigated agriculture to develop in the Stanthorpe WMA.

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<sup>8</sup> Aboriginal people's water needs in the Queensland Murray-Darling Basin: a guide to the draft water plans for the Condamine-Balonne, Moonie and Border Rivers catchments, April 2018, DNRME

Although this volume is theoretically available to be developed into reliable water allocations by the project, there appear to be strong expectations that a significant proportion of the irrigation and associated industry strategic reserve might be allocated in the future to:

- the Accommodation Creek area – taking into account this area’s topography and its current land-use (and the high proportion of area under National Park), as well as the relatively limited scale of current irrigation development and number of growers in the area, setting aside up to 300 ML as new un-supplemented water allocations from the general surface water strategic reserve might be reasonable to support growth in this area
- the Pikes Creek area – irrigators in the Pikes Creek catchment appear keen to secure a significant volume of strategic reserve in their area. It is understood that they are also examining options for trading water allocations into the area from elsewhere in the catchment.

This report therefore recommends that the extent to which water is allocated to the ESD project from the general reserve be minimised to provide for other economic benefits from growth in agriculture and associated industry elsewhere in the region including Pike and Accommodation creek areas.

### **Water secured by transferring existing water allocations from elsewhere**

- **Irrigation water entitlements**

Both the current and the proposed new water plan currently allow for water allocations to be traded, moved and changed within the Stanthorpe water management area (subject to some limitations set out in the current resource operations plan and in the proposed draft water management protocol). This provides an important additional avenue by which unused or under-utilised un-supplemented water allocations located upstream or downstream of the dam might be secured via the market – and moved/changed to supplemented water allocations located at the dam – to underpin the project.

Moving and changing un-supplemented water allocations from upstream of the dam also has the added advantage of reducing the volumes of potential water diversions in the upstream catchment. This, in turn, would lead to an increase in inflows to the dam which would result in an increase in the reliability of water allocations supplied by the project.

There is limited concrete information about the volumes of sleeper and dozer entitlements that may exist in the catchment. However, anecdotal reports from DNRME based on their recent discussions with irrigators in the Stanthorpe area suggest that up to one-third of un-supplemented irrigation water entitlements upstream of the dam might currently be unused, under-utilised and/or potentially available for transfer to the project. This equates to a potential volume of such water allocations that might be transferred to the dam of up to 850 ML.

- **Utilisation of unreliable component of Storm King Dam water allocation**

The review of urban requirements (summarised in Attachment A) examined the option of moving and changing un-supplemented water allocations from Storm King Dam to the project. This concluded that:

- 450 ML of the 1,150 ML water entitlement held by Council at Storm King Dam is very unreliable, effectively unusable as an urban water supply at Storm King Dam and not relied on by Council as part of its current or future bulk water supply strategy for Stanthorpe
- there is therefore effectively a surplus of 450 ML of unreliable water entitlement located at Storm King Dam that would be better utilised by the Emu Swamp Dam project.

It is considered that in exchange for this water allocation, Council might be offered an option to access water from the proposed Emu Swamp Dam scheme (as/if needed and only to the extent necessary) as an emergency water supply for Stanthorpe in the future. This is considered an appropriate contingent strategy for Council to mitigate against the unlikely event that low water levels are experienced simultaneously both in Connolly Dam and Storm King Dam.

An institutional review undertaken as part of the preparation of the business case also examined the implications of this option and recommended that the following would be needed to facilitate this:

- Council retain an option to take a specified volume of emergency water from the project as and if needed, and only to the extent necessary, as an emergency water supply for Stanthorpe in the future
- Council and the dam owner enter a supply contract that is similar to arrangements for other customers and sets out the specific triggers and other conditions that would be required to be satisfied prior to being entitled to exercise their option to take a specified volume of emergency water from the project
- The supply contracts for customers spell out:
  - the specific conditions that would trigger the requirement to supply emergency water from the project to Stanthorpe
  - the potential extent to which their annual entitlements to take water might be temporarily reduced during an emergency supply period
  - the potential extent to which the volume of water stored in their continuous sharing accounts might be reduced if an emergency supply period commences.

### **Recommended water allocation strategy**

Based on Source modelling and the preceding discussion, it is recommended that a mean annual diversion volume of 3,510 ML be secured through the following means (listed in order of priority):

- That 1,740 ML of mean annual diversions from strategic water infrastructure reserve be allocated to the project (which equates to a nominal volume of 1,933 ML of supplemented water allocations from the dam)
- That 405 ML of mean annual diversions from unusable Storm King Dam allocations be transferred and incorporated within the project (which equates to a nominal volume of 450 ML)
- That up to 765 ML of mean annual diversions be secured through the transfer of unused or under-utilised upstream un-supplemented irrigation water entitlements and their incorporation within the project yield (which equates to a nominal volume of up to 850 ML)
- That up to 1,350 ML of mean annual diversions from the urban strategic reserve be reallocated for irrigation purposes supplied by the project (which equates to a nominal volume of 1,517 ML)
- That, subject to the success in securing water through the preceding means, the extent to which mean annual diversions are allocated from the general reserve be minimised in order to provide for other economic benefits from growth in agriculture and associated industry elsewhere in the region including Pike and Accommodation creek areas.

## ATTACHMENT A – REVIEW OF STANTHORPE’S WATER NEEDS

### DNRME assessments of current situation in Stanthorpe

DNRME’s recent regional water supply security assessment for Stanthorpe<sup>9</sup> suggests that a small increase in urban demand is plausible in the medium to long term. The assessment identified that:

Stanthorpe’s current average annual water demand... [is] around 600 ML/a.

Stanthorpe’s projected average urban water demand on Storm King Dam... is projected to increase to approximately 740 ML/a by 2036... A projected higher demand, possible during extended dry periods... reaches approximately 858 ML/a by 2036.

DNRME concluded that Stanthorpe’s water demand is likely to increase by 282 ML/a from its current level of around 600 ML/a to a future demand of between 740 to 858<sup>10</sup> ML/a in the medium to long-term (around the year 2036 using DNRME’s projections).

This means that, in the short term to medium term, Stanthorpe is unlikely to require additional town water unless there is a need to address a drought-induced short-term water supply shortfall from Storm King Dam<sup>11</sup>. However, in the medium to long term Stanthorpe may require access to an additional volume of water to meet future growth in its water demands and maintain an appropriate level of service.

Section 0 provides commentary in relation to DNRME’s regional water supply security assessments of Council’s future plans for Stanthorpe.

### GHD June 2017 assessment

GHD made a number of conclusions and recommendations relating to Stanthorpe’s urban water needs and options in their June 2017 report to the Council<sup>12</sup>.

In relation to Stanthorpe’s urban water demand, GHD stated that:

Projections of population growth in Stanthorpe undertaken in previous planning and business cases have been significantly higher in comparison to the actual growth that has occurred. Rates of population growth used in previous planning studies (1.5% annually) have been far greater than actual population growth (0.4%). GHD has used a population growth rate of 0.95% to update the projected population

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<sup>9</sup> Stanthorpe regional water supply security assessment, DEWS, 2016.

<sup>10</sup> The upper range of this estimated increase (of 258 ML/a) recognises the heightened urban water demands that might occur during a particularly extended dry period within the town of Stanthorpe.

<sup>11</sup> DEWS, 2016, p11.

<sup>12</sup> Southern Downs Regional Council: Emu Swamp Dam Business Case Stage 1 Final Report, GHD, June 2017.

growth. Similarly, historical rates of water usage used to determine future demand (500 litres per capita per day (L/c/d)) are significantly greater than recent historical average (324 L/c/d). The current 324 L/c/d value, which is approximately 100 L/c/d greater than consumption in most of South East Queensland, has been used to update the water urban demand forecast<sup>13</sup>.

Overall, water demand for Stanthorpe has been far less than predicted in previous studies (1,246 ML/a predicted for 2015 in 2007 versus 590 ML/a actual). Using the revised population and usage values the forecast of water demand by 2050 is 844 ML/a. This is consistent with the most recent forecast by DEWS. On this basis, and using a supply yield of 600 ML/a from Storm King Dam (at circa 98% average monthly reliability), an additional circa 250 ML/a supply capacity is required by 2050 to meet demand with demand exceeding current supply by 2036<sup>14</sup>.

GHD recommended that integrated water supply management (IWSM) – which refers to demand reduction coupled with supply-side measures of reticulation system leakage management – be implemented as an interim measure. In relation to IWSM, GHD also noted that:

IWSM can potentially delay the need for new infrastructure and the triggering of drought restrictions... However, it is unlikely it will be able to achieve the sustained 30% reduction in water demand required to enable Storm King Dam to meet urban water demand up to 2050. This option may best be considered as a mechanism to defer expenditure in a major capital infrastructure project and is recommended for further analysis and potential implementation irrespective of any major capital infrastructure option selected to meet urban or urban and irrigation demand<sup>15</sup>.

The need for capital expenditure may be deferred by up to 14 (Note: the GHD report identifies 4 years however 2050 – 2036 = 14) years if IWSM measures are implemented... As [IWSM] will not be sufficient to offset forecast urban demand in its own right, a capital intensive infrastructure option is required to meet the forecast 2050 demand<sup>16</sup>.

GHD recommended that Council examine the option of installing a pipeline and pumping infrastructure to transfer water from Connolly Dam to the water treatment plant in Stanthorpe noting that:

[This] relies on there being sufficient available yield in Connolly Dam to meet the forecast shortfall in yield from Storm King Dam of approximately 250 ML/a by 2050. However, ... DEWS has only undertaken yield modelling for Connolly dam to 2036...

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<sup>13</sup> GHD, 2017, p iii.

<sup>14</sup> GHD, 2017, p iv.

<sup>15</sup> GHD, 2017, p vi.

<sup>16</sup> GHD, 2017, p 154.

It is possible, that this option combined with IWSM will be a viable option but this requires more analysis... As such, this option cannot be relied on as a potential option to meet forecast demand at this stage<sup>17</sup>.

GHD recommended taking forward other, alternative, capital infrastructure options to meet urban demand should DEWS modelling demonstrate that Connolly Dam has insufficient available yield to meet the projected 2050 demand after implementation of an IWSM strategy. These options were as follows (in the order of GHD's multi-criteria analysis ranking):

- Raise Storm King Dam
- Ballandean Dam (5,000 ML town water supply configuration)
- Emu Swamp Dam (5,000 ML town water supply configuration)

with investigations on each “only proceeding to the next less favourably ranked option if a given option being evaluated is found not to be technically viable”<sup>18</sup>.

### **Implications of Border Rivers water plan for Stanthorpe**

The Water Act 2000 ('the Water Act') establishes the legislative framework for planning the sustainable allocation and management of Queensland's water resources. The framework consists of water plans (formerly referred to as water resource plans), water management protocols and operations manuals (which are progressively replacing resource operations plans) as well as other statutory instruments.

The framework establishes water allocations which grant holders authorities to take water. Southern Downs Regional Council hold a number of water entitlements located at various locations within the Border Rivers catchment. These authorise Council to take specified volumes of water to supply their water customers (including in Stanthorpe).

The Border Rivers water plan sets a cap on the total mean annual diversion volume that may be taken under existing and new water entitlements in the plan area. The water plan is designed to facilitate trading in, and relocation of, water allocations and sets out the rules under which this can occur.

The water plan also establishes strategic reserves of unallocated water that may be made available for specific purposes in the Stanthorpe water management area. While the both the current and the recently released proposed new water plan currently reserve an additional 1,500 ML of mean annual diversions for urban water supply, it is unlikely that Stanthorpe's urban water demand is ever likely to require this amount.

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<sup>17</sup> GHD, 2017, pp 154-155.

<sup>18</sup> GHD, 2017, p 155.

## Summary of Council's plans for Stanthorpe's bulk water supplies

Storm King Dam is the sole source of bulk raw water supply for Stanthorpe's reticulation network. The dam has a storage capacity of 2180 megalitres (ML) with a catchment area of about 91 km<sup>2</sup>. Under normal conditions, water can be extracted from this storage down to a minimum operating volume of 200 ML, providing a useable storage volume of 1980 ML. Raw water is piped from the dam to Mount Marley Water Treatment Plant on the outskirts of Stanthorpe. This water infrastructure is owned by the Council<sup>19</sup>.

The draft water entitlement notice<sup>20</sup> that accompanied the release of the draft water plan for the Border Rivers indicates that it is proposed that to convert Council's water entitlement at the dam to an unsupplemented water allocation with a volumetric limit of 1,150 ML/a. However, the dam's historic no failure yield is considered to be significantly less than this and the total volume of water actually taken from Storm King Dam for Stanthorpe has therefore ranged from 530 ML/a to 696 ML/a (between 2008–09 to 2014–15) and average 590 ML/a over that period<sup>21</sup>.

### • Previous Council plans

In October 2009, Council assessed its existing water sources as within its drought management plan. This indicated that the reliability of Storm King Dam was considered "unreliable" and that "severe restrictions [would be] needed during dry periods" and "growth [was] restricted due to uncertain supply"<sup>22</sup>. The drought management plan also outlined Council's thinking about regional water source options at the time including:

- increasing supplies by 400 ML/a by constructing Petries Crossing Weir and Off Stream Storage and using part of the strategic reserve in the Border Rivers Resource Operations Plan ('ROP')
- increasing supplies by 750 ML/a by constructing Emu Swamp Dam, or Emu Swamp Weir and an offstream storage and using part of the strategic reserve in the ROP
- increasing the reliability of SDRC's existing 1,150 ML water entitlement from Storm King Dam. This would be achieved by building an offstream storage at Diamondvale and diverting water into it from the dam whenever possible. However, this was considered to be a risky option as it would "not diversify the source"
- refurbishing Connolly Dam infrastructure and pipeline from Connolly Dam to Stanthorpe and utilizing some of SDRC's existing 2,727 ML water allocation at Connolly Dam. However, it was noted that the allocation from Connolly Dam was effectively "unobtainable" (with the reliable yield estimated at around 1,000 ML/a at

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<sup>19</sup> Stanthorpe regional water supply security assessment, DEWS, 2016, p 2.

<sup>20</sup> Draft water entitlement notice (for the Border Rivers and Moonie draft water plan), DNRME, March 2018, p 42.

<sup>21</sup> Stanthorpe regional water supply security assessment, DEWS, 2016, p 4.

<sup>22</sup> SDRC Drought Management Plan, SDRC, October 2009, p 6.

the time). It was therefore questioned whether “some [allocation] could be reallocated to Stanthorpe” whilst noting that “this would have to be negotiated with Department of Environment and Resource Management”<sup>23</sup>.

- **Current Council strategy**

More recently, Council has indicated that its future plans for Stanthorpe’s water supply are based on the recommendations proposed by GHD as outlined in section 0<sup>24</sup>. This will involve Council (in descending order of priority):

- implementing IWSM measures to achieve a reduction in Stanthorpe’s urban water demand and in reticulation system leakage. Since October 2009, Council has adopted four levels of restrictions and associated target consumption levels – permanent water conservation measures (targeting 230 L/p/d), medium restrictions (targeting 200 L/p/d), high restrictions (targeting 170 L/p/d) and extreme restrictions (targeting 140 L/p/d) – that apply to all towns in the Southern Downs Region with a reticulated water supply including Stanthorpe<sup>25</sup>.
- installing a pipeline and pumping infrastructure to transfer water from Connolly Dam to Stanthorpe’s water treatment plant. In March 2018, Council instigated a process to make raw water available from Connolly Dam for purchase by minor and major water users located along a pipeline between the dam and Warwick. However, Council indicated that 700 ML from Connolly Dam “may be set aside in the future for the use of the Storm King Dam Pipeline and Stanthorpe water security”<sup>26</sup>.
- then investigating (only as/if necessary) other options recommended by GHD.

On 17 May 2018, Council wrote to the Stanthorpe and Granite Belt Chamber of Commerce about a range of matters relating to the Emu Swamp Dam project in which it stated that:

Southern Downs Regional Council has made an application to the *Maturing the Infrastructure Pipeline Program* through the State Government to ensue water security for Stanthorpe, as per the recommendations of the GHD Report adopted by Council. This *Maturing the Infrastructure Pipeline Program* does not require funding from Council. It is important that Emu Swamp business plan focus on irrigation water and not urban water<sup>27</sup>.

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<sup>23</sup> SDRC Drought Management Plan, SDRC, October 2009, pp 13-15.

<sup>24</sup> Based on discussions between the project team and Council in April 2018 and comments by the Council Mayor at the Emu Swamp Dam Project public meeting on 22 May 2018.

<sup>25</sup> SDRC Drought Management Plan, SDRC, October 2009, p 22.

<sup>26</sup> Request for Quotation Specification: Sale and Supply of Raw Water from Connolly Dam (Users over 5 ML only), SDRC, March 2018, p 4.

<sup>27</sup> Letter from Southern Downs Regional Council to the Stanthorpe and Granite Belt Chamber of Commerce, 17 May 2018

Council's previous and current plans for Stanthorpe's future water security have been summarised based on the following information:

- SDRC Drought Management Plan adopted October 2009
- Council's request for quotation specification in relation to the sale and supply of raw water from Connolly Dam for users over 5 ML only issued in March 2018
- Discussions between Council and project team in April 2018
- Correspondence from Southern Downs Regional Council to the Stanthorpe and Granite Belt Chamber of Commerce dated 17 May 2018
- Comments by Council Mayor at the Emu Swamp Dam project public meeting in Stanthorpe on 22 May 2018
- Council's draft submission on the draft Water Plan, Council Papers for meeting of 23 May 2018, SDRC website, accessed 21 May 2018.

### **Strategic assessment of Stanthorpe's water security**

- **Historical performance of Storm King Dam**

DNRME examined the historical performance of Storm King Dam as part of their water supply security assessment. They observed that:

There has been no supply failure to date from Storm King Dam. However, the dam has fallen to low levels on a number of occasions. As a result, there has sometimes been a need for extended water restrictions to ensure continuity of supply. For example, in 2007, following several successive years of below average rainfall, water levels in the dam fell to unprecedented low levels and water restrictions were in place for their third consecutive year to reduce urban water consumption<sup>28</sup>.

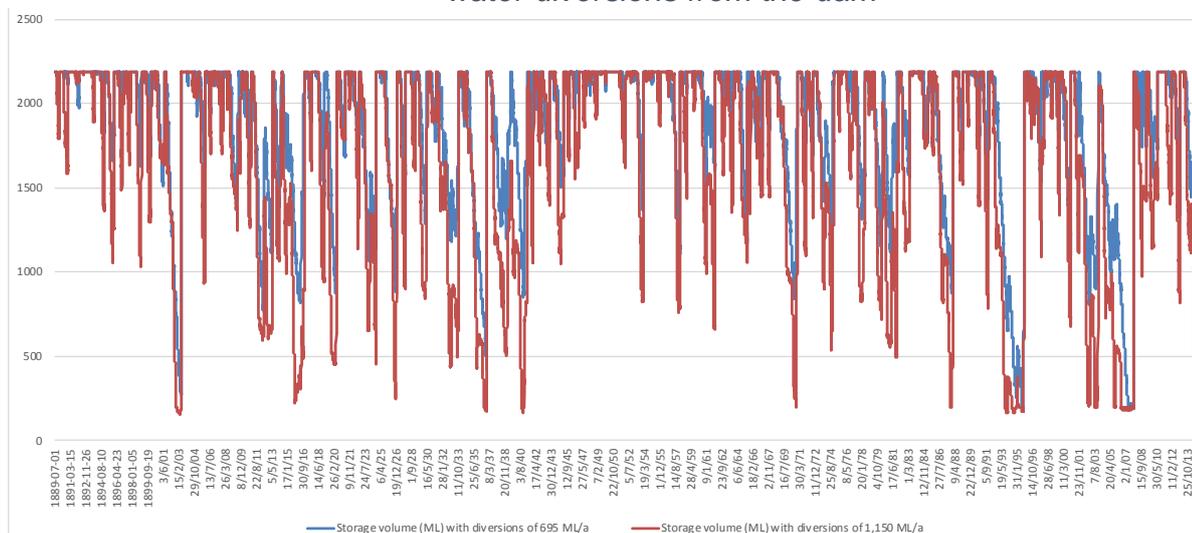
Hydrologic modelling was undertaken by Jacobs to examine the impact of increasing the volume taken from Storm King Dam on the performance of the dam in terms of the simulated daily storage volumes over the past 100-year historical rainfall/streamflow sequence. Using DNRME's Source model<sup>29</sup>, the volume of water taken from the dam for Stanthorpe was increased from the upper of the current annual diversion volume range (which is equal to around 696 ML/a) to the theoretical maximum allowable under Council's water licence at Storm King Dam (which is 1,150 ML/a). Storage volume plots for these two scenarios are presented in Figure 1.

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<sup>28</sup> DEWS, 2016, p 6.

<sup>29</sup> The Source model provided by DNRME relates to the recently draft water plan. It allows the hydrologic performance to be assessed of a range of water allocation and water infrastructure scenarios in the Stanthorpe water management area.

Figure 1 - Storage level plots for Storm King Dam under current and increased volumes of water diversions from the dam



This analysis found that increasing the volume of water taken from the dam from 695 ML/a to 1,150 ML/a would (over the simulation period<sup>30</sup>) result in:

- the total number of days that Storm King Dam would be empty (below dead storage) increasing from 193 days to 1356 days
- the maximum duration of the events during which the dam would be continuously empty increasing from 53 days (1.7 months) to 173 days (5.7 months)
- the number of events during which the dam would be empty increasing from 7 to 41.

In summary, the frequency, duration and severity of storage water supply failures would increase markedly if Council were to increase the volume of water taken from the dam from current levels to the maximum volume that is theoretically allowed under Council’s entitlement to take water from the dam.

**Assessment of Stanthorpe’s future level of service using stochastic modelling**

As part of its regional water supply security assessment, DNRME also undertook stochastic hydrologic modelling to examine the potential “level-of-service” under Stanthorpe’s current bulk water system. As DNRME states:

Stochastic modelling accounts for a wider variation of potential climatic scenarios than the historical modelling. Accordingly, it is a useful tool for improving our understanding of the capacity of the water supply system, including the likelihood of

<sup>30</sup> The simulation period in DNRME’s Source model extends from 1 July 1889 to 30 June 2015.

events that have not occurred during the historical period but may be possible in the future<sup>31</sup>.

Stanthorpe's bulk water supply level-of-service was modelled by DNRME in terms of the probabilities of different levels of restrictions occurring under various levels of water demand assuming present water infrastructure and current water allocations held by the Council. The results of this modelling were reported by DNRME in their regional water supply security assessment for Stanthorpe in terms of annual recurrence interval statistics:

Stochastic modelling indicates that, at Stanthorpe's current average annual water demand of around 600 ML/a, Stanthorpe could experience a water supply shortfall about once in 310 years on average without water restrictions in place, or about once in 1300 years on average with restrictions in place.

At Stanthorpe's projected 2036 water demand (740 ML/a), the stochastic modelling indicates that with restrictions in place Stanthorpe could experience a water supply shortfall about once in 350 years on average.

These have been translated and re-presented here in terms of the percentage likelihood that various restriction levels might occur in specified periods of time using statistical techniques similar to those developed and applied by the Townsville Water Security Taskforce<sup>32</sup>. This suggests that:

- supplying the current level of water demand (600 ML/a) from Storm King Dam has a low probability of running out of water (0.29%) and 33% probability of experiencing high level restrictions at least once in a four-year period
- supplying water from Storm King Dam at projected 2036 water demand levels (740 ML/a) still has a low (but slightly increased) probability of running out of water (1%) and 46% probability of experiencing high level restrictions at least once in a four-year period.

These results illustrate that increasing the level of water taken from Storm King Dam to meet Stanthorpe's future growth in water demands would increase the likelihood that the town will experience higher levels of water restrictions in the future.

In their draft submission on the draft water entitlement notice (in response to DNRME's proforma question 'please identify any details associated with your water entitlement that you believe are incorrect') Council question the wisdom of taking 1,150 ML of water associated with Councils' licence at Storm King Dam:

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<sup>31</sup> DEWS, 2016, p 11.

<sup>32</sup> Townsville Water Security Taskforce Interim Report, TWSTF, June 2017, p 20.

SDRC are also keen to understand the implications of the volumetric conversion and take of 1,150 ML/annum as compared to 600 ML/annum on performance/reliability and the implications in meeting future town water supply needs<sup>33</sup>.

Recent stochastic modelling by DNRME indicates that such concerns are well founded. Their analyses have found that by increasing Stanthorpe's average annual water diversions from Storm King Dam to 1,150 ML/a, Stanthorpe could expect to experience a water supply shortfall about once in 18 years on average without water restrictions in place, or about once in 41 years on average with restrictions in place.

It is therefore concluded that Storm King Dam should not be relied on to supply a volume of water greater than about 700 ML/a. This means that 450 ML of the 1,150 ML water entitlement held by Council at Storm King Dam is effectively unusable and that there is currently a surplus of 450 ML of water entitlement located there<sup>34</sup>.

#### • Regional considerations

Piping a volume of water of up to 700 ML/a from Connolly Dam (near Warwick) to Stanthorpe's water treatment plant is a key aspect of Council's future strategy for meeting future shortfalls in the town's water supply. It is important to examine the potential water supply security of water sourced from Connolly Dam for this purpose.

Prior to the construction of Leslie Dam, Warwick's sole water supply source was Connolly Dam. Warwick's primary water supply is now taken directly from Leslie Dam and only supplemented where needed by Connolly Dam. Water supply security assessments by DNRME suggest that:

- Warwick's urban water demand is anticipated to increase from the current average of about 2140 ML/a to an average of about 2725 ML/a by 2041 (which may reach up to 3135 ML/a during short-term prolonged dry periods)
- Leslie Dam is able meet Warwick's urban water requirements for demands up to council's existing allocation from Leslie Dam of 3207 ML/a with a high degree of reliability
- using Leslie Dam as a 'stand-alone' water supply source (and with restrictions in place), Warwick may experience a water supply shortfall on average about once in 4160 years for a demand of 3200 ML/a

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<sup>33</sup> From Council's draft submission on the draft Water Plan, Council Papers for meeting of 23 May 2018, SDRC website, accessed 21 May 2018 ([http://southerndowns.infocouncil.biz/Open/2018/05/CO\\_23052018\\_AGN\\_398\\_AT.PDF](http://southerndowns.infocouncil.biz/Open/2018/05/CO_23052018_AGN_398_AT.PDF)), p 104.

<sup>34</sup> This is consistent with DNRME's current Source model simulation of the draft water plan which is based on the water diversion volume from Storm King Dam being limited to 695 ML/a instead of 1,150 ML/a.

- Warwick's bulk water supply performance is not dependent on and would be only marginally improved by augmenting Leslie Dam's water supplies with water from Connolly Dam.

Discussions with DNRME indicate that additional hydrological modelling is currently being undertaken to examine the likely impact on the performance on both Stanthorpe's and Warwick's water supply system under a scenario where Stanthorpe's supply was being augmented with water from Connolly Dam. It is understood that preliminary stochastic modelling is indicating that:

- using Connolly Dam to augment supplies to Stanthorpe has little impact on the performance of supply to Warwick
- the frequency of Stanthorpe's urban water demand not being met would be at least halved when Stanthorpe's supplies are augmented from Connolly Dam. For example, with a demand of 750 ML/a and where supplies from Storm King Dam are augmented from Connolly Dam, Stanthorpe could expect to experience a water supply shortfall about once in 769 years on average with restrictions in place (compared to once in about 350 years without augmenting from Connolly Dam)

## Conclusions

Council's future bulk water supply plans for Stanthorpe involve taking water from Storm King Dam and piped from Connolly Dam, and do not involve holding (or require the holding of) water allocations from the Emu Swamp Dam project.

Augmenting Stanthorpe's existing water supplies piped from Connolly Dam (as/if needed):

- will significantly improve Stanthorpe's current and future level of service without impacting on Warwick's current or future level of service
- is also considered to be a prudent strategy in that it utilizes diversifies water sources given that Storm King and Connolly dams are located in different catchments

Under Council's bulk water plans, DNRME modelling shows that achieving an appropriate level of service for Stanthorpe's future water supply security will not be reliant on accessing any of the urban strategic surface water reserve that is currently proposed in the draft water management protocol. However, the volume of water that may be taken from Storm King Dam for Stanthorpe should be limited to 700 ML/a to achieve an appropriate level of service from this source. This means that that 450 ML of the 1,150 ML water entitlement held by Council at Storm King Dam is effectively unusable i.e. there is currently a surplus of 450 ML of effectively unusable water entitlement located there.

It is considered that Council securing an option to access water from the proposed Emu Swamp Dam scheme (as/if needed and only to the extent necessary) as an emergency water supply for Stanthorpe in the future is an appropriate contingent strategy for mitigating against the unlikely event that low water levels are experienced simultaneously in Connolly and Storm King dams.

With these considerations in mind, it is therefore concluded that it will be unnecessary to continue to lock up 1,500 ML of unallocated surface water strategic reserve proposed by the draft water plan for Stanthorpe's urban water supply. It is therefore recommended that the bulk of this volume (1,350 ML) should instead be made generally available to the project in order to:

- increase the total volume of water allocation for, and water available to be supplied by, the project and hence:
  - secure the financial viability of the project
  - deliver significant economic benefits from growth in the agriculture and associated industry in the region
- minimize the extent to which water is allocated to the project from other strategic reserves proposed in the draft water plan (i.e. minimize the call of water being taken by the project from the general reserve or the reserve for community or aboriginal purposes).

In Attachment A to their draft submission on the draft water plan, Council indicate their support for releasing 90% of the town water strategic reserve for to drive economic development in the agricultural sector<sup>35</sup>. This suggests that retaining 150 ML of the 1,500 ML strategic reserve may be appropriate.

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<sup>35</sup> SDRC draft submission,

[http://southerndowns.infocouncil.biz/Open/2018/05/CO\\_23052018\\_AGN\\_398\\_AT.PDF](http://southerndowns.infocouncil.biz/Open/2018/05/CO_23052018_AGN_398_AT.PDF), p 106.