Council Reference: Water Management General
Your Reference:

TWEED SHIRE COUNCIL

[redacted]

[redacted]

[redacted]

Regional Water Strategy
Department of Planning of Industry and Environment
Locked Bag 5022
PARAMATTA NSW 2124

By Email: regionalwater.strategies@dpie.nsw.gov.au

Dear Sir/ Madam

DRAFT FAR NORTH COAST REGIONAL WATER STRATEGY

Please find **attached** Council's submission to the Draft Far North Coast Regional Water Strategy which was considered by Council on 10 December 2020.

Further, after considering the Draft Far North Coast Regional Water Strategy, Council:

- requests the Department removes a dam at Byrrill Creek from the long list of options due to the identified loss of significant and irreplaceable environment values,
- objects to further commercial groundwater extraction for bottling in the Tweed Shire, and
- forwards the final report from Council's Water Strategies Review Project Reference Group

Council will also review the Water Strategies Review Project Reference Group report in February. After that review Council may wish to make a further submission to the Draft Far North Coast Regional Water Strategy

Should you have any further queries please do not hesitate to contact [redacted]

Yours faithfully

[redacted]

[redacted]

Attachments

1. Submission to Draft Far North Coast Regional Water Strategy
2. Water Strategies Review Project Reference Group

Water Strategies Review

Project Reference Group Draft Report to Tweed Shire Council

Compiled by: Workplace Edge (Facilitator) with the Water Strategies Review Project Reference Group

Prepared for: Tweed Shire Council

December 2020

workplaceedge

This Report has been prepared for:

Tweed Shire Council

by:
THE WATER STRATEGIES REVIEW PROJECT REFERENCE GROUP

Compiled by

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1. Glossary of Terms

Term	Acronym
Project Reference Group	PRG
Clarrie Hall Dam	CHD
Standard Secretary's Environmental Assessment Requirements (NSW Department of Planning, Industry and Environment)	SEARS
Byrrill Creek Dam	BCD
Tweed Shire Council	Council

2. Executive Summary

In March 2018, the Tweed Shire Council (Council) resolved to appoint a Project Reference Group (PRG) to undertake a comprehensive Review of the Tweed District Water Supply, Demand Management and Drought Management strategies. As per the Council resolution of March 2017, membership of the PRG was drawn from the reconvened original Community Working Group plus new Councillor representatives. On 7 March 2019 Council endorsed the appointment of eight members and two councillors for the PRG. Four council officers initially, and then three, also worked with the PRG throughout the process.

The PRG commenced the review in March 2019 and met 19 times. As per the Terms of Reference, the PRG identified options and strategies for the three review areas, which required further investigation. The PRG prepared scopes of work for the appointment of consultants to: further investigate options, best practice in other jurisdictions, and develop strategies for consideration by the PRG. As part of a tender process, the PRG developed consultant selection criteria and weightings to assist in assessing the selection of consultants. Council subsequently appointed two consultants, HARC and Hydrosphere Consulting to review and provide findings and recommendations regarding water supply augmentation and water demand management respectively.

The PRG reviewed the findings of the reports and presentations from the consultants. After considerable research, discussion and debate, the PRG developed options selection criteria and used qualitative multi-criteria analysis to rank the priorities for water supply augmentation, and undertook detailed analysis of the water demand management and drought management issues and options. From this analysis, the PRG developed findings and recommendations for consideration by Council.

2.1 Water supply augmentation

Clarrie Hall Dam and integrated water management approach – The majority of the PRG supports the raising of the Clarrie Hall Dam; and continuing the work on planning and land acquisition in accordance with the existing project schedule for this work which is consistent with the Council resolution. The PRG recognised that this option is rainfall dependent and considered it should be one option as part of an adaptive strategy by Council to be considered in the context of rainfall uncertainty in the future.

The PRG recommends that Council adopts an **integrated water management approach that is climate resilient**. If Clarrie Hall Dam is the short-term current choice for augmentation, then other sustainable, adaptive choices that are not reliant on rainfall capture need to be implemented for future water supply.

The PRG also recommends these other options be further investigated while the work is progressing on planning and land acquisition for raising the Clarrie Hall Dam. This will assist Council to understand the viability of other options that may improve secure yield, and diversify supply enabling less rainfall dependence.

Byrrill Creek Dam (large and small options) – the majority of PRG members do not support pursuing this option, either a small or large dam at this site, with two PRG members supporting the commencement of planning for the Byrrill Creek Dam and leaving this option for further consideration. The PRG recommends that this option not be pursued further due to the inundation of environmentally sensitive areas of land, which will not be useable in future for either agriculture or natural environment, and the likely impact on productivity and wellbeing of the community as a result of this option. In addition, another dam is also rainfall dependent, like the Clarrie Hall Dam.

Other options – the PRG recommends proceeding with construction of the **mini-link** between the Tweed and City of Gold Coast and investigation of the feasibility of a **desalination** plant or linking to the existing Tugun plant as a matter of urgency as such a supply is not reliant on rainfall.

The PRG recommends that, in the short term, Council engages with developers for existing developments such as Kings Forest and Cobaki regarding the possibility of implementing a **residential and/or precinct recycled water scheme** (non-potable) for the existing approved developments. In addition, it recommends Council considers reviewing planning requirements and enabling legislation to ensure the implementation of community recycled water schemes or water sensitive urban design which includes recycled water for future development applications. This should apply not just for large State significant developments but also for smaller developments within the Tweed Shire Council region.

Furthermore, Council is to ensure the following:

1. such schemes are mandatory and only removed by exception
2. Council develops policy to say it is to happen, unless legislatively prohibited.

The PRG is very supportive of Council considering detailed investigation, promotion and development (where viable) of programs for **landscape rehydration works and regenerative landscape management**.

In relation to **recycled potable water**, the PRG noted that the option is not rainfall dependent and recommends the following:

1. further research be undertaken into the technologies for recycled water
2. an education and information campaign be developed to address the community concerns in the short term with a view to medium/long term implementation of recycled potable water.
3. Council considers approaching the NSW government regarding reviewing and or amending policy and legislation to remove impediments to the use of recycled water.

The PRG recommends that Council adopts an **integrated water management approach with adaptive pathways** in the development of its future water strategies.

In relation to **managed aquifer recharge and coastal groundwater**, the PRG raised a number of questions and recommends further research into this option:

1. are there dry aquifer options that can have water inserted?
2. is water quality an issue for aquifer storage?
3. what is the impact across the Northern Rivers from groundwater extraction for bottled water?
4. what would be the best location for aquifer recharge and groundwater initiatives?
5. what would be the infrastructure required and costs involved?

The PRG recommends further research to confirm the costs and volume of water that could be stored in particular geographic areas using options such as **underground pipe grids**, as a supplement to other water supply options.

For **groundwater alluvium**, the PRG recommends further research regarding the quantity of water that is available and the environmental impacts of using alluvial sources of water

2.2 Water demand management

Council has successfully implemented a range of water demand management strategies since the 1980's. Since 2010, Council has implemented its demand management strategy and plan, which involved changes to pricing, a range of incentives and rebates, targeted strategies for high users including its own facilities. This strategy and other initiatives from the NSW State Government have resulted in a reduction in from 334 litres per person per day (L/p/d) in 1991 to 170 L/p/d in 2016 with a slight increase to 189 L/p/d in 2019.

Overall, the PRG endorses the water demand management findings and recommendations of Hydrosphere Consulting, with some variations and additions. The PRG recommends Council considers **improved collection and analysis** of water demand data by the implementation of **digital technology through smart meters**. The PRG notes that the collection and analysis of data is to be appropriate and relevant information for clearly defined outcomes. The PRG also supports pilot studies and trials of digital water meters.

As a matter of high priority, the PRG recommends Council implements **enhanced leak detection systems and procedures and subsequent leak reduction works.**

The PRG also recommends **enhanced incentive programs** as listed in table 6, especially with the introduction of a **hardship program** for those who are disadvantaged.

2.3 Drought Management

Council has updated its Drought Water Restrictions Policy on several occasions since it was introduced in 2012. Following the experience of the implementation of water restrictions between December 2019 and March 2020, and the associated bushfires in the Tweed Region, Council embarked upon a review of the Drought Water Restrictions Policy.

In 2019, the PRG considered the then existing Drought Water Restrictions Policy and identified the issues that may require the advice from an external consultant, and appropriate actions to be undertaken. As a result of this work, it was decided that an external consultant would not be required to address these issues, and that council officers would be able to respond to and address the issues raised as part of the review of the Drought Water Restrictions Policy.

In October 2020, when a draft copy of the revised Drought Water Restrictions Policy was available, the PRG reviewed the action plan it developed from 2019 and in light of the revised policy, finalised its comments on drought management and the Policy.

The PRG recommends that, given the changed triggers for implementation of water restrictions, Council change the wording of **the 5/10/10 rule** so that the text is consistent with the triggers.

The PRG recommends that Council considers **triggers for focussed community and business water use education programs and campaigns**.

The PRG also recommends that Council considers the use of **recycled water for firefighting and dust suppression**.

Finally, the PRG recommends Council considers a program for **growing shade trees around the edges of the dam and weirs and applying regenerative landscape management practices**.

2.4 Conclusion

The Tweed District has been fortunate to have had regular rainfall and minimal drought impacts over the years. However, with the changes to climate and the associated impacts on the region, it is timely for Council to undertake a comprehensive review of its approaches to water management.

Before the commencement of this review process, the Drought Restrictions Policy had never been properly tested. However, following the drought conditions in late 2019 and early 2020, and the fires that threatened the nation and nationally significant environment, the value of water and the protection of the natural resources, plus the need to ensure a secure yield of water supply for the Tweed Region are high priorities for the people of the Tweed.

This review and its recommendations provide a way forward to Council to ensure a considered and pre-emptive approach to long term water quality and supply management.

The PRG wishes to thank the council officers, councillors and consultants for their support during the review process and commends the findings and recommendations of this report to Council for consideration.

3. Summary of Recommendations

3.1 Overarching recommendation

REC 1. **Integrated water management with adaptive pathways –** Council adopts an integrated water management approach with adaptive pathways in the development of its future water strategies.

3.2 Water supply infrastructure

REC 2. **Clarrie Hall Dam –** Council proceeds with the raising of the Clarrie Hall Dam; and continues the work on planning and land acquisition, in accordance with the existing project schedule for this work which is consistent with Council's resolution. Concurrently, Council further investigates other options as recommended in this report that may be able to diversify water supply, be less reliant on rainfall dependent sources, and improve the security and longevity of the yield.

REC 3. **Byrrill Creek Dam –** the option of a large or small dam at Byrrill Creek not be considered any further due to the reliance on rainfall, inundation of areas of land, which will not be useable in future for this highly significant environment, for either agriculture or available as natural environment, and the likely impact on productivity and wellbeing of the community as a result of this option.

REC 4. **Mini-link -** Council continues with the upgrade of the mini-link between the City of Gold Coast and Tweed Shire to provide some contingency supply in the event of a failure of the Tweed District Water supply.

REC 5. **Desalination –** as a priority, Council commissions investigation and feasibility into the options of accessing the desalination plant at Tugun or purchasing a desalination plant in its own name or in conjunction with other regional Councils.

REC 6. **Recycled water non-potable –** in the short-term, Council considers engaging with developers for existing developments such as Kings Forest and Cobaki regarding the possibility of implementing a residential recycled water scheme for the existing approved developments.

REC 7. **Managed aquifer recharge –** Council investigates the reuse of stormwater with aquifer recharge storage, to be incorporated into a locally integrated water management scheme.

REC 8. **Community water recycling schemes** - In addition, Council considers reviewing planning requirements to actively encourage the implementation of community recycled water schemes for future development applications.

REC 9. **Recycled water potable –** Council considers development and implementation of an appropriate education campaign to address the community concerns regarding recycled potable water in the short term, with a view to medium/long term implementation of recycled potable water.

Council considers approaching the NSW government regarding the possible easing of restrictions and associated legislation and policy on the use of recycled potable water.

REC 10. **Land Management Practices –** Council considers detailed investigation, promotion and development of programs for landscape rehydration works and regenerative landscape management.

REC 11. **Commercial extraction for bottling water** – Council considers restricting the removal of groundwater for drinking purposes for crisis/drought management rather than a permanent/regular source for bottled water.

REC 12. **Groundwater alluvium and coastal sands aquifers –** Council considers further research regarding the quantity of water that is available and the environmental impacts of using alluvial and coastal sands aquifer sources of water.

REC 13. **Underground pipe grid** – Council considers further research to confirm the costs and volume of water that could be stored in particular geographic area as a supplement to other water supply options.

REC 14. **Long-term urban water strategy –** Council considers inclusion of the results of future research and development and hydrological (surface water and groundwater) investigations into a long-term urban water strategy.

3.3 Water demand management

REC 15. **Water Demand Strategies** - Council considers the recommendations by the PRG as listed in table 6 of the PRG Report, with a focus on the following high priority options:

- implementing enhanced leak detection and correction system and processes
- improving data collection as part of a shift towards digitisation of data collection with the introduction of smart metering
- enhance incentive programs as listed in table 6, especially with the introduction of a hardship program for those who are disadvantaged.

3.4 Drought management

REC 16. In light of the recent experience with drought conditions in the Tweed and application of drought water restrictions for the first time (under the current policy), and the projected impact of global warming, Council revises the text in the Policy to reflect the new triggers and water use targets (e.g. 5/10/25).

REC 17. Council considers triggers for focussed community and business water use education programs and campaigns.

REC 18. Council considers the use of recycled water for firefighting and dust suppression.

REC 19. Council considers a program for growing shade trees around the edges of the Dam and Weirs and applying regenerative landscape management practices.

4. Introduction and Background

4.1 Introduction

In March 2018, the Tweed Shire Council (Council) resolved to appoint a Project Reference Group (PRG) to undertake a comprehensive Review of the Tweed District Water Supply, Demand Management and Drought Management strategies. As per the Council resolutions of March 2017 and March 2018, membership of the PRG was drawn from the reconvened original Community Working Group (which was originally formed in 2009 to consider options for the augmentation of the Tweed District Water Supply) plus new Councillor representatives. On 7 March 2019 Council endorsed the appointment of eight members and two councillors for the PRG. Four council officers initially, and then three, also worked with the PRG throughout the process.

Members of the Water Strategies Review Project Reference Group are:

Ms Rachel Eberhard
Mr Rob Learmonth
Mr Tony Thompson
Mr Samuel Dawson
Mr Richard Murray
Mr Don Beck
Ms Robyn Lemaire
Ms Joanna Gardner

Council further nominated Councillors Katie Milne and Pryce Allsop as members of the Water Strategies Review Project Reference Group.

4.2 Context

The background to each of the three areas outlined in the terms of reference for review is detailed below.

4.2.1 Water Augmentation

Since 2009, Council has been through an extensive process to determine a preferred option to augment the Tweed District Water Supply. The process included community involvement through a Community Working Group, studies by independent consultants and analysis of options. In December 2015 Council resolved:

"Based on the information currently available, Council adopts the raising of the wall of the Clarrie Hall Dam as the preferred option for future water security and proceeds with the planning approval and land acquisitions phase for the project."

Council has been undertaking the planning approvals and land acquisitions for this project.

4.2.2 Demand Management

Council developed and adopted its Demand Management Strategy in 2009. Subsequently, Council prepared a Demand Management Implementation Plan and has been undertaking activities under that plan. In 2017 Council engaged an independent consultant to review the efficacy of Council's demand management. The report was available to Council at the time, and made available to the PRG.

4.2.3 Drought Management

A Drought Management Strategy was prepared for Council in 2009. Council also has a Drought Water Restrictions Policy which was updated in August 2017.

Following the drought conditions during the summer of calendar years 2019/2020, Council officers reviewed the Drought Water Restrictions Policy and the revised version 4.0 has been the subject of consultation. This was provided to the PRG for review on 28 October 2020. The revised Policy will be put to Council for its consideration in early 2021.

5. Terms of Reference

Under the Terms of Reference for the PRG Review, the purpose of the PRG was:

Consistent with the resolutions of Council the PRG will be required to:

- *review the existing information which has led to the adoption of each of the three strategies, the strategies and the status of implementation of the strategies*
- *for each of the strategies, form an opinion as to whether there are any gaps in the information used to develop the strategy and whether the strategy is still current, and*
- *if considered necessary, for each of the strategies, determine a Terms of Reference for their review.*

The agreed process was as follows:

1. Presentations will be given to the PRG on the purpose of each of the strategies, their history and how Council has implemented or is implementing the strategies.
2. The PRG will determine what aspects, if any, of each strategy may require review.
3. The PRG will prepare a Terms of Reference for the engagement of an independent consultant to review those aspects of the strategies they consider require review.
4. The PRG will receive a presentation or presentations from the independent consultant on the matters identified.
5. The PRG will form an opinion of the adequacy of the existing strategies and any changes that may be required.
6. The PRG will inform Council of that opinion.

6. Review Approach and Timeline

6.1 Review Stages

The review was undertaken through the following stages as illustrated below:

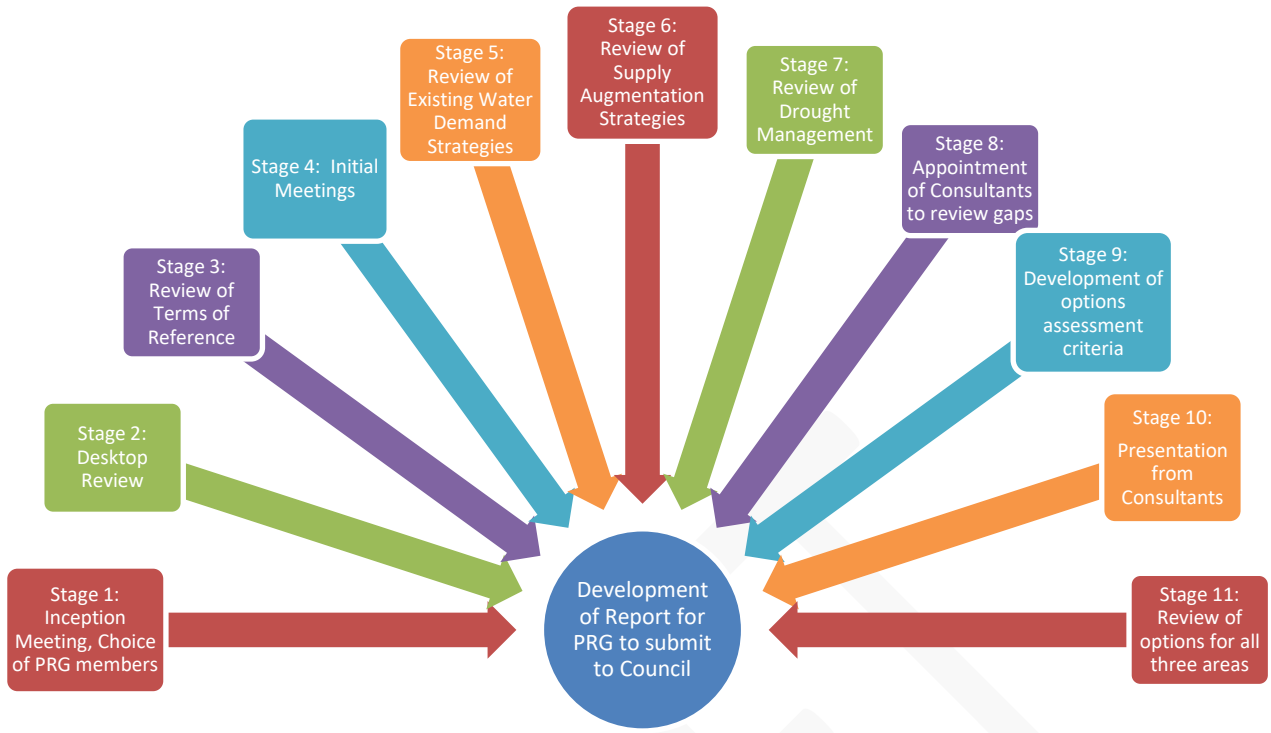

Figure 1 Review process

The approach to this project by the facilitator and the PRG involved 11 stages:

Stage 1 **Inception meeting and choice of PRG members**: confirm specific project details, deliverables, key milestones and reporting requirements and choosing the PRG members based on both recommendations from Council and availability of potential PRG members.

Stage 2 **Desktop review**: review all relevant background material including previous reports, Council decisions, previous Community Working Group outputs, options to address water supply augmentation, demand management, and drought management strategies.

Stage 3 **Review Terms of Reference**: review the adequacy of the Terms of Reference and providing suggested amendments and work with PRG to finalise the Terms of Reference.

Stage 4 **Initial PRG meetings**: update the PRG on the three current strategies and progress since the last group was established in 2009; understand the views and opinions of the PRG members in the three areas; ratify the terms of reference; agree on the code of conduct; and confirm the process for the review. This stage also involved a bus tour of the region including the Council water processing facilities, the Clarrie Hall Dam, the location of the proposed Byrrill Creek Dam and the water treatment facilities at Uki and Tyalgum.

Stage 5 **Review of existing water demand strategies:** review the existing water demand strategies and identify any gaps in information that required review by an independent consultant to enable the PRG to make a fully informed decision regarding their findings and recommendations to Council.

Stage 6 **Review of supply augmentation strategies**: as with Stage 5, review the existing material and strategies for water augmentation, in particular, the raising of the Clarrie Hall Dam and the option of another dam at Byrrill Creek, as well as the many other options for storage and supply of water in the Tweed Shire. The gaps in information, innovation and options were identified for consideration by an independent consultant.

Stage 7 **Review of drought management**: review the existing drought management policies and the drought water restrictions. This occurred during a time of increasing drought. The PRG developed some actions for later consideration when the findings and recommendations were to be drawn together. It was determined that an independent consultant review was not required for this area of the review.

Stage 8 **Appointment of Consultants to review options**: determine terms of reference for the consultants to review the options and strategies for water demand and water supply augmentation.

A Tender for proposals from consultants was called by Council. This resulted in the appointment of Hydrosphere to review the water demand strategies, and HARC to review the water supply augmentation options and strategies.

Stage 9 **Development of options assessment criteria**: following appointment of the consultants, develop options assessment criteria for the water demand and water supply augmentation options.

Stage 10 **Presentation from Consultants**: following review of drafts by the PRG, the consultants presented their findings in August 2020 via an interactive discussion with the PRG members.

Stage 11 **Review of options for all three areas:** score the options and discussed the merits, benefits and costs, innovation aspects, and the value for money of each of the options.

The PRG ranked the water augmentations options and developed some broad recommendations for consideration by Council.

The options for water demand strategy were all considered and prioritised with recommendations for Council's consideration.

The PRG reviewed the Drought Water Restrictions Policy and the options and provided feedback to the Council Officers and agreed on recommendations for Council's consideration.

Stage 12 **Present findings**: compile the findings and recommendations for consideration by the PRG for recommendation to Council.

6.2 Timeline

The initial Terms of Reference and Scope of work projected the following timeline:

- Engagement of a facilitator – by 11 January 2019
- Meeting with Council staff to finalise PRG Terms of Reference, methodology to seek membership and overall approach – within two weeks
- Seek members for the PRG – three weeks
- Report to Council – allow three to four weeks
- Initial meetings/workshops of the PRG (monthly) – six to eight months
- Engagement of consultant/s – four months
- PRG meetings to consider consultant/s recommendations/findings and form advice to Council (monthly) – two months
- Council decision/s on way forward - maximum two months

The total duration of the project was estimated to be approximately 18 months.

Council resolved in March 2018:

This review (Comprehensive Review of Tweed District Water Supply, Demand Management and Drought Management) should be completed 7 months prior to the end of the current Council (February 2020).

PRG meetings were held at Council's office at Murwillumbah. Each meeting was for three hours in the evening.

In February 2020, due to the impact of the COVID-19 pandemic, face to face meetings were no longer allowed under Council Policy. The last face-to-face PRG meeting in Murwillumbah, prior to lockdown, occurred on 24 February 2020 (Meeting 9). As a result of the pandemic, the Council elections were also postponed 12 months.

The next meeting of the PRG was held on 21 August 2019 remotely through Council's "Blue Jeans" software. This included a small number of PRG members and Council Officers at the Tweed Office for those unable to link in remotely. These meetings had a limit of 1.5 hours for PRG members that were located at the Council office.

During this seven-month period, the appointed expert consultants continued their reviews for presentation back to the PRG. This delayed progress of the PRG significantly. This delay, plus the time taken by the PRG to initially review the three areas in 2019, the time taken to appoint consultants, and for the consultants to complete their work, and the review of the results that were presented to the PRG, required a number of extensions to the process.

As a result, a total of 19 meetings (including a one-day workshop) were held, with this report due by the end of November 2020. It is projected that this report from the PRG will be submitted to Council in February 2021.

As a result, the total timeline for delivery of this project will be 23 months compared with a projected timeline of 18 months.

7. The Project Reference Group

In keeping with Council's resolution, previous members of the 2009-2010 Water Augmentation Community Working Group were invited to join the PRG.

Council endorsed the membership of the PRG on 7 March 2019.

Table 1 List of Project Reference Group (PRG) members and the interests they represent

Name	Representing/interests
Joanna Gardner	Landowner – Byrrill Creek dam area
Rob Learmonth	Community – Nunderi
Dr Rachel Eberhard	Academic/Consultant – Community Tweed
Tony Thompson	Community – Murwillumbah
Samuel Dawson	Environment – Numinbah
Richard Murray	Environment
Don Beck	Business / Commercial / Farming
Robyn Lemaire	Planner/ Community
Katie Milne	Councillor – Tweed Shire Council - Mayor up until Sept 2020
Pryce Allsop	Councillor – Tweed Shire Council

Key interest groups represented through PRG members include: Byrrill Creek Landcare, Tweed Landcare, local business and commercial interests, farmers, Murwillumbah Rotary, Caldera Environment Centre, Save our Boardwalk Group, the Murwillumbah Ratepayer and Residents Association and the communities of Nunderi, Tweed, Murwillumbah, Numinbah.

The PRG had a gender balance of six men and four women.

The PRG was supported throughout the process by Council Officers:

- Elizabeth Seidl - Engineer Water Efficiency and Connections
- Rob Siebert - Coordinator: Strategy & Business Management - Water & Wastewater Unit
- Brenda Hannigan - Stakeholder Engagement & Communications (Engineering)
- Sandra Freeman - Administrative Officer: Project Support

There were a number of internal Council and external guest experts who presented at various stages of the process. These included:

- Robyn Campbell, Senior Environmental Engineer, Hydrosphere Consulting
- Russell Beatty, Principal Water Resources Engineer & Economist, HARC
- Robert Keesen, Water Resources Engineer, HARC
- Dr Paul Wright, Lab Coordinator, Water and Wastewater, Tweed Shire Council
- Kathy Baker, Manager Service Sustainability, Water and Waste, City of Gold Coast

Figure 2 Project Group Reference Group Members

Front row (l-r): Richard Murray, Sandra Freeman (Council Officer), Joanna Gardner, Robyn Lemaire, Elizabeth Seidl (Council Officer), Don Beck. Back row (l-r) Paul Guyatt (Facilitator), Darren Lyndon (Council Officer), Pryce Allsop, Tony Thompson, Sam Dawson, Peter Mathews (Facilitator), Rob Seibert (Council Officer).
(Missing: Katie Milne, Rachel Eberhard, Rob Learmonth) (Photo Brenda Hannigan)

8. Water Supply Augmentation

8.1 Previous relevant decisions

There have been a number of studies undertaken of options for water supply augmentation which have included the following:

- Byrrill Creek Dam
- Raise CHD
- Pipeline to Rous Water
- Pipeline to SEQ Water
- Oxley River Dam
- Groundwater
- Desalination
- Indirect potable reuse
- Direct potable reuse.

The process pf review started in 2009 with options studies, and the CWG, and the three options shortlisted with CHD being recommended by the CWG. There were a number of Council resolutions that delayed the process including a Council resolution on Byrrill Creek. The work in 2014 was to reconsider the options of 2010 and develop some new options such as staged Byrrill Ck, link to Gold Coast as well as the link to SEQ Grid. In 2014, following a course screening process, these options were reduced to three main options as follows:

- Byrrill Creek Dam
- Raise CHD
- Pipeline to SEQ Water

The status of these options under Council resolutions as at 2014 is listed in Table 2.

Table 2 Options considered in 2014 and status under Council resolutions.

Short Listed/New Options	Status under Council Resolutions
Raise Clarrie Hall Dam	Not precluded and under investigation
Small Byrrill Creek Dam	Not permitted (15 May 2012)
Staged Byrrill Creek Dam	Not permitted (15 May 2012)
Large Byrrill Creek Dam	Not permitted (15 May 2012)
Link to SEQ Water	Permitted and under investigation
Link to Gold Coast City Council	Not precluded and under investigation

In 2015, the water supply augmentation options were reviewed as follows:

- Reviewed options (Raise Clarrie Hall Dam, Byrrill Creek Dam(s) and staging Links to SEQ/Gold Coast Water)
- Reviewed previous reports
- Considered alternate “rules/restrictions” 5/10/10 versus 10/20/10

(% time of restrictions/% years of restrictions/% reduction in consumption)

- Reviewed longevity of all six options – how long before the next augmentation
- Estimated cost of all six options
- Determined impact on developer charges and typical residential bill of options
- Work with SEQ Water to develop model of linked systems (ongoing).

In 2015, following a thorough assessment, Council resolved – in part:

Based on the information currently available, Council adopts the raising of the wall of the Clarrie Hall Dam as the preferred option for future water security and proceeds with the planning approval and land acquisitions phase for the project.

8.2 Water demand

In 2010, consultants MWH provided a baseline demand forecast for water in the Tweed Shire. With the water demand management strategies subsequently implemented by Council, such as new houses being built to BASIX standards and toilet cisterns replaced, demand for water has decreased by 22% (Hydrosphere Consulting - see Figure 3).

The graph below (Figure 3) shows the average demand (dark blue) and the peak demand (green) that was forecast[1].

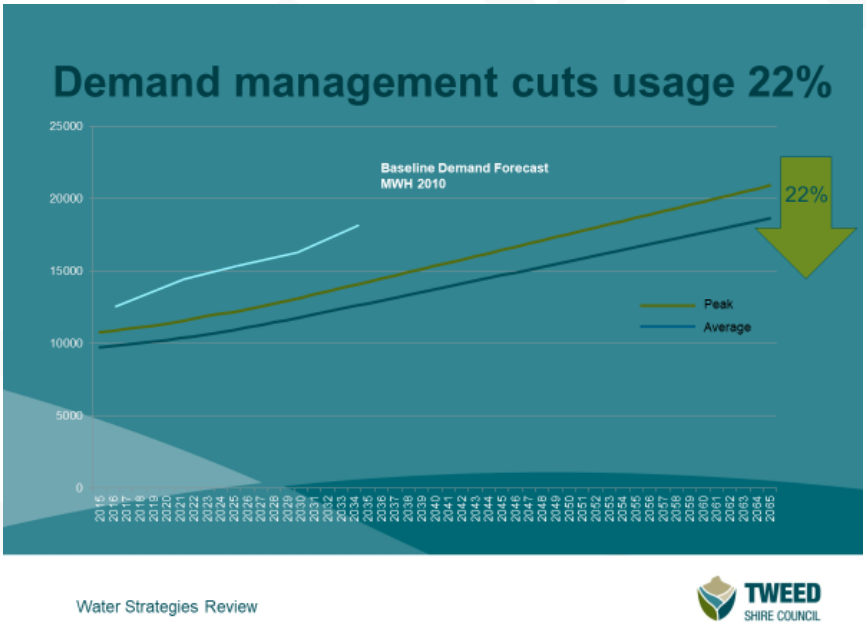

Figure 3 Projected impact of water demand strategies implemented by Council

The light blue line is the forecast demand prior to Council implementing demand management. Based on Council's population projections at the time, this graph highlights that there has been a significant reduction in demand. In 2014 demand was 22% less than peak demand (and more over average demand). It can also be seen from the graph that over time the demand reduction (from previously forecast demand) increases as the region becomes more water efficient.[2]

[1] Tweed Shire Council

[2] Ibid

Consumption per capita has also fallen in this time and possibly by more than the 22%.[3] Figure 9 illustrates that there has been a reduction in demand from 334 litres per person per day (L/p/d) in 1991 to 170 L/p/d in 2016 with a slight increase to 189 L/p/d in 2019.

Tweed water supply is a run of river supply, utilising the Tweed River, supplemented by the Clarrie Hall Dam (CHD). Water is drawn from the river at Bray Park Weir and treated at Bray Park Weir Treatment Plant before distribution.[4]

Most of the water Council draws is sourced from the river. When the river flows drop, water is released from CHD to supplement flows so Council can draw what is needed from the Bray Park Weir.[5]

8.3 Secure yield

Secure yield is calculated as the maximum amount of water that can be drawn from the system in the most adverse conditions. It is based on a daily step model using 100 years of record and involves taking a trial secure yield and seeing if the system can provide it.[6] If the system is unable to provide the secure yield, the level is reduced and the model is run again until the maximum amount of water the system can provide is identified.[7]

To take into account climate change, the 100 years of record is modified according to climate change predictions – higher temperatures, greater variation in rainfall and more extreme events. The process is repeated using a range of climate models.[8]

The secure yield estimate as at 2014 was 15,000 ML/a. The future secure yield of the present system assuming one-degree centigrade warming by 2030, is 11,250 ML/a.[9]

As a comparison, the current average demand is 9727 ML/a.[10]

The following graph (Figure 4) illustrates that by measuring forecast demand against secure yield, increased sources of supply will be required by 2026.

3 Ibid
4 Ibid
5 Ibid
6 Ibid
7 Ibid
8 Ibid
9 Ibid
10 Ibid

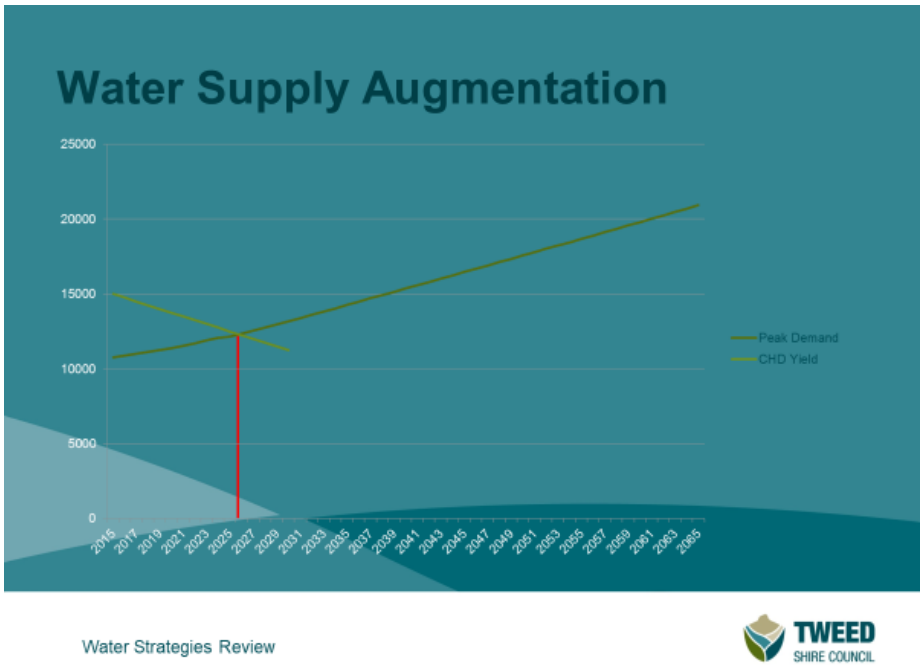

Figure 4 The point at which additional water supply augmentation will be required (2026) (source: Tweed Shire Council)

8.4 Review by HARC (Hydrology and Risk Consulting)

As per the terms of reference, the PRG identified the options that they would like the consultant to consider, to enable the PRG to draw together findings and make recommendations to Council.

The PRG developed a cope of works for the consultant and selection criteria with weightings for the appointment of a consultant. Following a tender process in accordance with Council's procurement policy, HARC was appointed on 9 December 2019.

The purpose of this engagement (Separable Portion B) was to assist the PRG to identify options that may enhance or provide an alternative to the option of raising of Clarrie Hall Dam by identifying alternate sources and/or storage to:

- Increase longevity of supply
- Diversify sources
- Ensure a guaranteed augmented supply by 2026.

The review considered:

- The general suitability and feasibility of the potential source
- How the option may be integrated into the Tweed District Water Supply
- The impact on secure yield of the Tweed District Water Supply
- The cost to develop and implement the option in terms of capital cost, ongoing operational and maintenance costs
- Other opportunities, risks, values or costs including environmental or social aspects such as regulatory issues, financial or timing risks, or potential organisational matters.

The following tables 3 and 4, summarise HARC's final findings as at October 2020:

Table 3 Cost effectiveness of options [11]

Option Name	Increase in Secure Yield (ML/yr)	Capital Cost ($M)	Annual Operating Cost ($/ML)	Estimated years before additional capacity needed	Levelised Cost of Water ($/kL)
Clarrie Hall Dam Raising	11,450	$50	$105	25	$1.46
Byrrill Creek small dam	4,550	$53	$105	10	$3.85
Byrrill Creek large dam	9,700	$79	$105	22	$3.32
Groundwater - Coastal Sands	1,500	$48	$130	3	$7.45
Groundwater - Alluvium	1,500	$14	$97	3	$2.23
Non-potable recycling	< 1	N/A	N/A	< 1	N/A
Potable Recycling	6,200	$136	$300	14	$8.00
Potable Recycling Staged	1,600	$40	$600	4	$5.75
Desalination	5,800	$122	$1,260	13	$8.18
Desalination Staged	1,950	$79	$1,260	4	$7.00
Gold Coast Transfers minilink	3,650	$10	$3,500	8	$4.24
Gold Coast Transfers maxilink	10,950	$50	$3,500	24	$5.51
Stormwater	< 1	N/A	N/A	< 1	N/A

Table 4 Summary of key indicators of options [12]

Criteria	Raising Clarrie Hall dam	Byrrill Creek Small	Byrrill Creek Large	Off Stream storage	Groundwater (Total of both sources)	Non- Potable recycled Water	Potable recycled Water	Desalination	Alternative Sources and Storage
Yield (GL/year)	11.4	4.55	9.70	1 to 10	0 to 4.5	Less than 1	1.6 to 6.2	5.8	Less than 1
Able to deliver by 2026	Yes	No	No	No	No	No	No	Yes	No
Future supply certainty	Rainfall dependant	Rainfall dependant	Rainfall dependant	Rainfall dependant	Reliable	Reliable	Reliable	Reliable	Rainfall dependant
Levelised Cost ($/kL)	1.46	3.85	3.32	3 to 6	Less than 3.00	3 to 20	5.75 - 8.00	7:00 - 8.18	3 to 20
Environmental risks and opportunities	Risk	Risk	Risk	Risk	Opportunity	Opportunity	Risk and Opportunity	Risk	Risk and Opportunity
Social	Negative	Negative	Negative	Negative	Positive	Uncertain	Negative	Negative	Positive and negative

HARC found that the options which can confidently be delivered before 2026 are the raising of Clarrie Hall Dam or, Desalination (either at the Tweed or through Gold Coast desalination water through Mini-link or Maxi-link transfers).[13]

11 HARC, Tweed Water Management Strategy Review Separable Portion B - Review of Water Augmentation Strategy Version 07 (FINAL)October 2020, p2.

12 Ibid p2.

13 Ibid p3

The uncertainty of future yield and drought resilience of rainfall dependant sources of water supply suggests that consideration should be given to a longer-term water strategy which is less rainfall dependant.[14]

Desalination would provide a source of water which is non-rainfall dependant in future, but is relatively costly.[15]

Potential groundwater sources in the Tweed are not capable of consistently delivering sufficient yields for the whole of the Tweed, but two groundwater aquifers may be suitable for local or supplementary solutions. Ground water extraction has the potential as:

- A supplementary supply harvesting water in the Tweed Alluvium source upstream of Bray Park weir, and
- A localised measure in the Tweed-Brunswick coastal sands potentially as part of an integrated water scheme.[16]

In the longer term, the most sustainable water supply scheme is likely to be developed around an integrated water, wastewater and recycled water plan that potentially includes groundwater extraction, non-potable recycling, stormwater, and the use of aquifer recharge to balance supply and demand.[17]

An integrated water cycle solution could potentially be developed for a new housing development which is located some distance from Council's infrastructure. Although such schemes have the potential to have greater sustainability credentials, their financial viability will be site-specific depending on the degree to which the scheme avoids costs in the centralised system, and whether the scheme has buy-in from the land developer.[18]

For a future water strategy there will be potential to include a mix of sources in an adaptive plan which can respond to climate change. The long timeframes for the planning and implementation of such schemes means that it would be valuable to plan a strategic approach to water and wastewater planning on the Tweed in the near future.[19]

PRG involvement

The report was supported by an interactive presentation of the findings by the HARC consultants with the PRG. This provided an opportunity for feedback and queries regarding the strategy. The PRG was involved at all stages of the process providing significant comment and input at the draft report stages.

8.5 Water augmentation options selection criteria

The PRG developed a range of selection criteria by which to assess the various water supply augmentation options. The criteria included an explanation of the meaning of each criterion, and considerations to take into account when assessing the options against the particular criterion (see Attachment 1 for a full list).

THE KEY CRITERIA WERE: best practice, water quality, sustainable / secure yield, environmental impact / benefit, cost, technology and innovation, climate change resilience, social impact, cultural heritage, risk, legislative issues.

[14] Ibid
[15] Ibid
[16] Ibid
[17] Ibid
[18] Ibid
[19] Ibid

8.6 Scoring of the options against the criteria

The PRG then scored each of the options against the criteria on a scale of 1 to 7 as follows:

Table 5 Scoring options

Scoring options
1 = very strongly disagree that the option meets the criteria; that is, it is a very bad option when assessed on this criteria
2 = strongly disagree that the option meets the criteria
3 = mildly disagree that the option meets the criteria
4 = neither agree nor disagree that the option meets the criteria
5 = mildly agree that the option meets the criteria
6 = strongly agree that the option meets the criteria
7 = very strongly agree that the option meets the criteria; that is, it is a very good option when assessed on this criteria

The score sheets were amalgamated and the options were ranked. The following graphs illustrate the mean and median rankings of the various options.

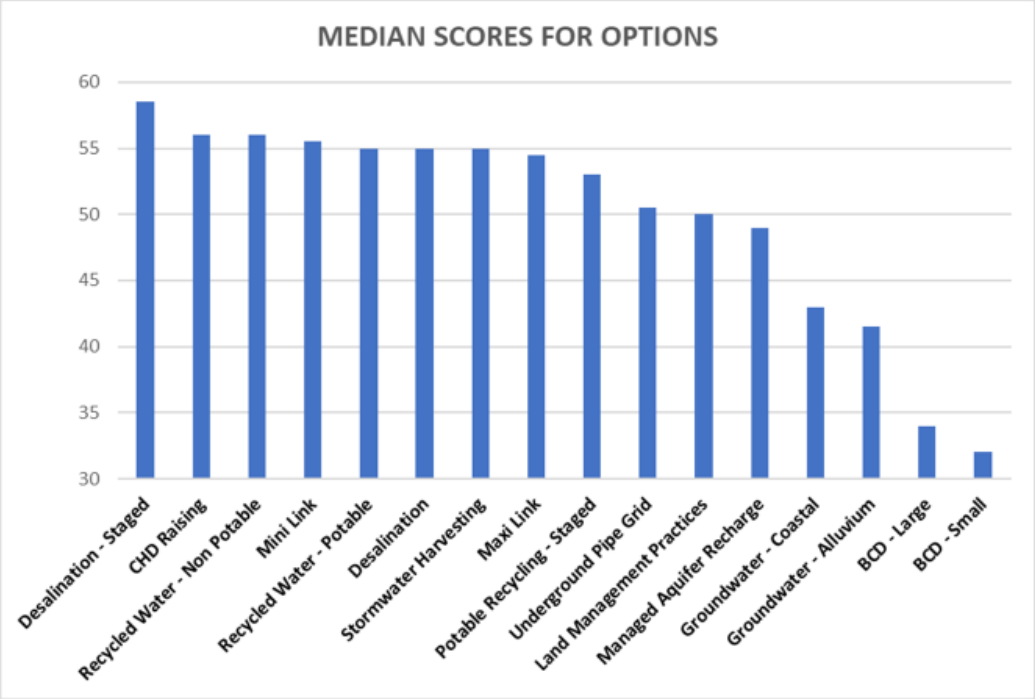

Figure 5 Ranked options according to median scores

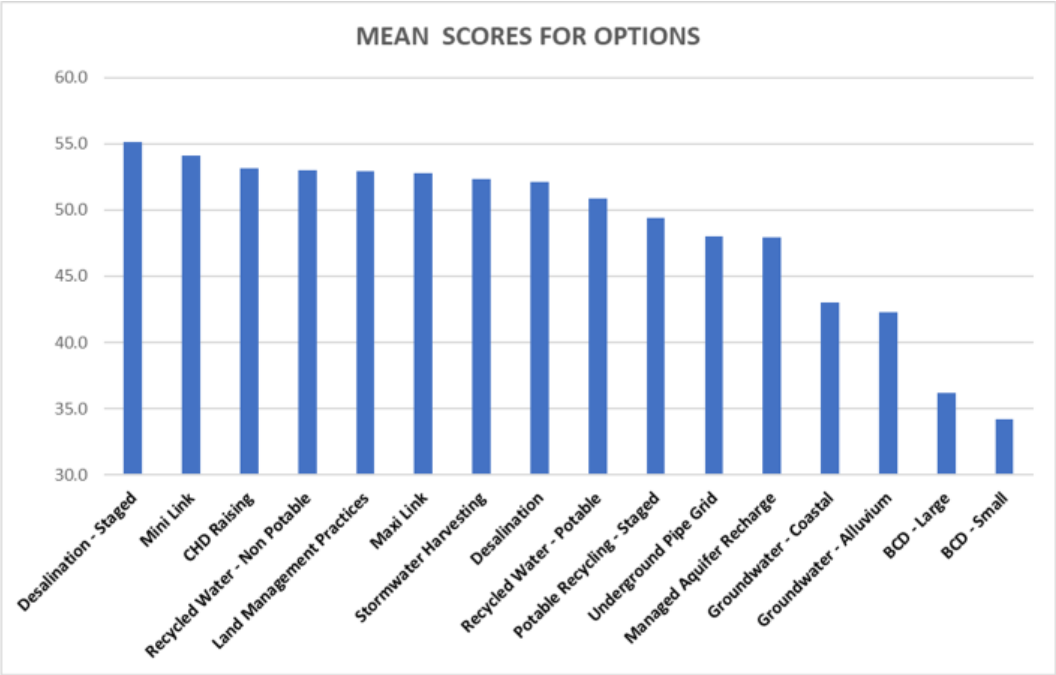

Figure 6 Ranked options according to mean scores

8.7 PRG Findings re water supply augmentation options

There was considerable discussion and debate amongst the PRG members regarding the options for water supply augmentation. The views regarding each of the options are listed below:

8.7.1 Current progress with raising Clarrie Hall Dam project

The following is a summary of progress with the raising of the Clarrie Hall Dam project as at 16 November 2020:

- The project is designated as State Significant Infrastructure (SSI) by the NSW Department of Planning, Industry and Environment (DPIE) (SSI Reference 9458). The Secretary's Environmental Assessment Requirements (SEARs) for the Proposal were issued by the (then) NSW Department of Planning and Environment (DPE) (now called the NSW Department of Planning, Industry, and Environment – DPIE) on 23 April 2019 (replacing a previous version of the SEARs issued on 15 August 2018) and identify the specific requirements to be addressed by the Environmental Impact Statement (EIS) for the Proposal.
- Eco Logical Australia Pty Ltd (ELA) has been engaged to prepare the EIS for the project. The EIS is due to be completed by mid-March 2021. Broad stakeholder consultation will occur in February 2021.
- For biodiversity assessment and offset approach, a preliminary assessment of the credits that need to be retired has been undertaken for some vegetation but additional survey work is required for fauna and threatened flora. In discussions with DPIE two options have been proposed; one being that applicable for normal development such as subdivision and another through biodiversity certification where the Minister decides what methods are available for retiring credits. This may involve a wide range of items such as gifting land and zoning of land.
- A consultation plan and social impact assessment (SIA) methodology has been agreed with ELA. The SIA has been completed and a draft report is due in November 2020.
- Cultural heritage site surveys are complete. Artefacts have been collected and are being catalogued/analysed.

- Other reports that will be included in the EIS are due for completion by end December 2021 i.e. flooding and hydrology, noise, air quality, traffic assessment, bush fire, water quality, soils and waste. Draft chapters of the EIS are being provided to Council for review.
- Land purchases – only three purchases are still outstanding. One purchase will not proceed until Council resolves to go ahead with the raising of the dam. Two other properties are being revalued.
- People can register their interest in the project and EIS on Council's Your Say Tweed website. Currently about 60 people are registered.
- Work is under way on a catchment management plan for the CHD catchment. Council is liaising with NSW National Parks and Wildlife Service (NPWS) on aspects of the plan. [20]

8.7.2 Raising the Clarrie Hall Dam

In general, most PRG members were in favour of raising the Clarrie Hall Dam; and continuing the work on planning, and land acquisition in accordance with the existing project schedule for this work which is consistent with Council's resolution.

Raising the Clarrie Hall Dam is amongst the highest yielding options, planning approvals are well underway, and it is the most cost-effective option. Future supply for CHD is rainfall dependent, and it should be considered as one option as part of an adaptive strategy by Council which needs to be considered in the context of uncertainty of rainfall in the future. Also, there will be some impact on reducing stream flows and inundation of natural bushland.

The PRG also recommends other options be further investigated while the work is progressing on planning and land acquisition for raising the Clarrie Hall Dam. This will assist Council to understand the viability of other options that may improve secure yield, and diversify supply, enabling less rainfall dependence.

8.7.3 Byrrill Creek Dam – large and small

There was considerable discussion by the PRG regarding the option of building a dam at Byrrill Creek. The majority of PRG members were not in favour of pursuing this option, either a small or large dam at this site. Two PRG members were in favour of pursuing planning for the Byrrill Creek Dam. and maintaining this option for consideration in the future.

HARC in their report, identified that the levelised cost of water $3.32/kL) is comparatively cheaper for a large dam at Byrrill Creek, but not as cheap as raising the Clarrie Hall Dam ($1.46/kL).[21]

However, another dam option is also rainfall dependent and options for Byrrill Creek Dam will inundate areas of land, which will not be useable in future for agriculture, or available as natural environment, which will impact on productivity and wellbeing of the community.[22]

Being an existing dam, the raising of the Clarrie Hall Dam will utilise the existing dam site and will have a smaller infrastructure footprint, compared with a new dam at Byrrill Creek. However, the raising of the water level will result in inundation of additional properties and bushland around the perimeter of the current storage.[23]

[20] Tweed Shire Council

[21] HARC Report pp23-24

[22] Ibid p22

[23] Ibid

The PRG were of the view that if a desalination and/or a link to the SEQ grid are pursued, there will be less need for additional storage and Council would be able to sell the land that was purchased for the Byrrill Creek Dam many years ago when early planning at Byrrill Creek was underway.

One PRG member expressed the view of having an independent assessment of the benefits and impacts of a dam at Byrrill Creek rather than deleting this as an option.

8.7.4 Maxi and Mini-link

Mini-Link

The proposed Mini-Link is the upgrading of an existing connection between the water networks of the City of Gold Coast and Tweed Shire. The primary purpose of the link is to provide some contingency supply in the event of a failure of the Tweed District Water supply.

The link connects Tweed Shire Council's Razorback reservoir and City of Gold Coast's Coolangatta reservoir. The link will be able to provide up to 10ML/day from the City of Gold Coast to Tweed. The cost of water from the City of Gold Coast is higher than the cost of water within Tweed and hence the link will be used to supply water to Tweed in emergencies only.

The cost of construction the link is estimated at $1.6m. At this time the detailed design of the link is 90% complete. The detailed design is to be approved by City of Gold Coast before construction will commence. It is anticipated construction of the link will commence in early 2021.[24]

Maxi-Link

The proposed Maxi-Link is a link between the water networks of SEQ Water and Tweed Shire to allow a transfer of water between the two systems of about 36ML/day. Although the link would provide secure yield benefits to both SEQ Water and Tweed Shire it is presently not economically viable for Tweed Shire to implement as the estimated cost of the link is over $50m. In addition, Council would be required to meet buy-in costs, annual access fees and the wholesale cost of water to Tweed, after those costs were met, would be over $3.00 per kL.

The PRG was very supportive of continuing the work to construct a mini-link with further consideration of the viability of a maxi-link at a future stage along with other options discussed in this report.[25]

8.7.5 Desalination

Desalination was one of the options HARC identified that can be confidently delivered before 2026 either through a portable plant at the Tweed or through mini-link or maxi-link transfer to Gold Coast desalination.[26]

One option is to access the Gold Coast desalination supply, the cost of which would be at the lower end of the scale for a desalination option ($4.24 to $5.50 per kL).

The significant benefit of desalination is the lack of reliance on rainfall, which provides an alternative source and improves the secure yield when there are periods of low rainfall and drought.

If Council was to invest in its own plant, HARC identified a site at Kingscliff as having the most potential with an intake outside the mouth of Cudgen Creek and use of the existing outfall for the disposal of brine. The costs of water for a Council plant is estimated by HARC at $7.00 to $8.18 per kL. If Council invests in its own

[24] Tweed Shire Council

[25] Ibid

[26] HARC Report p3.

desalination plant, Council would need to factor in the offset cost of operation with renewable energy investment. Council would need to consider energy options for running the desalination plant and factor into the renewable energy policy of Council already has in place,

HARC's observations regarding desalination include:

- Potential to deliver good volume of water
- Improves resilience to drought and climate dependency
- Costly and energy intensive
- Much higher cost than raising Clarrie Hall Dam.

The PRG was supportive of further investigation and feasibility work to be undertaken with this option as a high priority. The PRG particularly recommended further research into new desalination technologies currently in use in countries such as Israel.

8.7.6 Recycled water non-potable

The PRG viewed this option as important in the short term, especially in relation to existing developments such as Kings Forest and Cobaki. The PRG recommends, in the short term, that Council considers the option of mediation/meetings with Leda regarding the possibility of implementing a residential recycled water scheme for the existing approved developments.

In the medium term, the PRG recommends that Council considers including recycled non-potable water schemes for greenfield developments (e.g. West Pottsville) and industrial developments, and also for sports fields.

HARC identified the environmental opportunity with this option, which would reduce the volume of wastewater discharge to the Tweed River, and Rous Creek in particular.[27]

The success of this option depends on the community and developers' willingness to buy-in to residential schemes.

8.7.7 Recycled water potable

The PRG noted the difficulties in implementing this option, particularly with communities. In addition, this option is currently against NSW State Government policy. However, in Queensland, the SEQ grid policy is to put recycled water into the Wivenhoe Dam if the level reduces to 50% capacity.

The PRG noted that the option is not rainfall dependent and recommends the following:

1. further research be undertaken into the technologies for recycled water
2. an education and information campaign be developed to address the community concerns in the short term with a view to medium/long term implementation of recycled potable water.

8.7.8 Stormwater Harvesting

Stormwater harvesting refers to the collection of runoffs from urban areas. These can range from building large-scale water tanks (often referred to as rainfall retention tanks), or precinct scale schemes which collect runoff from buildings, roads and public open space.

[27] HARC presentation to PRG

The challenge for stormwater reuse is to identify a scheme which is cost competitive with other sources of water. Most stormwater re-use schemes are based on the extraction of stormwater from natural storage basins for secondary uses such as irrigation. Such schemes can reduce water demand by supplying water to uses which would otherwise have been supplied by potable water.[28]

HARC[29] identified that stormwater harvesting is being considered as an experimental scheme for the Sydney Science Park development in Sydney's west. This greenfield development is located in an area which currently has insufficient supplies of drinking water for its development. The development is therefore proposing to purpose design its stormwater system to capture and treat stormwater to provide sufficient water to enable the development to proceed ahead of the government's development schedule.

The PRG identified schemes such as at Orange Council which has implemented a stormwater harvesting scheme. The PRG also raised the use of permeable footpaths as used by Lismore City Council, particularly around street trees, which could be implemented in the Tweed.

The PRG viewed stormwater harvesting as a medium-term option. The PRG recommended that Council explores technical aspects of stormwater harvesting – algae growth etc. considering options for implementation in cost effective and safe manner.

8.7.9 Managed aquifer recharge and coastal groundwater

This option was viewed as medium term by the PRG. HARC identified the best opportunities with this option as:

1. Stormwater reuse with aquifer recharge storage incorporated into a locally integrated water management scheme
2. Localised scheme in coastal sands aquifer may be viable (Kings Forest or similar development).[30]

The PRG raised a number of questions and recommends further research into this option. The information required would include:

1. are there dry aquifer options that can have water inserted?
2. is water quality an issue for aquifer storage?
3. what is the impact across the Northern Rivers from groundwater extraction for bottled water?
4. what would be the best location?
5. what would be the infrastructure required and costs involved?

The PRG expressed the view that it is critical to protect the supplies that currently exist and any water put back into the aquifers is not removed by groundwater extraction for bottled water. The PRG expressed concern at the environmental impact of removing groundwater for drinking purposes and felt that this option could be considered for crisis/drought management rather than a permanent/regular water source.

8.7.10 Underground pipe grid

The PRG considered the use of underground structural water storage systems as part of a pipeline grid to store water in agricultural and other areas.

28 HARC Report p58

29 Ibid p53

30 HARC presentation to PRG

Figure 7 Underground pipeline water storage system[31]

Such systems can be used for underground structural water storage for rainwater harvesting, stormwater retention and infiltration. They are ideally suited to carparks, roadways, sports fields and deep burial applications. Under carparks, roads or highways, such stormwater systems are fully trafficable once correctly installed.[32]

The PRG recommends further research to confirm the costs and volume of water that could be stored in particular geographic area as a supplement to other water supply options.

31 Cubic M3 sustainable engineering solutions - https://cubicm3.com.au/resources/stormtech/

32 Ibid

8.7.11 Groundwater alluvium

It was suggested by the PRG that water could be diverted/pumped into the Bray Park Weir. However, there would need to be further research regarding the quantity of water that is available and the environmental impacts of using alluvial sources of water.

8.7.12 Land Management Practices

The PRG was very supportive of applying best practice land management practices. The purpose of regenerative land management practices is to increase and retain the amount of water in the landscape and provide multiple benefits for river health, droughts, floods, biodiversity, and reduction of bushfire risk.

HARC identified the importance of landscape rehydration works and regenerative landscape management practices which captures rain in the soils where it falls.[33]

The effect on water supplies to the Tweed is likely to be positive in the long term, but by how much is not certain. Evaporation from land decreases, evaporation from dams decreases, runoff decreases, but groundwater may or may not increase and the net result may or may not be significant. Further local research and development is needed to quantify the benefits and costs.[34]

Rehydration and regenerative landscape management will be important to sustain the agricultural sector, restore the natural environment, and for cooling. Significant investment on properties is needed, and there are questions around how this would be financed.[35]

The results of future research and development and hydrological (surface water and groundwater) investigations should be included into a long-term urban water strategy.[36]

One PRG member expressed the view that whilst happy to recommend to Council: “lack of confidence that this option can have significant impact on water supply”.

8.7.13 Integrated water management with adaptive pathways

HARC recommend the adoption of an integrated approach to water management with adaptive pathways. This would include an integrated approach across the total water cycle as illustrated in the following figure 8.[37]
This would include planning to consider a range of possible scenarios with plans developed ready to adapt to these changes as and if they occur. [38]

The key is to measure the signals of change and know when to act and to be prepared, if necessary, to run pilot projects (such as groundwater, recycled water aquifer recharge). These could include locally integrated schemes embedded within a centralised system.[39]

[33] HARC presentation
[34] Ibid
[35] Ibid
[36] Ibid
[37] Ibid
[38] Ibid
[39] Ibid

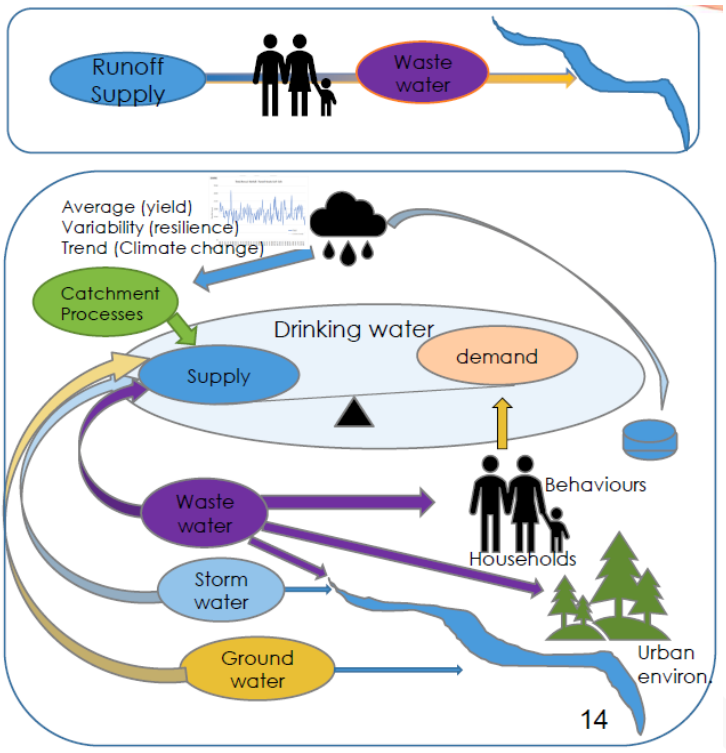

Figure 8 An integrated water management approach[40]

8.8 Overarching recommendation

REC 1. Integrated water management with adaptive pathways – Council adopts an integrated water management approach with adaptive pathways in the development of its future water strategies.

8.9 Recommendations re Water Supply Augmentation Options

REC 2. **Clarrie Hall Dam** – Council proceeds with the raising of the Clarrie Hall Dam; and continues the work on planning and land acquisition, in accordance with the existing project schedule for this work which is consistent with Council's resolution. Concurrently, Council further investigates other options as recommended in this report that may be able to diversify water supply, be less reliant on rainfall dependent sources, and improve the security and longevity of the yield.

REC 3. **Byrrill Creek Dam –** the option of a large or small dam at Byrrill Creek not be considered any further due to the reliance on rainfall, the inundation of areas of land which will not be useable in future for this highly significant environment, for either agriculture or available as natural environment, and the likely impact on productivity and wellbeing of the community as a result of this option.

[40] Ibid

REC 4. **Mini-link -** Council continues with the upgrade of the mini-link between the City of Gold Coast and Tweed Shire to provide some contingency supply in the event of a failure of the Tweed District Water supply.

REC 5. **Desalination –** as a priority, Council commissions investigation and feasibility into the options of accessing the desalination plant at Tugun or purchasing a desalination plant in its own name or in conjunction with other regional Councils.

REC 6. **Recycled water non-potable –** in the short-term, Council considers engaging with developers for existing developments such as Kings Forest and Cobaki regarding the possibility of implementing a residential recycled water scheme for the existing approved developments.

REC 7. **Managed aquifer recharge –** Council investigates the reuse of stormwater with aquifer recharge storage, to be incorporated into a locally integrated water management scheme.

REC 8. **Community water recycling schemes** - in addition, Council considers reviewing planning requirements to actively encourage the implementation of community recycled water schemes for future development applications.

REC 9. **Recycled water potable –** Council considers development and implementation of an appropriate education campaign to address the community concerns regarding recycled potable water in the short term, with a view to medium/long term implementation of recycled potable water.

Council considers approaching the NSW government regarding the possible easing of restrictions and associated legislation and policy on the use of recycled potable water.

REC 10. **Land management Practices –** Council considers detailed investigation, promotion and development of programs for landscape rehydration works and regenerative landscape management.

REC 11. **Commercial extraction for bottling water –** Council considers restricting the removal of groundwater for drinking purposes for crisis/drought management rather than a permanent/regular source for bottled water.

REC 12. **Groundwater alluvium and coastal sands aquifers –** Council considers further research regarding the quantity of water that is available and the environmental impacts of using alluvial and coastal sands aquifer sources of water.

REC 13. **Underground pipe grid –** Council considers further research to confirm the costs and volume of water that could be stored in particular geographic area as a supplement to other water supply options.

REC 14. **Long-term urban water strategy –** Council considers inclusion of the results of future research and development and hydrological (surface water and groundwater) investigations into a long-term urban water strategy.

9. Water Demand Management

9.1 Previous and current initiatives

Water efficiency has been a key component of Council's water supply activities since the late 1980s with actions ranging from policies aimed at reducing water losses and increases in water supply pricing to investment in leak detection, water main replacement, rebates and water recycling.[41]

In 2010, Council adopted a Demand Management Strategy that had been prepared by consultants MWH. Council then implemented a three-year Demand Management Implementation Plan in 2011.[42]

As at November 2020, the residential shower/tapware rebate was still running, resulting in estimated water savings of 15kL/household /year, equating to approximately 14.5ML/year.[43]

Council targeted the top 21 non-residential water customers with up to $5000 towards water saving projects and free water audits. This resulted in an estimated saving of 35ML/year.

The next 70 to 80 non-residential water customers were targeted with the same program which resulted in a saving of a further 13.5ML/year.[44]

The program included rebates for residential toilets which generated an estimated water saving of 48.7ML/year based on 30kl/year/household.[45]

Council also targeted its own top 20 users such as parks, nursery, pools, caravan parks, ovals, civic centres and treatment plants.[46]

41 Hydrosphere Consulting, Review of Tweed Demand Management Strategy, Final Report, 13 May 2020, pi.

42 Tweed Shire Council

43 Ibid

44 Ibid.

45 Ibid

46 Ibid

The following graph illustrates initiatives since 1991 and the impact on raw water extraction.

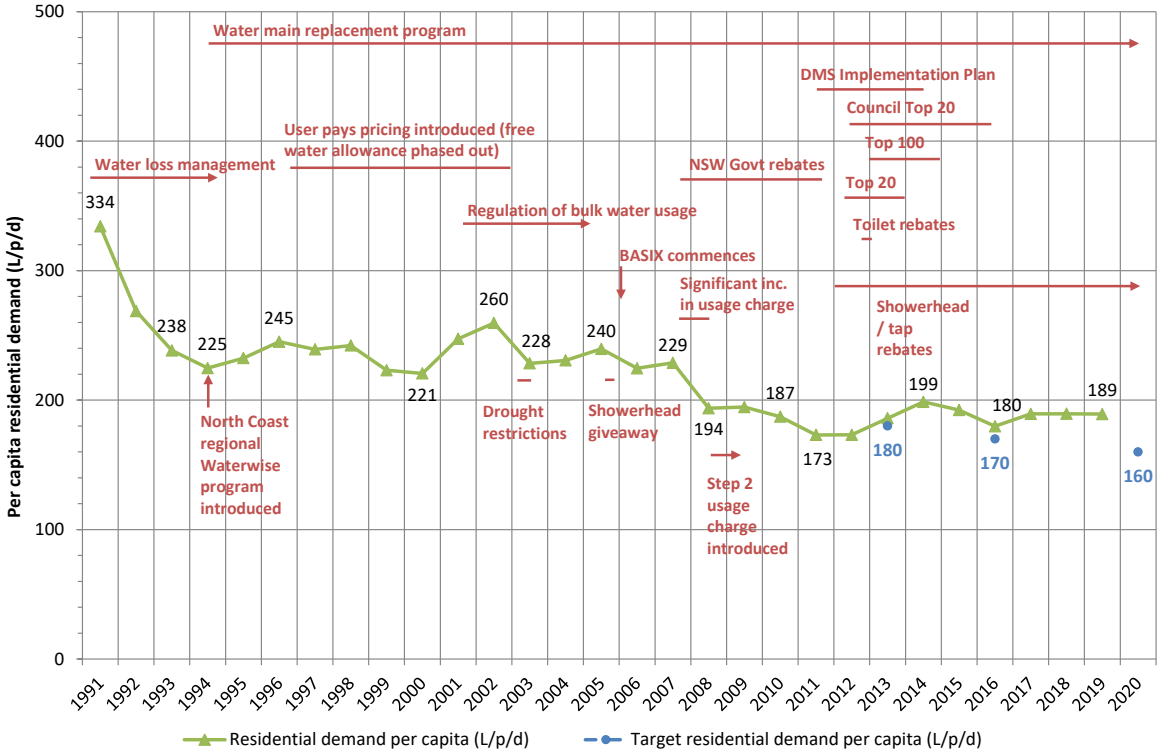

Figure 9 Impact on raw water extraction of water demand strategies (Source Tweed Shire Council)

The following graph illustrates the water extraction since 1991 compared with the growth in population.

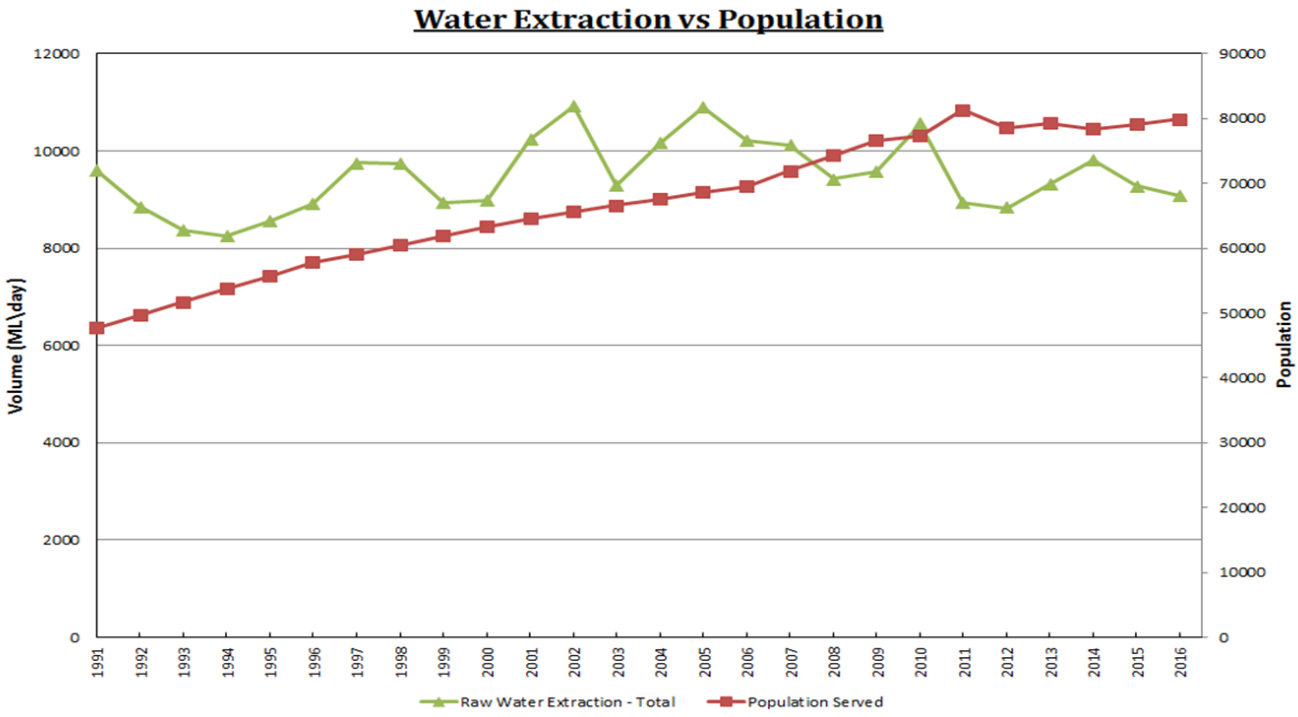

Figure 10 Water extraction vs population growth in the Tweed Shire.

As illustrated in Figure 2 on page 14, there has been a significant reduction in demand. In 2014 demand was 22% less than peak demand. It can also be seen from the graph that over time the demand reduction (from previously forecast demand) increases as the region becomes more water efficient.

9.2 PRG's assessment of water demand strategy options

The PRG researched, assessed and discussed a range of water demand management options and the relative impact of the various options in reducing water demand.

The result was a clear view of the scope of work for the demand management consultant and the options that the consultant was required to review and provide advice for the PRG.

9.3 Terms of reference for water demand options review

The purpose of the review was to assist the PRG in its review of the Tweed Shire Council Demand Management and Water Efficiency Strategy through the preparation and presentation of a report addressing:

- review of Councils' present situation
- identification of Best Practice
- identification of those measures or suites of measures that may be of advantage to Council, including technical, fit with Tweed context and incentive options.

In reviewing best practice options, the consultant was to undertake a literature search to determine Australian and international best practice in Demand Management and Water Efficiency.

The consultant was to consider and provide comment on the efficacy of the following to reduce demand on the Tweed District water supply.

- incentive programs including:
    - rewards programs;
    - rebates on fixtures and fittings (e.g. taps, toilets, rain water tanks (including larger tanks and health issues associated with use of tank water);
    - water audits and assistance to industry to reduce water consumption.
- intervention programs such as fixing of leaks in properties (Thames Water), and early identification of leaks.
- education programs including:
    - general education through the media/press (e.g. Water wise);
    - targeting of particular groups (including schools, business, commercial, caravan parks, high water users).
- pressure management;
- reuse including:
    - grey water reuse on site;
    - use of recycled water from waste water treatment plants (e.g. dual reticulation, open space irrigation, agricultural, industrial and commercial uses);
    - consideration of relevant legislation as it pertains to both grey water use and the use of recycled water.
- smart metering;
- pricing;
- use of bore water in lieu of potable water;
- storm water harvesting;
- rain water harvesting;
- water sensitive urban design;

- any other measures that may assist in managing demand of urban water supplies that could be applied to the Tweed.

The consultant was to review effective models and applicability to the Tweed Shire context, including social issues.

The consultant was to consider combinations of measures or suites of measures and staging of measures that may provide greatest efficacy of demand management.

9.4 Hydrosphere Consulting's assessment of previous and current strategies

As per the terms of reference, the PRG developed selection criteria and weightings for the appointment of a consultant. Following a tender process in accordance with Council's procurement policy, Hydrosphere Consulting was appointed on 18 December 2019.

The review considered and was structured as follows:

Part 1: Current Demand in Tweed Shire

Part 2: Past Demand Management in Tweed Shire

Part 3: Demand Management Practices in Other Jurisdictions

Part 4: Conclusions and Recommendations

Hydrosphere identified the following outcomes from previous and current strategies:

- Rebates have been cost effective for both Council and the customer due to the water savings resulting from substitution of inefficient fittings and fixtures with WELS-rated fittings and fixtures. The take-up of rebates has reduced over time which is considered to be due to the natural take-up of efficient fittings and fixtures through market trends and the NSW Government's Building Sustainability Index (BASIX).
- Pricing has had a significant influence on demand with pay-for-use tariffs and higher costs proven to effectively encourage water savings.
- Intervention programs such as non-residential Top Water User programs have required intensive engagement, significant staff resources and committed customers for these projects to be successful. However, these have been particularly cost-effective for the customers who were engaged and who were able to identify relevant projects.
- Recycled water schemes continue to be encouraged by Council, but the overall scheme benefits are reduced by increasing regulations and infrastructure costs. Opportunities are also limited by existing wastewater infrastructure, high rainfall limiting drivers for potable water substitution and limited large-scale residential development with the Shire.
- Water loss management actions have been restricted by a lack of human and financial resources, particularly in recent times.
- Council has implemented a detailed and effective customer support and engagement program through its website, rebates and customer interactions. However, these activities have been relatively passive with little promotion and direct engagement compared to other (usually larger) water utilities.

- State and federal government initiatives such as BASIX, rebates and WELS have also contributed to water savings in the Shire. [47]

9.5 Hydrosphere Consulting's demand management measures and recommendations

Hydrosphere identified four main focus areas for Council's future demand management program as follows:

1. **Collection and analysis of detailed demand data** - accurate identification of water demand in terms of customer sectors and uses, short and long-term climate influences and other drivers of demand and improved understanding of components of water losses.
2. **Water losses reduction** – Water losses are high in Tweed Shire. A targeted program of pressure management, active leak control, pipeline and asset management and leak repairs is recommended. This should be supported by improved data collection and analysis, digital integration and a shift from an asset-centric focus to a customer-centric focus.
3. **Implementation of digital technology** with a short-term focus on planning and developing systems and internal resources to achieve the many benefits of digitalisation such as reduced water losses, cost efficiencies due to task automation, improved service reliability and increased customer understanding and involvement across the full range of Council services over the longer term.
4. **Customer engagement programs** targeting key sectors, schools, older properties with inefficient fittings and fixtures, household leaks or high-water users supported by digital technology to increase customer involvement, understanding and ownership of water efficiency requirements.

Hydrosphere assessed a range of more detailed water demand management measures, as listed in Attachment 2.

9.6 PRG's recommended actions in response to Hydrosphere's recommendations

The PRG considered the identified water demand management strategies and responded as follows:

Table 6 Recommendations of the PRG re Water Demand Strategies

Component	Consultant recommended actions	PRG recommended actions
WATER LOSS MANAGEMENT		
Leak detection and repair	Implement a leak detection program.	Immediate – HIGHEST priority – no current leak detection program or water loss program. Some information exists. Recommend building on existing information to fast track development of leak detection/water loss program.
Undetected leak policy	Review undetected leak policy including monitoring expenditure and water savings.	Policy exists to determine if people eligible for refund of water costs when leak determined and fixed.
Pressure management	Review and implement improved pressure management systems.	Council have reviewed this and completed some implementation – consider further review and implementation by Council. Investigate water pressure at the meter and consider use of pressure

47 Hydrosphere report pi

Component	Consultant recommended actions	PRG recommended actions
		limiting valve at the meter – maintain minimum pressure but avoid over pressure.
Flow metering	Review and implement improved district metering.	Recommend additional budget and fast tracking of existing program
GENERAL		
Data collection and analysis	Improved data collection and analysis of all components of the water balance with improved systems to capture data.	Short term - High priority at both bulk water measurement and customer end. Long term strategy to have digital meters on every house but is there an interim option to have neighbourhood/suburb/street level digital meters? Implement trial/pilot within specific neighbourhoods/districts.
Customer engagement	Develop a program of customer engagement across all water operations with links to other demand management program measures.	Medium Term - Council needs to allocate funds to high priorities – this option is lower priority. Engagement can be issues based rather than broad spectrum – public forum etc. on needs basis. Is there a way to provide info to water users in rates notices etc. re. ways to save water and also examples of how much water has been saved by other houses with specific demand management strategies applied.
Performance tracking framework	Review and update the residential water use target program.	At present this is cumbersome as only read meters 3 mthly – digital metering would assist with more up to date measurements/data.
WATER SENSITIVE URBAN DESIGN		
Water sensitive urban design	Ongoing review of development controls including water cycle management approach in early land use planning stages.	Councils and planning departments work together to facilitate water sensitive urban design. Recommend investigation of options for WSUD, particularly large (precinct) scale systems in new developments.
Water efficient garden guidelines	Develop guidelines for water efficient gardens based on existing published information adapted for Tweed Shire.	Short term. Council currently have water efficient gardens. Could develop optional guidelines or advice re. water efficient/drought tolerant garden design. Consider program for giving out free mulch.
INCENTIVE PROGRAMS		
Hardship program	Develop hardship program (high priority).	Council does not currently have a hardship policy or a hardship program. Currently Council staff call customers when they identify

Component	Consultant recommended actions	PRG recommended actions
		leak/high water use. Many customers cannot afford to fix. Need assistance paying for. Short term option to develop and implement a hardship program.
Rebate program	Review rebate program including fixtures and fittings available, rebate value, costs, purchasing, administration, target customer sectors.	Good to consider after digital monitoring implemented so that can measure effectiveness. Hard to measure effectiveness of specific rebate program in the midst of a suite of initiatives. Consider any regional issues. Mid-long term – triggered rebate programs based on actual events/issues.
Residential rebates - showers	Continue rebate with rebate value increased (at least indexed with inflation).	Current rebate program – support ongoing program.
Residential rebates - toilets	Continue rebate with rebate value increased (at least indexed with inflation).	Conduct study re. water use at cistern valve with and without dual/restricted flush toilets – less water per flush but are more flushes required? Further research required re. cost/benefit. Short term research – medium/long for implementation if appropriate.
Residential rebates - tapware	Continue tapware rebate	Keep existing rebate program
Residential customer program	Target demand reduction for residential customers.	Longer term
Top non-residential users	Offer free audits for top non-residential water users that did not participate in previous program. Promote and subsidise rebates and leakage reduction measures.	Recommended
High residential users	Offer free audits for top residential water users.	Currently Council contacts high residential users to advise. Any residential customer using more than 1500l/day is contacted by letter and phone call. Maintain current program.
Reward programs	Develop a reward program for customers actively participating in the program.	Long term – possibly intermittent under triggered scenario.
Sponsorships and grants	Identify opportunities to support community organisations to reduce water consumption.	Council to consider applying for/accessing grants where available to support improved demand management strategies. Potentially facilitating sponsorship from private enterprise to support community organisations. Council currently has innovation grant fund – continue existing grant process.

Component	Consultant recommended actions	PRG recommended actions
Council facilities and operations	Monitor and review water consumption at Council facilities, maintenance and operations.	Support this for improved data, reduction in water use and for Council to showcase best practice demand management.
	Develop water saving measures for selected Council facilities.	Support
	Identify opportunities to showcase water saving measures by Council	Support
Top non-residential users	Offer free audits for top non-residential water users that did not participate in previous program.	Not recommended. Rural rebate issue etc. could be incorporated into Regional Water Strategy.
Residential rebates – rainwater tanks	Introduce rainwater tank rebate.	Not recommended. Rural rebate issue etc. could be incorporated into Regional Water Strategy.
Residential rebates – outdoor uses	Introduce a rebate for outdoor uses.	Not recommended
SMART METERING		
Develop program	Develop a staged smart metering implementation program.	Agree conceptually with implementation of smart metering and gathering of data to support initiatives. Support trial within neighbourhoods – pilot programs. Opt in/voluntary/data security/privacy considerations. Consider individual metering solutions for unit complexes – long term.
EDUCATION		
Education – schools	Develop school education program. Identify delivery partners.	Short term – higher priority for school-based education rather than general community education.
Permanent water conservation measures	Introduce voluntary permanent water conservation measures as level 0 in the drought restriction policy.	Some councils have basic water saving rules (e.g. No watering between 9am and 4pm, use nozzle on hose) – Council to consider incorporating these permanent water conservation measures. Drought friendly garden initiatives – keep going. Mulch giveaway program.
Education - general	Review and update education materials to promote water saving measures and demand management program components.	Education programs that are triggered by events/situations. Consider cost/benefit to any broad education campaigns. Develop education program with overall education strategy for education across various sectors (incorporate existing resources and drawing into one strategy). Link education resources to outcomes – e.g. Improved river health. Consider development of signs similar to bush fire threat signs – level of dam, average daily consumption, actual daily consumption.

Component	Consultant recommended actions	PRG recommended actions
	Review and implement cost-effective methods of information dissemination such as social media.	Council is member of Smart Approved Water Mark – gives access to large amounts of online material – cost is $5000 per annum – PRG support ongoing membership.
PRICING		
Water billing	Enhanced water bill format to include targets, comparative consumption and education information.	Support as a short-term measure to assist in educating people re. their water usage.
	Continue to adopt tariff structure in accordance with NSW Government best-practice requirements.	Support continued adoption of tariff structure in accordance with NSW government best-practice guidelines. Restricted to two level tariffs. Consider submissions by Council to government or North Coast Regional Water Strategy re. increased number of tariff levels. Review pricing in conjunction with water supply augmentation costs. Consider further pricing study to review inputs and options for pricing strategies and to include other factors such as environmental costs/impacts. Consider temporary pricing options for times of drought – as water restrictions implemented, water pricing increasing.
	Monthly billing when smart metering is available.	Do not support monthly water bills – unless there is an optional "opt-in" system for monthly instead of quarterly.
POTABLE WATER SUBSTITUTION		
Rainwater harvesting	Rainwater tanks promoted as a demand management measure.	Recommend investigation in the short term for rainwater harvesting options, particularly large (precinct) scale systems in new developments. Note – rainwater and stormwater harvesting have flood mitigation benefits as well.
Recycled water	Continue to investigate opportunities for recycled water use for greenfield developments, large users, open space irrigation and industrial uses where additional drivers (environment protection, community desire, development goals, limited potable supplies) increase attractiveness.	Recommend investigation in the short term for recycled water options, particularly large (precinct) scale systems in new developments.
Stormwater harvesting	Stormwater harvesting	Recommend investigation in the short term for stormwater harvesting options, particularly large (precinct) scale systems in new developments.

Component	Consultant recommended actions	PRG recommended actions
		Note – rainwater and stormwater harvesting have flood mitigation benefits as well. Develop and implement innovative rain and stormwater harvesting strategy.
Private bores	Private groundwater bores promoted as a demand management measure.	Do not support increased use of private bores.
Greywater reuse	Greywater reuse promoted as a demand management measure.	To progress any greywater options, Council would need to seek advice/approval from NSW Health. Technically illegal to re-use greywater on suburban blocks. Recommend Council investigates options to remove impediments to re-use of water.

One PRG member suggested the following:

- encouraging the use of swimming pool covers to reduce the amount of evaporation of water
- Council supplying jugs for people to measure water pressure on daily basis to assess for leaks
- investigating why the US, UK and Canada use less water flushing their toilets than is used in Australia.

9.7 PRG Recommendations re Water Demand Strategy Options

REC 15. **Water Demand Strategies** - Council considers the recommendations by the PRG as listed in Table 6 of the PRG Report, with a focus on the following high priority options:

- implementing enhanced leak detection and correction system and processes
- improving data collection as part of a shift towards digitisation of data collection with the introduction of smart metering
- enhance incentive programs as listed in Table 5, especially with the introduction of a hardship program for those who are disadvantaged.

10. Drought Management

10.1 Previous and current initiatives

In April 2009, consultants MWH prepared a drought management strategy which was adopted by Council in November 2009. The Strategy sets out the water restrictions that would be implemented in the event of a drought, plus triggers for each level of water restrictions, and targeted water savings at each level. [48]

The key elements were as follows:

- Water supplies generally designed to meet 5:10:20 Rule (note: the 5:10:10 rule came in later)
- The rule underpins the reasonableness of drought restrictions
- Restrictions are implemented no more than 5% of the time on average
- Restrictions are imposed no more than once every 10 years on average
- Demand reductions during drought restrictions should be 20%
- The change from 5/10/20 to 5/10/10 takes into account demand hardening.[49]

In late 2011, Council reviewed the strategy and although there were no changes to the triggers or target savings, there were significant changes to the wording of the restrictions and the revised restrictions were expanded with more activities and detail.[50]

In 2012 the restrictions triggers and targets were incorporated into a Council Policy *Drought Water Restrictions (Version 2.0),* which was adopted by Council on January 2013.[51]

In September 2014, the NSW Office of Water - North Coast local water utilities agreed to a consistent set of water restrictions for the North Coast. As a result, Council's Policy was amended with the changes relating mainly to the naming of Water Restriction Levels and residential watering. On 17 Aug 2017 the Drought Water Restrictions Policy v3.1 was adopted by Council.[52]

10.2 Drought management issues raised by the PRG

In 2019, the PRG considered: the recommendations of the original Drought Management Strategy by MWH, the then existing Drought Water Restrictions Policy, and considered the issues that may require the advice from an external consultant and appropriate actions to be taken.

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48 Tweed Shire Council

49 Ibid

50 Ibid

51 Ibid

52 Ibid

As a result of this work, it was decided that an external consultant would not be required to address these issues and that council officers would be able to respond to and address the issues raised as part of the review of the Drought Water Restrictions Policy.

10.3 Recent review of Drought Water Restrictions Policy

Following the experience of Drought Water Restriction implementation between December 2019 and March 2020, and the associated bushfires in the Tweed Region, and in response to actions identified by the PRG, Council embarked upon a review of the Drought Water Restrictions Policy.[53]

The revised Policy Version 4.0 is significantly different to the previous version 3.1 with the following key amendments:

- changes to restriction triggers and water use targets for the Tweed/Uki water supply, based on experience during the 2019-2020 restrictions
- inclusion of triggers and water use targets for the Tyalgum water supply
- statement relating to blue-green algae management and weed control during drought water restrictions
- statement relating to water used for fire-fighting during restrictions
- a full review of all water restrictions, based on experience during the 2019-2020 restrictions
- re-design of the restriction table to an easy to read and follow graphic summary, and
- plain English rewrite.[54]

The review was based on:

- Staff experience during the most recent water restrictions from late 2019 to early 2020
- Feedback about specific restrictions received from the public and Council staff
- water use trends monitored by Council during the restrictions and whether or not water use targets were achieved
- a plain English language check
- consultation with Council's Water and Wastewater Unit operations staff regarding restriction triggers for the Tyalgum water supply and algae/weed control.[55]

As well as the PRG, a number of internal Council stakeholders have been asked to review the draft revised Policy. A range of improvements to the Policy have been suggested, including:

- inclusion of a description of Council's permit system for mobile water using businesses
- many changes to wording
- clarification of algae and weed control measures.[56]

The changes suggested by the PRG will be collated with other feedback in order to prepare the final draft of the Policy for Council's endorsement followed by public exhibition for 28 days, as required.[57]

[53] Ibid
[54] Ibid
[55] Ibid
[56] Ibid
[57] Ibid

In October 2020, when a draft copy of the revised Drought Water Restrictions Policy was available, the PRG reviewed the action plan it developed from 2019 and in light of the revised policy, finalised its comments on drought management and the Policy.

This process was undertaken with the Council Officers who have been a part of the PRG process since its commencement. Table 7 lists the original actions proposed and the responses to the actions which are listed in red. The final column contains the PRG comments that were developed in October 2020.

Table 7 Drought Management Actions Table

Theme	Comments	Issues, Programs & Opportunities	Actions	Responsibility	PRG Comments
Triggers for water restrictions	Prepared in 2009 by MWH	They have not been tested – original strategy recommends restrictions with no detail. TSC has not had a drought since 2009 and has not had to put restrictions in place. One gap is that triggers and demand reduction targets need to be reviewed next time restrictions are implemented.	Triggers and demand reduction targets to be reviewed next time restrictions are implemented.	Can be addressed by Council. External consultant not required. The Drought Water Restrictions Policy has been extensively reviewed. Triggers and demand reduction targets have been revised in light of observed performance during 2019-2020 water restrictions. Revised Policy to be provided to PRG for comment.	Can increase in 5/10/10 rule be clarified in policy – e.g. 5/10/37.5 - "Telling people" - "Low value" water uses - Need to discuss permit system in policy - Trigger for focussed community education program re. drought – assistance for businesses – e.g. Free mulch - Education could also include easy to understand examples of water use volumes – shower, toilet flush, washing machine etc. - Could also include development of guidelines for range of business sectors re. ways to save water – for rolling out in event of water restrictions.
Tyalgum and Uki water supply systems	Individual triggers not included in Council Policy	Inconsistency in policy – not as straightforward. Gap in consideration of Tyalgum and Uki independent sub-	Consultant to investigate how the triggers work	Can be addressed by Council. External consultant not required.	

Theme	Comments	Issues, Programs & Opportunities	Actions	Responsibility	PRG Comments
		catchments. Each catchment has its own water treatment plant. TSC restrictions apply but what happens if there are specific restrictions required for each of these sub-catchments. The 5/10/10 rule would still apply but need to consider what can happen locally about triggering restrictions.	for Tyalgum and Uki water supply systems.	Revised Drought Water Restrictions Policy now includes triggers for the Tyalgum water supply. Triggers for the Uki water supply are the same as for the Tweed water supply.	
Bushfire	Tenterfield recently took water out of STP	Drought risk as well as bushfire risk – where do we take water in an emergency? In recent bushfire, water was taken from Clarrie Hall Dam.	Consideration for policy. Where is water taken from during a bushfire in drought conditions?	Can be addressed by Council. External consultant not required. Comment on water used for fire-fighting has been included in the revised Policy. RFS is required to seek Council approval for water extraction from CHD in the event of fire. A bushfire management plan will be developed for CHD.	Can recycled water from STP be used for fire-fighting? Recommend Council investigate use of recycled water for firefighting and dust suppression
Weir levels and flushing during drought		Droughts produce conditions for weed and algal issues. Not just a drought issue. Demand management plan is a risk assessment. Could be included in ancillary issues that need to be considered in light of drought and requirement to conserve water (e.g. mechanical options).	Has been superseded by the Drinking Water Strategy. Include words around how this is considered in the Drought Strategy. Step by step process for decision making on ancillary issues.	Can be addressed by Council. Add to Council's Drought Water Restrictions Policy. Comment re flushing for algae control has been added to the Policy.	
Other possible contingency measures		What is the contingency option? Technology is always improving. Desalination should be covered off in water augmentation tender. Being investigated in other consultancies.	Consultant will cover off on different technologies and best practice for desalination (existing	Broad review being undertaken by consultant already working on water supply augmentation options.	Recommend that Council continue investigation of drought water supply contingency options and when information available,

Theme	Comments	Issues, Programs & Opportunities	Actions	Responsibility	PRG Comments
			tender). Cross reference augmentation and drought management strategies.	No further work required at this stage. Investigation of contingency measures is continuing. Once a plan is determined, content can be added to the Policy.	include in Water Restrictions Policy (as addendum) with timeline for implementation. - Currently considering temporary desalination plant as a contingency – this could provide 10Ml/day plus the mini link of 10Ml/day, giving Tweed 20Ml/day as a contingency
Mixer of water at Bray Park Weir		To control stratification and hence, weeds and algae.	To be considered.	Council to investigate history and report back to PRG. Modelling of water quality at Bray Park Weir will be carried out as an extension of water quality modelling related to raising CHD.	In addition to a mixer, can we consider growing of shade trees around edges (regenerative landscape management practices)? Need modelling first to determine appropriate actions.
Worst case scenarios with climate change		Scenarios for 2046/2056.	Pushing the bounds of how these things are being considered in NSW.	Council to write to DPIE-Water and invite them to express a view. Council wrote to DPIE and the response was presented to the PRG. Council has already adopted best practice for climate change modelling.	Draft Regional Water Strategy including info re. this – to be reviewed by Council

10.4 PRG recommendations to Council re Drought Management

As is evident from the information in Table 7, Council Officers have had the opportunity to incorporate many of the matters raised by the PRG into the revised Drought Water Restrictions Policy. The key changes are as follows:

1. **Triggers for water restrictions -** Triggers and demand reduction targets have been revised in light of observed performance during 2019-2020 water restrictions. The revised Policy has been provided to PRG for comment.
2. **Tyalgum and Uki water supply systems –** the revised Drought Water restrictions Policy now includes triggers for the Tyalgum water supply. Triggers for the Uki water supply are the same as for the Tweed water supply.
3. **Bushfire -** Comment on water used for fire-fighting has been included in the revised Policy. RFS is required to seek Council approval for water extraction from CHD in the event of fire. A bushfire management plan will be developed for CHD.
4. **Weir levels and flushing during drought -** Comment re flushing for algae control has been added to the Policy.
5. **Other possible contingency measures -** investigation of contingency measures is continuing. Once a plan is determined, content can be added to the Policy.
6. **Worst case scenarios with climate change -** council wrote to DPIE and the response was presented to the PRG. Council has already adopted best practice for climate change modelling. The Draft Regional Water Strategy has included information regarding this issue and the content is to be reviewed by Council.

While some of the issues raised by the PRG have been addressed during the process, there are a number of outstanding recommendations for consideration by Council as follows:

REC 16. In light of the recent experience with drought conditions in the Tweed and application of drought water restrictions for the first time (under the current policy), and the projected impact of global warming, Council revises the text in the Policy to reflect the new triggers and water use targets (e.g. 5/10/37.5).

REC 17. Council considers triggers for focussed community and business water use education programs and campaigns when water restrictions are on the horizon.

REC 18. Council considers the use of recycled water for firefighting and dust suppression.

REC 19. Council considers a program for growing shade trees around the edges of the Dam and Weirs and applying regenerative landscape management practices.

11. CONCLUSION

The Tweed District has been fortunate to have had regular rainfall and minimal drought impacts over the years. However, with the changes to climate and the associated impacts on the region, it is timely for Council to undertake a comprehensive review of its approaches to water management.

Before the commencement of this review process, the drought restrictions policy had never been properly tested. However, following the drought conditions in late 2019 and early 2020, and the fires that threatened the nation and nationally significant environment, the value of water and the protection of the natural resources the need to ensure a secure yield of water supply for the Tweed Region is a high priority for the people of the Tweed. This review and its recommendations provide a way forward to Council to ensure a considered and pre-emptive approach to long term water quality and supply management.

The PRG wishes to thank the council officers, councillors and consultants for their support during the review process and commends the findings and recommendations of this report to Council for consideration.

Attachment 1 – Water Supply Augmentation – Options Assessment Criteria

Water Supply Augmentation – Options Assessment Criteria

Text in italics in the following table is taken wholly or significantly from the Bray Park Weir Tidal Protection Options Assessment Criteria.

Considerations are aspects or questions to be considered against each criterion

Additional Information is essentially explanatory notes about the criteria and to assist with utilisation of the criteria

Criteria	Considerations	Additional info
Best Practice	• Is the option supported as "best practice" by the literature search conducted by the consultant? • Does the option include or support use of innovative technologies such as monitoring of usage and leakage? • Is it proven technology or purely conceptual? • Have others had proven success with this option? • Can the success of the option be measured or validated e.g. as a reduction in demand or positive behaviour change?	Ensure that options considered are viewed through a lens of available technology, innovation and diversity, rather than simply being a repeat of existing options or "old school thinking". • Need to accept view of the consultants about Best Practice as members of the PRG may not have the background to know what is best practice.

Water Quality	• Does it improve or ensure drinking water quality standard? • Does it significantly reduce current drinking water quality? • Use of current suite of measures (used by TSC) for water quality – can these measures be applied to the new option? • Can water quality be regularly and repeatedly measured in a cost-effective manner to ensure ongoing water quality	• Will the option contribute to or improve water quality across TSC Water Supply continuum? • Can water quality be ensured with any new supply option considered • Water quality to be considered through the entire source, not just in the top layer • Algae, contaminants, salinity etc. • where water quality is mentioned, we assume we mean water quality based on currently accepted health standards *Individual and suitable combinations of options are to be assessed on their impact on water quality. In general, options are not to cause a reduction in water quality to a level below the current long-term average water quality. Where a reduction in quality may occur, that reduction and impact of the reduction are to be quantified.* Question – is Water Quality an assessment option on its own or should it be rolled into Environmental Impacts??
Sustainable / Secure Yield	• Does it help meet the secure yield pending "deadline" of 2026? • Does it help meet the secure yield in the longer term – i.e. Post the 2026 deadline – including factoring in the relevant population predictions? • Is the lead time for construction/implementation realistic? • Does it add to or ensure secure yield in drought conditions? • What is the level and ease of integration with existing infrastructure?	• Need to think both short term (meeting the 2026 deadline) and also long term and for a range of conditions – high rainfall years and times of drought • Need to diversify supply options so that we are drawing water from a range of sources, including innovative options, not just repeating existing options (e.g. a 2nd dam) *Individual and suitable combinations of options are to be assessed on their impact on secure yield. In general, options are not to cause a reduction in secure yield. Where a reduction in secure yield may occur, that reduction and the impact of that reduction are to be quantified. Where potential for increase in secure yield is evident, that increase and the impact of that increase should be quantified.*

	• Does the option contribute to a diversity of supply options?	
Environmental Impact / Benefit	• Does it promote/support the re-use of water? • What is the level of/impact on greenhouse gas emissions? • Does it support/promote improved environmental outcomes such as improved waterway health, fish passage and riparian restoration? • What is the impact on energy use? • What is the impact on environmental flows? • What is the impact on groundwater? • Does it support/promote improved wider environmental outcomes such as improved urban or rural landscape management through blue/green infrastructure or by enhancing groundwater reserves in the drinking water catchment through regenerative landscape management practices?	Include consideration of re-use of wastewater for planting/watering etc. If there is potential for reduction in water quality, particularly in the weir, we need to be clear on what the reduction is and how to mitigate.
Cost	• Net Present Value (NPV) • Equivalent Annualised Annuity calculations	• Consider costs and economic viability across a range of horizons (e.g. 30, 50, 100 years) *Individual and suitable combinations of options are to be assessed on capital cost, probable operational costs per year and Net Present Value so that options of*

	• Does it stack up from a longevity point of view, not just in the next 5-10 years	*different longevities can be compared. The options are also to be assessed using Equivalent Annualised Annuity calculations.*
Technology and Innovation	• Is the option based on the best technical and innovative information available? • Is best practice for greenfield design considered in the option where relevant? • Is it a resilient and proven technology? • Has it been successfully implemented elsewhere? • Will it pose a risk (see risk criteria for additional explanation in assessing this)?	Ensure that options considered are viewed through a lens of best practice technology, innovation and diversity, rather than simply being a repeat of existing options or "old school thinking".
Climate Change Resilience	• How is the option impacted by climate change predictions? • Is the option viable if climate change reality is worse than predicted? • Will sea level rise impact on the option being considered?	Climate change will impact groundwater sources as well.
Social Impact	• Does the option have a potential negative social impact and if so, can this be moderated or lessened? • What is the cost/benefit in terms of potential negative social impact compared to overall	The assessment is to include consideration of: • Costs associated for individual community members and/or businesses • *diminution or otherwise of property values* • *impact on farming and other practices within the impacted areas* • *impact on properties neighbouring the relevant area* • *property access* • *property damage/loss due to flooding or other relevant event* • *recreational activities, and*

	positive impact for secure water supply for Tweed Shire? • Would the community accept it? • Will it impact on present amenity e.g. lake turned into a water supply?	• *acceptability to stakeholders.*
Cultural Heritage	• Are there cultural heritage issues associated with it? • Is the option respectful of cultural heritage issues or does it have a potential negative impact? • Can the cultural heritage impact be managed?	In considering this issue, consider the need to liaise and consult with relevant Aboriginal communities/stakeholders, including the Tweed Byron Aboriginal Land Council.
Risk	Does the option result in increased risk across a range of areas and if so, can this increase risk be moderated? Consider areas such as: • Bushfire • Flood • Drought • Infrastructure disaster/crisis management plans • Political climate or political change • Human error • Systems error / complexity • Ease of operation • Ease of maintenance • Contamination	

Legislative Issues	Is the option legislatively possible/practical or would it require significant and unlikely legislative change?	

Attachment 2 – Hydrosphere Consulting's detailed demand management measures

Component	Action	Reasons	Priority
General			
Data collection and analysis	Improved data collection and analysis of all components of the water balance with improved systems to capture data.	• To more accurately identify components of the water balance. • To focus effort on customers and sectors with high consumption. • To support other demand management measures. • To identify consumption patterns and drivers and develop targeted demand management programs.	Focus area
Customer engagement	Develop a program of customer engagement across all water operations with links to other demand management program measures.	• To improve the success of other demand management measures. • To increase water literacy. • To encourage water efficient behaviour	Focus area
Performance tracking framework	Review and update the residential water use target program.	• Targets provide a measurable comparison of household consumption and improve understanding of customer consumption. • Supports other demand management measures.	Ongoing
	Total water demand target.	• Some overlap with other performance targets.	Not recommended
	Non-revenue water target Total water loss target	• Water losses are high. • Supports water loss management program.	Ongoing
	Annual reporting against key performance indicators for demand management measures.	• Facilitates tracking of progress and success of measures.	Ongoing

Component	Action	Reasons	Priority
Incentive Programs			
Rebate program	Review rebate program including fixtures and fittings available, rebate value, costs, purchasing, administration, target customer sectors.	• Supports the community to reduce consumption. • Cost-effective for Council and the customer.	Short-term
Hardship program	Develop hardship program.	• Supports the customers that cannot afford to reduce consumption. • Cost-effective for Council and the customer.	Short-term
Residential customer program	Target demand reduction for residential customers.	• The residential sector is the largest customer group in Tweed Shire with approximately 72% of total consumption.	Short-term
Residential rebates - showers	Continue rebate with rebate value increased (at least indexed with inflation).	• Cost-effective for Council. • Encourages water efficient behaviour. • Maintain attractiveness of rebate to improve uptake.	Short-term
Residential rebates - toilets		• Cost-effective for Council and the customer.	Short-term
Residential rebates - tapware	Continue tapware rebate	• Not cost-effective for Council. • Natural market trends for efficient fixtures and fittings.	Not recommended
Residential rebates – rainwater tanks	Introduce rainwater tank rebate.	• Not cost-effective for Council or the customer. • Addressed through BASIX for new developments.	Not recommended
Residential rebates – outdoor uses	Introduce a rebate for outdoor uses.	• Expand program to target discretionary uses. • Cost-effective for Council and the customer.	Short-term
Top non-residential users	Offer free audits for top non-residential water users that did not participate in previous program.	• Targets highest water users to increase water savings.	Long-term
	Promote and subsidise rebates and leakage reduction measures.		Long-term
High residential users	Offer free audits for top residential water users.	• Targets highest water users to increase water savings.	Short-term

Component	Action	Reasons	Priority
	Promote and subsidise rebates and leakage reduction measures.		Short-term
Reward programs	Develop a reward program for customers actively participating in the program.	• Encourage participation and increase water savings.	Long-term
Sponsorships and grants	Identify opportunities to support community organisations to reduce water consumption.	• Encourage participation and increase water savings.	Long-term
Council facilities and operations	Monitor and review water consumption at Council facilities, maintenance and operations.	• Quantify uses of water. • Identify unavoidable losses. • Identify potential water saving projects. • Lead by example.	Short-term
	Develop water saving measures for selected Council facilities.		Short-term
	Identify opportunities to showcase water saving measures by Council		Short-term
	Review Council policies for consistency with demand management program measures.	• Ensure consistency with adopted demand management program.	Long-term

Component	Action	Reasons	Priority
Smart metering			
Develop program	Develop a staged smart metering implementation program.	• Many benefits of digitalisation for Council and its customers. • Evolving technologies. • High costs. • Change in business philosophy required. • Human resource and training requirements.	Focus area
Identify options	Review program objectives and scope, technologies/suppliers for infrastructure, software and devices.		Short-term
Business case	Develop a business case for investment in infrastructure including extension of the program to other operational requirements, funding and subsidy model		Short-term
Preferred option	Identify preferred technology/supplier		Medium-term (if positive business case)
Implementation	Roll-out of preferred technology		Long-term (if positive business case)
Water loss management			
Data collection	Quantify components of water losses through improved metering and data analysis.	• To identify components of water losses and develop targeted water loss management programs.	Focus area
Program development	Develop a staged water loss management program.	• Water losses are high. • Minimal effort in water loss reduction to date.	Focus area
Pressure management	Review and implement improved pressure management systems.	• Reduce leakage. • Reduce main breaks.	Short-term
Asset management	Water main renewal program.	• Reduce leakage. • Reduce main breaks.	Ongoing
Flow metering	Review and implement improved district metering.	• Accurate flow monitoring. • Early identification of leaks.	Short-term
Leak detection and repair	Implement a leak detection program.	• Reduce water wastage.	Short-term

Component	Action	Reasons	Priority
Customer meter replacement	Continue to replace old or faulty meters.	• Improve accuracy of meter reading.	Ongoing
	Upgrade meter fleet to smart meters when available.	• Improved identification of leaks. • Improved understanding of consumption.	Long-term
Undetected leak policy	Review undetected leak policy including monitoring expenditure and water savings.	• Encourages property owners to repair leaks. • Monitor effectiveness of expenditure.	Ongoing
Education			
Permanent water conservation measures	Introduce voluntary permanent water conservation measures as level 0 in the drought restriction policy.	• Promotes sensible water use. • Links with drought restriction policy. • Supports other program measures.	Short-term
Education - general	Review and update education materials to promote water saving measures and demand management program components.	• Supports other program measures. • Increases water literacy.	Ongoing
	Review and implement cost-effective methods of information dissemination such as social media.		Short-term
Education – schools	Develop school education program. Identify delivery partners.	• Educate customers of the future.	Medium-term
Pricing			
Water billing	Enhanced water bill format to include targets, comparative consumption and education information.	• Supports other program measures. • Increases water literacy.	Medium-term
	Continue to adopt tariff structure in accordance with NSW Government best-practice requirements.	• User-pays pricing. • Full cost recovery.	Ongoing
	Monthly billing when smart metering is available.	• Supports other program measures. • Increases water literacy.	Long-term

Component	Action	Reasons	Priority
Potable water substitution			
Rainwater harvesting	Rainwater tanks promoted as a demand management measure.	• Rainwater tanks for new development are required through BASIX. • High cost to Council and the customer. • High energy requirements. • Space limitations. • Climate dependent.	Not recommended
Recycled water	Continue to investigate opportunities for recycled water use for greenfield developments, large users, open space irrigation and industrial uses where additional drivers (environment protection, community desire, development goals, limited potable supplies) increase attractiveness.	• TSC policy on providing financial assistance. • Growing community acceptance for recycled water use.	Ongoing
Stormwater harvesting	Stormwater harvesting	• Not beneficial due to the large amount of rainfall, large land area required for storage and infrastructure costs.	Not recommended
Private bores	Private groundwater bores promoted as a demand management measure.	• Regulated by NSW Government. • Licensing requirements. • Limited application as a potable substitution measure.	Not recommended
Greywater reuse	Greywater reuse promoted as a demand management measure.	• Health risks. • Stringent approval requirements. • Significant Council resources required for regulation.	Not recommended
Water sensitive urban design			
Water sensitive urban design	Ongoing review of development controls including water cycle management approach in early land use planning stages.	• Not part of the water supply demand management program. • Recommended for further consideration as part of Council's strategic planning.	-

Component	Action	Reasons	Priority
Water efficient garden guidelines	Develop guidelines for water efficient gardens based on existing published information adapted for Tweed Shire.	• Targets discretionary uses.	Medium-term

TWEED SHIRE COUNCIL
SUBMISSION ON DRAFT FAR NORTH COAST REGIONAL WATER STRATEGY
December 2020

Introduction

Tweed Shire Council commends the NSW State Government in preparing the draft Far North Coast Regional Water Strategy to provide guidance for water authorities in planning for the future while reflecting the competition for the resource and challenges such as climate change. Council believes that resource planning should match predicted strategic growth for the Shire, therefore giving a direct strategic link between planned population growth and necessary water infrastructure.

In 2018 Council established a Project Reference Group (PRG) to review Council's water strategies. When the review is complete and the PRG has provided Council with its report (in February 2021) Council would like to submit that report and Council's response to that report to DPIE for consideration in the development of the Far North Coast Regional Water Strategy.

The draft Far North Coast Regional Water Strategy is a comprehensive background document inclusive of all aspects of the water cycle. The culmination of the document is the numerous options which now require further investigation to determine their viability or otherwise.

In respect to the specific questions asked in the Regional Water Strategies Public Exhibition Submission Questionnaire Council offers the following response. Please note that it is not Council's intention to complete the submission form but to provide overarching guidance through this written report and a further report in February 2021 following Council's consideration of its PRG recommendations.

Do you support this vision for the Far North Coast Regional Water Strategy?

Council supports the vision of having a long term water strategy that addresses and balances the objectives of:

- Delivering and managing water for local communities, with the proviso that it remains the local water authorities' responsibility to develop and implement strategies within the context of the Regional Water Strategy Far North Coast. Further, it needs to be recognised that where state government objectives are given, support needs to be provided to local water authorities to achieve those objectives.
- Enable economic prosperity. Council agrees with this objective but in addressing this objective the long term water strategy should prioritise those industries that provide economic prosperity that have the least impact on the water cycle and or the impact on the water cycle should be considered.
- Recognise and protect aboriginal water rights. Council fully agrees with this objective.

- Protect and enhance the environment. Council fully agrees with this objective but conflict between objectives such as “Protect and enhance the environment” and “Enable economic prosperity” can occur. The strategy should include guidance on how such conflict can be resolved.
- Affordability. As stated above it needs to be recognised that where state government objectives are given, or the objectives of the Strategy are to be achieved, support needs to be provided to local water authorities to achieve those objectives.

Do you have any comments about the information used in the development of this strategy?

Council agrees with the use of both the 130 years of record and the paleoclimate data. It is recognised that the existing 130 years of data may not be appropriate for use in determining future water availability but it is understood work undertaken by CSIRO for the then Office of Water modified that data to reflect a scenario of one degree warming. It may be useful to compare that data to both the paleoclimate data and the 10,000 year data set to understand how the recent (100 years) climate sits within the longer data sets. Is the 130 year data set reflective of wet, dry or average years?

Council wishes to make DPIE aware of studies being undertaken on the Tweed River which include water quality modelling for the mid and lower Tweed being undertaken by OEH and water quality modelling of Clarrie Hall Dam and modelling from the confluence of Doon Doon Creek and the Tweed to Bray Park weir. It is anticipated that Council will undertake further water quality modelling of Bray Park Weir. These models would be available to DPIE on request.

In respect to sea level rise and the impact on the Tweed District Water supply studies have been undertaken by WRL. The outcomes of those studies are reasonably consistent with comments made in the FNC Regional Water Strategy under Snapshot.

Further, as part of work undertaken by Council through its PRG, two reports, one on water augmentation options and the other on demand management are available and need to be considered in the finalisation of the FNC Regional Water Strategy.

Stochastic modelling method

Council agrees that the stochastic modelling to develop a data set for 10,000 years is appropriate. It is not stated in the draft Strategy as to whether this dataset has been adjusted for climate change. If it has not been adjusted then it is recommended it be adjusted.

As discussed above, the dataset is only one of a number of data sets that can be used in the determination of the available resource. In developing the strategy the three data sets available should be used to estimate the available resource so that the estimates can be compared and risks identified.

It is stated in the draft FNC Regional Water Strategy that augmentation plans for the Tweed will provide only another 15-20 years of secure supply. Based on modelling of secure yield and demand undertaken for Council the presently proposed water supply augmentation for the Tweed will provide a secure water supply until at least 2046 for all planned growth in the Shire. If DPIE have information or modelling to show that "*augmentation plans for the Tweed will provide only another 15-20 years of secure supply*" Council would appreciate details of that information as it will have a significant impact on Council's planning. Nonetheless Council welcomes the draft FNC Regional Water Strategy confirming our analysis that the risk of supply shortfalls will increase in the future.

In respect to the stochastic modelling and the data set developed from that and the data sets generated to reflect climate change Council would appreciate those data sets being made available to Council so that Council can undertake the estimation of the secure yield of its water supply using the most current data and for periods beyond 2030.

Opportunities and challenges for water management in the Far North Coast region.

Council agrees with the opportunities and challenges outlined within the Draft Strategy and Submission Questionnaire. Further, as stated above there may be conflict between objectives such as "Protect and enhance the environment" and "Enable economic prosperity". The strategy should include guidance on how such conflict can be resolved.

The strategy should also provide a framework to determine the hierarchy of water uses and the matching of water use to the most appropriate available resource. The strategy provides no guidance on this matter.

The challenges of affordability, restrictive legislation and community perceptions of some options are not referred to in the Submission Questionnaire. These are three of the main challenges facing local water utilities in fulfilling their role in the management of the water resource.

Draft Far North Coast Regional Water Strategy options

At this time Council has not been able to fully investigate and determine its position on all the options listed but it should be noted that on 10 December 2014 Council resolved in part that:

> *Based on the information currently available, Council adopts the raising of the wall of the Clarrie Hall Dam as the preferred option for future water security and proceeds with the planning approval and land acquisitions phase for the project.*

It should also be noted that on 18 October 2011 Council rescinded its resolution to:

Adopt[s] Byrrill Creek Dam as the preferred option for augmenting the Tweed District Water Supply.

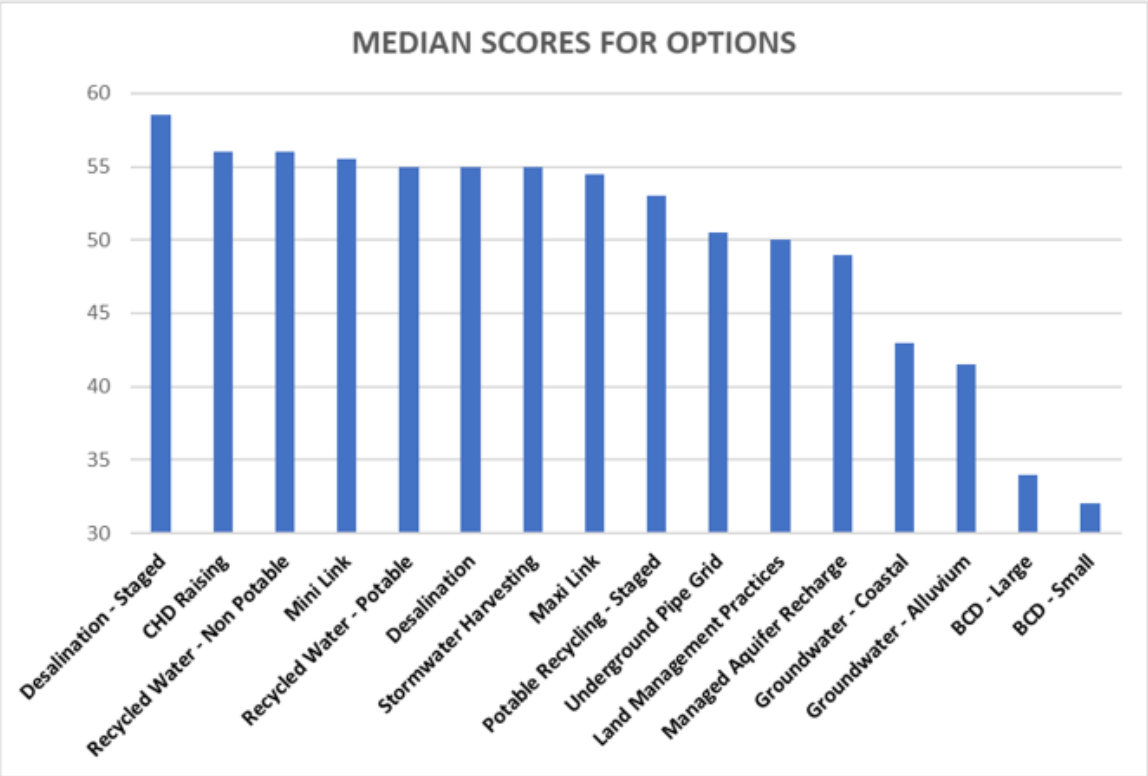
and on 15 May 2012 resolved that:

Council places a moratorium on any dam proposal at Byrrill Creek for a period of the next twenty (20) years, effective from 15 May 2012

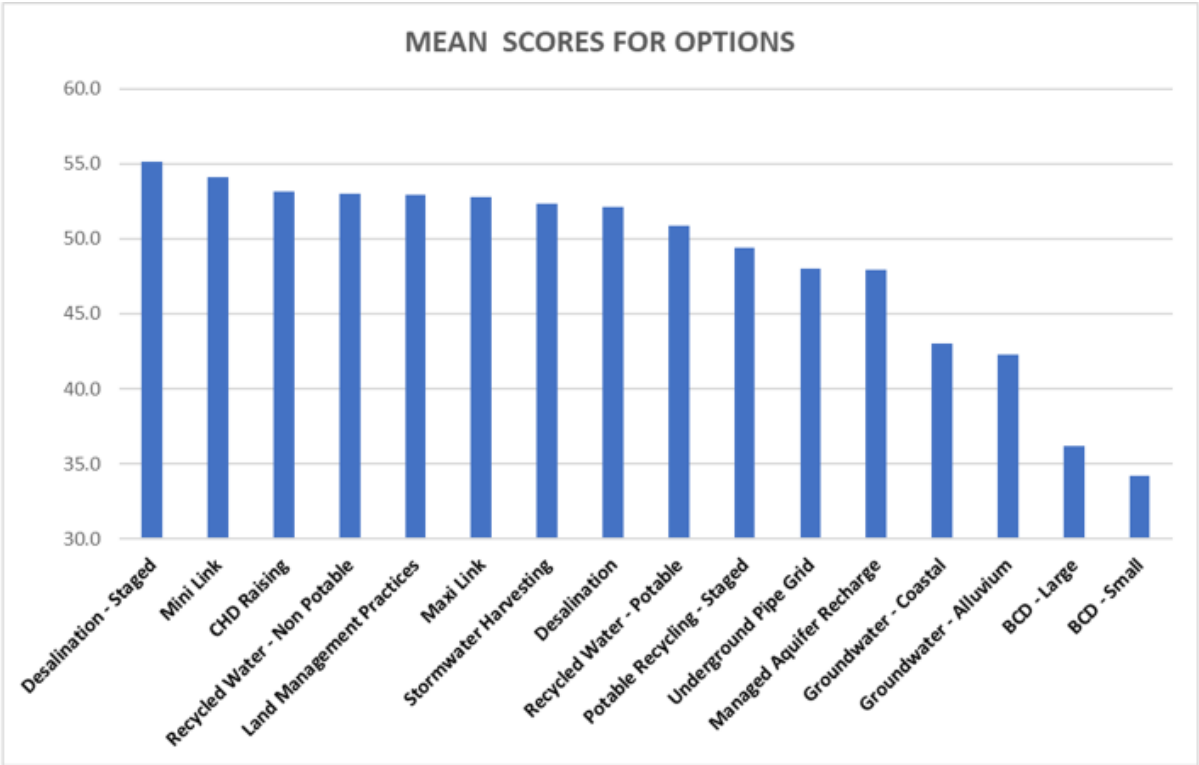
And on 18 June 2020 resolved:

Council maintains its long standing and scientific based opposition to the building of a dam at Byrrill Creek.

More recently the Water Strategies Review PRG established by Council in 2018 has determined its preferred options for the augmentation of water supply in the Tweed. Please note that this information is yet to be formalised and submitted to Council for consideration. The median score for options assessed is set out in the table below.



The mean score for options is set out in the table below



The PRG is also proposing to recommend that the “conversation” on potable reuse commence in the short term to facilitate pragmatic discussion on this option in the future.

Noting the above it is Council’s view that the options presented in the draft strategy are comprehensive and appropriate. However before any decisions are made in regards to setting priorities or discarding options, appropriate investigations and consultation needs to be undertaken to ensure informed decisions are made. To that end Council is unsure of the “rigorous assessment process” referenced in the questionnaire which will see some options removed from the final strategy. Further Council notes that the request to rank options in the questionnaire would appear to be premature given that there is little information available to make informed assessments of the options.

Option Combinations

In the consideration of the combination of options, thought should be given to the diversification of water sources. Stream flow, dam and to a lesser extent ground water are all rainfall dependant. Where options including stream flow, dams and ground water, are combined the combinations should include non-rainfall dependant options such as desalination, aquifer or alluvium recharge and or reuse. The diversification of options will give the greatest water security.

Other Comments

It is noted that the present Water Sharing Plan (WSP) for the Tweed expires in July 2021. The Natural Resources Commission is presently undertaking a review of the plan with the objective of making a recommendation to the Minister on whether the Plan should be replaced, amended or extended. As the WSP deals with the allocation of the water resource, it is considered appropriate that the WSP be extended until such time as the FNC Regional Water Strategy is approved. The WSP can then be developed based on the best science, consistent with the FNC Regional Water Strategy and implemented with certainty.

Tweed Shire Council has engaged a Project Reference Group to undertake a review of Council's primary water strategies of Demand Management, Water Augmentation and Drought Management. The PRG's report will be considered by Council in February 2021. The Report should provide significant guidance on community attitudes in the Tweed to water. The PRG will make specific recommendations on options such as Byrrill Creek Dam and its deliberations should be considered in the finalisation of the FNC Regional Water Strategy.

Conclusion

Tweed Shire Council commends the NSW State Government for preparing the draft Far North Coast Regional Water Strategy.

Council would like the DPIE to consider the PRG's report and Council's consideration of that report in February 2021 in the further development of the Far North Coast Regional Water Strategy.