Carnarvon Ministerial Advisory Committee

Final Report to the Minister for Water and the Minister for Agriculture and Food

29 May 2015

EXECUTIVE SUMMARY

The Carnarvon Ministerial Advisory Committee (CMAC) was established in October 2013 by the Minister for Water, and the Minister for Agriculture and Food. CMAC Terms of Reference and membership are provided at Appendix 1. CMAC's initial role was to provide Government with advice to alleviate the extended conditions of no river flow and the reduced access to water in the high demand period of the year (October to January) that prevailed in the Lower Gascoyne. Some minor river flows in early 2014, additional small responses to water access, plus fortuitous additional water from bores that were part of the planned Gascoyne Food Bowl Project (GFBI project) expansion, enabled irrigation to continue in the 2013/14 and 2014/15 summers with limited interruption.

In February 2015, a major river flow occurred that recharged the aquifers and allowed full access to water entitlements for growers and service providers.

In September 2014, CMAC advised that with the implementation of the proposed GFBI project and expansion of the horticulture industry in Carnarvon and the probability of low flow/drought conditions again at some time in the future, it was appropriate to undertake additional strategic planning to provide suitable infrastructure, enhanced management and operation of the irrigation systems and to review pricing for the horticulture industry. CMAC was charged with providing advice to Government to aid in the "*resolution of key issues to progress the Carnarvon agricultural sector over the next five years*".

CMAC is now in a position to provide Government with the results of the additional investigations undertaken to address these issues as well as to provide advice and recommendations on steps to be taken to underpin a vigorous and sustainable horticulture industry in the Carnarvon area for the future.

EXISTING POLICY FRAMEWORK

CMAC has summarised the existing policy, legislation and procedures for agriculture (including the GFBI project), water resource management, regional development planning, the background on various subsidies, and the establishment of the water Cooperatives for the operation and management of the irrigation system of the Lower Gascoyne (the Gascoyne Water Asset Mutual Cooperative [GWAMCO] and Gascoyne Water Cooperative [GWC]).

Specific matters for consideration for future policy development include:

- articulation of Government position and conditions for provision of support to facilitate the transition of Cooperatives to be more self-sufficient;
- maximising the use of available water trading;
- allocation of GFBI project water from the extended northern borefield with release of the proposed 400 hectares (ha) of new land;
- the processes to be put in place to allow temporary access to GFBI project water by existing growers while land sales of the GFBI project expansion occur;
- proposed revision of Western Australia's water legislation, particularly with regard to the linking of land with water allocations; and
- pricing of water for full cost recovery or appropriate subsidisation of capital expenditure or ongoing operating subsidies.

ENGINEERING AND INFRASTRUCTURE

CMAC has previously advised Government that the existing irrigation distribution infrastructure owned and operated by the Cooperatives requires further upgrade. In particular: flow regulation; re-installation of air bleed valves; installation of section valves; and reviving the Supervisory Control And Data Acquisition (SCADA) control system is required. In addition CMAC recommended additional on-farm storage.

All are considered important and will form part of the planned upgrade and refurbishment of the irrigation distribution system proposed by the Cooperatives. Their implementation will be guided by the understanding of the Level of Service that will be provided to growers and which will be part of the Cooperatives' service level agreements. Importantly, completion of these works will be a key element of the performance criteria to be established between the Cooperatives and Government.

CMAC has recommended that for compatibility and operation of the expanded northern borefield and the existing southern borefield, the infrastructure configuration of the expanded northern borefield is developed in accordance with the most cost effective option. This is Option 1 of the GHD engineering report (Appendix 5a) and is the preferred engineering configuration for the scheme. These details are represented in the schematic diagram in Map 2 of the CMAC Final Report. Specifically this includes:

- expansion of existing Cooperatives' borefields (from nine to 12 bores) to provide capacity to increase flows to a maximum of 183 L/s and extract up to 3.6 gigalitres per year (GL/yr);
- completion of GFBI project northern borefield developed to provide a system capable of delivering a maximum instantaneous flow of 400 L/s and extract up to 4 GL/yr (from an estimated 44 bores);
- instrumentation, integration and operation of all of the borefields with remote control of borepumps with SCADA to maintain a head of 19 m at the connection with the Cooperatives' distribution line;
- GFBI borefield collector main (pipeline) connected to GWC distribution pipeline with no additional storage in the supply system;
- the integrated system will be able to provide a maximum instantaneous flow of 907 L/s at a peaking factor of 2.3. This will alleviate most but not all of the peak demand requirements; and
- Progressive replacement of the southern borefield collector main according to Water Corporation plans.

CMAC RESPONSE TO ENGINEERING AND INFRASTRUCTURE

A timetable for capital upgrades and proposed changes to infrastructure is required. This cannot be finalised until the following matters are determined:

- the Level of Service to be provided by the Cooperatives to growers;
- the final design of the GFBI project expansion in the northern borefield, which will be based on the position of proposed bores, potential yields and hydraulic operating assessment;
- budget estimates for completion of GFBI project. Currently these are lower than estimates obtained by CMAC. Any differences, especially shortfalls that may require additional funding will be managed by DAFWA;
- a strategy for asset transfer is established including development of transfer agreements and conditions that ensure the final infrastructure is operated as an integrated system; and
- confirmation of Cooperatives' contribution to finance connections to the GFBI project pipeline.

TABLE 1: INDICATIVE COSTS FOR THESE DEVELOPMENTS

ITEM	ESTIMATE CAPITAL COST	SOURCE	Responsibility
GWC – Existing distribution system			
Replace / install flow control valves to all growers	$12 K	GHD	Cooperatives
Grower tanks and own supply system upgrades.		-	Growers
Section valves and air bleed valves		-	Cooperatives
GWC – Northern borefield upgrade			
Drill and test 2015 infill bores in existing GWC northern borefield	$1 451 K	GHD	GFBI project & Cooperatives
Install pumps for 2015 infill bores (equip and connect 7 bores)	$318 K	GHD	Cooperatives
Connect GWC infill bores to system (bore collector main)	$103 K	GHD	Cooperatives
SCADA to GWC bores	$147 K	GHD	Cooperatives
Gascoyne Food Bowl Initiative			
Drilling and testing of new GFBI project Bores	$5 500K	GFBI project budget	GFBI project – DAFWA
Electrification of northern borefield	$8 000 K	GFBI project budget	GFBI project – DAFWA
Extend northern borefield pipeline to approx. 27 km	$20 628 K	GHD	GFBI project – DAFWA
Install pumps and connect new GFBI project bores to 27 km	$2 826 K	GHD	Cooperatives
SCADA for new GFBI project borefield	$849 K	GHD	Cooperatives
Distribution systems to new land areas	$1 381 K	GHD	GFBI project – DAFWA
New land release costs	$1 000 K	GFBI project budget	GFBI project – Department of Lands
Water Corporation Infrastructure			
Separate Town supply from irrigation supply and install dedicated town supply pipeline if required	$6 300 K	GHD	Water Corporation
Replacement of Water Corporation southern borefield pipeline	$25 700 K	GHD	Water Corporation

BULK IRRIGATION WATER SUPPLY - GOVERNANCE AND MANAGEMENT OF SYSTEM

CMAC, with full support of the Cooperatives, has established two important principles for the operation and management of the irrigation system, these being:

Equitable supply

CMAC canvassed the principle and understanding of '**equity of supply'** widely in the Carnarvon community including with peak bodies, water service providers and growers.

Equity of supply means:

> *"Cooperative members are entitled to equitable flow, where equitable means access to the available peak production capacity at a rate of flow proportional to their Gascoyne Water Cooperative share allocations, and subject to an agreed minimum flow rate being available to all members."*

This definition relates only to GWC shares delivered via the irrigation distribution pipeline, and not to water obtained via self-supply entitlements through Subarea A.

The service agreement between the Cooperatives and the growers is currently being developed to ensure this objective can be achieved. It will consider matters such as access to C Class share allocations, growers' peak flow requirements and requirements for self-management and on-farm storage.

Single Bulk Supplier

In its Medium Term Review in June 2014 (Appendix 2), CMAC recommended that the preferred option for the management of the northern and southern borefields of the Lower Gascoyne region is to have a single bulk supplier of water for the irrigation system. The single bulk supplier could be either GWAMCO/GWC or the Water Corporation. It was considered that a single bulk supplier (aggregation of existing borefields under one management system) should achieve efficiencies through a common operating and planning framework that maximises automation and achieves economies of scale. CMAC further recommended that the costs and management requirements for each of these be compared with the status quo (current situation) with the Water Corporation managing the southern borefield and Cooperatives managing the northern borefield (including GFBI project borefield). For each of these options:

- the GWC would still manage the distribution supply pipeline to growers;
- the Water Corporation would manage the town water supply scheme; and
- growers would self-supply from Subarea A.

GOVERNANCE AND DUE DILIGENCE OF COOPERATIVES

A review of current Cooperatives' skills, capacity and governance by independent consultants with specific regard to their ability (capacity and skill) to manage and operate the bulk supply system of both the southern borefield and northern borefield was undertaken.

The main recommendation of the review was:

1. **Given the deficiencies identified, an immediate takeover and the associated increased responsibilities for the Cooperatives is not recommended.**

The review then considered whether the Cooperatives could develop the necessary skills and capacity and provided a second recommendation:

2. **Delayed and conditional transfer of all irrigation supply assets, including the southern borefield and developing Gascoyne Food Bowl Initiative supplies could be considered**.

The review provided the following caution to this recommendation:

> *Under no circumstances should the takeover of all assets be allowed unless there is confidence in the long-term financial and operational success of the new scheme management*

CMAC RESPONSE TO BULK IRRIGATION WATER AND GOVERNANCE

CMAC endorses the concept of Equity of Supply and regards it as an important principle in ensuring security of supply of water to growers, particularly with the proposed expansion of the agricultural industry in Carnarvon. This principle should be included in service agreements with growers.

CMAC recommends that Government supports the position of a single supplier of bulk water for agriculture in the region and that strong consideration is given to the Cooperatives taking on this role and responsibility.

In light of the assessment of the current Cooperatives' skills, capabilities and financial planning, CMAC advises Government that no further assets should be transferred to the Cooperatives at this time and that the "status quo" for the operation of the borefields should remain. The complete replacement of the two Cooperatives' Boards in late February 2015 plus further changes in key staff has generated additional uncertainty about the stability and continuity that is required to successfully manage and run an expanded Cooperative.

CMAC has also recognised a will (aspiration) within the Cooperatives and its members, as well as an interest in Government, to facilitate the development of the skills and capacity of the Cooperatives to ultimately become the single bulk supplier and distributor of water. This would require a step wise development of the relevant capacity and skills of the Cooperatives with regular review and assessment. This process may take from two to five years to complete.

CMAC supports a staged leasing of supply assets to the Cooperatives against agreed standards based upon performance criteria. **These performance criteria need to be developed by Government in consultation with the Cooperatives, while the Cooperatives must develop comprehensive management plans for the future.**

Should the Cooperatives demonstrate performance against these criteria, consideration can be given to the progressive transfer (lease then ownership terms) of infrastructure.

GASCOYNE FOODBOWL INITIATIVE

The current GFBI project is funded by Royalties for Regions to the sum of $25 million over four years (2012–16). It aims to increase horticultural production in the Carnarvon area to between $100 million and $150 million per annum through the provision of new land (400 ha) and water resources (4 GL/yr) for irrigation expansion. Suitable areas for land development are shown in Map 1.

It is anticipated that the GFBI project borefield development including electrification and pipeline will be complete by September 2016. Equipping bores with pumps and connecting these to the supply mains is the responsibility of the Cooperatives. At present no formal agreements exist for the transfer of these assets to the Cooperatives. As such no transfer of assets should occur until an asset transfer approach, complete with conditions that ensure the long term sustainable operation and integration of these assets within the overall irrigation supply system, is developed and agreed. No timetable for these works is available.

New land releases are seen as a key driver for the Carnarvon horticultural industry to increase opportunities for existing and new producers to market their produce both domestically and internationally. At least 400 ha of suitable land for horticulture has been identified for development through DAFWA's five class land capability ratings process. Major land qualities that are relevant to horticulture in the Carnarvon area include flood hazard, soil salinity and site drainage potential.

The Department of Lands (DoL) is leading the tenure change process, including native title negotiations where necessary, and eventually offering the land to the market following an Expression of Interest (EoI) process.

It is recognised that groundwater bores may be completed before the new land is released and a draft policy for 'interim water use' has been developed by DAFWA. Although GFBI project water is ultimately reserved for new land, it could be temporarily available under a formal agreement between the state and the Cooperatives.

CMAC RESPONSE TO GFBI PROJECT

The additional water that will be made available through the GFBI project expansion is of considerable value to the local growers and to the economic success of the Cooperatives. CMAC strongly supports its early availability of water from the GFBI project borefield on a temporary basis to the Cooperatives in a structured, logical and staged manner.

CMAC is of the view that the existing growers are likely to take up a significant portion of the proposed 4 GL/yr of new water on a temporary basis. Once new land is sold this water will need to be returned to be available for the new GFBI project land.

Very clear rules will need to be developed and agreed upon for this process to proceed in a non-contentious manner. CMAC strongly recommends that these rules be in place before any of this water is made available to existing growers.

ECONOMIC AND PRICING CONSIDERATIONS

Since their inception the Cooperatives have continued to receive regular financial support from Government (state and federal) both as contributions to capital development and as operating subsidies. Government has repeatedly indicated that it wishes to encourage the Cooperatives to develop their own ownership, management and operating systems and work towards improving efficiency, maximise cost recovery for water and move away from continuous subsidy.

An assessment of the effects of continuing with the current arrangement for bulk water supply (termed Business as Usual [BAU]) or with the potential devolution of responsibility for the bulk supply to the Cooperatives on the future price of water in the Gascoyne has been completed. The assessment was undertaken for the expanded irrigation system (implementation of GFBI project with 4 GL/yr of water and approximately 400 ha of extra land; and a single bulk supplier, being either the Water Corporation or the Cooperatives). Costs were estimated as percentage increases on existing costs over ten years. The cost of water to growers will also be expected to increase annually by the consumer price index (CPI).

The current price of water to growers from the Cooperative is estimated to range between $0.37 per kilolitres (kL) and $0.55/kL during periods with 100% of allocation limits available.

The main findings are:

1. Whatever system of operation and management is used, the price of water to growers will increase progressively. The question of the affordability of this increase was assessed by DAFWA, which advised that "*price increases for irrigated water in the order of 10% could potentially be absorbed by growers, while increases above 50% are likely to have significant*

impact on the viability of many farms. The impact of price increases between these extremes is unclear and will differ from grower to grower."

2. The most significant factor influencing the price of water is capital costs. The costs for the development of the GFBI project and its associated infrastructure is being borne by the state and hence will not affect water prices to growers. However the replacement of the Southern borefield main at an estimated cost of $25.7 million (although other estimates as low as $12 million have been made) would raise the price of water by approximately 30 per cent if this cost were to be borne entirely by recoup from the sale of water.

3. The sale of additional GFBI project water through the Cooperatives' distribution system has a significant influence on reducing the price of water. The timely and full uptake of 100 per cent of GFBI project 4 GL/yr of new water in the interim period and allocated to new GFBI project land makes a fundamental improvement to the economics of scale for the Cooperatives, with an estimated 20–30 per cent decrease in the price of water.

4. It is apparent that the pricing options that are acceptable to all growers and would retain a vigorous horticultural industry would also require a continuing Government subsidy (either operating subsidy or capital funding injection).

CMAC RESPONSE TO ECONOMIC AND PRICING

CMAC reviewed the economic and pricing implications associated with different governance arrangements and various options. Current charges levied by the Cooperatives are not adequate to ensure long term sustainability. The charges do not fully reflect the actual costs of supply and need to be increased to ensure ongoing success of the Cooperatives.

CMAC has modelled a number of scenarios to determine likely prices increases to growers. Under the best case scenario consisting of:

- 100% uptake of the GFBI project expansion;
- GWC / GWAMCO owning and operating the northern borefield; and
- Water Corporation owning and operating the southern borefield.

It is necessary to increase prices over ten years by approximately 40 per cent plus CPI to ensure full cost recovery. It is expected that such a price increase would require industry adjustment to the nature and number of horticultural producers in Carnarvon in order to remain vibrant. If Government wishes to cap the price increase to growers then it will be necessary for Government to provide financial assistance in the form of ongoing operating subsidy, capital injection or a combination of both. Government will need to assess the options and advantages and disadvantages for such support.

There is merit in Government considering support for capital works rather than only annual operating subsidies. There is the potential for capital contributions to be tax effective, they could be cheaper if the capital works are undertaken by the Cooperatives, and there is an opportunity for co-funding with Federal agencies as part of strategies to improve irrigation throughout Australia. In addition there is also the potential for greater responsibility and accountability by the Cooperatives for these assets if they are owned by the Cooperatives.

Any such transfer of assets or direct support of Cooperatives will require Government to impose a very rigid process of oversight and due diligence on the process of enhancing Cooperatives' capacity, skills and financial management. Regrettably Government has been lax in this respect in the past.

WATER RESOURCE PLANNING

The *Lower Gascoyne water allocation plan* (Department of Water [DoW] 2011) provides the framework for the sustainable management of the aquifers of the Lower Gascoyne system. The allocation plan is clear in its description of the procedures to be followed when low flow/drought conditions prevail. The allocation plan is proposed to be updated in 2018.

The allocation plan is developed from information gained from the use of a numerical model (Gascoyne Floodplain Aquifer Modelling System [GASFAMS]) to simulate recharge and various options for extraction.

Current DoW practice is to update GASFAMS every 4–5 years and thus not to use GASFAMS for decisions about seasonal availability of water. The encouragement of temporary and permanent trading by growers of their C Class shares within the GWC system is strongly supported.

CMAC RESPONSE TO WATER RESOURCE PLANNING

CMAC endorses the use of GASFAMS but recognises that it requires revision and recalibration to include the last few years of borefield data and also to be able to represent salinity in groundwater.

CMAC strongly recommends that the GASFAMS model must be kept current and it would be sensible to use the model to develop forward plans for water availability and extraction. A rolling five year plan for water use should be produced annually to simulate the nature and extent of water extractions that are possible under a range of recharge events and the management actions associated with each of these.

CMAC strongly supports water trading in Carnarvon and this requires provision of processes to encourage water trading by growers.

CONCLUDING COMMENTS

CMAC concludes that the two most pressing issues that arose during this assessment are, in order of importance:

- Security of supply (resource availability and infrastructure); and
- Price of water.

These two matters are linked but not necessarily totally dependent on each other.

Security of supply is strongly influenced by the following:

- Accurate and reliable understanding of the water resources of the region and the influences of the range of recharge conditions and extraction programmes on the renewable resource;
- A reliable and efficient water delivery system and integrated bulk water supply system;
- A stable Cooperative with realistic long term plans and an efficient business model; and
- Good relationships between Government agencies and the Cooperatives.

The price of water is strongly influenced by the following

- The nature and configuration of the borefields and water distribution system;
- Capital and operating costs; and
- External financial support.

Central to all of these is an operator of the system that is able to deliver an efficient and reliable service within the confines of acceptable costs to growers. CMAC accepts that there are no realistic options that can be found that do not involve some form of Government support.

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1. INTRODUCTION

CMAC was established in October 2013 by the Ministers for Water, and Agriculture and Food. The CMAC Terms of Reference and membership are provided in Appendix 1. The Committee's formation was in response to dry conditions for three successive years that led to a shortage of irrigation water for the summer of 2013/14 and significant concern by growers that they did not have adequate water for their summer crops.

CMAC undertook a series of remedial and support actions supplemented by two minor rain events during the peak demand period during October 2013 to January 2014, which allowed irrigation to continue with limited interruption. These matters were reported by CMAC to the two Ministers in the Carnarvon Irrigation District Short-Term Response Plan: November 2013 to April 2014 (outlined in section 7 and provided at Appendix 4).

In the Short-Term Response Plan, CMAC advised that with the continual increase in demands for water and the planned expansion of agriculture in the region, the measures undertaken during 2013/14 alone are unlikely to be sufficient to manage future periods of high water demand. In addition, CMAC advised that with the implementation of the GFBI, the vision prepared by the Gascoyne Development Commission (GDC) for an expanded impact of the agriculture economy in the region, as well as the recognition of significant limitations with existing infrastructure, it would be appropriate to review the structure and operation of irrigation supply and management in the region and develop a more strategic and collaborative approach for its management in the medium-term of five and more years.

CMAC prepared a second report to the Ministers (Appendix 2 Medium Term Review Executive Summary) incorporating the key findings and recommendations against each key finding. The findings were developed through CMAC and endorsed by its members following the meeting of 9 July 2014. The review was provided to the Minister for Water and the Minister for Agriculture and Food by CMAC through their respective Directors General. Its recommendations provide the Government with advice and direction on matters to be resolved that enable irrigated agriculture to develop and prosper in the region in the future. It identifies the specific components that need evaluation and the information that must be gathered to enable decisions to be made with a full understanding of all costs, responsibilities and implications.

The Ministers decided that CMAC would continue its work to further refine and assess the issues raised in the Medium Term Review. CMAC's work and final recommendations are provided in this report.

This document is a summary under seven short chapters of CMAC's findings and recommendations to the Minister for Water and the Minister for Agriculture and Food. The technical reports prepared by agencies and consultants for CMAC are provided as appendices. None of these documents have to date been released publicly, except a draft of the Policy Settings document (Appendix 3). The release of this final report or any of the technical reports will be a decision for the two Ministers as a part of the Government's response to CMAC's recommendations and the Carnarvon irrigation community.

2. POLICY SETTINGS

2.1 Introduction

The Western Australian State Government has a number of existing policies and plans for the management of water, water distribution, agriculture and regional development that are relevant to the Carnarvon irrigation area and that have been used to guide the past, existing and future development of agriculture in the Lower Gascoyne.

The Policy Settings (pre-March 2015) for the Carnarvon Horticultural Precinct document (Appendix 3) collates and summarises the current Government positions and policies impacting the Carnarvon irrigation area that have developed over the last 15 years and some background and context to the development of these initiatives in the area. It was produced to inform CMAC members, growers and stakeholders of the current settings and background to policy. CMAC found that many of these issues were not well understood in Carnarvon and across Government and this document should serve as a valuable reference to all those involved in irrigated agriculture in Carnarvon. A draft copy of the document was provided to growers during May 2014 for comment and the final version of the document will be made available to Carnarvon growers in both English and Vietnamese.

This background detail has informed CMAC in its consideration of recommendations to the Minister for Water and the Minister for Agriculture and Food regarding the future management and operation of irrigation to ensure a vigorous and sustainable agricultural industry in the region.

2.2 Agriculture

Agricultural policy is established under the agriculture and food related Acts and Regulations in Western Australia, and set by the Minister for Agriculture and Food through DAFWA to benefit consumers and producers of agricultural products in the state.

Carnarvon is an important supplier of horticultural produce to Western Australia's domestic market, especially during the winter months, when approximately 60 per cent of Perth's vegetables are supplied from the Carnarvon horticultural district. Major crops include bananas, table grapes, tomatoes, capsicum, cucurbits (pumpkin, cucumber, zucchini and melons), avocados and mangoes. It is worth between $80 and 100 million per annum.

2.2.1 Gascoyne Food Bowl Initiative

In 2008, the Gascoyne Food Bowl Ministerial Committee was formed to provide guidance and advice to Government on the Gascoyne Food Bowl Initiative which – through a suite of four projects – investigated a range of options related to water, agriculture, horticulture and the associated infrastructure requirements to unlock and maximise the agricultural production potential of the Gascoyne region.

The Gascoyne Food Bowl Initiative projects have received over $76.07 million in funding investment through the State Government's Royalties for Regions program. By partnering with investment by the Commonwealth and GWAMCO investment it will – on completion of the Gascoyne Food Bowl project - deliver over $102.1 million in infrastructure and related projects to the Gascoyne region.

The following activities of the Gascoyne Food Bowl Initiative focused on unlocking the potential of the Carnarvon Horticultural district:

- Gascoyne Food Bowl Local Consultative Committee (LCC) – whose recommendations informed the Gascoyne Food Bowl Project;
- Funding and construction of the Gascoyne Irrigation Pipeline Project (GIPP);
- Funding and implementation of the Carnarvon Stage 2 Flood Mitigation Works project;

- The Carnarvon Artesian Basin Advisory Group (CABAG) review; and;
- Subsequently to implement the Gascoyne Food Bowl LCC recommendations, a further $25 million Royalties for Regions funding was provided to DAFWA in 2012 for the Gascoyne Food Bowl Project to locate up to 4 GL/yr of new water and release 400 ha of new land for horticulture.

2.3 Regional Development

Regional Development policy is established under the appropriate Acts and Regulations and is set by the Minister for Regional Development through Department of Regional Development (DRD) and the Development Commissions. DRD manages and administers the State Government's Royalties for Regions program, which promotes and facilitates economic, business and social development in regional WA. The Development Commission in the Gascoyne is the GDC. The GDC's objectives are to promote, facilitate and monitor development in the region, by increasing the economic base, infrastructure, employment and services.

Since 2008, the state Government's Royalties for Regions program has invested $218.7 million in the Gascoyne across a range of infrastructure projects and services to build upon regional strengths and provide a platform to enable the region to achieve diversification and long-term sustainability. This investment has been guided by the Gascoyne Regional Development Plan 2010–2020 and the draft Gascoyne Regional Investment Blueprint (2015).

2.3.1 Gascoyne Stage 2 Flood Mitigation Works

The $60 million Gascoyne Stage 2 Flood Mitigation Works project comprised the full design and construction of four major levees to mitigate the effects and damage caused by severe flooding and provide a level of flood protection to the existing horticulture district, the North West Coastal Highway and the proposed Gascoyne Food Bowl Initiative expansion area. The four levees will reduce the impact of a major river flooding event in the greater Carnarvon horticultural district and minimise disruption to regional transport in times of major flooding. They will protect key water infrastructure in the region, including parts of the $17.083 million upgraded GIPP and the North West Coastal Highway.

2.4 Formation and Operation of the Cooperatives

Currently two Cooperatives exist in the Carnarvon horticulture district – GWAMCO and GWC. The impetus for these being formed was the 1996 Council of Australian Governments (COAG) strategic framework for the reform of the Australian water industry. Two key commitments in COAG's water reform agenda were the transfer of operational responsibility for the management of irrigation schemes to local bodies, and full cost recovery for water with transparent subsidies.

GWC (formed in 2001) delivers irrigation water to its members, maintains the pipeline assets and collects revenue from the members. GWC membership shares deliver an entitlement to a specified amount of water (which can be reduced according to the availability or 'seasonal announcement' of water on a pro rata basis). Members purchase water delivered via the scheme by way of an annual fixed charge based upon their share allocation, and a consumption charge based upon the water members actually use. Shares may be traded, with GWC approval.

GWAMCO (created in 2004) is a private irrigator Cooperative, whose sole purpose is to own and manage the infrastructure assets. As such it does not trade but simply collects an asset levy from members to provide for future asset replacement.

2.4.1 Water Infrastructure (Gascoyne Irrigation Pipeline Project)

Enabled by the GFBI, with DoW as the lead agency and the GWC as the delivery agency, the GIPP involved construction of a new irrigation distribution pipeline to replace the old asbestos concrete pipe with a new 31-kilometre (km) modern high density polyethylene pipeline. The pipeline was officially opened in April 2012 and provides for increased water flows for existing plantations and new horticultural developments in Carnarvon. The design of the system and replacement of the pipeline allowed for reduced leaks and pipe bursts, more effective distribution and in turn benefits the environment by making better use of the existing water.

2.5 Water resources

Water resources policy is established under the various water related Acts and Regulations and set by the Minister for Water through the Department of Water (DoW). The water supply for Carnarvon is sourced from the Lower Gascoyne River aquifer system and the *Lower Gascoyne water allocation plan* (DoW 2011) guides the allocation of water. The plan acknowledges the seasonally variable supply of water and the need to balance consumptive use with the maintenance of the resource. It sets out management triggers to respond to changes in the status of the (freshwater) groundwater and surface water resources. The plan is evaluated annually to continually improve implementation of the plan and management of the water resources.

For management purposes the aquifer system is divided into two main Subareas: Subarea A and Subarea B–L. Current Allocation Limits and licenced annual extraction rates are shown below:

Groundwater resources	Allocation limit	Licenced Annual Extraction Rates
Subarea A	6.1 GL/yr	8.2 GL/yr licensed to private landholders
Subarea B–L	15.5 GL/yr	3.6 GL/yr to GWC for irrigation 5.0 GL/yr to Water Corporation for irrigation 1.8 GL/yr to Water Corporation for town water supply

The allocation limit for Subarea A is 6.1 GL/yr, which is currently over-allocated at 8.2 GL/yr. The allocation limit for Subareas B–L is 15.5 GL/yr of water, with 8.6 GL/yr currently licenced for irrigated agriculture with an additional 1.8 GL/yr licensed for town water supply. A further 1.8 GL is unlicensed and reserved for future town water supply. As part of the GFBI expansion a licence application for 4 GL/yr will be assessed. The licence for this area is currently 3.3 GL/yr.

2.5.1 Middle Gascoyne Water for Food project

The project (funded at $2.6 million over the next four years through Royalties for Regions) and led by the DoW aims to define the volume of good quality water availability in the Middle Gascoyne River channel east of Rocky Pool and set local allocation limits, monitoring and management strategies for use of groundwater in this area. If there is significant new water located in the Middle Gascoyne, this would open up opportunities for industry to evaluate and make proposals relating to horticulture, the grow-on beef industry and other innovative agribusinesses. The distance from the current irrigation district means that any accessible water located would not be economically piped into the existing irrigation scheme supply.

2.5.2 New Water Resources Bill

The DoW is currently drafting a new Water Resources Management Bill that will replace the *Rights in Water and Irrigation Act 1914* and five other Acts regarding the management of water in Western Australia. It will consolidate the existing six Acts into one Act that will be simpler to understand and easier to administer. This Bill will set Western Australia up for the future and modernise legislation governing the management of, and access to, the state's valuable surface and groundwater resources.

2.6 Water Service Provisions and Charges

There are two bulk irrigation water suppliers in Carnarvon:

- Water Corporation; and
- GWC/GWAMCO.

The Water Corporation is the principal supplier of water, wastewater and drainage services in Western Australia and also provides bulk water for irrigation. It is owned by the Western Australian Government and is accountable to the Minister for Water. The Water Corporation operates under an Operating Licence granted by the Economic Regulation Authority to provide town water supply, sewerage and bulk water irrigation water supply in Carnarvon. The Water Corporation owns and operates the southern borefield covering Subareas B–L and has a licence from DoW to take 1.8 GL/yr of water for public water supply and a licence to take 5 GL/yr for irrigation supply. Water Corporation provides the bulk irrigation water to GWC.

Water Corporation charges GWC:

- a fixed fee for asset renewal and operation and maintenance; and
- a variable fee for power.

The Cooperatives own and operate the part of the northern borefield with a provisional licence to extract up to 3.6 GL/year, although they have previously abstracted only up to 2.8GL/year due to limited bores.

Water from both the GWAMCO northern borefield and the Water Corporation southern borefield is provided to Cooperative members via the Gascoyne irrigation pipeline.

To obtain water, growers need to join the Cooperatives and pay:

- GWC a fixed fee based on size of allocation;
- GWC a variable charge based on actual water usage;
- GWAMCO a fixed asset contribution; and
- GWAMCO a fixed charge based on size of allocation (this fee is currently not being charged).

A separate and additional fee based on volumetric use is also paid. The various charges and subsidies paid historically and currently to provide scheme water to the Carnarvon Irrigation District are further discussed in Appendix 3.

The Government pays an operating subsidy to the Water Corporation to cover the shortfall in revenue from bulk water sales to GWC and the cost of supplying that bulk water at approximately $2 million a year (based on 2014 figures). An operating subsidy paid to GWAMCO and GWC to support them through their formation and building the asset renewal fund began in 2003 and ceased in 2013 with the installation of the new irrigation pipeline.

3. ENGINEERING AND INFRASTRUCTURE

CMAC has comprehensively discussed and considered the technical and engineering aspects of the existing and expanded irrigation scheme. CMAC commissioned three engineering reports summarised by consultants GHD (Appendix 5a) and the Water Corporation (Appendix 6) to assess the systems, existing and proposed infrastructure and its enhanced integration. CMAC has found in order to deliver water in a manner likely to meet grower expectations and maximise horticultural production in the future the following need to be addressed:

- Defining equity of supply;
- Developing supply agreements – also termed service level agreements – between GWC and growers;
- Enhancing existing infrastructure:
  - GWC – borefield and pipeline;
  - Water Corporation – southern borefield collector main;
- Development of GFBI project borefield infrastructure; and
- Coordinated integration of the irrigation water supply scheme.

3.1 Equity of Supply

CMAC has canvassed the concept of '**equity of supply'** widely in the Carnarvon community including with peak bodies, water service providers and growers. The following definition was proposed and was agreed to by the Committee on 11 March 2015:

> *"Cooperative members are entitled to equitable flow, where equitable means access to the available peak production capacity at a rate of flow proportional to your Gascoyne Water Cooperative share allocation, and subject to an agreed minimum flow rate being available to all members. "*
>
> This definition relates only to Gascoyne Water Cooperative shares delivered via the irrigation distribution pipeline, and not to water obtained via self-supply entitlements through Subarea A.

Recommendation 1 – CMAC recommends the above definition of 'equity of supply' be adopted to facilitate the development of service level agreements with growers and the design and installation of infrastructure necessary to support this outcome – particularly during periods of peak demand.

Key findings that support recommendation 1:

- Growers do not currently receive 'equity of supply'.
- Approximately a third of growers in the western end of the scheme receive flow in excess of their proportional share, some up to 44 times their share, while many in the eastern end of the scheme have periodic problems with access to water from the distribution pipeline.
- Inequitable supply is primarily an issue during times of peak demand.
- Equity of supply is unlikely to be achieved through partial measures to manage demand and its achievement will require controls to be in place for all growers – for example installation of only a limited number of flow control valves was modelled and is insufficient to ensure equity as defined above.

Note: The concept of a minimum flow rate for growers with small annual entitlements of 5 000 kL/yr was proposed and supported by the Cooperatives at the 10 February 2015 meeting. GHD proposed a minimum flow rate of 1.5 L/s (approximate flow of a domestic service). However this was considered too low for growers and was not supported by the Cooperative representatives. No alternative minimum flow rate has been defined.

3.2 Development of a Level of Service to growers

Recommendation 2 – CMAC recommends that GWC defines the level of service and puts in place service level agreements with its members as a matter of priority.

Delivery by the GWC to growers in accordance with the service level agreements should form part of any future auditing or review of the Cooperative's performance.

Key findings that support recommendation 2:

- A defined level of service will establish the baseline delivery requirements that the scheme should be designed and operated to meet. The level of service will guide future investigations/modelling, solutions for hydraulic issues, infrastructure upgrades and operating strategies.
- A defined level of service is required to enable growers to develop business plans and is therefore essential for the success of the GFB and maximising production from the Carnarvon irrigation district.
- The GHD engineering review made recommendations to achieve equitable supply based on the definition as described in Recommendation 1. These recommendations included the re-installation of flow control valves. GWC needs to define minimum flows and consider flow control valves and any alternative approaches to achieve equity of supply for growers.
- The GWC charter states it will endeavour to meet growers' 'daily irrigation requirements'. This requires further clarification and should be defined with respect to a grower's entitlements.
- Communication of the level of service with growers is required. Consideration should be given to establishing a service level agreement with each grower.
- Some growers do not have suitable (or sufficient volume of) private water storage to allow for the balancing of flow rates and water pressure, and to allow for the blending of water for irrigation. This needs to be addressed in any future service level agreement.
- Contrary to the GWC customer charter in some isolated cases, growers do not have a secure, separate private water supply for their domestic use. The issues of quality and continuity for domestic water supply need to be addressed in any future service level agreements.

3.3 Enhancements to existing infrastructure

3.3.1 GWC Infrastructure

Recommendation 3.1 – CMAC recommends that the following improvements to the existing system owned and operated by GWAMCO / GWC be implemented:

a. **The existing distribution irrigation pipeline, also referred to as the Gascoyne Irrigation Pipeline (GIP), requires additional air bleed valves and section valves to be installed to allow sections of the irrigation pipeline to be serviced without shutting down and bleeding the entire pipeline.**

b. **Installation of additional production bores in the existing GWC northern borefield is required to bring peak flow up to 183 L/s including bores for stand-by. This will allow abstraction of the full licence volume of 3.6 GL/yr and will increase peaking capacity to a factor of 1.6, ultimately allowing increased supply to growers and an improved level of service during peak supply periods.**
c. **Repair and enhancement to SCADA telemetry systems to ensure full and stable operation and integration of the northern borefield into the overall system.**

Key findings that support recommendation 3.1:

- The Gascoyne Irrigation Supply Pipeline is of an inappropriate hydraulic design and is currently unable to provide the necessary hydraulic head for many users. It is therefore unable to continuously provide a reliable supply of water to all growers, particularly in peak demand periods.
- The lack of section valves results in extended customer outages for any repairs of the pipeline.
- GWC owns nine equipped bores and has connected two more. GWC has also equipped and connected a DAFWA bore (B11/13) resulting in a total production capacity of 136 L/s. An estimated additional five production and two stand-by bores are required to bring capacity to 183 L/s (Appendix 5a).
- SCADA telemetry systems on the distribution system and within the existing northern borefield are not fully operational (grower supply points). Upgrades are required to enable seamless integration with flows from the southern borefield as well as proposed flows from the GFBI borefield.
- The GHD engineering review (Appendix 5a) has estimated that seven additional bores and associated SCADA will cost approximately $2.02 million.

3.3.2 Water Corporation – southern borefield collector main

Recommendation 3.2 – CMAC recommends that the Water Corporation's southern borefield collector main should be progressively replaced in accordance with the Water Corporation's current replacement planning.

Key findings that support recommendation 3.2:

- The Water Corporation's existing collector main in the southern borefield requires an increasing level and cost of maintenance in order to maintain supplies. Whilst this increasing maintenance requirement has minimal impact on the service reliability of the scheme it has a significant impact on current and future bulk water supply charges to GWC.
- The replacement of the pipeline is economically justified, in sections, over the next two to ten years.
- Replacement of the Water Corporation's southern borefield collector main will be required as per Water Corporation's timetable with a 14 km section currently proposed for replacement in 2016–2017.

- This work and associated funding is included within the Water Corporation's future Asset Investment Program. The estimated cost for the total replacement of the pipeline is $24.7 million (estimates by GHD / McGarry and Associates).

3.4 Gascoyne Food Bowl Initiative borefield infrastructure

Recommendation 4 – CMAC recommends a staged approach to the development of the GFBI project borefield and related assets.

Stage 1: DAFWA to finalise the development of the GFBI project water supply infrastructure in accordance with the existing program and budget. GWAMCO/GWC to schedule upgrades and improvements to the existing irrigation scheme (Recommendation 1, 2 and 3.1). GFBI project assets should not be integrated with the GWAMCO northern borefield until stage 2.

Stage 2: Develop a program to facilitate the integration of the GFBI project infrastructure and development of new GFBI project land areas. This would include resolution of infrastructure owner / operator and any conditions that may be required to support the integration of GFBI project water into the scheme. Infrastructure requirements to support integration are included as Recommendation 5.

A timetable for capital upgrades and proposed changes to infrastructure is required. This timeline can only be finalised when the following items are determined:

- The Level of Service to be provided by the Cooperatives to growers – Recommendation 2;
- Confirmation of the ultimate owner / operator of the expanded northern borefield and asset transfer requirements;
- Agreement between Water Corporation and GWC of integrated operating strategy prior to borefield equipping and connection to the GFBI project pipeline.
- Confirmation of borefield equipping and connection to the GFBI pipeline;
- The final configuration of the GFBI project expansion in the northern borefield based on drilling and aquifer pump testing followed by detailed design; and
- Resolution of final budget requirements and funding sources, to support completion of the proposed works. At present the GFBI project budget is lower than the GHD estimates of $28.3 million. Any real differences need to be resolved by DAFWA.

Key findings that support recommendation 4

- DAFWA has selected a peak borefield production of 400 L/s, as the maximum instantaneous flow capacity from the preferred option for the GFBI project borefield. (Described as Scenario B in GHD detailed engineering report in Appendix 5a).
- GHD estimates 44 bores are required to produce peak production rate of 400 L/s. The number of bores may be reduced based on flow testing data from DAFWA and allocation assessment by the DoW.
- The GFBI project aims to provide 4 GL/yr of water which equates to an average annual flow of 127 L/s. Note that the 4 GL/yr is subject to licence approval by the DoW.
- GHD estimated total of 27 km of northern borefield collector main pipeline is required for the GFB which nominally includes 12.2 km of 800 mm polyethylene pipe at its western end to carry peak instantaneous flows of 400 L/s.

- Implementation of Recommendations 2 and 3.1 are required prior to integration of any GFBI project assets.
- The final system will rely on both the northern and southern borefields operating together to maintain pressures in the distribution system. Additional work as outlined in Section 11 of the GHD report is required to achieve a fully functional, integrated system including:
  - Confirmation of production bore locations and maximum recommended pumping rates to confirm northern borefield collector main pipe diameters and lengths;
  - A transient analysis is required to determine water hammer requirements and ensure mitigation measures are designed and installed as part of the GFBI pipeline;
  - Detailed steady state hydraulic modelling of the northern borefield, including GFBI expansion, to determine finalised bore draw downs and static groundwater level ranges;
  - Development by GFBI project of a "system hydraulic and operation description" agreed with both GWC and Water Corporation. This is required prior to any integration and sets out the basis of design for the bores including determination of the bore operating range for pump and drive type selection.
  - Documentation of modes of operation and control to allow the SCADA strategy to be finalised (which feeds design/selection of bore equipment and design of SCADA).

3.5 Ultimate integration of the scheme

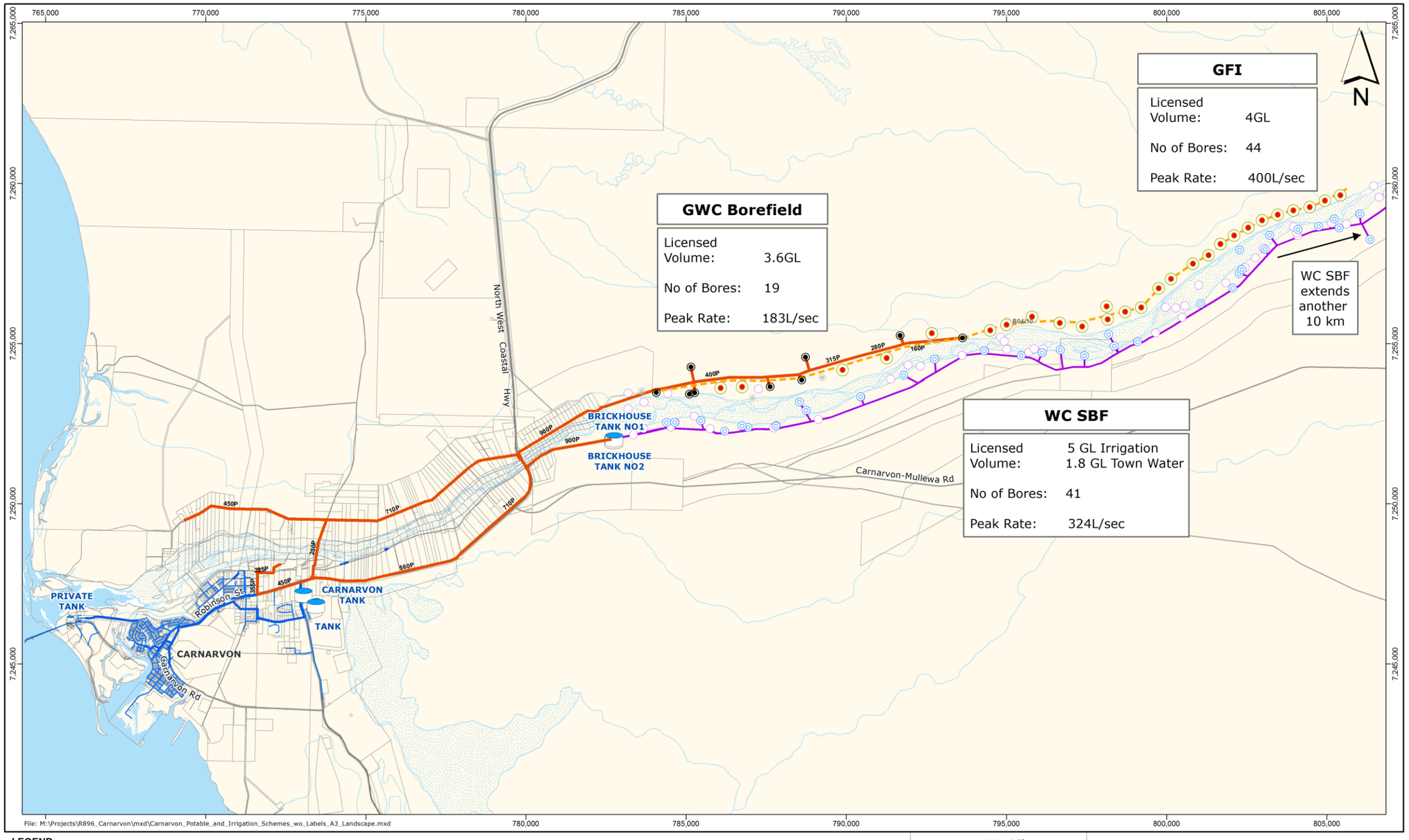
Recommendation 5 – CMAC recommends the infrastructure configuration outlined as Option 1 of the GHD report as the preferred engineering option for the scheme.

This option provides the least cost to achieve the required flows and reliability of the system. Detailed engineering and technical work to support this option should be undertaken to support the timeframes and requirements of all other recommendations made by CMAC.

Key findings that support recommendation 5:

- Option 1 involves no additional tanks or storage within the bulk water scheme and maintains separation of the southern and northern collector main pipelines. It is the option with the lowest capital and estimated operating cost.
- Indicative configuration of this proposed system is shown in Map 2 below with estimated costs in Table 1 (see Executive Summary). The current allocation limit is 3.3 GL/yr and the aspirational take is proposed to be 4 GL/yr.
- Upon the completion of upgrades and the GFBI project expansion the total capacity of the combined northern and southern borefields will be 907 L/s. This will increase the peaking capacity of the irrigation scheme from an existing factor of 1.4 to 2.3.
- The increase in peak factor will help reduce peak shortages but will not alleviate the peak supply problem completely. Some growers, including GFBI project areas, will receive lower flows and inequitable supply during times of high demand without implementation of equity of supply issues in Recommendations 1 and 2.
- A transient analysis is required to determine water hammer requirements and ensure mitigation measures are designed and installed as part of the GFBI project pipeline.
- Development of a 'system hydraulic and operation description' and agreed with both GWC and Water Corporation, is required prior to integration. This sets out the basis of design for the bores, modes of operation and control and allows the SCADA strategy to be finalised (which feeds design/selection of bore equipment and design of SCADA).

MAP 1: CARNARVON POTABLE AND IRRIGATION SCHEMES LOCATION MAP (BELOW).


765,000
770,000
775,000
780,000
785,000
790,000
795,000
800,000
805,000
7,265,000
7,260,000
7,255,000
7,250,000
7,245,000
GFI
Licensed Volume: 4GL
No of Bores: 44
Peak Rate: 400L/sec
GWC Borefield
Licensed Volume: 3.6GL
No of Bores: 19
Peak Rate: 183L/sec
WC SBF
Licensed Volume: 5 GL Irrigation 1.8 GL Town Water
No of Bores: 41
Peak Rate: 324L/sec
WC SBF extends another 10 km
N
North West Coastal Hwy
Carnarvon-Mullewa Rd
BRICKHOUSE TANK NO1
BRICKHOUSE TANK NO2
CARNARVON TANK
TANK
PRIVATE TANK
CARNARVON
Robinson St
Gairnarvon Rd
400P
315P
280P
160P
900P
710P
450P
250P
225P
560P
LEGEND
Planned Bores
Gascoyne Water Coop Bores
Equipped
Not Equipped
GFI Borefield Expansion
Gascoyne Water Coop Mains
Water Storage
Tank
Elevated tank
Reservoir
Water Treatment Plant
Water Main
Trunk
Distribution
Water Bore
Production
Observation
Non-Potable
Reticulation
Cadastre
Carnarvon
Perth
1:110,000 at A3
0 1000 2000 3000 4000
Metres
Coordinate System: GDA 1994 MGA Zone 49
Vertical Datum: AHD
AUTHOR: SELLENM0
DATE: 13/05/2015
BRANCH: IPB - SPATIAL SYSTEMS
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WATER CORPORATION
Carnarvon Potable and Irrigation Schemes Locality Map
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4. SINGLE BULK SUPPLIER – SIMPLIFIED AND IMPROVED GOVERNANCE

This chapter provides an overview of CMAC's considerations of the long term management and operation of the Carnarvon Horticultural Precinct irrigation system. Specifically it discusses the recommended operating model and requirements for improved future governance.

In its Medium Term Review in June 2014 (Appendix 2), CMAC recommended that the preferred option for the management of the northern and southern borefields of the Lower Gascoyne region is to have a single bulk supplier of water for the irrigation system based on a comparative assessment of a range of options. (see Table 2)

4.1 Operating model and future governance of irrigation system

Recommendation 6.1 – CMAC recommends that the process be commenced to confirm a single bulk supplier for irrigation water in Carnarvon. This supplier should be either the Water Corporation or the Cooperatives.

The selection of the single bulk supplier should be based on an understanding of the costs and management requirements for each of these and compared with the status quo (current situation) which is the Water Corporation managing the southern borefield and Cooperatives managing the northern borefield (including GFBI expansion). Regardless,

- the GWC would still manage the distribution supply pipeline to growers;
- the Water Corporation would manage the town water supply scheme; and
- growers would self-supply from Subarea A.

Key findings that support recommendation 6.1:

- The current irrigation water supply system in Carnarvon is relatively small and fragmented. The bores on the northern borefield and the southern borefield are not operated in the same manner nor to the same plan.
- DAFWA has advised that it will not be an operator of the GFBI project expansion borefield once commissioned in September 2016.
- A single bulk supplier should be able to achieve efficiencies through a common operating and planning framework that maximises automation and achieves economies of scale. The consolidated borefields would comprise approximately 90 bores with 50 km of pipeline conveying water to the distribution system.

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Table 2 – CMAC MEMBERS' COMPARATIVE ASSESSMENT DONE IN APRIL 2014 OF SEVEN OPERATING MODELS (OPTIONS) BY RISKS WITH COMMITTEE VOTING OF OPTION AGAINST STATUS QUO **[Poorer (P), Neutral (N), Better (B)]**

Option	Risk to government 9 votes	Risk to grower 9 & 11 votes	Supply reliability 11 votes	Governance 11 votes	Transitional issues 11 votes	Government policy 11 votes
1 Status Quo (Conjunctive Scheme)	**5 P 4 N**	**9 P**	**11 N**	**11 N**	**11 B**	**11 N**
2 Amended Status Quo GFI managed by Coops (Conjunctive Scheme)	**9 N**	**4 N 5 B**	**7 N 4 B**	**10 N 1 B**	**11 P**	**11 N**
3 Single bulk water supplier – GWAMCO–GWC (Independent Irrigation Scheme)	**1 P 2 N 6 B**	**1 P 2 N 6 B**	**4 N 7 B**	**2 N 9 B**	**11 P**	**10 N 1 B**
4 Option 3, with no irrigation water taken from SBF (not connected to Southern BF)	**9 P**	**9 P**	**11 P**	**11 B**	**1 P 10 N**	**10 P 1 B**
5 3Single bulk water supplier – Water Corporation (Government owned Irrigation Scheme)	**9 B**	**3 N 6 B**	**11 B**	**2 N 9 B**	**11 P**	**11 N**
6 3Single bulk water supplier – Third Party Utility Service Provider	**9 P**	**9 P**	**11 B**	**6 N 5 B**	**11 P**	**11 N**
7 Utility Service Provider runs Subarea A bores	**9 N**	**9 P 2 N**	**4 P 4 N 3 B**	**11 B**	**11 P**	**5 N 6 B**

4.2 Due Diligence and the Cooperatives as Bulk Supplier

Recommendation 6.2 – CMAC recommends that at present it would not be appropriate to designate the Cooperatives to be the single bulk supplier. However CMAC recommends that a procedure be put in place to facilitate the development of the Cooperatives' skills, capacity and experience with the intent of them being the bulk supplier in the future. A rigorous and regular assessment of the Cooperatives' progress is required. At no stage should transfer of assets occur unless there is confidence in the long-term financial and operational success of the new scheme management. This process could take two to five years.

Key findings that support recommendation 6.2:

- A Due Diligence and Governance assessment of the Cooperatives' ability to meet performance criteria was undertaken by an independent consultant and concluded that an immediate takeover and the associated increased responsibilities for the Cooperatives is not considered feasible (Appendix 7).
- The complete replacement of the two Cooperatives' Boards in late February 2015 plus further changes in key staff has generated additional uncertainty about the stability and continuity that is required to successfully manage and run an expanded Cooperative.
- CMAC considers that the Cooperatives could develop the necessary skills and capacity over time and hence delayed and conditional transfer of irrigation supply assets could still be considered.
- Government has repeatedly articulated its intent to support and encourage Cooperatives to be more self-sufficient
- CMAC has also recognised a will (aspiration) within the Cooperatives and its members, as well as in Government, to facilitate the development of the skills and capacity of the Cooperatives to ultimately become the single bulk supplier and distributor of water. This would require a step wise development of the relevant capacity and skills of the Cooperatives with regular review and assessment. This process may take from two to five years to complete.
- CMAC supports a staged leasing of supply assets to the Cooperatives against agreed standards based upon performance criteria. **These performance criteria need to be developed by Government in consultation with the Cooperatives, while the Cooperatives must develop comprehensive management plans for the future.** Should the Cooperatives demonstrate performance against these criteria, consideration can be given to the progressive transfer (lease then ownership terms) of infrastructure
- The CMAC Medium Term review also made a recommendation that *the Cooperatives complete an internal review of their operating structures and any changes that will be taken to their board membership. I*n response, the Cooperatives have taken positive steps to introduce greater efficiency and transparency in the operation of the GWAMCO and GWC Boards. In November 2014, the Cooperative members agreed to a rule change that allows the two Boards to have common directors. New Boards were elected at the AGM in February 2015 consistent with this rule such three GWAMCO Board members are also Board members of GWC. However current Boards consist of only growers and do not include any independent members. While these Board structures meet the obligations of the Cooperatives as identified in the functions, duties, and structure

summary of the boards, they limit the opportunity of the Boards to take advantage of external skills and advice

Given the timing of this wide ranging CMAC review and the recent election of new Boards for GWC and GWAMCO, it would be appropriate for any final decision on timing, conditions and separation payment to be based on plans developed by Government in close consultation with the Cooperatives.

4.3 Review Water Cooperatives Australia wide

CMAC understands that the Minister for Water and the DoW are undertaking a review of all four water cooperatives in Western Australia and reviewing the performance and sustainability of other small irrigation water Cooperatives across Australia.

Cooperatives that provide water for irrigated agriculture are numerous in Australia. The bulk of these are far larger than GWC/GWAMCO and use surface water as their source. However their operating requirements and financial responsibilities are similar and can provide valuable context in the progressive development of an independent Cooperative structure in Carnarvon.

Of particular relevance is the development of Local Management Arrangements (LMA) in Queensland. These are proceeding where public (SunWater) irrigation schemes are in the process of conditional transfer to private (irrigator) management, with interim support from government to allow them to develop to a stable and sustainable situation.

The principles for transition to local management, which would be largely applicable to a similar transfer process in Carnarvon, include:

- A strong majority of irrigators support the move to local management;
- The long-term benefits (including economic, financial and public interest benefits) to the state of each proposal outweigh the costs incurred in setting up and operating local management;
- The LMA must be a viable enterprise over the long term with limited risk of financial, operational or other significant failure, without recourse to Government;
- The LMA is capable of delivering efficient water services;
- The assets will be maintained and refurbished in line with agreed service levels;
- The LMA demonstrates a capacity to meet the statutory planning, regulatory and environmental obligations; and
- Any required debt funding can reasonably be accessed, noting that the new entities would be prohibited from borrowing from the Queensland Treasury Corporation.

5. GASCOYNE FOOD BOWL INITIATIVE PROJECT

The Western Australian Government established the Gascoyne Food Bowl Initiative (GFBI) in late 2008 in recognition of the importance of the Carnarvon horticultural industry in the supply of fresh fruit and vegetables for local and export markets. This chapter discusses the Gascoyne Food Bowl project – one of four GFBI projects (refer Section 2.2.1) – and the water supply scheme for Carnarvon's irrigation industry.

The current GFB project is funded to the sum of $25 million over four years (2012–16) by the state Government's Royalties for Regions program with DAFWA as the lead agency. It aims to increase horticultural production in the Carnarvon area to between $100 million and $150 million per annum through the provision of new land (up to 400 ha) and water resources subject to revision of existing allocations (up to 4 GL/yr) for irrigation expansion.

DAFWA is developing land and water infrastructure for an economically robust expanded horticultural precinct and sustainable soil, water and catchment management practices for the Carnarvon horticultural district. In its first stage, the GFBI project proposes a 400 ha expansion of the horticulture industry and identification of suitable soil for further future expansion of 800 ha. Detail of work on the GFBI project to the end of April 2015 has been provided in the Policy Settings document (Appendix 3).

5.1 Ownership of GFBI project borefield assets

Recommendation 7 – DAFWA will not be the long-term owner or operator of the GFBI project borefield and pipeline assets.

Ownership and operation of the northern borefield GFBI project expansion assets is discussed in the next chapter and has not yet been determined by Government.

5.2 GFB Infrastructure Timeframe

Recommendation 8 – DAFWA has informed CMAC that it anticipates the GFBI project borefield development out to 24 km (as per engineering designs in recommendation 5) including electrification and the collector main pipeline will be completed by September 2016 in line with the agreement for funding from Royalties for Regions.

Land release and then private land purchase will follow. It is not expected that significant uptake of new GFBI project land (and therefore call for water) will occur before 2017–18.

Key findings that support recommendation 8

- The electrification expansion extension that completed in 2014 in Stage 1 of the northern borefield (from McGlades Road east 11.5 km) into the GFBI project borefield (11.5–25 km east) and should be completed in October 2015. Electricity will be supplied via the design and construction of a high voltage (22 000 Volt) open aerial power line for the combined length of the northern borefields (25 km). The owner and operator of the 25 km northern power line asset will be Horizon Power.
- Running along the same infrastructure corridor as the power line, the GFBI project project is planning the installation of a collector main to take water from the borefield expansion area to connect into the existing irrigation supply system. Functional design planning for the GFBI project pipeline is nearing completion with final design, drawings and specification work is now underway. It is anticipated the installation of the collector main pipe will be completed by September 2016. The GFBI pipeline is designed to support additional water in the future if the 25–33km area is developed as a borefield, subject to DoW assessment.
- DAFWA has confirmed to CMAC that the GFBI project borefield and pipeline infrastructure will be completed to budget.

- Equipping bores with pumps and connecting these to the supply mains is the responsibility of the Cooperatives. No timetable for these works is available and the commitment of this expenditure will depend upon the Cooperatives being the preferred bulk supplier for the whole northern borefield.

5.3 Temporary use of GFBI project water

Recommendation 9 – CMAC supports the Minister for Agriculture and Food and DAFWA announcement that any water that can be obtained from the extended GFBI project will be available through the Cooperatives to current growers on a temporary basis while land release processes are being completed.

The Minister for Agriculture and Food, at the start of the fourth year of limited river flow and serious concerns by growers that the conditions were adversely impacting their economic viability, announced in February 2015 that the GFBI project water would be made available to existing growers as soon as the GFBI project infrastructure was completed and until the new GFBI project land was released.

The GFBI project drilling program is seeking to discover up to 4 GL/yr of 'new' water. The time lag between having identified 4 GL/yr of available water and installing the infrastructure required to deliver it to the Cooperatives distribution main, and completing the required tenure change processes for the 400 ha of identified suitable land, provides an opportunity for temporary use of the GFBI project water by existing growers in Carnarvon. The additional water is of considerable value to the local growers and to the economic success of the Cooperatives.

Key findings that support recommendation 9

- It is likely that existing growers will apply to use on a temporary basis a significant proportion proposed 4 GL/yr of GFBI project water in the interim period until the 400 ha of GFBI project land packages are released. Once the new land is sold, any water that has been made available for temporary use will need to be returned to be available for the new GFBI project land. Very clear rules will need to be developed and agreed upon for this process to proceed in a non-contentious manner. These rules need to be in place before any of this water is made available to existing growers. The agreement would state the water is for short term relief and temporary basis, and describes the quantity of water and the period of time of the take.
- The temporary water from the GFBI project borefield would be distributed by GWC and it would be paid for by the respective growers for that water at the agreed cost and volume.
- CMAC has discussed an alternative approach where the additional GFBI water only made temporarily available to growers under 'drought' or no river flow conditions and until the pipeline and associated infrastructure are installed and the operator/owner/manager of the borefield is determined. The majority of CMAC members did not endorse delay in access to GFBI project water past the completion of the borefield and pipeline infrastructure (July–September 2016) provided the rules governing the temporary availability of this water and integration of assets are in place.

5.4 Intent of Water and Land Release

The Ministers for Agriculture and Food, Water, and Regional Development have indicated to CMAC they continue to support the intent of the GFBI project to access up to 4 GL/yr of water, establish the infrastructure to deliver this water, release 400 ha of new horticultural land adjoining the current irrigation district and sell this land linked to water. Thus the new GFBI project water will not be made permanently available to existing growers.

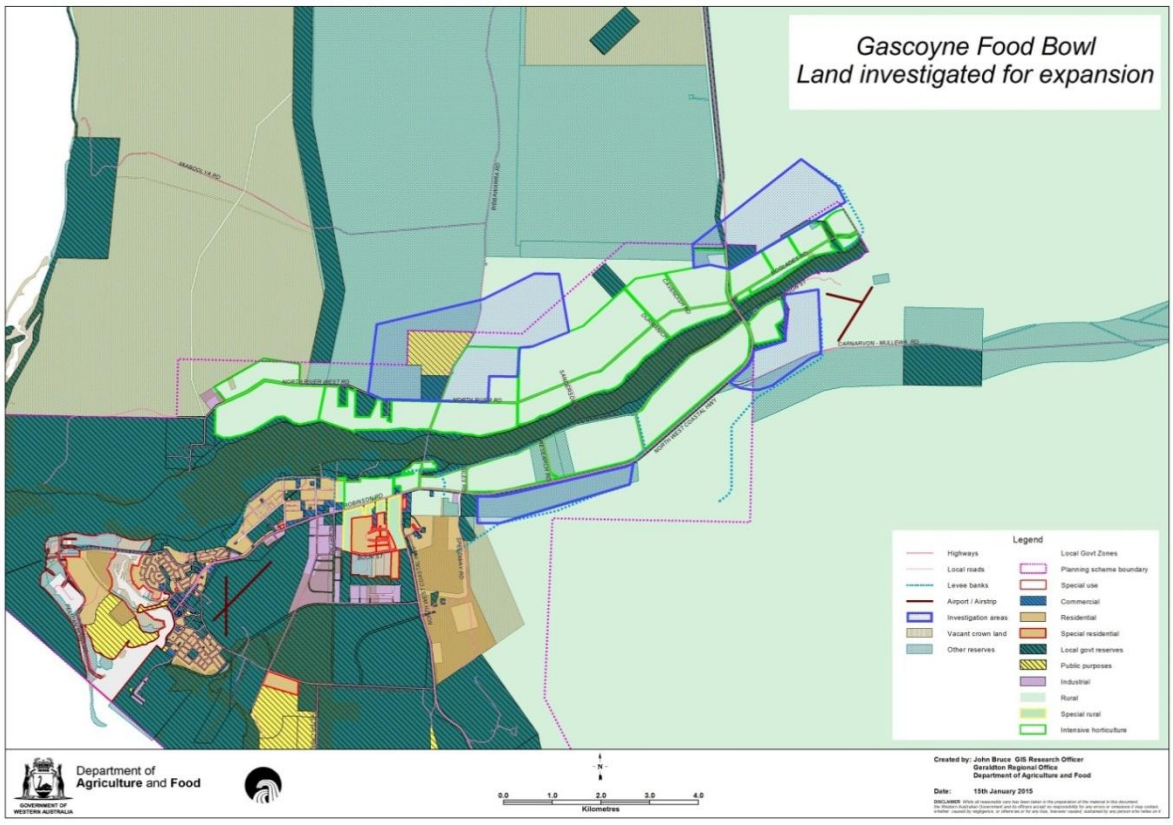
There has been significant discussion at CMAC meetings, with the Cooperative boards, with local members, during the grower information sessions and in broad conversations with the community and stakeholder groups regarding two aspects of the GFBI project objective to release an additional 400 ha of new land and link this land to GFBI project water volumes. The main discussion has been:

- the impact of the release of the additional 400 ha land on the viability of the existing plantation owners and horticultural industry; and
- the requirement by existing plantation owners for some or all of the additional GFBI project water that would enable them to expand their growing area or balance their current water use.

There is evidence of a number of existing growers who could and would permanently purchase additional water if it came onto the market. However, there has not been a business case presented to CMAC by growers or elements of the industry demonstrating a business requirement for additional water to existing growers either to optimise existing plantings or to increase plantings on existing land.

5.4.1 Land Release

The final step in the GFBI project land expansion process is land tenure change.

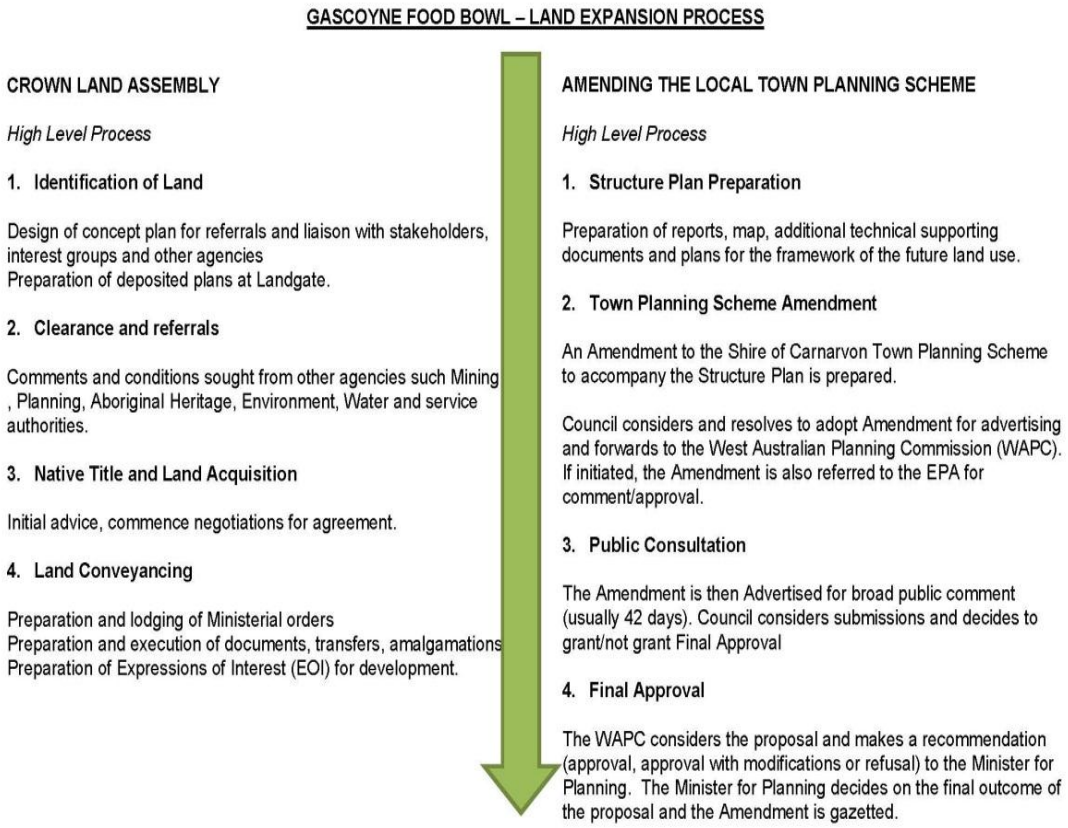


MAP 2: PRELIMINARY MAP INDICATING SUITABLE AREAS OF SOILS FOR HORTICULTURE UNDER THE GFBI PROJECT, SUBJECT TO CONSULTATION AND FURTHER ANALYSES (DAFWA).

There are several types of land tenure in Carnarvon that will require changing; primarily from Unallocated or Vacant Crown Land and Pastoral lease tenure into freehold. Importantly, the majority of land requires Native Title negotiations to occur. Simultaneously, further technical and land use planning studies also need to occur to include the new areas into the Shire of Carnarvon's 'Town Planning Scheme 10'.

Key milestones for this work, which commenced in early 2014 are shown in the following schematic. Some of these tasks can be undertaken simultaneously, while others can only occur sequentially. It is not expected that significant uptake of new GFBI project land (and therefore call for water) will occur before 2017–18. It should be noted that statutory approval for release of the new land is the responsibility of state agencies other than DAFWA and as such there may be delays with land delivery.

An EoI competitive process towards the conclusion of this time is the mechanism by which interested parties will be able to submit proposals to enter into a lease for the new land. An EoI would be expected to address a number of matters including financial capacity, project proposal, access, land management and water supply and would be assessed by a GFBI project EoI evaluation panel. This approach parallels the Water for Food initiative.



Undertaking land tenure change, Crown land assembly and amending the Shire of Carnarvon Local Town Planning Scheme is a complex process defined by statutory requirements. The above identifies some high level key milestones in this process. Some of this work can be undertaken simultaneously, some can only occur following a linear approvals pathway. Approximate timeframes are two years.

6. ECONOMIC AND PRICING ANALYSIS

CMAC reviewed the economic and pricing implications associated with different governance arrangements and various scenarios.

Current charges levied by the Cooperatives do not reflect the actual costs of supply and need to be increased to ensure ongoing sustainability.

CMAC has modelled a number of scenarios to determine likely price increases to growers. Under the best case scenario consisting of:

- 100 per cent uptake of the GFBI expansion;
- GWC / GWAMCO owning and operating the northern borefield; and
- the Water Corporation owning and operating the southern borefield.

Recommendation 10 – It is recommended that the Cooperatives implement price structures (increases) that reflect actual take up of GFBI project water to:

- **recover all costs associated with the diligent operations and maintenance of the scheme; and**
- **collect sufficient monies to cover the cost of all future asset renewals and replacement over the asset life.**

It is necessary to increase prices over ten years by approximately 40 per cent plus CPI.

If Government wishes to cap the price increase to growers then it will be necessary for Government to provide financial assistance in the form of ongoing operating subsidy, capital injection or a combination of both. It is acknowledged that the current ownership and operating arrangements should remain in place for a period (GWC – northern borefield, Water Corporation – southern borefield).

Recommendation 11 – CMAC recommends that any level of financial assistance offered should be determined by Government and be provided in line with the Cooperatives meeting agreed performance outcomes.

Key findings that support recommendations 10 and 11

COOPERATIVE WATER CHARGES

- Water prices must increase as the current prices charged by the Cooperatives are insufficient to ensure long term viability of the Cooperatives.
- Water prices charged by GWC to growers must also increase annually by CPI.
- There are insufficient monies being collected by Cooperatives to cover the costs of their asset renewals.

GASCOYNE FOODBOWL INITIATIVE PROJECT

- Full take up of the GFBI project expansion has a favourable impact for future price rises to growers. New members, the sale of additional water and the gifted GFBI project assets increases the viability of the Cooperatives and buffers the need to increase prices.
- Government and Cooperatives will need to monitor and adjust to the actual uptake of the GFBI project with respect to the financial impacts.

GOVERNANCE STRUCTURES

- Retaining a business as usual arrangement with GWC and the Water Corporation both acting as bulk water suppliers will allow the Cooperatives to improve performance and has the lowest price increases for growers in the order of approximately 40 per cent.
- There is no or little significant economic advantage of a single bulk water supplier with price increases of a similar magnitude for both GWC (55 per cent) and the Water Corporation (60 per cent).

CAPACITY TO PAY

- The impact of price increases on growers' viability will vary from grower to grower and it is difficult to determine exactly what growers can sustain.
- The DAFWA capacity to pay work indicates the impact of:
  - *increases below 10 per cent are considered viable;*
  - *increases greater than 50 per cent are likely to put substantial pressure on the industry; and*
  - *increases between 10–50 per cent is unclear and will vary from grower to grower.*
- Higher price increases to growers are likely to place pressure on the industry and result in structural adjustments.
- See Table 4 for a worked example of the water charges for each year until 2025 for a 30 per cent price and a worked example for two growers with different levels of water use (with assumed CPI of 2.5 per cent).

SUBSIDIES

- A significant factor influencing the price of water is capital costs, for example the replacement of the southern borefield collector main has a significant impact on prices.
- Subsidies could take the form of capital injection, such as through Royalties for Regions, or a year on year operating subsidy.
- There is merit in considering support for capital works rather than only annual operating subsidies particularly if this opens up opportunities for joint federal funding or improved tax opportunities.
- The Cooperatives have expressed a preference for capital injection rather than operating subsidy.
- A range of price increases and associated operating subsidies is provided in Table 3 below.

TABLE 3: EXAMPLES OF PRICE INCREASES AND ASSOCIATED OPERATING SUBSIDIES (BELOW)

Scenario	Business as usual – the Water Corporation operates southern borefield. GWC operates northern borefield, GFB expansion with 100% take up					GWC sole operator[4], GFB expansion with 100% take up	
	Extreme O.S to Water Corporation	High O.S to Water Corporation	Govt funds southern borefield main	Moderate Subsidy	Full cost recovery- No O.S	Govt funds southern borefield main	No direct subsidy, GWC funds $25 m southern borefield main
Estimated price increase for growers Favourable tax (Note 1)	0%	10%	20%	30%	40%	5% -20%	50% 20%
Increase in Water Corporation bulk water charge	0%	35%	66%	98%	132%	n.a.	
Estimated increase in subsidies Capital	N/A	N/A	$16 m [1]	$9 m	$0 m	$24.7 m (SBF)[1] $6 m (TWS)[2]	$6 m (TWS)[2]
OR Ongoing[3]	$2.1 m/yr ($33 m)	$1.5 m/yr ($24 m)	$0.9 m/yr	$0.5 m/yr	$0 m	$0 m	$0 m

[1] Assumes Government (R4R of federal) pays to replace the southern borefield main. Note $24.7 million is $22 million in Present Value (PV) terms assuming only the GWC proportion is funded requires 16 million PV. [2]If Government chooses to gift GWC the southern borefield a dedicated town water supply main is required estimated cost $6 million [3]Numbers are in Present Values terms over the 10 years. [4]The increase in subsidies relating to the reallocation of fixed costs to other regional customers is almost exactly offset by the reduced ongoing subsidy payments to Water Corporation from no longer contributing the southern borefield main. The removal of GWC as a customer for Water Corporation would result in reallocation of $7 million of overhead costs to metropolitan customers.

TABLE 4: EXAMPLE OF PRICE INCREASES OVER TIME BASED ON 30% RETAIL PRICE INCREASE

Price	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026+
Real prices (i.e. without inflation)												
GWAMCO ($/member/year)	2 000	2 060	2 120	2 180	2 240	2 300	2 360	2 420	2 480	2 540	2 600	2 600
GWC Fixed ($/kL)	0.240	0.247	0.254	0.262	0.269	0.276	0.283	0.290	0.298	0.305	0.312	0.312
GWC Variable ($/kL)	0.110	0.113	0.117	0.120	0.123	0.127	0.130	0.133	0.136	0.140	0.143	0.143
Nominal prices (i.e. including inflation)												
GWAMCO ($/member/year)	2 000	2 112	2 227	2 348	2 473	2 602	2 737	2 877	3 022	3 172	3 328	+CPI each year
GWC Fixed ($/kL)	0.240	0.253	0.267	0.282	0.297	0.312	0.328	0.345	0.363	0.381	0.399	+CPI each year
GWC Variable ($/kL)	0.110	0.116	0.123	0.129	0.136	0.143	0.151	0.158	0.166	0.174	0.183	+CPI each year

	YEAR 2014					YEAR 2025				
	GWAMCO	GWC		Total		GWAMCO	GWC		Total	
	Fixed Asset	Fixed Charge	Variable Charge			Fixed Asset	Fixed Charge	Variable Charge		
	$2 000 member	$0.24/kL	$0.11/kL	$	$/kL used	$3 328/ member	$0.399/kL	$0.183/kL	$	$/kL used
10 000 kL Entitlement										
100% use	$2 000	$2 400	$1 100	$5 500	$0.55/kL	$3 328	$3 990	$1 830	$9 148	$0.91/kL
80% use	$2 000	$2 400	$880	$5 280	$0.66/kL	$3 328	$3 990	$1 464	$8 782	$1.10/kL
120 000 kL Entitlement										
100% use	$2 000	$28 800	$13 200	$44 000	$0.37/kL	$3 328	$47 880	$21 960	$73 168	$0.61/kL
80% use	$2 000	$28 800	$10 560	$41 360	$0.43/kL	$3 328	$47 880	$17 568	$68 776	$0.72/kL

7. WATER RESOURCE MANAGEMENT AND WATER ALLOCATION

The DoW allocates groundwater from the Lower Gascoyne River aquifer system in accordance with the *Lower Gascoyne water allocation plan*, which was released in October 2011. The plan built on long standing 'rules of the river', the previous 2004 allocation plan and advice from the Carnarvon Water Allocation Advisory Committee (CWAAC).

Over the past four years (May 2010 to April 2015) the river flow and aquifer storage conditions have seen a number of extremes which have tested our understanding of the system and its resilience to extreme events. These include:

- the biggest flood on record in December 2010 (7.9 m at Nine Mile bridge) causing $90 million damage to infrastructure and horticultural production;
- four years without a major river flow (last time this occurred was 1910–1914);
- post the major flood brackish groundwater and surface water flows recharged aquifers with brackish (rather than fresh) water adversely impacting take in Subarea A for several years;
- clear identification and widespread acknowledgement of peak water demand period;
- development of the northern borefield as a major water supply for irrigation; and
- increased water usage by the industry.

Supply constraints from 2012 to 2014 created a difficult business environment for growers. Aquifer decline, water quality and infrastructure issues created considerable uncertainty about supply.

The lack of flow from 2012 to 2014 resulted in the lowest aquifer storage levels on record and provided valuable information on how the aquifer behaves under extreme circumstances. Prior to this the DoW only had a conceptual understanding of what would happen after four years of abstraction without recharge and how the aquifer would recover. Although these events have caused much hardship for the irrigation industry, they have also stretched our knowledge of appropriate management of the water resource. These learnings have provided some additional actions by the DoW and water service providers as outlined below.

7.1 Findings and Recommendations

7.1.1 Improved Aquifer Modelling Tool

Recommendation 12.1 – CMAC recommends an accelerated upgrade of the groundwater flow model GASFAMS v1.2, with the first stage completed by December 2015. This update, GASFAMS v1.3, will incorporate the initial results (bore logs, aquifer test data and water quality data) from the GFBI project northern borefield drilling project. It will be coupled with recent data from the extended no flow period and the subsequent recharge event.

The current groundwater flow and solute model for the Lower Gascoyne alluvial aquifers is the GASFAMS, version 1.2. The model was used to run various allocation scenarios in developing the allocation limits for the *Lower Gascoyne water allocation plan* (DoW 2011).

The data collected over the past five years and the detailed monitoring work undertaken provides a significant opportunity to improve and use the model to provide medium term outlooks for water security.

An upgraded GASFAMS v1.3 model will be able to provide a more confident estimation of aquifer recharge, storage and sustainability of the water resource. The outcomes of the modelling review will underpin licensing and management decisions required to support the current Carnarvon horticultural district and the proposed GFBI project expansion, and assist in the sustainable management of the Gascoyne River alluvial aquifer. It will also result in the design of an upgraded monitoring program for the alluvial aquifers that reflects current infrastructure, knowledge and extraction.

Ultimately, inclusion of the high resolution Airborne Electro-Magnetic Survey data for Subarea A and Subareas B–L will further improve the resolution of the model and will be included in the model upgrade currently scheduled for 2017 (GASFAMS v1.4). The 2017 upgrade will also incorporate the survey data and information collected from the active northern borefield and the GFBI exploratory drilling in the 25–33km area, which can then be used to assess aquifer performance, any allocation limit revision and will be used in the review of the *Lower Gascoyne water allocation plan* in 2018.

Recommendation 12.2 – A GASFAMS "Lite" version is developed for local usage that will enable DoW staff to use the model for local decision making and quarterly aquifer status reporting.

The GASFAMS model is a complex tool that will underpin future water allocation decisions. However due to its size and complexity, significant expertise is needed to use it. This limits its application for local use.

7.1.2 Improved Seasonal Predictions

Recommendation 13 – To alleviate uncertainty about water supply security it is recommended that medium term (three to five year) outlooks are generated annually to inform growers and water service providers on current, short term and medium term water availability.

The aim of a medium term outlook would be to:

- announce 12-month water resource availability;
- support the release of GWC seasonal share announcements;
- provide estimates of water resource availability for two to five years based on the initial aquifer status, seasonal outlooks and historical data; and
- predict temporary allocation limit changes as per the plan.

This information would allow the bulk water providers to take a longer term, integrated approach in managing the borefields. It will allow them to optimise their medium term supply and manage infrastructure issues needed to ensure sustained supply.

This information would assist the GWC to plan future delivery, their seasonal announcements and enable growers to make informed business decisions. Increased supply security will also support trading of unused shareholdings through increased grower confidence.

To support this it is recommended that the DoW refines the application of the management triggers and responses in the *Lower Gascoyne water allocation plan* to facilitate the use of medium term outlooks. It will consider the improved aquifer understanding from the 2011 to 2014 and the model upgrades planned for 2015 and 2017.

7.1.3 Increase Water Trading

Recommendation 14 – CMAC recommends the release of water through temporary or permanent trading of C Class GWC shares be actively supported and developed by:

- **improving grower security of supply;**
- **adoption of a pool-based trading program, administered by the Cooperative, that is impartial and considers the offset of fixed costs; and**
- **informing the grower community on the risks and benefits of water trading.**

Trading of water entitlements is not a common practice in the Lower Gascoyne. Although trading in Subarea A is limited to trades between licensed groundwater landholders (while the subarea is over-allocated), scheme water can be freely traded as GWC shareholdings.

All GWC members are able to temporary trade part of their allocation with another member at any time of the year. The negotiations and payment for temporary water trades is done between members who agree on the price and quantity of water to be traded.

The low level of water trading appears to be reflecting long term concerns by growers about water security and many growers see the financial cost of holding unused water as a necessary part of maintaining on farm water security. The inability of the scheme to meet peak period demand has meant there is a belief by growers that trading increases competition during peak demand periods.

Trading is also constrained due to the mechanism used. As trades are done on a direct buyer seller basis, selective trading occurs as growers minimise potential market competition or make decisions based on social issues. Secondly, temporary trade prices do not generally consider the full water price and opportunity cost of not using all available water.

As a result share allocations are not freely traded and GWC has does not sell or distribute its full licence entitlement. This indicates there is unused water within the system and also results in the loss of income for the Cooperative, higher proportion of fixed charges for those with unused water, and loss of opportunity for growers with limited annual water supplies. There are areas of undeveloped land within the current horticultural area even though there is a significant portion of the GWC shareholder allocation that is unused.

To achieve an environment where active trading can occur there must be:

- water security – all growers must be able to access their full entitlements as needed;
- knowledge – shareholders must understand the mechanisms and opportunities;
- impartiality – an open and impartial process to buy and sell; and
- benefit – there must be a positive return, whether financial or personal, to the individuals.

7.1.4 Short Term Response Plan

Recommendation 15 – CMAC recommends that the DoW, Cooperatives and the Water Corporation prepare a 'Peak Demand Response Plan' by 31 August each year to address peak demand responses for the coming October to January period.

In March 2014, the CMAC prepared the *Carnarvon Irrigation District Short Term Response Plan November 2013 – April 2014* (Appendix 3) outlining the introduction of a range of water management.

7.1.5 Lower Gascoyne Water Allocation Plan

Recommendation 16 – CMAC supports the DoW's revision of the current 2011 *Lower Gascoyne water allocation plan* to include all new information, as proposed, in 2018.

The Lower Gascoyne allocation plan defines:

- the groundwater resources in the plan area;
- the water resource and water management objectives that will be used to determine the effectiveness of the plan and its management;
- allocation limits set for each resource for consumptive use (both licensed and exempt-from-licensing);
- allocation and licensing policies (legislative requirements, licensing policies and rules) that provide the guidance and decision-making framework for all licences in the plan area;
- monitoring and measurement program to track how the resource is responding; and
- how the plan will be implemented, including the management triggers and responses and regularly evaluated.

The proposed revision of the current allocation plan in approximately 2018 will be timed to ensure the following issues have been completed prior to the plan update:

- the full development of infrastructure and to test the allocation limits for the northern borefield – both the GWC / GWMCO borefield and the GFB borefield;
- determination of a single bulk supplier; and
- the next recoup program for Subarea A proposed in late 2017 (following three years of 'normal' flow starting 2015).

8. COMMUNICATIONS

Ongoing and short-term communication to the 180 horticultural growers in Carnarvon is the shared responsibility of the DoW, GWC, GWAMCO, DAFWA, Water Corporation and the Carnarvon Growers Association.

It was recognised in 2013 that communications between agencies, the Cooperatives and the growers was ad hoc. At the same time there was also a strong interest and commitment to understand water management issues and CMAC recommends this dialogue be maintained.

To ensure that effective, consistent and coordinated communications occur into the future, the DoW in consultation with the CMAC members, has developed and is leading the implementation of the Carnarvon irrigation area communication and engagement strategy (Appendix 11). The purpose of the strategy is to:

1. inform Carnarvon irrigation growers, water service providers, other stakeholders and Government agencies of activities to address Carnarvon's short term water supply challenges;
2. identify and address misconceptions associated water supply and water resource issues;
3. understand and respond to the expectations of stakeholders and community;
4. inform all key stakeholders on CMAC's findings and recommendations (subject to Ministerial approval); and
5. maintain effective delivery of accurate and timely information to all stakeholders to improve understanding of annual and longer term water allocation, water availability, water supply and water resource management processes and issues.

At the CMAC meeting of 10 February 2015, CMAC members agreed that as CMAC is a key part of the strategy developed by the DoW, a stand-alone and separate CMAC communication strategy is not needed.

In addition, CMAC members ensured there were several communications opportunities centred around the CMAC meetings. These included ad hoc stakeholder meetings, informal discussions and importantly, three annual grower meetings to convey key findings and actions. CMAC representatives also updated and briefed the Ministers for Water and Agricultural and Food throughout the process.

However, throughout the CMAC process there has been no interactive and collaborative communications program, despite CMAC's recommendations (July 2014).

Recommendation 17 – CMAC strongly recommends that communications be addressed with genuine purpose and involve all parties, particularly the Cooperatives and growers and the agencies DoW, Water Corporation and DAFWA as equal partners.

TABLE OF RECOMMENDATIONS

Recommendation	**Page no.**
Recommendation 7 – Ownership of GFBI project borefield assets DAFWA will not be the long-term owner or operator of the GFBI project borefield and pipeline assets.	27
Recommendation 8 – GFBI project Infrastructure timetable DAFWA has informed CMAC that it anticipates the GFBI project borefield development out to 24 km (as per engineering designs in recommendation 5) including electrification and the collector main pipeline will be completed by September 2016 in line with the agreement for funding from Royalties for Regions.	27
Recommendation 9 – Temporary use of GFBI project water CMAC supports the Minister for Agriculture and Food and DAFWA announcement that any water that can be obtained from the extended GFBI project will be available through the Cooperatives to current growers on a temporary basis while land release processes are being completed.	28
Recommendation 10 – Financial viability of the Cooperatives It is recommended that the Cooperatives implement price structures (increases) that reflect actual take up of GFBI project water to: • recover all costs associated with the diligent operations and maintenance of the scheme; and • collect sufficient monies to cover the cost of all future asset renewals of all assets over the asset life.	31
Recommendation 11 – Full cost recovery versus subsidies CMAC recommends that any level of financial assistance offered should be determined by Government and be provided in line with the Cooperatives meeting agreed performance outcomes.	31
Recommendation 12.1 – Improved Aquifer Modelling Tools CMAC recommends an accelerated upgrade of the groundwater flow model GASFAMS v1.2, with the first stage completed by December 2015. This update, GASFAMS v1.3, will incorporate the initial results (bore logs, aquifer test data and water quality data) from the GFBI project northern borefield drilling project. It will be coupled with recent data from the extended no flow period and the subsequent recharge event.	35
Recommendation 12.2 – Improved Aquifer Modelling Tools A GASFAMS "Lite" version is developed for local usage that will enable DoW staff to use the model for local decision making and quarterly aquifer status reporting	36
Recommendation 13 – Improved Seasonal Predictions To alleviate uncertainty about water supply security it is recommended that medium term (three to five year) outlooks are generated annually to inform growers and water service providers on current, short term and medium term water availability.	36
Recommendation 14 – Increase Water Trading CMAC recommends the release of water through temporary or permanent trading of C Class GWC shares be actively supported and developed by: • improving grower security of supply; • adoption of a pool based trading program, administered by the Cooperative, that is impartial and considers the offset of fixed costs; and • informing the grower community on the risks and benefits of water trading.	37

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Recommendation	**Page no.**
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Recommendation 16 – Lower Gascoyne water allocation plan CMAC supports the DoW's revision of the current 2011 *Lower Gascoyne water allocation plan* as proposed in 2018.	38
Recommendation 17 – Communications CMAC strongly recommends that the matter of communications be addressed with genuine purpose and involve all parties, particularly the Cooperatives and growers and the agencies DoW, Water Corporation and DAFWA as equal partners.	39

GLOSSARY

Acronym	Meaning
BAU	Business as Usual
CABAG	Carnarvon Artesian Basin Advisory Group
CMAC	Carnarvon Ministerial Advisory Committee
COAG	Council of Australian Governments
CPI	Consumer Price Index
CWAAC	Carnarvon Water Allocation Advisory Committee
DAFWA	Department of Agriculture and Food, Western Australia
DoL	Department of Lands
DoW	Department of Water
DRD	Department of Regional Development
EM	Ground based electromagnetic surveys
EoI	Expression of Interest
FAO	Food and Agriculture Organization of the United Nations
GASFAMS	Gascoyne Floodplain Aquifer Modelling System
GDC	Gascoyne Development Commission
GFBI	Gascoyne Food Bowl Initiative
GIP	Gascoyne Irrigation Pipeline
GIPP	Gascoyne Irrigation Pipeline Project
GWAMCO	Gascoyne Water Assets Management Cooperative
GWC	Gascoyne Water Cooperative
ha	hectares
HDPE	High Density Polyethylene pipe
km	kilometres
LCC	[Gascoyne Food Bowl] Local Consultative Committee
LMA	Local Management Arrangement (Queensland)
SCADA	Supervisory Control and Data Acquisition
WAPC	Western Australian Planning Commission

Volumes of Water

One litre	1 litre	1 litre	(L)
One thousand litres	1 000 litres	1 kilolitre	(kL)
One million litres	1 000 000 litres	1 Megalitre	(ML)
One thousand million litres	1 000 000 000 litres	1 Gigalitre	(GL)
Litres per second			(L/s)
Gigalitres per year			(GL/yr)