Government of South Australia
Department for Environment and Water

SOUTH AUSTRALIA - ADDITIONAL EFFICIENCY MEASURES CRITERIA ASSESSMENT OUTCOME

Project Reference No:	267387
Outcome:	Compliant with the Efficiency Measures assessment
Date recommended to proceed to public comment	10 September 2020
Date recommended to proceed to the Australian Government's detailed assessment stage	18 December 2020

Overview

The project is proposing to undertake upgrades across 109.4ha of existing citrus and stonefuit properties located near Pyap in the Riverland region of SA.

Water savings will be generated through the installation of 3 separate netting structures over young citrus plantings along with the redevelopment of an under-tree irrigated stonefruit property. The stonefruit property will be connected into the existing irrigation system on the applicant's home property (70ha) which utilises precision fertigation, filtration and control and is fully automated. A small area of existing but aging and under-performing surface drip irrigation will also be replaced and modernised as part of the project and additional soil moisture probes will be installed into areas that do not currently have any soil water monitoring devices.

The works are projected to significantly increase (~30%) the productivity of on-farm water use primarily through the production of higher quality citrus fruit which commands a premium price in the market. The applicant has existing areas of netted plantings that consistently produce higher grade fruit on lower water use levels resulting in a much greater return per ML applied.

The property currently supplies fruit to a local packing shed and therefore the increased production will have flow on benefits beyond the farm gate and assist with securing employment within the fruit packing, distribution and marketing networks. While extreme weather events (e.g. hail, intense rainfall) that can cause complete crop failure are uncommon, the proposed netting structures will provide protection and insurance against these events which place enterprises under serious financial stress when they do occur.

All proposed works will occur within the existing irrigated footprint of the properties and therefore do not require the removal, or disturbance of any native vegetation. While the properties are serviced by private irrigation diversions, no works are proposed at the pump stations or rising mains so no risk is proposed to areas of high indigenous and/or cultural significance. The proposed works will contribute to improved irrigation practices and therefore minimise any irrigation induced impacts on surrounding wetlands, floodplains and the River Murray.

Part 1 - State Assessment - Efficiency Measures criteria

Assessment Approach

This State Assessment is reliant on the information provided by the applicant. The comments provide a summary of the information provided by the applicant which is deemed relevant by the assessor to demonstrate that the Efficiency Measures – Agreed Criteria have been met.

Water Savings Substantiation

The water savings expected to be achieved by the project have been verified by an Independent Approved Irrigation Professional.

From a water use efficiency perspective, permanent netting has been shown to significantly reduce the rate of evapotranspiration which has a direct relationship to irrigation requirements. The key driver of the reduction in evapotranspiration is the effect that permanent netting has on reducing wind speeds inside the netted areas compared to the observations taken outside of the nets. Netting also provides protection against heavy rainfall and hail which can potentially wipe out entire crops at major economic cost.

The project is expected to return a conservative 154.3 ML to the environment, with the applicant retaining 20.6 ML of water savings.

Water Saving Component	Area ha	Water Saving (ML/ha)	Estimated Water Saving (ML)	Total volume of Eligible Water Rights offered for transfer (ML)
Installation of Permanent Netting Enclosures	28.1	3-4	112.4	154.3
Crop Type Change (Stonefruit - Citrus)	11.2	3.8	42.6	
Drip Replacement, Filtration	10.4	1	10.4	
New Soil Moisture Monitoring	18.9	0.5	9.5	
Total Water Saving			**174.9**	

Efficiency Measures Criteria	Project Responses to Efficiency Measures Criteria	Adequate Response Y/N	State Assessment
Evidence of engagement with community, industry and government agencies during project design (Criteria 9, 6a, 6b)	6a. N/A - Private diverter 6b. While the property is not located within an irrigation network (private diverter) the works will ensure the future viability, sustainability and adaptability of the business. The Citrus industry is a critical sector of the Riverland ensuring the on-going sustainability and profitability of the industry has major flow on benefits to local towns, the Riverland region, the State and the nation. The project will assist to ensure the citrus industry retains a critical mass which will contribute to industry support programs such as local research, development, extension and adoption activities. The project will also generate year on year water savings which will not only assist the participating business but also the irrigation industry more broadly by reducing annual allocation leasing requirements. 9a. The delivery partner and proponent have consulted the state peak body Citrus Australia South Australia (CASA) along with local government, relevant regional bodies and key stakeholders. 9b. Through the consultation process the	Y	The application has demonstrated that the delivery partner has consulted with relevant industry bodies, Irrigation Infrastructure Operators, local governments and regional development organisations on a strategic regional approach to developing projects under the Water Efficiency Program. The proposed project is not located within an irrigation network, so the application is not required to provide evidence that the relevant network operator or water corporation is involved in or aware of the project.

	proponent has identified specialised citrus varieties that will be analysed for profitability and production to help future market development and promotion of the industry.		
Potential Direct Water Market Impacts (Criteria 7a, 7b, 7c, 7d)	7a. The water savings nominated for this proposal are based on accepted industry benchmarks for the types of irrigation modernisation activities being undertaken. The nominated water savings have been subjected to a technical assessment by an Independent Approved Irrigation Professional (IAIP). The assessed water saving for the proposal exceeds the volume to be returned and therefore the proponent will retain a share of the water saving which will contribute to enhanced adaptability, flexibility and resilience into the future. 7b. Attachment C_E confirms the nominated water access entitlements have been owned for well over the 3 year requirement. 7c. This project is proposing to return SA Class 3 (High Security) water entitlements and therefore will not have a direct impact on reliability of water given current requirements for delivery to the SA Murray system. 7d. The volume of water (154.3ML) that will be surrendered through this proposal will not impact on the price of water. The	Y	The application has demonstrated that: • The water rights to be transferred as part of the project have been independently verified as a conservative estimate of the water savings that can be generated and that the project will not transfer more water than the project will save. • The water entitlements to be transferred have been held for a minimum of 3 years at the time of application. • The project will generate water savings above the volume returned to the environment and will effectively increase the water available for productive uses in the consumptive pool. The increase in available water will have no direct impact on reliability, and will put downward pressure on water market prices.

	improvements in irrigation efficiency will also yield retained savings (20.6ML) for the applicant which will reduce annual allocation market requirements further substantiating that the project will not impact on the price of water. This will mean the business is less exposed to price fluctuations in the allocation market and will result in additional water being available in the broader consumptive pool due to the reduced demand.		
Contribution to Proponent Businesses and Irrigation District Viability (Criteria 4a, 4b, 4c)	4a. This project will deliver significantly increased productivity in terms of returns per ML to the participating business which will in turn facilitate increased business profitability. In financial terms the modernised plantings and irrigation are expected to increase the annual turnover of the enterprise by approximately 40% compared with the existing planting composition. While the netting represents a significant capital expenditure, the improved returns that will be generated will ensure a relative short payback period. The nets will also ensure more stable season to season production due to protection it will provide from severe weather events. This will ensure the business is more resilient and sustainable into the future. 4b. The proponent is a private diverter and is not part of an irrigation infrastructure operator network. The proposed works are	Y	The application has demonstrated that: • The project will contribute to the current and future financial viability of the irrigation district/region by increasing the annual turnover of the enterprise by approximately 40% compared with the existing planting composition. • The project is focused on modernising existing inefficient irrigation systems which will underpin irrigation management into the future and will not upgrade water supply infrastructure where the system, or parts of the system, are not going to be used in the future. The project is not located within an irrigation network, so the application is not required to take account of relevant irrigation business' strategies or plans.

	focused on modernising existing inefficient irrigation systems which will underpin irrigation management into the future. 4c. The applicant is a private diverter and not part of an irrigation infrastructure operator network. The properties to be upgraded are however located in the Kingston on Murray Land & Water Management Plan Area (P-KoM LWMP). The key objectives of the P-KoM LWMP are to foster sustainable irrigation practices in the region and also to develop landholder capacity to adapt to climate risks and variable resource availability which this proposal is very well aligned with.		
Support for Regional Economies (Criteria 5, 6c)	5a. The citrus industry is an important sector of the Riverland and SA State economy. This project will ensure the longer term sustainability of a family owned and operated business which employs local people both on a permanent and seasonal basis. The goods and services for this proposal will also be sourced from SA based companies. Works contractors will utilise local accommodation when undertaking the installation of netting which will add further economic stimulus to the Riverland community. Local businesses will also benefit from the on-going sourcing of local farm input supplies by the participating business.	Y	The application has demonstrated that the project will: • Support the citrus industry which is an important sector of the Riverland and SA State economy. • Increase water use efficiency in ways that align with current strategic plans developed by Citrus Australia for the ongoing prosperity of growers maximising returns, developing markets, protection of production through biosecurity, using resources responsibility and respecting the environment. • Increase the overall productive capacity of the Riverland region and Riverland citrus industry by contributing to industry support programs such as local research, development, extension and

	5b. This project is directly contributing to an increase in productivity in terms of return per ML. This will provide the enterprise with longer term resilience and viability which will have flow on benefits to the local, regional and State economies. 5c. This proposal will add further scale to the existing Riverland citrus industry, adding supply to a local pack house and distributor which supplies the Australian market and exports to over 20 countries. This will assist to ensure the citrus industry retains a critical mass which will contribute to industry support programs such as local research, development, extension and adoption activities. 5d. The proposal will also lead to an increase in seasonal employment during the harvest period along with engaging local contractors during the redevelopment and construction phase. 6c. The proposal will also contribute to improved water use efficiency on a year on year basis. The enterprise currently operates a mixed portfolio with owned entitlement and participates in the annual allocation market to meet overall crop water requirements. An additional conservative 20.6ML of the assessed water savings will be retained by the applicant as a result of implementing the proposal which will reduce		adoption activities. • Lead to an increase in seasonal employment during the harvest period along with engaging local contractors during the redevelopment and construction phase. • Generate benefits for the broader region and not just the applicant through sourcing of local farm input supplies by the participating business and generating regional employment. • Increase regional and Basin wide productivity through increasing the volume of water available for consumptive uses on the water market.

	the reliance on the annual allocation market even after taking into account the return of held water access entitlements. This will have a net positive outcome on water availability within the consumptive pool.		
Social and Environmental Benefits (Criteria 2a, 2b, 2c)	2a. This project represents a significant investment in a family owned and operated farming enterprise that will assist with sustaining the business into the future. The main component of the project is the installation of 28.1ha of netting which is expected to generate significant water and production efficiencies. The proponent has been directly involved in applied research assessing the benefits of netting and therefore has firsthand experience and knowledge of the water and productivity improvements that can be generated through netting irrigated patches. The business is already a significant employer of both full time and casual (seasonal) staff and this project will increase the requirements for seasonal labour which will bring further benefit to the broader Riverland region. All works will be completed by SA based companies meaning the investment will provide economic stimulus to the region and beyond. The investment in the netting will also provide an opportunity to further showcase the benefits of netting to other	Y	The application has: • Described the expected socio-economic and environmental benefits of their proposed project which include: ○ Increased productivity in terms of return per ML for the business and region. ○ Improving the business's long term resilience and viability which will have flow on benefits to the local, regional and State economies. ○ Sourcing of goods and services for the project from local companies which will add further economic stimulus to the Riverland community. ○ Increased enterprise annual turnover by approximately 40% compared with the existing planting composition. ○ Increased regional and Basin wide productivity through increasing the volume of water available for consumptive uses on the water market. • The proposed works are on-farm and will not affect the amenity to local communities of weirs, storages and parks. Accordingly, 2b is not

	growers which will facilitate further gains being made and assisting irrigated businesses to be more sustainable and resilient into the future. As the proponents have been directly involved in on-ground applied research on netting, they have a high degree of confidence that nominated outcomes will be achieved and adds value to their business in a way that delivers positive socio-economic outcomes. 2b. N/A 2c. N/A		applicable. The project is below the $4 million threshold for large projects and is not required to address criteria 2c.
Comply with all relevant laws including work health and safety laws. (Criteria 2d)	2d. The Delivery Partner and applicant share a strong safety focus across their respective business areas and comply with all regulations and laws to maintain a healthy and safe environment. Council planning approval is required for the installation of the netting which has been applied for and approval is pending noting there are currently long lead times to secure netting contractors. The applicant has also received previous Australian Government irrigation grants and therefore has a clear understanding of roles, responsibilities and expectations with respect to the safe implementation of Australian Government funded works.	Y	The application has demonstrated that the applicant and delivery partner have an understanding of all relevant legislation or regulation that will require approval prior to works commencing and that they will comply with all relevant laws including work health and safety laws.
Business Resilience, including Drought	10a. This has been addressed in the	Y	The application has demonstrated that the project

and Climate Change Impacts (Criteria 10a, 13a, 12)	responses to criteria 5 and 9. 12a. The nominated water savings have been subjected to a technical assessment by an Independent Approved Irrigation Professional (IAIP). The water savings have also been prepared based on accepted benchmarks for the types of activities being undertaken. The applicant has also been directly involved in applied research projects on the benefits of permanent netting on horticultural crops in the Riverland. 13a. As covered in previous criteria responses the proposed works are expected to generate significant productivity improvements for the enterprise and hence improved enterprise level profitability. This will provide the enterprise with an increased ability to endure and adapt to future climate variability and water availability. The proposed project aligns with the Citrus Australia priority policy on climate change where it states: • Recognise the citrus industry as an efficient user of water with a light environmental footprint. • Support for increased government grants and R&D into adaptation, biosecurity and value chain strategies that address climate variability, improve energy efficiency and reduce direct emissions.		will: • Increase water use efficiency in ways that address strategic plans developed by Citrus Australia for the ongoing prosperity of growers maximising returns, developing markets, protection of production through biosecurity, using resources responsibility and respecting the environment. • Address under-performing irrigation areas which will allow water to be used as efficiently as possible while maximising output (yield). • Generate additional water savings that will be retained by the applicant to improve the capacity of the proponent to better manage periods of reduced water availability. • Provide the enterprise with an increased ability to endure and adapt to future climate variability and water availability by generating productivity improvements and improving profitability.

Cultural Benefits **(Criteria 8a, 8b, 8c)**	8a. The works will facilitate social and lifestyle benefits for the proponent's family owned and operated business ensuring that they can continue to be active member of, and contributors to the local community. Irrigated agriculture underpins the Riverland community and therefore investment that enables irrigated businesses to be more sustainable into the future deliver significant socio-economic benefits at the local community, regional and State scale. The water returns achieved through projects such as this assist to improve the health of the River Murray and associated environments across the Basin. 8b. Goods and services for the project will be sourced from SA based companies and local contractors and the proposed works will enhance the resilience and adaptability of the participating business. The water recovered through the project will become part of e-water holder's portfolio which will benefit environmental assets across the Basin 8c. N/A	Y	The application has described the expected cultural benefits of the proposed project, including the strategy for increasing the cultural benefit to participants and their communities through local sourcing of goods, services and labour. The total project value is below $3 million and is not required to identify cultural heritage sites and manage any impacts in accordance with relevant Commonwealth and State laws.

In-Principle Recommendation

The application has adequately addressed the Efficiency Measures – Agreed Criteria and demonstrated that the project will have neutral or positive socio-economic impacts and not have negative third party impacts on irrigation systems, water markets or regional communities.

Accordingly, the South Australian Government provides in-principle approval for the project and recommends that the application proceed to the **public comment stage**.

Part 2 - State Response – Public Comments

Relevant Public Comments to be responded to	Response to Relevant Public Comments
While the amount of water to be recovered is relatively small, it is the cumulative impact of additional water recoveries that amount to significant third party impacts.	The South Australian Government prefers efficiency measures to recover water for the environment, as they provide real and positive outcomes to irrigation businesses, while supporting communities that would otherwise be hard hit by the reduction in regional productivity or the closure of businesses through water leaving the consumptive pool through buybacks. Unlike water buybacks that remove water from the consumptive pool, efficiency measures increase the volume of water available. Properly constructed efficiency measures projects recover water that is effectively "lost" through evaporation, leaky infrastructure and inefficient irrigation systems or overwatering and is unavailable for use until projects are completed. The water savings for all South Australian on-farm projects have been independently verified as a conservative estimated of water savings. Those water savings were not previously available to the consumptive pool. Additionally, proponents of all on farm projects in South Australia under the efficiency measures program have retained a portion (ranging from 12 percent to 89 percent) of the water savings with this increasing supply and putting downward pressure on water market prices. Accordingly, South Australian projects are increasing the water available for consumptive uses across the southern connected Murray-Darling Basin and have not reduced the amount of water available for agricultural use.
Any project that decreases the total pool available to food production results in negative outcomes as there will simply be less water available for agriculture.	
On-farm projects reduce the total amount of water available to agriculture. While this proponent claims they will become more efficient with their water use, agriculture as a whole in the Basin will be worse off as there is simply less for agriculture to use.	

Relevant Public Comments to be responded to	Response to Relevant Public Comments
On-farm efficiency measures are creating upward pressure on water prices as reported in independent research completed by ABARES and Aither and do not meet principle 7d – Projects must not directly increase the price of water.	Both the ABARE and Aither reports have acknowledged that it is difficult to separate the impact of water recovery from other major trends such as climate change and the significant growth in industries and as such the findings should be treated with caution. The ABARE report draws heavily on a recent study undertaken by ABARES, available at https://onlinelibrary.wiley.com/doi/full/10.1111/1467-8462.12396?af=R This study found that some on-farm program participants subsequently purchased water to increase their irrigated production. The study did not however directly link this to participation in the program and noted that many other demographic and economic factors are likely to influence business decisions. In fact, it is specifically stated that the study did not attempt to define or separately quantify direct and indirect effects of on-farm efficiency measures projects on water prices. The ABARES study also evaluated many projects that would not meet the criteria agreed by the MDB Ministerial Council and as a result, no conclusions can be drawn between the findings of this study and on-farm efficiency measures projects that have been submitted since these criteria were agreed. The Aither report appears to treat water recovered through on-farm efficiency measures the same as buybacks. This fails to recognise that on-farm efficiency measures are reducing demand by the same amount and in most cases more than the corresponding reduction in supply. Accordingly, it would be incorrect to infer that South Australian on-farm projects are directly attributable to increased water use and higher water market prices when they are consistently reducing water demand and increasing supply. Any expansion of irrigated area and hence water use that occurs post on-farm project is an indirect effect of the program and is likely to be driven by many other complex and interrelated economic and social factors. These indirect impacts are not considered as part of the socio economic assessment.
Independent research over a number of years, most recently from the University of Adelaide, has demonstrated that irrigators who participate in on-farm projects are highly likely to purchase additional water following the implementation of the project and the resulting increase in enterprise profitability.	

Relevant Public Comments to be responded to	Response to Relevant Public Comments
The application does not provide details of how it will impact the irrigation network, nor does it provide details of the local and regional plans for the area and how the project aligns with relevant objectives.	These criteria have been addressed in various places in the application and the proponent has demonstrated that their proposed project will: • Increase productivity in terms of return per ML for the business and region. • Improve the business's long term resilience and viability which will have flow on benefits to the local, regional and State economies. • Source goods and services for the project from local companies which will add further economic stimulus to the Riverland community. • Increased regional and Basin wide productivity through increasing the volume of water available for consumptive uses on the water market. The applicant is a private diverter and is not located within an irrigation network, so the application is not required to take account of relevant irrigation business' strategies or plans.

Final Recommendation

The application has adequately addressed the Efficiency Measures – Agreed Criteria and demonstrated that the project will have neutral or positive socio-economic impacts and not have negative third party impacts on irrigation systems, water markets or regional communities. Accordingly, it is recommended that the application proceed to the Australian Government's detailed assessment stage.

Water Savings Substantiation – Water Efficiency Program (WEP) Technical Assessment

Project ID: [redacted]

Crop Type: Citrus/Winegrapes

Project Summary:

The applicant is seeking to install permanent netting on 3 properties comprising a total of 28.1ha of citrus located near [redacted] in the SA Riverland and the irrigation system will also be fully upgraded on one of the properties where the permanent netting is to be installed. On a 4th property existing stone fruit plantings (for dried fruit) that are currently irrigated with aging and inefficient under tree sprinklers will be removed and replaced with lower water use and more profitable citrus varieties and a state of the art surface drip irrigation system.

The permanent netting together with irrigation system upgrades are expected to generate significant water savings and fruit quality improvements contributing to the overall profitability and sustainability of the enterprise.

A conservative water saving of 154.3ML is nominated for the proposal.

Water Saving Methodology:

Anecdotally the water savings generated by permanent netting have been understood to be in the vicinity of 30% however detailed applied research has been undertaken in recent years to better quantify the benefits of the installation of permanent netting over horticultural crops including citrus.

From a water use efficiency perspective permanent netting has been shown to significantly reduce the rate of evapotranspiration which has a direct relationship to irrigation requirements. The key driver of the reduction in evapotranspiration is the effect that permanent netting has on reducing wind speeds inside the netted areas compared to the observations taken outside of the nets. Netting also provides protection against heavy rainfall and hail which can potentially wipe out entire crops at major economic cost.

The table below shows the measured evapotranspiration levels at a citrus orchard (the applicant's orchard) located at Pyap (SA) for netted vs. un-netted patches over the past 3 complete irrigation seasons. As highlighted in the table there is a consistent reduction in the measured evapotranspiration rate ranging from a low of 333.7mm to a high of 663.0mm with an average reduction over the 3 year period of 512.2mm which equates to 5.12ML/ha.

	Evapotranspiration (mm)				
Season	***2018-19***	***2017-18***	***2016-17***	***3 Year Mean***	***Water Use (ML/ha)***
Netted	1,063.8	1,044.5	1,008.4	1,038.9	10.39
Un-Netted	1,603.6	1,378.2	1,671.4	1,551.1	15.51
Difference	539.8	333.7	663.0	512.2	5.12
% ETo Reduction	34%	24%	40%	33%	

Source: https://www.awsnetwork.com.au/

Project Budget:
Project costs have been based on quotes provided by [redacted]

Irrigation/Netting Design:

Designs of the permanent netting and the upgraded irrigation systems have been completed and are included as attachments to the application.

Approvals/Environmental:

Council Approval is required to erect the netting enclosures and a road crossing will also be needed to complete the integration of the Loffler property. All other works and activities will occur within the existing footprint of the property and therefore will not have an adverse environmental impact on the property or surrounds.

The specific irrigation efficiency improvements will contribute to reducing deep drainage beyond the crop root zone and hence improved salinity outcomes for the River Murray.

[redacted]

1 PROJECT DETAILS:

CID Name:	[redacted]	Date:	30/04/2020
CID No:	[redacted]	Client Name:	[redacted]
Project Name:	[redacted]	Project No:	[redacted]
Submitted By:	[redacted]	Contractors:	[redacted]

2 PREAMBLE AND PROJECT SCOPE:

The above project was assessed on the below mentioned scope and is limited to project data supplied, including any documentation and designs as being true and correct in every respect.

I declare, as an Independent Approved Irrigation Professional agreed to under the Deed, that:

a) I have carried out the technical and practical feasibility assessment for the Works; and
b) I have had no previous involvement in preparing this Project Proposal.

I certify that the Project Works are technically and practically feasible, including that:

a) the projected water savings they will generate are reasonable and realistic, including being appropriate to the crops, soils, climates, water delivery system and topography of the Eligible Irrigator's Property;
b) the rationale for the water savings assessment is clearly explained;
c) the projected water savings can be achieved while maintaining the agricultural production potential of the Property on which the Works would be completed as part of a Project;
d) the engineering solutions they entail are achievable and appropriate to the needs of the Eligible Irrigator and the Property;
e) the projected costs are reasonable and realistic, and within the expected range for that type of infrastructure and scale of installation; and
f) the projected water savings they will generate represent the conservative or minimum feasible volume that could be derived from completing the Works.

[redacted]

[redacted]

[redacted]