

An aerial photograph of a vast vineyard during the golden hour of sunset. The rows of grapevines are illuminated by the warm, low sun, creating a rich golden glow. In the background, a small village with several buildings is visible, nestled among trees. The sky is filled with soft, colorful clouds, transitioning from a pale blue to a deep orange near the horizon. A logo consisting of three curved lines in gold, red, and green is positioned on the left side of the image, partially overlapping the vineyard and the text.

*REEF* Research Foundation



# Our Mission

To seek out and investigate diverse projects to review, promote and improve regional Australia's economic, social and environmental future.



# Our Objectives

- To operate as a Not-for-Profit Company limited by Guarantee for the purposes of facilitating the development of projects that are in the Australian national interest and in Regional Australia, particularly in the fields of Resources, Energy and the Environment, but to include any projects in other areas deemed by the Directors of the company to be of significance.
- To use the foundation to promote research, awareness and education to Governments, business and the community as to the economic and social benefits of any particular project.
- To receive funds solely for the purposes of furthering the Company's objectives in the form of voluntary contributions, subscriptions, from fund raising activities, grants and any other independent income, where such funds are applied at the direction of the Directors, to meet costs incurred in the furtherance of the Company's objectives and for particular projects approved by the Directors.



# Our Directors



**Mike Blake**  
Chairman



**Noel Atkins**  
Director



**Duncan Macintyre**  
Secretary



**Graham J McKenzie**  
Director



**Jeffory Herdegen**  
Director



# Projects

Any projects undertaken by the Foundation are to be pre-approved by the Board of the Company. Projects must meet the criteria determined by the Board and be in accord with the company constitution and the Objects of the Company as set out in the Constitution.

The Board reserves the right to seek general approval of the company membership at a general meeting if in the opinion of the board, any particular project due to its nature, size, possible cost or if deemed to be of national importance such approval should be sought prior to acceptance.



# Current Project

## Burdekin-Murray Scheme

Foxton Dam Variation – Gravity System

# Infrastructure & Investment



# Burdekin-Murray Scheme

REEF Research Foundation has undertaken to research and develop information on the BMS with the objective of creating an awareness of the significance of this project to regional Australia.

It is hoped this will provide an opportunity for both government and private industry to consider the possibility of undertaking a full feasibility of the project, which if proven to be economically, socially and environmentally acceptable, can move to actual development.

It is not the intention of REEF to become involved in the commercialisation of such a project as the foundation is a not-for-profit organisation established to provide the catalyst for development of projects in accordance with the foundation's objects under its constitution. Any funding provided to REEF will be used to develop projects in the areas of resources, energy and the environment.



# Burdekin-Murray Scheme

- A potential solution to restore water balance in the Murray-Darling Basin (MDB).
- Based on the surplus water in the Burdekin and Herbert River systems in northern QLD that on average discharge 12,500GL per annum into the Coral Sea.
- Based on a new dam constructed at Mt Foxton, 30 kms downstream from the previously proposed Hell's Gate dam site.
- Gravity channel extending up to 2,500km from Mt Foxton dam to a site on the Murray River downstream of Albury on the NSW/Vic border.
- Offtake channels along the way discharging into major rivers of the MDB and potential offtakes to major inland cities along the route e.g. Longreach, Toowoomba, Tamworth.

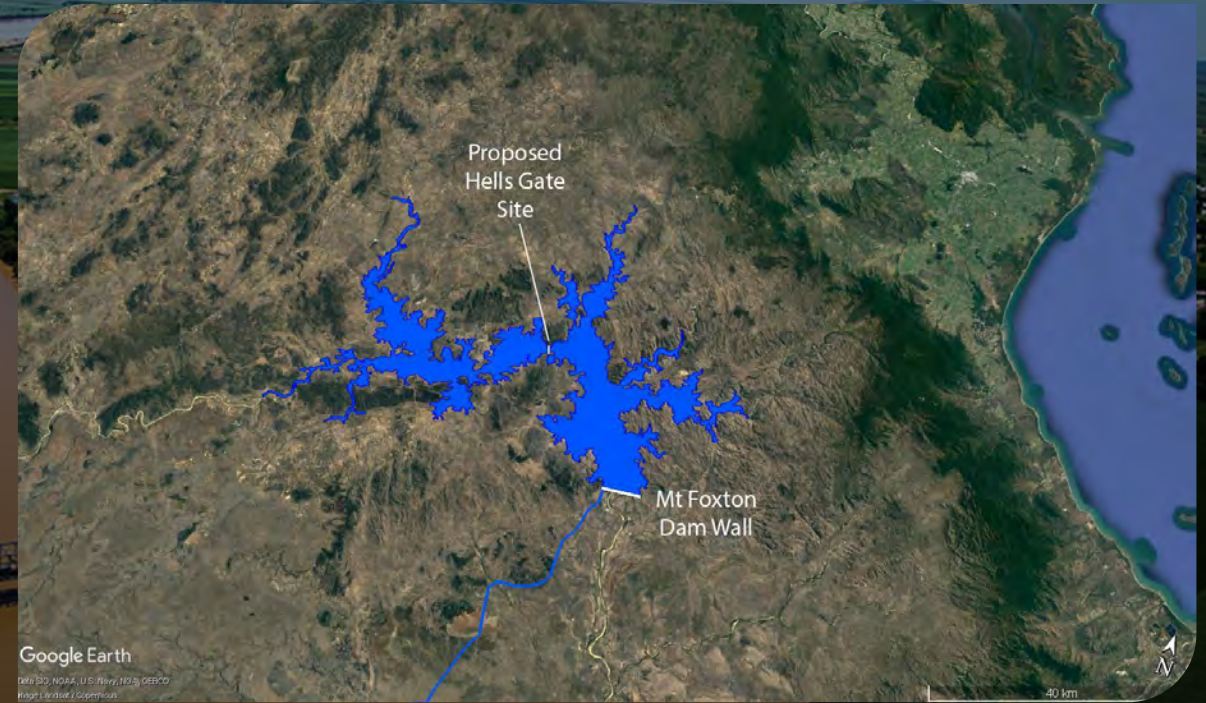




# Burdekin-Murray Scheme

## Dam Modelling

- Mt Foxtan Dam is the preferred dam site for the BMS.
- Previously considered sites are deemed unsuitable for the needs of the BMS.
- Burdekin Falls Dam at RL154 lacks the elevation needed to gravity feed even if it is raised to RL160 as currently proposed.
- Hell's Gate Dam as proposed is significantly smaller in capacity and inflow and can be absorbed within the larger Mt Foxtan Dam proposal.



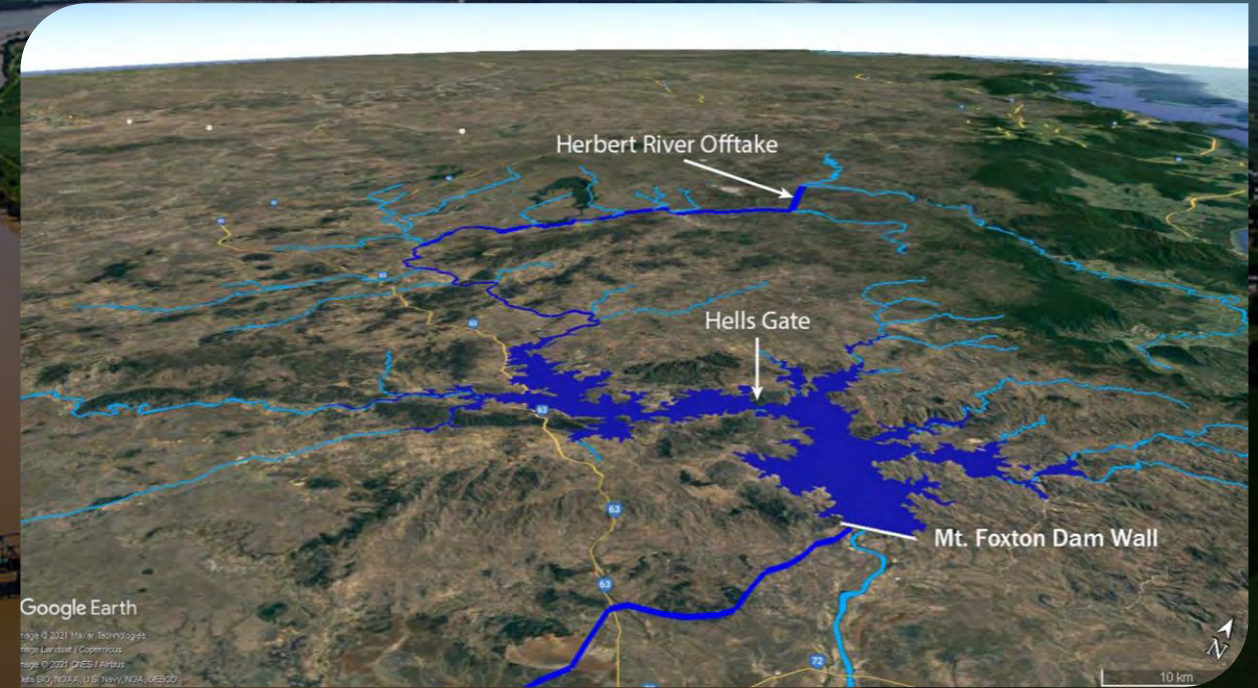
Extent of Mt Foxtan Dam at 380m RL



# Burdekin-Murray Scheme

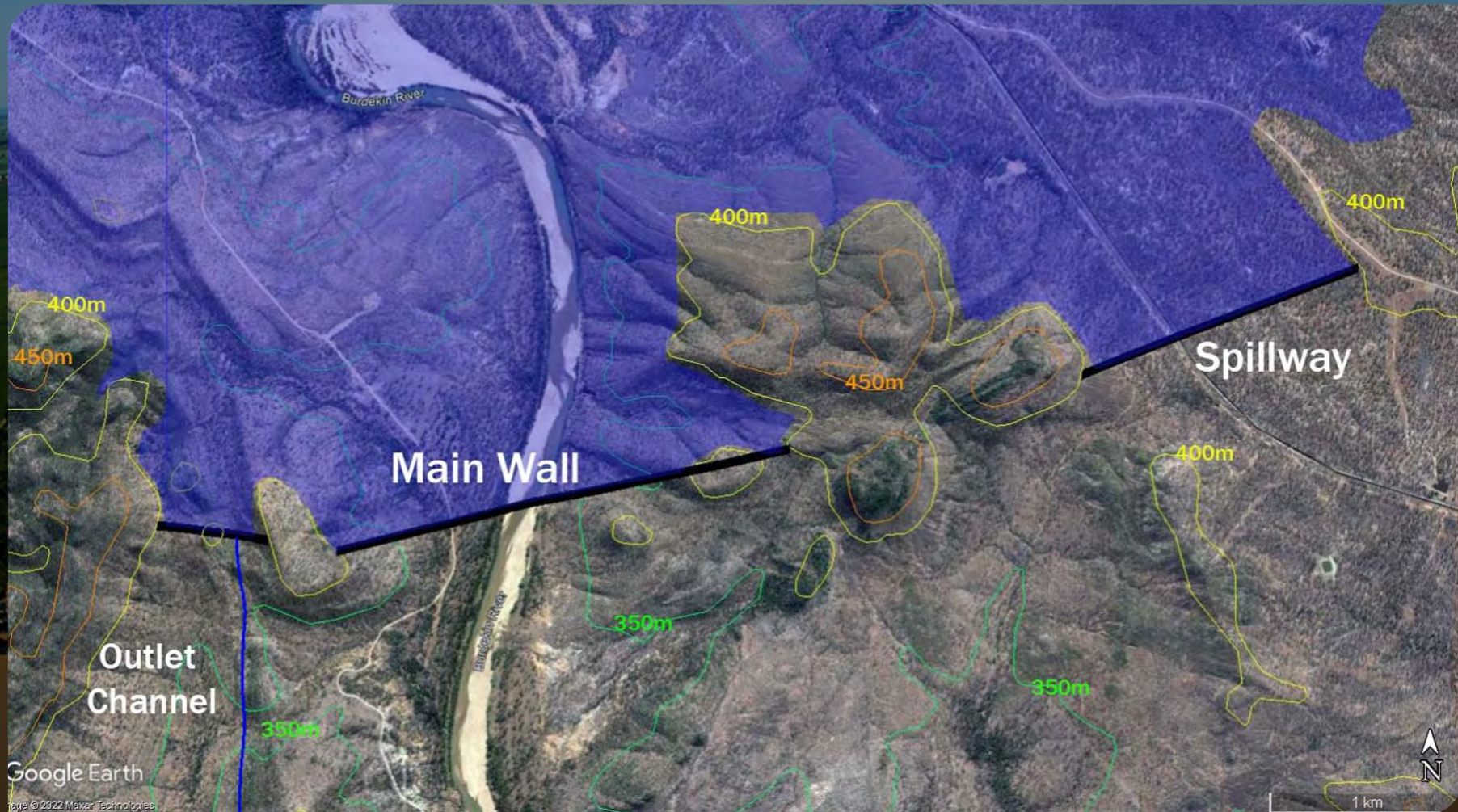
## Dam Modelling

- At RL380, the total volume of the proposed dam is 11,500 GL based on Shuttle Radar Topography Mission (SRTM) terrain modelling.
- The model calculates the volume enclosed by the SRTM land surface and a fill level to RL380.
- Calculated surface area is ~600 km<sup>2</sup> based on the SRTM terrain model as pictured.
- Potential exists to construct the dam wall to elevations up to 450m AHD before topographic limits are reached.





# Burdekin-Murray Scheme



Mt Foxton Dam Layout



# Burdekin-Murray Scheme

## Nature has given us free water and free gravity

### Let's make use of both

- North Queensland is blessed with an abundance of water from reliable monsoon rains but most of this water returns quickly to the ocean. This 'surplus' water has the potential to benefit large parts of the whole of eastern Australia, including undeveloped or underdeveloped regions of western Queensland.
- The proposed Mt Foxtton Dam (MFD) on the upper Burdekin River when completed will be the ***third largest constructed dam in Australia*** and will be located thirty kilometres downstream of the present proposed Hell's Gate Dam (HGD) and incorporate the area and goals of Hell's Gate.
- Importantly, Mt Foxtton Dam will fulfil the objectives of the Hell's Gate, Hughenden and BMS proposals, with water being supplied mostly by gravity from two independent discharge free flow gates, one at Reduced Level (RL) 350 and the other at RL300 above Australian Height Datum (AHD), discharging directly into the Burdekin River.



# Burdekin-Murray Scheme

## Mt Foxtan Dam water source:

- Water from the Herbert River will be harvested via a constructed tunnel delivering 1,100 Gigalitres (GL) per annum into the upper reaches of the Burdekin River.
- The water flowing through this tunnel will be able to generate Hydro power that can be fed into the State Power Grid.
- Mt Foxtan dam will capture all inflows into the upper Burdekin River from surrounding catchment areas above Mt Foxtan Dam wall.
- The Proposed Mt Foxtan Dam invert level is approximately **RL300**, while the dam full supply level will be approximately **RL380**, providing a total storage of **9,000GL**.



# Burdekin-Murray Scheme

## The Dam provides two independent service discharge outlets:

1. A flow control valve at the base of the dam wall at **RL300** discharging water directly into the Burdekin River that will maintain the operating capacity in the downstream weirs for the Charters Tower Irrigation District.
  - Note that electrical power for these pumps could be generated by a Hydro Generator at the base of the Mt Foxtan Dam.
  - Water will continue to flow on to the Burdekin Falls Dam (BFD) servicing Townsville and the Lower Burdekin Farming Districts.
2. A **MAJOR** control valve station at **RL350** which is the principal invert level at the commencement of the Mt Foxtan Main Distribution Channel.
  - The level of this station creates the opportunity for **a FREE (3,500 GL per annum) open GRAVITY flow OVER THE GREAT DIVIDING RANGE (GDR)**, taking water further west to support expanded agriculture, mining and related businesses, and enable the growth of existing rural centres and the development of new communities.



# Burdekin-Murray Scheme

- At a location in the vicinity of Lake Galilee a major Transfer Station will control the water distribution to the West and South.
- The **Western Flow** will continue to numerous transfer stations along the channel for distribution into feeder channels and/or to Pumping Stations required to deliver water to elevated western regions.
- The **Southern Flow** will be the commencement point for the main Burdekin Murray Scheme channel to southern Queensland and on to the southern States at a reliable rate of 2,500 GL per annum.

**Let's take advantage of Nature's gifts of FREE water and FREE gravity.**

This note should be read in conjunction with the attached Schematic Sketch covering the principal management features associated with the proposed Mt Foxtan Dam.



# Burdekin-Murray Scheme



## Proposed Mt Foxton Dam (Diagrammatical Concept)

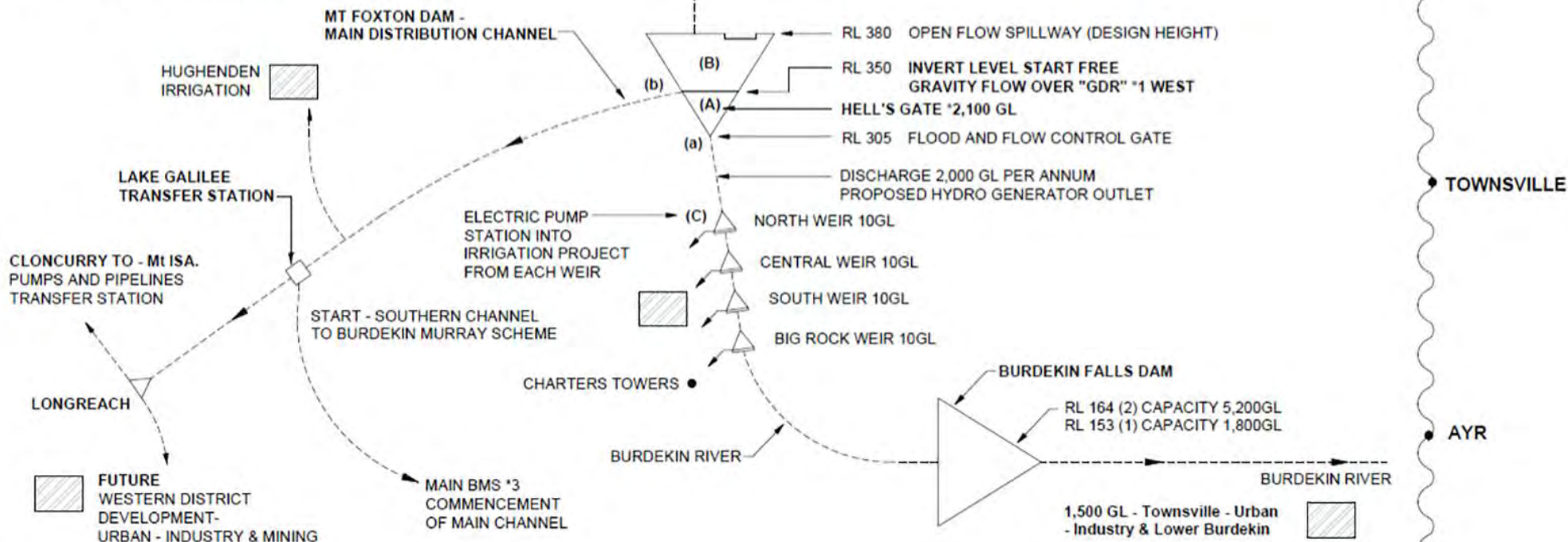
**Mt FOXTON DAM**

FULL SUPPLY LEVEL:	AHD RL. 380
CAPACITY HELL'S GATE	(A) 2,100 GL
CAPACITY FOXTON	(B) 7,000 GL
TOTAL CAPACITY	9,100 GL

**ANNUAL MANAGED DISCHARGE**

OUTLET HELL'S GATE	(a) 2,100 GL PER ANNUM
OUTLET 1	(b) 3,500 GL PER ANNUM
FLOOD RETENTION	6,000 GL PER ANNUM (IN DAM) (WATER RETENTION IN DRY YEAR - RESERVED)
EVAPORATION @ RL 380	1,000 GL 10%

**HYDRO POWER GENERATION**  
NUMBER OF OPPORTUNITIES WILL APPEAR DURING CHANNEL DESIGN WITH DROPS BETWEEN 2.5-5.0 METERS.  
SUBJECT TO VOLUME = 2.0-7.0 MW



FLOOD DISCHARGE FROM Mt FOXTON DAM  
WET SEASON > 5,000 GL  
DRY SEASON < 3,000 GL

\*1 - GREAT DIVIDING RANGE

\*2 - "HELL'S GATE" PROPOSED CAPACITY

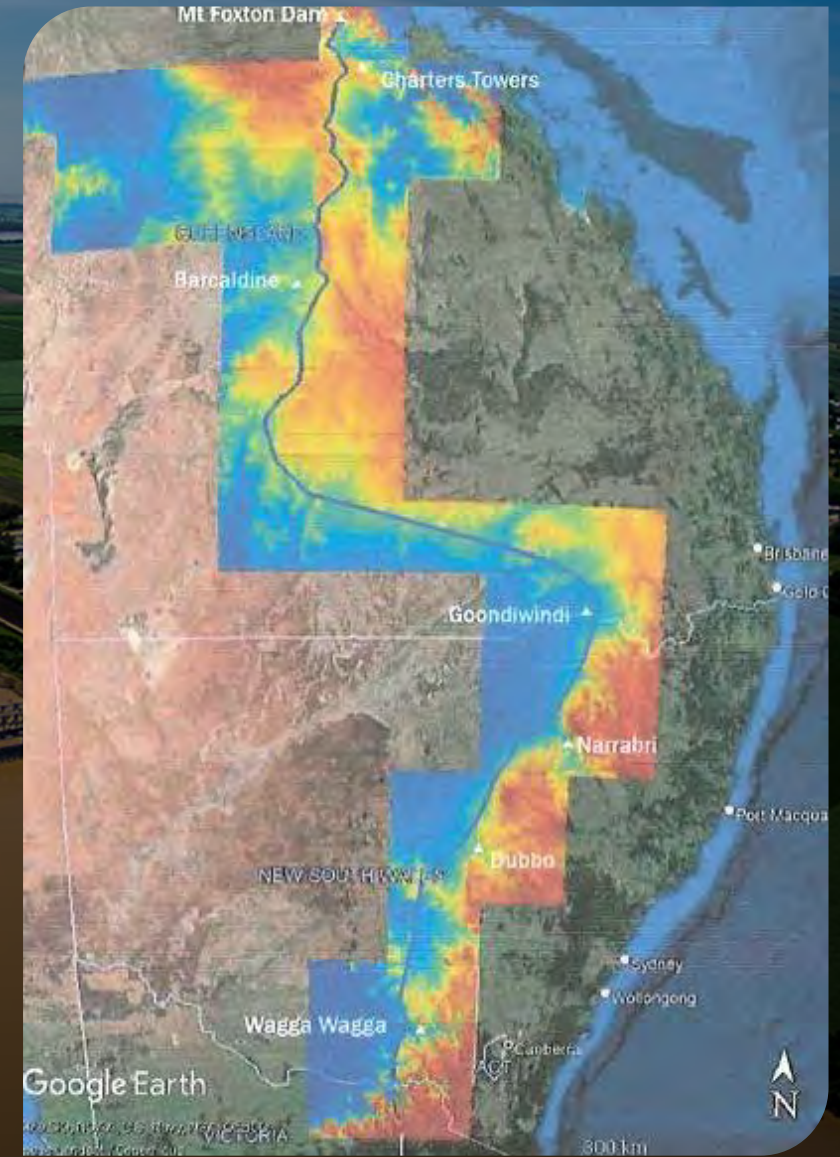
\*3 - BURDEKIN MURRAY SCHEME



# Burdekin-Murray Scheme

## SRTM Terrain Modelling

- SRTM data is available for the entire length of the proposed BMS channel.
- Elevation Profile modelling based on the DEM, highlight the stretches of the channel that are topographically simple to navigate and those where significant challenges may exist.
- The topographic challenges become greater on the western side of the Great Dividing Range after crossing near Lake Galilee due to the relatively steep and incised nature of the western slopes.
- Channel has been examined in 3 sections from north to south.

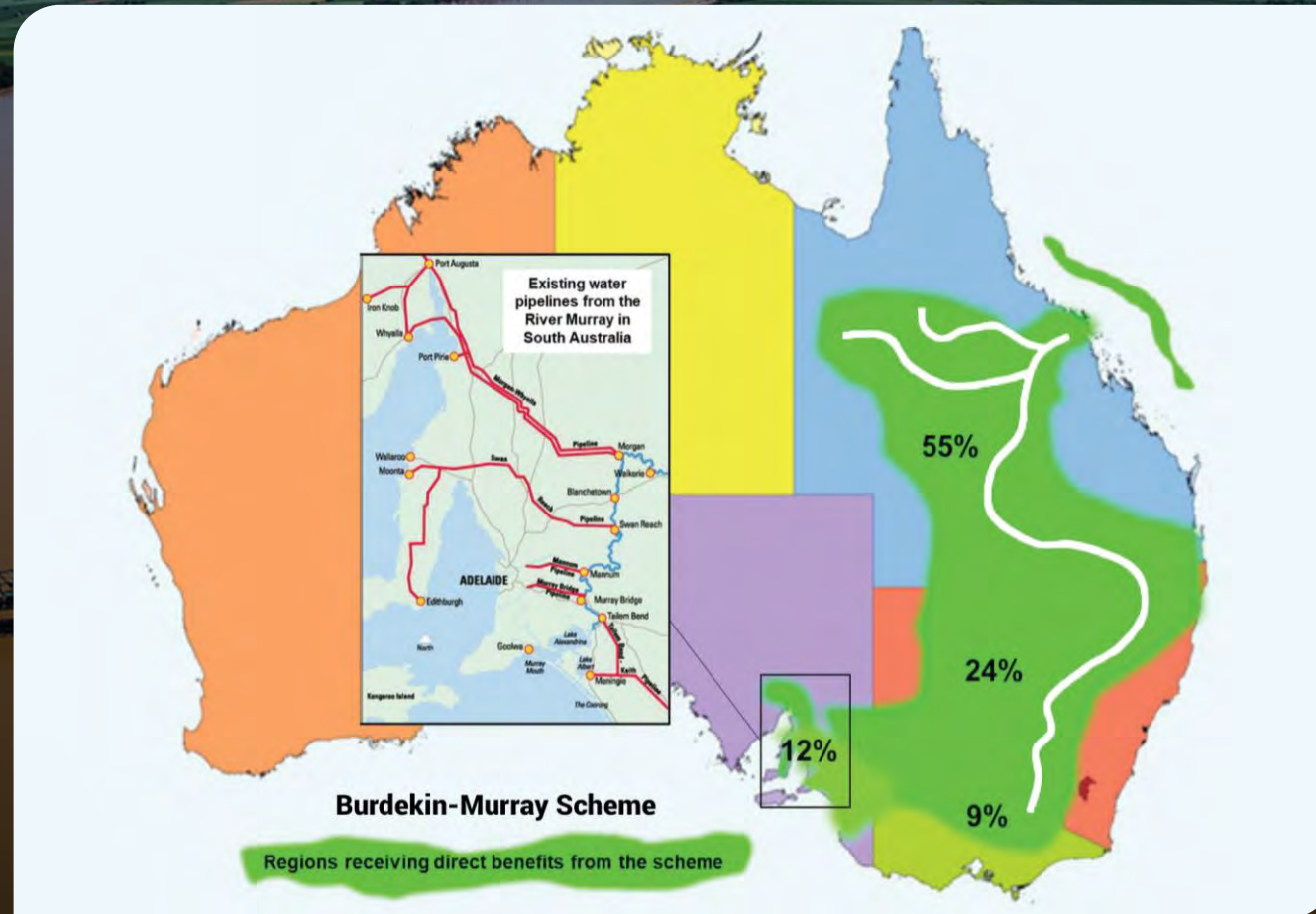




# Burdekin-Murray Scheme

## Benefiting Regions – 1.1m sq.km

(15% of area of Australian mainland)





# Burdekin-Murray Scheme

- Within the overall project area there are several suitable additional sites to establish up to 365x24 hour Hydro electric facilities.
- Potential evaporation losses across Mt Foxton and the channel system, have been assessed by engineers and hydrologists with the following determination –based on an annual evaporation rate in Townsville of 2.6 metres per annum.

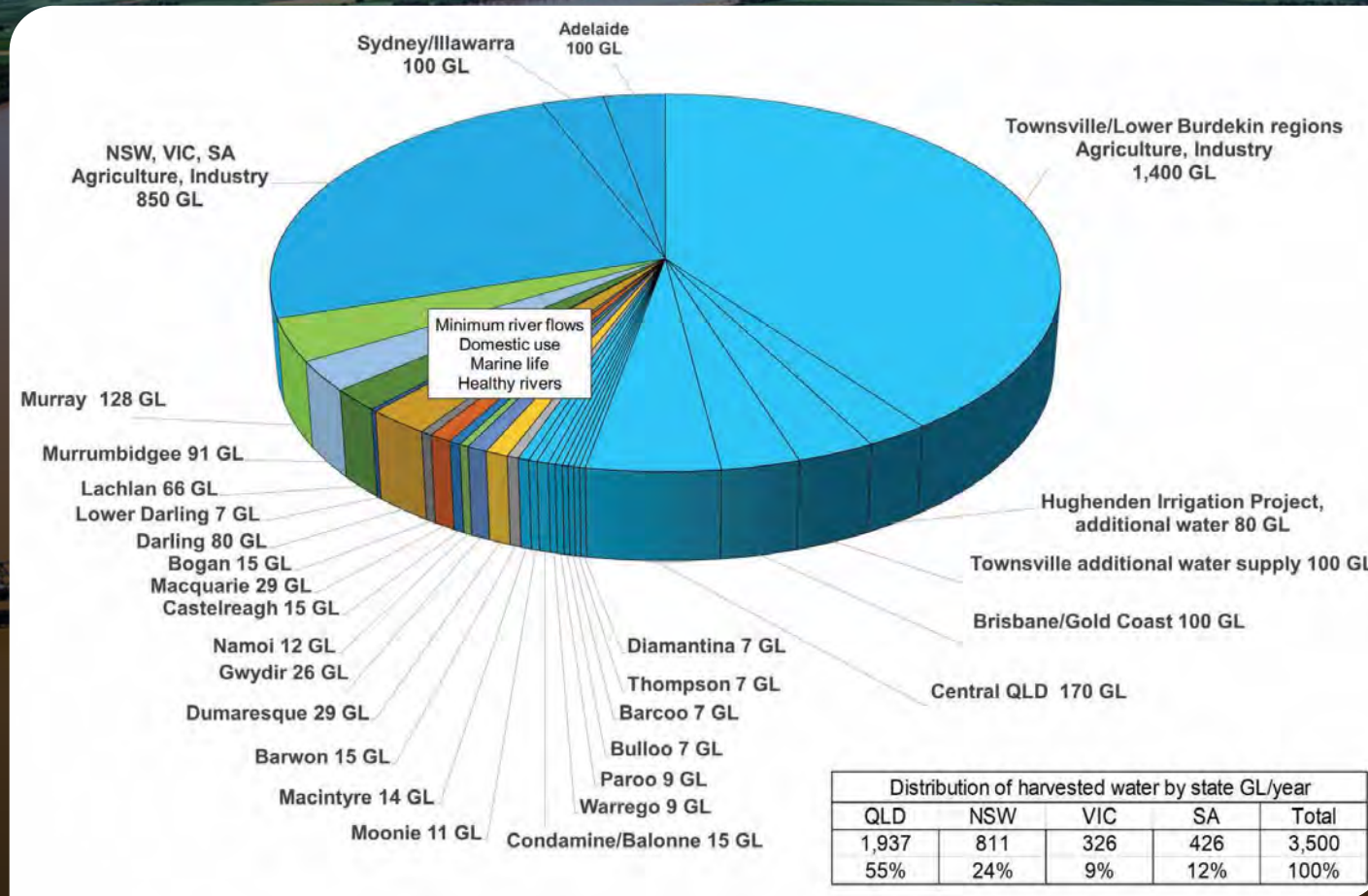
A.	Channel –calculated on a total length of 2100 km with a storage dam capacity 40 square km averaging 4m depth
B.	The total annual channel flow will be 2,100 km including evaporation annual loss 110 GL which equates to 5.2 per cent per annum.
C.	The Foxton Dam at full Supply Level has an estimated surface of 360 SQ Km which equates to 10.4 + Channel losses @ 5.2 which equates to 15.6%

Note: All levels and data will need to be further checked and verified during the Engineering / Feasibility study



# Burdekin-Murray Scheme

Example of possible annual distribution of 3,500 GL of harvested water





# Burdekin-Murray Scheme

## Comparison with other schemes

Scheme features	Bradfield	Revised Bradfield	Burdekin-Murray Scheme
Project cost	> \$20bn*	>\$30bn*	\$50bn*
O & M costs	>\$1,000mpa*	>\$1,000mpa*	\$160mpa*
Water delivered	<1,000 GL/year*	<1,000 GL/year*	3,500 GL/year*
River systems serviced	4*	7*	22*
New dams required	yes	yes	yes
New tunnels required	yes	yes	yes
Services Queensland	partly	partly	North to south Qld
Services NSW	no	Darling river only	Major river regions west of range
Services Victoria	no	no	Murray River region
Services South Australia	no	no	Adelaide & Gulf regions
Augments water supply for Brisbane/Gold Coast	no	no	yes
Augments water supply for Sydney/Illawarra	no	no	yes
Augments water supply for Adelaide	no	no	yes
Secures Townville's water supply	no	no	yes

\*Estimates based on available information



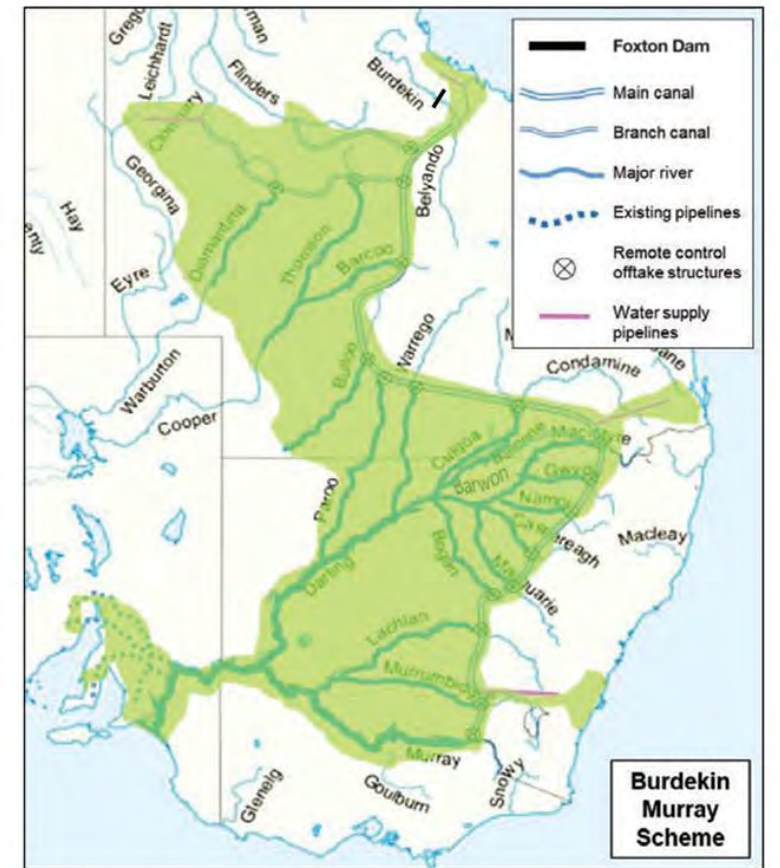
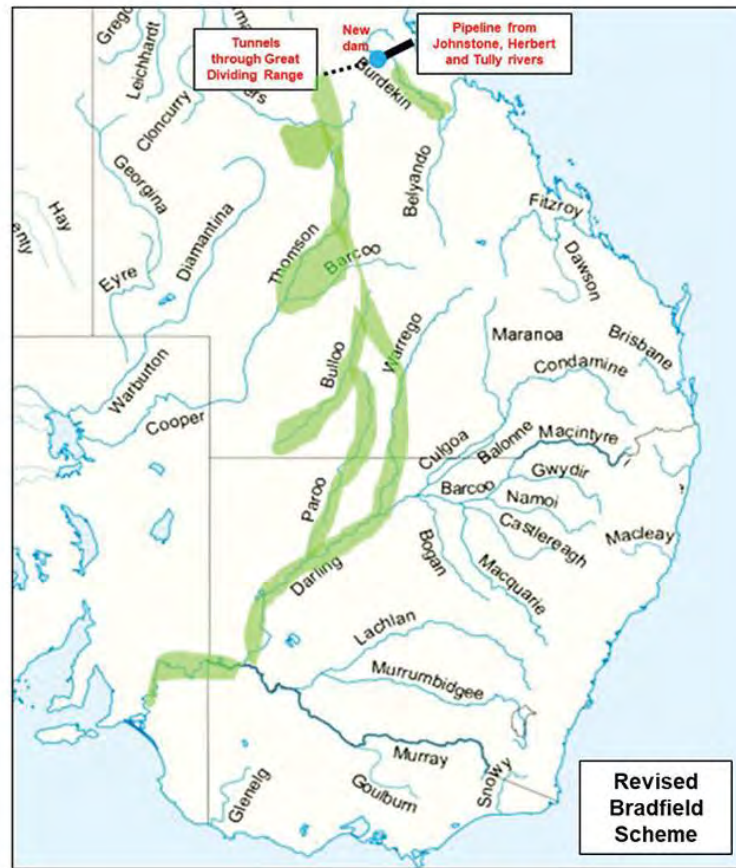
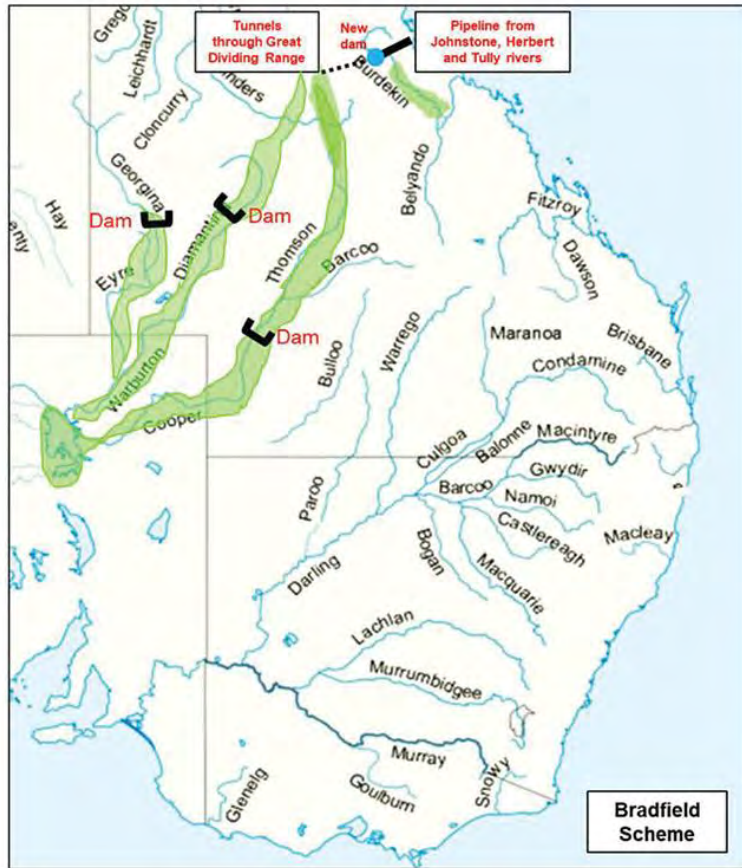
# Burdekin-Murray Scheme

PRESENT SITUATION October 2021								
EXISTING BFD withOUT RAISED								
SPILWAY AHD - AHD 154								
GRAVITY DELIVERY								
SUMMARY PRE HGD								
Total Dam Capacity GL			1,500					
Av Available Water GL			1,200					
Queensland	GL/an	Irr Ha						
Low Burden	300	24,000						
Utility	700							
Total	1,000	24,000						
FUTURE OPTIONS.								
EXISTING BFD with RAISED			NEW - HELLS GATE DAM - AHD 372			NEW - Mt FOXTON DAM AHD 380		
SPILWAY - AHD 163			+ EXISTING BFD with RAISED			+ EXISTING BFD without RAISED		
LOWER BURDEKIN GRAVITY DELIVERY			SPILWAY AHD 163			SPILWAY AHD 154		
PUMPED 'GDR-SWQld/Inta STATE'			PUMPED & GRAVITY DELIVERY			GRAVITY & HYDRO GENERATE		
SUMMARY PRE HGD			SUMMARY POST HGD			SUMMARY POST Mt FOXTON		
Total Dam Capacity GL			4,160			Total Dam Capacity GL		
			2,100			Total Dam Capacity GL		
			9,000					
Av Available Water GL			3,500			Av Available Water GL		
			1,785			Av Available Water GL		
			8,100					
Queensland	GL/an	Irr Ha	Queensland	GL/an	Irr Ha	Queensland	GL/an	Irr Ha
Urban&Ind	775		Urban&Ind	700		Low Burden	300	24,000
Low Burden	300	24,000	Low Burden	300	24,000	Sub Total	300	24,000
SW Qld	850	68,000				Qld Utility	500	
Sub Total	1,925	92,000	Sub Total	1,000	24,000	SW Qld	1,425	114,000
Intra State			Urban&Ind	500		Sub Total	1,925	
NSW	840	67,200	SW Qld	1,285	102,800	NSW	840	67,200
Vic	315	25,200				Vic	315	25,200
SA	420	33,600	Intra State	0	0	SA	420	33,600
Sect Total	1,575	126,000	Sect Total	1,785	102,800	Sect Total	3,500	240,000
Grand Total	3,500	218,000	Grand Total	2,785	126,800	Grand Total	3,500	264,000



# Burdekin-Murray Scheme

## Comparison with other schemes





# Burdekin-Murray Scheme

## The Central Arizona Project (CAP)

Similar terrain to western slopes of the Great Dividing Range

A canal and pipeline scheme which delivers water from the Colorado River across Arizona to Tucson.

The scheme was completed in 1985 and delivers 1,800 GL/year.

### CAP Economic results\*

- Since completion CAP's delivery of Colorado River water has generated \$2 trillion (\$2,000,000,000,000) of Arizona's Gross State Product.
- CAP currently generates an economic benefit of \$100 billion per year, accounting for more than one-third, of the entire Arizona Gross State Product.
- In 2010 CAP's supply of water generated annual employment of more than 1.6 million jobs.

\*Source: The Economic Impact of the Central Arizona Project to the State of Arizona, School of Business, Arizona State University





The Burdekin-Murray Scheme would be of benefit to the three main aspects of the REEF Research Foundation, i.e. Resources (water), Energy (Electricity) and Environment (flora/fauna sustainability)

# Questions





 [reefresearch.foundation](http://reefresearch.foundation)

## Contact

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