T. Bowring & Associates Pty Ltd

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Attention: Lauren McDougall
Senate RAT committee
PO Box 6100, Parliament House
Canberra, ACT, 2600.

Members of the Committee

I am very pleased to see the senate is taking an interest in where our future water needs will be coming from, and how best to productively manage its distribution to the public. We have been looking at dams and water from the north for some time, as this is the most obvious region to source our future water needs and we enclose a submission that meets senate expectations. To maintain climate stability we need to take care of Australian carbon and water cycles. Our water plans involve reduction of CO2 emissions while expanding opportunities to re-vegetate landscape via trees and carbon farming technology Our submission is classified into five sections, page numbers are at back of info supplied

A) Is a brief overview indicating water source and maps of distribution options to supply water in dry times and flood mitigation options via year round supply

B) Is a more detailed overview of supply, costs, benefits, and returns to investors.

C) Provides a simplified cost estimate of supply options and a business plan which estimates returns from various markets that will generate returns to investors.

D) Provides a list of engineers and companies who have provided assistance in the development of our plans, and have expressed interest in planning & construction

E) Is a brief summary of a second stage water supply and aquifer storage option that could offer opportunity for similar or larger supply to eastern states in dry times.

Our aim is to be realistic in all our calculations and forward plans, most are backed up by actual overseas experience. We have also suggested a range of technologies that could be cost effective once proven by demonstration. We favor a risk management approach to dam & water management through gradual introduction of systems that make economic and ecological sense. We see expanding global food demand as a big future opportunity for Australia, and have indicated where and how, dam and water introductions can be integrated to improve our global competitiveness in agri-food production and marketing .

We consider our report is more easily read from hard copies of this submission. After copying I would appreciate if the enclosed original is returned to above address. We also would be appreciative if data from financial returns section "C" is kept within committee.

Yours faithfully

Terry Bowring (CEO)

3 - 06 - 11

SECTION A

T. Bowring & Associates Pty Ltd

Agri-Food / Technical / Process Engineering / Environmental Specialists

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Multi State N to S Water Transfer Project (updated March 2011)

In years 2010/11, widespread La Nina induced rainfall in the eastern states of Australia provided welcome relief from a decade of drought, as well as some unwelcome city/town flooding. This rain event does not signal the end of drought and climatic projections are that rainfall in the southern states will reduce while northern rainfall will hold for 90yrs+.

Attached is a sketch of opportunities to divert about one third of approx 12,000 GL pa mean annual flows going to sea from the N/E Queensland Burdekin River and move it to southern areas of need. In 3 of the last 4 years, Burdekin flow to sea at Ayr has been more than double the annual needs of the Murray Darling Basin, the main agricultural region in Australia. It is possible to store these normal and intermittent big flows to sea, in existing and new dam sites along this river. This stored water can be used for normal consumptive needs, barrier reef ecology or about one third diverted via "Low-Lift" canal infrastructure towards the Murray river bordering NSW and Vic.
Two options are available to move water to the Murray, both involve canal infrastructure between the Burdekin Falls dam and Charleville in W/Qld. This early canal moving over some flood plains will need to consider cross flow flooding issues in design. Once we are near Charleville we have two options to move towards the Murray. The main canal route (see sketch) moving through central Qld and NSW farming regions has the best long term potential but will take many years to build . Main and subsidiary canal or pipe along this route can service environment flows, wetlands, irrigators and city dams in all four eastern states and has flood mitigation potential in SEQ. The fast build option of moving water down the Warrego and Darling rivers towards the Murray has cost reduction attractions but also has challenges with water break-outs in flat country that need to be contained with solid river embankments. In both options we propose water sold to coastal city dams is at a price below that needed for returns of desalinated water This high price will offset the lower charges needed to make irrigation water affordable. A second stage option we are also looking is to store large volumes of Gulf of Carpenteria water in the Gilbert River Formation fractured rock aquifer before moving over to above canal infrastructure.

Costs and benefits of water transfer are covered in more detail in available business plan data. Much of the canal construction data is based on updated actual data from a 600 km canal running through the hot, arid Arizona desert with only 2% pa water losses. Our early cost estimates are based on supplying 3750 GL of water 40% to environment, 40% to irrigators and 20% to coastal cities. Basic funding at low interest rates is designed to assist pay back of infrastructure and ops over 50 yrs. Returns to Fed Government PPP investors come more from what can be done with water than from water sales. See below.

- Reduction of need for MDBA water buybacks that could hurt farming viability.
- Expand potential to meet global & local food demands from population expansion
- Expand potential for low emissions power and fuels from biomass and hydro ops
- Reduce C emissions thru carbon farming initiatives and less need for desalination
- Take pressure off main city expansion by opening new industries in regional areas
- Utilize canal fiber optic systems to reduce costs of regional NBN expansion.
- Design subsidiary canal and levees to mitigate flooding in all regions serviced
- Introduce new dam/canal systems to generate hydropower and help fight bushfires

Terry Bowring (CEO)

Multi State, North to South, Water Transfer Project

<u>BFD Water Delivery 4000 GL pa</u>	Capital	Sell water	pay back	Sketch
BFD to Tocumwal Main canal	$9.6 bn	$125/ML	35yr	Not to scale
BFD to Wentworth canal/river	$3.7 bn	$ 55/ML	20 yr	
Subsidiary canal pipe to Bris/Syd	$3.2 bn			

A 2

MULTI STATE WATER TRANSFER PROJECT

Preliminary aqueduct routes

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A3

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MAP PRODUCED BY:
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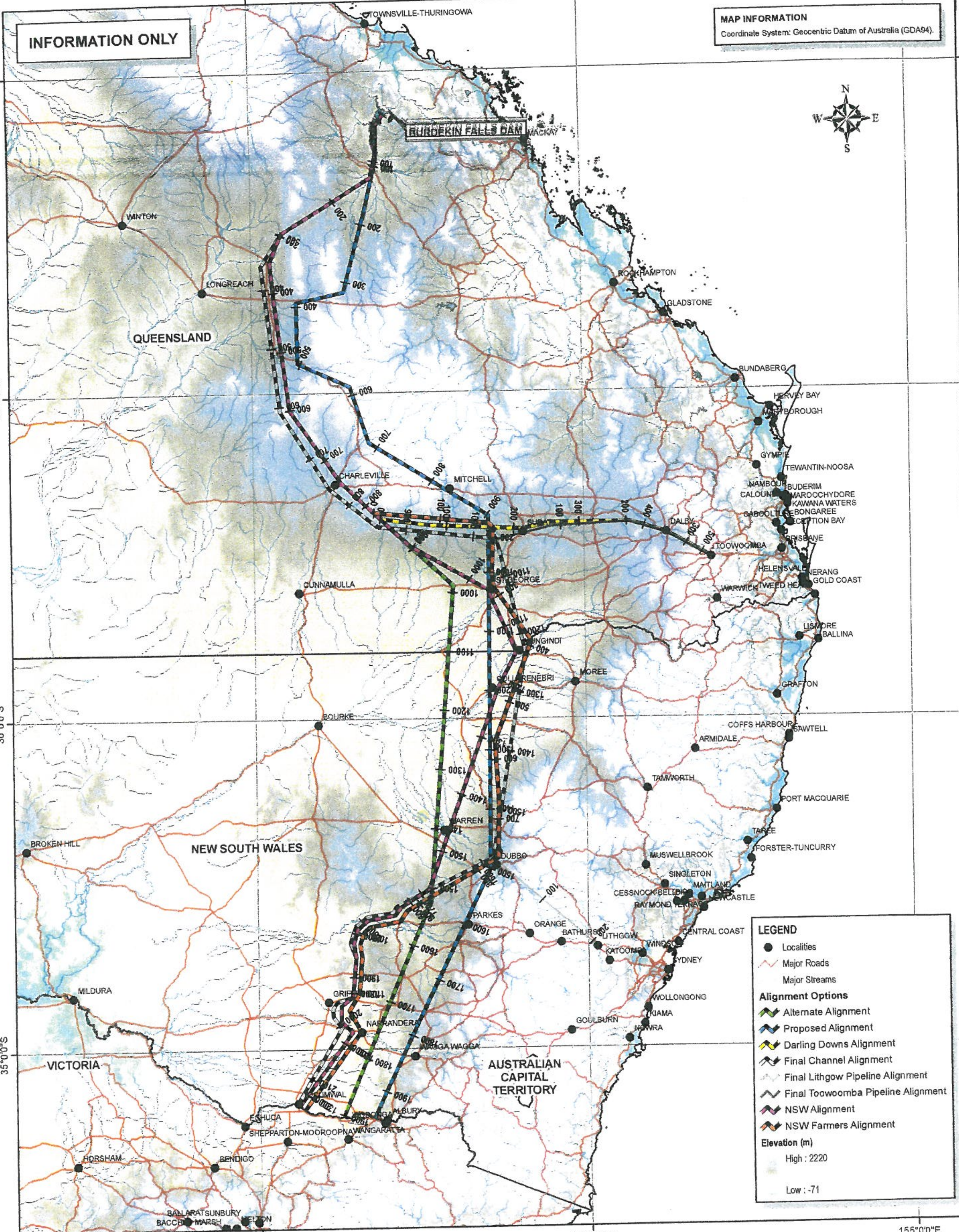

REVISION				
27/10/10	D	FINAL ALIGNMENTS ADDED		
23/08/10	C	ADDITIONAL ALIGNMENT		
26/07/10	B	ADDITIONAL TOWNS SHOWN		
15/07/10	A	TWO NEW ALIGNMENTS ADDED		
DATE		REMARKS	CKD	PSD

SCALES (A3 SIZE)

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SunWater

NORTH TO SOUTH WATER TRANSFER PROJECT
BURDEKIN FALLS DAM TO VICTORIA CANAL
ALIGNMENT DETAILS

CONTRACT NUMBER

DRAWING NUMBER 236124

DATE JUNE 2010

A B C D

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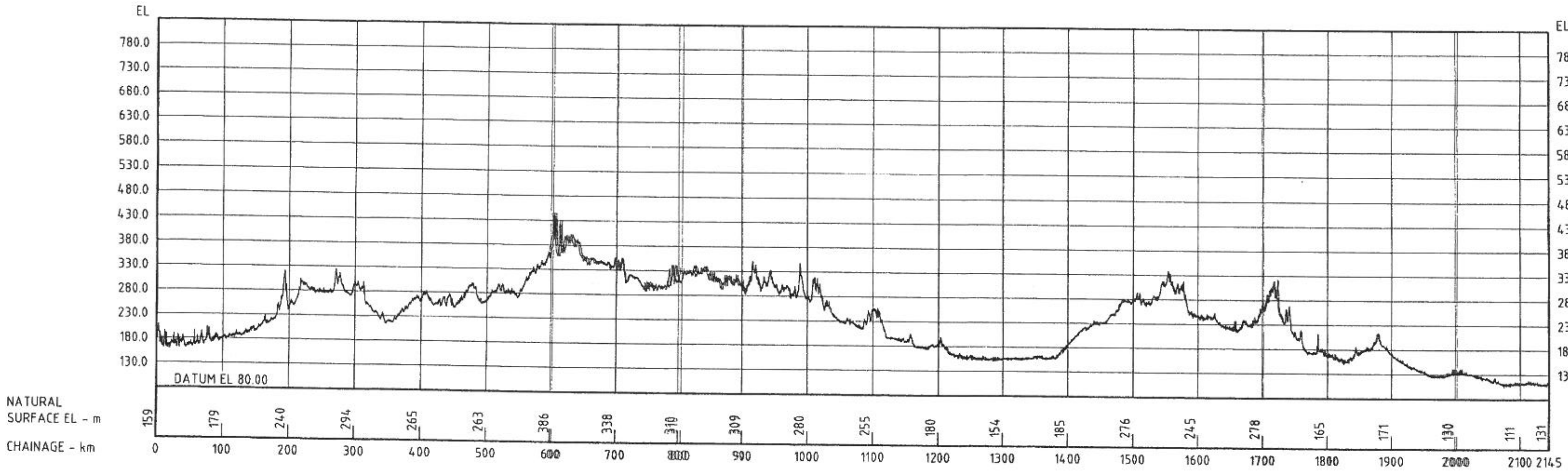

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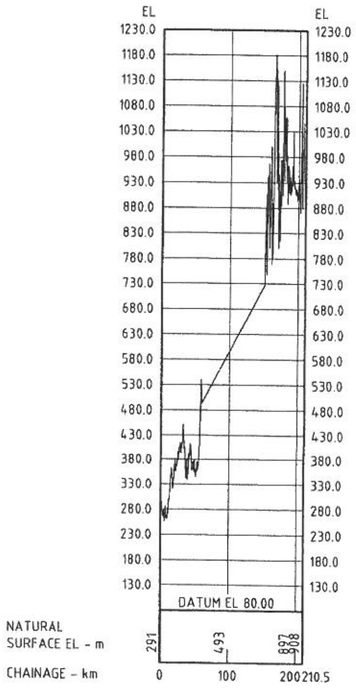
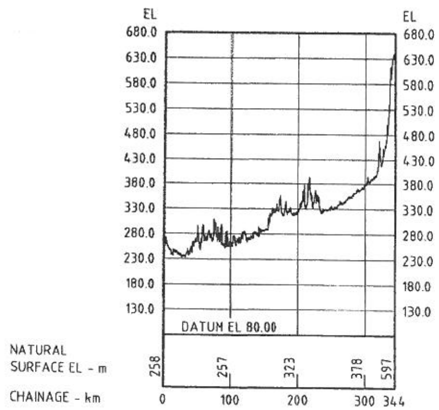


FINAL LITHGOW ALIGNMENT



FINAL TOOWOOMBA ALIGNMENT

INFORMATION ONLY

NOTES:

1. GENERAL
   - CHAINAGES ARE IN KILOMETRES UNLESS OTHERWISE NOTED.
   - LEVELS ARE IN METRES AND HAVE BEEN INTERPOLATED FROM NASA'S SRTM 90m DIGITAL ELEVATION MODEL.

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DRAWING PRODUCED BY:
SUNWATER LIMITED
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TEL: (07) 4783 0555

REVISION				
DATE	REMARKS	CKD	PSD	

REFERENCE DRAWINGS	
236844	DARLING DOWNS ALIGNMENT
236843	NSW ALIGNMENT
236126	ALTERNATE ALIGNMENT
236124	ALIGNMENT DETAILS

SCALES (A3 SIZE)
HORIZ 0 125 250 375 KILOMETRES 1:7,500,000
VERT 0 100 200 300 400 500 METRES 1:10,000

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CHECKED	CHECKED
APPROVED	

SunWater
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ACN 131 034 985

NORTH TO SOUTH WATER TRANSFER PROJECT
BURDEKIN FALLS DAM TO VICTORIA CANAL
FINAL CHANNEL ALIGNMENT
LONGITUDINAL SECTION
0km TO END

CONTRACT NUMBER
DRAWING NUMBER 237554
DATE OCTOBER 2010

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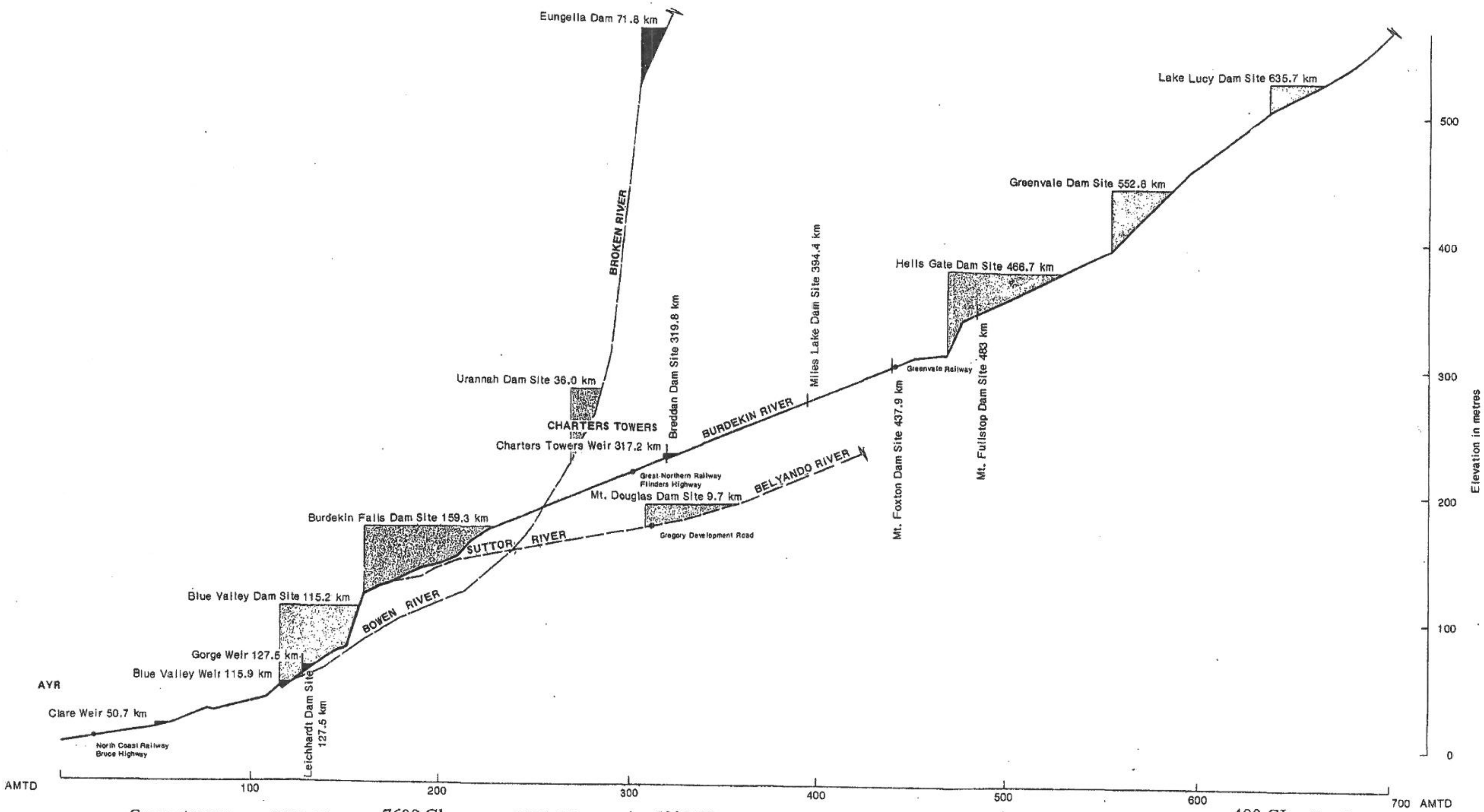
MAP 6



Gross storage	3100 Gl	7600 Gl	1500 GL	5000 GL	5700 GL	2430 GL	490 GL	Total water storage 25800 GL
Height above sea level	93 m	167 m	292 m	200 m	385 m	445 m	522 m	
Capital cost (1978)	$123 M	$99 M	$41 M	$63 M	$27 M	$28 M	$63 M	Total capital (1978) $444 M
			Urannah	Mt Douglas				

BURDEKIN PROJECT COMMITTEE
BURDEKIN RIVER BASIN STUDY
QUEENSLAND

LONGITUDINAL STREAM PROFILES
AND
LOCATION OF STORAGE SITES

SECTION B

Multi State, North to South, Water Transfer Project (Australia) updated Feb 2011

1) Preview

Australia's southern states are facing water shortages when world food demand is projected to double in 40 yrs from global population expansion. We are investing $14b in desalination plant for coastal cities without looking at opportunities to tap into excess northern water going to sea and economically moving it to areas of need. CSIRO climate change modeling indicate rainfall in N/Qld will hold at current levels for 90 yrs +, while 15% reductions in southern states, in decades, may cut back surface irrigation water by 35%.The aim of this preview is to show the economic, social and ecological benefits of a Federal government PPP investing in N to S water transfer infrastructure that can be adapted through agriculture and technology to meet future water and food needs while assisting in the reduction of carbon emissions. With a 60% population increase projected in 40 years, needed water infrastructure can assist industry growth, mitigate many of Qld flooding issues, while enabling de-centralization policies to work. Northern water will also be a more reliable source of water for the environment than MDBA water buy-backs, which experience has shown, return little water to the environment during dry periods.

2. a) S/E Australian water transfer opportunity:

It is estimated that on average, 173,000 GL pa of river water in N/E Qld and the Gulf of Carpentaria goes to sea each year. Part of this volume, which amounts to ~100 times southern city needs, could be better utilized by moving it to areas of need. Others have suggested southern irrigated agriculture should be moved to the north where all the water is. While the lower north has agri-potential, few have made the move to the top end due to a range of issues, higher evapo-transpiration rates than rain delivers, is high on list. We looked at infrastructure costs to move 4000 GL pa of water 1500-2000 km south by pipe or canal and it soon became obvious that the cost of making pipe in cities, trucking it to site by road, and laying it, at $32-40bn, was unlikely to be economic. We next looked at constructing concrete lined canal to move the same volume from a Burdekin dam source through either a Western Qld-NSW route or a central Qld-NSW route respectively going into the Murray at Wentworth or Tocumwal. From either option, a combination of rivers, subsidiary canals and pipe, could move water to major irrigation areas and city dams in Qld, NSW, Vic and SA. Canal route, length and outlets would be determined by market need and topography. Water delivery to farm/town users must be designed to minimize wastage. It will be desirable to hold seasonal supply water in existing or new Burdekin dams prior to moving it to permeable aquifers, or, to dams covered by safe mono-layer films to reduce evaporation losses. We also see long term potential to recover and treat some of the 65million GL of stored brackish and quality water in the Great Artesian Basin. Where exit water can be balanced with natural aquifer inputs, this water can be made potable by economic "modified osmosis" technology www.modernwater.co.uk and then added to canal. Power for canal pump stations will initially come from gas engines or turbines using coal seam or basin gas available in Queensland. Gas pipeline is already in place on part of proposed canal routes and where it isn't, new pipe will be installed. In the long term, we also see potential to use wind, solar or geothermal power sources on or near route, and where feasible to utilize the wastes from grain crops or plantations near canal to produce power and bio-fuels from proven Syngas fermentation processes.

2. b) Water source statistics:

CSIRO estimates of rainfall trends indicate N/Qld will maintain or slightly increase current patterns for 90 years, while southern regions, starting in the west, continue to dry out. Water to sea from Burdekin & Herbert rivers in N/E Qld or Gilbert and Norman on the Gulf could supply up to 24,000GL pa of base-load water to move south. Our aim is to divert no more than 1/3rd of rivers flow (4-8000GL) before it goes to sea. A good water storage point for a start off major canal would be the Burdekin Falls Dam which has a current storage capacity of 2100 GL. This dam has engineering potential to hold 7600 GL and potential upstream storage sites could hold up to 17,000GL The mean flow to sea (at Clare) from the Burdekin (less 1300 GL to irrigation) is 8250 GL pa. There is also potential to join the Herbert to the

Burdekin (at latitude 18-25 & longitude 114-25). By so doing, combined flow over the Burdekin Falls dam could go up to ~11,700 GL pa. Tropical areas around the world are experiencing increased climatic cyclonic activity. In each of years 07/08, 08/09 & 10/11 twice as much Burdekin water flowed to sea than the MDB uses in one year . By usage of mono-layer films to reduce dam evaporation, these occasional big flows could be held over in upstream dams, to even out first flush water to meet barrier reef ecology needs.

2. c) Preliminary Route options, Costs/ returns and environment issues

We estimate the main and subsidiary canal costs of either canal route option, delivering 3750 GL of water to crops, environment flows and city dams in Qld, NSW Vic & SA would be approx $12-13 Bn . A low cost option that could be quickly introduced is to use the Warrego and Darling rivers as a conduit to replace 2/3rds of canal infrastructure along the Western Qld-NSW route. To introduce we would need to reinforce river embankments along sections near Bourke to contain water breakouts that now spill flood-water onto plains. When introduced, future water to these wetlands only, would be delivered by built in pipe along river. A major challenge would be the current Warrego water resource plan, which is based on the river flowing occasionally . Discussion with regulators, towns and irrigators is needed. Returns from above canal options are below.

- If 3750 GL pa water sold to irrigators and environment at $125 /ML to pay back canal capital and operation costs, main canal only will be paid back in 20 yrs.
- If 1500 GL sold to environment at $125/ML,1550 to farms at $250/ML,& 700 GL to city dams at $1.20 KL (2/3rd desal costs) gross returns of 20% pa are possible.
- If Warrego canal/river option taken, water sold at $55/ML would pay-back canal & river ops in 20 yrs. This could be a useful first off option, for future expansion.

These preliminary costs were based on USA canal construction data of material, labor, equipment and energy usage with 50 year finance provided at 2.5% interest as in USA If finance rates rise to 7.5%, canal costs will go up by 10% and delivered water cost by 5%. Arizona canal specialists can provide design detail to Thiess or Sunwater engineers, plus Boral (for concrete) and Jemena (gas pipe). All these groups have contributed to project pre-estimates but we still need funding support to further pre-evaluate factors such as,

: Route plans are spatially/geologically surveyed to ensure best fit with land and clientele.

: Ensure canal routes can economically work around flood plains and river crossings.

: Check availability of easily accessible sand and rock for on line concrete production,
: Potential of dams & aquifers to store large volumes of water and recover economically
: Suitability of land near canals for future plantations, agriculture and to build soil carbon.
: Potential of various surface cover or mono-layer techniques to reduce dam evaporation.
: Potential of low and or zero carbon technologies to produce energy and recycle nutrients
: Test potential of surface mining & geo-polymer lining techniques to reduce canal costs.
: Potential to use Warrego as a year round aqueduct, while maintaining health of wetlands

Future Returns, Australia's research organization the CSIRO, has identified key forces that will shape the world. **1)** We live in an increasingly food in-secure world, **2)** We live in an increasingly urbanized world, and **3)** We live in a future carbon constrained world. N/E Qld seasonal water can play a part in adjusting to these challenges in S/E Australia. By capturing and distributing water to a Central Qld-NSW route crossing major rivers in the MDB we can provide a more reliable source of water to top up rivers and wetlands in dry periods than water buy backs have so far demonstrated. By infiltrating water to a landscape set up for carbon farming principles we can improve water retention, fertility and create a bank of soil carbon offsets. Thus when we look at delivering 3750 GL water 20% to city dams, 40% to environment, and 40% to irrigators, gross returns of 20% to a Federal PPP could come from savings, water margins, taxes from sales to irrigators, city dams, bio-fuel & power production, carbon offsets, plus reduced need for drought relief. GDP multiplier benefits of $30bn and 7% carbon reduction are also projected. (back up data available). By supplying top up water to rivers flowing west, we can protect key MDB wetlands etc. While protecting the environment is important, it has to be paid for and there are large revenue earning projects under consideration which could benefit from new water. Coal and coal seam gas projects proposed in the Gallilee basin and the Darling Downs, both need water and could benefit from agricultural carbon offsets. A stage 2 storage option for Reid Scheme water, ex the Gulf, is the Gilbert River Formation fractured rock aquifer, its lower section, just north of Richmond QLD and can potentially hold up to 20,000GL of water. This aquifer has been surveyed by Geo-science Australia geologists and offers water storage potential for year round cropping in the region. There are already large irrigation properties in Richmond area being developed for Sorghum.

2 d): Environment issues

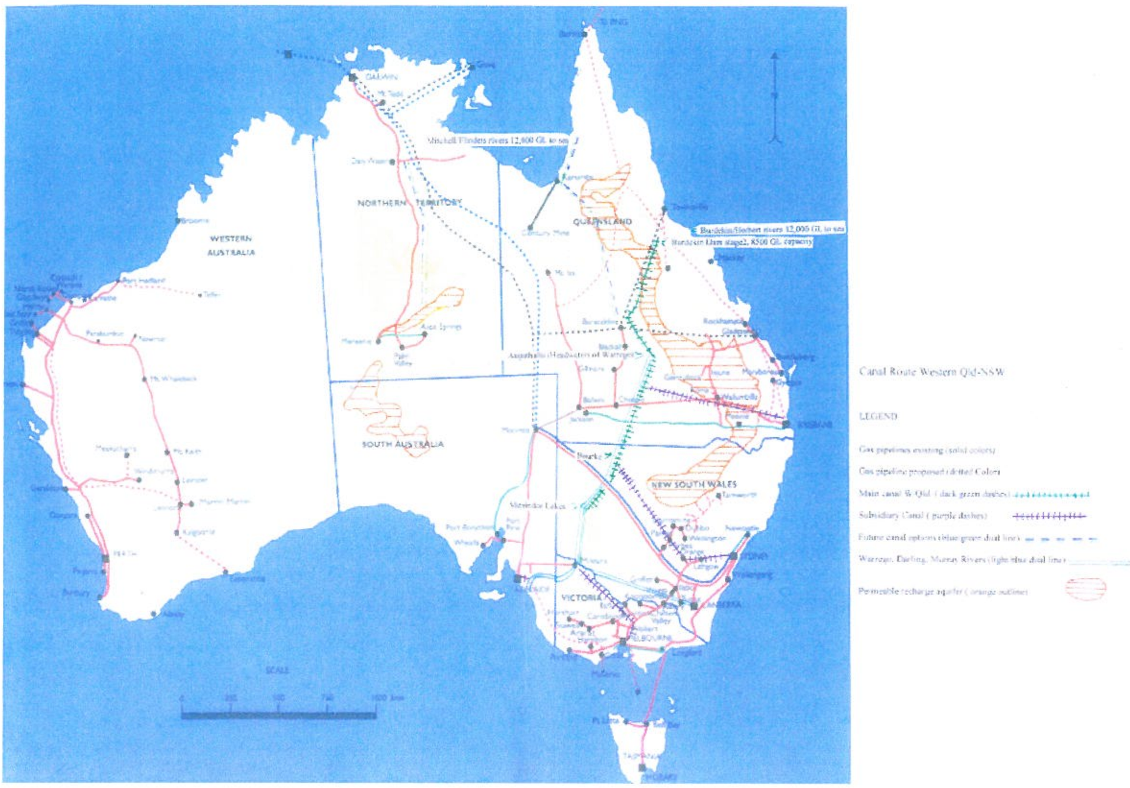
Water Services Australia projections of future need for 1.5 trillion litres (1500 GL) of desalinated urban water and Wentworth group projections of 4200 GL of water to sustain the Murray Darling Basin are so high, that a N to S transfer of northern water now going to sea must be considered an option, provided, the ecological impact of doing so is minor. All the source N/E QLD rivers under consideration carry agricultural silt which infiltrate tributaries of the Barrier Reef. Diverting 4000 of the 29,000 GL plus mean annual flow of rivers to sea along the reef, will help reduce this impact, with little effect on reef ecology.

Canal Design factors to protect environment

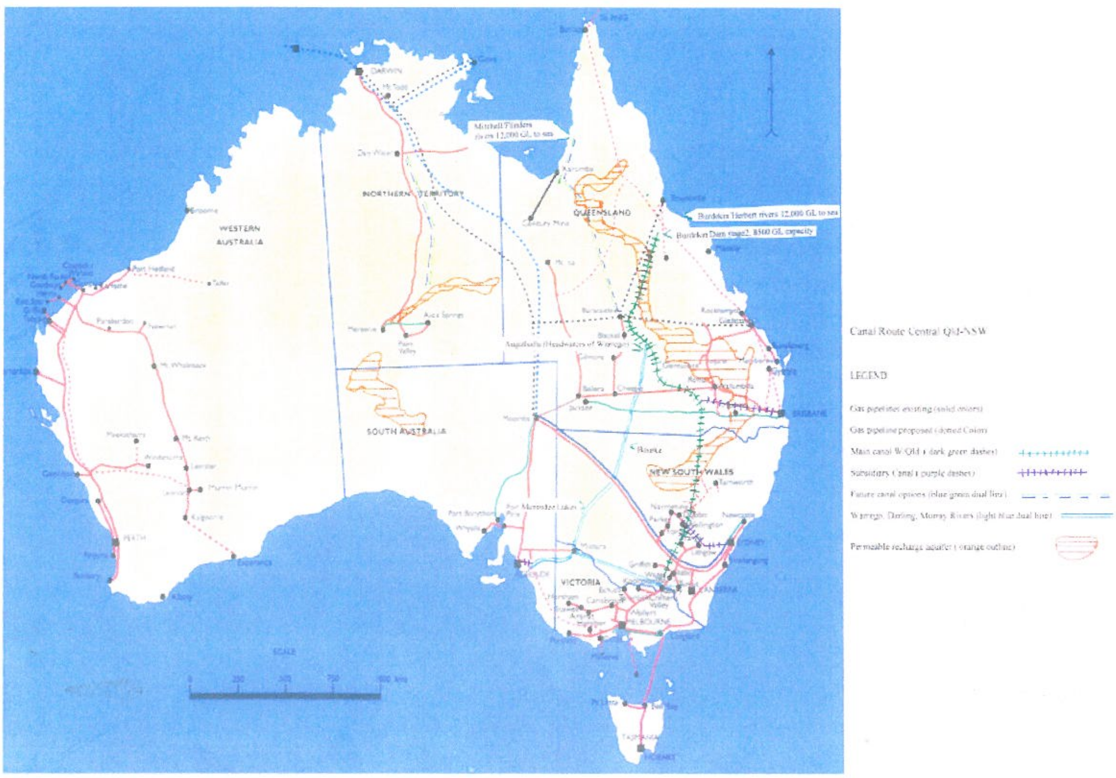
Arizona canal groups in the USA who we suggest could oversee our project have been working to tight USBR environment controls on multiple installations. Energy to move water a long distance is a major cost and emissions factor and we have selected a route to minimize lifting, while still providing ease of water distribution to online users. Where practical, stock routes will be used to reduce easement costs, while still providing user benefits. Unsealed roads will be on canal embankments and fences built on either side. Needed cross-roads and animal crossings will be built into the design. Radial gate flow structures on canal will control water levels and when needed, isolate canal sections to allow drainage and repairs. Cross stream flow will be directed by levees & contouring into canal cross- drainage structures. Inverted siphons and/or bridges will be used to cross large rivers and streams. Out-turns will direct water to subsidiary canals, pipe, rivers etc.

Integration of water with multi-basin carbon reduction innovations

Over the years there has been much criticism of the role of indiscriminate water usage on the past deterioration of the MDB. We have learnt many lessons from this and see large potential to integrate water transfer and usage with carbon farming techniques that will improve water retention, rehabilitate landscape and control salinity. Cane toads & Tilapia fish can be removed by filtration, and dry/hot southern climates will stop toad movement. Items 4- 8 describe how new water, integrated with agriculture can improve land fertility that lead to carbon offsets that could cut total Australian carbon emissions by up to 7%pa.



Canal route western Qld-NSW



Canal route central Qld-NSW

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3.) Solar and renewable power

Studies of future PV opportunities indicate arrays over or beside a canal could generate canal pump station power needs. Day solar power can be stored by holding water in elevated dams and metering it out at night, or used to convert water to Hydrogen when technology proven. The use of PV solar arrays over the entire canal could potentially generate 1.5 Gw of base load power. When combined with potential for up to 0.9Gw of hydro power from stored Burdekin dam water, power from crop biomass, and reduction of needs for desalination on the coast, a proposed N to S water project could also become a major generator of renewable power and carbon offsets

4. USA canal experience:

For over 100 years the United States Bureau of Reclamation have been building concrete lined trapezoidal canals to recover seasonal river water from melting snow and moving it thru suitable land to make it profitable for agriculture and industry. Most USA canals have been financed by the Feds at 2.5% interest rates on condition that "user-pay" water charges are to recoup capex and operating costs over 50 yrs. By opening this land, canals have led to the development of W/USA cities such as Los Angeles, Tuscon, and Phoenix, plus associated industries, to which they still supply water. Canal construction costs are less than pipe for equivalent volumes and transmission loss from evaporation & seepage when run thru 600km of the Arizona desert at 100Km/day, are repeatedly found to be rated at approx 4% per 1000 km of transit. Canals are easier to maintain than pipe which can have air supply problems during inspections, also, unlike pipe, they can be upgraded in volume flow as demand develops. As demand for water in Western states of USA has begun to exceed supply, authorities have begun saving seasonal water, excess to needs, by storing same in aquifers along canal routes. Water charges to growers along canals are currently around $60/ML but can be as low as $30/ML when subsidized by hydro-power or higher city water charges (when applicable). Use of centre pivots etc, to minimize farm water usage, can add ~$50/ML to growers from Capital/ Power/ R&M costs. Problems of algal development in canals have been solved by usage of sterile fish to eat algae and weed. Benefits from new canal infrastructure in eg Arizona USA has seen a doubling of the population to 7 million over 25 yrs from agriculture, industry and economic growth. This illustrates importance of water, when proposing regional development in Australia.

5. Market Opportunities:

With large demands coming out of N/Asia for agri-commodities, bio-fuels and mine resources both agriculture and mining should continue to be industries of major focus. Below is an overview of the economic and environmental benefits that can be made possible from making new water available.

6. a) The Murray Darling River's needs for 1500 GL of environmental flows: Based on historical sales high security water would cost ~$2800 /ML or $280 on a 10% return basis. If Government financed canals as suggested, the delivery charges for environment water @ $128 /ML would be approx 50% less and could save $230 mill pa. This is a cost effective option to buying out water rights whose volume may reduce as climatic drying takes hold. Water right buyouts can lead to loss of towns, no longer supported by farms.

6. b) Sell water from coastal dams at prices below costs of desalination. ie $1.20/KL Estimates indicate water delivered by canal/ pipe to city dams, could average ~$0.30/KL

6. c) $100bn pa grain and fuel sales from new water, to supply world markets:

The GRDC are projecting by 2020, grain output of 100 million TPA could come from value added areas of demand such as ethanol, starch, feed concentrate, meat substitutes etc. The main requirement to grow a quarter of this volume, is a temperate climate and reliable rainfall and/or irrigation water. If a North to South 7500 GL pa canal system as described above, was set up to irrigate 3.2 million ha of land with new irrigated wheat varieties yielding 9T/ha (6T in north -12T in south) it could produce 26 mill T of wheat. (ref- S Kearns GRDC). With variable growing costs of $2000/ha (inc'l $750 for water) and a grain price of $350/T, the crop could generate $9.1bn pa revenue and $3.0bn pa of grower margins. It is possible to concurrently recover 12T/ha of straw from above crop while retaining stubble. This could be converted to 12bn litre of ethanol & generate 7.5 million Mwh of base load power. Ethanol sold at 70c/L would generate $8.4bn revenue, (60% of our fuel demand) giving a $3.4bn margin. To meet larger demand, more canals sourcing water across the top end from Qld toWA would be required. While these plans are ambitious, as Asia urbanizes grains and bio-fuels will become higher value export items. Taxes at 30c/Dollar and GDP multiplier effects will create large economy benefits. By rotationally growing other grains, legumes or camelina (an oil seed for bio-diesel crop which double crops with wheat) we can potentially develop up to 150 million TPA of CO_2 carbon offsets coming from soil carbon, energy and bio-fuels. These offsets could be useful in protecting coal mining and other large CO_2 emitters from carbon charges. If plantings could be expanded using water further west, they could offset all our emissions.

6. d) Ethanol , Bio-diesel, bio-oils

Projections are by 2015, $30 bn of Australia's trade deficit will be due to oil imports. We plan to introduce a proven ethanol from cellulosics technology via www.ineosbio.com. This syngas fermentation technology can produce ethanol and power from carbonaceous feed-stocks such as waste plastics, straws and MSW. It also can recycle essential P and K crop nutrients in ash form,(a solution to peak phosphorous concerns). NSW has mandated introduction of 10% of ethanol into fuels and by 2012, it will reduce costs to motorists by allowing purchase of a lower cost E10 fuel with lower carbon charges. Cars can be fitted in NSW with a $350 fuel conversion kit to use regular fuel or purchase E85 fuel at approx 2/3rds the current cost of regular fuel. (yesterday's cost, who knows tomorrow?)

Oil from tree seeds is possible in northern regions. www.pacificrenewableenergy.com.au Pongamia Pinnata oil can be processed into diesel, growth will generate carbon offsets.

Opportunities are developing to produce oil from algae grown in covered ponds, channels or clear pipes. A USA group www.phycobiosciences.com have Arizona demo projects growing high protein algae in channels for stock feed &/or bio-fuels, using grow systems designed to fit in with regular farm equipment & expertise. System now going into China.

The pyrolysis of woody biomass (eucalypts) is a proven technology that has potential to produce bio-oil (car fuels) and Char (Iron reduction). For info go to www.renoil.com.au

6. e) Meat: $revenue traditionally triples the value of grain used to lot feed animals. As populations in Asia urbanize a 80% increase in world meat demand by 2030 is expected. The methane ex cattle/sheep is responsible for 18% of our GHG. We should reduce meat usage, but its amino acids are important to health. More intensive cattle feed-lot shedding and effluent plant can be designed to capture methane and use it for plant power. Cereal based meat substitutes, poultry, pork and even kangaroos, do not produce methane output

6.f) Dairy Farmers in recent dry periods have found it less expensive to feed cows grain than on pasture grown using expensive irrigation water. Dairy farms could triple feed /Ha while halving water usage /litre of milk by using intensive farming systems to grow grain for feed. **(see7.0),** US grain fed cattle tend to yield 2 times more milk per cow than ours. Super-marts in US supplied from intensive dairy farms sell unsubsidized milk at 43c/litre.

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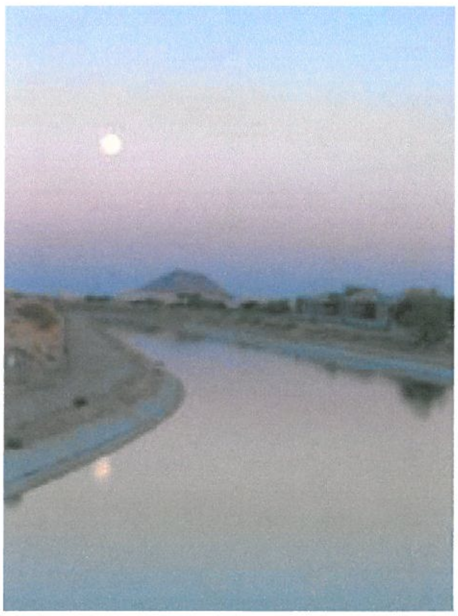
6. g)Wine& Fruit: Low water allocations in NSW, Vic & SA grape districts put $3bn pa of wine exports at risk. Many in this industry are now looking at how to tap into huge markets in Asia. Many vignerons desperate from prolonged drought are selling water rights at low prices.

6. h) Mallee Eucalypts to control salinity, sequester carbon & produce industry products:
Mallees are a fast growing local tree that survives in dry conditions of 125mm rainfall or



can yield 10 dry T/ha/yr in 550mm regions. Growth will taper off, when not harvested at 4 YO maturity. They are grown to sequester carbon & mallee alleys are used to lower salinity in WA wheat cropping areas. By harvesting coppiced tree tops 1 in 4 yrs on plantations irrigated with 7500 GL water, we could produce biomass for 20% of Australian base power needs or 55% of our liquid fuel needs (via ethanol). By growing without harvesting they could sequester 10% of Australian carbon emissions. Other uses of harvested wood are for panel board products, or to extract lignin via a solvent paper pulping process to be used as a binder for production of carbon fiber suitable for light weight car panels, competitive with steel. (Fiber can reduce car weight by up to half and Nissan and Honda are planning to go this way within 8 yrs.) Pyrolysis systems can convert mallee biomass into bio-char and bio-oil. The fuel can be used to generate power or car fuels and the char can be usefully added to soils to improve long term fertility. Steel produced know wood char can be safely used now as a 33% substitute to coke when converting iron ore to steel, (Brazilians are already doing this). 100% substitution requires strengthened chars to suit complete blast furnaces ops. In the long term char could also be used to convert high temperature CO_2 emissions from cement kilns and shale oil production into Carbon monoxide and then to ethanol. Wood char may be a substitute for geo-sequestration of CO_2 from coal derived power in highly populated regions. It is worth noting that power plants in central NSW are now growing mallees to test coal replacement in power plant.

7:) New Mining sites

Qld,-uranium, shale oil, zinc, copper, rare earths, gas, coal **SA** – uranium, gold, copper **NT**- uranium, gold, phosphates, rare earths. **NSW**: coal. All require water for viability and all can benefit from future carbon offsets derived from agricultural soil carbon etc.

NEW DEVELOPMENTS

8:) Bush-fires need to be put out while still small. NASA in conjunction with USA forest services has devised systems to use unmanned air vehicles (UAV's) or high flying drones fitted with IR cameras to transmit fire images to base and quickly direct water bombers to pick up water in dams located on roads in fire prone regions. Water needed for these dams can be moved from canals by tankers off season. Bushfires are known to markedly reduce water output from burnt catchments, while increasing output of carbon emissions. The CFA in Vic are reviewing UAV's, there are some concerns ex the aviation industry.

9.) Soil fertility& soil carbon offsets (CSIRO Research projects now underway to validate) Many broad acre farms in the <u>southern half</u> of Australia are swinging over to "no-till/liquid fert" pasture farming techniques to grow crops and feed livestock on same land. Grains when planted in cooler months out-strip growth of below foliage, shading it as a competitor. In a few seasons grain yields return to normal as a result of improved soil carbon, water retention and fertility. Vic growers are improving yield on duplex soils by using an initial cultivation technique that does not disturb top soil, when adding gypsum and nutrients into the clay base. They then stabilize soil with a deep rooted perennial rye grass. Irrigators using this technique are increasing crop yields while building deep rooted carbon at rates up to 3 T CO2e/Ha/yr. Provided land is not compacted the technology has potential to rehabilitate land, improve yields and generate large carbon offsets. With a future need to consider recycling of crop nutrients such as phosphate fertilizers, intensive carbon farming techniques, in conjunction with adequate irrigation and recycling of crop wastes, offer potential to re-vegetate land, improve crop yields and water retention, while reducing CO2.

10.) National Broadband Network and Other Services Canal infrastructure, controlled by fiber, could provide low cost communications in regions within vicinity of canal. We estimate 40 towns (population 270,000) could be joined with optical fiber broadband for medical, educational and business services, with wireless only to town homes and farms. Services such as communications, water, power and transport will be needed to develop regional industries that attract people away from working in over populated coastal cities.

11.0: Zero carbon energy is being looked at around the world mainly based on using solar power to split H2 and O2 from water. New electrolyzing catalysts are being used to increase conversion efficiency to enable economic hydrogen to be stored for power generation or usage as a fuel for fuel cell driven vehicles. see www.suncatalytix.com

12.0 Vortex power. A local group www.kourispower.com and others in Austria have been successfully testing the potential to use the rotational kinetic energy of the earth, ie Coriolis force, to generate hydroelectric power. (a simple application of this can be seen in water turning as it goes down plug hole) What interests us with this technology is its predicted potential to produce about 27Mw of power from a 30m dia vortex chamber which we see as fitting in well with our design parameters to power canal pump stations. This predicted power with low fall installations could also be useful for a wide range of energy applications such as an option to conventional hydropower on the Burdekin river

13.0 : Supermarket to Asia. We have 300 million potential consumers on our northern door step.. Major Australian super markets and grower groups have looked at this market before but lack of supply during winter months and rudimentary supply chain to Asian sales regions have been barriers. When adequate water is available in our warmer northern regions during winter we have potential to supply a full range of fresh dairy, meat, fruit and vegetables 12 months of year. A 1-2 day delivery service to S/E Asia could come from fast moving refrigerated catamarans leaving the Karumba port on the Qld Gulf. Fresh produce could also be flown out daily to markets as is done in Europe , for direct supply to supermarkets or for further value adding by destination communities.

14.0: New dam and canal construction techniques

Mining groups are automating 24/7 excavation using surface miners. Similar possibilities exist for canal excavation based on their accuracy and cutting speed: www.wirtgen.com "Soilcon Systems" a WA group has a geo-polymer soil consolidation system used to leak proof dams, canals and seal roads .We are interested in its potential to replace canal liners

15.0: Project advancement

T Bowring and Associates international activities in a range of agri-food industries have led to over $100 million from savings and crop expansion. We see introduction of new water from the north as vital to meeting future demands of the Australian food industry. A determined approach will be needed to make this big project go. We need to ensure the "value" of water is clearly outlined in a government funded PPP which outlines potential future issues of wars as a result of starvation and global warming in our part of the world.

T Bowring (Director)

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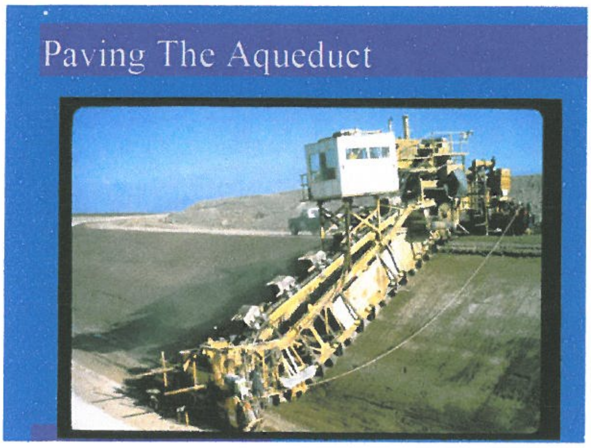
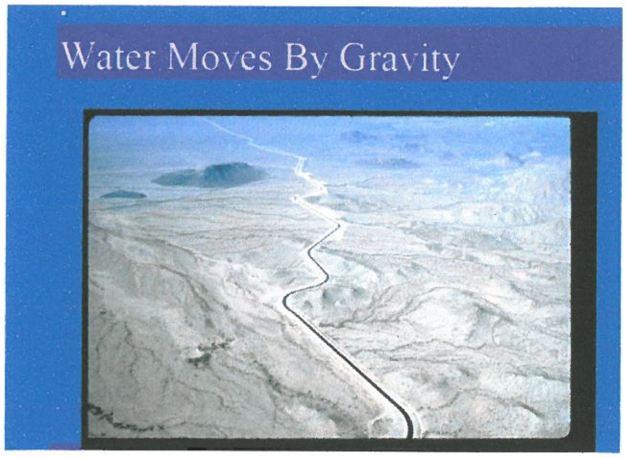
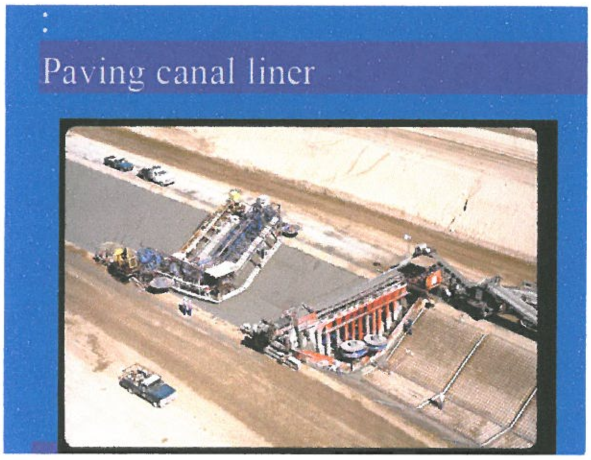
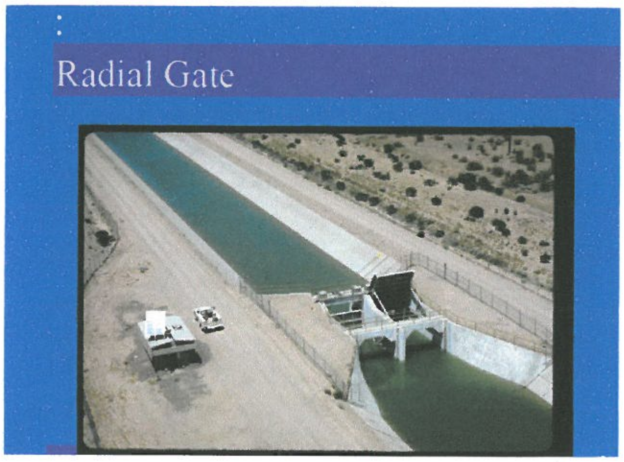
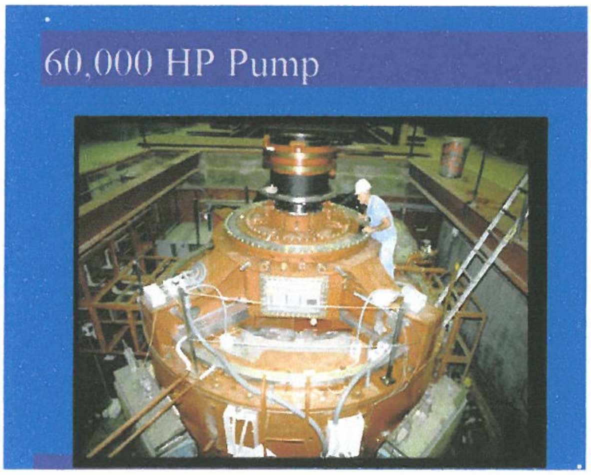
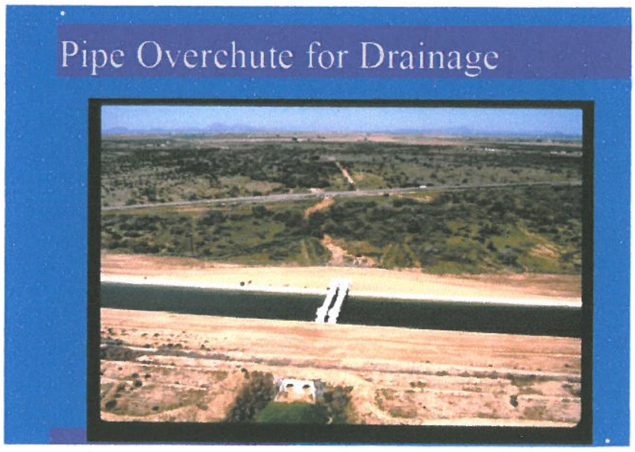

Paving The Aqueduct

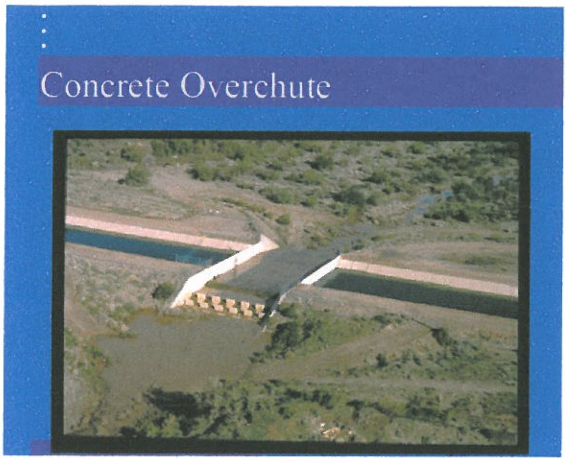

Water Moves By Gravity


Paving canal liner

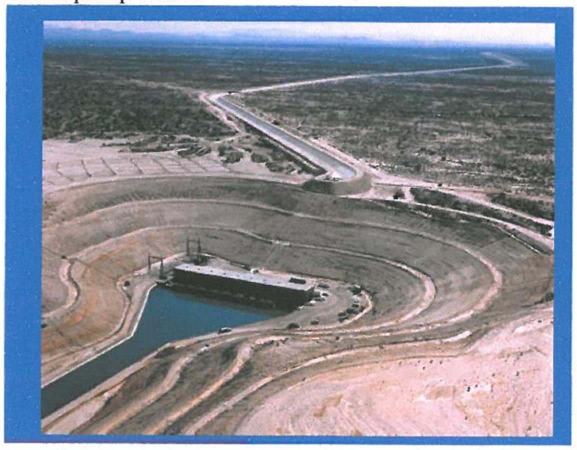

Radial Gate

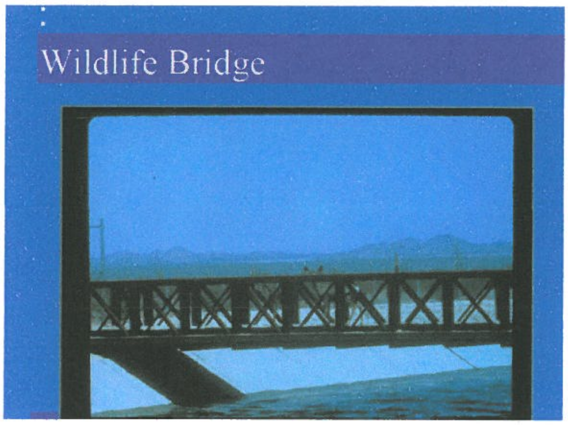

60,000 HP Pump


Pipe Overchute for Drainage

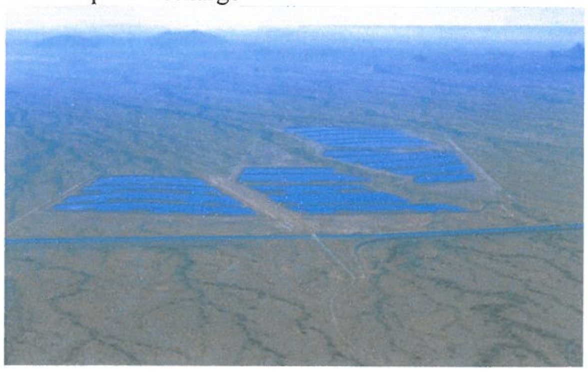


Canal pump station

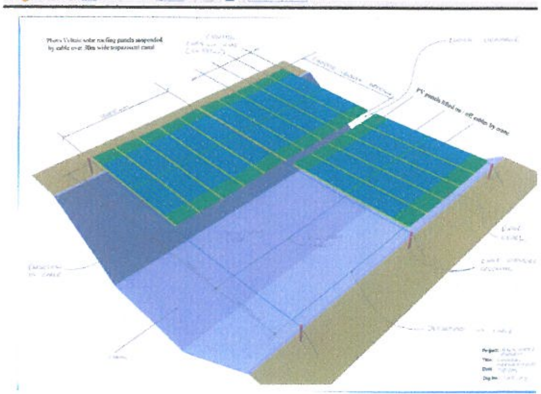




Canal aquifer recharge



Canal photo voltaic solar cover

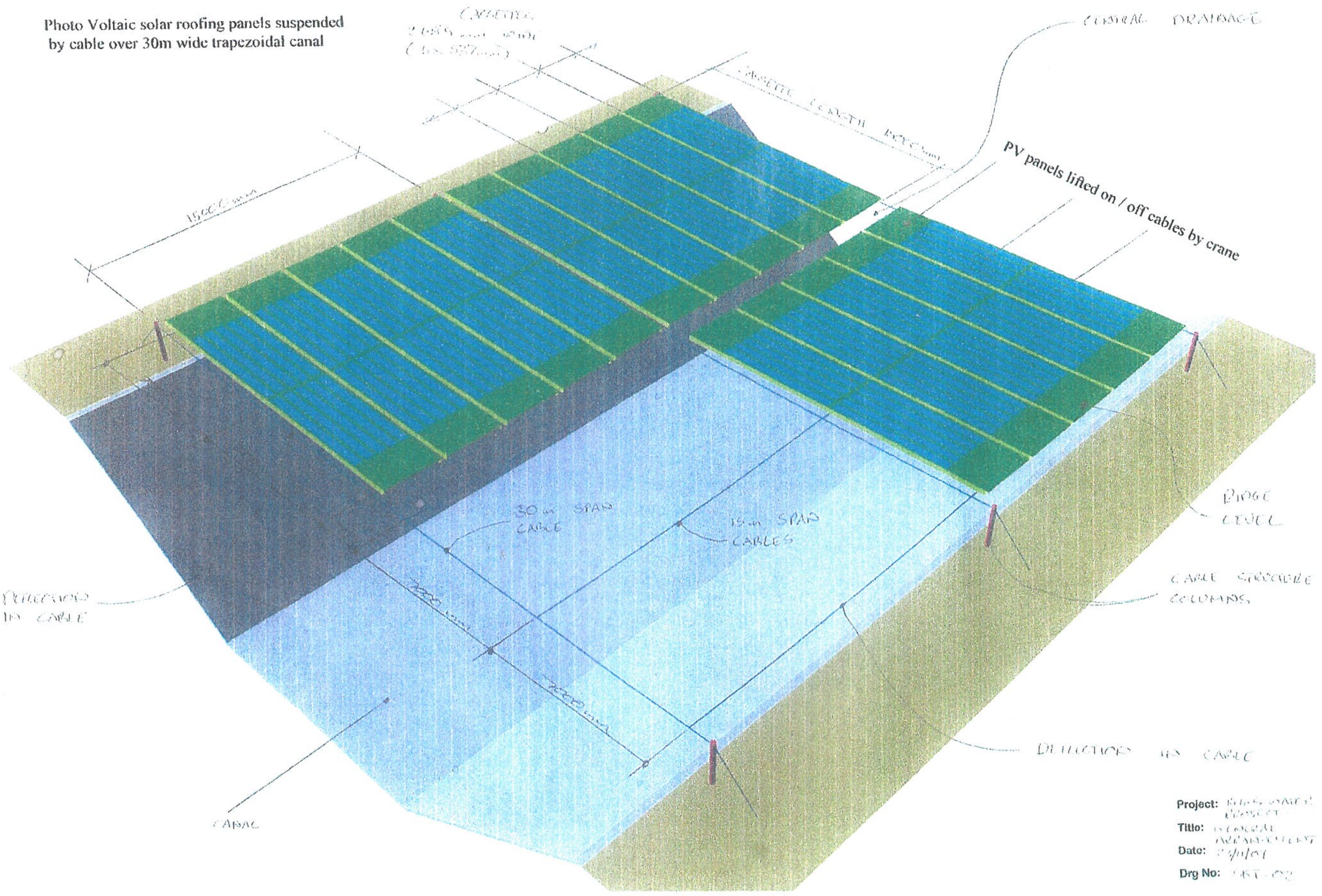


Below is a pipe forming system available and widely used in Australia on various road drainage and irrigation systems. The plastic tube around which concrete is poured, can make pipe up to 1000 mm in diameter. The concrete is poured in sections and after a pre-determined period of set, the inner plastic is pulled away and another section of pipe is added. This pipe can be formed from soil concrete for on farm applications or a 32MPa concrete can make pipe for long distance transit via suitable gravity fed pumping stations.

LOW COST IRRIGATION PIPE TO REPLACE IRRIGATION CHANNELS

(pour soil based concrete over inflated pipe)

Photo Voltaic solar roofing panels suspended by cable over 30m wide trapezoidal canal



PV Solar covers suspended above canal can provide an optional source of power for pump stations while reducing evaporation losses

SECTION C

BURDEKIN FALLS DAM TO MURRAY (APPROX ECONOMIC SUMMARY)

Preliminary costs of main canal for construction over 6 years. (Government Financed at 2.5% pa) Returns will be based on 50 year loan payback from user pay water charges.

Water Route, Burdekin Falls dam	**To Tocumwal**	**To Wentworth**
Annual Flow input	4000GL	4000GL
Canal construction costs over 6 yrs	A$ Mill	A$ Mill
Tunnel water through ranges	45	45
New dam plus increased BFD capacity	350	350
Inverted siphon install (river crossings)	50	12
Aquifer recharge/ recovery plant	85	85
Purchase of easements	40	20
Preliminary Surface mining plant	40	40
Auxiliary Excavation plant	327	110
Canal/aquifer Excavation crew	545	180
Canal Auto trim and line Plant (new)	49	13
Canal Trim and line crew	329	108
Portable accommodation and meals	100	33
Canal filter material (delivered)	732	241
Canal concrete lining (delivered)	1488	501
Canal Water Stop (expansion joints)	68	22
Fuel for excavation and lining plant	538	177
Pump stations (Pumps, electrical etc)	1780	590
Canal filtration plant	20	10
Gas engine or turbine power plant	484	160
Gas pipeline	240	79
Security Fencing & wild life crossings	99	33
Warrego River Embankment upgrade	-	40
Radial flow check-gate structures	240	80
SCADA plant and network	30	20
Eng Design and Project Management	400	132
Construction interest charges *@2.5%*	770	275
GST	848	308
Total Canal Construction Cost $Bn	**$9.697**	**$3.664**

Annual operation charges $ Mill pa		
Canal admin, ops and R&M costs	42	20
Power cost for lifting and pumping	105	35
Straight line Dep'n pa over 50 yrs	193	73
Water fees paid to catchment authority	20	20
Average investor returns @2.5% pa	113	45
Total	473	193
Water out (less evap/seepage losses)	3760 GL	3600GL
Delivered Water costs (approx)	**$126/ML**	**$54/ML**

Terry Bowring t.b.a@bigpond.com.au , mob 0402 089 943, ph 61 2 9918 9905

Government revenue streams from water sales, taxes from crops, new industries, bio-fuels and carbon offsets.

Water/ New business data | Annual Revenue and profit pre-estimates | ICN multiplier factors /$Mill of new industry

Total water available after losses =3750 GL Capex main& subsidiary canals $12-13 Bn	Sell price	Cost price	Water & /or Product revenue	Water &/or Product Margins	Value Added $1260m	Welfare $211m	Employed Persons $900 m	Tax revenue $317m	Gov't Returns ex water sales, savings, taxes, Carbon offsets, $ Bn pa
To Environment 1500GL Replace water buy backs	$128/ML	$125/ML	$192 mill	$5 mill	$11 Bn	$2bn	$8 bn	$3 Bn	$0.26bn savings
To City Dams 700 GL to replace desalinated water	$1200/Ml	$300/ML	$0.84Bn	$0.63 Bn					$0.63bn margin $0.35bnC offset
To Irrigators 1550 GL	$250/ML	$185/ML	$387 mill	$0.101bn					$0.10bn margin
12T/Ha of wheat from crops irrigated at 2.5 ML / Ha yields 7.5 mill TPA	$350/T	$166/T	$2.2 Bn	$1.15 Bn					$0.34bn taxes
Straw yield @12T/ha Gives 7.5 mill T of straw @330L ethanol /T yields 2,475 ML of ethanol ex $1.9 bn of new plant	$700/KL	$420/KL	$1.74 Bn	$0.70 Bn	$2.4bn	$0.4bn	$1.7bn	$0.6bn	$0.21bn taxes $0.13bnC offset
Power from straw @ 660 Kwh/KL of Ethanol yields 1.63 mill Mwh pa ex $0.5Bn of new plant saves 2millT CO_2 excoal	$80/Mwh	$48/Mwh	$0.13 Bn	$0.05 Bn $0..03 Bn	$0.6 bn	$0.1 Bn	$0.4 Bn	$0.2bn	$0.02Bn taxes $0.03bn offset
Soil carbon increase @ 3.0T CO_2e /ha/yr, offsets split 1:1 to gov't/industry	$20/T CO_2e		$0..02 Bn	$0.02 bn					$0.04bn offset
Drought relief reduction									$0.250bn saved
TOTAL			$6.63 Bn	42.486 bn	$14bn	$2.5bn	$10.1 bn	$4.05bn	$2.36 bn

Notes related to approx cost benefits and emission reduction estimates, associated with Multi State Water Transfer Project

Water availability Canal capex	4000 GL minus 6% pa losses~3750GL water delivered **20%** to city dams, **40%** to irrigators, **40%** to environmental flows Main canal \$9.5bn & subsidiary canal \$3.2bn delivering water to Qld, NSW, Vic and SA irrigation regions & coast cities. Could take 6 yrs to build, will have 50 yr plus life, water sourced from N/Qld regions with expected 90 yr rain reliability
Environmental flows	Water out of main canal is about one third of cost of a 10% return on water purchased for buy backs in last three years \$0.26bn savings come from deducting estimated cost of canal water from historical water charges for buy-back water
City dams	New coastal city water now comes from desalinated water which needs to be charged out at \$1.80/KL to cover costs. Power to run desalination plant @ 7Kwh/KL gives carbon charge of 1.1T CO2 from a 50: 50 split of coal and renewable
Irrigators	Irrigated water charges based on average cost of delivering water from main canal plus charges involved in moving water via subsidiary and irrigation canals to major irrigation areas in Qld, NSW, Vic and SA.
Wheat sales	We estimate as global food crisis impacts demand for grain from Asia will increase and so will price/T of wheat as dry - land farming struggles with diminished rainfall and climatic warming factors that will reduce yield
Straw to ethanol	Straw from wheat crop will be harvested, densified and delivered to ethanol plants at approx \$25/T then converted to ethanol & power using syngas fermentation technology. Offsets come from reduced carbon charges on bio-fuel
Power from straw	Exportable power generated from cooling gas in boiler associated with syngas fermentation process . Carbon offsets come from renewable power credits
Soil carbon	Soil carbon dollars based on 3.0T CO2-e/Ha charged @\$20T/tonne of CO2-e generated from no till irrigated grain crops. Carbon offsets split 50:50 between growers and gov't. Similar figures possible from other grains, legumes and cotton .
Drought relief	Estimate based on average drought relief pa paid out to irrigators/dry-land farms in Qld NSW Vic SA during drought yrs
Summary Gov't Returns from canal in a public-private JV & related industry	• Water returns to dams and irrigators \$1.02bn pa from canal investment of \$13.0Bn ~ 8% pa • Total returns pa from water sales, savings, industry taxes & carbon offsets less canal pumping C charges ~20% pa • GDP Multiplier benefits to economy (based on government recognized ICN factors) ~ \$30 bn • Emissions reduction as a percentage of Australian total emissions ~ 7% (NB within range of Australia 2020 target) • Potential future returns from developments in hydro and hydrogen power, bushfire reduction, carbon offsets, and Super-mart to Asia sales are outlined in abc wateroverview24ver3.doc

$89 for the larger storage to $366 for the smallest) and cost per ML yield ($1,593) (Table 3.21). The Mt Jack damsite is therefore not considered further.

3.7.2.9 Star River at The Bend

This site is located on the Star River at 53.3km AMTD. It is bounded on both sides by mountainous terrain, with the Coane Range on the right. The site presents a comparatively high cost per ML stored ($319) and yield ($1,963) and has therefore been excluded from further investigation (Table 3.21).

3.7.3 Level 2 Assessment of Development Options

The options remaining after the Level 1 assessment are listed in Table 3.22. These sites were examined according to a range of criteria relating to technical, economic, social and environmental factors as outlined in §2.4. Characteristics influencing the assessment of individual development options are given in the following sections.

Table 3.22 Upper Burdekin Development Options

Site Name	AMTD (km)	Bed Level (m)	FSL EL (m)	Storage (ML*10³)	Yield[1,2] (ML*10³)	Project Costs[3] ($M)	Cost / ML Stored	Cost / ML Yield
Mt Foxton	437.9	300	335	600	912 (668)	$143.5	$239	$157 ($214)
			345	1,250	1,258 (967)	$170.2	$136	$135 ($176)
			364	5,000	1,875 (1,555)	$247.2	$49	$132 ($159)
Hells Gate (CFRF)	466.7	325	365	970	1,006 (771)	$115.7	$119	$115 ($150)
			375	2,580	1,378 (1,116)	$124.6	$48	$90 ($112)
			385	5,720	1,551 (1,294)	$133.0	$23	$86 ($103)
Hells Gate (RCC)	466.7	325	365	970	1,006 (771)	$91.3	$94	$91 ($118)
			375	2,580	1,378 (1,116)	$108.7	$42	$79 ($97)
			385	5,720	1,551 (1,294)	$138.4	$24	$89 ($107)
Mt. Fullston	483.0	335	365	550	774 (592)	$106.1	$192	$137 ($179)
			375	1,650	1,200 (980)	$126.8	$77	$106 ($129)
			389	5,000	1,505 (1,264)	$179.7	$36	$119 ($142)
Greenvale	552.8	398	430	460	388 (280)	$57.1	$124	$147 ($204)
			439	1,380	489 (374)	$61.7	$45	$126 ($165)
			445	2,430	528 (407)	$88.8	$36	$168 ($218)

1. Yield analyses conducted by the Surface Water Group (DNR, Brisbane) assumes 85% monthly flow reliability.
2. Yield figures in brackets include 20th percentile Environmental Flow and 85% monthly reliability.
3. Embankment costs as determined by Engineering Services (State Water Projects, DNR, Brisbane).

3.7.3.1 *Burdekin River: Mt. Foxton Damsite*

Site Description

This damsite is located at AMTD 437.9km on the Burdekin River. The Mount Foxton area is formed by a fairly complex group of rocky hills, which makes a constriction of about 4km wide in the otherwise broad Burdekin River valley. Mount Foxton, part of the Coane Ranges, forms the left bank of the site and the Perry Ranges the right bank. Access to the site is via the Hervey Range Road from Townsville via a gravel road to the New Moon Homestead. This road would have to be upgraded if the site were to be developed.

The site was investigated by SMEC in 1973. The report considered storage capacities ranging from 3,870,000ML to 119,000,000ML using two possible alignments approximately 1.5km

SECTION D

Major Consultant

David W. Gunn, P.E.

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(623) 869-2233 (work)

dwgunn1@mac.com (home)

dgunn@cap-az.com (work)

Employment History

1997 to present – Central Arizona Project

- Engineering Manager
- Staff of 60+
- Responsible for technical design of CAP modifications, management of large capital improvement projects, stewardship of CAP land and technical records

1983 to 1997 – Central Arizona Project

- Lead Staff Engineer
- Involved in Construction, Operation, and Maintenance of CAP

1982 to 1983 – United States Bureau of Reclamation

- Construction Field Engineer
- Contractor interface, quality assurance, safety inspector

1981 to 1982 – Magadini-Alagia Consulting Structural Engineers

- Structural Engineer
- Design of structural elements on multiple building projects

1980 to 1981 – Boeing Commercial Airplane Company

- Weight and Balance Engineer
- 737-300 FAA certification submittals
- Tracked weight and balance of all 737 airplanes on the assembly line
- Customer interface on weight and balance issues

Education

1979 – Northern Arizona University

- General engineering degree with emphasis in civil engineering

Personal

Married with one son; avid outdoorsman with experience in rock climbing, mountaineering, canyoneering, river rafting, sailing, skiing, mountain biking, backpacking, fly fishing, spelunking; working toward certification to teach mathematics at the high school level; retiring from CAP in June 2008; willing to do some engineering consulting in a mutually beneficial situation; registered Arizona Professional Engineer

Engineers who have assisted our plans and have expressed interest in confirming costs to construct and services to implement

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Manager Engineering North
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Ph 07 4783 0505

Ian Holmes
Senior Technical Officer
Sunwater Ltd, Ayr Qld
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P 2

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26 November 2007

Mr T Bowring
T Bowring and Associates Pty Ltd
14 York Terrace
BILGOLA PLATEAU NSW 2107

Dear Terry,

Re: Multi State Water Transfer Project

Thank you for contacting Blue Circle Southern Cement (Blue Circle) regarding our potential interest in the Multi State Water Transfer Project.

Blue Circle is the largest integrated manufacturer of cement, cementitious, limestone and lime-based products in NSW and Victoria and a major supplier to customers across the Eastern seaboard of Australia. We are a wholly owned subsidiary of Boral Ltd, an Australian multi-national construction materials business.

In reviewing the documentation provided by Mr Terry Bowring dated 15 October 2007, our understanding is that the Multi State Water Transfer Project is still in the early concept stage and that the aim is for Mr Bowring to provide the Federal Government with expressions of interest from companies involved in concrete, energy and gas pipe line as a support for further funding.

It is the intention of Blue Circle to support this project with a non-binding expression of interest. At this stage, our initial interest lies in supplying cement and cementitious material in the construction of canals and ancillary infrastructure. There may be additional opportunities to provide other construction related materials and services from Boral.

Should you have further enquiries, please do not hesitate to contact me.

Regards,

Mike Beardsell
National General Manager
Blue Circle Southern Cement

The Australia Gulf Council have set up meetings with two delegations from middle eastern countries United Arab Emirates on 19/4/11 and a Qatar delegation on 6/6/11
The whole food security issue is central to almost every discussion you have with Government leaders in the Gulf today, said AGC chief executive Michael Yabsley.
No matter what wealth oil generates you cannot compensate for a scarcity of arable land.

We predict future delegations from Asian regions, will also be looking for food supply

TBowring

AUSTRALIA GULF COUNCIL

Australia Gulf Council

Invites

Terry Bowring

to dinner in honour of the Qatar Business Delegation visiti

Led by

Qatar Ministry of Business and Trade

Hosted by

Hon Duncan Gay MLC
Minister for Roads and Ports
Government of New South Wales

With Special Guests

Nasser Al Hajri
Chairman
Hassad Food

Mohammed Bin Ahmad Al Obaidly
Board Member and Chair of the Agriculture and Environment Gr
Qatar Chamber of Commerce and Industry

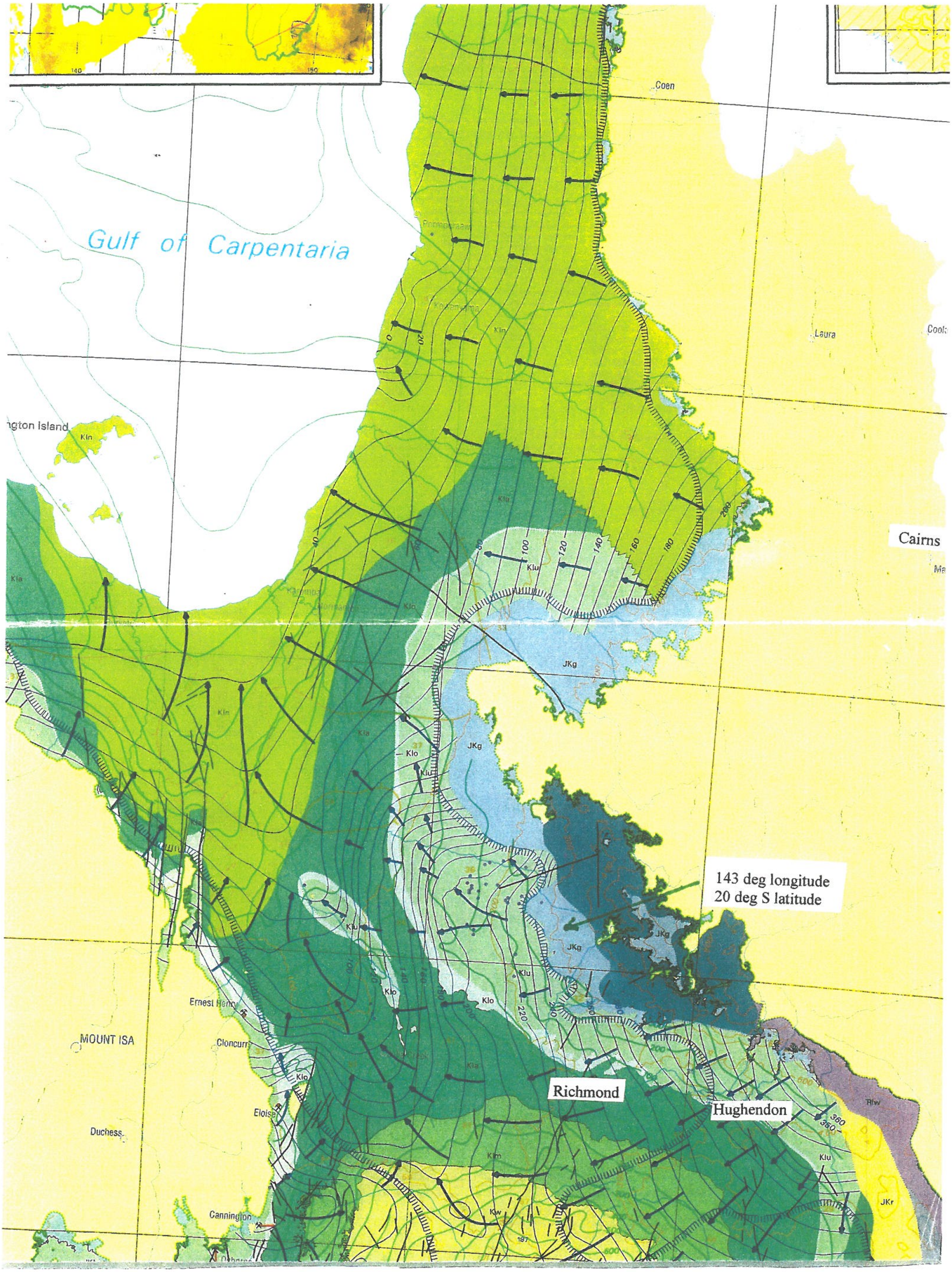
Mohammed Al Mosallam
Senior Executive
Qatar Holding

Event Partner

2/06/2011

D 4

SECTION E



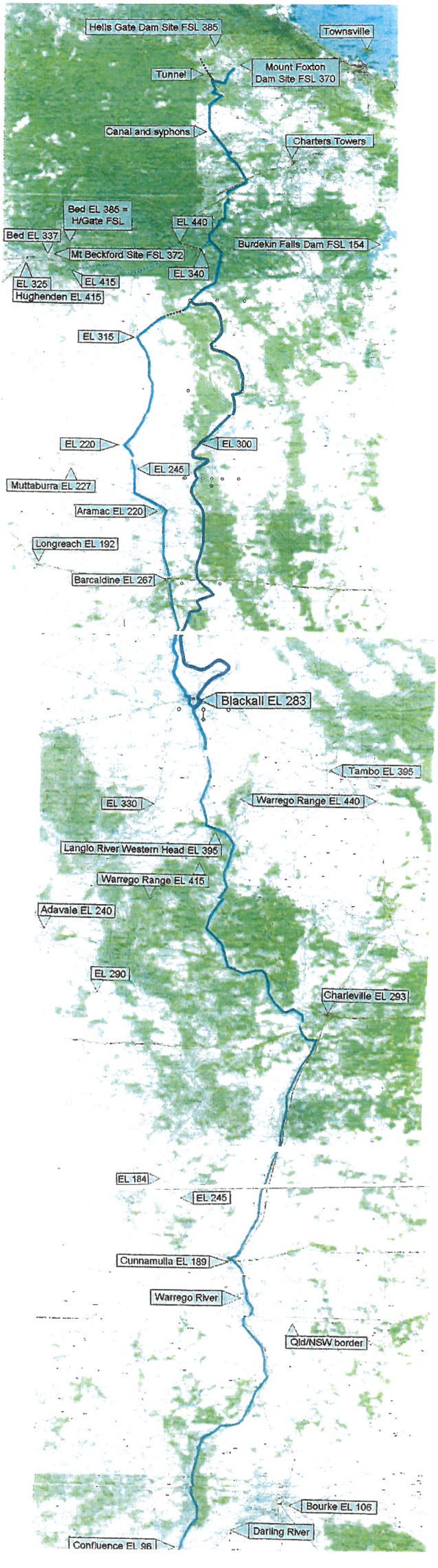
Gilbert River Formation aquifer designated by JKg on map is what Geo-science refers to as a fractured rock aquifer. Preliminary indications are that the lower section just north of Richmond could store up to 20,000 GL of water. Opportunity to store water from Gulf.

Terry Rennie

AQUIFER RECHARGE BESIDE CAP CANAL (ARIZONA USA)

Project Elements Were Carefully Selected – 19 Basins

E 3



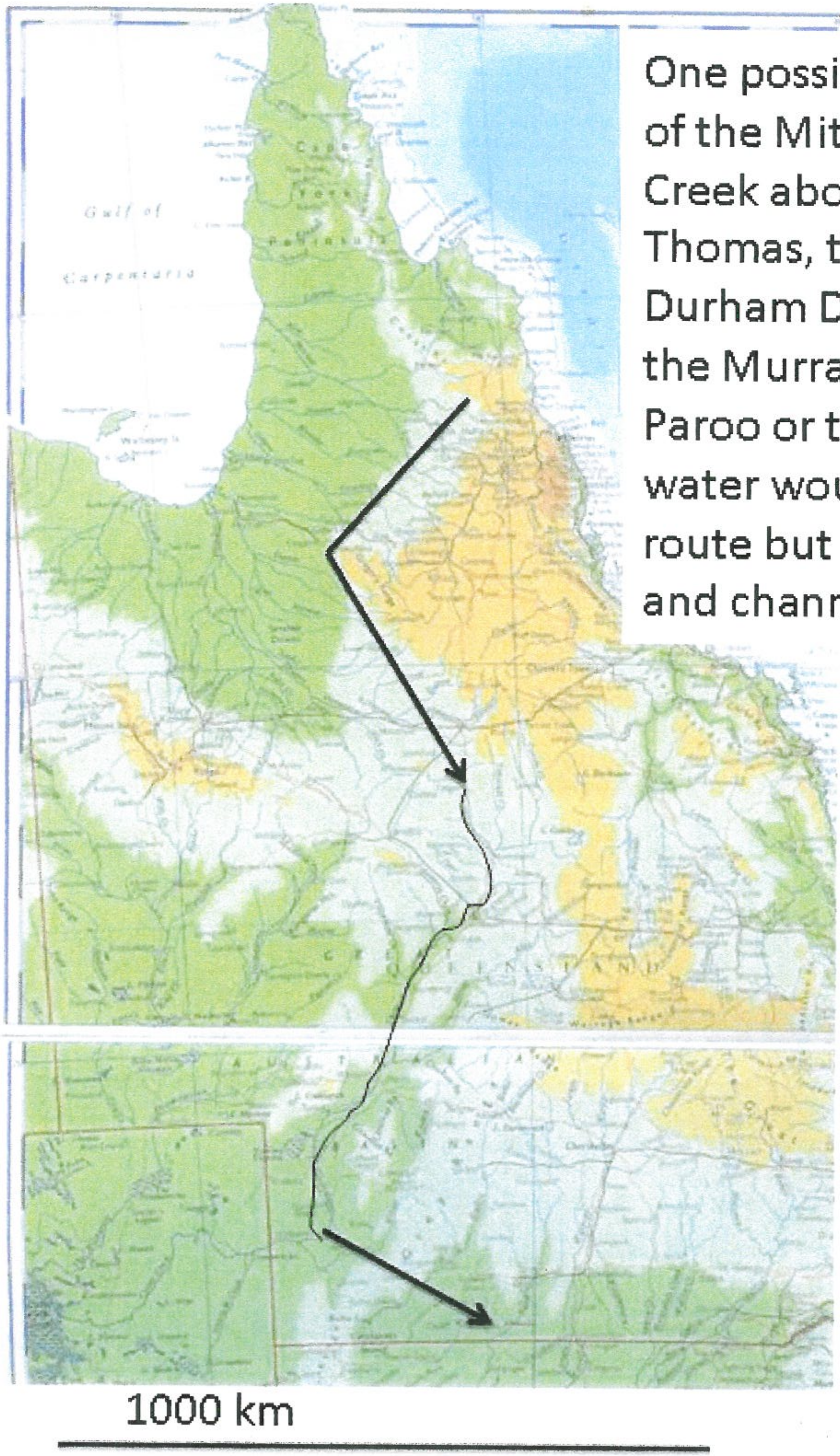
A gravity flow route to move 1000Gl water intoWarrego

The opportunity to develop this route was offered to water authorities by P Beattie premier of Qld at peak of drought. This route which runs through virgin territory with minimal road access is designed to flow most of way by gravity. For more info contact Peter Gilbey, Principle Planning Engineer Dep't Environment and Resource Management in Brisbane (ph 07 3330 6065)

Low power requirements to move water is a feature of this route, low availability of water (cf to Burdekin option) is a disadvantage when looking at overall canal infrastructure costs. Apossibility exists to expand water volume by tapping into one third of flow out of Herbert River see attached Great Water Projects (Bradfield Scheme, tunnel between Herbert & Hells Gate dam

E 4

One possible route for water transfer from the upper reaches of the Mitchell, Staaten and Gilbert Rivers to the Longreach Creek above Longreach, whence it could flow into the Thomas, then into Coopers Creek to a point between Durham Downs and Nappamerry, where it comes closest to the Murray Darling system and could be transferred into the Paroo or the Warrego, which flow into the Darling. A lot of water would be lost by evaporation and infiltration along this route but it would minimize the need to construct pipelines and channels (total about 1000 km to be constructed).



This is a natural flow route suggested by Brian Kirke Adjunct Senior Research Officer of the university of South Australia. Water from Gulf of Carpenteria catchments flows by gravity over natural terrain; water enters the Murray Darling System via the Warrego or Paroo. Potential route goes close to the Gilbert River Formation fractured rock aquifer which potentially can store large volumes of water from seasonal flows in its fractured rock sandstone base with porosity of between 10-30%. Further exploratory work on water flow pattern and potential for large scale water storage over the surface sandstone outcrops of the above aquifer is needed. Low loss water storage is the benefit we are chasing for the long term

T Ransley of Geo-science Australia studied the Gilbert River Formation Aquifer in 2003 and noted its potential to store large volumes of water over currently stored water about 70 m below surface. Water currently in the aquifer is of potable quality.

Techniques involved in evaluating and introducing the potential for large scale aquifer storage are well known and attached photo illustrates infiltration ponds developed by engineers such as Tim Gorey senior Hydro-geologist at the Central Arizona Project USA