



Tamar Lake Inc.

Incorporation Number IA 10501

Email: info@tamarlake.com.au

Web: www.tamarlake.com.au

All Roads lead to Tamar Lake

Section 1 – Freshwater Supply and Sediment Management

With better visibility on the plans for industry and agricultural development of the Tamar Valley and with results of the Longterm sedimentation study and modelling of the whole Tamar Estuary for both the existing tidal scenario and a lake scenario, funded by Tamar Lake Inc., it has become very clear that a Tamar Lake is the only economical solution to the myriad problems and opportunities available to satisfy the Northern Tasmanian community.

Let's look at the status of each of the major issues affecting the Tamar Valley community.

Freshwater supply for industry and agriculture

Hydrogen and Ammonia production at Bell Bay

Hydrogen and Ammonia production at Bell Bay for domestic and export is a huge opportunity for the State but the only company to show detail of their intent is Woodside Energy with plans to produce 900,000 tonnes of ammonia per annum.

Where do they plan to source their freshwater requirements of 3 GL per annum for their hydrogen electrolyzers? Desalinate saltwater from the Tamar and return the diluted saline concentrate to the Tamar further downstream with unknown effect on marine life. The desalination also involves significant consumption of very valuable green power.

Estimated capital cost of just the desalination plant is \$100m to \$200m, and production cost at \$1000 to \$2000 per ML, which over a 12-month period is \$5m.

With at least another 3 companies, including Fortescue Future Industries (FFI), considering the production of green hydrogen at Bell Bay, has any consideration been given by the government to freshwater source options and how the cost of the supply of freshwater for all industrial developments at Bell Bay may be minimised?

Tamar Lake Solution - freshwater locally available free direct from the Tamar behind the barrage at Point Rapid with the only requirement for hydrogen production being standard

Founding Members

Ross Ambrose	Scott Anthony	Charles Booth	Errol Stewart	Kevin French
Peter Thyne	Ralph Norton	Ted Pedley	Mike Steele	David Vautin
David Youngman	Jack Bain	Tim Dowling	Tony Gray	Andrew Lovitt
Bob Ruddick	Alec Purves	Stu Cottrell	Denis Tucker	Bill Woolcock
Phil Frith	Craig Yates	Richard Matson	Marcos Ambrose	Ross Peck
Robin Frith	Barry Larter	Martin Rees	Tim Lack	Peter Keam
Scott Bell	Robert Dutton	John Scott	Ian Goninin	John Ferrall
Rob Dowling	Sam Tucker	Jim Dennis	Peter Watt	John Dingemanse
Ben Lovitt	Jan Pesl	Nicolas d'Emden	Brian Faulkner	Anna Lovitt

water treatment and demineralisation. Electric power requirements are minimal with just pumping power over a short distance and no waste back into the river.

Tamar Valley Irrigation

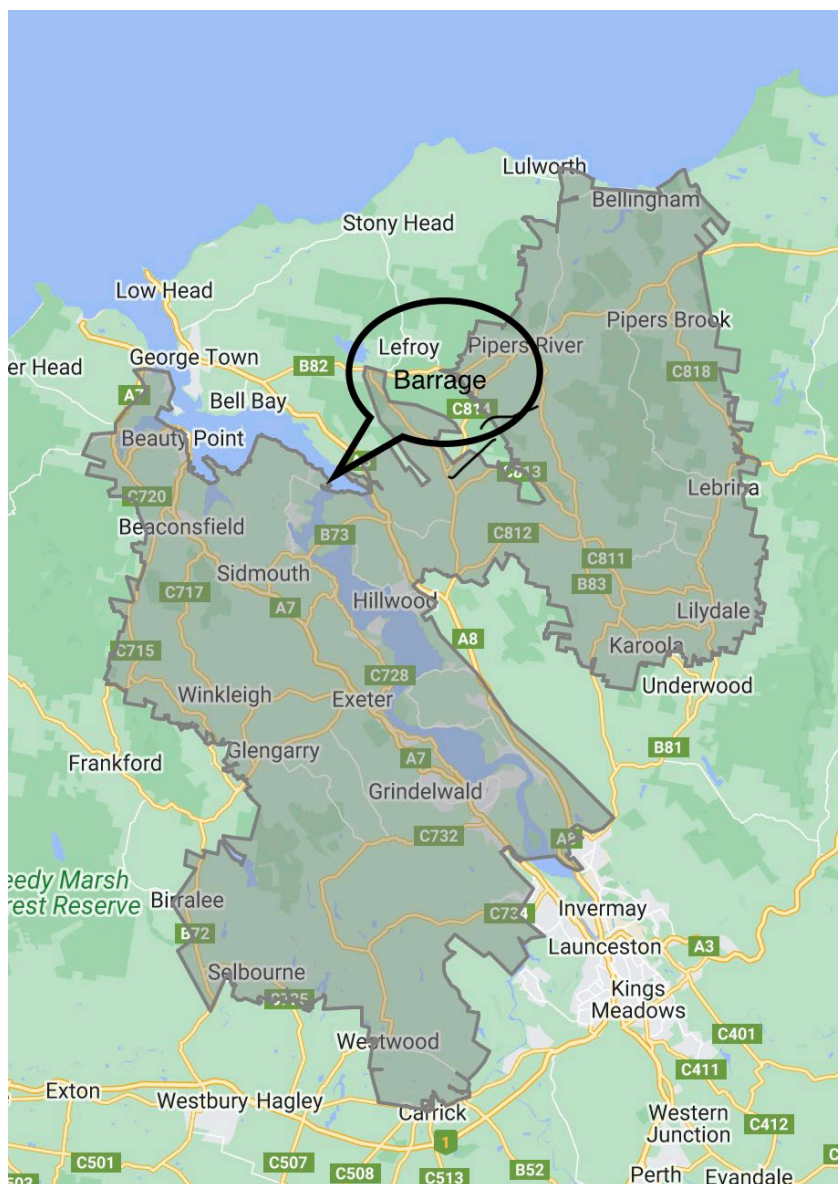
The Tamar Irrigation Scheme is being designed to deliver high-surety irrigation water to the Beaconsfield, Selbourne, Westwood, Hillwood, Lilydale, Pipers Brook and Pipers River areas in Northern Tasmania.

The Tamar Irrigation Scheme is a 24,500 ML scheme covering the West Tamar region, crossing the Tamar River at Legana, supplying the Curries River, a branch to Lilydale and a second feed to Pipers River and Pipers Brook.

Water will be harvested from Lake Trevallyn and distributed to scheme participants via an underground pipeline network over two defined summer and winter irrigation seasons. Forecast capital cost is \$290m.

The planned source for all the freshwater both summer and winter seasons is Lake Trevallyn, which is at the southern extremity of the irrigation area with 240kms of pipeline and 5 pumping stations.

No reference has been made in the current Tamar Irrigation plans to the potential lost revenue from power generation at the Trevallyn Power Station.



Tamar Lake Solution

A Tamar Lake solution would provide Tas Irrigation the opportunity to source freshwater from any location along the lake from Legana to the Barrage at Point Rapid as well as the gravity fed source from Lake Trevallyn for properties high up on the West Bank. Recent publicity has indicated that the most significant demand is from the centre of the irrigated area shown around Hillwood. This area is adjacent to the barrage.

Has Tas Irrigation looked at the economics of a Tamar Valley irrigation scheme with water sourced from Tamar Lake, based on both the potential reduction in capital and operating costs and increased demand?

Sediment accumulations

TEMT Report

In 2021, the Tamar Estuary Management Taskforce (TEMT) published an extensive report on the options available for the reduction of sediment accumulations in the Upper Reaches of the Tamar, principally in the Lower North Esk and Home Reach to Ti Tree bend. All the options were focussed on ways to increase the tidal prism in this area on the basis that this would reduce the volume of sediment accumulations, increase navigability and improve the aesthetic presentation of the area.

To increase the tidal prism in this area, the TEMT report proposes the formation of either a small- or large-scale wetland and floodplain restoration project with the excavation of 60,000 cubic metres of sediment for the small-scale project and an estimated 1,500,000 cubic metres for the large project.

What is not stated in the report is that these excavations will become sediment traps with new sediments transported up the North Esk River on the asymmetric tide and deposited in the excavated areas to restore the regime equilibrium status of this area.

The results for the three stages of wetlands restoration designed to increase tidal prism are shown in extracts from the report below.

9.3 Impacts on bathymetry, visible mudflats and navigability

The three stages of wetland restoration and restoration of tidal prism on the North Esk floodplain are intended to reduce sedimentation by increasing tidal prism. Estimates of the impacts of these stages on tidal prism have been made using GIS analysis. This estimate was then used to model a change in cross-sectional area at four locations in the estuary (two in the lower North Esk and two in Home Reach). Note that no impact is expected in the Yacht Basin as the North Esk does not impact on tidal prism in this part of the estuary.

Table 16. Likely impacts of North Esk floodplain restoration options on bathymetry.

Locations	Cease infill & tidal levee development	Remove informal tidal levees	Restoration of wetland	Large-scale floodplain restoration
<i>Channels</i>				
Lower North Esk	Minor to no change.	Moderate increase in depth (~20-30 cm).	Small increase in channel depth (~15 cm).	Large increase in channel depth (~1 m).
Royal Park	No primary impact.	No primary impact.	No primary impact.	No primary impact.
Home Point to Ti Tree Bend	Minor to no change.	Small increase in depth (~10 cm).	Very small increase in channel depth (max. estimated approx. 6 cm).	Moderate increase in channel depth (0.5 m).

Without knowing the full volume of sediments that would need to be excavated or the nature of these soils it is difficult to provide accurate estimates, but it is likely that the cost of the small-scale restoration project would be in the order of \$10 million, while the large-scale restoration project would likely cost closer to \$250 million.

These projected results showed only marginal improvements in the navigability and aesthetic presentation and does nothing for aquatic sports in this limited segment of the Upper Reaches of the Tamar. For a projected cost of up to \$250m the community has every right to question any plans by the government to implement these recommendations by TEMT.

Tamar Lake Solution

BMT Long-Term Sedimentation Technical Study, BMT - A11690 – 4 August 2022

Introduction

In April 2022 Tamar Lake Inc. members funded a very comprehensive study into the causes and effects of sedimentation not only in the Upper Reaches of the Tamar but in the whole Tamar Estuary. These studies were based on the formation of a large lake with the installation of a barrage at Point Rapid which is at the South End of Long Reach. The barrage, which is a special form of a weir, has large flood gates designed to not exacerbate the flood risk in Launceston. With the benefit of the latest numerical modelling technology and computer hardware, BMT were able to assess the long-term sedimentation impacts of the Tamar Lake concept using a 3D hydrodynamic, water quality and sediment transport model of the Tamar Estuary. Both current tidal and the proposed Tamar Lake concept scenario simulations were carried out over a 10-year period with the results extrapolated to produce a forecast for the long-term impacts.

While not supplanting the very well recognised sedimentation studies carried out by Foster in 1986, based on the 10-year simulations the latest technology has enabled BMT to forecast sedimentation impacts into the future for both the tidal and lake scenarios with a high degree of confidence, to complement the Foster studies as the reference standards for Tamar Estuary stakeholders.

Key findings from the Report

Tidal Prism – The installation of a barrage at Point Rapid reduces the tidal prism downstream the barrage from about 200 GL/tide at Low Head to about 100 GL/tide. At Bell Bay the tidal prism is reduced from 155 GL to 20GL. The consequent reduction in tidal flows should enable ships to transit and berth at Bell Bay at any tide level instead of being limited to a short period before and after high and low tides as for the current tidal scenario.

Sedimentation – North Esk – for the **tidal** case the North Esk will continue to infill up to regime equilibrium level, but in the **Lake** case the North Esk will be a net exporter of bed sediment particularly during flood events.

Sedimentation – Upper Reaches/lake – for the **tidal** case almost 100% of the fluvial silt input load of an average 108,000 m³/year is maintained in the Upper Reaches where it is mobilised and re-distributed upstream by the tidal regime. This contributes substantially to the increase in the extensive shallow and inter-tidal mudflats in the Upper Estuary.

For the **Lake** case the Upper Reaches will become a net exporter of sediment due to the erosion of sediment from the Yacht Basin and Home Reach driven by flood events. The ongoing fluvial supply from the catchment and any sediment mobilised from the Home Reach is predicted to disperse and settle in the relatively deep and wide areas of the lake from Stephenson's Bend to Point Rapid. Sediment settling to the bed from the freshwater of the lake will tend to settle in the deep channels. The predicted sediment load retained in the lake of an average 86,000 m³/year is likely to result in an annual increase of sediment depth of only 1.8mm per year. At this rate it would take approximately 40 years for sedimentation to reduce 1% of the lake volume of 350 million cubic metres,

Sedimentation – Downstream the barrage – the studies show that in the **Lake** case, only an average of 20% or 22,000 m³/year of the fluvial sediment flows through the barrage into the downstream area. This equates to only an average increase in sediment depth of 0.7mm/year in the area between the barrage and Low Head.

The studies also showed that during flood events, there is enhanced sedimentation just downstream the barrage in Long Reach due to the flocculation of silt-laden water discharged from the lake mixing with salt water. However, sedimentation rates predicted for the port facilities at Bell Bay and Inspection Head do not exceed 1mm/year which are unlikely to pose a serious constraint to Port operations.

Sand and fluvial sediment - Upstream from the estuary entrance at Low Head – In the **tidal** case there is significant sand transport upstream due to wave and tidal forcing from Bass Strait. With reduced tidal prism under the **Lake** scenario sand transport at Clarence Point is reduced from 1500 m³/year to just 110 m³/per year, and with the fluvial sediment load into the estuary of only 22,000 m³/year the estimated timescale for infilling of the lower estuary in order to approach regime equilibrium is likely to be of the order of 5,000 to 10,000 years.

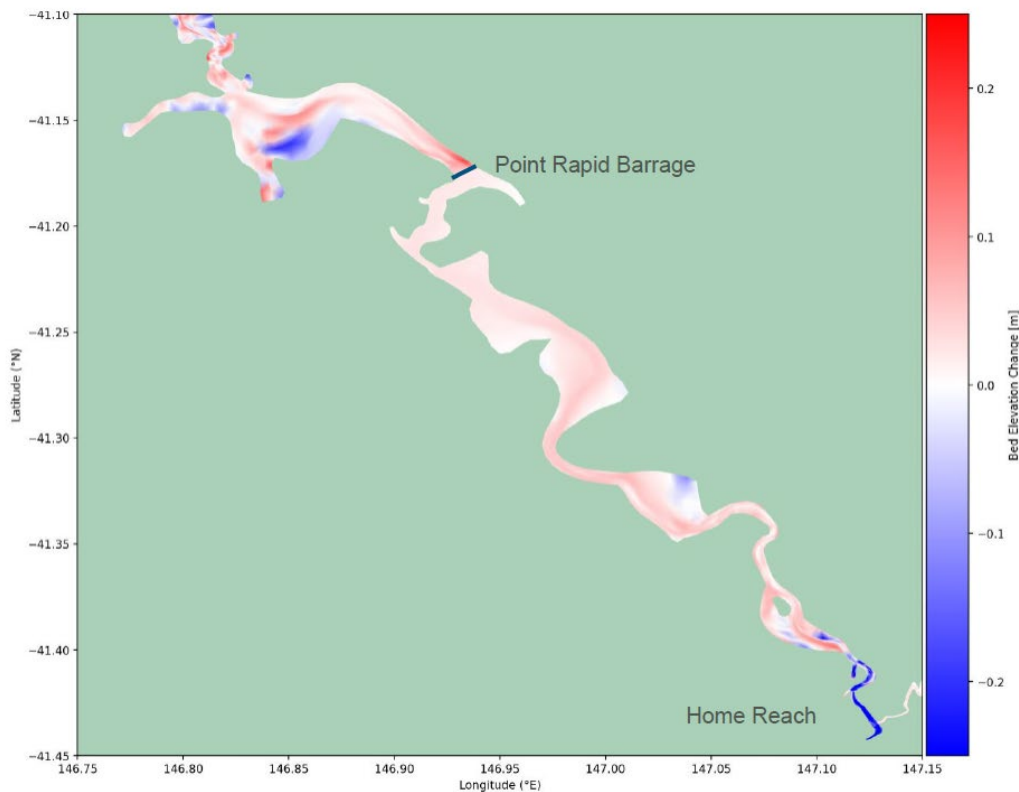
Over this long timescale the lower estuary would be expected to evolve towards a more fluvial character than the existing tidal case.

Conclusions

The chart below summarises the sedimentation changes for a Tamar Lake scenario over a 10-year period for the whole Tamar Estuary from the North Esk boundary at St Leonards weir down the Tamar to Low Head.

With the installation of the barrage at Point Rapid, the very large volume of sediment entering the Tamar from the catchment, which in the current tidal environment tends to accumulate in the narrow and shallow Upper Reaches of the Estuary, will, in the Lake environment, be distributed over the whole length of the much wider and deeper sections of the lake and remnant estuary section.

The area of current community concern, the Lower North Esk, Yacht Basin, Home Reach and North to Freshwater Point will, in the lake environment, experience a reduction in stored sediment over time and benefit from a minimum navigation depth of 3 metres 24 hours per day, 7 days a week.



Tamar Sediment accumulation and erosion over a 10-year period in Tamar Lake scenario.

Section 2 – Additional Tamar Lake Benefits

In the period 2010 – 2017 Tamar Lake Inc. carried out a wide range of studies for publication of their publicly released Tamar Lake Feasibility Report in 2017.

In addition to sediment management and freshwater supply, covered in more up to date detail above, the studies looked at environmental impacts, flood impacts, the impact of the rice grass meadows in the middle reaches, the ability to protect against the forecast Sea Level Rise in the Upper Tamar, and the economic costs and benefits.

A brief summary of these results follows.

Flood mitigation

Tamar Lake Flood Modelling – 15 pages BMT WBM – Philip Pedruco – November 2014

An assessment of the flood impact of the proposed Tamar Lake barrage was undertaken using the Tamar River TUFLOW 2D hydraulic model prepared for the Launceston Flood Authority.

This assessment has found that with a normal lake level at 0.8m AHD (approximately 1.0m below normal high tide):

- The approximate drawdown time from 0.8m AHD to 0m AHD is 4 hours for the current conditions and 14 hours for the climate change conditions.
- With 24 hours warning of a flood event on the Tamar River there is sufficient time to create enough storage upstream of the barrage to provide significant flood buffering for the 100-year ARI event and below under the current sea level conditions. In the 200-year ARI event, there is a small increase in water levels upstream of the barrage to Swan Bay, but no significant increases in Launceston.
- Under the sea level rise conditions there was a reduction in flood levels upstream of the barrage. This reduction in all cases is due to the barrage stopping the influence of the sea level propagate upstream.

Protection of the low-lying areas around Launceston from the effect of Sea Level Rise

The barrage at Point Rapid is equipped with flood gates that will normally remained closed during the period of flood tides in from Bass Strait and are opened on each ebb tide as long as the water level in the lake is above tide level. With a crest level of 2.2m AHD for the flood gates, lock gates and wall, all incoming tides are blocked from flowing into the lake.

All the hydrodynamic studies carried out for Tamar Lake Inc. assumed both the current sea levels and a rise in sea levels over the next 50 years of 0.8m.

Rice Grass Infestation

Rice grass was introduced to the Tamar Estuary in 1947 with the goal of stabilising mudflats, reclaiming intertidal lands and improving navigation. The plant spread rapidly throughout the estuary, and subsequently to other parts of the state. In 1997 **Rice Grass** was estimated

to cover 415 hectares within the Estuary, the largest infestation of rice grass in Australia (DPIWE 2002).

Rice Grass's dense growth and root network act as a trap for sediment, significantly altering the natural rate, magnitude and location of sediment deposition and erosion (Whitehead 2008). These processes eventually elevate shorelines and riverbanks, creating rice grass terraces and marsh islands, which have significant impacts on estuarine hydrodynamics, ecology and amenities. Impacts on biodiversity and integrity of native wetland communities, migratory birds and fisheries are of particular concern. Furthermore, rice grass adversely affects recreational amenities (Hedge 1997).

A report by Mark Breitfuss confirms that the Rice Grass will die off in the freshwater of the lake but that the mass dieback and decomposition will cause transient pollution in the lower levels of the lake.

However, like any significant change to any existing infrastructure like roads the transient effect will be tolerated by the community to achieve a much better outcome.

The extent and duration of this will depend on the rate and volume of water that is able to pass the barrage, and any mixing or layering of anoxic and oxygenated water. This transient effect and timing will need more study in the required Environmental Impact Assessment (EIA).

With the removal of the Rice Grass, it is expected that the natural environment will regenerate on both banks of the lake from Freshwater Point to Deviot and the community will have improved amenity access to the lake for aquatic sports.

Environmental changes - benefits and threats

Knowing that a transformational project like Tamar Lake would require a very detailed Environmental Impact Assessment (EIA) before any decision is made to proceed to implementation, at the feasibility level preliminary studies were carried out to assess all the Natural Values of the estuary and identify any threatened species and suggest the mitigation measures that may be required over time to reduce the impact on those species.

Natural Values Assessment – 160 pages BMT WBM - Dr. Andrew Costen - June 2012

Knowing the concept would involve a substantial change in the ecology of the saltwater section of the estuary, this report compiled a list of all the natural values of the whole estuary, potential effects of the Tamar Lake implementation, and Management, Legislation and the Regulatory Assessment Framework.

Ecological Assessment of threatened species and potential eco-system impacts – 35 pages E3 Consulting - Dr. Mark Breitfuss – June 2012

Dr Mark Breitfuss was asked to do a peer review of the Natural Values Assessment and specifically to identify the effect on threatened species and potential eco-system impacts. While the results indicated that there would be impacts on the saltwater ecology above the barrage it indicated that any impacts could be managed over time.

He indicated that the Environmental Impact Assessment (EIA) process will require a range of surveys and modelling to determine whether there will be an impact and to what extent this impact will occur. The EIA process will also require consideration of the types of mitigation

that will occur to reduce or offset impacts. We have identified some of the information requirements and mitigation measures that would be required for two threatened species (Australian Grayling; Green and Golden frogs) and one guild of protected species (migratory wading birds).

Economics and costing

Tamar Lake Economic Study – 39 pages NERA Economic Consultants – Greg Houston – April 2013

NERA is a NY based global economic consultancy with a significant presence in Sydney. They were asked to carry out a study on the economic benefits directly attributed to the formation of the Tamar Lake. Their results looked at: agricultural irrigation in the valley; sale of freshwater to Victoria; use of water for industrial purposes at Bell Bay; positive and negative benefits on the fish industry; the positive effect on residential and commercial property values; and tourism.

The results showed the potential for a very substantial increase in GRP for Northern Tasmania with the implementation of Tamar Lake.

Tamar Lake Economic Impact – 35 pages KPMG – Martin Rees – July 2014

After completion of the NERA economic Study, KPMG Tasmania offered to do a pro-bono peer review of that report and found that the project would provide an estimated boost to Gross Regional Product (GRP) of 3% just from agriculture and tourism within 15 years from the implementation of the Tamar Lake.

Tamar Lake Funding – AECOM – February 2017

Acknowledging the significant level of funding required to implement the project, Tamar Lake Inc. commissioned AECOM, (a global infrastructure consultancy) in February 2017 to estimate the potential for **value capture funding** methods to contribute to the funding of the Tamar Lake project. The findings from this study indicate that at least 50% of the capital cost of the project could be funded by a private developer in partnership with the State government.

Summary Economic Comparison

Given the results of the Tamar Lake studies above, and the public knowledge of the current plans for public and private investment and expenditure on Tamar projects,

What are the State Governments Plans?

- On sedimentation - as proposed by the TEMT Report an expenditure of somewhere between \$10m and \$230m on the North Esk wetlands to increase the tidal prism in the Lower North Esk and Home Reach for a very minor improvement in navigation depth and aesthetic presentation of the mud flats. This proposal will have no effect in the Yacht Basin.
 - On industrial level supply of freshwater for Tamar Valley -
 - expend \$290m on the Tamar Valley irrigation scheme to deliver water to farms from Lake Trevallyn over 240 kms of pipeline with the source the farthest point possible from where it is needed.
 - Expend an unknown capital (~\$120m?) on a pipeline from Lake Trevallyn to Bell Bay for a freshwater supply for all the potential Hydrogen producers, or
-

encourage producers to install their own desalination plants as Woodside Energy are planning to do, for \$100m to \$200m, or both?

- On flood mitigation - no known plans at this time
- On Sea Level Rise protection in Launceston - no known plans at this time.
- On Rice Grass eradication - no known plans at this time but if it were to try to eradicate it using mechanical or chemical means the cost would be in the order of hundreds of millions of dollars and they would still have the pollution disposal problems.
- On economic expansion - clearly hydrogen/ammonia production at Bell Bay and irrigating the Tamar Valley farmland are great projects for Tassie's economy but are we being smart about the implementation and taking a longer-term perspective on flood mitigation, protection against SLR, and restoring the natural environment in the middle reaches of the river? In addition, the current plans do nothing for the aesthetic presentation of the river around Launceston or the amenity value for aquatic sports despite TEMT's plans for "beautification".

What should the State Government do?

It is clear the Launceston community requires a solution to the sedimentation accumulation in the Upper Reaches and it is also clear now (with the results shown above for the long-term sedimentation study) that a Tamar Lake is the only solution to this requirement. It is also clear that a solution to the sedimentation problem also provides a solution to many of the other health and amenity problems for the Tamar Estuary that exist now or will be a future problem.

- Aesthetic presentation and aquatic sports amenity around Launceston.
- Eradication of the pest Rice Grass meadows in the middle reaches
- The ability to mitigate flood levels in the Upper Reaches, particularly to mitigate against infrastructure damage on the wet side of the levee system.
- Protect against Sea Level Rise in the Upper Reaches.

As a consequence of solving these problems, **the BIG difference is the effect the presence the lake will have on the economic future of not just Launceston but the whole of Northern Tasmania.** Tamar Lake will stimulate a huge boost to jobs, both in the construction phase and ongoing, and a huge boost to the general economy through tourism and domestic and international migration.

Launceston will become one of the great Regional Centres in the country.

It is clear that once the results of the Long-term Sedimentation study are made public, the Government will be under increased pressure to take action.

TEMT was constituted under the mantra "learn to love the mud" when the community wanted a solution to the mud: so the Taskforce was comprised of people and organisations that reinforced that mantra. This was made clear when they grossly misinterpreted the results of the sedimentation studies carried out for Tamar Lake and refused an offer to be supplied with the BMT modelling reports we had commissioned.

Does Tasmania have the skills and capability of carrying out a project of this magnitude? Of course it does. Think – TasWater - Tas Irrigation – Hydro – Entura – Flood Authority – NRM North – the three Councils in the Tamar valley - etc.

What it lacks is a properly staffed, budgeted and constituted Authority with teeth to manage the planning and implementation of all the projects associated with the health, amenity, and economic development of the Tamar Valley using the above resources.

This was a pre-election commitment and budgeted by the Gutwein government in 2021.
Why has it not been implemented?

Robin Frith
14th September 2022
