

Submission on Proposed Funding Model for the Proposed Lee Valley Dam

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1. Submission

There is a clear rationale for investing in a water augmentation scheme. With some 85% of the existing water in the 'Zone of Effect' used by the agricultural enterprises in the Waimea Plain, and the current capacity over subscribed, there will be a major negative impact on the economy from failing to address the long-term water supply issue.

The TDC are to be congratulated for making available so much background information on the project. The number of reports and the level of detail they go into show that the council has been very thorough in considering the implications of different options. One result of having so much information available is that it is difficult to follow how key decisions were made which affect the outcome.

From the material I have reviewed it appears that the proposed funding model for the Lee Valley Dam is predicated on a several key decisions which result in a larger, more expensive dam than is required. These decisions have been made on what seem to be sound technical and environmental advice, but have been made in isolation from: (i) the ability and willingness to pay by those expected to fund the dam; and, (ii) the economic and social benefits arising from the decisions.

A smaller dam with a revised funding model, and a different charging mechanism for water usage, would provide the TDC with a more viable and acceptable solution to help ensure adequate water supplies for future economic development.

Specifically, TDC should:

- Undertake a study to establish the appropriate level of ratepayer support for the project— i.e. what is affordable. As part of this, a review the design parameters and assumptions behind the future capacity of the dam should be done.
- Reduce the design flow for 'Environmental Capacity' from 1100 litres/second to 800 litres/second. This is sufficient to meet the environmental needs and would reduce the cost of the dam by up to 30%—\$21 million. The appropriateness of such a flow is supported by the 2013 TDC 'Policy Options Paper' on the dam which states: *"Investigations into flow regimes that would protect the instream uses and values (principally native and trout fisheries and swimming) of the Waimea River indicated then that flows in excess of 800 l/sec are the minimum required to maintain all of those in-stream values."*
- Adopt a market based tender scheme for the provision of new water rights for Lee Valley Dam users, and potentially for existing users. This would not only serve to encourage water conservation, but would over time see a shift of use towards the highest value production

thereby achieving the economic development goals of TDC which are the business case for the dam.

2. The ability and willingness to pay for the proposed Lee Valley Dam

The 2014 NZIER economic analysis¹ makes it clear that there are major economic benefits to all of TDC from the proposed dam. If the dam is not constructed it is estimated that: *“The Nelson-Tasman economy would be smaller by \$17.5 million and \$33.3 million as water allocations cuts increase from 20% to 35%.”* All ratepayers need to recognize that they indirectly benefit from the economic vitality of the Waimea water users through the economic activity that they generate, the jobs created, and the taxes and rates that they pay. The proposed funding model reflects this, by having charges to the direct and indirect beneficiaries.

Table 12.1 from the 2012 Tonkin & Taylor Stage 2 report² suggests that in terms of ‘Area Equivalent (hectares)’ the benefits will be:

- 75% irrigators
- 8% existing urban and industrial users
- 10% future TDC urban and industrial users
- 7% future regional supply

Table 12.1 Assumed Water Demand

Water Demand Component	Gross area (hectares)	Area Equivalent (hectares)
Existing Irrigation Area – Waimea Plains	3800	3800
Potential new irrigation area – Waimea Plains	1500	1500
Potential new irrigation area – Wai-iti	300	300
Potential new irrigation area – Rabbit Island	250	250
Existing TDC Urban and Industrial Use	NA	620
Allowance for Future TDC Urban and Industrial Use (100 years)	NA	780
Allowance for Future Regional Supply	NA	515
Total	5,850	7765

For this analysis, indicative capital costs have been allocated between potential users on the basis of the estimated number of area equivalents.

Although 75% of the supply is for irrigators, because of the ancillary benefits to TDC it is not appropriate that they bear 75% of the costs—it would also not be financially sustainable for the

¹ <http://www.eda.co.nz/edanew/wp-content/uploads/2014/10/NZIER-Waimea-Dam-Economic-Assessment-Report-21-October-2014.pdf>

² <http://www.waimeacommunitydam.co.nz/assets/Uploads/files/Phase-2-Report-Lee-Valley-Dam-Feasibility-Investigations-February-2010.pdf>

irrigators to do so, even though they will have increased yields and revenues from improved irrigation³.

The key issue which does not appear to have been addressed in the background reports is balancing the beneficiaries with their ability and willingness to pay. Each beneficiary in Table 12.1 above results in an increase in capacity for the dam—for example 7% of the additional capacity are for potential new irrigation in Wai-iti and Rabbit Island.

This proposed increase in capacity has a cost associated with it, about \$5 million⁴ for these two areas. The funding approach adopted is one of allocating all these costs as 'future capacity' and allocating them based on capital value or on a per hectare basis. This approach is also used for the additional regional supply for Nelson City. To date Nelson City have not shown a clear commitment towards funding the dam so TDC ratepayers are funding this additional capacity as well.

The challenge which TDC has been grappling with is how to equitably allocate these capacity increases. While investing \$5 million in future capacity for Wai-iti and Rabbit Island may be desirable, it may also simply be unaffordable. Similarly, TDC ratepayers may not be able to fund the cost of additional capacity for Nelson City. If that is the case, then the dam design parameters with regard to increased capacity need to be reduced to ones which reflect a more realistic funding model.

It is imperative that the final design parameters for the provision of future capacity reflect the ability and willingness to pay by the TDC rate payers and the water users. This will provide the financial constraints upon which the dam's design capacity will be governed. The approach to date of viewing these design parameters in isolation from the funding capacity has resulted in a disconnect and a potentially financially unviable dam design.

³ The proposed funding models do show a marked increase in the rates paid by irrigators—on the order of \$23 - \$30,000 for the examples given in the October 2014 'Newsline'. But if the NZIER economic analysis report is correct, there will be a net benefit after the rates to each irrigator by approximately \$3000/ha/year from the improved irrigation.

⁴ It is recognized that there is a large sunk cost for the dam so a 7% reduction in capacity does not equate to a 7% reduction in cost. However, a linear relationship has been adopted here for simplicity.

3. Do we need to spend 30% of the dam cost for ‘Environmental Capacity’

3.1 Summary

No.

As noted above, the dam costs—and thus the funding model required to meet those costs—are a direct result of certain key design parameters. These parameters appear to have been adopted in isolation from the financial implications of adopting them. This is a common issue in major infrastructure projects.

The current funding model sees 30% of the cost assigned to ‘Environmental Capacity’. This is required to increase the flows in the lower Waimea from 800 litres/second to 1100 litres/second to enhance the habitat. However, the available information shows:

- A minimum flow in the lower Waimea of 800 litres/second—outside of a year of extreme drought—will be met 98.6% of the time.
- This 800 litres/second limit is sufficient to meet the needs of native fisheries, and 80% of the requirements for brown trout which are the habitat design species for the dam.
- The increase from 800 to 1100 litres/second for the purposes of the dam design yields only a marginal ecological benefit and this accrues primarily to enhance the brown trout fishery.
- This marginal benefit comes at a cost of 30% of the cost of the dam, or some \$21 million.
- It has proved impossible to quantify any economic benefits from investing \$21 million in this increased capacity.

Adopting a design flow of 800 litres/second would reduce the dam cost and eliminate the district wide rate increase for environmental capacity.

3.2 TDC Funding Model Proposal

The proposed funding model from the TDC has assigned 30% of the dam’s cost towards “Environmental Capacity”. The funding for this is⁵: “*Environmental capacity costs are spread across all ratepayers as a flat rate (i.e. a fixed charge per rateable property).*” With the current dam estimate of \$69 million, this corresponds to about \$21 million. The model sees ratepayers in Murchison and Motueka wards paying as much as \$272/year, and Golden Bay \$129/year towards environmental capacity.

The NZIER report⁶ ‘How to pay for a dam’ states that: “*The dam will enable the minimum flow for environmental purposes to be raised to 1100 litres / second from the 800 litres / second in the new rules without the dam. This discretionary environmental enhancement is the marginal benefit of the*

⁵ http://www.tasman.govt.nz/document/serve/TasmanDCProposedWaimeaCommunityDam_SOI.pdf?path=/EDMS/Public/Other/Policy/PublicConsultation/WaimeaCommunityDamOctober2014/000000336300

⁶ <http://www.waimeacommunitydam.co.nz/assets/Uploads/files/NZIERHowtopayforadam221014.pdf>

dam for environmental purposes. This enhancement requires 30% of the dam’s design capacity ...”, or 3.8 million litres. Working backwards, the 2010 Tonkin & Taylor Stage 2 Design report states that “there is a requirement to maintain a minimum flow in the Waimea River at the Appleby Bridge to 1,100 l/sec, based on the ecological assessments undertaken for this project”.

So 30% of the cost—including the need to charge all ratepayers in TDC—is required to provide an additional 300 litres/second in the Lower Waimea catchment.

3.3 Minimum Flow Levels

The current minimum flow of 800 litres/second are given in: ‘Plan Changes 45 to 48: Waimea Water Management and Augmentation (Lee Dam)’⁷: “ ... provision for minimal recreation and amenity values in the lower Waimea River by maintaining a minimum flow of 800 litres per second (l/sec) flows in the Waimea River”.

The table below⁸ shows the number of days per year the flow in the Lower Waimea was below the current minimum threshold value of 800 litres/second. Over the 14 years of data, there were 148 days when the flow was below this threshold, or 3.1% of the time. If you exclude what was a severe drought year in 2000-2001, it is 1.6% of the time. Put another way, 96.9% of the time the river has sufficient flows to meet the 800 litres/sec threshold or, if you take out when there is a severe drought—which one can never provide sufficient capacity for—98.4% of the time the river is above that threshold.

Year	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
Days < 800 l/s	0	73	0	38	0	0	24	0	2	0	11	0	0	0

3.4 Ecological Benefits From Increased Flow Levels With Lee Valley Dam

The document ‘Plan Changes 45 to 48’ calls for: “Maintenance of flows at or above 1100 l/sec all year in up to a 50 year drought to: sustain aquatic ecosystems, provide for recreational activities, including trout fishing, provide for cultural and spiritual values, enhance landscape values, avoidance of seawater intrusion up river adjacent to any pumped bore, sustain habitat needs of native fish and trout, sustain flow in Neimannn and Pearl creeks, and support habitat needs of native birds.”

What are the implications of maintaining the current flow limit of 800 litres/second rather than increasing it to 1100 litres/second? The 2005 Cawthron Institute report⁹ addressed the river ecology. At that time, the 1991 Waimea Water Catchment Plan had a minimum flow of 225 litres/second.

⁷ http://www.tasman.govt.nz/document/serve/C45toC48-Waimea%20Water%20Mgmt%20and%20Augmentation.pdf?path=/EDMS/Public/Other/Policy/Plans/ResourceManagementPlan/BackgroundSupportingDocuments/ChangeVariations/C45_to_C48_-_Waimea_Water/000000253108

⁸ <http://www.waimeacommunitydam.co.nz/assets/Uploads/files/PresentationToPublicMeetings.pdf>

⁹ <http://www.waimeacommunitydam.co.nz/assets/Uploads/files/InstreamHabitatFlowAnalysisCawthronNov2005.pdf>

This report shows the implications of different flow levels on river ecology and recommends a minimum flow of 1300 litres/second. This flow is based solely on the needs for brown trout: *“The proposed minimum flows provided for this reach were based on maintenance of adult brown trout habitat. Brown trout attract relatively high angler use of the Waimea River and have the potential to support a valued fishery, given sufficient maintenance flows. Brown trout are also among the most flow demanding freshwater fish in New Zealand rivers, and so providing adequate flow for them should also provide for the flow needs of other species, including most native fishes.”*

The report suggesting alternatives of 500 litres/sec to maintain 70% of the trout habitat, or 800 litres/sec to maintain 80% of the habitat. The report also suggests that the benefits from higher flows do not accrue to native fishes: *“... incremental increases in flow above [500 – 1000 litres/second] would be predicted to make only minor changes to habitat availability”*.

An update to the report in 2010¹⁰ does not provide any additional benefits related to flows above 800 litres/second, reiterating that: *“The habitat requirements of yearling to adult brown trout for feeding are arguably the most pertinent to minimum flow setting for this river.”*

The 2013 Greenway report on river ecology¹¹ again reiterates that the design flow of 1100 litres/second is for brown trout: *“flows have been determined to provide appropriate instream habitat for the most flow-sensitive species –brown trout – and represent an improvement over the existing situation. Increased base flows in the Waimea River will therefore support an improved recreational fishery.”*

3.5 Economic Benefits from 1100 litres/second Design Flow vs 800 litres/second

There are none—at least that can be quantified, or even estimated.

One of the objectives of the NZIER ‘How to pay for a dam’ report was how to allocate the environmental costs. Unfortunately, the report does not consider whether or not these costs are of any net benefit to the community. As the report notes, this is not at all easy to quantify and is probably why the 2014 NZIER economic analysis¹² of the dam states that: *“Such [environmental] benefits are difficult to value and are not part of this analysis.”*

The ‘How to pay’ report notes that: *“Enhanced environmental flows can provide a range of valuable services to amenity, biodiversity retention, cultural and recreational activities, but these are not readily valued with either market or non-market valuation methods.”* These activities are in part addressed in the 2013 Greenway report on river ecology which notes that the reservoir will potentially offer a new lake-based recreation setting. However, access will be limited by private land ownership and ongoing forestry activity. If public access was available, there would be potential for kayaking and canoe access, a limited jet boating option, and possibly water skiing. The economic and social benefits from these activities are minimal at best.

¹⁰ http://www.cawthron.org.nz/media_new/publications/pdf/2014_08/CawRpt_1701_JoeHay.pdf

¹¹ http://www.tasman.govt.nz/document/serve/GreenawayWaimeaWaterAllocationRecreation%202013final20Dec.pdf?path=/EDMS/Public/Other/Tasman/Projects/WaterAugmentationProjects/Water_for_Waimea_Basin/LeeDamReports-Phase3/000000316822

¹² <http://www.waimeacommunitydam.co.nz/assets/Uploads/files/NZIER-Waimea-Dam-Economic-Assessment-Report-21-October-2014.pdf>

3.6 Conclusion

The 1100 litres/second design flow increases the dam's cost by some \$21 million. This design flow was adopted in isolation from the financial implications of the dam and the ability and willingness of TDC and its rate payers to fund it.

The 2013 TDC 'Policy Options Paper'¹³ states: *"Maintaining a minimum flow of 1100 l/sec ... is estimated by Cawthorn to improve adult trout numbers by approximately 25% with accompanying benefits to other instream values and ecosystem health"*. The same paper also notes that 800 litres/second would be a sufficient design flow: *"Investigations into flow regimes that would protect the instream uses and values (principally native and trout fisheries and swimming) of the Waimea River indicated then that flows in excess of 800 l/sec are the minimum required to maintain all of those in-stream values."*

There are no economic benefits identified from increasing the design flow from 800 to 1100 litres/second, and limited recreational and other benefits.

Adopting a design flow of 800 litres/second would:

- Significantly reduce the dam's cost
- Eliminate the need to impose a district wide rate
- Provide 80% of the optimal habitat for trout—and almost 100% for native fisheries
- Would be met 98.6% of the time with existing extraction

¹³ [www.tasman.govt.nz/document/serve/Waimea%20Water%20and%20Aug.%20-%20Policy%20Options%20Paper-Mar%202013.pdf?path%3D%2FEDMS%2FPublic%2FOther%2FPolicy%2FPlans%2FResourceManagementPlan%2FBackgroundSupportingDocuments%2FDraftPlanningProposals%2FWaimea_Water_\(Lee_Dam\)%2F000000247586&ei=6AFhVP7QKaLmAX034H4Bw&usg=AFQjCNHADPQEnapxUUWbnBYg0jBg8mVAMg&sig2=6IYH1TQU8qS4MOqXbCt2IQ&bvm=bv.79189006,d.dGY](http://www.tasman.govt.nz/document/serve/Waimea%20Water%20and%20Aug.%20-%20Policy%20Options%20Paper-Mar%202013.pdf?path%3D%2FEDMS%2FPublic%2FOther%2FPolicy%2FPlans%2FResourceManagementPlan%2FBackgroundSupportingDocuments%2FDraftPlanningProposals%2FWaimea_Water_(Lee_Dam)%2F000000247586&ei=6AFhVP7QKaLmAX034H4Bw&usg=AFQjCNHADPQEnapxUUWbnBYg0jBg8mVAMg&sig2=6IYH1TQU8qS4MOqXbCt2IQ&bvm=bv.79189006,d.dGY)

4. Allocating and pricing Waimea’s water

The 2013 ‘Policy Options Paper’ notes that “*Water permits in Waimea water management zones are due for renewal in 2016-17*”. It states that even should the dam be constructed, there will need to be a transition period until the dam is completed and operating as required so the status quo will continue until 2020.

The paper notes that “*In 2001 the Council had signalled a move towards allocation according to soil type in an effort to ensure more efficient allocation of water as well as efficient water use*”. The paper addresses how this approach will be applied with and without the dam.

What is absent is any consideration of adopting a fundamentally different allocation model which would maximize the economic and social benefits from ensuring water security on the Waimea plains: **a tradeable market based model whereby a dollar value is placed on water which people can buy and sell**. As a minimum this should be done for all new permits arising from the proposed dam.

The 2014 NZIER economic analysis shows that there are significant differences in the economic returns per hectare based on land use, their Table 7 is reproduced below.

Table 7 Assumptions on yields with and without dam

	Units	Without dam		With dam		Gross margins \$/ha	
		Yield / ha	Price \$ / unit	Yield / ha	Price \$ / unit	Without dam	With dam
Pasture	Stock units	6.5	102	12	102	663	1,225
Apples	Tce ¹	3,500	23	3,750	23	27,898	33,523
Kiwifruit	Trays	11,500	9	12,000	9	24,575	28,975
Grapes	Tonnes	8.5	1,700	9	1,800	487	1,337
Berries	tonnes	18	2,000	20	2,000	12,800	16,800

Note ¹ Tray carton equivalents (average 18 kg). We use a standard margin of \$800/hectare for all vegetable crops, which are too numerous to be itemised here.

Source: NZIER, drawing on Cook & Northington 2011, MPI Farm monitoring, interviews

They do unfortunately do not give an indication of the volume of water each of these land use types is allocated, but it clear that there are benefits associated with moving to higher margin activities—this is one of the rationales given in the NZIER report in support of the dam.

TDC has addressed the issue of tradeable water permits in the past, and are regularly mentioned in the literature for their efforts in this area¹⁴, so moving it is not clear why moving to a pricing based model has not been at all considered in the 2013 Policy Paper.

Besides leading to improved efficiency and economic outputs from the agricultural industry, they would also ensure that there was the correct trade off with the Richmond industrial users—it

¹⁴ See for example <http://www.otago.ac.nz/law/research/journals/otago036254.pdf>

recently argued for even lower flows than 800 litres/second in the lower Waimea so as to ensure their needs are met.

Given that there will be a need for TDC ratepayers to provide financial support to the dam, the TDC should also adopt the most economically efficient model for allocating the benefits that arise from such a support. This can best be achieved by creating a water market with a fully tradeable water permit system. All new allocations should be provided using a market based open tender system. Existing permits should be transitioned to such a model over a reasonable period of time.