

T&T job no: 22032.002  
1 July 2005

Waimea Water Augmentation Committee  
C/- Tasman District Council  
Private Bag 4  
Richmond 7031

Attention: Joseph Thomas  
Project Manager

Dear Joseph

## **Waimea Water Augmentation Study Revised Approach For Transfer From Site 2 Storage**

This letter report presents an outline design and costing for a transfer from a Pigeon Valley storage across to the Wairoa River, carried out in accordance with our approach faxed 24 May 2005. We have referred to river cross-sections and general surface level data supplied by TDC and have adopted the concept of Wai-iti area abstraction being taken directly from the Wai-iti River by irrigators.

### **KEY ASSUMPTIONS**

- ex Options report (T&T report 22032.002 April 2005), 3600 hectare irrigation equivalents transferred to Wairoa
- given the extent of land development which applies in the relevant areas, the whole transfer is assumed to be piped and located principally within the SH6 corridor (some open race could be considered between the vicinity of the Wai-iti River and the highway)
- peak discharge around 0.6 l/s/ha, giving around 2.15 m<sup>3</sup>/s design capacity

### **INTAKE**

Generally the river is incised about 1.6 to 2 m below the river bank. Some form of low weir would be required to enable an effective intake. It is desirable to avoid placing the intake on the inside of a bend to minimise maintenance due to shoaling and ingestion of sediment. However, the intake would only need to operate when river flows are very low, so that ingestion of bedload should not be a significant issue.

Taking into account river profiles, river alignment and right bank ground levels, the most suitable intake site appears to be at about distance 17200 m (TDC cross section data) where a weir about 1 m high (could be washout type) would bring the water level up to about RL 42

m. A buried pipe taken substantially within the stopbanked zone for some 400-500 m downstream, would then enable running out to the highway adjacent to the Borlase/Gaul boundary line where the ground level is at about RL 41m.

## **OUTLET**

The Wairoa river bed rises relatively steeply upstream of the SH6 bridge. An outlet at this location gives the shortest pipeline route and gives more head compared with exiting further upstream. This location is also likely to be close enough to the head of the aquifer recharge area to be effective where groundwater recharge is used as part of the distribution system. We have assumed that the Wairoa River itself would contain flow sufficient to ensure any minimum flow requirements at Appleby Bridge (expected to be a minimum of 500 l/sec) ie with a Wai-iti transfer to the Wairoa, and this transfer meeting the demand shortfall for the design requirement, sufficient flow will be left in the Wairoa to meet minimum flow requirements (500l/s). If this is not the case, any extra flow would be ex other sources or have to involve downgrading of the area serviced. The exit level at the bridge would be about RL 28 m based on TDC river section data. Some local armouring would be required at the pipe exit.

## **PIPELINE**

The main pipeline, if epoxy painted steel, G.R.P. or HDPE, would be about 750 mm diameter to convey the peak flow under the available head. The initial part from the Wai-iti River out to the highway, if located where assumed, would need to be about 1000 mm diameter to keep below the hydraulic grade line. This section would be about 1.2 km long out of a total length of approx. 5.2 km. Level data available indicates that the pipe could be on a continuously falling gradient.

Controls would be automated and need to include the ability to isolate the pipeline at intervals, flow metering and flow regulating valves. The small Wai-iti component would also need to be regulated at the weir.

Figure 1 attached, shows the transfer system and route schematically.

## **INDICATIVE COSTS**

Broad order indicative costs have been assessed for the system described, with order-of magnitude lump sums provided for most items, drawing on experience/precedents or otherwise making an educated guess (e.g. for dealing with buried services en route). Most of the cost is in the pipeline. Steel pipe is becoming more expensive but Saudi GRP suppliers are keen to establish a market in NZ and a new facility able to manufacture larger diameter HDPE pipe is being planned for Christchurch. Both GRP and HDPE are claimed to be more cost competitive than steel. Pipeline costing however is based on recent steel pipe data .

A total add-on figure of 30% is applied to the cost-to-build estimate, to cover establishment, engineering and contingency/uncertainty. This add-on is lower than adopted for dams because of the more straightforward and repetitive nature of the work.

The estimate, excluding GST, financing costs, RMA costs, and any land access/tenure costs, is about \$7.0M, made up as follows:

Intake works and access/power supply	-	allow \$200,000
Valving/flow metering/PLC controls (automated)	-	allow 200,000
Outlet works armour	-	allow 10,000
1000 mm pipeline, 1200 m @ \$1,200/m	-	1,440,000
750 mm pipeline, 4000 m @ \$800/m	-	3,200,000
E.O. for minor crossings and likely services relocation in places	-	allow 100,000
E.O. for Lord Rutherford Rd and Ellis Street crossings	-	allow 200,000
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	Cost to Build	\$5,350,000
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	Add-on percentage @ 30%	1,605,000
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	<b>Total</b>	<b>\$6,955,000</b>
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As a comparison, storage based on the Wairoa or the Lee catchments may require a new intake for distribution which is not via the aquifer, but that would be a relatively minor cost item compared with the Wai-iti transfer, if it has to be delivered to the Wairoa.

If the outlet to the Wairoa is required 700m or so further upstream then the capital cost estimate will increase to approximately \$7.7M

Note that the estimated cost is based on June 2005 costs. Pipe material costs have risen significantly in recent years and thus a 20% or 30% increase in supply cost could occur over the next few years.

## LAND IMPLICATIONS

A piped transfer system should only require easements. These would be required from Transit NZ for the highway section of pipeline and from private landowners for the section from the Wai-iti River out to the highway plus access to the intake site. Some refinement of the route over private land may be necessary.

## ENVIRONMENTAL ISSUES

We have undertaken a review of the TDC Tasman Resource Management Plan planning maps.

There appear to be no significant features, denoted on those maps, which would potentially be affected by the route shown on Figure 1. The route passes approximately midway between two specimen trees and a Heritage Building (NZ Historic Places Trust registered).

Alternative routes considered did appear to pass close to some features of note. These were taken into account in our brief field inspection and, combined with the issues of head and pipeline length, have resulted in the recommendation to locate the pipeline adjacent to SH6 over much of its length.

Assuming easements could be agreed with Transit NZ, following the highway would be expected to result in few environmental effects.

## **TRANSIT NZ**

We have had a preliminary and relatively hypothetical discussion with Transit NZ's Regional Networks Operational Team leader, Dave Robinson. He advises that Transit NZ is generally agreeable for utility companies to make use of the road reserve, subject to conditions. Those conditions relate to such things as traffic management during construction, depth of burial, reinstatement, responsibility for maintenance, responsibility for moving of utility should the highway shift position etc.

The type of arrangement and the conditions set depend on the ownership and ongoing responsibility for the pipeline – if it is essentially a privately owned utility (such as an irrigation scheme), Transit would require a Deed of Grant to be entered into. If the line is owned by TDC, the arrangements may be less formal.

There would be a fee associated with processing the application for the Deed (maybe in the order of \$500-\$1000, depending on length of line and difficulties). There may be a 'peppercorn' rental for use of the road reserve.

Crossing of bridges and culverts may require special attention including assessment of weight limits etc.

The Road Reserve is normally 20m wide. The reserve in part of SH6 of interest to WWAC near Spring Grove is narrower than the standard width; however Mr Robinson indicated it is still likely that the reserve would be sufficient to accommodate the pipe.

Mr Robinson has indicated that Transit NZ would encourage early discussion if this proposal were to be pursued.

## SUMMARY OPTION COST

The Site 2 – Pigeon Valley North option total indicative cost (using T&T's April 2005 Options report) is thus:

• Transfer from Site 2 storage to Wairoa (per this letter report)	\$7.0M
• Site 2 storage plus transfer to storage from Wai-iti river	\$22.4M
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Total Indicative Cost	\$29.4M

We trust that this brief report is sufficient for your purposes

Yours sincerely

J. O. Grimston

1-Jul-05  
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