MEMORANDUM

File: O/5/3/22
Chris Turver

9 April 2001

To: Councillor Chris Turver

Copy To: All Councillors

From: David Benham, Divisional Manager, Utility Services

Subject: **Options for Supplying Water to Kapiti Coast**

For Your: **Action d** **Comment ❑** **Information ✓**

In response to your request for information on options that may be available in relation to supplying the Kapiti Coast with water from the Wellington system, attached are some very high level estimates.

This information has been put together with very little knowledge of Kapiti Coast District Council's system or requirements. Clearly we would be more than happy to develop these options with them if that was their wish. Any invitations in that regard are very much in their court.

DAVID BENHAM
Divisional Manager, Utility Services

Attachment

Possible Options for Kapiti by Connecting to Wellington's Water System

			$ M
Option 1	Supplying 6 ML/d		
		Capital	8.80
		Operating	.44 p.a.
Option 2	Supplying 8 ML/d		
		Capital	9.30
		Operating	.48 p.a.
Option 3	Supplying up to 35 ML/d		
		Capital	20.2
		Operating	.4 p.a.

- Option 1 and 2 could be supplied now without impacting on ability to meet Wellington demand but would bring forward new source ($4M Hutt River option) to about 15 years out rather than current estimate of 20 years.

- Option 3 would probably require new source ($4M) when service comes on line depending on Kapiti requirement.

- Resource Consents would be needed for new source before any work commenced.

- The order of magnitude of financial contribution required by Kapiti to service $25M would be about $2.2M per annum plus operating costs of about $0.5M per annum. Assuming 10,000 connection this would be $270 per connection per annum.

  Assuming Kapiti take 15 ML/d on average a year at present, the additional production costs would be about $2.45M per annum which would be about another $250 per connection per annum. This may be excessive because Kapiti would probably take less than 15ML/d as they would probably use the Waikanae source for normal demand. These costs exclude Kapiti's own retail distribution costs.

- Note that these figures have been developed by Wellington Regional Council (WRC) staff and **no** discussions have been held with Kapiti Coast District Council staff. Hence theare made on the basis of WRC assumptions only.

- Clearly there is considerable scope for refinement if it was considered appropriate.

We would be more than happy to discuss options with Kapiti Coast District Council staff if approached.

DAVID BENHAM
Divisional Manager, Utility Services

9 April 2001

File: B/1 9/12/l
5 April 2001.

Supply of Water to Kapiti Coast:

Report on the Option of Extending the existing WRC Network from Pukerua Bay to Paraparaumu

1. Background

The current supply to Paraparaumu and Waikanae from the Waikanae River is insufficient to meet the aspirations of the Kapiti Coast community. Several schemes to supplement this supply have been investigated, but difficult resource management issues may seriously delay implementation of a new supply.

In 1998 a report was prepared describing an alternative supply to the Kapiti Coast from Wellington via a new branch main joining the Kaitoke main at Judgeford. The rough order cost for this supply was put at about $24m. A copy of the report is attached. The report did not include a contribution towards the bringing forward of the Te Marua intake structure estimated to cost about $4m.

This current new report looks at the option of supplying water to Kapiti by way of an extension of the existing network from Pukerua Bay to Paraparaumu. It provides an indication of the quantity of water that could be practicably supplied in this way and an estimate of the cost of doing so. The work reported is at a very high level, and the costs given are considered to be accurate to about +/- 20%. The costs are intended as indicative only, and should not be used for decision making, beyond a commitment to study the option in more detail.

2. Assumptions

This analysis is based on the following assumptions:

1. That sufficient water is available to supply the Kapiti Coast at the rate dictated by the hydraulics of the Porirua Branch and its extension to Paraparaumu.
2. That the capacity of the Porirua Branch Main is controlled by the section of pipe from Plimmerton to Pukerua Bay.
3. That operation of the Haywards pump station is acceptable, and in fact necessary in order to supply water to Paraparaumu.
4. That water is to be supplied to the Paraparaumu. Reservoir at a height of 113 m above MSL.
5. That Transit NZ would allow a water main to be installed along SH1, accepting that work during peak traffic times and possibly during the day would be precluded.
6. That re-chlorination, if required, would be the responsibility of Kapiti Coast District Council.

3. The Porirua Branch

The hydraulics of the Porirua Branch are relatively complex, and have not been analysed in detail in this evaluation. The complexity is due to the fact that there is a mixture of single and dual pipelines of various diameters, and because there are 10 reservoirs fed directly from the main, each supplied independently and at random times. Difficulties in managing this pipeline are currently experienced during high demand periods when limited quantities of water reach the Ascot Park reservoir. This difficulty can be easily overcome by starting the Haywards Pump Station, but running this station is very expensive.

This analysis looks only at the northernmost section of the Porirua Branch, a 5 km length of 250 mm steel pipe from Plimmerton to Pukerua Bay. Currently the daily delivery to Pukerua Bay is about 0.8 ML, and the flow rate in the pipe is 3 to 4 ML/d for short periods. There is spare capacity in this pipe.

4. Estimate of spare capacity

The flow through any pipe is a function of the pressure applied to it. That is, a main with a certain transmission capacity under gravity alone will have a greater capacity if additional pressure is applied using a pump. The most economical balance between pipe size and pumping effort depends on the length of the pipe, the relative capital costs of various size pipes and pumps and the cost of energy.

In this limited analysis, head losses in the branch between Plimmerton and Pukerua Bay have been calculated for various flows. Head losses in a 300 mm diameter extension to Paraparaumu have also been calculated. Additional boost pumping has been considered as available, but not analysed in detail. A larger pipe could be laid to Paraparaumu, but the reduction in head loss would not be great in comparison to the extra capital spent.

Operation of Haywards Pump Station will boost the pressure at the branch take off by 30 to 40 metres head, probably not sufficient to push water to Paraparaumu unless a very large pipe is used. A more efficient arrangement would use booster pump stations, probably located at Plimmerton and/or Paekakariki.

Using a single booster pump it is estimated that about **6 ML/d** could be supplied to Paraparaumu through a 300 mm pipe. If two booster stations were built, it is likely that **8 ML/d** could be supplied.

5. costs

Laying a 300 mm steel or ductile iron pipe along SHl from Pukerua Bay to Paraparaumu would cost about **$8.3m.** Boost pump stations would cost approximately $500,000 each.

Operating costs would be significant, especially that of the Haywards Pump Station. If it operated for six months of the year at an average flow of 80 ML/d, the annual

cost would be about $300,000 if the all in cost of electricity is taken as 10 cents per kWhr. Capitalised, this is equivalent to approximately $3 m. The analysis is not sufficiently detailed to identify a cost differential between pumping at 6 Ml/d or 8 ML/d. The annual operating cost of a small boost pump stations would be about **$40,000.**

6. Water Availability

Utilising 8 MLD from the existing water resources would reduce the spare capacity by about one third. Hence, new water collection resources may be needed in about 14 years at the earliest, instead of about 20 years as is currently predicted. This is based on the high population growth scenario for the Wellington area.

7. Summary

Option 1- Supplying 6 ML/d

Capital Costs:	**Pipeline**	**$8.3m**
	Boost Pump Station	**$O.Sm**
	Total	**$8.8m**
Running Costs:	**Boost Pump Station**	**$O.O4m**
	Haywards Pump Station	**$0.4m**
	Total	**$0.44m**
	(Capitalised	**$4.4m)**

Option 2 – Supplying 8 ML/d

Capital Costs:	**Pipeline**	**$8.3m**
	Boost Pump Stations	**$l.Om**
	Total	**$9.3m**
Running Costs:	**Boost Pump Station**	**$O.OSm**
	Haywards Pump Station	**$0.4m**
	Total	**$0.48m**
	(Capitalised	**$4.8m)**

Alastair McCarthy,
Asset and Quality Manager

THE REGIONAL COUNCIL

caring about you & your environment

MEMORANDUM

27 August 1998
File: B/l/l/5
Type Code Name Here

To: Murray Kennedy, Manager Strategy and Assets

From: Alastair McCarthy

Subject: **Bulk Supply to Kapiti Coast**

For Your: **Action** ☐ **Comment** ☐ **Information** ☒

Herewith a brief report summarising my investigations into providing a bulk supply to Paraparaumu from the Kaitoke main.

Alastair McCarthy
Asset and Quality Manager

B/1/1/5
27 August 1998

Supply of Water from Kaitoke Main to Paraparaumu

1. Background

Informal discussions with representatives of Kapiti District Council indicate that some difficulty is being experienced obtaining a resource consent to abstract water from the Otaki River, and that supply from Wellington Regional Council sources may be an alternative.

Based on earlier work by Kingston Morrison reported in "Kapiti Coast Bulk Water Supply - Feasibility Study Report" (October 1995), rough order costs have been established for a pipeline from Judgeford to Paraparaumu.

2. Supply Parameters

Supply parameters have been taken as follows:

Current demand (winter 1998)	10 to 12 Mlld
Expected peak demand summer 1998/99	23 Ml/d
Desired long term capacity	35Ml/d

3. Capacity of existing pipeline

An existing pipeline (the Porirua Branch Line) runs from Judgeford, west to Porirua and then north to Plimmerton and Pukerua Bay. This pipe varies in size from 375 mm down to 250 mm. A quick assessment of the capacity of this pipe between Plimmerton and Pukerua Bay indicates that it will carry about 8Ml/d under gravity and about 15 Ml/d with extra boost pumping. Clearly insufficient for it to be of use in supplying the Kapiti Coast.

4. Pipe Size Required

Simple hydraulic loss calculations indicate that Paraparaumu could be fed by gravity through a ***6001650*** mm NB pipe (approx. 620 mm id). Some additional pumping at Haywards may be required during peak demand periods.

If additional pumping stations are installed as proposed in the Kingston Morrison report, a 500 mm NB (520 mm id) pipe (and possibly smaller) would be adequate.

5. Estimate of Cost

Rough Order Cost estimates have been prepared, based on budget prices quoted by pipe suppliers and readily available in house information. In summary these estimated costs are:

1. 600 mm NB gravity supply

Pipe cost (DI pipe)	$222/m
Laying cost	$300/m
Investigation, Design and Supervision (15%)	$78/m
Contingency (15%)	$90/m
Total	$690/m

Length of pipeline	34,000 metres
Total cost	**$23.5m**

2. *500* mm NB boosted supply

Pipe cost (DI pipe)	$177/m
Laying cost	$250/m
Investigation, Design and Supervision (15%)	$64/m
Contingency (15%)	$74/m
Total	$565/m

Length of pipeline	34,000 metres
Total cost of pipeline	$19.2m
Cost of pump stations (source KM report)	$1m
Total cost	**$20.2m**

Estimated annual running cost $400,000
Capitalised running cost **$4m**

Notes 1 Prices for ductile iron (DI) pipes have been used because, although they are slightly greater than the price for equivalent steel, on site welded joints are eliminated. It may be however, that the additional seismic security of fully welded joints is desirable, in which case the cost would be increased slightly.

2. The pipe installation rates derived above are significantly greater than those used in Kingston Morrison's report. Additional information is required to establish a more reliable pipe installation rate.

6. Summary

The existing pipeline does not have sufficient capacity to supply the Kapiti Coast. Therefore a new pipe line, probably laid along the SH1 corridor, will be required. The pipeline will need to be between 450 mm and 650 mm OD. A more detailed study is required to establish the most economic balance between water demand (and its growth), pipe size and boost pumping.

ROC estimates indicate initial capital expenditure of around $20m with later additional costs for boost pumping, or expenditure of $23.5m if pumping is not favoured.