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Manuherikia Catchment Water Strategy Group
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MANUHERIKIA CATCHMENT FEASIBILITY STUDY: INITIAL TWO HYDROLOGICAL REGIMES TO BE MODELLED

Dear Kate

The Manuherikia Catchment Water Strategy Group (MCWSG) is currently undertaking a feasibility level study of the Manuherikia River catchment to provide water storage and distribution for irrigation. In October 2013, a group led by Golder was commissioned to undertake the following four components of the feasibility study:

- 1) Geotechnical and engineering;
- 2) Environmental investigations;
- 3) Land tenure, water allocation, planning and resource management act (RMA) issues; and
- 4) Economic and commercial investigations, scheme ownership and management models.

Aqualinc Research Limited (Aqualinc), who led the earlier pre-feasibility assessments, was commissioned to undertake the hydrological component of the feasibility study.

The feasibility investigations are focused on the following five options:

Options 1-3 Small, medium and large increases in the storage capacity of Falls Dam.

Option 4 Efficient water distribution systems to deliver irrigation water from the Falls Dam.

Option 5 The proposed Mt Ida Dam and distribution to serve the northern end of the Ida Valley.

In addition to the five main options high-level engineering assessment of the proposed Hopes Creek Dam is also being undertaken.

Each of the options has a number of potential irrigation scenarios, particularly in regard to the location of the irrigated area, the distribution network and the nature of the irrigation activities. The irrigation supply area and the storage requirement are very dependent on the ability to abstract run of river water from the areas watercourses. The hydrological models prepared by Aqualinc have the ability to run a variety of minimum flow and allocation regimes, and will be used to run various scenarios to assist in selection of the preferred minimum flow and allocation regime.

In a letter dated 13 May 2014 Golder Associates (NZ) Limited (Golder) presented a proposed minimum flow and allocation regime that was to be used for the base scenario runs of the hydrological model. The proposed regime was discussed at a meeting with the MCWSG on 16 June 2014.



Following the meeting, additional hydrological information was obtained from Aqualinc and the proposed flow regime updated. This letter² documents the updated flow regimes for the base scenario runs of the hydrological model.

Two initial runs are proposed which are aimed at enveloping the likely optimum flow regime. The regimes will be used to assess the large storage increase option for at Falls Dam, as this option will best highlight the differences between the two regimes.

- 1) Current regime – based on existing minimum flows and current allocation levels and is likely to maximum abstraction and the potentially irrigable area.
- 2) Proposed regime 1 – a modification of the current regime which imposes minimum flows on all major tributaries, reduces the catchment's primary allocation limit to 3,200 L/s as per ORC Water Plan, establishes a secondary allocation to accommodate the current allocation and uses guidance provide in the National Policy Statement for Freshwater Management 2011 and the proposed National Environmental Standard (NES) for ecological flows. This regime has a more environmental focus and is expected to reduce abstraction and limit the potentially irrigable area.

The current allocation levels used in the proposed regimes are based on our consent review¹ which has been checked and confirmed by the Otago Regional Council consenting staff.

The two regimes are highlighted in the attached Table 1.

It is anticipated that the regimes will be refined following completion of the feasibility investigations however they are expected to form the basis of the development option or options that are selected for potential consenting.

If you wish to discuss any of the above please contact Ian Lloyd (illoyd@golder.co.nz or telephone 03 377 5696).

Yours sincerely

GOLDER ASSOCIATES (NZ) LIMITED



Ian Lloyd
Senior Water Resource Engineer

Attachments: 1. Table 1
2. Report Limitations

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¹ Golder 2014, Manuherikia Feasibility Study – Consent Review – Current Resource Consents. Letter from Golder to the MCWSG dated 2 April that has subsequently been updated following review by ORC consenting staff.

Table 1: Manuherikia Catchment proposed flow regime for two base hydrological model runs.

Sub catchment allocation zone	Location of minimum flow site	Primary Allocation criteria		Secondary Allocation criteria		Other environmental flow requirements	Comments /Justification
		Minimum or residual flow	Allocation limit	Minimum or residual flow	Allocation limit		
Above Falls Dam	Downstream of Dam	As required on tributaries by Mt Ida Race takes. 1. 500 L/s Residual flow below dam as per current consents. 2. 1,370 L/s being natural 7DMALF of dam inflows	Mt Ida Race takes. Unlimited to allow Falls Dam to harvest inflows.	Nil Nil	Nil Nil	Nil Flushing flow of 3x median dam inflow released for 24 hours when flow below dam has been less than 3x median dam inflow for more 30 consecutive days.	Allows Mt Ida Race to continue as current. Allows for Falls dam to maximise water harvesting while providing for flushing flows to flush periphyton from the reach below the dam to the Dunstan Creek confluence.
Dunstan Creek	At Gorge	1. Nil as per current consents. 2. 620 L/s being 7DMALF.	Consented consumptive primary take 1,570.44 L/s. 1,000 L/s being 9 0% reliable water Aqualinc 2013.	Nil 2,620 L/s being Primary minimum flow plus 2 times primary allocation limit .	Nil 570.44 L/s being unreliable part of current consented take.	Nil	For High Race options allow abstraction above the race to operate with no residual flow requirements and high race to provide minimum flow downstream. This will need to be reassessed in subsequent scenarios in terms of fish movement.
Lauder Creek	At Cattle Yards (recorder may need to re-established)	1. Nil as per current consents. 2. 230 L/s being 7DMALF	Consented consumptive primary take 1,503.04 L/s. 240 L/s being 90 % reliable water Aqualinc 2013.	Nil 710 L/s being Primary minimum flow plus 2 times primary allocation limit.	Nil 1,263.04 L/s being unreliable part of current consented take.	Nil	
Ida Burn above Mt Ida Dam	Below proposed Mt Ida Dam	1. 7 L/s Residual flow as per DHA 2006. 2. Residual flow of natural 7DMALF at Dam site – to be calculated (7 day low flow with 10 year return period = 62 L/s from Raineffects 2005).	Unlimited to allow Mt Ida Dam to harvest inflows.	Nil	Nil	Nil	Flushing not considered at this stage as flows are known to disappear in to the gravels downstream of the proposed dam. For subsequent scenarios active management of flows may be required for sensitive fish species in lower Ida Burn.
Ida Burn (Including Pool Burn)	At Cobb Cottage	Nil as per current consents.	The hydrological model does not consider the Ida Valley and uses measured flows from the Ida Burn at Cobb Cottage which includes the effect of upstream irrigation and operation of the Poolburn and Mannorburn reservoirs. In future may need to consider Ida Valley irrigation and separate Pool Burn from the Ida Burn. Allocation from the Pool Burn is expected to be very high, and may need to be reduced in subsequent scenarios. Flushing from the Poolburn dam is not considered.				
Thomsons Creek	At diversion weir (recorder may need to re-established)	1. Nil as per current consents. 2. 170 L/s being 7DMALF	Consented consumptive primary take 1,562.09 L/s. 180 L/s being 90 % reliable water Aqualinc 2013.	Nil 530 L/s being Primary minimum flow plus 2 times primary allocation limit.	Nil 1,382.09 L/s being unreliable part of current consented take.	Nil	

Sub catchment allocation zone	Location of minimum flow site	Primary Allocation criteria		Secondary Allocation criteria		Other environmental flow requirements	Comments /Justification
		Minimum or residual flow	Allocation limit	Minimum or residual flow	Allocation limit		
Manuherikia Upper	At Ophir	820 L/s as per ORC plan	1. Consented consumptive primary take 8,029.08 L/s (excluding takes associated with Mt Ida Race, Falls Dam and Poolburn/Upper Manorburn reservoirs). 2. 2,815 L/s as per ORC plan (3,200 L/s) scaled relative to flow contribution (Aqualinc 2012).	820 L/s as per ORC plan. 6,450 L/s being Primary minimum flow plus 2 times primary allocation limit.	Consented consumptive secondary take 123.60 L/s (excluding takes associated with Mt Ida Race and Falls Dam). 5,337.68 being consented consumptive take less primary allocation in ORC plan.	Nil	Ophir will be the primary minimum flow site for all of the upper catchment.
Chatto Creek	At Manuherikia Confluence (recorder may need to re-established)	1. Nil as per current consents. 2. Natural 7DMALF yet to be calculated	Consented consumptive primary take 1,431.8 L/s. 90 % reliable water - to be calculated	Nil Primary minimum flow plus 2 times primary allocation limit - to be calculated.	Nil Unreliable part of 1,431.8 consented take – to be calculated.	Nil	The hydrological model currently does not separate Chatto Creek and Manor Burn from the lower tributaries. It may need to be upgraded to do so. No minimum flow is specified for the Manor Burn in recognition of the current situation and the extensive water harvesting.
Manor Burn	Below lower Manorburn Dam	nil	Consented consumptive primary take 655.63 L/s (excluding takes associated with Upper Manorburn reservoir).	Nil	Nil	Nil	If Hopes Creek Dam is constructed a residual flow site immediately below the dam would need to be established.
Manuherikia Lower	At Campground	Flow that equates to 820 L/s at Ophir yet to be calculated expected to be in the order of 1,000 L/s	1. Consented consumptive primary take 4,230.06 L/s 2. 345 L/s as per ORC plan (3,200 L/s) scaled relative to flow contribution (Aqualinc 2012).	Nil Approx. 1,690 L/s being Primary minimum flow plus 2 times primary allocation limit - to be calculated.	Nil 3,885.06 L/s being consented consumptive take less primary allocation in ORC plan.	Nil	Campground will be the primary minimum flow site for all of the lower catchment. Subsequent scenarios for Falls Dam raises to consider increased minimum flows over summer when Falls Dam can supplement low flows.
Below Campground covers the main stem of the Manuherikia River and all tributaries below the Campground monitoring site at Alexandra, and Waikerikeri Creek.	Nil	Nil	Consented consumptive primary take 194.21 L/s (excluding Dairy Creek take from lake Dunstan.)	Nil	Nil	Nil	
Groundwater takes which are strongly hydraulically connected to a surface water resource (i.e., stream depleting groundwater takes) are to be managed as part of the relevant surface water block.							
Other groundwater takes which are not hydraulically connected to a surface water resource (i.e., non steam depleting groundwater takes) are to be managed through the four groundwater allocation zones outlined in ORC's 2012 Alexandra Groundwater Basin Allocation Study.							Groundwater is currently not fully allocated in any of the four zones.

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