Ministry of Works
and Development

Alexandra Residency

IDABURN
IRRIGATION SCHEME

Review of Old Central Otago Irrigation Schemes.

Phase 1
Scheme Description and Inventory of Components.

R.85/31/Vol.1

MAY 1985

MINISTRY OF WORKS AND DEVELOPMENT
ALEXANDRA RESIDENCY

REVIEW OF OLD CENTRAL OTAGO IRRIGATION SCHEMES
PHASE 1: SCHEME DESCRIPTION AND INVENTORY OF COMPONENTS IDABURN SCHEME

Field Assessment: P Amos
Photographs: K Rhodes
Compilation: P Amos K Rhodes

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(b) Refer also to set of Aerial Photographs numbered 18, 19, 22, 25 of 46

IDABURN IRRIGATION SCHEME
SCHEME DESCRIPTION

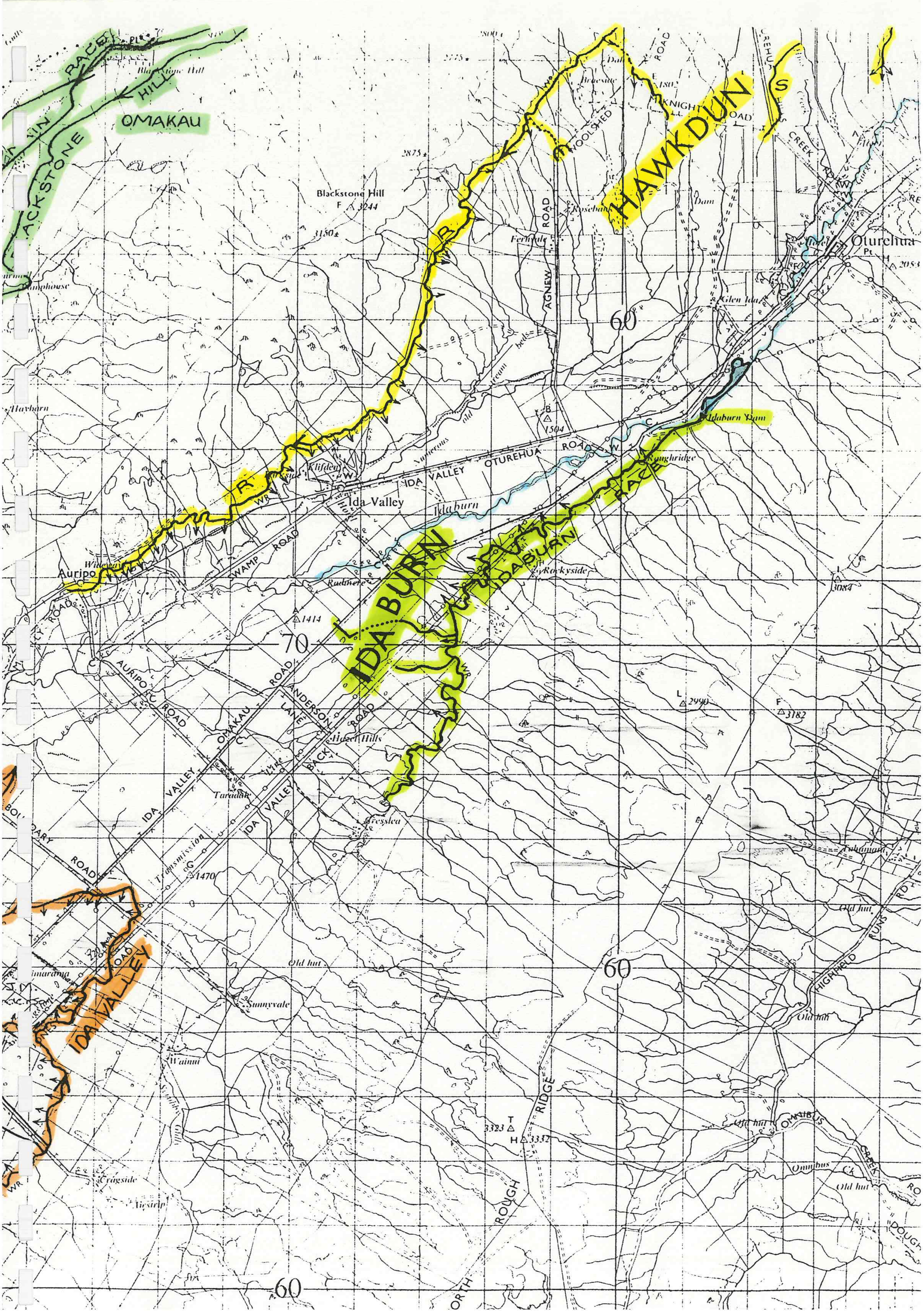
The Idaburn Irrigation Scheme is a small scheme built in 1931 to supply water to 228 hectares south of Oturehua.

The scheme relies on limited storage from the Idaburn Dam. The dam is a 10.6 metre high, 34.14 metre long concrete arch dam which provides an 8 hectare lake with a storage capacity of 234,000 m^3.

The dam is fed by the Idaburn Stream. This stream takes water from the Hawkdun Irrigation Scheme's 'R' Race to give an adequate supply of water to the Idaburn Scheme.

The dam is then used to supply a 12 km long main race running towards the south and two small distributaries off it.

The Idaburn Dam is also used as an outdoor venue for ice skating during winter.


RACE
HILL
OMAKAU
ACKSTONE
Blackstone Hill
HAWKDUN
AGNEW ROAD
WOOLSHED
Rosebank
Fernvale
Oturehua
Glen Ida
Idaburn Dam
Roughridge
IDA VALLEY OTUREHUA ROAD
Clifden
Ida Valley
Idaburn
SWAMP ROAD
Auripo
IDA BURN
IDABURN RACE
Rockyside
Radmere
AURIPO ROAD
OMAKAU ROAD
ANDERSON LANE
IDA VALLEY BACK ROAD
Hazel Hills
Taradale
Cresslea
BOUNDARY ROAD
Transmission
IDA VALLEY
Old hut
Sunnyvale
Wainui
Cragside
ROUGH RIDGE
HIGHFIELD RUNS RD
OMNIBUS CREEK
Omnibus Ck
60
70

IDABURN IRRIGATION SCHEME

OPERATIONAL PROBLEMS AND POSSIBLE IMPROVEMENTS

Comments from refurbishment walkover:

The Idaburn Irrigation Scheme is in fairly good order. Most of the problems with the scheme are not serious and an intensive maintenance programme could probably take care of them.

There were no "Urgent" or "Major" problems identified, but there was one "Minor" problem:

Structure No 54 is a 375 mm dia concrete pipe syphon across a gully. Most of the joints in this pipeline are leaking; some quite badly. This has caused swampy ground and aggravated the problem.

There are several other small problems which, if fixed, would improve the scheme's operation:

At present about 200 m^3/hr of water overall is lost through leaks in the racebanks and at poorly built pipeline inlets and outlets. However most of these losses are into broken schist rock through which the race travels.

This problem would be difficult to solve cheaply, especially as the first half of the race is a sidling race through many rock outcrops.

There appears to be inadequate provision for flood bywashing in the race. There is a winter bywash at structure No 61 which is just a 150 mm dia pipe out of the race.

There are some pipes under the raceline to drain gullies behind the race. Some of these, including structure No 2A (a 200 mm steel pipe), appear to be too small to cope with heavy rainfall in the catchments behind the race.

From the turnout to Distributary 1 the Main Race is required to carry 400 m^3/hr. However some of the pipelines, for example structure No 65, are too small to carry this flow.

Continuous vehicle access along racebanks, vehicle access onto and off the benches and gates between paddocks should be provided to improve efficiency.

Some turnout boxes and culverts are badly positioned or too high in the race to work efficiently. The repair and resiting of these structures would improve the operation of this race.

Some culverts, especially under Ida Valley Back Road, are too short and require headwalls or extensions to stop material falling into the race.

Accurate measurement of water in the races is a problem. The measuring weir at the outlet of the dam does not give true measurements and there are few measuring boxes in the races at boundary fences.

A report from the Alexandra Residency Operations and Maintenance Staff on operational problems was not available at the time of compilation. Comments will be available for use in Phase II of refurbishment.

MINUTES/COMMENTS FROM HAWKDUN/IDABURN IRRIGATION COMMITTEE
WILL BE SENT WHEN AVAILABLE

IDABURN SCHEME
3 (c) OPERATION COST DATA

(1) 1982/83, 1983/84 and 1984/85 costs are attached. It must be noted that these costs are not the true costs of this scheme. Significant costs from this scheme have been wrongly apportioned to the Hawkdun scheme. This is mainly becuase segment 1 salary costs are not charged out at less than full day portions. An estimate of the amount in question is $20,000 (ROC). Similar problems will never be eliminated while these two interdependent schemes remain as separate entities on paper.

(2) Completion of the refurbishment of the entire scheme would result in the following estimated annual operational costs. (All x $1,000 at CCI = 2,200). It is assumed that Hawkdun and Idaburn schemes will be operated and maintained by a full time staff of 5 racemen with the equivalent of 66% of one man on Idaburn. The two schemes are currently operated by 6 men in total.

SEG 1	Racemen Wages	13.0
	Wages - Alex. Irrig Section	2.5
SEG 2	Racemen Vehicles	6.5
	Other	1.0
SEG 3	Plant - Race cleaning etc.	2.0
SEG 4	Weedspray	0.5
	M & E Mtce	0.5
	Stores	1.0
10% Admin. Charge		3.0
	Total	30.0

Income based on

$200/irrigator	x 7	1.4
$50/hectare	x 230	11.5
$300/pipe	x Nil	-
		12.9

NB: Estimate is ROC

P A Deane
Senior Engineer
25.2.85

COSTS INCURRED - IDABURN SCHEME

All costs £'000)	1982/83 (CCI Av = 2000)					1983/84 (CCI Av = 2030)					1984/85 (CCI Av = 2180)				
	Seg 1	Seg 2	Seg 3	Seg 4	Total	Seg 1	Seg 2	Seg 3	Seg 4	Total	Seg 1	Seg 2	Seg 3	Seg 4	Total
General	.1			.9	1.0		0	0	2.4	2.4					
Water Management	1.7			0	2.5	2.4	.9			3.3	Not available when compiled				
Weed Spraying					-					-					
Machine Cleaning	.1	.1	1.1		1.3		.1	2.4		2.5					
Hand Cleaning	.6	.2			.8	0	.1			.1					
Minor R & R's	.2				.2	.2	.2	.3	.5	1.1					
Access Tracks	.5	.2	.1	.3	1.0				0	0					
Total	3.0	1.3	1.3	1.2	6.8	2.6	1.3	2.7	2.9	9.4					
% Total Schemes					0.4%					0.5%					
£NR MGT and General Costs (all schemes)					31.6					4.1					

REFERENCES

"CENTRAL OTAGO IRRIGATION, ENGINEERING REASSESSMENT HAWKDUN AND IDABURN SCHEMES" MOW Alexandra 1972

"HAWKDUN IRRIGATION SCHEME - Phase 1 - Scheme Description and Inventory of Components" (June 1985)

MWD Alexandra Residency R/85/33/Vol 1

Refer also FARMER SURVEY C J Reid 1982/83

APPENDIX A

IDABURN IRRIGATION SCHEME: RACE INDEX

Page	Race	Length (to nearest 0.1 km)	Race Capacity (m^3/hr)
1	Main	11.7	700
8	Distributary No 1	1.8	200
9	Distributary No 2	0.1	100

Total Raceline Length = 13.6 km

APPENDIX B

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 27.2.85 sheet 1 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
1	0				Dam	Good	Concrete arch dam in rock gorge. 300 dia. x 15.0 m L -				1-4	
				P/L 300ϕ		Good	Steel pipe					
						Bad	To Valve and measuring weir	Leaks in concrete structure				
2	30		B/W			Good	Bywash box. RHS	New			5-6	
							500 mm gate, concrete and steel pipe	Steel pipe destroyed by vehicles				
						Bad	450mm dia. 3 m length					
2a						Bad	200 mm dia. steel pipe under race	Drains steep gully				
3	140			P/L 600ϕ		Good	600 dia. x 46.0 m concrete pipeline				7-8	
						Good	Drain valve					
						Good	H/WL : Concrete					
						Good	E/WL : Concrete					
4	230			Syphon 600ϕ		Good	600 dia. x 171.0 m concrete pipe syphon				9, 11	
						Good	H/WL : Concrete					
						Good	E/WL : Concrete	(Buried)				
5	350				Drainage	Good	Pipe under pipeline 600 mm dia.	Drains gully behind pipeline			10	
6	470	Road				Fair	600 dia. x 5.5 m concrete pipe culvert	Under farm access road			12-13	
							H/WL : None					
							E/WL : None					
7	490		375 MB			Poor	375 mm box at end of crossing	Turnout RHS			13	
8	500	Access				Fair	600 dia. x 2.44 m concrete pipe culvert	No headwalls			14	
9	600			Syphon 600ϕ		Good	600 dia. x 200.0 m concrete pipe syphon				15-16	
						Good	H/WL : Concrete					
						Good	E/WL : Stone					
								Race leaks between structures 9 & 10				
10	900			P/L 600ϕ		Good	600 dia. x 83.0 m concrete pipeline				18, 20	
						Good	H/WL : Concrete					
						Good	E/WL: Concrete					
11	930				Drainage	Good	Pipe under syphon 600 mm dia.	Drains gully behind pipeline			19	
12	1000		375 MB			V.Bad	375 mm measuring box RHS	Needs replacing			21	
13	1080			Syphon 600ϕ		Good	600 dia. x 32 m concrete pipe syphon	Behind farm house			22-23	
13a	1110		375 MB			Broken	375 mm measuring box RHS	Needs repairs			24	

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 27.2.84 sheet 2 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
14	1160	Farm 650ϕ				Good	650 dia. x 10.0 m concrete pipe culvert Stone headwalls				25	
15	1420			P/L 600ϕ		Good Good Good	600 dia. x 56.0 m concrete pipeline H/WL : Concrete E/WL : Concrete	Hairline cracks in some pipes	Benched RHS		26-27	
16	1800	Farm 550ϕ				Fair	550 dia. x 6.0 m steel pipe culvert H/WL : Stone E/WL : Stone	Needs replacing (not broken)	Benched RHS		28	
17	1850			P/L 525ϕ		Good	525 dia. x 20.0 m concrete pipes H/WL : Concrete E/WL : Concrete	Across gully On rock supports			29-31	
18	1860		375 MB			Okay	375 mm measuring box RHS Stone stop	Needs replacing			32	
19	2100	Farm 575ϕ				Okay	575 dia. x 2.0 m steel pipe culvert Stone headwalls			BENCHED RHS	33	
20	2300			Pipeline		Good	450 dia. x 17.0 m concrete pipeline H/WL : Concrete E/WL : Concrete	Across gully On concrete supports			34-37	
21	2600	Bridge				Good	2.4 m x 1.2 m timber stock bridge				38	
22	2620		375 MB			Bad	375 mm measuring box RHS	Needs replacement Not used			39	
23	2930	Farm				Fair	450 dia. x 4.9 m concrete pipe culvert No headwalls				40-41	
24	3060		375 MB			Poor	375 mm measuring box RHS	Needs replacement Not used			42	
25	3120	Bridge				Good	2.4 m x 1.2 m timber stock bridge				43	
26	3350	Farm				Good	475 dia. x 2.4 m concrete pipe culvert	Erosion at outlet			44	
27	3630	Road				Good	525 inlet & 600 dia. outlet x 13.5 m concrete pipe culvert H/WL : None E/WL : None	Under Ida Valley Back Road			45-46	

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 27.2.85 sheet 3 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
											47	
28	3860		375 MB			Good	375 mm concrete measuring box RHS				48	
29	3940	Farm				Good	1.2mW timber bridge					
30	3980	Road				Fair	525 dia. x 11.5 m concrete pipe culvert H/WL : None E/WL : None	Under Ida Valley Back Road Needs head and end walls			49	
31	4150			P/L		Fair	525 dia. x 9.8 m concrete pipeline H/WL : None E/WL : None	Part covered for farm crossing Crosses drainage gully			50-51	
32	4300	Farm				Fair	450 dia. x 5.0 m concrete pipe culvert H/WL : None E/WL : None	Under fenceline Too high in race			52-53	
33	4370	Road				Fair	525 dia. x 6.1 m concrete pipe culvert H/WL : None E/WL : None	Under Ida Valley Back Road Urgent need for Head & End Walls (Close to edge of road)			54-55	
34	4640	Bridge				Good	1.2 m W timber stock bridge				56	
35	4900	.	500 MB			Fair	500 mm measuring box RHS				57	
36	5220			P/L		Good Good Good	600 dia. x 17.1 m concrete pipeline H/WL : Concrete E/WL : Concrete	Across gully			58-59	
37	5420	Road				Fair	525 dia (& larger) x 11.5 m concrete pipe culvert H/WL : None E/WL : None	Under Ida Valley Back Road Needs Head & End Walls			60-61	
38	5440	Farm				Fair	560 dia. x 6.1 m steel pipe farm crossing Stone headwalls				62-63	
39	5600			Syphon		Poor	525 dia. x 11 m concrete pipe syphon H/WL : None E/WL : None	Across gully Leaks			64-65	

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 5.3.85 sheet 4 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
40	5790	Road				Fair	525 dia. x 18.8 m concrete pipe culvert H/WL : None E/WL : None	Farm access inside fence. Under Ida Valley Back Road			66-67	
41	5990		500 MB			Fair	500 mm measuring box RHS				68	
42	6000	Farm				Poor	560 dia. x 5.5 m steel pipe culvert H/WL : None E/WL : None	Farm crossing Badly rusted			69-70	
43	6050		500 MB			Fair	500 mm measuring box RHS				71	
44	6120	Road				Fair	450 dia. x 6.1 m concrete pipe culvert H/WL : None E/WL : None	Under Ida Valley Back Road			72-73	
45	6320	Farm				Good	450 dia. x 7.3 m concrete pipe culvert H/WL : Stone E/WL : Stone	Farm access road			74	
46	6430	Farm				Good	600 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None				75-76	
47	6650	Road				Fair	450 dia. x 14.6 m concrete pipe culvert H/WL : Stone E/WL : None	Under Ida Valley Back Road			77-78	
48	6760		500 MB			Fair	500 mm measuring box RHS				79	
49	6780	Access				Good	600 dia. x 2 m concrete pipe culvert H/WL : None E/WL : None				80-81	
50	6810	Road				Fair	450 dia. x 6.1 m concrete pipe culvert H/WL : Stone E/WL : Stone	Under Ida Valley Back Road			82-83	
51	6830	Access				Good	450 dia. x 4.9 m concrete pipe culvert H/WL : Stone E/WL : Stone				84	
52	7300		500 MB			Poor	500 mm measuring box RHS	To Distrib. No. 1 Not adequate			85	

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 5.3.85 sheet 5 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/O box	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
53	7310	Access				Good	450 dia. x 5.5 m concrete pipe culvert H/WL : None E/WL : None				86-87	
54	7340			Syphon 450ϕ		Bad Fair	375 dia. x 37 m concrete pipe syphon H/WL :Concrete E/WL : Concrete	"Minor" Syphon across gully Needs renewing with 450 dia. pipes Leaks at joints Bad leaks under-ground: Created bog			88-90	
55	7550	Farm 450ϕ				Fair	450 dia. x 5.1 m concrete pipe culvert				91	
56	7570		375 MB			Fair	375 mm measuring box RHS				92	
					Stop	Fair	Concrete and wood stop 600 mm D x 640 mm W					
57	7740		500 MB			Good	500 mm measuring box and stop	To Distributary 2			93	
					Stop	Good	450 mm Dx1.1 m Wide					
58	7760		375 MB			Poor	375 mm measuring box RHS	Not used			94	
					Stop	Fair	Concrete and wood stop 840 mm D x 600 mm W					
59	7800	Access 600ϕ				Good	600 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None				95	
60	8200	Farm 450ϕ				Good	450 dia. x 5.1 m concrete pipe culvert H/WL : None E/WL : None				96	
61	8300		Pipe			Fair	150 mm pipe concrete	Winter bywash RHS (no gate)				
62	8340			P/L 450ϕ		Okay	450 mm dia. x 17.1 m concrete pipe H/WL : Concrete E/WL : Concrete	Leaks at joints across low ground			97-98	
63	8570	Farm 450ϕ				Okay	450 mm dia. x 2.5mconcrete pipe culvert				99-100	
64	8630		375 MB			Okay	375 mm measuring box turnout RHS				101	

REASSESSMENT OF SCHEME: IDABURN RACE: MAIN DATE: 5.3.85 sheet 6 of 9

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
65	9240			Syphon 300ϕ		Poor	300 dia. x 7.3 m concrete pipe syphon H/WL : None E/WL : None	Farm access and gully crossing - Needs 375 dia.pipes			102-103	
66	9270		375 MB			Fair	375 mm measuring box RHS				104	
67	9450		500 MB			Fair	500 mm measuring box RHS				105	
68	9500	Farm 375ϕ				Fair	375 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None				106	
69	9910			Syphon 375ϕ		Bad Good Good	375 dia. x 24.4 m concrete pipe syphon H/WL : Concrete E/WL : Concrete	Across gully - Hairline cracks right around some pipes Leaks at inlet			107-108	
70	10,120		375 MB			Fair	375 mm measuring box RHS		Benched	RHS		
71	10,400	Access 375ϕ				Okay	375 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None		Benched	RHS	109	
72	10,590		500 MB			Fair	500 mm measuring box RHS				110-111	
73	10,900	Farm 375ϕ				Good	375 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None			Patched RHS	112	
74	11,140			P/L 300ϕ	Check 375	Good	300 dia. x 7.4 m concrete pipeline H/WL : Concrete E/WL : Concrete	Race runs next to stable cliff-face of clay Across gully Resting on railway lines			113-114	
75	11,310			P/L 375ϕ		Okay Good Good	375 dia. x 24.4 m concrete pipeline H/WL : Concrete E/WL : Concrete				115-117	
76	11,500		500 MB			Fair	500 mm measuring box RHS				118-119	
77	11,520	Access 375ϕ				Good	375 dia. x 4.9 m concrete pipe culvert H/WL : None E/WL : None	Erosion at outlet due to stock			120	
											121-122	

REASSESSMENT SCHEME: IDABURN RACE: MAIN DATE: May 1984 sheet 7 of 9

struct. no.	Dist. (m)	ITEM				Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
		Acc-X	T/Obox	Pipeline	Misc.							
78	11,720		375 MB			Fair	375 mm measuring box RHS	End of MWD responsibility at fence line			123	

REASSESSMENT OF SCHEME: IDABURN

RACE: DISTRIBUTARY NO. 1 DATE:
BEGINS STRUCTURE No. 52, IDABURN MAIN

struct. no.	Dist. (m)	ITEM Acc-X	ITEM T/Obox	ITEM Pipeline	ITEM Misc.	Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
1	400	Road				Fair	300 dia. x 13.4 m concrete pipe culvert H/WL : Stone E/WL : Stone	Under Ida Valley Back Road			124-125	
2	410		Pipe T/O			Bad	675mm dia. x 48.8 m steel pipeline Turns out to RHS	Through "Spur" - Needs reconstruction Filled with debris			126-128	
3	430	Access			Stop	Poor	600 dia. x 1.2 concrete pipe in race H/WL : None E/WL : None	Wooden gate			129	
4	450	Access			Stop	Poor	675 dia. x 3.7 m concrete pipe in race	Wooden gate			130	
5	740	Access				Bad	300 dia. x 3.1 m steel pipe culvert H/WL : None E/WL : None	Squashed			131	
6	850	Access				Poor	300 dia. x 1.8 m concrete pipe culvert H/WL : None E/WL : None				132	
7	960	Access				Fair	300 dia. x 3.8 m concrete pipe culvert H/WL : None E/WL : None				133	
8	1080				Control	V.Good	500 MB 4.4 m long in race as control	New structure			134	
9	1460	Access				Bad	300 dia. x 3.7 m concrete pipe culvert H/WL : None E/WL : None	Cracked Holes in top of pipe			135-136	
10	1570		MB			V.G.	~~Race ends at fence~~ 500 MB set in race to monitor flow to P. Kirk.					
11	1840	Road					375 dia x m conc. pipe	Under Ida Valley-Omakau Rd.				

REASSESSMENT OF SCHEME: IDABURN RACE: DISTRIB. NO. 2 DATE: 5.3.85 sheet 9 of 9

struct. no.	Dist. (m)	ITEM				Cond.	Detail	Remarks	last ass.	Access	Photo no.	Drawing no.
		Acc-X	T/Obox	Pipeline	Misc							
							Starts at structure NO. 57 on Main Race					
1	100	Farm				Good	300 mm dia. x 3.7 m concrete pipe culvert	Farm access track			—	
							End of MWD responsibility at boundary fence					

APPENDIX C

IRRIGATION SCHEME. LEGAL DESCRIPTIONS

Irrigator	L/N	Ag'mnt. No.	Sec	Blk	SD	area total	area irrig.	C/T
Anderson WP	1	X15472	25	XVI	Blackstone		100 acres	)C/L
			4	VI	Poolburn			)228/77
Anderson TS	2	X15589	23	XVI	Blackstone		125 acres	)C/L
			1	IV	Poolburn			)228/90
			1	VI	"			)
Dundass BW	3	X15579	13	XVI	Blackstone		25 acres	C/L 110/59
			15	"	"			C/L
			16	"	"			)120/62
			17	"	"			)
			20	"	"			)
								)
			14	"	"			C/L 120/63
								C/L
			5	"	"			)199/113
			12	"	"			)
			Pt:7	"	"			)
			Pt:21	"	"			)
Kirk PL	4	X15474	17	XV	Blackstone		50 acres	)
			18	"	"			)210/228
			19	"	"			)
			22	"	"			)
			23	"	"			)
			24	"	"			)
			3	XVI	"			)
McKnight JI	5	X15471	24	XVI	Blackstone		)110 acres	C/L
			2	XVII	"		)	)228/73
			3	VI	Poolburn		)	)
							)	C/L
		X234791	Run 225D		Blackstone		)	259/149
Weir K	6	X15470	8	XVI	Blackstone		140 acres	C/L 118/92
			2	XVI	"			C/L
			4	"	"			110/61
								C/L
			11	"	"			110/62
								C/L
			9	"	"			110/60
			10	"	"			
Gillespie GS	7	X234790	27	XVI	Blackstone		15 acres	)C/L
			3	XVII	"			)388/195

WATER RIGHTS

IDABURN CREEK IS OPERATED UNDER PUBLIC WORKS ACT 1966.

APPENDIX D

WATER USAGE FOR IDABURN IRRIGATION SCHEME 19 83/84 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	-	-	-	141.50	668.0	287.75	-	1097.25	-
2	Anderson TS	2268.25	-	-	-	112.50	671.0	855.50	169.0	720.0	2528.0	259.75
3	Dundass BW	453.50	-	-	-	-	-	-	-	-	-	-
4	Keen ME	907.25	-	-	42.0	186.0	186.0	174.0	132.0	125.0	845.0	-
5	McKnight JI	1996.0	-	-	-	-	-	418.0	200.0	-	618.0	-
6	Weir K	2540.50	-	-	-	314.50	896.0	1044.0	253.50	-	2508.0	-
7	Gillespie GS	272.0	-	-	-	-	-	-	-	-	-	-
	TOTAL THIS SHEET		-	-	42.0	613.0	1894.50	3159.50	1042.25	845.0	8596.25	259.75
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	-	42.0	613.0	1894.50	3159.50	1042.25	845.0	7596.25	259.75

WATER USAGE FOR IDABURN IRRIGATION SCHEME 19 80/81 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	-	-	352.0	568.0	-	504.0	632.0	2056.0	241.50
2	Anderson Bros.	2268.25	-	132.0	631.50	624.0	656.0	-	504.0	720.0	3267.50	999.25
3	Dundass EW	453.50	-	-	-	-	120.0	-	-	-	120.0	-
4	Keen ME	907.25	-	68.50	164.0	-	864.0	-	126.0	180.0	1402.50	495.25
5	McKnight JI	1996.0	-	-	-	-	536.0	-	-	-	536.0	-
6	Weir K	2540.50	-	522.50	573.0	800.0	-	-	504.0	808.0	3207.50	667.0
7	Gillespie GS	272.0	-	-	-	-	-	-	-	-	-	-
	TOTAL THIS SHEET		-	723.0	1368.50	1776.0	2744.0	-	1638.0	2340.0	10589.50	2403.0
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	723.0	1368.50	1776.0	2744.0	-	1638.0	2340.0	10589.50	2403.0

WATER USAGE FOR IDABURN IRRIGATION SCHEME 1979/80 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	-	-	-	383.0	120.0	640.0	720.0	1863.0	48.50
2	Anderson Bros.	2268.25	-	-	-	-	667.0	-	544.0	720.0	1931.0	-
3	Dundass BW	453.50	-	-	-	-	-	-	148.0	-	148.0	-
4	Keen ME	907.25	-	-	115.50	52.50	-	32.0	212.0	66.0	478.0	-
5	McKnight JI	1996.0	-	-	-	-	-	904.0	48.0	1192.0	2144.0	148.0
6	Weir K	2540.50	-	-	115.50	52.50	702.0	415.0	904.0	330.0	2519.0	-
7	Gillespie GS	272.0	-	-	-	-	-	-	-	-	-	-
	TOTAL THIS SHEET		-	-	231.0	105.0	1752.0	1471.0	2496.0	3028.0	9083.0	196.50
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	-	231.0	105.0	1752.0	1471.0	2496.0	3028.0	9083.0	196.50

WATER USAGE FOR IDABURN IRRIGATION SCHEME 1978/79 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	328.0	744.0	636.0	744.0	484.50	255.0	61.0	3252.50	1438.0
2	Anderson Bros	2268.25	-	744.0	556.50	636.0	744.0	484.50	255.0	248.0	3668.0	1399.75
3	Dundass BW	453.50	-	-	269.50	318.0	372.0	-	127.50	124.0	1211.0	757.50
4	Keen ME	907.25	-	124.0	340.0	132.0	44.25	-	-	-	640.25	-
5	McKnight JI	1996.0	-	-	305.0	-	539.0	484.50	127.50	160.0	1616.0	-
6	Weir K	2540.50	-	-	396.0	947.0	1182.0	484.50	337.50	372.0	3719.0	1178.50
7	Gillespie GS	272.0	-	-	59.0	-	-	-	-	-	59.0	-
	TOTAL THIS SHEET		-	1196.0	2670.0	2669.0	3625.25	1938.0	1102.50	965.0	14165.75	4773.75
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	1196.0	2670.0	2669.0	3625.25	1938.0	1102.50	965.0	14165.75	4773.75

WATER USAGE FOR IDABURN IRRIGATION SCHEME 19 77/78 SEASON

L/N	NAME	QUOTA	M O N T H								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	-	-	24.0	572.50	28.50	-	-	625.0	-
2	Anderson Bros.	2268.25	-	-	-	24.0	572.50	28.50	-	-	625.0	-
3	Dundass BW	453.50	-	-	-	328.50	62.0	-	-	-	390.50	-
4	Keen ME	907.25	-	-	-	224.0	135.25	-	-	-	359.25	-
5	McKnight JI	1996.0	-	-	-	24.0	620.50	28.50	-	-	673.0	-
6	Weir K	2540.50	-	-	-	814.0	493.0	28.50	-	-	1335.50	-
7	Gillespie GS	272.0	-	-	-	403.50	52.0	-	-	-	455.50	183.50
	TOTAL THIS SHEET		-	-	-	1842.0	2507.75	114.0	-	-	4463.75	183.50
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	-	-	1842.0	2507.75	114.0	-	-	4463.75	183.50

WATER USAGE FOR IDABURN IRRIGATION SCHEME 19 76/77 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	732.0	279.0	468.0	-	447.0	484.50	375.0	2785.50	971.0
2	Anderson Bros.	2268.25	-	1104.0	558.0	229.50	-	495.0	484.50	375.0	3246.0	977.75
3	Dundass EW	453.50	55.0	84.0	175.50	156.0	-	247.50	124.50	103.50	946.50	493.0
4	Keen ME	907.25	-	264.0	159.75	78.0	147.75	168.0	162.0	93.75	1073.25	166.0
5	McKnight JI	1996.0	-	-	-	-	-	159.0	484.50	375.0	1018.0	-
6	Weir K	2540.50	198.75	156.0	267.0	337.50	-	287.25	404.25	468.75	2119.50	-
7	Gillespie GS	272.0	-	-	-	-	-	-	137.0	-	137.0	-
	TOTAL THIS SHEET		254.25	2340.0	1439.25	1269.0	147.75	1803.75	2281.25	1791.0	11326.25	2607.75
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		254.25	2340.0	1439.25	1269.0	147.75	1803.75	2281.25	1791.0	11326.25	2607.75

WATER USAGE FOR IDABURN IRRIGATION SCHEME 1975/76 SEASON

L/N	NAME	QUOTA	M O N T H							TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	744.0	720.0	372.0	513.0	126.0	-	-	2475.0	660.50
2	Anderson Bros.	2268.25	198.0	1116.0	720.0	558.0	480.0	150.0	-	-	3222.0	953.75
3	Dundass EW	453.50	36.0	186.0	260.0	184.0	-	36.0	-	-	702.0	248.50
4	Keen ME	907.25	-	28.0	360.0	186.0	107.75	24.0	-	-	705.75	-
5	McKnight JI	1996.0	-	744.0	720.0	372.0	513.0	129.0	-	-	2478.0	482.0
6	Weir K	2540.50	78.50	1116.0	1080.0	558.0	526.0	139.50	-	-	3498.0	957.50
7	McKnight SD	272.0	-	-	-	-	-	-	-	-	-	-
	TOTAL THIS SHEET		312.50	3934.0	3860.0	2230.0	2139.75	604.50	-	-	13080.75	3302.25
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		312.50	3934.0	3860.0	2230.0	2139.75	604.50	-	-	13080.75	3302.25

WATER USAGE FOR IDABURN IRRIGATION SCHEME 19 82/83 SEASON

L/N	NAME	QUOTA	MONTH								TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	-	120.0	576.0	40.0	617.0	670.50	360.0	2383.50	569.0
2	Anderson Bros	2268.25	-	472.0	288.0	1488.0	586.0	664.0	251.0	386.0	4135.0	1866.75
3	Dundass EW	453.50	-	-	-	-	-	-	-	-	-	-
4	Keen ME	907.25	-	76.75	42.25	78.0	78.0	-	-	-	275.0	-
5	McKnight JI	1996.0	-	-	-	-	167.0	672.0	72.0	386.0	1297.0	-
6	Weir K	2540.50	-	309.0	253.50	1116.0	568.50	1000.50	1116.0	579.0	4942.50	2402.0
7	Gillespie GS	272.0	-	-	-	-	18.25	-	-	-	18.25	-
	TOTAL THIS SHEET		-	857.75	703.75	3258.0	1457.75	2953.50	2109.50	1711.0	13051.25	4837.75
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	857.75	703.75	3258.0	1457.75	2953.50	2109.50	1711.0	13051.25	4837.75

WATER USAGE FOR IDABURN IRRIGATION SCHEME 1981 / 82 SEASON

L/N	NAME	QUOTA	M O N T H							TOTAL	EXTRA
			sept	oct	nov	dec	jan	feb	mar	april		
1	Anderson WP	1814.50	-	216.0	720.0	544.0	-	-	-	468.0	1948.0	133.50
2	Anderson Bros.	2268.25	-	216.0	720.0	544.0	-	-	-	468.0	1948.0	-
3	Dundass BW	453.50	-	-	-	-	-	-	-	-	-	-
4	Keen ME	907.25	-	86.0	180.0	86.0	-	-	-	-	352.0	-
5	McKnight JI	1996.0	-	-	640.0	544.0	-	-	-	468.0	1652.0	-
6	Weir K	2540.50	-	-	-	-	-	-	-	-	-	-
7	Gillespie GS	272.0	-	-	-	-	-	-	-	-	-	-
	TOTAL THIS SHEET		-	518.0	2260.0	1718.0	-	-	-	1404.0	5900.0	133.50
	BROUGHT FORWARD		-	-	-	-	-	-	-	-	-	-
	RUNNING TOTAL		-	518.0	2260.0	1718.0	-	-	-	1404.0	5900.0	133.50

APPENDIX E

REVIEW OF OLD CENTRAL OTAGO IRRIGATION SCHEMES

BRIEF FOR PHASE 1 : INVENTORY OF EXISTING INFORMATION AND SURVEY OF SCHEME SUPPLY WORKS

1 INTRODUCTION

A comprehensive programme for the upgrading of the old Central Otago irrigation schemes is proposed. It has been determined that this programme should be developed in four phases:

a Phase 1 : Inventory of existing schemes

b Phase 2 : Technical assessment of schemes for funding and programming for upgrading

c Phase 3 : Feasibility reporting on scheme proposals

d Phase 4 : Design and construction

This brief sets out the requirements for phase 1 of the review programme.

2 SCOPE OF BRIEF

The objective of phase 1 is to provide:

a An inventory of the existing scheme components, including aerial maps and photographs.

b An assessment of the structural condition of the scheme components.

c A commentary on operational problems and possible improvements.

d A summary of general operations aspects associated with the schemes.

e An assessment of present operating costs and the reduction in operating costs which will result from scheme upgrading works.

2.1 Inventory of Components

For each scheme an inventory of components will be prepared. The inventory is to identify and describe all headworks components and structures and major distributary structures. The location of these components and structures is to be defined by station values accurate to 100 metres.

2.2 Plans, Maps and Photographs

The following pictorial documentation of each scheme is to be provided:

2.2.1 A large scale map, 1:50 000 if available, is to be provided which describes the outline of the scheme.

2.2.2 The headworks and distribution works including turnouts and station values should be shown on aerial maps to a scale of 1:2000 where available. Aerials at scales of 1:5000 and 1:10 000 which already exist will be acceptable. Where aerials do not exist, these should be produced at 1:5000, with the capability of being reproduced later at 1:2000. The following information should be presented on the aerials:

i racelines (headworks and all distributary races);
ii station values to the nearest 100 metres;
iii supply points to properties;
iv end points of races;
v major headworks structures;
vi major distributary structures (syphons, gates, etc).

2.2.3 Photographs of each scheme are to be provided as follows:

a Headworks

i all urgent problems;
ii typical major problems;
iii typical structures and facilities not recorded in (i) and (ii).

b Distribution Works

i all urgent problems;
ii typical major problems;
iii typical structures and facilities not recorded in (i) and (ii).

It is envisaged that no more than 100 photographs will be provided for each scheme. Only one copy of each photograph is required. These photographs are to be numbered so that additional copies can be ordered if necessary.

2.3 Assessment of Condition of Scheme Structures and Facilities

An assessment is to be made of the structural condition of the scheme structures and facilities. Problems may be related to corrosion, cracking and aging of concrete; seepage, scour and slumping associated with scheme earthworks; and significant slope stability problems.

Structural problems are to be classified as follows:

a Urgent

Problems requiring immediate attention are those which have an 80% chance of resulting in failure within five

years, and which would cause a 30% reduction in the capacity of the scheme; and would take more than two weeks to repair.

b Major

Problems which would result in serious consequences to the headworks, or which if present in the distribution works would cut the supply totally to 30% of the scheme area.

c Minor

Problems which reduce the level of service, require a high level of maintenance. Routine maintenance needs should be excluded from this listing. Resources may not permit a full listing of all minor problems, and therefore those which require a significant financial input should be listed.

As all of the urgent and major problems will be examined during phase 2, the phase 1 description of these problems need not be too detailed. A grading of problems into major and minor will need care as during phase 2 it may not be possible to examine minor problems, if at all.

2.4 Operational Problems and Possible Improvements

A commentary is required of operational problems for each scheme including the following:

a Capacity of major sections of race and components.

b Operational inefficiencies and comment on where modifications, eg automation, would overcome this. This need not be provided in a great amount of detail.

c Undersize components.

d Inadequate access for operation and maintenance.

2.5 General Operational Aspects

Information should be provided on water rights, water supply agreements, water resource constraints and climatic constraints. This information should be provided where readily available, and that which cannot be obtained without undue difficulty should be identified as such.

2.6 Operating Costs

For each scheme a summary is to be provided of the items which provide the major contribution to the operating and maintenance costs.

Comment should be made on modifications which would result in a reduction of these operating and maintenance costs.

3 SCHEMES TO BE REVIEWED

The following schemes are to be included in this review:

a Arrow
b Manuherikia
c Hawkdun
d Ida Valley
e Omakau
f Teviot River
g Last Chance
h Galloway
i Ripponvale
j Ardgour
k Idaburn
l Pisa
m Tarras

4 PROGRAMME

The work contained within this brief is to be completed by 31 May 1985.

Reports on each scheme are to be provided progressively between 15 January 1985 and 31 May 1985.

A programme is to be prepared by 1 December 1984 detailing all items required for the completion of phase 1.

5 MANAGEMENT

The management of the refurbishment of old Central Otago irrigation schemes is to be under the direction of the district projects manager.

Phase 1 of the review is to be undertaken by staff under the direction of the resident engineer, Alexandra.

The district design engineer is to be the recipient of the phase 1 scheme reports, and therefore he will provide technical oversight of this work.

The project manager is responsible for the oversight of progress and costs of this work.

6 FINANCIAL MANAGEMENT

A detailed estimate for the completion of this work is to be submitted to the district projects manager by 5 December 1984 for his approval. All costs associated with the execution of this brief are to be properly identified and recorded.

7 REPORTING

Monthly reports are to be submitted to the district projects manager by the tenth day of each month. These reports are

to cover details of progress, programme review, expenditure and forecast final cost and are to be presented in the format set out in the project management manual.

K J Thompson
District Projects Manager

23 November 1984