Annual Compliance Report – CRC186228, CRC183882, CRC184617, CRC202204, CRC202205

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Executive summary

This compliance report is submitted under the terms of Hekeao/Hinds Managed Aquifer Recharge project resource consents CRC183882, CRC184617, CRC186228, CRC202204, and CRC202205. This report is written in terms of consent conditions. In brief, consent conditions included the monitoring of source water quality, groundwater levels, groundwater quality, and discharge flow rates related to the Managed Aquifer Recharge (MAR) activities described in the consents. The following annual compliance report describes the conditions and compliance for the following consents:

- CRC202204 - To take and use surface water from the Rangitata River at the Rangitata Diversion Race intake, Klondyke (replacing CRC164281)
- CRC202205 – to discharge water to land; various locations at Hinds Area (replacing CRC182576)
- CRC183882 – to discharge water to water; Timaru Track Road, Lowes Road & Frasers Road, Ashburton
- CRC184617 – to discharge water into land; Timaru Track Road, Lowes Road & Frasers Road, Ashburton (replacing CRC162191)
- CRC186228 – to discharge water to land & water for the Hekeao/Hinds River Project; various locations in the Hekeao/Hinds area, Ashburton

Excavation consents (Consents LUC15/0110 - To excavate land and CRC162192 - To excavate land) were also granted for the Lagmhor Pilot Site. These were utilised in Year 1 (June 2016 – May 2017) during construction of the site and have not been used since.

It is pleasing to report that all consent conditions of above consents have been met for the period covered in this report (1 June 2019 to 31 May 2020).

Please find attached the complete compliance report due for each resource consent. The full supporting dataset is available from Environment Canterbury on request.

Resource Consent CRC202204 (replacing CRC164281)

1. Water shall only be:

a. diverted from the Rangitata River to the Valetta Irrigation *{now MHV Water}* Scheme pipeline via the existing structure at the Rangitata Diversion Race Klondyke intake at NZ Topo50 BY19:5798-5278 at a rate not exceeding 500 litres per second with a volume not exceeding 15,780,000 cubic metres between 1 February and the following 31 January.

b. taken from Valletta Irrigation *{now MHV Water}* Scheme Pipeline, between map references(s), NZ Topo50 BY20:8800-4048 and NZ Topo50 BY20:8908-4061, at a rate not exceeding 500 litres per second, with a volume not exceeding 15,780,000 cubic metres between 1 February and the following 31 January.

Advice note: The rate and volume of water diverted under this consent is independent of resource consent CRC011237.

IN COMPLIANCE. Refer Figure 1 and Table 1 below. The difference in annual taken and delivered volumes is 0.6%, which is significantly less than the potential measurement error of monitoring devices.

2. Water diverted and taken under this consent in combination with Ashburton District Council consent CRC012114 shall not exceed 849 litres per second, unless diverted and taken during the period extending from 15 September in any year to 14 May in the following year it shall not exceed 1,115 litres per second for no more than 14 consecutive days over any period of four weeks during that time.

IN COMPLIANCE. Refer Figure 1 below.

3. The taking of water in accordance with Condition (1)(b) shall only occur when water is being diverted at the same or greater rate in accordance with Condition (1)(a).

IN COMPLIANCE. Refer Figure 1 and Table 1 below. Any water diverted from the Rangitata River to the Valetta Irrigation Scheme pipeline that cannot be immediately delivered to a MAR site is stored in irrigation ponds connected to the MHV Water Scheme.

4. Water shall only be used for managed aquifer recharge purposes in accordance with resource consent CRC162191 *{now CRC184617}*.

IN COMPLIANCE. Refer Table 1 below.

5. Water diverted shall pass through the fish exclusion device as described in Condition (4) and (5) of resource consent CRC011237.

IN COMPLIANCE. RDRML is required as per irrigation diversion consent to comply with this condition. It is not unique to MAR project operations.

6. The consent holder shall, within three months of the commencement of this consent, install a water level measuring device at the Measurement Site 1 (MMT1) (at or about NZ Topo50 BY20:8828-4053), MMT2 (at or about Topo50 BY20:8908) and MMT3 (at or about NZ Topo50 BY20:8920-4040) in accordance with Plan CRC164281; in a location that will enable the determination of the continuous rate of flow and volume of water being taken to within an accuracy of plus or minus 10 percent, and

IN COMPLIANCE. Refer Section 4.0 of Year 1 main report.

a. The measuring device shall, as far as is practicable, be installed at a site likely to retain a stable relationship between flow and water level. The measuring device shall be installed and maintained in accordance with the manufacturer's instructions.

IN COMPLIANCE. Refer Section 4.0 of Year 1 main report.

b. The level of water in the race, and times of abstraction, shall be recorded by tamper-proof electronic recording system such that the level of water is measured at least once every 15 minutes, and a record made either on site or at a remote location via telemetry of the recorded levels such that the flow volume through the site may be derived for time increments not exceeding 60 minutes using the current site rating relationship. The recorded data shall not be changed or deleted by any person, unless twelve months have passed since the date of recording.

IN COMPLIANCE. Refer Section 4.0 of Year 1 main report.

c. The measuring and recording devices described in clauses 6(a) and 6(b) shall be available for inspection at all times by the Canterbury Regional Council subject to providing adequate protection against vandalism which may require the consent holder's assistance on site to unlock or remove barriers.

IN COMPLIANCE. Refer Section 4.0 of Year 1 main report.

d. All data from the recording device described in clause 6(b), and the corresponding relationship between the water level and flow, shall be provided to the Canterbury Regional Council on request.

IN COMPLIANCE. Data has not been requested.

e. Maintain a rating curve to convert water levels to flow in accordance with best hydrological practice.

IN COMPLIANCE. Refer Section 4.0 of Year 1 main report.

7. The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent.

IN COMPLIANCE. No review requested.

8. If this consent is not exercised before 31 March 2019 it shall lapse in accordance with section 125 of the Resource Management Act 1991.

IN COMPLIANCE. Pilot trial has commenced.

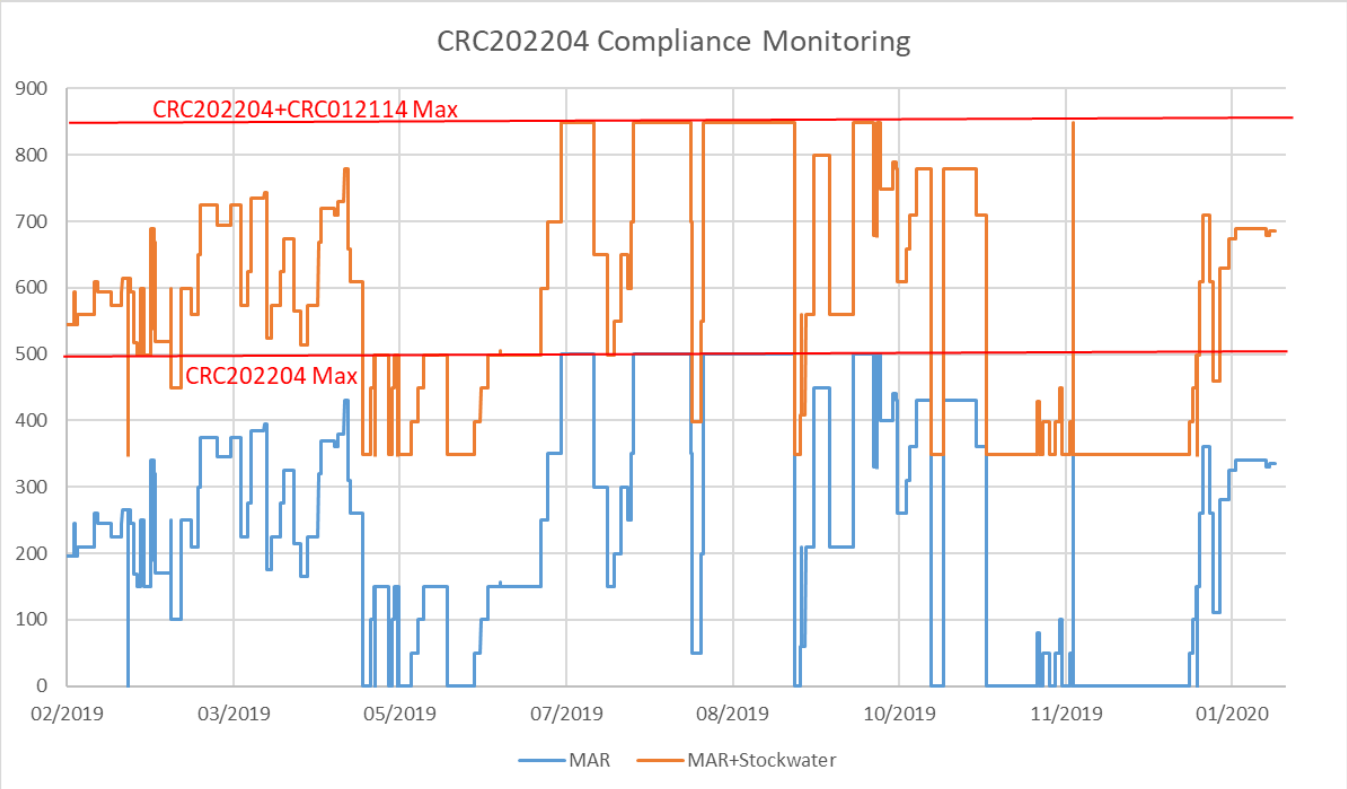

Figure 1. Ashburton District Council (ADC) 15 minute interval take and RDR MAR 15 minute interval take.

Table 1: Year 4 Hekeao/Hinds MAR take and delivery – water budget.

	MAR Volume (cubic metres)
Opening balance – Year 3 delivered but not taken	-321,690
Year 4 take through RDR	8,207,683
Total Year 4 inflow	**7,885,993**
Delivered to HHRP Site	3,299,011
Delivered to Pilot Site #1	881,971
Delivered to Test Sites #2-18	2,304,934
Distribution system recharge (when MAR water-only delivered)	1,400,077
Total Year 4 delivered flow	**7,885,993**

Resource Consent CRC202205 (replacing CRC182576)

1. The discharge shall be only:
   a. Water sourced from the Rangitata Diversion Race Klondyke intake in accordance with resource consent CRC164281 and;
   b. Sodium chloride for use as a tracer;

   for the purposes of a Managed Aquifer Recharge trial (MAR).

IN COMPLIANCE. Regarding Condition 1a: All water utilized for the consent was sourced from the RDR Klondyke intake in accordance with Resource Consent CRC164281 (see Figure 1 and Table 1 above).

Regarding Condition 1b: No tracer use during compliance report period.

2. Water shall be only discharged into land, via the cleaned open races and the soak pits at the MAR test sites located on Plan CRC202205, which forms part of this consent.

IN COMPLIANCE. Refer Table 2 below

3. The concentration of tracer discharged shall not exceed 200 mg/L.

IN COMPLIANCE. No tracer use during compliance reporting period.

4. The rate at which water is discharged at each site listed in Schedule One(a) shall not exceed:
   a. 100 litres per second;
   b. In combination with CRC184617 shall not exceed 500 litres per second, and 302,400 cubic metres per week; and
   c. In combination with any other resource consent listed in Schedule One(b) shall not exceed 1,300 litres per second.

IN COMPLIANCE. Refer Table 1 above and Table 2 below.

5. The discharge in terms of this permit into any soakage pit shall only occur when the standing groundwater level in the soakage pit is greater than one metre below ground level.

IN COMPLIANCE. All MAR sites have manual or automated water level alarms to enable shutdown at one metre below ground level.

6. The discharge shall be managed in accordance with Schedule Two, which forms part of this consent.

IN COMPLIANCE. Refer Table 2 below.

7. The consent holder may amend Schedule One and/or Schedule Two at any time subject to the following:
Any amendment shall be:
a. Only for the purpose of dealing with any adverse effects on the environment which may arise as a result of the exercise of this consent; or
b. Only for the purpose of improving efficacy of the MAR trial; and
c. Consistent with the conditions of this consent; and
d. Submitted in writing to and be approved by the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. No changes requested.

8. The consent holder shall undertake on going monitoring of:
   a. groundwater quantity; and
   b. groundwater quality.
In accordance with Schedule Three, which forms part of this consent.

IN COMPLIANCE. Refer Table 2 and Table 3 below. Further information is available upon request from the Year 4 Hekeao/Hinds MAR Annual Report (2019/20).

9. The consent holder may amend Schedule Three at any time subject to the following:
    a. Any amendments shall be:
        i. Only for the purpose of improving efficacy of the monitoring programme and shall not result in reduced quality of monitoring of the discharge; and
        ii. Consistent with the conditions of this consent; and
        iii. Submitted in writing and to be approved to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. No changes requested.

10. The consent holder shall record and maintain monitoring records and submit a review report to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager by 31 August each year.

With submittal of this report, Condition 10 is met.

11. The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent.

No comment required.

Table 2: Year 3 Hekeao/Hinds MAR Site flow, volume and shutdowns for *E. coli* exceedance

	TOTAL	HHRP	1	2	3	4	5	6	7	8	9	10	#	12	13	#	15	16	b	18		Site # shut
DATE	MAR	South Hinds	Pilot	Timaru Trk	Mark Wall	NZSF	pond 2	BCI/Howd	Lobblin	Lacmor	Riverbank	Foster	Sl	Slee	Hills view	P	Oakstone	Broadfields	Jc	McDougall	MH losses	down for E. coli
6/06/2019	**200.1**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0		0.0	28.2	#	0.0	19.5	#	0.0	0.0	
13/06/2019	**156.2**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	#	0.0	6.2	#	0.0	0.0	
20/06/2019	**157.2**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	#	0.0	7.2	#	0.0	0.0	
27/06/2019	**312.2**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	#	0.0	12.2	#	0.0	150	
4/07/2019	**311.9**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	1.5	#	0.0	10.3	#	0.0	150	
11/07/2019	**316.1**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	16.1	#	0.0	0.0	#	0.0	150	
18/07/2019	**315.4**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	15.4	#	0.0	0.0	#	0.0	150	
25/07/2019	**492.3**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		15.0	12.7	#	0.0	11.6	#	0.0	303	
1/08/2019	**486.9**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		15.0	11.1	#	0.0	7.8	#	0.0	303	
8/08/2019	**250.8**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	19.7	0.0		0.0	10.7	#	0.0	20.4	#	0.0	50	
15/08/2019	**469.6**	150	0	0	0.0	0.0	0.0	6.4	0.0	0.0	18.6	0.0		4.8	7.5	#	2.8	21.7	#	0.0	258	
22/08/2019	**498.2**	150	0	0	0.0	0.0	0.0	14.8	0.0	0.0	18.4	0.0		11.0	6.1	#	14.5	17.4	#	0.0	266	
29/08/2019	**497.2**	150	0	0	0.0	0.0	0.0	14.4	0.0	0.0	15.4	0.0	#	0.0	6.0	#	0.0	18.4	#	0.0	293	
5/09/2019	**492.6**	150	0	0	0.0	0.0	0.0	13.9	0.0	0.0	13.9	0.0	#	0.0	3.1	#	0.0	21.7	#	0.0	290	
12/09/2019	**207.9**	150	0	0	0.0	0.0	0.0	0.0	0.0	0.0	12.1	0.0	#	0.0	3.8	#	0.0	22.1	#	0.0	20	
19/09/2019	**392.4**	150	130.0	0	8.4	0.6	22.5	15.4	0.0	4.5	17.0	0.0	#	24.5	0.0	#	0.0	19.5	#	0.0	0.0	
26/09/2019	**364.8**	150	80	0	16.8	19.7	21.3	11.4	0.0	14.9	18.5	0.0	#	12.5	0.0	#	0.0	19.6	#	0.0	0.0	
3/10/2019	**349.4**	130	80	0	17.4	22.6	26.4	8.5	0.0	15.2	18.7	0.0	#	9.1	0.0	#	0.0	21.6	#	0.0	0.0	Site 12 (part)
8/10/2019	**425.2**	170	100	0	18.3	20.9	28.3	9.9	0.0	15.3	18.7	0.0	#	2.8	5.1	#	19.8	16.2	#	0.0	0.0	Site 12 (part)
15/10/2019	**342.2**	90	95	0	18.0	19.4	27.3	18.0	0.0	9.2	14.5	0.0	#	8.4	11.7	#	14.9	15.7	#	0.0	0.0	
22/10/2019	**409.3**	170	95	0	17.8	13.1	23.1	14.7	0.0	10.7	15.0	0.0	#	12.4	7.2	#	13.3	16.9	#	0.0	0.0	
29/10/2019	**410.8**	170	95	0	18.5	16.9	20.2	15.0	0.0	10.6	16.1	0.0	#	6.7	10.9	#	12.7	18.2	#	0.0	0.0	
5/11/2019	**322.3**	150	50	0	17.0	15.6	18.1	14.5	0.0	10.4	14.5	0.0	#	5.4	1.6	#	8.1	17.3	#	0.0	0.0	
12/11/2019	**81.2**	0	0	0	9.0	4.2	15.2	14.4	0.0	4.2	5.0	0.0	#	4.7	7.3	#	0.0	17.2	#	0.0	0.0	Site 4 (part)
19/11/2019	**30.0**	0	30	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
26/11/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
3/12/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
10/12/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
17/12/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
24/12/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
31/12/2019	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
7/01/2020	**0.0**	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
14/01/2020	**225.7**	135	0	0	0.0	13.1	17.3	1.6	0.0	8.2	0.0	0.0	#	7.1	16.2	#	0.0	27.2	#	0.0	0.0	Sites 9 & 15
21/01/2020	**303.9**	150	0	0	7.2	14.9	20.7	13.8	0.0	12.2	11.9	0.0	#	6.5	30.3	#	16.5	20.0	#	0.0	0.0	
28/01/2020	**310.7**	150	0	0	16.5	6.8	16.4	13.7	0.0	19.6	20.3	0.0	#	2.7	21.8	#	22.6	20.4	#	0.0	0.0	
4/02/2020	**170.9**	110	0	0	5.6	0.0	14.6	13.5	0.0	6.4	14.3	0.0	#	6.4	0.0	#	0.0	0.0	#	0.0	0.0	Sites 3 (part), 13, 15 & 16
11/02/2020	**37.2**	0	0	0	3.1	0.0	6.2	6.3	0.0	3.0	0.0	0.0	#	0.0	7.9	#	0.0	10.6	#	0.0	0.0	Site 9
18/02/2020	**325.6**	150	65	0	16.0	0.0	14.3	13.4	0.0	19.5	0.0	0.0	#	4.4	21.3	#	0.0	21.6	#	0.0	0.0	Site 9
25/02/2020	**55.3**	7	0	0	0.1	0.0	0.0	0.0	0.0	0.0	14.8	0.0	#	2.1	16.5	#	0.0	14.7	#	0.0	0.0	Sites 3 & 5
3/03/2020	**228.5**	0	120	0.0	10.3	0.0	6.1	14.2	0.0	18.6	19.5	0.0	#	10.4	17.9	#	0.0	11.5	#	0.0	0.0	
10/03/2020	**294.9**	0	109	35.1	13.9	8.1	17.2	14.3	11.9	19.5	20.4	0.0	#	6.0	16.8	#	14.2	7.2	#	1.4	0.0	Site 16 (part)
17/03/2020	**315.2**	64.3	95.7	0.0	17.9	21.6	8.2	14.5	0.0	19.7	20.6	0.0	#	6.1	16.7	#	21.6	8.2	#	0.0	0.0	
24/03/2020	**370.3**	87.1	97.9	0.0	20.5	23.8	18.7	16.5	0.0	20.1	23.3	0.0	#	4.1	17.7	#	15.8	24.8	#	0.0	0.0	
31/03/2020	**125.0**	125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
7/04/2020	**136.0**	136.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
14/04/2020	**156.0**	156.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
21/04/2020	**72.7**	72.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
28/04/2020	**153.0**	153.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#	0.0	0.0	#	0.0	0.0	#	0.0	0.0	
5/05/2020	**219.7**	50.0	63.6	0.0	12.9	0.0	0.0	8.1	0.0	33.4	15.7	0.0	#	4.7	20.9	#	0.0	10.4	#	0.0	0.0	Sites 5 & 15
12/05/2020	**319.2**	28.6	91.4	0.0	5.5	11.8	0.0	14.5	39.5	16.7	18.0	45.3	#	4.2	37.5	#	0.0	5.9	#	0.0	0.0	Sites 3 (part) and 15
19/05/2020	**500.0**	150.0	60.7	0.0	0.0	15.4	0.0	14.4	0.0	15.4	20.0	50.0	#	12.3	35.9	#	0.0	14.1	#	0.0	111.8	
26/05/2020	**500.0**	150.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	7.8	14.1	49.7	#	13.0	35.7	#	0.0	16.8	#	0.0	198.5	
2/06/2020	**500.0**	150.0	0.0	0.0	0.0	0.0	0.0	14.6	0.0	0.0	21.4	49.7	#	12.0	32.5	#	10.6	14.5	#	0.0	194.7	
TOTAL	**8,232,579**	3,299,011	881,971	21,240	163,672	150,230	206,832	217,181	31,085	190,536	286,080	117,729		141,621	309,536		113,473	354,859		860	1,746,662	

Table 3: Year 3 Hekeao/Hinds MAR Test Site *E. coli* monitoring

E. coli (MPN/100 ml) - resample at 500 and cease at 700																			
30/05/2019													140			105			
Date	1	2	3	4	5	6	7	8	9	10	#	12	13	14	15	16	17 B	18	Site # shut
	Pilot	Tim Trk	Mark Wall	NZSF	pond 2	BCI pump	Lobblin	Lacmor	Riverbank	FOSTER	Sl	Slee	Hills view	Pot	Oakstone	Broadfields	JONES	McDougal	down for E. coli
6/06/2019									1				7			38			
13/06/2019													7			147			
20/06/2019																			
27/06/2019																38			
4/07/2019													6			53			
11/07/2019													<1						
18/07/2019													2						
25/07/2019									12			50	261			4			
1/08/2019									14			7	129			5			
8/08/2019									2			2	16			11			
15/08/2019						<1			1			124	9		12	2			
22/08/2019						2			12			60	17		54	14			
29/08/2019						6			23				7		179 test	50			
5/09/2019					47 test	72			1				9			27			
12/09/2019	150 test		<1 test		24	10 test		20 test	2			35 test	7		91 test	14			
19/09/2019	40		10	60	15	6		13	1			47	<1 test		40 test	7			
26/09/2019	<1		114	20	133	155		30	5			225				5			
3/10/2019	130		34	77	130	17		23	17			921	11		101	5			Site 12 (part)
8/10/2019	156		24	130	135	22		138	10			435 test	12		64	20			Site 12 (part)
15/10/2019	114		31	35	41	17		11	2			166	4		78	4			
22/10/2019	36		20	40	16	4		36	36			579	6		148	4			
29/10/2019	4		7	23	16	10		33	9			488	9		145	9			
5/11/2019	261		64	770	67	40		140	43			140	79		613	140			
12/11/2019	228		192	185 test	228	161		206	649			172	80		147	127			Site 4 (part)
19/11/2019	no test		no test	no test	no test	no test		no test	no test			no test	no test		no test	no test			
26/11/2019	Rangitata floods																		
3/12/2019																			
10/12/2019																			
17/12/2019																			
24/12/2019																			
31/12/2019																			
7/01/2020	75 test		5 test	82 test	47 test	35 test		18 test	2420 test			122 test	27 test		980 test	210 test			
14/01/2020				41	326	112		34	435			172	152		411	548			Sites 9 & 15
21/01/2020	64 test		345	147	210	48		27	222			66	199		326	291			
28/01/2020			1300	88	613	96		47	488			162	1203		649	866			
4/02/2020	32 test		435 test		613	162		11	1733 test			119	93 test		1203	114 test			Sites 3 (part), 13, 15 & 16
11/02/2020	117		199	210 test	228	114		44	921 test			59	121			< 1			Site 9
18/02/2020	91		1046		1046	727		68	613 test			228	96			240			Site 9
25/02/2020	326		299 test		326	210		49	161			75	238			548			Sites 3 & 5
3/03/2020	219		488	288 test	727	488		58	248			57	517		276 test	921			
10/03/2020	387		299	308	548	61		40	42			687	291		61	411 test			Site 16 (part)
17/03/2020	179		461	105	240	49		31	114			219	49		32	64			
24/03/2020	no test		no test	no test	no test	no test		no test	no test			no test	no test		no test	no test			
31/03/2020	COVID 19																		
7/04/2020																			
14/04/2020																			
21/04/2020																			
28/04/2020	14 test		158 test	117 test	1553 test	25 test		19 test	112 test			44 test	152 test		1046 test	9 test			
5/05/2020	59		1120	193		345	687 test	137	14			411	101		>2420 test	65			Sites 5 & 15
12/05/2020	114			83		345		88	35	248 test		41	32			23	67 test		Sites 3 (part) and 15
19/05/2020																			
26/05/2020																			
2/06/2020																			

Resource Consent CRC184617 (replacing CRC162191)

1 The discharge shall be only water sourced from the Rangitata Diversion Race Klondyke intake in accordance with resource consent CRC164281 for the purposes of a Managed Aquifer Recharge trial (MAR).

IN COMPLIANCE. Refer Figure 1 and Table 1 above.

2 Water shall be only discharged into land, via the cleaned open race and the infiltration basins constructed in accordance with consent CRC162192 at the MAR site located on the corner of Fraser Road and Timaru Track Road legally described as RES 1959 at or about map reference NZ Topo50 BY20:8916-4955 as shown in attached Plan CRC162191 which forms part of this consent.

IN COMPLIANCE.

3 The rate at which water is discharged shall not exceed 302,400 cubic metres per week.

IN COMPLIANCE. Refer Table 4 below.

4 The discharge shall cease:

a. When 30 millimetres or more of rainfall within any 24 hour period as measured at the Hinds Plains Rainfall Monitoring Site at or about NZ Topo50 BY21:9423-2985 in accordance with Schedule One; and

b. When the flow at the Parakanoi Drain exceeds 2,200 litres per second measured at the Canterbury Regional Council gauge at or about NZ Topo50 BY21:9414-2294 in accordance with Schedule One, which forms part of this consent.

IN COMPLIANCE. Refer Figure 2 below which compares Parakanoi Drain flow at the recorder, Lagmhor Pilot Site flow at Flume 1 and Hinds Plains Daily Rainfall. Two instances of Parakanoi Drain flow exceeding 2.2 m^3/s and Hinds Plains Daily Rainfall exceeding 30 mm were received (1 June and 20 July 2019). The Pilot Site was not operational at these times.

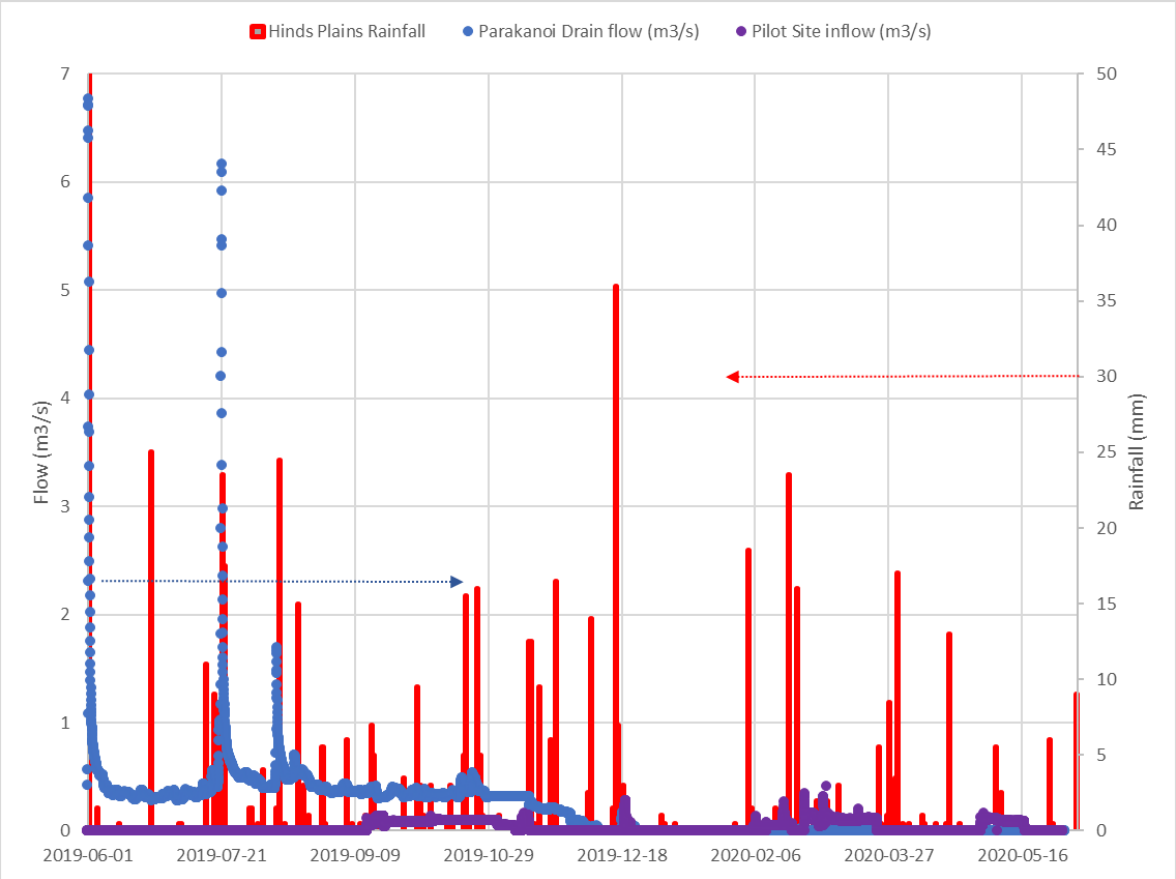

Figure 2. Lagmhor Pilot Site flow compliance monitoring

	Total MAR Volume (m3)	Pilot Site Volume (m3)	E. coli (MPN/100 ml)
6/06/2019	121,048	-	0
13/06/2019	94,466	-	0
20/06/2019	95,079	-	0
27/06/2019	188,820	-	0
4/07/2019	188,630	-	0
11/07/2019	191,174	-	0
18/07/2019	190,751	-	0
25/07/2019	297,741	-	0
1/08/2019	294,457	-	0
8/08/2019	151,672	-	0
15/08/2019	284,036	-	0
22/08/2019	301,314	-	0
29/08/2019	300,711	-	0
5/09/2019	297,943	-	0
12/09/2019	125,755	-	150
19/09/2019	237,323	78,624	40
26/09/2019	220,617	48,384	<1
3/10/2019	211,343	48,384	130
8/10/2019	257,167	60,480	156
15/10/2019	206,979	57,456	114
22/10/2019	247,542	57,456	36
29/10/2019	248,433	57,456	4
5/11/2019	194,930	30,240	261
12/11/2019	49,124	-	228
19/11/2019	18,144	18,144	no test
26/11/2019	-	-	Rangitata floods
3/12/2019	-	-	0
10/12/2019	-	-	0
17/12/2019	-	-	0
24/12/2019	-	-	0
31/12/2019	-	-	0
7/01/2020	-	-	75
14/01/2020	136,480	-	0
21/01/2020	183,816	-	64
28/01/2020	187,927	-	0
4/02/2020	103,381	-	32
11/02/2020	22,473	-	117
18/02/2020	196,920	39,312	91
25/02/2020	33,422	-	326
3/03/2020	138,177	72,576	219
10/03/2020	178,360	65,923	387
17/03/2020	190,637	57,888	179
24/03/2020	223,961	59,184	no test
31/03/2020	75,600	-	COVID 19
7/04/2020	82,253	-	0
14/04/2020	94,348	-	0
21/04/2020	43,978	-	0
28/04/2020	92,534	-	14
5/05/2020	132,850	38,448	59
12/05/2020	193,046	55,296	114
19/05/2020	302,394	36,720	0
26/05/2020	302,394	-	0
2/06/2020	302,394	-	0

Table 4: Year 4 Hekeao/Hinds Lagmhor Pilot Site monitoring

5 The discharge shall resume only after both rainfall and Parakanoi Drain flows return to below trigger values specified in Condition (4)(a) and (b) for a period of at least 48 hours.

IN COMPLIANCE. See Figure 2.

6 The discharge shall be managed in accordance with Schedule Two, which forms part of this consent.

IN COMPLIANCE. Automation of operations confirmed in Year 1 compliance report.

7 The consent holder may amend Schedule One and/or Schedule Two at any time subject to the following:

a. Any amendment shall be:
   i. Only for the purpose of dealing with any adverse effects on the environment which may arise as a result of the exercise of this consent; or
   ii. Only for the purpose of improving efficacy of the MAR trial; and
   iii. Consistent with the conditions of this consent; and
   iv. Submitted in writing to and be approved by the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. CRC184617 replaced CRC162191 during reporting period.

8 The consent holder shall undertake on going monitoring of:
   a. groundwater quantity
   b. groundwater quality
   c. surface water quantity
   d. surface water quality

In accordance with Schedule Three, which forms part of this consent.

IN COMPLIANCE. Year 1 monitoring was undertaken as described in Schedule Three. On-going optimisation of monitoring requirements has followed the process described in Schedule Three. During Year 3 this included the removal of level loggers at the following surface water sites: Parakanoi at McLennons Road, Flemington at Boundary Road, and Wheatstone at Boundary Road. As such, logging of flow at 15-minute intervals has not been continued and frequency of monitoring surface water flow rates at these locations has been reduced to monthly intervals. During Year 4, both groundwater and surface water monitoring for MAR was reviewed. The review results are contained in the accompanying memos.

9 The consent holder may amend Schedule Three at any time subject to the following:
   b. Any amendments shall be:
      a. Only for the purpose of improving efficacy of the monitoring programme and shall not result in reduced quality of monitoring of the discharge; and
      b. Consistent with the conditions of this consent; and
      c. Submitted in writing and to be approved to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. No amendments to Schedule 3 during reporting period.

10 The consent holder shall record and maintain monitoring records and submit a review report to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager by 31 August each year.

With submittal of this report, Condition 10 is met.

11 The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent.

No comment required.

Resource Consent CRC183882 – Conditions Summary

1 The discharge shall be only:
   a. Water sourced from the Rangitata Diversion Race Klondyke intake in accordance with resource consent CRC164281 for the purposes of a Managed Aquifer Recharge trial (MAR); and
   b. Any of the following tracers: i. Rhodomine WT; and/or ii. Flurescein fluorescent dyes.

IN COMPLIANCE. Refer Figure 1 and Table 1 above. (NOTE: Tracers not used during reporting period).

Water shall be only discharged into water:
   a. Via the soakage system described in Schedule 1 which forms part of this consent;
   b. At the MAR site located on the corner of Fraser Road and Timaru Track Road legally described as RES 1959 at or about map reference NZTM2000 1489159mE, 5140551mN.

IN COMPLIANCE.

2 The rate at which water is discharged shall not exceed a combined volume of 302,400 cubic metres per week in conjunction with CRC162191 (now CRC 184617) and CRC182576.

IN COMPLIANCE. Refer Table 4 above.

3 The total concentration of tracer discharged shall not exceed 1 µg/L.

IN COMPLIANCE. Tracer(s) not used during reporting period. No comment required.

4 The discharge shall cease:
   a. When 30 millimetres or more of rainfall within any 24 hour period as measured at the Hinds Plains Rainfall Monitoring Site at or about NZTM2000 1494229mE, 5129850mN; and
   b. When the flow at the Parakanoi Drain exceeds 2,200 litres per second measured at the Canterbury Regional Council gauge at or about NZTM2000 1494140mE, 5122940mN.

IN COMPLIANCE. Refer Figure 2 above which compares Parakanoi Drain flow at the recorder, Lagmhor Pilot Site flow at Flume 1 and Hinds Plains Daily Rainfall. Two instances of Parakanoi Drain flow exceeding 2.2 m^3/s and Hinds Plains Daily Rainfall exceeding 30 mm were received (1 June and 20 July 2019). The Pilot Site was not operational at these times.

5 The discharge shall resume only after both rainfall and Parakanoi Drain flows return to below trigger values specified in Condition (4)(a) and (b) for a period of at least 48 hours.

IN COMPLIANCE. See Figure 2.

6 The discharge:
   a. Shall cease if the E.coli count in the source water exceeds 1,000 MPN/100mL;
   b. May resume when the E.coli count in the source water is below 1,000 MPN/100mL,

   As measured in water samples obtained from the piezometer installed in the soakage system.

IN COMPLIANCE. Refer Table 4 above.

7 Source water quality samples shall be taken:
   a. at weekly intervals;
   b. from the piezometer located at the soakage system shown in Schedule 1

   to determine E.coli counts for the purposes of complying with condition 7.

IN COMPLIANCE. Refer Table 4 above.

8 Water quality samples shall be taken from observation bore K37/1748 within 24 hours of any exceedance of the E. coli trigger level in condition (7) to determine E. coli attenuation.

IN COMPLIANCE. No exceedance events during reporting period.

9 The discharge shall be managed in accordance with Schedule 2, which forms part of this consent.

IN COMPLIANCE but repeating the Year 3 note that the sand filter has not been constructed, as opening the intake on the new soakage system had no effect on infiltration rates so has been left closed.

10 The consent holder shall undertake on going monitoring of:
   a. groundwater quantity
   b. groundwater quality
   c. surface water quantity
   d. surface water quality

   In accordance with Schedule Three, which forms part of this consent.

IN COMPLIANCE. During Year 4, both groundwater and surface water monitoring for MAR was reviewed. The review results are contained in the accompanying memos. Additional information available on request (Year 4 Hekeao/Hinds MAR Annual Report 2019/20)

11 The consent holder may amend Schedule 2 and/or 3 at any time subject to the following:
   a. Any amendments shall be:
      a. Only for the purpose of dealing with any adverse effects on the environment which may arise as a result of the exercise of this consent; or
      b. Only for the purpose of improving efficacy of the MAR trial and its monitoring programme and shall not result in reduced quality of monitoring of the discharge; and
      c. Consistent with the conditions of this consent; and
      d. Submitted in writing and to be approved to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. No amendments to Schedule 2 or 3. No comment required.

12 The consent holder shall record and maintain monitoring records and submit a review report to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager by 30 August each year.

IN COMPLIANCE. With submission of this report, Condition 13 is met.

13 The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent.

IN COMPLIANCE. No comment required.

Resource Consent CRC186228 – Conditions Summary

1 The discharge shall be only be water sourced from the Rangitata Diversion Race Klondyke intake in accordance with resource consent CRC164281 for the purposes of the Hekeao/Hinds River Managed Aquifer Recharge trial.

IN COMPLIANCE. Refer Figure 1 and Table 1 above.

2 Water shall be only discharged into water and land via the Rangitata Diversion Race syphon at map reference NZTM2000: 1467282mE 5149793mN and delivery channel at the MAR Hekeao/Hinds River Project test site located on Plan CRC186228, which forms part of this consent.

IN COMPLIANCE. Refer Table 5 below.

3 The rate at which water is discharged shall not exceed:

a. A maximum rate of 210 litres per second, with a volume not exceeding 17,280 cubic metres per day;
b. In combination with CRC184617 and CRC182576, 500 litres per second, and 302,400 cubic metres per week.

IN COMPLIANCE. Refer Table 5 below.

4 The discharge shall be managed in accordance with Schedule One, which forms part of this consent.

IN COMPLIANCE. Full monitoring analysis available on request (Year 4 Hekeao/Hinds MAR Annual Report 2019/20)

5 The consent holder may amend Schedule One and/or Schedule Two, which forms part of this consent, at any time subject to the following:

a. Any amendment shall be:
   i. Only for the purpose of dealing with any adverse effects on the environment which may arise as a result of the exercise of this consent; or
   ii. Only for the purpose of improving efficacy of the MAR trial; and
   iii. Consistent with the conditions of this consent; and
   iv. Submitted in writing to and be approved by the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager, prior to any amendments being implemented.

IN COMPLIANCE. Confirmation of Conditions 6 and 7 discussed in 2018/19 Compliance Report.

6 The discharge shall:

a. Cease if the flow in the South Branch of the Hekeao/Hinds River at flow recorder site #69101 located at grid reference NZTM 1467250E 5149895N exceeds five cubic metres per second as determined by the Canterbury Regional Council;
b. Only be restarted after the flow at flow recorder site #69101 has decreased to below five cubic metres per second as determined by the Canterbury Regional Council for a minimum period of 24 hours after a cease event.

IN COMPLIANCE. See Figure 3 below. One cessation occurred after river fresh on 21/7/2019 (N.B. Logarithmic scale used for flow). In addition, CRC Compliance Report C19C/71226 dated 10 May 2019 states “Dr Brett Painter advised that discharge is stopped within 12 hours of the trigger level being reached when the South Branch Hinds River flow recorder indicates a river flow greater than 5 cubic meters per second. This practice is in line with the time frame set down by the Regional Council for river low flow restriction cessation of take. This practice is considered compliant with this condition and allows for time to manually turn off the discharge flow valve. Discharge is not recommenced until flow has dropped below the trigger level.”

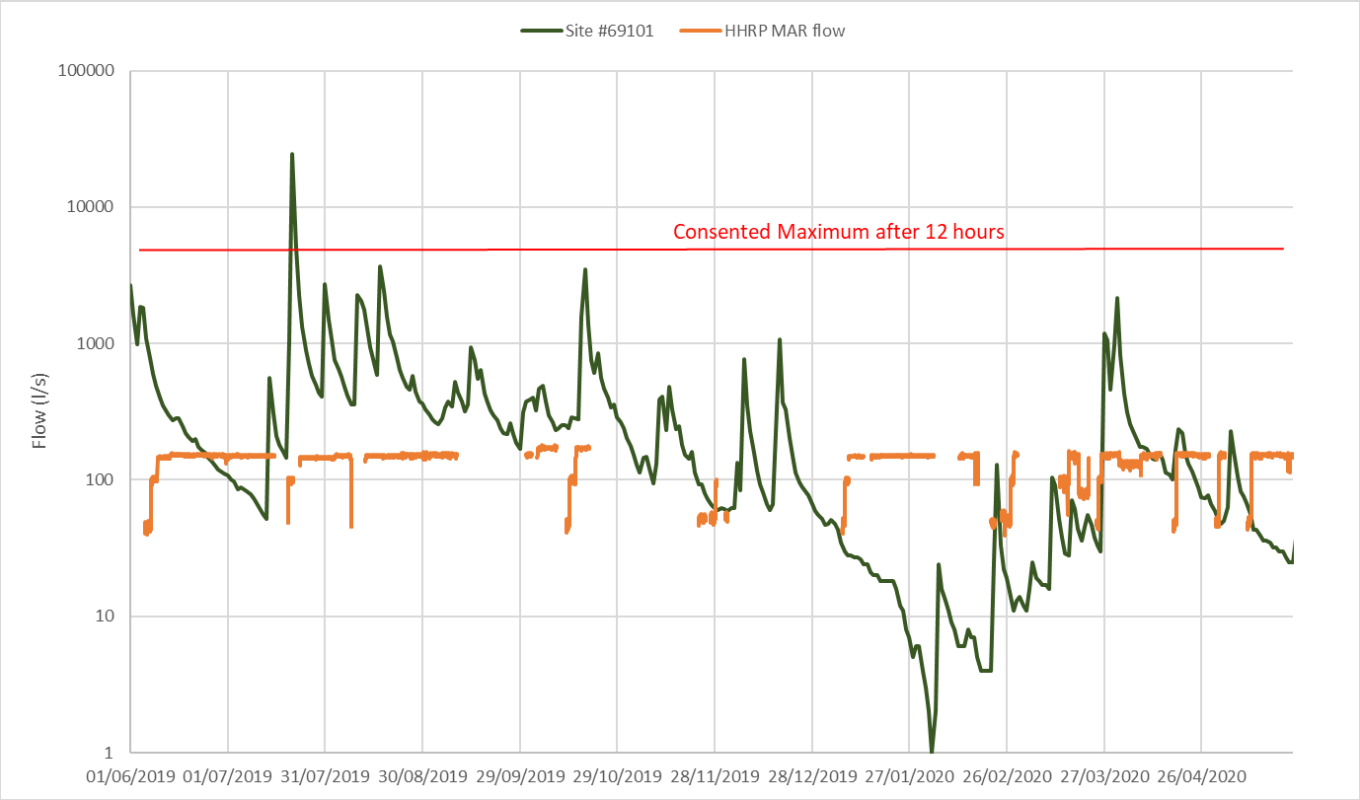

Figure 3. HHRP Site flow compliance monitoring

7 The discharge shall:

b. After September 2019:

1. Cease If turbidity levels at the RDR Siphon turbidity sensor exceeds "trigger level" NTU, the project until levels return to below "trigger level" NTU. The trigger value "trigger level" NTU will be calculated and provided to ECan compliance staff within 12 months of active recharge operation.

IN COMPLIANCE. See Figure 4 below. Confirmation of condition 7b can be found in CRC Compliance Report C19C/71226 dated 10 May 2019, which states “Real time turbidity monitoring occurs at the RDR Siphon where a monitoring instrument specific for purpose is installed. The discharge ceases when the turbidity level at the RDR Siphon automatic sensor reaches 100NTU. Currently discharge does not recommence until the turbidity level drops to below 60NTU. Note: This recommencement trigger NTU level is below that required by consent.”

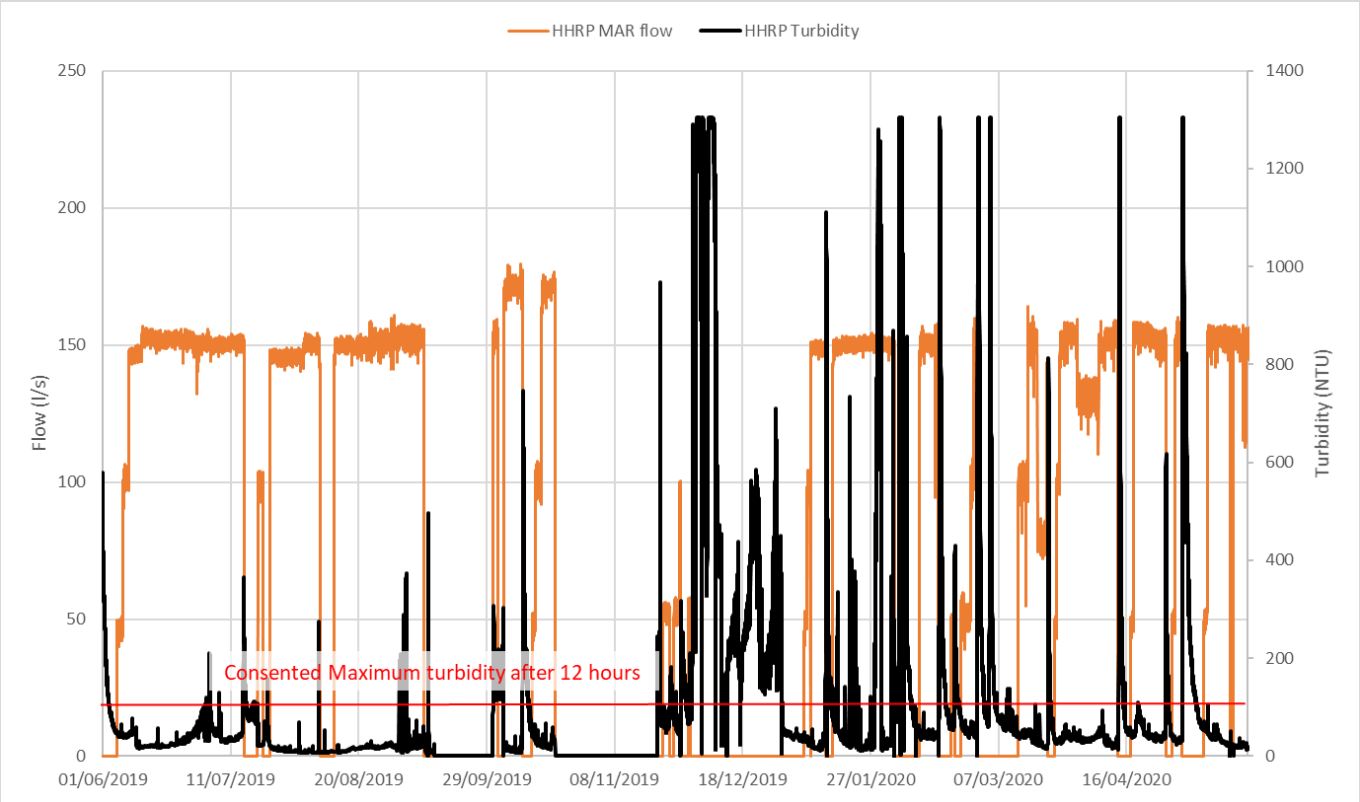

Figure 4. HHRP Site turbidity compliance monitoring

8 The consent holder shall undertake on going monitoring of:

a. groundwater quantity;
b. groundwater quality;
c. surface water quality;
d. freshwater ecology, and;
e. terrestrial ecology;

In accordance with Schedule Two, which forms part of this consent.

IN COMPLIANCE. Full monitoring analysis available on request (Year 4 Hekeao/Hinds MAR Annual Report 2019/20)

9 The consent holder shall record and maintain monitoring records and submit a review report to the Canterbury Regional Council, Attention RMA Monitoring and Compliance Manager by 31 August each year.

IN COMPLIANCE. With submission of this report, Condition 9 is met.

10 The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent.

No requests received so no comment required.

Table 5: Year 3 Hekeao/Hinds River Project Site monitoring

	Weekly MAR Volume (m3)	Max daily HHRP Volume (m3)
6/06/2019	121,048	12,960
13/06/2019	94,466	12,960
20/06/2019	95,079	12,960
27/06/2019	188,820	12,960
4/07/2019	188,630	12,960
11/07/2019	191,174	12,960
18/07/2019	190,751	12,960
25/07/2019	297,741	12,960
1/08/2019	294,457	12,960
8/08/2019	151,672	12,960
15/08/2019	284,036	12,960
22/08/2019	301,314	12,960
29/08/2019	300,711	12,960
5/09/2019	297,943	12,960
12/09/2019	125,755	12,960
19/09/2019	237,323	12,960
26/09/2019	220,617	12,960
3/10/2019	211,343	11,232
8/10/2019	257,167	14,688
15/10/2019	206,979	7,776
22/10/2019	247,542	14,688
29/10/2019	248,433	14,688
5/11/2019	194,930	12,960
12/11/2019	49,124	-
19/11/2019	18,144	-
26/11/2019	-	-
3/12/2019	-	-
10/12/2019	-	-
17/12/2019	-	-
24/12/2019	-	-
31/12/2019	-	-
7/01/2020	-	-
14/01/2020	136,480	11,664
21/01/2020	183,816	12,960
28/01/2020	187,927	12,960
4/02/2020	103,381	9,504
11/02/2020	22,473	-
18/02/2020	196,920	12,960
25/02/2020	33,422	605
3/03/2020	138,177	-
10/03/2020	178,360	-
17/03/2020	190,637	5,554
24/03/2020	223,961	7,529
31/03/2020	75,600	10,800
7/04/2020	82,253	11,750
14/04/2020	94,348	13,478
21/04/2020	43,978	6,283
28/04/2020	92,534	13,219
5/05/2020	132,850	4,320
12/05/2020	193,046	2,469
19/05/2020	302,394	12,960
26/05/2020	302,394	12,960
2/06/2020	302,394	12,960