From: Will Nicolson <will@landpro.co.nz>
Sent: Tuesday, 31 May 2022 2:10 p.m.

To: Natasha Pritchard

Cc: Tony Jack

Subject: RE: Agreed scenario documents and hearing date - RM18.004 **Attachments:** Statement of Agreed Scenarios - draft - 31 May 2022(tj and wn

comments).docx

HI Natasha,

Seems like a good summary. Tony and (to a lesser extent) I have made a few comments and suggested minor changes – see attached.

Cheers,

Will

From: Natasha Pritchard < natasha.pritchard@orc.govt.nz >

Sent: Tuesday, 31 May 2022 12:41 PM **To:** Will Nicolson <<u>will@landpro.co.nz</u>>

Cc: Tony Jack < tony.jack@pioneerenergy.co.nz >

Subject: RE: Agreed scenario documents and hearing date - RM18.004

Hi Will,

Thanks for the update and for making the review of the scenarios a priority.

I will continue on the basis of Option 1 and advise the submitters accordingly once we have the scenarios draft document finalised.

Kind regards, Natasha

From: Will Nicolson < will@landpro.co.nz > Sent: Tuesday, 31 May 2022 10:54 a.m.

To: Natasha Pritchard < <u>natasha.pritchard@orc.govt.nz</u>>

Cc: Tony Jack <tony.jack@pioneerenergy.co.nz>

Subject: RE: Agreed scenario documents and hearing date - RM18.004

Morning Natasha,

I just talked to Tony and he said he will try and get some comments back to you soonish/today. I'll also take a quick look through soon from a planning perspective.

Regarding hearing dates. We discussed this for a while, but we're keen to stick with the original hearing date of July 7th. Understand that this may put a bit of pressure on the various parties for reviews/responses/evidence prep, but it is what is it. Appreciate the sentiment behind the suggested hearing delay, however.

Will come back to you soon on the scenarios.

Regards, Will

Will Nicolson

Senior Planner/Scientist



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From: Natasha Pritchard < natasha.pritchard@orc.govt.nz>

Sent: Tuesday, 31 May 2022 9:22 AM **To:** Will Nicolson < will@landpro.co.nz >

Cc: Tony Jack < tony.jack@pioneerenergy.co.nz >

Subject: RE: Agreed scenario documents and hearing date - RM18.004

I have attached a draft version of the described scenarios. Unfortunately I am unable to connect to the VPN today (not a great day for IT issues!) so I haven't been able to check some of the references but will update those when I have connection. Are you and Tony able to review the draft version and let me know if you have any comments. You will still have an opportunity to provide more considered comments once it is sent out to all parties.

Understand the challenges the new date would pose and the desire to progress to a decision. Happy to discuss options so that it worked for Pioneer if that option is sought to be pursued. Appreciate you are meeting today and that you will get back to me once a decision has been made on that.

Any questions, let me know.

Kind regards, Natasha



Natasha Pritchard PRINCIPAL CONSENTS PLANNER

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From: Will Nicolson < will@landpro.co.nz > Sent: Monday, 30 May 2022 9:00 p.m.

To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Cc: Tony Jack <tony.jack@pioneerenergy.co.nz>

Subject: RE: Agreed scenario documents and hearing date - RM18.004

Hi Natasha,

Thanks for your email. Understood regarding the model. If possible, can you send it to us for comment first, so that Tony or myself can rectify any potential inconsistencies before it gets disseminated to the other parties? Should make it a lot cleaner that way.

I understand where you're coming from with regards to the suggested ~2 month hearing postponement. However I'll be away from July 21st till August 23rd, so it's not ideal from my perspective – noting that it's not all about me! I also suspect that after waiting close to 5 years to get to this point, Tony/Pioneer may be keen to just crack on with the current date, regardless of the benefits of delaying things. However, the applicant crew is meeting tomorrow, so I'll bring this up for discussion and get back to you ASAP with our response.

Apologies for the slight delay in getting back to you -

Talk tomorrow.

Cheers, Will

Will Nicolson

Senior Planner/Scientist



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From: Natasha Pritchard < natasha.pritchard@orc.govt.nz >

Sent: Monday, 30 May 2022 2:50 PM

To: Will Nicolson < will@landpro.co.nz >; Tony Jack < tony.jack@pioneerenergy.co.nz >

Subject: Agreed scenario documents and hearing date - RM18.004

Hi Will/Tony,

Thank you for sending through the updated model and the answers to the questions from the model. I have been summarising what this means for Lake Onslow and the Teviot River under the different scenarios. This summary document will be the basis for the technical evidence to be finalised against. There will be benefits for all parties in having these summary statements agreed prior to the hearing and clear certainty on where there is disagreement (if any). I plan to distribute the summary document with the further information to submitters. I will also circulate this document to you today/tomorrow. There will be a timeframe and opportunity for comment. Would you prefer this was sent individually or that the document was accessible for all to view on OneDrive?

Given the tight timeframes with finalising evidence and the s42A recommendation as well as the due date for the model peer review being the end of this week, I think there would be real value in postponing the hearing for approximately 2 months (until August/early September). This will allow the peer review to be absorbed by all and provide you with an opportunity to provide any updates or clarification (if required) as a result of that. It would also provide us with time to prepare a joint statement of agreed facts for the scenarios. Each of our evidence can then be prepared off these agreed facts (and areas of disagreement focussed on). It would also enable the ORC evidence to include consideration of the peer review and agreed statement. Without a postponement, the ORC technical evidence will be finalised this week. This will be based off my understanding of what the scenarios look like and will not include any consideration of the model peer review. My s42A report would then also be on that basis. Without a postponement, the ORC experts would need to consider these additional documents and provide supplementary evidence that addresses these in upcoming weeks. This would result in a double consideration. This also creates a lot of additional documentation for the decision maker.

I have outlined below a rough timetable of the two options. I am happy to discuss timeframes. In Option 2 we agree to have the technical evidence finalised a couple of weeks before the s42A report is completed and would circulate this to all parties so there was time for applicant and submitter evidence prep to carefully consider this.

Please let me know if you agree with proceeding with Option 2 and any dates that do not suit for a hearing in late August/September. We will then confirm with the decision maker as to their availability and an updated hearing notice/minute will be released with timeframes. You will also need to confirm that you agree to a timeframe extension for holding the hearing until the end of August.

Option 1:

Date A	Action
--------	--------

31/05/2021	Finalise scenarios, send further information to submitters. Ask for feedback on scenarios by 10/06	
03/06/2021	Evidence finalised with note that peer review has not been considered or agreed scenarios	
03/06/2021	Peer review of model due. Send to all parties.	
07/06/2021	Review model peer review.	
08/06/2021	S42A for peer review.	
09/06/2021	Update report. S42A to manager for review by C.O.B	
10/06/2021	Comments from submitters and applicant on scenarios due.	
13/06/2021	Update s42A based on manager review comments	
14/06/2021	S42A and evidence sent out	
15 and 16/06/2021	Collate scenarios document and virtual meeting to discuss/reach agreement on what is/is not agreed. Sent out by end of week.	
21/06/2021	Applicant evidence due	
28/06/2021	Supplementary evidence from ORC based of model peer review and scenario document.	
28/06/2021	Submitter evidence due	
05/07/2021	Site visit – decision maker	
06/07/2021	Hearing – Alexandra	

Option 2:

Date	Action
31/05/2021	Finalise scenarios, send further information to submitters. Ask for initial feedback on scenarios by 14/06
03/06/2021	Peer review of model due. Send to all parties.
07/06/2021	Review peer review – clarify any questions from peer reviewer/applicant
14/06/2021	Applicant answers to any questions due (or agreed timeframe).
14/06/2021	Feedback from all parties on scenarios due
15/06/2021	Review feedback and collate a document with agreed/not agreed.
16/06/2021	Virtual meeting with all parties to discuss and finalise scenario document
28/06/2021	Final expert evidence due taking into consideration peer review and scenarios document. Expert evidence to be sent to all parties by 30/06

Week of 4/07	Update and finalise s42A based on updated evidence.
Week of 11/07	Peer review of s42A and update report.
Week of 18/07	Manager review of s42A and update report
Week of 25/07	Send out s42A
Week of 1/08	Applicant evidence due
Week of 8/08	Submitter evidence due
Week of 15/08	Site visit and hearing

If a hearing were set for last week of August/early September that would build in 2 weeks of buffer if scenario considerations require slightly longer or if there are questions that need to be answered from the model peer review before the scenario discussions can be concluded that require more time.

Any questions, please let me know.

Appreciating the tight timeframes, if you can advise the preferred approach by early tomorrow morning I can then direct clearly to the submitters the next steps.

Kind regards, Natasha



Natasha Pritchard PRINCIPAL CONSENTS PLANNER

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<u>Baseline Data for Describing Lake Onslow and the Teviot River for</u> **Application RM18.004**

The below outlines the key parameters of Lake Onslow and the Teviot River as they relate to the operation of Water Permits 2001.475 and 2001.476 under various scenarios.

Scenarios:

The following scenarios are being considered for the RM18.004 application.

- A. Lake levels and lake management based on the current operating regime and current consent conditions (i.e. actual lake levels based on how the consents have been exercised with a 0.2 m per 7-day draw down) – This is the grey line in the model graph.
- B. Lake levels and lake management based on the current consents being exercised to their fullest extent (i.e. theoretical lake levels based on a 0.2 m per 7-day draw down).
 This is the orange line in the model graph.
- C. Lake levels and lake management based on the proposed consents being exercised to their fullest extent (i.e. theoretical lake levels based on a 0.4 m per 7-day draw down) – This is the blue line in the model graph.
- D. Lake levels and lake management based on changes to the current operating regime with the proposed consent conditions (i.e. potential actual lake levels based on a 0.4 m per 7-days draw down). The applicant has explained that modelling this is too difficult because of all the variables but indicates that the line on the graph would likely be between the grey and orange lines.

Scenario A

- Considering the time period February 2011-February 2022
- Lake levels were often above 1.5 m below crest (85.5 % of the time)¹
- Lake levels were above 2.5 m below crest for the majority of the time (97.9 %)²
- Lake levels were always above 3 m below crest³
- Mean lake levels
- Lowest lake level (5.2 m below crest) were never reached. Lowest lake level was 3 m below crest.⁴
- The lake level fluctuated between 0 and 3.0 m below crest. There is seasonality in fluctuation depending on rainfall/surface water inputs, electricity and irrigation demand. The lowest lake levels were typically between March and May.⁵
- The Teviot River discharge from Lake Onslow is variable between 1.4 m³/s and 5.7 m³/s and the average sustained discharge over the week is constrained by the draw

Commented [NP1]: Could make this from June 2007 so compares with Scenario A and B below. Can Fish and Game update spreadsheet to include this?

Commented [TJ2R1]: This data set has been updated to include data from 1/11/2006

Commented [TJ3]: Lake levels fell below 3m in 2008

Commented [TJ4]: Average 995mm below crest

Commented [TJ5]: Lowest was 3.37 below crest

Commented [NP6]: Do we have data that shows this? Further information 24 Sept 2021 shows a 6 week period with

¹ Fish and Game Supplementary Information to support submission dated 24 May 2022

² Fish and Game Supplementary Information to support submission dated 24 May 2022

³ Fish and Game Supplementary Information to support submission dated 24 May 2022

⁴ Fish and Game Supplementary Information to support submission dated 24 May 2022

⁵ Further information from Pioneer Energy Limited 26 May 2022 – Lake Onslow Lake Levels Model and answer to question 8.

down limit at lower lake levels – At 1 m below crest the average sustained discharge is around 3 m 3 /s $^{[6]}$. Flows discharged often, but not always, follow a diurnal pattern

Commented [TJ7]: Dependant on inflows

Under Scenario A, the lake has been predominantly full to half fill since 2012. The lake has never been at the minimum operating level <u>during this period</u>. The lake level fluctuated seasonally and has been variable between years. Lowest lake levels were typically between March to May and highest lake levels between July and the end of January. The flows to the Teviot River have been variable and dependent on electricity and irrigation demand, market value for electricity, available daily storage and the lag time to the generation facilities down the Teviot River.

Scenario B

In Scenarios B and C, it has been considered that the consents had been exercised to their fullest extent over the time period June 2007 to June 2021 and that each parameter can be exercised to the fullest extent at the same time I.e. the maximum rate of take can be taken at any draw down rate. It is understood that there are no limitations based on any other consents held by the Applicant in operating Water Permit 2001.475 and Water Permit 2001.476.V3 to their fullest extent. The main factors that influence how the consents are implemented sit outside of the consented framework. These include: irrigation demand, electricity demand and market value, the status of the generating plants, available daily storage, lag time to the generation facilities and inflows to the Teviot River downstream of Lake Onslow. These outside influences have not been considered in Scenarios B and C.

Lake levels

- Lake levels 2.5. m below crest (schist boat ramp accessibility between 0-2.5 m)
 - The lake levels would have predominantly been 2.5 m- 5.2 m below the crest since the consent was implemented.
 - The maximum period of time that the lake would have been above 2.5 m below crest would have been 1/5 of the time period.
 - Since 2007, there would have been between 2 and 6 years where the lake was 2.5 m below crest or lower for the entire year.
 - Lake levels above 2.5 m below crest would have most likely occurred between July and end of January.
- Lake levels 3 m below crest (no or very limited boat ramp access below 3 m)
 - Lake levels would have frequently (more than 2/3rd of the time) been 3 m below the crest or more since the consent was implemented.
 - The maximum period of time that the lake would have been more than 3.0 m below crest would have been 1/3 of the time period.
 - Since 2007, there would have been a maximum of 1 year where the lake was 3.0 m below crest or lower for the entire year.

Commented [TJ8]: 1/11/2006 –

Commented [TJ9]: concrete

⁶ See clarification to further information email dated 9 August 2021 and email dated 13 September 2021 from Pioneer Energy Limited.

 Lake levels above 3.0 m below crest would have most likely occurred between July and end of January.

Mean lake levels

Lowest lake level:

- The lake would have been at the lowest lake level for some of the time approximately 1/10th of the time since the consent was implemented
- The lowest lake level would not have been reached each year. There would have been variability between years in whether the lowest lake level would be reached as well as the duration at the lowest lake level⁷.
- The lowest lake levels would have most commonly been in the months of March to May.
- The lake would have been at the lowest lake level for varying durations depending on rainfall/surface inputs.
- The maximum number of total days that the lake would have been held at the lowest lake level continuously between June 2007 and June 2021 would have been between 54 and 92 days (i.e. approximately (2-3 months)).

Lake level fluctuations:

o Lake levels would have fluctuated between 0 m and 5.2 m below the crest.

• Teviot River flows:

- The maximum take (6 m³/s) would be discharged when the lake is being drawn down and is above the minimum operating level.
- When the lake is at the lowest lake level the discharge would be constrained to the lesser of 345 L/s (the residual flow on Water Permit 2001.476.V3) or actual inflows.

Under Scenario B the lake would have commonly been half fill to empty since 2007 but could have been above the level where there is boat ramp access for 1/5th of the time. The majority of that time would have been between July and January. There will have been some years where the lake level was never above 2.5 m below crest. The lake would have been at the lowest lake level for around 10% of the time. The lowest lake level would not have been reached each year. The lake would have been at the lowest lake level for varying durations with the maximum continuous duration being 2-3 months. The lake would have fluctuated between being full and empty. The flows to the Taieri River would oscillate between being the maximum discharge rate of 6 m³/s and the residual flow of 345 L/s. The duration of the residual flow being determined by the period of time the lake is at the lowest level.

Scenario C

Proposed change:

 To increase the draw down rate from 0.2 m per seven-days to a maximum of 0.4 m per seven-days. An increase of 0.2 m per seven-days. Commented [NP10]: Data on this for period June 2007. June 2021 and Feb 2011 to Feb 2022

Commented [TJ11R10]: Scenario b average -3958mm Scenario C average -4435mm

⁷ An average of between 39 to 71 days per year. The variance over the years is shown in Table X of the Further Information by Pioneer Energy Limited dated XX

Maximum operating range/minimum operating water level:

No change to the lake's maximum operating range (a minimum operating water level of 5.2 m below the crest of the dam8).

Maximum take/discharge from the lake:

- No changes to the maximum rate of take are sought. The maximum rate of take (and discharge) is restricted to 6 cumecs9.
- The current draw down rate does not enable the take/discharge to be fully exercised at lower lake levels. This is when the average take is considered over a seven-day period10. The 6 cumecs can currently be taken at any lake level but not for a sustained period.

Timing of use:

- Use of the increased draw down rate is likely to be employed in late summer and autumn (March to June) and during low rainfall years as the lake level lowers.
- No temporal restrictions are proposed by the Applicant.
- An increased draw down rate could occur any time of the year.
- Scenarios B and C is where the increased draw down is used throughout the year.

Lake level drop over any 7-days:

- Scenario C will enable a greater drop in lake levels over any 7 day period then
- At the maximum take of 6 m³/s, the duration (days) that the lake is dropping within a 7-day period would increase11.

Lake level drop within the 7-day period:

- There are no current consent conditions that limit how water is taken/discharged within a seven-day period.
- Under the proposed change, the maximum take/discharge rate is not increasing.
- The lake level and draw down rate is not currently a limiting factor to taking the maximum discharge rate¹². Based on this, there is no change to the maximum lake level drop that could occur within a 7 day period between Scenarios B and C13.

Lake level fluctuations with a 7-day period:

The draw down rate will be constant and even if the discharge rate is constant.

Duration of lake bed exposure:

- o The extent of lake bed/shore line that is exposed in a 7-day period is dependent on the starting lake level and shore terrain but more lake bed is exposed at lower lake levels14.
- More lake bed will be exposed in a 7-day period than could currently occur. This has not been quantified for any lake level.

⁸ During the exercise of this consent, the minimum operating water level of the impoundment shall be 679.9 metres above mean sea level. - Condition 2 of Water Permit 2001.476.V3

⁹ The maximum rate of abstraction from Lake Onslow under this consent shall not exceed 6 cubic metres per second.

When the lake is full and the outflow is 6m3/s the current 200mm limit will be reached in 4.4 days at a maximum rate of 45.5mm/dav.

Commented [WN12]: Seems unfinished?

Condition 1 of Water Permit 2001.476.V3 10 When the lake level drops below approximately 1 m below the dam crest the existing draw down limit of 200 mm/week limits the average weekly discharge rate to the river to around 3 cubic metres per second. See clarification to further information email by Pioneer Energy Limited dated 9 August 2021 and email dated 13 September 2021.

11 Further Information by Pioneer Energy Limited dated 9 September 2021 – question 2

When the lake is down 1m and the outflow is 6m³/s the current 200mm limit will be reached in 3.6 days at a maximum rate of 55.63 mm/day. At the same flow rate the time taken to lower the lake 400mm will be 7.2 days at a maximum rate of

When the lake is down 2m and the outflow is 6m3/s the current 200mm limit will be reached in 2.87 days at a maximum rate of 69.6 mm/day. At the same flow rate the time taken to lower the lake 400mm will be 5.75 days at a maximum rate of 69.6 mm/day

¹² See clarification to further information email by Pioneer Energy Limited dated 9 August 2021 and email dated 13 September

Further information by Pioneer Energy Limited dated 9 September 2022

¹⁴ Dungey (2017) *Lake Onslow Lake Bed Profile and Invertebrate survey.* Prepared by Ross Dungey Consulting for Pioneer Energy Limited. Attachment A of PEL 2018 resource consent application.

o There will be no change to the maximum extent of lake bed exposure.

Fluctuations in lake levels:

- o Fluctuations are based on an external factor (rainfall/surface water inflows bringing the lake level back up) as well as the outflow discharge.
- The model suggests there would be a similar pattern of fluctuation in lake levels between Scenario B and C with perhaps a slight increase in variability for Scenario C at the lower lake levels.
- The Applicant has stated that it is not possible to provide quantitative data on this.

Mean lake levels:

Lower lake levels:

- o Lower lake levels would be reached earlier in a season than under Scenario B due to the faster draw down rate. How much faster has not been able to be quantified as there are too many variables.
- Comparing Scenario B and Scenario C, the lake would have been at a level of 2.5 m or more below crest for between 3-9% longer over the time period and below 3.0 m or more below crest for between 1-11% longer.
- The lake would have been at the lowest lake level for longer (25% more of the time under Scenario C).
- Since 2007, the number of years where the lake would have not been greater than 2.5 m below crest would for the entire year have increased from 6 years in Scenario B to 10 years in Scenario C, at baseflow.
- Since 2007, the number of years where the lake would have not been greater than 3.0 m below crest for the entire year would have increased from 1 year in Scenario B to 7 years in Scenario C, at baseflow.
- There would continue to be a similar level of variance between years in when the lowest lake level is reached but there would be significantly more days each year when the lowest lake level was reached. This would have increased from an average of 71 days in Scenario B to 157 days per year in Scenario C, at base flow (from approximately 2 months to 5 months. This would not be continuous).
- The maximum number of continuous days that the lake would have been held at the lowest lake level would have not changed substantially¹⁵.

Seasonality of low lake levels:

There is no obvious change when viewing the model graph in the timing of when the lowest lake levels would be throughout a year (i.e. the pattern of high and low lake levels is similar) and this is confirmed by the Applicant 16. However, the lake levels may be lower in Scenario C than B for the lower lake levels reached each season.

Flows in the Teviot River:

- o There would be no change to the maximum flow.
- A greater duration at the lowest lake level means that the discharge to the Teviot River would have been at the residual flow for approximately 25% longer compared to Scenario B.

Comparison between Scenario B and C

Table 1: Lake Onslow and the Teviot River under Scenario B and Scenario C and the differences between the scenarios

Scenario B – 0.2 m per 7- days	Scenario C – 0.4 m per 7-days	Change from Scenario B to Scenario C
--------------------------------------	----------------------------------	--------------------------------------

15 1 day extra at baseflow. Question 3(a) in Further Information from Pioneer Energy Limited dated 26 May 2022
 16 Question 8 in Further Information from Pioneer Energy Limited dated 26 May 2022

Commented [TJ13]: Scenario b average -3958mm Scenario C average -4435mm

Commented [NP14]: Need mean lake levels for Scenario C.

Commented [WN15]: When compared to Scenario B?

Commented [WN16]: May be easier to just provide these in table format, for comparison. Or provide text and table as supplementary visual.

	T =	Γ = -	1
Minimum	5.2 m below	5.2 m below crest	No change
operating	crest		
water level			
Maximum	6 cubic metres	6 cubic metres per	No change
take from	per second	second	
Lake Onslow			
Lake levels - du	uration and seaso	nality	
Lake levels			 Lower lake levels reached earlier in a season for Scenario C Lake level 2.5 m (schist concrete boat ramp access) below crest or lower for approximately 3-9% more of the time. An increase in years when lake never above 2.5 m below crest. Lake level 3.0 m below crest or lower for 1-11% of the time. An increase in years when lake never above this lake level.
Duration at lowest lake levels			lake level At lowest lake level 25% more of the time Limited change in which years have lowest lake levels Average number of days at lowest lake levels doubles. Limited increase in maximum continuous period of lowest lake level.
Speed at	Not able to be	Not able to be	Not known
reaching	quantitatively determined	quantitatively determined	
lowest lake level	determined	determined	
Months of highest lake levels	July to January	July to January	No change
Months of lowest lake levels	March to June	March to June	No change
Fluctuation and	d lake drop param	eters	
Lake level drop over a 7 day period			More days in a 7 day period where the lake is dropping. Number of days depends on starting lake level.
Lake bed exposure within a 7-day period	Dependent on bathometry of lake and lake level start.		More bed exposure in a 7 day period. How much more is dependent on bathometry and lake level at start.

Maximum	Constrained by	Constrained by	No change
lake level	maximum take	maximum take	No change
drop within a	limit.	limit.	
7 day period	min.	min.	
Fluctuations	Constant	Constant discharge	No change
		Constant discharge	No change
in lake levels	discharge	assumed	
within 7-days	assumed		
Fluctuations	Fluctuations	Fluctuations	Fluctuations increase slightly
in lake levels	primarily due to	primarily due to	from Scenario B with more
over a year	rainfall/surface	rainfall/surface	fluctuations at the lower lake
	water inputs	water inputs.	levels
Teviot River			
Duration that			Approximately 25% more time
discharge to			where the discharge is at
the Teviot			residual flow only
River is at			, , , , , , , , , , , , , , , , , , , ,
residual flow			
only			

Scenario D

The Applicant has explained that it is not possible to model Scenario D¹⁷. This is because of the wide number of variables outside of the consent conditions that determine how much water is taken at any point in time. They have generally indicated that the lake levels would sit somewhere between Scenario A and B¹⁸. On the basis of this high level of uncertainty and that the focus of the assessment for the proposal is the effects of the consents being implemented to their fullest extent (Scenario C), a specific description of this scenario has not been undertaken.

Further information email from Applicant
 Further information from Applicant – 23 March 2022