

Before the Hearings Commissioners
at Christchurch

in the matter of: a submission on the proposed Hurunui and Waiau
River Regional Plan and Plan Change 3 to the Natural
Resources Regional Plan under the Resource
Management Act 1991

to: **Environment Canterbury**

submitter: **Meridian Energy Limited**

Statement of evidence of Sarah Dawson

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Statement of evidence of Sarah Dawson

1.0 INTRODUCTION

- 1.1 My name is Sarah Margaret Dawson. I hold the qualifications of Bachelor of Engineering (Chemical) with First Class Honours and Master of Science (Resource Management) with Distinction. I am a Full Member of the New Zealand Planning Institute, and a Member of the Resource Management Law Association of New Zealand, the International Association of Impact Assessment and the New Zealand Association of Impact Assessment. I was a recipient of the New Zealand Planning Institute's Distinguished Service Award in 1999. I am an accredited Hearings Commissioner.
- 1.2 I am a Director of Boffa Miskell Ltd, a New Zealand consultancy company specialising in planning, ecology, landscape architecture and design. I have held this position for 17 years. I am currently the company's Director of Planning. I have practised as a planner / resource manager since 1977, as both a consultant and a senior local authority planner. I have been a planning consultant based in Christchurch for most of those 35 years, providing consultancy services for a wide range of clients, mostly throughout the South Island, including local authorities, land and water resource users, and the infrastructure and electricity sectors.
- 1.3 One of my particular areas of expertise is the development of District and Regional Plans through all their phases and in the on-going variation and changing of Plans. I have written or, at least, substantially worked on the preparation of numerous District and Regional Plans, and Plan Changes in different parts of New Zealand. For many of these, I have been involved from the stage of early consultation and policy development to the resolution of appeals.
- 1.4 The other main area of my planning and resource management work is the preparation and auditing of assessments of environmental effects, and the processing of resource consents through the various statutory steps and requirements. I have been engaged by numerous clients to co-

ordinate and prepare assessments of environmental effects for a wide range of complex projects involving many inter-related technical assessments. A few relevant examples include assessments of environmental effects for Canterbury's Kate Valley regional landfill in Hurunui District, a new large hydro-electricity proposal - the North Bank Hydro Project - in South Canterbury / North Otago, Hunter Downs Irrigation Scheme in South Canterbury, and an increase in the discharge of freshwater from the Manapouri Power Station to Doubtful Sound in Fiordland.

- 1.5 In regard to this matter, I was initially engaged by Meridian Energy Limited (Meridian) when it was considering the Hurunui Waiau Draft Zone Implementation Plan in mid 2011. More recently, Meridian has asked me to advise in relation to the Proposed Hurunui and Waiau River Regional Plan (the Proposed Plan) and Proposed Change 3 to the Canterbury Natural Resources Regional Plan (the Proposed Plan Change).
- 1.6 I have been involved with reviewing the Proposed Plan and Plan Change, preparing Meridian's submissions and further submissions, assisting with reviewing the technical evidence being presented on behalf of Meridian, and preparing this planning evidence.
- 1.7 I have also undertaken the role of a reviewer in the preparation of the Assessment of Environmental Effects (AEE) and associated specialist technical reports for the resource consent applications lodged for the Amuri Hydro Project (AHP) and under preparation for the Balmoral Hydro Project (BHP), as described by Mr Eldred and Mr Page.
- 1.8 Although this is a Council hearing, in preparing my evidence I have reviewed the code of conduct for expert witnesses contained in part 5 of the consolidated Environment Court Practice Note 2011. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

2.0 SCOPE OF EVIDENCE

2.1 In my evidence I have been asked by Meridian Energy Limited (Meridian) to address (*the numbering refers to the following Sections of my evidence*):

4.0 The proposed Environmental Flow and Allocation Regime in the Proposed Plan, in particular:

- the new minimum flows and C Block allocations for the Waiau and Hurunui Rivers;
- the activity status of applications that comply;
- the B Block gap for the Waiau River; and
- the linking of different flow and allocation regimes to the provision of large-scale water storage.

5.0 Objective 6 and Policy 6.5 in relation to water storage infrastructure;

6.0 Priorities for water allocation, in particular in relation to:

- hydro-electricity generation;
- the Canterbury Water Management Strategy;
- spatial and temporal sharing of A and B Block water.

7.0 The changes Meridian has sought to Objectives 2 and 3 and the associated policies;

8.0 Staging of water infrastructure applications;

9.0 Consent durations;

10.0 Other specific matters, in particular;

- definition of non-consumptive uses and activities
- clarification of scope of damming prohibition in Policy 6.1;
- provision for short-term activities.

11.0 The scope of the Proposed Plan in relation to the Canterbury Natural Resources Regional Plan.

3.0 SUMMARY OF MY OPINIONS

3.1 As my evidence is lengthy, I have set out a summary of my opinions in Section 3.0 of my evidence, as follows.

Environmental Flow and Allocation Regimes

New Minimum Flows and C Block Allocations for Waiau and Hurunui Rivers

3.2 I have examined the proposed methods in Table 1 for minimum flows and C Block Allocations for the Waiau and Hurunui Rivers, in terms of their achievement of the objectives and policies of the Proposed Plan. I have examined, for the overall cohesion of the Plan, whether these proposed new rules or methods will achieve its objectives and policies (s68(1)(b)).

3.3 I have examined examples of modelled proposals for the Amuri Reaches of the Waiau and Hurunui Rivers. I have reviewed the requirements of Objectives 1, 2 and 3, and Policies 2.5, 2.6, 2.7, 3.5 and 3.6, in light of the evidence of the other witnesses on behalf of Meridian, relevant aspects of which I have summarised in my evidence.

3.4 Subject to other discussion in my evidence regarding the absolute emphasis in the wording of these objectives and policies, in my overall opinion, the practical, full implementation through consent processes of the new minimum flows and C Block allocations for the Amuri Reaches of the Waiau and Hurunui Rivers could achieve these relevant objectives and policies. The various geomorphological, ecological, cultural, recreational and social values, would not be significantly affected and mitigation measures can be practically implemented through consent processes, as necessary. In addition, water can be allocated to achieve further local, regional and national economic benefits, whilst protecting the reliability of supply for human and stock drinking water and other existing abstractors.

Higher Level Statutory Instruments

3.5 I have also examined the relevant higher level statutory instruments which the Proposed Plan must give effect to, specifically the Canterbury Regional Policy Statement 2011 – Decisions Version – July 2012 (CRPS)

and the National Policy Statement for Freshwater Management 2011 (NPS-FW).

- 3.6 In relation to the CRPS, I consider that the minimum flow and C Block allocation aspects of the Proposed Plan would give effect to the relevant objectives and policies for the Amuri Reaches of the Waiau and Hurunui Rivers. In relation to the NPS-FW, I have found no relevant objectives and policies which are more specific than those in the CRPS or in the Proposed Plan itself. In my opinion, the Proposed Plan gives particular effect to Policies B1 and B2 of the NPS-FW by establishing freshwater objectives, setting environmental flows for these two rivers, and providing for efficient allocation of freshwater to activities.

Activity Status for Applications that Comply with the Environmental Flow and Allocation Regimes

- 3.7 Within the limitations of the proposed environmental flow and allocation regime, and within the direction provided by the objectives, policies and rules, I consider that the appropriateness of a substantial water take, use and discharge could be comprehensively assessed through the activity status and policy guidance provided in the Proposed Plan. To do otherwise, and make an allocation from the C Block a non-complying activity, for example, would seem to me to contradict the whole approach taken through the Proposed Plan – which is to determine bounds in terms of environmental flows and allocations, within which the effects of any particular proposal can be considered (and considered cumulatively with the effects of other existing allocations) in terms of the proposed objectives and policies.

2 m³/s B Block Gap for Waiau River

- 3.8 Meridian has opposed the requirements in Table 1 of the Proposed Plan for a 'gap' between allocation blocks, as it relates to the Waiau River - the proposed 2 m³/s 'gap' between the A and B Block Allocations. I have endeavoured to ascertain any environmental effect-related purpose or objective and policy support in the Proposed Plan for the proposed 'gap'.
- 3.9 I have concluded that there is policy support for the 18 m³/s size of the A Allocation Block in the Waiau River in the specific requirement contained

in Policy 3.1 to reduce the block to this size. However, I can find no objective or policy direction in the Proposed Plan for the 2 m³/s gap between this A Allocation Block and the minimum flow for the B Allocation Block. Accordingly, I consider the appropriate implementation of the Proposed Plan's objectives and policies is to remove this gap and reduce the Waiau River B Block Minimum Flow rule to 38 m³/s.

Different Flow and Allocation Regimes Linked to Provision of Large-Scale Water Storage

- 3.10 A significant aspect of the Proposed Plan is the link made between the provision of large-scale water storage (20 million m³ in each of the Waiau and Hurunui catchments) and the environmental flow and allocation regimes in each catchment. In particular, this affects the A Block Minimum Flows and the availability of C Block Allocations, and for the Hurunui River, this also extends to the B Block Gap Size and a slight difference in the B Block Minimum Flow. It is important that the Plan "gets this right", as Rule 5.2 makes applications that do not comply with the Environmental Flow and Allocation Regimes in Table 1 prohibited activities. If large-scale water storage cannot be commercially provided as part of a proposal, beneficial projects may be prevented from being considered at all through a resource consent process.
- 3.11 In my evidence, I conclude that:
- (a) The C Block allocation can be made in a manner that achieves Objective 3 and Policy 3.5, including Objective 3(f) and Policy 3.5(f) relating to reliability for existing abstractors, without large-scale storage being provided as part of that allocation.
 - (b) A new take based on the proposed new minimum flows can achieve Objective 2 and Policies 2.5, 2.6 and 2.7, without large-scale storage being provided as part of that take.
 - (c) New amended minimum river flows can be introduced through new take consents whilst protecting the factors in Objective 2, without requiring large-scale water storage to be provided.
- 3.12 Accordingly, apart from the reference to the Table 1 Method in Policies 2.8 and 2.9 (and the Rule requirement through Table 1 itself), I can find

no objective or policy which requires the provision of large-scale water storage to ensure their achievement. In my opinion, this reflects the lack of cause and effect relationships. The resource management issue identified in the Proposed Plan is insufficient reliability of supply for existing abstractors at the proposed new minimum river flows, or for some new B Block irrigation users. However, in my opinion, this issue is not caused by the allocation of C Block takes, nor by new A or B Block takes, provided these are managed appropriately through conditions. I conclude from this that the Proposed Plan has not chosen the appropriate method to address this resource management issue.

- 3.13 I have also considered the effectiveness and efficiency of using this “incentive for storage” method to address the reliability issue identified in the Proposed Plan. These factors indicate to me that this is not an effective or efficient method to restore or provide reliability for irrigation abstractors when implementing new minimum flow requirements. It is also likely to prevent the consideration of potentially beneficial hydro-electricity proposals on these rivers, and prevent the associated benefits of improved reliability of supply for other abstractors being achieved.
- 3.14 I consider that a more effective and efficient method to address this resource management issue of insufficient reliability of supply should be more closely related to the causes and effects for this issue. I have outlined what more efficient and effective means could involve. This includes an alternative method suggested by Meridian’s submission, although Meridian is not committed to this method and there may be other methods of effectively and efficiently addressing this issue of reliability of supply for existing abstractors.
- 3.15 Meridian seeks various amendments to the Proposed Plan to reflect its submission that neither the proposed change to the minimum flows for the Waiau and Hurunui Rivers nor the allocations of C Block water should be linked to a requirement to develop large-scale water storage. Based on my consideration of how these provisions in the Proposed Plan would achieve its objectives and policies, and of the effectiveness and efficiency of those provisions, I support the amendments sought by Meridian.

Water Storage Infrastructure

- 3.16 From Issue 5 in the Proposed Plan and my interpretation of Objective 6, I can understand the importance of ensuring that the development of the water resources of these catchments, and the associated infrastructure, is considered in a comprehensive manner, which ensures the most efficient integration of water use options across these catchments. I can understand how, to address this Issue and achieve Objective 6, a proposal to use significant quantities of water needs to demonstrate that it does not unreasonably prevent other options for water use or storage which could provide for economically viable irrigation in a way that increases economic and social benefits for North Canterbury. However, I consider that the wording of Policy 6.5 appears to go further than is required to achieve Objective 6 and address this Issue
- 3.17 As I have summarised above, I do not consider it is an effective or efficient method, nor necessary to achieve Objectives 2 and 3 and their relevant policies, to require all water takes to “*provide for the storage of water*” for irrigation, when such storage is not required for that particular water use proposal, such as for hydro-electricity generation. Similarly, I do not consider it is necessary to achieve Objective 6. In addition, the full 20 million m³ is not required for the Waiau catchment for current economically viable irrigation areas and is not best provided in just one location.
- 3.18 Provided water takes can demonstrate that they will fit within a zone wide approach to infrastructure development, which would not preclude storage being provided in appropriate locations, and would not preclude economically viable irrigation opportunities, then in my opinion, Objective 6 would be achieved.
- 3.19 Consistent with this, I support that various amendments sought by Meridian to the Proposed Plan to clarify Objective 6, to ensure greater consistency between Policy 6.5 and Objective 6, and to avoid inefficient requirements in Policy 6.5 which are not necessary to implement Objective 6. These amendments are set out in Attachment 1 to my evidence.

Priorities for Water Allocation

National and Regional Benefits of Hydro-Electricity Generation

- 3.20 In my opinion, the Proposed Plan does not adequately discuss, or explicitly provide for, issues or objectives relating to renewable electricity generation, both as a significant issue for New Zealand as a whole, and for the north of the South Island. I consider the Proposed Plan falls short in giving effect to the relevant provisions of the CRPS or achieving the purpose of the RMA in terms of enabling people and communities to achieve their economic and social wellbeing from renewable electricity generation from the resources of the Waiau and Hurunui Rivers, particularly as reflected in the provisions of section 7.
- 3.21 I consider the Proposed Plan does not reflect the potential for the water resources of the Waiau and Hurunui Rivers to provide an important contribution to renewable electricity generation for the upper South Island. From my reading of the Proposed Plan, it only recognises the hydro-electricity generation potential from these rivers in terms of its possible support for more water for irrigation. It does not recognise and provide for hydro-electricity generation as a separate beneficial use of the water in these rivers that would give effect to these statutory requirements. Given Meridian's evidence regarding the importance of hydro-electricity in NZ, the benefits of additional generation for upper South Island, and the potential generation from medium-scale hydro-electricity developments on either or both of these river, then I consider that the Proposed Plan fails to give effect to these statutory provisions.

Priorities from the Canterbury Water Management Strategy

- 3.22 Meridian's submission generally supports the setting of priorities within the Proposed Plan in a manner that is consistent with the order of priorities from the CWMS. However, in my opinion, the preparation of the Proposed Plan does not appear to have had particular regard to these priorities. In particular, the CWMS give no higher priority for irrigation over hydro-electricity; nor for the use of water for recreation over other uses such as irrigation and hydro-electricity generation. I consider that the Proposed Plan is inconsistent with the CWMS in the manner that it

reflects those priorities. In addition, the approach of the Proposed Plan to priorities for new consents under this Proposed Plan is not clear to me.

- 3.23 In order to clarify the situation with respect to priorities within the Proposed Plan, Meridian seeks several amendments. I support those amendments as providing greater consistency with the CWMS and with the direction given through the ECAN Act. The amendments sought by Meridian are set out in Attachment 1 to my evidence.

Spatial and Temporal Sharing of A and B Block Water

- 3.24 Meridian's submission supports the concept contained in the Proposed Plan of spatial and temporal sharing of water allocated from the A and B Blocks – for example, the secondary allocation of water from those blocks for hydro-electricity generation use, when and where it is not being used for its first allocation for irrigation.
- 3.25 To achieve this, I consider the Plan needs to be clear in its Rules that the calculation of total water allocation (for example, in terms of the total Allocation Blocks in Table 1) needs to be undertaken as at any particular point in time, or at any particular point in the river, so as to avoid double counting. This would ensure that conditions on consents granted under these circumstances would reflect this approach to sharing allocated water. I consider that some minor amendments are required to the wording of the Proposed Plan to achieve this with certainty.
- 3.26 Meridian considers that the ability for the C Allocation Block to be used for renewable electricity generation also needs to be specifically recognised under Objective 9 relating to Priorities (provided it is consistent with Policy 9.4). I support the inclusion of the additional policy sought, in order to give effect to higher order national and regional statutory requirements and to assist in delivering on the priorities for water allocation and use in the Canterbury Water Management Strategy.
- 3.27 I understand that there may be an alternative view that water allocated to one user cannot then also be allocated to another user to take when it is not being taken for its first allocation. My experience is that a water permit gives the holder the right to take the water allocated through that permit. However, if the holder chooses not to take its allocated water at

any particular time, the permit does not give that holder the right to prevent that water being taken by second permit holder, either at the same take point or downstream. Provided that the consent conditions on the water permit held by the second permit holder are clear that water cannot be taken when it is being taken by the first permit holder, then in my opinion, the water is not being allocated twice, and importantly it does not derogate from the rights of the first permit holder.

Changes to Objectives and Policies

- 3.28 Meridian has lodged submissions to several objectives and policies (or parts of objectives and policies), which are aimed at moderating the absolute nature of the wording contained in the proposed objectives and policies.
- 3.29 From my review of the Proposed Plan, I consider that some of the objective and policy provisions are expressed in a manner that is too absolute and inflexible. In my experience, there is no magic answer to the drafting challenges involved. Each provision needs to be considered individually and carefully, in light of a clear, overall understanding of what the Plan is intended to achieve.
- 3.30 I have an understanding of the effects of water allocation and environmental flow regimes from my work on numerous rivers and water use projects. I am also familiar with the assessments of environmental effects for the proposed allocations of water to AHP and BHP (as described in the evidence presented on behalf of Meridian). From this understanding, I consider it is not possible to achieve the social and economic benefits from substantial water allocations to out of river uses, whilst also avoiding all adverse effects on instream values. I also understand that neither is this required by the provisions of the RMA, with its requirement to “avoid, remedy or mitigate adverse effects”. However, what I consider can be achieved is the avoidance of “significant adverse effects”. I support the amendments sought by Meridian to Objectives 2 and 3 which are more achievable and which would enable the allocation of water to the CWMS priority uses, whilst avoiding “significant adverse effects” on the first priority matters listed and providing support for the second priority matters.

- 3.31 Similarly, I support the wording changes sought by Meridian to Policies 2.5, 2.6, 2.7, 3.5 and 3.6.

Staging Water Infrastructure Applications

- 3.32 Policy 6.9 requires all new applications for water permits to concurrently apply for any discharge or land use consents required from either the Regional Council or Hurunui District Council, in order to enable consideration of the full range of effects of the proposed development. In my experience, proposed Policy 6.9 could also act to prevent the appropriate and efficient staging of consent applications.
- 3.33 From my past experiences with staging of consent applications for substantial projects (for example, Meridian's North Bank Hydro Project and Hunter Downs Irrigation), where the effects of the water consents are sufficiently discrete from the effects of the land use and construction, it can be efficient, fair and acceptable to the local community to stage the consent applications. It can also result in an unnecessary burden on all parties to consider all aspects at once. Whether or not the effects of the water consents are sufficiently discrete from the effects of the land use and construction, is a matter to be considered by the Council under Section 91 (as was the case with the projects I have referred to above). In order to allow these decisions to be made unfettered, and staging of consent processes to be allowed where appropriate, I support the deletion of Policy 6.9 as sought in Meridian's submission.

Consent Durations

- 3.34 I support Meridian's submission which supports the appropriateness of a 35 year duration for consents for hydro-electricity generation and large scale water storage infrastructure (with high capital costs of more than \$10 million) - as expressed in Policy 9.2. These developments involve a high level of investment with associated financial risks, have a long working life, and need the security and certainty of a long-term consent to make that investment financially worthwhile. The regional and possibly national significance of this infrastructure makes it appropriate for the Plan to signal its recognition of, and support for, investment in long-life

hydro-electricity generation and large scale water storage infrastructure, in this manner.

Scope of the Plan and the NRRP

3.35 From my review of the Proposed Plan and Proposed Plan Change, I consider that there is some lack of clarity regarding the scope of both documents and of their inter-relationship. It is important for clear interpretation of the inter-relationship between these two documents, that there is consistency between the wording of their “Scopes”. This particularly relates to:

- Discharges for non-consumptive uses;
- The “use of land”; and
- Discharges of nitrate-nitrogen or phosphate.

Other Specific Matters

3.36 I also address some other specific matters contained in Meridian’s submission and further submissions relating to:

- Definition of non-consumptive uses and activities
- The scope of the “damming” prohibition in Policy 6.1; and
- Provision for short-term activities.

4.0 ENVIRONMENTAL FLOW AND ALLOCATION REGIMES

New Minimum Flows and C Block Allocations for Waiau and Hurunui Rivers

4.1 The Submission from Meridian generally supports the Environmental Flow and Allocation Regimes in Table 1 of the Proposed Plan for the Waiau and Hurunui Rivers. I will discuss the specific aspects Meridian does not support later in my evidence.

4.2 In particular, Meridian supports the new minimum flows and the proposed establishment of the C Block Allocations for both rivers. However,

Meridian seeks an amended approach in relation to the new minimum flows and these allocations, without the mandatory provision of storage to gain access to the C block or make use of the new minimum flows.

- 4.3 I note the evaluation undertaken by the Council in its Section 32 Report regarding the efficiency and appropriateness of the minimum flow regime proposed to be applied. This refers (page 36) to the extensive debate I understand was undertaken regarding the minimum flows, through technical reporting, consultation processes, including the Hurunui and Waiau Community Advisory Group processes numerous Zone Committee and sub-committee meetings, and a number of Council workshops. On page 38, the Section 32 evaluation concludes that the information available is sufficient to provide a sound basis for the decisions on proposed minimum flows.
- 4.4 I also note the statement in the Section 32 evaluation (page 38) regarding the lack of specific knowledge, or varying degrees of knowledge, regarding the ecological values in many parts of the Hurunui and Waiau catchments, particularly in relation to the C Block minimum flow on the mainstem of the Hurunui and Waiau Rivers. I support the conclusion of the Section 32 evaluation on this matter, which states that it can be managed through the Plan provisions which identify the factors that must be managed for in these catchments – i.e. through the relevant objectives and policies and the full discretionary activity status for allocation applications from the C Block. I will return to this matter later in my evidence.

Objectives and Policies of the Proposed Plan

- 4.5 I have examined these proposed methods in Table 1, in terms of their achievement of the objectives and policies of the Proposed Plan. I understand that, for the overall cohesion of a Plan, it is important to consider whether any proposed new rules or methods will achieve the objectives and policies (s68(1)(b)).
- 4.6 In terms of Objectives and Policies which provide the basis for the new minimum flows and the C Block Allocations, in my opinion, Objective 2 and Policies 2.5, 2.6 and 2.7 are relevant in relation to the management

of effects relating to river flows, and Objective 3 and Policies 3.5 and 3.6 are relevant to the management of effects relating to the water allocation (and discharges from non-consumptive activities). Objective 1 is also relevant in terms of ensuring that the people and communities of North Canterbury have ready access to reliable supplies of human and stock drinking water.

4.7 In practice, there are many overlaps between the matters covered by these objectives and policies, and also between the effects from the implementation of minimum environmental flows and water allocations. These objectives and policies require consideration of an extensive range of potential effects from the implementation of these Table 1 methods. For example:

- (a) Objective 2 seeks to ensure that the minimum flow requirements do not result in adverse impacts on a long list of river qualities – mauri, instream aquatic life, fish passage, landscape and amenity values, riverbed nesting birds, river mouth functioning, periphyton and cyanobacterial growth, and recreation.
- (b) Policies 2.5 and 2.7 require flows that will effectively flush periphyton, mobilise gravel and reset algae and macroinvertebrate populations, and provide for recreational activities.
- (c) Policy 2.6 requires consideration of adverse effects on the mauri of these rivers.
- (d) Objective 3 seeks to enable water allocation for economic development, whilst ensuring a long list of outcomes relating to mauri, water quality, flow variability to flush periphyton, mobilise riverbed gravel and reset the riverbed, water temperature for salmonid species, fish passage, jet boat navigation and reliability for existing abstractors.
- (e) In relation to any allocation from a C Block, Policy 3.5 requires a similar list of river qualities to be considered – water quality, flow variability, water temperature for salmonid species, natural braided character, invertebrate food production, fish passage, navigation by jet boat, recreational opportunities and experiences, and reliability for existing abstractors.

(f) For discharges from non-consumptive uses, Policy 3.6 requires downstream effects to be considered relating to macro-invertebrate populations, fish habitat and passage, health and safety of people using the river, vegetation encroachment on to bare riverbed, and water quality.

4.8 I acknowledge that it can be difficult to clearly understand the in-river environmental, social, cultural and recreational effects from the implementation of an environmental flow and allocation regime specified in a Plan. This is particularly the case because any specific allocation of water within that flow regime will require resource consent approval, which may or may not be granted, and which is likely to be subject to flow and allocation-related conditions. In addition, any allocation may be taken and used in many different ways, including consumptively or non-consumptively; and may affect different reaches of a river. Understanding the effects of any particular proposal requires proposal-specific hydrological modelling in terms of the long-term natural flow regime in the relevant reach(es) of the river, combined with the cumulative effects of other consented abstractions. It is the cumulative effects of all likely consented takes (with their likely conditions of consent) that represent the likely effects of the implementation of a flow and allocation regime in a Plan and, therefore, whether these methods are likely to achieve the relevant objectives and policies (given the effects-oriented nature of these provisions).

Waiau River - Amuri Reach

4.9 In the case of the Waiau River, Meridian and Ngai Tahu Property Limited (NTPL) have lodged resource consent applications, with accompanying assessments of environmental effects, for the Amuri Hydro Project (AHP) to take, use and discharge of water (for hydro-electricity generation purposes) in the Amuri Reach of this river. In my opinion, the assessments of the potential effects of this proposal (and presented in evidence to this hearing by the relevant experts) can be used as a good example, which can inform an understanding of likely outcomes from the implementation of the proposed minimum flow and allocation regime in this reach of the river. I will explain why I consider this to be the case.

- 4.10 As described in the evidence of Mr Woods, four hydrological scenarios have been modelled to provide the basis for assessing the potential environmental effects of AHP. These are the Natural Flow, the Status Quo, Full Irrigation Development and the Modelled Proposed. This last scenario includes full irrigation development of all available A and B Block water, with the additional abstraction of up to 50 m³/s of water for hydro generation purposes in the Amuri Reach, taken from the 'C' Block and from the 'A' & 'B' Blocks when these are not required for irrigation. I will refer to this as the "modelled proposal" for the Amuri Reach of the Waiau River.
- 4.11 The modelled proposal takes, uses and discharges, all available water from the A, B and C Blocks in the Amuri Reach. This is on the basis that it would comply with the environmental flow and allocation regime proposed by the Plan for that reach (post provision of water storage), in combination with all existing takes from the river and any future irrigation takes (other than with the proposed 2 m³/s B Block gap which I will discuss later in my evidence).
- 4.12 The modelled proposal takes, uses (for hydro generation) and discharges any available A and B Block water not being used, at any time and in that reach, for community water supplies or irrigation (existing and future irrigation), as well as all available C Block water, up to the capacity of this modelled hydroelectricity scheme (50 m³/s). It has been modelled as having priority for access to A and B Block water that is behind, not only the existing consented abstractions, but also any new abstractions, for irrigation water from those Blocks in that reach. As such it makes use of the temporal and spatial sharing approach signalled in Policy 9.5.
- 4.13 Subject to resolution regarding the proposed 2 m³/s B Block gap and the link between the C Block and storage, the modelled proposal would be considered as a discretionary activity, if the proposed Environmental Flow and Allocation Regime in the Plan becomes operative. The modelling undertaken, which formed the basis of the various assessments of environmental effects, was based on the proposed post-storage Environmental Flow and Allocation Regime (other than the 2 m³/s B Block gap). This modelling also included all existing community water supply

and irrigation abstractions, and likely future irrigation abstractions in that reach within the full A and B Blocks.

- 4.14 The modelled proposal would make substantial use of the water available under the flow and allocation regime in the Proposed Plan, whilst complying with that regime. The modelling and assessments of effects assume full allocation of A and B Block water for community water supply and existing and likely future irrigation and, therefore, consider cumulative effects with those other likely abstractions under the Proposed Plan. As Mr Woods states in his evidence, he considers the take of water for the modelled proposal represents an economic upper limit for hydropower development in this reach of the Waiau River under the Proposed Plan.
- 4.15 Accordingly, I consider that the cumulative effects of the modelled proposal are representative of the effects of implementing the Proposed Plan to a practical full degree in this reach of the river. In my opinion, the evidence given by the specialist experts regarding the cumulative effects of the modelled proposal can assist in informing the effects of and, therefore, the appropriateness of the implementation of the proposed environmental flow and allocation for the Amuri Reach of the Waiau River (the allocation of water from the A, B and C Blocks in terms of the minimum flow requirements). In addition, the evidence regarding the incremental effects of the hydro-electricity component of the modelled proposal (over and above the irrigation and community water supply components) can assist in informing the effects of a full practical implementation of a C Block allocation in this reach.
- 4.16 I acknowledge that there could well be different proposals to take and use the water available under the Proposed Plan that could have different effects. For example, a hydro-electricity generation proposal with a larger capacity than the 50 m³/s proposed for the AHP would have somewhat different effects. Consumptive uses would not return the water to the river, so the effects would extend downstream. Other abstractions may occur in different reaches of the river and, therefore, result in different effects. However, in my opinion, this type of differentiation would be considered at the time of assessing the resource consent for the particular proposal.

- 4.17 Each application, if granted, would need to have individual consent conditions applied to address its specific effects (within the overall ambit of the flow and allocation regime). The AEE for the AHP application, for example, proposes conditions which would require that project to shut down at river flows of 210 m³/s or more, and mitigation conditions to limit periphyton accrual during sustained periods of lower flows in the Waiau River. This is the sort of detail that can be addressed through the discretionary activity resource consent process (I will also return to this matter later in my evidence).
- 4.18 I provide here a brief summary (drawn from the evidence of the other witnesses) of the likely environmental effects of the modelled proposal. I include examples (from this evidence) of the way that effects can be addressed through mitigation measures, such as those proposed for the AHP conditions of consent:
- (a) The discharge rate from the modelled proposal is designed to approximate the rate of take, so there would be little, if any, effect on flows in the river downstream of the proposed discharge. This limits the effects to the 29 km reach between the proposed intake and discharge points. This avoids downstream effects on the river's geomorphology, in-stream aquatic, landscape and recreation values, or river mouth. Downstream effects from implementing the Proposed Plan will be from other existing and proposed consumptive uses.
 - (b) Flood events that rearrange fairway landforms of braid channels, bars and islands would not be affected by the modelled proposal and, therefore, there would be no effects on braided river landforms and character.¹
 - (c) The reduction in flow through the reach is unlikely to have any detectable effect on the river's ability to transport suspended sediment. The transport of water through a canal and storage reservoir would also have no detectable effect on suspended sediment transport processes in the river. This would avoid adverse

¹ Evidence of Mr Woods and Dr Mabin

effects from transport and deposition of fine sediment in this reach and associated effects on instream habitat and aquatic life.²

- (d) The reduced river flow in the reach will have some effect on flows that flush fine sediment from the bed and scour out periphyton. This can be mitigated by providing for some freshes of about 100 m³/s or more to pass unimpeded down the Amuri Reach, as required in relation to periphyton accrual. Any effects on the bedload sediment transporting regime of the river in the reach would be minor. Effects would occur only in the smaller fine sediment transporting floods and the main bedload sediment transporting flood events (>1,000 m³/s) would not be affected.³
- (e) Weed invasion of bare riverbed gravels is likely to be exacerbated resulting in a loss of suitable habitat for native plants and riverbed nesting birds. However, this could readily be mitigated using established weed management techniques, if necessary, or by allowing some freshes to pass down the Reach for a time.⁴
- (f) Chemical water quality (including dissolved oxygen) would continue to fall well within the tolerance ranges of fish under the modelled proposal.⁵ Water quality will remain suitable for contact recreation.
- (g) Water temperatures would increase through the braided Amuri Reach by about 1 °C at most. Resulting water temperatures would continue to be below lethal temperatures for fish, but high enough to cause infrequent behavioural effects on trout and salmon, including reduced feeding and growth of trout and disruption of migration by salmon. These conditions will occur only on hot sunny days at low flow, which occurs occasionally under the existing flow regime.⁶
- (h) The modelled proposal could lead to an increase in the frequency and magnitude of nuisance periphyton proliferations compared with present conditions. Conditions along the Amuri Reach would be more favourable for long filamentous algae as result of more suitable

² Evidence of Dr Mabin

³ Evidence of Dr Mabin

⁴ Evidence of Dr Sanders

⁵ Evidence of Dr Hayes

⁶ Evidence of Dr Hayes

habitat being present in the river for longer periods of time. The abundance of periphyton would still be controlled by flow variability through naturally occurring floods and freshes. The frequency of flows in excess of 210 m³/s, that are effective at moving a large proportion of the bed of the Waiau River, and which would scour most algae from the river, would be unchanged. In addition, mitigation measures can readily be included to provide smaller freshes as required to help scour algal proliferations from the bed of the river.⁷

- (i) The modelled proposal would reduce benthic invertebrate habitat compared with the existing situation. This is not anticipated to have more than a minor effect on populations of macroinvertebrates, particularly the mayfly, *Deleatidium*, in the Waiau River. This is because the frequent flood disturbance in the river naturally suppresses invertebrate populations⁸. The predicted invertebrate habitat losses may further reduce food resources for fish and this may reduce growth and abundance of trout and juvenile salmon that rely on drift feeding, but probably not of benthic feeding native fish.⁹ However, modelling predictions of effects on fish abundance have a very high level of uncertainty, and fish populations are low in any case.¹⁰
- (j) The flow regime changes with the modelled proposal would result in similar overall levels of fish habitat compared with the existing situation, with decreased instream habitat for some fish species and life stages, and increased habitat for others. Loss of habitat availability would be greatest for torrentfish and habitat gain greatest for large longfin eels and juvenile salmon > 55 mm. The river would retain high levels of adult trout habitat and similar levels of juvenile trout habitat compared with the existing situation. Cumulatively, the effects of the modelled proposal on fish would be modest and not substantially different from existing effects at low flows. Where habitat losses are predicted for native fish and salmonids, these would not threaten the viability of the species and probably would not result in

⁷ Evidence of Dr Olsen

⁸ Evidence of Dr Olsen

⁹ Evidence of Mr Jowett and Dr Hayes

¹⁰ Evidence of Dr Hayes

population decline, because fish densities are currently low (i.e., habitat is unlikely to be limiting the total population).¹¹

- (k) The Plan's proposed minimum flow of 20 m³/s should allow fish passage, including salmon passage, in this reach. The natural frequency of floods > 210 m³/s will be retained, so salmon would continue to benefit from freshes that stimulate, and facilitate, upstream migration.¹²
- (l) The risk of floods destroying nests or drowning chicks of riverbed nesting birds is unlikely to be affected. The availability of habitat for aquatic macroinvertebrates, which provide a food source for many riverbed nesting birds, could be reduced compared with existing irrigation effects in the bird breeding season. However, this reduction is unlikely to adversely affect the ability of birds to obtain food. The loss of some braids in this reach during the bird breeding season, as a result of the modelled proposal, could make it easier for mammalian predators to reach and prey upon eggs, chicks and adults at nests on islands. The proportion of birds affected and the increase in risk would probably be small.¹³
- (m) The nationally important recreation values of the rest of the Waiau River beyond this reach would not be affected. At the regional level, there would be little net effect on tourism and recreation values. The lower flows present for longer periods in this reach would reduce the amenity of the river, particularly for local users such as jet boaters and swimmers. There would be some loss of amenity associated with salmon and trout fishing to local anglers.¹⁴
- (n) It appears that flows of at least 23m³/s are necessary to provide for jet boat passage along the Amuri Reach, although at least 30 m³/s is required for safe family boating. Jet boaters would need to be more aware of flows in this reach and, if they have little boating experience, opt to use the reach only when flows are likely to remain high. Those with deep draught vessels would find the reach less appealing as a

¹¹ Evidence of Mr Jowett and Dr Hayes

¹² Evidence of Mr Jowett and Dr Hayes

¹³ Evidence of Dr Sanders

¹⁴ Evidence of Mr Greenaway

destination and would be more frequently confined to the River below the outfall. Mitigation to enable higher flows during jet boat events can be provided.¹⁵

- (o) The modelled proposal would substantially reduce salmon angling lies (i.e. deep main braid pools) in the Amuri Reach, but this alone is unlikely to significantly adversely affect salmon angling opportunities because lies are probably underutilised over most of the reach. The truncation of flow recessions under the modelled proposal has greater potential to adversely affect salmon fishing opportunities, but this can be easily mitigated by managing flows into any intake immediately following floods.¹⁶
- (p) In natural character, landscape and visual terms, the alteration in flows due to the modelled proposal are not expected to be sufficient to change the overall appearance or character of the river. In this regard, the flow variations will maintain the braided appearance and character of the Waiau River.¹⁷
- (q) The modelled proposal would ensure that existing and other likely irrigation, domestic and community water supply users would obtain water from this reach prior to water being allocated for the hydro-electricity use. The availability and reliability of these other abstractions would not be affected. In addition, existing abstractive infrastructure is very likely to be setup to take water at or below the minimum flows in the Proposed Plan. However possible mitigation options are readily available, in the unlikely event that takes for existing abstractive users would be impacted on.¹⁸
- (r) A cultural impact assessment was prepared in relation to the Amuri Hydro Project on behalf of Ngāti Kurī (Te Rūnanga o Kaikōura). The key impacts on cultural values have been identified. The assessment includes preliminary recommendations for mitigating the cultural impacts of the water take and discharge in terms of the new minimum flows and C Block Allocation provided for by the Proposed Plan.

¹⁵ Evidence of Mr Jowett and Mr Greenaway

¹⁶ Evidence of Mr Jowett and Dr Hayes

¹⁷ Evidence of Ms Pfluger

¹⁸ Evidence of Mr Mthamo

Hurunui River - Amuri Reach

- 4.19 In the case of the Hurunui River, Meridian and NTPL have also lodged resource consent applications, with accompanying assessments of environmental effects, for the Balmoral Hydro Project (BHP) to take, use and discharge of water (for hydro-electricity generation purposes) in the Amuri Reach of this river.
- 4.20 As described by Mr Woods, several hydrological scenarios have also been modelled for the Amuri Reach of the Hurunui River to provide the basis for the assessment of the potential environmental effects of BHP. The flow regime modelling undertaken utilises flow rules that are very close to the environmental flow and allocation regime in the Proposed Plan for the Hurunui River. It also takes into account the effect of existing abstractors and the proposed Hurunui Water Project (HWP) takes on the river regime.
- 4.21 The modelling, therefore, accounts for all known abstractions and likely future irrigation abstraction, as well as the 15 m³/s take, use and discharge for hydro-electricity generation by the BHP. Any available water from the 'A', 'B' or 'C' Blocks, which is not taken for irrigation, is assumed available to be taken for hydro-electricity generation. I refer to this as the "modelled proposal" for the Amuri Reach of the Hurunui River. As for the Waiau River, this modelled proposal would, in conjunction with the proposed HWP irrigation takes, represent a full practical implementation of the environmental flow and allocation regime for the Amuri Reach of the Hurunui River in the Proposed Plan.
- 4.22 I provide here a brief summary (drawn from the evidence of the other witnesses) of the likely environmental effects of the modelled proposal on the Amuri Reach of the Hurunui River: I note that in this context the BHP is proposed to not take water for at least 48 hours when flows at Mandamus exceed 130 m³/s.
- (a) The frequency of floods and flushing flows would not be altered significantly by the incremental effects of the proposed BHP. While it would have the potential to slightly depower the river in its bed load sediment transporting flow bands, the river in its present condition is

undersupplied with bed load material and the small reductions in sediment transporting floods would not detectably affect the river. It would be able to continue to carry its normal bed and suspended sediment loads. Therefore, the Proposed Plan's allocation regime can be implemented in a manner that would have no adverse effect on the Hurunui River's ability to transport and deposit sediment in the Amuri Reach, nor its ability to form and maintain its braided river fairway.¹⁹

- (b) As the frequency or duration of channel maintenance flows and flushing flows would not be altered significantly, there will be no significant change to state of the river with regard to channel morphology and the accumulation of silt and periphyton.²⁰
- (c) The minimum flow provisions in the Proposed Plan provide a high level of protection for fish and benthic invertebrate communities and any change in habitat is unlikely to have any significant effect on fish populations.²¹
- (d) Although the effects of irrigation and/or hydro takes would reduce flows when they are above the minimum flows, the changes in the length of time between flushing events would not be sufficient to result in significant changes to invertebrate production. Fish populations are controlled by annual minima rather than occasional short duration flow reductions, and the duration of events would be too short for either fish populations or total food production to be affected²².
- (e) The predicted small decreases and increases in availability of instream habitat of the aquatic prey of river birds are much too small to affect – adversely or beneficially – the ability of birds to obtain food.²³
- (f) The modelled proposal would have negligible effects – adverse or beneficial – on the risk of floods destroying nests or drowning chicks

¹⁹ Evidence of Dr Mabin

²⁰ Evidence of Mr Jowett

²¹ Evidence of Mr Jowett

²² Evidence of Mr Jowett

²³ Evidence of Dr Sanders

of riverbed nesting birds, because floods would be only slightly reduced in size by the hydro take, or hydro and irrigation combined.²⁴

- (g) The taking of additional water for irrigation and/or hydro is likely to exacerbate weed invasion by reducing disturbance along channel margin. This would result in a loss of suitable habitat for native plants and riverbed birds, unless weed control efforts are increased.²⁵
- (h) A reduction in number of flowing braids could make it easier for mammalian predators to reach and prey upon eggs, chicks and adult birds at nests. The proportion of birds affected and the increase in risk would be small.²⁶
- (i) The minimum flow of 12-15 m³/s in the Proposed Plan should not affect the passage of salmon and migratory native fish species, but jet boating in the vicinity of SH7 might be marginal at a flow of 12 m³/s.²⁷
- (j) A cultural impact assessment has also been prepared in relation to the BHP. The key impacts on cultural values have been identified. This assessment includes recommendations for mitigating the cultural impacts of the water take and discharge which recognise the new minimum flows and C Block Allocation provided for by the Proposed Plan.

Waiau and Hurunui Rivers – Amuri Reaches

- 4.23 In terms of the economic and related social effects of implementing the proposed regimes in the Amuri Reaches of the Waiau and Hurunui Rivers, the Council's Section 32 evaluation refers to the level of certainty around the potential economic and social benefits that can be gained from the availability and use of those Allocation Blocks for out-of-stream use (in particular for irrigation and hydro-electricity generation use)²⁸. In relation to the use of this water for hydro-electricity generation, through proposals such as AHP and BHP, Mr Eldred has given evidence regarding their electricity generation potential. He refers to them as quality proposals,

²⁴ Evidence of Dr Sanders

²⁵ Evidence of Dr Sanders

²⁶ Evidence of Dr Sanders

²⁷ Evidence of Mr Jowett

²⁸ For example on pages 44-45

the opportunities for which are comparatively limited. He states that generation from these rivers, north of Christchurch, is likely to have a beneficial effect on wholesale spot prices for electricity throughout the upper South Island. He also refers to the potential to integrate hydro-electricity and irrigation development through these projects.

- 4.24 I have reviewed the requirements of Objectives 1, 2 and 3, and Policies 2.5, 2.6, 2.7, 3.5 and 3.6, in light of the evidence I have summarised above. Subject to the comments in my evidence to follow regarding the absolute emphasis in the wording of these objectives and policies, in my overall opinion, the practical, full implementation through consent processes of the new minimum flows and C Block allocations for the Amuri Reaches of the Waiau and Hurunui Rivers could achieve these relevant objectives and policies. The various geomorphological, ecological, cultural, recreational and social values, would not be significantly affected and mitigation measures can be practically implemented through consent processes, as necessary. In addition, water can be allocated to achieve further local, regional and national economic benefits, whilst protecting the reliability of supply for human and stock drinking water and other existing abstractors.

Higher Level Statutory Instruments

- 4.25 I have also examined the relevant higher level statutory instruments which the Proposed Plan must give effect to, specifically the Canterbury Regional Policy Statement – Decisions Version – July 2012 (CRPS) and the National Policy Statement for Freshwater Management 2011 (NPS-FW) – I deal with the National Policy Statement for Renewable Energy Generation 2011 later. I have considered whether a Regional Plan for the Hurunui and Waiau Rivers, which provides for a consent process (with associated objectives and policies) to implement the proposed new minimum flows and C Block allocation, would give effect to these higher level instruments.
- 4.26 In relation to the CRPS, and based on my assessment above, I consider that the following objectives and policies would be given effect to for the Amuri Reach of the Waiau and Hurunui Rivers, as follows:

- (a) Objective 5.2.2(2) and Policy 5.3.9(3) relate to the provision of regionally significant infrastructure. The proposed new minimum flows and the C Block allocation will enable the development of new regionally significant irrigation and hydro-electricity generation infrastructure consistent with these CRPS provisions. Significant adverse effects on the rivers' existing resources and values can be avoided, with the consent processes (and associated objectives and policies) of the Proposed Plan enabling detailed consideration of appropriate remedying, mitigating or controlling of other effects.
- (b) Policy 5.3.9(3)(c) refers to matters to consider when determining proposals within sensitive environments, including those the subject of RMA s6(c). The Amuri Reaches of these rivers are considered by Dr Sanders to be sensitive for braided river bird habitat in accordance with s6(c). As indicated in his evidence, this matter can be adequately considered when determining a development proposal that takes full advantage of the new minimum flows and C Block allocations in the Proposed Plan. These reaches do not provide s6(c) habitat for native fish.
- (c) Objective 7.2.1 recognises that freshwater resources can be sustainably managed for abstraction and use for irrigation, hydro-electricity generation and other activities, which enable people and communities to provide for their economic and social wellbeing, provided that 3 provisos are met. In my assessment, these provisos can be met with the implementation of the new minimum flows and C Block allocations in the Amuri Reaches of these two rivers. Similarly, I consider the provisions of Objective 7.2.3, regarding integrated management of freshwater between activities and between people with different interests in water, can be achieved.
- (d) The fresh water matters specified in CRPS Policies 7.3.1 (natural character), 7.3.2 (natural character of braided rivers), 7.3.3 (biodiversity) and 7.3.4 (management of water quantity) are all matters addressed through the objectives, policies and rules of the Proposed Plan, with specific policies in the Proposed Plan requiring detailed evaluation of matters listed in Policy 7.3.4(1)(a)-(f).

- (e) Policy 7.3.9 requires integrated solutions to fresh water management through the development and implementation of comprehensive management plans for catchments, with a list of matters to address in Appendix 3. In my assessment, the new minimum flow and allocation provisions of the Proposed Plan for the Amuri Reaches of the Waiau and Hurunui Rivers (including provision of the C blocks) gives effect to this policy and address the relevant matters in Appendix 3.
- (f) I do not consider that a more precautionary approach is required (as set out in Policy 7.3.12), as the evidence provided from the two modelled proposals that represent full, practical implementation of these provisions has, in my evaluation, shown that the effects of their implementation are not unknown or uncertain, and can be adequately addressed through the consent processes of the Proposed Plan.
- (g) I will return to the energy-related objectives and policies of the CRPS later in my evidence.

4.27 I have considered the NPS-FW and have found no relevant objectives and policies which are more specific than those in the CRPS or in the Proposed Plan itself. In my opinion, the Proposed Plan gives particular effect to Policies B1 and B2 of the NPS-FW by establishing freshwater objectives, setting environmental flows for these two rivers, and providing for efficient allocation of freshwater to activities.

Activity Status for Applications that Comply with the Environmental Flow and Allocation Regimes

4.28 Meridian generally supports restricted discretionary status for taking, diverting, discharge and use of surface water, from the A and B Allocation Blocks (Rule 2.3), in accordance with the proposed environmental flow and allocation regime; and discretionary activity status (Rules 3.1 & 3.2) for water from the C Allocation Block, for both the Waiau and Hurunui Rivers (subject to resolution of the link with storage). Meridian requests some amendments to the Standards and Terms of these proposed Rules, which I will discuss later in my evidence, but it supports the proposed activity status.

- 4.29 I have set out above the relevant objectives and policies relating to environmental flows and allocation of water. These objectives and policies provide the consent authority with the ability to carefully consider an extensive range of potential effects from any application to take, use and discharge water within the environmental flow and allocation regimes specified for each river. For example:
- (a) For any allocation from a C Block, Policy 3.5 requires a long list of river qualities to be considered, which I have set out above.
 - (b) For any new take from the mainstems of these rivers, Policies 2.5 and 2.7 require flows that will effectively flush periphyton, mobilise gravel and reset algae and macroinvertebrate populations, and provide for recreational activities.
 - (c) Policy 2.6 requires consideration of adverse effects on the mauri of these rivers.
 - (d) For discharges from non-consumptive uses, Policy 3.6 requires downstream effects be considered relating to matters which I have also set out above.
- 4.30 Although Meridian seeks amendments to some of these objective and policy provisions, which I will address later in my evidence, in my opinion, there is ample scope within the direction provided by these policies for a consent authority to decline consent, if necessary, or to require conditions controlling any adverse effects from a proposed take, use and/or discharge, even when it falls within the proposed environmental flow and allocation regimes. This is evident from my summaries of the environmental effects from the modelled cumulative flow regimes that would result from Meridian's proposed Amuri or Balmoral Hydro Projects.
- 4.31 For example, for the Waiau River, witnesses have described how the matters contained in the above objectives and policies would be influenced by the modelled proposal (which would be a full discretionary activity in terms of Rule 3.1 as it seeks to take C Block water). As described by Mr Woods, this proposal represents an economic upper limit for a take of C Block water for hydropower development in this reach of

the Waiau River. As such, it is an example of a substantial allocation that could be sought in terms of the proposed discretionary activity rules.

- 4.32 Although the modelled proposal would substantially alter the hydrology of the Amuri Reach of the Waiau River, several of the witnesses give evidence in relation to the effects of these hydrological changes which show that the relevant objectives and policies would be able to be achieved. As the modelled proposal is non-consumptive and only affects a 29 km reach of the river, effects outside of this reach would be avoided. Where potential adverse effects could eventuate, several of the witnesses have identified approaches to mitigation that could be required through conditions on a discretionary activity consent. The positive effects can also be taken into account and weighed alongside any residual adverse effects on the environmental, social and cultural values of the river. In coming to an overall judgement, the consent authority has full discretion under the discretionary activity status to impose conditions (for example, limiting the allocation at relevant times or during specific flow situations), or to decline consent if residual adverse effects are unacceptable (having regard to achievement of the Plan's objectives and policies).
- 4.33 It seems to me as a planner that, within the limitations of the proposed environmental flow and allocation regime, and within the direction provided by the objectives, policies and rules, the appropriateness of a substantial water take, use and discharge such as the modelled proposal, could be comprehensively assessed through the activity status and policy guidance provided in the Proposed Plan. To do otherwise, and make an allocation from the C Block a non-complying activity, for example, would seem to me to contradict the whole approach taken through the Proposed Plan – which is to determine bounds in terms of environmental flows and allocations, within which the effects of any particular proposal can be considered (and considered cumulatively with the effects of other existing allocations) in terms of the proposed objectives and policies.
- 4.34 From my brief, initial review of the Section 42A Report prepared by Ms Liz White, I note her discussion [paragraphs 328-335] of activity status in relation to the allocation of water from the C Blocks. I support her statement [para 328] that the environmental effects of any allocation from the C Block, and whether or not it would align with the Plan's policy

outcomes, can only be fully understood when proposals are put forward and assessed on a case-by-case basis. I agree with her comment [para 332] that this will depend on the quantum of water that is to be allocated and the way that it is managed. I add that it will also depend on the extent and nature of reach of the river affected, whether the allocation is consumptive or non-consumptive, and the ability of a particular proposal to incorporate management / mitigation measures.

- 4.35 Based on the expert assessments undertaken for AHP and BHP, I have assessed that a practical, full implementation (through these particular hydro-electricity projects) of the C Block allocations for the Amuri Reaches of the Waiau and Hurunui Rivers can achieve the Proposed Plan's relevant objectives and policies. Mr Eldred has also described Meridian's experience of implementing mitigation measures to address effects of hydro-electricity takes within braided river reaches. Accordingly, I agree with the comments in Ms White's Section 42A Report that support discretionary activity status for consideration of C Block takes [para 335].

2 m³/s B Block Gap for Waiau River

- 4.36 Meridian has opposed the requirements in Table 1 of the Proposed Plan for a 'gap' between allocation blocks, as it relates to the Waiau River - the proposed 2 m³/s 'gap' between the A and B Block Allocations. I have endeavoured to ascertain any environmental effect-related purpose or objective and policy support in the Proposed Plan for the proposed 'gap'.
- 4.37 The environmental effects from this gap have been considered by several of the witnesses presenting evidence on behalf of Meridian, from the perspective of their particular expertise. They say the following:
- (a) Dr Hayes states that a 2 m³/s gap will have no material benefit for fish or benthic invertebrate habitat;
 - (b) Mr Jowett states that the difference between the modelled flow regimes with and without the 2 m³/s gap between the B and C blocks would be insignificant and would not change his assessment of the

ecologically relevant hydrology or his assessment of environmental effects at all;

- (c) Dr Mabin notes that a 2 m³/s would make no difference to his assessment of effects on sediment transport;
- (d) Dr Sanders states, with regard to potential effects on river birds, the 2 m³/s gap in practice makes no difference because the differences are very small;
- (e) Both Mr Greenaway from a recreation perspective, and Ms Pfluger from a landscape perspective, state that it would be difficult to detect visually a difference of 2 m³/s.

- 4.38 Removal of the 2 m³/s gap for the Waiau River would result in a lower B Block minimum flow (38 m³/s instead of 40 m³/s).
- 4.39 The minimum flow rules need to achieve the Environmental Flow Objective 2 and its relevant policies (in particular Policies 2.5, 2.6 and 2.7). As I have previously stated, Objective 2 seeks to ensure that the minimum flow requirements do not result in adverse impacts on a long list of river qualities. The modelled proposal for the Waiau River does not incorporate the 2 m³/s gap and has assumed a lower B Block minimum flow. So the effects of this have been assessed by the witnesses I have referred to above. They have concluded that there will be no, or insignificant, environmental effects, from the removal of the gap and the consequential reduced B Block minimum flow, on the river qualities listed in Objective 2. Accordingly, achievement of Objective 2 is not influenced by the rule requiring this gap between the A Block Allocation and the B Block minimum flow.
- 4.40 Turning to the policies under Objective 2, to the extent that the mauri of the Waiau River is influenced by the environmental condition of the river, my understanding is, therefore, that Policy 2.6 will also be achieved. Similarly, the removal of a 2m³/s gap will not affect the achievement of the flushing or recreational flows sought through Policies 2.5 and 2.7.

- 4.41 Accordingly, I can find no objective and policy support relating to environmental flows for a rule that requires this 2 m³/s gap and, therefore, a higher B Block minimum flow.
- 4.42 In terms of Objective 3 and its policies, Policy 3.4 just states that water is to be enabled to be taken from the B Allocation Blocks (with no reason given for the gap from the A Allocation Blocks). Policy 3.1 states that the size of the A Allocation Block in the Waiau River is to be reduced to 18 m³/s. A relevant reason for this (on page 8) is that – *“Where A blocks have been exceeded through the historic granting of resource consents, the Plan seeks that the allocation will be reduced over time.”*
- 4.43 Accordingly, the Proposed Plan includes specific policy support, and some explanation, for the 18 m³/s size for the A Block Allocation but, again, I can find no objective and policy support, relating to water allocation, for a rule that requires a 2 m³/s gap between the A and B Block Allocations.
- 4.44 From this I conclude that there is policy support for the 18 m³/s size of the A Allocation Block in the Waiau River in the specific requirement contained in Policy 3.1 to reduce the block to this size. However, I can find no objective or policy direction in the Proposed Plan for the 2 m³/s gap between this A Allocation Block and the minimum flow for the B Allocation Block. Nor is there any good ecological or in-stream reason for providing this “gap” (as I have stated above). Accordingly, I consider the appropriate implementation of the Proposed Plan’s objectives and policies is to remove this gap and reduce the Waiau River B Block Minimum Flow rule to 38 m³/s.

Different Flow and Allocation Regimes Linked to Provision of Large-Scale Water Storage

- 4.45 A significant aspect of the Proposed Plan is the link made between the provision of large-scale water storage (20 million m³ in each of the Waiau and Hurunui catchments) and the Environmental Flow and Allocation Regimes in each catchment (Table 1). In particular, this affects the A Block Minimum Flows and the availability of C Block Allocations, although

for the Hurunui River, this also extends to the B Block Gap Size and a slight difference in the B Block Minimum Flow.

- 4.46 It is particularly important that the Plan “gets this right”, as Rule 5.2 makes applications that do not comply with the Environmental Flow and Allocation Regimes in Table 1 to be prohibited activities. Without the provision of large-scale water storage, there is no C Block Allocation, for example. The merits of proposals that require access to the C Block water, such as hydro-electricity generation, cannot even be considered, unless storage is provided. When such storage cannot be commercially provided as part of a proposal, beneficial projects may be prevented from being considered at all through a resource consent process.
- 4.47 I have reviewed the Proposed Plan in order to determine the resource management issues, objective or policy support evident in the Proposed Plan for linking large-scale water storage to the environmental flow and allocation regimes.
- 4.48 In the Chapter entitled “*How this Plan Responds to the Resource Management Issues and the Hurunui Waiau Zone Implementation Programme*” it is stated, under Environmental Flows (pg 6-7), that:

“In both the Hurunui and Waiau Rivers it is recognised that while rivers are currently in good ecological health, modelling shows that if all current abstractors used their entire consented rate of take, then the life supporting capacity and mauri of both rivers could be adversely affected.

However, increasing the minimum flows immediately would have negative effects on existing abstractors’ reliability of supply. Therefore this Plan proposes to maintain the status quo flow regime for the mainstem of the Hurunui and Waiau rivers in the short term. The Plan also recognises that the B Allocation Block is not sufficiently reliable for run of river irrigation and that storage is needed. Storage provides an opportunity for the minimum flow to be increased to improve ecological health and mauri of the rivers, as stored water is able to be utilised to augment existing abstractors supply when the river falls to low levels, improving reliability.

This Plan therefore requires the minimum flow in the Hurunui River be increased to 15 cumecs for the months of February, March and April, and decreased to 12 cumecs in August and 10 cumecs in June, July and August for non-consumptive takes following the commissioning of any water storage facility which takes and stores more than 20,000,000m³ of water. For the Waiau River the minimum flow must be increased to 20 cumecs in the months of February and March following the commissioning of any water storage facility which takes and stores more than 20,000,000m³ of water. To provide an incentive for storage (potentially alongside hydro electric power generation on Waiau River) reduced to 20 cumecs in the months of May to December, as modelling indicates that the life supporting capacity of the River will continue to be protected at this flow during these months.”

- 4.49 As expressed in this quote from the Proposed Plan, large-scale water storage is a means that can be used to maintain reliable irrigation water for existing abstractors when the minimum flows in the main stems of the Hurunui and Waiau Rivers are increased from their current summer minima, in accordance with the Proposed Plan flow provisions; and to provide sufficiently reliable water for irrigation from B Block water. However, in my opinion, the second paragraph quoted above inaccurately states that “*storage provides an opportunity for the minimum flow to be increased*”, when, more accurately, I consider it should say that storage provides an opportunity to maintain or provide reliability for irrigation abstractors if the minimum flow is increased. Meridian seeks amendments to this paragraph accordingly.
- 4.50 Whether this paragraph is expressed correctly or not, the resource management issues identified are; the impact on the river if all currently consented water is taken; the relationship between the proposed new minimum flows for the A Block and reliability of water available from that Block for existing irrigators; and lack of reliability of B Block water generally for run-of-river irrigation. Large-scale storage is identified as a means of addressing these issues by enabling the river minimum flow to be altered, while retaining something like the current level of irrigation reliability for existing A Block irrigators and providing reliability for new B

Block irrigators. There is no resource management issue identified here that links an allocation of C Block water to reliability of water for irrigation. Nor are there any resource management issues identified which link the provision of storage to addressing any other environmental effects of the proposed new minimum flows or of the allocation of C Block water. However, I have endeavoured to explore these matters in more detail through the relationship between the objectives, policies and methods of the Proposed Plan.

- 4.51 Firstly I have considered the relationship between the C Block Allocation rule and the requirement to provide large-scale water storage, in terms of the achievement of the Allocation of Water Objective 3 and its relevant Policy 3.5.
- 4.52 Allocation of water from the C Block can enable further economic benefit as sought through the implementation of Objective 3, either from irrigation use or from non-consumptive uses such as hydro-electricity generation, as has been described by Mr Eldred. Objective 3 and Policy 3.5 require this to be achieved in a way that is consistent with the list of outcomes specified. There is considerable overlap between the matters specified in these provisions. As I have discussed earlier, by way of the examples of the modelled proposals for the Waiau and Hurunui Rivers, practical full allocation of C Block water can be enabled in a manner which is not contrary to Objective 3 and Policy 3.5.
- 4.53 In terms of reliability of supply for irrigation, Objective 3(f) and Policy 3.5(f) can be achieved by a C Block allocation proposal that gives priority to existing irrigators. A resource consent for a C Block Allocation can readily ensure there is no impediment to achieving these aspects of Objective 3 and Policy 3.5, by way of appropriate conditions that specify priority for water access. Policy 3.5 itself requires that an allocation of C Block water in accordance with Table 1 must be behind allocations of A and B Block water, which would ensure protection of priority for existing irrigators (A Blocks) as required by this Objective and Policy.
- 4.54 Table 1, however, requires large-scale water storage to be provided before a C Block allocation can be enabled, presumably to achieve Objective 3(f) and Policy 3.5(f) as reliability for existing irrigators is the

resource management issue identified for this storage to address. From my analysis, this method required by Table 1 does not relate to the cause of this resource management issue (or effect) that the Proposed Plan is seeking to address. C Block takes can only be exercised at river flows well above the minimum flows specified for the A and B Block abstractors. From my understanding, a C Block take has no ability to affect or influence the reliability of existing A Block, or future B Block, irrigation takes which will have priority to be exercised at river flows below which a C Block take can be exercised. With increased minimum river flows, existing A Block and future B Block irrigators are going to need to address their reliability, irrespective of whether or not there is a C Block allocation from the river.

4.55 Even if a proposal involving a C Block Allocation does provide some large-scale water storage, it can't be assumed that within any C Block consent there would be the ability to control the use of that storage for the benefit of A and B Block abstractor reliability by way of conditions on that C Block consent. I understand that conditions on consent need to be related to the effects from the exercise of that specific consent. The provision of storage could be controlled to improve reliability for the use of the C Block take itself, or to mitigate the effect of the grant of consent on an existing consent holder. However, I find it difficult to ascertain how conditions could be imposed on a consent for a C Block take to improve reliability of supply for A and B Block abstractors when that reliability is not influenced by the C Block allocation. The change in reliability for existing abstractors arises from, firstly, the Plan framework establishing different minimum flows to manage the effects of the current consented takes; and, secondly, the consent authority choosing to, and successfully reviewing, the current consents to impose that minimum.

4.56 Secondly, I have considered the relationship between a new allocation from the A and B Blocks at the new minimum river flows and the requirement to provide large-scale water storage, in terms of the achievement of the Allocation of Water Objective 3 and its relevant Policy 3.5. A consent for a new allocation cannot directly change the minimum flow conditions of any existing abstractors. However, an additional take from the same Allocation Block can affect reliability of supply through the

additional sharing of the block allocation at low river flows. As with a C Block allocation, any new allocation of A and B Block water can be managed to be behind any existing A or B Block takes in terms of priority for access to that water. The proposals described by other witnesses to take A and B Block water from the Waiau and Hurunui Rivers for hydro-electricity generation uses demonstrate this. This can be controlled by way of conditions on consents for the new takes, so that the reliability of supply for existing abstractors is not affected, and Objective 3(f) achieved.

- 4.57 Thirdly, I have considered the relationship between a new take from the A and B Blocks at the new minimum river flows and the requirement to provide large-scale water storage, in terms of the achievement of the Environmental Flow Objective 2 and its relevant policies. Objective 2 seeks river flow management that does not result in adverse effects on the river values specified. Relevant policies under Objective 2 elaborate on how this is to be achieved for any new take (specifically Policies 2.5, 2.6 and 2.7). There is considerable overlap between the matters specified in these provisions. As I have discussed earlier by way of the modelled examples for the Waiau and Hurunui Rivers, takes from the A and B Blocks at the new minimum flows (even when considered cumulatively with existing takes at their existing minimum flows, other possible future takes from the B or C Blocks, and the modelled C Block takes) can be enabled in a manner which achieves Objective 2 and Policies 2.1, 2.5, 2.6 and 2.7. There is no reference to maintaining or protecting reliability of supply for existing abstractors in this Environmental Flow Objective 2 and these associated policies.
- 4.58 Policies 2.8 and 2.9 seeks that the new amended minimum flows are introduced for the Hurunui and Waiau Rivers *“to ensure that the factors in Objective 2 are protected”*. The achievement of these factors upon introduction of the new minimum flows is consistent with the assessment undertaken for the modelled proposals for the AHP and BHP. As I have just said, the factors to be projected through Objective 2 do not include protecting reliability of supply for existing abstractors.
- 4.59 However, Table 1 and Policies 2.8 and 2.8 go on to require the provision of large-scale water storage prior to the introduction of the new minimum flows, presumably to restore reliability for existing A Block abstractors

(following introduction of the new minimum flows) and to enable future B Block reliability. Policies 2.8 and 2.9 even go to the extent of stating that the new minimum flows are intended as “*creating an incentive for storage*”. These two policies, and their associated Method through Table 1, use the new minimum environmental flows to require (or “incentivise”) new takes to provide storage in order to improve reliability for existing and other future users, even though this is not a factor to be protected in the Environmental Flow Objective 2.

4.60 On the basis of these considerations, I conclude that:

- (a) The C Block allocation can be made in a manner that achieves Objective 3 and Policy 3.5, including Objective 3(f) and Policy 3.5(f) relating to reliability for existing abstractors, without large-scale storage being provided as part of that allocation.
- (b) A new take based on the proposed new minimum flows can achieve Objective 2 and Policies 2.5, 2.6 and 2.7, without large-scale storage being provided as part of that take.
- (c) New amended minimum river flows can be introduced through new take consents whilst protecting the factors in Objective 2, without requiring large-scale water storage to be provided.

4.61 Accordingly, apart from the reference to the Table 1 Method in Policies 2.8 and 2.9 (and the Rule requirement through Table 1 itself), I can find no objective or policy which requires the provision of large-scale water storage to ensure their achievement. In my opinion, this reflects the lack of cause and effect relationships. The resource management issue identified in the Proposed Plan is insufficient reliability of supply for existing abstractors at the proposed new minimum river flows, or for some new B Block irrigation users. However, in my opinion, this issue is not caused by the allocation of C Block takes, nor by new A or B Block takes, provided these are managed appropriately through conditions. I conclude from this that the Proposed Plan has not chosen the appropriate method to address this resource management issue.

4.62 Albeit that I do not consider it reflects any cause and effect relationship, I will now consider the effectiveness and efficiency of using this “incentive

for storage” method to address the reliability issue identified in the Proposed Plan.

4.63 In terms of effectiveness:

- (a) As I have already discussed, I do not consider that conditions should be imposed on a consent for a C Block take to require it to restore reliability of supply for A Block abstractors or provide reliability for B Block abstractors, when that reliability is not influenced by the C Block allocation (particularly when the C Block abstraction itself does not require the storage for its own reliability, such as for run-of-river hydro-electricity generation);
- (b) Conditions on a consent to develop a large-scale storage facility may or may not enable reliability support for other water users to be effective. For example, draw-down of storage during times of limited river water availability, may be restricted by conditions relating to the effects of the storage facility itself, in order to manage such effects as dust nuisance or loss of visual amenity;
- (c) As described by Mr Potts, provision of large-scale water storage by one consent holder may not be in a suitable location to effectively provide storage for the irrigable areas;
- (d) It is difficult for one consent holder and water user to predict or ensure reliability for other separate users that operate under completely separate consents.

These factors indicate to me that this is not an effective method to use to restore or provide reliability for existing or future irrigation abstractors when implementing new minimum flow requirements.

4.64 In terms of efficiency:

- (a) The cost of providing the large-scale water storage may well fall on a separate party from the one that would benefit from the reliability of supply. This would reduce the efficiency of the project required to provide the storage. For example, large-scale water storage is not necessary to provide significant benefits from hydro-electricity generation using the water resources of these rivers, even with the new minimum flows under the Proposed Plan. Mr Eldred states that

- the requirement to provide 20 Mm³ of storage with AHP would not be a good investment as part of a hydro-electricity generation scheme.
- (b) Even if associated with irrigation, Mr Eldred states that provision of 20 Mm³ of storage would not meet Meridian's commercial investment test, as the analysis provided by Mr Potts shows that there is only a requirement for 12.5 Mm³ of storage for the Waiau Catchment based on current economically viable areas for irrigation.
 - (c) This is likely to mean that, if the requirement for storage is retained, neither the benefit from the project required to provide the storage, nor the benefit of improved reliability of supply for other abstractors, will be achieved.
 - (d) The location of the storage may not be the optimal location for providing reliability for existing A Block or future B Block irrigation. As Mr Potts states, storage for irrigation would be best provided in smaller storage volumes, close to the demand areas.
 - (e) The cost of providing the water storage is not borne by the party benefiting from that storage, nor by any party that causes effects that need to be remedied by the storage provision. This does not seem to be an efficient outcome in terms of apportioning of costs and benefits.

In my opinion, this method is also not an efficient means of restoring or providing reliability for existing or future irrigation abstractors.

- 4.65 I consider that a more effective and efficient method to address this resource management issue of insufficient reliability of supply should be more closely related to the causes and effects for this issue.
- 4.66 If, as the Proposed Plan indicates, there will be adverse effects on the environmental and cultural values of the rivers at the current consented minimum flows, then there may be environmental and cultural benefits from applying the proposed new minimum flows to all future consents and, by way of condition review, to existing consents. However, as the Proposed Plan also indicates, this may result in unacceptable, negative, social and economic effects on existing abstractors as a result of lowered reliability of supply. More efficient and effective means of addressing this issue could involve:

- (a) Considering existing consents through a review under sections 68(7) and/or 128 and 130, whereby overall judgements can be made as to whether the adverse social and economic effects on existing abstractors of the new minimum flows outweigh the in-river benefits (at least until such time as water storage is provided).
- (b) An alternative method as suggested by Meridian's submission to include a Rule in the Proposed Plan which would enable existing A Block abstractors to retain and renew their existing consents at their current minimum flows until water storage is provided. Meridian is not committed to this particular method. There may be other methods of effectively and efficiently addressing this issue of reliability of supply for existing abstractors.
- (c) Encouraging water storage to be provided by new abstractors that require such storage to achieve sufficient reliability (as per Objective 6 and its policies which I will discuss further in the next section of my evidence).

4.67 Meridian seeks various amendments to the Proposed Plan to reflect its submission that neither the proposed change to the minimum flows for the Waiau and Hurunui Rivers nor the allocations of C Block water should be required to be linked to the development of large-scale water storage. Based on my consideration of how these provisions in the Proposed Plan would achieve its objectives and policies, and of the effectiveness and efficiency of those provisions, I support the amendments sought by Meridian.

5.0 WATER STORAGE INFRASTRUCTURE

- 5.1 Following on from the above discussion, I turn now to consideration of Objective 6 relating to Storage and Additional Demand for Water Resources and its associated Policy 6.5.
- 5.2 In addition to the issue I have just discussed regarding the effect of the proposed new minimum river flows on reliability of irrigation water supply, a more fundamental issue is also identified in the Proposed Plan. The first Issue identified (page 3) refers to the need for reliable water to be

available for irrigation, in order to support the economic growth of North Canterbury. Issue 5 identifies the need for storage of water to effectively irrigate additional land in this area, but that any development of infrastructure to store water needs to be “*undertaken in a comprehensive manner*” in order to avoid limiting or restricting storage options which are necessary to provide this reliable irrigation water.

- 5.3 These Issues are reflected in proposed Objective 6 which links the development of infrastructure for any out of stream uses of water to full irrigation of all economically irrigable land in the Waiau and Hurunui catchments. Proposed Policy 6.5 goes on to require:

“any proposal utilising water from the Hurunui, Waiau and Jed river catchments to: ... demonstrate how it will fit with a zone wide pattern of infrastructure development designed to optimise the amount of land irrigated, and: ... provide for the storage of water in the middle Reach of the Waiau River in the Emu or Amuri Plains; ... or provide for the storage of water in (various options outlined for the Hurunui River)”.

- 5.4 In examining Objective 6, it is not entirely clear what the first part of this Objective means. My interpretation is that together, in an integrated manner, infrastructure for out of stream water uses should not foreclose full irrigation of all economically irrigable land. However, I do not interpret Objective 6 as requiring that each and every out of stream water use provide storage infrastructure for irrigation water.

- 5.5 From Issue 5 and my interpretation of Objective 6, I can understand the importance of ensuring that the development of the water resources of these catchments, and the associated infrastructure, is considered in a comprehensive manner, which ensures the most efficient integration of water use options across these catchments. I can understand how, to address this Issue and achieve Objective 6, a proposal to use significant quantities of water needs to demonstrate that it does not unreasonably prevent other options for water use or storage which could provide for economically viable irrigation in a way that increases economic and social benefits for North Canterbury. However, I consider that the wording of Policy 6.5 appears to go further than is required to achieve the Objective and address this Issue.

- 5.6 The first part of Policy 6.5(a) and Policy 6.5(c) appear to be consistent with Objective 6 in requiring water users to demonstrate how they would fit within an overall zone wide pattern of water storage infrastructure development that would optimise the amount of economically viable irrigation, as well as other multiple water uses. However, Policy 6.5 (a)(i) and (ii) appear to go further than required to achieve Objective 6 by requiring all water use proposals to “provide for the storage of water” for irrigation, even when such storage is not required by the particular water use proposal. Perhaps the inconsistency results from the choice of words – “*provide for*” – and it is possible that a less directive wording is intended, such as “*and which includes provision for*”. However, this is not clear.
- 5.7 As I have discussed in the previous section of my evidence, I do not consider it is an effective or efficient method, nor necessary to achieve Objectives 2 and 3 and their relevant policies, to require all water takes to “provide for the storage of water” for irrigation, when such storage is not required for that particular water use proposal. Similarly, I do not consider it is necessary to achieve Objective 6. Further, as set out in the evidence of Mr Potts, the full 20 Mm³ of storage is not required for irrigation in the Waiau Catchment and what storage is required should not be provided in one location.
- 5.8 Provided water takes can demonstrate that they will fit within a zone wide approach to infrastructure development, which would not preclude sufficient storage being provided in appropriate locations, and would not preclude economically viable irrigation opportunities, then in my opinion, Objective 6 would be achieved.
- 5.9 Consistent with this, Meridian has sought various amendments to the Proposed Plan to clarify Objective 6, to ensure greater consistency between Policy 6.5 and Objective 6, and to avoid inefficient requirements in Policy 6.5 which are not necessary to implement Objective 6. These amendments are set out in Attachment 1 to my evidence.

6.0 PRIORITIES FOR WATER ALLOCATION

National and Regional Benefits of Hydro-Electricity Generation

6.1 In my opinion, the Proposed Plan does not adequately discuss, or explicitly provide for, issues or objectives relating to renewable electricity generation, both as a significant issue for New Zealand as a whole, and for the north of the South Island.

6.2 The only reference to hydro-electricity generation in the proposed Resource Management Issues section is to “*provide a larger pool of capital*” to enable the development of large scale irrigation which may otherwise “*be close to the affordability threshold for new water users*” (2nd para on page 3). None of the “*Issues*”, listed on page 3 as being addressed by the Proposed Plan, include reference to renewable electricity generation.

6.3 Similarly, the proposed section entitled “*How this Plan responds to the Resource Management Issues and the Hurunui Waiau Zone Implementation Programme*” only recognises the potential for hydro-electricity generation in these catchments as a means to providing ‘*more water*’ for irrigation. For example, the list on page 6, of the means by which the Proposed Plan responds to these matters, just refers to hydro-electricity generation in the following point:

“6. *Providing a policy and rule framework to deliver ‘more water’ for irrigation (with potential associated hydro-electricity power development) in the areas preferred for water storage, ...*”

There is also the reference I have already quoted in my evidence above, where hydro-electricity generation is seen as an incentive for providing storage to improve reliability of supply for existing irrigators when the minimum flows in the rivers are increased during the irrigation season.

6.4 From my reading of the Proposed Plan, it does not adequately discuss the Issue of providing for renewable electricity generation. Neither does the Proposed Plan set out how it responds to this Issue.

- 6.5 Meridian seeks that additional discussion and an additional Issue relating to hydro-electricity generation be included in the Resource Management Issues section of the Proposed Plan. Meridian also seeks an amendment and an addition to the list of points on page 6, in order to specifically state that the Plan provides a policy and rule framework enabling hydro-electricity generation (particularly recognising the ability of this Plan to enable additional electricity supply in the upper South Island).
- 6.6 In my opinion, the Proposed Plan generally does provide a framework of rules (including the environmental flow and allocation regimes) that would enable the allocation of water in the Waiau and Hurunui catchments for the generation of hydro-electricity within the upper South Island (subject, of course, to consideration of the effects of the particular proposal). However, the Proposed Plan is noticeably silent on this being an Issue addressed in the Plan, or an Objective to be achieved through the Plan.
- 6.7 By way of comparison, the Proposed Plan includes several Issues that refer to irrigation (pg 3), extensive discussion about the management of water resources for irrigation (pg 4-10) and Objective 6 and its policies specifically aimed at achieving full irrigation of economically irrigable land in the catchments. Whereas, the Proposed Plan does not recognise the significant potential for these water resources to provide for economic and social wellbeing through renewable electricity generation.
- 6.8 Meridian seeks amendments to Objectives 3 and 6 and a new Policy 9.5 to recognise the national and regional significance of renewable electricity generation and the ability of this Plan to play a part in enabling additional hydro-electricity generation. In my opinion, the amendments Meridian seeks are necessary to adequately reflect current national and regional RMA policy guidance and national energy strategy direction that relate to renewable electricity generation activities.
- 6.9 The New Zealand Energy Strategy 2011 – 2021²⁹ sets out the government's strategic direction for the energy sector in New Zealand. New Zealand's overall energy goal as specified in the Energy Strategy is:

²⁹ New Zealand Government, August 2011.

The Government's goal is for New Zealand to make the most of its abundant energy potential, for the benefit of all New Zealanders.

This will be achieved through the environmentally-responsible development and efficient use of the country's diverse energy resources so that:

- The economy grows, powered by secure, competitively-priced energy and increasing energy exports.*
- The environment is recognised for its importance to our New Zealand way-of-life.*

- 6.10 In meeting this goal, the government has a target of achieving 90% of electricity generation from renewable sources by 2025 (in an average hydrological year) providing this does not affect security of supply. The strategy notes that by enabling generation from renewable resources will help make New Zealand more resilient to fluctuating commodity prices as a result of being less reliant on fuel sources for generation, and thereby leading to improved energy security. Furthermore enabling renewable generation will assist in reducing energy-related greenhouse gas emissions, and improve air quality and public health.
- 6.11 The National Policy Statement on Renewable Electricity Generation 2011 (NPS-REG) supports the implementation of the Energy Strategy by enabling the sustainable management of renewable electricity generation activities under the RMA. The NPS-REG elevates the development of renewable electricity generation to a matter of national significance in achieving the purpose of the Act. In its Preamble, the NPS is stated as not applying to the allocation and prioritisation of freshwater, which are matters for regional councils to address in a catchment or regional context. However, I understand the NPS is relevant to the provisions in a plan that address infrastructure for renewable electricity generation activities.
- 6.12 The objective of the National Policy Statement is to provide for the development, operation, maintenance, and upgrading of renewable generation activities, such that the proportion of electricity generated from renewable energy sources increases to a level that meets or exceeds the

Government's 90% by 2025 target. Central to the policies of the NPS are that RMA decision makers:

- (a) Recognise the national significance of the benefits of renewable energy activities;
- (b) Acknowledge the practical constraints associated with the development, upgrading, maintenance, and operation of new and existing renewable energy generation activities;
- (c) Incorporate provisions for renewable electricity generation activities into regional policy statements and regional and district plans;
- (d) Enable identification of renewable electricity generation possibilities; and
- (e) Support small and community scale renewable electricity generation.

6.13 In addition to the Government initiatives outlined above, sections 7(i) and 7(j) of the RMA requires all persons exercising functions and powers under it to have particular regard to the effects of climate change and the benefits of renewable energy. This includes having particular regard to these matters in the preparation of regional and district planning documents.

6.14 The CRPS follows on from these higher level statutory provisions and includes specific objectives and policies relating to renewable energy resources. Objective 16.2.2 seeks reliable and resilient generation and supply of energy for the region, and wider contribution beyond Canterbury, with a particular emphasis on renewable energy. It seeks to provide for appropriate use of the region's renewable resources to generate energy; to minimise transmission losses; and to recognise locational constraints in the development of renewable electricity generation; subject to requirements regarding avoidance, remedying, mitigation and control of adverse effects. Policy 16.3.5 then goes on to require recognition and provision for efficient, reliable and resilient electricity generation, including enabling the development of new generation (particularly renewable electricity generation). This policy also requires particular regard to be had to constraints to the location or design

of such generation activities; and a similar proviso to that stated in Objective 16.2.2 regarding management of adverse effects.

- 6.15 Mr Eldred's evidence explains the importance of hydro-electricity in NZ the need for more electricity generation, particularly for the upper South Island, and how this would affect pricing for electricity north of Christchurch. Mr Eldred has described how he considers the AHP and BHP projects to be quality proposals, with the potential to both generate electricity north of Christchurch and to integrate with irrigation development. As Mr Page has explained, neither project is viable without affordable access to the C Block water, and the A and B Block water when it is not being taken for irrigation. Without access to these blocks (and without being required to provide 20 Mm³ of water storage), Mr Page states that neither project will be constructed. Opportunities will be foregone for renewable electricity production in a part of New Zealand where electricity currently needs to be "imported" from elsewhere.
- 6.16 In my opinion, the Proposed Plan falls short in giving effect to these relevant provisions of the CRPS. Similarly, it does not achieve the purpose of the RMA in terms of enabling people and communities to achieve their economic and social wellbeing from renewable electricity generation from the resources of the Waiau and Hurunui Rivers, particularly as reflected in the provisions of section 7. It does not reflect the potential for the water resources of the Waiau and Hurunui Rivers to provide an important contribution to renewable electricity generation for the upper South Island, as identified by Meridian and described by Mr Eldred and Mr Page.
- 6.17 As I have discussed above, from my reading of the Proposed Plan, it only recognises the hydro-electricity generation potential from these rivers in terms of its possible support for more water for irrigation. It does not recognise and provide for hydro-electricity generation as a separate beneficial use of the water in these rivers that would give effect to these statutory requirements. Given Mr Eldred's evidence regarding the importance of hydro-electricity in NZ, the benefits of additional generation for upper South Island, and the potential generation from medium-scale hydro-electricity developments on either or both of these river, then I

consider that the Proposed Plan fails to give effect to these statutory provisions.

Priorities from the Canterbury Water Management Strategy

6.18 Under section 63 of the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 (ECAN Act), in considering any proposed regional plan, the Council must have particular regard to the vision and principles of the Canterbury Water Management Strategy (CWMS) in addition to the matters relevant under the RMA. The vision and principles of the CWMS are contained in Schedule 1 to the ECAN Act.

6.19 The principles state that:

“The planning of natural water use is guided by the following:

First order priority considerations: *the environment, customary uses, community supplies and stock water.*

Second order priority considerations: *irrigation, renewable electricity generation, recreation, tourism and amenity”*

There is no higher priority identified for the allocation of water for irrigation, for example, over and above other uses such as hydro-electricity generation. Similarly, there is no higher priority identified for the use of water resources for recreation over uses such as irrigation and renewable electricity generation.

6.20 Meridian’s submission generally supports the setting of priorities within the Proposed Plan in a manner that is consistent with the order of priorities from the CWMS. However, in my opinion, the preparation of the Proposed Plan does not appear to have had particular regard to these priorities. I consider that the Proposed Plan is inconsistent with the CWMS in the manner that it reflects those priorities. It also indicates that the Council does not intend that resource consents be prioritised in accordance with the CWMS until the Plan is reviewed in 2025 (Policy 9.3 and discussion of *“Efficient Use of Water”* on page 10). This may be a response to the situation with existing consent holders within the A

Allocation Block, and that there is no intention to reprioritise those under after 2025. However, the approach to priorities for new consents under this Proposed Plan is not clear to me.

- 6.21 In order to clarify the situation with respect to priorities within the Proposed Plan, Meridian seeks several amendments, as follows. I support those amendments as providing greater consistency with the CWMS and with the direction given through the ECAN Act.
- 6.22 Meridian seeks that the 5th paragraph under “*Efficient Use of Water*“ (page 10) be amended to more accurately reflect the priorities in the CWMS, particularly in relation to priorities for hydro-electricity generation and recreation. In my opinion, these amendments would spell out more clearly and specifically why priorities are needed, that priorities in this Plan are to be underpinned by those of the CWMS, and what those priorities are. In particular, I consider that it needs to be clear that first order priorities in this Plan relate only to community and stock drinking water supplies and river flows for the environment and customary use; and that second priorities relate to irrigation, hydro-electricity generation and recreational activities.

“To allow for the efficient and effective provision of water to competing uses, the use of water for specified activities needs to be prioritised. community and stock drinking water supplies and to fulfil the goal of optimising the amount of irrigated land within the Waiau Hurunui Zone, the use of water for specified activities needs to be prioritised. This Plan seeks to prioritise resource consents in accordance with the first and second order priorities in the Canterbury Water Management Strategy ~~when the Plan is reviewed.~~ Accordingly, community and stock drinking water supplies are provided with first priority, alongside the river flows for the environment and customary use. Second order priorities are the provision of water to optimise the amount of irrigated land within the Waiau Hurunui Zone, to enable hydro-electricity generation from the Waiau and Hurunui Rivers, and to support recreational activities.”

- 6.23 Meridian does not oppose the choice by the Council, for this particular Plan, to enable the A and B Block Allocations to be available to irrigation before hydro-electricity generation. The A Blocks in both the Waiau and Hurunui Rivers are, I understand, already allocated to existing consent holders (predominantly for irrigation use). However, Meridian seeks some

amendments to the 6th paragraph under “*Efficient Use of Water*” (page 10) to make it consistent with the previous paragraph that refers to 1st and 2nd order priorities from the CWMS. In my opinion, these changes are necessary to avoid confusion between the CWMS priorities I have discussed above, and the additional allocation priorities determined by this Proposed Plan for A and B Allocation Block water. I will return to the matter of sharing allocated water in the next section of my evidence.

“In addition to the first and second order priorities set out in the Canterbury Water Management Strategy, ~~the Plan~~ also recognises that within the A Allocation Block existing consent holders will continue to have priority for future allocation, and within the B Allocation Block irrigation, both existing and future, will also have ~~first~~ priority. This means that, within the A and B Allocation Blocks, allocated water needs to be available for ~~first~~ priority ~~these~~ uses when and where those uses wish to have access to, that water. However, the water may also be allocated to ~~second priority~~ other uses, such as hydro-electricity generation, when or where the water is not actually being taken, diverted or used for ~~its first~~ these priority uses. For example, water allocated for irrigation from the A and B Allocation Blocks may be used for hydro-electricity generation when the water is not being taken for irrigation ...”

- 6.24 I consider that there is also some confusion evident in the objectives regarding the implementation of these water allocation priorities, in particular the priority provided to water in-river for recreation activity, compared with out-of-river water allocation for irrigation and other uses such as hydro-electricity generation. As I stated above, I do not read the CWMS as prioritising recreation above these out-of river water uses. The Section 32 evaluation supporting the Proposed Plan, in its evaluations of the effectiveness of the policies and rules for both minimum flows and water allocation, acknowledges that there will be less social benefits from recreation following the implementation of the Plan, as social and economical benefits from water allocation and use increase. However, my interpretation of the Proposed Plan is that it seeks to place support for current and future recreational activities at the same level as many of the first order priorities.
- 6.25 Accordingly, Meridian seeks amendments to Objective 2(d) and (h), Objective 3 (g) and Objective 6 and Policy 2.7 to more accurately reflect

these priorities. I consider that the priority afforded to recreation in these objectives and policy needs to be modified from “*protecting*” or “*maintaining*” existing recreational activities or recreational values. Some sharing of water for these activities or opportunities will be necessary, if water for recreation is to be recognised as having the same priority as water for irrigation, hydro-electricity generation or other uses. Similarly, in Objective 2(d), in my opinion, existing landscape and amenity values fall within the second order priority considerations of “*recreation, tourism and amenity*”, rather than any of the first order priority considerations. I consider that recognition of these values within Objective 2 should, therefore, be modified to be at a different level of priority than the other matters listed in (a) – (g).

- 6.26 The amendments sought by Meridian are set out in Attachment 1 to my evidence.

Spatial and Temporal Sharing of A and B Block Water

- 6.27 Meridian’s submission supports the concept contained in the Proposed Plan of spatial and temporal sharing of water allocated from the A and B Blocks – for example, the secondary allocation of water from those blocks for hydro-electricity generation use, when and where it is not being used for its first allocation for irrigation. This concept has been adopted by Meridian in its lodged application for the proposed Amuri Hydro Project.
- 6.28 The concept means that A and B Block water can be allocated to a non-irrigation use when it has not yet been allocated for irrigation, provided that future uses for irrigation from these Blocks would have first access to this water once their consents are granted. Alternatively, water from these Blocks can be allocated for more than one use, provided that it is clear that the second allocation can only use its allocated water:
- when it is not being used for its first allocation (on any particular day or time of year);
 - where the first allocation occurs downstream of the second allocation and the water is returned to the river upstream of the intake for the first allocation.

- 6.29 To achieve this, the Plan needs to be clear in its Rules that the calculation of total water allocation (for example, in terms of the total Allocation Blocks in Table 1) needs to be undertaken as at any particular point in time, or at any particular point in the river, so as to avoid double counting. This would ensure that conditions on consents granted under these circumstances would reflect this approach to sharing allocated water. I consider that some minor amendments are required to the wording of the Proposed Plan to achieve this with certainty.
- 6.30 Specifically, Standard (d) to Rule 3.1 and Standard (c) to Rule 3.2 do not appear to provide sufficient flexibility in relation to temporal sharing of allocated water between consented takes. Rule 3.1 (d) states that “*The maximum rate of take shall be calculated as the amount allocated and available to be used by all existing consented takes on any day and at any point in the river*” (relevant words underlined). However, Policy 9.4 states that temporal sharing of allocated water is to be enabled. Footnote 4 to Table 1 also states that such sharing can include the sharing of allocated water which is not (at that time) being used by the first allocated consent. This would entail the shared use of allocated water, which is “available to be used” by a consented take, but which is not actually “being used” by that take at that time. I consider that clarification of the Standards referred to above is required to make it clear that the calculation of the cumulative rate of take for all consented takes is able to accommodate the shared allocation of water to two or more consents, provided that the second (or subsequent) allocation can only use the shared water when it is not “being used” by the prior allocated consent. This may be able to be achieved by an appropriate footnote, similar to that included in Table 1. Similar amendments would need to be made to both Rule 3.1(d) and 3.2(c).
- 6.31 Policy 9.4 supports spatial and temporal sharing of allocated water between different uses within Allocation Blocks A and B. This is supported by Meridian. Policy 9.4 also states that within the A Allocation Block existing consent holders shall retain priority and within the B Allocation Block irrigation activities shall be afforded first priority. As I stated earlier, Meridian accepts these priorities for the A and B Allocation Blocks for this Proposed Plan. However, Meridian considers that the

ability for the C Allocation Block to be used for renewable electricity generation also needs to be specifically recognised under Objective 9 relating to Priorities (provided it is consistent with Policy 9.4). Meridian has requested the addition of a new policy recognising priority to hydro-electricity generation within the A, B and C Blocks, as follows:

To enable the use of water for hydro-electric generation:

- (i) *within A and B Allocation Blocks when the water is spatially and/or temporally shared in accordance with Policy 9.4; and*
- (ii) *within the C Allocation Blocks.”*

I support the inclusion of this additional policy, in order to give effect to the higher order national and regional statutory requirements I referred to earlier in my evidence, and to assist in delivering on the priorities for water allocation and use in the Canterbury Water Management Strategy.

6.32 I understand that there may be an alternative view that water allocated to one user cannot then also be allocated to another user to take when it is not being taken for its first allocation. My experience is that a water permit gives the holder the right to take the water allocated through that permit. However, if the holder chooses not to take its allocated water at any particular time, the permit does not give that holder the right to prevent that water being taken by second permit holder, either at the same take point or downstream. Provided that the consent conditions on the water permit held by the second permit holder are clear that water cannot be taken when it is being taken by the first permit holder, then in my opinion, the water is not being allocated twice, and it does not derogate from the rights of the first permit holder.

6.33 This situation is particularly the case with water allocated initially for irrigation, when demand is seasonal and no water is taken between about April or May and August or September. That water can then be available for secondary allocation for hydro-electricity generation, for example. In addition, as stated by Mr Jowett, a reduction in flow during winter is likely to have less effect on ecology than a reduction in summer flow, because growth rates and energetic demands of biota are temperature dependent and water temperatures are lower in winter.

7.0 CHANGES TO OBJECTIVES AND POLICIES

- 7.1 Meridian has lodged submissions to several objectives and policies (or parts of objectives and policies), which are aimed at moderating the absolute nature of the wording contained in the proposed objectives and policies.
- 7.2 I am very much aware of the challenges of preparing effective objective and policy statements in any Plan. I am familiar with the careful thinking that needs to go into crafting objective and policy provisions that clearly and specifically state what is intended by the Plan, whilst not being so absolute or constrained that there is no flexibility to allow worthy proposals that overall achieve the outcomes intended by the Plan.
- 7.3 From my review of the Proposed Plan, I consider that some of the objective and policy provisions are on the absolute and inflexible side of this spectrum. In my experience, there is no magic answer to these drafting challenges. Each provision needs to be considered individually and carefully, in light of a clear, overall understanding of what the Plan is intended to achieve. This Plan makes specific provision for the allocation of water from the Waiau and Hurunui Rivers, within a well-developed Environmental Flow and Allocation Regime. Although resource consent applications will need to be considered for any applications, in my opinion, the objectives and policies should not be so constrained that they act to prevent reasonable allocation of water to out of river uses in a manner that is consistent with that Regime. The objectives and policies need to reflect the likely effects of water allocation in accordance with the Plan's Environmental Flow and Allocation Regime.
- 7.4 I will cover each of the amendments sought by Meridian in the following sections of my evidence.
- 7.5 Because of the nature and extent of Meridian's submission on the wording of some of the Proposed Plan's objectives and policies, Meridian has also lodged Further Submissions in opposition to Submissions from the Department of Conservation, Fish and Game New Zealand and Royal Forest and Bird Protection Society, that seek to retain or add to their absolute or inflexible nature.

Environmental Flow - Objective 2 and Policies (page 11-12)

7.6 Proposed Objective 2 requires that water levels and flows in the Hurunui, Waiau or Jed rivers are managed in a manner that does not result in adverse impacts on a list of factors contained in the Objective. These factors include broad statements, such as:

- (a) *the mauri of the waterbodies;*
- (b) *instream aquatic life;*
- (c) *upstream and downstream passage of native fish, salmon and trout;*
- (d) *..."*

7.7 My understanding is that this absolute requirement to avoid any adverse effects on these factors is unrealistic and unachievable with the minimum flows and allocation regimes provided for in the Proposed Plan, if it also purports to enable the use of water for the out of river uses discussed in the Plan. Even with the proposed increased minimum river flows in summer months, the Proposed Plan makes provision for substantial allocations of water in blocks above the minimum flows. These allocations are intended to achieve the Proposed Plan's other objectives of enabling further economic development (Objective 3) and allowing for full irrigation of economically irrigable land (Objective 6).

7.8 I have an understanding of the effects of water allocations and environmental flow regimes from my work on numerous rivers and water use projects. I am also familiar with the assessments of environmental effects for the proposed allocations of water to AHP and BHP (as described in the evidence presented on behalf of Meridian). From this understanding, I consider it is not possible to achieve the social and economic benefits from substantial water allocations to out of river uses, whilst also avoiding all adverse effects on instream values. I also understand that neither is this required by the provisions of the RMA, with its requirement to "*avoid, remedy or mitigate adverse effects*". However, what I consider can be achieved is the avoidance of "significant adverse impacts". I support the amendments sought by Meridian to Objective 2 which are more achievable and which would enable the allocation of water to the CWMS priority uses, whilst avoiding "significant adverse

effects” on the first priority matters listed and providing support for the second priority matters.

7.9 Similar wording occurs in proposed Policy 2.5, which seeks:

“To ensure any new take, dam or diversion of water does not adversely affect the effectiveness of flows, between 1.5 and 3 times the median flow, that flush periphyton, mobilise gravel, and reset algae and macro-invertebrate populations in the mainstem of the Hurunui and Waiau rivers.”

Meridian’s submission supports the inclusion of guidance in Policy 2.5 as to which values associated with flows between 1.5 and 3 times the median flow are of importance. This is also supported by the evidence of Dr Mabin, who identifies flows between the median flow and 3 times the median flow (FRE3 flow) as providing fines and depth flushing.

7.10 However, as I have discussed above in relation to Objective 2, I do not consider it will be possible to achieve no adverse effects on the effectiveness of these flows, whilst enabling the take and use of water within the allocation regimes provided for in the Proposed Plan. Some reduction in the effectiveness of those flows is likely at some times of the year, with a substantial level of water allocation.

7.11 As Dr Mabin states for the modelled proposal, the reduced river flow in the reach will have some effect on flows that flush fine sediment from the bed and scour out periphyton. This can be mitigated by providing for some freshes of about 110 m³/s or more to pass unimpeded down the Amuri Reach. Any effects on the bedload sediment transporting regime of the river in the reach would be minor.

7.12 Similarly, Dr Olsen states that there is the risk that the modelled proposal could lead to an increase in the frequency and magnitude of nuisance periphyton proliferations compared with present conditions. He notes that the abundance of periphyton will still be controlled by naturally occurring floods and freshes. In addition, he considers that mitigation measures can be included to provide smaller freshes as required to effectively reduce periphyton biomass such that the effect on periphyton would be no more than minor. This will have benefits for recreational amenity by scouring filamentous algal growths out of the river.

- 7.13 Accordingly, I consider this absolute wording in proposed Policy 2.5 is unrealistic and unachievable in light of the overall environmental flow and water allocation provisions of the Proposed Plan. Avoiding “significant adverse effects” on the effectiveness of these flows would be achievable, whilst still enabling the allocation of water as provided for by the Proposed Plan.
- 7.14 Similar amendments, for these same reasons, are sought to Policy 2.6.
- 7.15 Policy 2.7 specifically requires any new take, dam or diversion to provide for a range of flows for recreational activities. The policy specifically identifies the flows to be provided – “*between 30 and 50 m³/s in the mainstem of the Hurunui River and between 35 and 75 m³/s in the mainstem of the Waiau River*”.
- 7.16 The evidence of Mr Jowett states that the Amuri Reach of the Waiau River would be able to be negotiated by jet boat at a flow of 23 m³/s, however this would depend on the skill of the driver and the draft of the boat. Mr Greenaway agrees with this, but states that a flow of 30 m³/s would be needed for a more comfortable passage through this reach. For salmon angling, salmon passage and some salmon angling lies would be available at a minimum flow of 20 m³/s in this reach (evidence of Mr Jowett), but that there is a reduction in areas suitable for salmon angling and passage is more demanding for the salmon compared with higher flows (evidence of Dr Hayes and Mr Jowett).
- 7.17 What this evidence shows to me is that some flow variability above the minimum flows is favourable for these recreational uses. However, it also suggest to me that there is insufficient information to state, as definitely as is stated in proposed Policy 2.7, that those particular flows (35 – 75 m³/s) are required to provide for recreational activities in any particular reach of the Waiau River. From my understanding, it is some provision for variability above the minimum flows that is important in relation to these recreational activities. However, the specific flows and the nature and timing of the variability required, for any specific proposal and the reach it affects, will need to be assessed through the resource consent process. Accordingly, I support Meridian’s submission to amend Policy 2.7 to refer

to flow variability generally, rather than to the specific flows specified in the Proposed Plan.

Allocation of Water - Objective 3 and Policies (page 12-13)

7.18 Objective 2 supports the environmental flows provided for in the Plan, and the associated management of water levels and flows through resource consent processes. Whereas Objective 3 supports the water allocation provisions in the Plan, and the associated management of specific allocations to water uses through the consent processes. I consider there is potential for an overlap between the consideration of the factors listed under Objective 3 and those listed under Objective 2, as they are closely related. The factors listed under each objective are similar. I consider it is important to clearly state that the factors listed under Objective 3 are those which are affected by the amount of water allocation, rather than being affected by the minimum flows and levels (Objective 2).

Accordingly, I support Meridian's submission that factors (a), (b) and (d) under Objective 3 be qualified to clarify that the effects to be considered are those arising from the amount of water allocated (above the minimum flows).

7.19 For the same reasons that I have discussed above, in relation to Objective 2 and its policies, I consider that the absolute requirements in the following factors listed under Objective 3 to "*protect*", "*maintain*", "*ensure*" no decrease, or "*ensure*" no adverse effects, etc, are unrealistic and unachievable with the implementation of the water allocation provisions of the Proposed Plan.

- “(a) protecting the mauri of the waterbodies;*
- (b) ensuring that water quality is not decreased;*
- (c) ensuring flow variability is maintained and that flows of between 1.5 and 3 times the median flow required to flush periphyton and mobilise gravel and reset the bed of the mainstem of the Hurunui and Waiau rivers are not adversely effected;*
- (d) ensuring that the water temperature is not unnaturally increased to levels which affect salmonid species;*
- (e) protecting the ability of native fish, salmon and trout to traverse the river from the marine environment to upstream habitats;*

- (f) *protecting the reliability of supply for existing abstractors; and,*
- (g) *maintaining the ability to navigate the river by Jet Boat;”*

7.20 As I discussed above in relation to Objective 2 and its policies, some adverse changes to these factors are inevitable, with a substantial level of water allocation. The existing situation will not be able to be exactly protected or maintained. This is supported by the assessments of environmental effects for the proposed allocations of water to AHP and BHP (as described in the evidence presented on behalf of Meridian). Avoiding “significant adverse effects” would be achievable, whilst still enabling the allocation of water to achieve economic and social benefits as provided for by Objective 3 and the Proposed Plan.

7.21 I support the amendments sought by Meridian to Objective 3 which are more achievable and which would enable the allocation of water to the CWMS priority uses, whilst avoiding “significant adverse impacts” on the first priority matters listed and providing support for the second priority matters. Similar amendments, for these same reasons, are sought to Policy 3.5 and 3.6.

7.22 Policy 3.5(a) refers to the effects on “*water quality*” of the take and use of C Allocation Block water. As I have just discussed, I support the Meridian’s submissions on Objective 3 and Policy 3.5 which seek to moderate the requirement to “*maintain*” water quality. As with the other factors listed in these objectives and policies, some change to water quality is inevitable with a substantial level of C Block water allocation, particularly if water is used consumptively. However, I support there being some policy direction as to the level of water quality that should be achieved, even with a take of C Block water. To this end, I support Meridian’s submission that Policy 3.5(a) should cross-reference to the water quality outcomes specified in Objective 5.1. This would achieve greater consistency between the water allocation and water quality objectives and policies.

8.0 STAGING WATER INFRASTRUCTURE APPLICATIONS

8.1 Policy 6.9 requires all new applications for water permits to concurrently apply for any discharge or land use consents required from either the

- Regional Council or Hurunui District Council, in order to enable consideration of the full range of effects of the proposed development.
- 8.2 Consent authorities have the ability to make decisions in terms of section 91 of the RMA as to which consents need to be applied for together for the purpose of better understanding the nature of any proposal. In my opinion, the requirement in proposed Policy 6.9 for all applications for water permits to also apply concurrently for discharge and land use consents, seeks to fetter the administrative discretion allowed under the RMA to consider the implications and applicability of section 91.
- 8.3 Policy 6.9 also seeks to apply a different test to that applied under section 91. Section 91 refers to reasonable grounds that it is appropriate, for the purpose of better understanding the nature of the proposal, that applications be made together. Whereas, Policy 6.9 refers to enabling consideration of the full range of effects of the proposed development. Any application is required by section 88 to provide a sufficient AEE with this information, and Council's have discretion to seek further information to enable full consideration of effects under both sections 88 and 92. In my opinion, Policy 6.9 confuses Council's responsibilities under sections 88, 91 and 92. It would be clearer and not unnecessarily fetter the discretions available under those sections, if Policy 6.9 was deleted.
- 8.4 In addition, in my experience, proposed Policy 6.9 could also act to prevent the appropriate and efficient staging of consent applications. I have been involved in substantial applications for water use developments, with major infrastructure components, which I consider have benefited from the ability to stage the consent requirements.
- 8.5 Meridian's North Bank Hydro Project, a 270 MW hydro-electricity development on the Lower Waitaki River, and Hunter Downs Irrigation in South Canterbury using 20 m³/s of water from the Lower Waitaki River, are examples. In both these cases, whether or not the water should be allocated from the Lower Waitaki River, and at what minimum environmental flows in the river, were crucial factors. If the water consents had not been obtained, or conditions imposed were unacceptable to the applicants, the projects would not have proceeded. Considering the water consents in the first instance saved considerable

time and cost being expended on the land use and construction consents, until a decision had been made on the water allocation and minimum environmental flows. Those people whose properties might be affected by the land uses were not tied up in land acquisition and consenting processes unnecessarily early. The local community and environmental groups interested in these applications were able to focus in the first instance on the water related effects and consenting issues, leaving concerns regarding the land use and construction to a later phase (should the primary water consents be granted – which they were).

- 8.6 Mr Eldred has described Meridian’s experience with, and support for, staging the consenting for these significant development projects. From my experience with these processes, where the effects of the water consents are sufficiently discrete from the effects of the land use and construction, it proved to be efficient, fair, acceptable to the local community, and did not result in unnecessary costs and burdens on all parties to consider all aspects at once. Whether or not the effects of the water consents are sufficiently discrete from the effects of the land use and construction, is a matter to be considered by the Council under Section 91. In order to allow this decision to be made unfettered, and staging of consent process to be allowed where appropriate, I support the deletion of Policy 6.9 as sought in Meridian’s submission.

9.0 CONSENT DURATIONS

- 9.1 I support Meridian’s submission which supports the appropriateness of a 35 year duration for consents for hydro-electricity generation and large scale water storage infrastructure (with high capital costs of more than \$10 million) - as expressed in Policy 9.2. These developments involve a high level of investment with associated financial risks, have a long working life, and need the security and certainty of a long-term consent to make that investment financially worthwhile. The regional and possibly national significance of this infrastructure makes it appropriate for the Plan to signal its recognition of, and support for, investment in long-life hydro-electricity generation and large scale water storage infrastructure, in this manner.

10.0 OTHER SPECIFIC MATTERS

Definition of Non-Consumptive Uses and Activities

- 10.1 Meridian's submission seeks clarification and amendment to the definition and use of the terms "*non-consumptives uses*", "*non consumptive use*", and "*non-consumptive activity*".
- 10.2 From my review of the Proposed Plan, I consider that there is confusion between the use of these terms, as follows:
- "*non-consumptives uses*" in Part 1 Introduction, within the section regarding the Scope of this Plan;
 - "*non consumptive use*" in Rules 3.1 (b) and 3.2 (d); and
 - the Definition of "*Non-consumptive activity*" which is used in Rule 2.1.
- 10.3 Each term is spelt slightly differently in these three instances (and in other instances within the Proposed Plan). I consider that it is not clear whether each term is intended to apply to slightly different activities. However, because the terms used are so similar, there is considerable potential for confusion as to whether the terms have the same or different meanings.
- 10.4 The term "*non-consumptives uses*" in Part 1 Introduction, under "Scope of this Plan", appears to be used in a wide sense. I assume that it is intended to apply to any use of water that is not a use for consumption by plants, animals or people.
- 10.5 However, the Definition of "*Non-consumptive activity*" puts some limitations on the nature of the activity beyond just that the activity does not "*consume*" the water before it is discharged back into the river. The Definition states that the water must be discharged in the same or better quality and at the same or similar rate as the water that is taken from the river.
- 10.6 "*Non-consumptive activity*" is used in Policy 3.6 and Rule 2.1. The first of the limitations in the Definition (the same or better quality) is also a proviso within Policy 3.6 (which relates to the discharge of water from non-consumptive activities), so does not appear to me to be also needed within the Definition. The second of these limitations (the same rate) is

included in the Standards required for Rule 2.1, so I consider that this does not need to be in the Definition.

- 10.7 Within Rules 3.1 and 3.2 (which are full discretionary activity provisions for the take, divert, discharge and use of water from the Waiau and Hurunui River Catchments respectively), Standards (b) and (d) state that the discharge of water used for “*non consumptive use*” shall be upstream of the confluence of the Stanton and Pahau Rivers respectively. There are no specific limitations on these activities (by way of Standards) relating to same or similar rates of discharge or water quality compared with the water taken. This means that the storage of water (for non consumptive uses), for example, can be considered as part of an application, and the effects of storage on water quality and rate of discharge can be considered as part of such an application.
- 10.8 In order to clarify these matters, ensure consistency, and provide scope to consider the effects of any non-consumptive use of water through the application process rather than fettering that opportunity through an unnecessarily limited definition, I support Meridian’s submission which seeks that:
- any potential for confusion between these terms is removed;
 - the terms are used consistently throughout the Plan; and
 - scope is provided for the terms to cover any use of water that is not a use for consumption by plants, animals or people, with any limitations on the use of that water being contained within relevant policies and rules, rather than within the Definition of the use itself.

Clarification of Scope of “Damming” Prohibition in Policy 6.1

- 10.9 Meridian has supported the Submissions of J Talbot (1.30) and the Independent Irrigators Group (92.16) which seek an amendment to the wording of Policy 6.1 to clearly state that complete damming of the mainstems of the two rivers is prohibited, but partial damming is allowed.
- 10.10 This matter was the subject of Meridian’s appeal in relation to the Council’s decisions on submissions on the Natural Resources Regional Plan (NRRP). Through that appeal, what was meant by “damming”, was

clarified, particularly as it related to the prohibition of damming of the full flow of a river. From my experience, this is an important matter to be clear about in any plan, in order to prevent rules unintentionally prohibiting for example, a weir structure, which might divert flow (but in doing so has the effect of temporarily damming part of the flow of a river).

Provision for Short-Term Activities

10.11 Meridian has supported the Submission from Z Energy, BP Oil, Mobil Oil and Caltex which seeks recognition in the policies under Objective 9 of the need to afford some priority to short term takes required for non-consumptive purposes, such as carrying out excavation, construction and geotechnical testing. These types of consents do not appear to be clearly recognised in the lists of priorities for resource consents (such as in Policy 9.3), but short-term takes of groundwater, in particular, are frequently necessary parts of construction activities.

11.0 SCOPE OF PLAN AND NRRP

11.1 From my review of the Proposed Plan and Proposed Plan Change, it is my opinion that there is some lack of clarity regarding the scope of both documents and of their inter-relationship.

11.2 It is important for clear interpretation of the inter-relationship between these two documents, that there is consistency between the wording of their "Scopes". I support Meridian's submission to achieve greater clarity and consistency in the inter-relationship between them.

11.3 In my opinion, there is a lack of clarity in both documents, in relation to discharges for non-consumptive uses. I do not consider it is sufficiently precise to refer to "*a discharge for non-consumptive uses*", as it is the prior use of the water (prior to the discharge), that determines whether the use is consumptive or not. An example contained within the Proposed Plan, which I consider is a more appropriate and precise wording, is Proposed Rule 3.1 (b). This refers to the "*discharge, or return, of water used for non consumptive use ...*". I consider this wording, or similar, would be better to be adopted in Parts 1 and 3 of the Proposed Plan and

in the Proposed Plan Change. Meridian's submissions point out the various places in both documents where I consider such an amendment (or similar) would be beneficial in terms of clarity.

- 11.4 In relation to the "*use of land*" which is to be covered by the provisions of the Proposed Plan, I consider the description of that activity in the Proposed Plan Change is clearer and more specific. This reads:

"(b) Within the area shown as the Nutrient Management Area in Map 2 in Schedule WQN18, the provisions of the Hurunui and Waiau River Regional Plan shall apply to the use of land which may result in the discharge of nitrate-nitrogen or phosphate".

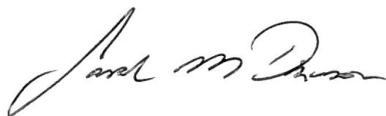
I consider that this description should also be adopted in the Proposed Plan, as sought through Meridian's submission.

- 11.5 To provide additional clarity, Meridian submission seeks that it be clear that the "*discharge of nitrate-nitrogen or phosphate*" covered by both documents be "*to water*" rather than to any other receiving environment. I agree with this, and suggest that this full description be used consistently throughout the amendments to the Proposed Plan and Plan Change. Meridian's submissions also point out the places in both documents where I consider these amendments (or similar) would be also beneficial in terms of clarity and consistency.

12.0 CONCLUSIONS

- 12.1 As my evidence is lengthy, I have included a summary of my opinions in Section 3.0 of my evidence. I will not repeat that section here, but refer to that previous section as my conclusions.

Dated: 12 October 2012



Sarah Margaret Dawson