THIS DRAFT REPORT AND THE INFORMATION CONTAINED HEREIN IS CONFIDENTIAL, AND MAY BE SUBJECT TO LEGAL PRIVILEGE

Aotearoa/NZ Battery Project – Interim assessment of social impacts for Lake Onslow pumped hydro scheme option

A report to the Ministry for Business, Innovation and Employment

From

Nick Taylor and Associates*

July 2022

* This report was prepared by a team comprising Privacy of natural persons

Contents

Executive summary

Social impact assessment (**SIA**) provides information to decision makers and affected people in advance of a decision being made about a project. It is used widely in planning infrastructure projects. This report provides an interim SIA and is part of the NZ Battery Project feasibility work for the proposed pumped-hydro scheme at Lake Onslow, in Central Otago (**the project**).

The report contains a scoping analysis, baseline analysis and interim assessment of social effects. Scoping an SIA precedes a detailed assessment by helping to understand the proposal and its social environment. Scoping ensures that the full assessment is focused on the likely impacts, affected areas and key issues. If there is a decision by Cabinet to proceed with further planning and design for the project, there will be a full SIA required for subsequent decisions and resource consents.

In addition to formal approvals and conditions, the SIA has a broader objective of helping the project establish working relationships with affected people and communities, to understand and work through their views and concerns and, over time, attain the social licence to operate. To this end, this interim SIA has built on other project engagement, scoping interviews, and studies – such as the recreation values assessment, by holding a half day community forum in the Teviot Valley, and discussions with farmers, the Central Otago District Council, the Teviot Valley Community Board and local business owners. Local people were very clear on the need to support and engage with them so that project development is well informed by their "voice", knowledge and objectives.

A spatial framework that maps the potentially affected areas and communities was prepared. This framework was used to prepare initial descriptions of the social environment. The assessment area is consistent with statistical boundaries and includes Central Otago and Clutha districts, the focus for local government, and social-economic development. Teviot Valley contains the project footprint and is defined as the local impact area. Using the spatial framework, initial descriptions of the social environment were based on social statistics and documents such as community plans. They noted key characteristics, values and trends in the potentially affected areas. The Annexes of this report have additional information and the affected communities should be reviewed for further SIA.

The social baseline shows the area experiences economic cycles and changes in employment that drive population size, along with the attractiveness of communities for retirement and amenity migration. Uneven population growth and an aging population are important issues, with smaller settlements and rural areas tending to experience little or low growth over recent years compared to the larger towns and Cromwell in particular, which are experiencing growth constraints such as available land and infrastructure for housing.

There is a high level of social capital with available volunteers and many local community organisations, including those running sport and recreation and maintaining facilities such as local halls and community pools. However, the trend to increasing numbers of elderly, including the older elderly, is increasing demands on local services and the pool of volunteers. The current population has services in health and education, emergency services, police and social support, although many rural schools have declining rolls. Populations with a decreasing cohort of working age people and an increasing population of elderly raise concerns about the viability of social services and social capital over time. Social services and facilities will need to be adapted and resourced in a timely manner for a rapidly increased population during construction and then for project wind down.

The project area has experienced hydro-electricity investigations and developments, including dams at Roxburgh and Clyde, and several smaller dams and generation stations including at Lake Onslow and on the Teviot River. This experience includes flooding of productive land, and new reservoirs that have then gained amenity values and recreational activity. Communities have also experienced temporary and permanent housing for incoming construction workers. Based on this experience, communities want to engage with project planning, minimise or manage any negative impacts and ensure that they maximise benefits to their social wellbeing in the short and longer term.

An interim SIA matrix was developed using comparison cases from international and Aotearoa New Zealand as a starting point for the social impact analysis. The matrix was revised following community engagement and further analysis. These showed Lake Onslow is valued by local people and visitors alike for its amenity values, and recreational settings including recreational fishing and food gathering, with potential negative social and cultural impacts following from an expanded lake and associated project infrastructure.

Another important local concern is around the losses of farm land to a larger lake and intake ponds, and possible effects on irrigation, potable water, and small-scale energy production. Farmers will need to adjust their land holdings and farming systems around their available mix of land types and operational locations, with likely effects on farmers, farm workers, their families and communities.

There are also likely to be social impacts from changes to local roads, heavy machinery on roads, increased traffic and reduced safety, and difficulties with stock movements. During construction there will be social consequences from increased noise and dust and potential disruption to the Clutha Gold cycle trail.

Potential negative social impacts could result from an influx of construction workers and their dependants affecting housing, social services and social cohesion. Possible mitigation includes an emphasis on procuring, recruiting and training resident and iwi workers, and a labour market strategy that looks to optimise employment in the construction sector and the regional labour market. There is also potential benefit from procurement of goods and services from local businesses, with associated business advice and training.

In the housing sector, there will be a demand for short term accommodation, possibly including a temporary facility or construction camp, and also for the supply of additional permanent housing in nearby towns, where spatial plans allow. Temporary worker accommodation could be reused in other sectors such as for seasonal workers and visitors.

This interim SIA found social impacts are very likely to result from all phases of a scheme at Lake Onslow, from initial investigations and feasibility analysis through project planning and approvals to construction and operation. Social impacts and longer-term changes from this project will test the capacity of the area through the need to manage local and regional social effects. There is potential to support local social development in the longer term through community, council and iwi development initiatives, utilising a benefit sharing mechanism such as a community fund. There will need to be active social impact mitigation and management. Requirements for further SIA and development of a social impact management plan are outlined, including finding ways to maximise benefits with the affected communities.

1 Introduction

1.1 The Lake Onslow option for the NZ Battery Project

The Ministry of Business, Innovation and Employment (**MBIE**), as part of the NZ Battery Project, is currently carrying out feasibility analysis for the proposed pumped hydro scheme at Lake Onslow. Lake Onslow, in Central Otago, is a man-made lake east of Roxburgh and south of Alexandra, at 700 m above sea level (**the site**).

The proposed project will pump water from the Mata-au / Clutha River (**the river)** or Lake Roxburgh and return it back to after being released down a tunnel where it passes through an underground powerhouse that generates electricity. The expanded Lake Onslow (shown in Figure 1) will be capable of storing a large amount of water, which could act as a national backup for electricity generation. The proposal is intended to support Government objectives for renewable energy generation and decarbonisation of the national electricity system.[1]

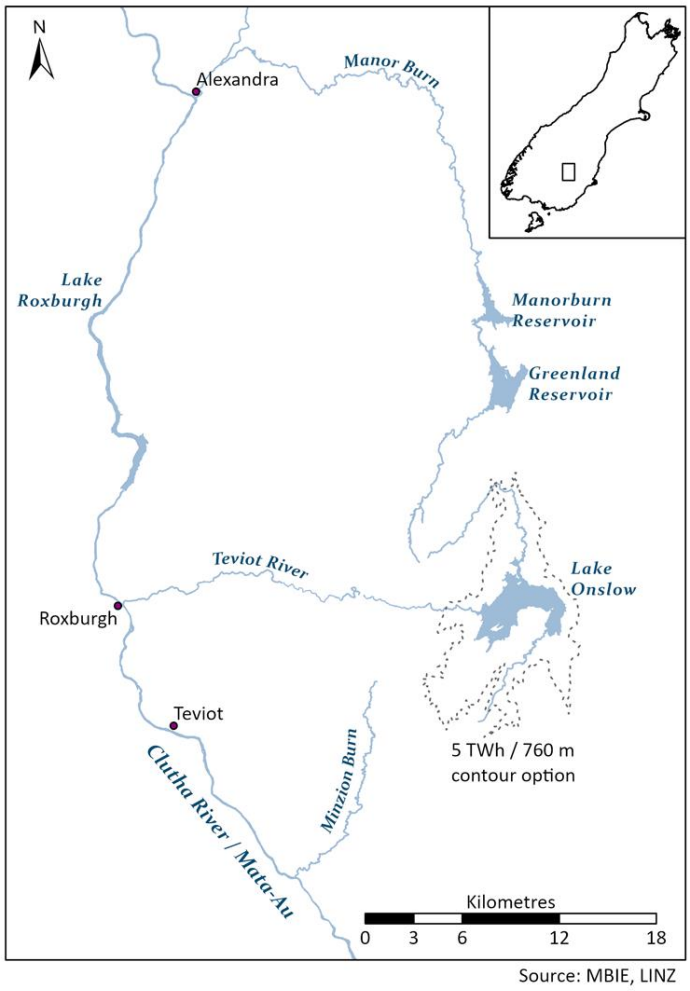

Figure 1 **Project site area showing the possible extent of an expanded Lake Onslow**

[1] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/low-emissions-economy/nz-battery/

The project is likely to include the following elements: access roading, construction bases, a water intake and outlet structure, pumping facilities, a power station, a tunnel between the upper reservoir and lower reservoir and spoil disposal sites. The pumping /generating facilities will be contained within an underground powerhouse. A larger dam will have to be built to contain an expanded reservoir. Sub-station and transmission upgrades will also be required.

The construction timeframe is currently unknown as the scheme design options are still being developed. An early estimate in the Project Description is in the order of 7-10 years from early construction activities to wet commissioning. It is expected to create direct and indirect jobs on and off site, the current number of workers required is yet to be determined, but early estimates are for a total direct construction workforce of 2,500 people engaged over the construction period and a peak of 1,000 workers.

Several options were in consideration as part of the feasibility study when preparing this SIA.

- Different sizes of storage, affecting lake levels, lake area and the amount of flooded land
- Three potential locations for offtakes and pumping stations: two new constructed ponds and Lake Roxburgh, which would operate as a reservoir in itself.
- The location and size of the new dam – relates to preferred storage capacity
- The location and alignment of power houses and tunnels – relates to the preferred lower reservoir location.

Social issues and impacts are very likely to result from construction and operation of a scheme at Lake Onslow. Impacts typically begin during the necessary investigations and feasibility studies, project formulation, planning and consenting, and then during project construction and operation.,

1.2 The purpose of an SIA

SIA provides information to decision makers and affected people when planning a project. The process assists all the participants to balance economic, social and environmental outcomes and promote sustainable development.[2]

SIA does this by helping people to:

- Identify positive and negative social impacts during project planning to inform decisions made
- Design mitigations that reduce negative social impacts, while enhancing those that are positive
- Manage social impacts once a change is underway
- Monitor longer term community outcomes, and respond where needed to enhance social wellbeing.[3]

Aotearoa New Zealand and international best practice of SIA[4] reinforces the need to scope an SIA so that it is well focused on likely issues and impacts for a defined assessment area. Practice also

[2] Consistent with section 5 of the RMA.
[3] See Taylor and Mackay (2022) for further information.

reinforces the importance of building information on social impacts in a phased approach as a project is developed and has happened to date with the NZ Battery Project. International and New Zealand best practice also emphasises the importance of engaging fully, and as openly as possible, with interested and affected parties in order to ensure a project is well designed and managed from a social perspective, with a focus on maximising positive social outcomes from the beginning.

The purpose of scoping an SIA for the proposed NZ Battery Project at Lake Onslow was to understand the proposal and the background to it, so the assessment is focused on the likely social impacts, affected areas and key issues[5]. Scoping an SIA always precedes detailed assessment work. The scoping assessment was subsequently expanded into this interim SIA in order to provide sufficient detail to advise project decision makers as to the likely feasibility of the project from a social perspective and, where possible, to distinguish between current options for lake levels, alignments and lower reservoirs.

The objectives of this interim SIA therefore are twofold - to provide:

1) Sufficient information about the existing social environment and likely social impacts for a social lens on the options for project components at the feasibility stage and to inform an Environmental Impact Statement for the project

2) A work plan for an SIA of the project later in project planning, as part of resource consents applications for a fully specified project if it were to proceed to that stage.

1.3 Outline of the interim SIA report

This report provides an outline of the likely social impacts of the proposal as scoped and assessed at an initial level of analysis.

The report describes our method and approach, and provides an overview of the existing social environment. Findings on the expected issues and effects of the proposal include population, employment and livelihoods, important values, and community characteristics of the affected areas. The report frames likely social impacts and includes initial suggestions for how the project can maximise benefits for the social wellbeing of affected communities. The report provides observations on community engagement and outlines requirements for a full SIA if there is a decision to proceed to further design and planning.

There are three other preliminary reports commissioned by MBIE relating to social issues. Key information from their findings is utilised in the analysis below. These reports provide considerable further detail about the social environment and potential effects of the proposal, and should be consulted for that information:

- Landscape and visual assessment by Blakely Wallace Associates (2021)
- Recreation assessment by Rob Greenaway & Associates (2022)
- Cultural assessment by Aukaha Ltd. (2021).

[4] International Association for Impact Assessment guidelines for assessing and managing the social impacts of projects https://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf
[5] Taylor at al. (2004a).

2 Method and approach for the interim SIA

2.1 Definition of the affected area and communities

Scoping includes an initial identification of the potentially affected local communities and the assessment area. This task was achieved by examining layers of Statistics NZ 2018 census boundaries and overlaying them with administrative boundaries (primarily district councils) and topographical information. This initial spatial framework (statistical areas and maps) was used for the analysis of official statistics such as relevant census and other statistical data, with tables and thematic maps.

The highlighted area in Figure 2 represents this initial spatial framework. The map also shows the communities selected for initial community descriptions. Ongoing SIA, if a decision is taken to proceed to detailed project design and planning, should review these boundaries and communities, as noted in the list of tasks for a full SIA in Section 5.

Broadly, the study area includes Central Otago and Clutha districts as shown in Figure 2. The rationale for including both as the wider assessment area is that together they represent an induced commuting area of around one hour by vehicle. These districts together also form a focus for local government, and therefore for social and economic development related to the proposal if it proceeds to further development. Lakes District, including the towns of Queenstown and Wanaka lies to the West and Dunedin City is the Otago regional centre.

Statistical Area 1 boundaries are consolidated to define larger areas and settlements. Particular focus is placed on Teviot Valley (Statistical Area 2)[6] and its settlements, i.e., Roxburgh, Ettrick and Millers Flat as these are scoped as the likely local impact area for the Lake Onslow Project along with the Teviot catchment. Following the initial scoping analysis it was decided to investigate the project-affected area in more detail for its demographic characteristics. Negotiations The demographics of this area (the two SA1s combined) such as age, ethnicity, educational qualifications, occupations and housing tenure were compared to the area listed as Rest of Teviot Valley (ie the rural area outside the settlements). The results were very similar (generally varying by 0-2%) suggesting that Rest of Teviot Valley provides sufficient description of the immediate impact area.

In the rest of Central Otago district, discussions below centre on Cromwell, Clyde, Alexandra and Ranfurly as key settlements in the wider impact area.

The location of Patearoa is indicated on the map but, due to confidentiality in the data, it is not possible to separate the information for this settlement from the Statistical Area 1 (7027813) in which it is situated. In the Clutha District the settlements of Lawrence and Tapanui are included in the discussions.

[6] Statistical areas are defined by Statistics NZ with SA1 being the smallest areas for data purposes. SA1 areas are too small and numerous to include on Figure 2. These smaller areas approximate previous meshblocks.

It is notable that Lake Onslow itself is a statistical area (SA1) defined by the lake margins. There are resulting issues for describing residences and population in the surrounding area as discussed in the social description of the lake in Section 3.7 below.

A more nuanced analysis of the spatial geography of the area than provided by statistical boundaries is possible using data such as school catchments and bus routes, commercial catchments, labour markets, participation in community life, sports club memberships, and local histories,[7] for example. This detailed level of analysis is appropriate for the full SIA and included in the tasks outlined in Section 5.2.

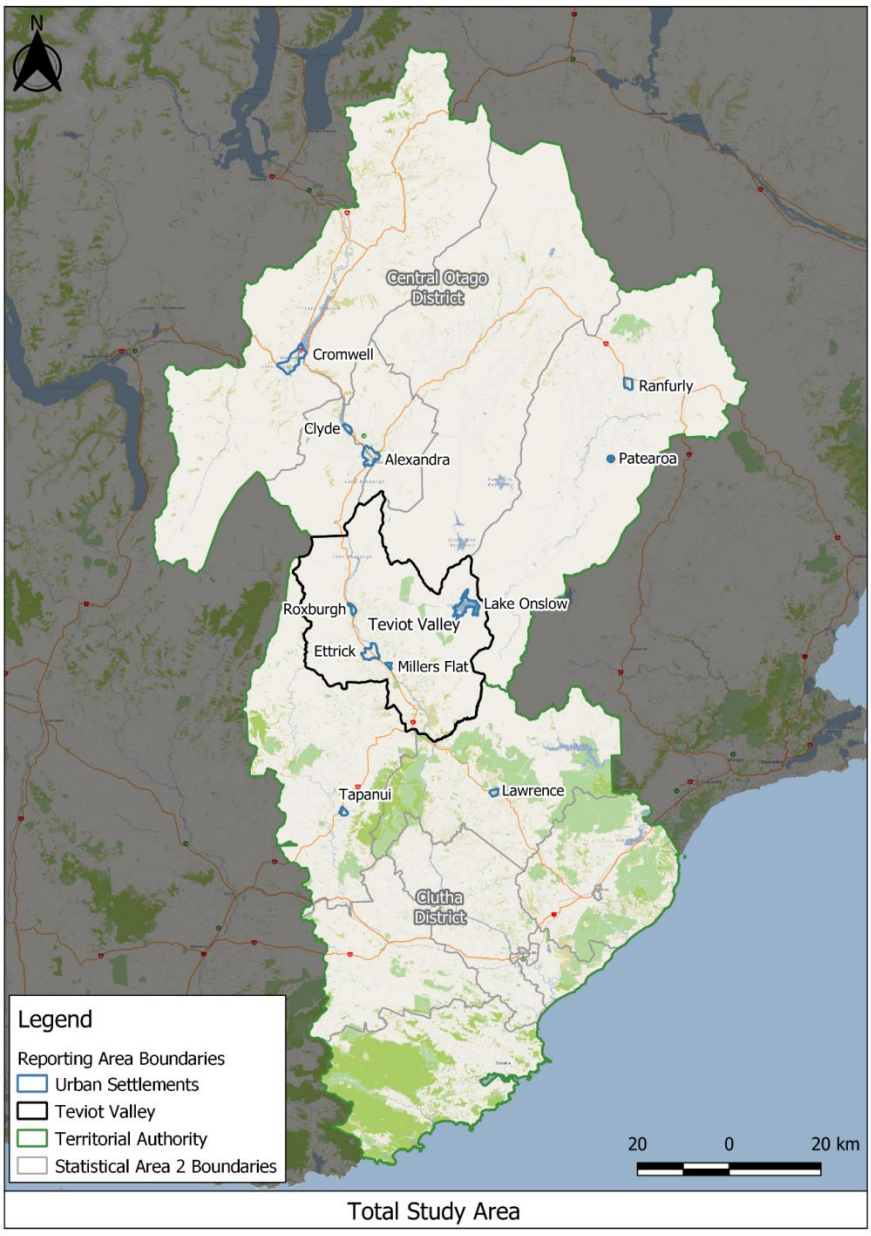

Figure 2 **Spatial frame used for scoping the Interim SIA**

[7] Webster 1948).

2.2 Initial descriptions of communities and important values

Insights into key community values and social wellbeing outcomes took place through a focused review of relevant statutory policies, strategies and plans and other relevant documents listed in Annex 1, as well as other sources listed in the references and footnoted. A number of the community plans accessed were quite dated and, wherever possible, more recent information was added. The research also drew on a survey of social media and media sources, with key sources footnoted throughout. It is useful to note the coronavirus pandemic has severely disrupted social and economic trajectories of these communities (and economies) so some trends may not continue, at least in the near future, and observed social issues will need updating over time.

In considering information on community history, culture and key events that have shaped communities of interest, we draw on the complementary reports on Ngāi Tahu cultural values, recreational values and landscape values, as these all pertain to the social environment.

2.3 Identification of partners and key stakeholders

The identification of affected stakeholders was based on the following categories of interested and affected people:

- Directly affected[8] people
- Community groups and organisations in the affected areas
- Sector groups and non-government organisations
- Mana whenua
- Local, regional and central government.

Information about stakeholders came from the community descriptions, initial engagement by MBIE, and several key-informant interviews.

2.4 Comparison cases

A summary of lessons and likely social impacts was drawn from relevant SIAs and comparative cases for hydro projects overseas and in Aotearoa New Zealand. Relevant sources are cited and these sources also include additional references. This information helped to inform the preliminary matrix of impacts in Section 4.5.

2.5 Site visit and scoping interviews

A site visit was conducted in the last week of February 2022 and included several key informant interviews and a drive through Lake Onslow Road from Patearoa to Millers Flat, past the lake and Lake Onslow dam on public roads. Additional interviews and discussions with MBIE's project team were conducted by telephone and electronically.

[8] Information on affected people is available in the table in Section 4.5.

2.6 Community engagement

Community engagement is an essential part of SIA. MBIE have utilised a process of engagement, and ongoing collaboration with interested and affected parties as a core part of their approach to project development. To this end they have so far established relationships with Te Rūnanga o Ōtākou, Kāti Huirapa Rūnaka ki Puketeraki, and Hokonui Rūnanga, set up a Technical Reference Group (TRG) and worked with district councils and local farmers and land owners. The TRG provides the Project team at MBIE with independent expertise, sector knowledge and advice. The members have a range of backgrounds and expertise with the aim of a diverse and balanced membership. MBIE project team members provided useful commentary to the SIA from their engagement activities,

In addition to the initial scoping interviews and site visit, SIA team members were in . the Teviot Valley area in the week of 11 July 2022 and had four key activities that all contributed to the analysis of social impacts in this report:

- A Community Forum held under the auspices of the Teviot Valley organisation known as Teviot Prospects, formed previously for the purposes of developing community development strategies and active in holding a regular "coffee" meeting at the Millers Flat Hall to discuss local issues. The forum was workshop-format meeting held over the morning of Tuesday 12 July. It included presentations to describe the project timeline and feasibility studies underway up to a decision by Cabinet on options that should proceed to further investigation and/or planning, and an outline of the SIA and typical social impacts experienced with hydro-electricity projects. Participants then met in small-group discussions and brainstormed social issues and impacts. Notes from . the forum . discussion .are provided in Annex 3. Phone calls or virtual meetings were offered to those that could not attend in person.
- A meeting was held in the home of a potentially affected landowner. Attendeeswere a group of some of the farmers potentially affected by the flooding of farm land at Lake Onslow and therefore potentially affected by arrangements for land acquisition as well as by any disruptions to farming operations from access agreements, technical investigations and construction activity, such as the use of roads for stock movements.
- A "breakfast meeting" was held with around 30 members of the Roxburgh Teviot Valley Business group in a Roxburgh café to discuss project implications for businesses and the local economy.
- A series of meetings was held with the Mayor, Economic Development Officer, Senior Policy Planner and members of the Teviot Valley Community Board of the Central Otago District Council (CODC).

2.7 Tasks for the interim SIA

In summary, the following tasks were undertaken to develop scoping of the SIA into an interim assessment of social effects during June and July 2022:

- Attend project briefings and discussions with people undertaking related assessments including recreation assessments and landholder agreements

- Review the detailed project description prepared by Te Rōpū Matatau and information, diagrams, maps and plans to understand the physical parameters of the project
- Obtain information on proposed acquisition of land at the lake and other sites and how the acquisition process will proceed
- Obtain information on likely workforce requirements over time by industry group
- Assess the capacity of the labour market, housing and infrastructure to meet workforce requirements and consider issues for accommodation and housing
- Engage with affected parties to help identify and describe effects and management options, and coordinate this activity with overall project communication and engagement activities
- Expand the description of community values and topical issues based on the community engagement and additional desk-top analysis focused on workforce issues
- Update and expand the assessment of effects from the scoping analysis.

3 The existing social environment

3.1 Overview of the wider assessment area

Fed by the Southern Alps, alpine lakes and its major tributaries, the assessment area is dominated geographically by the Mata-au / Clutha River. Mana whenua for the Mata-au / Clutha, Teviot River and Lake Onslow is held by three papatipu rūnaka of Kai Tahu: Te Rūnanga o Ōtākou, Kāti Huirapa ki Puketeraki and Hokonui Rūnaka.[9]

The economy of the area is based predominately on agriculture, horticulture and forestry, a feature of the distribution of employment across industries in both districts, followed by retail, rental services and other service sectors. The service sectors are driven in particular by tourism activity (see Annex 2 for further detail on business numbers and types, and employment by sector). Domestic and international visitors and amenity migrants, including second home owners and retirees, all contribute to the economy.[10] Construction activity is also a significant contributor to employment, including for housing and expanding infrastructure. Operation of hydro-electricity adds to GNP and to employment with periodic plant upgrades. Historically, gold and coal mining[11] were important sectors in the Teviot economy and a small coal mine remains today.

There is a long history of hydro-electricity investigations and developments in the Mata-au/ Clutha catchment. These include completion of the Roxburgh, Lake Hāwea and Clyde dams on the main river and a number of small hydro-electricity facilities, with several in the Te Awa Makarara /eviot River catchment. Investigations of additional projects have included the upper and lower Mata-au/ Clutha, with none of these proceeding as yet, primarily because of the costs involved.[12]

The Roxburgh dam was built in the 1950s and had significant social impacts on the community there from the presence of the construction workforce, with a temporary village built on Roxburgh East and a permanent (operational) village at the dam, just up river from the township. Further upstream, the dam at Clyde had a particular social impact on Cromwell in the 1980s and 1990s, as most of the workforce was located there and left a legacy of housing and social infrastructure in the town. These dams together flooded cultural sites, horticultural and farm land, homes and an historic part of Cromwell town. They also created reservoirs widely used now for recreational purposes and appreciated for their amenity values. Displacement of horticulture, and available irrigation, saw this land use progress from river flats to a much wider range of types and sites.

An economy based on agriculture, horticulture, tourism and construction tends to experience cyclical changes due to vagaries of weather, international markets, available workers and logistical vulnerabilities. Most recently, the Coronovirus pandemic (**covid 19**) has affected land transport and hospitality, for example, with Otago region hit hard due to the reliance on international visitors, affecting visitor numbers, economic activity and employment, including the demand for and

[9] See Aukaha Ltd (2021) for further detail.
[10] Mackay et al. (2014).
[11] Coal mining developed for local use and then to power gold dredges on the river (Webster 1948).
[12] https://www.odt.co.nz/regions/central-otago/contact-pulls-plug-dams

availability of seasonal workers.[13] On the other hand, new cycle trails such as the Dunstan and Clutha Gold trails have continued to boost the local economy due to domestic demand.

The economy drives employment, which in turn drives population, the size of the settlements and the viability of community facilities such as schools. Table 1 presents historic population counts for the study area, since 2006. Approximately 24,790 people live in Central Otago and 18,490 in Clutha district. Some observations about the population count of the selected communities are (see Annexes 2.1 and 2.2 for further detail on population and employment outlook and Annex A2.3 for school roll data):

- Central Otago population is largely concentrated within the main urban areas of Cromwell (27%) and Alexandra (24%), with these two urban areas accounting for more than half of the district's population.
- Approximately 1,880 people live in Teviot Valley, with Roxburgh having 620 people, followed by Ettrick (180 residents) and Millers Flat (90 residents).
- Approximately 820 people currently reside in Tapanui and 470 in Lawrence.

Table 1: Population - Central Otago District and Clutha District

Population (Historic and current)					Total Change (n)			Change %		
Reporting Area	**2006***	**2013***	**2018***	**2021**	**2006-2013**	**2013-2018**	**2018-2021**	**2006-2013**	**2013-2018**	**2018-2021**
Cromwell	3,850	4,500	5,830	6,630	650	1,330	800	2%	5%	4%
Clyde	930	1,040	1,180	1,250	110	140	70	2%	3%	2%
Alexandra	4,940	4,920	5,630	5,960	-20	710	330	0%	3%	2%
Ranfurly**	730	680	740	770	-40	50	40	-1.0%	2%	1%
Roxburgh**	620	540	600	620	-80	60	20	-2%	2%	1%
Ettrick**	180	180	170	180	-	-	10	0%	-1%	2%
Millers Flat**	100	90	90	90	-10	-	-	-1%	0%	0%
Rest of Teviot Valley	820	800	960	990	-30	160	30	-0.4%	4%	1%
Rest of Central Otago District	4,880	5,730	7,020	8,300	840	1,300	1,270	2%	4%	6%
Total Central Otago District	**17,050**	**18,480**	**22,220**	**24,790**	**1,420**	**3,740**	**2,570**	**1%**	**4%**	**4%**
Lawrence**	440	420	460	470	-20	40	10	-1%	2%	1%
Tapanui**	760	740	800	820	-30	70	20	-0.4%	2%	1%
Rest of Clutha District	16,020	16,080	16,780	17,200	70	700	420	0.1%	1%	1%
Total Clutha District	**17,220**	**17,240**	**18,040**	**18,490**	**20**	**800**	**450**	**0.02%**	**1%**	**1%**

Source: Stats NZ; Market Economics calculations

**Census years.*

*** Stats NZ releases population estimates in non-census years with some uncertainty because 2021 estimates are released by SNZ is at a higher spatial level than reported for these areas, requiring adjustment calculations by ME.*

Over the past 15 years, Central Otago District has experienced much stronger population growth relative to Clutha District. The Central Otago population increased from 17,050 to 24,790 residents between 2006 and 2021 (+7,730), while Clutha increased from 17,220 to 18,490 (+1,270) over the same period. Most of the growth occurred from 2013 onwards. The annual growth rate across Central Otago was around 4% between 2013 and 2021, compared to 1% per annum between 2006

[13] https://www.nzta.govt.nz/assets/planning-and-investment/arataki/docs/regional-summary-13-otago-potential-impacts-of-covid-19.pdf (Otago specific analysis pp. 24-27)

and 2013. Similarly, Clutha experienced very little growth (<0.1%) between 2006 and 2013, shifting to around 1% per annum between 2013 and 2021 (see Annex 2).

Central Otago households are concentrated within the urban areas of Cromwell (24%) and Alexandra (27%) with more details provided in Annex 2. The numbers of households reflect the total population and household size. The towns tend to have more households than rural areas because of the high number of elderly living there and in smaller households.

The population of Central Otago is projected to reach 31,560 in 2048, growing by 27% from 24,790 in 2021. Most of this growth is projected for Cromwell and Alexandra, suggesting Central Otago's population will remain concentrated in these urban locations. Nonetheless, the urban population is projected to grow more slowly than in the rural areas, so in future the urban share of the population is likely to reduce a little making up a smaller share (53%) of the district's population in 2048 compared with the current share (56%). (Further details on population projections are in Annex 2).

The population has an older age profile than found nationally. There are high numbers in age groups over 40 years, including those aged 65 years and over, and those 80 and over. The age profile indicates an aging population across these two districts, a trend evident across New Zealand but at a faster pace within the study area as people come in to retire (Annex 2.1). An older population has implications for the supply of labour and demand for social services. For example, the rolls of many schools are falling (Annex 3) and communities raise demographics as an issue of concern, as discussed in the localised descriptions below.

Consistently across the study area, higher proportions of respondents identify as European, relative to the national average. In Central Otago, Europeans make up 92% of the population, and 89% in Clutha, compared with only 70% nationally. For settlements in the study area, this ranges from 84% in Ettrick up to 97% in Millers Flat.

Concurrently, for Māori, Pacific peoples, and Asian groups, the proportion of the population they represent, is generally lower across the settlements within the study area, than the national average. Māori represent 8% of the Central Otago District and 12% of the Clutha District population, compared with 17% nationally. Annex 2 has further information on demographics and households.

3.2 Cromwell and Lake Dunstan area

Cromwell (estimated population of 6,630 in 2021) is the main town in an intermontane basin dissected by the Mata-au/Clutha and Lakes Roxburgh and Dunstan. The history of Cromwell is heavily influenced by the discovery of gold in 1862 and then the construction of the 460 MW Clyde dam project in the 1980s and early 1990s, and the creation of Lake Dunstan. Filling of Lake Dunstan led to resettlement of some homes and relocation of the town centre and many community facilities. Heritage remnants of the old town are a popular visitor attraction[14] and Cromwell is on the main tourist highway routes into the lakes area, Queenstown and Wanaka. The area drew a pre-covid 19 mix of domestic and international visitors, including backpackers working seasonally in hospitality and horticulture.

[14] https://www.odt.co.nz/regions/central-otago/celebration-cromwells-past

As with the wider Central Otago District, Cromwell's economy relies on primary industry (pastoral agriculture, horticulture and viticulture), as well as trades and service sectors including retail, education and hospitality, with considerable growth in business activity from 2001-21 as shown in Annex 2.2.[15] Diversification of land uses into grapes (including premier pinot noir plantings), cherries and olives is the result of available irrigation and a favourable climate. There has been significant expansion of peri-urban and lake-front land with amenity migrants and lifestyle blocks. Past investigations of potential hydro projects up river at Luggate and Queensburry have not led to additional projects in that area.[16]

Its central location helped Cromwell develop as a significant service centre after construction of the dam at Clyde, when many workers were based in Cromwell. There is a broad range of social infrastructure including early childhood education options, two primary schools and a secondary school (Cromwell College) plus the Central Otago Campus of the Otago Polytechnic. There is also a wide range of recreational and social facilities, the retail and commercial area, a growing light industrial area, and a range of emergency services and other health services and churches.

Construction of the Clyde Dam saw a significant increase in population, then a fall, but many worker houses were of permanent construction and have since attracted new residents. Population growth in Cromwell from 2006 has consistently outpaced the district's growth, accounting for more than a third (35%) of the district's population increase between 2006 and 2021, benefitting from the spill over of population from Queenstown and Wanaka.[17] Between 2013 and 2018, Cromwell's population also increased at a faster rate than the rest of Central Otago but this has softened over the past three years (Table 1).

A number of issues and development opportunities are identified in the Cromwell Community Plans (2013, updated 2020) and other sources:

- Population growth and rural subdivision requires active spatial planning to retain the amenity values that attract visitors and newcomers. Development in the area needs to be sympathetic to the surrounding landscape, green space, water quality, heritage and sense of space and place. Growth will continue to put pressure on all services and infrastructure with demand for water for urban use, households, irrigation and wastewater disposal ever-present issues, and with seasonal pressures and peaks in demand requiring consideration[18]
- The community values Lake Dunstan for its amenity and the recreational activities it offers, with a community desire to ensure that the values of the lake are well managed into the future and environmental quality is retained
- There is a loss of young people for education and employment, partially mitigated by local provision of tertiary education and apprenticeship opportunities

[15] http://www.stuff.co.nz/southland-times/business/4705374/Cromwell-thriving-as-hub-for-Central-Otago-businesses
[16] https://www.odt.co.nz/regions/central-otago/contact-pulls-plug-dams
[17] https://www.stuff.co.nz/business/90641635/oncesleepy-cromwell-the-rising-star-of-the-south
[18] https://www.stuff.co.nz/business/102359965/masterplan-to-be-developed-for-cromwells-future-amid-unprecedented-and-continuing-growth

- A large number of charitable trusts and organisations in the Cromwell district contribute to the running of community organisations and the community volunteer hours that build community connections and social capital.

3.3 Alexandra, Clyde and the Manuherikia Valley

Alexandra (estimated population of 5,960 in 2021) has become the administration centre for Central Otago, including having the central offices of the District Council and a number of government agency offices. It is an important service centre for the horticulture, pastoral and viticulture industries and for lifestyle properties, along with an increasing number of tourism activities. Dominant activities include pastoral farming, orcharding, the hospitality industry, viticulture, central government departments, service industries for farming, horticulture and viticulture, and health and education services.[19]

The town sits at the head of Lake Roxburgh on the Clutha Mata-au and the confluence of the Manuherikia River. Areas surrounding Alexandra town include the nearby town of Clyde, Conroys Gully, Earnscleugh, Gilligans Gully, Letts Gully, Springvale, Galloway, Muttontown, Springvale and Chatto Creek. There is also a string of small settlements and associated rural localities further up the Manuherikia valley into the Maniatoto[20] including, Omakau, Ophir, Lauder, Becks, Oturehua and St Bathans. Local businesses service the farming community as well as cycle tourists and other visitors.

These towns and localities were heavily influenced by the 1860s gold rush. Original orchards served the mining community, and around the turn of the century orchardists realised the full potential of the dry climate and fertile soil combined with the irrigation available from old mining races, and horticulture expanded rapidly. Irrigation via the Omakau Area Irrigation Scheme (built in the 1930's), utilises water from the Manuherikia River, supplemented by the Falls Dam higher up the catchment.

Summer visitors and holiday makers are a long-standing part of the area and they were boosted in recent years by cycle tourists. The Otago Central Rail trail utilised the old railway route from Middlemarch to Clyde and was the first great ride in the area. More recently the Lake Dunstan Cycle Trail opened in 2021 with considerable success, and the Clutha Gold trail is currently being extended downstream (from Lawrence to Waihola) extending a new "river of gold".

Alexandra has a summer population of more than 7,000 people with visitors, holidaymakers and seasonal workers. In recent years, new subdivisions and housing have brought new residents, and there are a large number of retirees and residents drawn by remote working and the available services, amenity and lifestyle.

Clyde (estimated population 1,250 in 2021) is 7.5km from Alexandra and known for its goldmining history and relics and distinctive pioneer architecture. It was the administrative centre for Vincent County until the local government reorganisation in 1989 (when the centre moved to nearby Alexandra). There was significant change in the area during the 1980s and 1990s with the

[19] Information drawn from the Alexandra Community Plan (2013), the Clyde Community Plan (2010), Annex 2 and other sources cited.
[20] In this report the spelling of Māniatoto is used in accordance with the Ngāi Tahu atlas.

construction of the Clyde Dam, and flooding of the Cromwell Gorge up river, where Lake Dunstan has become a significant recreation asset for the area, with handy foot, cycle and boat access to the lake and lake margins above Clyde.

Pastoral farming, orcharding, hospitality and viticulture contribute to the economy of these two towns along with retired people, families, small lifestyle properties and a range of government administrative and social services. Dunstan Hospital was upgraded in 2005 and is a key facility that dates back to 1863. The area has exceptional recreational opportunities that attract holiday home owners and draw in visitors. Most recently, the two cycle trails of Roxburgh Gorge and Clutha Gold (downstream from Alexandra) and the Dunstan Trail linking Cromwell and Clyde (along the western lakeshore) are attracting riders over an extended visitor season, boosting cycle tour companies and hospitality businesses.[21] A number of homes were unoccupied (residents away or dwelling empty) at the time of the 2018 census, indicating the presence of holiday homes in Clyde in particular (30% of dwellings there) versus just 9% in Alexandra (see Table A.9 in Annex 2).

Populated by families with a strong sense of connection to the area and given a wide range of social infrastructure including primary health services and Dunstan Hospital, an active hospitality sector and good sports facilities, these towns attract retirees and have a high proportion of people aged 65 and over (Alexandra 29% and Clyde 30%). There are also a large number of people aged over 80 years amongst this age group.

A large number of service related businesses meet the needs of the surrounding agricultural, horticultural and viticulture industries, as shown in Annex 2.2. Alexandra has visitor accommodation and campgrounds, excellent recreation and spots facilities and several community halls. Active volunteers support the many social services and community organisations and the continuation of these services. Government representation includes Oranga Tamariki, Accident Compensation Corporation, Department of Conservation (DOC), Work and Income, the District Court and Probation Service.

North from Alexandra, up the Manuherikia Valley, Omakau is a small f settlement, which, like nearby Ophir and locations such as Oturehua and St Bathans, has historic buildings and a gold mining-era history and heritage. Omakau was a key point on the rail link between Dunedin and Central Otago, but better roads and road transport led to closure of the Otago Central railway line in 2000 and contributed to the decline of small adjoining settlements. Added to the reductions in farm labour requirements over time, the valley has experienced a loss in population. However, the development of the Otago Rail Trail has helped to invigorate the villages along it. Some residents commute to Alexandra for work and some families send their children into Alexandra for their schooling.

A number of issues and development opportunities are identified in the relevant community plans and survey of media sources for Alexandra, Clyde and the Manuherikia.

- Alexandra has experienced an increase in new subdivisions and house prices along with demand for industrial and commercial land as the Central Otago economy grew. On the

[21] https://www.stuff.co.nz/travel/experiences/cycling-holidays/300534206/lake-dunstan-trail-55000-more-riders-than-expected-in-first-year?cid=app-android

other hand, a shortage of skilled labour, isolation from markets and transport costs, a small local market and seasonality, are all limits to further growth

- Increased land and housing prices along with rising living costs has put Alexandra out of reach for young families (as a place to live) so there is a spill over of population to nearby communities, including Omakau[22]
- The availability of apprenticeships (in all trades) slows the loss of young people who otherwise leave for education and employment opportunities
- Opportunities for businesses include farming, horticulture, fruit processing, mining, tourism, and construction. Improvements in IT (dependent on access to ultra-fast broadband), an attractive environment and lifestyle can attract information technology-related businesses and people working from home. There is a perception of business and employment competition (and losses) to Cromwell as it expands
- The community have worked hard over time to retain and expand Dunstan Hospital (Clyde), and to support the NIWA base in Alexandra and atmospheric research station at Lauder
- There is growing community unease about the negative effects of intensive farming, particularly dairy. Intensive land-use practices and new regulations highlight the need to develop sustainable irrigation supplies and reduce stress on farmers.[23] Environmental concerns include the impacts of development on outstanding natural landscapes, control of wilding trees and pests, awareness of native biodiversity and healthy ecosystems and reducing air pollution in populated valleys prone to air inversions in winter
- Concerns surround preservation of heritage features and identification of historic values of buildings and relics, especially with new earthquake standards. It is important to balance new development, heritage and town character, with lifestyle values of residents
- Potential growth of tourism and visitors is possible on the Central Otago, Lake Dunstan and Clutha Gold cycle trails with potential for Alexandra to become a recreational cycling hub, supported by improved visitor information and signage
- Economic cycles include periodic downturns as well as periods of growth. There was a boom of real estate activity rippling out from development in Queenstown and Wanaka, and most recently there is a downturn in visitors with covid 19
- Periods of growth put pressure on infrastructure and a small ratepayer base in the smaller settlements for maintaining or upgrading water supply, reticulated sewerage systems and wastewater disposal, public toilets, drinking water, rubbish and recycling collection, roading, footpaths and street lighting
- Retention of young people is an ongoing issue - older teenagers and young adults tend to move out of the region for education, career or 'life' experiences, although many later return to raise their own families in Central Otago
- High numbers of elderly, and older elderly requiring specialised care, are placing pressure on community services
- There is room for improved communication throughout the community and between the main towns and smaller communities and Council. It is often difficult to get consensus across small and diverse communities with some apathy and negativity toward local authorities.

[22] https://www.odt.co.nz/regions/central-otago/over-omakau

[23] Manuherikia River: Ongoing battle a draining experience for farmers - NZ Herald
This article which reports on the stress experienced by local farmers in respect of the Manuherikia River and its future minimum flows, also concerns around wider range of water regulations coming into force

3.4 Ranfurly, Patearoa and the Māniatoto

The Māniatoto basin's main service town is Ranfurly (estimated population of 770 in 2021) and there are several other smaller settlements, which include Patearoa. A road south through Patearoa connects with the Lake Onslow Road, a formed track through to Millers Flat suitable for 4W drive vehicles and closed during winter to prevent damage to the road surface.[24] Farmers in the Māniatoto operate parcels of the land around Lake Onslow.

Ranfurly grew due to its location on the Central Otago railway, with a station, post office the Ranfurly Hospital (built in 1929), school (1926) and area school (since 1969). With pastoral farming and expansion of economic activity the town flourished and the population expanded to 850 residents by 1961. But through the 1980s there was a period of decline and loss of businesses, services and people. This trend turned around mainly due to the Māniatoto Irrigation Scheme completed in the mid 80's,[25] with increasing farm productivity and employment and demand for worker housing. The Central Otago railway finally closed in 1990 and was replaced by the Central Otago Rail Trail in 2000 – a cycle trail initiative that has brought considerable benefit to the places along it, fulfilling a locally-driven development strategy to boost tourist activity.[26]

The total population of the Māniatoto and Ranfurly has increased modestly in recent years (Table 2) and is further boosted by retirees and visitors in the summer. There is a small number of hospitality businesses and social infrastructure including the hospital, health services and rest home, a store and agricultural services.

A number of issues and development opportunities are identified in the relevant community plans for Māniatoto and Patearoa and the Upper Taieri plus the survey of media sources.

- The reliance on agriculture (sheep, beef and dairy) means that the economy is inextricably linked to external factors such as the value of the New Zealand dollar, demand for farming produce and climate changes, especially periods of intense drought. Continuing access to water supply for irrigation is a key issue for maintaining farm productivity
- There is land available for development and 22% of dwellings were unoccupied in 2018. Increased urban development, and short-term or seasonal demand, will put pressure on infrastructure (water supply, sewage disposal methods) and roading services (footpaths and street lighting), with a financial burden on a small ratepayer base. There is concern about the potential costs of upgrading the town water supply and upgrades are needed for the hospital and area school
- Identification, protection and promotion of heritage (farming, railway, mining history, engineering and art deco buildings) is important for locals and visitors. There is potential to promote the full set of Otago rail trails and to promote seasonal events (e.g., Cavalcade) which utilise the strengths of the area (including more winter activities such as winter sports with the ice rink at Naseby)
- Skills shortages across business, trades and services could limit future activity alongside rising costs of business compliance

[24] https://www.codc.govt.nz/services/roading/back-country-tracks
[25] Maniototo scheme 'lifeblood' of area | Otago Daily Times Online News (odt.co.nz)
[26] Warren and Taylor (2001) pages 64-5.

- There are challenges for localities to keep their uniqueness and maintain cultural values and community attributes, such as being a safe, friendly, down to earth place to live
- There are concerns around a reliance on volunteers and maintaining volunteerism
- There is concern and community division over the protection of unique landscape attributes (e.g., opposition and support for Project Hayes wind farm).[27]

3.5 Teviot Valley including Roxburgh

The Teviot Valley area is shown in (Figure 2) and includes the main town of Roxburgh, which has a history of dam construction and public works as have Lake Onslow and the Te Awa Makarara / Teviot River (discussed in more detail below in Section 3.7). It is highly likely that the Valley would host significant aspects of construction activity for the Lake Onslow project, as a base for contractors as well as experiencing physical works.

Teviot Valley was first settled by sheep farmers in the late 1850s and gold was discovered in 1862 with Roxburgh becoming a major centre for gold mining. Later, the sluicing channels made by miners were used for irrigation, allowing development along the river flats.[28]

Hydroelectricity has played an important part in the history of the Valley with the first facility commissioned in 1924 and further small hydroelectric stations on the Te Awa Makarara / Teviot River at Teviot Bridge (1972), Ellis (1981), Michelle (1982), Lake Onslow (1984) and Tallaburn Power (2010). The Roxburgh dam was commissioned on the main stem of the Mata-au / Clutha in 1956. Its development brought many people into the district for construction and formed Lake Roxburgh up to Alexandra, with opportunities created for recreational activity. Most recently, a small 2.3 MW hydro scheme was commissioned in 2010 on Beaumont Station.[29]

Lake Onslow (discussed below in more detail) also stores water from the Te Awa Makarara / Teviot River for irrigation. The Teviot Irrigation Company draws water from Lake Onslow for farming as well as for rural water supplies (includes stock and household). The water in the river is shared between the irrigation company and Pioneer Power (based in Alexandra), who maintain the dam at Lake Onslow and utilise the head of the lake to take the water through six small power stations. The Teviot Flat Water scheme takes water from a bore close to the Mata-au / Clutha to supply households in the area. This scheme arose from the efforts of the Teviot Valley Community Plan group and is now run by the Millers Flat water company. By providing water the settlement was enabled to grow as the supply avoided conflicts between household bores and septic tank systems.

Pastoral farming and horticulture are the principal economic activities of Teviot Valley with two main dairy farms on the valley floor and some dairy grazing. Summer fruit and pip fruit are also important industries (but are subject to the vagaries of climate and international and domestic markets and logistics). The fruit industry is reliant on seasonal workers. Some of the apricot yield was canned locally until the early 2000s with the area in apricots declining since the loss of productive land to the Roxburgh dam reservoir.[30] A small coal mine remains operating near Roxburgh. There are a

[27] https://www.odt.co.nz/opinion/project-hayes-it-simply-didnt-stack
[28] See Webster (1948).
[29] https://www.hydroreview.com/world-regions/private-development-of-the-paul-2/#gref
[30] https://www.odt.co.nz/lifestyle/food-wine/preserving-dying-art

number of fruit packhouses, agricultural contractors, and various services including health and education, retail and hospitality business, concentrated in Roxburgh but also evident in the smaller settlements such as Miller Flat.

With the advent of centralised local government and services, Alexandra has tended to be the local centre for service provision. Loss of services leads over time to the loss of professional people who contributed to the local organisations. That said the valley retains a rest home, medical centre, primary school, area school, and active community halls operated by local organisations. The Millers Flat Hall committee is a good example of these organisations, maintaining the hall as an active community hub alongside the school and swimming pool.

The biggest permanent employer in the Valley was Roxburgh Children's Health Camp with a staff of 43 (closed in 2018). It provided a service to children and their families from Oamaru south. There is potential to re-purpose and develop the old facility led by local iwi. The development of the Clutha Gold and Roxburgh Gorge cycle trails has provided recent economic impetus and drawn attention to the Valley's recreational potential and attractive lifestyle amenity.

Population growth in Teviot Valley has been much slower than the rest of the district, with negative annual growth between 2006 and 2013. Over the past three years the population in Teviot Valley grew at just 1% per annum, compared to 6% growth across the rest of Central Otago (Table 1). In addition, it is notable (see Annex 2.1) that the populations of Roxburgh (21%) Ettrick (23%) and Millers Flat (34%) have high proportions of people aged 65 plus compared with the rest of the Valley (18%) and the District (16%). As with Alexandra and environs the Valley is an attractive location for retirement.

The Teviot community view these demographic trends as a particular challenge for their future, so Teviot Prospects ran a futures forum with Dist. Prof. Paul Spoonley and other speakers in September 2020 , who discussed the downward trends in total population, and an ageing population with a decreasing age group aged 15 and under. Teviot Prospects is a local community organisation (Charitable Trust) focused on community wellbeing and futures. Begun around 2005 to contribute to the Community Plan they have continued with their own plan and goals for the area, most recently organising this workshop on demographics and community futures.[31]

A number of issues and development opportunities are identified in the 2011 Roxburgh and Teviot Valley Community Plan and in our interviews and survey of other media and other sources:

- A lack of long term and skilled-work employment opportunities is of great concern in respect to retaining young people and attracting new families to the Valley. There are efforts to develop a skate/bike park, with some local controversy, and retain a centre for youth[32]
- Horticulture requires seasonal labour although there is a shift to greater mechanisation. Seasonal variation in employment means there is an element of transience in the population with labour sources including RSE[33] workers, back packers and retirees. In recent years, covid 19 has required more sourcing of local workers

[31] https://www.thenews.co.nz/community/ageing-population-challenge-for-teviot/
[32] https://www.punarangatahi.nz/about-us
[33] Recognised Seasonal Employer (RSE) scheme workers from selected Pacific Island countries

- The 20–45-year-old age group is noticeably under-represented in the population, with high school graduates leaving the Valley for tertiary study and jobs and not returning, so reducing the pool of new workers. Working families, remote workers and retirees are attracted to live in the area because of high amenity values including the river and environs, the scenery and opportunities for living in a peaceful place
- There are advantages for operating a business in the Teviot Valley (quality of life, customer loyalty and local labour), as well as disadvantages (transport costs and a shortage of skilled labour) and major constraints to expansion (availability of finance and size of local market)
- Negative attitudes, entrenched views and resistance to change are factors that have held back the area, to some extent, in the past[34]
- There are some concerns associated with the capacity to accommodate increasing numbers of cycle trail visitors and their expectations for supplies and services alongside seasonal workers
- There are increasing concerns about water quality at Lake Roxburgh Village and the costs of upgrading community supplies[35]
- Older residents increase the number of people available to volunteer (younger elderly) but people aging in place also increase demand for social services, particular primary health care, due to the increasing number of people with long-term conditions.

3.6 Lawrence, Tuapeka and Tapanui

Lawrence, Tuapeka and Tapanui lie in Clutha District and on the lower reaches of the Clutha Mata-au. The towns and surrounding rural areas are potentially affected as part of the labour market and procurement area for the project.

Lawrence (with an estimated population of 470 in 2021) is the centre for a population of around a further 1,600 in the surrounding Tuapeka area, which includes smaller townships from Beaumont across to Waitahuna.[36]

As with the Central Otago communities, the history of Lawrence as a settlement lies in the 1860s gold rushes and the extension of transport links.[37] A branch railway from Lawrence to the Main South Railway Line opened in 1877, and the Roxburgh Branch was built in 1910. The railway closed in 1968 and the town's station was demolished.

In addition to pastoral farming in the surrounding area, Lawrence has developed a strong reputation as a visitor location offering heritage and historical attractions. Cycle tourism is also increasing due to the Clutha Gold cycle trail to Lawrence, with a mixture of hospitality outlets and unique local businesses, including a saffron farm.

Tapanui (with an estimated population of 820 in 2021) is a forestry town at the foot of the Blue Mountains on the Pomahaka River (Mataura catchment through Southland) and home to

[34] Roxburgh and Teviot Valley Community Plan – 2011, page 11.
[35] https://www.stuff.co.nz/southland-times/6630036/Water-costs-force-Roxburgh-rate-rise
[36] https://www.lawrence.nz/
[37] Gabriel's Gully (4 km from Lawrence, in a side valley off the Tuapeka River) was the site of Otago's first gold rush and swelled the population to over 11,000. A settlement of Chinese miners just outside the town had 300 residents in 1870.

approximately 820 people in 2021. Tapanui also had a branch railway line opened in 1880 and closed after being damaged by severe flooding in the region in 1978.

The Tapanui economy depended heavily on the provision of forest services and timber milling but employment in this sector has reduced over time with closures and redundancies. Overall, employment in agriculture, forestry and fishing has fallen over recent years in the Clutha District (as shown in Annex 2.2).

Popular with outdoor adventure seekers (hiking, hunting, and trout fishing) there is a variety of accommodation available (hotel rooms, B&B, motor home and cabins) along with a range of community services (medical centre and rest home, library, toy library, primary and area schools).

A number of issues and development opportunities are identified from the material surveyed and the Council community plan processes. The 2020 Lawrence-Tuapeka Community Plan identifies six key points of concern: facilities and infrastructure; opportunities for development; parks and reserves; destination management; walking and cycling; landscape and environment. The Tapanui (West Otago) Community Plan is currently in process.

The council hopes to identify projects that will promote inward migration to the district, under its Living and Working in Clutha strategy. Potential projects that could help to attract people to live and work in Lawrence-Tuapeka and Tapanui include improvements or additions to community facilities such as playgrounds and a skate park, council-facilitated housing, industrial or commercial developments, conservation and enhancement of landscape and environment such as community wetlands, heritage projects, Tapanui main street improvements, and the creation of walking or cycling trails.

Growth in employment opportunities has driven a gradual population increase in the Clutha District since 2013, leading to demand for more homes. Employment opportunities are needed alongside housing development to attract people to live and work there.

3.7 Lake Onslow area

Located 22 km east of Roxburgh (at the head of the Te Awa Makarara / Teviot River), Lake Onslow is a product of the 1888 damming of the upper River by the Roxburgh amalgamated mining company. The dam was progressively rebuilt and the lake raised to cover around 380 hectares. Lake Onslow lies around 680m above sea level with small seasonal variations from draw down by Pioneer Energy for electricity generation and irrigation.

The lake and environs are considered a “treasure” by Māori and by local people for its ecological and cultural values, water-based recreation, feed production and summer grazing values, and as a source of water for energy and for irrigation. The cultural values assessment places the lake and environs as an important place for regional iwi, being a source of mahinga kai and traditional places (many recorded as archaeological sites). The cultural assessment records the progressive loss of the surrounding wetlands (dubbed locally as “Dismal Swamp”) from successive raising of the lake over

many years to form a reservoir and head of water for irrigation and hydro-electric power generation, with negative impacts on Kāi Tahu life and identity.[38]

Local people and visitors regularly use the lake for recreational purposes that include angling, hunting (ducks and pigs in particular), cycling, 4W driving, sightseeing and passive recreation, including people who regularly visit several huts located on the lake shore.[39] The lake holds a sustainable fishery stocked with brown trout and there are several access points and a boat ramp.[40] The Lake is notable for an all-year fishing season (although the recreation assessment found most use is in summer during the cicada flight) and there is a high bag limit with trout commonly taken for food verses release. Lake Onslow and the Te Awa Makarara / Teviot River are considered a fishery of regional significance, part of a series of dams and reservoirs used for angling in the Mata-au / Clutha and Upper Taieri catchments. Most importantly, this is also a fishery used by local anglers including farm families, and the Teviot Angling Club has two of the huts at the lake.

At least 10 farm properties adjoin the lake and farm the lake margins that are potentially flooded by the project. Land tenure is typically dynamic and complex in this high-country, tussock environment, with farm enterprises representing a mixture of land holdings, farm practices, and stages in farm life cycles and family succession. Farmers in the area traditionally used the lake area for summer grazing and the farmers live at lower altitudes. Most properties have a mix of land holdings at different elevations (low, medium and high). There are small areas of forestry in the catchment as well.

There are risks to stock from snow in the winter and sheep in particular are brought down for winter, with ewes typically held on lower country for lambing. There is some intensification in the form of cultivated land, improved pastures and summer feed and small areas of forestry. On hill country around the lake there are common improvements to pasture by over sowing with clovers and lotus spp., and by top dressing.

3.8 Summary of key values

A useful way to summarise the affected area is to list key values of the potentially affected communities.[41] Values reflect underlying considerations of individuals, groups and communities about aspects of the social environment that are important in their lives. The following values emerged as important through this preliminary description of the social environment:

- Pastoral farming dominates throughout the area and provides a high degree of social stability through farm succession, participation in community life and strong stewardship values
- Horticulture is also an important primary production, originally most evident on the river flats but now evident in the Teviot Valley and the extension of wineries and summer fruit in the upper catchment of the Clutha / Mata-au

[38] See Aukaha Ltd (2021) for further details including a history of development and environmental loss.
[39] See Greenaway (2021) report on recreation for further details. Note also the holiday homes are not captured by the SA1 statistical area which follows the lake margins so the homes are spread over other statistical areas and it is not possible to discern statistical information about them, such as occupancy levels.
[40] https://fishandgame.org.nz/dmsdocument/145
[41] Sometimes referred to in SIAs as Citizens' Values Assessment.

- Food processing is important in this area of food production, with beverages recently proliferating (wineries and distilleries emphasising local terroir). Fruit packing is common but stone fruit processing is now limited. Meat processing is located in Clutha District and milk and meat processing in Southland
- Irrigation is vital for horticulture and any intensification of farming including dairy production, and also for summer and winter feed production that increases productivity of large-scale pastoral farming systems. Irrigation widely utilises old mining permits and races and communities are actively involved in processes to set water quantity and quality limits[42]
- Innovation and economic development are highly valued, especially development that creates employment opportunities that attract young people and people with families
- Social services in health, education, policing and local government are highly valued
- There are many diverse landscapes, cultural and heritage sites valued by mana whenua, local communities, recreationists and visitors. These form the basis for community identity and strong, localised sense of place
- Gold mining and farming histories are highly valued (with strong connection to this heritage fostered by the presence of multi-generational residents)
- The sense of place, high amenity values and peaceful places to live together attract retirees and remote workers
- There are strong values of small, close-knit communities with emerging concerns around the direction of development, population growth, intensive farming, sustainability of visitor numbers, greater social diversity and maintaining community cohesion
- Strong values of resilience and social capital emphasise self-sufficient rural communities with a strong volunteer base, such as support for the volunteer fire brigades, local primary schools, community libraries, halls, pools, and services for the elderly and new settlers.

3.9 Summary of key themes for the existing social environment

Community adaptation

There is a history of adaptation and reinvention throughout the assessment area, with successive periods of economic development around resource cycles of gold mining, pastoral production of wool and meat, summer fruits, grapes and wine. There is long-term reliance on seasonal and transient workforces. Economic diversity brings strength and communities have actively pursued new ventures in outdoor recreation and tourism alongside local food and wine, and hospitality. Cycle trails are described as current day 'ribbons of gold.' Hydroelectricity has seen the construction of large and small dams with temporary and expanded settlements to house construction workers. Hydro lakes have become attractive resources for recreation and locations for amenity migrants. Railways were very important in opening up this area and connecting communities, replaced today by modern roads. River systems (irrigation, hydro and recreation) still connect communities and emphasise interdependence up and down stream. Social capital is strong with heavy reliance on community volunteers, with strong resilience that sometimes results in entrenched views and resistance to change, while new population groups continue to challenge community characteristics and help to drive adaptation.

[42] https://interactives.stuff.co.nz/2022/03/manuherekia-river-more-or-less/

Population growth and decline

A lack of long-term and skilled-work employment opportunities and the loss of young people for education and training is a problem throughout. At the same time the area attracts retirees, and the proportion of elderly is increasing. Cromwell and Alexandra are population hubs and growth centres benefiting from a range of facilities and a large volunteer base for community support. But constraints on land for housing require active spatial planning. Population growth and economic production can put pressure on existing lifestyle values, services and infrastructure (particularly water resources) exacerbating seasonal fluctuations in numbers.

Population change in the area affects communities, for example the presence of seasonal workers and the presence of migrant workers and newcomers, which can affect community participation and the social and cultural make up of communities. Often newcomers require a focused effort to help them settle in and contribute to community life through organisations such as schools and churches. Efforts to foster community connection are important when there is significant population growth projected for Cromwell and Alexandra, and also when rising house prices are forcing some people further out into smaller rural communities.

Housing

The supply of housing and affordable housing in particular is a constraint on future development and employment growth. The communities experiencing the most population growth, as in Cromwell, have seen the greatest pressure on housing supply, raising questions for spatial planning. Insufficient, affordable housing makes it difficult to offer career progression and grow or manage sustainable workforces for a diverse economy and population. It also creates competition between sectors for workers and accommodation as short-term and seasonal housing are an ongoing issue for housing incoming and transient workers.

Smaller settlements in the impact area appear to have limited potential for growth in housing areas. The CODC are in the process of spatial planning for the Teviot Valley[43] as part of their preparation for a revised District Plan. The plan will cover future urban development in Roxburgh, Roxburgh Hydro, Ettrick, and Millers Flat. New spatial plans were recently adopted for Vincent and Cromwell. Community engagement identified the need to ensure project housing is planned in a way that helps to meet longer-term population growth and demand for a range of accommodation types.

Economic challenges

The area is significantly impacted by national and global economic cycles and pre-covid 19 was enjoying significant economic growth, with a flow-on effect on employment and population with growing numbers of international workers and tourists. Some communities have lost significant employers (e.g., the TB sanatorium at Waipiata, sawmills at Tapanui, Roxburgh Children's Health Camp at Teviot Valley). Challenges include staffing (particularly in horticulture) but also tourism and hospitality workers to service ongoing tourism as visitors increase again post covid 19. Otago region previously had a high international tourism spend due to the Lakes District regional tourist hubs but communities in the assessment area (Central Otago and Clutha) have found some buffering from

[43] https://www.codc.govt.nz/your-council/news?item=id:2icf96krk1cxbyre9qoi

ongoing domestic visitors and additional cycle trails. These areas will continue to face the challenge of distance from major tourism centres and need to attract a mix of domestic and international visitors in future.

More corporate agriculture and horticulture leads to reduced numbers of farmer operators and an increase in manager-employer structures with a heavy reliance on migrant workers and reduced connection to smaller settlements. A shortage of skilled labour and small local markets present business challenges, along with transport costs and the time/distance from suppliers and services, and limited opportunities for recruitment and training. In 2022, staffing challenges are particularly evident in horticulture, and post-Covid, tourism and hospitality.

In response to the evident economic development issues and opportunities, including for the Māori economy, economic development managers across Otago have developed a strategic, collaborative approach. At present there is no region-wide economic development agency so the approach is a framework for action in potential growth areas such food and fibre, and hospitality, with support for the strategy from the Provincial Growth Fund.[44] In addition, a Regional Workforce Plan has identified jobs, skill requirements and ways to meet workforce needs regionally and nationally. This regional approach to labour market planning considers the construction, accommodation, food services, healthcare, social assistance and food and fibre sectors in particular.[45]

Construction employment

These strategic responses to economic development in the Otago region have focused in particular on a well-recognised problem with the supply of construction employment. A recent report found a pipeline of major construction projects across the Otago region will require up to 5,000 extra workers, including the new hospital in Dunedin and new infrastructure and housing projects in Inland Otago. The region has to look towards achieving an enhanced local labour market with upskilling, compete for a nationwide pool of construction workers or attract migrant workers at a time when they are in limited supply. A regional group, including iwi, considers that the hospital project in particular is an opportunity to "create a legacy of skills, employment and innovation in the sector that will benefit Otago now and into the future."[46] The opportunities are to attract, retain and develop (train and upskill) workers to support the construction pipeline, including appropriate housing.

Water issues

There are significant (and ongoing) issues in these communities with reliable water supplies, due to climate change and new regulations relating to water quality, extraction and minimum flows. There are also significant upcoming capital and operating costs associated with water upgrades in smaller settlements with a low ratepayer base, to meet the needs of any future population growth. There are potential improvements to rural or urban three waters as a result of replacing supplies that are physically disrupted by project works, or supplies built to service a project in the short term; seen locally as a potential benefit from a project at lake Onslow.

[44] Otago Regional Economic Development (ORED) Priority Action Areas, 2022.
[45] https://www.mbie.govt.nz/assets/otago-regional-workforce-plan.pdf (see also Heyes et al., 2022).
[46] Otago Regional Skills Leadership Group, Otago Regional Workforce Plan, June 2022.

Community facilities

Most community plans have a strong focus on maintaining and upgrading community facilities such as health/hospital facilities, which are an important community service and an attractor for new residents. Community halls and schools provide strong community focal points, and these have attracted considerable community input over time. Facilities for youth are important (e.g., skate parks, playgrounds) and new facilities take time to achieve through community plans and fund raising. Recreation facilities are important for all residents and visitors and there is significant economic development associated with community-driven investments such as the emerging cycle trail network (which also acts as an anchor for other development proposals).

Protection of natural and cultural environment

The natural, cultural and heritage environment is a significant attraction for residents and visitors, and important to iwi. Heritage resources and trails are important and an integrated approach is needed for future developments and promotion, otherwise communities can appear to be competing for visitors and development funds. There are significant concerns around developments that could compromise outstanding landscapes, green spaces, and the sense of space and heritage values. There are associated environmental concerns associated with air quality, lakeside enhancement and development, waste management, intensive farming and pressure of recreation activity on natural locations.

3.10 Summary: partners and stakeholders

An indicative list of key partners and stakeholders is in Table 2. This list is intended as a guide to the likely range of interests in this project. The full SIA will add further detail to the list.

Table 2 Indicative partners, stakeholders and affected parties

Category	Organisation
Iwi	Te Rūnanga o Ōtākou Kāti Huirapa Rūnaka ki Puketeraki Hokonui Rūnanga
Central government	Department of Conservation (DoC) Ministry of Business Innovation and Employment (MBIE) Ministry of Primary Industries (MPI) Ministry of Social Development (MSD) Ministry for the Environment (MfE) NZ Police
Local, regional government	Central Otago District Council Clutha District Council Otago Regional Council Teviot Valley Community Board
Sector groups and non-government organisations	Contact Energy Federated Farmers High Country Industry Group Fish and Game Forest and Bird Local promotions groups Local water user groups Māniatoto Irrigation Company and distribution companies Otago Polytechnic Central Otago Campus Otago Rural Support Trust
Community groups and organisations in the affected areas	Business groups Central Otago Environment Society Connect Cromwell Cromwell Business Network Cromwell & Districts Community Trust Guardians of Lake Dunstan Heritage groups and organisations Residents groups School boards, hall committees
Directly affected people and organisations	Clutha Gold Trail and operators Lake Onslow farmers Lake Onslow hut owners and users Millers Flat Hall Committee Millers Flat Water Company Pioneer Power Roxburgh Teviot Valley Business Group Teviot Angling Club Teviot Irrigation Company Teviot Prospects

4 Social issues and effects

4.1 Issues and effects from international experiences

There are numerous studies[47] of the social impacts of large dams reported in the international literature and common issues arise in the available reviews of the social impacts of these sorts of projects.[48] Our overview found that "research efforts have begun to shed light on the widespread, prominent and long-lasting effects of hydropower development",[49] especially the effects of *large-scale* hydroelectricity projects, as opposed to small or average sized dams. While impacts clearly begin to take shape at the design planning and development phase of projects, and carry on through construction, many of the effects identified are experienced in the operation of projects, often years after the construction is complete. Social research indicates a high level of controversy and tension surrounding these developments over their planning, construction and operation, and much of the focus is on the nature, scale and management of negative effects.

The authors of these studies encourage consideration of the temporal dimensions of dam projects and associated social impacts over time. They also argue for a broad spatial focus, finding that the focus of SIAs needs to be on the local host communities as well as considering regional and national scale effects. Comprehensive SIAs identify social impacts upstream and downstream, at the site of construction, across regions and in locations for resettlement areas – thus requiring multi-area analyses. Although, the "The variables that are important must be locally defined, and there may be local considerations that a generic listing does not adequately represent".[50]

One comprehensive review article on the social impacts of large dams is particularly useful.[51] It suggests a "Matrix Framework" to help focus SIAs, based on extant knowledge and frameworks used in 217 journal articles. The authors highlight the dimensions of space, time and value across the components of infrastructure, livelihoods and community. Figure 3 below is adapted from this model by us and helps to define the scope of SIA for the proposed project.

[47] For international insights we draw in particular on the work of Tilt et al., (2015), Égré and Senécal (2003), Kirchherr and Charles (2016), Wang et al. (2013)and Cernea (2004). They in turn draw on an extensive literature and practical experiences, such as those compiled by the World Commission on Dams, and these works provide many additional references.

[49] Tilt et al. (2009, p.s249), Kirchherr (2016).
[50] Tilt et al. (2009)
[51] presented by Kirchherr and Charles (2016) and Kirchherr et al. (2016).

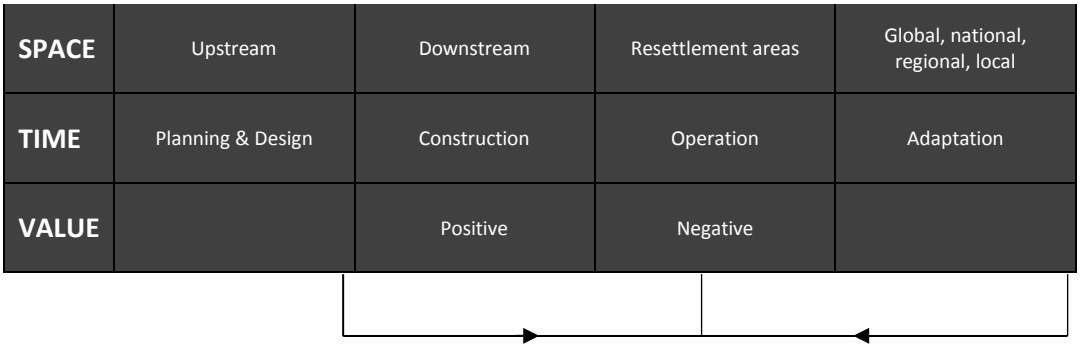

Figure 3 Framework for understanding the dimensions of social impacts

From our review of international research the following social issues may need addressing in large dam projects:

Community impacts

- Protection and preservation of cultural heritage sites, including relocation of important features or compensation for any loss of cultural, historical and sacred sites
- Community experiences of resettlement and disruption to the social fabric of communities, including the creation of new and expanded communities by resettlement populations
- Construction workforces create challenges as well as development opportunities for host communities
- Incoming workers and migrants drawn to a project area during the construction period can remain in an area and increase the supply of labour and skills to the rural economy as well as demand additional infrastructure and services
- The health and well-being of affected populations both upstream and downstream, including from effects on livelihoods
- The benefits of new electricity production when shared with local areas
- Economic, social and cultural futures and development opportunities for host communities on a sustainable, long-term basis, accounting for gender differences and minority rights
- Reduced social cohesion and inequitable social outcomes from social displacement, lost or reduced livelihoods and standard of living, and poorly planned and implemented resettlement
- Benefits from well-planned social impact management, incomes, health, social development and enhanced social wellbeing, including heightened incomes for resettled communities
- New services and facilities in health, education and training, housing and infrastructure, including the provision of improved or new roads and bridges, and other infrastructure such as water supplies, with general associated improvements in living conditions
- Social development supported by sufficient and fair compensation for loss of homes, land or household resources, farm land, businesses and communities, with budgetary allocations adjusted depending on the results of social monitoring and evaluation
- All voices are heard and social impacts are addressed fully and fairly through effective systems of engagement, provision of information. management of complaints and grievances, and empowerment of communities.

Livelihoods

- Loss of farmland and forests, and forced relocation of people, production, livelihoods and communities; there are commonly losses of farm land and water resources including irrigation water and supplies of potable water to new hydro-electricity infrastructure and water impoundments, which includes negative impacts on the livelihood of farmers and changes to farming systems
- Loss of residential and commercial properties, and associated challenges around primary production, business activity, re-employment, and fair compensation for lost assets and livelihoods
- Longer term effects after project-induced population displacement; equitable mitigation or resettlement plans developed with the participation of all stakeholders including ensuring that production systems and livelihoods are replaced or enhanced
- Heightened incomes for host and resettled communities.

Infrastructure

- New supplies of water from new water takes, canals and reservoirs, and associated infrastructure such as new or improved roads, bridges, and other infrastructure such as water supplies assist rural economics to grow with general improvements in living conditions
- Construction often sees a temporary influx of contractors and construction workers and demand for both temporary and permanent housing. Housing, infrastructure and services are required for expanded populations, schools, health, policing, and community services; with a common lag effect in providing these in a timely way
- Influx planning needs to consider temporary accommodation for peak worker demand and shorter-term contracts raising issues for siting, design and management of work camps. Training and procurement of local workers can ameliorate the influx effect.

Benefit sharing

- Internationally, hydroelectricity projects are expected, and often required through community impact agreements, to share the benefits of the project with the local people and communities affected, recognising that the benefits of the new electricity are generally exported out of the area where the electricity is produced.
- The concept of benefit sharing recognises that the environmental and social impacts of a project are likely to be a mix of positive and negative effects and many of these can be mitigated or managed to enhance the net effect on people and communities. So benefit sharing is more than impact management and certainly more than compensation or offsets for any loss of assets, including ecological, cultural and heritage assets. "In practice, a mix of benefit-sharing mechanisms and institutional arrangements is possible and desirable."[52]

[52] Schulz and Skinner (2022).

4.2 Issues and effects from Aotearoa NZ experiences

There is considerable experience with the social impacts of major projects and hydro-electricity projects in particular in this country.[53] This base of SIA research covers communities such as Turangi, Twizel, Otematata, Cromwell, Roxburgh and Manapouri.[54]

It is very evident that the main social impacts addressed in these comparison cases focus on the issues around project construction, especially sourcing, accommodating and winding down an incoming construction workforce over a period of several years. Workforce numbers tend to grow rapidly, peak and then decline just as rapidly through the construction period. Project management and specialised skills such as tunnelers, tend to be engaged longer term and can require permanent housing. Other workers tend to vary in the length of time they are engaged with the project necessitating at least some level of temporary accommodation. Workers are usually a mix of single people and some families and dependants.

Examples of planning responses vary from temporary construction towns that no longer exist (e.g., Roxburgh East and Manapouri construction villages) to towns like Twizel and Otematata that were considered "temporary" but became repurposed communities post construction, to Cromwell (Clyde Dam), which included a mix of permanent and temporary housing.

When workers are sourced locally from resident workers there is a significant potential benefit to the local labour market as well as reduced demand for temporary housing. However, the experience shows there are potential flow-on effects for the local labour market as workers and small contractors shift between sectors looking to maximise their incomes. These changes necessitate comprehensive local and regional worker strategies and associated training.

There are potential long-term effects on social cohesion, social capital, community resources, facilities and capacity. These effects require ongoing investment and support such as from an up-front capital allocation, shares in ownership generating profits, or an agreed formula for an annual allocation, via a mechanism such as a community trust.

Local communities and councils have a particular interest in the construction phase because of the additional employment and increased local business activity, along with the potential for better amenities (schools, health services). They look for ways to maximise benefits and mitigate social dislocation. The changes require an active response from spatial planning and social-economic development strategies for host communities to deal with periods of rapid growth and decline, as an affected area moves through phases of the arrival, settlement and then the departure of the construction workers and their dependants.

Because of their scenic locations, hydro-construction villages have the potential to play an active role in visitor strategies after construction. In some instances, houses are sold on as holiday homes and temporary accommodation is repurposed as visitor accommodation. The village residents have then instigated new projects such as camping facilities alongside new reservoirs, centres for water

[53] Taylor et al. (2004b)
[54] Fitzgerald (2000); Fitzgerald and Taylor (2000); McClintock and Taylor (2007).

sports such as rowing and, more recently, bases for cycle trails that often run alongside rivers and hydro lakes.

Limited public access during construction, for health and safety reasons, is likely to limit any tourist potential from site visitors but there may be an opportunity for an information centre at an accessible location or located on a proximate road or trail frequented by visitors. Some projects have built stand-alone centres and others have successfully co-located project information facilities within an existing visitor centre nearby the project.

Planning stage impacts are noted and these include psychological impacts and stress due to uncertainty over project plans, land acquisition, the effect of potential physical impacts on lifestyles and any compensation made. The research shows there is often social conflict and divisions over the pros and cons of a project. The planning stage also diverts local social capital and community resources into dealing with project planning through successive meetings and hearings.

A study by the University of Otago[55] points out that it is increasingly difficult to build social acceptance for renewable energy projects and there are increasing levels of local opposition to projects due to their potential negative impacts. Another study points out,[56] green is good but more green may not always be better so just because a project produces renewable energy does not necessarily make it a good project! Of particular concern are projects that create cumulative effects, such as a cascade of dams and project proposals on a river system (as is a case with several river systems in Aotearoa NZ) and also with several windfarms sited in the same locality.

A wide range of physical and ecological impacts during the construction phase have potential consequences for people and communities and require mitigation or offsetting. These impacts include noise and dust, heavy traffic and increased use of local roads, all capable of disrupting local social life and livelihoods. They can also include losses of recreation resources such as recreational water, and access for fishing. In the longer-term new community assets are often created with high recreational and amenity values such as the Waitaki Lakes and Lake Dunstan.

A legacy of poor project planning and inadequate engagement with affected people can build a legacy of distrust in affected communities, as can evidence of poor impact management (such as persistent breaching of set conditions and poor responses by regulatory bodies). Full use of available assessment techniques is important, with attention paid to impacts on factors such as intrinsic values, sense of place, inter-generational land stewardship and farm succession, and cultural values. It is therefore important to engage widely with affected people from the start of project planning, keeping affected people well informed and ensuring all voices are listened to, and local knowledge is respected.

In many places damming of rivers has created loss and mistrust for mana whenua, adding to the cultural effects from modification of the land and environment in river systems and from ongoing social-economic disparity. This history of loss is noted for Lake Onslow itself,[57] in the cumulative loss of wetland areas and the negative settler perception of these areas, as reflected in the name

[55] Stephenson and Ioannou (2010)
[56] Baines and Taylor (2021)
[57] Aukaha Ltd (2021).

"Dismal Swamp". Cultural effects in river systems have led to greater attention paid to iwi as partners in project development sites as commercial partners and kaitiakitanga.

4.3 Effects relating to the assessment areas

Issues and potential social effects in this section are based on analysis of the existing social environment of the assessment area, the information from international and Aotearoa NZ sources, reference to other assessment reports for the project, the initial site visit, discussions with key people and organisations, discussions with MBIE regarding feedback they have received from their ongoing engagement with stakeholders and affected parties, and the recent SIA engagement in the area.

At this stage the information on social effects is at a broad level sufficient to provide an input to project feasibility and also to provide a basis for later assessment if the project progresses to detailed design and planning work. It is useful to emphasise here that an issue does not necessarily represent a social effect at this feasibility stage of the project. Most effects will require further investigation as to their origin, who is affected, where they will take place, their significance (likelihood and magnitude) and, most importantly, the possible options to avoid, mitigate, or manage them.

The issues raised and the current assessment of social effects are grouped under a number of topic headings in this section. All the information on social effects is consolidated into an impacts matrix in section 4.4.

Effects on farmers and farm operations

Farmers around Lake Onslow are already experiencing disruption to their farm operations during technical investigations and this effect is being dealt with through individual agreements. The effect includes disruption to stock movements, farm operations and use of local roads.

The feasibility stage of the project has created significant uncertainty and stress for a group of farmers, farm workers and their families living in the Teviot Valley area and Māniatoto. This uncertainty is disruptive to farm planning, and causes stress for staff, many of whom are longstanding employees, and to longer-term planning of farm families for retirement and succession. The stress is difficult for farmers, farm workers and families, causes tensions, and is drawing on the resilience of families and the community to cope.

Farmers in the project area will experience direct effects from the project if it proceeds. These include effects on farm operations, effects on the configuration and ownership of farms, and effects on local roads. The issues around possible effects on irrigation require further investigation.

If the project proceeds to an extended period of detailed design and planning through to approvals and an investment decision, there will be an increased level of uncertainty and stress for farmers, workers, families and communities. Uncertainty will further disrupt farm planning and , potentially, the retention and hiring of staff. To help mitigate this effect farmers appreciate the one-on-one discussions they have had with project personnel and strongly consider they require early notification of project decisions and direct communications as individuals and as a group. They

would also appreciate further information on important issues such as the procedures and rights of land owners regarding acquisitions for public works.

In the longer term, land acquisition and effects on farming will happen over several years and include the loss of up to Negotiations of farm land to a raised lake level, new lake margins and fences. Further farm land will be required for new physical infrastructure including the dam, a lower reservoir or intake structure, road improvements, construction sites and bases, and the disposal of spoil. Landowners are concerned that any loss of land could potentially affect the integrity of farm operations due to the mix of low, middle and high country required for each farm. In particular, the area required for a greatly expanded lake will mean the loss of valuable, summer-safe, grazing country and some feed crops on improved land. These areas provide a seasonal balance of country for each farm and therefore affect each enterprise as a whole.

Land acquisition effects are likely to be temporary (during construction), seasonal (loss of summer grazing and additional feed) and longer term (reconfiguration of land within and between farm enterprises). Land acquisition could affect the configuration of properties, increase land amalgamation and consolidation between enterprises, and alter farm succession and retirement. These changes could in turn affect the number of long-standing pastoral farming operations and farm families living in the Teviot and Paerau areas, and the traditions and practices of land stewardship that goes with them. There is likely to be at least a short to medium term increase in disruption, stress and costs (legal, property and farm advisors) to farmers, farm workers and farm families.

There are potential consequences for farm families through impacts on their livelihoods, family life and heritage. Even a small loss of individuals or farm families could affect small schools and reduce the social capital of these communities, due to the role these families play in community leadership and voluntary activities.

Farmers raised concerns about local roads used to access project sites, including movements of heavy machinery, and potentially uses by people unused to driving on rural, gravel roads, including “rubber neckers”. These all create additional risks to rural residents, other drivers, children and farm operations. Local roads are currently used for grazing and stock movements and would require additional fencing, stock passes, tracks and lane ways for farming operations to continue with least interruption. Physical and visual effects from physical works, quarrying and access roads (e.g., dust and noise), primarily in and around the access roads and construction sites, could affect livestock, cultivation and grazing patterns, and reduce amenity values for farmers and farm workers,

In relation to irrigation, there are potential effects on supplies and reliability of water takes and groundwater bores along the Mata-au / Clutha and Te Awa Makarara / Teviot Rivers from a raised Lake Onslow and ongoing pumping. This issue requires further investigation and could affect producers outside the lake environs, including horticulturalists and farmers growing feed and other crops on river flats, and also dairy farming and grazing operations. As the amount of available irrigation water directly affects farm production it also directly affects on and off farm employment and rural populations, raising issues about the social outcomes that local people and communities can achieve from sustainable use of the water and land resource.

Effects on recreation and tourism

The proposed Project has potential negative effects on recreation values and activities around Lake Onslow and the Clutha / Mata-au, and also for recreation and tourism businesses throughout the area. These social effects will require active mitigation and management.

Potential effects at the Lake are from proposed lake levels that will inundate the sites of recreational huts on the lake shore as well as tributaries and extensive wetlands that feed into the lake. A greatly expanded lake will sever access routes and the boat ramp and alter landscapes and the quality of the recreation experience. Modifications to trout habitat, breeding and fishing quality are assessed as very negative.[58] There will be periods of low lake levels when fishing access, especially by boat, is very difficult due to the extended shore line.

Local people pointed out during the community forum (see Annex 2) that they are active users of Lake Onslow as a highly valued, local recreational resource and there are effects on the huts and hut users including local residents. There are concerns about loss of a peaceful retreat; the large fluctuations in lake levels; poor lake water quality; losses of the in-flow creeks and wetlands to inundation; loss of Galaxid spp.; loss of places for spawning of trout; and for deterioration of the resource due to any new species of phytoplankton, macrophytes or predators introduced with the Mata-au / Clutha river water.

The recreation assessment is that the effects at Lake Onslow "will be significant and adverse at the regional level without mitigation",[59] which could require active re-stocking of the lake, relocating or replacing fishing huts, new access roads, new access points above the new high lake level, and possibly offsetting fisheries management at other nearby lakes and burns.

Other potential recreational effects at the Lake and in surrounding areas were raised by the community during the SIA and many are confirmed in the recreation assessment. They include effects on cycling and running, four-wheel driving, sightseeing, passive recreation and events such as the Cavalcade. There is considerable concern about any potential disruption to the Clutha Gold Cycle trail along the river caused by construction of an offtake structure and pond, rerouting of the trail and road crossings with heavy traffic. Community members pointed out that recreational cyclists could be put off by major construction activity displacing cyclists to other touring options. They also raised concerns about competition from project contractors and project visitors for seasonal accommodation, which is already under pressure in summer months from visitors, and seasonal workers in hospitality or horticulture.

The project recently has provided additional activity for local businesses providing food and accommodation for workers carrying out technical investigations. This activity requires coordination between providers and contractors to ensure the workers are well provided for, especially in the winter period, with warm homes and good food, and that they have opportunities to connect with the community. Experience managing incoming workers in other projects shows that it is important

[58] https://www.odt.co.nz/regions/central-otago/lake-onslow-development-would-affect-trout-fish-and-game
[59] See Rob Greenaway and Associates (2021).

to take a proactive approach to ensure local providers are fully involved in these procurement opportunities.[60]

Community engagement also pointed to longer-term opportunities for tourist activity by farmers or their families in the area, e.g., farm-based tours and accommodation, and activities such as 4wD tours, cycle tours and helicopter tours, due to increased interest in the lake and the project. Given an increase in visitors and possibly the movement of FIFO[61] workers with a major project, they also pointed to the possibility expanded air services out of Alexandra airport, which currently services private and charter flights.

Site effects

The project at Lake Onslow would be distributed over an extensive part of the Teviot Valley, including the Lake and surrounding areas, a dam site, a tunnelling site, the tunnel alignment, access roads (potentially through to the Māniatoto) and the intake site and any storage facility close to the Mata-au / Clutha.

The physical effects on local areas have potential social consequences, such as visual changes, noise, dust and heavy traffic that affects the quality of the road surfaces, health and safety of other users, and the pleasure they derive from the environment. Community consultation identified concerns about both construction and operation noise (operation of the pumps and tunnels); dust (construction and longer-term road dust); other types of pollution such as rubbish, visual effects, signage; and sediment and wastewater in waterways and aquifers.

More traffic on local roads is likely to include increased blockages, delays and travel time for road users; cause increased heavy traffic in the area; cause traffic congestion in the townships and increased demand for parking outside cafes and shops; have effects on the ease of stock movement along roads; reduce safety on bridges including one-lane bridges. People noted the need for mitigation by safety improvements on roads, intersections and bridges and other road upgrades. They also noted there could be new bridges and access points, including new access through to the Ida Valley and or upgrades to Onslow road (to Paerau).

Another issue raised was the disposal of spoil from the tunnelling, where this will happen and asking if it is possible to repurpose the spoil as fill or for roading aggregate. Available spoil could benefit council operations both short and longer term (taken from a disposal site).

Employment, population and housing

Experience on previous projects discussed in sections 4.1 and 4.1, and the community engagement with affected communities (Annex 3) all point to an influx of construction workers being a major potential source of social impacts for this project. These sources all point to the need to consider carefully the plans for an incoming construction workforce, where will the workers come from and the likely size of an incoming workforce, how and where to accommodate them for the best social outcomes, the necessary requirements for housing and infrastructure, and the nature of any

[60] For example see https://www.lgnz.co.nz/news-and-media/2018-media-releases/kaikoura-district-council-hospo-project-a-finalist-in-lgnz-excellence-awards/

[61] Fly-in fly-out.

boom/bust effect. It is not necessary or realistic to answer many of the questions raised at this feasibility stage as this will be an important part of any social impact management plan prepared as part of detailed project planning and design. It is possible to outline here the main issues that will require consideration if the decision is to proceed further.

Early estimates of Te Rōpū Matatau indicate the likely project workforce as 2,500 over 7 years, with a peak workforce of 1,000. From the components in the project description, the SIA has identified the likely industry groups affected and these are listed as the "construction workforce" in Table 3 with the most recent (2021) labour market data for those groups shown for Central Otago and Clutha districts, the Otago region and nationally. The data in Table 3 shows that the assessment area of Central Otago and Clutha Districts has workers in all the categories listed. The table also provides average annual growth over 10 years, and it is evident that most growth is in the building sector, as expected.

Table 3 Construction workforce in the project area and Otago 2021

Construction sub-industry	Modified* Employment Count 2021					Average Annual** growth (2011-2021)			
	Central Otago District	Clutha District	Otago Region	New Zealand		Central Otago District	Clutha District	Otago Region	New Zealand
House Construction	285	80	3,400	51,890		1%	2%	7%	7%
Other Residential Building Construction	30	2	310	6,235		10%	-18%	5%	11%
Non-Residential Building Construction	15	-	880	13,620		13%	-	3%	2%
Road and Bridge Construction	180	70	1,615	17,875		0%	20%	4%	3%
Other Heavy and Civil Engineering Construction	165	20	1,060	21,490		0%	-1%	5%	3%
Land Development and Subdivision	15	1	50	1,400		18%	4%	6%	8%
Site Preparation Services	185	55	795	13,235		8%	-1%	5%	4%
Concreting Services	55	15	235	5,540		44%	10%	11%	7%
Bricklaying Services	30	9	235	2,850		-6%	0%	0%	1%
Roofing Services	15	8	280	5,170		-2%	16%	9%	5%
Structural Steel Erection Services	-	4	75	1,195		0%	13%	20%	6%
Plumbing Services	115	20	930	15,565		14%	11%	4%	5%
Electrical Services	125	30	1,365	23,115		10%	12%	4%	3%
Air Conditioning and Heating Services	2	4	240	7,320		15%	-11%	1%	3%
Fire and Security Alarm Installation Services	-	-	140	4,250		0%	0%	1%	2%
Other Building Installation Services	-	-	140	4,665		-	0%	10%	11%
Plastering and Ceiling Services	20	-	465	6,890		-6%	-	3%	4%
Carpentry Services	8	10	195	5,010		7%	-2%	2%	4%
Tiling and Carpeting Services	10	5	310	5,465		0%	7%	6%	4%
Painting and Decorating Services	50	35	880	14,575		-3%	2%	3%	3%
Glazing Services	2	2	160	2,655		6%	0%	8%	4%
Landscape Construction Services	60	30	580	11,545		12%	3%	2%	6%
Hire of Construction Machinery with Operator	0	1	30	1,590		0%	0%	0%	5%
Other Construction Services n.e.c.	55	2	560	12,845		26%	1%	7%	7%
Gravel and Sand Quarrying	-	0	20	985		0%	0%	3%	0%
Other Construction Material Mining	60	45	120	955		17%	-3%	0%	1%
Other Mining Support Services	-	-	-	805		-	0%	-21%	0%
Ready-Mixed Concrete Manufacturing	65	6	-	-		11%	-21%	0%	0%
Concrete Product Manufacturing	35	40	-	-		-3%	0%	0%	0%
Surveying and Mapping Services	1	-	270	2,885		2%	0%	6%	2%
Scientific Testing and Analysis Services	2	7	265	5,905		-4%	18%	0%	4%
Total	**1,590**	**500**	**15,610**	**267,525**		**4%**	**2%**	**4%**	**5%**

**** Includes working proprietors (figures are rounded)***
*****Compound Annual Growth Rate***
-No data

Source: Statistics NZ Business Demography Survey

Figure 4 shows the ten-year trend for the proportion of the construction workforce (as defined in Table 3) over the last 10 years. It is evident that Central Otago, and the Otago region (includes Lakes District) in particular, have experienced strong growth relative to New Zealand over recent years, and this is likely to continue with the current pipeline of projects. Clutha District relatively has a smaller construction sector and little long-term growth.

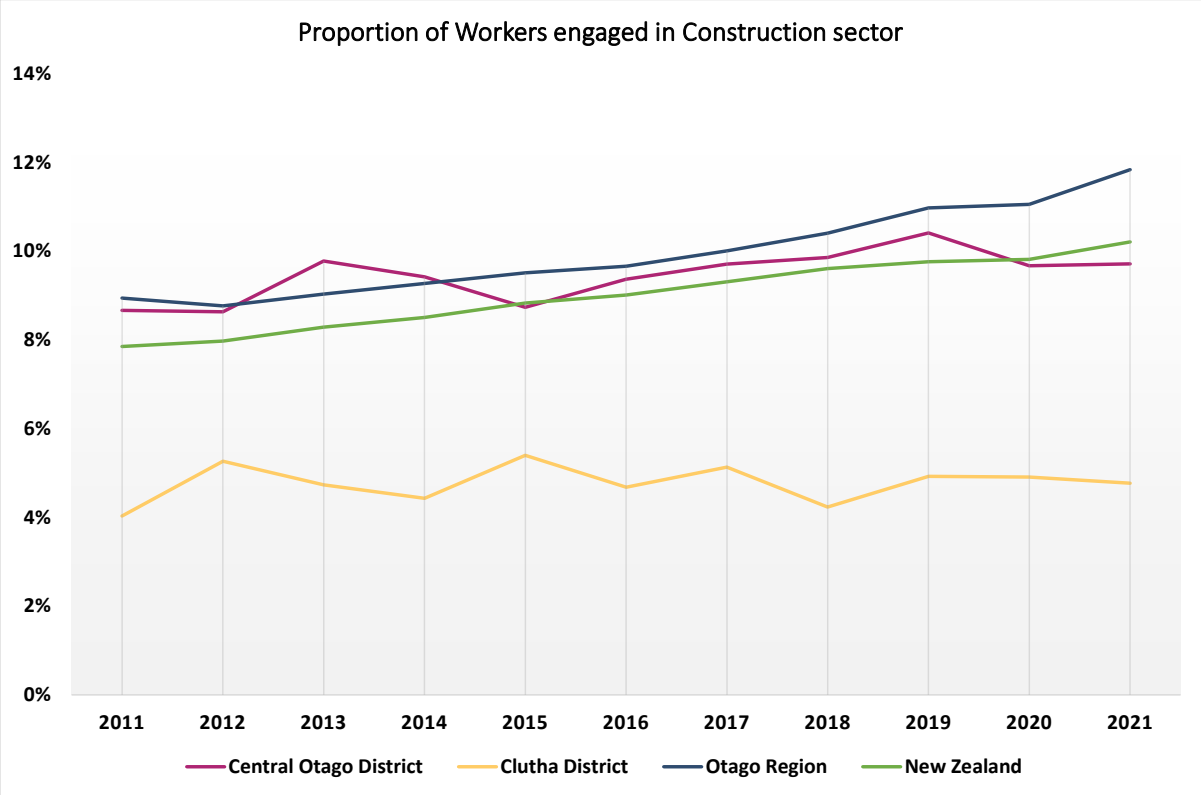

Figure 4 Construction sector workers ten-year trend

The project will have significant effects on employment and the local and regional labour market given the constraints identified in section 3.9. Recent analysis of the construction sector in inland Otago and the region as a whole, found that the current pipeline of projects (without a major project at Lake Onslow) already has insufficient workers to meet regional needs,[62] requiring an active, strategic response by relevant councils, iwi and agencies. For the Lake Onslow project this response will most likely need to extend to Southland Region as well for a larger potential catchment of workers.

There are two main ways for finding the necessary workers and both look necessary: 1) expand the local and regional labour market by recruiting and training workers locally or by recruiting new workers to stay in the region through and after the project, including workers who retire locally after the project; 2) bring the workers in on a short-term basis, either accommodated on or off site short term (fly-in fly out) or longer term, leaving for another region afterwards.

[62] Heyes et al. (2022).

There are a number of issues associated with working through these options. The first one raised by many during community engagement is the provision of housing and/or short-term accommodation for incoming workers and contractors. It is widely accepted that new short-term accommodation and a form of construction camp is highly likely but there are possibilities to consider around where this is located and the nature of the buildings used. In previous projects such as for the Clyde dam and Cromwell a mix of permanent and temporary housing was used. New housing is needed now to accommodate a growing population in towns such as Cromwell and Alexandra and new homes are evident on the edge of Roxburgh as well. The Council is completing a new spatial plan for Roxburgh and the Teviot townships. A key question is the potential to expand permanent housing in the main settlements and then utilise that for new workers who are retained in the region or retire, and for a growing population after construction workers move on. If temporary accommodation is built, there are questions to address about the best locations and whether buildings and facilities can be reused or repurposed, for example as accommodation for seasonal workers (tourism, horticulture), as visitor accommodation or as a retirement facility. There may be existing facilities such as the old Health Camp complex in Roxburgh that can be repurposed for a period.

Expansion of housing and associated population will require land acquisition and changes to urban uses with associated infrastructure requirements (water, waste, sewerage, curbing and channelling and internet connectivity). Concerns were raised about the impacts on property values and whether surplus houses after the project would deflate house prices or attract social housing for a period, suggesting the transition post project needs careful management.

Questions were also raised about increased demand for services such as health and education and the potential for longer wait times, as health services are already viewed as below capacity. If schools need to grow where would this happen? A number of small schools have extra capacity and would benefit greatly from extra pupils. Comments from the community also suggested there are not enough pubs, shops, supermarkets and restaurants for everyone, and these will need to increase as will emergency services and police. New people will be less connected to the area suggesting the need for programmes for settling in newcomers and overseas migrants in particular. Also, the way project construction is wound down would need to be managed, as businesses and services would need to adapt again afterwards, as experienced in Cromwell previously.[63]

Incoming workers and families will include people who move to the area on a speculative basis anticipating the flow-on effect of extra work and business opportunities in the local economy, with a likely regional multiplier effect on employment and population. New workers and residents will most likely affect the demographic profile of the area depending on their age and ethnicity, with a mix of single people and families, and the level of transience (length of residence) is highly likely to increase.

Community engagement identified that pressures from a rapid increase in workforce and population could affect community cohesion and social connection and the level of “care” for places, a possible increase in crime, social problems such as substance abuse, increased rental costs for locals and other increased costs locally. Bike companies could bypass the area due to a shortage of accommodation taken by construction workers and also by any loss of the “paradise” factor. With

[63] Rayner (1988).

new trails opening out of Lawrence the companies will have other options for routes. Labour effects could include diversion of local labour and trades to the project creating shortages in other sectors and pressures on the supply of short-term housing for seasonal workers. The project could also affect the attractiveness of the area for non-project migration such as for retirement, remote workers or workers in other sectors than construction.

Finally, it is useful to note that while media and commentary on the project have projected a large increase in employment due to the project construction. These effects are recognised locally as uncertain and largely temporary, and the final social outcomes from the project will require careful, well-resourced, community-driven planning and management.

Community futures

There are many opportunities from the project that should be built into thinking about community futures with the affected communities. The main opportunities noted are for enhancement of the local economy, new housing and associated infrastructure development, opportunities for recreation and tourism, and opportunities to boost the viability of declining rural populations, and associated social services and facilities.

Project procurement of labour, goods and services should look to assist local economics in the assessment area. A collaborative approach should investigate how to support and enhance the Otago regional labour market planning already underway with the Dunedin hospital rebuild. In addition, local and regional businesses can be assisted with procurement for project activities including in the planning stage. It should be possible to target procurement through devices such as business directories, and business advice and assistance (e.g., training re procurement opportunities and assistance with upskilling).

Communities see the potential for improving housing and associated infrastructure alongside the project, including roads and bridges, transport services, and internet and communications from fibre installations. There is also potential to increase permanent housing and to leave additional housing for transient workers post project. Additional facilities and infrastructure could help to attract new residents after project construction.

While there is potential for social change and reduced social cohesion from increased transience in the population, efforts to meet a short-term increase in demands for social services can provide a leverage to help fill current unmet demand for social services and social capital such as the level of volunteering. There is already experience in the affected area with managing transience associated with horticulture and hospitality workforces.

There is a need to clearly identify that benefit sharing over the longer term is not the same as social impact mitigation, remedy or compensation, as discussed in section 4.1. If new community facilities and infrastructure are built as part of the project, it is important to consider who will fund and maintain these in the longer term. It is also important to identify and weigh up private, public, local, iwi, regional and national values and benefits and ensure project costs and benefits are handled equitably.

The community engagement proposed a targeted community fund linked to long-term income from the project operation as an important step, in order to assist the affected people and communities

to grow sustainably in the longer term. The purpose, size and organisation of such a fund should be tied specifically to community needs and sustainable future directions through a broadly based community development process.

Engagement and communication

The stress of uncertainty is noted in this SIA and the community consultation emphasised the rights of the affected people to know about what is happening well in advance of information becoming known in the media or, worse, through hearsay, when messages tend to become distorted, further compounding anxiety and stress.

There were issues with community engagement in the early stages of project identification and feasibility planning, as often happens, and this left some disillusionment around the project. Since then, the NZ Battery Project team has actively engaged with affected land owners and the community. This includes multiple site visits, meetings with local organizations, Otago District Council, iwi and the two affected regional councils. Additionally, a member of the Community Board is in the NZ Battery Project's Technical Reference Group. The recreation assessment has engaged with recreation stakeholders and this SIA has also engaged with the community (see section 2.6).

It is important to engage actively with affected people in the next planning stage if a feasibility decision proceeds. The community suggested more meetings, regular updates and "get togethers". They suggested holding meetings at a range of times, including night and weekend meetings, so more people, including younger members of the district, can attend. They also emphasised going beyond the Teviot to include places like Heriot, Tapanui, Lawrence, Paerau, Cromwell and Alexandra. It is important to hold meetings through local groups and organisations and to take advantage of the opportunities offered by regular local meetings. The project team should work with community leaders, the Council and the Community Board to organise engagement opportunities and provide information by means of established community newsletters and websites.

It is important to keep up regular communications including project newsletters, emails and media to reach everyone and engage with a range of organisations and networks. It is also important to develop mechanisms early in any subsequent stage of planning to involve local people, such as a local information hub and a widely representative local liaison group combining elected and valley members who can advocate for the valley. These mechanisms will require funding for an information person, secretarial assistance, independent professional advice, and a local coordinator.

4.4 Social impact management

For large developments such as proposed here, a social impact management plan (**SIMP**) is required as part of the final SIA. The SIMP sits alongside environmental management plans. The hierarchy of impact management of avoid, reduce, mitigate, enhance, remedy requires a SIMP to be fully integrated with the process of design and planning. In particular, a SIMP should include all necessary strategies and actions to reduce, mitigate or remedy negative social impacts and enhance positive ones. A SIMP for a project of this size is expected to include a communications and engagement strategy and a complaint and a grievance redress mechanism.

In developing a SIMP for the proposed project the SIA will need to work with the affected communities. This will include working with local leaders and organisations such as the local

councils, iwi, social and economic development agencies and voluntary organisations that can adopt a community development approach. A stakeholder group can bring community representatives and key organisations together for the specific purpose of helping the SIA team to develop the SIMP and later to monitor and implement it, taking a proactive approach to issues such as workforce planning. Funding will be required to facilitate this sort of collaborative approach, support capacity at the Council level and to provide independent advice where necessary.

Monitoring is an essential part of any management plan, so actions of mitigation and management are well informed and adjusted as necessary. Monitoring of social impacts should focus on significant effects and requires ongoing community input.

4.5 Matrix of social impacts

Table 4 below contains a high-level matrix indicating important social impacts, who is affected and likely locations in the impact areas. The matrix also has a column of potential management actions categorised by the hierarchy in section 4.2 for further development. It is important to note that if the full project proceeds this list is intended as a starting point and can be reviewed, and further detail added.

Table 4 Summary of potential social impacts

Likely impact variable	Who is affected and likely locations	Example management actions to investigate
Stress and anxiety from uncertainty and change during planning and construction	Land owners and farmers, residents, recreational users, and businesses - in the project footprint and Teviot Valley	Avoid – information and engagement systems Mitigate – engagement in design of mitigation; provide mental health support
Loss of farm land, adjustments to farm operations, and reconfiguration of farm enterprises; use of rural roads	Land owners and farmers, farm families, farm workers and families operating at or close to Lake Onslow, reservoirs or in project footprint	Avoid –decisions made on lake height and location of physical works Remedy - compensation; new fencing,access and lane ways Mitigate – fund farm enterprise plans; rural support
Disruption to irrigation, rural and potable water supplies and small-scale electricity	Farmers, small settlements, councils, irrigation companies, electricity companies and consumers	Avoid – design and siting decisions Mitigate – replace or enhance supplies
Loss of wetlands and mahinga kai	Mana whenua, regional conservation and recreation groups	Avoid –final lake level Mitigate- cultural and ecological management plans Remedy – biodiversity offsets/ regeneration
Changes to trout habitat, fishing conditions and take of fish	Anglers (local and regional); hut owners	Remedy – stocking of the lake; development of new take fisheries at nearby sites
Flooding of huts, boat ramp and access ways	Hut owners at Lake Onslow, farmers, recreational visitors (local, regional)	Remedy – replace/relocate huts and facilities, financial compensation
Loss of heritage and cultural sites and taonga	Mana whenua, multi-generational farmers and residents, surrounding communities, lake users, visitors	Remedy – documentation of historical and cultural sites Mitigate – site recording, relocations, new interpretation material
Short-term demand for construction workers and flow on effects on employers and self employed	Regional workers, youth, iwi, contractors, employers; national and international contractors and employers	Reduce – train and recruit resident and iwi workers; utilise fly-in, fly-out workers Mitigate – a procurement strategy for utilising resident and iwi regional workers Enhance - develop a construction labour market and training strategy
Temporary demand for construction worker accommodation	Providers of temporary accommodation; Seasonal workers in horticulture and hospitality; Residents renting	Mitigate – build for future permanent homes; repurpose current accommodation; reutilise temporary or new buildings; build bespoke construction camp
Increased local and regional business activity, employment and demand for services	Employers and workers in multiple sectors, councils, sector organisations	Enhance – procurement strategy and labour plans; Business strategies and advice
Changes to visitor activity; Physical effects on rivers, cycle and walking trails and recreation access points and sites	Local tour operators and guides, hospitality businesses, workers, visitors	Enhance – procurement of short term accommodation and hospitality Enhance – project visitor information centre; new visitor facilities Mitigate – manage effects on cycle trail operations; promote trails
Provision of social and community services	Social, health, police, council and emergency service staff and clients, families, vulnerable groups	Avoid - Project health and safety plans; worker inductions and codes of conduct Mitigate – clinics on site Manage – funding for additional services
Community change and social cohesion	Residents, workers, councils, community groups and leaders	Mitigate- Community funding and development initiatives, newcomer support

4.6 Comments on feasibility-stage design options

At this interim stage of analysis and detail, the SIA can distinguish between options from a social perspective. These comments on the current options are tempered by the recognition that they do not account for mitigation and management of the social impacts. It is also useful to note that there are below-ground options being investigated and these are not considered here. The comments are also formed from the view of affected people and communities and not national social benefit. Also, these comments from a social perspective take into account the recreation impacts assessed by Rob Greenaway and Associates. This information is important because the recreation impacts clearly affect the way of life and social wellbeing of local residents and communities of the Teviot Valley, as well as recreation users from further afield.

For Lake Onslow, there are different dam and storage reservoir scenarios considered for feasibility, providing different amounts of stored energy. Two storage options are for 3Twh (Negotiations of reservoir) and 5 Twh (Negotiations of reservoir). Both reservoirs would fluctuate and at maximum height would be considerably larger than the current lake area of 380 ha. Expansion of the lake size and the potential lake level fluctuations resulting from the operation of the scheme for both options, will negatively affect recreation and amenity values. There are limited opportunities to mitigate these losses, such as relocation of fishing huts, and ecological and recreational offsets, which are being investigated. The second main source of social impact is the loss of farm land as discussed above. There is a difference of Negotiations between the two storage options that will involve no additional properties, Negotiations

From a social perspective, a lesser lake size affects less farm land so the 3Twh option is preferred over 5 Twh.

Negotiations

5 SIA requirements and approach towards a consented project

5.1 Ongoing requirements for SIA

A full SIA would be required for the NZ Battery Project as part of any Assessment of environmental effects (AEE) prepared in order to take the project into a design, planning and consents process. At the current feasibility stage, this SIA sits alongside technical and financial analysis to inform the decision on whether to proceed further with the project. Consistent with international and national best practice, a full SIA would build on this Interim Report and include the following information:[64]

- An explanation of how the SIA was commissioned and funded
- The objectives and scope of the SIA and a summary of the key findings
- How the SIA was conducted, who did the analysis, with lists of all sources used
- A description of the project with key project components, maps and diagrams
- A description of the feasibility work to date, the alternatives assessed, and how the results of the SIA have been used so far to improve the design and planning of the project
- A description of stakeholders and how interested and affected people and communities have participated in the SIA, and in project planning as a whole, including issues raised and how these were incorporated into the full SIA and an AEE
- An updated description of the social baseline – the affected people and communities and the existing social environment and key trends without the project
- Analysis of particular social impacts from the project detailing the nature of the impact, who is impacted, where they are located, and who will experience any positive and negative impacts, with timeframes, including projections on how social outcomes are likely to change with the project
- A SIMP with descriptions of plans to avoid, reduce, manage or remedy negative impacts, enhance positive ones, and monitor changes over time, with responsibilities for all proposed actions. The SIMP should include detailed plans for procuring, housing and servicing an incoming workforce, describe any work camp and how it would be managed
- An analysis of benefit sharing that includes affected communities, local authorities and iwi with a proposed allocation mechanism, and a description of likely project benefits and community futures
- A social monitoring framework
- A conclusion about the likely net impact of the proposal on social wellbeing over time.

5.2 Skills and resources required

The team to undertake the full SIA should have:

- Extensive skills and experience of SIA including experience in Aotearoa New Zealand and internationally, and preferably in working on major infrastructure developments and hydro-electricity in particular

[64] Based on Taylor et al., (2022).

- Skills in social—spatial analysis and a knowledge of Aotearoa New Zealand's social statistics
- An understanding of social wellbeing frameworks
- Skills and experience in community engagement techniques and collaborative, community-led planning
- Preferably, knowledge and work experience in Central Otago and in working with rural communities
- A knowledge of relevant comparison cases in Aotearoa New Zealand and in Central Otago
- A strong focus on identifying, analysing and describing a full range of social impacts
- Experience preparing a social impacts management plan.

The SIA team will require sufficient budget to undertake a full assessment. They will also need a collaborative relationship with other assessment work relating to landscape, recreation and cultural assessments and their social outcomes.

The SIA team will also require a coordinated approach to community engagement, working with project management and other assessment teams, especially in dealing with key stakeholders, e.g., local authorities, sector groups, community groups, and community leaders.

6 Conclusions

This report provides an interim SIA of the NZ Battery Project's Lake Onslow pumped-hydro scheme. The purpose of the SIA is to provide information to all project participants to help them balance the social, economic and environmental outcomes of the project, and to promote sustainable development consistent with the purpose of the Resource Management Act. The report is intended to provide information through an Environmental Impact Statement for decisions about project feasibility.

The report contains a scoping analysis, baseline analysis and interim assessment of social effects. Scoping an SIA precedes detailed assessment work by helping to understand the proposal social environment and to provide an initial scoping of social impacts. Scoping an SIA ensures that the full assessment is fully focused on the likely impacts, affected areas and key issues.

In addition to the technical feasibility analysis, approvals and conditions, SIA helps the project to establish working relationships with affected people and communities and, over time, attain the social licence to operate. It is evident that, based on their past experience with construction of major hydro-electricity facilities, the communities along the Mata-au / Clutha want to engage with project planning, minimise or manage any negative impacts and ensure they maximise project benefits to social wellbeing in the short and longer term. To this end, the SIA held a series of engagement activities building on scoping interviews with community leaders. These activities included a half-day community forum, and meetings with a business network, farmers and the Teviot Valley Community Board.

An important local concern is around the loss of farm land to a larger lake and any possible effects on irrigation, potable water and current small-scale energy production. Farmers will need to adjust their land holdings and farming systems around their available mix of land types and locations. Potential negative effects include social consequences of physical effects such as noise and dust and reduced safety for users of local roads, including for stock movements. Potential negative social

impacts will follow from any loss of wetlands, ecological values, recreational activity, holiday huts and public access from an expand lake and associated infrastructure. As a result, farmers, recreational users and visitors are also likely to experience disruption and loss of amenity values from project construction and operation.

Social disruption is highly likely in the construction phase, from the recruitment and housing of construction workers over a period of five to seven years with the regional construction labour market expected to be tight in future years. Incoming workers would require a mix of permanent and temporary housing. A rapid influx of contractors, workers and job seekers is likely to strain the housing market, social services, community facilities and social cohesion in larger towns and small communities, requiring an active programme of mitigation and management.

There are potential benefits in the construction phase from training and recruiting resident and iwi workers, along with a labour market strategy that looks to optimise employment in the construction sector and reduce competition for workers between sectors. There is also potential benefit from procurement of goods and services from local businesses, with associated business advice and training, and the flow-on effects on the local economy.

In the housing sector there will be opportunities for providers of short term accommodation and also for additional permanent housing in nearby towns consistent with spatial planning. Temporary worker accommodation could be reused in other sectors such as for seasonal workers and visitors. In addition to economic benefits, there is potential to support social, community and iwi development initiatives in the longer term through a benefit sharing mechanism such as a community fund.

For a development of this size, with significant potential social effects, a social impact management plan (SIMP) should be included alongside the usual construction environmental management plans. A SIMP should include all necessary strategies and actions to reduce, mitigate or remedy negative social impacts and enhance positive ones in construction and operation of the project. Active engagement with interested and affected parties is an essential part of preparing a SIMP. Engagement for the SIA should continue alongside and in conjunction with wider project communication and engagement activities, leading to consent processes informed by local knowledge, and a social licence to operate over time.

7 References

Aukaha Ltd. (2021). Cultural Values Statement: The Lake Onslow option for the New Zealand Battery project. Unpublished report prepared for the Ministry of Business, Innovation, and Employment on behalf of Te Rūnanga o Ōtākou, Kāti Huirapa Rūnaka ki Puketeraki, and Hokonui Rūnanga.

Blakely Wallace Associates (2021). New Zealand Battery Project Landscape and Visual Assessment. Unpublished report Prepared for the Department of Conservation.

Cernea, M. M. (2004). Social impacts and social risks in hydropower programs: pre-emptive planning and counter-risk measures. Background Paper to Keynote Address: Session on Social Aspects of Hydropower Development, United Nations Symposium on Hydropower and Sustainable Development, Beijing, China 27-29 October 2004.

Égré, D. and Senécal, P. (2003). Social impact assessments of large dams throughout the world: lessons learned over two decades. Impact Assessment and Project Appraisal, 21(3), 215-224.

Fitzgerald, G. (2000). A Case Study of Manapouri. Working Paper 21, prepared for the Foundation for Research Science and Technology Project - Resource Community Formation & Change (TBA 801), Taylor Baines & Associates, Christchurch.

Fitzgerald, G. and Taylor, N. (2000). A Case Study of Twizel. Working Paper 22, prepared for the Foundation for Research Science and Technology Project - Resource Community Formation & Change (TBA 801), Taylor Baines & Associates, Christchurch.

Heyes, R., Brunsdon, N., Kiernan, G., Whiteford, A. and Williams, M. (2022). Construction activity and the supply and demand for workers in Otago: a 15-year outlook, January 2022. Infometrics, Wellington.

Kirchherr, J. and Charles, K. J. (2016). The social impacts of dams: A new framework for scholarly analysis. Environmental Impact Assessment Review, 60, 99-114.

Kirchherr, J., Pohlner, H., & Charles, K. J. (2016). Cleaning up the big muddy: A meta-synthesis of the research on the social impact of dams. Environmental Impact Assessment Review, 60, 115-125.

Mackay, M., Perkins, H. C. and Taylor, C. N. (2014). Producing and consuming the global multifunctional countryside: Rural tourism in the South Island of New Zealand, K. Dashper (ed.) 'Rural Tourism: An International Perspective' Cambridge Scholars Publishing, Newcastle upon Tyne, UK.

McClintock, W. and Taylor, N. (1997). A social and economic impact assessment of the development of Turangi township. A report commissioned by the Crown Law Office for the Waitangi Tribunal Turangi Township Remedies Hearing, Taylor Baines & Associates, Christchurch.

Rayner, C. A. (1988). Clutha Valley Development wind down: social impact monitoring. State Services Commission, the Cromwell Social Task Force and the Alexandra, Clyde and District Social Task Force.

Rob Greenaway and Associates (2022). Aotearoa NZ Battery Project Recreation Values Assessment. Unpublished report Prepared for the Ministry of Business, Innovation & Employment.

Schulz, C. and Skinner, J. (2022). Hydropower benefit-sharing and resettlement: A conceptual review. Energy Research and Social Science, 83, 102342.

Stephenson, J., & Ioannou, M. (2010). Social acceptance of renewable electricity developments in New Zealand. A report for the Energy Efficiency and Conservation Authority. Centre for the Study of Agriculture, Food and Environment, University of Otago, New Zealand.

Taylor, C. N., Goodrich, C. G. and Bryan, C. H. (2004a). Social Assessment: Theory, Process and Techniques (Third Edition). Social Ecology Press, Middleton, Wisconsin.

Taylor, N., Fitzgerald, G., & McClintock, W. (2004b). Social assessment of hydro-electricity development: lessons from the New Zealand experience. Paper prepared for the Annual Meeting of the International Association for Impact Assessment, Vancouver, 26-29 June.

Taylor, N. and Mackay, M. (2022). Social impact assessment guidelines for thriving regions and communities. Building Better Homes Towns and Cities, National Science Challenge.

Tilt, B., Braun, Y., & He, D. (2009). Social impacts of large dam projects: A comparison of international case studies and implications for best practice. Journal of Environmental Management, 90, S249-S257.

Vanclay, F., Esteves, A. M. and Franks, D. M. (2015). Social Impact Assessment: Guidance for assessing and managing the social impacts of projects. International Association for Impact Assessment, Fargo, USA.

Warren, J. and Taylor, C. N. (2001). Developing heritage tourism in New Zealand. Centre for Research, Evaluation and Social Assessment, Wellington.

Webster, A. H. H. (1948). Teviot tapestry: a history of the Roxburgh-Millers Flat district. Otago Centennial Publications.

Annex 1 Lists of additional unpublished sources

Central Otago Community Plans

https://centralotagonz.com/opportunities/in-the-community/community-plans/

Roxburgh & Teviot Valley (December 2011) Rox Community Plan - 20 December 2011 (codc.govt.nz)

Alexandra (May 2013) Alex Community Plan - Final.doc (codc.govt.nz)

Clyde 2010 (March 2011) Final Clyde CP March11 (codc.govt.nz)

Cromwell (January 2013) Final Cromwell Community Plan (codc.govt.nz)

Cromwell (updated plan 2020) https://www.connectcromwell.nz/post/latest-cromwell-community-plan

Maniototo (February 2007) Maniototo Plan final.doc (codc.govt.nz)

Patearoa & Upper Taieri (2019) Patearoa Community Plan 2019.pdf (codc.govt.nz)

Omakau (December 2014) Omakau Community Plan.pdf (codc.govt.nz)

Ophir (September 2015) Ophir Community Plan.pdf (codc.govt.nz)

Other material- Central Otago

Central Otago District Council Vincent Spatial Plan Establishment Report March 2020 Cromwell Establishment Report Working Draft.docx (codc.govt.nz)

Cromwell 'Eye to the Future' Masterplan Spatial Framework Stage 1: Spatial Plan 2019 https://www.codc.govt.nz/your-council/project-updates/cromwelleyetothefuture#:~:text=The%20Cromwell%20Community%20Board%20adopted,over%20the%20next%2030%20years

Central Otago Heritage Strategic Plan 2021-2024 https://www.heritagecentralotago.org.nz/wp-content/uploads/2021/10/CENTRAL-OTAGO-HERITAGE-PLAN-2021-2024-.pdf

Central Otago Outdoor Recreation Strategy 2012-2022 https://www.codc.govt.nz/repository/libraries/id:2apsqkk8g1cxbyoqohn0/hierarchy/sitecollectiondocuments/strategies-and-policies/community-led-strategies/Outdoor%20Recreation%20Strategy.pdf

Clutha District Community Plans

https://www.cluthadc.govt.nz/community/our-place-community-planning

Current plans cover Balclutha, Waihola, Milton, The Catlins, Lawrence-Tuapeka and Kaitangata. Clutha District Council will be working with the West Otago community over the 2021/22 summer to create the West Otago Community Plan (this would include Tapanui).

Lawrence-Tuapeka Community Plan 2020
https://www.cluthadc.govt.nz/repository/libraries/id:2c0gik8bh17q9s5atec4/hierarchy/Documents/Our-Place-Lawrence/Our%20PLace%20Lawrence-Tuapeka%20Community%20Plan.pdf

Other Clutha material

Lower Clutha Rohe Lower Clutha Rohe | Otago Regional Council (orc.govt.nz)

Roxburgh Rohe Roxburgh Rohe | Otago Regional Council (orc.govt.nz) (contains Lake Onslow)

Manuherekia Rohe Manuherekia Rohe | Otago Regional Council (orc.govt.nz)

Clutha Economic Development Strategy
https://www.cluthanz.com/assets/Documents/26d7c23b8a/2018-07-16-Clutha-Economic-Development-Strategy-PDF.pdf

Living and Working in Clutha Strategy Living and Working in Clutha Strategy 2021 (ID 597582).pdf (cluthadc.govt.nz)

Clutha Destination Strategy https://www.cluthanz.com/assets/CluthaDestinationStrategy2020-2030_CompleteDocument.pdf

Otago regional

Clutha River/Mata-au Plan (including Lakes Dunstan and Roxburgh) (2011)
https://www.codc.govt.nz/repository/libraries/id:2apsqkk8g1cxbyoqohn0/hierarchy/sitecollectiondocuments/plans/other-council-plans/Clutha%20River%20Mata-au%20Plan%202011.pdf

Local Insights Report Otago interim Regional Skills Leadership Group September 2020
https://www.mbie.govt.nz/dmsdocument/12168-local-insights-report-otago-interim-rslg-september-2020

Te Ara – Otago Place (Page 14. West Otago and Teviot Valley, Page 12. Clutha River/Mata-Au, Page 16. Cromwell district) https://teara.govt.nz/en/otago-places

Annex 2 Additional social baseline information

A2.1 Population and Settlements

This section discusses selected demographic patterns within the study area, using information produced by Statistics New Zealand (Stats NZ). Data from Census 2018 inform the tables presented in this section. It is acknowledged that this information is now four years old, but we consider that patterns have broadly remained stable over this period. Population and household estimates were updated recently (2021-2022) by Stats NZ.

Population and Households, 2021

Table 1 presents historic population counts[65] for the study area, since 2006. Some key observations about the size (population count) of the selected communities are:

- Currently, approximately 24,790 and 18,490 people live in Central Otago and Clutha districts, respectively
- Central Otago population is concentrated within Cromwell and Alexandra. These two urban areas account for 27% and 24% of the district's population, respectively. That is, more than half of the district's population reside in these two urban areas
- Approximately 1,880 people live in Teviot Valley, with Roxburgh being the largest, i.e. 620 people, followed by Ettrick (180 residents) and Millers Flat (90 residents). Approximately 820 people currently reside in Tapanui and 470 in Lawrence.

Table A-1: Population - Central Otago District and Clutha District

Population (Historic)					**Total Change (n)**			**CAGR (per annum)**		
Reporting Area	**2006***	**2013***	**2018***	**2021**	**2006-2013**	**2013-2018**	**2018-2021**	**2006-2013**	**2013-2018**	**2018-2021**
Cromwell	3,850	4,500	5,830	6,630	650	1,330	800	2%	5%	4%
Clyde	930	1,040	1,180	1,250	110	140	70	2%	3%	2%
Alexandra	4,940	4,920	5,630	5,960	-20	710	330	0%	3%	2%
Ranfurly**	730	680	740	770	-40	50	40	-1.0%	2%	1%
Roxburgh**	620	540	600	620	-80	60	20	-2%	2%	1%
Ettrick**	180	180	170	180	-	-	10	0%	-1%	2%
Millers Flat**	100	90	90	90	-10	-	-	-1%	0%	0%
Rest of Teviot Valley	820	800	960	990	-30	160	30	-0.4%	4%	1%
Rest of Central Otago District	4,880	5,730	7,020	8,300	840	1,300	1,270	2%	4%	6%
Total Central Otago District	**17,050**	**18,480**	**22,220**	**24,790**	**1,420**	**3,740**	**2,570**	**1%**	**4%**	**4%**
Lawrence**	440	420	460	470	-20	40	10	-1%	2%	1%
Tapanui**	760	740	800	820	-30	70	20	-0.4%	2%	1%
Rest of Clutha District	16,020	16,080	16,780	17,200	70	700	420	0.1%	1%	1%
Total Clutha District	**17,220**	**17,240**	**18,040**	**18,490**	**20**	**800**	**450**	**0.02%**	**1%**	**1%**

Source: Stats NZ; Market Economics calculations

**Census years*

***Some uncertainty because 2021 estimates released by SNZ is at a higher spatial level than reported here*

[65] Stats NZ releases population estimates in non-census years (e.g. 2021).

Over the past 15 years, Central Otago has experienced strong growth relative to Clutha. Central Otago population increased from 17,050 to 24,790 residents between 2006 and 2021 (+7,740), while Clutha increased from 17,220 to 18,490 (+1,270). Most of the growth occurred from 2013 onwards. The annual growth rate across Central Otago was around 4% between 2013 and 2021, compared to 1% per annum between 2006 and 2013. Similarly, Clutha experienced very little growth (<0.1%) between 2006 and 2013, shifting to around 1% per annum between 2013 and 2021.

Population growth in Cromwell has consistently outpaced the district's growth, accounting for more than a third (35%) of the district's population increase between 2006 and 2021. Between 2013 and 2018, Cromwell population also increased at a faster rate than the rest of Central Otago. But this has softened somewhat, and over the past three years, the rest of Central Otago population growth surpassed Cromwell (6% per year across the rest of Central Otago compared to 4% per year in Cromwell).

Population growth in Teviot Valley as a whole, has been much slower than the rest of the district, with negative annual growth between 2006 and 2013.

Currently, the average household size across Central Otago is 2.5 persons, and slightly smaller (2.4) in Clutha district. This suggests around 10,060 households in Central Otago and 7,580 households in Clutha. Historic household numbers[66] for the study area are presented in Table A-2, followed by some key observations about the selected communities regarding household numbers.

Table A-2: Households - Central Otago District and Clutha District

Households (Historic)					**Total Change (n)**			**CAGR (per annum)**		
Reporting Area	**2006***	**2013***	**2018***	**2021**	**2006-2013**	**2013-2018**	**2018-2021**	**2006-2013**	**2013-2018**	**2018-2021**
Cromwell	1,440	1,730	2,110	2,440	290	380	330	3%	4%	5%
Clyde	380	440	530	610	60	90	80	2%	4%	5%
Alexandra	1,970	2,090	2,340	2,710	120	250	370	1%	2%	5%
Ranfurly**	330	320	330	390	-10	10	60	-0.4%	1%	6%
Roxburgh**	260	250	280	320	-10	30	40	-1%	2%	5%
Ettrick**	70	80	80	90	10	-	10	2%	0%	4%
Millers Flat**	40	40	40	50	-	-	10	0%	0%	8%
Rest of Teviot Valley	320	310	350	400	-10	40	50	-0.5%	2%	5%
Rest of Central Otago Dist.	1,810	2,170	2,630	3,050	360	460	420	3%	4%	5%
Total Central Otago Dist.	**6,620**	**7,410**	**8,680**	**10,060**	**790**	**1,270**	**1,380**	**2%**	**3%**	**5%**
Lawrence**	190	180	210	230	-10	30	20	-1%	3%	3%
Tapanui**	320	330	350	380	10	20	30	0.4%	1%	3%
Rest of Clutha District	6,020	6,210	6,490	6,980	190	280	490	0.4%	1%	2%
Total Clutha District	**6,530**	**6,720**	**7,050**	**7,580**	**190**	**330**	**530**	**0.4%**	**1%**	**2%**

Source: Stats NZ; Market Economics calculations

**Census years*

***Some uncertainty because 2021 estimates released by SNZ is at a higher spatial level than reported here*

[66] Stats NZ releases population estimates in non-census years (e.g. 2021).

Key observations about households are:

- Central Otago households are largely concentrated within the urban areas of Cromwell and Alexandra. These two urban areas account for 24% and 27% of the district's households, respectively. Interestingly, Alexandra account for a larger share of the district's total number of households, but a smaller share of the population. This suggests smaller households in Alexandra than Cromwell, which is generally associated with an older population. The age profile (discussed later) further highlights the older population living in Central Otago
- In total, around 860 households reside in Teviot Valley, with more than a third (37%) of them in Roxburgh (320 households). The three urban settlements account for 53% of the households in Teviot Valley, but only 47% of the population, suggesting smaller households in the urban settlements
- Approximately 380 households currently reside in Tapanui and 230 in Lawrence. The data suggests the average household size in these two settlements is somewhat smaller than the Clutha district average, i.e. 2.2 in Tapanui and 2 in Lawrence, compared with 2.4 across Clutha
- Over the past 15 years, the average household size has decreased in both districts, but slightly more in Clutha, from 2.6 persons in 2006 to 2.5 in Central Otago and 2.4 in Clutha
- Central Otago has experienced strong household growth in recent times, adding an estimated 1,380 households between 2018 and 2021, with the growth in Alexandra (+370) and Cromwell (+330) accounting for half of the district's growth. Clyde and Ranfurly accounted for 6% and 4% of the growth, respectively. In comparison, Teviot Valley's household growth made up 8% of the district's growth
- While some settlements experienced negative growth between 2006 and 2013 (Ranfurly, Roxburgh, Lawrence), this trend reversed between 2013 and 2018, and is expected to continue, in the short to medium term at least
- The annual household growth rate across Central Otago has increased from around 2% between 2006 and 2013, to 5% between 2018 and 2021. The larger settlements[67] have displayed broadly similar patterns as the district in terms of annual growth, i.e. somewhat slower in the earlier years, lifting to around 5% per annum over recent times
- Annual household growth across Clutha district was around 0.4% between 2006 and 2013, lifting to 2% between 2018 and 2021. The annual growth rate in Lawrence and Tapanui has surpassed the rest of Clutha District and the district as a whole over the past three years, but this is off a very low base, so care needs to be taken when interpreting these rates.

Population and Household Outlook, 2021-2048

Looking forward, medium population and household projections published by Stats NZ are used in this report. It is acknowledged population and household projections are released at a higher spatial level (i.e. at SA2 level) than Census data, which is published for Statistical Area 1s (SA1). For this report, we derived SA1-level projections from Stats NZ's SA2 projections by assuming that the

[67] Alexandra, Cromwell, Roxburgh

distribution of population and households within each SA2 (i.e. in each of the constituent SA1) remains constant in the future, and applying those proportions to the SA2 projections. The output from that process is SA1-level projections which sum to the Stats NZ SA2 projections. Subsequently, the derived SA1 counts are then used to estimate the projections for urban settlements in the study area.

Table A-3 presents the population projections[68] for Central Otago and Clutha districts, followed by some key points about the population projections. Tables containing the SA2 level projections can be found in Table A-3.

The population of Central Otago is projected to reach 31,560 in 2048, growing by 27% from 24,790 in 2021. Most of the growth is projected to be within and on the fringes of the urban areas of Cromwell and Alexandra, suggesting Central Otago's population will remain concentrated in these locations. However, population in the urban settlements[69] are projected to grow slightly slower than the rural areas. This results in the urban population making up a smaller share (53%) of the district's population in 2048, compared with the current share, 56%.

Table A-3: Population Projections (2021-2048)

Population Projections*					**Total Change (n)**			**CAGR (per annum)**		
Reporting Area	**2021**	**2028**	**2038**	**2048**	**2021-2028**	**2028-2038**	**2038-2048**	**2021-2028**	**2028-2038**	**2038-2048**
Cromwell	6,630	7,190	7,990	8,740	560	800	750	1%	2%	3%
Clyde	1,250	1,250	1,280	1,260	-	30	-20	0%	0%	-1%
Alexandra	5,960	6,200	6,540	6,750	240	340	210	1%	1%	1%
Ranfurly	770	770	790	790	-	20	-	0%	1%	0%
Roxburgh	620	620	630	610	-	10	-20	0%	0%	-1%
Ettrick	180	180	180	180	-	-	-	0%	0%	0%
Millers Flat	90	90	90	90	-	-	-	0%	0%	0%
Rest of Teviot Valley	990	990	1,000	980	-	10	-20	0%	0%	-1%
Rest of Central Otago District	8,300	9,130	10,720	12,160	830	1,590	1,440	1%	3%	4%
Total Central Otago District	**24,790**	**26,430**	**29,220**	**31,560**	**1,640**	**2,790**	**2,340**	**1%**	**2%**	**3%**
Lawrence	470	470	470	460	-	-	-10	0%	0%	-0.7%
Tapanui	820	820	820	820	-	-	-	0%	0%	0%
Rest of Clutha District	17,200	17,460	17,680	17,440	260	220	-240	0.2%	0.3%	-0.5%
Total Clutha District	**18,490**	**18,740**	**18,960**	**18,720**	**250**	**220**	**-240**	**0.2%**	**0.2%**	**-0.4%**

Source: Stats NZ; Market Economics calculations
**Some uncertainty because projections released by SNZ is at a higher spatial level than reported here*

Alexandra is expected to grow at a somewhat slower rate than the district as a whole, which suggests that as a share of the total population, Alexandra will make up a slightly smaller share in 2048. The population of the Teviot Valley area, on the other hand, is not projected to contract, indicting a population of 1,860 in 2048, a decrease of 20 people, from 2021.

The Clutha District is projected to have a population of 18,700 in 2048. The projections suggest that the district will not experience significant growth over the next two to three decades, and largely maintain its current population level with an increase of 200 from 2021. The distribution of the

[68] Medium growth projections.
[69] Cromwell, Clyde, Alexandra.

population across areas within the district is not projected to change much, with only small increases and decreases in different areas.

Error! Reference source not found. Table A-4 presents the projected household numbers out to 048, under the Stats NZ's medium growth scenario with increases in numbers as the population grows and ages.

Table A-4: Household Projections (2021-2048)

Household Projections*					Total Change (n)			CAGR (per annum)		
Reporting Area	**2021**	**2028**	**2038**	**2048**	**2021-2028**	**2028-2038**	**2038-2048**	**2021-2028**	**2028-2038**	**2038-2048**
Cromwell	2,440	2,670	3,260	3,570	230	590	310	1%	2%	3%
Clyde	610	600	660	650	-10	60	-10	0%	0%	-1%
Alexandra	2,710	2,690	3,020	3,110	-20	330	90	1%	1%	1%
Ranfurly	390	370	400	400	-20	30	-	0%	1%	0%
Roxburgh	320	320	330	340	-	10	10	0%	0%	-1%
Ettrick	90	80	90	90	-10	10	-	0%	0%	0%
Millers Flat	50	50	50	50	-	-	-	0%	0%	0%
Rest of Teviot Valley	400	390	420	420	-10	30	-	0%	0%	-1%
Rest of Central Otago District	3,050	3,320	4,280	4,860	270	960	580	1%	3%	4%
Total Central Otago District	**10,100**	**10,500**	**12,500**	**13,500**	**400**	**2,000**	**1,000**	**1%**	**2%**	**3%**
Lawrence	230	230	240	230	-	10	-10	0%	0%	-0.7%
Tapanui	380	370	380	360	-10	10	-20	0%	0%	0%
Rest of Clutha District	6,980	7,100	7,490	7,500	120	390	10	0.2%	0.3%	-0.5%
Total Clutha District	**7,600**	**7,700**	**8,100**	**8,100**	**100**	**400**	**-**	**0.2%**	**0.2%**	**-0.4%**

Source: Stats NZ; Market Economics calculations
**Some uncertainty because projections released by SNZ is at a higher spatial level than reported here*

Age Profile (Census 2018)

The age profile of the population within the study area according to Census 2018, is shown in Table A.5.

The Central Otago population has an older age profile than the age profile across the country. The proportion of the population in age groups above 40 years, is larger in Central Otago than for New Zealand as a whole. Almost a quarter (23%) of Central Otago's population is aged 65 years and over, which is significantly higher than the share across New Zealand (16% of the total population). More specifically, settlements where 65 plus make up a large share of the district's population (within the study area) are:

- Millers Flat (45%)
- Ranfurly (34%)
- Roxburgh (32%)
- Clyde (30%).

In Clutha, the age profile (65+ years) is comparable with the national profile. However, for groups younger than 64 years, the age profile in Clutha is similar to that of Central Otago.

People aged 80 years and over are viewed as particularly vulnerable. This group make up a significantly higher share of the district's population, relative to the national average (4%), in the following settlements:

- Ranfurly (12%)
- Roxburgh (10%)
- Millers Flat (10%)
- Alexandra (8%)

It is not unexpected that rural areas such as Rest of Teviot Valley, has lower proportions (3%) of their population fall in this age group. Older people need healthcare and other social services to be easily accessible, which makes rural areas less attractive.

Table A.5: Distribution of Population by Age (Census 2018)

Reporting Area	Age cohort					
	0-14 yrs	15-19 yrs	20-39 yrs	40-64 yrs	65-79 yrs	80+ yrs
Cromwell	19%	4%	27%	31%	15%	3%
Clyde	14%	3%	15%	38%	25%	5%
Alexandra	17%	5%	18%	31%	21%	8%
Ranfurly	13%	4%	14%	34%	22%	12%
Roxburgh	15%	4%	13%	37%	21%	10%
Ettrick	7%	5%	25%	37%	23%	4%
Millers Flat	3%	7%	3%	41%	34%	10%
Rest of Teviot Valley	15%	5%	22%	38%	18%	3%
Rest of Central Otago District	18%	5%	20%	40%	16%	3%
Total Central Otago District	**17%**	**4%**	**21%**	**35%**	**18%**	**5%**
Lawrence	14%	3%	14%	42%	21%	5%
Tapanui	18%	7%	14%	32%	23%	7%
Rest of Clutha District	19%	6%	22%	36%	13%	4%
Total Clutha District	**19%**	**6%**	**21%**	**36%**	**14%**	**4%**
Otago Region	**17%**	**7%**	**28%**	**32%**	**12%**	**4%**
New Zealand	**20%**	**6%**	**27%**	**32%**	**12%**	**4%**

Conversely, these regions exhibit lower proportions in age bands below 40 years when compared to the national average. In New Zealand 53% of the population is aged 39 years and younger, and this is similar (52%) across Otago Region. However, for Central Otago and Clutha Districts, this figure is 42% and 46%, respectively. In both districts, just 21% of the population is aged between 20 and 39 years, compared to 27% nationally. Children[70] and teenagers[71] represent 25% of the Clutha District population, which is similar to the national average (26%), but they make up only 21% of Central Otago's population.

The age profile over time highlights the trend of an aging population across these two districts. This aligns with the trend emerging across New Zealand, but it appears the trend is occurring at a faster pace within the study area, than nationally. This suggests it is likely driven by inward migration, i.e. people coming to retire in the area.

[70] 0-14 years
[71] 15-19 years

Ethnicity Profile

The ethnicity profile of the populations are shown in Table A.6 according to data gathered from the 2018 Census. Importantly, ethnicity data comes with some caveats[72]. Primarily, census respondents can select more than one option in response to the ethnicity question, so for this reason, the total of the shares does not sum to 100%.

Consistently across the study area, higher proportions of respondents identify as European, relative to the national average (of 70%). In Central Otago, Europeans make up 92% of the population, and 89% in Clutha, compared with only 70% nationally. For settlements in the study area, this ranges from 84% in Ettrick up to 97% in Millers Flat.

Concurrently, for Māori, Pacific peoples, and Asian groups, the proportion of the population they represent is generally lower across the settlements within the study area than the national average. Māori represent 8% of the Central Otago District and 12% of Clutha's population, compared with 17% nationally. There is some variation across settlements, with the largest share of Māori population in:

- Roxburgh (15%)
- Ranfurly (13%)
- Alexandra (10%) .

Notably, Lawrence (19%) is the only settlement with a larger Māori population (as a share of the settlement's total population) than the national average.

Asian and Pacific Peoples represent 15% and 8% of the national population, respectively. The proportions of these ethnic groups within the study area are significantly below the national average. The portion of the population represented by those identifying as Asian and Pacific in the Central Otago District was 3% and 2%, respectively, and for the Clutha District, 4% and 2%, respectively. The district level proportions are broadly similar to those across the settlements, with the exception of a higher than district average proportion of Pacific Peoples in Ettrick (14%) and Roxburgh (6%) at the time of the 2018 census. The Rest of Teviot Valley also has a higher than district average share of Pacific Peoples (10%).

In terms of the portion of the population identifying as MELAA[73] or Other, these are largely consistent with the national average across all areas. Combined they make up a very small share (<2%) of the population, in these districts.

[72] https://datainfoplus.stats.govt.nz/Item/nz.govt.stats/7079024d-6231-4fc4-824f-dd8515d33141
[73] Middle Eastern/Latin American/African

Table A.6: Distribution of Population by Ethnicity (Census 2018)

Reporting area	2018					
	European	Māori	Pacific Peoples	Asian	MELAA	Other
Cromwell	90%	9%	2%	4%	1%	1%
Clyde	93%	6%	2%	2%	0%	2%
Alexandra	93%	10%	2%	2%	0%	1%
Ranfurly	91%	13%	1%	3%	0%	0%
Roxburgh	87%	15%	6%	5%	1%	1%
Ettrick	84%	2%	14%	4%	0%	0%
Millers Flat	97%	7%	0%	0%	0%	0%
Rest of Teviot Valley	87%	9%	10%	1%	0%	2%
Rest of Central Otago District	94%	6%	2%	2%	1%	1%
Total Central Otago District	**92%**	**8%**	**2%**	**3%**	**1%**	**1%**
Lawrence	89%	19%	0%	1%	0%	0%
Tapanui	90%	15%	0%	2%	2%	2%
Rest of Clutha District	89%	12%	2%	4%	1%	1%
Total Clutha District	**89%**	**12%**	**2%**	**4%**	**1%**	**1%**
Otago Region	**87%**	**9%**	**3%**	**7%**	**2%**	**1%**
New Zealand	**70%**	**17%**	**8%**	**15%**	**1%**	**1%**

MELAA - Middle Eastern/Latin American/African
Note: Census respondents are able to identify with more than one ethnicity, and therefore the shares do not add to 100%

Educational qualifications

Table A.7 shows the highest education qualification level of the population within the study area according to Census 2018.

Across the urban settlements in the study area the proportion of the population with no formal qualification, is consistently higher than the national average (21%), ranging from 22% to 39%. Both districts also have higher proportions of people with no formal qualification, than the national average, i.e. Central Otago 25% of the population and Clutha 31% of the population. Settlements with the highest proportions of people without any formal qualification are:

- Millers Flat (39%)
- Tapanui (36%)
- Roxburgh (34%)
- Ranfurly, (34%).

When compared to the national average, the Central Otago and Clutha districts have similar proportions of the population with highest qualifications of Level 1-4 Certificate, however, lower proportions of the population with a tertiary qualification and subsequently higher proportions of the population with no qualification.

In both districts, for around half of the population their high school qualification (Level 1-4 Certificate) is their highest qualification. This is similar to the regional and national average. However, both districts have a lower share of the population that indicated they have a tertiary

qualification, than nationally. In Central Otago, nearly a quarter (24%) of the population has a tertiary qualification, compared to 29% across New Zealand. In Clutha, this share is even lower, i.e. 17%. Ettrick has the lowest proportion of the population holding a tertiary qualification within the study area (13%).

With the exception of Millers Flat, the share of the population without any formal qualification has declined over time (from 2006), and concurrently, the share of people with a tertiary qualification has increased. These patterns indicate an overall increase in education levels within the study area, which aligns with the regional and national trends observed.

Table A.7: Distribution of Highest Qualification Level (Census 2018)

Reporting area	2018		
	No Qualification	Level 1-4 Certificate (incl. Overseas High School qualification)	Tertiary Qualification - Level 5 and above
Cromwell	24%	55%	21%
Clyde	22%	52%	26%
Alexandra	28%	50%	21%
Ranfurly	34%	50%	17%
Roxburgh	34%	46%	19%
Ettrick	30%	58%	13%
Millers Flat	39%	35%	26%
Rest of Teviot Valley	28%	54%	18%
Rest of Central Otago District	20%	50%	30%
Total Central Otago District	**25%**	**52%**	**24%**
Lawrence	30%	54%	15%
Tapanui	36%	47%	17%
Rest of Clutha District	31%	51%	17%
Total Clutha District	**31%**	**51%**	**17%**
Otago Region	**20%**	**52%**	**29%**
New Zealand	**21%**	**50%**	**29%**

Source: Statistics NZ (Census)

Selected sources of Personal Income

Census 2018 information on selected sources of personal income is shown in Table A.8. The data suggests for both Central Otago and Clutha districts, people receiving pensions/superannuation/annuities make up the largest share of the population, i.e. 19% and 16%, respectively. This is still somewhat lower than the national average (20%), despite both these districts having larger proportions of retirees (65+ years) than nationally.

With the exception of Cromwell, all urban settlements in the study area, have a higher share of the population receiving superannuation than the national average (20%). Settlements where the share is significantly higher are:

- Ranfurly (30%)
- Millers Flat (30%)

- Roxburgh (26%).

The proportion of people on Jobseeker support is noticeably lower in Central Otago (1%) compared with Clutha (5%) and the regional (5%) and national (6%) averages suggesting a tight labour market.

Across both districts, there is also very few people receiving a student allowance, i.e. 0.4% of people in Central Otago and 1% of people in Clutha. Nationally and regionally, around 2% of census respondents indicated they receive a student allowance.

Table A.8: Selected Sources of Personal Income (Census 2018)

	2018						
Reporting area	ACC pmts/ Workplace Insurer	Superan/ Pension /Annuity	Jobseeker Support	Sole Parent Support	Supp'd Living Pmt	Student Allowance	Other govt payments/ Income support
Cromwell	2%	17%	1%	1%	0%	1%	2%
Clyde	1%	25%	1%	0%	1%	1%	2%
Alexandra	1%	25%	2%	1%	1%	0%	2%
Ranfurly	1%	30%	2%	0%	1%	0%	1%
Roxburgh	1%	26%	2%	1%	1%	0%	3%
Ettrick	1%	20%	3%	0%	0%	0%	1%
Millers Flat	0%	30%	2%	0%	0%	2%	5%
Rest of Teviot Valley	2%	16%	2%	2%	1%	1%	3%
Rest of Central Otago District	1%	15%	1%	0%	0%	0%	2%
Total Central Otago District	**1%**	**19%**	**1%**	**1%**	**1%**	**0.4%**	**2%**
Lawrence	2%	22%	7%	1%	2%	0%	3%
Tapanui	3%	24%	3%	1%	1%	0%	3%
Rest of Clutha District	2%	15%	5%	1%	1%	1%	2%
Total Clutha District	**2%**	**16%**	**5%**	**1%**	**1%**	**1%**	**2%**
Otago Region	**2%**	**21%**	**5%**	**1%**	**2%**	**4%**	**4%**
New Zealand	**2%**	**20%**	**6%**	**2%**	**2%**	**2%**	**4%**

Note: Not all sources of personal income are included

Source: Statistics NZ (Census)

Unoccupied Dwellings

For census purposes, Stats NZ record dwellings as 'occupied' if they are occupied at midnight on census night or occupied at any time during the 12 hours following midnight on census night unless the occupant(s) completed a form at another dwelling during this period. This includes occupied dilapidated dwellings and occupied dwellings under construction. Conversely, dwellings are recorded as unoccupied if it is unoccupied at midnight and at all times during the next 12 hours following midnight on census night. An unoccupied dwelling is classified as 'empty' if it clearly had no current occupants and new occupants are not expected to arrive or move in on, or before, census night. Unoccupied private dwellings that are being repaired or renovated are defined as empty dwellings, as are baches and holiday homes with no occupants on census night. A dwelling is classified as having 'residents away' where occupants of a dwelling are identified as being temporarily away and are not expected to return by noon on the day after census night.

The occupation status of dwellings within the study area for the 2018 census is shown in Table A.9.

Table A.9: Occupation Status of Dwellings (Census 2018)

Reporting area	2018				
	Total Dwellings	Occupied dwelling	Unocc dwg - Residents away	Unocc dwg - Empty dwelling	Dwelling under construction
Cromwell	2,730	79%	7%	11%	2%
Clyde	790	70%	23%	6%	1%
Alexandra	2,620	91%	5%	5%	0%
Ranfurly	460	76%	10%	12%	0%
Roxburgh	370	78%	14%	7%	0%
Ettrick	100	82%	15%	3%	0%
Millers Flat	60	74%	11%	16%	0%
Rest of Teviot Valley	450	79%	13%	7%	0%
Rest of Central Otago District	3,790	74%	13%	12%	2%
Total Central Otago District	**11,360**	**79%**	**10%**	**9%**	**1%**
Lawrence	280	79%	12%	8%	0%
Tapanui	400	89%	3%	6%	0%
Rest of Clutha District	8,070	82%	8%	11%	0%
Total Clutha District	**8,750**	**83%**	**8%**	**10%**	**0%**
Otago Region	**103,610**	**85%**	**7%**	**7%**	**1%**
New Zealand	**1,886,520**	**89%**	**5%**	**5%**	**1%**

Source: Statistics NZ (Census)

Figures for small communities such as, Millers Flat, Ettrick, etc. have to be interpreted with care when assessing occupancy status, as there might be some inaccuracies in actual counts due to confidentiality requirements. Nevertheless, in Central Otago and Clutha districts 79% and 83% of dwellings, respectively, are reported to be occupied. This is somewhat lower than the national figure, which is 89% of dwellings identified as occupied. Census data suggest both districts have larger shares of empty dwellings than the national average, i.e. 9% of Central Otago dwellings and 10% of Clutha dwellings are empty. It is not possible to deduce from Census data, what share of empty dwellings are holiday homes and which are being renovated.

Settlements within the study area with a high proportion of empty dwellings, relative to the national average of 5%, are:

- Millers Flat (16%)
- Ranfurly (12%),and
- Cromwell (11%).

Deprivation Index

The map below of the study area shows SA1s coloured according to University of Otago's New Zealand Deprivation Index (NZDep). The NZDep is an area-based measure of socioeconomic

deprivation in New Zealand.[74] It measures the level of deprivation for people in each small area, relative to the rest of New Zealand across nine Census variables. NZDep is displayed as deciles, with each decile containing about 10% of small areas in New Zealand. Decile 1 represents areas with the lowest deprivation scores with decile 10 representing areas with the highest deprivation scores. Importantly, NZDep is a measure of relative socioeconomic deprivation, not absolute socioeconomic deprivation.

The Teviot Valley areas range between deciles 4 and 6, with Roxburgh and the area to the northwest of it at decile 7. Within the larger urban areas such as Alexandra and Cromwell, the variance in deprivation levels is noticeable but not unexpected. Most towns have residents in varied stages of employment, income, education, and other factors defining the level of deprivation.

Clutha district appears to have higher levels of socioeconomic deprivation when compared to Central Otago, with the exception of Teviot Valley. Teviot Valley have deprivation levels which are similar to Clutha District.

[74] Atkinson J, Salmond C, Crampton P. 2014. NZDep2013 Index of Deprivation. Wellington: Department of Public Health, University of Otago, Wellington. Available online: http://www.otago.ac.nz/wellington/research/hirp/otago020194.html

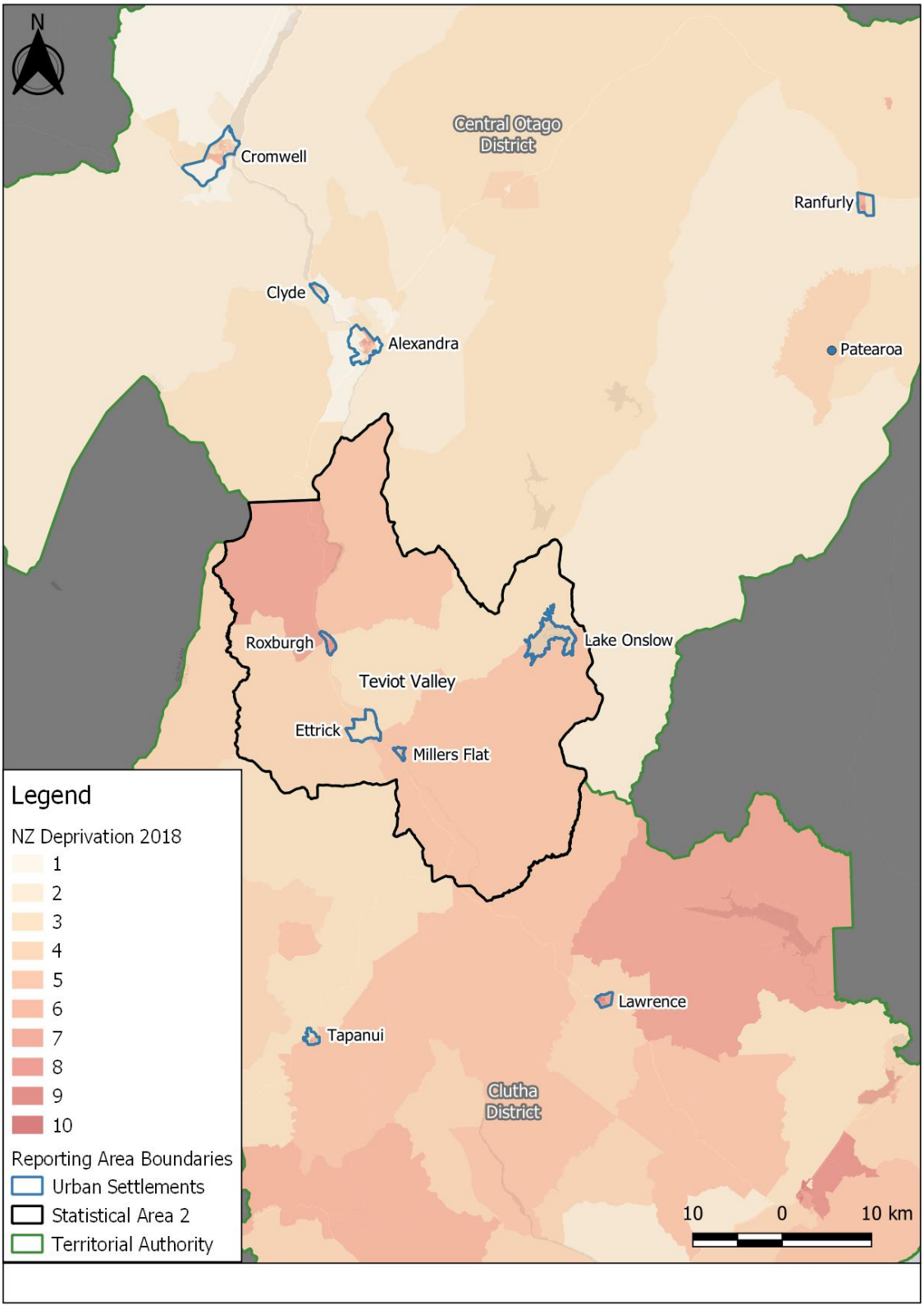

Figure A-1: Deprivation Index

A2.2 Employment and Livelihoods

Count of Businesses by 1D Industry Category, 2000-2021

Geographic Units[75] (GUs) by industry between 2001 and 2021 are shown in Table A.10 for Central Otago District and in Table A.11 for Clutha District. In the tables, change is reflected over the longer term (2001-2011), as well as more recent growth trends (2011-2021).

Across all industries in **Central Otago**, there are 3,820 business units (GUs) in 2021. This number has grown significantly over the previous two decades, increasing by 1,550 from 2,270 GUs in 2001. Some key observations about Central Otago's business landscape are:

- The largest industry (by GUs) is Agriculture, forestry and fishing with 835 GUs in 2021, followed by Rental, hiring and real estate services (655), and Construction (555).
- Agriculture, forestry and fishing was the only industry to decrease in the number of GUs despite employment growth across the district.
- Rental, hiring and real estate services experienced the strongest growth since 2001 (+440). An increase in the number of non-residential property operators is responsible for the largest share (50%) of the growth in the Rental, hiring and real estate services sector, followed by Residential property operators (31%). Over the past 10 years however, these two subsectors have increased at a similar pace, each increasing by around 60 GUs. Farm animal and bloodstock has also experienced strong growth, quadrupling between 2011 and 2021, but it is from a small base (4 GUs in 2011 to 17 GUs in 2021).
- Construction had the second largest increase in GUs (+355) over the longer term, with House construction accounting for the largest share of the district's growth in this sector (25%; 88 GUs). Other sub-sectors contributing to the growth of the Construction sector are:
    - Landscape construction services (12%; 41 GUs).
    - Other residential building construction (11%; 39 GUs), and
    - Electrical services (10%; 35 GUs).

  While growth across the subsectors has been somewhat less concentrated in recent times (2011-2021), the same sectors have been driving the growth in GUs:
    - House construction (17%; 25 GUs),
    - Landscape construction services (16%; 23 GUs),
    - Electrical services (14%; 21 GUs), and
    - Other residential building construction (13%; 19 GUs).
- In terms of average annual growth, Financial and Insurance Services have shown sustained growth over time, with an annual growth rate[76] of 11%. This is well above the longer-term growth rate for the district (3%). Notably, most of the growth in this sector occurred between 2004 and 2007 (pre-GFC). Post-GFC, solid growth occurred in 2014 (+18 GUs) and 2016 (+17 GUs), but 2017 and 2018 saw that growth wiped out (-41 GUs).

[75] The smallest statistical business unit operating within a single physical location and owned by a single enterprise. The term is used to represent what is usually called the 'geographic unit' in other Statistics NZ publications. The data relies on business units included in the NZ business frame.
[76] Compound Annual Growth Rate (CAGR).

Table A.10: Business Units by Industry for the Central Otago District

Geographic Units (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Central Otago District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	855	920	870	880	835	-20	-35	0%	-1%
Mining	10	5	10	20	10	0	0	-1%	1%
Manufacturing	100	120	150	170	165	65	15	3%	1%
Electricity, Gas, Water and Waste Services	10	15	25	20	30	20	5	5%	1%
Construction	200	380	410	450	555	355	145	5%	3%
Wholesale Trade	85	85	115	130	130	45	15	2%	1%
Retail Trade	155	180	195	185	185	30	-10	1%	-1%
Accommodation and Food Services	100	145	160	165	165	65	5	3%	1%
Transport, Postal and Warehousing	65	100	95	90	95	30	0	2%	0%
Information Media and Telecommunications	15	15	15	25	25	10	10	3%	3%
Financial and Insurance Services	25	90	140	200	190	165	50	11%	3%
Rental, Hiring and Real Estate Services	215	405	490	560	655	440	165	6%	3%
Professional, Scientific and Technical Services	105	150	185	215	270	165	85	5%	4%
Administrative and Support Services	45	85	85	100	95	50	10	4%	1%
Public Administration and Safety	40	45	45	35	40	0	-5	0%	-1%
Education and Training	45	45	45	55	60	15	15	2%	4%
Health Care and Social Assistance	55	75	85	95	100	45	15	3%	1%
Arts and Recreation Services	55	80	90	80	90	35	0	2%	0%
Other Services	80	110	115	140	125	45	10	3%	2%
Total	**2,270**	**3,040**	**3,330**	**3,620**	**3,820**	**1,550**	**490**	**3%**	**1%**

Due to rounding, individual figures may not always sum to the stated total(s)

Source: Business Demography Survey (Statistics NZ)

Table A.11: Business Units by Industry for the Clutha District

Geographic Units (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Clutha District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	1,555	1,535	1,450	1,410	1,255	-300	-195	-1%	-1%
Mining	5	5	5	5	10	5	5	5%	7%
Manufacturing	85	80	90	85	95	10	5	0%	0%
Electricity, Gas, Water and Waste Services	5	0	5	10	15	10	10	9%	10%
Construction	150	190	200	210	225	75	25	2%	1%
Wholesale Trade	50	45	60	50	35	-15	-25	-2%	-5%
Retail Trade	135	145	125	130	120	-15	-5	-1%	-1%
Accommodation and Food Services	80	95	95	95	100	20	5	1%	1%
Transport, Postal and Warehousing	60	70	70	65	60	0	-10	0%	-1%
Information Media and Telecommunications	5	10	15	5	5	0	-10	0%	-7%
Financial and Insurance Services	20	50	80	150	130	110	50	10%	5%
Rental, Hiring and Real Estate Services	245	430	480	560	555	310	75	4%	1%
Professional, Scientific and Technical Services	50	65	60	70	95	45	35	3%	4%
Administrative and Support Services	15	35	30	45	30	15	0	3%	0%
Public Administration and Safety	45	45	45	40	45	0	0	0%	0%
Education and Training	60	65	60	65	70	10	10	1%	2%
Health Care and Social Assistance	50	60	55	45	60	10	5	1%	1%
Arts and Recreation Services	40	45	45	50	50	10	5	1%	1%
Other Services	85	100	100	110	110	25	10	1%	1%
Total	**2,740**	**3,070**	**3,070**	**3,195**	**3,055**	**315**	**-15**	**1%**	**0%**

Due to rounding, individual figures may not always sum to the stated total(s)

Source: Business Demography Survey (Statistics NZ)

Clutha has slightly fewer businesses than Central Otago, with 3,055 business units (GUs) in 2021 (Table A.11). This is an increase of 315 from 2,740 in 2001. Some key observations about Clutha's business landscape are:

- Employment sectors in Clutha mirror the patterns in Central Otago. Clutha's largest industry (by GUs) in 2021 is Agriculture, forestry and fishing with 1,255 GUs, followed by Rental, hiring and real estate services (555), and Construction (225).
- Despite being the largest sector, the number of Agriculture, forestry and fishing businesses has decreased both over recent times, but also over the longer term (-300 between 2001 and 2021). More than half of the decline in this sector occurred over the past five years (-155 GUs).
- Conversely, the Rental, hiring and real estate services sector has shown the strongest growth, adding 310 GUs over the between 2001 and 2021, of which 75 (24%) was added over the past ten years. Two sub-sectors account for the vast majority (95%) of this sector's long term district growth, i.e. Non-residential property operators (219 GUs) and Residential property operators (74 GUs).
- Financial and insurance services also showed solid growth, adding 110 GUs between over the past twenty years. The data suggests an average annual growth rate of 10% between 2001 and 2021 for this sector.
- The number of businesses in Clutha in the Wholesale trade sector has decreased by 25 GUs since 2011.

Table A.12 below shows there are around 300 businesses located in Teviot Valley. Growth has been relatively subdued over the past two decades, with only around 10 more businesses in 2021 than in 2001. In 2016, GUs peaked at 320.

The annual growth rate was calculated using the unrounded figures, care should be taken when interpreting the rate (CAGR) in this table. Further, because of the rounding and the small number of businesses in some sectors[77], CAGR might appear to overstate the change. This table is a sub-set of Central Otago District, and covers the urban settlements of Roxburgh, Ettrick, Millers Flat and the rural surrounds. Some key observations are:

- Similar to the district as a whole, Agriculture, forestry and fishing is currently by far the largest sector in terms of the number of businesses in Teviot Valley (120 GUs). However, the sector has been contracting over the past two decades (-40 GUs between) with a slight lift between 2011 and 2016 (back to 2006 levels). Nevertheless, over the past five years, the number of businesses in this sector has continued the downward trend (-10 GUs).
- Rental, hiring and real estate services is the next largest, with 60 businesses currently making up this sector. This sector has also shown the strongest growth over the long term (+40 GUs). Making up the largest share of this sector is Non-residential property operators (37 GUs) and Residential property operators (13 GUs).

[77] For example Information media and telecommunications and Electricity, gas, water and waste services.

Table A.12 Business Units by Industry for Teviot Valley (2001-2021)

Geographic Units (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Clutha District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	160	130	115	130	120	-40	5	-1%	0%
Mining	0	0	0	5	5	5	5	100%	100%
Manufacturing	10	10	10	10	5	-5	-5	-3%	-5%
Electricity, Gas, Water and Waste Services	0	0	5	0	0	0	-5	5%	-4%
Construction	10	15	15	15	15	5	0	2%	0%
Wholesale Trade	0	0	5	10	5	5	0	4%	-3%
Retail Trade	15	20	10	15	15	0	5	0%	1%
Accommodation and Food Services	15	20	20	15	15	0	-5	0%	-3%
Transport, Postal and Warehousing	10	15	5	10	10	0	5	0%	2%
Information Media and Telecommunications	5	0	0	0	0	-5	0	-2%	11%
Financial and Insurance Services	0	5	10	15	10	10	0	8%	2%
Rental, Hiring and Real Estate Services	20	25	45	45	60	40	15	5%	3%
Professional, Scientific and Technical Services	0	5	5	10	10	10	5	9%	2%
Administrative and Support Services	5	5	10	10	5	0	-5	0%	-5%
Public Administration and Safety	5	5	5	5	5	0	0	-1%	3%
Education and Training	5	5	5	5	5	0	0	-3%	-7%
Health Care and Social Assistance	5	5	5	5	0	-5	-5	-4%	-4%
Arts and Recreation Services	5	5	5	5	5	0	0	3%	-1%
Other Services	10	10	15	10	10	0	-5	0%	-4%
Total	**290**	**285**	**295**	**320**	**300**	**10**	**5**	**0%**	**0%**

**Teviot Valley is a subset of Central Otago District* *Source: Business Demography Survey (Statistics NZ)*

Due to rounding, individual figures may not always sum to the stated total(s)

Modified Employment Count (MEC)[78] by 1D Industry Category, Otago, 2000-2021

Employment in for Central Otago by industry (1-digit ANZSIC[79]) for selected years between 2001 and 2021, is shown in Table A.13 and in Table A.14 for Clutha District.

Across all industries in the **Central Otago District**, 16,360 MECs were employed in 2021. This number has grown significantly over the previous two decades, increasing by 7,565 from 8,795 MECs in 2001, at a rate of 3% per annum.

The largest industries (by MEC) are:

- Agriculture, forestry and fishing - 5,460 MECs
- Construction - 2,035 MECs,
- Administrative and support services - 1,230 MECs, and
- Retail trade - 1,195 MECs.

These industries also experienced the strongest employment growth since 2001,

- Agriculture, forestry and fishing (+2,400 MECs),
- Construction (+1,315 MECs), and
- Administrative and support services (+830 MECs)

[78] MEC = Modified Employment Count, a measure of total employment that includes all paid employees and working proprietors, from Statistics NZ's Business Frame and Linked Employer Employee Database.
[79] Australian and New Zealand Standard Industrial Classification.

Despite the decrease in the number of businesses in Agriculture, forestry and fishing, the number of workers has grown strongly, driven by horticulture in particular (see later discussion). This suggests businesses are becoming larger, i.e. more workers per business. In 2001 the average size of businesses in this sector was 3.6 MECs, and in 2021 this increased to 6.5 workers per business. This trend was observed across the district as a whole, but not to the same extent as in the Agri sector. Business size increased from 3.9 MECs per GU in 2001, to 4.3 in 2021.

In terms of annual growth, sectors that have the highest growth rates over the longer term are:

- Mining (8%pa)
- Administrative and support services (6%pa),
- Construction (5%pa), and
- Arts and recreation services (5%pa).

These sectors all have higher annual growth rates than the district average (3%). As mentioned before, care should be taken with interpreting growth rates in small sectors. For example, while Mining has the highest average annual growth rate, it is a very small sector, currently employing only 35 people. In contrast, Agriculture, forestry and fishing is the largest sector in the district, but with an average growth rate of 3% per annum (in line with the district as a whole) has added 2,400 MECs to the sector over the past 20 years.

Table A.13: Modified Employment Count by Industry for the Central Otago District

Modified Employment Count (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Central Otago District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	3,060	3,285	3,745	4,720	5,460	2,400	1,715	3%	4%
Mining	10	15	30	30	35	25	5	8%	1%
Manufacturing	590	680	645	780	710	120	65	1%	1%
Electricity, Gas, Water and Waste Services	140	95	155	110	150	10	-5	0%	0%
Construction	720	1,450	1,400	1,580	2,035	1,315	635	5%	4%
Wholesale Trade	235	335	420	450	535	300	115	4%	2%
Retail Trade	800	1,060	1,055	1,125	1,195	395	140	2%	1%
Accommodation and Food Services	480	700	735	900	890	410	155	3%	2%
Transport, Postal and Warehousing	310	400	435	465	495	185	60	2%	1%
Information Media and Telecommunications	60	70	60	75	60	0	0	0%	0%
Financial and Insurance Services	80	120	150	100	110	30	-40	1%	-3%
Rental, Hiring and Real Estate Services	200	215	190	200	250	50	60	1%	3%
Professional, Scientific and Technical Services	345	455	470	515	710	365	240	4%	4%
Administrative and Support Services	400	675	1,025	1,125	1,230	830	205	6%	2%
Public Administration and Safety	135	185	180	200	255	120	75	3%	3%
Education and Training	440	440	575	520	700	260	125	2%	2%
Health Care and Social Assistance	535	715	790	860	965	430	175	3%	2%
Arts and Recreation Services	90	155	155	215	225	135	70	5%	4%
Other Services	175	225	270	325	355	180	85	4%	3%
Total	**8,795**	**11,265**	**12,480**	**14,290**	**16,360**	**7,565**	**3,880**	**3%**	**3%**

Due to rounding, individual figures may not always sum to the stated total(s)

Source: Business Demography Survey (Statistics NZ)

In the **Clutha District**, 10,430 MECs were employed across all industries in 2021. However, employment in the district has only marginally increased from 9,945 MECs in 2001 (+485 MECs). The largest industry by employment in 2021 was Agriculture, forestry and fishing with 3,460 MECs, followed by Manufacturing (2,215 MECs) and Construction (775 MECs). However, over the past ten years, Agriculture, forestry and fishing employment has fallen sharply (-705 MECs). While no other

industries have experienced a large decline, there is a mix of growth and decline across the rest. The decline of Agriculture, forestry and fishing employment has been partially offset by increases in Public administration and safety (+305), Manufacturing (+240), and Health care and social assistance (+130). Growth in sectors such as Health care and social assistance is typically linked to population growth.

Table A.14: Employment by Industry for the Clutha District (2001-2021)

Modified Employment Count (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Clutha District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	3,960	3,955	4,165	4,200	3,460	-500	-705	-1%	-2%
Mining	75	30	35	35	30	-45	-5	-5%	-2%
Manufacturing	2,090	1,900	1,785	2,135	2,215	125	430	0%	2%
Electricity, Gas, Water and Waste Services	10	20	25	30	40	30	15	8%	4%
Construction	535	740	605	545	775	240	170	2%	3%
Wholesale Trade	105	105	115	90	85	-20	-30	-1%	-3%
Retail Trade	600	760	650	705	620	20	-30	0%	0%
Accommodation and Food Services	350	410	410	400	405	55	-5	1%	0%
Transport, Postal and Warehousing	330	350	290	305	260	-70	-30	-1%	-1%
Information Media and Telecommunications	40	35	45	45	20	-20	-25	-3%	-7%
Financial and Insurance Services	65	55	50	40	35	-30	-15	-3%	-4%
Rental, Hiring and Real Estate Services	130	115	110	145	125	-5	15	0%	1%
Professional, Scientific and Technical Services	225	265	235	250	310	85	75	2%	3%
Administrative and Support Services	35	50	50	75	70	35	20	4%	3%
Public Administration and Safety	170	175	455	395	475	305	20	5%	0%
Education and Training	540	545	540	610	580	40	40	0%	1%
Health Care and Social Assistance	445	470	480	630	575	130	95	1%	2%
Arts and Recreation Services	45	40	40	50	85	40	45	3%	9%
Other Services	200	235	240	255	265	65	25	2%	1%
Total	**9,945**	**10,255**	**10,325**	**10,935**	**10,430**	**485**	**105**	**0%**	**0%**

Due to rounding, individual figures may not always sum to the stated total(s)

Source: Business Demography Survey (Statistics NZ)

A key feature of the distribution of employment across industries in both districts, is the importance of the Agriculture, forestry and fishing industry. While there has been mixed growth patterns across districts in this sector, the industry still represents about a third of the number of workers in each of these two districts.

Employment by industry for Teviot Valley is presented in Table A.15. In 2021, 1,185 MECs were employed in the area. Overall, there has been variation in total employment but a decline since 2001, falling by 210 MECs from a total of 1,395 in 2001 despite rebounding to 1,315 in 2016 from a low of 1,090 in 2011. Similar to the wider Central Otago District, the Agriculture, forestry and fishing industry is the largest employer, with 790 MECs in 2021. However, the importance of this industry, in terms of its share of total employment, is much greater, representing 67% of total MECs in Teviot Valley. Despite being the largest employment sector, Agriculture, forestry and fishing experienced a sharp decline in employment from 870 MECs in 2001 to 555 in 2006 but has slowly rebounded since then. The rest of employment is fairly evenly distributed across industries, although small. Administrative and support services is the second highest employment sector (60 MECs) in Teviot Valley.

Interestingly, Manufacturing in Central Otago as a whole, increased by 120 MECs over the past 20 years, despite this sector contracting significantly in Teviot Valley (-150 MECs). This suggests there was solid growth in the sector elsewhere in the district.

Table A.15 Employment by Industry for Teviot Valley (2001-2021)

Modified Employment Count (selected years) by 1D Industry Category						Change (n)		CAGR (% pa)	
Teviot Valley*	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Agriculture, Forestry and Fishing	870	555	570	715	790	-80	220	0%	3%
Mining	-	-	-	5	5	5	5	100%	100%
Manufacturing	185	80	50	55	35	-150	-15	-8%	-3%
Electricity, Gas, Water and Waste Services	10	-	-	-	-	-10	0	-100%	-100%
Construction	30	40	30	40	55	25	25	3%	6%
Wholesale Trade	5	5	5	5	5	0	0	0%	-4%
Retail Trade	45	45	50	90	50	5	0	1%	0%
Accommodation and Food Services	35	45	30	45	20	-15	-10	-3%	-5%
Transport, Postal and Warehousing	20	25	20	40	30	10	10	2%	4%
Information Media and Telecommunications	5	5	-	5	5	0	5	-1%	100%
Financial and Insurance Services	-	-	15	-	-	0	-15	5%	-26%
Rental, Hiring and Real Estate Services	10	20	10	5	10	0	0	-2%	-2%
Professional, Scientific and Technical Services	-	5	10	10	10	10	0	8%	0%
Administrative and Support Services	65	225	135	140	60	-5	-75	0%	-8%
Public Administration and Safety	5	5	-	5	5	0	5	-3%	100%
Education and Training	60	70	70	50	55	-5	-15	0%	-2%
Health Care and Social Assistance	20	80	60	70	25	5	-35	2%	-8%
Arts and Recreation Services	5	5	10	5	10	5	0	1%	-2%
Other Services	20	20	25	25	25	5	0	1%	0%
Total	**1,395**	**1,220**	**1,090**	**1,315**	**1,185**	**-210**	**95**	**-1%**	**1%**

**Teviot Valley is a subset of Central Otago District*

Source: Business Demography Survey (Statistics NZ)

Due to rounding, individual figures may not always sum to the stated total(s)

Top 10 employment industries by ANSIC6D groups

The ten largest employment sectors (ANSIC 6D) for the Central Otago and Clutha Districts are shown in Table A.16 and these shed more light on the changes in agriculture and horticulture respectively.

In **Central Otago**, five of the top ten employment sectors are directly related to Agriculture and Fruit growing. The largest two sectors, Stone fruit growing and Other agriculture and fishing support services, have grown significantly over the last two decades. Furthermore, Labour supply services may provide a significant share of workers to the agriculture and horticulture industries, particularly in peak seasons. This suggests growth in this sector (Labour supply services) could be linked to the growth in the Agriculture sector, especially horticulture. Packaging services employment is likely linked to that growth too, albeit indirectly.

The largest employment sectors in **Clutha** highlight the high concentration of primary sector production and processing employment in the district. Seven of the top ten employment sectors are linked to the dairy, sheep, and beef farming industries. The largest employment sectors are:

- Meat processing, with (1,295 MECs),
- Dairy cattle farming (970 MECs) and
- Sheep farming (specialised) (905 MECs).

Sheep farming (specialised) has been steadily declining over the past two decades, showing some recovery in 2016 before continuing the downward trend. It was the largest sector in 2001, falling to number three in 2021. The decline was most prevalent between 2001 and 2011, when Dairy cattle

farming and, to a lesser extent, Sheep-beef farming, experienced notable increases. This is likely driven by conversions between farming types.

While employment in the ten largest employment sectors has increased over the last twenty years, there was a drop over the past five years (-435 MECs). The main contributors to this recent shift are:

- Sheep farming (specialised) (-360 MECs)
- Meat processing (-205 MECs)
- Shearing services (-185 MECs)
- Dairy cattle farming (-125 MECs)

The increased employment in Cheese and other dairy product manufacturing (+295 MECs) offset the combined effect of these sectors to some extent, resulting in a smaller decline than what would otherwise have been the case.

In terms of long-term annual growth rates, Correctional and detention services had the highest growth rate, due to the establishment of Otago Corrections Facility in 2007 near Milton. However, this is a 'one-off' change, and the sector is not a sustained growth sector.

Table A.16: Top 10 Employment Sectors (ANZSIC 6D) for Central Otago and Clutha Districts

Top 10 Employment Sectors - Modified Employment Count (selected years)						**Change (n)**		**CAGR (% pa)**	
Central Otago District	**2001**	**2006**	**2011**	**2016**	**2021**	**2001-2021**	**2011-2021**	**2001-2021**	**2011-2021**
Stone fruit growing	915	990	1,180	1,955	2,255	1,340	1,075	5%	7%
Other agriculture and fishing support services	95	325	680	650	1,175	1,080	495	13%	6%
Labour supply services	-	15	510	740	575	575	65	100%	1%
Supermarket and grocery stores	290	385	395	395	475	185	80	3%	2%
Grape growing	90	370	460	370	455	365	-5	8%	-0.1%
Packaging services	205	290	155	135	415	210	260	4%	10%
Sheep farming (specialised)	625	570	380	435	410	-215	30	-2%	0.8%
Shearing services	385	365	345	450	405	20	60	0.3%	2%
Cafes and restaurants	85	180	280	300	355	270	75	7%	2%
House construction	80	265	220	255	345	265	125	8%	5%
Total	**2,765**	**3,750**	**4,595**	**5,695**	**6,870**	**4,105**	**2,275**	**4.7%**	**4.1%**
Share of Total District Employment	*31%*	*33%*	*37%*	*40%*	*42%*				
Clutha District									
Meat processing	1,240	1,105	1,065	1,500	1,295	55	230	0.2%	2%
Dairy cattle farming	505	760	1,000	1,095	970	465	-30	3%	-0.3%
Sheep farming (specialised)	1,685	1,590	1,280	1,265	905	-780	-375	-3%	-3%
Cheese and other dairy product manufacturing	130	105	140	260	555	425	415	8%	15%
Sheep-beef cattle farming	500	520	670	570	540	40	-130	0.4%	-2%
Other agriculture and fishing support services	135	175	205	275	325	190	120	5%	5%
Correctional and detention services	5	5	310	240	305	300	-5	26%	-0.2%
Primary education	295	255	230	255	300	5	70	0.1%	3%
Supermarket and grocery stores	220	245	230	270	290	70	60	1%	2%
Shearing services	570	430	370	465	280	- 290	- 90	-3%	-3%
Total	**5,285**	**5,185**	**5,505**	**6,200**	**5,765**	**480**	**260**	**0.4%**	**0.5%**
Share of Total District Employment	*53%*	*51%*	*53%*	*57%*	*55%*				

Source: Business Demography Survey (Statistics NZ)

Due to rounding, individual figures may not always sum to the stated total(s)

A2.3 School rolls

Schools in area of interest			Roll 2021	% Change 1996-2021	% Change 2011-2021
Central Otago District					
	Cromwell	Cromwell College (7-15)	548	**77**	47
		Cromwell Primary School (1-6)	357	**98**	**67**
		Goldfields School (1-6)	297	**170**	**59**
	Clyde	Clyde School (1-8)	166	17	23
	Alexandra	Terrace School (1-8)	339	10	-2
		Alexandra School (1-8)	187	-31	-11
		St Gerard's School (1-8)	138	-1	30
		Dunstan High School (9-13)	593	21	17
	Omakau	Omakau School (1-8)	65	20	**55**
	Poolburn	Poolburn School (1-8)	39	34	5
	Teviot	Roxburgh Area School (1-15)	161	-41	-5
		Millers Flat School (1-8)	30	-30	-6
	Ranfurly	Maniototo Area School (1-15)	152	-33	-19
		St John's School (Ranfurly) (1-8)	52	**63**	-4
Clutha District					
	Tapanui	Tapanui School (1-6)	87	-38	-7
		Blue Mountain College (7-15)	219	-22	3
	Heriot	Heriot School (1-6)	75	0	-11
	Lawrence	Lawrence Area School (1-15)	144	-31	11

Notes:

The able is summary data (Annual roll data is available for 18 schools in the area of interest). School roll data is available from 1996-2021 (1 July count). Percentage change is calculated for the most recent ten years and also back to 1996 to provide a longer-term perspective on populations and community change.

Four Central Otago schools closed during this period: Becks (2000), Oturehua School (1997), Paerau School (2011), Patearoa School (2004). There was significant growth in Cromwell over this period with slower growth in both Clyde and Alexandra. The last 10 years saw an increase in some Alexandra schools, and Clyde and Omakau (small roll numbers). The Teviot and Maniototo schools (with comparatively small roll numbers) have experienced declining rolls although this decline has slowed over the last 10 years. Clutha District school rolls saw an overall decline over the 26 year period, with some recovery evident over the last 10 years (particularly in the Lawrence Area School). There were no Clutha district school closures in the area during this time.

Annex 3 Community engagement forum

Teviot Valley Community forum, Millers Flat Hall, Tuesday 12th July

The Forum was chaired by Privacy of natural persons for Teviot Prospects. 68 people attended. Privacy of natural persons attended for MBIE. Thanks to all who took part and contributed information and ideas and helped to organise and host the meeting, with refreshments.

Programme:

9.00am	*Welcome and introductions.*
	MBIE update on progress of feasibility study and decision-making timeline.
	Questions
	Social Impact Assessment process and scenarios
10.00am	*Morning tea*
	Outline of breakout session
	Move to main hall and discussion in groups
	Presentation of responses from each group
12.15pm	*Summary and wrap up*
12.30pm	*Finish*

Questions raised covered the timeline and investigations up to and after Cabinet decision later this year. The following is a consolidated summary of views ,opinions and suggestions of those people present as compiled by Privacy of natural persons based on the group sheets and the additional comments of participants. Information from the forum and the other engagement activities, as described in Section 2.6, formed a valuable input to the interim analysis of potential social impacts (positive and negative) in the SIA.

Impacts on local amenity

Noise due to construction and longer term from operation of the project (operation of the pumps and tunnels); dust (construction and road dust); other types of pollution such as rubbish, visual effects, signage; poor water quality and wastewater; possible effects on the water table/aquifers.

More traffic on local roads and increased blocks, delays and travel time for road users; heavy traffic; traffic congestion in the townships, and increased demand for parking outside cafes and shops; effects on the ease of stock movement along roads; safety on bridges; constraints of local, one-lane bridges; possible new bridges and access points including possible, new, less steep access through to Ida Valley and or upgrades to Onslow road (to Paerau); the need for safety improvements on roads, intersections and bridges.

Effects on outdoor recreation, fishing, walking, cycling/mountain biking and operation of the cycle trail. The lake values are highly important to local people verses long muddy beaches.

Effects on emergency services; what happens in an earthquake? Where do we go?

People live in the area for the lifestyle. PARADISE. Effects on property values, elderly people and retirement plans; this is a "huge disruption".

Incoming workforce

Much thought is needed to plan for an incoming construction workforce and dealing with a boom/bust effect; where will the workers come from? What will be the mix of workers, including local and NZ workers? What are the social impacts of overseas workers? What entertainment will workers need? Will they want to live in the Teviot? There are not enough pubs, shops and restaurants for everyone; new people will be less connected to the area.

Pressures from a rapid increase in population; effect of increased transience in the population; lack of "care"; possible increase in crime, drugs; need for increased policing; increase in rental costs for locals; increased costs locally.

What land acquisition is needed for new housing? Need to maintain our property values; will extra houses left after the project deflate house prices? Any temporary housing left behind must be of a standard to be on-sold or repurposed and reused, for example for hospitality or housing seasonal workers or for pest control; could some become a rest home/retirement village and is that a good idea?

Bike companies could bypass the area due to a shortage of accommodation taken by construction workers and by the loss of the "paradise" factor. With new trails opening out of Lawrence the companies will have other options for routes.

Labour effects include diversion of local labour and trades to the project creating shortages elsewhere; pressures on housing seasonal workers in other sectors.

Increased demand and disruption to infrastructure (water, waste, sewerage, curbing and channelling), connectivity and services such as medical and schools. Health services are already below par; longer wait times. Will schools grow in this area, or will that happen in other towns where the workers live? Pressures on emergency services, police, supermarkets; develop new assets for the longer term verses the old Roxburgh hydro construction village, removed after construction finished. Or, will there be a ghost town after? Left over housing could be left as social housing after the workers go leaving a new set of issues (this happened in the past); local businesses could be starved after project completion; schools will need to deal with declining rolls as people leave.

Loss of tranquillity/lifestyle

Need for information about the lower ponds; could they be developed for recreational uses? Where will they be located and their size? How many are needed?

How much of the Teviot Valley will be left? People have moved to the area over time because of the way it is: need to maintain the "status quo"; some have limited abilities/resilience to adjust to change.

Itinerant workers don't necessarily have a relationship with the community; safety and security issues; crime.

Loss of a peaceful retreat at Lake Onslow; loss of natural landscape and beauty; wetlands, ecology and species such as Teviot flathead galaxias. Loss of farmland.

Effect on social history and social connection; history and heritage of the area could be lost; the Millers Flat bridge is iconic. Could affect traditional events such as the Cavalcade.

Effects on holiday makers and cycle trails; maintain continuity for the cycle trail.

Climate effects

Increased evapotranspiration from a large body of water affects local climate; removal of trees, and increased wind and fog; effects on horticultural production (e.g., cherries, apricots).

Ways to create benefits

Forum participants identified a number of potential local benefits from the project and these will require active management:

Accept there may be change and if so, we need a positive focus; the Council should work collaboratively with the community for planning, consents, zoning, etc.; also needs coordination with and between multiple agencies and funding sources; define what is needed and priorities through a community process – not everyone agrees on them.

Encourage spill over of contractors and expenditure into the area. Will local contractors and businesses get opportunities? Will workers stay in the area, and will overseas workers be given residency? Otherwise, they will move onto other projects. Invest in education in the valley that will attract workers to become residents. Manage the project development to maximise benefits to local workers facilities and services.

Need longer-term benefits for local people and assets that remain long after construction ends, as with the fabulous rowing facility at Twizel; reduced charges or free power for the locals for the next 99 years – address current high charges; a covered swimming pool – heated, all-year round (covered) swimming pool; adult fitness; playgrounds; additional facilities for schools (beyond usual funding); salmon hatchery; new infrastructure - new sewage systems good for the small towns that lack reticulated systems; fibre networks; tourism opportunities (for project visitors), e.g., flights over the project.

Ongoing funding for community assets; plan for what happens after the boom; what happens to any infrastructure that has been added. Who pays for all this? How is it going to be paid for? Unforeseen events and circumstances happen; what are the obligations for defaults?

The focus of community compensation should be a substantial yearly income stream that the local community allocates as appropriate. That should be in addition to infrastructure which may be left after the project is completed.

The geographical boundary of Teviot Valley should be the boundary for benefits from any ongoing compensation.

Suggestions for ongoing communications and engagement

The problem and stress of uncertainty; we need to be the first to know about what is happening before it hits the media – TRUTH. Where is everything going including ponds and bridges; we need to know where, and who is affected - NOW. The timeline - What will happen if the government changes? Information is easily distorted and hearsay compounds anxiety; be interested in our lives not just the national good.

More meetings, regular updates and get togethers; hold meetings at a range of times, including night and weekend meetings, to include more people including younger members of the district; those who attend a meeting are those who can attend at that time, e.g., 9.00 am.

Include communities beyond the Teviot: Heriot, Tapanui, Lawrence, Paerau, Alexandra.

Keep up all communications; help with communications; use newsletters and emails to reach everyone in the valley; develop email list.

How much is a small population going to be listened to? Deal with locals, not the Council; create a "voice" for the valley with elected and valley members and the ability to advocate for the valley, with funding from MBIE; employ secretarial assistance, and professionals; a local liaison person; good idea to fund independent legal advice.