



Assessment Report

Project Name: Clyde and Roxburgh

Installed Capacity: 432+320MW

Country: New Zealand



Project Sponsor: Contact Energy

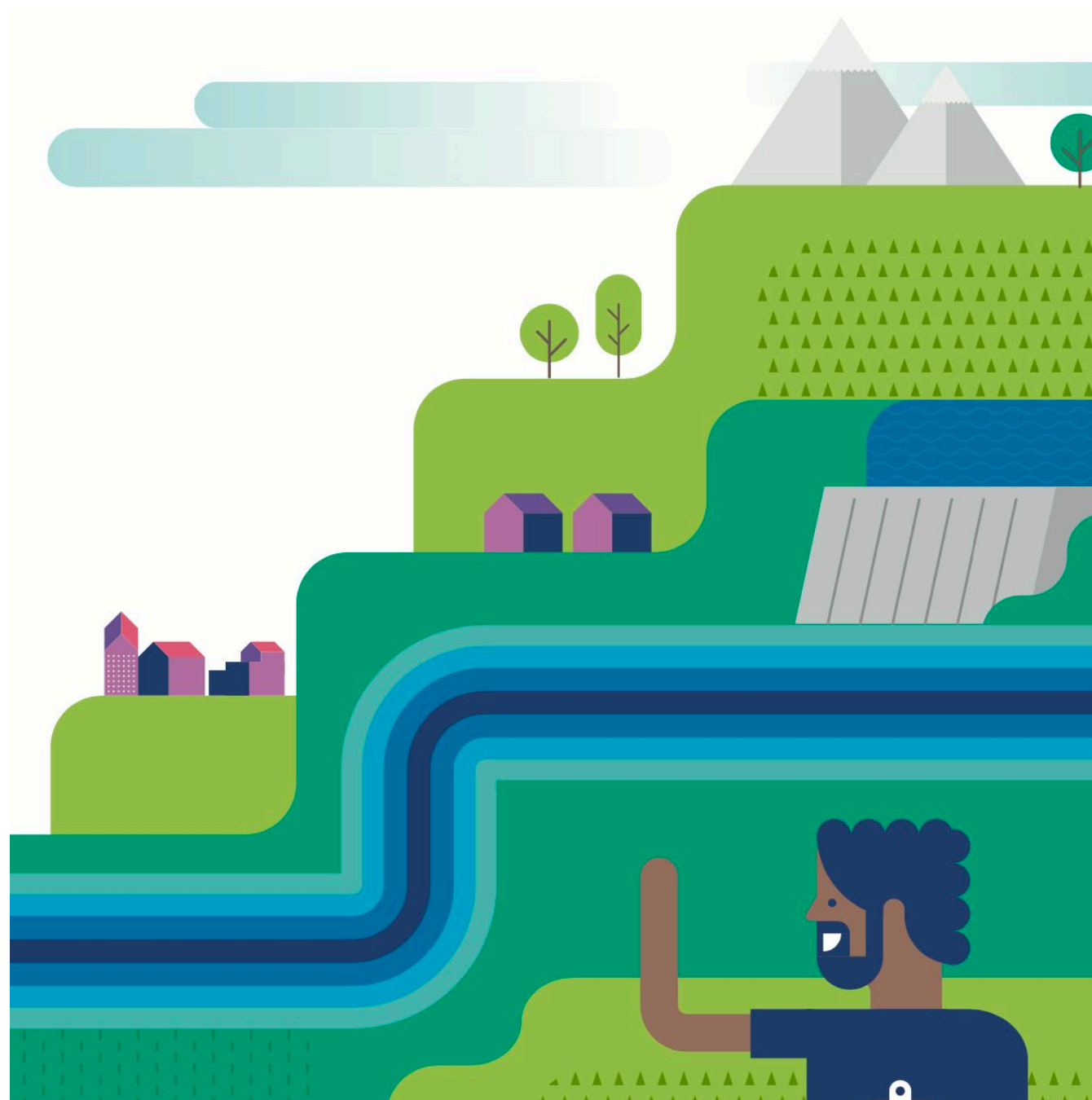
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Report Date: 5 November 2023



Operation

Cover page photo: The Clyde Dam



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The findings in this report are based on an independent assessment conducted in compliance with the processes set out in the Hydropower Sustainability Assurance System.

Hydropower Sustainability Standard

<p>About the HSS</p>	<p>The Hydropower Sustainability (HS) Standard is the normative document that sets out the performance requirements of the Hydropower Sustainability Certification System, a global labelling and certification scheme outlining the expectations for hydropower projects around the world.</p> <p>The HS Standard recognises hydropower projects for their environmental, social and governance (ESG) performance by setting minimum and advanced performance requirements for the sector and acknowledging projects for meeting these requirements. The HS Standard is aligned with the safeguards of key lenders (e.g. IFC and World Bank) and can be used to attract climate-aligned finance through green bonds certified by the Climate Bonds Initiative and support electricity sales to RE100 companies.</p> <p>The HS Standard is managed by the Hydropower Sustainability Alliance. The HS Alliance was established in October 2023 to act as the independent and multistakeholder standard-setting body that oversees the Hydropower Sustainability Certification System.</p>
<p>Intended users and uses</p>	<p>The HS Standard includes three separate stages: Preparation, Implementation and Operation. These reflect the different stages of hydropower development and have been designed to be used as standalone documents. Each reporting template provides an action plan to help project teams address any gaps against minimum (good practice) and advanced requirements (best practice).</p> <p>Official HS Standard assessments are carried out by Accredited Assessors, who take an evidence-based approach based on data triangulation. All findings are supported by objective evidence, which is factual, reproducible, objective and verifiable. The HS Standard is most effective when operators and developers commit to implement the recommendations provided and resolve identified significant gaps.</p> <p>Hydropower development and operation may involve public entities, private companies or combined partnerships, and responsibilities may change as the project progresses through its life cycle. It is intended that the organisation with the primary responsibility for a project at its particular life-cycle stage will have a central role in any HS Standard assessment.</p>
<p>Structure of the reporting template</p>	<p>The HS Standard comprises 12 sections that cover the environmental, social, governance and climate change impacts, both negative and positive, that arise from hydropower development and operation. Summary sections at the beginning of the report include: (A) Assessment Overview, (B) Project Details, (C) Performance against Minimum Requirements, (D) Performance against Advanced Requirements. The summary sections are followed by the 12 ESG sections where requirements for good and best practices are presented and project findings are provided. The report finishes with three appendixes that list the types of evidence used in the assessment.</p>
<p>Supporting resources</p>	<p>Additional guidance on the structure, content and history of the HS Standard can be found online at: www.hs-alliance.org.</p>
<p>Version date</p>	<p>October 2023</p>

A. Assessment Overview

Assessor(s)	Simon Howard, Helen Locher, Dayang Zanariah Binti Abang Kashim
Assessment objective	<ul style="list-style-type: none"> The overarching objectives of the Hydro ESG gap analysis project fit in with Contact’s wider ‘Contact26’ strategy to decarbonise New Zealand (NZ). The HSS assessment has been prioritised by Contact’s transformation journey – Mau Taniwha - and will allow the company to benchmark the hydro schemes against international good practice. Specifically, the HSS assessment will assist in improving the visibility of sustainability focus areas and allow Contact to prioritise action on those areas, and serve as a reputational endorsement for the sustainability practices Contact already has in place. This assessment, if a success, is one of the requirements for achieving the Climate Bonds Initiative Green Hydro certification which has not been achieved elsewhere in NZ. Achieving certification would be reputationally beneficial to Contact as it would further strengthen sustainability credibility by providing assurance to investors that they have access to responsible investments. Contact may see value through increased demand for Green labelled bond issuance and potential price tightening in their interest rates.
Assessment dates	Site visit: 2-6 October 2023
Assessment report date	November 2023
Summary of key findings	<p>Suitable processes, like the annual Material Impact Assessment, are in place to identify ongoing and emerging environmental and social issues associated with the operating hydropower facilities. Monitoring programmes are in place, although there is scope for more trend analysis within internal and external data sets, and for exploring correlations amongst detected alterations. An ISO 14001 Environmental and Social Management System is in place to manage measures to address identified environmental and social issues. Third-party audits confirm this system is functioning well. Processes and objectives in environmental and social management plans have been and are on track to be met with no major non-conformances. There have been a range of minor non-compliances, most of which have been appropriately resolved. As with every hydropower project, there are some ongoing environmental and social impacts, such as disruption to sediment dynamics and the barrier to ecological connectivity. However, measures are in place to minimise and mitigate these effects to a satisfactory degree.</p> <p>Contact Energy is pursuing a workforce transformation project, with the aim of Contact Energy being New Zealand’s most sought-after business to work for. Contact Energy has numerous people, health, safety and well-being policies and initiatives which have the oversight of the board Health, Safety and Environment (HSE) Committee. Contact is going through a process of evaluating its safety maturity with Sentis, and has partnered with the Wellbeing Tick foundation, a New Zealand organization to support businesses. Important issues include workforce planning in relation to an aging workforce, managing of workloads, and staff diversity and inclusion objectives. Cintellate is a software platform supporting incident management, and Peakon surveys provide</p>

	<p>employee engagement insights. There are no significant gaps against the HSS’s minimum requirements, and only one advanced requirement gap relating to a non-conformance during 2023.</p> <p>A variety of processes are in place to address water quality, erosion, and sedimentation concerns. The Otago Regional Council (ORC) ensures high-quality water monitoring throughout the catchment. Contact conducts appropriate monitoring of the reservoir rims, landslides, and bathymetry. To meet advanced requirements, Contact could analyse ORC's monitoring data independently to identify issues or trends that may not be apparent to the ORC but could affect Contact's operations. Measures such as Lagarosiphon control works are implemented to control growth of invasive aquatic weed species, and in doing so improves water quality. Erosion reduction and mitigation measures are deployed throughout the catchment and appear to be effective. In recent years, there have been two minor non-compliances. One was an abatement notice issued by the Otago Regional Council regarding the delayed submission of the Landscape and Visual Amenity Management Plan (LVAMP) for the Kawarau Arm of Lake Dunstan, which has since been resolved. Additionally, the 2023 bathymetric monitoring of the Bannockburn inlet revealed that the consent conditions were exceeded; this issue is ongoing. Negative water quality impacts stemming from the operations of the hydropower facility are being avoided, minimised, and mitigated. While there are erosion and sedimentation issues associated with the project, they are largely minimised and mitigated in line with good practice. To meet the advanced requirements of this standard, efforts could be directed towards gaining a deeper understanding of potential coastal erosion impacts that the project may contribute to.</p> <p>There are numerous project-affected communities along the Mata-au/Clutha river system. Whilst Hāwea Dam and Roxburgh power stations have been in place since the 1950s, established under the Public Works Act 1928, the intermediate Clyde Dam and associated Lake Dunstan were created from 1977 to 1992, developed under the Clutha Development (Clyde Dam) Empowering Act 1982. All three projects were considered via the 2001 Application for Resource Consents and Assessment of Environmental Affects, which established via a stakeholder-inclusive process the key issues and operating requirements for all 3 lakes/dams in the Mata-au/Clutha river system. These consents address impacts on local communities such as the requirement to develop Landscape & Visual Amenity Management Plans (LVAMPs) in areas where the operations may have influenced the landscape and visual amenity. Commitments to project-affected communities are addressed through resource consent conditions and side agreements. Monitoring of consent compliance is ongoing with annual reporting to the Otago Regional Council (ORC). There are no known public health issues, and project benefits are met through sponsorships funded by Contact Energy, namely the annual Contact Epic Race, and the Alexandra Blossom Festival. All minimum requirements of the HSS are met.</p> <p>The Clutha Hydropower projects are rated as High Potential Impact Classification (PIC) under the New Zealand Dam Safety Guidelines. Contact has demonstrated their recognition of the classification by implementing a robust Dam Safety Management System. This system is complemented by their updated monitoring and surveillance system the Dam Assurance Monitoring System (DAMS) which has enabled Contact the enhanced ability to analyse information to anticipate risks and opportunities. In general,</p>
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the findings from the dam safety reviews for all three dams show no significant dam safety issues, with the schemes well maintained and operating effectively relevant to the identified safety risks.

Contact Energy conducts biodiversity studies, assessments, and monitoring of effectiveness, underpinned by adherence to the Resource Consents. These measures have proven effective in avoiding, minimising, mitigating, and compensating for identified negative impacts on biodiversity. Efforts are ongoing to enhance the efficacy of trap-and-transfer systems for the passage of eels and lampreys. The partnerships established with key stakeholders and agencies have facilitated improved communication, efficient execution of initiatives, and better collaboration in identifying emerging issues. While various assessments and measures are in progress, evidence that the facility's measures can sustain healthy, functional, and viable aquatic and terrestrial ecosystems over the long term is still forthcoming. There is an opportunity to re-evaluate and enhance biodiversity programmes, extending positive conservation impact to address wider biodiversity concerns that are not solely confined to the project's area of influence.

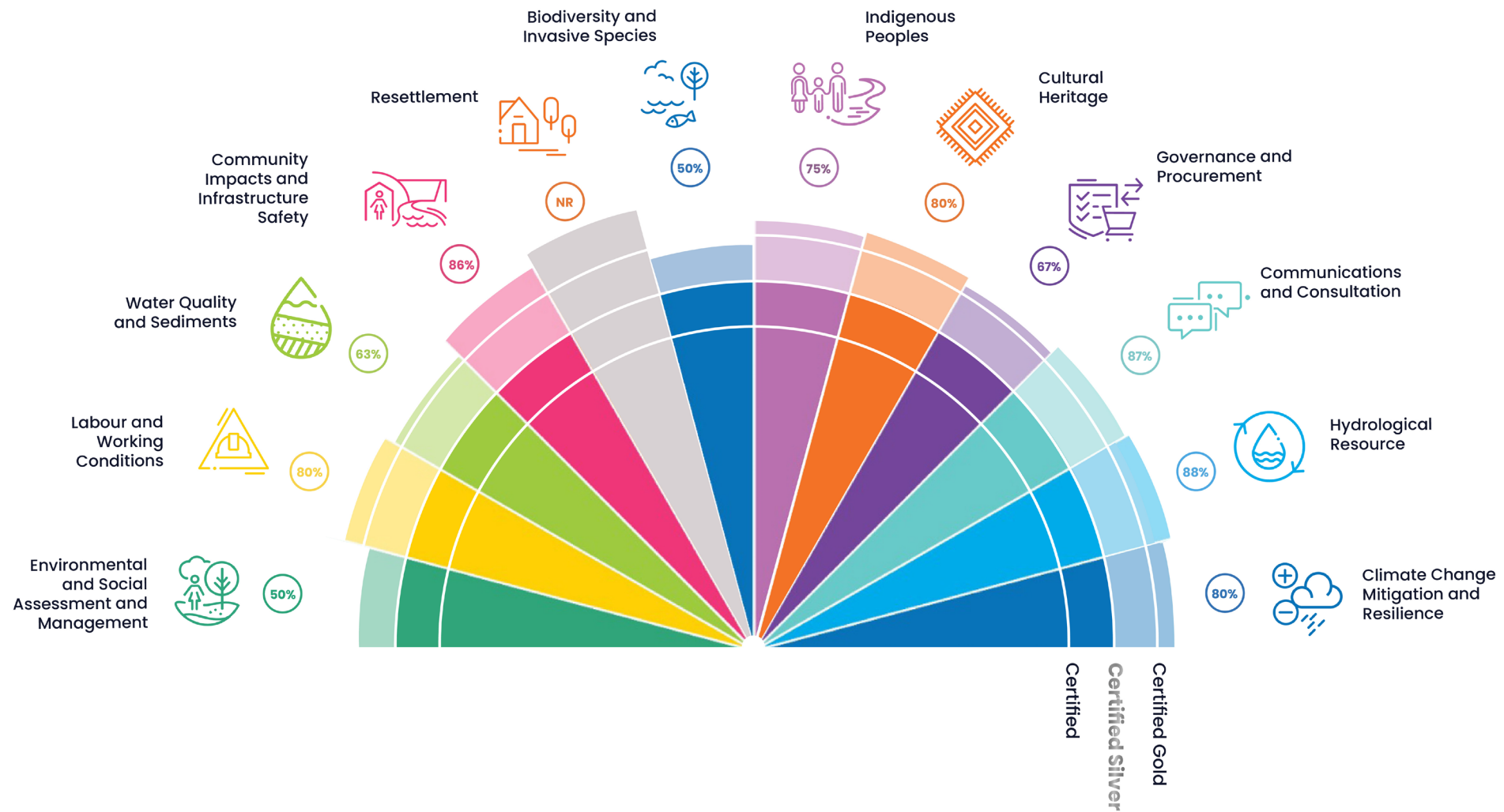
The affected people include Indigenous Peoples of the south island of New Zealand. Māori are the Indigenous Peoples of Aotearoa New Zealand, and Iwi are tribes of Māori from the founding peoples, . Ngāi Tahu is the biggest Māori Iwi of the South Island. The ten Papatipu Rūnanga (sub tribes of Ngāi Tahu) have mana (authority) for the Mata-au/Clutha catchment as identified in the 2000 Cultural Impact Assessment. The Ngāi Tahu Mitigation Agreement was reached in 2002, and the Mata-au Trust was signed in 2018. Important Iwi stakeholder groups represented on the Trust are: Aukaha, the consenting agency representing the four northern Rūnanga; and Te Ao Mārama Inc (TAMI), the consenting agency representing the three southern Rūnanga. Of high importance to the Iwi is the right to mahinga kai ("to gather food"), nohoanga sites (land traditionally providing a place to sit during the seasonal travels inland for resources), education packages, and scholarships. The trustees have recently been updated, with Contact Energy employing a tangata whenua (people of the land i.e. Māori of Aotearoa) specialist to manage and grow tangata whenua relationships. Particular areas for future collaboration are the native fish passage and a partnership relationship agreement focused on a mana to mana, relationships at the right level e.g. leader to leader. Whilst all minimum HSS requirements are met, there are a few gaps against the advanced requirements under the Outcomes area, as these are reliant on several present initiatives coming to fruition.

Cultural heritage relating to the Mata-au/Clutha hydropower is largely about artefacts of historical development (e.g., the Dunstan gold rush), and relicts of old Cromwell that were inundated with development of the Clyde Dam. The application for Resource Consents and Assessment of Environmental Effects in March 2001 provided a fresh look at heritage impacts of the Clutha / Mata-au hydro projects. A Baseline Survey & Management Plan was prepared in 2010 and identified twenty-two sites that lie within the zone of land that has the potential to be affected by Contact's consented activities. The resource consents require Contact to undertake a baseline survey of archaeological sites to record the location, nature and condition of archaeological sites and to identify any risks to their integrity; develop a Management Plan for archaeological sites identified in the baseline survey;

	<p>implement the Management Plan; and monitor the sites at intervals of no more than once every three years (unless otherwise agreed). According to the July 2023 monitoring report, the sites showed very little change in comparison to previous recorded observations, and all negative impacts from hydropower operations are addressed. All HSS requirements are met, other than one advanced requirement relating to a minor non-compliance with a consent requirement.</p> <p>Ongoing or emerging political and public sector governance issues are identified by the Regulatory & Government Relations role, within Corporate Affairs. The Finance and Risk team continually evaluates prospective corporate governance challenges. Monitoring is undertaken to assess whether corporate governance measures are effective through internal evaluations and independent external scrutiny. Accredited third parties conduct periodic audits to review Contact's adherence to international standards. Identified corporate, political, and public sector risks are managed through a range of board committees, which formulate strategy and delegate actions. Policies and processes are communicated internally and externally as appropriate, with most relevant documents available on the website. In case of capacity shortfalls, appropriate external expertise is contracted for additional support, for example in strategy formation in 2021 under the Contact 26 initiative. The project has no major non-compliances, and there are no significant unresolved corporate and external governance issues identified by this review.</p> <p>There is a wide array of stakeholders and stakeholder groups in relation to the Mata-au/Clutha hydro projects, and a wide range of issues that require management. Contact Energy has two dedicated roles that ensure ongoing or emerging issues relating to the projects are well-identified. These are the community relations officer based in Cromwell, and the environmental advisor based at Wānaka. Where necessary, expertise is utilised within the engineering/dam safety team. Communications and consultation plans and processes are in place, with key documents including the Contact Stakeholder Engagement Policy – June 2022; Hydro Stakeholder Mapping – Master; and the Clyde Community Engagement Plan June 2022. A high level of sensitivity is shown to Iwi consultation needs, led by Contact Energy's employment of a tangata whenua (people of the land i.e. Māori of Aotearoa) specialist, and development of a mana to mana relationship agreement to assist communications going forward. Whilst all minimum HSS requirements are met, a significant gap at advanced requirements is that the processes in place are individual resource-dependent, and if one person were to leave there would be a lot of relationship gaps that would take some time to fill. Contact publicly discloses a good range of information on its website, there are some project specific areas where stakeholders would like more information.</p> <p>Water availability and reliability are well managed, with a good understanding of data on current and historical flow rates via the Hydrological Database, which is quality-assured by a third-party consultant. This data serves Contact for forecasting and generation planning, ensuring optimised water usage and electricity generation. The ongoing assessment of potential impacts on generation due to changes in Probable Maximum Precipitation, considering Climate Change, will provide Contact with the necessary information for long-term planning in the future. Issues concerning reservoir management and downstream flow regimes are managed according to the conditions of the Resource Consents, and requirements are incorporated into the Clutha Catchment</p>
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	<p>Manual and the Site Emergency Response Plan. Contact actively liaises with identified stakeholders for the effective management of hydropower issues. To date, there have been no formal instructions from the Regional Councils or the District Councils for any amendments to the conditions within the Resource Consents.</p> <p>The projects have a high-power density, so there are no concerns about reservoir GHG emissions. Various detailed assessments of the projects’ resilience to climate change have been conducted, based on plausible climate change studies by NIWA for the project sites. The study includes a range of climatological and hydrological conditions at the project sites and applies these conditions in a risk assessment. The risk assessment addresses dam safety, infrastructural resilience, environmental and social risks, and power generation availability. Contact is undertaking numerous initiatives to reduce GHG emissions in line with their 2035 Net Zero Commitment and has implemented measures to improve SF6 handling and safety protocols. Project resilience is addressed in a five-year strategy focused on capital investment, specifically earmarked for sustaining business continuity, as well as improving the reliability and robustness of generation assets. This review has not identified any major non-conformances or non-compliances. The only minor non-conformance regarding climate change mitigation is not achieving an internal objective to achieve a 10% reduction in travel emissions compared to the prior year. The project's GHG emissions are demonstrated to be consistent with low carbon power generation. The ongoing process safety concerning asset upgrades and maintenance incorporates climate change resilience measures appropriately, contributing to projects that are resilient to a changing climate.</p>
<p>Limitations of the assessment</p>	<p>The assessment was well planned with no obvious limitations.</p>

Clyde and Roxburgh Hydropower Projects, 432+320 MW, New Zealand



Operation

Figure 1 Hydropower Sustainability Standard (HSS) results diagram

B. Project Details

Project name	Clyde	Roxburgh
Country	New Zealand	New Zealand
Location	Central Otago, Clyde	Central Otago, Roxburgh
Purpose	Hydropower dam	Hydropower dam
Developer / Owner	Contact Energy Limited	Contact Energy Limited
Financer(s)	Various (publicly owned company)	Various (publicly owned company)
Installed capacity (MW)	432MW	320 MW
Construction start date (planned or actual)	1977	1949
Commercial operations date (planned or actual)	1993	1956
Annual average generation (GWh / year)	2,100 GWh/year	1,650 GWh/year
Associated infrastructure: road(s) (length)	Hāwea Dam, Gladstone Gap Stopbank	Hāwea Dam, Gladstone Gap Stopbank
Transmission lines and sub-stations (names, lengths)	None	None
Total cost (USD m)	<i>Confidential</i>	<i>Confidential</i>
Annual operating costs (USD m)	<i>Confidential</i>	<i>Confidential</i>
Project development cost not including transmission (USD m)	<i>Confidential</i>	<i>Confidential</i>
Transmission costs for project development (USD m)	<i>Confidential</i>	<i>Confidential</i>
Specific investment cost (USD m / MW)	<i>Confidential</i>	<i>Confidential</i>
Levelised energy cost (USD / kWh)	<i>Confidential</i>	<i>Confidential</i>
Dam type	Concrete Gravity	Concrete Gravity
Dam height (m)	105m	73m
Dam length at crest (m)	490m	366m
Units (number, type, MW)	4 Francis Turbine units X 120 MW	8 Francis Turbine units x 40 MW
Reservoir area at Full Supply Level (FSL) (km ²)	25 km ²	5.9 km ²
Average net head at FSL (m)	~60m	~40m
Average flow (m ³ / s)	~495m ³ /s	~505m ³ /s
Design flow (m ³ / s)	PMF inflow 5800 m ³ / s	PMF inflow 7000 m ³ / s
Load factor	<i>Confidential</i>	<i>Confidential</i>
Number of physically displaced households	280 People	nil
Power density (W / m ²)	17.3 (W / m ²)	54.2 (W / m ²)
Emissions intensity (gCO ₂ e / kWh)	Nil	Nil
Contacts / website	https://contact.co.nz/aboutus/investor-centre	https://contact.co.nz/aboutus/investor-centre

Clyde and Roxburgh Hydropower Projects, 432+320 MW, New Zealand

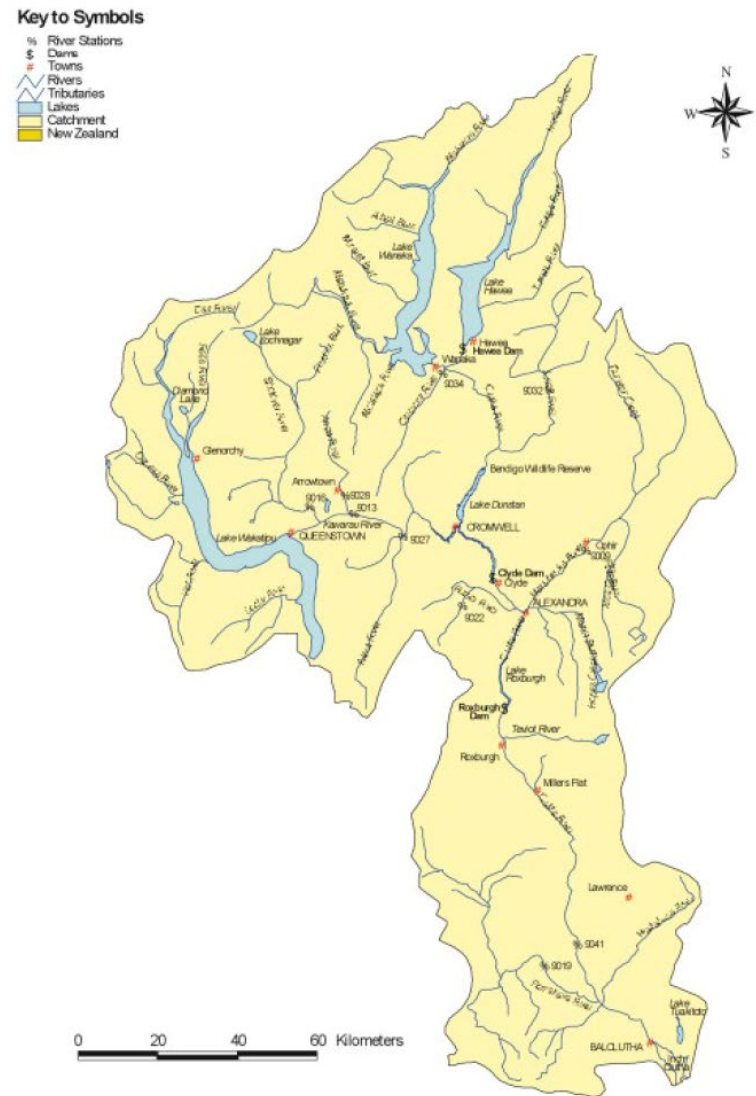


Figure 2 – Map of dam site

B. Project Details

C. Performance against Minimum Requirements

(Note to user: filling in this table is only required if there are gaps identified at Minimum Requirements)

List of significant gaps against Minimum Requirements		Sections											
		1. Environmental and Social Assessment and Management	2. Labour and Working Conditions	3. Water Quality and Sediments	4. Community Impacts and Infrastructure Safety	5. Resettlement	6. Biodiversity and Invasive Species	7. Indigenous Peoples	8. Cultural Heritage	9. Governance and Procurement	10. Communications and Consultation	11. Hydrological Resource	12. Climate Change Mitigation and Resilience
1.	No significant gaps against minimum requirement identified.												
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
NUMBER OF SIGNIFICANT GAPS BY SECTION:													
TOTAL NUMBER OF SIGNIFICANT GAPS:													

D. Performance against Advanced Requirements

	Sections											
	1. Environmental and Social Assessment and Management	2. Labour and Working Conditions	3. Water Quality and Sediments	4. Community Impacts and Infrastructure Safety	5. Resettlement	6. Biodiversity and Invasive Species	7. Indigenous Peoples	8. Cultural Heritage	9. Governance and Procurement	10. Communications and Consultation	11. Hydrological Resource	12. Climate Change Mitigation and Resilience
TOTAL NUMBER OF REQUIREMENTS	6	5	11	21	5	6	8	5	6	15	16	15
NUMBER OF REQUIREMENTS MET	3	4	7	18	NA	3	6	4	4	13	14	12
PERCENTAGE OF REQUIREMENTS MET	50%	80%	63%	86%		50%	75%	80%	67%	87%	88%	80%

Note:

- A project must meet all Minimum Requirements on all relevant sections to achieve HS Certified label.
- To receive the HS Silver label, a project must meet all Minimum Requirements on all relevant sections AND meet at least 30% of the Advanced Requirements on each relevant section.
- To receive the HS Gold label, a project must meet all Minimum Requirements on all relevant sections AND meet at least 60% of the Advanced Requirements on each relevant section.



1 Environmental and Social Assessment and Management

Scope and Principle	
<p>This section addresses the plans and processes for environmental and social issues management. The principle is that negative environmental and social impacts associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.</p>	

Background	
Identify the main environmental and social issues during operation	<p>The Assessment of Environmental Effects (AEE) which was written as part of the application for the project’s resource consents highlighted the following potential issues (in descending order of significance):</p> <ul style="list-style-type: none"> • Adverse effects on the mauri of the Clutha River/Mata-au • Reduction in sediment load to the coast • Flooding - sediment related • Interference with amenity values through changed sediment regime • Interference with water access by other users • Dust and amenity effects • Interference with fish migration • Sediment deposition and reclaiming of land • Interference with land-stability • Erosion of riverbanks and lake margins • Increased sediment in river flows • Impacts on ecosystems • Water level changes affecting upstream and downstream users • Habitat impacts (including invertebrates and spawning areas)
Identify the environmental regulator	<p>The Otago Regional Council (ORC) is the body responsible for regulating environmental and natural resources in the Otago region. Its scope includes water quality and quantity management, soil conservation, air quality monitoring, and biosecurity, among others. It acts within the framework of New</p>

	<p>Zealand's Resource Management Act and other national-level policies but operates at a regional scale.</p>
<p>Identify other regulators (e.g. on land, water use, Indigenous Peoples)</p>	<p>Other entities which have a role/interest in the projects include:</p> <ul style="list-style-type: none"> • Land Information New Zealand (LINZ) is a government department responsible for land titles, geodetic and cadastral survey systems, topographic information, hydrographic information, managing Crown property and supporting government decision-making around foreign ownership. • Department of Conservation (DOC): Regarding conservation lands and endangered species, this entity ensures compliance with the Conservation Act and other relevant legislation. • Fish and Game New Zealand: Concerned with the impact on freshwater fish and game birds. • Heritage New Zealand: Regarding sites of cultural or historical significance, this entity ensures compliance with the Heritage New Zealand Pouhere Taonga Act. • WorkSafe New Zealand: Overseeing occupational safety and health during construction and operation.
<p>Summarise the ESIA regulatory requirements</p>	<p>Hāwea, Roxburgh, and Clyde were operational before the introduction of the Resource Management Act of 1991 (RMA). They were given provisional RMA resource consents that lapsed in 2001 and 2003. New RMA consents were applied for in 2001 and approved in 2007, remaining valid until 2042. The Otago Regional Council has the discretion to reassess the consent terms every five years to mitigate environmental impact and ascertain the efficacy of the existing conditions.</p>
<p>Describe the non-physical cultural heritage in the project area</p>	<ul style="list-style-type: none"> • Oral Traditions: Māori legends, myths, and whakapapa (genealogies) often pertain to the land and waters of Otago. • Languages: Te Reo Māori and English are significant, but there are also pockets where Gaelic, and other European languages have historical significance. • Māori Customs: Practices like kaitiakitanga (guardianship of natural resources) and manaakitanga (hospitality) are highly valued. • Art Forms: Māori carving and weaving styles, along with European influenced arts like painting and literature, contribute to the cultural fabric.

	<ul style="list-style-type: none"> • Music and Dance: Traditional Māori music and dance forms like kapa haka exist alongside European folk music and dance. • Festivals: Local festivals such as Waitangi Day celebrations or the Dunedin Midwinter Carnival capture the region's multi-faceted culture. • Folklore: Local stories, superstitions, and folklore can also be considered intangible cultural heritage. • Cuisine: The food culture, involving traditional Māori methods like hāngī (earth ovens), alongside British-influenced dishes, reflects the region's blended heritage. • Spiritual Beliefs: Both Māori spirituality and introduced religions contribute to the spiritual landscape.
Other relevant information	<p>The Roxburgh Power Station was sanctioned under the Public Works Act 1928 through an Order in Council issued on 19 May 1948. The dam was finished in 1956, and its generators were commissioned between 1956 and 1962. It is listed as a scheduled activity in the Central Otago District Plan. Similarly, the Hāwea control structure was established under the same Public Works Act and Order in Council on the same date. Built between 1954 and 1958, its purpose was to offer extra regulated storage in the Clutha Catchment. By 1985, controls on the lake level had been put in place, following a review by the National Water and Soil Conservation Authority. Lastly, the Clyde Power Station came into being through the Clutha Development (Clyde Dam) Empowering Act, which was introduced in Parliament on 29 September 1982. This legislation incorporated more comprehensive environmental safeguards and mitigation steps. The dam was completed in 1990, and Lake Dunstan began to be filled on 22 April 1992. Like Roxburgh, it is also a scheduled activity in the Central Otago District Plan.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Systematic processes are in place to identify any ongoing or emerging environmental and social	✓ Contact has a robust system in place for identifying ongoing and emerging environmental and social (E&S) concerns. The AEE (Assessment of Effects on the	✗ Processes to identify ongoing and emerging environmental and social issues take into account	✗ The current issue identification processes are focused on consent conditions and informal stakeholder engagement. To meet this criterion a more holistic approach towards

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
issues associated with the operating hydropower facility	Environment), completed two decades ago for the application for resource consents under the RMA, provides a good evaluation of the environmental and social impacts associated with Contact Energy's existing hydro-electricity operations. This informed the consent condition framework which now guides actions and necessitates the implementation of various monitoring programs. Annually, Contact conducts a Material Impacts Assessment, subject to independent review. The site environment team maintain an up-to-date aspects and impacts register, which outlines potential environmental and social risks along with corresponding control measures. This register is dynamic and undergoes updates throughout the year. Contact's site environment team maintains regular and open communication with stakeholders to proactively identify emerging issues within the communities surrounding the projects.	broad considerations, and both risks and opportunities	environmental and social monitoring could be adopted, in agreement with supporting agencies. This could encompass trend analysis within internal and external data sets and exploring correlations amongst detected alterations. Such a pro-active approach would position Contact well ahead of the next consents application process. Collaborations with academic institutions could provide a deeper insight into the projects' operational dynamics and environmental ramifications, thereby contributing to a reduction in operational risk.
The processes utilise appropriate expertise	✓ Personnel involved in identifying E&S issues possess the appropriate expertise. Contact maintains corporate standards that establish guidelines for managing employee competencies. Staff undergo training and competency evaluations. Assurance standards and suitable criteria underpin these competency assessments. Contact enlists external expertise when necessary. For instance, WSP conducts the		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	annual compliance review of hydrological conditions and was also responsible for formulating the landscape management plans (discussed in more detail in Topic 3).		
Monitoring programmes are in place for identified issues	✓ Monitoring programs are established and effectively managed within the organization’s environmental management system. A ‘hydro master spreadsheet’ serves as a tool for monitoring ongoing compliance with consent requirements. The SAP document management system houses maintenance plans, with automated notifications dispatched to designated personnel responsible for monitoring. Some aspects are not under the direct purview of Contact. For instance, the responsibility for water quality and downstream erosion monitoring falls under the jurisdiction of the ORC. The ESG (Environmental, Social, and Governance) dashboard featured in Board papers provides a concise overview of key analytics, encompassing quality, environmental, and safety objectives.		
MANAGEMENT			
Environmental and social management system is in place to manage measures to address identified environmental and social issues	✓ An ISO 14001 certified environmental and social management system has been successfully implemented. The SAP document management system serves as a platform for storing and organizing plans and processes. Additionally, a separate system called ‘Cintellate’ is employed for recording	Processes are in place to anticipate and respond to emerging risks and opportunities	✓ To respond to environmental and social risks and opportunities Contact utilises the ‘Mau taniwha’ strategic tool. This system is designed to oversee and manage resources, including environmental and social projects. It highlights key initiatives and their potential risks to senior management and the board.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		<p>observations and assessing risks, with corresponding actions in place for mitigation. Within this framework, the Consents delineate rules and management actions for various projects, encompassing monitoring, reporting, hydrology, erosion/sediment, safety, archaeology, fish, and recreation.</p> <p>All mandatory statutory reporting, such as the Native Fish Management Program annual report, has been completed without any notable issues.</p> <p>A bi-annual review of the Environmental and Social Management System (ESMS) is carried out by an external consultant from Telarc. These reviews consistently identify areas for enhancement, although they have not uncovered any significant deficiencies to date.</p>			<p>Projects are assessed based on available resources, and only those surpassing a significance threshold are pursued. The goal is to prioritise and accelerate initiatives with high environmental and social impact, which align with Contact’s sustainability strategy.</p>
<p>This management system is implemented utilising appropriate expertise (internal and external)</p>	✓	<p>Appropriate expertise is used, as discussed above.</p>	<p>Plans and processes are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001</p>	✓	<p>The systems incorporate plans and processes that are in accordance with the International Organisation for Standardisation’s ISO 9001 (Quality Management Systems), ISO 14001 (Environmental Management Systems), and the New Zealand Standard NZS 7901:2012 (Electricity network management).</p>
CONFORMANCE AND COMPLIANCE					
<p>Processes and objectives in environmental and social management plans have been and are on track to be met with:</p>					
<ul style="list-style-type: none"> no major non-compliances 	✓	<p>There have been no major non-compliances in recent years. This is confirmed by Telarc’s 2022 audit and Contacts 2022 compliance report.</p>	<p>There are no non-compliances</p>	✗	<p>There have been a range of low risk non-compliances over several topics. Issues include:</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<ul style="list-style-type: none"> no major non-conformances 	✓ This review has not identified any major non-conformances (i.e., non-implementation of management plans) regarding environmental and social management.		<ul style="list-style-type: none"> Variation in flows outside of the consent conditions (refer to Topic 11: Hydrological resource) Late delivery of the Landscape and Visual Amenity Management Plan (LVAMP) for the Kawarau Arm of Lake Dunstan (refer to Topic 3: Water) The 2023 bathometric monitoring of the Bannockburn inlet revealed that the consent conditions have been exceeded (refer to Topic 3: Water)
Environmental and social commitments have been or are on track to be met	✓ Contact has a suitable Environmental Policy which was approved in May 2023. The policy includes a range of detailed commitments, which appear to be on track to be met.	There are no non-conformances	✗ Most plans and processes appear to have been delivered as expected. However, the non-compliances listed above are evidence that the ESMS is not working flawlessly, the advanced criteria is not met.
Environmental and social funding commitments have been or are on track to be met	✓ Contact provides funding to a range of community projects, of which none are obligatory. The 2023 Integrated Report details Annual budgets set aside for environmental and social commitments. There is no indication of any shortfall in funding.		
OUTCOMES			
Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised and mitigated	✓ As anticipated in the AEE (Assessment of Effects on the Environment), the project has changed both environmental and social dynamics. Principal shifts include a diminished sediment load to the coastline, modifications in perceived amenity values due to the altered sediment regime, and a barrier to ecological connectivity. Nonetheless, measures are in place to minimise and mitigate these effects to a satisfactory degree. Continuous monitoring	Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised, mitigated and compensated	✓ Contact contributes to a wide range of projects and programs which compensate for any residual environmental and social impacts. Examples from the previous financial year include support to: <ul style="list-style-type: none"> The Green Room Wanaka Haehaeata Natural Heritage trust CO Riding for the Disabled Dunedin Monumental Masons

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	and management of project impacts is undertaken by Contact and ORC, with proactive adjustments implemented as necessary to further diminish any adverse impacts.		<ul style="list-style-type: none"> Alexandra District Parents Centre Central Otago Primary Schools - Contact Kids Central Otago Water Ski Club Lake Hāwea Community Centre Roxburgh Pool Lake Hāwea Community Association
Land disturbance associated with development of the hydropower project is rehabilitated or mitigated	✓ All land disturbance associated with the project's development has been rehabilitated. Ongoing land management is being completed in consultation with local stakeholders and gives suitable focus to native varieties.		
The operating hydropower facility or the corporate entity to which it belongs can pay for social and environmental commitments	✓ This review has not identified any concerns that Contact cannot pay for its social and environmental commitments.		

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> 1. No gaps identified 2. ... 	3 of 6

Summary of findings and other notable issues
<p>Suitable processes, like the annual Material Impact Assessment, are in place to identify ongoing and emerging environmental and social issues associated with the operating hydropower facilities. Monitoring programmes are in place, although there is scope for more trend analysis within internal and external data sets, and for exploring correlations amongst detected alterations. An ISO 14001 Environmental and Social Management System is in place to manage measures to address identified environmental and social issues. Third-party audits confirm this system is functioning well. Processes and objectives in environmental and social management plans have been and are on track to be met with no major non-conformances. There have been a range of minor non-compliances, most of which have been appropriately resolved. As with every hydropower project, there are some ongoing environmental and social impacts, such as disruption to sediment dynamics and the barrier to ecological connectivity. However, measures are in place to minimise and mitigate these effects to a satisfactory degree.</p>

Clyde and Roxburgh Hydropower Projects, 432+320 MW, New Zealand

Relevant evidence	
Interview	1, 2, 4, 10, 11, 12, 13, 15, 19, 20, 26, 27, 30, 31
Document	25, 43, 48, 53, 54, 56, 64, 76, 77, 80, 81, 84, 91, 102, 110, 123, 149, 165, 170, 176
Photo	4



2 Labour and Working Conditions

Scope and Principle	
This section addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The principle is that workers are treated fairly and protected.	
Background	
Labour requirements during operation (full-time equivalent)	Contact Energy has around 330 people in the generation and trading area. There are ~11 safety professionals full-time at Contact Energy, with one based at Clyde. There are ~66 people based in Clyde, including generation, maintenance, engineering and dam safety.
Applicable key human resources regulations	Employment Relations Act 2000: Governs employer-employee relations and emphasizes the importance of good faith in all aspects of the employment relationship. Holidays Act 2003: Details entitlements to public holidays, annual leave, sick leave.
Applicable key occupational health and safety (OH&S) regulations	Health and Safety at Work Act 2012: Outlines employer responsibilities for ensuring a safe work environment.
Identify the regulator for labour law and OH&S	Labour Law Regulator: Employment New Zealand, a division of the Ministry of Business, Innovation & Employment (MBIE), it oversees employment rights and responsibilities. OH&S (Occupational Health and Safety) Regulator: WorkSafe New Zealand, the primary workplace health and safety regulator.
Other relevant information	Cintellate is a software system that supports Contact Energy with occupational health and safety (OH&S) reporting processes, containing all risk management, observations, etc.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
A periodically updated assessment has been undertaken of human resource and labour management requirements for the operating facility	✓ Labour is reported each month against budget and forecast. A rolling 5-year capex programme is reviewed every year. Annually labour needs are assessed with respect to budgets, vacancies, requirements, and succession planning. A quarterly survey Peakon is conducted for workplace satisfaction and issues.	Identification of ongoing or emerging labour management issues takes broad considerations into account, and both risks and opportunities	✓ The workforce transformation office kicked off about one year ago, with the aim of Contact Energy being New Zealand’s most sought-after business to work for. Contact Energy partners with the Wellbeing Tick foundation, a New Zealand organization to support businesses. A survey provides an engagement score quarterly by workgroup, followed by focus groups and workshops.
The assessment included project occupational health and safety issues, risks, and management measures	✓ OH&S reporting is included in monthly monitoring, and a section on OH&S is included in corporate scorecard KPIs. In the last six months Contact Energy did an in-depth survey/maturity assessment with Sentis, including contractors, identifying several issues and opportunities.		
Monitoring is being undertaken to assess if management measures are effective	✓ A dedicated OH&S specialist is based at Clyde. The HSE Board committee gets a quarterly health, safety and well-being update. Items regularly monitored and reported on include head count, attrition, turnover, H&S observations, Total Recordable Injury Frequency Rate (TRIFR), and Total Injury Severity Rate (TISR). The Peakon surveys provide a valuable tool for quarterly staff checks. TelArc is an external service provider who comes in annually and audits pressurised equipment.		
Ongoing or emerging labour management issues have been identified	✓ Potential risks that have been identified include: <ul style="list-style-type: none"> • an aging workforce and future workforce planning (include diversity and inclusion); • the need for the dam safety team to focus solely on dam safety; 		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<ul style="list-style-type: none"> work load pressures on dispatch traders; and delivery of hydro capital projects. 		
MANAGEMENT			
Human resource and labour management policies, plans and processes are in place to address all labour management planning components	✓ Human resource planning and processes address all labour management components, including talent and recruitment, onboarding, well-being, remuneration and performance, learning and development, OH&S, and employee relations. Key policies include: <ul style="list-style-type: none"> Code of Conduct 2020 (under review); Quality Statement 2022; Discrimination, Bullying & Harassment Policy 2020 (under review); Inclusion and Diversity Policy 2021; Health and Safety Policy 2023; Growing Your Whanau Policy 2022 (family); Well-Being Policy 2023; An Our Tikanga statement (refers to Contact Energy’s behaviours and moral compass); Annual Modern Slavery Statements; and Contact University Courses. There are safety procedures for every task that Contact does, and an intranet home page with a dashboard, safety alerts, shared learnings, and links to further information.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓ Cintellate is used to store records, observations, and events, based on severity, with learnings and an action register for follow-up. ISO 14001 and 55001 certification is reviewed every year and certified every 3 years. Elements to address labour and OH&S risks include: <ul style="list-style-type: none"> Diversity and inclusion objectives. A competency assurance framework; Learning pathways; A LifeSaver document for every generation inductee focused on high risks (such as confined spaces, working at heights, working near water, etc); Generic hazards induction; A Making Fair Calls framework to review incidents using a trust and verify approach; Various team morale-boosting initiatives; and Pre-employment health screening including drug and urine testing. Peakon surveys provide employee engagement insight down to work group
Human resource and labour management policies, plans and processes of contractors,	✓ Contact’s hydro assets are mostly maintained by internal staff, with external resources brought in as needed. Contact has a Supplier Code of		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
subcontractors and intermediaries are in place		<p>Conduct 2021. Several capital projects have recently been undertaken, including:</p> <ul style="list-style-type: none"> Replacement of transformers at Clyde (2 out of 4); and Replacement of the crane system at Roxburgh. <p>Planned projects include:</p> <ul style="list-style-type: none"> Replacement of remaining transformers at Clyde; and Replacing runners and two transformers at Roxburgh. <p>External contractors have gone through Contact's H&S journey, including attending the Sentis culture change programme.</p>			<p>levels that are followed up. For example, five new roles were filled in the Hydro team during 2023 to respond to identified and emerging issues: Engineering Hydro Manager; Dispatch Trader; 2x Hydro Generation Technician (Mechanical); and a Project Manager to deliver on capital projects.</p> <p>Culture has been a big focal area for change in recent years. OH&S is now more integrated into normal operations, and staff have increased ownership of the issues. Previous safety audits are now called safety collaboration improvements.</p> <p>There has been follow-up with Sentis running intense workshops to address issues identified in the Sentis survey. There is a plan to repeat the survey.</p>
CONFORMANCE AND COMPLIANCE					
Processes and objectives relating to human resource and labour management have been and are on track to be met with:			There are no non-compliances	✓	There are no identified non-compliances.
• no major non-compliances	✓	There are no major non-compliances.			
• no major non-conformances	✓	There are no major non-conformances.			
Any labour related commitments have been or are on track to be met	✓	All labour-related commitments are on track to be met.	There are no non-conformances	✗	Unfortunately, electric shocks happen, with the most recent in May 2023. These are reported to Worksafe NZ and followed up, including with aftercare support.
OUTCOMES					

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	✓ There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	Labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights	✓ The Contact Energy Human Rights Policy 2023 seeks to align business activities with the United Nations Guiding Principles on business and human rights.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1. No significant gaps identified ● 2. ... 	4 of 5

Summary of findings and other notable issues
Contact Energy is pursuing a workforce transformation project, with the aim of Contact Energy being New Zealand’s most sought-after business to work for. Contact Energy has numerous people, health, safety and well-being policies and initiatives which have the oversight of the board Health, Safety and Environment (HSE) Committee. Contact is going through a process evaluating safety maturity with Sentis, and has partnered with the Wellbeing Tick foundation, a New Zealand organization to support businesses. Important issues include workforce planning in relation to an aging workforce, managing of workloads, and staff diversity and inclusion objectives. Cintellate is a software platform supporting incident management, and Peakon surveys provide employee engagement insights. There are no significant gaps against the HSS’s minimum requirements, and only one advanced requirement gap relating to a non-conformance during 2023.

Relevant evidence	
Interview	8, 9, 10, 12, 13, 21
Document	43, 55, 74, 75, 86, 98, 101, 105, 118, 119, 131, 134, 135, 136, 150, 152, 172, 173, 174, 182, 188, 190
Photo	1, 2, 3



3 Water Quality and Sediments

Scope and Principle	
<p>This section addresses the management of water quality, erosion and sedimentation issues associated with the operating hydropower facility. The principle is that water quality in the vicinity of the operating hydropower facility is not adversely impacted by activities of the operator, that erosion and sedimentation caused by the project are managed responsibly and do not present problems with respect to other social, environmental and economic objectives, and that commitments to address water quality, erosion and sedimentation issues are fulfilled.</p>	
Background	
Water Quality	
Description of water quality	<p>Monitoring by the ORC up to June 2022 concludes for Total Nitrogen and Total Phosphorous - Lake Hāwea and Lake Dunstan show the A-band for all monitored attributes, but note that rapid urban development with associated stormwater and drainage infrastructure is a threat to the lakes' water quality. The ORC reports that all monitored lakes achieve the 'A' band for ammonia toxicity and E. coli concentrations.</p>
Key water quality issues associated with the projects	<p>The AEE analysis does not identify any water quality issues associated with the projects. Lagarosiphon is present and requires management to avoid water quality issues though light inhibition and oxygen depletion.</p>
Main influences on water quality	<p>The project's three reservoirs have relatively low inflows of pollutants and low retention times, so water quality issues have not developed to date and are not anticipated to develop unless a significant change in land use or water treatment occurs.</p>
Sedimentology	
Key sediment issues	<p>The AEE identified the following sediment issues associated with the project (in descending order of significance):</p> <ul style="list-style-type: none"> • Reduction in sediment load to the coast • Flooding - sediment related • Interference with amenity values through changed sediment regime • Dust and amenity effects • Sediment deposition and reclaiming of land • Interference with land stability • Erosion of river banks and lake margins

	<ul style="list-style-type: none"> Increased sediment in river flows Habitat impacts (including invertebrates and spawning areas)
Sediment load (tonnes/year)	<p>The Clutha River has the largest catchment and mean flow in New Zealand and encompasses Lakes Wakatipu, Wānaka, and Hāwea. Its key tributaries include the Hāwea, Kawarau, Shotover, Arrow, Nevis, Cardrona, Lindis, Fraser, and Manuherekia Rivers. Before the construction of the dams, the sediment load was 2.6 Mt/year, with 60% coming from the Shotover River.</p> <p>The Roxburgh Dam, completed in 1956, traps 1.96 Mt/year of sediment with a 74% trap efficiency. Sediment accumulation is thought to have exacerbated floods in Alexandra in 1994, 1995, and 1999.</p> <p>The Clyde Dam, completed in 1992, has a 93% trap efficiency for suspended sediment. Sediment is accumulating in Lake Dunstan, particularly at the Kawarau Arm which accumulates 1.32 million m³/year, leading to a prograding wedge formation. The Clutha Arm accumulates 0.38 million m³/year, forming a shallow delta. All data is based on the NIWA 2000 sediment budget.</p>
Catchment area at the dam	The Clutha River catchment area above the Roxburgh Dam is approximately 21,960 square kilometres.
Other information	Click here to enter text.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging issues have been identified in the following areas:		Identification of ongoing or emerging water quality issues takes into account both risks and opportunities	✗ Contact does not conduct water quality monitoring or analyse the data collected by the ORC to identify risks or opportunities. To meet advanced requirements, Contact could perform its own analysis of ORC data to identify issues and trends. This would offer a more comprehensive understanding of water quality issues and potential inter-
• water quality	✓ The Otago Regional Council (ORC) is responsible for managing Otago’s water resources. ORC carries out regular water-quality monitoring and ecological assessments, as part of its State of Environment (SoE) programme.		
• erosion and sedimentation	✓ Contact undertakes a number of suitable erosion and sedimentation monitoring programs which identify ongoing or emerging issues.		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>The 2021 Lake Hāwea Lake Margins Monitoring Management Plan was revised in 2021; in consultation with the Hāwea Community Association, LINZ, and Queenstown Lakes District Council. The detailed monitoring was completed in 2022, and informal visual monitoring is ongoing. Piezometers track potential landslide risk in the slopes around the lake in real time. Sedimentation is not monitored, given the lake’s low sediment inflow and high capacity. Potential movement in the slopes around Lake Dunstan is monitored on a 24-hour basis using many piezometers which feed into Contact’s control system. Slope movement triggers an alarm which is then investigated with a site visit. This level of monitoring will be required for the life of the project. In 2022 Contact completed a sedimentation and backwater analysis for Lake Dunstan. This enabled the project to determine changes in sediment distribution, sediment delta advance, and backwater effect.</p> <p>Lake Roxburgh has the same landslide risks as Lake Dunstan, and has the same monitoring regime. In 2020 a Lake Roxburgh sedimentation analysis was completed to assess sediment distribution changes since 2017. The work evaluated the flushing strategy, predicted peak flood levels at Alexandra and updated the stage/discharge curve at Alexandra Bridge. Contact contributes 50% of the costs of an Otago Regional Council coastal erosion management programme.</p>		<p>relationships and opportunities. An example could be examining the correlation between changes in water quality parameters and eel migration.</p>
If management measures are required then monitoring is being undertaken to assess if management measures are effective for:		Identification of ongoing or emerging	✗ Contact has not engaged in the monitoring or data analysis of

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• water quality	✓	The only water quality management measure being completed is periodic removal of Lagarosiphon, which can cause water quality issues through light inhibition and oxygen depletion. Contact and LINZ visually monitors build-up and removes it as required.	erosion and sedimentation issues takes into account both risks and opportunities		downstream fluvial or littoral erosion processes, relying on the ORC's assessments. To gain a more advanced level of geomorphological insight, Contact could arrange for an expert to independently analyse ORC's monitoring data to identify both risks and opportunities. This could identify nuanced erosion dynamics or trends not readily apparent to the ORC, and could enhance the analysis and potentially identify opportunities for Contact to add value. Such an approach would enrich the framework for understanding both downstream and coastal erosional phenomena.
• erosion and sedimentation	✓	Flushing at Roxburgh is the key sediment management measure. The effectiveness of the flushing is being monitored as described above.			
MANAGEMENT					
Measures are in place to manage the following identified issues:			Processes are in place to anticipate and respond to emerging risks and opportunities relating to:		
• water quality	✓	Few measures are required or taken to maintain water quality in the water bodies. Lagarosiphon is removed if build up is observed. High water flows and associated high suspended solids can also reduce Lagarosiphon. Very little was observed during the site visit. Standard good practice measures are followed to prevent oil spills and to clean up if required. No issues were identified with solid waste or wastewater management.	• water quality	✓	Contact participates in multiple water management initiatives across the different water bodies. In Lake Hāwea, the focus is on developing a Catchment Action Plan and establishing ecological corridors. For Lake Dunstan, financial contributions are made to aquatic weed management. In the Lower Clutha Mata-au, efforts

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			are towards native fish habitat enhancement, including weed control and riparian planting. Additionally, Contact sponsors the Waterwise Otago educational programme, addressing key water issues like availability, use, economics, and quality.
<ul style="list-style-type: none"> erosion and sedimentation 	✓ Few measures are required or taken to maintain water quality in the water bodies. Lagarosiphon is removed if build up is observed. High water flows and associated high suspended solids can also reduce Lagarosiphon. Very little was observed during the site visit. Standard good practice measures are followed to prevent oil spills and to clean up if required. No issues were identified with solid waste or wastewater management. Erosion of the foreshore at Lake Hāwea is managed by the 2021 Lake Hāwea erosion management plan and supported by the Lake Hāwea Foreshore Landscape Management Plan. The plans propose mitigation measures involving remedial works in a limited number of locations, including signage, fencing, land purchase or easements and installation of riprap. The geohazard risk associated with mass wasting phenomena around Lake Dunstan is elevated, necessitating substantial geotechnical interventions during the construction phase. Slope stabilisation was primarily achieved through subterranean drainage conduits, designed to evacuate pore water from potential slip planes, thereby maintaining shear strength and reducing the likelihood of slope failure.	<ul style="list-style-type: none"> erosion and sedimentation 	✓ The monitoring of landslide and erosion risk in the slopes surrounding the three bodies of water is sophisticated and allows Contact to anticipate and respond to emerging risks and opportunities.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>Additionally, hydrological barriers and other geotechnical countermeasures have been implemented at certain locations to inhibit water infiltration, mitigating the risk of slope destabilisation due to elevated pore water pressure.</p> <p>In terms of sedimentation upstream of the Clyde Dam, no flushing of sediment is currently occurring, and Lake Dunstan is being managed in ‘accumulation mode’ until approximately 2043. This allows sediment which was accumulated in Lake Roxburgh up until the floods in the 1990s to be reduced. Most of the sediment that is accumulating in Lake Dunstan is in the Kawarau Arm. This does not pose a significant technical or environmental issue at present, but the visual impact is a concern for some stakeholders and is being addressed by a landscape and visual amenity plan.</p> <p>Roxburgh utilises a flood drawdown strategy to flush sediment, this is anticipated to be used until at least 2030 before a more aggressive strategy may be required in anticipation of an increasing amount of sediment passing the Clyde Dam.</p> <p>If inflow exceeds 850m³/s then the reservoir is drawn down and gates opened. Many events are too short (3-12 hours) for effective flushing.</p> <p>When effective, the process removes sediment from the Clyde Tailrace to immediately downstream of the Narrows. Contact is investigating whether short-duration large inflow events may be more effective at sediment displacement due to higher velocities.</p>		
CONFORMANCE AND COMPLIANCE			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Processes and objectives in place to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		
• water quality, with no major non-compliances	✓	This review has not identified any major non-compliances regarding water quality.	• water quality	✓	This review has not identified any non-compliances regarding water quality.
• water quality, with no major non-conformances	✓	This review has not identified any major non-conformances regarding water quality.			
• erosion and sedimentation, with no major non-compliances	✓	This review has not identified any major non-compliances regarding erosion and sedimentation.			
• erosion and sedimentation, with no major non-conformances	✓	This review has not identified any major non-conformances regarding erosion and sedimentation.	• erosion and sedimentation	✗	There have been some minor non-compliances regarding erosion and sedimentation. In July 2022, Contact was issued an abatement notice by the Otago Regional Council concerning the late delivery of the Landscape and Visual Amenity Management Plan (LVAMP) for the Kawarau Arm of Lake Dunstan. A revised LVAMP received approval from the Council in May 2023, after which the abatement notice was rescinded. The 2023 bathometric monitoring of the Bannockburn inlet revealed that the consent conditions have been exceeded. Consultation to determine appropriate solution to this is ongoing.
Commitments related to the following have been or are on track to be met:			There are no non-conformances relating to:		
• water quality	✓	Contact have published the 'Our Water Commitment' which details how the company is committed to caring for New Zealand's waters and aquatic ecosystems, protecting this precious taonga for the health of the environment, and the use and enjoyment of future	• water quality	✓	The projects have few specific management measures aimed at maintaining water quality, but all actions appear to have been satisfactorily completed.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		generations. The projects appear to meet these commitments.			
• erosion and sedimentation	✓	See above.	• erosion and sedimentation	✓	The actions outlined in the erosion and sediment monitoring and management plans have been completed as intended.
OUTCOMES					
Negative water quality impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	Monitoring and stakeholder engagement has not identified any significant negative water quality impacts that result from the hydropower activities. Lagarosiphon build up could impact water quality but appears to be suitably managed.	Water quality in the area affected by the operating hydropower facility is of a high quality	✓	As discussed in the background information, monitoring by ORC, up to June 2022 concludes that Lake Hāwea and Lake Dunstan show the A-band for all monitored attributes.
			The facility has contributed or is on track to contribute to addressing water quality issues beyond those impacts caused by the operating hydropower facility	✓	As detailed under the management criteria, Contact participates in multiple water management initiatives across the different water bodies which contributes to addressing water quality issues beyond those caused by the hydropower projects.
Erosion and sedimentation issues are avoided, minimised and mitigated	✓	Bankside erosion at Lake Hāwea has diminished in recent years, following a period of heightened erosion caused by elevated lake levels in late 2019 and early 2020. These conditions undermined areas such as Flora Dora and Grandview cliffs, leading to anticipated sloughing, which frequently occurred during summer months due to desiccating winds. Sediment is accumulating in Lake Dunstan, particularly in the Kawarau Arm which is now shallow and braided in parts, with lower recreational value. Contact is	Erosion and sedimentation associated with operating facility do not present ongoing problems for environmental, social and economic objectives of the	✗	There remains ongoing uncertainty about the impact of the project on downstream and coastal erosion. Experts have disagreed on the impacts in several hearings, although there is acceptance that the dams partially contribute to coastal erosion by trapping sediment. This is why Contact

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>trying to bring forward the transition from lake to alluvial river in an attractive fashion to maintain amenity value.</p> <p>The 2020 Roxburgh bathymetry survey concluded that there was net deposition of 154,000m³ from March 2017 to March 2020 between Clyde Dam tailrace and Roxburgh Dam. The flushing program is reported to have reduced the accumulation and hence flood risk at Alexandra.</p>	<p>facility or the project-affected areas</p>	<p>funds 50% of the ORC coastal erosion programme.</p> <p>Coastal erosion is complex to assess; monitoring could help quantify effects over time. The effects of coastal erosion are likely delayed due to historical sediment reduction from the dams and could still become an issue in the future.</p>

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1. No significant gaps identified ● 2. ... 	7 of 11

Summary of findings and other notable issues
<p>A variety of processes are in place to address water quality, erosion, and sedimentation concerns. The Otago Regional Council (ORC) ensures high-quality water monitoring throughout the catchment. Contact conducts appropriate monitoring of the reservoir rims, landslides, and bathymetry. To meet advanced requirements, Contact could analyse ORC's monitoring data independently to identify issues or trends that may not be apparent to the ORC but could affect Contact's operations. Measures such as Lagarosiphon control works are implemented to control growth of invasive aquatic weed species, and in doing so improves water quality. Erosion reduction and mitigation measures are deployed throughout the catchment and appear to be effective. In recent years, there have been two minor non-compliances. One was an abatement notice issued by the Otago Regional Council regarding the delayed submission of the Landscape and Visual Amenity Management Plan (LVAMP) for the Kawarau Arm of Lake Dunstan, which has since been resolved. Additionally, the 2023 bathymetric monitoring of the Bannockburn inlet revealed that the consent conditions were exceeded; this issue is ongoing. Negative water quality impacts stemming from the operations of the hydropower facility are being avoided, minimised, and mitigated. While there are erosion and sedimentation issues associated with the project, they are largely minimised and mitigated in line with good practice. To meet the advanced requirements of this standard, efforts could be directed towards Contact bringing in independent geomorphic analysis to gain a deeper understanding of coastal erosion and the role of the projects, towards identifying potential opportunities to add value.</p>

Relevant evidence	
Interview	10, 12, 13, 19, 20, 25, 26, 27, 28, 29, 31
Document	2, 3, 4, 9, 10, 14, 19, 20, 21, 23, 27, 28, 29, 33, 34, 35, 36, 43, 53, 56, 90, 140, 183
Photo	4, 5, 16, 17, 18, 19, 20



4 Community Impacts and Infrastructure Safety

Scope and Principle

This section addresses how impacts of development of the hydropower facility on project-affected communities have been addressed, in cases where these commitments are well-documented against a pre-project baseline. These impacts include economic displacement, impacts on livelihoods and living standards, public health impacts, impacts to rights, risks and opportunities of those affected by the project, infrastructure safety risks and additional benefits that can arise from a hydropower facility. The principle is that livelihoods and living standards impacted by the project have been improved relative to pre-project conditions for project-affected communities, that commitments to project-affected communities have been fulfilled, and that life, property and community assets and resources are protected from the consequences of dam failure and other infrastructure safety risks. This section does not address requirements that relate to physical displacement or to Indigenous Peoples, which are addressed in Section 5 and 7. Other interested parties and groups are addressed in Section 10.

In the case of older projects, commitments to project-affected communities and project benefits refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.

Background

In the case of older projects, commitments to project-affected communities and project benefits refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.

Community Impacts and Benefits

Description of project-affected communities and how they are affected (distinguish between physically displaced (addressed in Section 5), economically displaced and other project-affected communities and include estimated number of people and households)

There is no information available on the pre-project baseline conditions for project-affected communities, nor on well-documented commitments made to communities at the time of project approval. Every effort has been made to understand the currently affected communities and how their present views on impacts and concerns are being addressed.

The impact on local communities from the creation of the Hāwea and Roxburgh projects in the 1950s is not well documented. These two projects were originally established under the Public Works Act 1928.

The Clyde project in the 1970s was developed under the Clutha Development (Clyde Dam) Empowering Act 1982. It involved the creation of Lake Dunstan resulting in the physical displacement of an estimated 280 people, and inundation of 6 farms and 17 orchards. A further 15-30 farms were affected to some degree. A total of >70 km of roads required works and realignment. The project built new buildings, and businesses were relocated. Works were

	undertaken to minimise losses and support relocation of fruit trees, including irrigation strategies. All three projects were considered via the 2001 Application for Resource Consents and Assessment of Environmental Affects.
Agencies relevant to land acquisition	The then ministries of Works and Development, and Agriculture and Fisheries
Agencies relevant to livelihood restoration and project benefits	As above
Description of key public health issues	None identified.
Agencies relevant to public health	National Public Health Service Health New Zealand - Public Health South - https://www.southernhealth.nz/getting-help-you-need/public-health

Infrastructure Safety Details	Clyde	Roxburgh	Hawea
Type of dam	Concrete Gravity	Concrete Gravity	Earth Dam
Dam height (m)	105m	73m	32m
Probable maximum flood (m ³ / s)	PMF 5800 m ³ / s	PMF 7000 m ³ / s	5440 m ³ / s
Design flood (expressed as estimated flood with return period)	Clyde 100 year inflow flood 2600m ³ /s Clyde 500 year inflow flood 3200m ³ /s	Roxburgh 100 year inflow flood 3000m ³ /s Roxburgh 500 year inflow flood 3600m ³ /s	Hawea 100 year inflow flood 1690m ³ /s Hawea 500 year inflow flood 1820m ³ /s
Spillway capacity (m ³ / s)	5230 m ³ /s	7540 m ³ /s	295 m ³ /s
Spillway height (masl)	182msl	119.19msl	No spillway
Headrace length (m)	N/A	N/A	
Headrace width (m)	N/A	N/A	
Headrace capacity (m ³ / s)	N/A	N/A	
Seismicity	The Otago region lies upon several faults, with Peak Ground Acceleration (PGA) identified to be higher in the West zone of the Region. Central Otago is categorised as Medium Seismic Risk Area as noted by the District Council. 2 notable earthquakes within the Otago Region in 1947 (Magnitude 6.2 West Coast) and in 1876 (Magnitude 5.8 Southeast Coast). Site specific seismic hazard assessment completed.		

Clyde and Roxburgh Hydropower Projects, 432+320 MW, New Zealand

Infrastructure Safety Details	Clyde	Roxburgh	Hawea
Geology	The predominant geology of Central Otago is Otago Schist (metamorphosed greywacke) which underlies most of the region’s geology with the Haast Schist forming the area of the northern margin of the Clutha Valley. Both the Clyde and Roxburgh dam site geology were intensively investigated during design and construction. A significant investigation and update was completed 1995-2001.		
Dam safety regulatory authorities	New Zealand Government (Dam Safety Regulations 2022)		
Local presence/capacity of emergency services	Emergency Management Otago		
Potential safety risks in this context	Contact liaises with local emergency services (Police, Fire and Health) through the Otago Civil Defence Emergency Management Group (Otago CDEM Group) represented by the district Councils (Central Otago, Clutha, Queensland Lakes, and Waitaki), Dunedin City Council and Otago Regional Council.		
Degree of risk of dam failure and in what way	Hāwea, Clyde and Roxburgh are classified a High Potential Impact structures under the NZSOLD Guidelines. Although with low likelihood, the failure could result in fatalities and catastrophic socio-economic, financial, and environmental damage.		
Dam safety standards followed	New Zealand Society of Large Dams (NZSOLD) Guidelines 2015, (2022 Dam Safety Regulation)		
Agencies relevant to dam safety	New Zealand Society of Large Dams (NZSOLD)		
Other infrastructure safety issues	<ul style="list-style-type: none"> • Sedimentation build up in upper reaches of Lake Roxburgh potentially causing floods to Alexandra town. • Roxburgh Dam crest is passable via public access to both the left and right of the dam. 		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Community Impacts and Benefits			
Monitoring is being undertaken to assess if the following commitments have been delivered and if management measures are effective:			
<ul style="list-style-type: none"> commitments to project-affected communities 	✓ Commitments to project-affected communities are addressed through resource consent conditions and side agreements. Monitoring of consent compliance is ongoing with annual reporting to the ORC, recorded in the Annual Compliance Report. Contact Energy has a Community Engagement Plan which is reviewed every two years. This covers sponsorships and activity within the community.	Identification of ongoing or emerging issues for project-affected communities takes into consideration both risks and opportunities, and interrelationships among issues	✓ A community liaison officer is appointed and is aware of ongoing and emerging issues in the community. Regarding recreational amenity within the reservoirs, the land and margins are owned and administered by the Crown through Land Information New Zealand (LINZ) and Contact and LINZ have monthly meetings to discuss issues of relevance.
<ul style="list-style-type: none"> commitments to project benefits 	✓ Many construction-related project benefits have been completed and there are no known requirements for ongoing monitoring. Landscape and visual amenity plans are monitored through consent compliance, as shown in the annual compliance reports. Monitoring of additional commitments such as the Hāwea white water course, the Roxburgh pool solar panels, and the sponsorships is via the ongoing work of the Contact community relations officer.		
Ongoing or emerging issues relating to the following have been identified:			
<ul style="list-style-type: none"> issues that affect project-affected communities 	✓ Today Contact Energy operates under the Resource Management Act and the current ORC consent framework. These consents address impacts on local communities such as the requirement to develop Landscape & Visual Amenity Management Plans (LVAMPs) in areas where the operations may	Identification of ongoing or emerging issues relating to project benefits takes into account both risks and opportunities	✓ As above.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>have influenced the landscape and visual amenity. Examples of current LVAMPs include:</p> <ul style="list-style-type: none"> • 2022 Lake Hawea Foreshore Landscape Management Plan • 2022 Kawarau Landscape Visual Amenity Plan • 2022 Manuharekia Landscape Visual Amenity Plan <p>The consents also address impacts to recreational users, and this is mitigated through recreational flow requests and agreements.</p>		
<ul style="list-style-type: none"> • delivery of project benefits 	<p>✓</p> <p>In terms of recreational amenity within the three reservoirs, the land and margins are owned and administered by the Crown through LINZ. Contact and LINZ have monthly meetings to discuss issues of relevance.</p>		
Infrastructure Safety and Public Health			
Ongoing or emerging issues relating to the following have been identified:			
<ul style="list-style-type: none"> • dam and other infrastructure safety 	<p>✓</p> <p>Contact Energy undergoes a Comprehensive Dam Safety Review for the Hāwea, Clyde and Roxburgh Dam every five years to identify any potential safety risks. Risks that are identified are logged and monitored through a robust process that tracks remedial actions. The latest reports show that all three dams are in satisfactory condition without any significant safety issues. Additionally, Intermediate Dam Safety Reviews are carried out annually. Both reviews are conducted in adherence with the New Zealand Dam Safety Guidelines (2015) by the New Zealand Society on Large Dams (NZSOLD).</p>	<p>Identification of ongoing or emerging safety issues takes into account a broad range of scenarios and both risks and opportunities.</p>	<p>✓</p> <p>Contact is working with the University of Otago to support research into understanding the seismic hazard posed by the Pisa Fault lines which lies relatively close to the Clyde and Hāwea dams. Contact is involved in an initiative led by the New Zealand Dam Safety Hydrology Group consisting of other New Zealand large dam owners to update the estimate of Probable Maximum Precipitation (PMP) which will take into consideration Climate Change impacts. The updated PMP will later be utilised to re-assess the Probable Maximum Flood (PMF) estimates for the three dams.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>Contact conducts an Annual Landslide Performance Review for both Clyde and Roxburgh. The movement of the Mt Maude Slide (Hāwea) is included in the Hāwea Intermediate Dam Safety Review</p> <p>16 potential landslides (10 Major Impact and 6 Minor Impact) have been mapped within the Cromwell Gorge, all of which required stabilisation measures (discussed below). 34 large landslides have been mapped within the Roxburgh Gorge, 19 of these were identified to be Major Impact due to their size in relation to the reservoir width.</p> <p>Contact has undertaken comprehensive Dam Break studies to evaluate the consequences of dam failure over various scenarios. The findings are used to inform the emergency response planning.</p>		
<ul style="list-style-type: none"> public health issues associated with the operating hydropower facility 	<p>✓ There is no knowledge of public health impacts on the community as a result of the development or operation of the projects.</p>		
<p>Routine monitoring of dam and infrastructure safety is being undertaken to identify risks and assess the effectiveness of management measures</p>	<p>✓ The Dam Safety Unit at Contact actively oversees safety concerns by monitoring their assets and implementing scheduled maintenance. The most recent maintenance included the replacement of 2 transformers at Clyde. Contact plan to upgrade four out of eight turbines which will provide a 45GWh uplift in hydro generation. Two cranes have recently been upgraded at Roxburgh to facilitate ongoing maintenance. The team has routine scheduled inspections and checklists used as part of their dam safety monitoring.</p>		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>Contact introduced the Dam Assurance Monitoring System (DAMS) which is utilised to store and manage all the collected data from the three dams. Various instruments including piezometers, inclinometers, plumplines, crack meters, flow weirs, extensometers, dam survey points and joint meters have been installed according to the required monitoring needs for each dam. In addition, Contact actively monitors both collective and individual movement rates of identified landslides.</p> <p>Given the substantial impact potential landslides could have at Roxburgh Gorge, Contact Energy has implemented two water level alarms to actively monitor for such events. One alarm is situated at the Roxburgh Dam, functioning as a low water level alarm, while the other utilises inflow data from the Clutha and Manuherekia rivers to determine water levels at Alexandra, acting as a high-water level alarm. These systems provide an early warning for landslides or partial blockages in the gorge and serve as the primary monitoring tools for these hazards.</p>		
If public health issues require management measures then monitoring is being undertaken to assess if management	<p>✓</p> <p>No management measures are required to be taken by Contact Energy to address public health issues.</p>	<p>Identification of ongoing or emerging public health issues takes into account public health system capacities, access to health services, and health needs, risks and opportunities for</p>	<p>✓</p> <p>Identification of ongoing or emerging public health issues is undertaken with a good awareness of local health services, and risks and opportunities for different community groups. In recent years the Cromwell community have expressed frustrations with the sedimentation and Lagarosiphon (lake weed) build up along the Cromwell Town lakefront, and its ability to impact on community amenity and well-being. This has been addressed in the review</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
measures are effective			different community groups		of Contact's Kawarau Arm Landscape & Visual Amenity Plan, review of consent 2001.385_V3, condition 17 and engagement with the community to co-develop a Kawarau Arm Community Project. Although the Lagarosiphon weed growth is not directly related to the construction of the Hydro scheme, Contact has responded to community feedback/concerns and has increased its financial contributions to Lagarosiphon weed control which is managed by Land Information New Zealand (LINZ), specifically targeting weed in front of the Old Cromwell Township.
MANAGEMENT					
Community Impacts and Benefits					
Measures are in place to deliver commitments:			Processes are in place to anticipate and respond to emerging risks and opportunities relating to project-affected communities and project benefits	✓	In addition to Contact Energy's regional partnerships, it has an employee volunteer programme which enables employees across Contact to contribute part of their time to good causes. This is called Community Contact. It is publicised on Contact's website - https://contact.co.nz/aboutus/community - along with an email address inviting sponsorship, community investment and other inquiries.
• to project-affected communities	✓	Requirements to deliver on commitments to project-affected communities are addressed through delivery of various consent condition requirements.			
• to project benefits	✓	Several sponsorships are funded by Contact Energy. These include: <ul style="list-style-type: none"> • Contact Epic Race • Alexandra Blossom Festival 			
Measures are in place to manage any identified issues relating to these commitments:					
• to project-affected communities	✓	Requirements to deliver on issues important to project-affected communities are addressed through delivery of various consent condition requirements. Examples at Lake Hāwea include: <ul style="list-style-type: none"> • Hāwea Foreshore Management Plan 			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<ul style="list-style-type: none"> Swimming embayment in Hāwea <p>Examples at Lake Dunstan include:</p> <ul style="list-style-type: none"> Kawarau Arm Landscape & Visual Amenity Plan The Kawarau Arm Community Project <p>Examples at Lake Roxburgh include:</p> <ul style="list-style-type: none"> Manuherekia Landscape & Visual Amenity Plan. 		
<ul style="list-style-type: none"> to project benefits 	<p>✓</p> <p>A number of sponsorships are funded by Contact Energy. These include:</p> <ul style="list-style-type: none"> Contact Epic Race - First raced in 2008, the 125 km Contact Epic is an opportunity to ride around the Lake Hāwea. Contact Energy has been the principal partner since the Epic's inception in 2008. A percentage of funds raised by rider entry fees help support the Hāwea District community. Clyde Dam webcam - To help the recreational users of Lake Dunstan gauge weather conditions before heading off on their trips to the lake, Contact Energy installed a webcam at the top of Clyde Dam. It is updated every 15 minutes, ensuring an accurate take on current conditions. Alexandra Blossom Festival - Contact has been a major sponsor of the colourful Alexandra Blossom Festival since 2004, and in 2008 became the "Principal Partner" of the Festival and Grand Procession. 		
<p>If there are any formal agreements with project-affected communities, these are publicly disclosed</p>	<p>✓</p> <p>An annual consents compliance report is submitted to the Otago Regional Council. Contact discloses of the existence of this report in its annual report.</p>		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Commitments to project benefits are publicly disclosed	✓ Contact Energy discloses its project benefits on its website, at https://contact.co.nz/aboutus/community		
Infrastructure Safety and Public Health			
Dam and other infrastructure safety management plans and processes have been developed in conjunction with relevant regulatory and local authorities	✓ Contact implements a Dam Safety Management System (DSMS) which covers the 12 elements recommended by the New Zealand Dam Safety Guidelines. The system consists of 7 sections namely the following: <ul style="list-style-type: none"> • Dam monitoring Procedures • Dam Safety Review and Reporting • Post-Earthquake Inspections • Dam and Landslide Instrument Calibration & Maintenance • Dam Safety & Landslide Management Reference Documents • Dam Safety Management Standard • Site Emergency Response Plan. The system has been audited by a third party as part of the 2022 Comprehensive Dam Safety Review which is submitted to the Otago Regional Council. To address identified geological risks, the Clyde dam, which is constructed over a geological fault line, has a slip joint integrated into the dam's design. This feature segments the dam into two parts, with a gap between them. On the reservoir side, a concrete wedge, maintained in position by water pressure, seals this gap. This innovative design aims to equip the dam with the capacity to accommodate a certain degree of ground	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	✓ Contact liaises closely with multiple stakeholders such as the Otago Regional Council, Queenstown Lakes District Council, Central Otago District Council who are all members of the Civil Defence and Emergency Management (CDEM) network. Contact is also a member of the Lifeline Utilities, a collaborative organisation comprising various agencies, utilities, and stakeholders with the purpose of co-ordination and enhancing emergency related efforts for critical infrastructure and essential services. The group holds annual meetings under the Central Otago Lifelines and Emergency Services (COLES) which consists of the St John, Police, Fire Service, Dunstan Hospital, Otago Regional Council, Central Otago District Council and Contact Energy. Contact also engages the services of Dam Engineering Support Consultants to review and verify their Quarterly Dam Safety Performance Review Report. Contact, together with the Consultants conducts an annual safety inspection, which subsequently serves as the basis for the annual Interim Dam Safety Report (IDSR).

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	movement, thereby enhancing its structural resilience. Additionally, for the major potential landslides especially within the Cromwell Gorge over 18km of drainage tunnels were constructed throughout the gorge for stabilisation purposes. Refer to topic 3 for more detail.		
These plans and processes provide for communication of public safety measures	✓ Contact’s Emergency Response Plan has safety management systems identified relevant to Public Safety risks. The plans are reviewed with consultation with Otago Regional and Central Otago District Councils every five years. Contact has put up safety signage at high-risk areas close to the dam site (e.g., no swimming between log boom and dam, and no boating at identified areas) with safety booms and fencing notably installed.	Public safety measures are widely communicated in a timely and accessible manner	✓ The Otago Civil Defence and Emergency Management (CDEM) groups utilises communication tools such as social media as well as radio stations to issue real time updates in cases of emergencies that requires response.
Emergency response plans and processes include awareness and training programmes and emergency response simulations	✓ Contact has undertaken evacuation drills (every six months as per the Site Emergency Response Plan) with the on-site team and has training programs (e.g. emergency warden training) in place for their staff.		
Measures are in place to manage identified public health issues	✓ No public health issues have been identified.	Processes are in place to anticipate and respond to emerging public health risks and opportunities	✓ The same communication and engagement processes that would alert and respond to any issue of concern to local communities will be in place regarding public health issues.
CONFORMANCE AND COMPLIANCE			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Community Impacts and Benefits					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• delivery of commitments to project-affected communities, with no major non-compliances	✓	Commitments have been delivered to project-affected communities with no major non-compliances.	• project-affected communities	✓	There are no non-compliances relating to project-affected communities
• delivery of commitments to project-affected communities, with no major non-conformances	✓	Commitments have been delivered to project-affected communities with no major non-conformances.			
• project benefits, with no major non-compliances	✓	Project benefits have been delivered to project-affected communities with no major non-compliances	• project benefits	✓	There are no non-compliances relating to project benefits
• project benefits, with no major non-conformances	✓	Project benefits have been delivered to project-affected communities with no major non-conformances			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• project-affected communities	✓	Commitments to project-affected communities are on track to be met.	• project-affected communities	✓	There are no non-conformances relating to project-affected communities
• project benefits	✓	Commitments to project benefits are on track to be met	• project benefits	✓	There are no non-conformances relating to project benefits
Infrastructure Safety and Public Health					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• dam and other infrastructure	✓	There have not been any major non-compliances reported.	• dam and other infrastructure safety	✗	There was a minor non-compliance following the omission of data interpretation in the Annual

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
safety, with no major non-compliances					Report regarding hazards to Alexandra from lake bed monitoring. Contact Energy has acknowledged this oversight and has provided the Otago Regional Council (ORC) with a one-off memorandum detailing the data interpretation for the 2022 calendar year. It has been mutually agreed that this information will be included in future annual compliance reports submitted to the ORC.
• dam and other infrastructure safety, with no major non-conformances	✓	There are no major non-conformances.			
• public health issues, with no major non-compliances	✓	Processes and objectives to manage public health issues are on track to be met with no major non-compliances	• public health	✓	There are no non-compliances relating to public health
• public health issues, with no major non-conformances	✓	Processes and objectives to manage public health issues are on track to be met with no major non-conformances			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• dam and other infrastructure safety	✓	There are no indications to date that any commitments are not yet met relevant to the dam and other infrastructure safety.	• dam and other infrastructure safety	✓	There are no non-conformances identified relating to dam and infrastructure safety to date.
• public health	✓	There are no commitments to manage public health. Indirectly, commitments to enhance well-being of local communities have been met.	• public health	✓	There are no non-conformances relating to public health
OUTCOMES					
Community Impacts and Benefits					
Livelihoods and living standards impacted by the project have been	✓	There is a sense of improved livelihoods and living standards in the Clutha/Mata-au communities compared to pre- hydro projects. This is evidenced by real estate prices, lakeside developments, visual evidence of vineyards and horticultural activities,	The measures put in place to improve livelihoods and living standards are on track to become self-	✓	Improvements to living standards and livelihoods appear to be self-sustaining over the long-term, although concerns have been expressed over silt coming down the Kawarau Arm of Lake Dunstan and also Lagarosiphon and occasional (post-storm)

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
or are on track to be improved	supporting industries, and local tourism advertising of the region.	sustaining in the long-term	build ups of debris impacting the foreshore amenity. Contact Energy is working with local stakeholders through development of the Kawarau Arm Landscape & Visual Amenity Plan.
Economic displacement has been fairly compensated, preferably through provision of comparable goods, property or services	✓ Indications are that economic displacement was fairly compensated.		
Communities directly affected by the development of the hydropower facility and any other identified beneficiary of the facility have received or are on track to receive benefits	✓ Communities in the Clutha/Mata-au catchment are clearly the beneficiaries of sponsorship initiatives of Contact Energy.	Benefits are significant and sustained for communities affected by the project	✓ Sponsorships of the Contact Epic Race, and the Alexandra Blossom Festival, are significant and sustained for communities in the Clutha/Mata-au catchment. Additionally, Contact Energy has supported: <ul style="list-style-type: none"> • Development of the Hāwea Wave and support for its use via a side agreement with the white-water kayaking association; and • the new public pool in Roxburgh with solar panels.
Infrastructure Safety and Public Health			
Safety risks have been avoided, minimised and mitigated with no significant gaps	✓ There has been no notable public safety incidents recorded or highlighted relevant to the Clutha Hydropower projects in recent years. In general the findings from the dam safety reviews for all three dams shows no significant dam safety issues, with the schemes well maintained and operating effectively relevant to the identified safety risks.	Safety risks have been avoided, minimised and mitigated with no identified gaps	✗ It is noted that there are identified shortcomings within the Comprehensive Dam Safety Report (CDSR) with actions in place to address. Examples include where the closing rate of Roxburgh Spillway Gate 1 was found to be inconsistent during testing. Also that the stability assessment is not compliant with the current NZSOLD guidelines with respect to the aftershock scenario, and is found to be recurring action from 2017 CDSR.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			It is accepted that the resolution of some issues may span several years, contingent upon the complexity of the issue and resource availability. It is important to recognise that the New Zealand Society on Large Dams (NZSOLD) categorises dam safety issues into four distinct grades: Confirmed Dam Safety Deficiency, Potential Dam Safety Deficiency, Physical Infrastructure Issues, and Non-Conformance Issues. Currently, the Comprehensive Dam Safety Reviews (CDSRs) document a single confirmed deficiency for both the Clyde and Hawea dams.
		Safety issues have been addressed beyond those risks caused by the operating facility itself	✓ Safety measures extend beyond the facility's operations. Four hydro staff are volunteer firefighters, supported by Contact's policy to allow them to respond to emergencies during work hours and attend training. Special Leave is available for such activities, including firefighting. Additionally, Contact grants local brigades site access for training and familiarization, enhancing overall safety preparedness.
Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓ No negative public health impacts have arisen from activities of the operating hydropower facilities.	Where opportunities have been identified, measures to address public health issues beyond those impacts caused by the operating hydropower facility have been or are on track to be achieved	✗ No opportunities have been identified to address public health issues beyond impacts caused by the project.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1.No significant gaps identified ● 2. ... 	18 of 21

Summary of findings and other notable issues
<p>There are numerous project-affected communities along the Mata-au/Clutha river system. Whilst Hāwea Dam and Roxburgh power stations have been in place since the 1950s, established under the Public Works Act 1928, the intermediate Clyde Dam and associated Lake Dunstan were created in the 1980s, developed under the Clutha Development (Clyde Dam) Empowering Act 1982. All three projects were considered via the 2001 Application for Resource Consents and Assessment of Environmental Affects, which established via a stakeholder-inclusive process the key issues and operating requirements for all 3 lakes/dams in the Mata-au/Clutha river system. These consents address impacts on local communities such as the requirement to develop Landscape & Visual Amenity Management Plans (LVAMPs) in areas where the operations may have influenced the landscape and visual amenity. Commitments to project-affected communities are addressed through resource consent conditions and side agreements. Monitoring of consent compliance is ongoing with annual reporting to the Otago Regional Council (ORC). There are no known public health issues, and project benefits are met through sponsorships funded by Contact Energy, namely the annual Contact Epic Race, and the Alexandra Blossom Festival. All minimum requirements of the HSS are met.</p> <p>The Clutha Hydropower projects are rated as High Potential Impact Classification (PIC) under the New Zealand Dam Safety Guidelines. Contact has demonstrated their recognition of the classification by implementing a robust Dam Safety Management System. This system is complemented by their updated monitoring and surveillance system the Dam Assurance Monitoring System (DAMS) which has enabled Contact the enhanced ability to analyse information to anticipate risks and opportunities. In general, the findings from the dam safety reviews for all three dams shows no significant dam safety issues, with the schemes well maintained and operating effectively relevant to the identified safety risks.</p>

Relevant evidence	
Interview	10, 12, 13, 14, 15, 19, 20, 23, 24, 27
Document	1, 3, 6, 8, 13, 17, 18, 22, 25, 26, 30, 31, 32, 33, 35, 36, 37, 39, 40, 42, 43, 51, 56, 68, 71, 72, 79, 104, 116, 142, 143, 156, 162, 171, 178, 183, 186, 191
Photo	4, 5, 6



5 Resettlement

Scope and Principle	
<p>This section addresses how the physical displacement arising from development of the hydropower facility has been addressed, in cases where resettlement occurred and commitments are well-documented against a pre-project baseline. The principle is that the dignity and human rights of those physically displaced have been respected; that these matters have been dealt with in a fair and equitable manner; that livelihoods and standards of living for resettles and host communities have been improved; and that commitments made to resettles and host communities have been fully fulfilled. This section does not address those that are only economically displaced, who are addressed in Section 4.</p>	
Background	
<p>Did the project require or result in any physical displacement of people? Please state the evidence on which this determination is made.</p>	
Yes, this section is relevant (for older projects, see note below)	
No, this section is not relevant	<p>The flooding of parts of Cromwell in the 1990s to create the Clyde Dam resulted in the physical displacement of people.</p> <p>Despite there being known physical displacement of hundreds of people, in the context of this operation stage assessment this topic is considered as Not Relevant. There was no available well-documented information on the pre-project baseline, nor on commitments made at the time of project approval, and there do not appear to be outstanding legacy issues nor grievances.</p>
<p>In the case of older projects, commitments to resettles and host communities refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.</p>	
Description of physically displaced communities and how they are displaced (distinguish between permanently vs temporarily and include number of people and households)	<p>The creation of the Cromwell project in the late 1970s and the creation of Lake Dunstan resulted in the physical displacement of an estimated 280 people, and inundation of 6 farms and 17 orchards. A further 15-30 farms were affected to some degree. Most of the 20 km highway between Clyde and Cromwell was inundated, and so a new highway was built. A total of >70 km of roads required works and realignment. The project built new buildings, and businesses were relocated. Works were undertaken to minimise losses and support relocation of fruit trees., including irrigation strategies.</p>
Name and number of settlements	Sections of Cromwell
Agencies relevant to land acquisition	The then ministries of Works and Development, and Agriculture and Fisheries
Agencies relevant to livelihood restoration	As above



6 Biodiversity and Invasive Species

Scope and Principle

This section addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the operating hydropower facility. The principle is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the area that are sustainable over the long-term; that biodiversity impacts arising from the operating hydropower facility are managed responsibly; that ongoing or emerging biodiversity issues are identified and addressed as required; and that commitments to implement biodiversity and invasive species measures are fulfilled.

Background

Short description of the ecological region in the project area

Central Otago, located in the southern part of New Zealand's South Island, has a distinct ecology characterised by its semi-arid climate, schist-based mountains, and unique flora and fauna. It has a continental climate, which means it experiences hot summers and cold winters. Due to its inland location, it's shielded from maritime influences, leading to significant diurnal and seasonal temperature variations. The region is marked by deep river valleys, large schist rock formations, and rugged mountains. This topography has played a role in shaping the ecology of the area. The dominant vegetation type, particularly in upland areas. Species include narrow-leaved tussock and silver tussock. Native shrubs like matagouri and native broom are common. The region is home to a variety of alpine herbs, many of which bloom in the summer. Kānuka and Mānuka native trees can be found in certain pockets, often on hill slopes.

Central Otago is home to several endemic bird species. Notable among them are the New Zealand falcon (kārearea) and the endangered black stilt (kakī). Due to its unique climate and flora, Central Otago has a distinct insect population, including several species of moths and butterflies. The region is home to several species of skinks and geckos, many of which are adapted to the dry conditions.

Over the past centuries, there has been significant human intervention. Introduced mammals like rabbits, deer, and possums have impacted native vegetation. Overgrazing by sheep and cattle, along with the introduction of exotic grasses and other plants, has also altered the original ecology. Efforts are being made to conserve the unique ecology of Central Otago. This includes pest control initiatives and efforts to restore native vegetation.

Protected areas (national parks and reserves etc) and their distance from the project	The project does not operate within any protected areas. The table below lists some Conservations areas near the project sites.		
	Conservation Area	Distance from Cromwell	Description
	Bendigo Conservation Area	20 km	Located northeast of Cromwell with remnants of gold mining activities. Features tussock grasslands and schist tors.
	Lowburn Valley Conservation Area	7 km	Situated north of Cromwell, it has a range of native vegetation and is a habitat for native birds.
	St Bathans Conservation Area	60 km	Located to the northeast of Cromwell with gold mining remnants. The Blue Lake is a tourist attraction.
	Hector Mountains Conservation Area	80 km	Situated southwest of Cromwell, it covers mountainous terrain, offering habitats for various native species.
	Hāwea Conservation Park	55 km	Located west of Cromwell, near Lake Hāwea, this park features native forests, tussock lands, and offers opportunities for tramping and hiking.
	Kawarau Gorge Conservation Area	15 km	Situated between Cromwell and Queenstown, this area offers stunning gorge views. Home to the historic Kawarau Suspension Bridge, a popular bungee jumping site.
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	No critical habitats have been identified within the project area.		
# threatened species in the directly affected area: terrestrial	None recorded		
# threatened species: aquatic	Īnanga and Giant Kōkopu- as well as migratory fishes Long-fin eel and Lamprey		
	Common Name	Latin Name	
	Īnanga	<i>Galaxias maculatus</i>	
	Giant Kōkopu	<i>Galaxias argenteus</i>	
	Long-fin Eel (Tuna)	<i>Anguilla dieffenbachii</i>	

	Lamprey (Kanakana)	<i>Geotria australis</i>	
Any other species of conservation importance	Click here to enter text.		
Migratory pathways	The Hāwea, Clyde and Roxburgh Dam are barriers to the migratory fishes i.e., Long Fin eel (<i>Anguilla dieffenbachia</i>) and Lampreys (<i>Geotria Australis</i>)		
Invasive species: terrestrial	Category	Species	Scientific Name
	Plants	Old Man's Beard	<i>Clematis vitalba</i>
	Plants	Gorse	<i>Ulex europaeus</i>
	Plants	Wilding Pines	<i>Pinus spp.</i>
	Animals	Stoat	<i>Mustela erminea</i>
	Animals	Possum	<i>Trichosurus vulpecula</i>
	Animals	Rat	<i>Rattus spp.</i>
	Insects	German Wasp	<i>Vespula germanica</i>
	Insects	Argentine Ant	<i>Linepithema humile</i>
Invasive species: aquatic	Category	Species	Scientific Name
	Plants	Lagarosiphon	<i>Lagarosiphon major</i>
	Plants	Hornwort	<i>Ceratophyllum demersum</i>
Key threats to biodiversity	<p>Key Threats to Biodiversity in Otago, are:</p> <ul style="list-style-type: none"> • Habitat Loss and Fragmentation through agricultural expansion, urbanisation and resource extraction • Invasive Species, both terrestrial and aquatic, described above • Pollution of water from agricultural runoff and air pollution from industry • Climate Change bringing temperature fluctuation and extreme Weather Events 		
Agencies involved in biodiversity conservation	<ul style="list-style-type: none"> • Department of Conservation (DoC): The primary governmental agency responsible for conserving New Zealand's natural and historic heritage. • Otago Regional Council (ORC): Plays a key role in managing natural resources, which includes implementing biodiversity and biosecurity strategies for the Otago region. 		

	<ul style="list-style-type: none"> • Fish and Game New Zealand: Focuses on the management, maintenance, and enhancement of sports fish and game birds and their habitats in New Zealand's recreational interests. • Queenstown Lakes District Council: Among other responsibilities, they manage some reserves and address issues related to biodiversity within their jurisdiction. • Royal Forest and Bird Protection Society of New Zealand: Focuses on the preservation and protection of New Zealand's indigenous flora and fauna. • Ngā Whenua Rāhui: Provides funding for the protection of indigenous ecosystems on Māori land.
Other relevant information	Click here to enter text.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging biodiversity issues have been identified	✓ Biodiversity issues have been identified in line with the Resource Consent requirements, with good coverage of the following: Fisheries: The assessment included habitat restoration and spawning areas for Galaxiids (e.g., Īnanga and Giant Kōkopu) as native species and comparable evaluations for salmonids (salmon and trout), which are categorised as non-native aquatic species. Aerial monitoring surveys are conducted to further understand the abundance and spawning activities. Studies have also examined the impact of flow variation on the availability of invertebrate habitats. Fish Migration: The Hāwea, Clyde, and Roxburgh dams act as barriers to migratory native species, particularly the Longfin Eel (<i>Anguilla dieffenbachii</i>) and Lampreys (<i>Geotria australis</i>). Assessments of their upstream and downstream passage, the performance of fish ladders, trap and transfer operations, and potential	Identification of ongoing or emerging biodiversity issues takes into account both risks and opportunities	✓ Opportunities to support biodiversity have been undertaken through site sponsorship funding, for example, initiatives concerning the awareness and protection of Grebes. Contact recently undertook an assessment for hydro-operation-specific areas, examining individual species at risk. This included reference to the International Union for Conservation of Nature (IUCN) Red List, as well as the New Zealand threat classification under the Department of Conservation (DOC), incorporating species endemic to the Otago region. Assessments were also specifically carried out concerning UNESCO World Heritage Sites and IUCN Protected Areas, as well as any other regions known to harbour key biodiversity at risk. This was executed for both Hydro and Geothermal sites. Contact have collaborated with Hokonui Rūnanga (one of the regional tribal councils of

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>enhancements are ongoing. Specialists are engaged to conduct habitat assessments and species population surveys.</p> <p>Aquatic Plants: Lagarosiphon, especially in Lake Dunstan, has been identified as the primary invasive weed in the Clutha. There are minimal effects on the environment, such as water quality, but more significant impacts on water-based recreation within the lake.</p> <p>Terrestrial Pest Animals: Rabbits have been identified as a significant issue affecting native tree planting.</p> <p>Ongoing and emerging issues are identified through reports and assessments relevant to the biodiversity concerns.</p>		<p>Ngāi Tahu) at Mataura Falls. Contact co-funded a system that monitors kanakana (lamprey) at this historical harvesting site which is now significantly altered by industrial activities. The Hokonui team is enhancing fish passage where feasible. The Artificial Intelligence (AI) monitoring technology detects the presence of kanakana and identifies Lamprey Reddening Syndrome (LRS), a new affliction, thus monitoring fish health.</p>
<p>If management measures are required, then monitoring is being undertaken to assess if management measures are effective</p>	<p>✓</p> <p>Contact actively monitors the measures in place as part of the Resource Consent requirements and initiatives. This includes the following:</p> <ul style="list-style-type: none"> • An annual review and report on the effectiveness of the Native Fish Management Programme, including the passage of native fish, working with the Department of Conservation and the National Institute of Water and Atmospheric Research (NIWA). The results of the trap and transfer activities are monitored to assess their effectiveness. • An annual review and reporting on the progress of the Sports Fish Management Programme with Fish & Game. 		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<ul style="list-style-type: none"> Implementation of the Landscape and Visual Amenity Management Plan, which includes native tree planting. Annual Lagarosiphon monitoring and reporting. Contact tracks the progress of data on implemented initiatives (e.g., pest control, trees planted, habitats at risk, eel, elver, and lamprey catches) within a master spreadsheet, overseen by the Environment team. 		
MANAGEMENT			
Measures are in place to manage identified biodiversity issues	✓ Contact implements the following measures, as stipulated within the Resource Consents. The Native Fish Management Programme focuses on activities, including the restoration of inanga spawning sites, habitat restoration to enhance populations, monitoring of spawning and catches, giant kōkopu and lamprey eDNA surveys, and the implementation and improvement of fish ladders for elvers and lampreys. These efforts align with those of the Mata-Au Trust to ensure a holistic approach to native fish conservation. Salmon and trout, considered non-native species, are popular for recreational fishing in the Clutha River. The Resource Consent requires Contact to implement a Sports Fish Management Programme, which includes creating artificial spawning channels and hatchery stocking. A funding agreement is being finalised between Contact Energy and the Clutha/Mata-Au Sports Fish and Habitat Trust to	Processes are in place to anticipate and respond to emerging risks and opportunities	✓ The frequent communication required to achieve the works associated with the partnerships has created a platform where emerging risks and opportunities can be identified and responded to. Contact collaborates closely with the following agencies regarding ongoing initiatives: <ul style="list-style-type: none"> The Department of Conservation (DOC) on Native Fish Management. Fish and Game on Sports Fish Management. Land Information New Zealand (LINZ) on Lagarosiphon management. Hāwea Community Association on Foreshore Landscape Management, which includes enhancing native biodiversity through pest control and tree planting. Mōkihi Reforestation Trust on indigenous tree plantings and the removal of willows.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
	<p>undertake these works and address the conditions of the Resource Consent. Contact's pest control measures target both terrestrial and aquatic species. Terrestrial pest control efforts, in collaboration with local community groups, have been ongoing since 2018. Contact has funded 20 tracking tunnels located at Gladstone Gap and Hāwea Track. These tunnels detect the presence of native lizards and insects, indicating the success of the pest control measures.</p> <p>Contact manages the issue of Lagarosiphon, an invasive weed prevalent in the Clutha River, particularly in Lake Dunstan. Contact funds weed control initiatives undertaken by the Lake Dunstan Aquatic Weed Management Group, managed by Land Information New Zealand (LINZ).</p>				<ul style="list-style-type: none"> Mata-au Trust on consultation with Kāi Tahu to better understand approaches to enhancing mahinga kai resources.
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage biodiversity issues have been and are on track to be met with:			There are no non-compliances	✗	There have been some low-risk non-compliances e.g. Late submission of the Foreshore Landscape Management Plan for Lake Hāwea
• no major non-compliances	✓	There has not been any major non-compliances reported			
• no major non-conformances	✓	There are no major non-conformances	There are no non-conformances	✓	No non-conformances has been recorded to date.
Biodiversity related commitments have been or are on track to be met	✓	No major issues on meeting the commitments has been recorded or highlighted.			
OUTCOMES					
Negative biodiversity impacts arising from	✓	The biodiversity conservation measures currently undertaken by Contact and other	There are healthy, functional and viable	✗	The terrestrial and aquatic environments proximate to the project sites exhibit a

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
activities of the operating facility are avoided, minimised, mitigated, and compensated	agencies generally aim to avoid, minimise, mitigate, and compensate for identified negative impacts on biodiversity. An example of a compensation initiative is the habitat restoration works for the Giant Kōkopu, along with ongoing efforts for weed removal and native tree planting to enhance habitats. Contact actively engages in improvement initiatives, reflecting its commitment to addressing insights gained from ongoing monitoring. For instance, Contact has addressed issues with elver migration submerged ramp ends by developing a trap and ramp that can be lowered into the river via a winch. Moreover, they have installed artificial grass substrates to aid climbing elvers and have plans for future trials to explore other potential substrates.	aquatic and terrestrial ecosystems in the area affected by the hydropower facility that are sustained over the long-term	satisfactory state of ecological health. Nonetheless, the efforts to rehabilitate and foster ecosystems that are healthy, functional, and viable remain a work in progress. Contact has achieved commendable strides towards mitigating the dam's impact on ecological connectivity. Despite these efforts, the work remains incomplete, with the advanced benchmarks specified under the Standard yet to be fulfilled.
		The facility has contributed or is on track to contribute to addressing biodiversity issues beyond those impacts caused by the operating hydropower facility	✗ The focus of Contact's biodiversity conservation efforts has been to mitigate impacts directly attributable to the project. Ancillary measures have included support for species-specific conservation, exemplified by initiatives for Grebe nesting. To meet the advanced criteria of this Standard, Contact would need to deliver a comprehensive biodiversity conservation strategy that transcends the project's immediate geographical boundaries and its direct impacts. This affords Contact an opportunity to re-evaluate and enhance their existing programmes, extending their positive conservation impact to address wider biodiversity concerns that are not solely confined to the project's area of influence.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
● 1.	3 out of 6

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 2. ... 	

Summary of findings and other notable issues

Contact Energy conducts biodiversity studies, assessments, and monitoring of effectiveness, underpinned by adherence to the Resource Consents. These measures have proven effective in avoiding, minimising, mitigating, and compensating for identified negative impacts on biodiversity. Efforts are ongoing to enhance the efficacy of trap-and-transfer systems for the passage of eels and lampreys. The partnerships established with key stakeholders and agencies have facilitated improved communication, efficient execution of initiatives, and better collaboration in identifying emerging issues. While various assessments and measures are in progress, evidence that the facility's measures can sustain healthy, functional, and viable aquatic and terrestrial ecosystems over the long term is still forthcoming. There is an opportunity to re-evaluate and enhance biodiversity programmes, extending positive conservation impact to address wider biodiversity concerns that are not solely confined to the project's area of influence.

Relevant evidence	
Interview	10, 13, 25, 26, 29, 31
Document	24, 25, 33, 35, 36, 41, 43, 45, 47, 52, 57, 60, 61, 62, 95, 106, 107, 111, 138, 144, 155, 159, 179, 189
Photo	15, 19



7 Indigenous Peoples

Scope and Principle	
<p>This section addresses the rights at risk and opportunities of Indigenous Peoples with respect to the hydropower facility, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalized and vulnerable segments of the population. The principle is that the operating facility respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of Indigenous Peoples in an ongoing manner throughout the project life.</p>	

Background	
<p>Are any of the affected people Indigenous Peoples? Please state the evidence on which this determination is made.</p>	
<p>Yes, this section is relevant</p>	<p>The affected people include Indigenous Peoples of the south island of New Zealand. Māori are the Indigenous Peoples of Aotearoa New Zealand, and Iwi are tribes of Māori from the founding peoples.. Ngāi Tahu are the biggest Iwi of the South Island.</p>
<p>No, this section is not relevant</p>	<p>Click here to enter text.</p>
<p>Add columns for each Indigenous People</p>	
<p>Brief description of the peoples and their culture, lands, and representation</p>	<p>All Papatipu Rūnanga (constituent areas of Ngāi Tahu) have a shared connection to the landscape through whakapapa (the line of descent from one’s ancestors), genealogy, and a deep relationship to the integrity of the land.</p>
<p>Directly affected communities and how they are affected</p>	<p>The shared Papatipu Rūnanga for the Mata-au/Clutha catchment identified in the 2000 Cultural Impact Assessment are:</p> <ul style="list-style-type: none"> • Te Rūnanga o Arowhenua • Te Rūnanga o Waihao • Te Rūnaka o Moeraki • Kāti Huirapa Rūnaka ki Puketeraki • Te Rūnaka Ōtakou • Hokonui Rūnaka • Waihōpai Rūnaka • Ōraka Aparima Rūnaka • Awarua Rūnaka • Te Rūnanga o Makaawhio

Other affected indigenous communities	Mana whenua, i.e. those tribes with an acknowledged cultural obligation to provide stewardship over an area of land, have the responsibility to take other Iwi considerations into account.
# households physically displaced	0
# households economically displaced	Local Iwi followed migratory cycles and therefore used the area seasonally. This seasonal access was disrupted by industrial development prior to the building of the hydro scheme. Economic displacement came by way of Iwi losing contact with food gathering and other traditional economic activities.
Agencies relevant to Indigenous Peoples	The 7 Papatipu Rūnanga of the Clutha/Mata-au with whom Contact Energy is actively working are defined in the Te Rūnanga o Ngāi Tahu Act 1996.
Other relevant information	<p>In 1840 Te Tiriti o Waitangi (the Treaty of Waitangi) was signed between the Chiefs of Aotearoa and Her Majesty the Queen of England. In 1998 was the Ngāi Tahu Claims Settlement Act.</p> <p>Important Iwi groups, in that they are represented on the Mata-au trust, are:</p> <ul style="list-style-type: none"> • Aukaha (the consenting agency representing the four northern Rūnanga) • Te Ao Mārama Inc (TAMI, the consenting agency representing the three southern Rūnanga) <p>Iwi engagement groups additional to these include:</p> <ul style="list-style-type: none"> • Ōraka Aparima Rūnaka • Waihōpai Rūnaka • Awarua Rūnaka • Hokonui Rūnaka • Manuhaea Ahuwhenua Trust • Ōtakou Rūnaka • Puketeraki Rūnaka • Te Tapu o Tāne <p>Contact Energy also engages with:</p> <ul style="list-style-type: none"> • Murihiku Regeneration

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging issues relating to the operating hydropower facility that may affect Indigenous Peoples' rights have been identified	✓ The 2000 Cultural Impact Assessment was triggered by the consents process and was led by the Kāi Tahu ki Otago. It outlined issues of importance to the Iwi with the hydropower projects. These related to economic redress, cultural redress (place names, landscape reunification), and seats on statutory boards. Of high importance to Iwi is the right to mahinga kai ("to gather the food"), to places where resources are gathered, the activity and business of gathering kai and the types of resources that were caught or gathered. Recognition of the right to fish implicitly recognises the need for sufficient water of the appropriate quality to enable the fishing activity to proceed. Additional issues of relevance to Ngāi Tahu and hydro generation include: <ul style="list-style-type: none"> • The importance of waahi tapu (sacred places) • Lack of recognition and protection to waahi taoka (treasured resources) • The mauri (life force) of Otago's water bodies; • The concept of mana whenua and practice of kaitiakitanga (guardianship) in management of Otago's natural and physical resources. 	Identification of issues that may affect Indigenous Peoples' rights is undertaken with the free, prior and informed participation of Indigenous Peoples	✓ The 2000 Cultural Impact Assessment led by the Kāi Tahu ki Otago was undertaken with the free, prior and informed participation of the Papatipu Rūnanga of the Clutha/Mata-au.
If management measures are required, then monitoring is being undertaken to assess if management measures are effective	✓ The Mata-au Trust Deed was signed in 2018 and identified a number of focal areas, being work to: <ul style="list-style-type: none"> • Enhance mahinga kai resources and nohoanga sites associated with the Mata-au/Clutha River catchment area; • Provide fish passage, improved habitat and increased diversity and abundance of mahinga kai resources in the Clutha River / Mata-au catchment area; • Enable Ngāi Tahu whānui to exercise effective kaitiakitanga and to manage the natural resources and sites of cultural significance in the Clutha River / Mata-au catchment area; • Enable the people of New Zealand and in particular Ngai Tahu whānui (for whom the area has cultural significance) to use and 	Identification of issues that may affect Indigenous Peoples' rights takes into account both risks and opportunities	✓ Contact Energy is a member of Murihiku Regeneration, focussed on socio-economic uplift for Māori, which allows both risks and opportunities and a nation-wide view to be adopted - https://www.murihikuregen.org.nz/

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>access traditional and contemporary nohoanga sites for the gathering of mahinga kai;</p> <ul style="list-style-type: none"> • Encourage and upskill students in tertiary education in the area of natural resource management; • Promote and educate the people of New Zealand in relation to Kāi Tahu traditional and contemporary associations with the Clutha River / Mata-au catchment area; and • For any other purpose (whether relating to the relief of poverty, the advancement of education or religion or any other matter beneficial to the community) which are charitable according to the law of New Zealand. <p>Monitoring has been undertaken informally through the meetings of the Trustees.</p>		
MANAGEMENT			
Measures are in place to address the Indigenous Peoples' rights at risk	<p>✓</p> <p>The Ngāi Tahu Mitigation Agreement was reached in 2002, capturing the issues important to Iwi and establishing a financial contribution for the resource support needed. Elements included enhancement of mahinga kai, a catchment plan, mapping of particular sites (Nohoanga - land traditionally providing a place to sit during the seasonal travels inland for resources), education packages, and scholarships. The 2002 agreement was conditional on consents being granted, and so was active in 2007 but experienced some delays in action delivery.</p> <p>The Mata-au Trust Deed was signed in 2018 which refreshed the commitments, updated financial values, and created a platform for delivery.</p>	Measures to address ongoing or emerging issues that may affect Indigenous Peoples' rights at risk have been developed with the free, prior and informed participation of Indigenous Peoples	<p>✓</p> <p>All measures to address ongoing or emerging issues that may affect Iwi rights at risk have been developed with the free, prior and informed participation of the Papatipu Rūnanga of the Clutha/Mata-au.</p>
Formal agreements are publicly disclosed	<p>✓</p> <p>Yes, as appropriate. Mata-au trust is a registered charitable Trust within the public domain (https://opencorporates.com/companies/nz/9429047762497)</p>	Processes are in place to anticipate and respond to	<p>✓</p> <p>The trustees have recently been updated, with Contact Energy employing a tangata whenua (people of the land, i.e., Māori of Aotearoa) specialist, who has assumed the role as Contact's representative</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
			emerging risks and opportunities		Trustee. Contact Energy is seeking ways to support the trust such as providing project management resource to accelerate the Trust's activities.
CONFORMANCE AND COMPLIANCE					
Processes and objectives relating to Indigenous Peoples' rights at risk have been and are on track to be met with:			There are no non-compliances	✓	There are no non-compliances.
• no major non-compliances	✓	There are no major non-compliances.			
• no major non-conformances	✓	There are no major non-conformances.			
Commitments made to Indigenous Peoples have been or are on track to be met	✓	Contact Energy had provisioned its financial commitments and has been doing work that relates to what matters most to the Iwi, but has been careful that the Trust Fund is complementing / extending the consents work.	There are no non-conformances	✓	There are no non-conformances.
OUTCOMES					
Processes provide for negative impacts of the project to Indigenous Peoples' rights to be avoided, minimised, mitigated or compensated	✓	Negative impacts have been addressed through the consent condition framework and the mitigation agreement.	Opportunities for positive impacts have been identified and maximised as far as practicable	✗	This criterion is not met at present. Past efforts to operationalise the Trust and gain momentum have struggled. However the recent change of Trustees and opportunities for future collaboration on native fish passage are areas for positive impact. It is hoped the opportunities will be maximised going forward.
Processes provide some practicable	✓	Murihiku Regeneration is an example of a forward-looking formalised partnership agreement, joined as of February 2020. It is a	Opportunities for positive impacts have been or are	✗	This criterion is not met at present. While the Murihiku relationship is in place there is still a need with Runaka to establish a

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
opportunities for positive impacts to be achieved	commercial level relationship looking at partnering with Iwi to best identify and achieve socio-economic aspirations. Through the Murihiku Regeneration, tangata whenua (people of the Land) metrics are being developed to articulate short, medium and long-term positive aspirations.	on track to be achieved	partnership through a mana to mana relationship formalised through an agreement that recognises the authority of relevant runaka leaders and enables regular discussion with Contact leadership. The agreement is in the design and negotiation phase, and is viewed as a critical step towards positive impacts.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1.No significant gaps identified ● 2. 	6 of 8

Summary of findings and other notable issues
<p>The affected people include Indigenous Peoples of the south island of New Zealand. Māori are the Indigenous Peoples of Aotearoa New Zealand, and Iwi are tribes of Māori from the founding peoples, . Ngāi Tahu are the biggest Iwi of the South Island. The shared Papatipu Rūnanga (constituent areas of the Ngāi tahu) for the Mata-au/Clutha catchment were identified in the 2000 Cultural Impact Assessment. The Ngāi Tahu Mitigation Agreement was reached in 2002, and the Mata-au Trust was signed in 2018. Important Iwi groups represented on the Trust are: Aukaha (the consenting agency representing the four northern Rūnanga); and Te Ao Mārama Inc (TAMI, the consenting agency representing the three southern Rūnanga). Of high importance to the Iwi is the right to mahinga kai (“to work the food”), to Nohoanga sites (land traditionally providing a place to sit during the seasonal travels inland for resources), education packages, and scholarships. The trustees have recently been updated, with Contact Energy employing a tangata whenua (people of the land, i.e., Māori of Aotearoa) specialist to manage and grow the relationship and represent Contact Energy as its trustee. Particular areas for future collaboration are in relation to native fish passage and a partnership relationship agreement through a mana to mana high level agreement . Whilst all minimum HSS requirements are met, there are a few gaps against the advanced requirements under the Outcomes area, as these are reliant on a number of present initiatives coming to fruition.</p>

Relevant evidence	
Interview	10, 13, 14, 22
Document	43, 72, 96, 125, 126, 130, 145, 146, 147, 151, 157
Photo	7, 8, 9



8 Cultural Heritage

Scope and Principle	
<p>This section addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The principle is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance. This section does not address non-physical cultural resources, which are addressed in Section 1 and/or in Sections 5 and 7 when relevant.</p>	
Background	
<p>Does the project affect any physical cultural resources? Please state the evidence on which this determination is made.</p>	
<p>Yes, this section is relevant</p>	<p>Central Otago was an important focus of activity from the earliest decades of Polynesian settlement in New Zealand. In the 1860s gold was discovered in the Clutha River, starting the Dunstan gold rush, and with follow-up finds at the turn of the century. The 1862 gold rush resulted in spectacular growth to the town of Cromwell (then called Junction), seeing ten pubs built and supporting a population estimated at 10,000.</p> <p>With development of the Clyde Dam and inundation of the shopping centre, affected retail outlets were moved to a new town centre including new commercial and civil amenities. Care was taken with the archaeological studies and in providing for community, recreational and visual amenities.</p>
<p>No, this section is not relevant</p>	<p>Click here to enter text.</p>
<p>Sites of physical cultural heritage affected by or in proximity to the project-affected areas</p>	<p>How they are affected</p>
<p>22 archaeological sites were identified by the 2010 study to be within or very close to the zone of potential effects from Contact’s hydro generation activities. Some examples of affected areas include:</p> <ul style="list-style-type: none"> • Lake Hāwea e.g Manuhaea - flooding of the Pa site • Lake Dunstan e.g. Chinese settlements, archaeology 	<p>The application for Resource Consents and Assessment of Environmental Effects in March 2001 provided a fresh look at heritage impacts of the Clutha / Mata-au hydro projects. In May 2007, Contact Energy Ltd was granted resource consents to allow the continued operation of the Hāwea, Clyde and Roxburgh dams. The 2010 Archaeological Survey and Management Plan sets out sites considered to be of heritage value. The consents expire in May 2042.</p>
<p>Agencies responsible for cultural heritage</p>	<p>Heritage New Zealand NZ Archaeological Association</p>
<p>Other important local or regional cultural heritage values and issues</p>	<p>Click here to enter text.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging cultural heritage issues with respect to physical cultural resources have been identified	✓ The Baseline Survey & Management Plan was prepared in 2010 by Southern Pacific Archaeological Research, University of Otago, on behalf of the New Zealand Historic Places Trust. The Plan identified twenty-two sites that lie within the zone of land that has the potential to be affected by Contact’s consented activities. Of these 22 sites, ten sites were previously unrecorded.		Of the 22 sites in the 200 study, an Archaeological Site Monitoring Form is used for future monitoring of the sites. The form documents site details, condition, and threats; management recommendations; and actions undertaken, including a photographic record.
If management measures are required, then monitoring is being undertaken to assess if management measures are effective.	✓ The resource consents require Contact to: <ul style="list-style-type: none"> undertake a baseline survey of archaeological sites to record the location, nature and condition of archaeological sites and to identify any risks to their integrity; develop a Management Plan for archaeological sites identified in the baseline survey. The Plan also assesses the significance and degree of risk to at-risk sites; implement the Management Plan; and monitor the sites at intervals of no more than once every three years (unless otherwise agreed). Monitoring has been undertaken on a regular basis.	Identification of ongoing or emerging cultural heritage issues takes broad considerations into account, and both risks and opportunities	✓ Twelve sites were identified as currently being affected by water erosion, and a further nine sites were flagged as in danger of being affected in the future. Broader considerations and both risks and opportunities are considered via erosion monitoring, the relationships of Contact Energy with Old Cromwell Town Inc., and the landscape and visual amenity initiatives at all 3 lakes including relationships supporting these. Also relevant is the Cultural Impact Assessment on the Clutha/Mata-au Catchment in 2000; and the Mata-au Trust Agreement and Trust Deed and the mana to mana agreement concept.
MANAGEMENT			
Measures are in place to manage identified cultural heritage issues	✓ Of the seven sites out of 22 assessed in the 2010 report as being of high significance, the majority simply require monitoring. Only two, G43/18 and G42/312, required any active management. G43/18, Mrs Heron’s	Processes are in place to anticipate and respond to emerging risks and opportunities	✓ Processes to anticipate and respond to emerging risks and opportunities include: <ul style="list-style-type: none"> The existence of long-standing guardian associations for each of the 3 lakes with resource consents.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		Cottage, required stabilisation of its eroding bank, and G42/312, the bridle track that runs along the true left side of Lake Roxburgh, required monitoring and stabilisation. All measures identified in the Baseline Survey & Management Plan have been undertaken.			<ul style="list-style-type: none"> • Good relations with local councils and local groups, and notably with Old Cromwell Town Inc. • The involvement of Heritage NZ. • The ability to review any consent conditions any time.
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage cultural heritage issues have been and are on track to be met with:			There are no non-compliances	✗	A low-risk non-compliance was identified in the most recent compliance audit, being the Hāwea Dam Archaeological Survey was passed its due date of May 2020 and not yet received by ORC.
• no major non-compliances	✓	There are no major non-compliances as confirmed by the annual compliance reports to the Otago Regional Council.			
• no major non-conformances	✓	There are no major non-conformances.	There are no non-conformances	✓	There are no non-conformances.
Cultural heritage related commitments have been or are on track to be met	✓	Cultural heritage related commitments are on track to be met.			
OUTCOMES					
Negative cultural heritage impacts arising from activities of the operating hydropower facility are avoided, minimised, mitigated and compensated	✓	<p>According to the July 2023 monitoring report, the sites showed very little change in comparison to previous recorded observations, and all negative impacts from hydropower operations are addressed.</p> <p>In general, the remote sites have less evidence of human activity and associated damage, however these areas are dominated by woody weeds such as gorse and lupins.</p> <p>The huts at site G41/619 were in reasonable condition, potentially due to the location which is very unlikely to be visited by the public on a regular basis.</p>	Where opportunities have been identified, measures to address cultural heritage issues beyond those impacts caused by the facility have been or are on track to be achieved	✓	<p>Contact Energy maintains good relations with local groups. Out of these relations, several opportunities have identified and have been acted on:</p> <ul style="list-style-type: none"> • Historical signage at The Neck and at Johns Creek at Lake Hāwea; • Providing an ANZAC wreath at the memorial at Lake Hāwea; • Providing additional erosion protection around the point near Old Cromwell Town Inc. to protect the Renhaus building;

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	Other sites are at much higher risk of human impact have signage signalling 'Heritage Area'. For example, G41/618 located just below the Lake Dunstan Cycle Trail, had evidence of small foot tracks within the tailings. Many of these types of areas feature signage signalling 'Heritage Area' where necessary along the track.		<ul style="list-style-type: none"> Establishing a gold-miner headstone along Lake Dunstan; and Supporting the Lake Dunstan cycle trail, including contributing information on multiple signs along the route.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> 1. No significant gaps identified 2. ... 	4 of 5

Summary of findings and other notable issues
<p>Cultural heritage relating to the Mata-au/Clutha hydropower is largely about artefacts of historical development (e.g., the Dunstan gold rush), and relicts of old Cromwell that were inundated with development of the Clyde Dam. The application for Resource Consents and Assessment of Environmental Effects in March 2001 provided a fresh look at heritage impacts of the Clutha / Mata-au hydro projects. A Baseline Survey & Management Plan was prepared in 2010 and identified twenty-two sites that lie within the zone of land that has the potential to be affected by Contact's consented activities. The resource consents require Contact to: undertake a baseline survey of archaeological sites to record the location, nature and condition of archaeological sites and to identify any risks to their integrity; develop a Management Plan for archaeological sites identified in the baseline survey; implement the Management Plan; and monitor the sites at intervals of no more than once every three years (unless otherwise agreed). According to the July 2023 monitoring report, the sites showed very little change in comparison to previous recorded observations, and all negative impacts from hydropower operations are addressed. All HSS requirements are met, other than one advanced requirement relating to a minor non-compliance with a consent requirement.</p>

Relevant evidence	
Interview	10, 13
Document	12, 33, 35, 36, 43, 44, 53, 79, 97, 142, 146, 148, 164, 171, 180, 181, 191
Photo	10, 11, 12



9 Governance and Procurement

Scope and Principle	
<p>This section addresses corporate and external governance considerations for the operating hydropower facility. The principle is that the owner/operator has sound corporate business structures, policies and practices; addresses transparency, integrity and accountability issues; can manage external governance issues (e.g. institutional capacity shortfalls, political risks including transboundary issues, public sector corruption risks); and can ensure compliance.</p>	
Background	
<p>Key information on political context and public sector risks</p>	<p>Political Context:</p> <ul style="list-style-type: none"> • Renewable Energy Transition: New Zealand's government has been pushing for a transition to renewable energy sources. • Regulation: The electricity sector in New Zealand is subject to various regulatory frameworks. The Electricity Authority (EA) is responsible for ensuring a competitive, reliable, and efficient electricity industry. Regulations could affect pricing, market entry, and operations. • Climate Change Response: New Zealand has committed to the Paris Agreement and has set targets for reducing greenhouse gas emissions. <p>Public Sector Risks:</p> <ul style="list-style-type: none"> • Regulatory Changes: Any changes in the regulatory framework could impact Contact Energy's operations, profitability, and strategic direction. For instance, changes in tariff regulations or grid access could affect revenues. • Public Opposition: There is a risk of public opposition if Contact's operations impact or are perceived to impact stakeholders. • Infrastructure Dependency: Contact relies on the national grid. Any disruptions or changes in infrastructure policy can affect operations.
<p>Key information on corporate ownership and governance</p>	<p>Ownership</p> <p>Contact Energy is one of the largest publicly traded companies in New Zealand. Its shares are listed on the New Zealand Stock Exchange (NZX) and the Australian Securities Exchange (ASX). The ownership of Contact Energy is distributed among institutional investors, retail shareholders, and other entities. Historically, one of Contact Energy's significant shareholders was Origin Energy, an Australian energy company.</p> <p>Governance:</p> <p>Contact Energy's governance is overseen by its board of directors. The Board is responsible for the strategic direction of the company, ensuring corporate accountability, and overseeing management's performance. The Board consists of a mix of independent and non-independent directors, each bringing a range of skills, experience, and expertise.</p>

	There are several board committees, including: an Audit and Risk Committee; Remuneration Committee; and Health, Safety, and Environment Committee. Each committee has specific responsibilities and is typically comprised of several board members. Contact adheres to the NZX Corporate Governance Code and has its own set of corporate governance documents, including the Board Charter, Code of Conduct, and various policies related to risk management, diversity, and securities trading, among others. Day-to-day operations are managed by the executive team, led by the Chief Executive Officer (CEO). The executive team is responsible for implementing the strategies set by the Board and managing the company's operations across various functions.
Details of the concession, if applicable	N/A
Key licenses or permits	Hāwea, Roxburgh, and Clyde were operational before the introduction of the Resource Management Act of 1991 (RMA). They were given provisional RMA resource consents that lapsed in 2001 and 2003. New RMA consents were applied for in 2001 and approved in 2007, remaining valid until 2042. The Otago Regional Council has the discretion to reassess the consent terms every five years to mitigate environmental impact, employ the best feasible methods, and ascertain the efficacy of the existing conditions.
Other relevant information	

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging political and public sector governance issues have been identified	✓ Contact has a team responsible for 'Public Sector and Regulatory Affairs'. The team monitors potential shifts in the public sector and regulatory environment. Their engagement strategy comprises maintaining a register of public sector stakeholders and convening periodic meetings. In parallel, the project level environmental units collaborate with local governmental bodies to keep abreast of changes to consent requirements or evolving community demands. Routine risk evaluations are compared with the board's accepted risk threshold. These assessments are revisited tri-annually and are linked to structured mitigation strategies. Current risks identified include: the forthcoming general elections and anticipated amendments	There are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate governance requirements and issues	✓ Within Contact's corporate governance framework, there was an opportunity to standardise risk identification methodologies. Notably, the asset maintenance division employed a sophisticated, dedicated system for risk reporting. In 2023 the Risk and Business Assurance team introduced processes to ensure Contact has a cohesive, company-wide system (including the use of Cintellate) to enhance uniformity in risk assessment and reporting. Such harmonisation should bolster the risk identification across various business units.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	to the Resource Management Act; and potential adherence to discretionary consumer care norms, which might transition to being obligatory in the future.		
Corporate governance requirements and issues have been identified	✓ Contact's Finance and Risk team continually evaluates prospective corporate governance challenges. Reviews are commissioned by the Audit and Risk Committee, focusing on risk areas such as climate change, stakeholder engagement, and Business Continuity Planning (BCP). This unit promotes best practices in risk management across the organisation and offers targeted support to teams requiring improvement. Structured risk workshops are conducted with business divisions to assess operational risks. Annually, a compilation of key risks is presented to the risk oversight committee. Contact uses an internal risk registry to document all risks, with appropriate controls and mitigation to be implemented. One of the current business risks being considered regards revision of the consents for the hydropower assets. This then drives ongoing dialogue with local communities to pre-empt and counteract potential constraints.		
Monitoring is being undertaken to assess if corporate governance measures are effective	✓ Within Contact's corporate governance framework, there is a multi-tiered oversight mechanism in place to review the effectiveness of operational measures. This includes both internal evaluations and independent external scrutiny. Accredited third parties conduct		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>periodic audits to review Contact's adherence to international standards: ISO 9001 (Quality Management Systems), ISO 14001 (Environmental Management Systems), ISO 55001 (Asset Management Systems), and ISO 7901 (concerning Public Safety). Business resilience and modern slavery governance protocols also undergo audit procedures. The Sustainability team presents its findings and progress to the board on a quarterly cycle. The cadence varies when interfacing with the Health, Safety, Environment Committee and the Audit and Risk Committee. A non-compliance ledger captures any issues observed during these assessments.</p>		
MANAGEMENT			
Processes are in place to manage the following:			
<ul style="list-style-type: none"> corporate, political and public sector risks 	<p>✓ Contact uses a range of risk management mechanisms to oversee identified challenges. A range of committees formulate strategy to deal with emerging issues, including the Health, Safety, Environment Committee and Audit and Risk Committee that meet quarterly. The People Committee focuses on performance, remuneration, people-related aspects. At the granular level, an asset management system is utilised, and the Cintellate Risk module logs incidents and observations, subsequently generating action items and directives.</p>	<p>Processes are in place to anticipate and respond to emerging risks and opportunities</p>	<p>✓ To addressing macro-level issues that require transformative measures, Contact uses a strategic management tool 'Mau taniwha', (loosely translates as 'holding the beast'). This system manages operational and capital outlays, including aspects like IT and legal resource distribution. It identifies key projects and their associated risks. Projects are evaluated against resource limitations, and only those meeting a predefined significance benchmark go ahead. The objective is to expedite high-impact initiatives, ensuring all efforts align with Contact's business strategy.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
• compliance	✓ A range of processes guide ongoing compliance. All actions and compliance mechanisms are aligned with the broader organisational strategy. The senior management reports to the board every quarter, focusing on performance measures. This offers a regular check-in mechanism to ensure alignment with previous commitments to the board. The Audit and Risk Committee and the Health, Safety, and Environment Committee both meet quarterly to ensure regular visibility and critique of compliance requirements. Any instances of non-compliance or breaches are logged.		
• social and environmental responsibility	✓ Environmental and social responsibility is managed using the systems described above. Contact is moving towards an integrated work program within sustainability, aiming for consistent planning across functions. In recent years there has been an evolution in the board's expectations, focusing more on community engagement, understanding indigenous community landscapes, and their roles and responsibilities towards these communities. They frequently review the company's strategy and alignment towards sustainability.		
• procurement of goods and services	✓ Within Contact's procurement framework, any transaction greater than \$100,000 requires a structured tendering procedure. As part of this process, bidders receive the Contact Energy Code of Conduct, a Sustainability Procurement Overview, and a specific Sustainability Assessment. The sustainability protocols dictate	Contractors are required to meet or have consistent policies as the developer	✓ The procurement processes drive Contractors to have consistent policies with Contact. In some cases, Contact may engage with small local businesses that may not have all required operational procedures. In these instances, Contact might request use of internal procedures or require commitments from

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>that suppliers actively mitigate environmental impacts and align with the company’s plans and processes. The Ethical Procurement Assessment obliges contractors to recognise and align their policies with Contact’s. Contact offers guidance to contractors on tools available to fulfil specific requirements e.g., GHG calculations.</p> <p>Contact is in the process of integrating an E-procurement solution designed to streamline existing operations. This system will facilitate surveys, enhance data collection, refine bid evaluation, and improve procurement efficacy and documentation.</p>		<p>bidders geared towards performance enhancement, such as elevating employee remuneration to reflect the living rather than minimum wage.</p>
<ul style="list-style-type: none"> grievance mechanisms 	<p>✓</p> <p>Current grievance channels in the public domain are predominantly through community relations. Other avenues include the official website's contact form and a direct 0800 helpline. Internal channels include a confidential whistle-blower system. Alongside this formal approach, there are less structured channels for staff to report issues through line management.</p> <p>All grievances should be recorded in the Cintellate system. Many grievances are resolved informally before being recorded, but this is not considered a significant gap.</p> <p>Depending on the nature and gravity, complaints might demand technical insights and, in critical instances, may escalate to the board's attention.</p>		
<ul style="list-style-type: none"> ethical business practices 	<p>✓</p> <p>Contact has many policies to guide ethical business practice, including:</p>		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<ul style="list-style-type: none"> • Code of Conduct • Supplier Code of Conduct • Inclusion and Diversity Policy • External Audit Independence Policy • Market Disclosure Policy • Remuneration Policy • Risk Management Policy • Securities Trading Policy • Whistleblowing Policy • Anti-bribery and Corruption Policy • Competition and Consumer Law Policy • Confidentiality and Privacy Policy • Discrimination Bullying and Harassment Prevention Policy • Human Rights Policy • Conflict of Interest Policy • Modern Slavery Statement FY23 • Stakeholder Engagement Policy • Health and Safety Policy • Wellbeing Policy • Environment Policy <p>These policies are reviewed and reported to on a regular basis, driven in part by stock exchange requirements.</p>		
<ul style="list-style-type: none"> • transparency 	✓ Contact is dual listed on both the Australian Stock Exchange (ASX) and the New Zealand Stock Exchange (NZX), with associated public disclosure mandates. The annual Integrated Report provides analysis of company operations, reflecting a commitment to transparency. Contact disseminates a monthly	Procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening	✓ Contact has an Anti-Bribery and Corruption Policy, which forms a compliance requirement for all contractors. The tender questionnaire pack also includes anti-corruption screening questions. Prior to finalising contracts, Contact completes a counterparty risk assessment into the legal backgrounds of prospective vendors,

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	operating report, providing operational data to meet the specific informational needs of the investment community. Contact will make most project reports available on request, however, could make more effort to communicate to its stakeholders that reports exist, to facilitate such requests.		including any prior engagements in bribery and corrupt practices. Any procurement involving overseas entities is subjected to an additional tax and treasury examination.
Policies and processes are communicated internally and externally as appropriate	✓ All policies listed above are publicly available on Contact's website.		
In case of capacity shortfalls, appropriate external expertise is contracted for additional support	✓ Recognising internal capacity constraints, Contact occasionally collaborates with external experts. For instance, McKinsey played a crucial role in strategy formation in 2021 under the "Contact 26" initiative. Contact also use the Big Four accounting firms and engineering consultancies for specific tasks, both internal and client-facing.		
CONFORMANCE AND COMPLIANCE			
The project has no major non-compliances	✓ The projects have no major non-compliances. Contact report that the last major non-compliance was in 2019, at Wairakei Geothermal Power Station where a technical malfunction of the reinjection system caused geothermal fluid to be redirected to a storage pond.	The project has no non-compliances	✗ There have been a range of low risk non compliances over several topics mentioned here as they indicate the governance processes are not working flawlessly. Issues include (but not limited to): <ul style="list-style-type: none"> Variation in flows outside of the consent conditions (refer to Topic 11: Hydrological resource) Late delivery of the Landscape and Visual Amenity Management Plan (LVAMP) for the

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			Kawarau Arm of Lake Dunstan (refer to Topic 3: Water) <ul style="list-style-type: none"> The 2023 bathometric monitoring of the Bannockburn inlet revealed that the consent conditions have been exceeded (refer to Topic 3: Water)
OUTCOMES			
There are no significant unresolved corporate and external governance issues identified	✓. This review has not identified any significant unresolved corporate and external governance issues.	There are no unresolved corporate and external governance issues identified	✗ <p>Whilst there are no significant governance issues, areas to improve corporate governance include:</p> <ul style="list-style-type: none"> Enhancing mechanisms to ensure strict adherence to consent requirements, mitigating any potential non-compliance. Instituting robust communication and consultation frameworks to eliminate reliance on individual personnel. Harmonising risk identification methodologies across various departmental contacts.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> 1. No significant gaps identified 2. ... 	4 of 6

Summary of findings and other notable issues
Ongoing or emerging political and public sector governance issues are identified by the Public Sector and Regulatory Affairs team. The Finance and Risk team continually evaluates prospective corporate governance challenges. Monitoring is undertaken to assess whether corporate governance measures are effective through internal evaluations and independent external scrutiny. Accredited third parties conduct periodic audits to review Contact's adherence to international

standards. Identified corporate, political, and public sector risks are managed through a range of board committees, which formulate strategy and delegate actions. Policies and processes are communicated internally and externally as appropriate, with most relevant documents available on the website. In case of capacity shortfalls, appropriate external expertise is contracted for additional support, for example in strategy formation in 2021 under the Contact 26 initiative. The project has no major non-compliances, and there are no significant unresolved corporate and external governance issues identified by this review.

Relevant evidence	
Interview	1, 2, 3, 4, 5, 6, 7, 12, 16, 17, 21
Document	43, 63, 92, 93, 94, 99, 112, 114, 120, 121, 128, 137, 163, 166, 175, 187, 192
Photo	1, 2, 3, 4, 5, 6, 7, 12, 16, 17, 21



10 Communications and Consultation

Scope and Principle	
<p>This section addresses ongoing engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The principle is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life.</p>	
Background	
<p>Directly affected community-level stakeholders</p>	<p>Directly-affected stakeholders and stakeholder groups include:</p> <ul style="list-style-type: none"> • Lake Hāwea Stakeholder Forum • Lake Hāwea Guardians • Hāwea Community Association • Upper Clutha Lakes Trust • Lake Dunstan Charitable Trust (LDCT) • Keep Alexandra Clyde Beautiful • Central Otago Waterski Club • Otago Harbour Master • Upper Clutha Wilding Tree Group • Guardians of Lake Wānaka • Manuherekia Catchment Group • Central Otago Environmental Society • Old Cromwell Heritage Precinct Group • Mōkihi Reforestation Trust • WAI Wānaka • Central Otago Whitewater Association • Water consent holders (multiple) • Kawarau Arm water users (multiple) • Lake Dunstan easement holders (multiple) • Lake Hāwea easement holders (multiple) • Hāwea-Dunstan easement holders (multiple) • Lake Roxburgh easement holders (multiple) • Bannockburn residents

	<ul style="list-style-type: none"> • Queenstown Central Otago Trail Network Trust • Various catchment groups, irrigation societies, educational and other groups involved when relevant
Directly affected institutional stakeholders	<p>Directly affected institutional stakeholders and stakeholder groups include:</p> <ul style="list-style-type: none"> • Aukaha- the consenting agency representing the four northern Rūnanga on the Mata-au trust • Te Ao Mārama Inc (TAMI) - the consenting agency representing the three southern Rūnanga on the Mata-au trust • Central Otago District Council (CODC) • Queenstown Lakes District Council (QLDC) • Cromwell Community Board • Otago Regional Council (ORC) – Regulator, Planner and Compliance • Fish and Game (Otago Council) • Department of Conservation (DOC) • Land Information New Zealand (LINZ) • National Institute of Water and Atmospheric Research (NIWA)
Other relevant information	<p>Iwi engagement groups additional to those stated above include:</p> <ul style="list-style-type: none"> • Ōraka Aparima Rūnaka • Waihōpai Rūnaka • Awarua Rūnaka • Hokonui Rūnaka • Manuhaea Ahuwhenua Trust • Ōtākou Rūnaka • Puketeraki Rūnaka • Te Tapu o Tāne

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging issues relating to hydropower facility communications and	✓ Contact Energy has two dedicated roles that ensure ongoing or emerging issues relating to the projects are well-identified. These are predominately the community relations role and the environmental advisor. Where necessary	The stakeholder mapping takes broad considerations into account	✓ The Hydro Stakeholder Mapping considers each stakeholder organisation, the primary contact, the site and issue grouping, contact details and preferred method of contact, responsibility within Contact Energy as well as supporting personnel if

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
consultation have been identified	<p>expertise is also utilised within the engineering/dam safety team.</p> <p>Issues identified include:</p> <ul style="list-style-type: none"> • Lake levels and discharges; • Lagarosiphon (Lagarosiphon major) - an aggressive introduced water weed that forms dense mats and spreads rapidly from plant fragments. • Accumulations of floating debris after floods; • Passage of native fish species (eels and lamprey); • Water availability via irrigation schemes and/or direct off-takes; • Sport-fish management, including a salmon hatchery; • Terrestrial weed species management, including removal of wilding pines and replanting with natives; • Recreational uses (boat ramps, swimming, white-water kayaking, fishing, boating, cycling, jet-boating, water-skiing, rowing); • Camping and picnic facilities; • Cultural heritage; • Landslide protection; • The patterns and delivery of sediments coming out of the Shotover River, sediment flushing operations, erosion, and coastal changes; • Flooding concerns and preparedness (e.g. at Alexandra); • Sponsorships (Alexandra Blossom Festival, Contact Epic Race); • Dam open days and school visits. 		<p>required; and an assigned tier (Tier 1 - influential - requires active communication; Tier 2 - medium - have an interest but not directly affected - require responsive communication; and Tier 3 - fairly neutral - kept informed as required).</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Requirements and approaches are determined through a periodically updated assessment process involving stakeholder mapping	✓ Contact Energy recently (May 2023) undertook a Stakeholder Engagement Model Review.		
Effectiveness is monitored	✓ The effectiveness of monitoring is informally monitored by the community liaison staff ensuring no issues are escalated. There is oversight of key issues by the Board Health, Safety and Environment Committee.		
MANAGEMENT			
Communications and consultation plans and processes are in place to manage communications and engagement with stakeholders	✓ Communications and consultation plans and processes are in place, with key documents including: <ul style="list-style-type: none"> • Contact Stakeholder Engagement Policy – June 2022 • Hydro Stakeholder Mapping - Master • Clyde Community Engagement Plan June 2022 	Communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics	✓ A high level of sensitivity is shown to Iwi consultation needs, led by Contact Energy’s employment of a tangata whenua (people of the land, i.e, Māori of Aotearoa) specialist, and development of a mana to mana relationship agreement to assist communications going forward. Contact also employed consultants to assist in managing the Kawarau Arm workshops. A Clyde Sports Fishing Mitigation Trust was agreed with Fish and Game to assist in regular communications.
They include an appropriate grievance mechanism	✓ Community liaison staff receive grievances when in the community, often quickly and informally resolving issues. Any major community issues are picked up in HSE papers, and significant issues go into Cintellate. There are mechanisms and escalation pathways that can be activated, such as community members engaging directly with	Processes are in place to anticipate and respond to emerging risks and opportunities	✗ The two community facing Hydro staff together share issues and opportunities and meet monthly to ensure coordination. Contact Energy is establishing Community Practice groups internally. Community development work undertaken by the CODC shows that people value the environment, recreation, open spaces where people can congregate and

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		regulators (the ORC), but at present the direct lines of engagement with Contact Energy appear effective.			recreate. Projects and initiatives supported by Contact Energy support these values by visibly supporting well-being activities and places. A significant gap at advanced requirements is that the processes in place are individual resource-dependent, and if one person were to leave there would be a lot of relationship gaps that would take some time to fill.
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The Hydro Stakeholder Mapping identifies all key stakeholder groups by topic, the contact details and engagement preferences, and the responsible person within Contact Energy.			
STAKEHOLDER ENGAGEMENT					
The project operation stage involves engagement with directly affected stakeholders	✓	Regular engagements include: <ul style="list-style-type: none"> • Meetings of and in support of the Mata-au Trust; • Meetings of the Lake Hāwea Stakeholder Group, and monthly meetings of the Lake Hāwea Community Association; • Monthly meetings of Contact Energy and LINZ, and with Boffa Miskell the consultancy doing the aquatic weed management; • Regular meetings with DOC, ~ monthly, with a formal annual meeting; • An annual meeting with all fish stakeholders at Dunedin; • As needed with the ORC. 	Engagement is inclusive and participatory	✓	Engagement on key operating issues has been via the ORC Resource Consent Framework. The community was highly involved, and significant issues have management plans. Any engagement requirement associated with consent conditions are outlined in the consent, such as engagement on the operationally focused Landscape and Visual Amenity Plans (LVAMPs). For all three of these plans, Contact Energy has engaged a professional landscape architect. If the consent is not clear, Contact Energy has sought clarity via the ORC (e.g. Bannockburn Inlet). The Kawarau Arm Community Project is Contact Energy’s own capital investment initiative focussed on sediments, in response to community pressures.
Engagement is:					
• appropriately timed and scoped	✓	The consents process was appropriately timed and scoped. Further engagement appears to be appropriately timed and scoped.	Negotiations are undertaken in good faith	✓	Negotiations are undertaken in good faith, evident with regards to the LVAMPs.
• often two-way	✓	The consents process was often two-way. Further engagement appears to be often two-way.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• undertaken in good faith	✓	The consents process was undertaken in good faith. Further engagement appears to be undertaken in good faith.			
The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	Contact Energy interacts with the range of stakeholder groups listed in the background to this topic to understand issues of interest to them.	The assessment and management process for downstream flow regimes has involved appropriately timed and two-way engagement with directly affected stakeholders	✓	Downstream flow regimes were a focus of the consents process. Engagement was appropriately timed and two-way through this process.
Ongoing processes are in place for stakeholders to raise issues and get feedback	✓	Through its two dedicated roles, and participation in regular meetings, Contact Energy has ongoing processes for stakeholders to raise issues and get feedback. Contact will make use of local newsletters as needed to assist in local communications.	Ongoing processes are in place for stakeholders to raise issues with downstream flow regimes and get feedback	✓	Through engagement directly with the dedicated roles at Contact Energy, or through the Contact Energy 'Contact Us' details on its website (https://contact.co.nz/support/contact-us), or through the local council or Otago Regional Council, any stakeholder can raise issues with downstream flow regimes and get feedback.
Ongoing processes are in place for:			Feedback on how issues raised have been taken into consideration has been thorough and timely	✓	Through the consents process or direct contact with one of Contact Energy's two dedicated hydropower roles, feedback on how issues raised have been taken into consideration has been thorough and timely.
• environmental and social issues	✓	Anyone can raise issues through one of Contact's two dedicated roles, through the Contact website, or via Council.			
• project-affected communities	✓	As above.	Project-affected communities have been involved in decision-making around relevant issues and options	✓	Through the consents process or direct contact with one of Contact Energy's two dedicated hydropower roles, project-affected communities have been involved in decision-making around relevant issues and options.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• resettles and host communities	✓	Not relevant	Resettles and host communities have been involved in decision-making around relevant issues and options	✓	N/A
• Indigenous Peoples	✓	Relations with the Iwi are the responsibility of Contact Energy’s tangata whenua (people of the land, i.e, Māori of Aotearoa) specialist.			
• employees and contractors on human resources and labour management issues	✓	Employees and contractors can liaise with the hydropower head or with one of the Contact Energy’s People business partners.			
• management of climate risks	✓	Climate change risks are reported on in the publicly available Integrated Report.			
Channels of communication with Indigenous Peoples are maintained	✓	Relations with the Iwi are the responsibility of Contact Energy’s tangata whenau specialist (Māori of Aotearoa),	Directly affected Indigenous Peoples have been involved in decision-making around relevant issues and options	✓	Directly affected Iwi, via the Trust representatives, have been involved in decision-making around relevant issues and options.
These channels are:					
• appropriately timed	✓	Channels of communication with Iwi are appropriately timed.			
• culturally appropriate	✓	Channels of communication with Iwi are culturally appropriate.			
• two-way	✓	Channels of communication with Iwi are two-way.			
A mutually-agreed disputes procedure is in place with Indigenous Peoples	✓	The Mata-au Trust has provisions for notice of meetings, quorum rules, validity of proceedings, committees, and resolutions.			
Public disclosure:			The business publicly reports on project performance in sustainability areas of	✗	Whilst performance regarding sustainability is given in the integrated and monthly operating reports, some stakeholders interviewed mentioned other areas of interest which they would appreciate more
• the business makes significant	✓	Some project reports are available on the Contact website, include the annual integrated report and monthly operating reports, which can be found			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
project reports publicly available		here: https://contact.co.nz/aboutus/investor-centre/reports-and-presentations#Operating-reports	high interest to its stakeholders		detailed public reporting, these included management of Lagarosiphon, reservoir debris, eel migration and sports fishing.
<ul style="list-style-type: none"> the business publicly reports on project performance, in some sustainability areas 	✓	Contact Energy publishes on several areas of interest to its stakeholders, including on ESG initiatives: https://contact.co.nz/aboutus/investor-centre/esg-reporting#Infrastructure			
<ul style="list-style-type: none"> power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment are publicly disclosed 	✓	The power density calculation is available on the Contact website: https://contact.co.nz/aboutus/investor-centre/esg-reporting#Water	The assessment of project resilience is publicly disclosed	✓	The 2023 Integrated report includes an assessment of climate resilience: https://indd.adobe.com/view/ef87476b-317c-4cb5-8c1b-1adcb3c55479
CONFORMANCE AND COMPLIANCE					
Processes and objectives relating to communications and consultation have been and are on track to be met with:			There are no non-compliances	✓	This review has not identified any non-compliances regarding communication and consultation.
<ul style="list-style-type: none"> no major non-compliances 	✓	This review has not identified any major non-compliances regarding communication and consultation.			
<ul style="list-style-type: none"> no major non-conformances 	✓	This review has not identified any major non-conformances regarding communication and consultation.	There are no non-conformances	✓	This review has not identified any non-conformances regarding communication and consultation
Communications related commitments have been or are on track to be met	✓	All communication and consultation commitments appear to be on track			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1.No significant gaps identified ● 2. ... 	13 of 15

Summary of findings and other notable issues

There is a wide array of stakeholders and stakeholder groups in relation to the Mata-au/Clutha hydro projects, and a wide range of issues that require management. Contact Energy has two dedicated roles that ensure ongoing or emerging issues relating to the projects are well-identified. These are predominately the community relations role and the environmental advisor. Where necessary, expertise is also utilised within the engineering/dam safety team. Communications and consultation plans and processes are in place, with key documents including the Contact Stakeholder Engagement Policy – June 2022; Hydro Stakeholder Mapping – Master; and the Clyde Community Engagement Plan June 2022. A high level of sensitivity is shown to Iwi consultation needs, led by Contact Energy’s employment of a tangata whenua (people of the land, i.e. Māori of Aotearoa) specialist, and development of a mana to mana relationship agreement to assist communications going forward. Whilst all minimum HSS requirements are met, a significant gap at advanced requirements is that the processes in place are individual resource-dependent, and if one person were to leave there would be a lot of relationship gaps that would take some time to fill. Contact publicly discloses a good range of information on its website; there are some project specific areas where stakeholders would like more information.

Relevant evidence	
Interview	10, 13, 15, 21, 22, 23, 24, 25, 26, 27, 29, 30
Document	25, 43, 49, 58, 59, 70, 72, 79, 82, 85, 87, 88, 89, 108, 122, 133, 139, 142, 143, 160, 167, 169, 171, 185, 186
Photo	13, 14, 15



11 Hydrological Resource

Scope and Principle

This section addresses hydrological resource availability and reliability, reservoir management, and downstream flow regimes in relation to the operating hydropower facility. The principle is that power generation planning and operations take into account hydrological resource availability and reliability in the short- and long-term, that the reservoir is well managed taking into account power generation operations, environmental and social management requirements, and multi-purpose uses where relevant, and that issues with respect to downstream flow regimes are identified and addressed.

Project name	Clyde	Roxburgh
Average flow at dam (m ³ / s)	509m ³ /s based on calculated inflow data at the dam data from 1992 to 2023.	524m ³ /s based on calculated inflow data at the dam data from 1965 to 2023.
Minimum monthly average flow (m ³ / s)	205m ³ /s based on calculated inflow data at the dam data from 1992 to 2023.	223m ³ /s based on calculated inflow data at the dam data from 1965 to 2023.
Maximum monthly average flow (m ³ / s)	1411m ³ /s based on calculated inflow data at the dam data from 1992 to 2023.	1516m ³ /s based on calculated inflow data at the dam data from 1965 to 2023.
Lowest observed flow (m ³ / s)	31m ³ /s based on measured flow data from Clutha at Clyde flow station data from 1959 to 2023	96m ³ /s based on measured flow data from Clutha at Roxburgh flow station data from 2001 to 2023
Highest observed flow (m ³ / s)	3450m ³ /s based on measured flow data from Clutha at Clyde flow station data from 1959 to 2023	3623m ³ /s based on calculated inflow data at the dam data from 1965 to 2023.
Design flow (m ³ / s)	Clyde 100 year inflow flood 2600m ³ /s Clyde 500 year inflow flood 3200m ³ /s	Roxburgh 100 year inflow flood 3000m ³ /s Roxburgh 500 year inflow flood 3600m ³ /s
Affected river reaches (start/end and how affected)	Upper Clutha Catchment, including the three large lakes of Wakatipu, Wānaka and Hāwea, only Hāwea has a controlled outflow, all other reaches are natural flow with no anthropogenic influence. Downstream there are three main tributaries into the Clutha, these are the Manuherekia, Pomahaka and Tuapeka. The river flows in the Clutha are affected by generation flows all the way to Balclutha at the coast.	
Proposed downstream flow regimes for environmental or social objectives	No minimum flow requirement, but a minimum discharge of 120m ³ /s must be discharged 1 hour after sunset and 1 hour before sunrise.	Minimum flow of 250m ³ /s

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging issues in the following areas have been identified:			
<ul style="list-style-type: none"> hydrological resource availability and reliability 	✓ Contact manages an internal Hydrological Database that contains data such as lake levels, power station discharges, gate discharges, and calculated lake inflows. The scope encompasses lake levels and inflows/outflows from nearby natural lakes in the Clutha catchment, including Wānaka and Wakatipu. Raw data from the power stations are used alongside data from NIWA, which includes metrics like rainfall, water levels, and air temperature. Some data sets, such as the levels of Hāwea, Wakatipu, and Wānaka lakes—as well as the mean flow of the Clutha river—date back to the 1930s.	Issues that may impact on water availability or reliability have been comprehensively identified	✓ Contact acknowledges that alterations in weather patterns and precipitation will affect the availability and reliability of operations. The New Zealand Dam Safety Hydrology Group, which includes Contact Energy, Genesis Energy, Manawa Energy, Mercury Energy, Meridian Energy, and Watercare Services Limited, has commenced a study on the Probable Maximum Precipitation (PMP). This study will address the following primary areas of focus: <ul style="list-style-type: none"> Automation and standardisation of the methodology described in the 'blue book'; Enhancements to several datasets that underpin the 'blue book' methodology; Incorporation of the effects of climate change on the PMP; and A funding proposal to tackle the necessary research for the creation and presentation of an advanced PMP estimator. In light of potential agricultural expansion in the Clutha Catchment, Contact foresees the ramifications of irrigation development on their energy generation. As a proactive measure, they commissioned a consultant in 2015 to scrutinise the Clutha river catchment irrigation. The aim was to discern the maximum conceivable influence of irrigation on water flow through Clyde and
<ul style="list-style-type: none"> reservoir management 	✓ The primary issues relevant to reservoir management have been documented in the AEE (Assessment of Effects on the Environment), conducted for the Resource Consent Application. Issues concerning shoreline erosion were highlighted for Lake Hāwea, as it has a broader operating range (approximately 10 metres) compared to both Lake Dunstan (1 metre) and Lake Roxburgh (1.85 metres). The creation of Lake Dunstan led to problems like sediment accumulation at the Kawarau arm, which is reverting to an alluvial river. Moreover, the Kawarau Arm is grappling with issues of Lagarosiphon and driftwood accumulation along the lake edge		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	near Old Cromwell Town. Sediment accumulation in Lake Roxburgh and gravel build-up at the Manuherekia River are known to intensify the flood risks for Alexandra town.		Roxburgh. The investigation produced estimates of water volume reductions at the Clyde and Roxburgh stations, covering both the probable and the absolute worst-case scenarios.
<ul style="list-style-type: none"> downstream flow regimes 	✓ Issues related to the downstream flow were addressed in the AEE. These include the necessity to ensure downstream discharges that cater to social flows, such as kayaking, surfing, and the duck season. The assessment also indicated that the spawning of trout and salmon redds would be compromised if water discharge wasn't upheld during the pertinent times of the year. The dams have become barriers to the migration of eels and lampreys. Contact has introduced trap and transfer techniques along with a fish ladder, however there remain uncertainty about the effectiveness of these methods.	Scenarios, uncertainties and risks for water availability and reliability are routinely and extensively evaluated over the short- and long-term	✓ Contact has a good understanding of various scenarios, uncertainties, and risks in the short term. Contact possesses ample information to evaluate water availability and reliability, including factors such as precipitation, temperature, and flow rates, among others. This understanding is also evident in their continuous forecasting efforts. Contact commissioned a detailed study on the impacts of climate change from NIWA. This initiative demonstrates a proactive approach to assessing long-term scenarios, uncertainties, and risks.
If management measures are required then monitoring is being undertaken to assess if management measures are effective:			
<ul style="list-style-type: none"> reservoir management 	✓ The conditions of the Resource Consents are monitored through the Annual Compliance Report submitted to the Regional and District Councils, as well as through the Compliance Audit conducted by the Otago Regional Council. Contact has allocated resources to monitor the measures required to fulfil both the commitments and the conditions of the Resource Consents.		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
• downstream flow regimes	✓ As above		
Monitoring is being undertaken of hydrological resource availability and reliability	✓ Contact engages a third-party consultant to process monthly primary data, such as datasets of station output, water levels, and gate operations, in conjunction with data from NIWA. They have implemented a robust monitoring programme to ensure quality-assured hydrometric data. Quarterly update reports are submitted to Contact to maintain an up-to-date database and guarantee the quality of the data.	Identification of ongoing or emerging reservoir management issues takes into account both risks and opportunities	✓ Contact engaged the services of a consultant, in collaboration with NIWA, to investigate long-term sediment management for the Clutha Catchment. They considered scenario modelling as well as sedimentation control strategies from other countries. The effects of climate change and seismic events were also examined. The study concluded that the risk of flooding beyond the easement lines is low and no further mitigation actions for private properties are necessary. Improvements to the Alexandra Clyde walkway were identified through this assessment to enhance escape routes under flood conditions.
Inputs to this monitoring include:		Issues identification relating to downstream flow regimes takes into account both risks and opportunities	✓ Contact actively oversees the downstream flow regime in accordance with the flows outlined in the Resource Consent, conducting regular monitoring and reporting. Although the Resource Consent includes a provision requiring Contact to consider interim flow requests from stakeholders, the decision to proceed is based on risks to generation as well as the ability to discharge in line with the commitment for that specific period.
• field measurements	✓ Contact collects data from their power stations and collaborates with NIWA to conduct field measurements for the 21	An assessment has been undertaken that includes identification of the flow ranges	✓ Contact manages the discharges within the Clutha River in accordance with the Resource Consents. These levels have been

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	stations installed for the Clutha. A Hydrological Report is submitted to Contact quarterly. Additionally, NIWA transmits the raw data to Contact Energy at hourly intervals.	and variability to achieve different environmental, social and economic objectives based on field studies as well as relevant scientific and other information	designed to meet ecological and social objectives through consultation with various stakeholders, including experts in the relevant fields.
• appropriate statistical indicators	✓ To process the data and analyse trends, appropriate statistical indicators are used. These include, among others, flow statistics which indicate the minimum, mean, median, and the 10% and 90% exceedance flows. The distribution of lake inflow and outflow is examined, along with the frequency analysis of high and low flows.		
• issues which may impact on water availability or reliability	✓ Contact tracks weather and inflow variability using daily hydrometeorological forecasts for all three dams.		
• a hydrological model	✓ Contact employs the Tribs Catchment flow model to proactively and consistently forecast inflows into the reservoirs and to monitor water availability.		
MANAGEMENT			
Measures are in place to guide generation operations that are based on:		Planning of generation operations has a long-term perspective	✓ Contact has incorporated two unused additional penstocks into the Clyde dam, which could accommodate additional turbines in the future. Contact possesses a comprehensive understanding of long-term hydrological resource availability, as demonstrated by a study conducted by NIWA that explored the climate change projections for Clutha Hydropower. The findings from these
• analysis of the hydrological resource availability	✓ Contact operates both Clyde and Roxburgh, which are downstream of Hāwea, as run-of-river projects. They are managed such that the outflow release closely matches the inflow as closely as possible. The Contact Hydrological Database provides the data used to determine the operating ranges. Given the		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	narrow operating range, both Roxburgh and Clyde function as run-of-river schemes. Contact employs the Tribs model, a catchment flow forecasting tool, to manage power generation activities. This model uses data from weather forecasts and installed monitoring sites to predict inflows to Lake Hāwea, Lake Dunstan, and Lake Roxburgh. The model is updated hourly.		studies are intended for future generation planning.
<ul style="list-style-type: none"> • a range of technical considerations 	✓ As described above, Contact uses real-time hydrological and meteorological data to actively inform the daily operations and power generation activities at the Clyde and Roxburgh stations. This encompasses the drawdown of lake levels, discharge, and the scheduling of maintenance and equipment testing. Contact Energy operates the Hāwea, Clyde, and Roxburgh dams in accordance with the terms specified in the Resource Consents, which outlines the permissible limits for both minimum and/or maximum consented flows/discharges, as well as lake levels.	Planning of generation operations fully optimises and maximises efficiency of water use	✓ Contact applied for a variation in the Resource Consent in 2007 which involved the increase of water take from Dunstan through the Clyde Dam from 850 cumecs to 1000 cumecs to enhance the water usage. Contact Dispatch Traders utilize weather forecasting for the upper Clutha Catchment with a 7 day outlook to plan for generation to fully optimize and maximise water use.
<ul style="list-style-type: none"> • an understanding of power system opportunities and constraints 	✓ Contact Energy traders dispatch the power generated from the plant based on several factors, including water availability and necessary Resource Consent commitments. Additionally, Contact predicts usage trends and participates in the regulated Wholesale Market, which is overseen by Transpower New Zealand, the entity responsible for managing the Grid and System Operation. A	Planning of generation operations has the flexibility to adapt to anticipate and adapt to future changes	✓ Contact ensures the operation of all three dams is governed by the conditions within the Resource Consents. Any adjustments or modifications to the operational conditions will necessitate a comprehensive review and consultation with the Regional Council and other stakeholders. The NIWA Climate Change projection, showed the likely increase in rainfall totals

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	comprehensive understanding of these factors enables Contact to optimise water use and power generation.		for Clyde and Roxburgh resulting in increased potential hydropower generation. There maybe is an opportunity to utilise the two unused penstocks for additional turbines. For the finding that extreme but rare rainfall events are likely to increase, this is deemed able to be managed through the review of operations of lake levels where required.
Measures are in place to manage identified reservoir management issues	<p>✓</p> <p>Contact operates the dams from the Clutha Control Centre located at the Clyde power station. Plant operations strictly adhere to the Clutha Catchment Manual, which outlines operations for conditions ranging from normal to pre-flooding. In the event of a flood, Contact implements the Site Emergency Response Plan (SERP), which provides flood management procedures further categorised into four levels, each corresponding to different flood inflow scenarios.</p> <p>Contact manages the debris and visual aspects of the Kawarau Arm through the Lake Visual Amenity Management Plan. Erosion issues at Hāwea are addressed through the Lake Hāwea Foreshore Landscape Management Plan, which includes measures such as placing rip-rap as control mechanisms.</p> <p>The heightened issue of flooding in Alexandra is primarily managed through the flushing mechanism of Lake Roxburgh during high</p>	Processes are in place to anticipate and respond to emerging risks and opportunities for reservoir management	<p>✓</p> <p>Contact maintains close liaison with stakeholders involved in reservoir management and downstream flow, such as the Otago Regional Council, District Councils, Land Information New Zealand, and the Department of Conservation. This interaction with stakeholders serves as a platform to identify emerging risks and opportunities.</p> <p>Contact has been granted rights pertaining to the reservoirs' easement, including storing and releasing water, taking and discharging. They will be consulted by the Otago Regional and District Councils regarding any plans related to reservoir activities that may affect them.</p> <p>The Resource Consents governs the operating limits of the lake levels, and the discharge limits can be reviewed every five years, either based on Contact's needs or if triggered by the Otago Regional Council.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>inflows. Additionally, there is a requirement for Contact to maintain the mean bed levels and thalweg levels from the confluence with Lake Roxburgh up to 1.5 km downstream of the Galloway bridge.</p> <p>In the case of the Kawarau Arm, Contact implements the Kawarau Landscape Visual Amenity Management Plan, which mandates the removal of driftwood and other water-borne debris to downstream areas during high flow events. Lagarosiphon removal is conducted in collaboration with LINZ (Land Information New Zealand) through the funding of the Aquatic Management Programme.</p> <p>Additionally, debris management, including the handling of log booms, is carried out at the power station intakes periodically to ensure uninterrupted operations.</p>		
Measures are in place to address identified downstream flow issues	<p>✓</p> <p>Contact primarily manages the identified downstream flow issues through the Clutha Catchment Manual, which details the various flow requirements for each hydropower project (e.g. minimum flow for kayakers, duck shooting season, etc.). Furthermore, a side agreement was signed between Contact, the New Zealand Recreational Canoeing Association Incorporated, and Central Otago Whitewater Incorporated. This agreement pertains to the construction and operation of whitewater</p>	Processes are in place to anticipate and respond to emerging risks and opportunities for downstream flow regimes	<p>✓</p> <p>As above</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	features and facilities to mitigate impacts on recreational users. Contact utilises both the Native Fish Management Plan and the Sport Fish Management Plan to address issues related to eel and lamprey migration and sports fishing, respectively. Trap and transfer programmes for eel and lamprey, as well as fish ladders, have been implemented.		
Where formal commitments have been made to downstream flow regimes, these are publicly disclosed	✓ Contact's main Clutha Consents outline the framework for the downstream flow regime. The discharge consents can be requested through the ORC by the public. Contact share the flood rules and the flood management plan with the Otago Regional Council, which are then publicly accessible and disclosed.	Commitments are made in relation to downstream flow regimes that include the flow objectives; the magnitude, range and variability of the flow regimes; the locations at which flows will be verified; and ongoing monitoring	✓ Contact's commitments regarding downstream flow are specified within the Resource Consents and involve measurements at specific locations. Contact reports its compliance annually to both the Otago Regional Council and District Councils. The Regional Council also monitors compliance through the Consent Compliance Audit.
CONFORMANCE AND COMPLIANCE			
Processes and objectives in place to manage each of the following have been and are on track to be met:		There are no non-compliances relating to:	
• reservoir management, with no major non-compliances	✓ There have not been any major non-compliances reported.	• reservoir management	✗ Low-risk non-compliances have been identified in reservoir management, such as two minor breaches of the Maximum Operating Level for Hāwea and Clyde Dam. Additionally, there's a moderate risk non-compliance concerning the lakebed monitoring not being supplied within the committed timeframe. These non-compliances present a significant gap compared to advanced requirements.
• reservoir management, with no major non-conformances	✓ There have not been any major non-conformances identified to date.		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
• downstream flow regimes, with no major non-compliances	✓	There have not been any major non-compliances reported.	• downstream flow regimes	✗	There are minor non-compliances noted; for example, the Hāwea recreational flows did not consistently remain above the stated flow, and the Roxburgh minimum discharge was not achieved on several occasions. These non-compliances create a substantial discrepancy against the advanced requirements.
• downstream flow regimes, with no major non-conformances	✓	There have not been any major non-conformances identified to date.			
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• reservoir management	✓	There are no indications to date that any commitments are not yet met relevant to the reservoir management.	• reservoir management	✓	This review has not identified any non-conformances.
• downstream flow regimes	✓	There are no indications to date that any commitments are not yet met relevant to the downstream flow regimes.	• downstream flow regimes	✓	This review has not identified any non-conformances.
OUTCOMES					
Downstream flow regimes take into account environmental, social and economic objectives	✓	The flows within the Clutha River are maintained and managed as per the environmental and social objectives identified within the Resource Consent.	Downstream flow regimes and commitments are an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances	✓	The downstream commitments for the Clutha Hydropower projects were designed in consultation with the relevant stakeholders. The requirements were constructed to allow for revisions to management plans if necessary to achieve the intended objectives. To date, the flow regimes managed by Contact are considered an optimal fit.
Where relevant, they also take agreed transboundary objectives into account	✓	Not Relevant			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1. No significant gaps identified ● 2. ... 	14 of 16

Summary of findings and other notable issues

The water availability and reliability are well managed, with a good understanding of data on current and historical flow rates via the Hydrological Database, which is quality-assured by a third-party consultant. This data serves Contact for forecasting and generation planning, ensuring optimised water usage and electricity generation. The ongoing assessment of potential impacts on generation due to changes in Probable Maximum Precipitation, considering Climate Change, will provide Contact with the necessary information for long-term planning in the future. Issues concerning reservoir management and downstream flow regimes are managed according to the conditions of the Resource Consents, and requirements are incorporated into the Clutha Catchment Manual and the Site Emergency Response Plan. Contact actively liaises with identified stakeholders for the effective management of hydropower issues. To date, there have been no formal instructions from the Regional Councils or the District Councils for any amendments to the conditions within the Resource Consents.

Relevant evidence	
Interview	10, 12, 13, 18, 19, 20, 28
Document	5, 7, 11, 15, 19, 25, 27, 29, 34, 38, 43, 46, 53, 67, 69, 90, 117, 132, 141, 158
Photo	5, 16



12 Climate Change Mitigation and Resilience

Scope and Principle		
<p>This section addresses the estimation and management of the project’s greenhouse gas (GHG) emissions, analysis and management of the risks of climate change for the project, and the project’s role in climate change adaptation. The principle is that the project’s GHG emissions are consistent with low carbon power generation, the project is resilient to the effects of climate change, and the project contributes to wider adaptation to climate change.</p>		
Background		
Climate Change Mitigation	Clyde	Roxburgh
Capacity (MW) (or additional capacity in case of expansion/ rehabilitation projects)	432MW	320MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km ²) (or additional reservoir area if any, for expansion/rehabilitation projects)	25 km ²	5.9 km ²
Power density (W / m ²)	17.3 (W / m ²)	54.2 (W / m ²)
Emissions intensity (gCO _{2e} / kWh)	Nil for 2023 according to GHG emissions inventory reporting. Contact's Greenhouse Gas Emissions Report is publicly available on Contact's website: https://contact.co.nz/aboutus/sustainability/emissions	
National and regional policies, plans and commitments relevant to mitigation	<ul style="list-style-type: none"> • The New Zealand Climate Change Commission, an independent entity, offers evidence-based counsel to the government, spearheading policy alterations. Its core agenda, defined in legislation, encompasses setting emissions budgets and furnishing advice on climate change management, amongst other tasks. • The Climate Change Response Act 2002 underpins the New Zealand Emission Trading Scheme (ETS). • Regionally, a 2019 resolution by ORC underscores the prioritisation of climate adaptation measures, particularly in flood and drainage schemes in South Dunedin, alongside carbon emissions reduction. • The ORC has completed a Climate Change Risk Assessment to understand the implications of climate change including risks and opportunities, covering the Clutha catchment. 	
Climate Change Resilience		
Hydrological data available for the project site and the basin, and observed climate trends	The Project's consents require Hydrological Compliance Reporting which document hydrological and climatic trends. The archival data includes metrics of precipitation, riverine stages and discharge rates, alongside ambient thermal readings. Snowpack accumulation and subsequent melt phenomena are projected and subjected to intermittent monitoring.	
Regional and basin-level climate models relevant to the project location, if any	In 2019, Contact Energy engaged NIWA (The National Institute of Water and Atmospheric Research) to analyse anticipated climatic changes relevant to Contact's geothermal, thermal, and hydroelectric stations.	

	<p>The research considered ten climate scenarios extending through the 21st century, drawing substantively on models of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Subsequently, NIWA produced a supplementary synopsis, specifically on the Clutha Catchment, documenting potential variances in temperature, precipitation, snow accumulation, and the frequency of extreme thermal days, as interpreted through three distinct IPCC model frameworks.</p>
<p>Any climate change predictions for the project location, and degree of consistency</p>	<p>NIWA’s research shows the propensity for extreme and infrequent rainfall events will escalate, because of a warmer atmosphere’s capacity to retain moisture. Short-duration, rare rainfall events are likely to increase. The amplification in extreme rainfall events could trigger more flooding incidents, especially within the Clutha catchment, where a projected uptick in average annual, winter, and spring rainfall is anticipated.</p> <p>Presently, Clyde has around one snow day biennially, while the highest altitudes of the Clutha catchment record over 30 snow days annually. A forward-looking analysis suggests a reduction in snow days across the Clutha catchment, with the decline being more pronounced at higher elevations. This reduction in snow days may alter the seasonal dynamics of meltwater inflow into hydropower storage lakes, potentially impacting hydroelectric power generation.</p> <p>Across New Zealand, all hydroelectric schemes are forecast to witness an increase in total annual potential power generation as the century progresses, with marginal discernible variance by mid-century. The Clutha catchment is expected to see enhanced potential generation owing to increased westerly airflow across the South Island, channelling more rainfall to the catchment’s headwaters, augmenting the hydroelectric power generation potential.</p>
<p>National policies, plans and commitments relevant to adaptation and resilience</p>	<ul style="list-style-type: none"> • National Energy Strategy: Focuses on transitioning towards renewable energy, enhancing energy efficiency, and ensuring energy security to support a low emissions economy. • The Climate Change Act 2002: Establishes the legal framework for New Zealand’s response to climate change, including the emissions trading scheme (ETS) to reduce greenhouse gas emissions. • Climate Change Commission: An independent body providing evidence-based advice to the government on climate change mitigation and adaptation, setting emissions budgets, and monitoring progress. • National Adaptation Plan: A blueprint for building resilience to climate impacts, addressing risks, and ensuring coordinated action across various sectors. • Otago Regional Council - Climate Change Adaptation Technical Working Group: Engages in assessing climate risks and developing strategies for adaptation, particularly in areas like flood and drainage schemes.
<p>Other relevant information</p>	<p>Contact is moving from following the TCFD (Task Force on Climate-related Financial Disclosures) to the XRB climate related disclosure standards. Both aim to improve climate-related reporting by organizations. TCFD:</p>

	<p>The TCFD is an international initiative established by the Financial Stability Board (FSB). It provides a globally recognized framework for climate-related disclosures and is not specific to any one country. XRB, or the External Reporting Board in New Zealand, developed its climate-related disclosure standards specifically for New Zealand organizations. It follows the NZX Listing Rules and focuses on New Zealand's climate context.</p> <p>Other useful things to know:</p> <ul style="list-style-type: none"> • Resource Management Act (RMA) - Central to New Zealand's climate policy, the RMA regulates land use and environmental conservation, ensuring sustainable management of natural resources. It has provisions for addressing climate change impacts within local planning and development decisions. • Infrastructure Sustainability Council - This council promotes sustainable infrastructure practices. While not a direct climate policy, its work supports New Zealand's broader climate goals by encouraging lower emissions and resilience in infrastructure projects. • Energy Sector Climate Change Scenarios (funded by Aotearoa Circle) - This initiative, under the aegis of the Aotearoa Circle, investigates various scenarios of how climate change might affect New Zealand's energy sector.
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Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Climate Change Mitigation			
If power density is below 5 W/m ² , net GHG emissions (gCO ₂ e) of electricity generation are calculated, independently verified and periodically updated	✓	Power density is greater than 5 W/m ² so net GHG emissions have not needed to be calculated or independently verified.	
If power density is below 5 W/m ² and estimated emissions are above 100 gCO ₂ e/kWh, a site-specific assessment of GHG	✓	As above.	✓
		If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks	Power density is greater than 5 W/m ² so a site-specific assessment was not required.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
emissions is undertaken and periodically updated			
Climate Change Resilience			
An assessment of the project's resilience to climate change is undertaken and periodically updated	<p>✓</p> <p>Contact has completed several assessments of the project's resilience to climate change. This has been done in line with the TCFD method for disclosure. Contact have used this method since 2018 which details the information companies should disclose so investors, lenders, insurance underwriters, and other stakeholders can adequately access and price financial risks and financial impact related to climate change.</p> <p>The 2023 integrated report, in line with the TCFD, includes a summary of the revised scenario analysis regarding the financial implications of climate-related risk on the business. This analysis is based on the NIWA assessment detailed in the background section of this topic.</p> <p>The FY24 asset management plan includes an objective to complete a physical risk adaption and resilience study of all sites considering the impacts of climate change, particularly considering recent events in New Zealand. This is intended to provide information for climate risk adaptation planning and mandatory climate related financial risk disclosures.</p>	<p>✓</p> <p>Assessment of resilience incorporates sensitivity analysis, project specific hydrological modelling using recognised climate models</p>	<p>✓</p> <p>The NIWA study assesses potential effects of climate change on hydropower for the Clutha River scheme. It used hydrological modelling based on climate change projections, as discussed in the background section of this topic. The work used river flow simulations from 1971 to 2099 under the drivers of six global climate models, downscaled using a single regional climate model and bias-corrected.</p>
The assessment:			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<ul style="list-style-type: none"> incorporates an assessment of plausible climate change at the project site 	✓ The assessment is based on the NIWA study which provides a plausible assessment of potential changes to the climate.		
<ul style="list-style-type: none"> identifies a range of climatological and hydrological conditions at the project site 	✓ The NIWA study considered ten climate scenarios extending through the 21 st century, drawing substantively on models of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.		
<ul style="list-style-type: none"> applies these conditions in a documented risk assessment or stress test 	✓ Contact has produced a risk assessment based on potential climate changes; medium term risks identified include: <ul style="list-style-type: none"> Increased potential for erosion issues. Disruption to physical works during storms. Increased wildfires disrupting electricity supply due to transmission lines flashing. Stormwater systems require redesign and/ or replacement to meet changing capacity requirements. 		
The risk assessment or stress test encompasses:			
<ul style="list-style-type: none"> dam safety 	✓ The climate resilience risk assessment highlighted the following risks associated with dam safety: <ul style="list-style-type: none"> Inability to meet operational maintenance requirements leads to plant damage or loss of generation. Dam structure unable to pass peak mean flows resulting in spilling and loss of generation. 	The project's opportunities to provide adaptation services are considered on an ongoing basis	✓ Opportunities to provide adaptation services have been identified, including: <ul style="list-style-type: none"> Increased rainfall leads to greater storage at Hāwea. Increased rainfall and flow in Clutha catchment present opportunity for new/increased generation and/or wider operating range; and Run plant more as baseload instead of peaking.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<ul style="list-style-type: none"> Increased rainfall and intensity cause flooding and overtopping of the dam – leads to damage and loss of generation. Higher rainfall and intensity require greater management of active landslides. 		<p>One point of note is that Contact are currently contributing to the NZSOLD (NZ Society on Large Dams) research project investigating stopbank structures and the implications of climate change on these.</p>
<ul style="list-style-type: none"> other infrastructural resilience 	✓ Infrastructure resilience has been reviewed, highlighting risks including: <ul style="list-style-type: none"> Increased temperatures and storms resulting in grid damage or constraints on transmission. Roading infrastructure being affected by extreme weather (both heat and rain/storms); and Increased rainfall and intensity lead to excessive stormwater flows causing flooding, erosion, landslips, sinkholes, and plant damage. 		
<ul style="list-style-type: none"> environmental and social risks 	✓ Environmental and social risks identified include: <ul style="list-style-type: none"> Higher ambient temperatures and water temperatures causes increases in lake weed and pests requiring greater management. Increased temperatures lead to personnel impacts such as sunburn, heat exhaustion, angry, emotional people, tiredness, dehydration. Increased ambient temperatures and drought leads to environmental hazards (fire); and 		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		<ul style="list-style-type: none"> Increased rainfall and intensity cause greater sediment volumes to move down catchment. 			
<ul style="list-style-type: none"> power generation availability 	✓	<p>Contact conducted an examination of potential climate changes on its business operations, detailed in the 2023 Integrated Report. The assessment was based on the TCFD guidelines, and evaluated Contact's strategic resilience against three prospective climate trajectories: An elevation in global temperature by 1.5°C; a temperature rise ranging between 2°C and 4°C; and a scenario where the global temperature exceeds 4°C. The analysis showed that, under all scenarios, Contact's sales, power production, and EBITDAF should continue to grow.</p>			
MANAGEMENT					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures, these measures are in place	✓	<p>GHG emissions estimates do not assume design and management measures. Nonetheless, Contact is undertaking numerous initiatives to reduce GHG emissions, in line with their 2035 Net Zero Commitment.</p>	<p>Management measures are in place to respond to risks and opportunities including offsetting emissions</p>	✓	<p>Contact have contributed to the formation of Dryland Carbon LLP with Air New Zealand, Genesis Energy, and Z Energy. The aim is to invest in diverse forest portfolios for carbon sequestration, targeting marginal land for afforestation with a mix of permanent and production forests. The primary goal is a stable supply of NZU carbon credits for New Zealand Emissions Trading Scheme compliance.</p>
		<p>Contact have implemented measures to improve SF6 handling and safety protocols. The engineering layout ensures SF6 containment within the Gas Insulated Switchgear (GIS) compartment. There are integrated alarm systems for real-time SF6 leak surveillance. On-site personnel have</p>			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	been trained in SF6 handling and GIS operations and there is effective coordination with SF6 stakeholders, notably Transpower.	estimates or to monitor GHG stocks	report of the GHG emissions that result from Contact’s operations within the declared boundary and scope for the reporting period. The reporting is audited by a third party. Contact publicly discloses a range of climate change related data and commitments online. It is aligned with relevant associations like the Sustainable Business Council, The New Zealand Initiative, and ERANZ (The Electricity Retailers' Association of New Zealand) and is a signatory of the New Zealand Climate Leaders Coalition.
Climate Change Resilience			
Measures are in place to avoid or reduce identified climate risks	✓ Each risk identified in the climate change resilience assessment is associated with a mitigation measure. In response to risk assessments, upgrades to existing power generation infrastructure have been identified as critical. Contact is currently in the second year of a five-year strategy focused on capital investment, specifically earmarked for sustaining business continuity, as well as improving the reliability and robustness of generation assets. Two transformers at the Clyde station have been replaced and additional transformers are planned for installation within the next 36 months. Two aging transformers at Roxburgh will be replaced in the Fiscal Year 2024. At Roxburgh 4 of the existing 8 runners will be replaced. This initiative is expected to	Measures take account of a broad range of risks and interrelationships	✗ At present, the detailed work done assessing potential climate resilience requirements has not informed an actionable climate resilience plan, beyond existing asset maintenance. However, Contact appears to be on track to deliver such a plan in the future. To meet this criterion, a plan should provide measures to address a broad range of risks and interrelationships such as <ul style="list-style-type: none"> • Adaptive Measures: Engineered Solutions, Upgrading turbines, dams, or spillways. • Operational Changes: Altering water storage or release protocols. • Strategic Planning: Contingency contracts, supply chain adjustments, etc.
		Processes are in place to respond to unanticipated climate change	✓ The Hydro Site Emergency Response Plan (SERP) provides a detailed suite of processes to respond to events which

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		augment hydroelectric generation output by 45GWh. The first turbine is scheduled to go offline for replacement in April 2024, and full operational capability is projected to be restored by the close of Fiscal Year 2026.			could be caused by climate change such as flooding, storms, and landslides.
			Plans are in place to provide adaptation services if necessary	✗	This review has not identified any plans in place to provide adaptation services if necessary. For example: <ul style="list-style-type: none"> Adaptive Design Solutions: Engineering, architectural, or other infrastructural adjustments. Capacity Building: Training sessions, workshops, or educational programmes. Monitoring & Evaluation: Systems to monitor changes and evaluate the effectiveness of adaptation measures.
CONFORMANCE AND COMPLIANCE					
Climate Change Mitigation					
Processes and objectives relating to mitigation have been and are on track to be met with:					
• no major non-compliances	✓	Contact does not have any regulatory requirement regarding climate change mitigation, so no major non compliances.	There are no non-compliances	✓	Contact does not have any regulatory requirement regarding climate change mitigation, so there have been no non compliances.
• no major non-conformances	✓	Climate change plans appear to have been implemented without any major non-conformances.			
Mitigation-related commitments have been or are on track to be met	✓	Contact is on track to meet its key target of a 45% reduction on Scope 1 and 2 emissions by 2026. The decrease has been driven by lower thermal/gas generation and gas peakers running less often.	There are no non-conformances	✗	Contact have not met their internal objective of a 10% reduction in travel emissions on prior year. Emissions from business flights was 1,187 tCO _{2e} for FY23. Travel emissions include both domestic and long-haul flights, were up 130% on FY22 Q4. This is not considered a major non-conformance as travel emissions represent 0.15% of Contact’s Scope 3 emissions.
Climate Change Resilience					

Minimum Requirements			Advanced Requirements					
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations				
Processes and objectives relating to resilience have been and are on track to be met with:			There are no non-compliances	✓	Contact does not have any regulatory requirement regarding climate change resilience, so no non compliances.			
• no major non-compliances	✓	Contact does not have any regulatory requirement regarding climate change resilience, so no major non compliances.						
• no major non-conformances	✓	Ongoing asset maintenance and upgrade plans have been implemented as planned with no major non-conformances identified.						
Resilience-related commitments have been or are on track to be met	✓	In various documents Contact has committed to running safe and resilient infrastructure. This review has found this commitment to be on track, as detailed above.	There are no non-conformances	✓	This review has not identified any non-conformances related to climate change resilience.			
OUTCOMES								
Climate Change Mitigation								
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	The project reservoirs are not anticipated to be significant sources of GHG so the projects are consistent with low carbon power generation. Contact's 2035 Net Zero Commitment aims at achieving net-zero carbon emissions by 2035, underlining a decisive shift towards renewable energy generation as a pivotal aspect of decarbonising the nation's energy portfolio.	Project net emissions are minimised or project operations facilitate system emissions reductions	✓	Project emissions are low and at a company level Contact is making good progress to reduce GHG emissions. Compared to the 2018 base year, in FY23 Scope 1 and 2 emissions were 55 percent lower and Scope 3 emissions were 47 percent lower.			
Climate Change Resilience								
Findings of the climate change assessment indicate that the project is resilient to climate change	✓	The potential changes to the climate in the project area have been thoroughly assessed. Subsequently, the risks associated with these changes were evaluated, and mitigation	The project is resilient under a broad range of scenarios	✓	The assessments completed to date have not highlighted any critical issues which could be caused by the anticipated range of climate change scenarios.			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	measures considered. The ongoing process safety concerning asset upgrades and maintenance incorporates mitigation measures appropriately, contributing to projects that are resilient to a changing climate.	The project will contribute to climate change adaptation at a local, regional or national levels	<p>A hydropower project with a reservoir contributes to a region’s resilience to climate change, and these projects are no exception. Benefits include:</p> <ul style="list-style-type: none"> • Water Storage: The Hāwea Reservoir acts as water storage facilities. • Supporting Agriculture: The reservoirs support irrigation, allowing for diversified crops. • Infrastructure Resilience: A consistent water and power supply supports the resilience of other essential infrastructure, such as water treatment plants, hospitals, and industries.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
<ul style="list-style-type: none"> ● 1.No significant gaps identified ● 2. ● 3. 	12 of 15

Summary of findings and other notable issues
<p>The projects have a high-power density, so there are no concerns about reservoir GHG emissions. Various detailed assessments of the projects’ resilience to climate change have been conducted, based on plausible climate change studies by NIWA for the project sites. The study includes a range of climatological and hydrological conditions at the project sites and applies these conditions in a risk assessment. The risk assessment addresses dam safety, infrastructural resilience, environmental and social risks, and power generation availability. Contact is undertaking numerous initiatives to reduce GHG emissions in line with their 2035 Net Zero Commitment and has implemented measures to improve SF6 handling and safety protocols. Project resilience is addressed in a five-year strategy focused on capital investment, specifically earmarked for sustaining business continuity, as well as improving the reliability and robustness of generation assets. This review has not identified any major non-conformances or non-compliances. The only minor non-conformance regarding climate change mitigation is not achieving an internal objective to achieve a 10% reduction in travel emissions compared to the prior year. The project's GHG emissions are demonstrated to be consistent with</p>

low carbon power generation. The ongoing process safety concerning asset upgrades and maintenance incorporates climate change resilience measures appropriately, contributing to projects that are resilient to a changing climate.

Relevant evidence	
Interview	10, 12, 13, 15, 18, 19, 20, 28, 31
Document	16, 38, 43, 50, 56, 58, 65, 66, 73, 78, 83, 100, 103, 109, 113, 115, 124, 127, 129, 153, 154, 161, 168, 177, 184, 193, 194, 195
Photo	10, 12, 13, 15, 18, 19, 20, 28, 31

Appendix 1 – Interviews

Ref	Interviewee	Position	Organisation
1	Chris Abbott	Chief Corporate Affairs Officer	Contact
2	Taria Tahana	Head of Sustainability	Contact
3	Brett Woods	Head of Regulatory and Government Relations	Contact
4	Sarah Crowe	Head of Business Assurance and Risk	Contact
5	Brian Ultee	Assurance Manager	Contact
6	Murray Keast	Senior Procurement Partner, G&T	Contact
7	Drew Cowley	Strategic Sourcing Manager	Contact
8	Stephanie Philip	Health and Safety Advisor	Contact
9	Emily Ross	Senior People Experience Partner	Contact
10	Jenny Bullock	Environment Advisor	Contact
11	Amber Archer	Senior Environment Advisor	Contact
12	Boyd Brinsdon,	Head of Generation Hydro	Contact
13	Neil Gillespie	Snr Specialist - Hydro Sustainability	Contact
14	Ron Bull	Specialist - Tangata Whenua	Contact
15	Kim Kelleher	Manager - Sustainability and Community	Contact
16	Rachel Kirby	Assistant Treasurer	Contact
17	Will Thomson	Corporate Treasurer	Contact
18	Dan Forbes	Advisor - Sustainability	Contact
19	Peter Silvester,	Dam Safety and Engineering Mgr	Contact
20	Richard Mckey	Intmd Engineer - Civil & Dam Safety	Contact
21	Clare Ward		Delta Utility Services
22	Edward Ellison		Aukaha
23	Helen Scoles		Old Cromwell Inc
24	John Taylor		Hāwea Community Association (HCA)
25			
26	Stuart Chandler		Land Information New Zealand (LINZ)

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27	Paula Penno		Central Otago District Council (CODC)
28	Peter Foster		Stantec
29	Shannan Crow		National Institute of Atmosphere & Water (NIWA)
30	Tamara Linnhoff		Ministry of Business, Innovation & Employment (MBIE)
31	Tami Sargeant		Otago Regional Council
32	Liam Genever		Department of Conservation
33	Ian Hadland		Fish & Game, Otago
34	Sally Feineman		Roxburgh shop owner

Appendix 2 – Documents

Ref	Document details
1	1987 Roxburgh Dam Break Study
2	1995-2020 Clutha Turbidity Monitoring Data Report 1995-2010.
3	1997 Contact Hydro Station Hydraulic Data 1997
4	1999 Lake Dunstan Water Quality Monitoring
5	1999 OPUS Clutha River Hydrological Overview
6	2000 - Opus - Clutha Hydro Dams - Probable Maximum Flood Update
7	2000 Opus - Clutha Hydro Lakes Operating Regimes
8	2001 Application for Resource Consents and Assessment of Environmental Affects
9	2001 Clutha Consents Programme - Study Brief 19 - Overview of the Water Quality in the Clutha River System
10	2001 Clutha Consents Programme - Study Brief 8 - Lower Clutha River Sediment & Erosion Issues
11	2005 Side Agreement - The construction & operation of whitewater features & facilities
12	2010 Archaeological Baseline Survey & Management Plan Final
13	2011 Hawea Dam Break Study
14	2012 Clutha Catchment Sediment Management Plan (Clyde & Roxburgh (10 yearly review is still in progress))
15	2015 Clutha River Catchment Study - Step 1 - Irrigation Report
16	2019 NIWA Report on Climate Change Projections (and associated internal Literature Review and Risk workshop outputs)
17	2020 Clutha Catchment Signage Plan
18	2020 Clyde CDSR
19	2020 Lake Roxburgh Sedimentation and Backwater Analysis
20	2021 - Erosion Management Plan Version 3 - Issued (5 yearly review)
21	2021 - Lake Hāwea Margins Monitoring Management Plan - Issue 3

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22	2021 Hawea CDSR
23	2022 Lake Hawea Erosion - Annual Inspection - Issued
24	2022 - 2023 PROPOSED LINZ Biosecurity Annual Programme V2
25	2022 Annual Compliance Report
26	2022 Building (Dam Safety) Regulations
27	2022 Clutha Catchment Flood Management Plan - reassessment DRAFT
28	2022 Clutha Catchment Flood Management Plan - reassessment DRAFT (still in draft as consultation with ORC is underway)
29	2022 Clutha Flood Rules - Modes reassessment DRAFT_v1.2 (still in draft as consultation with ORC is underway)
30	2022 Clyde Community Engagement Plan
31	2022 Clyde Dam Break Study
32	2022 Hawea Dam Interpretive Geology Report
33	2022 Kawarau Landscape Visual Amenity Management Plan
34	2022 Lake Dunstan Sedimentation and Backwater Analysis
35	2022 Lake Hawea Foreshore Landscape Management Plan
36	2022 Manuherehia Landscape Visual Amenity Management Plan
37	2022 Roxburgh CDSR
38	2022 WSP Hydrological Compliance Report
39	2022-23 Site Sponsorship Control - Hydro
40	2023 Clyde Dam Break Flood Hazard Assessment
41	2023 Draft - WSP New Kanakana Ramp Design
42	2023 IEA report New Zealand
43	2023 Integrated Report
44	2023 Native Fish Management Programme Annual Compliance Report Final
45	2023 NFMP Annual Compliance Report Final
46	2023 NIWA Hydrological stations Report: produced quarterly

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47	2023 SFMP Annual Compliance Report
48	A-1 Quality Management FY23
49	A-4 Board Summary Community Engagement ARC June 2023
50	Adapting to Climate Change in New Zealand
51	Annual signage check sheets Clyde and Hawea
52	Annually review and report on the effectiveness of our native and sports fish management programmes
53	Application for Resource Consents and Assessment of Environmental Affects March 2001
54	AS NZS ISO Standard 14001 2016 Environmental Management Systems
55	Asbestos health monitoring programme.
56	Aspects & Impacts register
57	At Risk Species Assessment
58	August 2023 Health Safety & Environment Committee Paper
59	Bannockburn - Stakeholder Engagement Strategy (Oct-22)
60	Biodiversity Management Plan
61	Biodiversity Statement of intent
62	BML Lake Dunstan Aquatic Weed Stakeholder Meeting May 2023
63	Business assurance and risk charter
64	Cintellate User Manual
65	Climate Change Response Act 2002
66	Climate Leaders Coalition Statement of Ambition https://climateleaderscoalition.org.nz/about/statement-of-ambition/
67	Clutha Catchment Manual
68	Clutha Catchment Signage Plan 2020
69	Clutha Consent Conditions
70	Clutha Projects - Stakeholder Engagement Plan (20221012)
71	Clyde 2023 IDSR

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72	Clyde Community Engagement Plan June 2022
73	Clyde Under Writing Report 2016
74	Code of Conduct 2020 (under review)
75	Competency Assurance Framework
76	Consent conditions plans/programmes
77	Contact Clutha Main Consent Suite 2007
78	Contact Energy Climate Change Risk and Opportunity Assessment
79	Contact Energy Cromwell Kawarau Arm workshops 16 April 2023 - Final
80	Contact Energy Environmental Certification ISO14001.2015
81	Contact Energy Risk Appetite Statement
82	Contact Energy Stakeholder Engagement Model
83	Contact Energy website provides summary of our work and Contact's Climate Change Position: https://contact.co.nz/aboutus/sustainability/emissions
84	Contact Environment Policy: https://contact.co.nz/aboutus/investor-centre/governance#Code-of-conduct-and-policies
85	Contact Stakeholder Engagement Policy June 2022
86	Contact University Courses
87	Contact website provides email and phone numbers to contact: https://contact.co.nz/aboutus/community
88	Contact Website: https://contact.co.nz/aboutus/sustainability
89	Contact Website: https://contact.co.nz/aboutus/sustainability/emissions
90	Contact websites provides a section specifically on Water - https://contact.co.nz/aboutus/sustainability/water
91	Contact's website provides more information on wider company initiatives https://contact.co.nz/aboutus/community
92	Contract governance form
93	Corporate gov statement on investor section on website: https://contact.co.nz/aboutus/investor-centre/governance

94	Corporate governance statement: https://www.nzx.com/regulation/nzx-rules-guidance/corporate-governance-code
95	Critical Biodiversity Assessment
96	Cultural Impact Assessment on Clutha Catchment - Kai Tahu ki Otago 2000
97	Cultural Impact Assessment on Clutha Catchment - Kai Tahu ki Otago 2000
98	Discrimination, Bullying & Harassment Policy 2020 (under review)
99	DJSI guidelines on good corp govt practice
100	Drylandcarbon media release 2019
101	Employment Relations Act 2000
102	Enterprise Risk Matrix
103	Example of latest meeting minutes for triannual risk review
104	Examples of monthly check sheets
105	External feedback, engagement surveys.
106	External Partnerships - Biodiversity Management
107	Fish Management Programme - Appendix 4 Glyceria Weed Control Report 2022/23
108	Flood Management Plan & Clutha Flood Rules
109	Forsyth Barr Carbon & ESG Rating 2022 https://www.forsythbarr.co.nz/corporate-news-events/cesg-report/ , https://www.forsythbarr.co.nz/assets/public/Uploads/Research-Public/CEN-final-scorecard.pdf ,
110	FY22 Telarc Management System Assessment Report
111	FY23 Biodiversity Data for data collected regarding pest trapping.
112	FY23 Full year results presentation - page 12
113	FY23 Greenhouse Gas Emissions Report
114	Governance page on website https://contact.co.nz/aboutus/investor-centre/governance
115	Greenhouse gas emission reports available on Contact's website: https://contact.co.nz/aboutus/sustainability/emissions
116	Hawea 2023 IDSR

117	Hawea Lake Control Power Storage Available Area and Volume Curves
118	Health and Safety at Work Act 2015
119	Holidays Act 2003
120	https://app.companiesoffice.govt.nz/companies/app/ui/pages/companies/660760
121	https://bec.org.nz/about/our-members/
122	https://contact.co.nz/aboutus/investor-centre/esg-reporting#Water
123	https://contact.co.nz/aboutus/sustainability
124	https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/
125	https://ngaitahu.iwi.nz/ngai-tahu/
126	https://ngaitahu.iwi.nz/wp-content/uploads/2021/07/Ngai-Tahu-Charter-effective-July-2020.pdf
127	https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/
128	https://www.eranz.org.nz/
129	https://www.legislation.govt.nz/act/public/2002/0040/latest/DLM158584.html
130	https://www.murihikuregen.org.nz/about-us/our-partners/
131	Human Rights Policy 2023
132	Hydro Daily Report
133	Hydro Stakeholder Mapping - Master
134	Inclusion and Diversity Policy 2021
135	ISO 55000 - asset management.
136	ISO 9001 quality management
137	ISO31000 - risk management standard
138	July 2023 NIWA Elver Catch update for Research Partners
139	Kawarau Arm Community Project supporting documentation
140	Lake Dunstan Water Quality Monitoring (1999 Annual Report) - John Stark Cawthorn Institute

141	Land Air Water (LAWA) Aotearoa website: https://www.lawa.org.nz/explore-data/otago-region/
142	Landscape Architect Initial Draft - Kawarau Arm Community Project
143	LINZ & Contact Monthly Meeting Minutes
144	LINZ Dunstan Aquatic Weed Stakeholder presentation May 2023
145	Mana to mana document being developed, still in design and negotiation phase.
146	Mata-au Trust Deed 2018
147	Mata-au Trust Deed covers this in broader detail.
148	Material Impacts Review
149	Material sustainability impacts review 2023
150	Ministry of Business, Innovation & Employment; Worksafe NZ
151	Mitigation Agreement 2002
152	Modern Slavery Statement 2022
153	National Adaptation Plan Website: https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/adapting-to-climate-change/national-adaptation-plan/
154	National Energy Strategy
155	Native Fish Management Programme
156	New Zealand Government (Dam Safety Regulations 2022)
157	Ngāi Tahu charter te tiriti
158	NIWA Hydrological stations Report: produced quarterly
159	NIWA Lake Dunstan Aquatic Weed Stakeholder presentation May 2023
160	November 2022 Lake Hawea Stakeholder Report
161	NZ Climate Change Commission
162	NZSOLD Guidelines 2015
163	NZX corp gov code
164	ORC Consent Compliance Audit







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165	ORC website: https://www.orc.govt.nz/consents-and-compliance/resource-consents
166	Org structure
167	Otago Regional Council - Lake Hawea Workshop Handout
168	Otago Regional Council Climate Change Risk Assessment
169	Power Density Calculations:
170	Project Risk Matrix
171	Public Create Waterfront Article
172	Public Safety - per the EA and gas act
173	Quality Statement 2022
174	Quarterly survey Peakon
175	Regulatory update to November 2022
176	Risk Management Policy
177	Risk workshop output 2019
178	Roxburgh 2023 IDSR
179	Ryder ecology reports.
180	Schedule 30-Hawea, 61 Te Wairere Lake Dunstan, 22 Ka Moana Haehae Rox
181	Schedule 40 Statutory Acknowledgement for Mata-au (Clutha River) https://www.legislation.govt.nz/act/public/1998/0097/latest/DLM430873.html
182	Sentis survey
183	SERP - Site Emergency Response Plan
184	SF6 Register
185	Sponsorship Application Form 2020
186	Stakeholder Engagement Model Assurance Review
187	Stakeholder engagement survey
188	Standard health monitoring
189	Summary provided in the 2023 NFMP Annual Compliance Report Final
190	Supplier code of conduct 2021

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191	Supporting documentation for the Kawarau Arm Community Project
192	TCFD reporting in back of FY23 Integrated Report
193	TCFD website: https://www.fsb-tcfid.org/publications/
194	TCFD/XRB standards
195	XRB website: https://www.xrb.govt.nz/standards/climate-related-disclosures/aotearoa-new-zealand-climate-standards/aotearoa-new-zealand-climate-standard-1/

Appendix 3 - Photographs

		
<p>Photo 1: O-2. Clyde staff tea room</p>	<p>Photo 2: O-2. Safety equipment – Clyde Power Station</p>	<p>Photo 3: O=2. Girls with Hi-Vis certificate – Contact Energy</p>
		
<p>Photo 3: O-4. Lake Dunstan logs and woody debris</p>	<p>Photo 5: O-4. Lake Dunstan – post flood raised water level</p>	<p>Photo 6: O-4 Lake Hawea ANZAC memorial</p>

<p>Dated 2018</p> <p>MATA-AU TRUST</p> <p>Settlor CONTACT ENERGY</p> <p>Trustees NEIL GILLESPIE: representative of Contact Energy GAIL TIPA: representative of Northern Rūnanga collective (Ōtākou, Puketeraki & Moeraki) Louise Fowler: representative of Southern Rūnanga collective (Awarua, Waihopai & Hokonui)</p>	<p>Cultural Impact Assessment On Clutha Catchment For Contact Energy Ltd</p>  <p>By Kai Tahu ki Otago Ltd on behalf of Te Runaka o Moeraki Kati Huirapa Runaka ki Puketeraki Te Runaka Otakou Hokonui Runaka</p>	 <p>Te Rūnanga o NGĀI TAHU</p> <p>Charter of Te Rūnanga o Ngāi Tahu</p> <p>Effective July 2020</p>
<p>Photo 7: O-7. Mata-au Trust 2018</p>	<p>Photo 8: O-7 Cultural Impact Assessment 2000</p>	<p>Photo 9: O-7 Charter of Te Runanga o Ngai Tahu 2020</p>
		
<p>Photo 10: O-8. Cromwell Heritage Precinct Sign</p>	<p>Photo 11: O-8. Heritage buildings Old Cromwell</p>	<p>Photo 12: O-8 Hawea Dam – Then and Now sign</p>



Photo 13: O-10. Visual model of a Roxburgh generator – Clyde Power Station



Photo 14: O-10. Thank-you notes – Clyde Power Station



Photo 15: O-10. Signage and nesting box at Lake Hawea for endangered grebe



Photo 16: Roxburgh tailrace



Photo 17: Lake Hawea



Photo 18: Foreshore erosion at Lake Hawea



Photo 19: Trash rack cleaning at Roxburgh



Photo 20: Log boom at Roxburgh