ENGCO
Consulting Engineers

The Engineering Company Limited
Capability Statement

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Section 1

Overview

Overview

ENGCO has successfully executed a wide range of projects across New Zealand. Our team comprises experienced and qualified structural, civil and geotechnical engineers who collaborate with surveyors, planners, architects, project managers, and other engineering professionals to deliver exceptional results.

Offering services in structural, civil, and geotechnical engineering allows ENGCO to provide our clients with a holistic approach to engineering, ensuring that all aspects of a project are considered and integrated into the final solution.

Our strong relationships with industry and contractors enable us to stay up to date with current construction market trends, which helps us provide insightful solutions to our clients. We understand that each project is unique, and we take the time to understand our client's goals and aspirations to provide the best possible engineering solutions.

We offer the following:

Leading technical expertise and innovation across timber, steel and concrete structural systems, assisting with New Zealand Design Standards development and new product development.

Expert testing and strong ties with the University of Canterbury, directing and analysing test data in timber products.

Proven modelling and design strategies in complex stiffness and capacity modelling for materials such as timber with non-homogeneous properties (CLT).

Clear and effective communication
Issues are identified, raised and resolved early in the design process with challenging and robust conversations where required to achieve the best result for our client.

ENGCO is dedicated to your success through excellent service and timely delivery to our valued clients.

The projects we have peer-reviewed to date demonstrate the trust and reputation ENGCO has built in New Zealand.

ENGCO are committed to our values of:

Passion

- for engineering
- always learning
- solving client challenges
- getting it right
- humbly being the best at what we do

Principles

- keep agreements
- pride in our work
- take ownership
- trusted partner
- high standards and ethics
- accountable for results

People

- better together
- positive attitude
- open, honest, transparent
- support each other
- embrace diversity
- work hard and have fun

ENGCO have **niche experience** in large-scale construction to meet demanding requirements.

Clients include government and numerous private developers on multi-storey buildings up to 12 storeys across New Zealand.

As a result, ENGCO has developed a vast depth of knowledge and understanding of engineering and architectural requirements that impact the structural, civil and geotechnical solutions, and therefore offer solutions that avoid extensive coordination to resolve them into a compliant solution.

Our design experience in the highest seismic zones and our knowledge of soil structure interaction has allowed us to challenge geotechnical parameters and reduce design loads, and therefore costs, by almost 30% on other projects.

We believe that the concept design stage is the most critical time for exploring options and determining the preferred solution and we would promote the idea of workshop-style design meetings that explore all options.

ENGCO understands that the **commercial risk and cost** pressures in the project need to be reflected in the proposed design solutions.

Simple and easy-to-build solutions need to be championed in all projects but specifically where the construction cost is the key variable in the business case. We have learnt that there are a number of commercial challenges in construction that need to be considered in engineering solutions.

ENGCO place great importance on **communication**, promoting constant improvement and lessons learnt in how to communicate effectively.

Experience has demonstrated that a strong relationship is required within the design team to enable a solution-focused approach that finds solutions quickly that benefits the entire client team.

To this end, all staff have undertaken communication skills training courses and it is regularly discussed in weekly training briefings.

We believe this to be a strength in ENGCO that differentiates us.

Geotechnical Expertise

ENGCO offers comprehensive geotechnical engineering services tailored to the specific geological conditions of New Zealand. Our expertise covers a wide range of projects, from residential development and commercial construction to infrastructure projects and earthworks.

ENGCO's services include site investigations, geotechnical assessments, ground improvement techniques, and construction/earthworks monitoring. We specialise in areas such as liquefaction analysis, slope stability analysis, and foundation design.

By partnering with ENGCO, clients can benefit from our expert guidance and ensure the success of their projects in the **unique geological environment of New Zealand**.

Civil Expertise

Our team brings extensive experience in delivering highly detailed building services design and documentation throughout New Zealand. Our expertise encompasses flood modeling, three waters, and siteworks designs for a wide variety of projects, ranging from high-end residential developments to large industrial facilities, commercial properties, and both brownfield and greenfield developments.

By **combining our structural, geotechnical, and civil engineering services**, we effectively reduce risks and save considerable time for our clients. Our vast experience across local, national, and international projects equips us with a profound depth of civil engineering knowledge.

We are also **committed to offering environmentally sustainable solutions** for stormwater management and pavement design, all while ensuring our solutions remain cost-effective and efficient.

Structural Expertise

Our **track record** speaks for itself. We have a multitude of experience in commercial developments, ranging from small sheds to 10,000m^2+ developments. We deliver to a large variety of clients and stakeholders who have varying expectations and budgets.

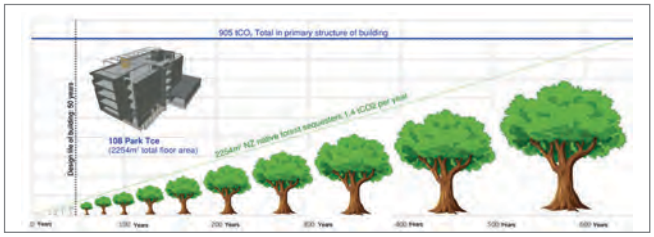
We have **extensive experience** with a large variety of construction techniques and materials, which will cover any commercial development.

Our **dedicated drafting team** has considerable knowledge in different detailing methodologies, and construction sequencing, which allows for well-thought-out drawings that are completed to a default of LOD 300 minimum. When required, we can deliver to a LOD 400 level of detail. Our drawings are prepared from 3D models fully coordinated with other consultants' work which mitigates conflicts. This allows the fabricators, contractors and QSs all have a fundamental understanding of the structure. A good set of drawings significantly reduces project risks.

Carbon Impact

As a company striving to become net carbon zero, ENGCO can provide our clients with information on the carbon impact of the structural design options and a breakdown for different design methodologies to facilitate their own environmental goals.

This can be useful for reporting to shareholders to demonstrate environmental actions taken by the company for a proposed development.



Innovation Experience through partnering with industry leaders

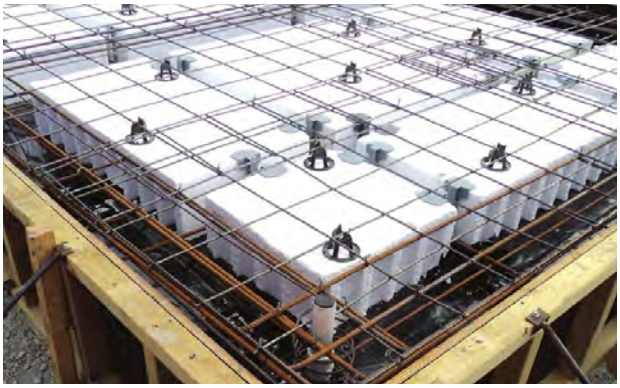
Our Product Engineering projects showcase the partnering of engineering with business.

We provide clients with our commercial knowledge to assist then in what the market place requires and the technical expertise to realise their project.

2.2gForce Seismic dampers

Provision of technical expertise and commercial guidance in the development of innovative low-damage seismic damping systems for buildings and bridges.

These dampers operate as "shock absorbers" that dissipate the kinetic energy of movement, aiming to improve the performance of structures during earthquakes and repairability after the event.



Firth Ribraft® Concrete Waffle Flooring System

Enhancement of one of NZ's most popular flooring solutions for residential and light commercial projects to meet the loss of bearing requirements of TC2 and TC3 site conditions.

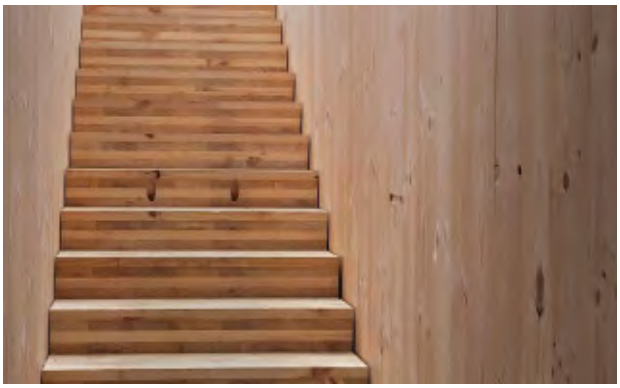
Improvements included the addition of steel fibre reinforcing and the development and testing of a re-levellable jacking system, widely adopted as the standard engineering solution for these sites.

Panelised & Modular Construction Technology

Aligning with our ethos of clean and green, we have partnered with Concision, Hector Egger and others to help develop the critical key connections between prefabricated panels, focusing on developing an efficient system that would work well in the manufacturing process.

The panels exemplify "building better" through a controlled manufacturing environment that delivers high quality with less waste, fewer defects and improved health and safety.

Our extensive knowledge of European timber sources and codes enabled us to deliver the technical approvals for connections using untreated timber.



Mass Timber – CLT, PLT and Glulam

ENGCO partnered with numerous suppliers to provide highly qualified engineering resources, available to guide and assist the project design team from the concept stage forward.

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Section 2

Project Examples

Projects

35 Brecon Street, Queenstown

Project Details

Location	Queenstown
Value	$20m

Timeframe

Start Date	2019
Completion Date	2021

Project Brief

5000m² two storey commercial development across two buildings. Includes hospitality, bowling alleys and retail spaces to both levels. Large cantilevers at both midfloor and roof levels to maximise use of site.

ENGCO was responsible for all civil design including removal of stormwater & foul water from the site, reticulated gas supply, temporary works (including public safety refuge tunnels to footpaths) & retaining, relocating public wastewater main & high-voltage power mains across the site.

ENGCO also designed the traffic circulation on the site for delivery vehicles and service lane, as well preparing the environmental management plan for the construction phase.

Relevance

Critical Factors

Complex design involving multiple stakeholders (Australian client & architect, local authority, key tenants, fire and service consultants) to achieve a satisfactory outcome for all parties' requirements.

A very restricted brown field site with three dimensional co-ordination of the external services requiring construction sequencing and earthworks to be resolved during design.

Boundary retaining wall and basement construction through legal easements demanded proactive co-ordination with stakeholders to achieve a design.

Careful co-ordination was required with the QLDC street works development programme to resolve parking and line of sight issues.

Pumped sewage design was required to accommodate high flows.

Surface water was designed for retention and soakaway.

ENGCO were engaged by the contractor to design temporary sheet piling and support structures for site offices suspended over street footpaths.

Projects

Titiraukawa Nursery

Project Details

Location	Pelorus Bridge, Marlborough
Value	$2.8m

Timeframe

Start Date	September 2023
Completion Date	July 2024

Project Brief

Design and construction supervision of the Ngati Kuia, Titiraukawa Nursery construction project.

The Civil Design encompassed:

- 3D surface model and earthworks design
- Access road design and detailing suitable for B-Train/heavy vehicles
- Culvert design, managing stormwater flow from the upstream catchment
- Water supply, including a water bore, raw water and UV treated
- 1000m^3 water storage consisting of water bladders to be used for irrigation
- On-site wastewater treatment and disposal fields
- Stormwater, water, wastewater, power and phone reticulation detailing and coordination
- Design long term sustainable infrastructure for the Kaikaiāwaro Charitable Trust Board.

Relevance

Challenges	Complex water supply requirements
	Short design timeframe and construction program.
	Limited construction budget, requiring optimisation of funds and resources
Team Approach	Client focused solutions.
	Pragmatic approach to produce a low-cost solution for bulk water supply storage.
	Designing solutions to be robust and sustainable.
	Maximizing the use of local resources including site won soils and river quarried rock.
Project Outcome	Working in collaboration with the design and construction team, the project was delivered on time and to budget.

Projects

Queenstown Country Club

Project Details

Location	Queenstown
Notes	New Care Facility and Apartments

Timeframe

Start Date	2020
Completion Date	2024

Project Brief

ENGCO have been engaged to provide comprehensive structural engineering services for Arvida's Queenstown Country Club Care & Dementia Units and Apartments.

The development consists of two main structures, the first being an apartment building and the second purposed as a dementia care facility. The buildings are approximately 90m long, three-storeys tall and of mass timber construction.

Following on from the success of the Arvida Park Lane development, the focus of the structural design was achieving a low carbon footprint through extensive use of cross laminated timber (CLT) panels. These CLT panels were utilised for the structural floor, wall, stair and lift shaft panels across the three levels of the two buildings.

Relevance

Critical Factors	Leading edge mass timber and sustainable design. Sustainability – the large quantities of CLT used in these two structures results in an estimated potential biogenic (stored) carbon of 1,450,000 kg CO2eq. This stored carbon plays a crucial role in partially offsetting the embodied carbon of the overall construction.

More Information

Website	www.arvida.co.nz/living-with-arvida/communities/queenstown-country-club

Projects

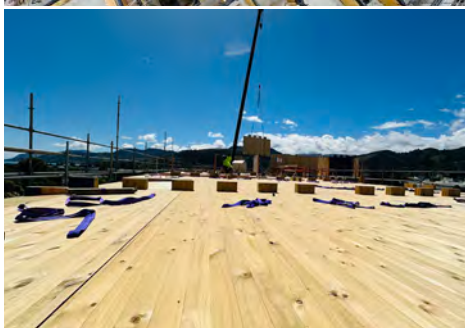
Haven Road, Nelson

Project Details

Location	Nelson
Value	$18m

Timeframe

Start Date	Planning 2019, Construction 2023
Completion Date	Under construction, ETA Nov 2024



Project Brief

ENGCO was engaged to provide comprehensive structural engineering services for this new Special Housing Area six-storey apartment block consisting of 30 1–3-bed apartments.

Innovative use of hold downs, as tested in the UC Canterbury PHD program, allowed a degree of repairability after a seismic event of the main connections. This provides robustness which ensures the building is quickly operational following a major event.

Cross laminated timber (CLT) is the primary structural material for the walls and floors, to achieve a low carbon footprint.

- 6 storey (1 concrete podium – 5 CLT floor and shear walls)
- 450m^2 each floor
- L-shaped building with external 6-storey staircase lift shaft in CLT and Glulam.
- Shear through contact (shear keys L1-3)
- Connections for efficiency and post fire stability.

Architectural

- Cladding: DP955 metalcraft diamond-extruded aluminium brown flash clad.
- Lining: everywhere due to acoustic flanking noise issue (we could have left some exposed).
- Coating of CLT: intumescent coating (zone arch products zone92) – communal spaces as corridors and stairwell

Fire

- Sprinklered – 30 min FRR with visual exposed CLT staircase
- Only one means of escape – sprinklered.

More Information

Sustainability

The 965m^3 of CLT used was sourced from PEFC certified, sustainable softwood plantations in Southern NSW, Australia. Timber used in the CLT is regrown in Australian softwood plantations in 90 minutes. This timber sequesters 753 tonnes of C02 through its growth.

The C02-eq stored in the 965 m^3 of CLT supplied is the equivalent to the emissions from an individual taking 195 return flights from Auckland to London or saved by taking 446 cars off New Zealand roads for a year.

Projects

888 Colombo Street, Christchurch

Project Details

Location	Christchurch
Value	+$20m

Timeframe

Start Date	2023
Completion Date	In consent – 2025

Project Brief

ENGCO was appointed to provide comprehensive civil engineering design services on a new residential development.

The Civil Engineering services included Stormwater, Wastewater, Water Supply and Pavement Design, as well as Construction Monitoring and sign-off.

The development consists of 70 new mid to high end residential dwellings, access road and parking areas

Relevance

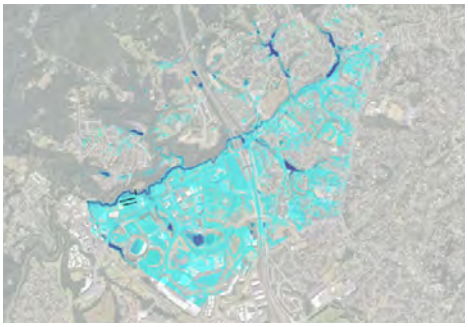
Challenges	The development was affected by 10% AEP, 1%AEP and 0.5%AEP flood event. By conducting a detailed site investigation and reporting the Council agreed with the finding that the 10%AEP hazard notice could be removed. ENGCO prepared a 3D ground and a Flood Model, from which were able to mitigate flood risk on the development site as well as flood displacement on neighbouring properties.
Team Approach	The 3D model optimised the earthwork by mitigating flood risk and ensure stormwater runoff is managed during all storm events
Project Outcome	Significant cost savings on pump systems as well as increased building heights with complex foundations.

Projects

Pacific Padel, Auckland

Project Details

Location	Albany, Auckland
Value	+$2m



Timeframe

Start Date	2024
Completion Date	In construction – 2025

Project Brief

ENGCO was appointed to provide a comprehensive civil engineering design for a new sports facility development.

The Civil Engineering services included a 3D surface model over 4,000m² as well as a flood model for a 6.4Ha catchment. ENGCO was required to assess the effects of the development on the existing overland flow paths, Lucas Creek and neighbouring properties.

Relevance

Challenges

The development is affected by the 10% AEP, 1%AEP and 0.5%AEP overland flow paths and flood events. The site is also located within a flood prone area. The development is placed within the overland flow path and it was required to provide detailed flood model data as part of the resource consent application showing that the overland flow paths and flood depths would either remain unchanged or have no effects on neighboring properties.

ENGCO prepared a 3D ground and a Flood Model, from which design was able to mitigate flood risk on the development site as well as flood displacement on neighboring properties.

Team Approach

ENGCO modelled the stormwater runoff with the use of Hydrologic Engineering Center's River Analysis System (HEC:RAS), using the existing LIDAR contour data available from LINZ, Topographical survey, and Auckland Council TP108 Figure A.6 rainfall depth.

ENGCO developed a rain on grid model to determine hydrographs within the catchment and Lucas Creek. Furthermore, refinement regions were also modelled to determine the effects of the development on the overland flow paths and downstream catchment.

Project Outcome

A full pre-to-post development flood and ground model of the proposed development was completed, and the design successfully mitigated any flood risk upstream and downstream of the development.

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