
Tonkin+Taylor
60 years
of leading
dam expertise
www.tonkintaylor.com

Introduction

Construction of Whau Valley dam in Whangārei, the first large dam designed by Tonkin + Taylor, (T+T) began in 1967.

In the 60 years since then, T+T has developed concepts, assessed feasibility, and designed many dams, hydropower schemes, and other large water infrastructure.

We continue to provide dam safety and technical advice for a number of these dams and schemes while forging ahead with the creation of new schemes.

In this booklet, we commemorate the achievements of our first 60 years of dam engineering, and recognise the legacy created by those that were instrumental in creating our dams business. A selection of key projects from the last 60 years is presented in the following pages.

The key leaders

While there have been many talented staff contributing to our dams business over the past 60 years, we would like to recognise the leadership and long involvement of:

- Alan Pickens
- John Duder
- John Grimston
- David Bouma

Alan, John G. and David served on the Management Committee of the New Zealand Society on Large Dams and contributed to the 1995, 2000, 2015, 2023 and 2024 versions of the New Zealand Dam Safety Guidelines.

Alan Pickens

Alan was instrumental in creating the T+T dam engineering business in the mid-sixties. He was lead designer on Whau Valley dam and most of the earlier dams and hydro schemes developed by T+T throughout the seventies and eighties. Alan is well recognised in the industry for his innovation and for finding the most cost-effective way to create these schemes. Many of our past and current dam engineers have benefited from working with Alan, who continued to provide technical expertise to our projects right through to 2016, when he retired. T+T acknowledges and greatly appreciates Alan's contribution of more than 50 years to this part of our business.

John Duder

John joined T+T in 1973 to work on the Tongariro power scheme, and has played a large part in developing the hydro power and dams business at T+T. John helped to develop the Aniwhenua hydro scheme, and was a key player in some significant hydropower studies in Malaysia and the Solomon Islands, building a strong international and local business. A great mentor and supporter of our dam engineering team for some 52 years, John continues to provide dam safety and engineering advice to a number of clients, and assists T+T with some of our projects.

John Grimston

John joined T+T in 1991 as a senior water resources engineer. He had a strong background in dam and hydro engineering, and led our Water Resources group from 1995 to 2007. Under John's leadership, T+T's New Zealand dam and hydro business continued to grow, with significant hydro power scheme development studies and the creation of the Opuha dam project. This was followed by a nine-year period of leading T+T International's hydropower and dam engineering projects in the Philippines and further afield. John continued to provide his wealth of experience to the T+T business, both within New Zealand and on international projects until he passed in 2020. John left a legacy of projects and inspired dam engineers from his 29 years at T+T.

David Bouma

Since David first joined T+T in 1987, he has made a significant contribution to T+T and its clients through project work and multiple management and leadership roles. This includes leading T+T's Tauranga Group from 2008 to 2015, continuing to strengthen T+T's New Zealand dam and hydro business as Business Leader - Dams (NZ) from 2011 to 2018, and fostering expertise as Technical Director - Dams and Rivers. He has contributed to the wider industry on the Management Committee of the New Zealand Society of Large Dams, leading the 2023 and 2024 updates to the New Zealand Dam Safety Guidelines, and as an elected member of the International Commission on Large Dams Technical Committee on Levees. Over the last 17 years, David has continued T+T's legacy of investigations, design, and construction supervision of numerous dam upgrades, dam replacements, and new dams. He has led dam safety inspections, Potential Impact Classification, dam safety assurance programmes, and provided certification for a remarkable proportion of New Zealand's Classifiable dams as one of New Zealand's first Recognised Engineers.

Whau Valley water supply dam

Whangārei | New Zealand

Date: 1967 - 1969
Client: Whangarei District Council

Tonkin + Taylor roles in this project

Concept, site investigation, feasibility, design, observation and surveillance.

Project description

This project included a 25m high earth dam for Whangarei City water supply. Rolled clay embankment over soft foundation soils with plastic concrete cut off wall. Exceptionally high spillway flood capacity.

References + awards

"The Whau Valley dam", Pickens, Alan G, New Zealand Engineering 15 December 1970 p.319-324.

Dam 19 wastewater treatment dam

Kinleith | New Zealand

Date: 1972
Client: New Zealand Forest Products Ltd, Oji Fibre Solutions

Tonkin + Taylor roles in this project

Site investigation, design and construction supervision.
A comprehensive effluent treatment system for waste water from the pulp and paper mill.

Project description

This project included a 20m high dam that retains a reservoir of 350,000m^3 in which aerators were installed, and through which there is a constant flow via a chute spillway of 16m^3/s capacity.

Mangatangi water supply dam

Hunua | New Zealand

Date: 1971 - 1977
Client: Auckland Regional Council, Watercare

Tonkin + Taylor roles in this project

Detailed investigations, design and observation.

Project description

This project included a 80m high earth/rockfill embankment dam with bellmouth spillway: a key component of Auckland's bulk water supply feeding the Ardmore treatment plant.

Aniwhenua Hydroelectric Scheme

Galatea | New Zealand

Date: 1973 - 1980
Client: Bay of Plenty Electric Power Board, Southern Generation

Tonkin + Taylor roles in this project

Feasibility study, environmental impact assessment, design, construction supervision, commissioning and ongoing surveillance.

Project description

This project included a 25MW river diversion hydroelectric scheme comprising 10m concrete/earthfill barrage, two radial and three flap spillway gates, 2.2km concrete lined canal and intake, 20m high rockfill headpond dam, penstocks and intake power station with two Francis turbines.

References and awards

"The Aniwhenua hydroelectric scheme", Pickens, Alan G. Leyland, Bryan W. Duder, John N., Published in Water Power & Dam Construction December 1987.

"Reservoir sedimentation - some aspects of reservoir asset management", Duder, John N., Presented at: The 9th conference of the British Dam Society held at the University of York, 1996. Published by Thomas Telford, London.

Ruakohua water supply dam

Glenbrook | New Zealand

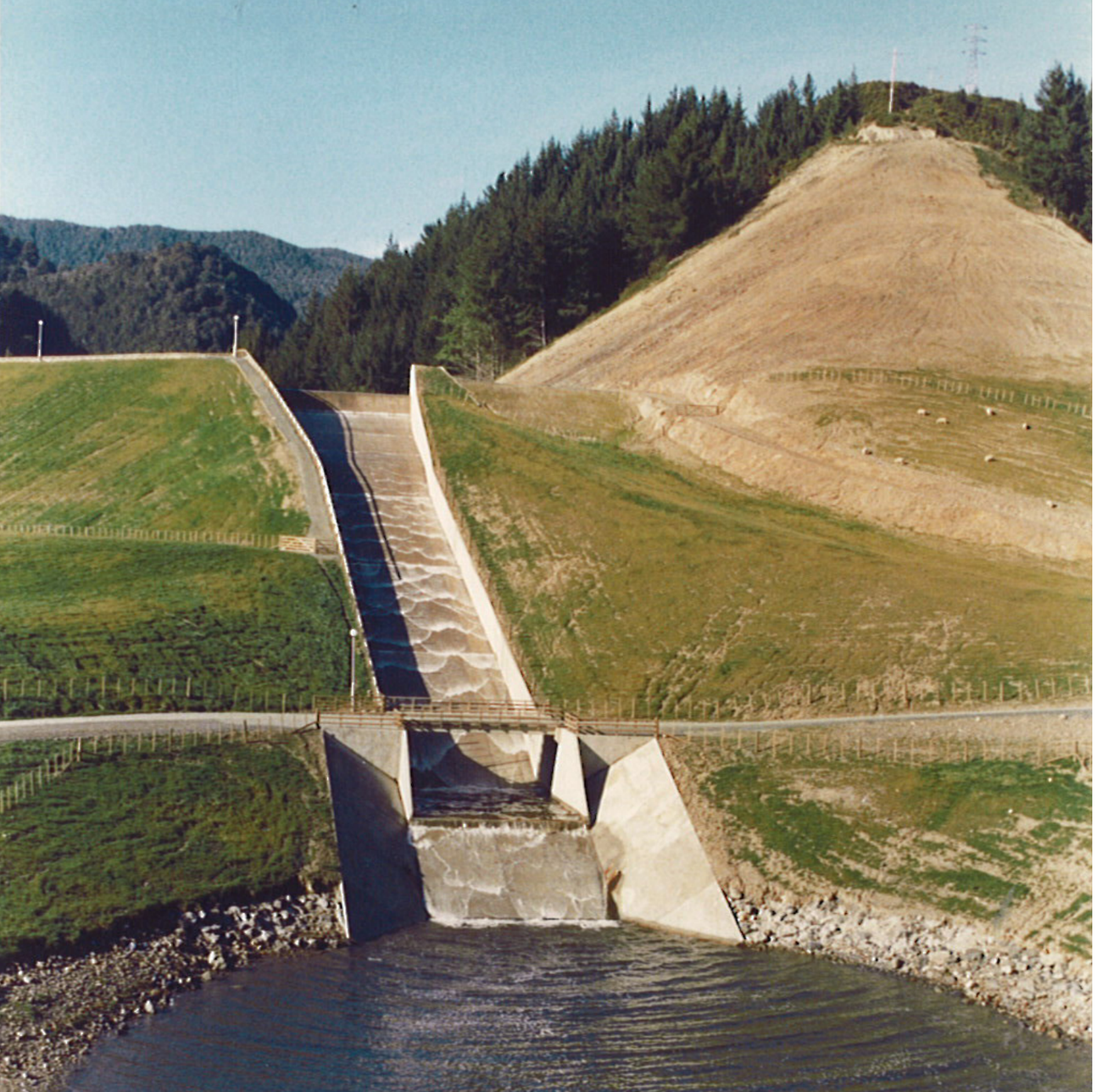
Date: 1979 - 1980
Client: NZ Steel

Tonkin + Taylor roles in this project

Feasibility study, design and construction administration, and ongoing surveillance.

Project description

This project included a 18m high earth dam built on and with weathered basalts and volcanic ashes forming a key component of the water supply scheme for New Zealand Steel Glenbrook Mill, together witha a unique river intake, pumpstations and pipeline to the on site dam.



Maitai water supply dam

Nelson | New Zealand

Date: 1980 - 1987
Client: Nelson City Council

Tonkin + Taylor roles in this project

From concept through feasibility and design to construction administration and surveillance.

Project description

This project included a 40m high earthfill dam on North Branch of Maitai river, with intake tower, concrete service spillway and auxiliary fuse plug spillway.

References and awards

“The Maitai water supply project”, Pickens, Alan G.
IPENZ 1989 conference proceedings.

Mangaotuku and Huatoki flood detention dams

New Plymouth | New Zealand

Date: 1984 - 1985
Client: New Plymouth City Council

Tonkin + Taylor roles in this project

Detailed investigations, design, observation and surveillance.

Project description

This project included 25m and 15m high earthfill dams with through-culverts for throttling flood inflows.

References and awards

“Flood detention dam design”, Pickens, Alan G.Matuschka, Trevor, Paper presented at the IPENZ Annual Conference in February 1988; Transactions Vol.15 No.3/CE, November 1988.

Golden Cross tailings and silt control dams

Waihi | New Zealand

Date: 1987 - 1998
Client: Cyprus Gold NZ, Coeur Gold

Tonkin + Taylor roles in this project

Concepts and prefeasibility, feasibility, design and observation. Direction of investigations and feasibility study for raising dam crest, direction of investigation and design measures for landslide stabilisation.

Project description

This project included a 70m high earth rockfill (tailings) dam and 15m high earthfill (silt control) dam. Design of main tailings retention dam and saddle dam including zoning of dam to match pit schedule, stability analyses for short term and long term conditions and intermediate stages, and design of internal drainage system for final rehabilitation and closure.

Te Marua Lakes water supply dams

Upper Hutt | New Zealand

Date: 1979 - 1985 and 2008 to 2025
Client: Wellington Regional Council, Wellington Water

Tonkin + Taylor roles in this project

Detailed investigations, design, contract administration and surveillance.

Project description

This project included a 18m high earthfill (gravels) ponds with bentonite enhanced soil upstream lining and concrete intake structures. Special design features in respect of adjacent active Hutt Valley fault.

References and awards

“Design and construction of seismic enhancement works for Stuart Macaskill Lakes, Upper Hutt, New Zealand”, Eldridge, Simonne, Cherrill, Hugh E. Taylor, Mark C.N. Croft, Simon F. ANCOLD 2012 Perth.

Manuwai and Waingaro irrigation dams

Kerikeri | New Zealand

Date: 1979 - 1983
Client: Kerikeri Irrigation Company

Tonkin + Taylor roles in this project

Prefeasibility, feasibility, design, surveillance and construction supervision.

Project description

This project included 33m and 28m high earthfill dams featuring construction with sensitive volcanic ashes. Mitchell turbine for irrigation pumping.

References and awards

“The Kerikeri irrigation scheme southern and northern area storage dams”, Pickens, Alan G.

Opuha irrigation and hydropower dam

Fairlie | New Zealand

Date: 1995 - 1999
Client: Doug Hood Ltd, Opuha Water

Tonkin + Taylor roles in this project

Design Build and detailed design, construction observation and commissioning.

Project description

This project included a 50m high earthfill embankment with Obermeyer gates on stepped spillway for 7.5MW power station, diversion, power and irrigation conduit and downstream regulating weir structure.

References

"The Opuha Dam project", Pickens, Alan G.Grimston, John O, NZSOLD/ANCOLD 2001 Conference on Dams.

Karapiro Dam stability enhancement

Karapiro | New Zealand

Date: 1997 - 1999
Client: ECNZ Northern Generation, Mercury

Tonkin + Taylor roles in this project

Structural and stability evaluation including 3-D finite element structural analysis of the dam components under seismic loading and foundation and field testing / investigation programme. Then remedial works design and construction supervision.

Project description

This project comprised remedial works to a 52m high concrete arch dam on Waikato river with left abutment gravity structure and thrust block; penstock intake structure for 96MW powerstation and a gated spillway.

References and awards

"Karapiro Dam - stability investigations and enhancement works", Walker, Jim; Gillon, Murray Grimston, John O, Proceedings ANCOLD Conference on Dams, Jindabyne, Australia October 1999.

"Karapiro Dam stability enhancement project – construction", Orange A, Dawson Robin M, Australian National Committee on Large Dams: ANCOLD Conference on Dams 2002, 21-22 October, Adelaide, Australia.

East Tamaki Dam

Auckland | New Zealand

Date: 1998
Client: Manukau City Council

Tonkin + Taylor roles in this project

Investigation, detailed design, and construction supervision.

Project description

East Tamaki Dam, also known as Flat Bush Dam or Birmingham Dam, is a High PIC earthfill dam constructed for flood protection. The dam embankment is 110 m long, 9.5m high, and stores 740,000 m^3 at the dam crest.

Lake Hood recreational lake

Ashburton | New Zealand

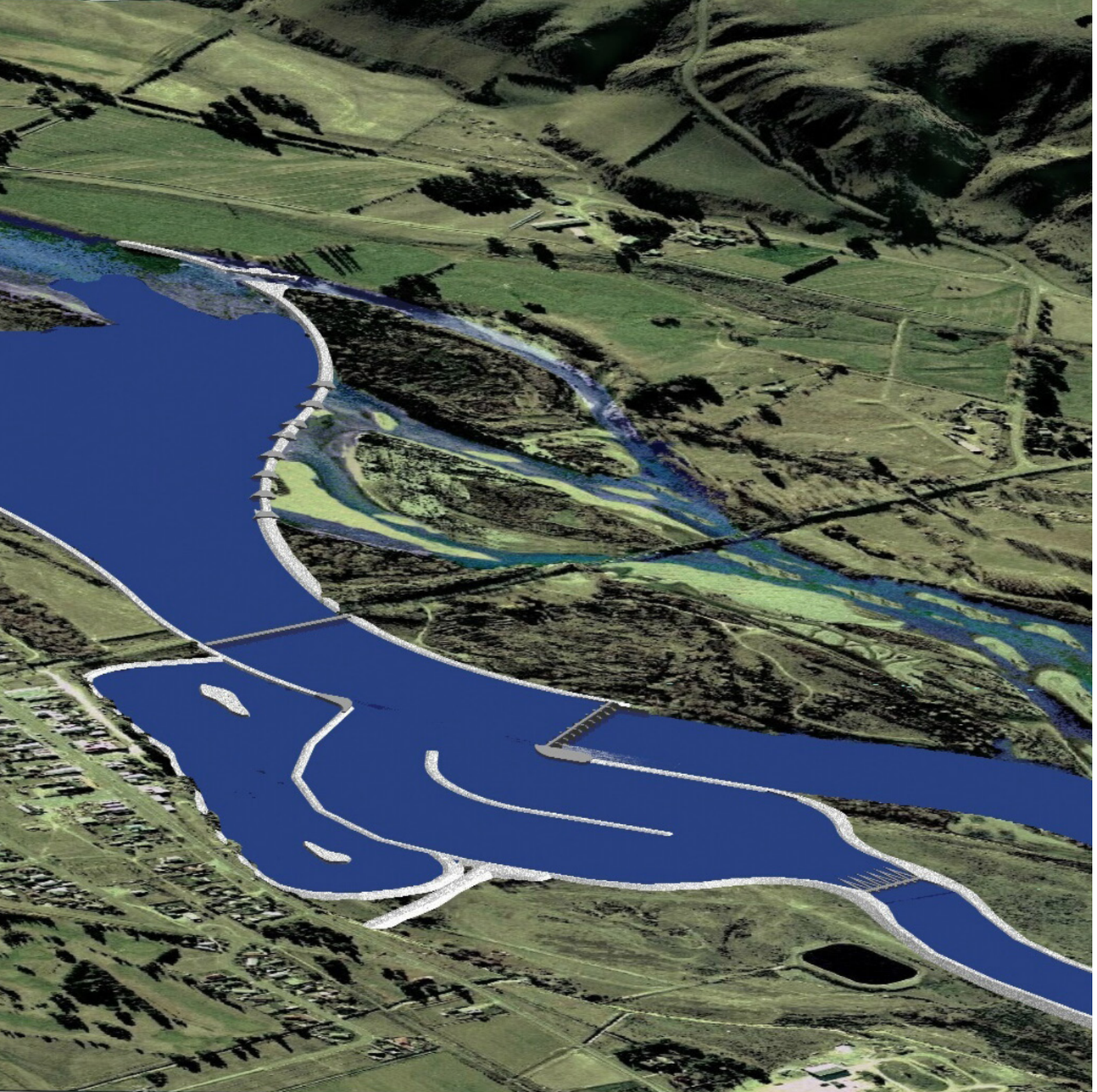
Date: 1999 - 2000
Client: Ashburton Aquatic Trust

Tonkin + Taylor roles in this project

Detailed design and construction supervision.

Project description

This project included an embankment dam and reservoir lining as key component of recreational lake and residential sub division.



Project Aqua Hydropower Scheme feasibility study

North Otago | New Zealand

Date: 2000 - 2003
Client: Meridian Energy.

Tonkin + Taylor roles in this project

Pre-feasibility, feasibility and design including geotechnical site investigations. Also, assessment of environmental effects support for consent applications for US$600M hydroelectric project.

Project description

This project developed and assessed the feasibility of a 540MW cascade hydro scheme with connecting canals, six 15 to 20m high headpond embankments and six power stations.

Delta irrigation dam

Blenheim | New Zealand

Date: 2002 - 2004
Client: Lower Waihopai Irrigation Co.

Tonkin + Taylor roles in this project

Feasibility study, detailed design and documentation, construction supervision and surveillance.

Project description

This project included a 24m high earthfill dam used to store irrigation water for a group of Marlborough vineyards. It features a bellmouth spillway and multi-level screened irrigation offtakes.

Wai-iti water augmentation dam

Wakefield | New Zealand

Date: 2003 - 2005
Client: Tasman District Council

Tonkin + Taylor roles in this project

Concept and options assessment, feasibility study, detailed design and documentation and construction supervision.

Project description

This project included a 19m high earthfill dam storing up to 800,000m^3 which is released as required during summer to provide irrigation water, environmental base flow, and groundwater augmentation.

Project Black Point irrigation scheme

North Otago | New Zealand

Date: 2004 - 2006
Client: WORKS Infrastructure, North Otago irrigation Co.

Tonkin + Taylor roles in this project

Detailed design and construction observation of project primary works, value $22M.

Project description

This project included two pumping stations total 18.2MW, 1.8m diameter 3.4km long rising main pipeline, 2.5km canal with 7m high fills and 10m deep cuts and associated structures. Civil and geotechnical engineering aspects for the primary infrastructure component of the Downlands Irrigation Scheme.

Award

Recipient of 2008 ACENZ Merit Award.

Waimea Community Dam

Tasman | New Zealand

Date: 2004-2019
Client: Tasman District Council,
Waimea Water Augmentation Committee

Tonkin + Taylor roles in this project

Prefeasibility, feasibility studies, ECI design and Detailed design, design, geotechnical investigations, hydrological analysis, water demand modelling, and expert evidence to support resource consent.

Project description

Prefeasibility engineering, environmental and economic assessments for multiple sites and options; feasibility storage and allocation options assessment; hydrological and yield modelling, site investigations, geological model development, dam design, and fish passage design to support resource consent; detailed design and risk assessment for selected 53 m high concrete faced rockfill dam (CFRD) and feasibility design of hydroelectric power add-on. Partnered with international CFRD experts, the ECI contractor and local consultants.

Sibulan Hydropower

Philippines

Date: 2007 - 2010
Client: Hedcor Sibulan Inc.

Tonkin + Taylor roles in this project

Detailed design of the two power stations, construction project management and review services.

Project description

This project included a run-of-river hydro power project with two independent hydro schemes, one upstream 16.5MW, the second downstream 26MW, totaling 42.5MW. Intake weirs on the two main rivers plus three tributary weirs; conveyance tunnels 2.3km long; low pressure steel conveyance and pipelines; 70,000 and 50,000m^3 headpond storages; desanding basins; steel penstocks some 7.4km long; two surface power houses with tailrace channels and switchyards; extensive access roading.

Mangawhai Winter Storage Dam

Mangawhai, Northland | New Zealand

Date: 2008-2010
Client: Water Infrastructure Group

Tonkin + Taylor roles in this project

Design, dam safety documentation, and construction supervision

Project description

Mangawhai Winter Storage Dam is part of the wider Mangawhai EcoCare Wastewater Scheme for the Kaipara District Council. The 6m high dam, retains a PE lined pond, which provides 176,100 m^3 storage (at NTWL) for treated effluent from Mangawhai Heads Treatment Plant, which is then irrigated to various sites in the Hakara North area during summer via an irrigation network.

Kourarau Power Scheme Upgrade

Masterton, Northland | New Zealand

Date: 2009-2010
Client: Genesis

Tonkin + Taylor roles in this project

Feasibility, detailed design and construction observation of dam upgrades

Project description

The Kourarau Power scheme comprises two low PIC puddle clay core earthfill embankment dams. The dams were constructed in the 1920s and required significant upgrades to meet current standards. T+T designed, downstream butresses, crest reinstatement, new auxliary spillways and spillway upgrades.

Ruataniwha Multi-purpose Water Storage Project

Hawkes Bay | New Zealand

Date: 2009 - 2019
Client: Hawkes Bay Regional Council

Tonkin + Taylor roles in this project

Prefeasibility and feasibility studies, design, geotechnical investigations, hydrological analysis, water demand modelling, and expert evidence to support resource consent.

Project description

This project included several earth and CFRD dam options for irrigation storage. Design review and cost estimates for proposed 83m dam on Makaroro River plus hydropower station, 21km of canals and 135km pipework to irrigate over 25,000 ha.

References

"The Ruataniwha Plains water storage project : sustainable irrigation for Central Hawke's Bay New Zealand", Leong, David C, Hansen, G.B.

Presented at ICOLD 2012 Kyoto: International Symposium on Dams for a Changing World.

Angat dam and dyke remedial works study

Philippines

Date: 2011 - 2012
Client: PSALM Corporation

Tonkin + Taylor roles in this project

Spillway capacity and hydrology study plus seismic studies including rehabilitation options for dam and dyke and associated costings and preliminary design and documentation for Design-Build Contract.

Project description

Angat dam project located north of Metro Manila is the primary water supply for the city as well as providing hydropower, irrigation and flood control functions. The study included a dam safety assessment of the 125m high Angat main dam and its 55m dyke dam. Remediation works proposed include raising cores to crest level; wave walls on upstream crests, flattening of downstream slopes with rockfill buttresses; filter and drainage zones on downstream slope of dyke dam. Review of the probable maximum flood resulted in substantial increase in design inflow and spillway capacity was found to be inadequate. A new spillway was proposed to address the shortfall.

References

“Angat multipurpose dam remedial works project”, Grimston, John O., Dawson, Robin M., Leong, David C, ANCOLD 2012 Perth.

Tudaya 1 and 2 Hydropower Project

Philippines

Date: 2010-2011
Client: SN Aboitiz Power

Project description
Detailed design.

Project description
Detailed design for the 13 MW, two station cascade involving three diversion weir and intakes, two desanding basins, 1.2 km tunnel, low pressure conveyance pipelines, penstocks, power houses and access roads.

Lake Rochfort Hydro Scheme

Westport | New Zealand

Date: 2010-2013
Client: Kawatiri Energy Ltdl

Tonkin + Taylor roles in this project

Geology, geotechnical engineering, dam safety, infrastructure design, and construction monitoring.

Project description

The scheme features additional capacity for stream diversion into the lake, a new 2.2 km long penstock from the lake to the base of Mt Rochfort, and a new powerhouse with a single pelton wheel turbine. A geomembrane faced rockfill dam has been constructed to seal the cutting through the lake edge where the 1 m diameter HDPE penstock was installed. The design capacity of the scheme is 4.2 MW produced from a head of up to 415 m.

References and awards

Design and Construction of the New and Improved Lake Rochfort Hydro Scheme, Westport, NZ
Finigan J and Bouma D 2013.

Huoi Quang Dam and Tunnel

Vietnam

Date: 2011-2020
Client: Hydropower Project Management

Tonkin + Taylor roles in this project

Technical review of the hydropower, engineering geology, hydrology, hydraulics, structural and civil aspects of the headworks through design and construction.
Dam safety panel adviser.

Project description

520 MW scheme, comprising a 104 m high concrete gravity dam and 4.6 km headrace tunnel. .

Ambuklao + Binga Dams Safety Services

Philippines

Date: 2007-2010, 2012-2013, 2024-2025
Client: SN Aboitiz Power

Project description

Dam safety audits, PMF routing studies, dam break studies, seismic review study, rehabilitation design, surveillance database design and set-up, flood forecasting and warning system reviews, operation, maintenance and surveillance and rehabilitation standards review, preparation of OMS manuals and emergency action plans, quantitative landslide risk assessment study, and Comprehensive Dam Safety Review.

Project description

Ambuklao comprises a 129 m high central core rock fill dam with radial gated ogee spillway, steep chute and flip bucket outlet, a 75 MW underground power station and 327 million m^3 capacity storage. Binga is downstream of Ambuklao and comprises a 107 m high zoned earth-rock fill embankment with inclined core, radial gated ogee spillway with steep chute and flip bucket, a 100 MW power station.

Bujagali Dam and Hydro Scheme

Uganda | Africa

Date: 2007-2011, 2023-2025
Client: Bujagali Energy Ltd

Tonkin + Taylor roles in this project

Environmental and social impact assessment plus dam break analysis and emergency preparedness planning for pre construction (2007-11). Operational phase inputs (2023-25) covering substantial update to EPRP, in country consultation, and 2024 CDSR.

Project description

Bujagali Dam and Hydro Scheme is a 250 MW run of river scheme that was commissioned in 2011/2012. The dam is up to 34.5m high and comprises embankment sections and a concrete gravity section housing the power station. The spillways comprise a gated service spillway and siphon auxiliary spillway with a nominal combined capacity of 4,500 m^3/s.

Lake Mainit Hydro Scheme

Mindanao | Philippines

Date: 2012-2018
Client: EDCOP

Project description

Detailed design and optimisation of all civil structures, geotechnical site investigations and interpretation of geology, production of Design Report, technical specifications for civil works and design advice during construction.

Project description

25 MW hydropower project which involves tapping the existing Lake Mainit and diverting flow through a ridge to the Bohol Sea via a gated intake, 3 km long 5.8 m diameter concrete lined horseshoe tunnel section, surge tank, 5.8 m diameter penstock trifurcating to 2.9 m diameter penstocks.

Aniwhenua Headpond remediation project

Galatea | New Zealand

Date: 2015 - 2016
Client: Nova Energy, Southern Generation

Tonkin + Taylor roles in this project

Forensic investigations, design options formulation, detailed design, consents support and construction observation by designer.

Project description

This project included a 18.5m high rockfill embankment and a key component of the 35 year old, 25MW Aniwhenua hydropower scheme. Scheme enhancements were proposed to mitigate leaks and identified risks by installation of a geosynthetic liner as the new primary seepage control measure for the headpond. Stream diversion through the penstocks was used to facilitate a minimal construction window.

References and awards

Contractor Federation Gold Award 2017 for excellence in the under $6M category.

Paremuka Lakes dam upgrade

Auckland | New Zealand

Date: 2021-2025
Client: Auckland Council

Tonkin + Taylor roles in this project

Design and construction observation for the longer-term remediation.

Project description

Built in the 1960s for the railway, the embankment was modified in 1998 to function as a dam and extended in 2008 for a second rail line. The High PIC dam is 11.8 m high with 20,000 m³ normal and 890,000 m³ maximum storage. Though the culvert could pass the IDF, its 1960s concrete had severely deteriorated. Emergency repairs in 2019 provided temporary stability, with full rehabilitation completed by Pipeline and Civil Ltd in July 2025.

References and awards

Spillway upgrades for dams that are also road or rail embankments" Ng K, Bouma D, Knappstein D, NZSOLD ANCOLD 2025 Conference.

Linton Park dam upgrade

Rotorua | New Zealand

Date: 2020-2025
Client: Rotorua Lakes Council

Tonkin + Taylor roles in this project

Preliminary design, detailed design, construction monitoring, and ongoing dam safety services.

Project description

This High PIC, earth dam was originally constructed for flood detention in 1998. The remedial works addressed several dam safety deficiencies, including an urgent lack of spillway capacity. The works included dam raising, addition of a concrete crest wall, replacement of the concrete primary spillway, and addition of a new auxiliary spillway. The design addressed complex ground conditions, including liquefiable foundations in some locations, and soft compressible foundations in other locations. The works were progressed under a fast-tracked staged Building Consent process and via emerency provisions in the Resource Management Act.

Morey Street dams

Rotorua | New Zealand

Date: 2021-2025
Client: Rotorua Lakes Council

Tonkin + Taylor roles in this project

Preliminary design, detailed design, construction monitoring, and ongoing dam safety services.

Project description

This project comprised two High PIC, large flood detention dams with challenging volcanic soil foundations, including pumice, ash and liquefiable sands. Morey Street East Dam is 17 m high and has a crest-full storage volume of 151,000 m^3. Morey Street West Dam is 10 m high and has a crest-full storage volume of 106,000 m^3. The primary spillways for both dams comprise a low level inlet and high level manhole riser, discharging to a 4 m diameter manhole riser drop structure, then to a 1.8-2.0m culvert.
The auxiliary spillways comprise open channels cut into natural ground. For Morey Street West, the auxiliary spillway comprises a concrete weir block discharging to a grouted riprap lined channel. For Morey Street East, the auxiliary spillway comprises an ungated ogee crest discharging to a concrete-lined channel.

Kennedy Road dam upgrade

Tauranga | New Zealand

Date: 2020-2025
Client: Tauranga City Council

Tonkin + Taylor roles in this project

Integrated catchment planning, Potential Impact Classification, detailed design and construction supervision of upgrade works.

Project description

T+T developed an integrated catchment solution for flood attenuation and water quality treatment to support residential development in the Pyes Pa West Area. The project involved upgrading the Kennedy Road embankment to function as a flood detention dam. A PIC assessment confirmed a low PIC category. Upgrade works included upstream and downstream earthfill buttresses, a 2.5 m diameter culvert acting as both primary and auxiliary spillway (installed by pipe jacking to maintain road access), and a low-flow culvert with a spillway drop structure. The design addressed challenging ground conditions, including liquefiable and compressible soils.

References and awards

Spillway upgrades for dams that are also road or rail embankments" Ng K, Bouma D, Knappstein D, NZSOLD ANCOLD 2025 Conference.

Dam 5

Tauranga | New Zealand

Date: 2020-2025
Client: Tauranga City Council

Tonkin + Taylor roles in this project

Integrated catchment planning, Potential Impact Classification, detailed design and construction supervision of the new dam.

Project description

T+T developed an integrated catchment solution to provide flood attenuation and water quality treatment to enable residential development in the Pyes Pa West Area. The solution included the construction of an earth fill dam on the Nanako Stream named Dam 5. As part of the works T+T undertook a PIC assessment which found the dam has a low PIC categorisation.

The dam is an 8 m high zoned fill earth embankment structure consisting of a low permeability core, granular downstream filter drain (chimney and foundation) and granular shoulders.
A 3.2m diameter profile wall HDPE culvert is constructed through the embankment which functions as the primary and auxiliary spillway. The design addressed complex ground conditions, including deep organic and soft compressible soils.

Mangima Hydro Scheme

Bukidnon | Philippines

Date: 2022-2025
Client: EDCOP

Tonkin + Taylor roles in this project

Design support / inputs and technical review of scheme design from concept to construction.

Project description

12 MW run-of-river hydropower scheme located on the Mangima River, including a concrete gravity diversion weir with reinforced concrete energy dissipation basin on schist rock, twin bay gated sluiceway, gated side intake structure with twin bay desander, 6 km long low pressure headrace pipe (HDPE), steel tower simple surge tank, above ground steel penstocks, surface powerstation with two units, and tailrace channel.

Other design projects

Sg Layang Dam, Malaysia
Date: 1976- 1982
ADB Feasibility study, followed by design + construction monitoring.

Martha Hill Gold Mining Project, Wahi, NZ
Date: 1985- 1988
Prefeasibility and feasibility studies, environmental impact assessment, water rights and mining license evidence followed by design and construction monitoring.

Branch Hydropower Project, Marlborough, NZ
Date: 1979- 1986
Pre-commissioning review, concept development and review for intake dam completion and upgrading.

Komarindi Hydroelectric Project, Solomon Islands
Date: 1988- 1992
Feasibility study with economic evaluation leading to detailed design and documentation.

Hawea Hydro Electric Development, Otago, NZ
Date: 1995- 1996
Feasibility study Included geotechnical investigations, costing and reporting.

Upper Clutha Hydro-Electric Development Options Review, Clutha River, NZ
Date: 1993
Reviewed the concept and costing.

Northland Wairua Falls Hydro Scheme Refurbishment, NZ
Date: 1993- 1995, 2006- 2007
Investigations and design.

Kaituna Hydroelectric Development Lake Rotoiti, NZ
Date: 1994- 1996
Prefeasibility and Feasibility Study.

Kioreweku Hydropower Scheme, NZ
Date: 1992- 1996
Options review leading to Feasibility Study.

Waihi Coeur Tailings Dam Raising + Investigations, NZ
Date: 1997- 1999
Stabilisation of the abutment hillside to arrest a large scale ground movement adjacent to the dam abutment.

Stebbings Flood Detention Dam, Wellington, NZ
Date: 1997
Concept, feasibility, design and observation.

Bankhouse Storage, (Irrigation), Marlborough, NZ (later renamed to Lake Pinot)
Date: 2001- 2002, 2005- 2007
Feasibility design then detailed design and construction supervision for the 400,000m^3 water storage embankment.

Wawa Dam, (waste storage), Kinleith, NZ
Date: 2001- 2002
Detailed analysis for tender design for pulp sludge earth dam constructed on compressible foundation. Followed by review and advice during construction.

Upper Wawa Dam, (waste storage), NZ
Date: 2002- 2003
Investigation, design and documentation and supervision for a new 22m high waste de-watering and storage dam.

Dam 22 Re-build, Kinleith, NZ
Date: 2004
Detailed design and construction supervision for re-build of wastewater treatment dam.

Silverstream Landfill Dam, Upper Hut, NZ
Date: 2004- 2005
Feasibility Study and detailed design or storm water detention and treatment dam at toe of landfill.

Kate Valley Landfill Water Supply and Silt Dams, Canterbury, NZ
Date: 2001, 2004- 2005
Preliminary analysis, design and costing for water supply earth dam for proposed Kate Valley Landfill. Design included; site selection, dam arrangement, flood routing, spillway design, geotechnical design, access road. Specialist advice and risk analysis of water demands and appropriate storage sizing. Then Detailed design and construction supervision.

Kaituna Hydropower Project, Bay of Plenty, NZ
Date: 2005- 2010
Studies and pre-consent support for the proposed hydropower scheme.

Opuha Dam Downstream Weir Overflow Embankment Reinstatement Fairlie, South Canterbury, NZ
Date: 2009
Detailed design, preparation of design documentation and construction stage inputs for the 2009 Overflow Embankment Reinstatement works.

Falcon Ridge Vineyard Irrigation Dam, Nelson, NZ
Date: 2010- 2012
Detailed design and construction observation for new 15m high water storage dam.

Stuart Macaskill Lakes Water Supply, Upper Hut, NZ
Date: 2008- 2013
Liner design and rehabilitation for the upgraded water storage reservoir.

Dam 19 Wastewater Treatment Dam, Kinleith, NZ
Date: 2011- 2012
Detailed design, Contract administration and construction supervision for the new auxiliary spillway to meet modern design standards.

Arnold Hydroelectric Scheme Expansion Project, West Coast, NZ
Date: 2005- 2010
Concept development, geotechnical investigations, feasibility study and consents support for new canal.

Magat Pumped Storage Hydropower Project, Philippines
Date: 2010- 2012
Phase 2 Feasibility studies.

Wairarapa Water Use Project, NZ
Date: 2013- 2016
A series of studies of the entire Wairarapa valley to develop concepts for multi-use water storage schemes to increase community resilience during droughts. Six single dam storage schemes were advanced through the full Prefeasibility programme of evaluation.

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