AUCKLAND HOSPITAL — CENTRAL PLANT & TUNNEL

All good on paper. But could we have done even better?

Hard-won technical & engineering lessons from what was called New Zealand’s most complex services construction project — shared with our industry peers.

240 m SERVICES TUNNEL

A01 EXISTING HOSPITAL BUILDING

A40 CENTRAL PLANT

One energy centre for New Zealand’s largest hospital

240 m

Services tunnel threaded beneath a live hospital campus

12 MW

HV capacity, backed by 5.4 MW of standby generation

2 separate 10 Mw HV incomers supply the new Sub Q

14.5 MW

Mechanical cooling served across the campus

IL4

Base-isolated importance level — 39 isolators from the US

100 yr

Design life, including a climate-change allowance

1-in-5,000

Year earthquake event the plant is designed to ride out

“The most complex services construction project in New Zealand.” — according to us…

Five design principles we set early — and held

01

IL4 + 100-year design life

Built for the 1-in-5,000-year design event — a 75% reduction in seismic effect on contents.

02

Continued risk reduction

A ring-main services concept removes single points of failure across the campus.

03

Hospital campus access kept open for the duration

Construction sequenced so access to the campus was never lost.

04

Site operational at all times

Thread a new tunnel and plant through a 24/7 hospital without interrupting clinical services.

05

Future-proofed for growth

Tunnel and plant sized and routed for buildings and maximum GFA extensions still to come.

The most resilient building in the country — but was it the best value?

ON PAPER

- 100-year design life at IL4 — the most resilient building in the country.
- 39 base isolators; a 75% reduction in seismic effect on installed plant.
- Concrete-framed for durability; to cover a 1-in-5,000-year design event.

IN HINDSIGHT

- Warranties run only 15–20 years — as little as 2–5 for many subtrades.
- The 100-year target added real complexity to reinforcement, steel and seismic bracing.
- Over-design is a real — and expensive — risk, not a free margin of safety.

TAKEAWAY Set design life and importance level against genuine whole-of-life value and warranty horizons — and challenge every resilience assumption explicitly.

Design to the ground you have — not the ground you feared

As-builts we couldn’t trust

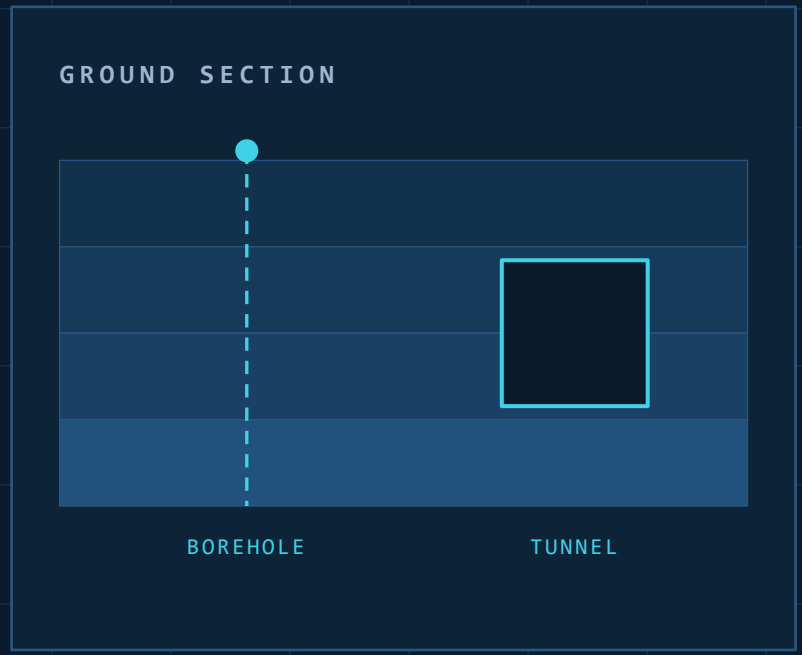
Assets appeared on no drawing, sat in the wrong place, or carried the wrong dimensions.

“The sky is falling” geotech

Conservative ground assumptions drove heavier tunnel temporary works and excavation than the competent ground actually needed.

The avoidable cost

Over-built temporary works, rework and variations — a missed chance for leaner, cheaper design.



TAKEAWAY Make intrusive investigation and extra boreholes the default — verify the ground before you design, and revisit the design when conditions prove favourable.

Subcontractors own nothing you didn’t draw

Detail = accountability

“Desktop” line-on-a-drawing left too little for contractors to price or be held to. Fully detail workable solutions.

Close the seismic gap

Bracing responsibility for services, plant and structure fell between parties. Sequence seismic design to follow the services documentation.

Right-size the supports

One-size-fits-all modular supports were grossly oversized on single-service runs. Specify flexible modular systems.

TAKEAWAY Treat documentation detail as business-critical — kill hybrid design responsibility with an error-checked responsibilities matrix.

A near-flawless cutover was designed in, not hoped for

STEP 01

PLAN EARLY

9-month plan embedded in the tender; planning began ~18 months out.

STEP 02

PROVE OFFLINE

Every system run in “island mode” before connection to the live hospital.

STEP 03

MIGRATE

20+ planned events across nights and weekends to protect clinical services.

STEP 04

HAND OVER

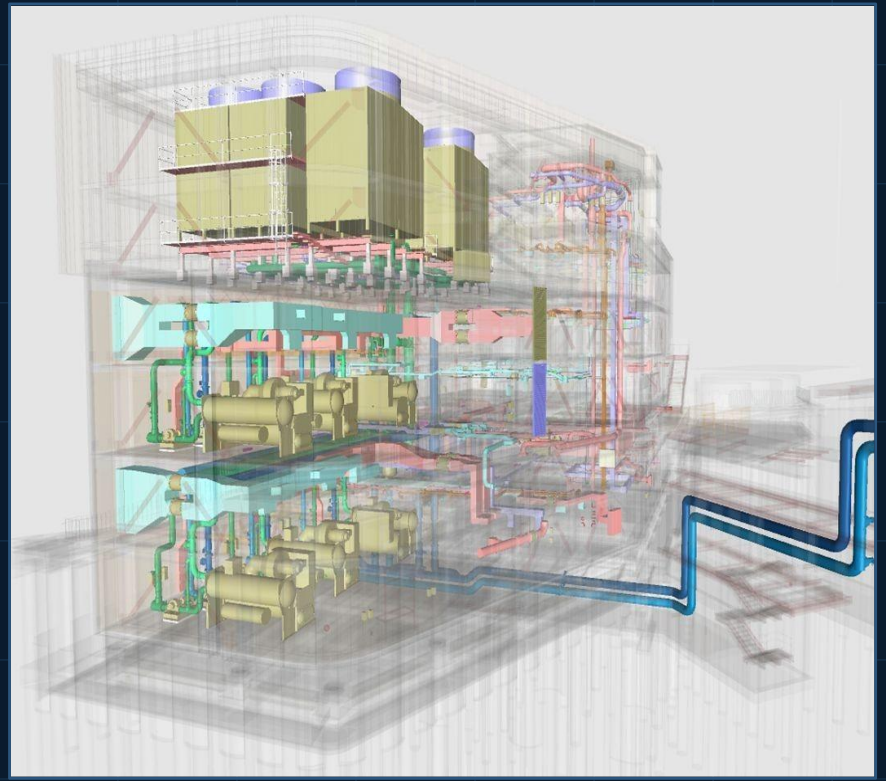
One full-site live cutover — zero rollbacks required.

BUT — COULD WE HAVE DONE BETTER?

Migration risk handed to the contractor created commercial conflict, added cost and lost time. Live-service migration belongs with the asset owner, who best understands the site.

What we’d carry into the next major project

- **Whole-of-life value over aspiration** — Resilience must pay back within warranty and replacement horizons — not just look good on paper.
- **Put risk with the owner who controls it** — Keep live-service migration with the asset owner; hand the contractor no ambiguity.
- **Ground truth first** — Intrusive investigation as the default, with all site information disclosed to the contractor.
- **Documentation is the deliverable** — Fully detail the design, sequence seismic to follow services, and close shared-responsibility gaps.
- **Plan for the shocks** — ~120 working days were lost to the wettest winters in a century — budget weather and supply-chain risk in.



Built for a 1-in-5,000-year event — the lessons are for every project in between.