

CASE STUDY

Christchurch Bus Interchange Redesign



Learn how Connexionz helped to reconnect communities with a modern bus interchange after devastating earthquakes destroyed the heart of Christchurch city.

Christchurch City's bus services and routes are managed and provided by Environment Canterbury (ECan) and, operate under the branding Metro. The former city bus exchange, built over the past twenty years, as a result from its remarkable success it was bursting at the seams within a decade. Improvements in bus services and infrastructure created massive growth outpacing the forecasts from which the bus exchanges design arose.


With off-site layover, stop sharing and dynamic bay allocation, Christchurch's former bus exchange was managing twice the bus flows in less than half the space of the on-street terminal it replaced. But everything changed when a devastating earthquake in February 2011 forced the closure and demolition of most buildings in the central city, including the bus exchange.

REDESIGNING A NEW BUS INTERCHANGE FOR THE CITY

To ensure growth and accessibility after the astonishing earthquake, the New Zealand government stated that its first rebuild anchor project would be a new central city bus terminal. It is well known that a successful transit project will help boost economies. The theory was tested to the limit when Christchurch's central business district had to be re-imagined from the ground up. The disaster had presented Christchurch an opportunity to start anew — creating stronger safer buildings and infrastructure fitted with advanced technology and systems.

This time it would have room for growth with a modern design comprising 16 operational bays, more seating, and several new facilities including a café, shops, and covered bike-lock area. It would also have the same high-quality services and infrastructure of the former bus exchange that customers demanded while providing some well thought out audible and visual components to assist passengers in finding their way and improving the station and system's accessibility.

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Bus routes would once again connect at the central bus station and extend out to reach nearby locations in Canterbury including; Kaiapoi, Woodend, Rangiora, Lincoln, Prebbleton, Templeton, and Rolleston. Most importantly, the central station could bring new development in from outside of the city limits via public transportation, which Christchurch was in need of badly.

OPPORTUNITY FROM ADVERSITY – TECH INNOVATION AND OPERATIONAL SUCCESS

Working with the Christchurch City Council and ECan, Connexionz was contracted to redesign, develop and install the core technology needed to manage bus movements and provide real-time bus information services.

But the new bus station design would be a controversial one. It would have sawtooth bays and reversing buses within an L-shaped building enclosure that would have an active retail frontage to two principal streets. The objective was to create a people-focused, small off-street bus station that would form a primary part of the city's fabric as a central destination in a prominent main street.

The innovative design was questioned as unorthodox and potentially unsafe with reversing buses, despite proven examples in the UK and European terminals. With extensive field testing to ensure it would work, New Zealand transit specialists set about guaranteeing the new Christchurch Bus Interchange would present a safe and modern mobility option that would contribute to getting the city working again.

The Interchange includes modern and innovative technology with essential safety features in the design. Locking glass doors that line up with the bus doors would segregate pedestrians from bus movements. Drivers would be trained to reverse into the wide roadways with 3D driver training simulation tools before taking to the wheel. Reversing cameras would be fitted in all buses. Alarms now ring if unauthorized people or vehicles are in the restricted bay areas. The technology successfully monitors every movement and directs drivers to their bays with additional help from automated processes such as door openings along the way. A central control tower would also watch over and manage everything via live camera and data feeds into their Connexionz ITS dashboards.

To help the design team meet these new challenges, Connexionz worked hard to upgrade its Intelligent Transport System (ITS) to control the bus movements in and out of the bays. The system had to manage every bus seamlessly, with sensors to enable automatic bay allocation, door opening and closing, and driver notification. It also had to be fully automated, with an extensive dashboard view of the entire network to provide control room staff the supervisory capability to manage every bay, bus, driver, and service.



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AGENCY IMPROVEMENTS

- › An ITS that will provide control room personnel with a dashboard view and supervisory control across the entire system
- › Dynamic bay allocation works well for compact transit terminals by making use of all bays and directing drivers which bay to go to
- › Automatic synchronous door systems keep passengers safe from reversing buses
- › Real-time information of bus location and stages of loading keeps operation staff fully informed of the network status

CREATING A FULLY-INTEGRATED PASSENGER EXPERIENCE

Today, Christchurch buses transport 18,000 passengers every day. With population and public transport growth, the system is expected to manage up to 70,000 passengers per day by the year 2041. It is no surprise the transit center is respected as a staple and core of the ongoing rebuilding effort in CBD.

The audio and visual components make traveling in and out of the CBD a lot easier for frequent riders.

Routes are grouped geographically into four groups of four bays. The ITS system then dynamically assigns bay numbers to approach buses based on route number and direction, notifying drivers via the displays located at the driveway entrance.

The system also tracks buses on approach to the bus station, monitors bay use and stages of loading in the station. It even can borrow spaces from adjacent stands to increase the natural standard of four stops to five or six if needed. This feature has been essential, as the ITS system has had to cope with some seriously out of order buses due to the extensive infrastructure rebuilding and traffic diversions throughout the city after the earthquakes.

Connexionz real-time information service also provides a fully integrated commuter experience by keeping passengers informed via electronic displays and the solar powered BusFinder™ display at bus stops, audio announcements, Braille totems, and even a Smartphone app. Passengers are directed to their allocated bay well before a bus is set to arrive. The system accommodates those with hearing or vision issues while making the transit experience seamless.

Respected transit consultant Jarrett Walker commented on the space in an article after the unveiling, "It's a fine building: spacious, well-lit, with a little cafe as well as great information, both human and automated." [\[read article\]](#)

A GREAT MOMENT FOR CHRISTCHURCH

When the new bus exchange opened in May 2015, the Canterbury earthquake recovery minister Gerry Brownlee said the facility's opening was "a great moment for Christchurch." He said,

"The Interchange is stylish and user-friendly, with airport-style passenger lounges that will ensure people can wait for their buses in comfort and be protected from the elements. It is also designed with a real emphasis on safety and sustainability. Having an attractive facility like this is crucial if we want to attract more people to public transport."

The redesign of the Christchurch's new bus interchange continues to receive significant international interest from global agencies seeking to improve service efficiencies and increase patronage.

"The new terminal is impressive. It's modern, clean, efficient and more spacious than the previous bus exchange. The enclosed waiting areas are comfortable and dry, the information is clear and easy to follow, and the automatic doors keep the warmth in and the exhaust fumes out. I've used buses in some cities overseas, and by comparison, I think we have one of the best and most commuter-friendly bus terminals in the world."

– Susan Rollins

BETTER SERVICE FOR PASSENGERS

- › Clear signs and intelligent integrated technology keeps passengers well informed throughout their journey.
- › Real-time information of bus arrival and departure times makes the trip less stressful and more comfortable.
- › Automatic synchronous opening of both bus and exchange door systems maintains climate control, ensures passenger safety, and protect riders from fumes.
- › Audio announcement and Braille totems help hearing and visually impaired passengers to locate their bus.

