

IPENZ TRANSPORTATION GROUP CONFERENCE 2015

Delivering Auckland City Centre's First On Road Segregated Cycleway

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ABSTRACT

The Auckland City Centre Masterplan identified the need to increase the proportion of trips made by bike. Beach Road is a key entry into the city centre, and an important link to the city fringe and waterfront. The road had no current cycle facilities, but was identified as a Cycle Metro route in the Auckland Cycle Network which means that the highest quality facility should be provided.

In 2010 the NZ Transport Agency began investigations into extending the existing Northwestern Cycleway along Grafton Gully to terminate at Beach Road. The Beach Road Walking and Cycling Improvements project provides a link from the Grafton Gully cycleway to existing cycling facilities on Quay Street via Mahuhu Crescent. It provides a dual-direction cycle facility which is the first separated on-road cycleway in Auckland's city centre.

A key challenge of the project was to achieve a scheme that was affordable, fundable and consentable. This paper describes the preparation of the detailed design for this showcase project, and outlines the novel design features and challenges encountered in achieving stakeholder support. It will also outline the next stage of the project which will incorporate streetscape enhancements between Britomart Place and Mahuhu Crescent.

EXISTING SITUATION

Beach Road is generally flat with a number of horizontal curves. Located within the Quay Park Precinct of the Central Area Boundary of Auckland's CBD (see Figure 1), Beach Road is classified as a District Arterial road. Prior to the project being implemented, the road had two lanes in each direction with additional turning lanes provided at intersections; however, a small section (150m) between the Stanley Street / The Strand intersection and Churchill Street contains just one vehicle lane in the city-bound direction. Traffic volumes are typically about 20,000 AADT with a high proportion of heavy vehicles.

Between the Churchill Street and Tangihua Street intersections, there is pay and display car parking along both sides of Beach Road between intersections. Parking is limited by property access and a single bus stop on the eastern side of Beach Road. Beach Road is notorious for cars and vans parked all over the kerb and footpath.

There are signalised intersections at Te Taou Crescent, Mahuhu Crescent, Tangihua Street, Anzac Avenue and Britomart Place.

Te Taou Crescent has two connections off Beach Road and loops around the Railway Station Gardens. Te Taou Crescent is a one-way street for much of its length, with traffic moving in a clockwise direction. The exception to this is the southern leg of the loop which provides access to car parking and the area to the rear of Vector Arena. The southern intersection with Beach Road is

signalised with a free left turn out of Te Tauo Crescent.

Mahuhu Crescent / Tapora Street have one lane in each direction with some pay and display parking. At the Beach Road / Mahuhu Crescent intersection, there is a double right turn out of Mahuhu Crescent onto Beach Road. Traffic is very light on Mahuhu Crescent and Tapora Street, but experiences heavy traffic volumes during events at the Vector Arena.

For most of its length, Tangihua Street has three lanes southbound (towards Beach Road) and two lanes northbound (towards Quay Street). Tangihua Street was observed as having both high traffic numbers and a high proportion of heavy vehicles as it serves both the Countdown Supermarket and one of the entrances to the Port of Auckland. It is classified as a District Arterial Road.

Britomart Place has one lane in each direction with additional short lanes at the intersections. Traffic counts are about 6,000 vehicles (annual average daily traffic).

STRATEGIC CONTEXT

City Centre Masterplan

The City Centre Masterplan (CCMP) was adopted in August 2012 and sits under the Auckland Plan. The CCMP sets the vision and direction for the City Centre. It includes the need to ensure that the city centre is highly accessible and identifies the need to undertake a significant modal shift, with sustainable modes (which includes cycling) envisaged to make up 20% of peak hour trips by 2041.

The CCMP seeks to significantly improve the public realm of the city centre to cater for the growing population of residents, workers, and visitors.

Beach Road represents a key entry into the city centre, and a link to the city fringe (namely Parnell). To which end it needs to cater for movement demands, strengthen the link between the city centre and the city fringe, and provide a key transition into pedestrian and liveable city streets.

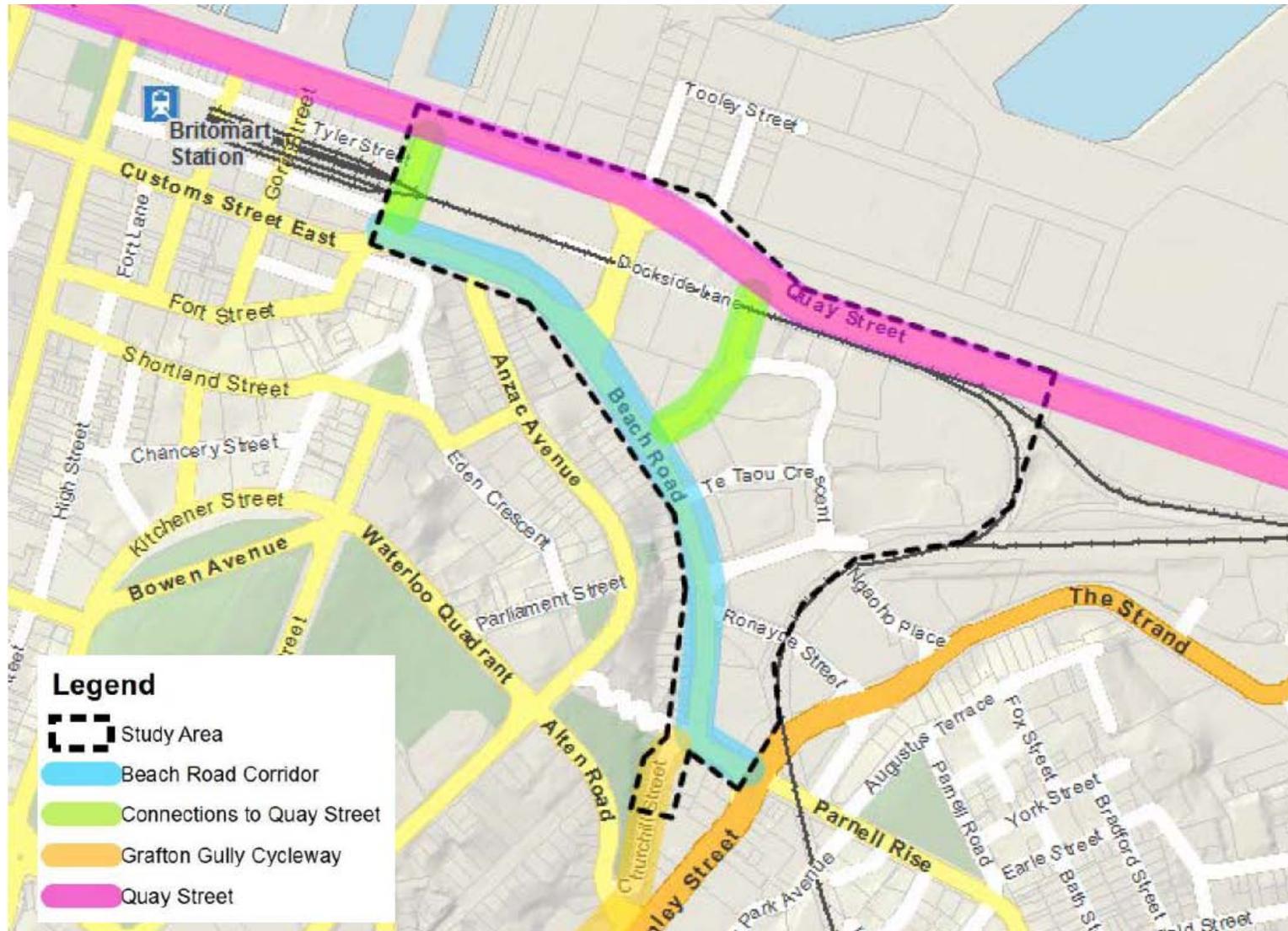
Beach Road also represents one of the barriers between the city centre and the waterfront, and is discussed in the CCMP under Transformational Move 1 - Harbour Edge Stitch. The CCMP has identified the broad paved areas along Beach Road as providing place making and public realm improvement opportunities.

Central East West Transport Study

Auckland Transport has undertaken the Central East West Transport Study (CEWT study) in response to the CCMP and Integrated Transport Programme to guide the future transport decisions for east-west corridors through the City Centre.

The draft CEWT study identifies the requirements for Beach Road to provide for bus, general traffic and cycle movements, while also improving pedestrian movement along and across the street. The draft CEWT study considers the following necessary: "bus lanes and dedicated cycle lanes, and general traffic access, especially near SH16 connections. Design improvements to maximise pedestrian capacity and quality, especially North-South crossings".

Figure 1 - The Beach Road Corridor



Auckland Cycle Network

The Auckland Cycle Network (CAN) is Auckland Transport's blueprint for developing a well-connected and convenient cycle-friendly region. The ACN has been developed based on the five main principles of coherence, directness, safety, attractiveness and comfort.

The ACN's function is to:

- Serve as a key planning tool and guide for investment
- Provide the strategic programme for cycling infrastructure development in Auckland
- Define levels of service so there is clarity for cyclists using these routes
- Provide a designated network that serves longer-distance cycle trips, as well as everyday cycle trips.

The ACN has been divided into three categories reflecting their function within the ACN to support a strategic and prioritised long term programme of implementation. This three-layered approach will provide a quality, robust and comprehensive network that will make cycling a more attractive and feasible everyday transport option. They are:

- **Cycle Metros** – Provide regional links connecting metropolitan centres, public transport interchanges and other key regional destinations. They provide the highest level of service. Many of these routes are along motorway corridors or rail corridors.
- **Cycle Connectors** – Provide links to the cycle metros and key local destinations (e.g. public transport interchanges, town centres, residential areas, schools). They are often along arterial roads and some are along collector roads.
- **Cycle Feeders** – Provide neighbourhood access and links to the cycle connectors and cycle metros, key community facilities, schools, parks and reserves, and local services. The feeder network often aligns with the local board's greenways.

The Beach Road corridor is part of the ACN and is classed as a cycle metro. It will be the first two-way protected cycle lane installed on the Auckland road network and will provide a 1.25km cycle route. The corridor consists of a 3m-wide two-way cycle lane segregated from traffic and pedestrians along Beach Road, from Churchill Street to Te Taou Crescent South, and a 1.5m wide cycle lane from The Strand to Te Taou Crescent South, with a flush/raised median separating the cycle lane from traffic. The project will complete a key gap in the ACN between the NZ Transport Agency's Grafton Gully Cycleway (see below) and the cycle facilities on Quay Street. It will also support the creation of a distinctive street and public realm character.

Grafton Gully Cycleway

In 2010 the NZ Transport Agency (Agency) began investigations into extending the Northwestern Cycleway from Ian McKinnon Drive/Upper Queen Street along Grafton Gully, terminating at the intersection of Churchill Street and Beach Road. The Grafton Gully Cycleway is one of the most significant cycling projects in the Auckland region, and is expected to bring increased numbers of cyclists to Beach Road, which has no current cycle facilities. The Beach Road Walking and Cycling Improvements project was created to provide cycle facilities along this ACN route, which links the end of the Agency's Grafton Gully Cycleway and the existing cycling facilities on Quay Street.

BEACH ROAD SCOPING AND ASSESSMENT

In August 2012, a Draft Scoping Report was completed for Auckland Transport to identify potential routes and the design options to be taken forward to the Scheme Assessment stage. The Scheme Assessment phase identified the recommended route and facilities for the Beach Road cycle scheme to be progressed for detailed design. The recommended option was for a dual direction cycle facility to be provided on one side of the road, and included links between Beach Road and Quay Street along Britomart Place and Mahuhu Crescent.

KEY PROJECT OUTCOMES AND OBJECTIVES

The key Project Outcomes of the Beach Road project are as follows:

- Context – the design will respond sensitively with the local area (historic, cultural and existing)
- Character – the design will establish an appropriate character that reflects the immediate area, and be cohesive with the broader city centre
- Access and connectivity – the design needs to improve accessibility for all users within the site and to adjacent areas
- Safety – improve safety for pedestrians and cyclists; utilise both Crime Prevention through Environmental Design (CPTED) and Injury Prevention through Environmental Design (IPTED) Principles
- Cost effectiveness – be a cost effective development, robust and easily maintained
- Sustainability – considers sustainability principles through construction, operation, and management of streetscape.

The key objectives for the Beach Road project are to:

- Contribute to the regeneration of Beach Road, its associated streets and land uses
- Increase safety and encourage an increase in walking and cycling in the study area
- Expand the cycle network, provide continuous routes, and fill a key gap in the existing cycling network
- Provide cycle and pedestrian connectivity to the city centre and Quay Street/ Tamaki Drive shared path
- Incorporate place making provisions into the design
- Create a distinctive street and public realm character
- Provide a high quality, attractive and durable streetscape.

DETAILED DESIGN PROGRAMME

The contract to design the project was awarded by Auckland Transport in March 2014 and there was a requirement to complete work in the stage 1 area of the project by September 2014 and work in the stage 2 area of the project by June 2015. The two project areas are shown in Figure 2.

OVERALL DESIGN APPROACH

Overall the design team focused its initial work on the design elements that could impact on consenting at the start of the developed design process, to avoid unnecessary programme delays. The design was developed in accordance with ATCOP guidelines.

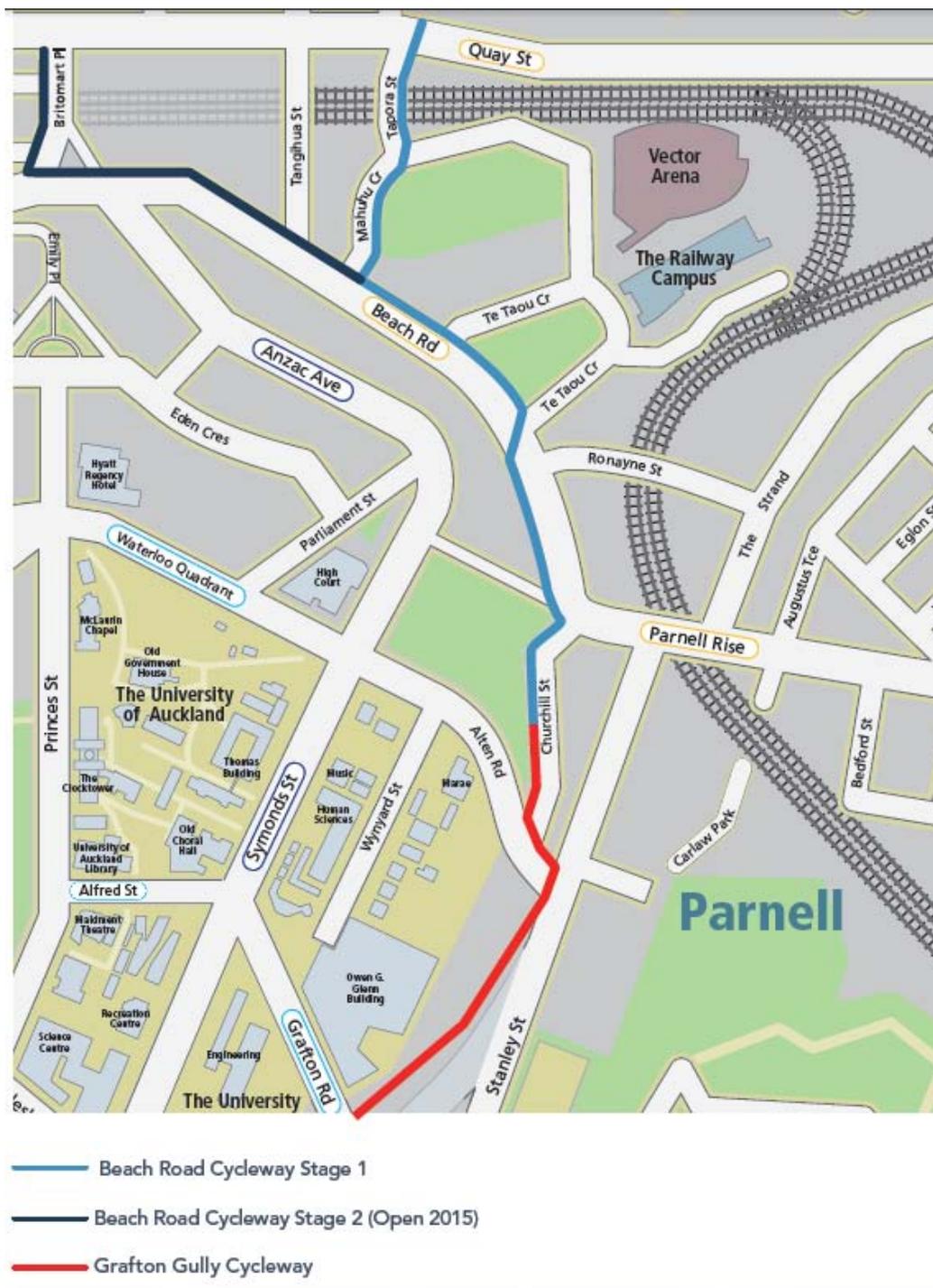
Design work was focused on the overall delivery of the Beach Road programme for Auckland Transport, rather than just the delivery of the detailed design. This focus allowed us to think holistically about project risks and consider planning and project interface risks also.

Throughout the project we held project briefing workshop with key stakeholders (including representatives of Auckland Transport, Auckland Council and the NZ Transport Agency). This was critical to confirming the preferred design option early on, and avoiding re-litigation of key issues and re-work.

In order to provide optimum design outcomes, and meet the timescales required, our methodology incorporated clearly defined objectives, deadlines and deliverables, as well as clearly defined hold points for stakeholder feedback and client decisions / sign off.

A key focus of the project was also to obtain stakeholder and Local Board buy-in and effective engagement with the community.

Figure 2– Stage 1 and 2 Project Areas



Resolving Conflicts between Cyclists and Left Turning Vehicles

A number of conflicts between cyclists and left turning vehicles existed in the scheme design. These were designed to reduce safety issues associated with the need for motorists to have to look backwards for cyclists before turning left.

Opportunities were identified in the design process to improve the interface between the cycleway and private access ways and therefore provide a higher quality cycling experience.

There are a number of driveway entrances along the southern side of the street adjacent to the

cycleway, so gaps are provided in the separator at the driveways. At the gaps there is a vertical element (rubber speed hump) in the gap in the separator to slow vehicles down (see Figure 3). The cycleway was also painted and stencilled over the driveway entrances to indicate to drivers that this is not just a separated parking lane.

Figure 3 – Gaps in the Vertical Elements



Beach Road / Te Taou Crescent East Intersection Design

The scheme design incorporated a partly off-road facility on a cycle path that effectively reduced facilities for pedestrian. The final design retained full footpath widths. The kerbs and associated drainage were left on the same alignment and a large tree retained. This achieved major cost and time savings.

The design was also modified to incorporate diagonal cyclist-specific crossing facilities at the intersection of Beach Road and Te Taou Crescent East (see Figures 4 and 5). This provided cyclists with a more direct means of crossing Beach Road.

Closure of Te Taou Crescent West Intersection

In order to resolve potential conflict between traffic turning left and right into Te Taou Crescent west from Beach Road, it was agreed that the Te Taou Crescent West intersection would be closed, apart from when events take place at the Vector Arena. Closure was achieved by installing removable bollards (see Figure 6). The closure of Te Taou Crescent Road required a number of design changes to be made to the adjacent car park, which required close consultation with affected parties.

Figure 4 - Te Taou Crescent East Intersection

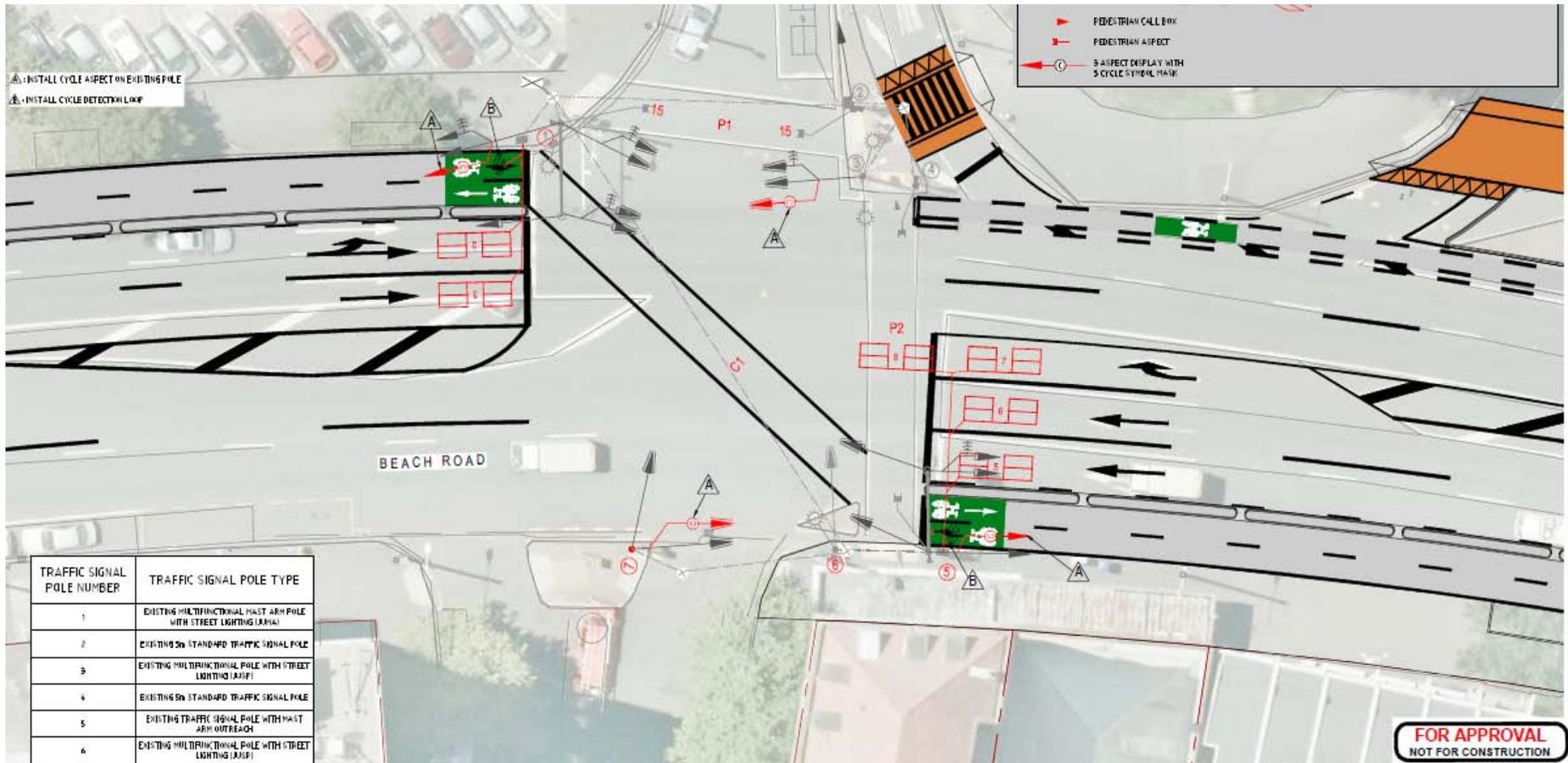


Figure 5– Start of Diagonal Cycle Crossing at Te Taou Crescent (East) Intersection



Figure 6– Closure of Te Taou Crescent (West) Intersection



Separation of Cyclists from Traffic

The design adopted effectively amounts to inserting a 150mm high, 800mm wide kerbed separator into the carriageway, between vehicles and cyclists, with gaps at the driveways. This approach was adopted for a number of reasons including the ability to keep the cars out of the cycleway, compared to what would be achieved with an Amsterdam style unit with a narrow 50mm high kerb.

The common approach in the Netherlands, for the elevation of the cycle lane to be closer to that of that adjacent footpath, was not adopted.

It is acknowledged however that the solution adopted does create an additional barrier to any pedestrian who crosses the road. Anyone with universal access issues can use the designated areas at crossings.

CONSTRUCTION OF THE RAISED KERB SEPARATOR

The design team worked in collaboration with the Civil Contractor to develop an innovative solution for procurement of the raised cycleway separator. A bespoke modular precast separator system was made to measure off site and attached to the pavement surface using epoxy resin. This both expedited the process for procuring and laying the separator, as well as ensuring minimal disruption to traffic during the construction process and minimising expenditure on costly traffic management. For images of the construction and the finished project see Figures 7 and 8.

Figure 7 – Raised Kerb Separator



Figure 8 – Raised Kerb Separator (Under Construction)

REACTION TO THE PROJECT

The project evoked a mostly positive reaction from stakeholders and transport professionals. The main strengths of the project can be summarised as

- It is not a shared path (mostly)
- The cycleway is well separated and wide (mostly)
- The improvements were built relatively cheaply and very quickly
- The road is narrowed for motorists
- Protective humps are provided at driveways
- The project managed to remove a significant amount of on-street car parking to provide room for the cycleway
- The project has delivered good safety outcomes for pedestrians e.g. raised table crossings.

The main areas for improvement are acknowledged to be:

- The project does not address Parnell/Stanley intersection (n.b. this is the NZ Transport Agency's responsibility and is planned to be addressed by them in the future)
- Supporting infrastructure (e.g. bike parking, rest areas, staging areas to mount/dismount) is not provided yet (this will be provided in Stage 2).
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IMPACT OF THE PROJECT

All engineering projects solve problems but some provide solutions that are transformational. This project does fit into that category. The project has laid a firm foundation for the future development of cycle infrastructure in Auckland.

This transformation has brought many immediate advantages to the area around the cycle facility, including improved cycle safety.

Aucklanders have voted with their bikes. The road now typically has over 300 cycle users a day—a figure that is more than double the level before the project was constructed. More importantly, the project has built the foundations for future development -not just of cycling projects but for Auckland Transport generally.

Cycling is now capable of fulfilling its essential role as a central backbone that unlocks the potential for a more effective multi-modal, inter-connected transport system.

The project has made an enormous contribution to the development of New Zealand cycle engineering. It has enabled Auckland Transport to make major advances in its technical and project management skills. The skills of the people involved have been hugely enlarged and strengthened through the experience gained in the course of this project. This will contribute to the broader revitalisation of New Zealand's cycle use and benefit the entire transport network. It will also help provide Auckland Transport with the skills it needs to drive the organisation forward.

STAGE 2 OF THE PROJECT

Beach Road Streetscape and Cycleway upgrade Stage two is the final stage of the Upper Queen Street Bridge, Grafton Gully, Beach Road cycleway network.

The improvements extend along the northern edge of Beach Road linking Mahuhu Crescent to Britomart Place. The proposed design incorporates a 3m wide segregated cycleway and pedestrian footpath. The carriageway, cycleway and footpath are separated by low coastal shrub planting which will provide cyclists a safe route into the city centre. The enhanced public realm will include high quality materials, seating, specimen trees and aesthetic lighting (see Figure 9).

Detailed design will be completed by February 2015. Construction is scheduled to start in March and be completed by July 2015.

CONCLUSION

Designing the cycleway was not just a case of installing some separators. The design team identified innovative solutions to difficult problems not fully resolved in the scheme design, and improved the overall quality of the final design e.g. changes to the position of cycle lanes to improve safety.

Implementing the project is not low hanging fruit by any stretch, and it has taken constant prodding within Auckland Transport and by organisations like Cycle Action Auckland and the Local Board to get the project moving.

The Beach Road cycle facility is one of a number of links planned for construction by Auckland Transport in next 12 months to provide a fully connected network of routes in the city centre. Examples are K Road facilities and additional north-south links on Hobson/Nelson Street.

FURTHER DETAILS

For more information on the final design see the educational video showing a cyclist using the cycleway at: <https://www.youtube.com/watch?v=fNlu7xaS2KA> and the article on Campbell Live at: <http://www.3news.co.nz/tvshows/campbelllive/cyclists-and-truckies-agree-on-safe-separation-2014100920>

Figure 9 – Stage 2 of the Project



REFERENCES

Auckland Plan, Auckland Council, (March 2012)

Proposed Auckland Unitary Plan, Auckland Council, (September 2013)

Auckland Cycle Network, Auckland Transport (2013)

Draft City East West Transport Study (CEWT), Auckland Transport (2013)