



Nelson Street Bridge Removal – Alternative Pedestrian & Cycle Access Assessment

Response to Sydney Metro SSI 15_7400 – Condition of Approval E95

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1. Executive summary

On 9 January 2017, the Minister approved the Sydney Metro City & Southwest - Chatswood to Sydenham application lodged by TfNSW as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval. This report addresses planning condition E95 for the CSSI Approval, which is as follows:

E95. The Proponent must in consultation with the TTLG review the need and opportunities for a pedestrian and cycle bridge across the rail corridor to replace the Nelson Street bridge. The review must be presented in the Interchange Access Plan(s) and the findings implemented by the Proponent.

1.1. Assessment process

This report responds to planning condition E95 through outlining the need and opportunities for a pedestrian and cycle crossing of the T1 North Shore and Sydney Metro rail line corridor in the vicinity of Nelson Street, Chatswood. This has been through:

- Consideration of existing and future land uses, pedestrian and cycle networks.
- Surveys were undertaken of pedestrian and bicycle rider movements in 2017 which indicated that around 210 pedestrians and 20 cyclists used the Nelson Street bridge on an average weekday. This amount of movement is typical of a local street. A conservative growth rate of 5% per annum was applied to estimate future demand and the impact to alternative routes with the closure of Nelson Street bridge. This finding was confirmed by the results of weekday and weekend peak counts in 2018 and 2019 compared pedestrian and bicycle rider movements before and after the removal of Nelson Street bridge and temporary closure of the Chapman Avenue underpass/ Frank Channon Walk.
- Connectivity options were identified in consultation with stakeholders. These options comprised: do nothing, replace the Nelson Street bridge, upgrade the Chapman Avenue shared path and provide a shared path along the northern side of Mowbray Road.
- These options were evaluated against a range of criteria including safety, customers, coherence, directness, capacity, comfort, construction impact and value for money.

1.2. Key findings

The assessment concluded that providing a replacement bridge on or near Nelson Street across the realigned railway corridor is **not practical** due to the required gradients for railway clearance and the high structure would impact on adjoining properties. As Nelson Street is a local link, a replacement bridge would offer limited benefits and poor value for money. A replacement bridge was not justified given existing and forecast active transport demands.

However, based on current and proposed bicycle/ pedestrian networks and strategies including how integration would occur with the future development of TfNSW and Council's proposed network infrastructure. The preferred option is to provide an up to three metre wide shared path along the northern side of Mowbray Road from Pacific Highway, connecting to the future extension of Frank Channon Walk.

This would link into the Mowbray Road bridge which provides a crossing over the railway. This preferred option will address future pedestrian and cyclist demand by providing the first stage of a strategic east-west walking and cycling route between Goodchap Road and Tindale Road along the Mowbray Road corridor. The option will provide adequate capacity for the forecast estimated demand.

A future upgrade of the Mowbray Road railway bridge can potentially be provided as part of the Chatswood Dive Site redevelopment. Bridge upgrade works are required for this option to the footpath at the eastern side of the Mowbray Road bridge to tie in the shared path along the northern side of the bridge to the nearby kerb ramp at the Orchard Road/ Mowbray Road intersection.

The Mowbray Road shared path option contributes to the development of future pedestrian and cycle networks and could be complemented through wider network solutions. Future elements that could be added to expand the walking and cycling network to build on the shared path includes:

- Retention of temporary construction stage traffic signals at Mowbray Road/ Hampden Road intersection. Sydney Metro will continue investigations with Willoughby Council and TfNSW (former RMS) on this option.
- Extension of the walking and cycling network along the rail corridor to Artarmon station to the south, potentially along the western side of the railway line as suggested by Willoughby Council. This would be facilitated by additional crossings of Mowbray Road at Hampden Road. Any signalised pedestrian crossing of Mowbray Road at the Hampden Road intersection would be subject to further assessment and separate TfNSW approvals.
- Extending the preferred shared path option to provide an east-west walking and cycling route between Goodchap Road and Tindale Road along Mowbray Road. This can include working with TfNSW (former RMS) to review the traffic signal timing at the Pacific Highway/ Mowbray Road intersection.

2. Background

2.1. Overview of the Sydney Metro in its Context

The Sydney Metro Project

Sydney Metro is Australia’s biggest public transport project, consisting of Sydney Metro Northwest which commenced operations in May 2019 and Sydney Metro City & Southwest which is due for completion in 2024. An overview of the Sydney Metro projects is shown in Figure 1.



Figure 1 Sydney Metro alignment map

Sydney Metro City and Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney’s CBD to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of five new metro stations. Once completed, Sydney Metro will have the ultimate capacity for 30 trains an hour (one every two minutes) through the CBD in each direction - a level of service never seen before in Sydney.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham application lodged by TfNSW as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval.

The approval includes all physical work required to construct the CSSI, which involves:

- the demolition of existing buildings and structures on each site;
- the construction of rail related infrastructure; an underground station with a southern portal and entrances, ground level pedestrian connections and supporting interchange and precinct enhancements; and
- In addition to the station the provision for the construction of below and above ground structure and other components to enable a future Over Station Development (OSD).

2.2. Purpose of assessment

As part of the CSSI approval, the demolition of the Nelson Street bridge is authorised to enable the delivery of the dive structures for Sydney Metro City and Southwest. Condition of Approval E95 requires the following:

E95 The Proponent must in consultation with the TTLG review the need and opportunities for a pedestrian and cycle bridge across the rail corridor to replace the Nelson Street bridge. The review must be presented in the Interchange Access Plan(s) and the findings implemented by the Proponent.

The interpretation of this planning condition requires Sydney Metro to assess the need and opportunities for a walking and cycling connection across the T1 North Shore and Sydney Metro rail line in the vicinity of Nelson Street.

In responding to this requirement, this report describes current and future walking and cycling patterns and demands along Nelson Street across the T1 North Shore line railway corridor. It provides recommendations for connectivity across the railway corridor following demolition of the Nelson Street bridge that occurs to enable delivery of dive structures for Sydney Metro City and Southwest rail tunnels.

2.3. Relationship to other planning conditions

Condition of Approval E95 requires that the review of opportunities for a replacement pedestrian and cycle bridge must be presented in the Interchange Access Plan(s) being developed for each of the Metro stations. The preparation of Interchange Access Plans is in turn a requirement of Condition E92 of the CSSI approval.

Sydney Metro is preparing Interchange Access Plan(s) in accordance with Condition E92 for each new metro station approved under SSI_7400. The northernmost station captured by an Interchange Access Plan is Crows Nest Station. The Nelson Street bridge, and any associated replacement opportunities, are situated about three kilometres north of Crows Nest Station. These are located within a different local government area and would not offer interchange options for Crows Nest Station.

The role of Nelson Street bridge and associated replacement opportunities in relation to Chatswood station, which is some 500m north of the bridge and does not form part of the SSI_7400 approval, has nevertheless been considered in this plan.

As such, Sydney Metro has prepared this document as a standalone 'Interchange Access Plan' that presents the review of the replacement opportunities for the Nelson Street bridge. This report forms the response to Condition E95 and has not been incorporated in either the Crows Nest or Chatswood Interchange Access Plans.

The requirements of Condition E92 relate to station access and interchange. Potential Nelson Street bridge replacement opportunities would not provide station access or interchange to metro stations approved under SSI_7400. This standalone Nelson Street bridge replacement 'Interchange Access Plan' has thus reviewed the requirements of Condition E92 as shown in Table 1 below.

Table 1 Review of requirements of Condition E92 for Nelson Street bridge replacement 'standalone Interchange Access Plan'

Condition of Approval E92 requirement:	Response
<p>The Proponent must develop an Interchange Access Plan for each station to inform the final design of transport and access facilities and services, including footpaths, cycleways, passenger facilities, parking, traffic and road changes, and integration of public domain and transport initiatives around and at each station.</p> <p>The Interchange Access Plan(s) must consider walking and cycling catchments and take into account:</p>	<p>This document forms the response to Condition E95, reviewing the need and opportunities for a pedestrian and cycle bridge to replace the Nelson Street bridge. It is provided as a standalone 'Interchange Access Plan' to meet the requirement of Condition E95 that the review must be presented in the Interchange Access Plan(s).</p>
<p>(a) station access hierarchy consistent with the transport planning principles defined in the EIS</p>	<p>Not relevant. The Nelson Street bridge and associated replacement opportunities do not provide access at Metro station(s)</p>
<p>(b) safe, convenient, efficient and sufficient access to stations and transfer between transport modes (including subterranean connections and the safeguarding of additional entrances in response to land use change and patronage demand)</p>	<p>Not relevant. The Nelson Street bridge and associated replacement opportunities do not provide access or modal transfers at Metro station(s)</p>
<p>(c) the maintenance or improvement of pedestrian and cyclists level of service within a justified proximity to stations</p>	<p>Not relevant. The Nelson Street bridge is not in close proximity to Metro stations forming part of the SSI_7400 approval.</p>
<p>(d) current transport initiatives and plans</p>	<p>The review has considered current plans for the extension of Frank Channon Walk, the addition of bicycle/ pedestrian lanes on the northern side of the Mowbray Road bridge and opportunities for integration with these. Refer Section 4.2 of this report. The review has also considered the active transport plans in Council's Bike Plan 2012 (Plan) by Willoughby Council.</p>
<p>(e) opportunities and constraints presented by existing and proposed transport and access infrastructure and services</p>	<p>The review has considered Willoughby Council's proposed cycle network strategy and has provided solutions and recommendations that integrate with and enable future development of Council's proposed network.</p>
<p>(f) patronage changes resulting from land use population, employment, transport infrastructure and service changes</p>	<p>Future pedestrian and cyclist demands have been assessed in reviewing potential crossings of the rail corridor. This is described at Section 4.4 of this report.</p>

Condition of Approval E92 requirement:	Response
(g) integration with existing and proposed transport infrastructure and services	The review has considered Willoughby Council's proposed cycle network strategy and has provided solutions and recommendations that integrate with and enable future development of Council's proposed network. Refer Section 5.3 and Section 5.5.
(h) pedestrian, cycle, bus, taxi, vehicle and emergency vehicle access and parking infrastructure and service changes	Pedestrian and cycle routes pre- and post-bridge closure have been assessed. Refer Section 3.2 and Section 4.2 of this report.
(i) legislative requirements and applicable guidelines	Austroads and other relevant guidelines for pedestrian and cycle facilities would be used in the design for alternative cycle routes and shared paths proposed to mitigate removal of the Nelson Street bridge.
(j) safety audits, including but not limited to a review of traffic facility and cycle changes to ensure compliance with Austroads design criteria	The review has identified a preferred option, described in Section 5.3, that builds on network elements being delivered through existing Metro contracts. A safety audit of the preferred option is subject to separate assessment for redevelopment of the Chatswood dive site following the completion of construction activities there.
(k) final design, infrastructure, management and service measures and the level of access and service to be achieved for all users	The review has considered end-state operations and potential redevelopment for the Sydney Metro Chatswood site and Willoughby Council's long-term strategy for pedestrian and cycle networks. The review has considered integration with these. Refer Section 5.3 and Section 5.5.
(l) the contents of the Interchange Operations and Maintenance Plan (IOMP) and operational management provisions for future operational requirements, including maintenance, security and management responsibilities	Not relevant. The Nelson Street bridge and associated replacement opportunities do not fall within interchange operations for Metro stations.
The Interchange Access Plan(s) must be prepared in consultation with the TTLG and the Design Review Panel and must be supported by traffic and transport analysis. Where necessary, consultation must also be undertaken with major landholders adjoining station precincts. The Plan(s) must detail a delivery and implementation program which must be provided to and agreed by the Secretary before commencement of permanent aboveground facilities at any station site.	Supporting traffic and transport analysis is described in Section 3.3 and Section 4.4. Consultation with stakeholders including TTLG has and will continue to be carried out and is described in Section 2.6. A delivery and implementation program is described in Section 5.4.

2.4. Study area

The study area for the Nelson Street assessment is illustrated in Figure 2. The area is located approximately 300m south of Chatswood Station along the Sydney Trains T1 North Shore Line. The study area is bound by Albert Avenue to the north, Mowbray Road to the south, Orchard Road to the east and Pacific Highway to the west.

Figure 2 illustrates the location of the Nelson Street bridge prior to its removal in November 2018 with construction of the City & Southwest Metro. The study area includes key intersections and walking and cycling links within the vicinity of the Nelson Street Bridge.

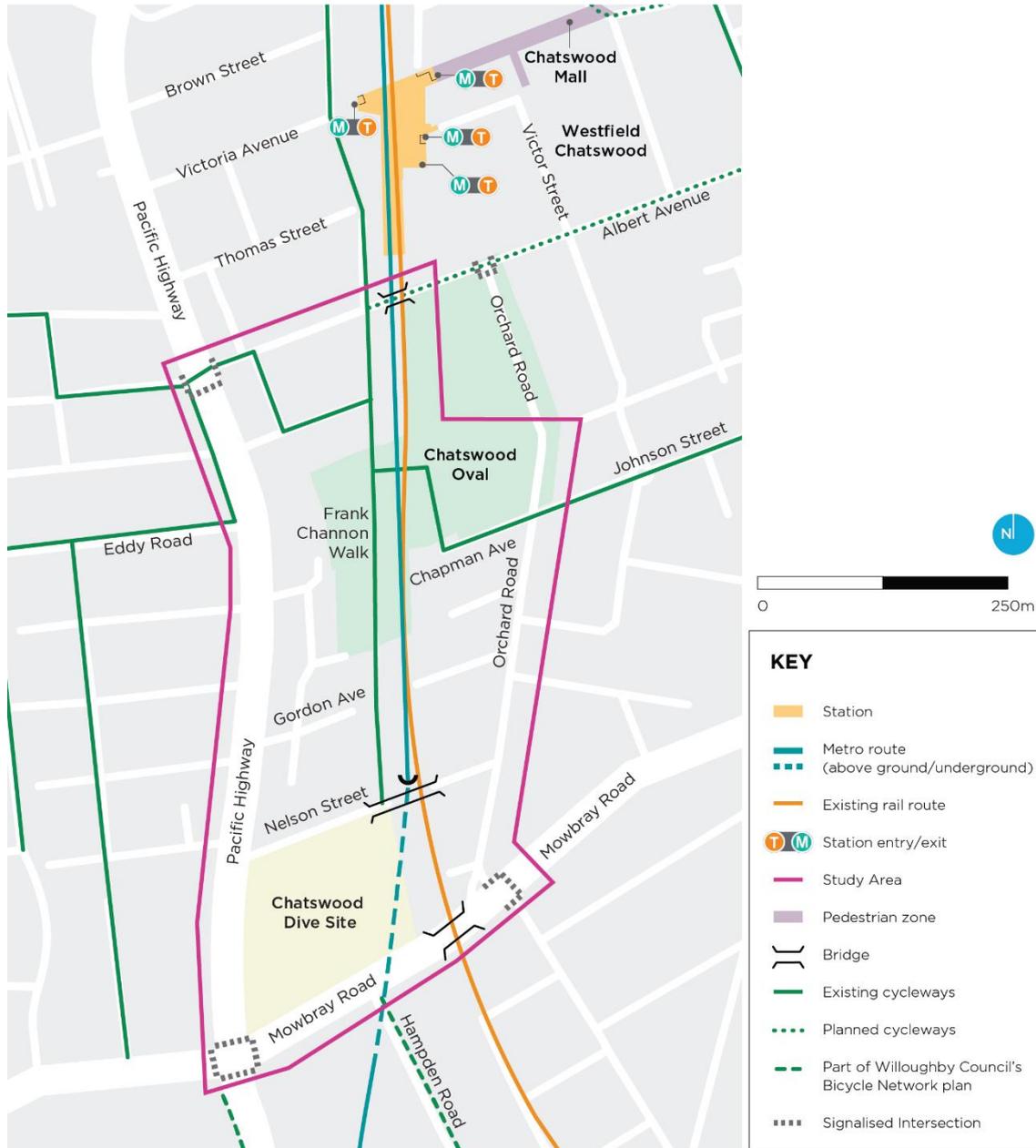


Figure 2 Nelson Street pedestrian and cycle activity study area

2.5. Background documents

A number of relevant studies and documents provide key background information for this assessment, including:

- *Sydney Metro Chatswood to Sydenham Environmental Impact Statement*
- *Sydney Metro Chatswood to Sydenham Submissions and Preferred Infrastructure Report*
- *Sydney Metro City & Southwest – Technical Services Northern Corridor Report – Reference Design*
- *Sydney Metro City & Southwest Chatswood to Sydenham – Conditions of Approval*
- *Australian Standard – Design for access and mobility – Part 1: General requirements for access – new building work.*

2.6. Stakeholder consultation

In line with the E95 planning condition, Sydney Metro has and will continue to consult with the TTLG. Sydney Metro has also engaged widely with internal and external stakeholders with interests in and impacted by the Nelson Street bridge removal. The collaboration and input of the following stakeholders has underpinned the development of this report:

- Internal stakeholders within the Transport Cluster:
 - Active Transport Planning, Freight, Strategy and Planning – provided information regarding the walking and cycling networks, planned cycleway infrastructure and bike parking facilities;
 - TfNSW (former Roads and Maritime Services (RMS)) - provided information regarding the future planning and delivery of the potential extension of the regional walking and cycling network.
- External Stakeholders:
 - Willoughby Council – provided information regarding the development of the LGA-wide cycle network, future demand for walking and cycling in the area and information regarding potential land use uplift.
 - Bicycle NSW and Bike North – notified that Nelson Street bridge will be removed to accommodate northern line/ Metro dive works. Identified existing volumes and desire lines and provided an overview of various options assessed to mitigate the impacts of the bridge removal on pedestrians and cyclists.

An overview of the stakeholder consultation process and feedback for the removal of Nelson Street bridge is provided at **Appendix A Stakeholder consultation**.

3. Existing conditions

3.1. Land use

The eastern side of the railway corridor within the Nelson Street study area is predominantly low density residential, with one and two storey dwellings and Chatswood Park. The western side of the railway corridor comprises a mix of land uses such as Chatswood Bowling and Croquet Club and medium density residential development mainly in the form of three storey town houses. Chatswood CBD is a strong attractor in the area with high density mixed-use development.

The area along the Pacific Highway has two storey commercial buildings. The Ausgrid site fronting both Nelson Street and Mowbray Road will be redeveloped as part of the construction of the Chatswood dive site.

3.2. Walking and cycling network

The area encompasses local walking and cycling links which are illustrated in Figure 3.

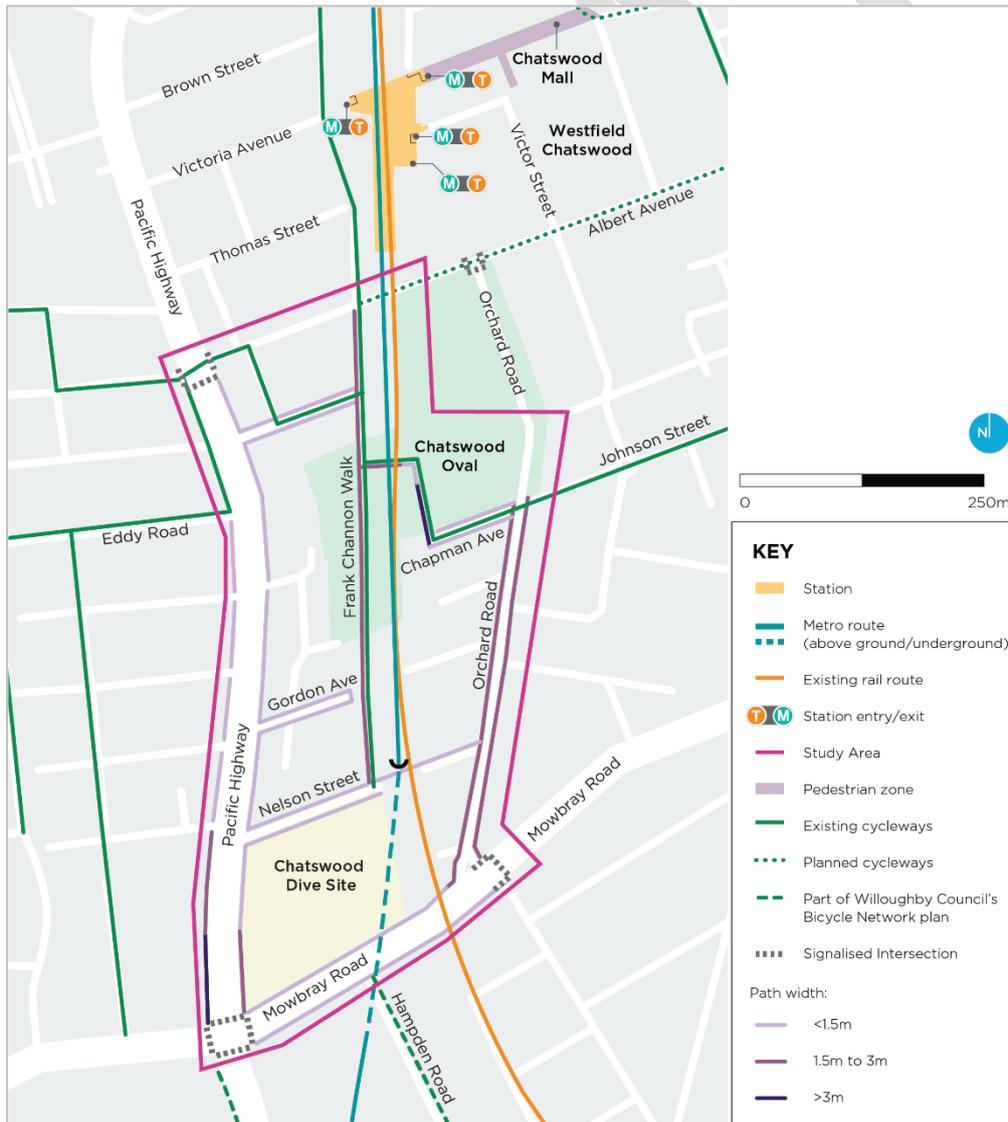


Figure 3 Walking and Cycling Network

The existing network can be characterised as follows:

- Nelson Street bridge (prior to its removal in November 2018) – a cross railway corridor connection, linking the local community areas from Orchard Road in the east to the Pacific Highway in the west. The nearest cross railway connection for pedestrians and bicyclists is approximately 350m to the north at Chapman Avenue to Frank Channon Walk and Chatswood Oval/ Johnson Street and approximately 150m south at Mowbray Road. Chapman Avenue is a shared path and Mowbray Road has footpaths only. The Nelson Street bridge had a footpath on one side, which is approximately 1.2 metres wide.
- Frank Channon Walk – a shared walking and cycling path that parallels the western side of the rail corridor connecting Chatswood Station to Nelson Street.
- Chapman Avenue underpass – passes underneath the railway line connecting the Chatswood oval to the east to the local community to the west and to Frank Channon Walk.
- Albert Avenue is the only identified bicycle route across the Pacific Highway. This link then joins a dispersed bicycle network connecting to the Lane Cove National Park, Chatswood West and Lane Cove North. To the east, this connects with Frank Channon walk.

As illustrated in Figure 3, footpaths in the study area are predominantly less than 1.5 metres. The exceptions to this are the north-south routes – Frank Channon Walk, Orchard Road and sections of the Pacific Highway.

Willoughby Council's *Walking in Willoughby* map identifies Frank Channon Walk, Nelson Street, Orchard Road and Elizabeth Street as part of a 'Links and other Walking Tracks' network. This network connects with the 'Harbour to Great North Walk' that runs through Chatswood in the north and the 'St Leonards to Artarmon Heritage Walk' that extends along Mowbray Road to the south of the study area.

3.2.1. Current deficiencies and challenges

The existing walking and cycling network varies in quality, the following deficiencies and challenges have been identified:

- The footpath along the eastern side of the Pacific Highway between Nelson Street and Mowbray Road has been subject to utilities related works which has created uneven (and unsafe) surfaces in locations.
- The circuitous pedestrian crossing at the intersection of Orchard Road/ Mowbray Road/ Elizabeth Street results in long waiting times for pedestrians. This could potentially encourage pedestrian jaywalking across the road (unsafe crossing).
- There are only two controlled pedestrian crossing opportunities at Mowbray Road (at Elizabeth Street and at Pacific Highway). People jaywalking (unsafe crossing) across Mowbray Road at these crossings have been observed.
- Some kerb ramps along Orchard Road may not be compliant for wheelchair users which could potentially result in safety issue.
- There are only two controlled pedestrian crossing points across Pacific Highway within the study area, at the intersection of Mowbray Road/ Pacific Highway and at Albert Avenue/ Pacific Highway. These traffic signals are 700 metres apart.

- The Chapman Avenue shared path has cricket nets located on the eastern side and landscaping on the western side, limiting the opportunity for footpath widening at this location (Figure 4 a). Based on Willoughby Council comments provided on 29th April 2022, Council has completed upgrade works in Chatswood Oval and Chapman Avenue that have removed the deficiencies outlined.
- The Chapman Avenue underpass lacks passive surveillance and would benefit from upgrading. A fence and gate exist along Chapman Avenue shared path that also narrows the corridor width (Figure 4 b). It is not known whether this gate is ever shut to restrict access along the shared path. Based on Willoughby Council comments provided on 29th April 2022, Council has completed upgrade works in Chatswood Oval and Chapman Avenue that have removed the deficiencies outlined.

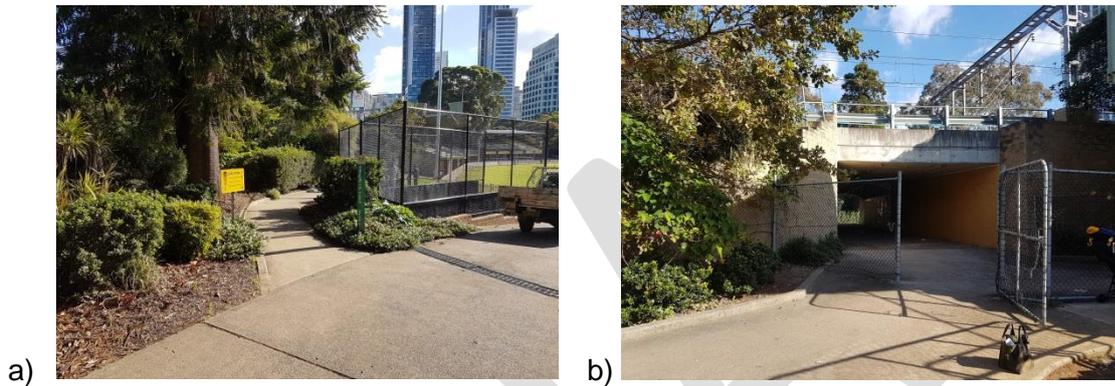


Figure 4 a) Narrow section of Chapman Avenue shared path
b) Chapman Avenue underpass and existing gate

3.2.2. Road network administrative classification

Table 2 Table 2 identifies the administrative road classification and management arrangements of relevant roads within the study area.

Table 2 Road administrative classification within the study area

	Classification	Speed Limit	Management
Nelson Street*	Local Road	Unmarked (50 km/h)	Willoughby Council
Orchard Road	Local Road	Road markings 50 km/h	Willoughby Council
Pacific Highway	State Road	60 km/h	TfNSW (former RMS)
Mowbray Road	Regional Road	50 km/h	Managed by Willoughby Council, funded by TfNSW (former RMS)

*Nelson Street Bridge and road closed in November 2018

Roads in the study area are generally lower order roads managed by Willoughby Council, with the exception of Pacific Highway.

3.3. Pedestrian and cycle volumes

3.3.1. Daily volumes – 2017 survey

Pedestrian and bicycle rider surveys were undertaken to identify current walking and cycling demand across the Nelson Street bridge and to assess demand and desire lines within the study area. Surveys were conducted over a one-week period from Friday 12 May 2017 to Thursday 18 May 2017 at 12 locations within the study area between 6am to 10pm (16 hours). Results of the survey are provided at **Appendix B: Pedestrian and cycle movement**.

Average weekday pedestrian and cyclist volumes were assessed to identify key flows and links within the study area, as presented in Figure 5.

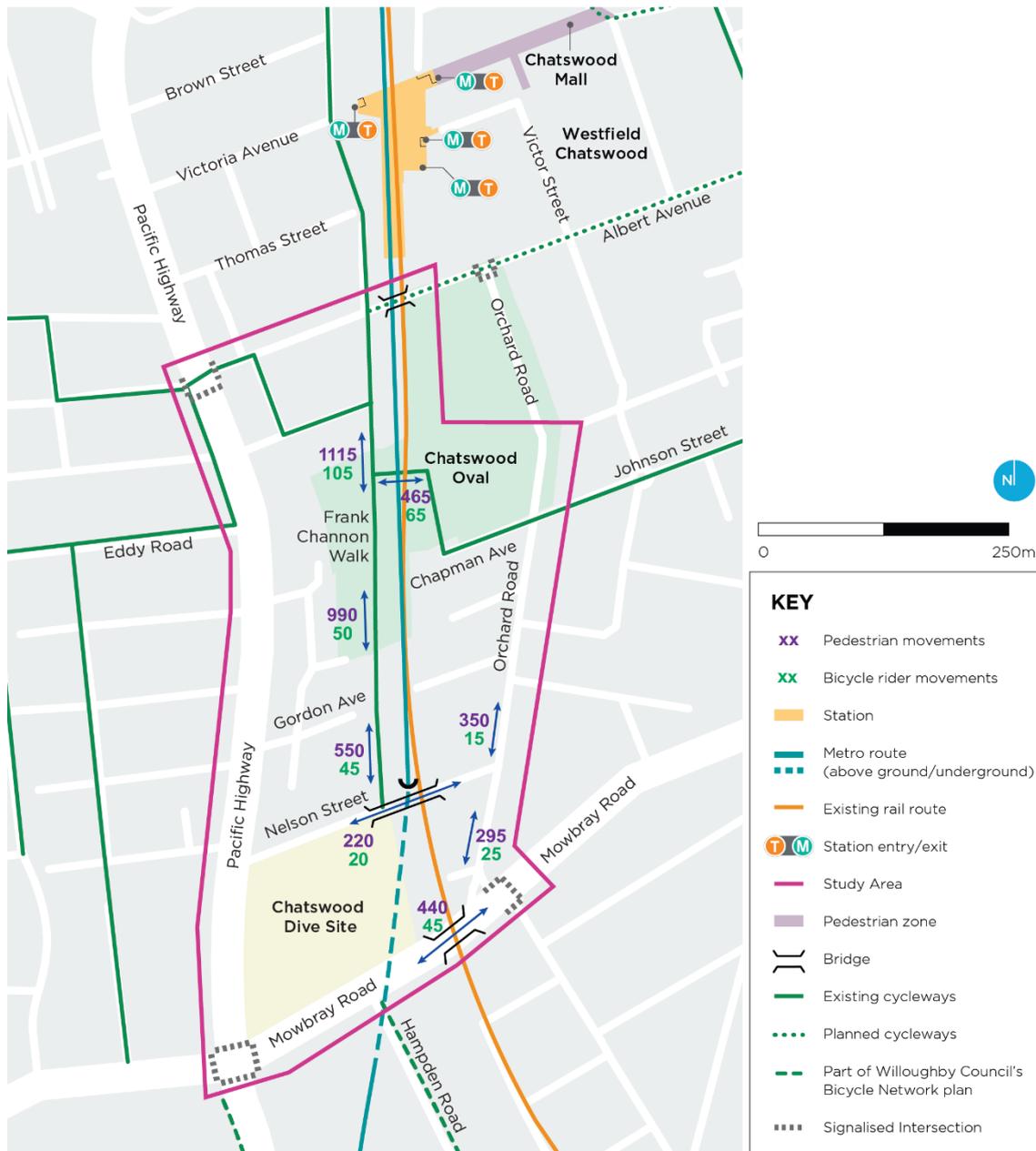


Figure 5 Average weekday pedestrian and cyclist volumes at surveyed locations (May 2017)

The data from Figure 5 indicates the following travel patterns:

- Nelson Street bridge (prior to its closure in November 2018) carried around 220 pedestrians and 20 cyclists on the average surveyed weekday.
- Frank Channon walk is an important pedestrian and cycle link in the area, with volumes increasing as the path approaches the Chatswood CBD.
- The Chapman Avenue underpass and Mowbray Road are key east-west connections with each carrying an approximate volume of 500 pedestrians and cyclists combined per weekday.

Figure 6 shows the variation in the pedestrian and cyclist profiles observed during the surveyed week at the Nelson Street Bridge.

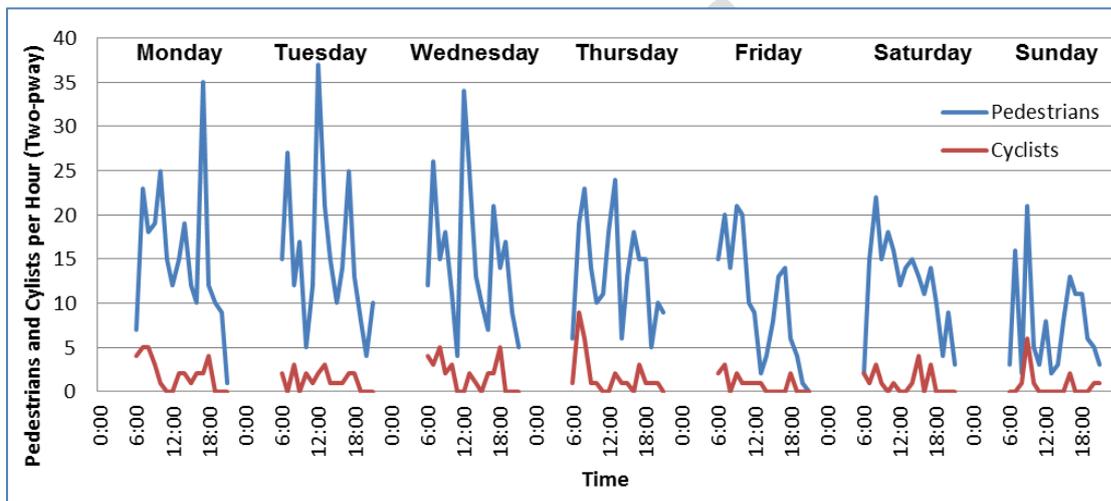


Figure 6 Daily pedestrian and cyclist profile on Nelson Street bridge (May 2017)

The following key observations were noted:

- Trends for pedestrian levels in morning and afternoon peak periods were observed on weekdays. This trend was less strong on for Friday evening. Some lunch time spikes in pedestrian volumes were observed on Tuesday, Wednesday and to a lesser degree on Thursday.
- Pedestrian and cyclist volumes do not change significantly between weekdays and the weekend. Pedestrian volumes are 8% lower than average weekdays, weekend cyclist volumes are around 16% higher than average weekdays.

3.3.2. Peak volumes – 2018/19 pre and post CSSI works commencement

As part of meeting CSSI planning condition E75, Sydney Metro commissioned traffic counts in the weekday and weekend peak periods on the following dates and times:

- Saturday 18 August 2018
- Tuesday 21 August 2018
- Saturday 30 March 2019
- Tuesday 2 April 2019.

The counts in 2018 were conducted while the Nelson Street bridge and Frank Channon Walk were open, prior to the installation of traffic signals at the Mowbray Road/ Hampden Road intersection. The counts in 2019 provide a comparison after the closure of Nelson Street bridge in November 2018, Frank Channon Walk and Chapman Avenue underpass. In 2019 the Chatswood Dive Site was in operation, with tunnel boring machine spoil being removed by truck.

The results of these counts are reported in **Appendix B: Pedestrian and cycle movement**.

The largest numbers of pedestrians observed in this survey were during the weekday peaks. A notable exception was during the 2018 count which recorded over 400 pedestrians during the Saturday peak, moving from Orchard Road onto Johnson Road. This could potentially be attributed to an event held at one of the places of worship located on Johnson Road.

The majority of survey locations recorded very low numbers of cyclists, especially on weekends. Only on the Pacific Highway were significant numbers observed, with between 140 and 170 cyclists recorded during the peak in the 2018 Saturday survey, travelling along the southbound segments. This is likely due to the presence of cycling clubs using this route.

The effect of the Chapman Avenue underpass and Frank Channon Walk closure was observed with significantly reduced pedestrian traffic walking on Ellis Street, from the direction of the bus stop just south on the Pacific Highway. Demand for this movement reduced by over 40 people during the 2019 weekday AM peak, and approximately 70 on the weekend. Weekday PM peak pedestrian volumes along the Pacific Highway south of Gordon Avenue doubled (increasing by 50 people) which is likely to be a result of the Frank Channon Walk closure.

The effect of the Nelson Street bridge closure in November 2018 saw, as was expected, significantly reduced pedestrian traffic on Nelson Street and Berkeley Court. Weekday peak pedestrian volumes increased on Mowbray Road saw an increase of 130 people in the 2019 weekday PM peak on the northern footpath between the Pacific Highway and Hampden Road intersection. The number of people using the southern Mowbray footpath east of the Hampden Road intersection during the weekday morning increased by approximately 25 people.

A minor increase in cyclist traffic (8 – 15) was recorded between Nelson Street and the Pacific Highway, during the 2019 weekday morning and evening peaks. This is potentially due to the Sydney Metro construction workforce travelling to site by bicycle, using the entrance on Nelson Street.

3.3.3. Nature of pedestrian and cycling demand on Nelson Street

Both sets of counts reported in sections 3.3.1 and 3.3.2 (and in **Appendix B**) have confirmed that the key east-west crossings across the North Shore line are at Chapman Avenue and Mowbray Road. Prior to its closure, the Nelson Street bridge carried a smaller volume of traffic than both of the other crossings. The majority of this traffic is local, with trips generated by land uses along Nelson Street.

The comparison counts reported in section 3.3.2 and **Appendix B** demonstrate the effect of the closures of Chapman Avenue underpass, Frank Channon Walk and Nelson Street bridge during works on the North Shore Line corridor. The effect of closing the Chapman Avenue underpass and Frank Channon Walk has seen increased pedestrian movements on the Pacific Highway and Orchard Road. This is a temporary impact on north-south pedestrian movements.

The effect of closing Nelson Street bridge saw the pedestrian demand transfer to Mowbray Road. The introduction of the Metro construction traffic signals and marked foot crossing of Mowbray Road at the intersection with Hampden Road has allowed pedestrian demand to spread to the southern footpath on the Mowbray Bridge, lessening the increase in demand on the northern footpath during the weekday morning peak.

4. Future conditions

4.1. Land use

Willoughby Council anticipates an intensification of development densities in the study area as the Chatswood Centre expands further south over the next 10-20 years. This will be accompanied by an increase in pedestrian and cyclist generating land-uses within the study area. There is also the likelihood that the Chatswood dive site will be redeveloped for a more intensive and high density use after the completion of Metro construction works in 2024.

4.2. Networks changes

There are a number of planned walking and cycling improvements to the study area to be undertaken by Willoughby Council and Sydney Metro.

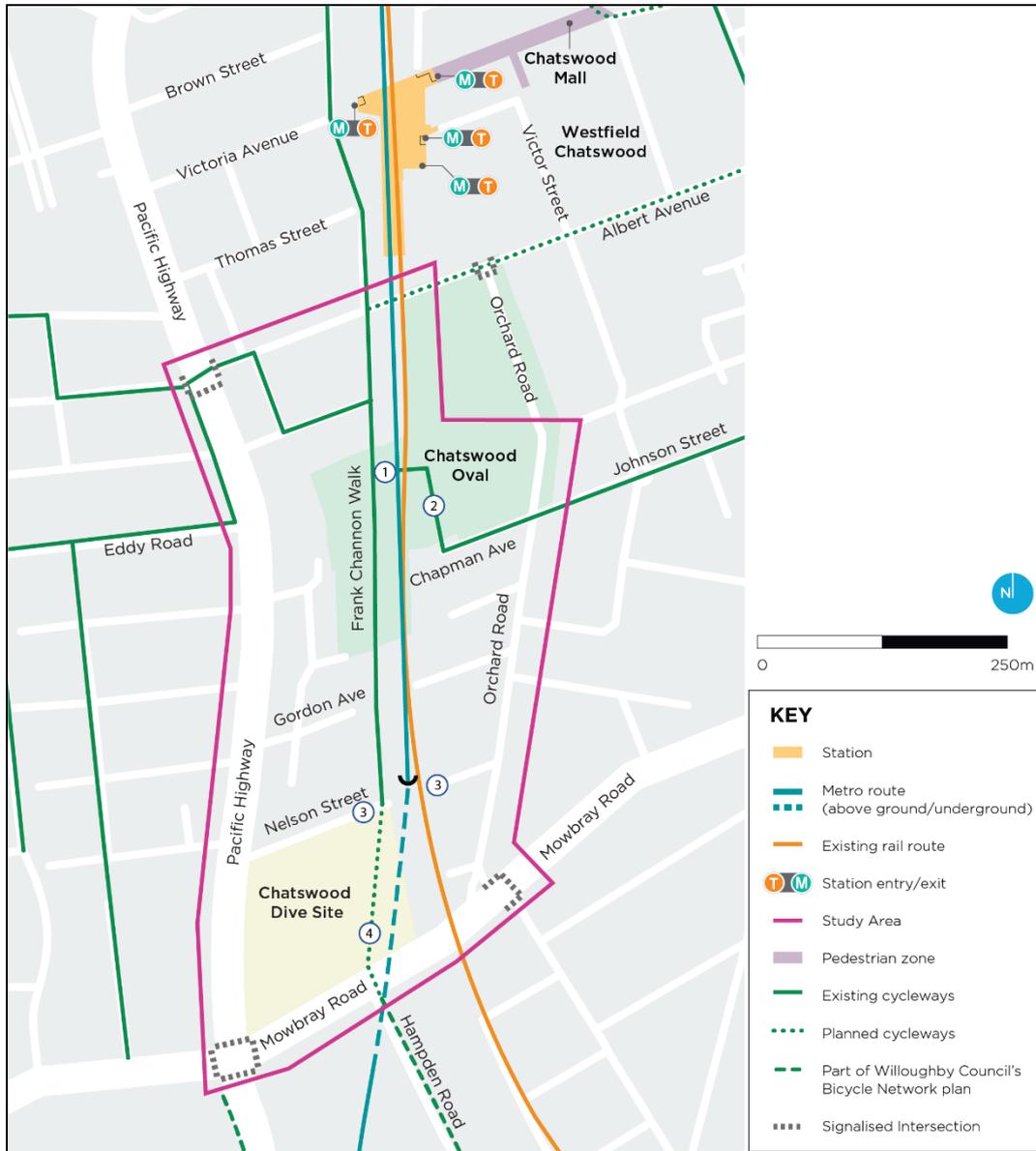


Figure 7 Planned walking and cycling changes to the study area (changes are numbered)

As illustrated in Figure 7, there are four proposed changes to the walking and cycling network, which are as follows:

1. The *Willoughby City Council Chatswood Park Masterplan 2018* (the Masterplan), identifies the Chapman Avenue underpass connecting to the Frank Channon Walk as a pinch point in the walking and cycling network and proposes an upgrade of the underpass.
2. The Masterplan also identifies the “need to improve pedestrian and bicycle access through the park via connections into the wider cycle and walking networks”. This includes a shared path route upgrade along the Chapman Avenue shared path.

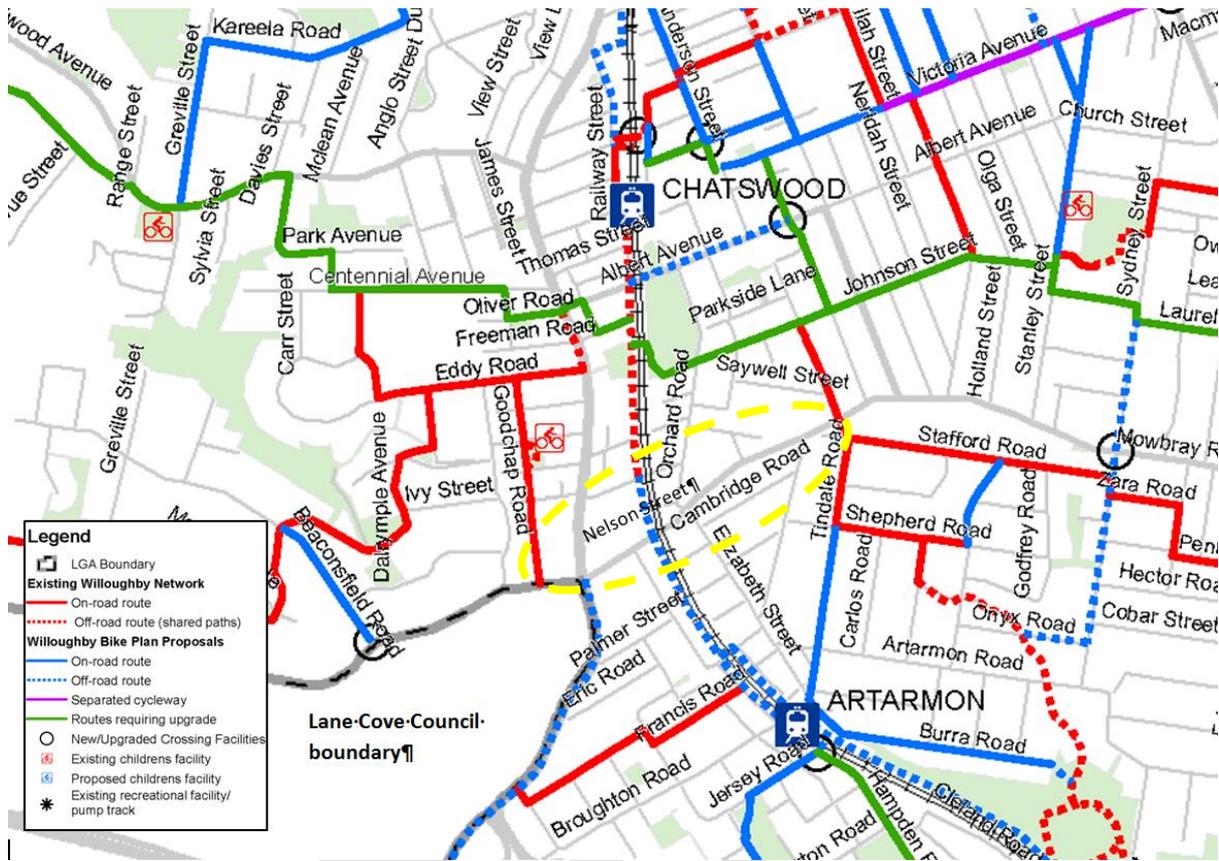
3. Both the eastern and western ends of Nelson Street fronting the rail corridor have been reconstructed as cul-de-sacs after the Nelson Street closure in late 2018. The cul-de-sac on the eastern side of the rail corridor is known as Berkeley Court. Pedestrians and cyclists will be able to access Frank Channon Walk from the western side of Nelson Street. If no additional infrastructure was delivered following the bridge closure, cross corridor access would be available at Mowbray Road or at the Chapman Avenue underpass.
4. Sydney Metro has committed to the extension of Frank Channon Walk through the Chatswood Dive site between Nelson Street and Mowbray Road. Willoughby Council's proposed bicycle network identifies an extension of the Frank Channon Walk to run south along the rail corridor via Hampden Road to Artarmon and St Leonards railway stations.

TfNSW (Active Transport) acknowledges Willoughby Council's views in relation to the need for a shared path between Mowbray Road and Artarmon station on the eastern or western side of the railway line. This connection however needs to form part of a broader regional bicycle network plan that is being developed by Willoughby Council.

Temporary signals have been installed at the intersection of Mowbray Road and Hampden Road to facilitate construction access to the Metro dive site. Separate to these E95 investigations, Sydney Metro is exploring options with TfNSW (former RMS) for the retention of these signals following completion of Metro construction works.

4.3. Networks gaps

An extract from the Willoughby Council bicycle plan covering the study area and surrounds is shown in Figure 8. There is an east-west network gap between Goodchap Road and Tindale Road; this is identified in yellow. One of the options assessed in this report (option 4) proposes a shared path that could form part of this missing link between the Pacific Highway and Elizabeth Street.



Source: Willoughby Council website, accessed 30 October 2018

Figure 8 Willoughby Council proposed bicycle network (network gap outlined in yellow).

4.4. Estimated future year pedestrian and cyclist movements

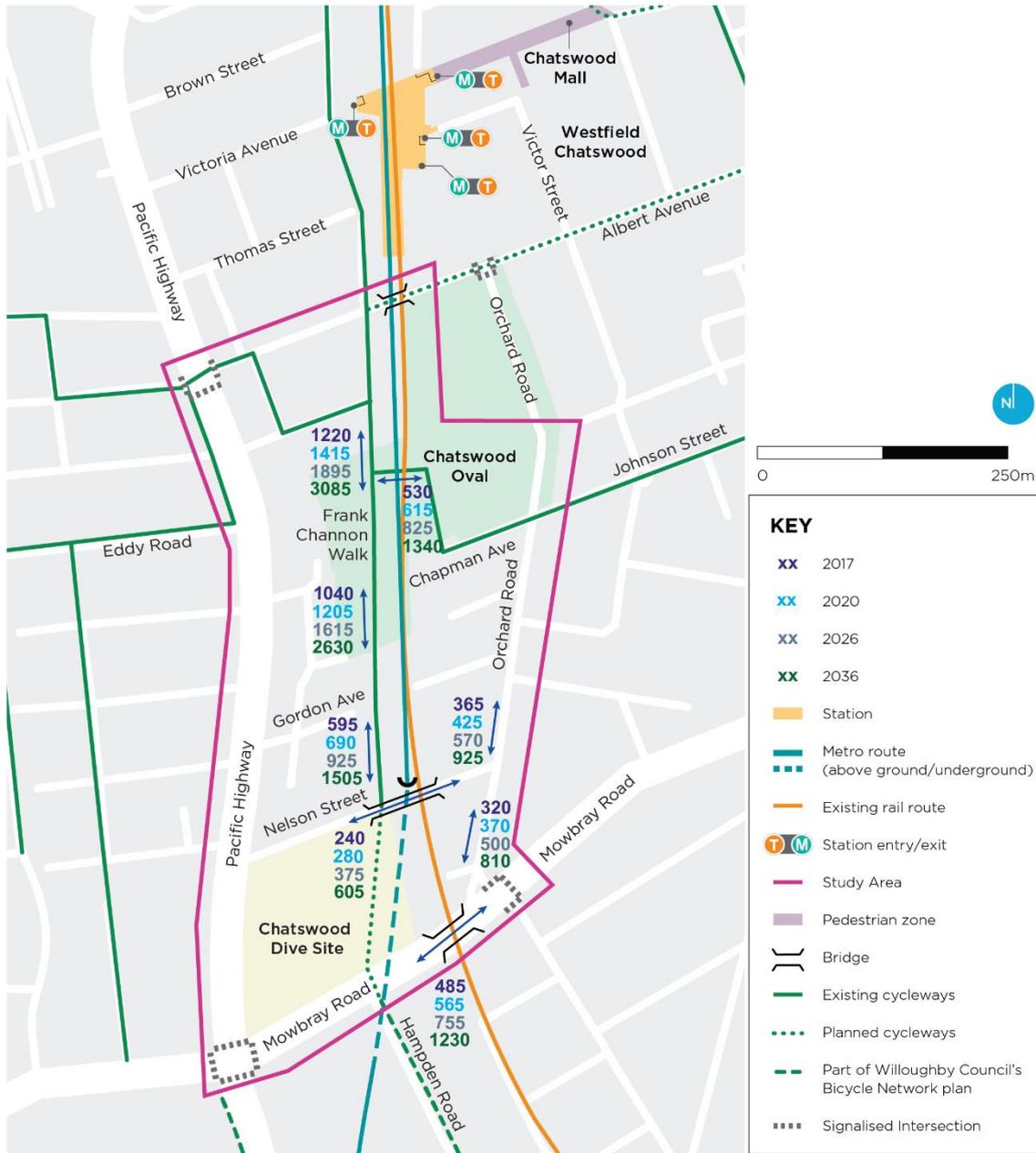
In order to assess capacity and future performance of alternative routes after the removal of Nelson Street bridge, estimates of growth rates were made to approximate pedestrian and cycle demand.

Growth rates for pedestrian and cycle demand for a typical weekday were estimated through review of projected population and employment growth rates for the sub-region around the study area. TfNSW Transport Performance and Analytics (TPA) branch produces projections for population and employment at local level based on Department of Planning & Environment forecasts for Local Government Areas. The growth rates from 2016-2026 forecasted by TPA for the sub-region of the study area are as follows:

- Population: 1.2 – 1.7% per annum
- Employment: less than 1% per annum

Based on these rates and the potential for additional take-up of pedestrian and cycling movements, a growth rate of 5.0% per annum was applied to the surveyed volumes to provide an indication of likely future demand.

Figure 9 provides estimates of future year average weekday daily pedestrian and cycle demands based on this assumption. With the closure of the Nelson Street bridge, this indicates that approximately 375 pedestrians and cyclists would be diverted to other cross corridor links at the Chapman Avenue underpass and Mowbray Road in 2026.



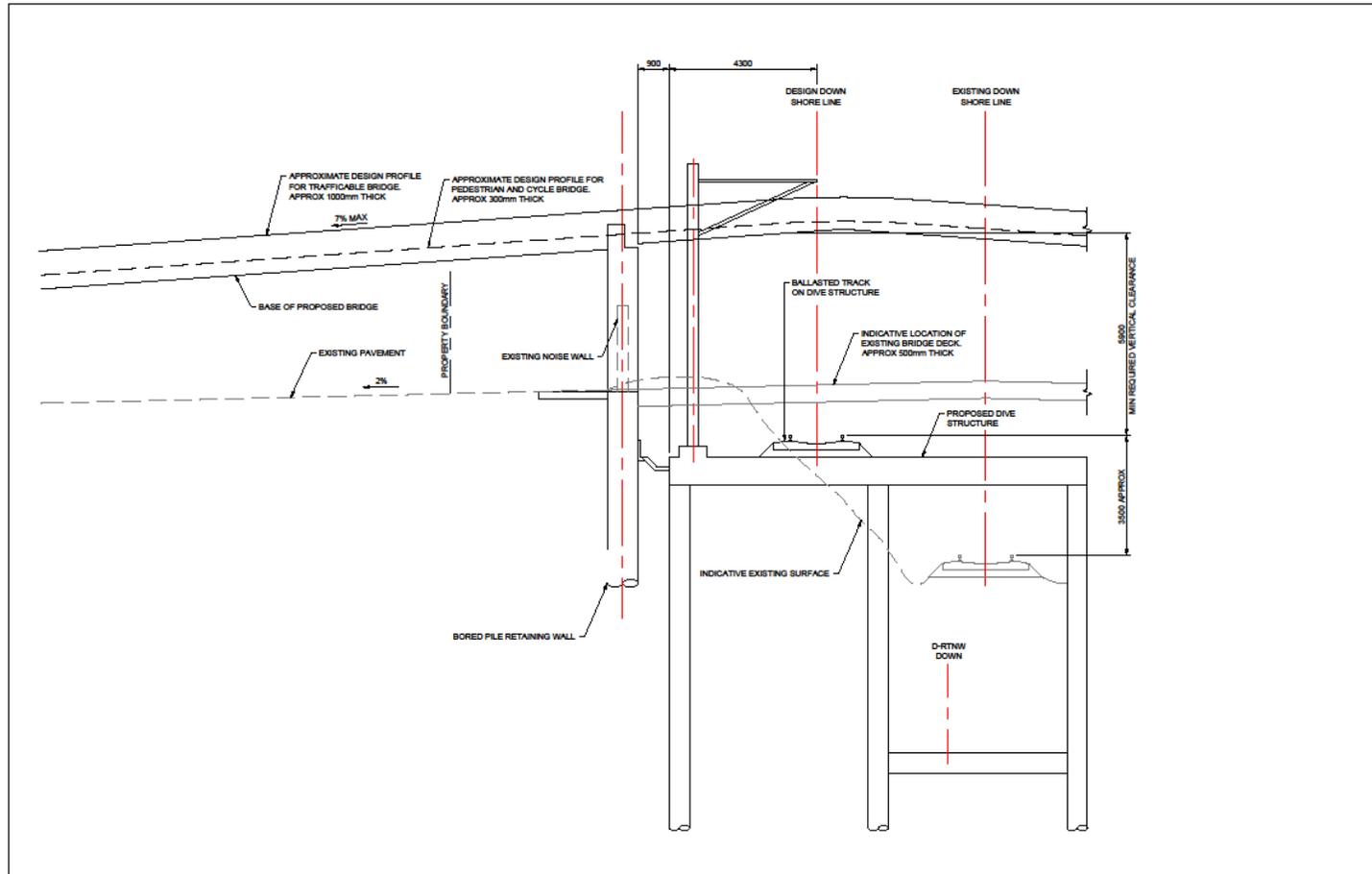
Estimated combined average daily pedestrian and cyclist demand
Figure 9 Future year daily pedestrian and cycle demand estimates, based on 5%pa growth factor

4.5. Future infrastructure constraints

The removal of Nelson Street bridge facilitates the construction of the Sydney Metro dive structure at Chatswood. It is at this point the Sydney Metro alignment leaves the North Shore Line corridor and descends into tunnel towards the new Crows Nest station. The construction of the dive structure has also required the slewing of the Sydney Trains North Shore down line, in both horizontal and vertical profile, to a new position on top of Sydney Metro dive structure.

It is due to the slewing of the North Shore down line that raises the deck of any replacement Nelson Street bridge. The new bridge height clearance above the North Shore line's overhead line equipment is sketched in Figure 10.

DRAFT



NELSON STREET BRIDGE
TYPICAL SECTION - MH11+14.7 (HALF OF CORRIDOR)

NOT FOR CONSTRUCTION
FOR INFORMATION PURPOSES ONLY

SCALE 1:100m

Figure 10 Illustration of a raised replacement Nelson Street bridge deck

5. Options analysis

5.1. Option outline

A review of potential treatments for pedestrian and cycle access following the closure of the Nelson Street bridge identified five options for assessment in response to Planning Condition E95.

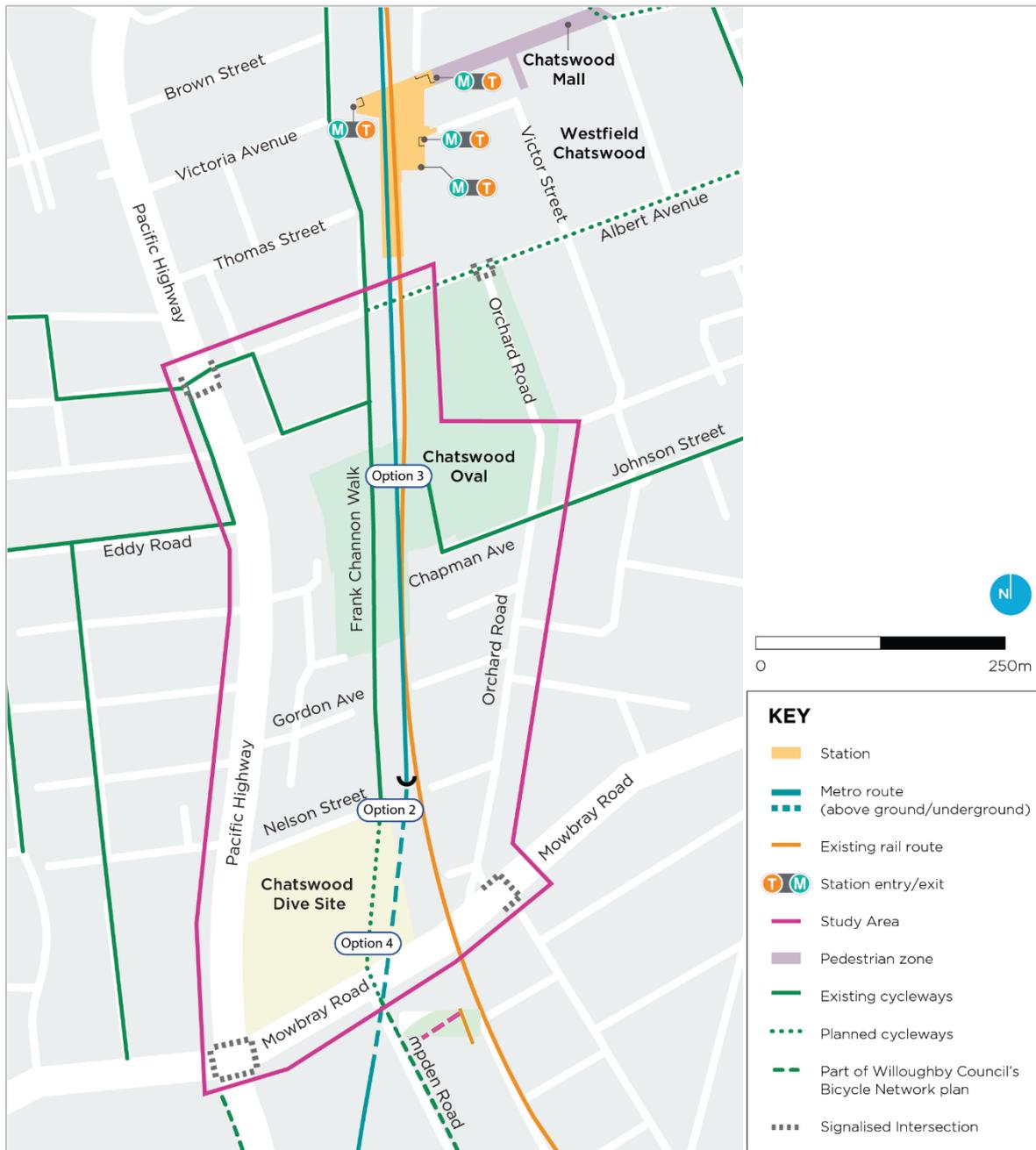


Figure 11 Option Analysis

Do Nothing – Do Nothing (remove Nelson Street bridge and remove temporary traffic signals at Mowbray/ Hampden Roads after Sydney Metro works are complete)

- Findings – pedestrian and cyclist counts show east-west movement is currently being facilitated by existing crossings at Chapman Avenue underpass and Mowbray Road.
- This option does not increase capacity for a future growth in pedestrian and cyclist demand.
- Removing the temporary traffic lights will cease to facilitate safe pedestrian and cyclist crossing of Mowbray Road using the future extension of Frank Channon Walk through the Chatswood Dive Site.

Option 2 – Construct a replacement Nelson Street pedestrian and cycling bridge

- Investigation – replacement of the previous local traffic bridge with a new pedestrian/ cycle bridge above North Shore Line and Sydney Metro dive structure. Access to the bridge would be via a series of ramps or a lift/ stair option.
- Findings – due to the raised height of the North Shore Line track bed, the replacement bridge deck would need to achieve a higher clearance than the previous bridge. This is illustrated in Figure 10. To achieve accessible gradients, the extent of ramps would require a large footprint in the Nelson Street/ Berkeley Court road reserve. This is presented in further detail at **Appendix C: Replacement pedestrian and cycle bridge at Nelson Street**. The land required by a bridge would impact on adjoining properties and their driveway access. Constructing bridge foundations in this location would require monitoring and potentially disrupt North Shore line operations. The replacement bridge structure and associated access ramps would be visually and operationally intrusive for nearby residents.
- The need for new structures, planning permission and property acquisition significantly increases risk and complexity of this option.
- Providing new infrastructure significantly increases capacity for pedestrian and cyclist movement. Nelson Street and Berkeley Court are streets that provide local access only. A bridge in this location would not provide a strategic connection within the existing and planned active transport network. The significant increase in capacity provided by a pedestrian/ cycle bridge, if provided in this location, would not be fully utilised by future demand forecasted in Figure 9.

Option 3 – Upgrade the approaches to the Chapman Avenue underpass

- Widen the shared path approaches (includes relocating cricket nets, structure and vegetation removal).
- Resurface underpass pavement, upgrade lighting, wayfinding, security.
- Council's Chatswood Park Masterplan identifies opportunities to change the Chapman Avenue underpass entry through access, wayfinding and safety improvements.

Option 4 – Provide a shared path along Mowbray Road

- Investigation – Provide an up to three metre wide shared path along the northern side of Mowbray Road, between the Pacific Highway and the western edge of the bridge across the North Shore Line. The existing bridge would not be altered for pedestrians, with cyclists requiring on-road bicycle lanes across the bridge.

- Findings – Mowbray Road provides a connection that would fit within Council’s shared path network. This option would meet the increased pedestrian and cyclist demand to access the Mowbray Road bridge following the removal of the Nelson Street bridge (see **Appendix B2**).
- There may be scope for Sydney Metro to make available land along the Pacific Highway and Mowbray Road frontages of the residual site to accommodate a widened path.
- Other subsequent improvements separate to Option 4 - a potential new bridge across the North Shore Line to provide an up to three metre wide shared path. Work to clear vegetation and utilities diversion would be required to upgrade the path on eastern side of the Mowbray Road bridge, to tie in the shared path lanes to the nearby kerb ramp at the Orchard Road/ Mowbray Road intersection. The new bridge would be required to meet increased demand resulting from redevelopment on the Chatswood residual Site. Separate exploration of the possible retention of traffic signals at Mowbray/ Hampden Roads after completion of Metro construction works.

5.2. Assessing suitability of options

The five options were assessed against criteria based on Austroads *Guide to Road Design Part 6A: Paths for Walking and Cycling*, and are as follows:

1. Safety
2. Customers (accommodating commuter, education and other trip purposes)
3. Coherence (continuity of routes & ease to follow)
4. Directness (minimises delay & minimises detours)
5. Capacity (able to accommodate existing and forecast demands)
6. Comfort (ease to use and grades)
7. Value for money
8. Construction impact

The outcomes of this assessment are summarised in Table 3.

Table 3 Multi-criteria assessment for options for removal of Nelson Street bridge

Criterion	Do nothing	Option 2 - Replacement bridge	Option 3 - Upgrade underpass	Option 4 - Widen footpaths Mowbray Rd
Safety	●	●	●	●
Customers	●	●	●	●
Coherence	●	●	●	●
Directness	●	●	●	●
Capacity	●	●	●	●
Comfort	●	●	●	●
Value for money	●	●	●	●
Construction impact	●	●	●	●

5.2.1. Assessment outcomes

An option to do nothing does not deliver good outcomes against the criteria apart from minimal construction impacts (removal of temporary traffic lights). It does not improve network legibility, connectivity, capacity and comfort. This is due to both the removal of the Nelson Street bridge and the loss of the temporary traffic signals at Mowbray Road/ Hampden Road intersection.

Option 2, providing a replacement bridge at Nelson Street, performs poorly against criteria for construction impact and value for money. This is due to the raised height clearance for Sydney Trains infrastructure, as a result of the Sydney Metro dive structure being constructed in this location. A replacement pedestrian and cycle bridge with accessible ramps at Nelson Street would be costly to construct, resulting in poor value for money. It would have high environmental and property impacts due to the close proximity of residents, meaning this option has poor deliverability. Option 2 performs well only for capacity and moderately against other criteria (safety, customers, coherence, directness and comfort) as it provides a dedicated pedestrian and cycle infrastructure but no strategic connection within the wider active transport network. As a result, this option is not considered practicable or desirable.

Option 3, upgrading the Chapman Avenue underpass, scored well in the multi-criteria assessment. As this is part of an opportunity identified by Willoughby Council in its Chatswood Park Masterplan, it is noted here only as an item for delivery by others.

Option 4 proposes to create an up to three metre wide shared path along the northern side of Mowbray Road between the Pacific Highway and the future extension of Frank Channon Walk. This enhancement would be a good strategic fit within the broader cycle network. It would also be accessible given its proximity to Nelson Street, and would deliver good outcomes against criteria for legibility and network coherence and acceptable outcomes for safety, customers, directness and comfort. No additional land take is required and the minor works provide good value for money and minor construction impacts.

The existing Mowbray Road bridge provides sufficient capacity for the smaller number of pedestrians and cyclists previously using the Nelson Street bridge. This option does not propose to alter or add to the Mowbray Road bridge. A new structure to accommodate an up to three metre wide shared path alongside the Mowbray Road bridge could be provided with the redevelopment of the Chatswood residual site. Bridge upgrade works would also be required to the footpath at the eastern side of the Mowbray Road bridge to tie in the shared path lanes along the northern side of the bridge to the nearby kerb ramp at the Orchard Road/ Mowbray Road intersection.

5.3. Preferred option

The preferred option to be implemented is Option 4:

- Option 4: up to three metre shared path along the northern side of Mowbray Road from Pacific Highway connecting to the extension of Frank Channon Walk. The shared path would tie into a future pedestrian/ cyclist link on Pacific Highway. Subsequent development of the Chatswood residual site could see the shared path extended across the Mowbray Road bridge.

The possible retention of the Mowbray Road/ Hampden Road traffic signals will be pursued separately with TfNSW. The traffic signals, if retained, will need to be modified (possibly as part of the Chatswood residual site redevelopment), subject to TfNSW Network and Asset (former RMS) approval. The traffic signals, introduced to accommodate Metro construction, have seen an increase in pedestrians using the southern footpath of the Mowbray Road bridge during the weekday AM peak. Retaining the traffic signals with one or more marked foot crossings after the Sydney Metro construction would accommodate safe pedestrian and cyclist movement across Mowbray Road.

5.4. Implementation plan

A number of pedestrian and cycle infrastructure works around the area of the Chatswood Dive Site have already been committed for delivery by Sydney Metro. The preferred options identified through the assessment above integrate with these planned works.

The timing for currently contracted pedestrian and cycle infrastructure works and the delivery of the preferred option are shown in Table 4.

Table 4 Implementation plan – pedestrian and cycle infrastructure works following removal of Nelson Street bridge

Item	Delivery By	Date
Extension of Frank Channon Walk from Nelson Street to Mowbray Road	Sydney Metro – existing awarded contract	At time of completion of Chatswood Dive facility in 2024.
Provision of an up to three metre wide shared path between Pacific Highway and new traffic signals at Hampden Road, connecting to Frank Channon Walk extension.	Safeguarding of reserve and setback by Sydney Metro in planning for redevelopment of the Chatswood residual site. Delivery of path potentially by Sydney Metro or future developers of Chatswood residual site.	At time of completion of Chatswood Dive facility in 2024.
Investigate the possible retention and modification of traffic signals at Mowbray Road and Hampden Road intersection to facilitate pedestrian and cyclist connectivity and Dive facility access/ egress – subject to TfNSW approval.	Sydney Metro	2021 -2024
A shared path link between the Frank Channon Walk extension at the north eastern corner of traffic signals at Mowbray Road/ Hampden Road, to the western embankment of the T1 rail corridor and connecting to the new shared path along the northern side of Mowbray Road bridge.	For consideration in other TfNSW Active Transport plans or possibly by the Chatswood residual site redevelopment.	2024 onwards
A shared pedestrian/ cycle path structure along the northern side of the Mowbray Road bridge	Eastern bridge footings (western footings in place) – Not in scope for Sydney Metro. For consideration in other TfNSW Active Transport plans or possibly by the Chatswood residual site redevelopment.	2024 onwards
Minor works to the footpath at the eastern side of the Mowbray Road bridge to tie in the shared path along the northern side of the bridge to the nearby kerb ramp at the Orchard Road/ Mowbray Road intersection	For consideration in other TfNSW Active Transport plans or possibly by the Chatswood residual site redevelopment.	2024 onwards

The delivery strategy for the preferred option is for Sydney Metro to consider safeguarding the setback required for the shared path connection between the Pacific Highway and the Frank Channon Walk extension/ Hampden Road intersection in planning for the redevelopment of the Chatswood residual site which will occur following completion of construction activities.

5.5. Additional measures

Additional measures would complement the preferred option discussed in section 5.3. These could include:

1. This proposal should form part of a broader Regional Bicycle Network Plan led by Willoughby Council and will need to be implemented by and in consultation with TfNSW (former RMS).
2. An extension of the walking and cycling network along the rail corridor to Artarmon station. Willoughby Council's *Proposed Bicycle Network* plan identifies an extension of the Frank Channon Walk to run south along the rail corridor along Hampden Road to connect to Artarmon train station. This connection should form part of a broader Regional Bicycle Network Plan that is being developed by Willoughby Council.
3. Provide an east west walking and cycling route between Goodchap Road and Tindale Road. Through the consultation process, Willoughby Council has identified that its preferred east-west walking and cycling route is between Goodchap Road and Tindale Road along Mowbray Road. Sydney Metro's preferred option in response to the E95 planning condition is to provide a section of this east-west route between the Pacific Highway and the eastern side of the Mowbray Road bridge. A further extension of this route needs to form part of a broader Regional Bicycle Network Plan that is being developed by Willoughby Council. TfNSW has indicated it is willing to participate in a working group to collaborate with Willoughby Council to develop these additional network options.

5.6. Engagement with bicycle user groups

Sydney Metro will continue to engage with bicycle user groups on the outcomes of this assessment and the broader end-state network to be delivered following opening of the Metro for operations in 2024.

6. Conclusion and recommendations

The recommendations in this report are in response to the Condition of Approval E95, which requires Sydney Metro to “*review the need and opportunities for a pedestrian and cycling bridge across the rail corridor to replace the Nelson Street bridge*”.

Demand for pedestrian and cyclist movement at Nelson Street has been examined, both before and after removal of the Nelson Street bridge. Current and future land uses were considered in looking at future demand for east-west movement. The future infrastructure constraints at Nelson Street were also examined.

Sydney Metro has reviewed connectivity options in response to Condition E95. Four options were identified in consultation with stakeholders and assessed through multi-criteria analysis. The assessment concluded that providing a replacement bridge on Nelson Street across the realigned North Shore line is **not warranted**, would represent poor value for money and the structure would impact on adjoining properties.

An option to provide an up to three metre wide shared path along the northern side of Mowbray Road, from the Pacific Highway, connecting to the future extension of Frank Channon Walk and continuing across the existing Mowbray Road bridge performed well against the assessment criteria. This option would facilitate increased demand for east west movement to/from Frank Channon Walk and across the rail corridor.

This preferred option will accommodate future pedestrian and cyclist demand by providing the first stage of an east-west walking and cycling route between Goodchap Road and Tindale Road along the Mowbray Road corridor. The proposed solution will provide adequate capacity for estimated use with Sydney Metro operations after 2024 and align with future active transport projects for Hampden Road and Pacific Highway.

The Mowbray Road shared path solution contributes to development of future pedestrian and cycle networks and could be complemented through wider network solutions. Future elements that could be added to expand the walking and cycling network to build on the shared path solution include:

- Continued exploration of the possible retention of the traffic signals at Mowbray Road/Hampden Road intersection, subject to TfNSW (former RMS) approval. This would allow pedestrian demand to be spread over both northern and southern footpaths on the Mowbray Road bridge.
- As part of the Chatswood Dive Site redevelopment or other TfNSW Active Transport plans and further negotiation with Willoughby Council, provide an up to three metre wide shared path bridge to the north of the Mowbray Road bridge and minor tie-in works on the eastern side of the Mowbray Road bridge to the kerb ramp at the Orchard Road/ Mowbray Road intersection.
- Extension of the walking and cycling network along the rail corridor to Artarmon station to the south, potentially along the western side of the railway line via Hampden Road as suggested by Willoughby Council. Additional crossings of Mowbray Road at Hampden Road would facilitate this. Any signalised pedestrian crossing of Mowbray Road at the Hampden Road intersection would be subject to further assessment and separate TfNSW approvals.

Extending upon the preferred solution identified through this assessment to provide an east-west walking and cycling route between Goodchap Road and Tindale Road along the Mowbray Road corridor.

Appendix A Stakeholder consultation

A summary of the stakeholder consultation process for removal of the Nelson Street bridge is provided at Table 5.

Table 5 Stakeholder consultation for removal of Nelson Street bridge

Consultation	Timeframe	Outcome
Department of Planning and Environment meeting to communicate preliminary findings	October 2017	Provided an overview of the assessment findings, including an overview of the options identified
Willoughby Council meeting to communicate preliminary findings	October 2017	Willoughby Council expressed its general agreement with a solution that provides for the staged delivery of a shared path along the northern side of Mowbray Road, noting that it would have a strategic fit with the broader cycle network and a longer term link between Goodchap Road and Tindale Road.
Presentation to the Sydney Metro Transport Integration Working Group	November 2017	Provided an overview of the assessment findings, including an overview of the options identified
Active Transport Team (TfNSW) meeting	November 2017	<p>The team was concerned with the removal of the bridge and its effect on the existing east west connections across the rail corridor.</p> <p>The team suggested that Sydney Metro investigates a bridge between Hopetoun Ave and Gordon Ave. This was considered and was found to be unfeasible given bridge crossing grades and visual impacts.</p>
Sydney Metro City & Southwest Traffic and Transport Liaison Group	21 December 2017	<p>Provided an overview of the assessment findings, including an overview of the options identified.</p> <p>Willoughby Council noted at the meeting that a shared path along the Mowbray Road corridor would be generally consistent with Council's medium and longer term planning in the area.</p> <p>The Sydney Coordination Office advised that consultation with bicycle groups should be considered given the impact on them.</p>
Willoughby Council, Bicycle NSW and Bike North meeting	February 2018	Provided an overview of the assessment findings, including an overview of the options identified.

Consultation	Timeframe	Outcome
		<p>Bike North and Bicycle NSW expressed their general agreement with a solution that provides for the staged delivery of a shared path along the northern side of Mowbray Road, noting that it would have a strategic fit with the broader cycle network and a longer term link between Goodchap Road and Tindale Road</p> <p>Willoughby Council suggested consideration of a shared path extension along the eastern side of the rail corridor towards Artarmon. Sydney Metro advised that this should form part of broader regional bicycle network plan investigations.</p>
<p>Willoughby Council</p>	<p>Meeting held October 2020</p> <p>Email correspondence April 2020.</p> <p>Email correspondence January 2021.</p>	<p>Provided an overview of the latest assessment findings, including an overview of the options identified.</p> <p>Retention and modification of traffic control signals across Mowbray Road at Hampden Road is considered essential to link the north and south sides of Mowbray Road for pedestrian movement and the future bicycle link between Chatswood CBD and Artarmon Local Centre – Confirmed in Sydney Metro scope (2021)</p> <p>Consider separate shared path bridge over the railway corridor just north of the existing Mowbray Road bridge – Not in Sydney Metro scope, Council advised.</p> <p>Consider shared path or a separate two way bicycle path/ pedestrian footpath on the northern side of Mowbray Road between Pacific Highway and Frank Channon Walk extension – Confirmed as part of Sydney Metro scope (2021).</p> <p>Consider the need for extension of Frank Channon Walk to Mowbray Road – Confirmed as part of Sydney Metro scope (2021).</p> <p>Consider the need for regional road network connectivity improvements via a new right turn in Pacific Highway, southbound, into Mowbray Road West – To be determined by TfNSW.</p>

Consultation	Timeframe	Outcome
Transport for NSW – Greater Sydney Network and Asset	Email correspondence April 2020 and September 2021 to TfNSW Greater Sydney Network and Asset.	<p>Proposed retention and modification of Traffic control signals across Mowbray Road at Hampden Road is considered essential to pedestrian and cycle link and access and egress point for Dive facility. TfNSW Network and Asset have advised Metro that a separate assessment to justify the retention of the traffic signals would need to be undertaken, based on the end state arrangements – Further consultation required with TfNSW.</p> <p>Investigation of Pacific Highway southbound right turn into Mowbray Road west. TfNSW Network and Asset has prepared a preliminary design. No traffic assessment or funding commitment. Further advice has indicated the intersection is complex to modify with existing utilities, land acquisition and efficiency concerns are main factors.</p>
TfNSW Greater Sydney Division	Presentation and discussion of E95 report on 22 nd February 2022	<p>Sydney Metro would provide separate assessment to this E95 to justify the retention of the traffic signals at Mowbray Rd/ Hampden Rd intersection.</p> <p>The next step is for Sydney Metro to seek clarifications from SM Environmental Planning and DPIE on this E95 report.</p>
TfNSW / Sydney Metro collaboration forum	Presentation and discussion of E95 report findings on 30 th March 2022.	<p>TfNSW indicated the shared path provision across Mowbray Road bridge should be investigated, as the future land use uplift of the Chatswood Dive residual land could increase the pedestrian and cyclist activity.</p> <p>Sydney Metro indicated the option of providing a shared path provision across the Mowbray Road bridge should be pursued through the future developer of the Chatwood residual site, as the current demand does not warrant this upgrade at this stage or for Metro operations.</p>
Willoughby Council	Presentation and discussion of E95 report findings on 31 st March 2022.	<p>Council indicated that the shared path provision across Mowbray Road bridge should be investigated, as the future land use uplift of the Chatswood residual site could increase the pedestrian and cyclist activity. The upgrade would enable future connectivity opportunities.</p> <p>Sydney Metro indicated the option of providing a shared path provision across the Mowbray Road bridge should be pursued through the future developer of the Chatswood residual site, as the current demand does not warrant this upgrade at this stage or for Metro operations.</p>

Consultation	Timeframe	Outcome
<p>Willoughby Council</p>	<p>Submission of DRAFT Nelson Street Planning Condition E95 Report on 16th February 2022</p> <p>Council's comments received on 29th April 2022</p> <p>Sydney Metro responded to Council's comments on 10th June 2022</p>	<p>Council's main feedback:</p> <p>Council highlighted that the east-west walking and cycling route between Goodchap Road and Tindale Road along Mowbray Road is not the preferred alignment at this time.</p> <p>However, Council prefers the provision of the new bicycle facility over the rail corridor as part of the Sydney Metro City and South West project. The following requirements must be achieved should Council's preferred solution not be accepted:</p> <ul style="list-style-type: none"> • TfNSW and all relevant operating entities that have ownership, management responsibility and powers to control infrastructure provision such as Sydney Trains approves the construction of a structure that provides (as a minimum) 3.0m wide separated bicycle path or shared path across the rail corridor on the northern side of Mowbray Road and links seamlessly with a minimum 3.0m wide shared path on the northern side of Mowbray Road on the east and west side of the rail corridor. • TfNSW and all relevant operating entities that have ownership, management responsibility and powers to control infrastructure provision such as Sydney Trains agree to the joint creation of a Rail Interface Agreement with Willoughby Council, if this is a requirement for the construction, maintenance and operation of this new active transport facility. TfNSW accepts responsibility for the delivery and all costs of the creation of this agreement.

Consultation	Timeframe	Outcome
		<ul style="list-style-type: none"> The design, development and construction of the bicycle facility i.e. separated bicycle path or shared path is contractually linked to the sale and/or development of the surplus land (residual land) on the Chatswood Dive site. The land owner being fully responsible for the costs and delivery of the new facility. NSW Government funding for the design, development and construction for a minimum 3,0m wide separated bicycle path or shared path across the rail corridor on the northern side of Mowbray Road and links seamlessly with a minimum 3.0m wide shared path on the northern side of Mowbray Road on the east and west side of the rail corridor be confirmed in a NSW Government program and assurances provided that it will be delivered within 5 years of the finalisation of the Sydney Metro City and South west project. Council is advised in writing of the approval of funding and the arrangements for delivery of the project. <p>Sydney Metro provided the following response to Council comments on their preference for provision of the new bicycle facility over the rail corridor as part of the Sydney Metro City and Southwest project:</p> <p>Given these proposals sit outside the scope of the E95 Report, these requirements will need to be communicated to the Chatswood residual site developer and be subject to assessment having regard to the proposed use of the site once defined. Sydney Metro will consider these proposals and relay Council's comments to the future developer.</p> <p>It is also noted that, neither Council or TfNSW have provided any formal advice to suggest the need for such infrastructure and project budget expenditure. Current traffic and active transport around the site have not indicated a need to provide such a shared path either.</p>

Consultation	Timeframe	Outcome
		<p>The potential land use uplift and pedestrian/ cyclist demand of the Chatswood residual site falls outside of the remit of the project and should be pursued via a separate process e.g. Traffic Impact Assessment when the development adjacent to the Chatswood Dive facility has matured. It is Sydney Metro understanding that Council wishes for TfNSW to continue exploring, with the future developer, what requirements will be needed to cater for forecast pedestrian and cyclist demand by the residual land development. Given the very low traffic generation, and lack of a station at this site, any uplift in access demand is not driven by Sydney Metro operations. Condition E95 relates to construction and operation of the City and Southwest Metro line.</p>
<p>Traffic & Transport Liaison Group (TTLG)</p>	<p>Presentation and discussion of E95 report findings on 29th June 2022</p>	<ul style="list-style-type: none"> • Council provided support on: <ul style="list-style-type: none"> ○ Shared path linking Frank Channon Walk to Mowbray Road ○ Retention & modification of existing signal at Mowbray Rd/Hampden Rd intersection ○ Consider shared path or a separate two-way bicycle path/ pedestrian footpath on the northern side of Mowbray Road between Pacific Highway and Frank Channon Walk extension • Council stated that the pedestrian crossing across Mowbray Rd is important to connect the bicycle network. • Council highlighted to TTLG forum that it is desirable to provide pedestrian footpath with sufficient width for bicycle to the east of Hampden Rd (across the rail corridor).

Appendix B: Pedestrian and cycle movement

B.1 Daily pedestrian and cyclist counts

Table 6 presents the daily pedestrian and cyclist volumes in terms of average weekday, average weekend and high usage day.

Table 6 Daily pedestrian and cyclist volumes on Nelson Street bridge (12 – 18 May 2017)

Average weekday			Average weekend			Critical Day (Monday)			Change	
EB	WB	Total	EB	WB	Total	EB	WB	Total	Critical day vs avg. Weekday	Weekend vs Weekday
Pedestrians:										
128 (60%)	86 (40%)	214	124 (62%)	75 (38%)	199	138 (57%)	104 (43%)	242	+13.1%	-7.0%
Cyclists:										
15 (75%)	5 (25%)	20	19 (83%)	4 (17%)	23	20 (59%)	14 (41%)	34	+70.0%	+15.0%

Notes:

(1) EB – Eastbound, WB – Westbound

(2) Percentages in brackets indicate the directional distribution as a percentage of the two way traffic volume

Observations during peak three-hour periods for each of these surveys on Nelson Street are summarised in Table 7.

Table 7 Observed pedestrian and cyclist volumes on Nelson St east of bridge (2015-2018) – both directions combined

	3-hr AM Peak Period (6:00-9:00am)		3-hr PM Peak Period (4:00-7:00pm)		Total (combined peaks - six hours)	
	Pedestrians	Cycles	Pedestrians	Cycles	Pedestrians	Cycles
Dec 2015 ^a	41	0	49	1	90	1
May 2017 ^b	53	8	38	2	91	10
Aug 2018 ^a	39	7	34	7	73	14

a. single weekday count

b. average of weekdays for full-week count

B.2 Peak pedestrian and cyclist counts, 18 & 21 August 2018 and 30 March & 2 April 2019

As part of satisfying CSSI planning condition E75, traffic counts were carried out in the weekday and weekend peak periods on the following dates and times:

- Saturday 18 August 2018
- Tuesday 21 August 2018
- Saturday 30 March 2019
- Tuesday 2 April 2019.

The counts in 2018 were conducted while the Nelson Street bridge and Frank Channon Walk were open, prior to the installation of traffic signals at the Mowbray Road/ Hampden Road intersection. The counts in 2019 provide a comparison after the closure of Nelson Street bridge, Frank Channon Walk and Chapman Avenue underpass. In 2019 the Chatswood Dive Site was in operation, with tunnel boring machine spoil being removed by truck.

Since these counts were carried out during peaks only, these are compared with each other as per the diagrams below.

Figure 12 shows the effect of the underpass closure on weekday morning pedestrian traffic in the vicinity of Chapman Avenue. Increases in pedestrians on Orchard Road to and from Chatswood are accompanied by reductions in pedestrians between Ellis Street and the southbound bus stop on the Pacific Highway (south of Ellis Street). This suggests that pedestrians are now beginning and ending trips on Chapman Avenue by walking to Chatswood instead of using bus services on the Pacific Highway.

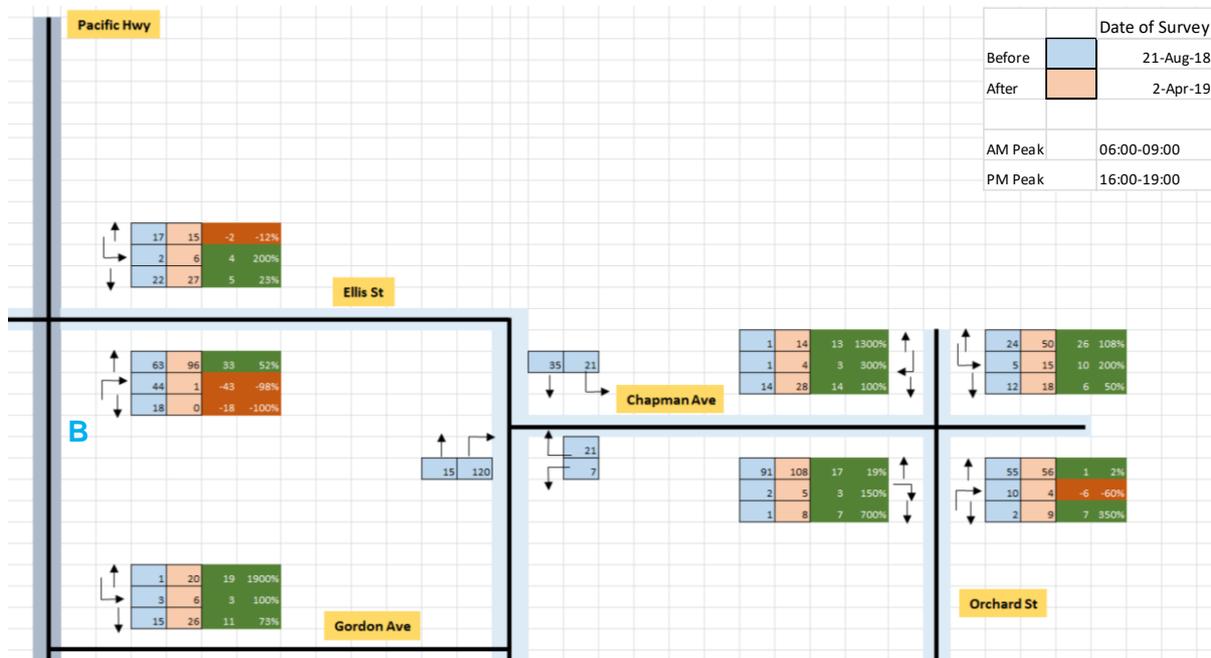


Figure 12 Weekday AM Peak pedestrian counts 21/08/18 and 02/04/19: North of Gordon Avenue

Figure 13 shows reductions in weekday morning pedestrian traffic on Nelson Street/ Berkeley Court following the closure of the bridge. This demand has shifted to Mowbray Road bridge, primarily to the footpath on the northern side. East of the Hampden Road intersection, there is a small increase in pedestrians using the southern footpath on Mowbray Road, following the introduction of the traffic signals.



Figure 13 Weekday AM Peak pedestrian counts 21/08/18 and 02/04/19: South of Gordon Avenue

Figure 14 shows weekday evening peak changes to pedestrian numbers in the vicinity of the Chapman Avenue underpass. Similar to Figure 12 (weekday morning peak – Chapman Avenue), there are increases in pedestrians using both Orchard Road and the Pacific Highway to walk to and from Chatswood. There is a reduction in pedestrians walking between the Highway and Ellis Street, as a result of the closure of the Chapman Underpass.

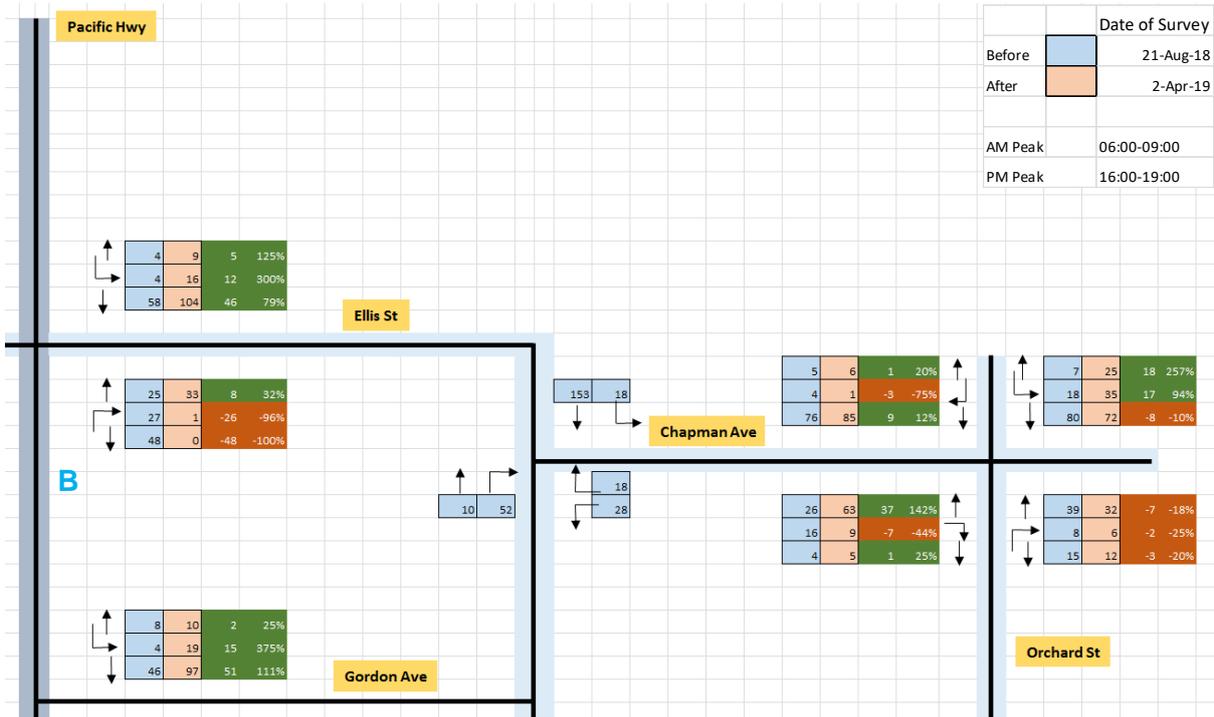


Figure 14 Weekday PM Peak pedestrian counts 21/08/18 and 02/04/19: North of Gordon Avenue

Consistent with Figure 13, Figure 15 shows reductions in weekday evening peak pedestrian movement on Nelson Street and Berkeley Court as a result of the Nelson Street bridge closure. There is a corresponding increase in pedestrian traffic on the northern side of Mowbray Road indicating that pedestrian demand has changed to this location.

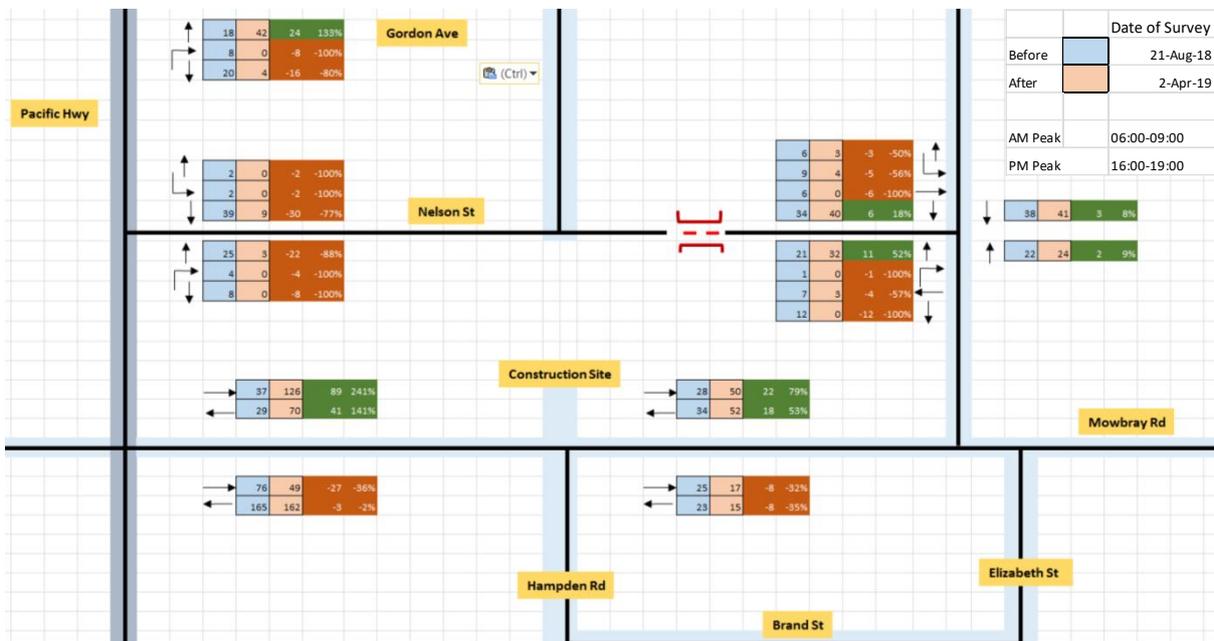


Figure 15 Weekday PM Peak pedestrian counts 21/08/18 and 02/04/19: South of Gordon Avenue

Weekend peak pedestrian flows in the vicinity of the Chapman Avenue underpass are shown in Figure 16. Reductions in pedestrians can be observed on the Pacific Highway, while the number of pedestrians using Orchard Road has increased. A very large reduction in pedestrians travelling from Orchard Road into Johnson Street (opposite Chapman Avenue) occurred. As the number recorded in 2018 (over 440) was significantly higher than surrounding streets, this is likely to be due to an event being held.

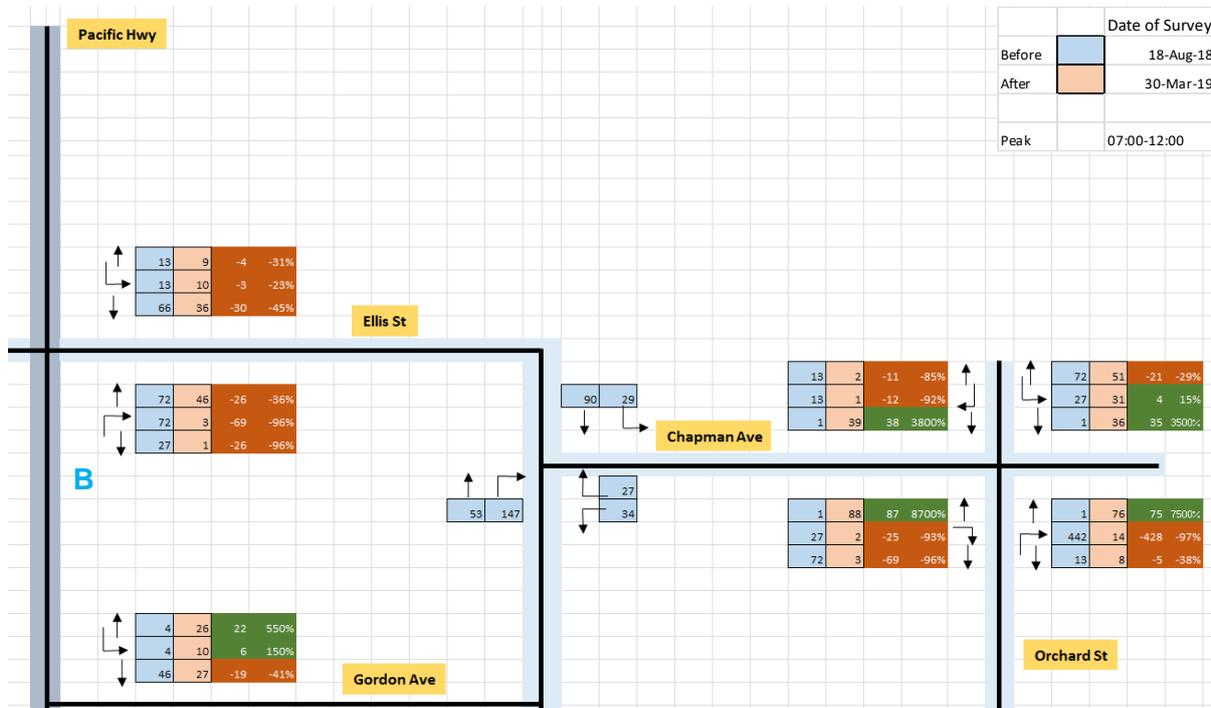


Figure 16 Weekend Peak pedestrian counts 18/08/18 and 30/03/19: North of Gordon Avenue

Changes to weekend peak pedestrian flows as a result of the Nelson Street bridge closure are shown in Figure 17. Unlike the weekday counts shown in Figure 13 and Figure 15, weekend pedestrian traffic has reduced on all surrounding streets.

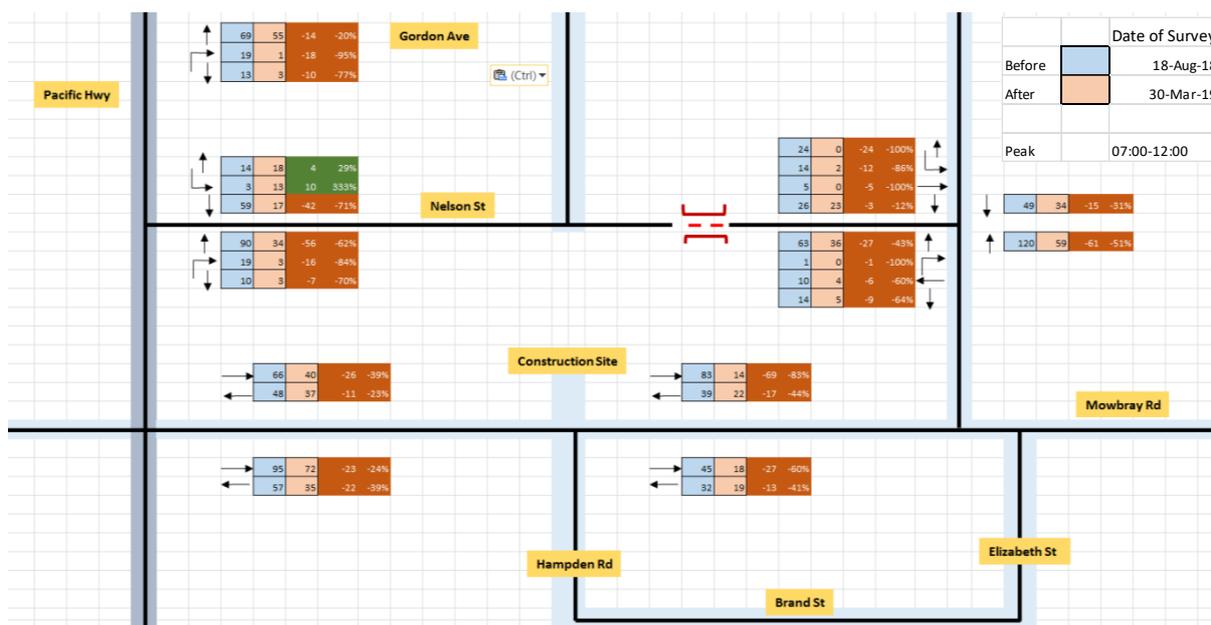


Figure 17 Weekend Peak pedestrian counts 18/08/18 and 30/03/19: South of Gordon Avenue

Figure 18 shows the cyclist counts for the vicinity of the Chapman Avenue underpass, for the weekday morning peak. No significant effect of the underpass closure can be seen due to the small numbers of cyclists recorded, both before and after the closure.

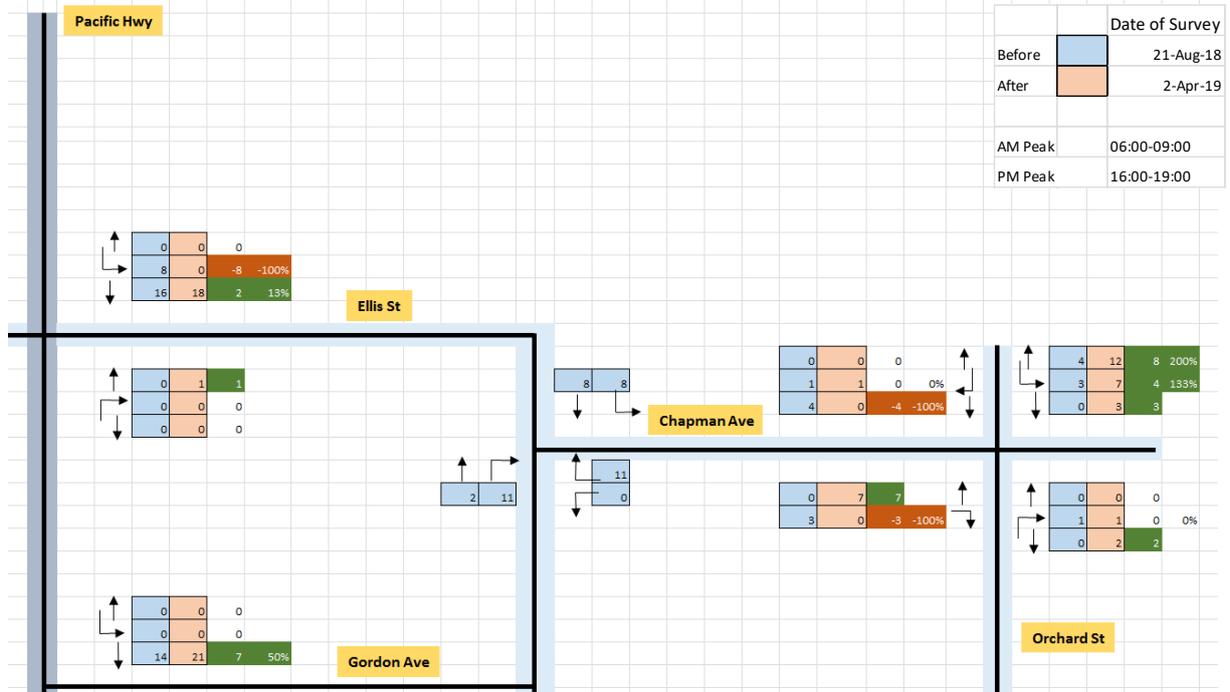


Figure 18 Weekday AM Peak cyclist counts 21/08/18 and 02/04/19: North of Gordon Avenue

Figure 19 shows the effect of the Nelson Street bridge closure on weekday morning peak cyclists. A small increase is recorded for Orchard Road, however overall numbers of cyclists are low. A more significant increase in activity was observed on the Pacific Highway in the vicinity of Nelson Street. An increase in cyclists on Nelson Street could be due to construction workforce arriving at site by bicycle.

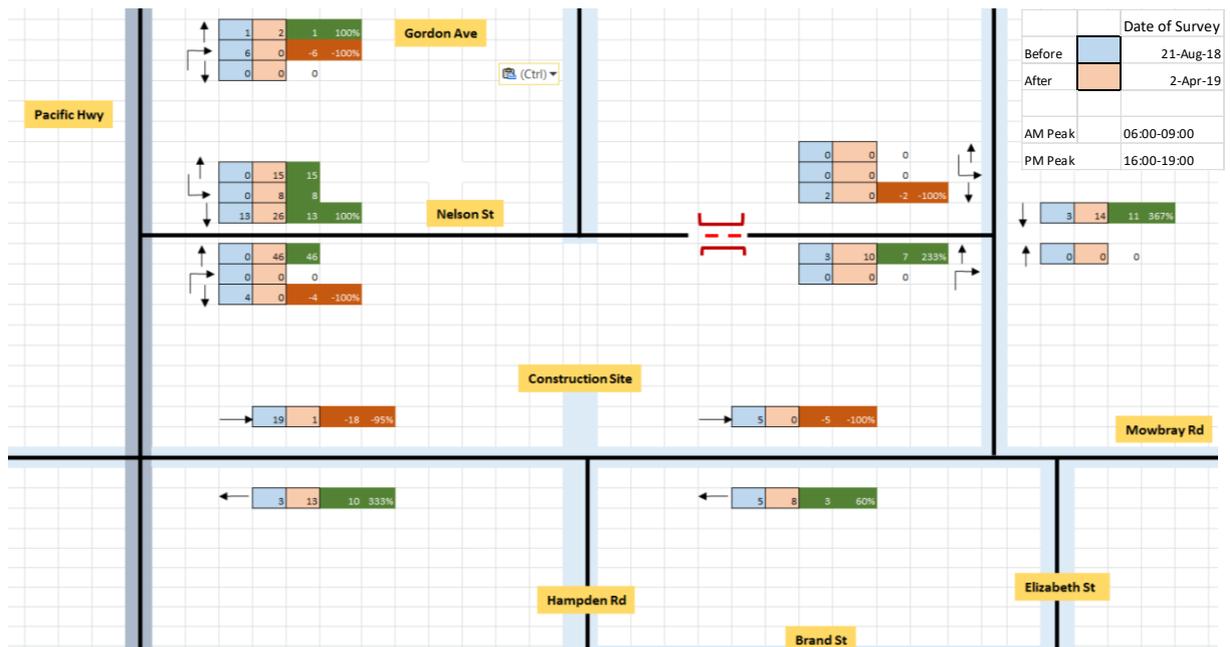


Figure 19 Weekday AM Peak cyclist counts 21/08/18 and 02/04/19: South of Gordon Avenue

Figure 20 shows minor increases of cyclists on the Pacific Highway and Orchard Street in the vicinity of Chapman Avenue and Gordon Avenue during the weekday evening peak. Overall cyclist numbers are very low in both 2018 and 2019 surveys.

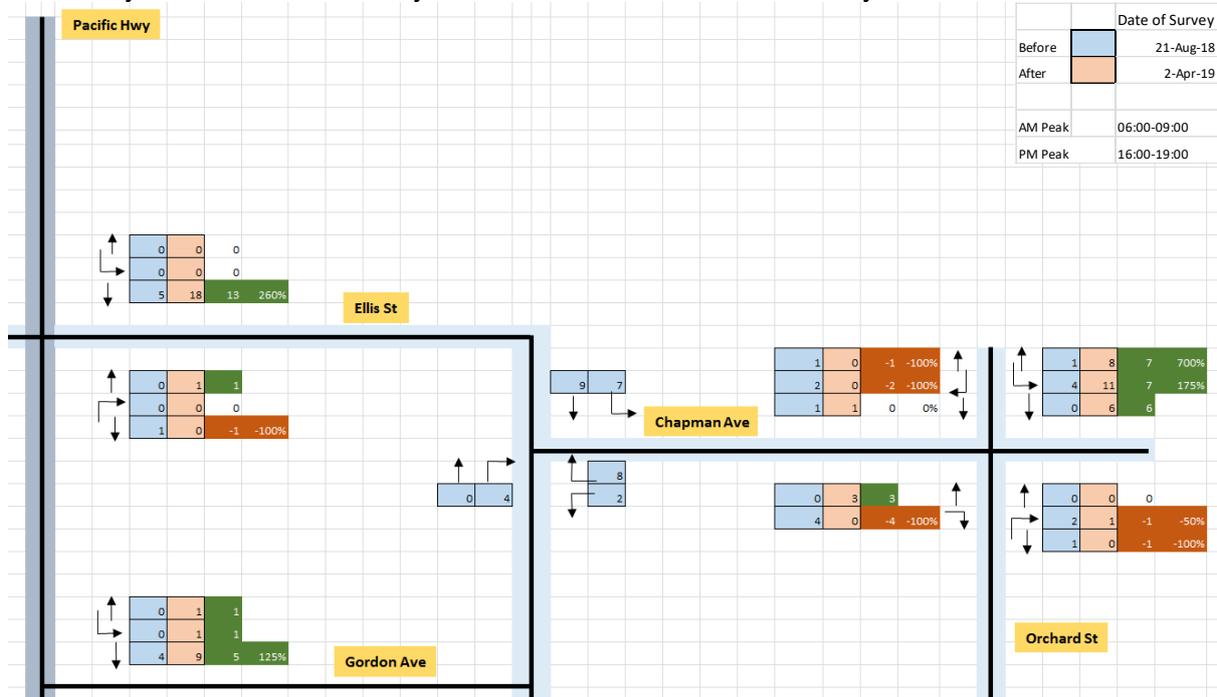


Figure 20 Weekday PM Peak cyclist counts 21/08/18 and 02/04/19: North of Gordon Avenue

Figure 21, which shows weekday evening peaks, follows a similar pattern to the weekday morning peak. Increases in cyclist activity around Nelson Street could be attributed to the Sydney Metro construction workforce travelling by bicycle.



Figure 21 Weekday PM Peak cyclist counts 21/08/18 and 02/04/19: South of Gordon Avenue

Figure 22 shows an insignificant number of weekend peak cyclist numbers were recorded in the vicinity of the Chapman Avenue underpass. A significant reduction in southbound cyclists on the Pacific Highway was recorded. It is inconclusive whether this decrease is a result of the Chapman Avenue or Nelson Street bridge closure.

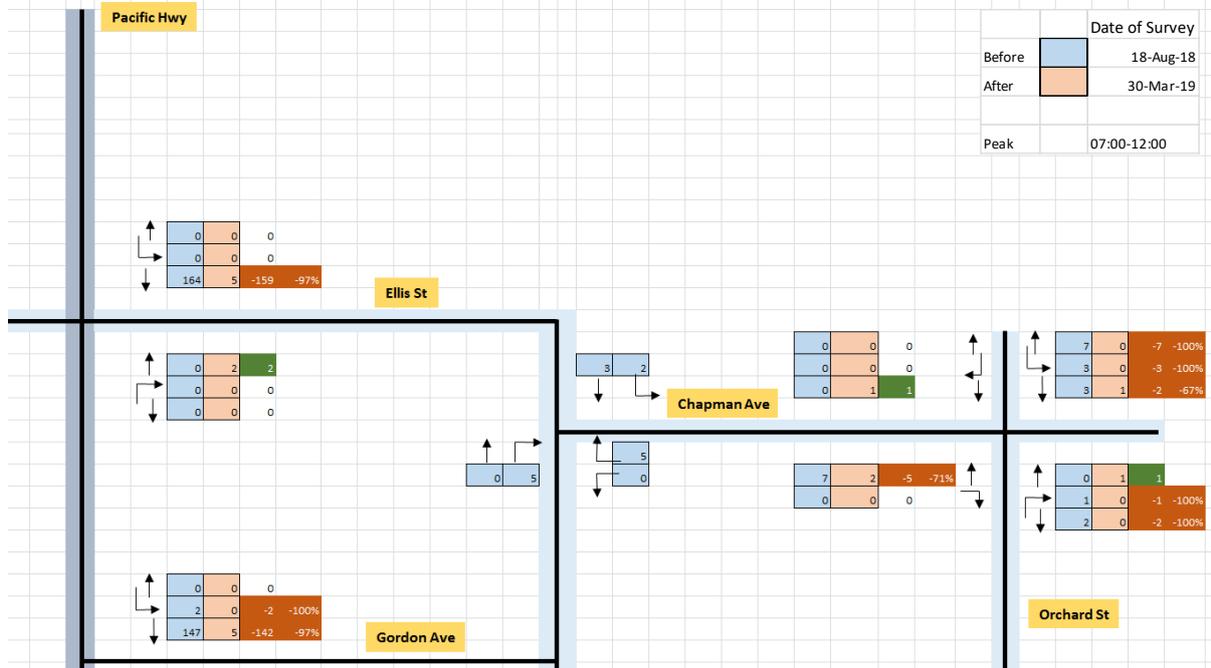


Figure 22 Weekend Peak cyclist counts 18/08/18 and 30/03/19: North of Gordon Avenue

Figure 23 shows a reduction in cyclists on Mowbray Road, potentially as a result of the Chatswood Dive Site. As with Figure 22 (Weekend peak cyclist counts, north of Gordon Avenue), a reduction in southbound cyclists on the Pacific Highway was recorded. It is inconclusive whether this decrease is a result of the Nelson Street bridge closure.

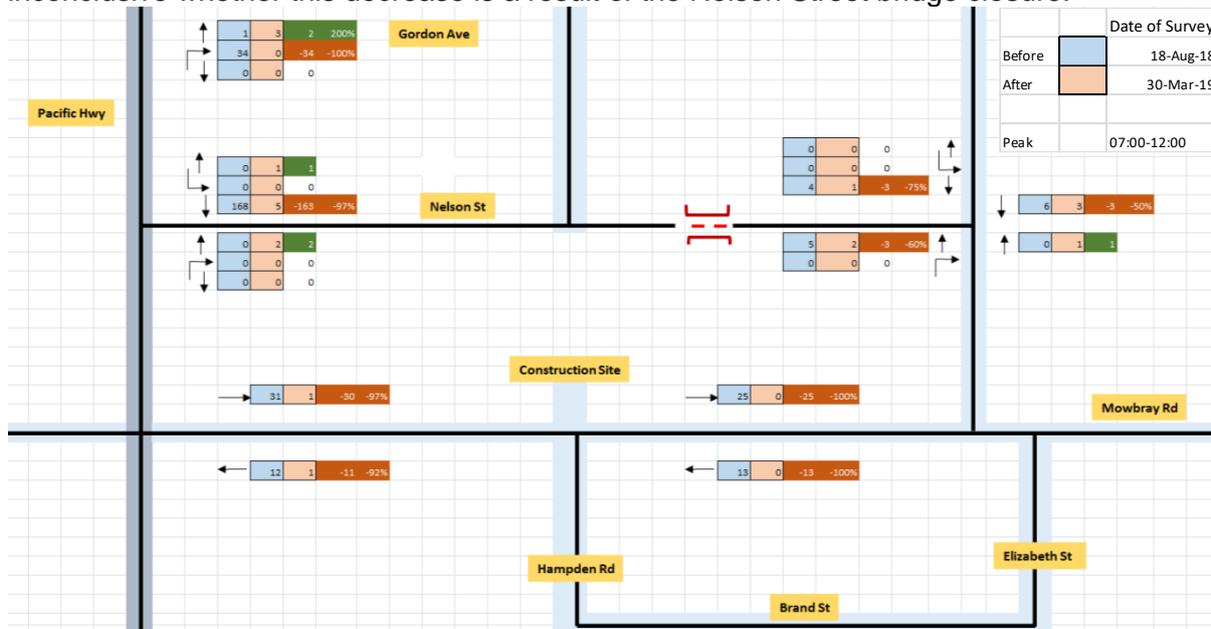


Figure 23 Weekend Peak cyclist counts 18/08/18 and 30/03/19: South of Gordon Avenue

Appendix C: Replacement pedestrian and cycle bridge at Nelson Street

This Appendix to the report discusses design requirements to understand the conceptual constructability and footprint impacts of the various landing options that could connect a potential bridge, across the railway corridor at Nelson Street, to ground level.

Due to the North Shore Line’s raised track bed, the approximate clearance to the underside of the potential walking and cycling bridge is at least 4.5m from the current road level.

The various landing options that could provide vertical connection include:

- Straight ramp
- Curved ramp
- Back to back ramp
- Lift and stairs.

The two options with the least impact to adjoining properties are the back to back ramp and lift with stairs.

C.1 Back to Back Ramp

The ramp from the bridge to the ground level is to incorporate the following:

To reach a bridge height of 4.5 metres, an interval ramp would require a width of at least 28 metres.

- Ramp gradient of 1 in 14
- Interval landings of 1.2 metres in length
- 180 degree turn back landing of 1.54 in width
- Seven landing intervals along a span of 71.4 metres.

This was calculated by:

Horizontal length	= 14 x 4.5m	= 63m
Intervals	= 7m x 1.2m	= 8.4m
Total ramp span	= 63m + 8.4m	= 72m

Figure 24 illustrates the longitudinal cross section for this option.

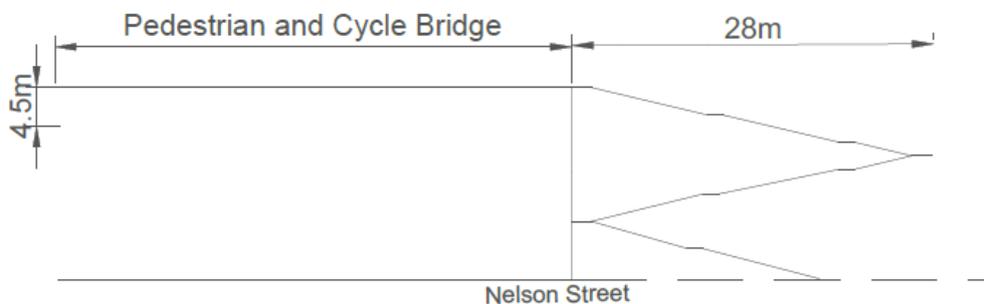


Figure 24: Nelson Street Back to Back Ramp option – longitudinal cross section

Figure 25 illustrates the footprint of the ramp for this option. This footprint impacts on four private property driveways on Berkley Court. The ramp structure would impact on the Berkeley Court houses due to its close proximity. Ramp supports may also require relocating underground services located in the Nelson Street footprint.

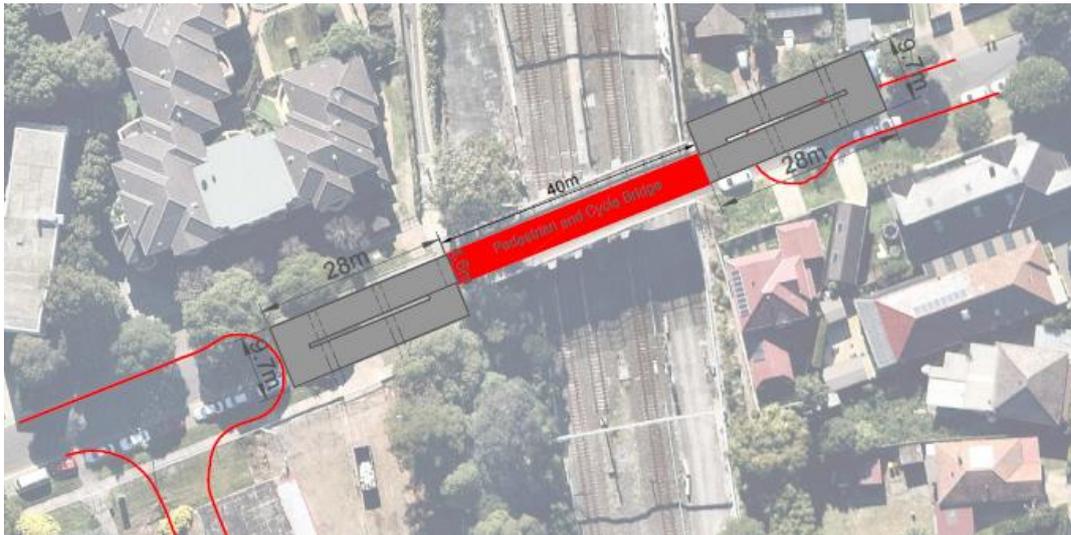


Figure 25: Nelson Street Back to Back Ramp option – footprint

C.2 Lift and Stairs

The lift and stair option from the bridge to the ground level is to incorporate the following:

- Ramp gradient of 1 in 14
- Interval landings of 1.2 metres in length
- Lift footprint
- Seven landing intervals along a span of 71.4 metres.

This was calculated by:

Horizontal length	= 14 x 4.5m	= 63m
Intervals	= 7m x 1.2m	= 8.4m
Total ramp span	= 63m + 8.4m	= 71.4m, round up to 72m

Figure 26 illustrates the longitudinal cross section for this option.

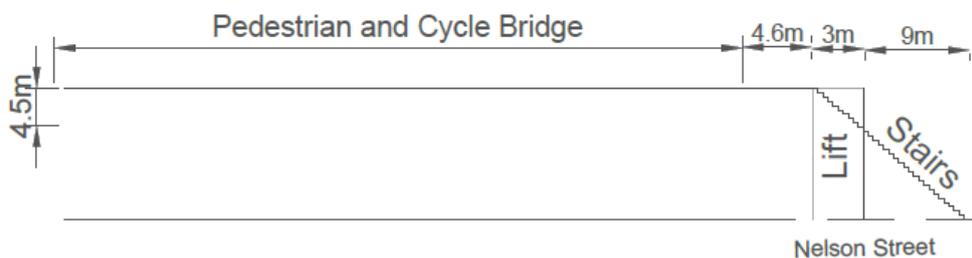


Figure 26: Nelson Street Stairs and Lift option – longitudinal cross section

Figure 27 illustrates the footprint for this option. The stairs and lift would impact on two private property driveways in Berkeley Court. The stair and lift structure would impact on the amenity of these two houses. The Nelson Street lift would require the relocation of underground services located in the Nelson Street footpath.



Figure 27: Nelson Street Stairs and Lift option – footprint