Regional Route 2

Option Assessment and Concept Design

Client	Inner West Council
Office //	NSW
Reference //	N116730
Date //	06/11/17

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	16/05/17	Feedback included	Dean Rance	Volker Buhl	Dick van den Dool	Dick van den Dool
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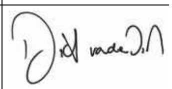
C	06/11/17	Feedback included	Dean Rance	Volker Buhl	Dick van den Dool	

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1. Introduction

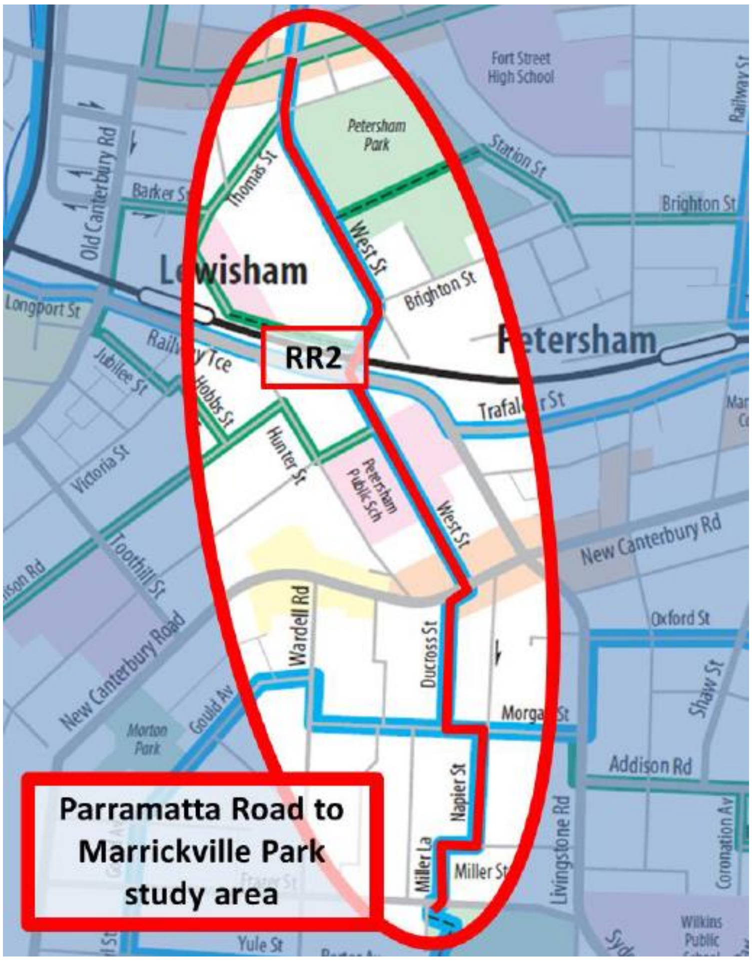
1.1 Background

Inner West Council (Council) is seeking to implement a number of bicycle routes as identified as part of the 2007 Marrickville Bicycle Strategy.

GTA Consultants (GTA) has been appointed to undertake a route option assessment for Regional Route 2 (RR2). This incorporates identifying and assessing route options and to subsequently develop concept designs for a selected route.

RR2 provides a regional north-south link between Parramatta Road (Petersham) and Marrickville Park (Marrickville) and is part of the former Marrickville Council's strategic corridor between Leichhardt and Earlwood. At the northern end, it links to Flood Street which ultimately provides access through to the Hawthorne Canal cycleway. Further south of Marrickville Park, Council has recently completed concept designs for LR3 to the crossing of the Bankstown railway line at Livingstone Road. It is envisioned that the intent of the works is to ultimately provide a cycling corridor between Hawthorne Canal and the Cooks River cycleway.

Figure 1.1: RR2 between Parramatta Road and Marrickville Park



2. Option Identification

2.1 Approach

2.1.1 RR2 – Petersham to Marrickville

A total of three route corridors have been identified and investigated as part of this study, noting that opportunities for corridors are heavily restricted by the crossing of the rail corridor. The corridor options are indicatively summarised as follows and shown illustratively in Figure 2.1. For continuity of the cycling network, the integration of RR2 with the existing cycle route on Flood Street (north of Parramatta Road) is a key design consideration.

Petersham to Marrickville – Central Corridor

- Route 1 (R1) – via West Street, New Canterbury Road, Ducros Street, Morgan Street, Napier Street, Miller Street, Miller Lane and Lawson Avenue.

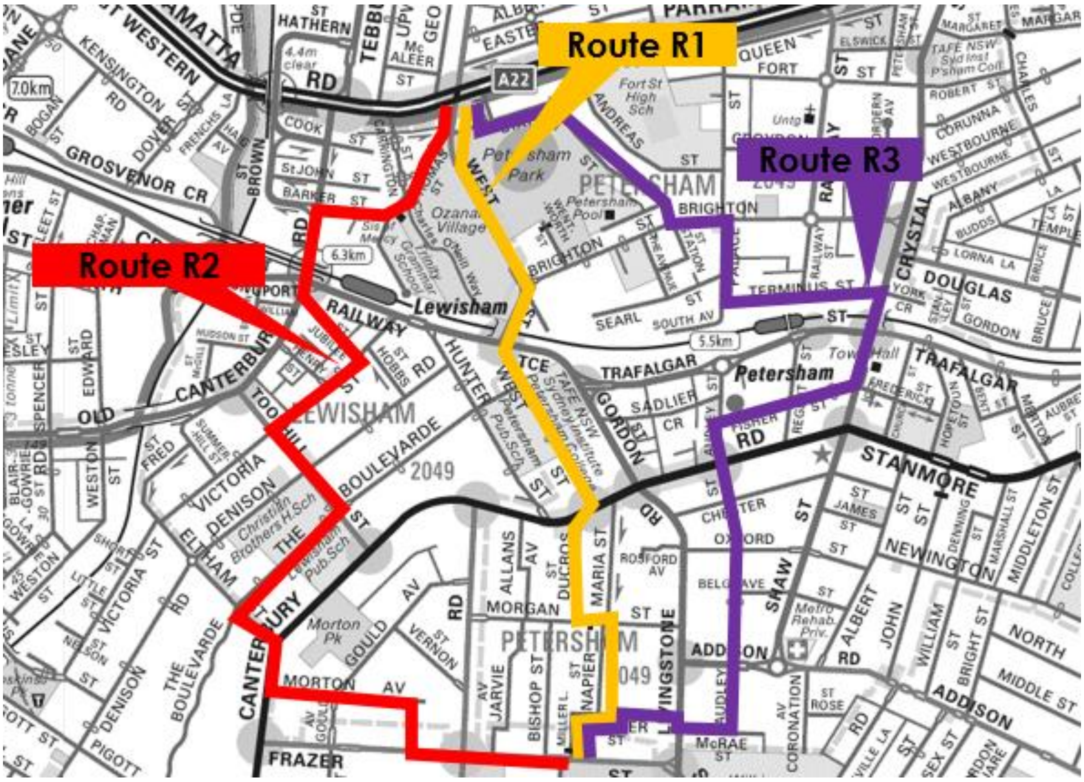
Petersham to Marrickville – West Corridor

- Route 2 (R2) – via West Street, Thomas Street, Barker Street, Old Canterbury Road, Jubilee Street, Toothill Street, The Boulevard, Eltham Street, New Canterbury Road, Morton Avenue and Frazer Street.

Petersham to Marrickville – East Corridor

- Route 3 (R3) – via West Street, Station Street, Brighton Lane, Searl Street, Palace Street, Terminus Street, Crystal Street, Fisher Street, Audley Street, McRae Street, Livingstone Road, Miller Street, Miller Lane and Lawson Avenue.

Figure 2.1: Concept Route Options



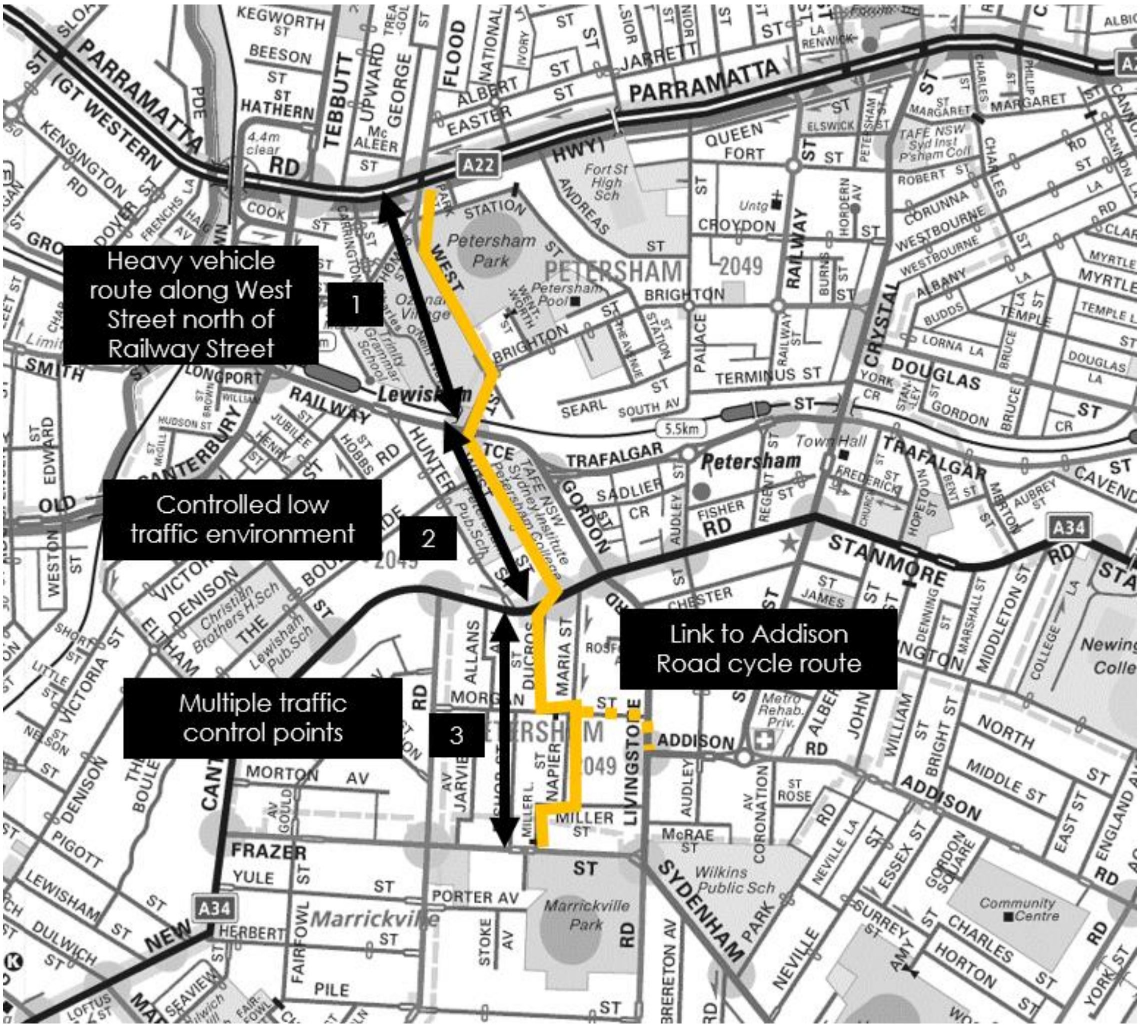
Source: Modified from Sydway

2.2 Route investigation

2.2.1 Route R1

Route R1 is the most direct route between the nominated end points in Petersham and Marrickville. The primary corridor it runs along is West Street. An indicative corridor alignment option of the route is illustrated in Figure 2.2 and explained in the subsequent text.

Figure 2.2: Route R1 Overview



- **Section 1:** Existing off-road shared path on western side of West Street south of Thomas Street which is supplemented by low level on-road markings. West Street also has a low level of on-road bicycle markings. This section of the route was characterised by the presence of a high number of heavy vehicle movements. Parking was generally observed to be unrestricted and there was the presence of bus stops along this section of the route. There are two primary design considerations in this section. The first one is integration of RR2 across Parramatta Road into Flood Street. Secondly, is the heavily constrained road environment on the railway overpass, noting a narrow road and pedestrian movement corridor. There is potentially some space available to reconfigure lane alignments on the bridge to accommodate extra space for cyclists and pedestrians. A broader works package on this constrained area will be complemented by plans associated with the development of Regional Route 7. (Figure 2.3, Figure 2.4).
- **Section 2:** As motor vehicle access is prevented across the southern leg of the West Street-Railway Street intersection, West Street was observed to be a low traffic and controlled environment for cycling. Footpaths were observed to be of standard width, with limited availability to provide a shared path. The road is currently not marked with stencils to formalise a cycling route. Parking was generally observed to be unrestricted, with a small number of disabled access spaces, and some 15P school peak period parking (7am-9:30am) and (3pm-6:30pm) adjacent to the school. Near New Canterbury Road, an increased prevalence of 1P and 2P parking was observed. (Figure 2.5, Figure 2.6).
- **Section 3:** This section was characterised by road furniture which prevents rat running through the local streets. Subsequently, this section shows low traffic volumes and is restricted to local access (Figure 2.7, Figure 2.8). This route option provides the opportunity to link with the proposed cycleway in Addison Street by continuing along Morgan Street and on a shared path along the western side of Livingstone Road.

Figure 2.3: Existing shared path on West Street (north of rail corridor)

Figure 2.4: West Street Road corridor (north of rail corridor)

Figure 2.5: West Street south of rail corridor

Figure 2.6: Ducros Street

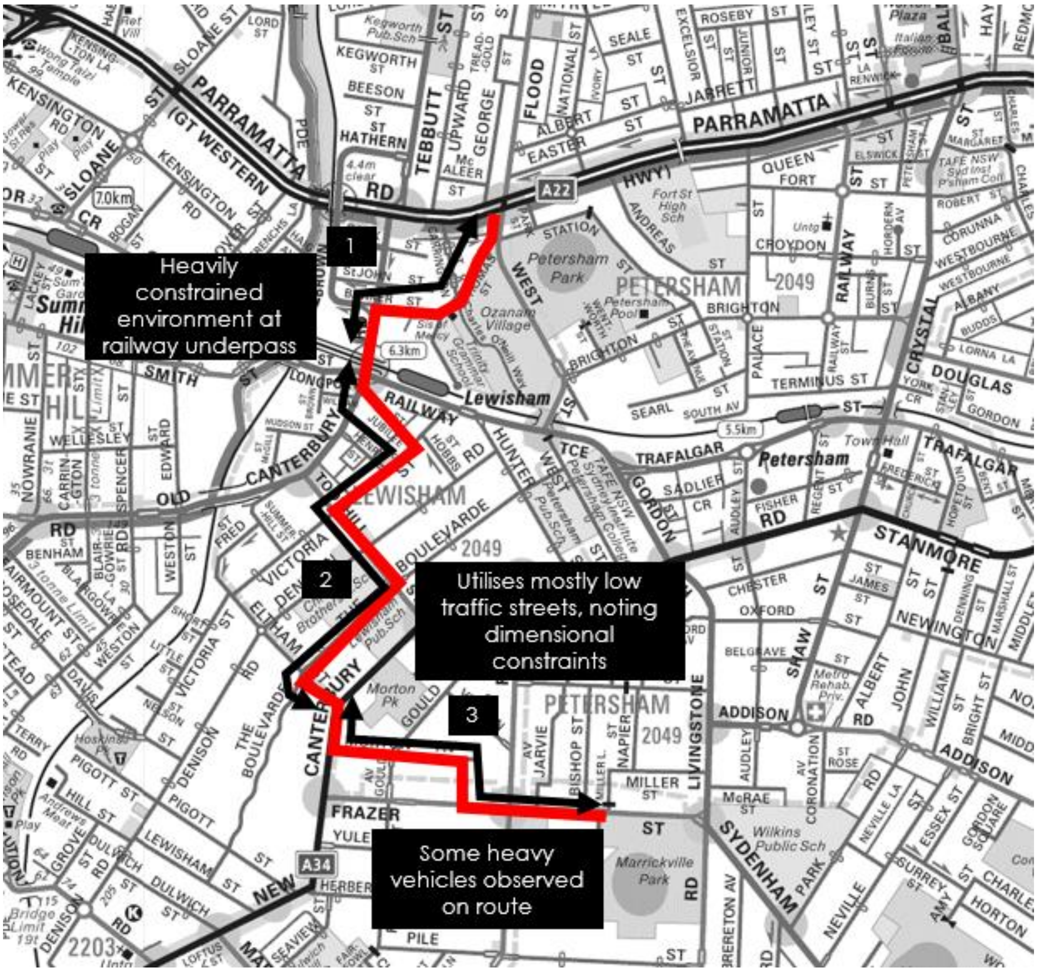
Figure 2.7: Existing traffic control on Morgan Street

Figure 2.8: Miller Lane

2.2.2 Route R2

Route S2 deviates to a western rail crossing point at Old Canterbury Road and follows a series of local access streets. An indicative corridor alignment option of the route is illustrated in Figure 2.9 and explained in the subsequent text.

Figure 2.9: Route R2 Overview



- **Section 1:** Existing mixed traffic route between Parramatta Road and Old Canterbury Road, with a contraflow bicycle route on Barker Street. Parking along this portion of the corridor was observed to be generally unrestricted. A 'No Parking' restriction is generally present on Old Canterbury Road. There is limited capacity for off-road routes and overall, the road corridors are constrained. The integration of the route into the Flood Street cycle route is a key consideration. (Figure 2.14, Figure 2.15).
- **Section 2:** This section mainly comprises of an existing on-road route. The intersection of Jubilee Street and Old Canterbury Road is blocked to traffic, and therefore, the area immediately south of the station is for local access. Parking was observed to be generally 2P around the station during daytime periods. Road reserves are constrained. A further two schools are located on The Boulevard, noting that road reserves are more generous, but the area would be subject to periods of considerable local pedestrian and vehicular traffic. The eastern end of Eltham Street is closed to traffic, again resulting in a localised low traffic environment. Parking is generally unrestricted and there is no existing facility to aid crossing New Canterbury Road (Figure 2.12, Figure 2.13).
- **Section 3:** Moreton Avenue functions as a local access street and has a generous road corridor and low traffic volumes and no parking restrictions. Some heavy vehicle movements and high traffic volumes were observed in Frazer Street, also noting parking was generally unrestricted (Figure 2.10, Figure 2.11).

Figure 2.10: Frazer Street near Wardell Road

Figure 2.11: Morton Avenue

Figure 2.12: Crossing of New Canterbury Road at Eltham Street

Figure 2.13: Constrained road environment on Victoria Street

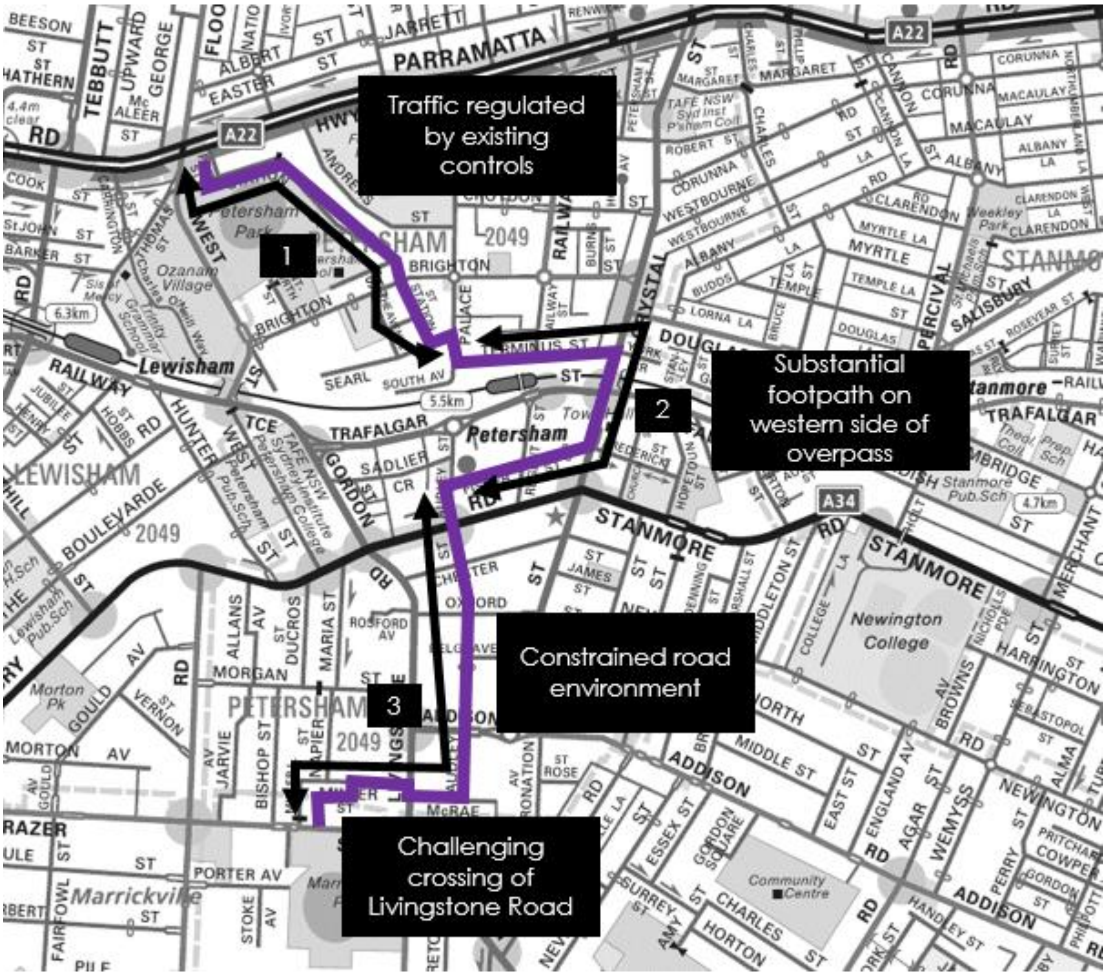
Figure 2.14: Constrained road environment at Old Canterbury Road underpass

Figure 2.15: Thomas Street

2.2.3 Route R3

Route R3 is a route option which deviates to the east to provide a crossing of the rail corridor. It has the benefit in that it partially utilises existing infrastructure, but is an indirect route. An indicative corridor alignment option of the route is illustrated in Figure 2.16 and explained in the subsequent text.

Figure 2.16: Route R3 Overview



- **Section 1:** An on-road route exists along Station Street, or alternatively, there is an off-road link through Petersham Park. Existing traffic controls regulate traffic on Station Street. Brighton Street may be difficult for a cyclist to cross at peak periods without the provision of an upgraded crossing facility. There is an existing non-trafficable laneway which connects Little Brighton Street with Searl Street. Along these roads, parking is generally observed to be unrestricted, and road corridors are constrained to provide upgraded infrastructure. The integration of the route into the Flood Street cycle route is a key consideration (Figure 2.17, Figure 2.18).
- **Section 2:** Traffic flow is regulated on Terminus Street, with traffic controls at Crystal Street. On the western side of the road overpass, there is a substantial existing footpath which continues to Fisher Street. Fisher Street is also controlled with respect to Crystal Street. The cycle route would have to pass through an existing Council facility carpark. Parking along Terminus Street and Crystal Street was generally observed to be

unrestricted, with 'No Parking' during peak periods permitted on Crystal Street, and 1P parking restrictions in the inter-peak period (Figure 2.19, Figure 2.20).

- **Section 3:** A route along Audley Street which was observed to be dimensionally constrained south of New Canterbury Road, existing traffic controls restrict traffic flow south of Addison Road. The crossing of McRae Street to Miller Street across Livingstone Road would represent a substantial design and safety issue for users given the road environment and would need the provision of a crossing facility. Parking was generally observed to be unrestricted (Figure 2.21,Figure 2.22).

Figure 2.17: Existing traffic control device and road corridor on Railway Street

Figure 2.18: Brighton Lane

Figure 2.19: Terminus Street corridor

Figure 2.20: Existing footpath on Crystal Street

Figure 2.21: Constrained road environment on Audley Street

Figure 2.22: Crossing of Livingstone Road

3. Route Assessment

3.1 Route Analysis Method

To assess the various corridor alignments, each route is subject to three evaluations. Firstly, the route is subject to the RMS Bike Path Assessment, which generally looks at factors including safety and route performance. However, there are a range of important considerations that are overlooked in the assessment (as acknowledged in the guidelines). Subsequently, in consultation with Inner West Council, GTA has developed an assessment framework which looks at more qualitative factors including an impact on parking, corridor space and feasibility. Finally, high quality infrastructure can be provided, but if there is no demand, it will not be used, accordingly, a land use assessment, also consistent with RMS guidance has been completed. The various considerations for the assessments are detailed below in Section 3.2, with the assessment outputs shown in Section 3.3.

3.2 Assessment Considerations

3.2.1 Distance, On-Road Distance and Detour Factors (RMS)

Distance is an important consideration when designing for cyclists, cyclists tend to take 'the path of least resistance' between their two points, and have a limited tendency to detour, even if infrastructure is provided elsewhere. Research and international best-practice tends to show that detour factors should be limited to approximately 140%.

On-road infrastructure should generally be limited, except where speeds and volumes are low. Where volumes and speeds are not controlled, cyclists will not perceive there to be adequate safety, and the overall objective of achieving an age 8 to 80 route will not be achieved.

Table 3.1: Distance outputs

Route	Distance [Indicative estimate]	On-Road Distance [Estimate]	On-Road Proportion of Route [% estimated]	Indicative Detour Factor [Route Distance/Straight Line 1.35km)]
Route R1	1.5km	1km	65%	115%
Route R2	2.3km	1.6km	70%	175%
Route R3	2.7km	2.1km	80%	200%

3.2.2 Climbs (Altimetry) (RMS)

Elevation change is generally a deterrent to riding due to the extra effort required, and where on-road facilities are present, the speed differential between cyclists and vehicles is amplified. Climb data has been sourced from www.mapmyride.com as the route would be ridden in a north-to-south direction. Route R1 was observed to generally run along the top of a ridge, with the topography dropping off to the west of New Canterbury Road, and Audley Street was observed to be steeper than (for example) Ducros Street. The output is divided by 10 for the purposes of the assessment – that is to say that 10 metres of elevation change is equivalent to 1 kilometre of riding.

Table 3.2: Altimetry outputs

Route	Altimetry
Route R1	Runs broadly along a ridge top, with a north-to south elevation change of approximately 15 metres. Generally, gradients are consistently low (which is preferred) as opposed to small sections of high gradients.
Route R2	There is a not insignificant gradient around the area of Victoria Street and the Boulevard. North-to south elevation change of approximately 23 metres is estimated.
Route R3	Audley Street is where most of the elevation change occurs, with approximately 30 metres of elevation change expected riding in a north-to south direction.

3.2.3 Sharp Turns and Yield (RMS)

Although in the RMS assessment these inputs are combined, in this assessment, they have been separated. They pertain to the continuity and potential safety of a link.

Sharp turns are generally not preferred due to the need to brake and reaccelerate back up to speed. Further, whilst left turns may be relatively easy to navigate for cyclists, right turns across traffic can cause substantial delays and cause broader safety concerns (and limit the useability for specific demographics).

The yield refers to the crossing of a non-priority intersection along the route, this may include the crossing of a major road, roundabout or set of traffic lights.

In the local road network, the arterial road corridors are the only continuous corridors. This has the benefit of reducing traffic on local access streets, but the disbenefit is that it generally results in more turns along an identified corridor.

Each sharp turn and yield gets assigned a value of 1, indicating that a yield/sharp turn is the equivalent of riding 1 kilometre, which can be considered appropriate when the safety and/or delays of the sharp turn/yield are considered.

Table 3.3: Sharp Turn and Yield Output

Route	Sharp Turn	Yield (Traffic Light, non-priority intersection)
Route R1	6 turns with most of these are on low volume local streets	4 major yield points
Route R2	13 turns with some turns required on collector roads	5 major yield points
Route R3	11 turns with some turns required on collector roads	8 major yield points

3.2.4 Pedestrian Volume Environment (Qualitative)

Footpath congestion is ultimately affected by the level of pedestrian volumes along a path compared to its available width. The generally low population density and non-intensive land uses along the majority of the corridors generally restrict pedestrian volumes. Volumes would be subject to significant temporality during peak times (around train stations) and during school start and finish times (around schools).

Notwithstanding, this assessment is generally only applicable to where shared paths would be envisioned, and shared paths are generally no longer preferred treatment options.

Table 3.4: Pedestrian Volume Environment Output

Route	Pedestrian Volume Commentary
Route R1	○ As the route would primarily be an on-road facility, the impact to pedestrians would be largely minimised. ○ There is a section of West Street north of the rail corridor which is already designated a shared path. There are also bus stops along this section of the corridor. ○ The railway overpass is heavily constrained and may not be dimensionally appropriate for a shared path.
Route R2	○ Pedestrian volumes around Lewisham Station may be elevated during peak times meaning that a shared path may be unviable. ○ Pedestrian volumes around schools on The Boulevard will be higher during school pick up and drop off times, with space constraints and parking demand meaning a shared path would likely be the most suitable treatment.
Route R3	○ Depending on the treatment identified, there may be conflict on the Crystal Street railway overpass, as well as down through the New Canterbury Road-Audley Street intersection.

3.2.5 Parking Impact (Qualitative)

Where a separated facility is considered, this assessment criterion determines any adverse impact on existing parking facilities. It is noted that considering an off-road facility does not necessarily result in a loss of parking.

In some instances, a separated facility can be installed and the lane widths reduced to retain the effective existing configuration of the road. An example of this is Bourke Street in Surry Hills. A bi-directional cycleway has been constructed, and there has not been any widespread loss of on-street parking.

Table 3.5: Parking Impact Output

Route	Parking Impact Commentary
Route R1	○ Given corridor space constraints and the generally low traffic volumes on the identified streets, separated infrastructure may not be required which would therefore generally have a minimal impact on existing parking conditions.
Route R2	○ Given some medium traffic volume streets on the identified corridor, some separated infrastructure may be required, and given corridor constraints, some parking loss may eventuate.
Route R3	○ Given some medium traffic volume streets on the identified corridor, some separated infrastructure may be required, and given corridor constraints, some parking loss may eventuate.

3.2.6 Traffic Volumes (Qualitative)

Site observations of roads in the area has provided an understanding of general traffic conditions along each route option, including the relative volume of traffic, heavy vehicles, speeds and driver behaviour along the corridors being evaluated.

Where possible, this assessment has been developed to account that an off-road facility may exist on a high traffic corridor, and accordingly, this would not impact the assessment. As such, this is an assessment of traffic volumes where an on-road route is proposed.

Table 3.6: Traffic Volume Output

Route	Traffic Volume Commentary
Route R1	○ West Street north of the railway overpass is a sub-arterial road, but otherwise, the identified route is a low traffic environment characterised by a number of local access streets.
Route R2	○ Traffic volumes are high on Old Canterbury Road. ○ Local roads such as The Boulevarde may tend to be low traffic, but will likely be substantially elevated around school drop off and pick up times. ○ Frazer Street is a collector road and experiences moderate traffic flow.
Route R3	○ Observed to generally be local traffic along the length of the route, with Audley Street experiencing modestly increased traffic volumes relative to some surrounding roads.

3.2.7 Corridor Space (Qualitative)

This is a broad assessment of the ability to improve the infrastructure provision for cyclists within the existing corridor. For example, bridges and underpasses are generally significant corridor impediments. In other instances, local residential streets may be constrained, but due to low traffic volumes, a mixed traffic treatment might be appropriate.

Table 3.7: Corridor Space Output

Route	Corridor Space Commentary
Route R1	○ Where corridor space is constrained, traffic volumes are generally low and a mixed traffic treatment is probably appropriate.
Route R2	○ Some sections of the indicative corridor are heavily constrained, and due to traffic volumes, some separated infrastructure may be required (such as Old Canterbury Road, The Boulevard and Frazer Street).
Route R3	○ Some sections of the indicative corridor are modestly constrained, and due to traffic volumes, some separated infrastructure may be required (such as Audley Street).

3.2.8 Cost of Infrastructure (Qualitative)

A first principles assessment of the likely infrastructure requirement of the route was considered (for example, Old Canterbury Road would not be suitable as a mixed traffic environment), with an indicative qualitative assessment applied to the route.

Table 3.8: Cost of Infrastructure Output

Route	Cost of Infrastructure Commentary
Route R1	○ A shared path largely exists on West Street north of the rail corridor. ○ With the indicative corridor mainly on low volume streets, a mixed traffic treatment may be appropriate (these can be built with varying 'intensity'). ○ Installation of bicycle lanterns and crossing points. ○ The railway overpass might represent a high cost section of infrastructure.
Route R2	○ A mixture of cycleways and shared paths would likely be appropriate in conjunction with some limited mixed traffic. ○ Providing a cycling treatment at the railway underpass on Old Canterbury Road would likely be a high-cost exercise.
Route R3	○ A mixture of cycleways and shared paths would likely be appropriate in conjunction with some limited mixed traffic.

3.2.9 Feasibility (Qualitative)

This input considers a broad level assessment of the feasibility of the identified route in providing a safe cycling facility between the two nominated end points. This also considers if the route falls on the alignment of any state (classified roads), and the associated risks of constructing infrastructure on these routes. It also considers to a broad extent the risks associated with external consultation.

Table 3.9: Feasibility Output

Route	Feasibility Commentary
Route R1	○ Highly feasible depending on infrastructure provision with a likely low level of external consultation to minimise risk. ○ Identified constraint point on West Street railway corridor overpass. ○ No use of classified roads under the Roads Act.
Route R2	○ Pockets of the indicative route would be subject to external stakeholder agreement but preferred infrastructure types may not be feasible due to planning restrictions, asset ownership and loss of (for example) parking. ○ Old Canterbury Road is a classified road under the Roads Act, and RMS would not likely support the route.
Route R3	○ Pockets of the indicative route would be subject to external stakeholder agreement but preferred infrastructure types may not be feasible due to planning restrictions, asset ownership and loss of (for example) parking. ○ Crystal Street is a classified road under the Roads Act. Although the path would likely be off-road along Crystal Street, it is unclear as to whether RMS would support such a route.

3.2.10 Land Use Assessment (RMS)

Finally, high quality infrastructure can be provided, but if there is no demand, it will not be used, accordingly, a land use assessment, also consistent with RMS guidance has been completed. The following points of interest are close to the identified routes. This includes Universities, TAFEs, schools, parks, shops, transport interchanges, train/light rail stations and employment centres

Table 3.10: Land Use Output

Route	Land Use Commentary
Route R1	○ Petersham Park ○ Petersham Primary School ○ Open High School ○ Shops on New Canterbury Road ○ Marrickville Park ○ Fanny Durack Aquatic Centre
Route R2	○ Petersham Park ○ John Berne School ○ Lewisham Station ○ Lewisham West Light Rail Station ○ Shops around Lewisham station ○ Lewisham Public School ○ Christian Brothers High School ○ Marrickville Park ○ Fanny Durack Aquatic Centre
Route R3	○ Petersham Park ○ Petersham Station ○ Inner West Council Service Centre (Petersham) ○ Shops around Audley Street- New Canterbury Road ○ Wilkins Public School ○ Marrickville Park ○ Fanny Durack Aquatic Centre

3.3 Output of Assessments

3.3.1 RMS Route Assessment

The RMS Route Assessment has been sourced from Section 12 of the NSW Bicycle Guidelines (July, 2005). The inputs considered as part of this framework include:

- **Absolute Distance** – How far is the route?
- **On-Road Distance** – Intrinsic safety of the route and suitability for different user groups
- **Vertical Alignment** – Vertical elevation change along route
- **Sharp Turns and Stops** – Cyclists are adversely impacted by stopping/slowing points. These have been separately counted into 'sharp turns' and 'yield'.

The analysis utilises the methodology of a bike path analysis template set out by the RMS to objectively identify the relative strengths and weaknesses of each of the proposed routes. The bike path analysis model takes on a holistic approach to the routes including distance, altimetry, turns, traffic lights and land use.

Table 3.11: RMS Bike Path Assessment (Note a lower score is better)

	Distance	On-Road Distance	On-Road %	Climbs[1]	Sharp Turns	Yield	Score	Detour Factor[2]
Weighting	20%	20%		20%	20%	20%		
Route R1	1.5	1.0	66%	1.5	6	4	**10.4**	115%
Route R2	2.3	1.6	70%	2.3	13	5	**17.4**	175%
Route R3	2.7	2.1	80%	3.0	11	8	**19.8**	200%

3.3.2 Land Use Assessment

Bicycle infrastructure is most effective when it links, or passes by points of interest. Part of the RMS assessment involves investigating the number of significant land uses a route passes to obtain a normalised score. The land uses and the points assigned are shown below in Table 3.12. It shows that although Route R1 has the lowest aggregate score, this is effectively because it is the shortest route. When the scores are normalised to a score per kilometre of infrastructure, Route 1 ends up marginally ahead of R2 and well ahead of R3.

Table 3.12: Land Use Assessment (note a higher score is better)

Land Use	Score per facility	Route R1	Route R2	Route R3
University	5	0	0	0
TAFE	3	0	0	0
School	1	2	3	2
Major Park	3	2	2	2
Local Park	1	0	1	0
Major CBD	5	0	0	0
Regional Shops	3	0	0	1
Local Shops	1	1	1	0
Major Transport Interchange	5	0	0	0
Railway Station/Light Rail Station	3	0	2	1
Employment Centre	1	1	1	2
Total		**10**	**18**	**16**

[1] Where the value is divided by 10. For route 1, a score of 1.5 represents a vertical elevation change of 15m as ridden north-to-south
[2] Where the distance is divided by the straight line distance (1.35km)

Land Use	Score per facility	Route R1	Route R2	Route R3
Land use score per km		**6.7**	**7.7**	**6.0**

3.3.3 GTA Qualitative Assessment

The criteria used in the RMS template do not take into consideration additional specific and relevant issues relevant to bike path design (and specifically RR2). To incorporate these issues, GTA has developed an additional framework in conjunction with Inner West Council to provide a second reference assessment.

Each criterion is assessed using high level, qualitative performance indicators as detailed in Table 3.13.

Table 3.13: Route Analysis Assessment Criteria

Assessment Criteria	Performance Indicators		
Pedestrian Volume Environment	Low	Medium	High
Parking Impact	Low	Medium	High
Traffic Volumes	Low	Medium	High
Corridor Space	Unrestricted	Moderate	Constrained
Cost	Low	Medium	High
Feasibility	High	Medium	Low

Table 3.14: GTA Qualitative Assessment

Route	Pedestrian Volume Environment	Parking Impact	Traffic Volumes	Corridor Space	Cost of Infrastructure	Feasibility	RMS Score (From above)	Land use assessment (from above)
Route R1	Medium	Low	Low	Moderate	Low	High	**10.4**	**6.7**
Route R2	Medium	Medium	High	Constrained	High	Medium	**17.4**	**7.7**
Route R3	High	Medium	Medium	Constrained	Medium	Low	**19.8**	**6.0**

3.4 Consultation

Inner West Council engaged the community and other external stakeholders for feedback regarding the alignment for the RR2 route. 28 public submissions were received, as well as comments from RMS, Sydney Buses, Bike Marrickville and Sydney Water. Some of the comments with a high number of responses have been addressed below, with the summary provided by Council included in Appendix A.

Table 3.15: Community Consultation

Category	Comment	GTA Comment
Parking	General parking comment	In the route that is subject to further concept design, a design will seek to minimise the loss of parking, and offset its loss if possible
Specific road comment	Connectivity to Flood Street	GTA will investigate opportunities to integrate the bicycle infrastructure across Parramatta Road to Flood Street
	West Street is constrained at railway overpass	Possible interim treatment with long term consideration of infrastructure renewal
	Improve Miller Lane access for bicycles	Noted
Treatment	Support separated bike paths	Cyclist treatments developed will be consistent with the traffic speeds and volumes expected on the specific road

Category	Comment	GTA Comment
External Stakeholders	**Sydney Buses** ○ Consider West Street bus movements (route 413)	○ Noted
	Petersham Public School ○ Pedestrian safety at West Street/Railway Terrace intersection ○ Maintain parking adjacent to the school	○ Examine opportunities for extra space to delineate cyclists and pedestrians ○ Noted

3.5 Summary of Assessment

Based on the output of Table 3.14 and Table 3.15, the following summary comments are made:

i **Route R1** performs well in terms of a quantitative assessment. It is by far the most direct route with the fewest turns and yields. It also performs well through a range of qualitative factors.

ii **Route R2** performs average from a range of quantitative factors. From a qualitative perspective, the route performs poorly. As Old Canterbury Road is a classified road under the Roads Act, any expansion of bicycle facilities would require RMS approval.

iii **Route S3** performs average on qualitative factors, but quantitatively performs poorly. This route represents a significant detour and is not considered to be suitable as a route would serve a regional function.

The project requires that GTA develop concept designs for a route nominated. By way of the assessment outlined in this report, and with regards to the above points, GTA recommends to develop concept designs for R1. Following the submission of the draft report, Council has indicated that they support this route option.

The route options shown for R1 in this report is indicative, and alterations to the corridor designed may eventuate as a result of consultation with Council.

3.6 Stakeholder Review

During April 2017, the preliminary design drawings were submitted to Council who subsequently distributed to core stakeholders including RMS, Sydney Metro and (internally within) Council. The following comments were noted:

- Parramatta Road was noted as a highly complex area, with initially proposed changes requiring being too costly/unfeasible.
- At the West Street railway bridge, the widening/relocation of the existing jersey kerb was considered to be too costly/unfeasible.

4. Route Infrastructure Description

4.1 Route Infrastructure

Following route option endorsement by Council, GTA subsequently has developed concept designs for the preferred option. This was a process of identifying what treatment options were possible, and would support the overall intention of the route. In some instances, multiple options were identified before a discussion with Council as to what were their tolerances and preferences to various issues. Such issues included:

- i The desirability of shared paths, noting that Transport for New South Wales has broadly indicated that where possible they are not preferred treatments. Furthermore, discussion was had as to whether a shared path would be a satisfactory treatment for a 'regional route'.
- ii Tolerances regarding the loss of parking, loss of vegetation and changes to the road network environment. Council has indicated a strong preference of not losing parking and offsetting a loss where possible, minimising the loss of trees (including a 2:1 replacement) and broadly maintaining existing traffic conditions as much as possible to mitigate impacts to existing residents.

Due to the preferences identified, in many cases, this left only one or two viable treatment options which were confirmed prior to concept design drawings. The options are discussed below.

1) **Parramatta Road integration** – After feedback from RMS, the existing intersection is largely being retained with the installation of bicycle lanterns directing cyclists to the west side of West Street. Some small-scale traffic changes are proposed around the Thomas Street intersection to rationalise traffic movements, including the installation of a continuous footpath across Nestor Lane.
   a. Consideration was given to realigning crossing points of Parramatta Road to better facilitate for cyclists, however, it was observed that the intersection has both red light and speed cameras, and any realignment of the intersection would be cost and time intensive.
   b. Consideration was also given to a treatment whereby a southbound cyclist would ride down the eastern side of West Street and across Station Street before crossing at the existing pedestrian crossing. Whilst this would probably be a preferred treatment, it was not endorsed by the stakeholders and was subsequently discarded.
2) **West Street shared path north of Railway Terrace** – South of Station Street, it is proposed to extend and formalise the existing shared path on the western side of the road. Key impacts to be considered include the presence of bus stops (which will be relocated closer to the kerb in-situ).
   a. Alternatively, a bi-directional cycleway was proposed on West Street, but due to the presence of large vehicles, a cross section could not be developed without the loss of parking on one side of the road. This was unacceptable to Council and subsequently discarded as an option.
3) **Railway overpass** – The existing overpass is narrow, and the bridge is generally a highly-constrained environment. Although the preference would be to widen the existing barrier on the western side of the bridge by at least 0.5m, this was determined to largely be unfeasible. A build out the north-western kerb line to provide additional space has

been approved by another project. Swept paths show that a semi-trailer can still turn left from Railway Terrace into West Street without any other changes to existing traffic conditions. It is noted that under existing conditions, the bridge falls well below Austroads guidance of a minimum of 2.5m width and this may lead to pedestrian /cyclist conflicts.

   a. An alternative initially discussed included substantially setting back the stop line on the overpass (up to 15m). This would allow separated cycling infrastructure to be provided, and retain the ability for large vehicles to turn left from Railway Terrace into West Street. However, road design guidance restricts how far back a stop line can be from an intersection.

4) **West Street south of Railway Terrace** - On West Street, a mixed traffic treatment is proposed. Traffic conditions and speeds are such that a mixed traffic environment can be supported.
   a. Alternatively, a cycleway was proposed on the eastern side of West Street. This was GTA's preferred treatment, but with such a treatment, it would not have been possible to retain existing traffic conditions. GTA proposed changing West Street to one-way southbound, with angled parking on one side of the road only. This treatment would have resulted in the net loss of approximately 12 parking spaces, and this was not acceptable to Council and subsequently discarded as an option.
5) **Ducros Street** – Following discussion with RMS and Council, existing conditions are largely retained in this area. It was agreed to propose a 'No Left Turn' arrangement, prohibiting cars turning south from New Canterbury Road (travelling westbound). This would be accompanied by a 'Bicycle Excepted' sign to permit bicycle movements into Ducros Street (southbound). In addition, the following options have been examined during the course of the study.
   a. A shared environment intersection treatment was also proposed on Ducros Street at New Canterbury Road, with a mixed traffic treatment on Ducros Street. RMS indicated that they would generally not be supportive of such a treatment immediately off a state road and indicated a preference for another treatment.
   b. GTA examined the possibility of building a kerb extension on the eastern aspect of Ducros Street adjacent to the existing trees and provide a safe cycling access. However, swept paths show that a garbage truck would be unable to make a left turn into Canterbury Road if the kerb was widened any further.
6) **Napier Street** – A mixed traffic treatment is proposed on Napier Street. Traffic volumes and speeds generally support such a treatment.
7) **Crossing of Frazer Street** – The existing treatment is not compliant with Austroads guidance in terms of its width (3.0m minimum). This should be upgraded as per the concept drawing. Due to the increased width of the median island, some parking on Frazer Street needs to be removed. There is no immediate offset for this loss of parking.
   a. A mid-block pedestrian crossing was considered, but it is unclear as to whether the crossing facility would meet minimum RMS warrants for the installation of a crossing, and would have relatively more parking loss impacts than a median island.
8) **Addison Road Link** – A mixed traffic linkage is proposed along Morgan Street, with a shared path on the western side of Livingstone Road. This will integrate with a future cycleway on the southern side of Addison Road. A bus stop will need relocation works to place the shelter closer to the kerb.

5. Cross Sections

Cross sections have been developed at a couple of select locations for the route, however, these are limited as there is no large scale physical change to infrastructure anywhere along the route. A cross section has been included below midblock on West Street and at the West Street overpass.

Figure 5.1: Typical West Street Cross Section (Looking South)

Figure 5.2: Indicative West Street Overpass Cross Section (Mid-bridge) (Looking South)

6. Draft Concept Design

6.1 Draft Concept Design

Based on the preliminary consultation, GTA developed a concept design for the route. The options considered, and the preferred option were discussed extensively in Section 4. The numbered bullets outline the preferred option and the lettered bullets outline alternative options which were considered.

In brief, the following design was preferred by Council and prepared by GTA:

- Shared path on the western side of West Street (north of Railway Terrace)
- Mixed traffic treatment on West Street (south of Railway Terrace)
- Mixed traffic treatment on Ducros Street, Morgan Street, Napier Street and Miller Lane
- Upgraded intersection and crossing treatments.

The draft concept design was released for a second round of stakeholder comments and public exhibition comments.

6.2 Public Exhibition

The draft concept designs for RR2 went on public exhibition for one month between 12 July 2017 and 13 August 2017. A range of comments and suggestions were submitted and addressed as part of the review. Key changes to the concept design following the public exhibition are shown in Table 6.1.

Table 6.1: Key changes to RR2 based on submissions from public exhibition

Location/ Issue	Comment	Changes Made
Frazer St ○ Loss of seven parking spaces is not supported. ○ High demand for these spaces for visitors to Marrickville Park Should be offset or mitigated	Parking loss could be reduced by reducing width of proposed refuge to 2.0-2.5m. Existing refuge near Bishop Street could be removed given new refuge provides better access to the park. This may allow additional spaces to be gained to offset losses.	Reducing the proposed pedestrian refuge width gained two parking spaces. Removal of existing refuge near Bishop Street gained four parking spaces. Net loss in parking spaces reduced to one.
Morgan Street ○ Conflict point where bikes turn right to Livingstone Rd shared path	Unsafe without a similar treatment to that proposed on Griffiths St Tempe. May be sufficient road width to accommodate right turn bay without parking loss. Issue raised at June Traffic Committee.	Protected right turn bay added, no parking impacts on Morgan Street.
West Street (north) Squeeze point behind buses	Potential to build out kerb slightly at bus stop to provide wider shared path.	Plan amended accordingly
Muriel Lane Removal of existing tree	Council's Tree Management Officer raises no objection to removal of tree subject to replacement tree being provided nearby.	Plan amended to show replacement tree planting location

7. Final Concept Design

The final draft concept design was endorsed by Council with two modifications, these changes and the reasoning are described below:

- The median island proposed to aid cyclists crossing Frazer Street was reduced to 2.5m from 3m to minimise the loss of parking.
- A cyclist turning bay is proposed at the eastern extent of Morgan Street.

During the course of this stage of the project, the concept designs also went through a preliminary road safety audit by a third party. No significant changes or safety issues were identified in the audit process. Similar to GTA's comment in Section 4 the report, the road safety audit identified the West Street railway overpass as an area which requires further consideration in the detailed design stage.

The final concept design is attached as Appendix B to this report.

8. Preliminary Cost Estimate

Based on the finalised concept designs, GTA has undertaken a preliminary cost estimate of the preferred infrastructure. These are based on unit costs for the various identified items. The estimated cost is **$991,500**[3] and is broken down into the costs shown in Table 8.1.

The full breakdown of costs according to individual sheets is attached as Appendix C to this report.

Table 8.1: Preliminary Cost Estimate

Item	Cost
Bicycle Lanterns (Pairs)	$24,000
Bicycle Lantern TCS Review	$200,000
Works in vicinity of Thomas Street	$40,000
Shared Environment Intersection	$100,000
Kerb Extension	$60,000
Kerb Ramp (New/Remodel)	$48,000
Stencils	$17,000
Relocate Bus Stop	$75,000
Green Pavement Treatment	$20,000
Turning Bay	$15,000
Head Start Box	$2,000
Works in vicinity of Frazer Street	$10,000
Median Island	$30,000
Signage Allowance	$20,000
SUB-TOTAL	**$661,000**
Contingency (50%)	$330,500
TOTAL	**$991,500**

[3] The above opinion of probable cost has been prepared based on desktop review and is for initial planning only and must not be relied upon for quoting, budgeting or construction purposes. It is recommended that you seek a detailed cost estimate from a suitably qualified quantity surveyor

9. Conclusion

- GTA was engaged by Inner West Council to prepare a concept design package for Regional Route 2 (RR2) linking Parramatta Road with Marrickville Park.
- Initially, GTA undertook an options assessment comparing three routes through two different methodologies to identify a preferred route.
- The preferred option was the most direct route and performed well in regards to the assessments undertaken.
- The route is comprised of a shared path on West Street north of Railway Terrace and mixed traffic treatments south beyond this point to Marrickville Park.
- The route is supplemented by a range of intersection and crossing upgrades.
- A concern remains with the West Street railway overpass and crossing of West Street as a preliminary third party road safety audit indicated the potential for conflicts between cyclists and other road users. The treatment at this location should be further considered at the detailed design stage in consultation with RMS.
- Vehicular access southbound into Ducros Street from Canterbury Road is proposed to be restricted. Given low traffic volumes on Ducros Street, it is not expected that this will lead to broader circulation and traffic issues.
- The preferred infrastructure design results in the net loss of one parking space on Frazer Street.
- A strategic cost estimate for the proposed infrastructure has been prepared and it is estimated that the route can be developed as shown in the concept design for approximately $991,500.

Appendix A

Initial Community and Stakeholder Feedback

REGIONAL ROUTE 2 (PARRAMATTA RD TO MARRICKVILLE PARK) – PRELIMINARY CONSULTATION

Issues most commonly raised in community consultation (February 2017)	% of responses
Bicycle route options	
At Parramatta Rd, the route must consider connectivity to the Flood St bike lanes	7
The road and footpath are very constrained at the West St rail bridge. Intersection improvement is required here.	14
The Miller Ln road closure should be modified to improve access for bicycles	11
The route should be as direct as possible	7
The project should focus on commuter routes to Sydney CBD	11
The project should focus on improving the GreenWay	7
Bicycle route infrastructure	
Provide more separated bike paths	11
Parking	
Don't remove parking (in general)	18
Don't remove parking on West Street (south of Railway Terrace)	7

Other stakeholder comments

Sydney Buses

- Consider bus turning movements from Railway Tce into West St.

Petersham Public School

- We're concerned about pedestrian safety at the West St/Railway Tce intersection with an increased number of bikes.
- Don't remove on-street parking on West Street (south of Railway Terrace).

Appendix B

Final Concept Design

INNER WEST COUNCIL
BICYCLE ROUTE RR2

LEGEND

- EXISTING FEATURE
- PROPOSED DESIGN

SYMBOLS

- TRAFFIC SIGNAL LANTERN
- PS-2 PAVEMENT MARKING (ON ROAD)
- PS-3 PAVEMENT MARKING (SHARED PATH)
- PS-4 PAVEMENT MARKING
- BOLLARD
- KERB RAMP
- GAINED PARKING SPACE
- REMOVE PARKING SPACE
- REMOVE TREE

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2. BASE INFORMATION OBTAINED FROM AERIAL PHOTOGRAPHY FROM INNER WEST COUNCIL DATED 22 MARCH 2017. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
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5. ALL KERB RAMPS TO BE CONSISTENT WITH RMS DOCUMENT TDT 2002/08 MD.R173.B01.A
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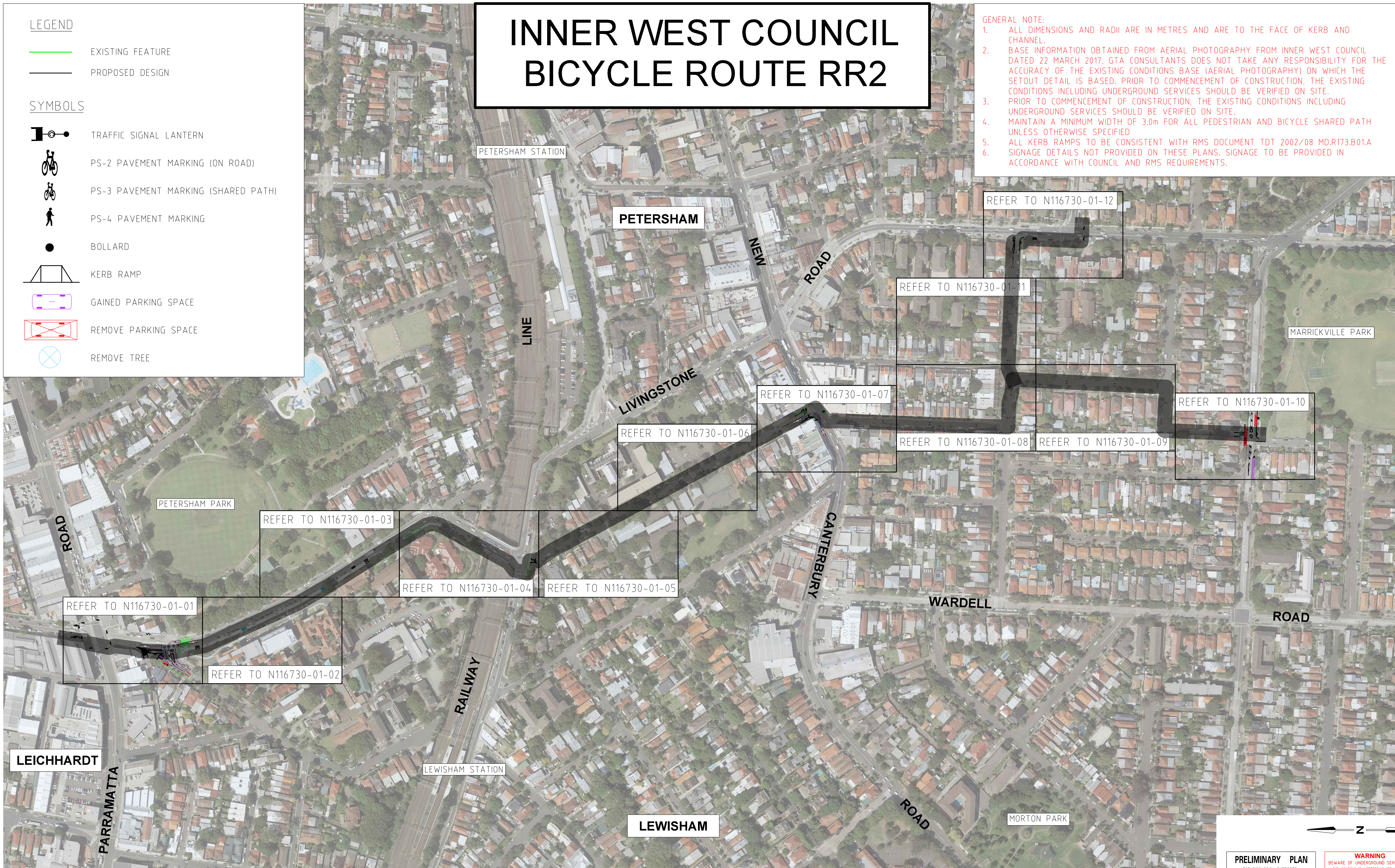

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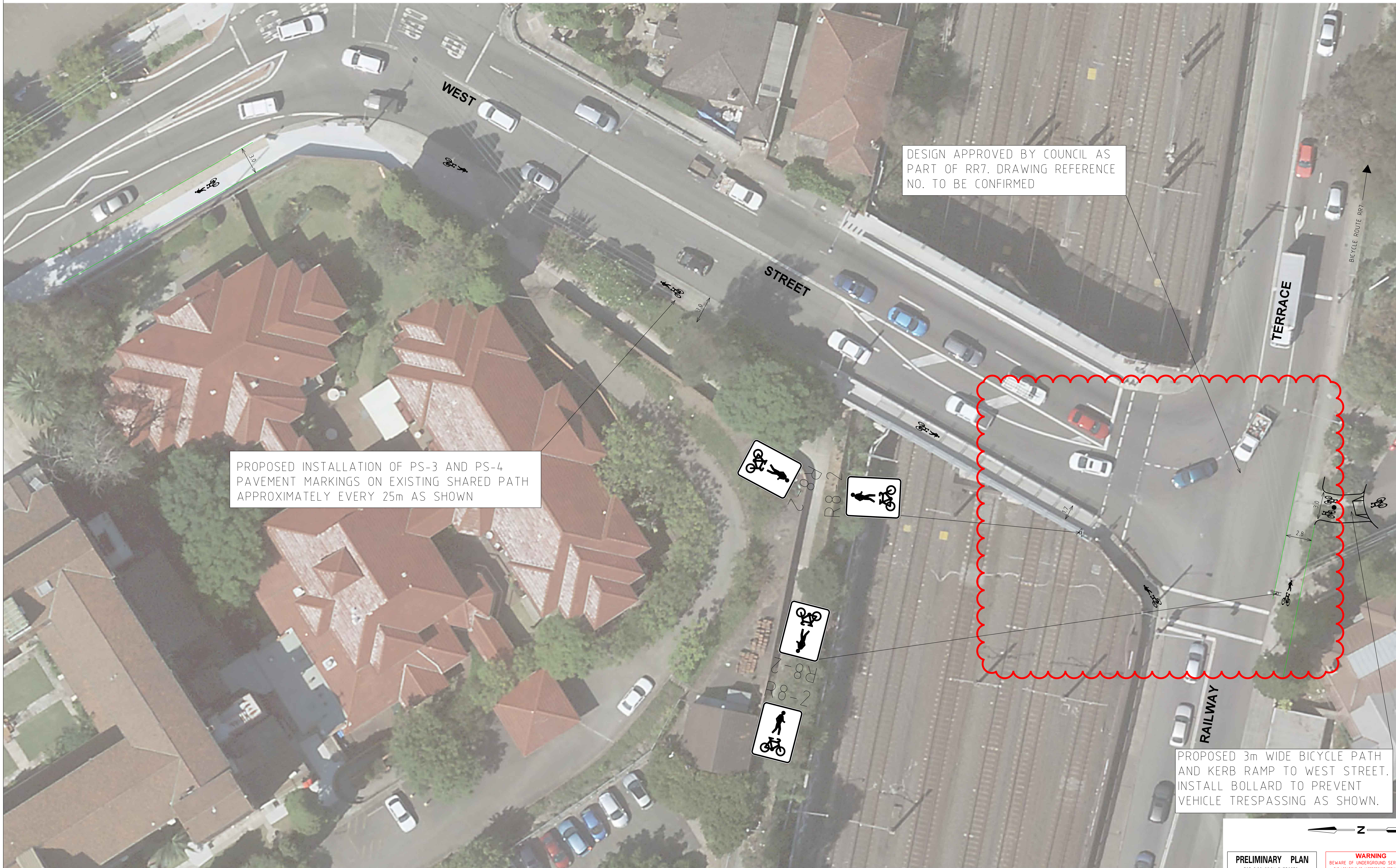

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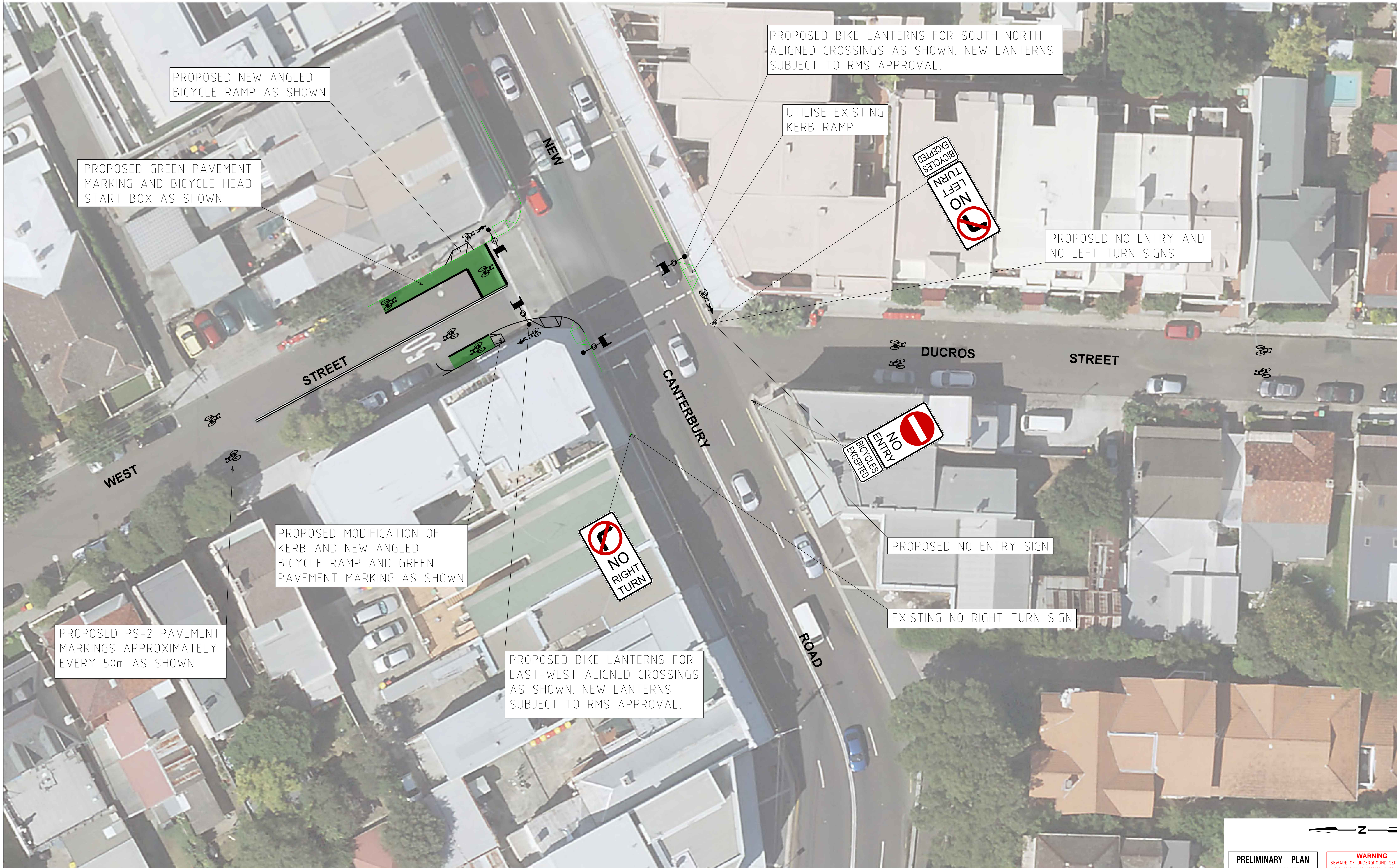

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P4	17.05.17	DESIGN UPDATES	C.Y	V.B	V.B
P3	24.04.17	DESIGN UPDATES	C.Y	K.W	V.B
P2	30.03.17	DESIGN UPDATES	C.Y	S.B	V.B
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Appendix C

Strategic Cost Estimation

Work Item	Units	Unit Cost	Sub-Total	Sheet 1	Sheet 2	Sheet 3	Sheet 4	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Sheet 9	Sheet 10	Sheet 11	Sheet 12
Bicycle Lanterns (Pairs)	6	$ 4,000	$ 24,000	2	0	0	1	0	0	2	0	0	0	0	1
Bicycle Lantern TCS Review	4	$ 50,000	$ 200,000	1	0	0	1	0	0	1	0	0	0	0	1
Works in vicinity of Thomas Street	1	$ 40,000	$ 40,000	1	0	0	0	0	0	0	0	0	0	0	0
Shared Environment Intersection	1	$ 100,000	$ 100,000	1	0	0	0	0	0	0	0	0	0	0	0
Kerb Extension	2	$ 30,000	$ 60,000	1	0	0	0	0	0	1	0	0	0	0	0
Kerb Ramp (New/Remodel)	24	$ 2,000	$ 48,000	12	0	0	3	0	0	7	0	0	1	0	1
Stencils	85	$ 200	$ 17,000	10	5	3	8	6	6	12	12	8	4	4	7
Relocate Bus Stop	3	$ 25,000	$ 75,000	1	0	1	0	0	0	0	0	0	0	0	1
Green Pavement Treatment	100	$ 200	$ 20,000	0	15	15	0	0	0	50	0	0	20	0	0
Turning Bay	1	$ 15,000	$ 15,000	0	0	0	0	0	0	0	0	0	0	0	1
Head Start Box	1	$ 2,000	$ 2,000	0	0	0	0	0	0	1	0	0	0	0	0
Works in vicinity of Frazer Street	1	$ 10,000	$ 10,000	0	0	0	0	0	0	0	0	0	1	0	0
Median Island	2	$ 15,000	$ 30,000	1	0	0	0	0	0	0	0	0	1	0	0
Signage Allowance		$ 20,000	$ 20,000	0	0	0	0	0	0	0	0	0	0	0	0
SUB-TOTAL			$ 661,000												
Contingency (50%)			$ 330,500												
TOTAL			$ 991,500												

Preliminaries and General (i.e. site establishment, survey, service proving, traffic management, etc.)	15% of subtotal
Design and documentation	10% of subtotal
Project management	5% of subtotal
Services relocation (provisional cost subject to detailed design and service provider advice)	15% of subtotal

The above opinion of probable cost is for initial planning only and must not be relied upon for quoting, budgeting or construction purposes.
It is recommended that you seek a detailed cost estimate from a suitably qualified quantity surveyor.

Excludes:
1. Price escalation
2. GST
3. The above opinion of probable cost has been prepared based on desktop review and is for initial planning only and must not be relied upon for quoting, budgeting or construction purposes. It is recommended that you seek a detailed cost estimate from a suitably qualified quantity surveyor.
4. Authority fees and charges have been excluded.
5. Site rehabilitation of contaminated materials due to historical land use.
6. Protection of environmentally significant areas.
7. Contraflow bicycle lane and shared zone treatment assumes existing kerb and road geometry is retained and no pavement rehabilitation works.
8. No upgrade works is required on existing stormwater drainage and street lighting.
9. The above rates excludes demolition works as extent is not known at this stage.
10. The rates provided above are generally inclusive of supply and install.
11. Major earthworks.
12. Retaining structures.
13. Landscape works.

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