LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

DATE 4 May, 2016

CONTACT ANDREW PEZZUTTI

Proposed Bicycle Route LR3 (part) / RR2 (part) Livingstone Road - Study Area 2

Concept Design Report

For Marrickville Council

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 KEY OBJECTIVES 4
3.0 SITE ANALYSIS & OPTION ASSESSMENT 5
3.1 REVIEW OF EXISTING INFORMATION 5
3.2 REVIEW OF PROPOSED ROUTE 7
3.3 COMMUNITY COLLABORATION 9
3.4 WORKSHOP 10
3.5 DESIGN STANDARDS 11
3.6 DISCUSSION OF OPTIONS 11
4.0 CONCEPT DESIGN 15
4.1 LIVINGSTONE ROAD 15
4.2 MARRICKVILLE PARK 26
4.3 CONCEPT DESIGN PLANS 26
5.0 COST ESTIMATES 27
6.0 CONCLUSION 28

APPENDIX A
CONCEPT DESIGN PLANS
APPENDIX B
PRELIMINARY COST ESTIMATE

Document Control Page

Revision	Date	Description	Author	Signature	Verifier	Signature	Approver	Signature
A	11/04/16	DRAFT	AP		AH		AP	
B	27/04/16	FINAL	AP		AH		AP	
C	04/05/2016	UPDATED FINAL	AP		AH		AP	

1.0 INTRODUCTION

Lambert & Rehbein has been engaged by Marrickville Council to prepare a concept design of the proposed bicycle route located along Livingstone Road, Marrickville; between the Bankstown rail line and Marrickville Park; as highlighted in the Marrickville Bicycle Plan (2007).

The proposed route is part of Local Route 3 (LR3) and also provides linkages to and from parts of Regional Route 2 (RR2) at Porter Street, to connect to Wardell Street and to Frazer Street near Lawson Avenue. The proposed route is approximately 1700m in length and is to be known as Study Area 2 for the purpose of this report. Please refer to Figure 1-1 identifying the extent of Study Area 2.

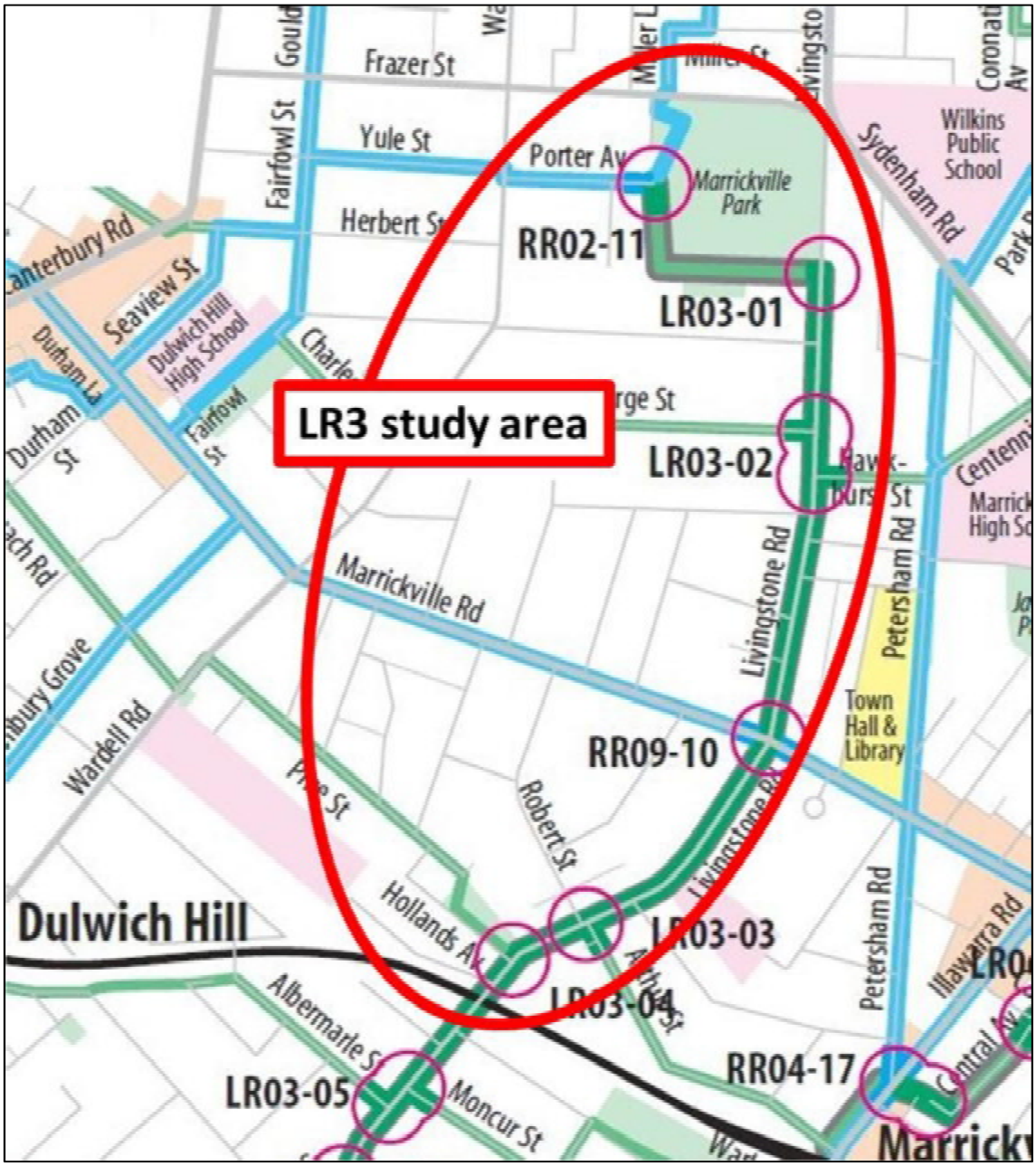


Figure 1-1 Study Area

The preparation of the concept design for Study Area 2 is being undertaken in conjunction with the preparation of two other nearby bicycle route concept designs. A summary of the three study areas is provided below:

- Study Area 1: LR18 (part) / RR2(part) Marrickville Station to Dulwich Station
- Study Area 2: LR3 (part) / RR2(part) Livingstone Road, Marrickville
- Study Area 3: LR16 / Addison Road, Marrickville

In conjunction these routes will connect two important transport hubs – Dulwich Hill Station and Marrickville Station and local trip attractors such as the Addison Road Community Centre and markets, Annette Kellerman Aquatic Centre and Enmore Park, Marrickville Park and Marrickville Metro shopping centre to the surrounding suburbs. Furthermore they will provide improved connection to existing regional and local bicycle routes and facilitate future extension of the networks in accordance with the Marrickville Bicycle Plan.

2.0 KEY OBJECTIVES

The key objectives of this project are to:

- Provide bicycle infrastructure that, as far as practical, meets user needs by providing a safe, comfortable and convenient route for bike riders; connects to intersecting bicycle routes and local destinations; whilst maintaining and preferably enhancing the amenity of the route for local users and residents;
- Work closely with Council staff to include local knowledge; and
- Undertake surveys, analysis and investigation of the proposed route as required for the preparation of concept design plans and itemised costs estimates.

The following tasks are required to be undertaken in order to achieve the objectives for this project:

- Review of existing information;
- Review of the proposed route;
- Consultation with stakeholders relevant to the project;
- Preparation of conceptual design plans for Study Area 2, as described above;
- Preparation of detailed cost estimates for implementation of the works; and
- Preparation of a Concept Design Report to summarise the tasks undertaken in the project including the site analysis and option evaluation, concept design plans and cost estimates for submission to Council's Traffic Committee.

3.0 SITE ANALYSIS & OPTION ASSESSMENT

3.1 REVIEW OF EXISTING INFORMATION

Marrickville Council provided the study team with the following documents and information relevant to the proposed route.

- Marrickville Bicycle Strategy 2007 (Bike Plan);
- Traffic volume and speed data;
- Draft Marrickville Park Master Plan;
- Marrickville Town Centre Parking Study;
- Parking surveys for part of Livingstone Road and surrounding streets;
- GIS data of existing road infrastructure; and
- Aerial Imagery.

A summary of our review of this information is provided as follows:

Road Infrastructure

Livingstone Road is classified as a 'local' road and is typically 12.8m wide kerb to kerb for the extent of the Study Area. The existing road pavement is a mixture of concrete and asphalt surfacing with the traffic lanes typically concrete and the parking lanes adjoining the kerb, asphalt. It has a 50km/h posted speed limit with a 40km/h School Speed Zone located between Robert Street and St Brigid's Catholic Church for the Casimir Catholic College

There is an existing set of traffic signals located at the intersection of Livingstone Road and Marrickville Road.

Two raised pedestrian crossings are located within the extent of the Study Area. One midway between Hollands Avenue and Arthur Street and one at the intersection of Francis Street adjoining the Casimir Catholic College. There are also a series of pedestrian refuge islands located on Livingstone Road at various side street intersections along the full length of the Study Area.

Livingstone Road is a nominated bus route (Route 412) with several bus stops located in both travel directions within the extent of the Study Area.

Traffic Volumes and Speed

The information provided by Council included traffic volume and speed data for various time periods and sections of Livingstone Road located within the Study Area. The most recent data obtained in 2015 for the section of Livingstone Road between Sydenham Road and Pile Street recorded a total AADT of 11,537 vehicles, an 85% percentile speed of 49.7 km/h and 4% heavy vehicles (Non Class 1). Data prior to this date showed similar results with traffic volumes in the order of 9, 000 – 10,000 AADT (3 – 4% heavy vehicles (Non class 1)).

Parking Studies

The Marrickville Town Centre Parking Study (MTCPS) completed in 2012/13 included parking information over part of the Study Area. This includes parking inventory and occupancy data for Livingstone Road and associated side roads between Arthur Street and Graham Avenue.

The MTCPS is broken down into various zones. Zones 1 and 15 are located within the Study Area 2 and include data for Livingstone Road and surrounding streets. The average parking occupancy for Zone 1 is 43% and for Zone 15 is 63%.

Further parking inventory and occupancy survey data undertaken in February 2016 for Livingstone Road and associated side streets between Frazer Road and Enfield Street was also provided by Council. This covered Livingstone Road between Enfield Street and Frazer Road and also Enfield, George and Pile Streets. Data was obtained over 4 days (Thursday, Saturday, Sunday and Tuesday). We calculated the average occupancy rates in each of these streets over these for days with the results summarised below:

- Livingstone Road 54.7%
- Enfield Street 49.8%
- George Street 64.8%
- Pile Street 52.5%

It can be seen that the results of the parking occupancy surveys in the MTCPS and the February 2016 surveys correlate reasonably well and parking occupancy rates vary between approximately 45 – 65% in the Study Area.

The parking inventory information from the MTCPS and the February 2016 survey was used in conjunction with our site observations to determine the number of existing parking spaces within the Study Area.

The above information has been utilised to assist in making assessments of the potential impacts of parking modifications and losses proposed as part of the concept design.

Draft Marrickville Park Master Plan

The Marrickville Park Master Plan is currently being prepared by Council. A draft version of the plan was provided for consideration in the development of the concept designs. The draft master plans indicates an off road shared path linking Livingstone Road to Porter Street via a route to the south of the main oval and also an off road shared path through the park linking Porter Avenue to Frazer Street adjacent to Lawson Avenue.

Marrickville Bike Plan

A review of Council's Bike Plan was completed to provide background information and input to the project. The Bike Plan indicates no existing cycle routes along Livingstone Road within the Study Area. Only the a portion of existing cycle repute L10 passes through the western end of Marrickville Park between Frazer Street and Porter Avenue.

Apart from the local route LR03 subject of this report there are a number of proposed Local and Regional Cycle Routes and Local Links (LL) identified in the Bike Plan within and directly around the Study Area that should be considered in developing the concept designs. These include:

- RR02 along Porter Avenue and through Marrickville Park to Frazer Street;
- RR09 along Marrickville Road;
- LR17 along Hawkhurst Street and George Street; and
- LR18 along Hollands Avenue and Pine Street.

GIS Data / Aerial Imagery

The GIS data supplied by Council included locations of existing features such as property boundaries, kerb and channel, signage and line marking. When overlayed with the supplied aerial imagery there was some discrepancies in the location and extent of these features. For the purpose of the concept design we have made our best interpretation of the actual site conditions based on this information and our site observations but note that detail survey will be required as part of the detailed design process to confirm actual extent of property boundaries and the features located within the road reserve.

3.2 REVIEW OF PROPOSED ROUTE

The project team undertook a number of site inspections of the proposed route and existing surrounding network to obtain an understanding the existing route infrastructure, traffic, parking and potential safety issues and to identify any physical or operational constraints along the proposed route.

Bus Stops

Livingstone Road is a nominated bus route (Route 412) with several bus stops located in both travel directions within the extent of the Study Area. The current configuration of the bus stops

sees buses pull out of the traffic lane into the parking lane adjoining the kerb and gutter. At some locations we observed buses pulling over but still slightly impeding traffic due to the bus stop proximity to pedestrian refuge islands. The majority of the bus stops include shelters which will need to be considered in locating potential cycle routes. All existing bus stops locations have been identified and included on the concept plans.

Parking

The large majority of the extent of Livingstone Road located within the Study Area is provided with non-restricted parallel parking on both sides of the road with some minor areas of restricted parking. Our observations of the parking occupancy during the times of our inspections generally supports the data obtained from the parking surveys as detailed in Section 3.1 of around 45 – 65%. This did differ at the southern end of the Study Area at the school morning drop off and afternoon pick up times around the Casimir Catholic College where localised parking demand was high on Livingstone Road, Francis Street and Robert Street.

All existing parking signage has been identified and included on the concept plans.

Other

There were no other clear alternative north – south routes evident for the proposed cycle route between the rail line and Marrickville Park.

Existing Bicycle Infrastructure

There is virtually no existing cycle route signage, line marking or infrastructure located along the length of the proposed route. There is some on road line marking indicating a shoulder or mixed lane on Livingstone Road as it approaches the rail line at the southern end of the Study Area and some directional and share path signage at the Porter Avenue connection to Marrickville Park at the northern end of the Study Area.

Pedestrian Facilities

It was evident that at times there was a high volume of pedestrian traffic around the Casimir Catholic College and the community and commercial facilities adjacent to the Livingstone Road, Marrickville Road intersection.

3.3 COMMUNITY COLLABORATION

There are a number of key stakeholders that may be directly or indirectly impacted by the potential findings of this project. Detailed following is a summary of discussions held to date.

Bike Marrickville

Council met with Bike Marrickville to obtain their input and comments for the proposed bicycle route for Study Area 2. Comments included:

- 2-way path supported;
- People using the tennis courts at Marrickville Park would rely on the availability of nearby on-street parking; and
- Heavy parking issues around the school – although most of this occurs at the entrance to the church on Marrickville Road whereas Livingstone may be accessed more by students catching the school buses from there.

These comments were taken into consideration in the development of the concept design.

Community Survey

Council has undertaken a 4 week community engagement process to gather input on the proposed route. Below is a summary of the responses received:

- Dangerous road surface - concrete / asphalt interface; and
- Marrickville Road intersection is dangerous due to skew in road and crossing north of the intersection;

Roads & Maritime Services

Although Livingstone Road is a Council Road any proposed alteration to the existing signalised intersection at Livingstone Road / Marrickville Road will require consultation with RMS. Discussions were undertaken with Mr Ken Hind of Roads & Maritime Services (RMS) in regards to proposed changes to the intersection. He advised that any proposed changes to the intersection would need traffic modelling to demonstrate there are no major impacts to the operation of the intersection. Formal feedback on the proposed concept design has been requested but not yet received.

State Transit Authority

Relocation and alteration of existing bus stops are proposed as part of the concept designs detailed later in the report. Liaison was undertaken with Mr Peter Whitney of the State Transit Authority (STA) in regards to the proposed relocation and alterations of existing bus stops and minimum lane width requirements to accommodate buses. In addition to phone conversations our draft concept plans were forwarded to him to for review and comment. In general the proposed

modifications to the existing bus stops were acceptable. The STA written feedback included the following relevant points:

- If possible make the southbound lane 3.2m wide and the northbound lane 3.3m wide outside the new kerb extended bus stop on Livingstone Road just to the south of Robert Street;
- The width of the bus stop located on the eastern side of Livingstone Road just to the south of Marrickville Road needs to be 3.0m;
- The existing no parking signs between the existing south bound bus stop on Livingstone Road and Marrickville Road just to the north of Marrickville Road need to be changed to no stopping signs;
- Ensure the lane widths at the proposed relocated bus stop on the eastern side of Livingstone Road just to the south of Graham Avenue allow a car to pass a stopped bus; and
- STA have indicated that two existing bus stops located within the Study Area are proposed for removal as part of a rationalisation process. These are located on Livingstone Road to the south of Pile Street in both the north and south bound lanes. They advised the final decision in regards to their removal is subject to public consultation which will be occurring over the next 1 -2 months.

3.4 WORKSHOP

A workshop with approximately 16 internal Council staff members was undertaken on the 14th March 2016 to present initial option assessments and obtain feedback and input to the proposed concept design for the Study Area. A few of the key points made in the workshop include:

- Intersection of Livingstone and Marrickville Road
- Would be a local route - encourage beginner cyclists
- School – opportunity to increase active travel / safer routes
- Bus stops pinch points
- Sync with development plans for old hospital site
- Separated on road paths not shared
- Interface with LATM
- Incorporate opportunities for street trees
- Consideration of heavy vehicle proportions

These were taken into consideration in the development of the concept design.

3.5 DESIGN STANDARDS

The following design standards and guidelines were considered in preparing the concept designs:

- Cycling Aspects of Austroads Guides
- RTA NSW Bicycle Guidelines
- City of Sydney - Standard Cycleway Details (2012) - Attachment C

3.6 DISCUSSION OF OPTIONS

A number of alternative options for the provision of a cycle route along Livingstone Road were considered including:

- Mixed on road traffic lanes
- Shoulder lanes
- On road cycle lanes in each direction
- Bi directional on road paths
- Off road shared paths

Figure 3.2 "Separation of bicycles and motor vehicles according to traffic speed and volume" of the RTA NSW Bicycle Guidelines (Also in Figure 2.2 in Austroads), provides guidance on the selection of separated or mixed facilities for cyclists. Figure 3.2 has been reproduced as Figure 3-1.

The relationship between the prevailing traffic speed and volume is an important factor in the decision to provide physically separated facilities, mixed profile or something in between. Based on the traffic volumes of between 10,000 -12,000 vehicles per day and an 85th percentile speed of 50km/h, Figure 3.2 suggests that separate path facilities should be provided for cyclists for the route along Livingstone Road. Discussion on each of the listed options is provided as follows:

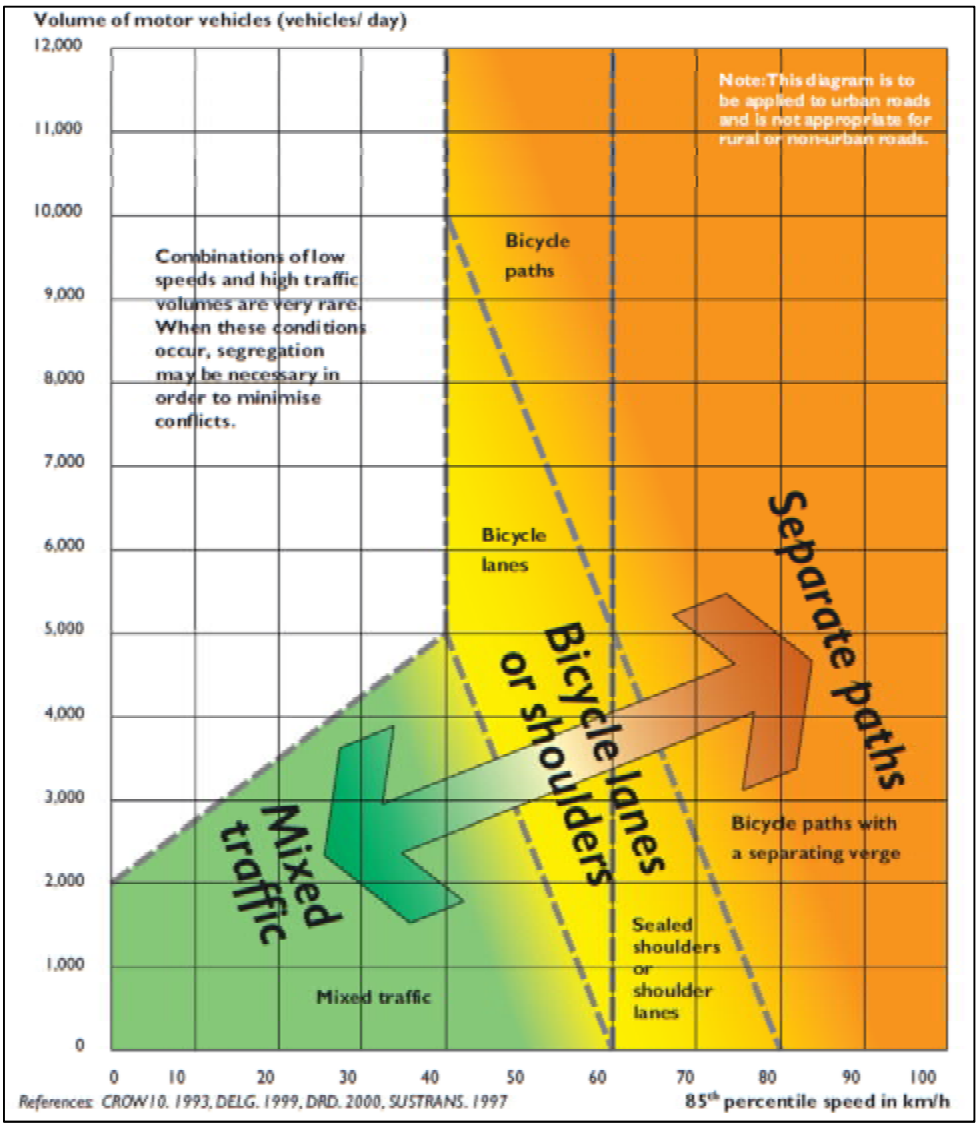


Figure 3-1 Separation of bicycles and motor vehicles according to traffic speed and volume

Mixed Traffic Lanes

Based on Figure 3.2 of the RTA NSW Bicycle Guidelines, mixed traffic lanes are not considered an appropriate treatment in this instance. Coupled with the vehicle traffic volumes and speeds, Livingstone Road is also a bus route and carries a reasonable volume of heavy vehicles which is not conducive to this option.

Shoulder Lanes

Based on Figure 3.2 of the RTA NSW Bicycle Guidelines shoulder lanes are not considered an appropriate treatment in this instance. Shoulder lanes could potentially be provided within the 12.8m wide pavement width; however, the cycle lanes would only be 1.2m wide allowing for a minimum traffic lane width of 3.1m, required for buses/heavy vehicles (ideally this should be 3.2m) and 2.1m parking lanes on both sides of the road.

This provides no physical separation between cyclists and parked cars, increasing the hazard to cyclists from the opening of car doors. There is also an increase in risk of heavy vehicles straying into the cycle lane given the relative narrow lane widths

On Road Cycle Lanes

Based on Figure 3.2 of the RTA NSW Bicycle Guidelines on road cycle lanes would be an appropriate treatment for Livingstone Road. In order to accommodate on road cycle lanes in each direction within the 12.8m pavement width the parking would need to be removed on one side of the street.

Bi Directional On Road Cycle Path

Based on Figure 3.2 of the RTA NSW Bicycle Guidelines, a bi - directional on road cycle path would be an appropriate treatment for Livingstone Road. The proposed width of the bidirectional cycle path is 2.4m allowing for a minimum 1.2m width in each travel direction. We have allowed for a 0.4m wide raised median between the cycle path and the traffic lane. This is considered a minimum width to achieve an acceptable level of separation. In order to accommodate a bi - directional on road cycle path within the 12.8m pavement width, the parking would need to be removed on one side of the street.

Off Road Shared Path

There are existing concrete footpaths located along both sides of Livingstone Road for the length of the Study Area. They appear to be generally 1.5m wide but vary in width up to 2.0m in some localised areas. In order to have a functional off road shared path a minimum width of 2.5m is recommended. Therefore any proposal for off road shared paths would necessitate the widening of existing footpaths. There are existing street trees, electrical poles and road furniture that would need to be relocated to accommodate such widening.

As mentioned previously, there are at times a high volume of pedestrian traffic around the Casimir Catholic College and the community and commercial facilities adjacent to the Livingstone Road, Marrickville Road intersection. An off road shared cycle path would not be an ideal solution for these areas.

Based on the above constraints, whilst some small extents of off road shared paths could be considered at localised locations, we do not recommend this option as a general treatment to Livingstone Road.

4.0 CONCEPT DESIGN

Based on the site analysis, option assessment and consultation with Council officers, the following route options and cycleway facilities are proposed for Study Area 2.

- Bi Directional Cycle Path on Western Side of Livingstone Road.
- Off Road Shared Path through Marrickville Park
- Mixed On Road Traffic Lanes in Porter Avenue

Further discussion on the design considerations for each segment is detailed in the following sections.

4.1 LIVINGSTONE ROAD

There are a number of design considerations for the provision of a bi directional cycle path along the western side of Livingstone Road. These include the loss of parking and treatments at bus stops, pedestrian facilities, intersections and driveways and garbage collection.

Parking

An assessment of the number of existing parking spaces on each side of Livingstone Road was undertaken to determine what side would be least affected by loss of parking. The approximate number of existing spaces on the western side is 99 and the eastern side is 104. The number of properties that do not have access to off street parking is 7 along the western side and 3 on the eastern side.

In addition it is noted that the location of the bi directional path on the western side of Livingstone Road also provides the best connectivity to Marrickville Park.

It was therefore considered that the western side was the best location for the bi directional cycle path.

As detailed in Section 3.1 occupancy rates for parking in this area are in the order of 45 to 65% so there is capacity for some of the loss of parking to be absorbed into existing parking spaces. However, there is also potential to offset the loss of parking on Livingstone Road by converting existing parallel parking to 90 degree angle parking in adjacent side streets. The concept design plans indicate the approximate number of spaces that could be provided at side streets that have sufficient width to accommodate such a treatment. These side streets include Marrickville Avenue, Robert Street, Hastings Street, Enfield Street and Pile Street on the western side of Livingstone Road and Francis Street, Graham Avenue and Hawkhurst Street on the eastern side. The total number of extra spaces that could be provided is approximately 148. It is noted that the majority of these are in areas to the north of Marrickville Road and there are less opportunities to the south of Marrickville Road. Further detailed assessment beyond the scope of

this study would be required to confirm actual number of extra parking spaces could be achieved with 90 degree angle parking.

There will be the loss of approximately 10 parking spaces on the eastern side of Livingstone Road just to the south of Marrickville Road (in front of St Brigid's) to accommodate the proposed changes to the signalised intersection.

There are some locations on the eastern side of Livingstone Road where gains and losses in parking spaces will occur as part of the relocation of bus stops and pedestrian refuges. These are detailed in the following sections but will result in an overall loss of 6 parking spaces.

With the incorporation of the 90 degree angle parking described above there would be an overall gain in the number of parking spaces of 33.

Intersection Treatments

An appropriate intersection treatment that accommodates motorists, cyclists and pedestrians is required at the side streets located along the western side of Livingstone Road. The relatively low traffic volumes of the side streets would typically mean that a treatment where continuity lines are shown across the intersection to delineate the cycle lane would be adequate for a single direction cycle lane. However, in the case of a bi directional cycle path such a treatment may not be an appropriate treatment, given the contraflow arrangements and motorists potential unfamiliarity with cyclists travelling against the flow of traffic.

We understand that preferably Council do not want to provide bi directional cycle paths that require cyclists to give way to vehicles exiting and entering side streets at non signalised intersections. This is based on recent experiences along the Carrington Road, Marrickville cycle path where the requirement for cyclists to give way to vehicles at 5 side street intersections in 500m is resulting in cyclists utilising the on road traffic lane instead of the cycle path.

There are a number of potential options for treatment of these side street intersections that are described and discussed below.

Bend Out (Figure 5.7 NSW Bicycle Guidelines)

A typical bend out type treatment is detailed below in Figure 4-1



Figure 4-1 Bend Out Intersection Treatment

(Source: City of Sydney - Standard Cycleway Details (2012) - Attachment C)

This intersection treatment may be difficult to achieve for the side streets in the Study Area. The parking lane in the example in Figure 4-1 serves to provide a stopping area for vehicles outside of the main through road (Livingstone Road) traffic lane. For the Study Area case there is no parking lane and the bend out will potentially need to push further into the side street to achieve the necessary stopping area and accommodate the other features of the intersection such as pedestrian refuges, bus stops and travel lanes. This may present difficulties in achieving a satisfactory geometry for the cycle path and footpaths without property resumptions.

Cyclist Priority without Bend Out

A typical layout of a side street intersection with cyclist priority for a one way contraflow cycle path is shown below in Figure 4-2.

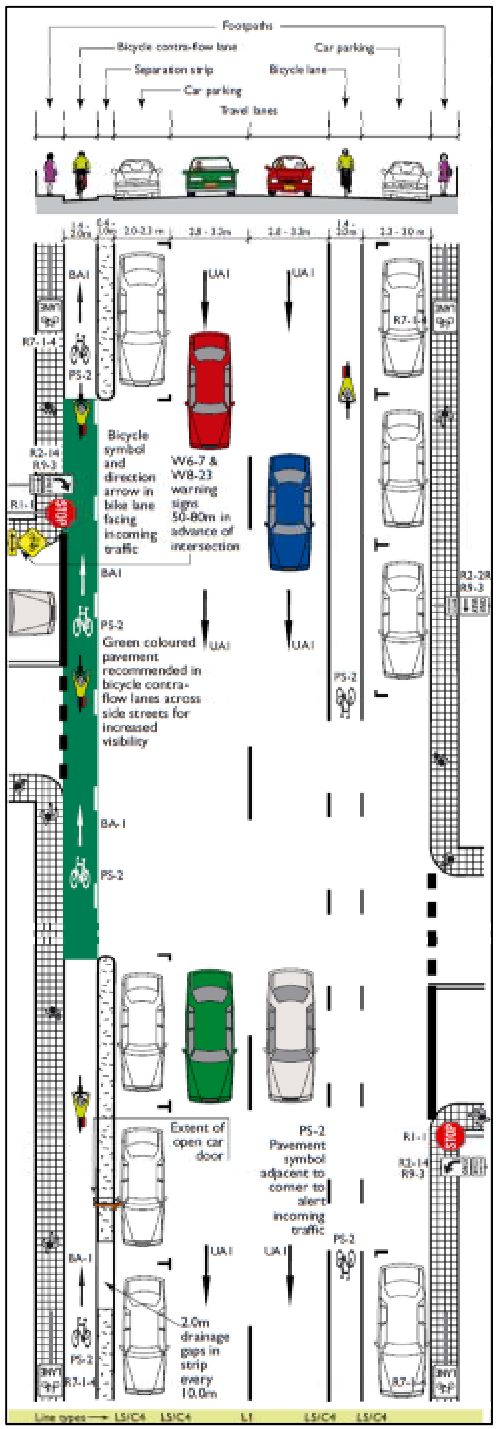


Figure 4-2 Cyclist Priority Intersection Treatment without Bend Out

(Source: Figure 5.7 RTA - NSW Bicycle Guidelines)

This option would be the simplest and most cost effective to implement. However, adopting this treatment for a bi directional cycle path may not be an appropriate treatment, given the motorists potential unfamiliarity with cyclists travelling against the flow of traffic particularly for vehicles entering the side street from Livingstone Road. Green line marking and signage could be provided to warn motorists to be aware of cyclists to potentially reduce the risk

Shared Environment

A typical shared environment intersection treatment is detailed below in Figure 4-3.

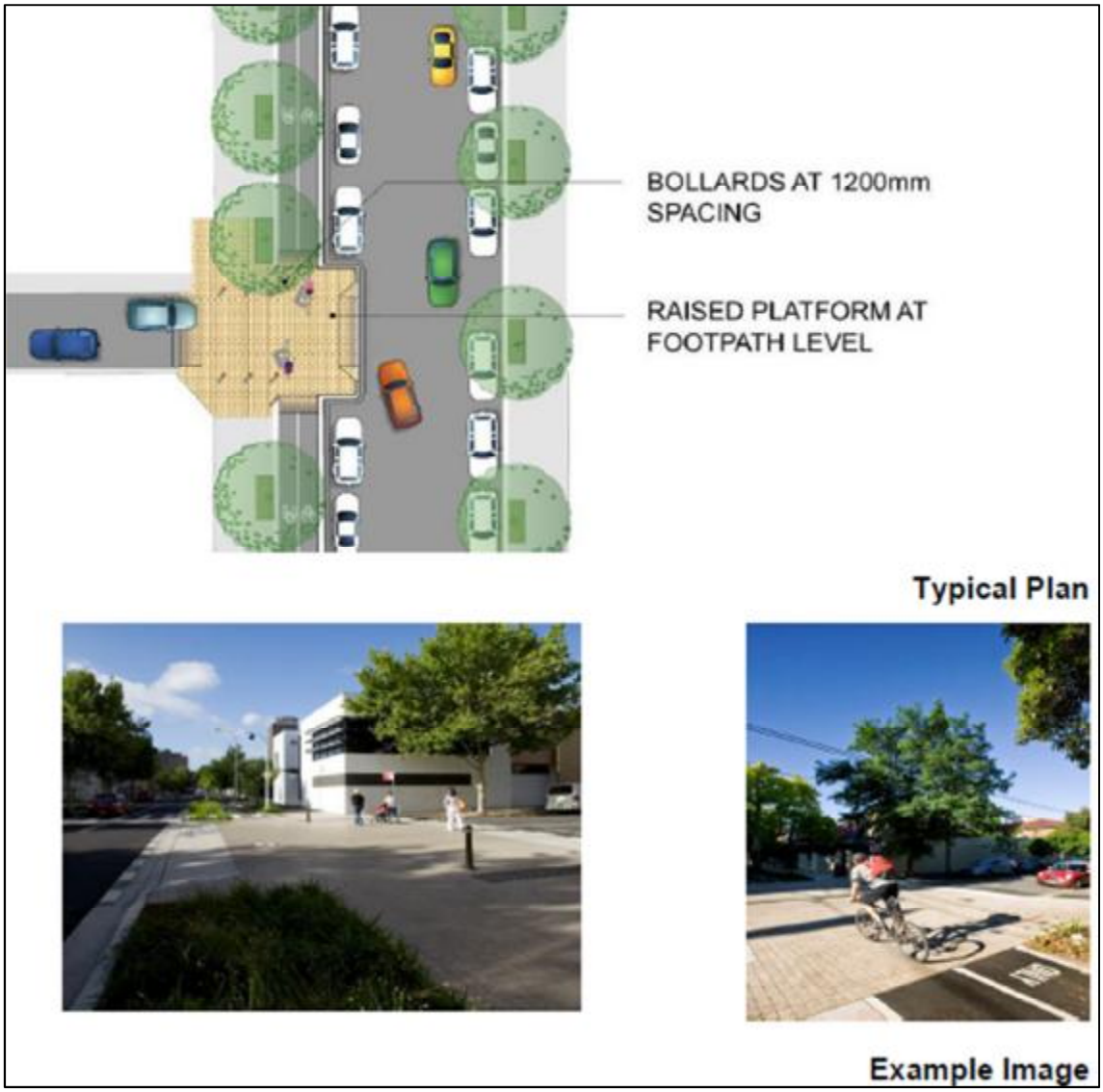


Figure 4-3 Typical Shared Environment Intersection Treatment

(Source: City of Sydney - Standard Cycleway Details (2012) - Attachment C)

This treatment has been developed by the City of Sydney and the RMS as part of the Bourke Street Cycleway. Initially installed as a trial the RMS has recently endorsed its use in appropriate locations where side street traffic is low volume (eg. < 30vph) and further trials for traffic volumes up to 60vph. Based on the traffic data provided by Council the approximate traffic volumes on the relevant side streets located within the Study Area are listed in Table 4-1.

Table 4-1

Street	AADT	Vph (approx.)
Marrickville Avenue	360	15
Hollands Avenue	513	21
Robert Street	745	31
Hastings Street	345	14
Enfield Street	743	31
George Street	943	39
Pile Street	1318	54

It can be seen that most of the side streets are under or very close to the < 30vph threshold with only two side streets likely in the range of 30 – 60 vph. Based on this it is likely that this would conceptually be an acceptable treatment of the side street intersections within the Study Area. This treatment would also provide a local traffic calming effect so could be incorporated as part of any future LATM schemes proposed in this area.

It is noted that the example shown in Figure 4-3 incorporates a parking lane which allows for the raised pavement section to be constructed and transitioned to the existing pavement level on the main through road (Livingstone Road). In the applying this treatment within the Study Area there will be no parking lane so the cycle path may need to bend out slightly (600 - 1000mm) to incorporate a transition that does not impact on the through lane nor reduce the width of the cycle path crossing.

Similar to the 'Cyclist Priority without Bend Out ' option described above there are potential risks of motorists being unfamiliar with cyclists travelling against the flow of traffic particularly for vehicles entering the side street from Livingstone Road. However the raised treatment is a visual

and physical trigger to warn them of this. Appropriate signage could also be provided to warn motorists to be aware of cyclists to potentially reduce the risk further.

Based on the above the most appropriate treatment for side street intersections would be a shared environment treatment. The concept plans identify this treatment however consideration should still be given to the other alternatives during the detailed design phase.

Council have advised that a shared environment treatment will not be able to utilised at the Pile Street intersection due to stormwater drainage issues. At this location a treatment where cyclists will need to give way motorists will need to be installed as other options are not viable.

There is an existing set of traffic signals located at the intersection of Livingstone Road and Marrickville Road. Adjustments to the lane location and widths will be required on the Livingstone Road legs of the intersection to accommodate the proposed bi directional cycle path.

Cycle lanterns are proposed to be installed on both the northern and southern approaches of the bi directional cycle path to the intersection. We are still awaiting confirmation from RMS on the potential to accommodate a separate phase for the cycle movement across the intersection.

Pedestrian Facilities

As detailed in Section 3.1 there are two existing raised pedestrian crossings and also a series of pedestrian refuge islands located on Livingstone Road at various side street intersections along the full length of the Study Area.

At the pedestrian crossing locations it is proposed to alter the existing kerb build outs / islands and signage on the western side to accommodate the bi directional cycle path. We recommend that the section of the crossing located across the cycle path remain raised so as to alert cyclist that pedestrian will have right of way. Appropriate flatter grade transitions on approach and departure to the crossing can be provided to ensure rider comfort is maintained.

The existing pedestrian refuges are already pinch point locations for on street parking and traffic lane widths. The introduction of an on road cycle path further exacerbates this problem and requires special consideration of the location and geometry of these facilities. It is proposed to adjust or completely remove the majority of the existing pedestrian refuges to accommodate the installation of the cycle path. Details of the treatment of the existing pedestrian refuges at each location are detailed in the following sections.

Bus Stops

There are 4 existing bus stops located along the western side and 5 along the eastern side of Livingstone Road within the Study Area.

The current configuration of the bus stops sees buses pull out of the through traffic lane into the parking lane adjoining the kerb and gutter thus allowing traffic to be able to still pass. The

proposal to provide an on road bi directional cycle path on the western side will require the existing bus stops to be modified and result in the buses stopping within the northbound traffic lane. This is required to accommodate the bidirectional cycle path deviating around the rear of the bus stop.

There are also locations where the existing bus stops on the western and eastern side are either fully or partially located opposite one another. In these instances there is insufficient width to provide for the bus stops, cycle lanes and traffic lanes and they will need to relocated so that they are not located directly opposite each other and appropriate lane widths can be provided.

Specific details of the proposed modifications to the existing bus stops are described in the following sections and shown on the concept design plans.

Driveways / Drainage

Breaks will need to be provided in the separation median at driveway / access locations and to allow for continued surface drainage of the road pavement. Final details of appropriate locations for breaks will need to be undertaken as part of the detailed design.

Garbage Collection

Consideration will need to be given to garbage collection for properties with frontage to the bi directional cycle path. Options would be to place the bins on the 400mm wide median or temporarily on the cycle path itself on collection day. A similar bi directional path treatment exists at Epping Road, Lane Cove and from our observations of this area, the bins are temporarily placed on the cycle path for collection with cyclists required to ride around the bins.

Further details of the concept design considerations for various segments along the Livingstone Road are summarised below.

Railway Line to Francis Street

The two existing raised pedestrian crossings are located within this section. Details of their proposed treatment are detailed above.

The existing bus stop located on the western side of Livingstone Road just to the south of Robert Street is proposed to reconstructed in the parking lane to allow the cycle path to pass behind and buses to stop in the travel lane.

The existing bus stop located on the eastern side of Livingstone Road just to the south of Arthur Street is proposed to be relocated to the northern side of Arthur Street as it is currently located partially opposite the bus stop on the western side and there will be insufficient width to accommodate bus stops on both sides of the road.

It is proposed to relocate the existing pedestrian refuge located adjacent to Robert Street to be able to accommodate the new western side bus stop, minimum lane widths and the cycle path.

The relocation of the bus stop on the eastern side of Livingstone Road will result in the loss of 6 parking spaces on the northern side of Arthur Street but will enable 3 parking spaces to be reinstated on the southern side of Arthur Street in the former bus zone. There will be a net loss of 3 parking spaces on the eastern side.

There is minimal impact to parking on the western side of this section as the majority is either signed no stopping zone across the rail bridge, in front of the SES Station around the pedestrian crossings and bus zone. Two car parking spaces will be lost on the western side between the bus stop and the pedestrian crossing to the south of Robert Street and a further 6 will be lost north of Robert Street to the existing pedestrian crossing adjoining Francis Street.

There is opportunity to provide for angle parking in Marrickville Avenue, Robert Street and Francis Street to offset these parking losses. A potential extra 49 spaces can be provided in Robert Street (24), Francis Street (10) and Marrickville Avenue (15) which would more than offset the loss of parking (11) in this section.

We have shown the extent of the bi directional cycleway extending to Jersey Street at the southern side of the rail bridge. This will provide connectivity to a bi directional path located between Jersey Street and Albermarle Street being proposed as part of the east west cycle route LR19 – Marrickville to Dulwich Hill Station (Study Area 1). Some minor loss of parking (4 spaces) will occur on the western side of Livingstone Road between the Rail Bridge and Randall Street however 90 degree angle parking is proposed in Randall Street to offset this loss.

Francis Street to Marrickville Road

This section of Livingstone Road between Francis Street and Marrickville Road includes a curve in the road. Based on the GIS and aerial information provided by Council there should be sufficient width to provide appropriate width traffic lanes in conjunction with the proposed bi directional cycle path and parking lane on the east side however turning path clearances will need to be checked and confirmed using detail survey as part of the detailed design process.

The existing bus stop located on the western side of Livingstone Road just to the south of Marrickville Road is proposed to reconstructed partially in the parking lane to allow the cycle path to pass behind and buses to stop in the kerbside travel lane. In order to allow vehicles to be able to pass around a stopped bus on approach to the intersection the cycle path will encroach into the existing footpath slightly more than the typical proposed treatment at other bus stop locations along the route. The remaining footpath width will still be approximately 1.5m.

The existing bus stop located on the eastern side of Livingstone Road just to the south of Marrickville Road is proposed to retained in its existing location. There is sufficient width provide by the parking lane (2.1m) and the adjoining traffic lane (3.95m) to allow a vehicle to pass whilst a bus is stopped.

It will be necessary to reconfigure the northbound and southbound approach traffic lane arrangements at the Livingstone / Marrickville Road signalised intersection. The layout and a typical section are included in the concept design plans. These include a dedicated right turn lane on each approach. These arrangements have been discussed with RMS and are subject to their final approval.

There will be the loss of approximately 10 parking spaces on the eastern side of Livingstone Road just to the south of Marrickville Road (in front of St Brigid's) to accommodate the proposed changes to the signalised intersection.

There will be 25 parking spaces lost on the western side of this section of Livingstone Road. It is noted that only one of the properties fronting this section have no off street parking available.

There is opportunity to provide for angle parking in Marrickville Avenue, Robert Street and Francis Street to offset these parking losses. A potential extra 49 spaces can be provided in Robert Street, Francis Street and Marrickville Avenue.

Marrickville Road to Enfield Street

The existing bus stop located on the western side of Livingstone Road just to the south of Enfield Street is proposed to be reconstructed in the parking lane to allow the cycle path to pass behind and buses to stop in the travel lane.

The existing bus stop located on the eastern side of Livingstone Road just to the north of Marrickville Road is proposed to retained in its existing location.

The existing bus stop located on the eastern side of Livingstone Road just to the north of Graham Avenue is proposed to be relocated to the southern side of Graham Avenue as it is currently located partially opposite the bus stop on the western side and the existing pedestrian refuge for Enfield Street and there will be insufficient width to accommodate bus stops on both sides of the road.

The relocation of the bus stop on the eastern side of Livingstone Road will result in the loss of 3 parking spaces on the southern side of Graham Avenue. The existing bus stop location will be converted to a no stopping zone due to its proximity to the Enfield Street intersection and associated pedestrian refuge.

There will be 26 parking spaces lost on the western side of this section of Livingstone Road. It is noted that only two of the properties fronting this section have no off street parking available.

There is opportunity to provide for angle parking in Hastings Street, Enfield Street and Graham Avenue to offset these parking losses. A potential extra 58 spaces can be provided in these three streets.

It is proposed to relocate the existing pedestrian refuge located adjacent to Enfield Street to be able to accommodate the new western side bus stop and the cycle path. The refuge will also be widened to the minimum 2.0m width.

Enfield Street to Marrickville Park

Sydney Buses have indicated that two existing bus stops located within the Study Area are being considered for removal. These are located on Livingstone Road to the south of Pile Street in both the north and south bound lanes. At the time of the preparation of this report the decision on this matter has not been made however for the purpose if the concept design report we have assumed these bus stops will be removed.

The removal of the bus stop on the eastern side of Livingstone Road will result in the gain of 4 parking spaces on the southern side of Pile Street.

There will be 36 parking spaces lost on the western side of this section of Livingstone Road. It is noted that only five of the properties fronting this section have no off street parking available.

There is opportunity to provide for angle parking in Pile Street and Hawkhurst Street to offset these parking losses. A potential extra 41 spaces can be provided in these three streets. .

It is proposed to relocate the existing pedestrian refuges located adjacent to George and Pile Streets to be able to accommodate the cycle path. The relocated refuges will be widened to achieve the minimum 2.0m width. This will result in the loss of 3 parking spaces adjacent George Street and 1 parking space adjacent Pile Street.

We have shown a kerb ramp to transition the bi directional cycle path to the off road shared path at Marrickville Park. Further coordination of this transition will need to be undertaken in conjunction with the preparation of the Marrickville Park Master Plan.

Alternative Option

An alternative to providing the bi directional cycle path on one side of Livingstone Road would be to provide an on road cycle lane on each side of the road. This would still require the loss of parking on the western side however may assist in providing more simple intersection treatments at side roads and remove the need to move bus stops into the travel lane on the western side. However, the geometric layout of such a treatment would result in the cycle lane heading southbound being located partially over the concrete pavement and partially on the asphalt pavement. This is not an appropriate outcome for the cycle path users and considerable costs would be necessary to modify pavements to achieve a suitable solution.

4.2 MARRICKVILLE PARK

It is the intent to adopt the proposed cycle routes / paths as depicted in the Marrickville Park Master Plan. We have indicatively shown the routes as we have interpreted then from the draft master plan document provided by Council on the concept plans. The draft master plans indicates an off road shared path linking Livingstone Road to Porter Street via a route to the south of the main oval and also an off road shared path through the park linking Porter Avenue to Frazer Street adjacent to Lawson Avenue. We recommend that that width of the shared path through the park be made wider than the minimum 2.5m where there is opportunity to do so. It is noted that based on our site inspections there are potential narrow constriction points on the proposed route around the southern side of the main oval.

The path should connect to Porter Avenue which is suitable for on road mixed traffic lanes. Porter Avenue provides a link to Wardell Road as part of the RRO2 route. It is noted that the existing gate arrangement at the Porter Avenue entrance to Marrickville Park will need to be adjusted to allow for cyclists connectivity.

4.3 CONCEPT DESIGN PLANS

Concept designs plans have been prepared for Study Area 2 and are included in Appendix A. The concept design plans are scaled drawings and include the following details;

- existing and proposed cycling facilities;
- existing and proposed traffic and parking arrangements;
- all proposed signage and line markings;
- typical cross sections; and
- highlight design issues and constraints and how they are proposed to be treated

It is important to note that the GIS maps and aerial photography provided by Council of the study area have been used as the base for the concept plans. Based on our site inspections there may be some variance to the existing road widths and location of features depicted on this information. Detail feature and level survey will be necessary to complete the detailed design and confirm the prosed concepts are achievable. Where possible we have identified particular areas of concern.

5.0 COST ESTIMATES

A preliminary cost estimate has been prepared for the proposed infrastructure improvements recommended in this concept design report and shown on the concept design plans. The preliminary cost estimate is provided in Appendix B and summarised below.

Preliminary Cost Estimate Study Area 2 - $710,000 (excl GST)

The cost estimate generally includes for the following items.

- Pavement Markings
- Medians
- Signage
- Bus Stops
- Intersection Treatments

The cost estimate makes no allowance for the following items:

- Off Road shared paths and associated signage located within Marrickville Park. We have assumed that this will form part of the masterplan works and budgets;
- 90 degree angle parking
- Relocation or adjustment of existing utilities
- Design and project management costs associated with detailed design and construction of the proposed works

6.0 CONCLUSION

Lambert & Rehbein has been engaged by Marrickville Council to prepare a concept design of the proposed bicycle route located along Livingstone Road, Marrickville; between the Bankstown rail line and Marrickville Park; as highlighted in the Marrickville Bicycle Plan (2007).

The proposed route is part of Local Route 3 (LR3) and also provides linkages to and from parts of Regional Route 2 (RR2) at Porter Street, to connect to Wardell Street and to Frazer Street near Lawson Avenue.

Based on the site analysis, option assessment and consultation with Council officers, the following route options and cycleway facilities are proposed for Study Area 2.

- Bi Directional Cycle Path on Western Side of Livingstone Road.
- Off Road Shared Path through Marrickville Park
- Mixed On Road Traffic Lanes in Porter Avenue

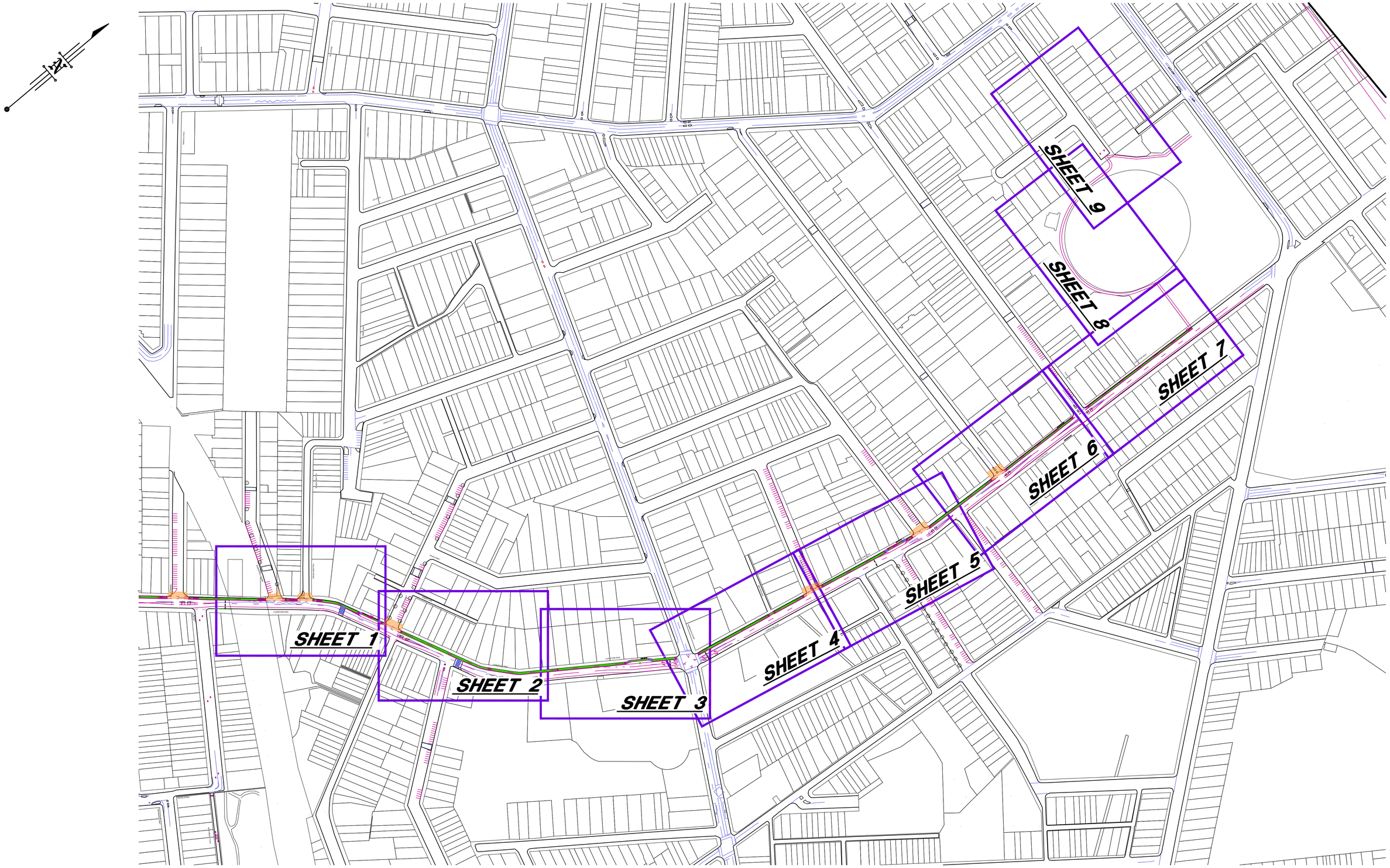
Concept design plans for the proposed route options and cycleway facilities have been prepared and are included in Appendix A

A preliminary cost estimate of $710,000 (excl GST) has been calculated for the proposed route options and cycleway facilities based on the proposed concept design plans and is included in Appendix B.

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

APPENDIX A

CONCEPT DESIGN PLANS



No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: STUDY AREA 2 (LR3)
OVERALL KEY PLAN

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size A1	Drawing No. B16049-C200
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	

LEGEND:-

- EXISTING LINE MARKING
- PROPOSED LINE MARKING
- PROPOSED LINE MARKING - ALTERNATE OPTION
- EXISTING SIGNAGE
- EXISTING SIGNAGE - TO BE REMOVED
- PROPOSED SIGNAGE
- PAINTED BIKELANE

POTENTIAL 15 EXTRA CAR SPACES IF CONVERTED FROM PARALLEL TO 90° ANGLE PARKING. (LIVINGSTONE RD TO 12 MARRICKVILLE AV.)

MARRICKVILLE AVENUE

HOLLANDS AVENUE

W6-7A

W8-23

2.4m WIDE BI-DIRECTIONAL CYCLE PATH

PROVIDE SHARED ENVIRONMENT INTERSECTION TREATMENT

R5-35

PROVIDE BREAKS IN MEDIAN FOR DRIVEWAY ACCESS & DRAINAGE AS REQUIRED.

ADJUST PEDESTRIAN CROSSING ISLANDS & SIGNAGE TO ACCOMODATE CYCLE PATH

LOSS OF 2 PARKING SPACES

R5-20(L)

R5-20(R)

NEW BUS STOP. RELOCATE EXISTING BUS SHELTER AND SIGNAGE (BUS STOPS IN TRAVEL LANE.

R5-35(R)

EXIST. BUS STOP

REFER INSET A BELOW

3.50 3.50 3.00

BUS ZONE

LIVINGSTONE ROAD

NOMINAL 2.1m PARKING LANE (SOME AREAS WILL HAVE NO STOPPING)

R5-35(L)

3.20 3.20

3 PARKING SPACED GAINED WITH REMOVAL OF BUS STOP

SIGNAGE TO BE RELOCATED ON NEW STEM TO NORTH-EAST SIDE OF ARTHUR ST INTERSECTION

0 5 10m

SCALE 1 : 250

INSET A

RANDALL ST

PROVIDE SHARED ENVIRONMENT INTERSECTION TREATMENT

2.4m WIDE BI-DIRECTIONAL CYCLE PATH

3.50 3.50 3.00

BUS STOP

JERSEY ST

RELOCATE BUS STOP TO NORTH SIDE OF JERSEY STREET

R5-35(L)

R5-20(L)

R5-400(R)

R5-20(R)

ON ROAD MIXED TRAFFIC LANES (PROVIDE NEW PS-2 SYMBOLS)

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE CONCEPT DESIGN MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT PLAN SHEET 1 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size: A1	Drawing No.: B16049-C201
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A B C D	

REFER INSET A ADJACENT

ROBERT LANE

ROBERT STREET

POTENTIAL 24 EXTRA CAR SPACES IF CONVERTED FROM PARALLEL TO 90° ANGLE PARKING. (LIVINGSTONE RD TO DOT ST)

PROVIDE SHARED ENVIRONMENT INTERSECTION TREATMENT

RELOCATE EXISTING 2.0m WIDE PEDESTRIAN REFUGE

LANE

R7-1-4B

LOSS OF 6 PARKING SPACES

NO STOPPING

R5-35(L)

R5-35

NO STOPPING

R5-35

NO STOPPING

R5-35(R)

ADJUST PEDESTRIAN CROSSING ISLANDS & SIGNAGE TO ACCOMODATE CYCLE PATH

NO STOPPING

R5-35(L)

LOSS OF 6PARKING SPACES

NO STOPPING ON

R5-35(R)

SIGNAGE TO BE RELOCATED ON NEW STEM TO NORTH-EAST SIDE OF ARTHUR ST INTERSECTION

3.0m WIDE FOR BUS BAY. CONTINUED THRU TO FRANCIS ST

ARTHUR STREET

BUS ZONE

R5-20(L)

BUS ZONE

R5-20(L)

NO STOPPING

R5-35

FRANCIS STREET

NO STOPPING ON

R5-35(R)

LOSS OF 25 PARKING SPACES

LIVINGSTONE ROAD

LANE

R7-1-4B

LANE

R7-1-4B

2.1m PARKING LANE

TURNING PATH LANE CLEARANCES AROUND CURVE WILL NEED TO BE CHECKED AS PART OF DETAILED DESIGN

POTENTIAL 10 EXTRA CAR SPACES IF CONVERTED FROM PARALLEL TO 90° ANGLE PARKING. (LIVINGSTONE RD TO 43 FRANCIS ST)

DAVID STREET

ROBERT STREET

ROBERT LANE

INSET A

LEGEND:-

- EXISTING LINE MARKING
- PROPOSED LINE MARKING
- PROPOSED LINE MARKING - ALTERNATE OPTION
- EXISTING SIGNAGE
- EXISTING SIGNAGE - TO BE REMOVED
- PROPOSED SIGNAGE
- PAINTED BIKELANE

0 5 10m

SCALE 1 : 250

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

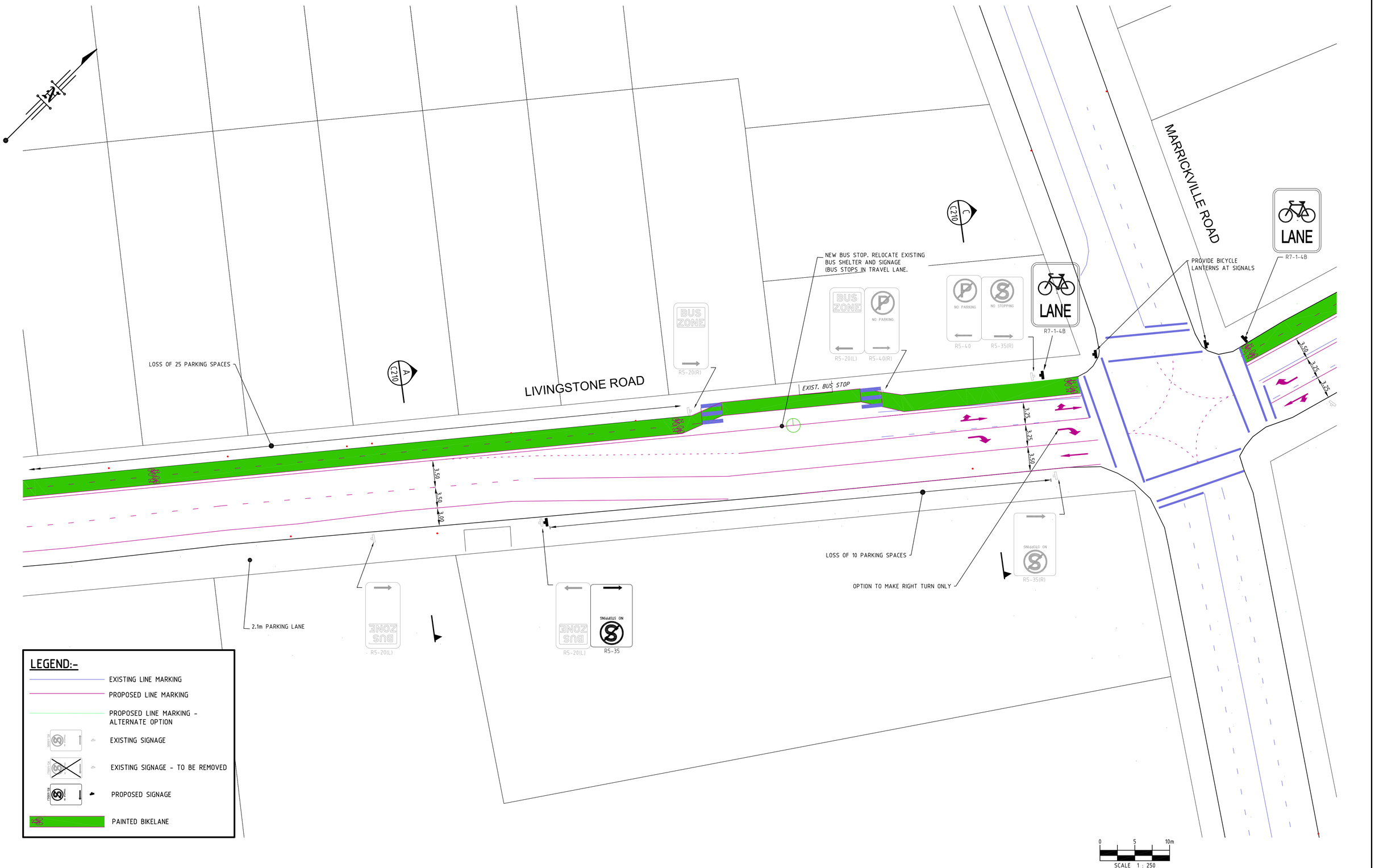
LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE CONCEPT DESIGN MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT PLAN SHEET 2 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size A1	Drawing No. B16049-C202
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	



No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

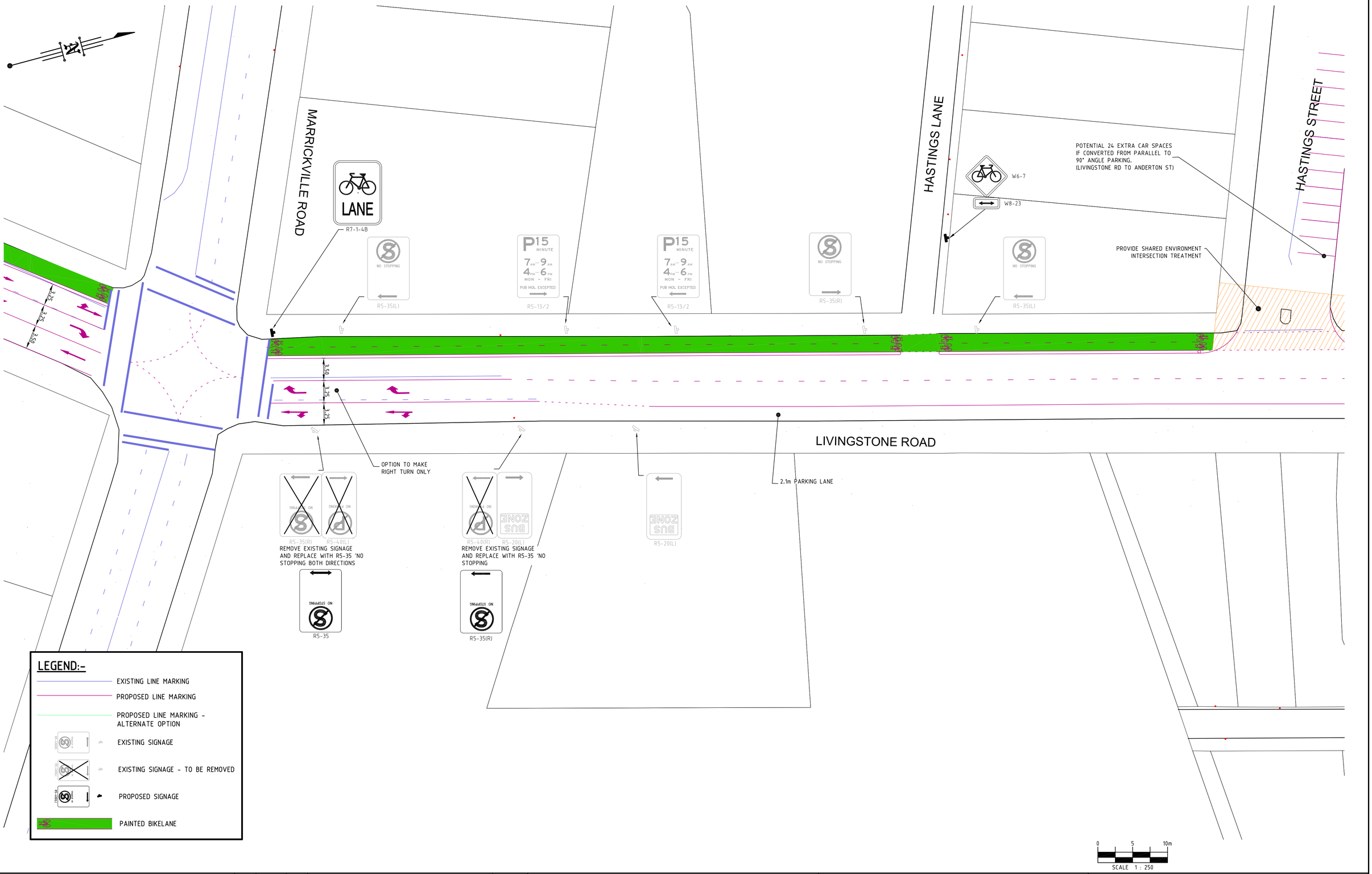
LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT
PLAN SHEET 3 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size: A1	Drawing No.: B16049-C203
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	



No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT
PLAN SHEET 4 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size: A1	Drawing No.: B16049-C204
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	

HASTINGS STREET

W6-7

W8-23

POTENTIAL 24 EXTRA CAR SPACES
IF CONVERTED FROM PARALLEL TO
90° ANGLE PARKING.
(LIVINGSTONE RD TO ANDERTON ST)

LANE

R7-1-4B

LIVINGSTONE ROAD

BUS ZONE

R5-20(R)

NEW BUS STOP. RELOCATE EXISTING
BUS SHELTER AND SIGNAGE
(BUS STOPS IN TRAVEL LANE.

EXIST. BUS STOP

BUS ZONE

NO STOPPING

R5-20(L)

R5-35(R)

PROVIDE SHARED ENVIRONMENT
INTERSECTION TREATMENT

ENFIELD ST

POTENTIAL 12 EXTRA CAR SPACES
IF CONVERTED FROM PARALLEL TO
90° ANGLE PARKING.
(LIVINGSTONE RD TO ANDERTON ST)

W6-7

W8-23

ADJUST PEDESTRIAN REFUGE
ISLANDS & SIGNAGE

NO STOPPING

R5-35(L)

4.00

6.00

3.65

3.500

2.0

4.500

2.1m PARKING LANE

LOSS OF 3
PARKING SPACES

BUS ZONE

R5-20(L)

RELOCATE BUS STOP,
& SIGNAGE

BUS ZONE

R5-20(L)

NO STOPPING

R5-35(L)

RELOCATE BUS STOP, & SIGNAGE

POTENTIAL 22 EXTRA CAR SPACES
IF CONVERTED FROM PARALLEL TO
90° ANGLE PARKING.
(LIVINGSTONE RD TO PETERSHAM RD

STANLEY STREET

GRAHAM AVENUE

NO STOPPING

R5-35

R5-20(L)

R5-20(L)

NO STOPPING

R5-35(R)

NO STOPPING

R5-35

NO STOPPING

R5-35

LEGEND:-

- EXISTING LINE MARKING
- PROPOSED LINE MARKING
- PROPOSED LINE MARKING - ALTERNATE OPTION
- EXISTING SIGNAGE
- EXISTING SIGNAGE - TO BE REMOVED
- PROPOSED SIGNAGE
- PAINTED BIKELANE

0 5 10m

SCALE 1 : 250

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT
PLAN SHEET 5 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG
Designer: SG
Scale: AS SHOWN
Checked: DL
Approved: A.PEZZUTTI
RPEQ No: 6382
Date: MAR 2016
Sheet Size: A1
Drawing No. B16049-C205
A B C D

LEGEND:-

- EXISTING LINE MARKING
- PROPOSED LINE MARKING
- PROPOSED LINE MARKING - ALTERNATE OPTION
- EXISTING SIGNAGE
- EXISTING SIGNAGE - TO BE REMOVED
- PROPOSED SIGNAGE
- PAINTED BIKELANE

GEORGE ST

PROVIDE SHARED ENVIRONMENT INTERSECTION TREATMENT

W6-7

W8-23

ADJUST PEDESTRIAN REFUGE ISLANDS & SIGNAGE

MAIL ZONE WILL NEED TO BE REMOVED/RELOCATED

R5-35(R)

R7-1-4B

R5-35(L)

R5-20(R)

R5-20(L)

BUS STOP TO BE REMOVED

EXIST. BUS STOP 220424

3.950

3.950

2.10

3.50

2.00

4.50

LIVINGSTONE ROAD

EXIST. BUS STOP 220427

BUS STOP TO BE REMOVED

GAIN 4 NEW CARPARKING SPACES

POTENTIAL 22 EXTRA CAR SPACES IF CONVERTED FROM PARALLEL TO 90° ANGLE PARKING. (LIVINGSTONE RD TO PETERSHAM ST)

LOSS OF 3 PARKING SPACES

R5-35(L)

R5-41/11

R5-41/11

R5-35(L)

R5-35(R)

R5-16/7

R5-16/7

R5-20(L)

R5-20(L)

R5-35(L)

HAWKHURST STREET

0 5 10m

SCALE 1 : 250

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE CONCEPT DESIGN MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT PLAN SHEET 6 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size: A1	Drawing No.: B16049-C206
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	

PILE STREET

TENNIS COURTS

LIVINGSTONE ROAD

OFF ROAD 2.5m WIDE SHARED PATH - DETAILS TO BE CONFIRMED AS PART OF MARRICKVILLE PARK MASTER PLAN PROJECT

POTENTIAL 19 EXTRA CAR SPACES IF CONVERTED FROM PARALLEL TO 90° ANGLE PARKING. (LIVINGSTONE RD TO WARDELL RD)

W6-7

W8-23

LANE

R7-1-4B (DOUBLE SIDED)

NO STOPPING

R5-35(L)

WATCH FOR

G9-57

LANE

R7-1-4B

LANE

R7-1-4B

END

R7-4A

KERB RAMP FOR CYCLISTS.

NEW DIRECTIONAL SIGNAGE

WATCH FOR

G9-57

3.50

2.00

4.50

2.1m PARKING LANE

ADJUST EXISTING PEDESTRIAN REFUGE ISLAND AND ASSOCIATED LINEMERKING.

LOSS OF 1 PARKING SPACE

NO STOPPING

R5-35

NO STOPPING

R5-35(R)

RELOCATE NO STOPPING SIGNAGE ON NEW STEM

LEGEND:-

- EXISTING LINE MARKING
- PROPOSED LINE MARKING
- PROPOSED LINE MARKING - ALTERNATE OPTION
- EXISTING SIGNAGE
- EXISTING SIGNAGE - TO BE REMOVED
- PROPOSED SIGNAGE
- PAINTED BIKELANE

0 5 10m

SCALE 1 : 250

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE CONCEPT DESIGN MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT PLAN SHEET 7 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size A1	Drawing No. B16049-C207
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	



THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT
PLAN SHEET 8 OF 9

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size: A1	Drawing No. B16049-C208
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	



THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

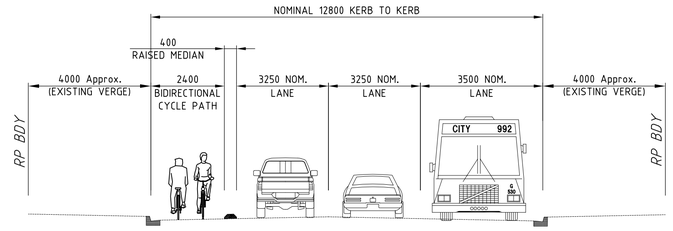
LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE CONCEPT DESIGN MARRICKVILLE

Title: STUDY AREA 2 (LR3) LAYOUT PLAN SHEET 9 OF 9

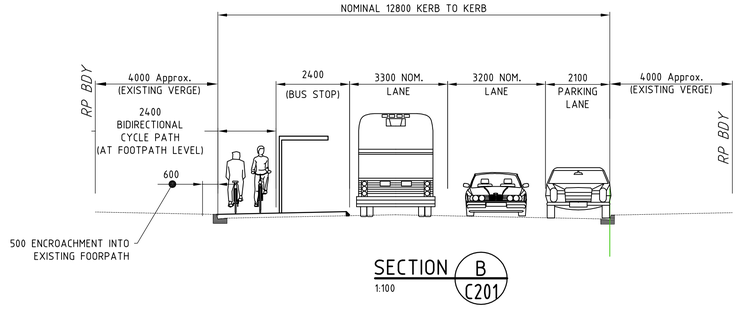
Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG	Checked: DL	Sheet Size A1	Drawing No. B16049-C209
Designer: SG	Approved: A.PEZZUTTI RPEQ No: 6382		
Scale: AS SHOWN	Date: MAR 2016	A / B / C / D	



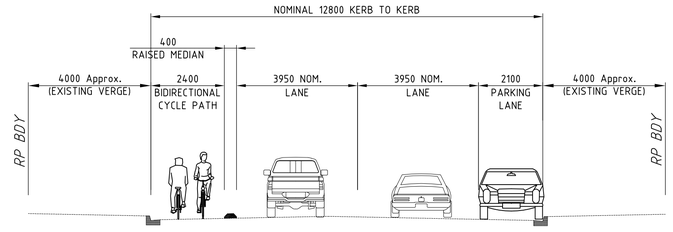
SECTION C / C203
1:100

TYPICAL SECTION - LIVINGSTONE RD INTERSECTION OF MARRICKVILLE ROAD (SOUTHERN APPROACH)



SECTION B / C201
1:100

TYPICAL SECTION - LIVINGSTONE RD @ BUS STOP



SECTION A / C203
1:100

TYPICAL SECTION - LIVINGSTONE RD

0 1 2 3m
SCALE 1 : 100

THIS DESIGN AND DRAWING IS COPYRIGHT. NO PART OF THIS DRAWING MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF LAMBERT AND REHBEIN PTY LTD

No.	Date	By	Amendment	Checked
D	03.05.2016	S.G.	SYDNEY BUSES AMENDMENT	
C	27.04.16	S.G.	CONCEPT ISSUE	
B	20.04.16	AST	REVISED DRAFT	
A	11.04.16	S.G.	DRAFT	

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006
A.C.N. 010 451 902
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

Project: PROPOSED BICYCLE ROUTE
CONCEPT DESIGN
MARRICKVILLE

Title: TYPICAL SECTIONS SHEET

Client: *MARRICKVILLE COUNCIL*

Draftsperson: SG
Designer: SG
Scale: AS SHOWN
Checked: DL
Approved: A.PEZZUTTI
RPEQ No: 6382
Date: MAR 2016
Sheet Size: A1
Drawing No. B16049-C210
A B C D

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

APPENDIX B

PRELIMINARY COST ESTIMATE

LAMBERT & REHBEIN **PROJECT NO: B16049**

CONSULTING ENGINEERS 4 May 2016

PRELIMINARY COST ESTIMATE

PROPOSED BICYCLE PATH
STUDY AREA 2 LR3

DESCRIPTION	UNIT	RATE	QTY	AMOUNT
Site establishment	budget			$ 20,000
Provision for traffic control	days	$1,500.00	40	$ 60,000
Painted bicycle lane 2.4m wide				
Pavement marking (coloured treatment & centre line)	m	$120.00	1200	$ 144,000
Painted directional arrows	No.	$250.00	52	$ 13,000
Painted bicycle symbol	No.	$250.00	52	$ 13,000
Raised concrete median	m	$60.00	980	$ 58,800
Shared environment intersection treatments				
Raised pavements and decorative finishes	m^2	$250.00	560	$ 140,000
Allowance for landscaping	No.	$3,000.00	6	$ 18,000
Allowance for stormwater drainage	No.	$5,000.00	6	$ 30,000
Adjustment of existing traffic islands and raised finishes				
Relocate bus stops including raised concrete and furniture	No.	$12,000.00	3	$ 36,000
Additional allowance for relocation of Adshel shelter	No.	$3,000.00	1	$ 3,000
Relocate bus stop without pavement works	No.	$2,000.00	1	$ 2,000
Remove existing bus stop	No.	$1,000.00	2	$ 2,000
Adjust pedestrian crossings including islands and signage	No.	$3,000.00	2	$ 6,000
Adjust pedestrian refuges including line marking and signage	No.	$7,000.00	4	$ 28,000
New cycling lanterns and buttons at traffic signals	budget			$ 10,000
New kerb ramps	No.	$1,500.00	2	$ 3,000
Traffic signage				
New street sign	No.	$450.00	35	$ 15,750
Replace existing street sign	No.	$350.00	8	$ 2,800
Relocate existing sign	No.	$350.00	8	$ 2,800
Remove existing sign	No.	$300.00	3	$ 900
Adjustment of existing line marking				
New centre lines, lane lines and continuity lines	m	$4.00	2600	$ 10,400
Directional arrows	No.	$250.00	9	$ 2,250
Remove existing line marking	budget			$ 5,000
Adjustment of existing stormwater drainage grates	budget			$ 15,000
Angle parking in adjacent residential streets	excluded			
Off road 2.5m wide shared path & associated works in Park	excluded			
Miscellaneous & contingency - 10%				$ 64,170

SUB-TOTAL (EXCLUDING GST) *$ 705,870*

TOTAL PRELIMINARY COST ESTIMATE (EXCLUDING GST) ***$ 710,000***