8.11. The Draft North Sydney Walking Strategy

AUTHOR: Nigel Turner, Senior Strategic Transport Planner

ENDORSED BY: Joseph Hill, Director City Strategy

ATTACHMENTS:

1. The Draft North Sydney Walking Strategy [8.11.1 - 32 pages]

2. North Sydney Walking Strategy Background Report [8.11.2 - 168 pages]

PURPOSE:

To seek endorsement of the attached *Draft North Sydney Walking Strategy* for the purpose of public consultation.

EXECUTIVE SUMMARY:

On 24 February 2020, Council considered Mayoral Minute MM04: *Prioritising Pedestrians* and resolved that staff prepare a report on options for improving our focus on pedestrian needs and that the report considers how to ensure that all voices are equally heard when balancing the needs of pedestrians, cyclists, public transport users and motorists. In July 2020, Council resolved to allocate funding to prepare the North Sydney Walking Strategy.

The North Sydney Walking Strategy (NSWS) will be Council's guiding document for the delivery of its walking planning and management functions. This includes strategic planning, walking advocacy and the design and delivery of local walking projects. The draft NSWS builds on the Vision and Community Priorities detailed in the Community Strategic Plan and the North Sydney Transport Strategy (NSTS 2017) to create an over-arching walking planning and management framework for the whole of Council. More specifically, the NSWS:

- identifies existing conditions and participation rates for walking in North Sydney;
- identifies a Vision as well as specific Objectives and Targets for walking in North Sydney;
 and,
- plots a course between current walking behaviours and the future walking vision by identifying and prioritising walking initiatives and projects for inclusion in Council's policy development, advocacy and forwards works program.

This report details the draft NSWS development completed to date and recommends its adoption as well as the associated Background Report for the purpose of community consultation.

FINANCIAL IMPLICATIONS:

Increased walking participation achieves a financial trifecta. Not only does it provide

significant cost savings for individuals in terms of up-front transport cost savings and longer-term health savings, it also increases local spending, stimulates business activity and, as an added benefit, reduces Councils' transport infrastructure maintenance costs.

SCT Consulting prepared a Walking Strategy Background Report (attached) that formed the basis for the development of the draft Strategy. \$53,000 of the \$60,000 funding allocation for this work has been expended to date.

RECOMMENDATION:

1. THAT the attached Draft Walking Strategy is endorsed for the purposes of community consultation.

LINK TO COMMUNITY STRATEGIC PLAN

The relationship with the Community Strategic Plan is as follows:

- 1. Our Living Environment
- 1.2 North Sydney is sustainable and resilient
- 1.4 Public open space and recreation facilities and services meet community needs
- 2. Our Built Infrastructure
- 2.1 Infrastructure and assets meet community needs
- 2.2 Vibrant centres, public domain, villages and streetscapes
- 2.3 Sustainable transport is encouraged
- 2.4 Improved traffic and parking management
- 3. Our Future Planning
- 3.1 Prosperous and vibrant economy
- 3.2 North Sydney CBD is one of NSW's pre-eminent commercial centres
- 3.3 North Sydney is smart and innovative
- 3.4 North Sydney is distinctive with a sense of place and quality design
- 4. Our Social Vitality
- 4.1 North Sydney is connected, inclusive, healthy and safe
- 5. Our Civic Leadership
- 5.1 Council leads the strategic direction of North Sydney

BACKGROUND

In July 2017, Council adopted the *North Sydney Transport Strategy* (NSTS). The NSTS is Council's guiding document for the delivery of its transport planning and management functions, which include strategic transport planning, delivery of local transport projects and transport advocacy. A key recommendation of NSTS was the development of five Modal Action Plans, including a North Sydney Walking Action Plan. Detailed requirements for the Walking Action Plan were included in NSTS and include the following:

As per the modal hierarchy identified in Section 3, walking will be accorded the highest level of priority in North Sydney to ensure that it is both pleasurable and safe.

The North Sydney Walking Strategy will be based on a walking catchment assessment, in line with endorsed NSW Government "Planning Guidelines for Walking and Cycling" processes.

Mapping the physical efficiency of walking and cycling catchments around all commercial centres, mixed use centres, neighbourhood centres, public transport

nodes, schools and parks will give a clear picture of how urban form affects North Sydney walkability.

An assessment of land use diversity in existing commercial, mixed use and neighbourhood centres will identify opportunities for land use planning interventions to support the delivery of more diverse local centres: new shops, open space, community facilities, etc.

Emerging transport trends that may affect the uptake of walking in North Sydney will also be identified and addressed as part of the Walking Strategy.

On 24 February 2020, Council considered Mayoral Minute MM04: Prioritising Pedestrians and resolved:

1. **THAT** staff prepare a report on options for improving our focus on pedestrian needs and that the report considers how to ensure that all voices are equally heard when balancing the needs of motorists, cyclists, pedestrians and public transport.

On 27 July 2020, Council received report 8.11 and resolved in part:

1. **THAT** Council allocates \$60,000 to the development of a North Sydney Walking Strategy...

In December 2020, Council officers engaged SCT Consulting to prepare a *North Sydney Walking Strategy Background Report* (Appendix 2).

The *Draft North Sydney Walking Strategy* (Appendix 1) was informed by the *Background Report*, with additional policy development and advocacy actions identified through internal consultation.

CONSULTATION REQUIREMENTS

Community engagement will be undertaken in accordance with Council's Community Engagement Protocol.

The Strategy will be exhibited and stakeholder input sought for a minimum period of 42 days. All precinct committees, Streetscape Committees, Sustainable Transport Reference Group, industry and special interest groups like the Heart Foundation and others will be notified and invited to comment. It is likely that this will commence in late October/early November.

A "Yoursay" web site will be created and a simple feedback environment formulated to easily collate feedback received.

DETAIL

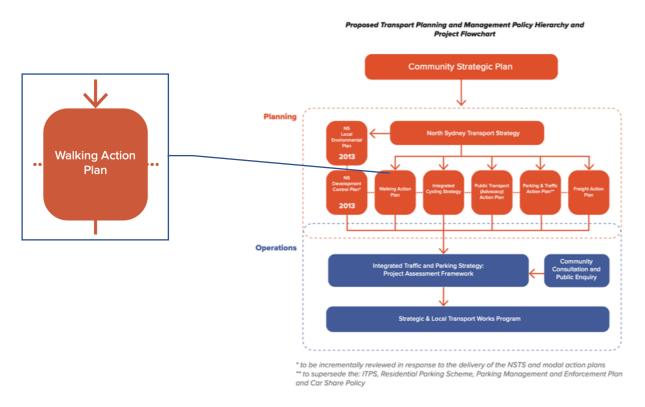
The *Draft North Sydney Walking Strategy* (Attachment 1) was informed by the *Background Report* with additional policy development and advocacy actions identified through internal consultation. It:

- 1. defines current walking conditions and participation rates in North Sydney;
- 2. identifies a Vision for the future of Walking in North Sydney: and
- 3. identifies policy, advocacy and engineering initiatives required to map a course between current walking outcomes and desired future walking outcomes for the LGA.

Specific Walking Strategy outputs will include the following.

The North Sydney Walking Action Plan

Delivery of a North Sydney Walking Action Plan was identified in the NSTS 2017. The NSTS also detailed a preliminary methodology for developing the Action Plan.



In December 2020, Council officers engaged SCT Consulting to prepare a *North Sydney Walking Strategy Background Report* (Appendix 2). The *Background Report* uses the methodology outlined in NSTS to deliver an engineering-based *Walking Action Plan* that:

- identifies North Sydney's current walking context in term of local and regional walking policy, population demographics, topography, road safety and emerging transport trends:
- identifies a bold Vision, Objectives and Targets for North Sydney's walking future;

- uses an evidence-based framework to identify "walking infrastructure investment hotspots", which it then consolidates into priority walking investment precincts and routes (section 3.2.1); and
- identifies typical and preferred walking infrastructure treatments (Section 3.3) for application as part of the development of North Sydney *Pedestrian Access and Mobility Projects* (PAMPs).

While some of North Sydney's highest priority walking infrastructure investment hotspots are already included in major projects such as the *North Sydney CBD Transport Masterplan*/ TfNSW's *North Sydney Integrated Transport Program* and the *Neutral Bay Planning Study*, many of the identified high and medium priority routes do not, currently, have specific pedestrian safety and amenity projects identified or prioritised within Council's transport works program. A more comprehensive list of potential locations/projects to consider as part of the development of Pedestrian Action and Mobility Plan (PAMP) projects is included in the Strategy.

Priority	Location (Precinct/Route) *projects largely addressed by major projects
High	North Sydney CBD (North Sydney Integrated Transport Program - NSITP)
High	North Sydney CBD-Kirribilli (+ Sydney CBD) (NSITP)
High	North Sydney CBD-Neutral Bay
High	Crows Nest-St Leonards
High	North Sydney CBD-Crows Nest
Medium	North Sydney CBD-Cammeray
Medium	Neutral Bay-Cremorne
Medium	North Sydney CBD-Blues Point
Medium	Neutral Bay-Crows Nest
Lower	Kirribilli-Blues Point-Waverton
Lower	North Sydney CBD-Neutral Bay Wharf-Cremorne Point (+ Anderson Park to
	Kirribilli)
Lower	North Sydney CBD-Waverton
Lower	Crows Nest-Cammeray
Lower	Neutral Bay-Neutral Bay Wharf
Lower	St Leonards-Wollstonecraft
Lower	Cremorne-Cremorne Point
Lower	Cremorne-Northbridge
Lower	St Leonards& Crows Nest-Waverton
Lower	North Sydney CBD- Wollstonecraft
Lower	Neutral Bay& Cremorne- Cammeray
Lower	Crows Nest-Wollstonecraft
Lower	St Leonards-Cammeray
Lower	Waverton-Wollstonecraft
Lower	Cammeray-Northbridge

It is recommended that, following receipt of the post-consultation report and adoption of the Draft Walking Strategy, that Pedestrian Access and Mobility Plans (PAMPs) are developed and that they include projects that address the priority walking infrastructure locations identified in the North Sydney Walking Action Plan (Walking Strategy Section 4.2) and that these projects are then included either in Council's TfNSW advocacy program and/or included for prioritisation in Council's transport works program.

Related Policy Development

While the *Walking Action Plan* is a major component of the *Draft Walking Strategy*, internal consultation has also identified a number of key areas where further policy development is required to deliver improved walking outcomes for North Sydney.

A review of those Council policies that affect walking infrastructure planning and management will help to ensure ongoing improvements to North Sydney walking networks. Identified policies for review are:

- the North Sydney Development Control Plan (DCP)
- the North Sydney Outdoor Dining and Goods Display Policy

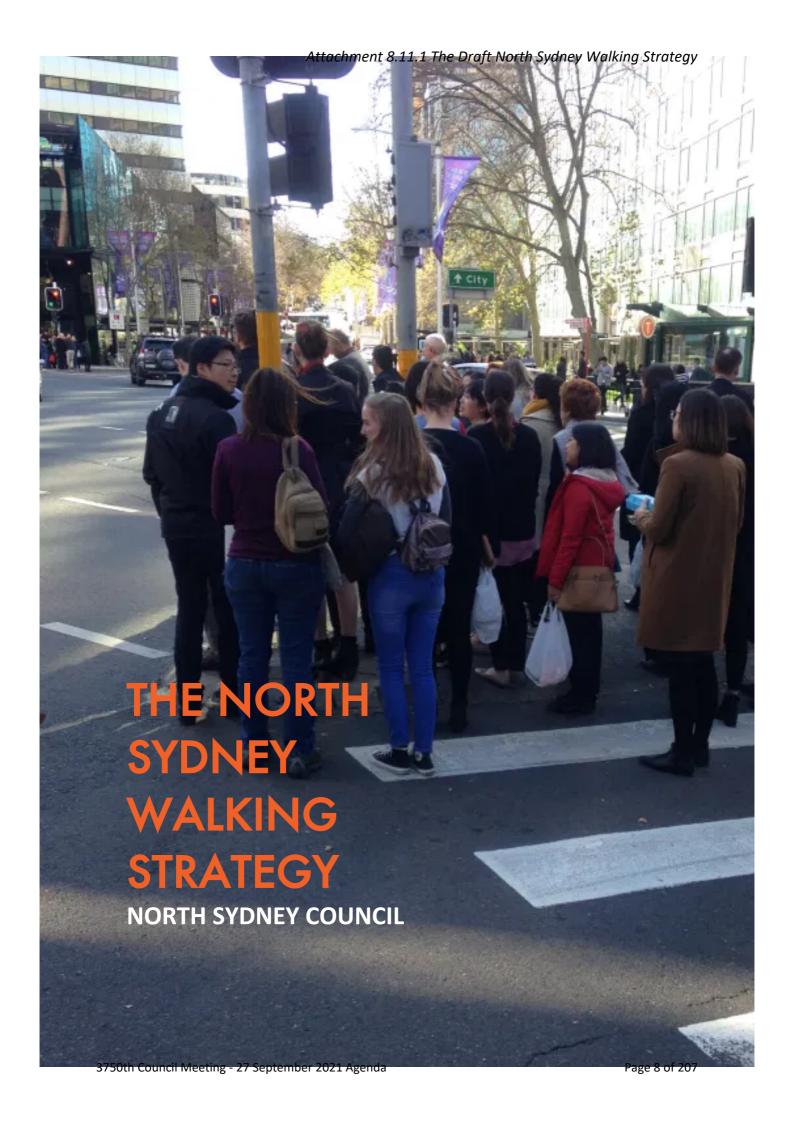
A review of these policies will help to improve walking friendly building design, guide developer impact on/contribution to the development of North Sydney walking networks and minimise the impact of footpath dining and goods display on walking amenity, particularly for visually impaired pedestrians and wheelchair users.

Internal consultation has also identified a number of new policy initiatives that would help to guide the planning and management of North Sydney Walking Networks. These are:

- the North Sydney Safe Travel Policy
- the North Sydney Construction Management & Transport Policy
- the North Sydney Access and Mobility Policy
- the North Sydney Wayfinding Policy
- the North Sydney Vehicle Crossing Policy

Introducing these new policies will help to improve walking safety, limit the impacts of onstreet construction zones on existing pedestrian network amenity, improve disabled access and mobility outcomes in North Sydney, guide North Sydney's wayfinding practices and limit the impact of vehicle crossings on North Sydney's footpath network.

It is recommended that, following receipt of the post-consultation report and adoption of the Draft Walking Strategy, policy initiatives identified in the Related Policy section of the Strategy (4.1) be included for consideration in Strategic Planning's forward works program. It is acknowledged that these represent new areas of transport policy and that they may not be developed or implemented for some time.



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Attachment 8.11.1 The Draft North Sydney Walking Strategy

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1. INTRODUCTION

Walking is humanity's most fundamental travel mode and supports all other modes of travel.

The North Sydney Walking Strategy (NSWS) is Council's guiding document for the delivery of its walking planning and management functions. This includes strategic planning, walking advocacy and the design and delivery of local walking projects.

As per the modal hierarchy identified in Section 4.3 of the North Sydney Transport Strategy, walking will be accorded the highest level of priority in North Sydney to ensure that it is both pleasurable and safe.

NSWS builds on the Vision and Community Priorities detailed in the Community Strategic Plana and the North Sydney Transport Strategy (NSTS, 2017) to create an over-arching walking planning and management framework for the whole of Council.

More specifically, NSWS:

- identifies existing conditions and participation rates for walking in North Sydney;
- identifies a Vision as well as specific Objectives and Targets for walking in North Sydney; and
- plots a course between current walking behaviours and the future walking vision by identifying and prioritising walking initiatives and projects for inclusion in Council's policy development, advocacy and forwards works program.

2. CURRENT CONTEXT

North Sydney suburbs are ranked as some of the most liveable in Sydney. An assessment of local place and road network characteristics shows that high levels of liveability are reflective of "very walkable" suburbs (Walk Score 2021).

However, in spite of the LGAs enviable position on the Lower North Shore and its shady tree-lined streets, the percentage of "walked only" journeys in North Sydney is significantly less than many other Sydney suburbs. ABS census responses show that residents of Haymarket and Darlinghurst walk to work nearly twice as frequently, 35.8% and 35.2% respectively, as residents of North Sydney's most walkable suburbs: North Sydney 20.1% and Crows Nest/St Leonards 14.5%. Furthermore, TfNSW Household Travel Survey responses show that more than twice as many resident walking journeys were undertaken in the City of Sydney than in North Sydney.

The following sections provide analysis of the current walking situation in North Sydney, including policy, demographic and contextual walking considerations. Understanding the current walking context allows us to establish realistic objectives and targets as well as setting timeframes for projects required to achieve the vision for Walking detailed in this strategy.

2.1 Policy Context

2.1.1 LOCAL POLICY

The North Sydney Transport Strategy (NSTS) identifies walking as our most fundamental travel mode, supporting all other modes of travel. NSTS demonstrates how further policy development, Council advocacy and the delivery of Council's forward works program will help to promote increased walking participation and deliver the Vision and community priorities identified in the NSTS. These include improving road safety, improving active health, reducing traffic congestion and delivering positive environmental and sustainability outcomes.

The North Sydney Development Control Plan (DCP2013) provide guidelines and requirements for the delivery of new and improved walking infrastructure as part of new development in North Sydney. While developer-led improvements to the walking network can provide cost-effective solutions to local walking issues, a more holistic approach to walking network planning, prioritisation and delivery is required to ensure the delivery of higher priority walking initiatives and infrastructure.

The North Sydney CBD Transport Masterplan and Public Domain Strategy were developed to underpin Council's feedback to the opening of the Victoria Cross Metro Station in the heart of the CBD. Miller Place and pedestrianisation of Dennison Street south of the Metro entry were designed to address the dramatic increases in walked Metro linking journeys within the CBD as well as to create valuable new public open space in the heart of the growing North Sydney CBD.

Similarly, Precinct-based Planning Studies identify potential impacts of population growth, including increased walking demand, and the location and type of infrastructure required to address it. Recent Council Planning Studies have recognised a shortfall of public domain and efficient walking networks in many of Council's higher density precincts, recommending major new public domain/priority walking links such as the Young Street and Grosvenor Street Plazas.





NORTH SYDNEY DEVELOPMENT CONTROL PLAN 2013





2.1.2 REGIONAL POLICY

Future Transport 2056 (TfNSW, 2018) outlines Transport for NSW's commitment to creating 'successful places' that enable a shift from private vehicle to walking, cycling and public transport use.

In its Providing for Walking and Cycling in Transport Project Policy (CP21001) TfNSW further commits to including provision for walking within the core scope of "every transport project funded by TfNSW", in line with Future Transport 2056.

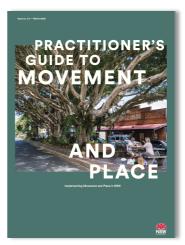
In Beyond the Pavement 2020 (TfNSW, 2020), the Centre for Urban Design urges delivery of safe, high quality walking facilities that:

- minimise the time and effort involved in travel
- improving the frequency and ease with which they can cross major roads
- Connecting people to other communities and parts of the urban environment
- providing easy access to public transport

The Practitioner's Guide to Movement and Place (GANSW, 2020) highlights the importance of considering activities across the whole street, including walking as well as people spending time in places. It notes the need to make tradeoffs when pursuing the balance between movement and place where the outcomes may not always be complementary.







2.2 Demographic Context

The following demographic analysis suggests that a large percentage of North Sydney residents and workers who already walk for typical daily journeys will benefit from identified Walking Strategy projects. Moreover, it suggests that there is significant potential for further growth in walking participation and mode share associated with these projects.

2.2.1 AGE/HOUSEHOLD MAKE-UP

Residents of North Sydney are more likely to be young professionals with no dependents than the Greater Sydney average. Australia Bureau of Statistics (ABS) data illustrated in **Figure 1** below shows that North Sydney has a higher proportion of 25- to 39-year-olds compared to the Greater Sydney average and a lower proportion of 5- to 24-year-olds. In 2016, 77% of North Sydney households had no children, compared to an average of 54% in Greater Sydney. This demographic group is less likely to need a car for school/sport related trips and more likely to walk for all or part of typical trips.

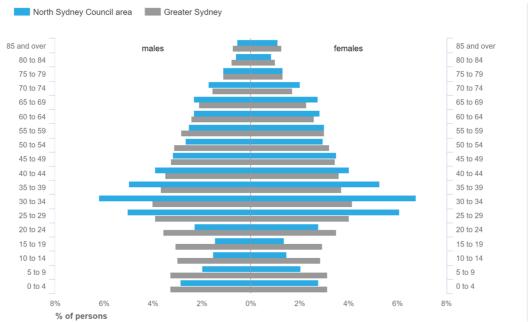


Figure 1 - North Sydney Age/Gender Profile - Australian Bureau of Statistics Census (2016)

2.2.2 JOBS, LOCAL LAND USES AND PUBLIC TRANSPORT

North Sydney has a high concentration of jobs in Professional, Scientific and Technical Services as well as Financial and Insurance Services. These jobs are typically office-based in highly accessible centres served by high-capacity public transport. By contrast, Technicians, Trade Workers, and Labourers, jobs which are more likely to require works vehicles to transport tools and equipment, make up only 7% of North Sydney jobs. This suggest that the program of works identified in this strategy would benefit the majority of residents and workers that currently walk or take public transport to travel to work and for every-day trips to, from and within North Sydney.

Furthermore, comparing dwelling and employment locations shows that a high percentage of North Sydney residents and workers live within a walkable distance of work, with approximately 70% of resident and 25-30% of workers living within 5km of their normal place of employment. These figures are well above the ~11% of residents and ~6% of workers that "walked only" to get to work on census day, suggesting that there is significant potential to increase the percentage of "walked only" journeys by delivering the program of works identified in this strategy.



Figures 2&3 – dwelling/work locations for NS residents/workers - Australian Bureau of Statistics Census (2016)

2.3 Topographic Context

North Sydney's challenging topography is frequently cited as a key reason for reduced walking participation. While there is no doubt that the ridges and headlands of the North Shore have had a formative role in the layout of North Sydney transport networks, modern technologies such as elevators and escalators provide ways in which these topographical challenges can be overcome. In locations where higher pedestrian demand, strategic walking connections and requirements for all abilities access coincide (e.g. Sydney Harbour Bridge access), these types of technologies should be considered as part of options development for local walking projects.

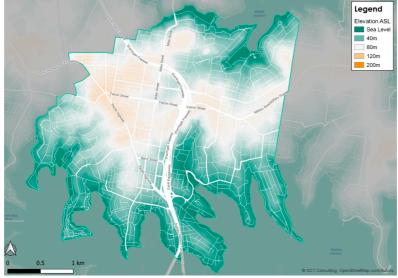


Figure 4 – North Sydney Topography

2.4 Road Safety Context

From 2015 to 2019 there were 105 crashes resulting in pedestrian injuries in the North Sydney LGA. These crashes resulted in 124 injuries, 53 of which were more serious and 5 of which were fatal.

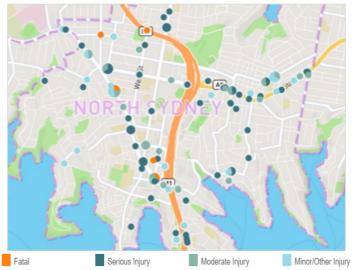


Figure 5: Pedestrian Crashes - TfNSW, Centre for Road Safety, 2021

While a number of these crashes occurred on local roads, it is clear that the majority of crashes during this period occurred on more heavily trafficked and higher speed arterial routes. This is consistent with wider road safety analysis, which shows that vehicle inertia and speed are underlying causes of all crashes. Adopting the following overarching road safety principles will, therefore, ensure that pedestrian safety outcomes are optimised:

- 1) Plan for more car free lifestyles that reduce the number of high impact traffic movements that occur in North Sydney.
 - a) Prepare and deliver walking, cycling and public transport strategies, action plans and related policies that improve walking, cycling and PT amenity to encourage more trips to be made by these lower impact travel modes.
 - b) Local traffic generation will be incrementally minimised by carefully managing parking allowances for higher density development, thereby controlling the amount of traffic generated by growing North Sydney populations.
 - c) Regional traffic will be minimised through advocacy for sub-urban growth precincts to only be located in areas with high levels of public transport access.
- 2) Advocate for 40km/h High Pedestrian Activity Area (HPAA) speed limits in all North Sydney centres, including on regional traffic arterials, and 40km/h Local Traffic Area (LTA) speed limits on all of North Sydney's local roads. In special circumstances, even lower 30km/h speed limits may be desirable.

N.B. Increased pedestrian numbers also increases pedestrian exposure/crash risk. Research shows that this is offset by increased driver awareness due to shared walking experience (i.e. drivers are pedestrians) and increased pedestrian activity.

Pedestrian crash clusters have been identified using the above data and have helped to inform prioritisation of the North Sydney Walking Action Plan "Priority Infrastructure Initiatives" detailed in section 4.2.1.

2.5 Travel Demand and Mode Share Context (Emerging Trends)

Land use and transport policies use residential and jobs growth forecasts to justify investment in community and transport infrastructure. The land use principles and transport priorities detailed in the Sydney Region Plan, District Plans and Future Transport 2056 are premised on significant residential and worker population growth. Delayed population growth and dramatic increases in remote working due the global pandemic have the potential, therefore, to dramatically impact future transport trends in North Sydney.

2.5.1 EMERGING TRENDS

While advances in autonomous vehicle technologies and drone pizza deliveries tend to monopolise news headlines, land use and travel demand trends are likely to have a more immediate impact on community travel choices and resulting demand for transport infrastructure. Updated population forecast (2021) show a 3-4 year delay in NSW population growth compared to 2019 forecasts due to border closures, a declining NSW birth rate and migration to other states. The NSW Innovation and Productivity Council: Remote Working Insights Report (2020), suggests that a 70% increase in remote working in NSW could be one of the long-term impacts of Covid-19. The report notes that office-based workforces, such as those in North Sydney, have the potential to undertake an even more dramatic shift to remote working and research undertaken by the Property Council of Australia showed that office buildings in Sydney were only 50% full in March 2021.

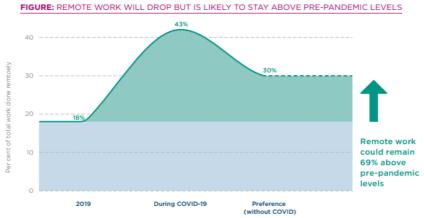


Figure 6: NSW Innovation and Productivity Council (NSW Treasury) – Remote Working Insights (2020)

Changing work patterns have had a knock-on impact on travel demand and mode share trends. While public transport growth and associated linking journeys had exceeded traffic growth in the 15 years prior to 2020, dramatic increases in remote working among office-based workforces combined with wariness of public transport germ vectors have resulted in dramatic declines in public transport patronage. In early 2021, some train routes were carrying approximately 50% of pre-Covid passengers in the morning peak. By contrast, peak hour traffic has increased to approximately 95% of pre-Covid levels. This is likely to be partially due to shoulder peak traffic consolidating into the peak hour, with peak hour traffic demand still constrained by network capacity. However, with fewer residents and workers regularly travelling to traditional office-based centres, two things have become obvious:

- 1. Fewer workers travelling to the office on a daily basis will mean delayed demand for additional walking infrastructure capacity in commercial centres.*
- 2. More residents working from home will mean increased demand for walking capacity, safety and amenity improvements in and around mixed use and local centres.

^{*}North Sydney is likely to be partially protected from this demand delay as: a) it is playing "catch up" following recent rapid population increases, particularly worker populations, and b) businesses from less well-connected centres are likely to move to the better connected Eastern Harbour City centres in the longer term.

3. NORTH SYDNEY'S WALKING VISION

The Vision for walking in the North Sydney mirrors the overarching Vision for transport detailed in the North Sydney Transport Strategy (NSTS). While walking may not provide the same levels of mobility as other travel modes, maximising the number of local trips undertaken on foot is critical to delivering the community's Vision and the transport priorities detailed in the NSTS.

WALKING WILL BE ACCORDED THE HIGHEST LEVEL OF PRIORITY IN NORTH SYDNEY, ENSURING THAT MAXIMUM WALKING PARTICIPATION SUPPORTS A HAPPY, HEALTHY AND PROSPEROUS NORTH SYDNEY COMMUNITY.

3.1. Walking Objectives

More detailed walking objectives mirror the community priorities detailed in NSTS.

3.1.1. SAFE TRAVEL

Pedestrians feel safe walking in North Sydney. The rate of pedestrian crashes and severity of resulting injuries declines, resulting in fewer residents citing "safety" as a reason for not walking for local trips.

3.1.2. TRANSPORT SECURITY

Increased walking participation results in more "eyes on the streets". Resulting increases in active and passive surveillance reduce opportunities for antisocial behaviour and crime. While personal security is important to everyone, it has a particular impact on walking participation by more vulnerable road users.

3.1.3. SOCIAL WELL-BEING

More human interactions take place on North Sydney streets, contributing to a sense of social cohesion and community.

3.1.4. ACTIVE HEALTH

Walking is enjoyable, encouraging physical activity as part of daily routines, resulting in better health outcomes for individuals and the community.

3.1.5. FAIR ACCESS TO PARKING

More residents walking to local centres will "free up" existing parking for more valuable kerb-side uses and more vehicle-critical trips (e.g. disabled parking).

3.1.6. ENVIRONMENTAL SUSTAINABILITY

More residents walking for local trips will reduce greenhouse gas emissions and the imposition of environmental clean-up costs on future generations.

3.1.7. LOCAL ENVIRONMENTS

More residents walking for local trips results in less particulate pollution, better local air and water quality and less traffic noise on local streets.

3.1.8. TRANSPORT AFFORDABILITY

Residents undertaking more trips on foot results in reduced individual and community transport costs; the cost of Council's walking infrastructure program is outweighed by corresponding parking and traffic infrastructure savings.

3.1.9. CONGESTION

Residents undertaking more trips on foot results in less local congestion, increasing amenity for more vehicle critical journeys and, over time, reducing demand for traffic capacity upgrades.

3.1.10. BUSINESS ACTIVITY

Walkable centres support local spending resulting in increased demand for local goods and services and reducing the likelihood of residents driving to more car-based regional shopping centres.

3.2. Walking Targets

Specific walking targets address the overarching safety and amenity objectives identified in section 3.1 using metrics identified in the North Sydney Community Strategic Plan, Transport Strategy and the recently adopted Environmental Sustainability Strategy.

3.2.1. WALKING SAFETY

Metric	Past	Current	Target
	(year)	(year)	(year)
Number of Pedestrian Crashes	39	18	<5
	(2010)	(2019)	(2030)
Severity of Pedestrian Injuries	50%	67%	45%
(% deaths+serious injuries vs all injuries)	(2010)	(2019)	(2030)
Household Car Ownership	16.5%	16.4%	25%
(% households that own "No Motor Vehicles")	(2011)	(2016)	(2030)

Figure 7 - Walking Safety Metrics

3.2.2. WALKING AMENITY

Metric	Past	Current	Target
	(year)	(year)	(year)
% residents and businesses satisfied with the maintenance of local roads and footpaths	70%	73%	78%
	(2016)	(2020)	(2030)
% residents and businesses satisfied with cleanliness of local roads and footpaths	81%	82%	86%
	(2016)	(2020)	(2030)

Figure 8 - Walking Amenity Metrics

3.2.3. WALKING PARTICIPATION

Metric	Past	Current	Target
	(year)	(year)	(year)
% "Walk Only" trips according to TfNSW Household Travel Survey	24.6%	26.8%	30%
	(2009/10)	(2018/19)	(2029/30)
% "Walked Only" resident JTW according to ABS	12%	11%	15%
Census	(2011)	(2019)	(2030)
% "Walked Only" worker JTW according to ABS	6.3%	5.8%	9%
Census	(2011)	(2019)	(2030)

Figure 9 - Walking Participation Metrics

Identified metrics are regularly updated under the following data sources: TfNSW Centre for Road Safety interactive crash statistics; North Sydney Council's Customer Satisfaction Survey; the Australian Bureau of Statistics' Census; and TfNSW's Household Travel Survey.

4. DELIVERING THE VISION

Council officers will apply the principals and guidelines detailed in this strategy to accord walking the highest level of priority in the development of all transport policy, programs and projects. However, with scarce time, resources and budget available, it is important to prioritise initiatives with the greatest potential to provide walking safety and amenity benefits.

A review of current North Sydney policies and their impacts on walking will identify amendments that will support the development of a more walkable city. This policy review will include the North Sydney Development Control Plan (DCP) and Outdoor Dining and Goods on Footpath Guidelines.

Internal consultation also identified a number of areas where new policy initiatives will result in improved walking safety and amenity in North Sydney. Some of these policy initiatives, such as the delivery of 40km/h Local Traffic Area speed limits on all North Sydney local streets, will require advocacy and collaboration with the road authority to achieve.

And finally, for those works that Council has delegated authority to deliver directly, this strategy undertakes to identify those areas of the municipality where direct investment in new and improved walking infrastructure will provide the greatest possible safety and amenity benefits for the North Sydney community.

4.1. RELATED POLICY

4.1.1. Review of Existing North Sydney Policy

DCP: Guidelines and requirements for increasing local walking network capacity to address the demands of new development as well as for improving walking safety and amenity through good walking infrastructure design are detailed in Council's Development Control Plan.

While the delivery of new and improved walking infrastructure as part of new developments ensures localised walking infrastructure improvements in development precincts in the longer term, a more strategic and timely approach to walking infrastructure investment is required to ensure that priority pedestrian projects outside of these development precincts are delivered as part of council's forward works program.

North Sydney Council Outdoor Dining and Goods Display Policy: The location of seats, tables and display equipment have a major impact on the walkability of North Sydney footpaths, particularly in North Sydney's retail centres and particularly for visually impaired pedestrians and wheelchair users. Ensuring that dining and display equipment do not interfere with the use of footpaths by these pedestrian groups is the basis for the proposed revisions to the North Sydney Council Outdoor Dining and Goods Display Policy.

4.1.2. New North Sydney Policy Initiatives

The North Sydney Safe Travel Strategy: Community consultation, undertaken as part of NSTS, identified "Safe Travel" as being the highest priority transport issue facing the North Sydney community. As such, one of the key recommendations of this Strategy is that Council develop a North Sydney Safe Travel Strategy that encourages the uptake of walking by: protecting North Sydney's most vulnerable road users from higher impact road users; reducing the number and length of vehicle trips; and minimising injury severity through the creation of slow speed traffic environments.



The North Sydney Land Use Diversity Plan: The strategic walking network used in the Walking Background Report was based on analysis of land use diversity within and between different centre pairings. This analysis highlighted that lack of land use diversity in some North Sydney centres. This lack of diversity limits the types of daily trips that can be accommodated locally, with trips to larger centres, further away from local residential precincts being less likely to be walked. To address this issue, the North Sydney Land Use Diversity Plan will investigate opportunities to support the delivery of more diverse land uses, shops and services in North Sydney's smaller neighbourhood centres.

The North Sydney Construction Management & Transport Policy: Construction zones create temporary hazards for all road users. While Council records work zone locations and times to try to minimise overlap, guidelines for best practice work zone planning and management are needed to ensure that walking amenity is maintained during construction.

The North Sydney Wayfinding Policy: The term "wayfinding" describes the ways in which information can be conveyed to help guide individuals through a physical environment. In recent times, the term has become synonymous with provision of finger post signs. However, these obtrusive wayfinding techniques create visual clutter and are often less effective than more subconscious wayfinding techniques that provide guidance while, at the same time, adding to the legibility of urban form. Development of a North Sydney Wayfinding Policy should consider how the following can be used to improve the legibility of North Sydney's strategic and local walking networks:

- creation of gateways and recognisable landmarks;
- protecting view lines to improve visual connectivity between these landmarks; and
- introducing a network of walking amenity nodes that provide seating, shade, artwork and other supporting infrastructure.

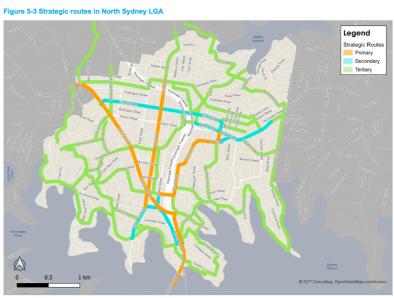
The North Sydney Vehicle Crossings Policy: Vehicle crossings are classified as a permitted use for most development types. However, they have an inherent and detrimental impact on the walkability of local streets, increasing conflict between pedestrians on the footpath and vehicles crossing between carriageway and private property. The proposed North Sydney Vehicle Crossings Policy should: ensure that vehicle crossings are taken from street frontages with the lowest levels of pedestrian activity (normally, the road with the lowest position within the functional road hierarchy) and ensure material use highlights pedestrian priority as well as minimising the loss of on-street parking by only permitting vehicle crossings where provision of private on-site parking exceeds the loss of on-street parking.

4.2. The North Sydney Walking Action Plan

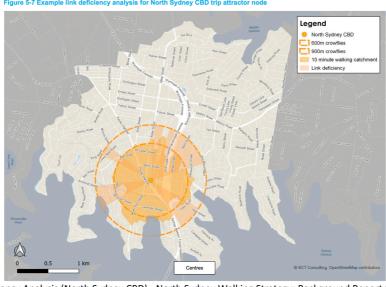
The North Sydney Walking Action Plan takes a strategic approach to assessing North Sydney's existing walking network to provide a prioritised list of precincts and routes where Council infrastructure investment will have the greatest potential safety and amenity benefits; identifying locations where access improvements will maximise walking between North Sydney centres and local trip attractors.

Action Plan analysis is based on the following key metrics:

- potential overlap with strategic walking links (North Sydney's Strategic Walking Network);
- proximity to local centres (Local Walking Networks);
- locations where the current walking network provides poor access to local trip attractors (Walking Network Deficiencies).



The North Sydney Strategic Walking Network - North Sydney Walking Strategy: Background Report (SCT 2021)



Link Deficiency Analysis (North Sydney CBD) - North Sydney Walking Strategy: Background Report (SCT 2021)

In combination, this analysis identified "walking infrastructure investment hot spots" where walking infrastructure serves multiple functions: connecting North Sydney centres, improving local access and identifying sub-standard network links near to centres and local trip attractors.

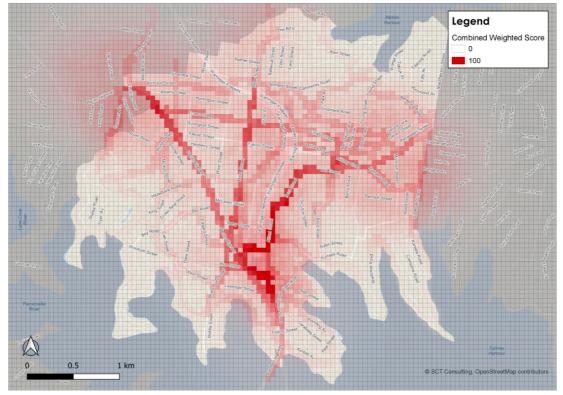


Figure 5-10 Combined weighted grid score for North Sydney LGA

Combined Walking Network Analysis - North Sydney Walking Strategy: Background Report (SCT 2021)

A full list of "walking infrastructure investment hot spots" can be found in the North Sydney Walking Strategy Background Report (SCT 2021).

4.2.1. Priority Walking Infrastructure Initiatives

"Walking infrastructure investment hot spots" were then grouped by proximity and priority to provide a prioritised list of precincts and routes where walking infrastructure projects should be developed for inclusion in Council's forward works program.

All projects developed in response to identified "Priority Walking Infrastructure" recommendations should be designed to accommodate walkers of all abilities. Requirements for accessible walking infrastructure are detailed in the Disability Discrimination Act (1992). The Act requires developers to deliver infrastructure that caters to the needs of walkers of all abilities, including visually, hearing and mobility impaired road users.

Priority precincts, routes and examples of the types of projects that are either pre-identified in State and Council policy or that require further development in response to this analysis are listed in the table overleaf.

Priority	Location (Precinct/Route)	Pre-identified Projects and/or Potential Project Option/s (*where specific links to stakeholders are identified)	Primary Stakeholders
High	North Sydney CBD (NSITP)	Miller Place; North Sydney CBD Laneways Masterplan; Post Office Square; Pacific Highway junction re-designs (incl slip lane removal at Miller Street, Walker Street and Blues Street), safety and amenity improvements; Warringah Freeway-	NSC, TfNSW (NSITP), Metro, WHT/BL,
High	North Sydney CBD-Kirribilli (&Sydney CBD)	overpass pedestrian links at Mount Street and High Street Pacific Highway/Arthur Street/High Street junction redesign; High Street overpass and the Cahill Freeway pedestrian link*	GSC, GA NSC, TfNSW (NSITP), WHT*/BL
High	North Sydney CBD-Neutral Bay	Mount Street overpass pedestrian link*; Alfred Street North junction re-designs, safety and amenity improvements*; Forsyth Park pedestrian link (incl accessibility improvements); Yeo Street (Bent Street-Barry Street) junction re-designs, safety and amenity improvements; Barry Street Shared Zone (Neutral Bay Planning Study)	NSC, TfNSW (NSITP)*, WHT/BL*
High	Crows Nest- St Leonards	Pacific Highway (Fiveways-St Leonards Station) junction redesigns, safety and amenity improvements	NSC*, TfNSW (Metro), DPIE (2036 Plan), WHT/BL
High	North Sydney CBD-Crows Nest	Pacific Highway (West Street-Fiveways): Pacific Highway/ Rocklands Road safety improvements (see 2.4); junction re- designs, safety and amenity improvements	NSC*, TfNSW (NSITP), WHT/BL
Medium	North Sydney CBD-Cammeray	Civic Spine (PDS); Miller Street junction re-designs, safety and amenity improvements (incl slip lane removal at Miller Street/Flacon Street and Miller Street/Ernest Street)	NSC, TfNSW (NSITP), WHT/BL
Medium	Neutral Bay- Cremorne	Military Road junction re-designs, safety and amenity improvementspotentially as part of a Beaches Link "Local Benefits Program"	NSC, TfNSW, WHT/BL
Medium	North Sydney CBD-Blues Point	Blues Point Road junction re-designs, safety and amenity improvements; Miller Street/MacKenzie Street junction redesign; Miller Street safety and amenity improvements; Miller Street/Lavender Street/Waiwera Street junction redesign; Waiwera Street safety and amenity improvements	NSC*, TfNSW (Signals)
Medium	Neutral Bay- Crows Nest	Ernest Street junction re-designs, safety and amenity improvements (incl slip lane removal at Park Avenue and Miller Street); Ernest Place shared zone	NSC, TfNSW, WHT/BL
Lower	Kirribilli- Blues Point- Waverton (The North Sydney Highline)	Waverton Station-Luna Park via the Milsons Point rail yard spur line*; Lavender Crescent-Waiwera Street accessibility improvements; Luna Park to Cliff Street pedestrian link; Cliff Street shared zone; Alfred Street South/Cliff Street junction re-design	NSC, TfNSW (TAHE)*
Lower	North Sydney CBD- Neutral Bay Wharf- Cremorne Point (+ Anderson Park to Kirribilli)	Mount Street overpass footpath*; Alfred Street-Anderson Park junction re-designs, safety, amenity and accessibility improvements; Clarke Street-Broughton Street junction redesigns, safety and amenity improvements; Anderson Park pedestrian link; Kurraba Road-Billong Street-Shellcove Road-Honda Road-Bogata Avenue junction re-designs, safety and amenity improvements	NSC, TfNSW (NSITP)*, WHT/BL*
Lower	North Sydney CBD-Waverton	Post Office Square*; Mount Street-Edward Street-Lord Street-Bank Street-Carr Street junction re-designs, safety, amenity and accessibility improvements	NSC, TfNSW (NSITP)

Priority	Location	Pre-identified Projects and/or Potential Project Option/s	Primary
	(Precinct/Route)	(*where specific links to stakeholders are identified)	Stakeholders
Lower	Crows Nest-	Ernest Place shared zone; Ernest Street-West Street-Amherst	NSC
	Cammeray	Street junction re-designs, safety and amenity improvements; Smoothey Park pedestrian link	
Lower	Neutral Bay- Neutral Bay Wharf	Yeo Street/Barry Street junction re-design; Barry Street-Westleigh Street-Undercliff Street-Undercliff Lane junction re-designs, safety and amenity improvements; Kurraba Road/Undercliff Lane/Hayes Street junction re-design*; Hayes Street junction re-designs, safety and amenity improvements	NSC, TfNSW*
Lower	St Leonards- Wollstonecraft	St Leonards Plaza*; Newlands Park pedestrian link; River Road/Canberra Avenue junction re-design; Russel Street safety and amenity improvements	NSC, Lane Cove Council*
Lower	Cremorne- Cremorne Point	Spofforth Street junction re-designs, safety and amenity improvements; Spofforth Street/Rangers Road junction redesign	NSC*
Lower	Cremorne- Northbridge	Primrose Park pedestrian link	NSC
Lower	St Leonards& Crows Nest- Waverton	Fiveways junction re-design*; Shirley Road-Sinclair Street- Morton Lane-Morton Street-Hazelbank Road junction re- designs, safety, amenity and accessibility improvements; Brenan Park pedestrian link; Carr Street-Crows Nest Road junction re-designs, safety and amenity improvements	NSC, TfNSW*, WHT/BL*
Lower	North Sydney CBD- Wollstonecraft	Post Office Square*; Mount Street-Edward Street-Bay Road- pedestrian link-McHatton Street-Crows Nest Road-Morton Street-Hazelbank Road-Brennan Park-Ivy Street-Ivy Lane- Meadow Lane-Belmont Lane-Shirley Road junction re- designs, safety and amenity improvements	NSC, TfNSW (NSITP)*
Lower	Neutral Bay& Cremorne- Cammeray	Young Street Plaza*; Grosvenor Lane shared zone; Ben Boyd Road-Ernest Street-Park Avenue junction re-designs, safety and amenity improvements (or Big Bear through site link); Cammeray Park pedestrian link to Miller Street*	NSC*, TfNSW (B-Line)*, WHT/BL*
Lower	Crows Nest- Wollstonecraft	Fiveways junction re-design*; Shirley Road-Milner Crescent-Shirley Lane junction re-designs, safety and amenity improvements; Shirley Lane pedestrian link/Milner Crescent re-design	NSC, TfNSW*, WHT/BL*
Lower	St Leonards- Cammeray	Atchison Street junction re-designs and safety/amenity improvements, St Thomas Rest Park pedestrian link, West Street-Amherst Street junction re-designs, safety and amenity improvements	NSC
Lower	Waverton- Wollstonecraft	Whatmore Lane-Peace Park-Mckye Street-Gas Works Road- Walumetta Drive junction re-designs, safety, amenity and accessibility improvements; Walumetta Drive-Shirley Road pedestrian link*	NSC, TfNSW (TAHE)*
Lower	Cammeray- Northbridge	Miller Street junction re-designs, safety and amenity improvements	NSC, TfNSW

4.3. Preferred Walking Infrastructure Treatments

Rather than developing particular project options for identified "walking infrastructure investment hot spots", the *North Sydney Walking Action Plan* identifies preferred walking infrastructure treatments to be applied during future development of project options for inclusion in Council's forward works program. Preferred treatments are identified for junction and link sites. Consideration must also be given to warrants/guidelines when developing project options. Preferred infrastructure options will not be technically feasible in some cases.

Junction Treatments

Junction Treatments	Image/Reference	Pros	Cons	Recommendation
Kerb Build-outs (kerb extensions)		 Maximises intervisibility between pedestrians and drivers. Minimises crossing distances. Narrower carriageway widths result in slower vehicle speeds. Provides additional space for street furniture, planting and WSUD. Protects the parking lane. 	More complex drainage requirements. Does not guarantee priority for pedestrians.	Preferred treatment type. Integrate with raised thresholds, table-top junctions and zebra crossings where possible.
Continuous Footpath Treatment (Raised Thresholds)		Visually reinforces existing pedestrian priority over vehicles turning into side streets/laneways. Raises driver awareness of pedestrian activity. Vertical deflection measure reduces vehicle speeds on the approach to the junction. Setback give way markings can provide	More complex drainage requirements. May affect passenger comfort on bus routes. May result in driver frustration relating to increased awareness/ compliance with existing pedestrian priority over vehicles turning into side streets.	Preferred treatment type. Integrate with kerb extensions where possible.

Junction	Image/Reference	Pros	Cons	Recommendation
Treatments		even greater pedestrian priority.		
Table-top Junction (raised intersection)		Visually reinforces existing pedestrian crossing priority at intersections. Raises driver awareness of pedestrian activity. Vertical deflection measures reduce vehicle speeds on the approach to the junction. Setback give way markings can provide even greater pedestrian priority.	More complex drainage requirements. May affect passenger comfort on bus routes. May result in driver frustration relating to increased awareness/ compliance with existing pedestrian priority over vehicles.	Preferred treatment type. Integrate with kerb extensions and zebra crossings where possible.
Wombat Crossing		Provides high levels of pedestrian priority. Vertical deflection measures reduce vehicle speeds on the approach to the crossing. Raise awareness of crossing location	More complex drainage requirements. May affect passenger comfort on bus routes. Can lead to significant traffic delays where there are higher levels of pedestrian crossing demand (e.g. Miller Street slip lanes).	Preferred treatment type. Integrate with kerb extensions where possible.

Junction	Image/Reference	Pros	Cons	Recommendation
Treatments School Crossing	25 km/h CHILDREN CROSSING	Useful for pedestrian crossing locations specifically associated with school start/finish times and low crossing demands at other times.	Can require ongoing management/ budget where school crossing supervisors are required.	Use where appropriate. Integrate with kerb extensions and raised thresholds where possible.
Zebra Crossing		Provides high levels of pedestrian priority.	Can increase crash and injury risk at crossing location due to channelisation and pedestrians "taking the priority", especially when combined with the risk of drivers not seeing zebra markingparticularly faded markings during rain. Can lead to significant traffic delays where there are higher levels of pedestrian crossing demand (e.g. Miller Street slip lanes).	Wombat crossing is preferred treatment type. Integrate with kerb extensions where possible.

Junction	Image/Reference	Pros	Cons	Recommendation
Treatments				
Pram Ramp		Provides better access for less mobile pedestrians (e.g. wheelchair users and parents with prams) than kerb/channel treatment.	 Does not guarantee priority for pedestrians. Poor pedestrian/driver intervisibility and resulting safety and amenity outcomes for crossing pedestrians. Ramp grade and resulting ramp length requirements may be unachievable and/or effect the usability of footpaths, particularly on steep hills. 	Wombat crossings and raised thresholds are preferred treatment types. Integrate with kerb extensions possible.
Refuge Island		Minimal impact on typical kerb/channel drainage systems.	 Does not guarantee priority for pedestrians. Creates a two-stage crossing, increasing pedestrian decision making, opportunity for mistakes and the total width of the crossing. Difficult to accommodate longer pedestrians within typical refuge widths (parents with prams, dismounted cyclists, etc.). Creates "squeeze points" for cyclists on the carriageway. Reduces opposing traffic friction resulting in higher traffic speeds. 	Kerb Build-outs are preferred treatment type. Ensure adequate widths for longer pedestrians and passing traffic + cyclists where used.

Junction Treatments	Image/Reference	Pros	Cons	Recommendation
Traffic Signals (Pelican, Puffin, Toucan, etc.)		Signals CAN BE USED to prioritise pedestrian crossing movements (signals must be set to hold approaching traffic, minimise pedestrian wait times and increase green time for pedestrians). Warrants allow for use on multi-lane arterial traffic routes.	Signals are frequently used to reduce pedestrian priority and prioritise traffic movements. Delays are often significant. Pedestrian queues at crossings can interrupt footpath capacity. Where used on primary traffic routes, integrate with kerb extensions and threshold treatments as well as prioritising signal phasing for pedestrian to increase pedestrian safety and amenity.	Not appropriate on local roads. Where used on main arterial traffic routes, advocate for integration with kerb extensions as well as prioritisation of signal phasing for pedestrians over traffic.
Roundabouts (including mini- roundabouts)		Reduced traffic speeds.	Reduced priority for crossing pedestrians compared to typical giveway junctions – gives increased priority to right-turning vehicles. Geometric requirements/ crossing set-backs can result in significant detours away from pedestrian desire lines. Drivers' heads are turned to the right as they turn left into pedestrian crossing areas. Refuge islands can be small so don't accommodate cyclists or parents with prams.	Standard "Give Way" or signalised junctions are preferred treatment type. Provide justification for removal where possible.

Junction Treatments	Image/Reference	Pros	Cons	Recommendation
Slip-lanes		More free flowing traffic outside of peak hours (when slip lanes are frequently interrupted by pedestrian crossing movements).	 High levels of conflict between turning vehicles and crossing pedestrians. Confusion/lack of understanding regarding pedestrian priority at slip lanes. Poor intervisibility between pedestrians and drivers. Opportunity for traffic left turns constrained at high frequency pedestrian crossing locations (e.g. Pacific Highway/Miller Street) 	Provide justification for removal in all cases. Result: Improved pedestrian safety and amenity. Signals manage impact of frequent pedestrian crossings on left turning traffic.
Grade Separation (pedestrian underpasses and overpasses)		Can support increased business activity where land use and topography support direct (vertical as well as horizontal) visual and physical connections. Limits traffic delays.	 Cost of grade separation usually results in more limited crossing locations than at-grade crossings, creating long detours. Ramps/ lifts are used to accommodate disabled access, putting the onus on pedestrians rather than drivers to change their path of travel. Can cause compliance and safety issues where "jumping the fence" offers a quicker crossing. 	Signalised and/or permissive crossing arrangements are preferred treatment. Should only be used where topography and adjacent land uses align to support direct (vertical as well as horizontal) connections with 24hr active and passive surveillance (overlooking from adjacent buildings) eliminating any need for CCTV surveillance.

Linear Treatments

Linear Treatments	Image/Reference	Pros	Cons	Recommendation
Urban Gateways (vertical treatments showing change of road environment)	LUNA PARK OLYMPIC POOL BRADFIELD PARK	Raises driver awareness that the place and movement functions of the road are changing. Visually (and often physically) narrows carriageways resulting in slower traffic speeds.	Visually obtrusive. May effect footpath capacity where limited space is available.	Preferred treatment type for identifying boundaries around local centres on arterial traffic routes.
Slower Speed Limits (High Pedestrian Activity Area and Local Traffic Area 40km/h speed limits for all local roads)	HIGH PEDESTRIAN ARE A	Effective speed reduction treatmenteven where physical road design remains unchanged.	TfNSW "Speed Limit" processes and warrants can be difficult to fulfill and time consuming.	Preferred treatment type for all roads. Deliver alongside physical traffic management treatments (e.g. gateway treatments and centre line removal) for maximum effect.

Linear Treatments	Image/Reference	Pros	Cons	Recommendation
Street Tree Planting		 Visually and, when planting is introduced in the carriageway, physically narrows carriageways resulting in slower traffic speeds. Provides shade for pedestrians. Absorbs particulate pollution. 	Selection of species should consider vehicle movement envelopes.	Preferred treatment type for all roads.
Re-introduction of On-street Parking		 Physically and visually narrows the carriageway without the need for physical changes to assets. Increases side-friction, reducing traffic speeds. Forces drivers to slow down to give way to oncoming traffic. 	May result in community backlash where parking has been removed to facilitate two-way traffic flows. N.B. Creation of wider carriageways to accommodate two-way traffic flows result in higher traffic speeds.	Preferred treatment type for all roads. Deliver on all local roads where a 3m passing width can be maintained.

Linear Treatments	Image/Reference	Pros	Cons	Recommendation
Footpath/Nature Strip Widening (Kerb Re- alignment/ Carriageway Narrowing)		 Physically narrows carriageway resulting in slower vehicle speeds. More space for pedestrians, reducing queuing and catering for wheelchairs more easily. 	High cost of relocating existing kerb lines and drainage.	Preferred treatment type for all roads Deliver, where possible, as part of asset renewal program.
Sign Audits	CABRAMATIA AV LANE SHOWMANNO HAIL STOOT HALL AHEAD GOOD GOOD GOOD GOOD GOOD GOOD GOOD G	Fewer footpath obstructions. Ensures important messages "get through", reducing driver confusion and forcing drivers to take more responsibility for driving behaviour, resulting in slower traffic speeds.	May result in community backlash if residents assume that more signs result in increased compliance. Evidence suggests that this is not the case.	Preferred treatment type for all roads. Deliver as part of asset renewal program.
Centre Line Removal		 Increases opposing friction, reducing traffic speeds. Can be delivered costeffectively as part of asset renewal program. 	May result in community backlash if residents assume that more line marking results in better driver behaviour. Evidence suggests that this is not the case.	Preferred treatment type for local roads. Deliver as part of asset renewal program.

Linear	Image/Reference	Pros	Cons	Recommendation
Treatments Shared Space Design Principals		Minimising use of signs, line marking and level differences as well as using simple materials can provide effective and inexpensive speed management on local roads.	Difficult to define appropriate parking areas.	Preferred treatment type for low traffic volume/ slow speed local roads.
Shared Zones		 Can be simple and inexpensive to deliver where place requirements (i.e. seating, planting, etc.) are minimal. Pedestrians can cross throughout area, not just at designated crossings. Reduces traffic speeds, number of crashes and severity of injuries. 	TfNSW "Shared Zone" processes and warrants can be difficult to fulfill and are time consuming. Difficult to define appropriate parking areas.	Use for strategic projects close to activity centres. Treatment can be iconic where more complex place infrastructure and higher quality materials are used (e.g. Mitchell Street Plaza).

Linear Treatments	Image/Reference	Pros	Cons	Recommendation
Cycle Lanes (line marked and separated cycle lanes)	Col To	Creates a buffer between higher speed carriageway environments and pedestrian footpaths.	In some instances, may require removal of onstreet parking and/or reallocation of traffic lane space to deliver appropriate cycle lane widths.	On-street parking, with cyclists operating in low volume/ slow speed carriageway environments, is preferred treatment on most local roads. Separated cycle lanes, which require more road space and, therefore, more often result in removal of on-street parking, should be prioritised for arterial traffic routes or to protect contra-flow cycle lanes.
Shared Paths (pedestrian & cycling paths)	्रेड व्यक्त	Can be designed to minimise hard surfacing in parklands and nature reserves.	 Provide lower levels of service for both pedestrians and cyclists than separated facilities due to the potential for conflicts between pedestrians and cyclists. Pose safety risks for both pedestrians and cyclists, particularly on roads with numerous driveways. 	Pedestrian only footpaths with cyclists operating in separated cycle lanes on more heavily trafficked roads, in quietways on local roads or on separated footpaths/ cycle paths in parklands are the preferred treatments.

Linear Treatments	Image/Reference	Pros	Cons	Recommendation
Edge Lines (visual carriageway narrowing)		Visually narrows carriageways without the need for physical changes to assets Slows traffic speeds.		Physical carriageway narrowing (e.g. kerb re-alignment or re- introduction of on- street parking) is the preferred treatment where possible.
Vertical Deflection Devices (speed humps, speed cushions, etc.)		Localised traffic speed reductions. Useful when included as part of threshold treatments or wombat crossings.	Obtrusive traffic calming can increase pedestrians' concern over potential road safety issues. May affect passenger comfort on bus routes. Can result in significant noise, impacting residential amenity. Potential for private vehicle damage. Potential for increased maintenance requirements.	Horizontal deflection/ carriageway narrowing (e.g. kerb re-alignment or re- introduction of on- street parking) is the preferred treatment in most cases.

Linear	Image/Reference	Pros	Cons	Recommendation
Treatments Pedestrian Barrier Fencing	NO RIGHT TURN NO NY FAM.	Provides a trellis for planting.	 Limited safety benefits and/ or potential for safety issues when poorly designed (e.g. pedestrians getting trapped on the wrong side of the fence when crossing the road). Significant negative impact on walking connectivity and amenity. Can "catch the handlebars" of passing cyclists when poorly positioned. Limits provision of bus zones, loading zones and on-street parking. 	Provide justification for removal in all cases.

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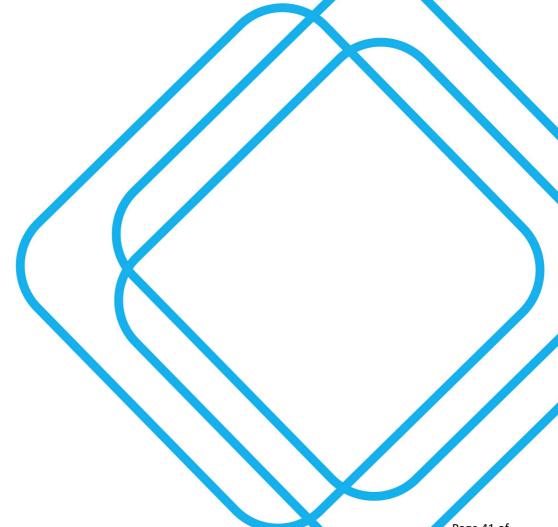




NORTH SYDNEY WALKING STRATEGY

Background Report

1 MARCH 2021





Quality Assurance

Project:	North Sydney Walking Strategy				
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Client:	North Sydney Council	ABN:	32 353 260 317		
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	ABN:	53 612 624 058		

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Prepared:	Matthew Chow, Consultant Jonathan Chung, Consultant Adam Smith, Consultant Jennifer Chen, Consultant				
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Executive Summary

North Sydney Council is preparing a Walking Strategy as part of its commitment to delivering the *North Sydney Transport Strategy* (NSTS, 2017). This background report was created to support the preparation of the walking strategy; examining policy context, travel behaviour, activity nodes and walkability to create a vision for walking in North Sydney, and a framework with which to prioritise pedestrian infrastructure projects.

In line with the NSTS vision, the vision for walking in North Sydney is that "Delivery of high priority walking projects will ensure that walking participation is maximised to support a happy, healthy and prosperous North Sydney community." This report found that walking best aligns with the community priorities as set out in the NSTS (**Appendix A**) and that delivery of walking projects to increase prioritisation of pedestrians is key to achieving the vision for transport in North Sydney. Typical treatments recommended for delivery are detailed in **Appendix B**.

North Sydney has an above-average concentration of residents who are young professionals with no dependents. This demographic is more likely to make walking trips. This is reflected in survey data, with already high walking mode share and low car ownership rates compared to Greater Sydney. The local demographic means that improvements in pedestrian infrastructure will result in benefit for a large portion of residents and is more likely to further increase walking participation.

The vision and demographic make a case for walking infrastructure improvements to be implemented in nearly every location throughout the LGA. With scarce time, resources and budget, a mechanism to prioritise investment into walking is required to ensure that the infrastructure with the greatest benefits to walkability is invested in first. A prioritisation framework was created through a combination of determined strategic walking routes, proximity to centres and the results of a walkability analysis of key trip attractors located throughout the LGA. The resultant framework is a 50m-by-50m grid map of the LGA with a score assigned to each which allows for ranking of walking projects in order of priority. The analysis found that the highest priority grids were located along primary strategic routes in the Neutral Bay South / Warringah Freeway area. An extensive list of all maps produced as part of this report can be found in **Appendix E**.

This report concludes with an identification of project opportunities throughout the LGA and suggests actions to be delivered based on strategic routes and state-led plans. The full list of potential project opportunities is tabled in **Appendix D**.

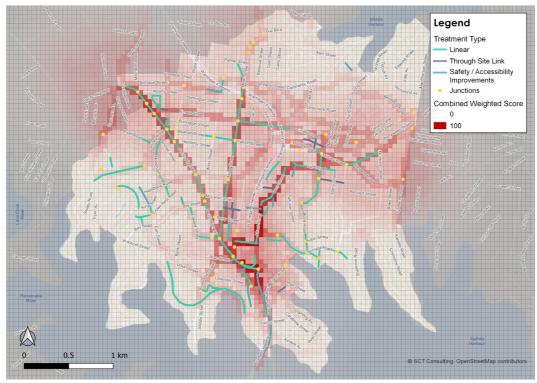


Figure 0-1 Potential projects overlayed on the prioritisation framework



1.0 Introduction

North Sydney Council is delivering its *North Sydney Transport Strategy* by preparing a Walking Strategy. The strategy outlines walking as the top priority in the Council's transport mode hierarchy over cycling, public transport, local deliveries and freight and private vehicles. This background report seeks to support the Walking Strategy by examining the existing walking conditions in the North Sydney Local Government Area (the LGA) and developing a framework to prioritise walking infrastructure projects.

This report divided into multiple parts, in which:

- Section 2: establishes the strategic context for walking in North Sydney based on Council and NSW Government documents
- Section 3: explains the current North Sydney demographics, mode share and factors that affect travel behaviour
- Section 4: establishes a vision for walking in North Sydney, and outlines the associated objectives and targets to support the vision
- Section 5: details the approach in creating a project prioritisation framework that will assist in determining an order of priority for future infrastructure projects
- Section 6: summarises potential actions that would assist North Sydney in delivering the vision for walking and recommends actions to be prioritised
- Appendix A: summarises academic research and studies by transport authorities that demonstrates how
 walking achieves the community priorities laid out in the North Sydney Walking Strategy
- Appendix B: is to be used as a reference document for what pedestrian infrastructure treatments are preferred when delivering walking infrastructure
- Appendix C: details the assumptions used for the analysis of walkability in the LGA
- Appendix D: provides a prioritised list of project locations (The Walking Action Plan)
- Appendix E: has the full complement of maps created for this background report



2.0 **Policy Context**

Walking is a fundamental part of the transport network and will always be part of the transport journey, whether it is walking to and from the train station, the bus interchange or parking. Walking also brings a significant number of benefits to the community that is recognised by academia, planners, and governments. London and New York, often held as exemplars of transport planning, are cities that have embraced walking, citing key benefits to human health, social connection, environmental sustainability, business activity and increased efficiency in the transport network. Prioritising walking has become the focus of many Australian cities alongside North Sydney, such as the City of Sydney, City of Parramatta, and Melbourne.

2.1 **NSW Government framework**

The NSW Government has highlighted the importance of walking in NSW by emphasising improving the walking network across various state government

Future Transport 2036 (TfNSW, 2018) outlines Transport for NSW's commitment to providing a long term vision of the transport network for the community. Concerning walking, Future Transport's six state-wide outcomes highlight the importance of providing 'successful places' by encouraging walking and cycling, and an aim to achieve 'sustainability' by planning cities that will enable a shift from private cars to public transport and active transport.

In Beyond the Pavement 2020 (TfNSW, 2020), the Centre for Urban Design encourages consideration of the broader context of transport infrastructure. For walking, facilities should provide good safe connections and movement options for people by:

- Minimising the time and effort involved in travel
- Improving the frequency and ease with which they can cross major roads
- Connecting people to other communities and parts of the urban environment
- Providing easy access to public transport

Walking infrastructure should serve to enhance the economy by minimising crime through good passive surveillance, provide connections between destinations such as shops, businesses and other transport modes and improve the environmental quality of the area via seating shading and lighting.

Similarly, the Practitioner's Guide to Movement and Place (GANSW, 2020) details the importance of considering the whole street which includes people walking and cycling as well as people spend time in places. It notes the need to make trade-offs when

pursuing the balance between movement and place where the outcomes may not always be complementary.







2.2 North Sydney Transport Strategy

The North Sydney Transport Strategy (North Sydney Council, 2017) designates walking as the top priority in its modal hierarchy over cycling, public transport, local deliveries and freight and private vehicles. The decision to award walking the highest priority was informed by the conclusion that walking best served the 10 community priorities outlined as part of the strategy. The value of walking infrastructure is supported both by academic research as well as studies done by transport institutions in best-practice cities across the world, detailed in **Appendix A**.

In its best practice principles, the Council committed to identifying and prioritising improvements to walking infrastructure within the walking catchment of commercial, mixed-use and neighbourhood centres within the LGA. Doing so will enable council to identify routes and nodes where infrastructure improvements will yield significant benefits to walking outcomes.



2.3 North Sydney CBD Transport Masterplan

The North Sydney CBD Transport Masterplan (North Sydney Council, 2020) explores the opportunities that the future Metro Victoria Cross Station will bring to North Sydney CBD. Due to the introduction of the Metro in these areas, there is a high proportion of shift expected from private vehicle to public transport, leading to an expected increase in walking journeys by 13%.

The study built on community priorities identified in the NSTS, analysing options available for the CBD area. It concluded that a "Miller Street Pedestrian Plaza" was the best option and recommended an endorsement of this for further development as part of the North Sydney CBD Public Domain Strategy.



2.4 North Sydney CBD Public Domain Strategy

The North Sydney CBD Public Domain Strategy is a framework to deliver public domain works that will complement the new transport, commercial and cultural infrastructure in North Sydney by 2036. It identifies 19 public domain projects which aim to create a CBD where pedestrians have priority over vehicles, including:

- Miller Walk and Miller Place, a civic spine outside the Metro Station
- Post Office Square outside the North Sydney Post Office
- Central Laneways, converting some of the smaller streets into pedestrian areas or shared zones

2.5 Military Road Planning Study

The Military Road Planning Study is a review of current planning controls along Military Road, focusing on Neutral Bay and adjoining parts of Military Road. The goal is to deliver future housing and job growth in the study area.

Recommendations include increasing maximum height limits (up to 12 storeys in certain areas), building setbacks around public space, improving amenity along Military Road and creation of new plazas and through-site-links.





2.6 Civic Precinct Planning Study

The Civic Precinct Planning Study was formed to understand the impact of the Victoria Cross metro station northern portal on the Civic Precinct and to formalise an urban design framework for its future. 9 key actions were identified to develop the vision and design concept for the Civic Precinct, including:

- Increase amenity and activation along Pacific Highway
- Improve public open space
- Identify access and active transport network improvements

2.7 Planning documents of other councils

The City of Sydney Council and Parramatta City Council have released walking strategies to address the growing demand for walking and to capitalise on the benefits of providing an improved walking network.

2.7.1 City of Sydney – Walking Strategy and Action Plan

City of Sydney's Walking Strategy and Action Plan (City of Sydney, 2015) details the many benefits of walking which impacts economic, social, and environmental factors in Sydney.

The City of Sydney aims to encourage walking in the city by implementing its four directions

- Make walking quick, convenient, and easy by prioritising pedestrians.
- Make walking inviting and interesting by creating lively streets as well as attractive and interesting places.
- Make walking safe and comfortable by improving road, personal security and pedestrian comfort.
- Create a strong walking culture by changing attitudes and supporting travel choice at school and in the workplace.

Walking Strategy and Action Plan

2.7.2 Parramatta Ways Walking Strategy

The *Parramatta Ways Walking Strategy* (City of Parramatta, 2017) acknowledges that walkability is a measure of how pleasant and attractive an area is to walk. Internationally, it is recognised as one of the key aspects of what makes a city liveable.

Parramatta, like North Sydney, has many great destinations such as parks, natural bushland and heritage sites that provide good reasons to walk. To make their city more walkable Parramatta City has indicated the need to better connect people to these places and support walking in their everyday journeys. The council will increase the city's environmental resilience through increased canopy cover, green infrastructure and include the walking network as part of the greater transportation network, making it attractive for people to walk more and drive less.

Kev Network Strategies



Stitch together key destinations into a connected walking network.



maximise local walking and oper space connection opportunities



loops that encourage recreational walking.



friendly streets across the LGA supporting the walking network



e LGA community facility
etwork, destination connec





3.0 Travel Behaviour

3.1 Demographic analysis

Residents of North Sydney LGA are more likely to be young professionals who have no dependents, a demographic that is more likely to walk, and less likely to own a car. Australia Bureau of Statistics (ABS) data is illustrated in **Figure 3-1** Age-sex pyramid for North Sydney LGA, 2016showing that North Sydney has a higher proportion of 25 to 39-year-olds compared to the Greater Sydney average, and a lower proportion of 5 to 24-year-olds. In 2016, 77% of North Sydney households had no children, compared to an average of 54% in Greater Sydney.

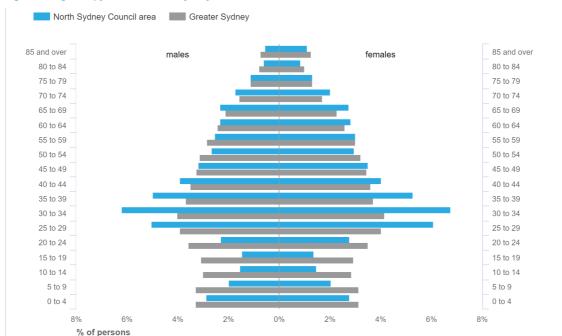


Figure 3-1 Age-sex pyramid for North Sydney LGA, 2016

Source: ABS 2016, profile.id

North Sydney has a high concentration of jobs in Professional, Scientific and Technical Services followed by the Financial and Insurance Services industry. 65% of residents are employed as Managers or Professionals compared to the Greater Sydney average of 40%. In contrast, Technicians, Trade Workers, and Labourers make up only 7 % of North Sydney residents, compared to 19% at the Greater Sydney level. Office workers tend to rely less on private vehicles as they generally work at a specific location and do not need to bring tools or supplies with them when commuting.

A study by TfNSW on licence-holding and travel behaviour trends (Raimond, T, 2010) found that younger people were less likely to hold a licence, and that licence-holding was trending down for this age group over the past decade. This is reflected lower car ownership rates in North Sydney, with 67% of households having one motor vehicle or not owning any, significantly higher than the Greater Sydney average of 46%.

This demographic means that a higher-than-average proportion of North Sydney residents would benefit from or can make use of walking infrastructure improvements.

3.2 Mode share analysis

North Sydney residents have more than twice the walking mode share (36%) compared to the Greater Sydney average (15%), meaning that there is already a large base of residents who would benefit from investment in pedestrian infrastructure. A comparison of mode share between North Sydney, City of Sydney and Parramatta LGA is presented below in **Table 3-1**.



Table 3-1 Travel by mode, Household Travel Survey 2018/19

Mode of	North Sydney		City of Sydney		Parramatta	
travel	Mode share	Average distance	Mode share	Average distance	Mode share	Average distance
Vehicle Driver	31%	10 km	20%	10 km	43%	10 km
Vehicle Passenger	12%	18 km	5%	6 km	19%	7 km
Train	11%	8 km	7%	9 km	7%	23 km
Bus	6%	5 km	6%	5 km	8%	10 km
Walk Only	36%	1 km	57%	1 km	22%	1 km
Other	4%	8 km	5%	5 km	3%	5 km
Total	100%	-	100%	-	100%	-

Source: TfNSW Household Travel Survey, 2018/2019

Walking trips tend to be relatively short, with an average distance of 1km, while trips on other modes tend to average 5 kilometres or more. This situation is consistent in City of Sydney and Parramatta as well as across Greater Sydney suggesting that the focus for most walking infrastructure needs to be for 1-2km trips. This data also shows that built form and particularly mixed-use is a driving influence on walking levels.

Aside from the built form, walking infrastructure also contributes to levels of walking activity. *Demand response to improved walking infrastructure: A study into the economics of walking and health behaviour change* (Longo, A., et. al., 2015) showed that a policy which increased walkability and people's perception of access to shops and facilities would lead to an increase in walking by 36 minutes per person per week. One of the differences in levels of walking between North Sydney and City of Sydney may relate to the quality of walking infrastructure.

The importance of increasing the walkability to local facilities can also be seen when comparing travel by purpose between North Sydney and City of Sydney, shown below in **Table 3-2**. Trip distances for work-related business, shopping, personal business, and social/recreation are significantly lower in the City of Sydney, where walking mode share is at 57%. Improving the attractiveness of walking routes to local facilities is an influential factor for residents when deciding substitutable destinations, such as which shop or park they choose to go to.

Table 3-2 Travel by purpose, Household Travel Survey 2018/2019

	North Sydney		City of Sydney		Parramatta	
Trip purpose	% of the total	Average distance	% of the total	Average distance	% of the total	Average distance
Commute	22%	8 km	22%	7 km	20%	17 km
Work related business	4%	21 km	6%	13 km	5%	14 km
Education/childcare	4%	3 km	5%	3 km	9%	5 km
Shopping	21%	6 km	18%	2 km	15%	5 km
Personal business	6%	9 km	5%	2 km	6%	7 km
Social/recreation	25%	6 km	33%	3 km	28%	7 km
Serve passenger	12%	13 km	7%	4 km	16%	5 km
Other	6%	1 km	4%	1 km	1%	1 km
Total	100%	-	100%	-	100%	-

Source: TfNSW Household Travel Survey, 2018/2019

Figure 3-2 below shows which suburbs within the North Sydney LGA are most likely to walk to work. Residents in North Sydney, Crows Nest, and St Leonards are most likely to walk to work, followed closely by McMahons Point.



This is unsurprising due to the higher concentration of commercial and retail in these suburbs and the proximity of residents. These suburbs also tend to be along the ridgeline and have a more permeable street network, leading to a more pleasant and direct walk.

Pedestrian infrastructure improvements within these suburbs, such as improvements along Pacific Highway, will therefore benefit the largest proportion of residents. The improvements will also simultaneously improve the journey for public transport users as these suburbs also have good public transport connections.

Lower uptake of walk-only trips in suburbs such as Kurraba Point and Cremorne Point reflects they are further away from high-density commercial spaces, as well as the unfavourable terrain between these residents and the centres around them.

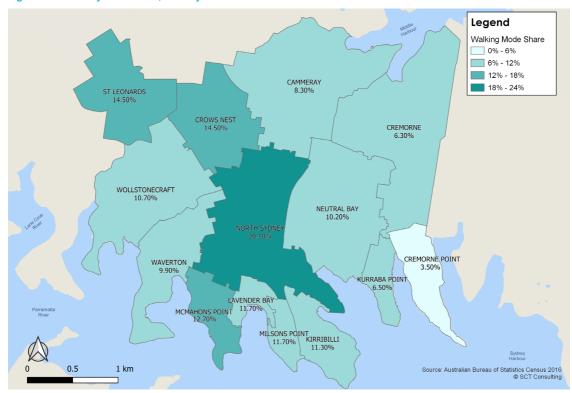


Figure 3-2 Walk-only mode share, Journey to Work 2016

3.3 Barriers to Walking

Barriers to walking often refer both to environmental and personal obstacles (Mitra, Siva, and Kehler, 2015). Environmental barriers can be examples of poor town and transport planning, choice and location of infrastructure, topographical challenges, or meteorological considerations such as high rain, wind, and temperature levels. Personal obstacles to walking can be both physiological and psychological. Physiological barriers are more commonly found among vulnerable groups such as the elderly and the very young who may lack the stamina, speed, or observation skills to safely navigate higher risk areas such road crossings (Dunton, 2006). Psychological barriers are often safety related, with a fear of crime and traffic-related risks reducing walking activity. Environmental and personal barriers can be correlated, for example, limited street lighting may increase the perception of safety risks resulting in higher car use which could result in more traffic-related risks within an area.

The scarceness of time is one of the biggest barriers to people choosing to walk (Clark and Scott, 2016). Featuring both environmental and personal obstacles, people's perceived time availability limits uptake especially among those who work and those who need to connect to other modes. A consequence of urban sprawl, land zoning and carcentric development means the distance between work, leisure and home has seen large increases over the 30 years (Rose and Raymond, 2012; Hirsch and Mohl, 1993). If people cannot generally reach a destination within a 15-minute walk they tend to choose alternative modes. Even among groups which are within accessible walking distance



of a destination (e. primary schools with smaller catchments), it may be easier for parents to drop off the children at the school in the car as part of a long journey to work or the supermarket.

Safety is also a major factor impacting the uptake of walking (Gomez, 2004; Troped 2000; King 2008). Perceptions of safety risks are different among different groups, for example, a large section of parents fear about the possibility of their child being involved in a car collision while on their walk to school. As a result, parents are more inclined to drive their child to the school, ironically exacerbating traffic-related safety risks for those who do walk. An overview of crashes involving pedestrians is presented in **Section 3.4**. Fear of crime can also a barrier to walking, especially at night in areas which are poorly lit and with low pedestrian footfall volumes. Often the correlation between crime rates and the perception of crime fail to correlate but an area with inadequate street lighting and low levels of street activation can increase the perceived safety risks.

Other factors can also pose barriers to walking. Vehicle and background noise can impact on people's willingness to walk particularly in urban settings. Poor air quality, with high levels of Nitrogen Dioxide and Particulate Matter, has shown to have negative impacts on the propensity to walk in high exposure areas such as city centres. High vehicle speeds along road reduce willingness to walk even if safe crossings are available across it. A lack of pedestrian ramps can serve as a barrier to people with mobility issues and people with young children or pushchairs.

The conclusion is that upgrades to pedestrian infrastructure should aim to reduce travel time requirements, increase amenity and improve pedestrian safety (whether it be actual or perceived). Doing so will reduce barriers to walking and increase walking participation throughout the LGA.

3.4 Pedestrian crash analysis

Between 2015 and 2019 there was a total of 105 crashes involving pedestrians resulting in 124 casualties in North Sydney LGA. Of these casualties, five were fatal and 53 resulted in Serious injury. There appears to be no overall trend in either the frequency or severity of the crashes.

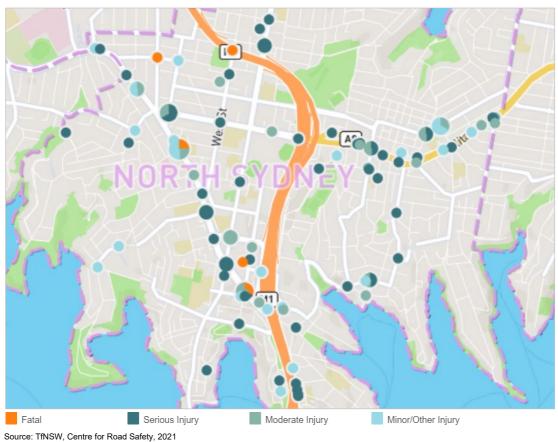


Figure 3-3 North Sydney Pedestrian related Crashes, 2015-2019



Most of the crashes involving pedestrians occurred on roads managed by TfNSW, specifically Military Road and Pacific Highway. Unsurprisingly, crashes with pedestrians occurred around Centres in North Sydney, areas of higher pedestrian activity. Neutral Bay, St Leonards, Crows Nest, Kirribilli and the CBD. These clusters are also the locations of all fatal collisions in the 5 reported years. The intersection of Walker Street and Pacific Highway had the highest number of pedestrian crashes, where there has been one fatal casualty and two seriously injured. The casualty rate at the intersection could be a result of the complex junction configuration, pedestrian wait times and vehicle speeds.

Crash data suggest that special consideration should be given to infrastructure that improves pedestrian safety, particularly around areas of high pedestrian activity. This is especially the case given the growth projected for onstreet activity in North Sydney and is consistent with the community priorities of the North Sydney Transport Strategy.

Centreline Removal - Transport for London (TfL) conducted a study where centre lines/hatching was not reinstated following resurfacing of the road. It found that there was a statistically significant (up to 8.6 miles per hour) reduction in vehicle speeds as a result of removing central markings on the carriageway. This was attributed to the introduction of uncertainty for drivers, which explains the lower speeds as drivers proceed more cautiously. Given that higher speeds are associated with more crashes, the study recommended not reinstating centre lines when resurfacing roads unless the markings highlight a particular hazard.



4.0 Vision and Objectives

4.1 The vision for walking in North Sydney

Walking is the most aligned travel mode for the vision-led community priorities outlined in North Sydney's Transport Strategy (NSTS). In line with this Transport Strategy, the vision for walking in North Sydney is:

"Delivery of high priority walking projects will ensure that walking participation is maximised to support a happy, healthy and prosperous North Sydney community."

This vision is underpinned by 10 walking objectives that correlate to the 10 community priorities in the NSTS. These objectives are listed in **Section 4.2**.

4.2 Objectives

Table 4-1 Objectives for walking in North Sydney

NSTS Community Priority	Walking Strategy Objective
Safe Travel	Pedestrians feel safe walking in the North Sydney LGA.
Transport Security	Pedestrian infrastructure encourages participation in walking, increasing the level of on-street activity throughout the day.
Social well-being	Pedestrians experience more human interaction, improving social cohesion and a sense of community.
Active Health	Walking is enjoyable, encouraging physical activity, improving the health outcomes of North Sydney.
Fair Access to Parking	Locals who currently drive feel comfortable with walking as an alternative for more trips.
Environmental Sustainability	Emissions from the transport sector are reduced as more people choose to walk.
Local Environment	Air quality and noise pollution are reduced as space for vehicles is reduced and returned for walking and placemaking.
Transport Affordability	Access by walking is safe and direct for all demographics, providing viable alternatives to private cars and public transport.
Congestion	Less time is spent in congestion as people choose to walk instead of drive.
Business Activity	Walking infrastructure is prioritised around centres



4.3 Targets

As the strategy delivers walking projects and walking participation is prioritised, it is expected that the tangible results will be reflected in changes to key metrics as objectives are met. The success of the strategy in achieving its outcomes are measured with the following targets for 2030, benchmarked against past and present performance in **Table 4-2**.

Table 4-2 Targets for walking in North Sydney

Metric	Past	Present	2030 Target
	(Year)	(Year)	(Year)
Walked only mode share in	11.8%	11.0%	15%
Journey to Work Census data	(2001)	(2016)	(2031)
Walk Only travel mode in	24.6%*	26.8%	30%
Household Travel Survey	(2009/10)	(2018/19)	(2029/30)
Number of pedestrian crashes	39	18	9 ⁺
	(2010)	(2019)	(2030)

^{*}SA3 dataset only, *Benchmarked on North Sydney trend of 6% reduction each year

These metrics have been collected historically and continue to be produced regularly, serving as a good indicator of general pedestrian infrastructure performance that can be easy obtained and compared. As noted in previous sections, consideration should be given to metrics that positively correlate. In this case, higher pedestrian activity may be positively reflected in mode share but will also likely increase the total number of pedestrian crashes simply since there are now more pedestrians on the streets.



5.0 Prioritisation Framework

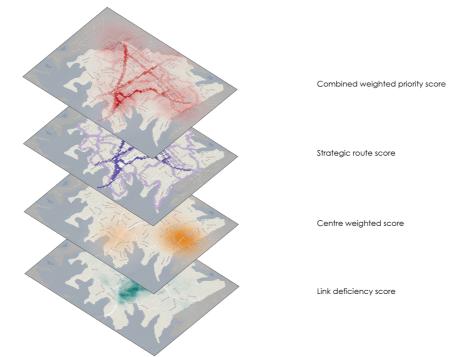
5.1 An evidence based framework

Walking infrastructure should be implemented in nearly every location throughout the LGA – the NSTS recognises walking as the highest priority mode. However, with scarce time, resources and budget, North Sydney Council wants a mechanism to prioritise investment into walking. Prioritisation ensures that the infrastructure with the greatest benefits to walkability is invested in first. This section outlines how a priority scoring mechanism was developed spatial analysis and evidence.

The priority framework assigns importance to investment based on:

- Whether the location is part of a strategic route
- Whether the location is near one of North Sydney LGA's centres
- Whether the location has currently poor accessibility to local destinations (link deficiency)

Figure 5-1 Prioritisation framework methodology



Source: SCT Consulting, 2021

As this analysis focuses on the walkability of North Sydney LGA, factors such as financial cost were not considered. Such factors should be considered separately when deciding the types of projects to progress in different locations.

The strategic walking network is an indication of the most important pedestrian routes within the North Sydney LGA, such as those that connect centres and those that service key trip attracting facilities. Investment along these routes is expected to provide the most improvement in amenity for pedestrians that journey to and between key destinations and will be a significant factor in prioritising pedestrian projects.

5.2 Strategic routes

Strategic routes start and end at key destinations within the LGA or in the surrounding areas. The significance of key destination pairs is scored based on the amount of activity within each destination and the number of trip attractors between each pair. The facilities that added to the "activity level" of each destination were:

North Sydney Walking Strategy

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- Employment opportunities
- Post offices
- Medical centres (or General Practitioner)
- Pharmacies
- Supermarkets
- Cafes
- Primary Schools
- Secondary Schools
- High-frequency public transport

The number of trip-attracting nodes between each destination pair was then added to the score to produce a final activity score for each of the 30 destination pairs identified by North Sydney Council, leading to the ranked list in **Table 5-1**.

Table 5-1 Activity score of key destination pairs

From	То	Score	From	То	Score
North Sydney	Sydney CBD	29	Cremorne	Cammeray	18
North Sydney	Cammeray	29	North Sydney	Wollstonecraft	16
North Sydney	St Leonards	29	North Sydney	Neutral Bay Wharf	15
North Sydney	Neutral Bay	25	Kirribilli	Neutral Bay Wharf	15
North Sydney	Crows Nest	24	Crows Nest	Waverton	14
Kirribilli	Sydney CBD	23	Neutral Bay	Neutral Bay Wharf	14
North Sydney	Kirribilli	22	St Leonards	Wollstonecraft	13
Neutral Bay	Crows Nest	21	Neutral Bay	Cremorne South	13
Neutral Bay	Cremorne	21	North Sydney	HMAS Platypus	13
North Sydney	Blues Point	21	Blues Point	Waverton	12
Neutral Bay	Cammeray	20	Cremorne	Cremorne Point	11
St Leonards	Crows Nest	20	Cremorne	Northbridge	11
Crows Nest	Cammeray	20	St Leonards	Northbridge	10
Kirribilli	Blues Point	20	Cammeray	Northbridge	8
St Leonards	Cammeray	19	Waverton	Wollstonecraft	7

Source: SCT Consulting, 2021

The key destination pairs were then categorised as Primary, Secondary or Tertiary routes depending on the activity level score achieved in the process above.

- Primary routes: A score of 25 or above
- Secondary routes: A score above 20 and below 25
- Tertiary routes: A score of 20 or below

The key destination pairs and their categories are illustrated in Figure 5-2.

Specific routes between each of the key destinations were then drafted based on the following considerations:

- Directness: What is the shortest route between the destinations
- Existing infrastructure: Are there existing walkways that already have good walking amenity

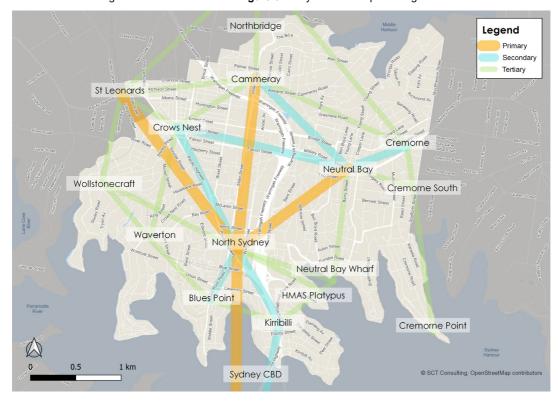


- Proximity to other trip attractors: Which routes will also serve other trip attractors
- Topography: Does the gradient of the route deter pedestrian activity. A map of North Sydney topography is provided in Appendix E.

5.2.1 Recreational routes

While they do not directly improve walkability throughout the region, recreational walks and trails serve as important destinations for both residents and international visitors. As such, recreational walking routes are highlighted as tertiary routes to mark their contribution to health and tourism. Routes included in this analysis are:

- Sydney's Green Grid & Foreshore Routes (Government Architect NSW)
- Port Jackson to Middle Harbour Walking Route (North Sydney Council)
- North Sydney Highline
- The final strategic routes are illustrated in Figure 5-2 Key destination pair categories



School Streets – School Streets is a concept which has grown over the last three years in the UK, particularly in London. A school street is where no-stopping restrictions are placed on traffic streets or in the vicinity of the school during pick-up and drop-off hours. Enforced through automatic number plate recognition or immovable obstacles, such as bollards, drivers who stop in the zone during those allocated times are issued a fine. The School Streets concept aims to encourage walking and cycling to and from school, improve air quality in the local environment, and improve safety by removing collision and congestion risks.

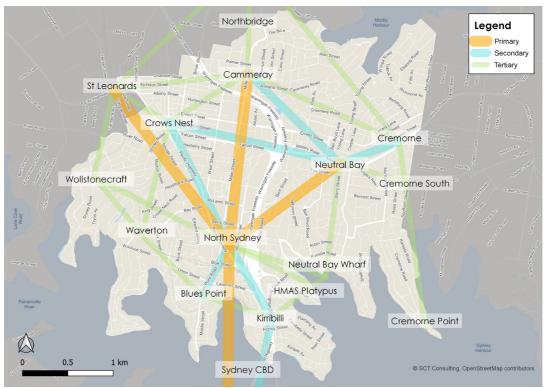
Figure 5-3.

North Sydney Walking Strategy

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Figure 5-3 Strategic routes in North Sydney LGA





5.3 Proximity to Centres

Centres have the highest place value throughout the LGA and are locations of concentrated pedestrian activity. Walking infrastructure investments in these areas are likely to be used by the highest volume of people and should therefore be awarded priority. Weighting was given to grids located around centres, decreasing by 100m increments up to 900m (10 minutes as the crow flies). This is illustrated in **Figure 5-4**.

Legend
Centre Weighted Score

O

O

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SCT Consuling OpenStreetMap contributors

Figure 5-4 Grid priority by proximity to centres

The high scores around St Leonards and Neutral Bay centres are due to the clustering of centres in these areas.

30km/h speed limit areas – In July 2020 Northern Beaches Council introduced a 30km/h speed limit around Manly Town Centre to create greater protections for pedestrians and cyclists and increase the attractiveness of walking. School zones in the suburb have also been changed from 40m/h to 30 km/h. The rationale for the change is by decreasing vehicle speeds in the area, the suburb could become more 'liveable' and will lead to safety improvements. Pedestrians have a 40 per cent risk of dying in a crash with an impact speed of 40km/h, but this falls to a 10 per cent risk when the impact speed is 30km/h (TfNSW, 2020)



5.4 Link deficiencies

Trip attractors were identified by Council throughout the LGA and surrounds. These attractors represent prominent destinations that are expected to generate activity, such as commercial centres or parks. Destinations such as these need pedestrian activity to fulfill the business activity objective. Trip attractors used in this analysis are illustrated in **Figure 5-5**.

Legend

Community Facility

Park

Politic Transport

School

Community Facility

Politic Transport

School

Community Facility Facility

Politic Transport

School

Community Facility Facility Facility Facility Fac

Figure 5-5 North Sydney Trip Attractors

The current level of walkability in North Sydney plays a significant role in shaping the current high level of walking mode share. This section evaluates the walking infrastructure using catchments to understand where locations of good and poor access are located. Also called "ped sheds", they map how far a 400m, 800m or ten-minute walk compares to the crow flies' distance, usually articulated as a dashed line.

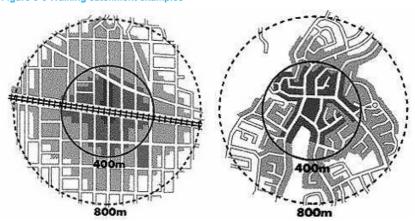


Figure 5-6 Walking catchment examples

Source: Active Healthy Communities, accessed 2021



The walking catchments of different key attractors in North Sydney LGA were analysed with a network that includes delays in crossing road corridors. Assumptions on walking speed and delays at each type of crossing facility can be found in **Appendix C**. These catchments are compared to the coverage as the crow flies within the LGA as an indicator of walkability to these different attractors.

5.4.1 Walking catchment deficiencies

10-minute walking catchments were produced for every trip attractor identified in **Section 5.4** and compared to the 10-minute crow flies' distance (900m). A 10-minute catchment closely reflects the average walking trip distance of 1km in the LGA and provides a scale at which deficiencies in the walking catchment are still evident. This comparison highlighted sectors of walking "link deficiency" for each node, and a deficiency heat map could then be produced by compiling the deficient sectors from every node.

Walking catchments that did not reach the 600m crow flies' distance were considered as a significant deficiency. An example of this process for the North Sydney CBD is illustrated in **Figure 5-7**.

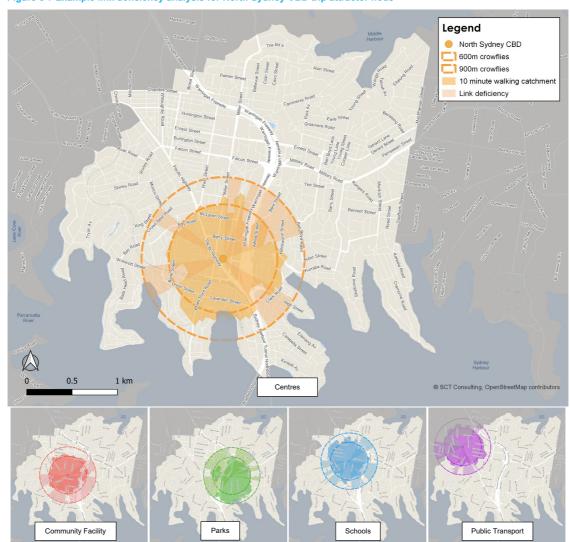


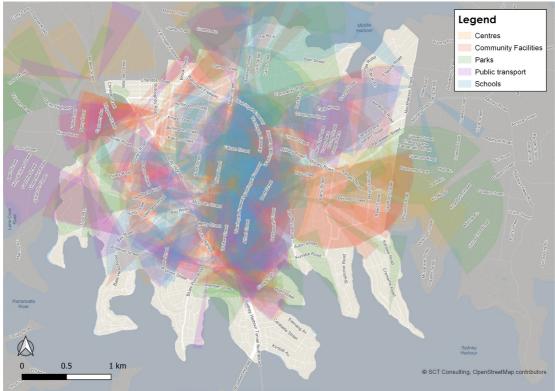
Figure 5-7 Example link deficiency analysis for North Sydney CBD trip attractor node



Deficient sectors from each node were overlayed to produce an indication of areas that were particularly unfavourable for pedestrians, illustrated in **Figure 5-8**. Priority is awarded to projects that address areas with a high concentration of link deficiency, and the 50m by 50m grid scored accordingly.

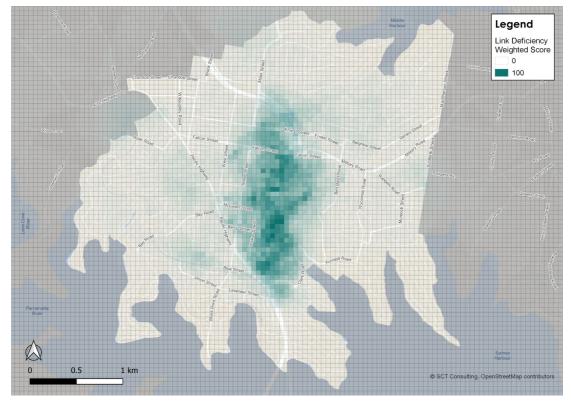
As shown in **Figure 5-9**, poor walkability has the greatest impact on local nodes in Neutral Bay South, and around the Warringah Freeway. This is likely due to the circuitous street network, limited crossing opportunities across the Freeway, and many local destinations in the area.

Figure 5-8 Combined link deficiency sectors for all nodes







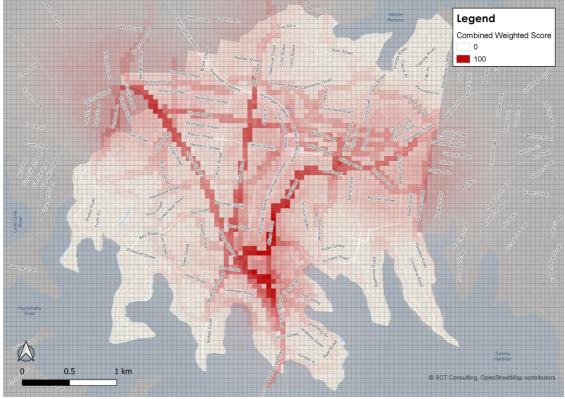




5.5 Final priority heat map

A combined priority map was then produced by combining the grid maps of Centre Proximity, Strategic Routes, and Walking Catchment Deficiencies. For this analysis, equal weighting was given to each of the three factors when combining the maps. This heat map (**Figure 5-7**) provides a framework that is then used to prioritise projects which would provide the highest practical return to improving walkability in the North Sydney LGA.

Figure 5-10 Combined weighted grid score for North Sydney LGA





6.0 Walking Action Plan

6.1 Action Plan

Strategic Routes (**Section 5.2**) form a central part of the analysis and recommendations of the background report. These routes provide connections between centres and uses that have economic importance and are prioritised based on the quality of the current access they provide to local destinations.

Walking investments should be prioritised where it is on a strategic route so that the objectives identified in **Section 4.2** can be delivered. Opportunities were identified on strategic routes as well as throughout the LGA and placed into four categories depending on treatment type:

- Junctions
- Linear treatments
- Through site links
- Safety / accessibility improvements

Different infrastructure treatments are available to each category. **Appendix B** presents a list of typical treatments, including a recommendation of preferred types for the North Sydney LGA. **Figure 6-1** illustrates the locations of opportunities by treatment type.

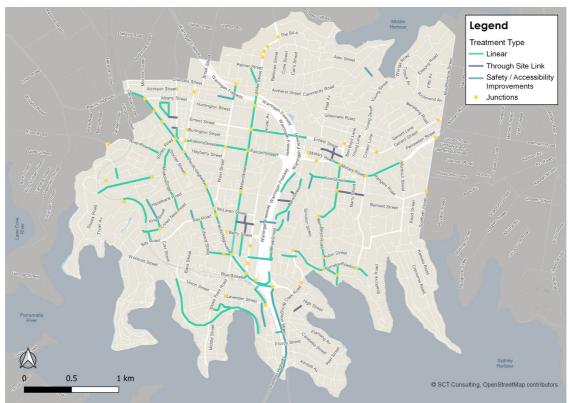


Figure 6-1 Potential project type and location



Table 6-1 provides the action plan for the walking strategy, covering both state-led actions and corridor actions.

Table 6-1 Action plan

Action Name Order of priority Opportunities (project ID) State led actions NSITP & WHT High 2,3,6,7,12,13,19,20,21,22,26,28,29,30,31,33,38,40,41,42,48,50,51,55,56,58,60,61,63,67,70 Corridor Corridor North Sydney CBD - Sydney CBD High 4,5,85 North Sydney CBD - Neutral Bay High 1,8,10,11,14,78,91,95,96,116,117,125,128 North Sydney CBD - Cammeray Medium 24,25,27,32,34,43,49,154,156,158 Neutral Bay - Cromorne Medium 37,119,165 North Sydney CBD - Blues Point Medium 37,119,165 North Sydney CBD - Kirribilli Medium 39,86,134 Neutral Bay - Crows Nest Medium 54,69,77,124,136,148 North Sydney CBD Centre Low 79,110,115 Neutral Bay - Shoreline Low 73,89,90,101,102,137,139,140,150,151 North Sydney CBD - Neutral Bay Wharf Low 104,142 North Sydney CBD - Weutral Bay Wharf Low 104,142 North Sydney Highline Low 103,147 St Leonards - Cammeray Low 2,281,09,114,1	Table 6-1 Action plan			
NSITP & WHT	Action Name		Opportunities (project ID)	
Corridor actions	State led actions			
North Sydney CBD - Sydney CBD High 4,5,85 North Sydney CBD - St Leonards High 9,15,16,17,18,35,36,52,53,57,59,62,64,68,71,82,84,15 North Sydney CBD - Neutral Bay High 1,8,10,11,14,78,91,95,96,116,117,125,128 North Sydney CBD - Cammeray Medium 24,25,27,32,34,43,49,154,156,158 Neutral Bay - Cremorne Medium 37,119,165 North Sydney CBD - Blues Point Medium 37,119,165 North Sydney CBD - Kirribilli Medium 39,86,134 Neutral Bay - Crows Nest Medium 54,69,77,124,136,148 North Sydney CBD Centre Low 79,110,115 Neutral Bay - Shoreline Low 73,89,90,101,102,137,139,140,150,151 North Sydney CBD - Neutral Bay Wharf Low 74,75,80,87,118,155,162,166,167,176,180,182,183 Kirribilli - Neutral Bay Wharf Low 104,142 North Sydney Highline Low 113,147 St Leonards - Cammeray Low 93,94,99,100,105,120 Crows Nest - Wollstonecraft Station Low 72,88,109,114,126,127,149,170,177 Crows Nest - Waverton Station Low 103,106,108,129,130,131,132,143,173 </th <th>NSITP & WHT</th> <th>High</th> <th></th>	NSITP & WHT	High		
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Waverton Station - Wollstonecraft StationLow171,181Belgrave StLow76,83LGA East BoundaryLow65,98,123	Falcon Street Corridor	Low	144,145,146,159,169	
Station Low 171,181 Belgrave St Low 76,83 LGA East Boundary Low 65,98,123	Cammeray - Northbridge	Low	97,107,112,133	
LGA East Boundary Low 65,98,123		Low	171,181	
	Belgrave St	Low	76,83	
Other Low 111,135,138,157,178	LGA East Boundary	Low	65,98,123	
	Other	Low	111,135,138,157,178	

A full list of the opportunities by Project ID can be found in **Appendix D** which also details the specific location and the delivery mechanism.



APPENDIX A

NSTS Community Priorities and walking



Walking aligns positively with the community priorities identified by the *North Sydney Transport Strategy* (North Sydney Council, 2017). A summary of the benefits of walking to each of the priorities is listed below.

Safe Travel

As identified by North Sydney Council in North Sydney Transport Strategy, people who walk are the most vulnerable road users so Council will seek to increase pedestrian safety with reduced traffic speeds and increasing driver awareness. These measures can be addressed through the built environment and investment in walking infrastructure. A Canadian review of walking safety Walking and child pedestrian injury: a systematic review of built environment correlates of safe walking (Rothman et al., 2012) found that traffic calming devices and the presence of playgrounds and recreation areas were consistently associated with more walking activity and less injury. However, the review also highlighted the fact that increased pedestrian activity also meant increased traffic exposure, furthering the case to provide adequate investment in walking infrastructure to support the Modal Hierarchy outlined in the North Sydney Transport Strategy.

Transport Security

Improved walking environments increases transport security through increasing the amount of "eyes on the street", improving passive surveillance and the perceived safety walking. In a study of neighbourhoods of medium-sized cities *Does walkability matter? An examination of walkability's impact on housing values, foreclosures, and crime* (Gilderbloom et al., 2014) walkability was linked to deterrence in property crime, murders, and violent crime. Similarly, a study by Cambridge *The Impact of Street Lighting on Crime, Fear, and Pedestrian Street Use* (Painter, 1994) concluded that lighting improvements have a powerful capacity to reduce crime, fear, and increase pedestrian street use after dark. The perception of safety is also affected by walkability and pedestrian activity. In the *Household and Resident Survey 2011* (City of Sydney, 2011), respondents said the biggest factor that makes them feel unsafe in the public domain is a lack of other people. Increasing walkability, and therefore the number of people walking, will improve both safety and the perception of safety on the streets.

Social Well-being

Walking brings improves individual and community well-being. In their *Walking Action Plan* (Transport for London, 2018), TfL states 20-30% of cases of depression could be prevented by people walking 20 minutes a day, and that more people walking increases human interaction, enhances local communities, and improves social cohesion. This is echoed the City of Sydney in their *Walking Strategy and Action Plan* (2015) which links walking to lower incidences of poor mental health, alleviating stress, and anxiety-related disorders. In *Economic value of walkability* (Litman, 2014), Litman found that attractive, safe, and walkable streets increased community liveability as streets form a major portion of the public realm where people interact with their community. The article notes that in streets with higher traffic volumes and speeds, people are less likely to know their neighbours and show less concern for their local environment.

Active Health

There is a growing prevalence of physical inactivity in Australia stated by the National Heart Foundation of Australia in their article *Good for business* (2011). They argue that the rise of obesity is increasing strain on the health system and that walking more is a solution to relieving the health system amongst other benefits. The *Walking Strategy* (City of Sydney, 2015) points out that in 2011-2012, over 60% of the national population was overweight or obese, with this trending towards 80% by 2025. The City of Sydney recommended walking as a way which would increase physical activity and combat this trend.

A correlation between physical activity levels, health outcomes and walkability was found in *Economic value of walkability* (Litman, 2014). People who lived in areas of improved walkability had more walking activity, lower body mass index, less likely to be obese and were nearly twice as likely to achieve recommended activity levels compared to people in less walkable areas.

Fair Access to Parking

The North Sydney Transport Strategy (North Sydney Council, 2017) states that this priority is to encourage alternatives to driving and reduce parking demand. This would in turn increase the availability of existing parking supply. Increasing walkability compliments this priority by making walking more attractive as an alternative to driving



and therefore reducing parking demand. This has been shown in *Physical Activity and Transportation Benefits of Walkable Approaches to Community Design in British Columbia* (British Columbia Recreation and Parks Association, 2009) where vehicle kilometres travelled decreased with increasing neighbourhood walkability. The study found that people in the most walkable neighbourhoods drove 58% less than people in the least walkable neighbourhoods. Walking also supports public transport use, further reducing driving and parking demands.

Environmental Sustainability

Cars are responsible for approximately half the emissions generated by the Australian road transport sector as stated in *Walking Strategy and Action Plan* (City of Sydney, 2015), with an emission of 203 grams of carbon dioxide per passenger kilometre. By comparison, average emissions of people walking is negligible. Sustainability also includes reducing the intensity of energy consumption. In his transport research piece, *The effect of transportation policies on energy consumption and greenhouse gas emission from urban passenger transportation* (Poudenx, 2008), Poudenx finds that cars have the highest consumption at 2-3 Megajoules per passenger kilometre, followed by buses at 1 Megajoule per passenger kilometre, and light rail at 0.3 Megajoules per passenger kilometre.

Local Environments

Impact on local environments can be measured in multiple ways, including air quality, noise, injuries, and space requirements. Why cities need to take road space from cars – and how this could be done (Gossling, 2020) finds car users cause an average social cost of 0.11 euros (AUD 0.17) per kilometre that are not covered by taxes and fees. Car use produces more pollution, injuries, and noise than other transport modes, while in contrast, walking has the lowest impact in all these categories. The study also finds that cars are the most space intense form of transport, with a car moving at 50km/h requiring 70 times more space than a pedestrian, and a parked car using the same space as 10 cyclists. Space requirements are often overlooked when considering the costs of transport modes, yet this is especially important to environmental quality in constrained areas such as CBD areas and when seeking to improve residential and job density. Increasing walkability and reducing the priority of vehicles will improve air quality, noise, injuries and return space for placemaking purposes.

Transport Affordability

The North Sydney Transport Strategy identifies walking as the cheapest and most equitable form of transport – a walking trip is essentially free (unlike the cost in purchasing a private vehicle for example). In the Economic Value of Walkability (Litman, 2014), a study found that households in auto-mobile-dependent communities spent 50% more on transportation than households in more accessible land use and multi-modal transportation systems (closely linked to walkability). A more walkable network improves affordability, allowing substitution of walking and transit, reducing the need for car ownership.

Congestion

Congestion is where demand exceeds available supply. Use of public roads is often free or taxed marginally through fuel excise, leading to many road corridors operating with congestion. This is exacerbated by limited vehicle occupancy in peak periods so that cars are regarded as the least space-effective form of transport. In contrast, walking is the most space-efficient form of travel. A study of travel behaviour in British Columbia, *Physical Activity and Transportation Benefits of Walkable Approaches to Community Design in British Columbia* (British Columbia Recreation and Parks Association, 2009), found that people who lived in the most walkable neighbourhoods drove 58% less than their counterparts in the least walkable neighbourhood. The same study also showed significant complementarity between walking and public transport.

Business Activity

Walking encourages expenditure in retail areas and stimulates economic activity. In *The Economic Benefits of Sustainable Streets* (NYC Department of Transportation, 2013), the Department of Transportation found that improved pedestrian infrastructure and priority increased economic activity, by studying the change in economic activity around corridors and plazas that had improvements in public space and street design. The Bronx Hub, one of the study sites, saw a 50% increase in sales by the third year after implementation, while the Borough only experienced an 18% increase.

Attachment 8.11.2 North Sydney Walking Strategy Background Report



Research in London also confirmed this relationship, finding that people who walked spent 40% more in town centres than those who travelled there by car. The research also found a 17% reduction in retail vacancies on streets after walking investment (Transport for London, 2018).

An Australian discussion paper *Good for Business* (National Heart Foundation of Australia, 2011) also highlighted that improved walking conditions were associated with higher rents, improved reputation, and business activity.



APPENDIX B

Typical Treatments



Appendix B – Typical Treatments

The type and quality of walking infrastructure, particularly speed and safety, influences the attractiveness of walking. However, not all facilities are appropriate in all locations. This section provides a summary of facility types, their application, and the types of walking infrastructure available for implementation and guidance for selection.

Numerical warrants stipulated by the NSW Government, Australian Standards and other sources can prohibit certain facility types. Consideration should be given to lowering numerical warrants for higher priority treatments (such as zebra or wombat crossings) where this is feasible by the Council to increase the priority afforded to pedestrians.



Junction Treatments

Objective: Increase priority for safe pedestrian crossing movements that: address identified pedestrian desire lines, maximise pedestrian/driver intervisibility, minimise crossing distances and create slower traffic environments.

Preferred treatments: build-outs, table-top junctions, threshold treatments, wombat crossings

Treatment Type	Image/Reference	Pros	Cons	Recommendation
Kerb Extensions (build outs)		 Maximise intervisibility between pedestrians and drivers Minimises crossing distances Narrower carriageway widths resulting in slower vehicle speeds Provides additional space for Watersensitive urban design Defines parking lane 	 Drainage Does not guarantee priority for pedestrians 	 Preferred treatment type Integrate with threshold treatments or table-top junction where possible



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Thresholds/ Continuous Footpath Treatments		 Visually reinforces existing pedestrian priority over vehicles turning into side streets Raises driver awareness of pedestrian activity Vertical deflection measure reduces vehicle speeds on the approach to the intersection Can be used in conjunction with setback give way markings to provide even greater pedestrian priority. 	 Drainage May result in some confusion over pedestrian priority vs traffic approaching the intersection 	 Preferred treatment type Integrate with kerb extensions where possible
Raised threshold intersection (table-top Junction)		 Visually reinforces existing pedestrian crossing priority at intersections Raises driver awareness of pedestrian activity Vertical deflection measures reduces vehicle speeds on the approach to the intersection 	 Drainage May result in some confusion over pedestrian priority vs traffic unless other measures (i.e. set back give way lines or zebra crossings) are integrated into the treatment 	 Preferred treatment type Integrate with kerb extensions where possible



Treatment Type	Image/Reference	Pros	Cons	Recommendation	
Wombat crossing (raised threshold crossing)		 Provides high levels of pedestrian priority Vertical deflection measures reduces vehicle speeds on the approach to the intersection Raise awareness of crossing location 	 Drainage Limited priority for crossing pedestrians 	 Preferred treatment type Integrate with kerb extensions where possible 	
School crossings	25 Local Children- Crossing	Useful for crossing locations specifically associated with heavy crossing movements at school start/finish times and low crossing demands at other times	Requires ongoing management / budget for a school crossing supervisor	 Use where appropriate Integrate with kerb extensions and raised threshold where possible. 	
Zebra Crossings		 Provides high levels of pedestrian priority 	 Can increase crash injuries at crossing location due to channelisation Pedestrians "stepping out onto the zebra" and drivers not seeing zebra marking (particularly faded markings during rain). 	 Wombat crossing is preferred raised threshold intersection Integrate with a kerb extensions and wombat crossing or table-top junction where possible. 	



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Pram ramps		 Provides better access for less mobile pedestrians than stepped / kerbed treatment E.g. wheelchair users and parents with prams. 	 Set back from crossing Ramp grade / length requirements may impact usability of footpaths, particularly on already steeply graded hills Limited priority for crossing pedestrians 	 Wombat crossings and raised threshold intersections are preferred Integrate with kerb extensions where possible
Refuge islands (including junction splitter islands)		 Addresses drainage issues 	 Limited priority for crossing pedestrians Creates a two-stage movement – improving pedestrian decision making and the total width of the crossing Difficult to accommodate longer pedestrians (parents with prams, dismounted cyclists, etc.) within typical refuge width Creates "squeeze points" for cyclists. 	 Kerb extensions preferred Ensure adequate widths for longer pedestrians and passing cyclists where suitable.
Pedestrian Signals (Pelican, Puffin, Toucan, intersection etc.)		 Signalised crossings provide set levels of priority for both traffic and pedestrians Can be set to leave pedestrian crossing phase on unless traffic approaches signals to increase pedestrian priority Provides form of crossing over large number of lanes of traffic 	 Delays for pedestrians while waiting for crossing opportunity can be significant Queues forming while pedestrians wait can disrupt footpath movement 	 Not appropriate on local roads Where used on primary traffic routes, integrate with kerb extensions and threshold treatments as well as prioritising signal phasing for pedestrian to increase pedestrian safety and amenity Use signal settings to increase green time for pedestrians such as low cycle times, walk for green, countdown timers



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Roundabouts and mini-roundabout		 Reduce traffic speeds 	 Take priority away from pedestrians and give it to turning traffic Result in significant detours away from pedestrian desire lines Drivers are often distracted and not expecting pedestrians Refuge islands can be small so don't accommodate bicycles or prams 	 Standard "Give Way" or signalised junctions are preferred Provide justification for removal where possible
Slip lane removal		 Improved intervisibility between pedestrians and drivers Pedestrian / vehicle conflict managed within signal phasing Managed priority for left turning traffic Increased vehicle priority at times of high pedestrian activity 	Less free flowing priority for left turning traffic	 Removing the island formed by the slip lane and replacing slip lane with turn bay Provide justification for removal in all cases
Grade separation (underpasses & overpasses)		 No delays to traffic Can support increased business activity where land use and topography support direct visual and physical connections 	 Can cause compliance and related safety issues where "jumping the fence" offers a quicker crossing Requires long ramps or lifts to facilitate disabled access where topography requires Can cause significant delays to walking if route is indirect 	 Should only be used where topography and adjacent land uses support direct connections with high levels of activity and active / passive surveillance (not CCTV) or to cross motorways



Linear Treatments

Objective: Targeted infrastructure typologies for local and classified roads - integrated streetscape design and slow speed traffic environments on local roads and increased separation between pedestrians and traffic on higher volume/speed traffic routes.

Preferred Treatment: slower speed limits supported by gateways and carriageway narrowing/horizontal deflection measures

Local Roads: gateways, build-outs, reintroduction of on-street parking, centre line removal and streets tree planting

Classified Roads: wide footpaths, nature strips and buffer zones (on-street parking, cycle lanes and street tree planting)

Treatment Type	Image/Reference	Pros	Cons	Recommendation
Gateways (urban design, tree planting, line marking and signage to indicate change of context)		 Raises driver awareness that the place / movement functions of the road are changing Visually narrows carriageways resulting in slower traffic speeds. 		 Preferred treatment type at interface between higher and lower order roads.
Slower speed limits: High Pedestrian Activity Area speed limits & local traffic area speed limits	HIGH HIGH AREA ACTIVITY AREA	Reduce traffic speeds, even without associated physical treatments	TfNSW "Speed Limit" processes and warrants can be difficult to fulfill and time consuming	 Preferred treatment type for all roads Deliver alongside physical traffic management treatments (e.g. gateway treatments and centre line removal) for maximum effect.



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Street tree planting	Toe Pro- Coles Coles	 Visually narrows carriageways resulting in slower traffic speeds Provides shade for pedestrians Absorbs particulate pollution 	Selection of species needs to be consider vehicles envelopes to avoid incidents	Preferred treatment type for all roads
Re-introduction of on-street parking		 Visually narrows carriageways without the need for physical changes to assets Increases side-friction, reducing traffic speeds Forces drivers to slow down to give way to oncoming traffic 	 May result in community backlash where parking has been removed to facilitate two-way traffic flow 	 Preferred treatment type Deliver wherever possible, particularly on local road where two-way flows result in undesirable traffic speeds



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Footpath or nature strip widening		 Physically (and visually) narrows carriageway resulting in slower vehicle speeds More space for pedestrians, reducing queuing and catering for wheelchairs more easily 	 Requires reallocation of carriageway space away from traffic High cost of relocating existing kerb lines (drainage) Should be considered in line with asset renewal program 	 Preferred treatment type for all roads Deliver as part of as part of asset renewal program
Sign audit	NO STOPPING 330 - TIM NON-FRIM AP AP AP AP AP AP AP AP AP A	 Removes unnecessary street clutter ensuring important messages "get through" and forces drivers to take more responsibility for driving behaviour resulting in slower traffic speeds Reduces driver confusion 		 Preferred treatment type for all roads Deliver as part of as part of asset renewal program



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Centre line removal		 Increases opposing friction, reducing traffic speeds Can be delivered as part of asset renewal program 		 Preferred treatment type for local roads Deliver as part of asset renewal for all local roads
Shared space design principles		Removal of signs, line marking, level differences can provide effective and inexpensive speed management on local roads	May be difficult to define appropriate parking areas	 Preferred Treatment Type for Local Roads Using simple materials can save costs Incorporate shared space design principals into all projects on local road.



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Treatment Type	Image/Reference	Pros	Cons	Recommendation
Cycle lanes and separated cycle lanes	(STE)	Creates a buffer between higher speed carriageway environments and pedestrian footpaths	Requires re- allocation of carriageway space away from traffic, resulting in increased delays to drivers	Preferred treatment type for arterial roads only
Shared zones		 Can be simple and inexpensive to deliver when place requirements (i.e. seating, planting, etc.) Pedestrians can cross throughout area, not just at designated crossings Reduces traffic speed for vehicles and crash severity 	 TfNSW "Shared Zone" processes and warrants can be difficult to fulfill and are time consuming Putting signs at the entry to "shared zones" is the antithesis of "shared zone design principles". 	 Use for strategic projects close to activity centres Materials can be straightforward (e.g. tarmac from property boundary to property boundary in laneways and cul-de-sacs) or iconic where more complex place infrastructure and higher quality materials are used (e.g. Mitchell Street Plaza).
Narrowing of carriageway using edge lines		 Visually narrows carriageways without the need for physical changes to assets Slows traffic speeds 		Physical narrowing (e.g. re- introduction of on-street parking) is preferred



Treatment Type	Image/Reference	Pros	Cons	Recommendation
Speed humps		 Slows traffic speeds 	 Damage to vehicles Cause significant noise impacting residential amenity Not suitable for bus routes Additional maintenance 	 Kerb extension is preferred Ensure adequate widths for longer pedestrians.
Pedestrian barrier fencing	NO POLICE OF THE	Provides a convenient trellis for planting	 Limited safety benefit and may result in unintended negative consequences if designed poorly (e.g. trapped pedestrians) Significant negative impact on pedestrian connectivity, priority, and amenity 	Provide justification for removal in all cases



APPENDIX C

Walking analysis assumptions



Assumptions – Walking Analysis

The walking speed of a pedestrian on a continuous path is assumed to be 1.5m/s. Research by La Trobe University and the Australia Road Research Board found that the average walking speed was 1.49m/s in *Walking speeds for timing of pedestrian walk and clearance intervals* (Truong et al., 2018). It should be noted that this means half of the population walks at a speed below this, particularly vulnerable user groups. While the analysis uses the average walking pace, consideration should still be given to user groups such as children, elderly, people using wheelchairs and other vulnerable users when delivering projects.

Walking catchments generally assume crossing facilities have the same travel speed as unrestricted pathways, which can overstate catchments. The following assumptions were used at crossing to replicate the delays that pedestrians experience:

- Crossings are assumed to be 14 metres wide (4 general traffic lanes of 3.5m each) which leads to a total of 9 seconds to complete a crossing. While Local roads are more typically 9 metres, a single measurement was adopted for simplicity, and the 14 metres was regarded as a more conservative approach.
- For Signalised crossings, 70 seconds of delay is added for each leg of the crossing. This represents half of a typical peak hour intersection cycle time (140 seconds) on a major corridor (where signalised crossings tend to be).
- For Refuge Islands, 5 seconds of delay is added as pedestrians must check for traffic and yield to vehicles on the road
- For Uncontrolled crossings, 5 seconds of delay is added as pedestrians must check for traffic and yield to vehicles on the road.
- For Zebra crossings, no additional time penalties were added to zebra crossings as pedestrians have priority over vehicles and experience nearly no delay at these crossings.
- The impact of gradients was not considered.



APPENDIX D

Project Opportunities – Full List



Appendix D - Project Opportunities

Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
1	Alfred St: Mount St - Darley St	Linear	North Sydney Council Advocacy (WHT)	North Sydney CBD - Neutral Bay	87
2	Mount St: Walker St - Alfred St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	87
3	Pacific Hwy / Arthur St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	87
4	Pacific Hwy: Walker St - Arthur St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Sydney CBD	87
5	Cahill Expressway - Kirribilli	Safety / Accessibility Improvements	North Sydney Council Advocacy (WHT)	North Sydney CBD - Sydney CBD	86
6	Pacific Hwy: Arthur St - Alfred St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	85
7	High St / Alfred Street	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	82
8	Bent St: Eaton St - Wyagdon St	Linear	North Sydney Council Advocacy (WHT)	North Sydney CBD - Neutral Bay	80
9	Pacific Hwy: Oxley St - Hume St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	79
10	Ben Boyd Rd / Yeo St	Junction	North Sydney Council	North Sydney CBD - Neutral Bay	77
11	Ben Boyd Rd: Military Rd - Yeo St	Linear	North Sydney Council	North Sydney CBD - Neutral Bay	77
12	Pacific Hwy / Walker St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	77
13	Pacific Hwy: Mount St - Walker St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	77
14	Yeo St: Bent St - Ben Boyd Rd	Linear	North Sydney Council	North Sydney CBD - Neutral Bay	77
15	Pacific Hwy / Oxley St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	75
16	Pacific Hwy: Albany St - Oxley St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	75
17	Pacific Hwy / Hume St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	74
18	Pacific Hwy: Hume St - Falcon St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	74
19	Walker St / Hill St	Junction	North Sydney Council Advocacy (NSITP)	NSITP & WHT	74
20	Miller St: Falcon St - Ernest St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	72
21	Pacific Hwy / Falcon St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	71
22	Pacific Hwy: Falcon St - Alexander St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	71
23	Military Rd / Ben Boyd Rd	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Cremorne	70
24	Miller St / M1 Offramp	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Cammeray	70
25	Miller St: Ernest St - M1 Offramp	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Cammeray	70
26	Miller St: Ridge St - Carlow St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	70
	Miller St: Rosalind St - M1		North Sydney Council	North Sydney CBD	



Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
28	Miller Place	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	
29	Miller St: Carlow St - Falcon St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	69
30	Miller St: McLaren St - Ridge St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	69
31	Miller Walk	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	69
32	Miller St / Berry St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Cammeray	68
33	Miller St / Carlow St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	68
34	Miller St / Falcon St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Cammeray	68
35	Pacific Hwy / Albany St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	68
36	Pacific Hwy: Christie St - Albany St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	68
37	Blue St: Miller St - Walker St	Linear	North Sydney Council Advocacy (WHT)	North Sydney CBD - Blues Point	67
38	Ernest St: Miller St - Merlin St	Linear	North Sydney Council	NSITP & WHT	67
39	Middlemniss St: Lavender St - Arthur St	Linear	North Sydney Council	North Sydney CBD - Kirribilli	67
40	Miller St / Blue St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	67
41	Pacific Hwy / Miller St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	67
42	Pacific Hwy: Berry St - Mount St	Linear	North Sydney Council Advocacy (NSITP, WHT, TfNSW)	NSITP & WHT	67
43	Ernest St / Miller St	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	North Sydney CBD - Cammeray	66
44	Military Rd / Wycombe Rd	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Cremorne	66
45	Military Rd / Young St	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Cremorne	66
46	Military Rd: Wycombe Rd - Murdoch St	Linear	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Cremorne	66
47	Military Rd: Young St - Wycombe Rd	Linear	North Sydney Council Advocacy (TfNSW)	Neutral Bay - Cremorne	66
48	Miller St / M1 Onramp	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	66
49	Miller St / McLaren St	Junction	North Sydney Council	North Sydney CBD - Cammeray	66
50	Miller St: M1 onramp - Amherst St	Linear	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	66
51	Pacific Hwy / Berry St	Junction	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	65
52	Pacific Hwy: Bay Rd - Berry St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	65
53	Pacific Hwy: Hazelbank Rd - McLaren St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	65
54	Hume St - Willoughby Rd	Through Site Link	North Sydney Council	Neutral Bay - Crows Nest	64
53	Pacific Hwy: Hazelbank Rd - McLaren St	Through Site	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards Neutral Bay - Crows	



Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
55	Middlemiss St - Pacific Hwy	Safety / Accessibility Improvements	North Sydney Council Advocacy (NSITP & WHT)	NSITP & WHT	64
56	Miller St / Ridge St	Junction	North Sydney Council (NSITP & WHT)	NSITP & WHT	64
57	Pacific Hwy / Alexander St	Junction	North Sydney Council	North Sydney CBD - St Leonards	64
58	Pacific Hwy / Lavender St	Junction	North Sydney Council (NSITP & WHT)	NSITP & WHT	64
59	Pacific Hwy: Alexander St - Rocklands Rd	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	64
60	Miller St / Abbott St	Junction	North Sydney Council (NSITP & WHT)	NSITP & WHT	63
61	Pacific Hwy: Rocklands Rd - Hazelbank Rd	Linear	North Sydney Council (NSITP & WHT)	NSITP & WHT	63
62	Pacific Hwy / McLaren St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	62
63	Pacific Hwy: McLaren St - Bay Rd	Linear	North Sydney Council (NSITP & WHT)	NSITP & WHT	62
64	Pacific Hwy / Bay Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	61
65	Spofforth St / Rangers Rd	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	LGA East Boundary	61
66	Military Rd: Ben Boyd Rd - Young St	Linear	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Cremorne	60
67	Military Rd: Watson St - Ben Boyd Rd	Linear	North Sydney Council (NSITP & WHT)	NSITP & WHT	60
68	Pacific Hwy / Rocklands Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	60
69	Ernest St / Sophia St	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	Neutral Bay - Crows Nest	59
70	Military Rd / Murdoch St	Junction	North Sydney Council (NSITP & WHT)	NSITP & WHT	59
71	Pacific Hwy / Hazelbank Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	58
72	River Road / Russell St	Junction	North Sydney Council Advocacy (TfNSW)	Crows Nest - Wollstonecraft Station	58
73	Ben Boyd Rd: Hardie St - Yeo St	Linear	North Sydney Council	Neutral Bay - Shoreline	57
74	Clark Rd / Kurraba Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	57
75	Kurraba Rd: Clark Road - Ben Boyd Rd	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	57
76	Belgrave St / Waters Ln	Junction	North Sydney Council Advocacy (TfNSW)	Belgrave St	56
77	Ernest St / Park Av	Junction	North Sydney Council Advocacy (TfNSW)	Neutral Bay - Crows Nest	55
78	Alfred St - Bray St	Safety / Accessibility Improvements	North Sydney Council	North Sydney CBD - Neutral Bay	54
79	Ward St Masterplan	Through Site Link	North Sydney Council	North Sydney CBD Centre	54
80	High St: Arthur St - Alfred St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	53



Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
81	Military Rd / Merlin St	Junction	North Sydney Council Advocacy (TfNSW)	Neutral Bay - Cremorne	53
82	Willoughby Rd - Hume Ln	Through Site Link	North Sydney Council	North Sydney CBD - St Leonards	52
83	Oaks Av / Ben Boyd Rd	Junction	North Sydney Council Advocacy (TfNSW)	Belgrave St	52
84	Crows Nest Plaza	Linear	North Sydney Council	North Sydney CBD - St Leonards	51
85	Broughton St / Burton St	Junction	North Sydney Council	North Sydney CBD - Sydney CBD	51
86	Burton St: Broughton St - Alfred St S	Linear	North Sydney Council	North Sydney CBD - Kirribilli	51
87	Bray St: Nicholas St - Clark Rd	Linear	North Sydney Council	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	51
88	Shirley Rd / Nicholson St	Junction	North Sydney Council Advocacy (TfNSW)	Crows Nest - Wollstonecraft Station	51
89	Ben Boyd Rd / Hardie St	Junction	North Sydney Council	Neutral Bay - Shoreline	50
90	Ben Boyd Rd: Premier St - Hardie St	Linear	North Sydney Council Advocacy (WHT)	Neutral Bay - Shoreline	50
91	Hampden Street Overpass	Safety / Accessibility Improvements	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay	50
92	Morton St: Sinclair St - Rocklands Rd	Linear	North Sydney Council	Crows Nest - Waverton Station	50
93	Atchison St / Alexander St	Junction	North Sydney Council	St Leonards - Cammeray	49
94	Atchison St / Willoughby Rd	Junction	North Sydney Council	St Leonards - Cammeray	49
95	Nook Av: Alfred St - Eaton St	Linear	North Sydney Council	North Sydney CBD - Neutral Bay	49
96	Eaton St - Forsyth Park	Safety / Accessibility Improvements	North Sydney Council	North Sydney CBD - Neutral Bay	48
97	Miller St / Pine St	Junction	North Sydney Council Advocacy (BL "Local Benefits Program")	Cammeray - Northbridge	48
98	Spofforth St / Military Rd	Junction	North Sydney Council Advocacy (TfNSW)	LGA East Boundary	48
99	West St - Atchison St	Safety / Accessibility Improvements	North Sydney Council	St Leonards - Cammeray	48
100	Atchison St / Oxley St	Junction	North Sydney Council	St Leonards - Cammeray	47
101	Ben Boyd Rd / Premier St	Junction	North Sydney Council	Neutral Bay - Shoreline	47
102	Ben Boyd Rd: Phillips St - Premier St	Linear	North Sydney Council	Neutral Bay - Shoreline	47
103	Mount St: William St - Miller St	Linear	North Sydney Council	North Sydney CBD - Waverton Station	47
104	Clark Rd / Adderstone Av	Junction	North Sydney Council Advocacy (TfNSW)	Kirribilli - Neutral Bay Wharf	46
105	West St: Amherst St - Metcalfe St	Linear	North Sydney Council	St Leonards - Cammeray	46
106	Edward St: Oak St - William St	Linear	North Sydney Council	North Sydney CBD - Waverton Station	45
107	Miller St / Cambridge St	Junction	North Sydney Council Advocacy (TfNSW)	Cammeray - Northbridge	45
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Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
108	Mount St / William St	Junction	North Sydney Council	North Sydney CBD - Waverton Station	45
109	Shirley Road / River Rd	Junction	North Sydney Council Advocacy (TfNSW)	Crows Nest - Wollstonecraft Station	45
110	North Sydney CBD Laneways	Linear	North Sydney Council Advocacy (WHT)	North Sydney CBD Centre	45
111	Alfred St N: Merlin St - Winter Av	Linear	North Sydney Council	Other	44
112	Miller St / Vale St	Junction	North Sydney Council Advocacy (TfNSW)	Cammeray - Northbridge	44
113	North Sydney Highline	Linear	North Sydney Council	North Sydney Highline	44
114	Shirley Road / Nicholson Pl	Junction	North Sydney Council Advocacy (TfNSW)	Crows Nest - Wollstonecraft Station	44
115	Walker St	Junction	North Sydney Council	North Sydney CBD Centre	44
116	Yeo St: Ben Boyd Rd - Barry St	Linear	North Sydney Council Advocacy (WHT)	North Sydney CBD - Neutral Bay	44
117	Alfred St N - Lower Bent St	Through Site Link	North Sydney Council	North Sydney CBD - Neutral Bay	43
118	Anderson Park - Clark Rd	Safety / Accessibility Improvements	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	43
119	Blues Point Rd / King George St	Junction	North Sydney Council	North Sydney CBD - Blues Point	43
120	Amherst St / West St	Junction	North Sydney Council	St Leonards - Cammeray	42
121	Morton St / Rocklands Rd	Junction	North Sydney Council	Crows Nest - Waverton Station	42
122	Morton St: Rocklands Rd - Hazelbank Rd	Linear	North Sydney Council	Crows Nest - Waverton Station	42
123	Langley Av / Gerard St	Junction	North Sydney Council Advocacy (TfNSW)	LGA East Boundary	41
124	Hume Street Plaza	Linear	North Sydney Council	Neutral Bay - Crows Nest	41
125	Forsyth Park - Yeo St	Safety / Accessibility Improvements	North Sydney Council	North Sydney CBD - Neutral Bay	40
126	Shirley Rd / Belmont Av	Junction	North Sydney Council	Crows Nest - Wollstonecraft Station	40
127	Shirley Rd: Telopea St - Balmont Av	Linear	North Sydney Council	Crows Nest - Wollstonecraft Station	40
128	Bent St - Winter Av	Through Site Link	North Sydney Council	North Sydney CBD - Neutral Bay	39
129	Edward St / Berry St	Junction	North Sydney Council	North Sydney CBD - Waverton Station	39
130	Edward St / Oak St	Junction	North Sydney Council	North Sydney CBD - Waverton Station	39
131	Edward St: Bay Rd - Berry St	Linear	North Sydney Council	North Sydney CBD - Waverton Station	39
132	Edward St: Berry St - Oak St	Linear	North Sydney Council	North Sydney CBD - Waverton Station	39
133	Miller St / The Boulevarde	Junction	North Sydney Council Advocacy (TfNSW)	Cammeray - Northbridge	39
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Project ID	Opportunity Detail	Туре	Delivery Mechanism (Project Stakeholders)	Action Name	Score (/100)
135	Ada St / Gerard St	Junction	North Sydney Council Advocacy (TfNSW)	Other	38
136	Park Av - Ben Boyd Rd	Through Site Link	North Sydney Council	Neutral Bay - Crows Nest	37
137	Ben Boyd Rd - Wycombe Rd	Through Site Link	North Sydney Council	Neutral Bay - Shoreline	37
138	Alexander St / Burlington St	Junction	North Sydney Council	Other	36
139	Ben Boyd Rd / Phillips St	Junction	North Sydney Council	Neutral Bay - Shoreline	36
140	Ben Boyd Rd: Aubin Rd - Phillips St	Linear	North Sydney Council	Neutral Bay - Shoreline	36
141	Morton St / Hazelbank Rd	Junction	North Sydney Council	Crows Nest - Waverton Station	36
142	McDougall St - Bradly Av	Through Site Link	North Sydney Council	Kirribilli - Neutral Bay Wharf	36
143	Bay Rd / Edward St	Junction	North Sydney Council	North Sydney CBD - Waverton Station	35
144	Falcon St: Alexander St - West St	Linear	North Sydney Council Advocacy (TfNSW)	Falcon Street Corridor	35
145	Falcon St: Miller St - Moodie St	Linear	North Sydney Council Advocacy (TfNSW)	Falcon Street Corridor	35
146	Falcon St: West St - Miller St	Linear	North Sydney Council Advocacy (TfNSW)	Falcon Street Corridor	35
147	King George St: Blues Point Rd - Lavender Crescent	Linear	North Sydney Council	North Sydney Highline	35
148	Military Rd - Ernest St	Through Site Link	North Sydney Council	Neutral Bay - Crows Nest	35
149	River Rd: Shirley Rd - Lithgow St	Linear	North Sydney Council Advocacy (TfNSW)	Crows Nest - Wollstonecraft Station	35
150	Ben Boyd Rd / Aubin St	Junction	North Sydney Council	Neutral Bay - Shoreline	34
151	Ben Boyd Rd: Kurraba Rd - Aubin St	Linear	North Sydney Council	Neutral Bay - Shoreline	34
152	Berry St / Angelo St	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - St Leonards	33
153	Falcon St / Bent St	Junction	North Sydney Council Advocacy (TfNSW)	Neutral Bay - Cremorne	33
154	Miller St - Walker St	Through Site Link	North Sydney Council	North Sydney CBD - Cammeray	33
155	Kurraba Rd / Ben Boyd Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	32
156	Abbott St / Palmer St	Junction	North Sydney Council	North Sydney CBD - Cammeray	31
157	Sinclair St / Rocklands Rd	Junction	North Sydney Council	Other	31
158	Abbott St: Palmer St - Miller St	Linear	North Sydney Council	North Sydney CBD - Cammeray	30
159	Falcon St / Alexander St	Junction	North Sydney Council Advocacy (TfNSW)	Falcon Street Corridor	30
160	Crows Nest Rd / McHatton St	Junction	North Sydney Council	Crows Nest - Waverton Station	29
161	Crows Nest Road: Morton St - McHatton St	Linear	North Sydney Council	Crows Nest - Waverton Station	29
162	Manns Ave: Kurraba Rd - Hayes St	Linear	North Sydney Council	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	29

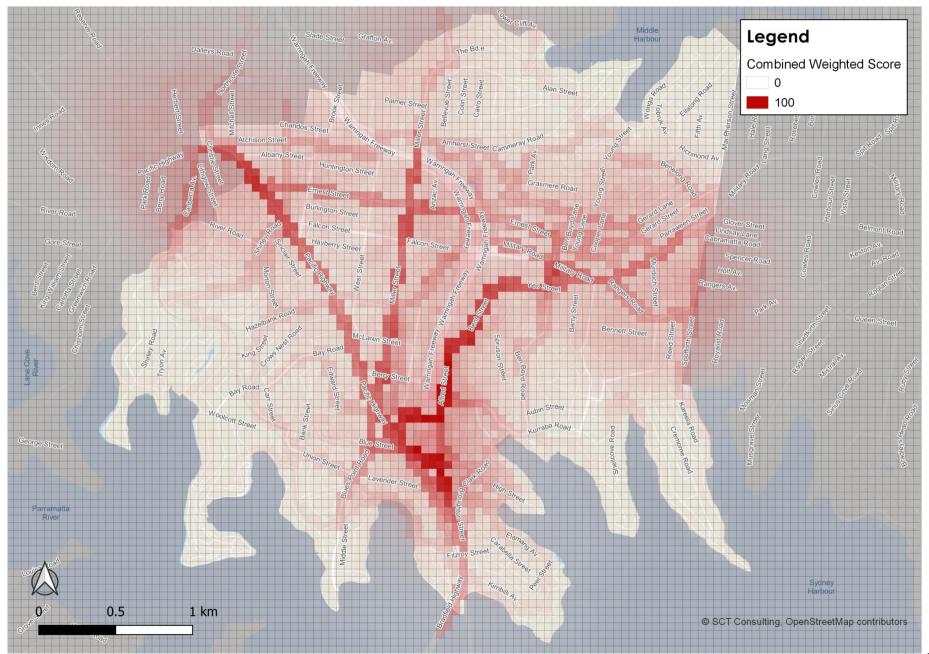


Project	Opportunity Detail	Туре	Delivery Mechanism	Action Name	Score
ID		-37-	(Project Stakeholders)		(/100)
163	Carr St / Crows Nest Rd	Junction	North Sydney Council	Crows Nest - Waverton Station	28
164	Carr St: King St - Crows Nest Rd	Linear	North Sydney Council	Crows Nest - Waverton Station	28
165	Lavender St / Miller St	Junction	North Sydney Council	North Sydney CBD - Blues Point	28
166	Hayes St / Manns Av	Junction	North Sydney Council	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	27
167	Hayes St: Manns Av - Neutral Bay Wharf	Linear	North Sydney Council	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	27
168	Morton St: Hazelbank Rd - Crows Nest Rd	Linear	North Sydney Council	Crows Nest - Waverton Station	25
169	Falcon St / West St	Junction	North Sydney Council Advocacy (TfNSW)	Falcon Street Corridor	24
170	Russell St: Milner Crescent - Shirley Ln	Linear	North Sydney Council	Crows Nest - Wollstonecraft Station	24
171	Bridge End / Walumetta Drive	Junction	North Sydney Council	Waverton Station - Wollstonecraft Station	23
172	Whatmore Ln: McKye St - Bay Rd	Linear	North Sydney Council	Crows Nest - Waverton Station	23
173	McHatton St - Bay Rd	Safety / Accessibility Improvements	North Sydney Council	North Sydney CBD - Waverton Station	23
174	Morton St / Crows Nest Rd	Junction	North Sydney Council	Crows Nest - Waverton Station	22
175	King St - Rocklands Rd	Safety / Accessibility Improvements	North Sydney Council	Crows Nest - Waverton Station	19
176	Kurraba Rd: Ben Boyd Rd - Wycombe Rd	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	19
177	Milner Crescent / Shirley Ln	Junction	North Sydney Council	Crows Nest - Wollstonecraft Station	18
178	Primrose Park - Churchill Crescent	Safety / Accessibility Improvements	North Sydney Council	Other	16
179	McKye St: Carr St - Tunks St	Linear	North Sydney Council	Crows Nest - Waverton Station	15
180	Hayes St: Kurraba Rd - Manns Av	Linear	North Sydney Council	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	14
181	Rail Path: King St - Bridge End	Linear	North Sydney Council	Waverton Station - Wollstonecraft Station	13
182	Kurraba Rd / Wycombe Rd	Junction	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	9
183	Kurraba Rd: Wycombe Rd - Billong St	Linear	North Sydney Council Advocacy (TfNSW)	North Sydney CBD - Neutral Bay Wharf - Cremorne Point	9

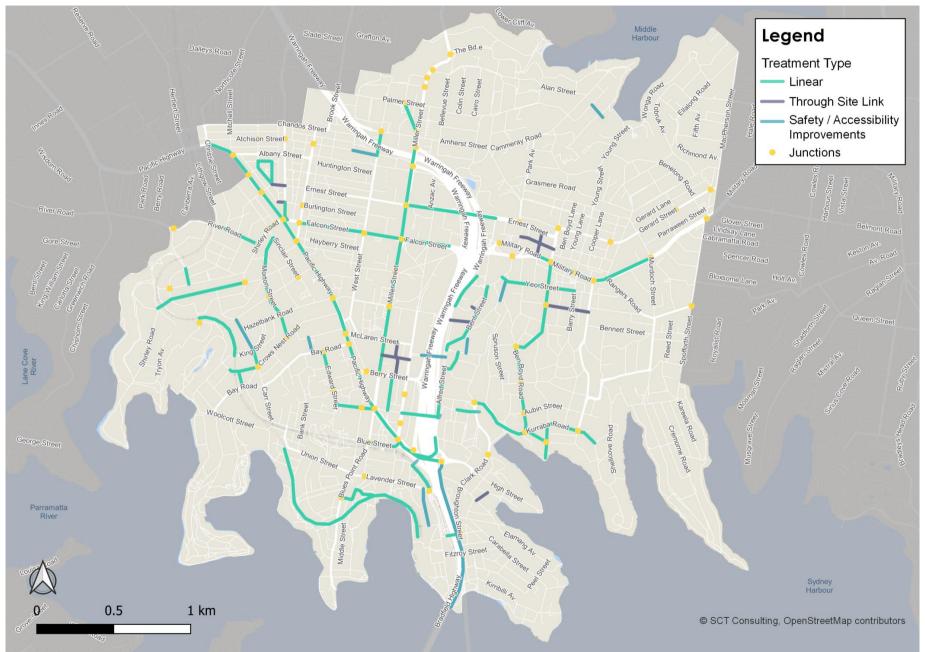


APPENDIX E All Maps

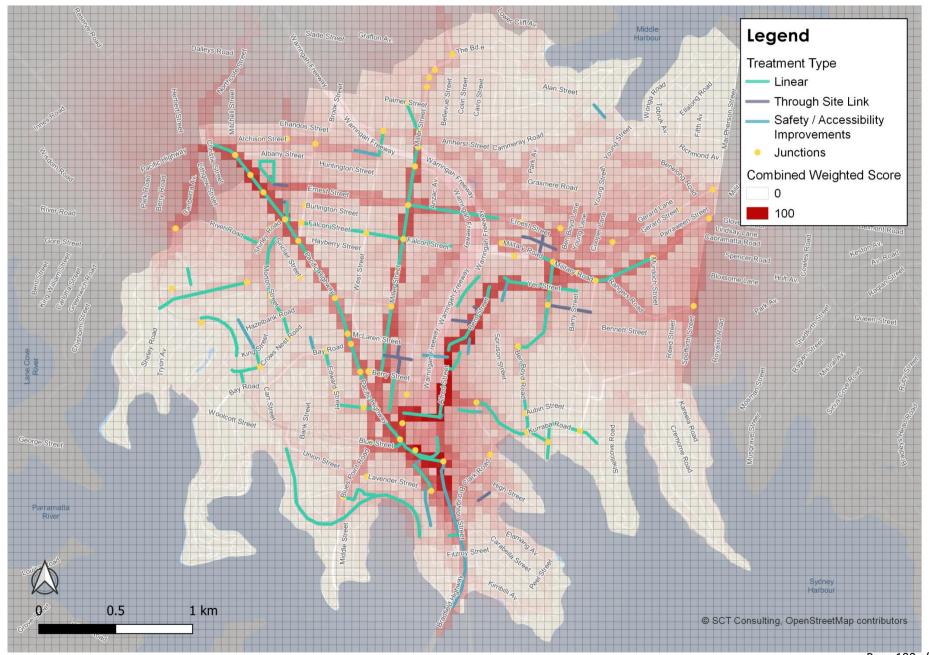
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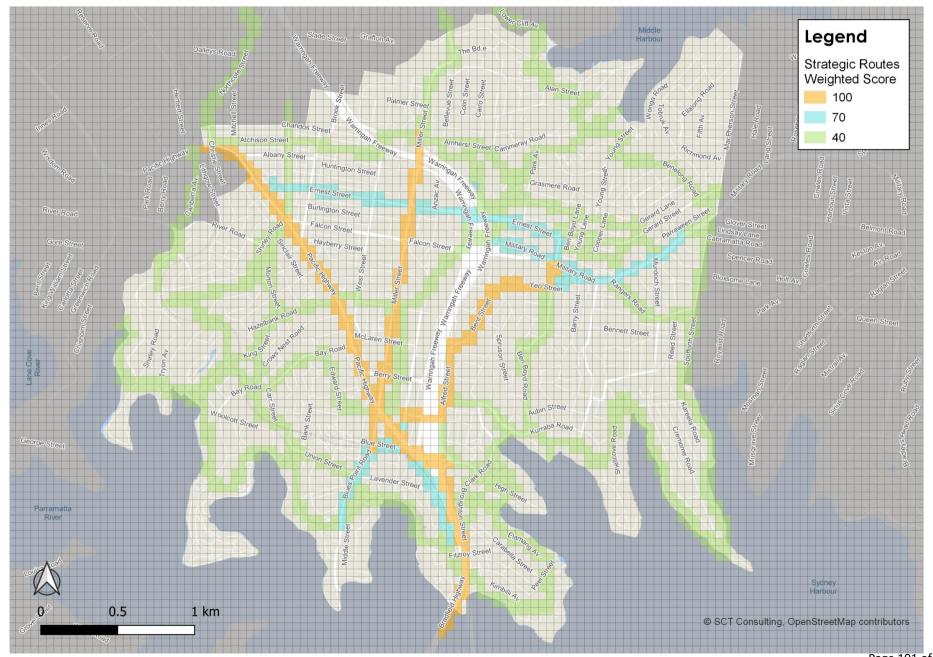
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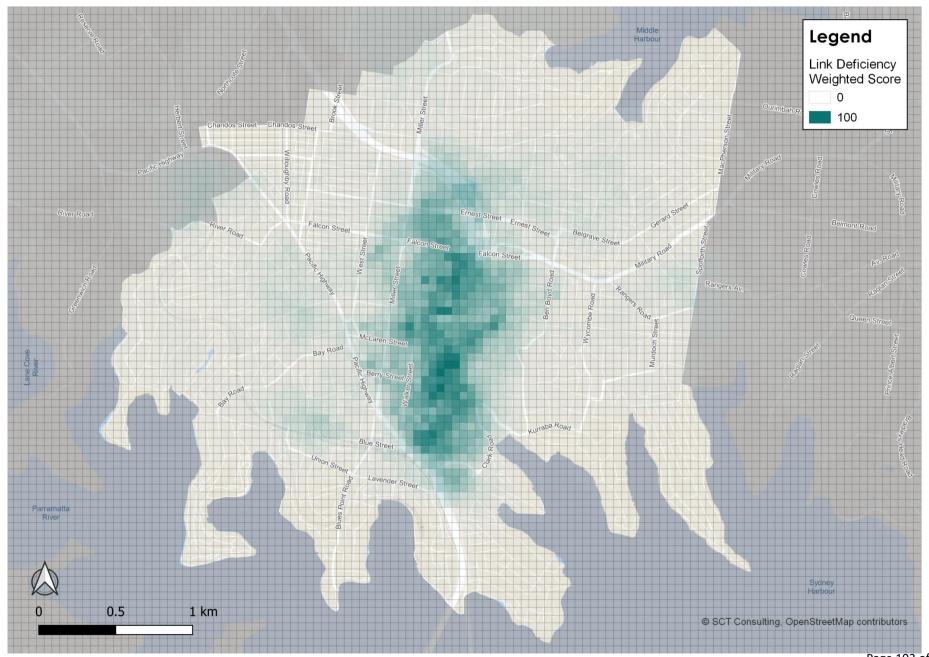
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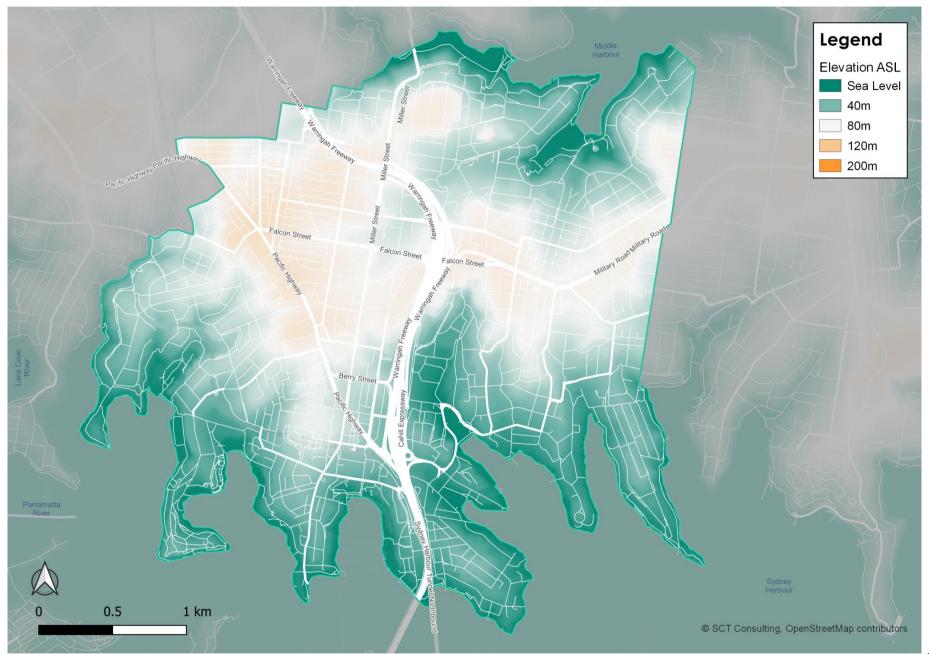
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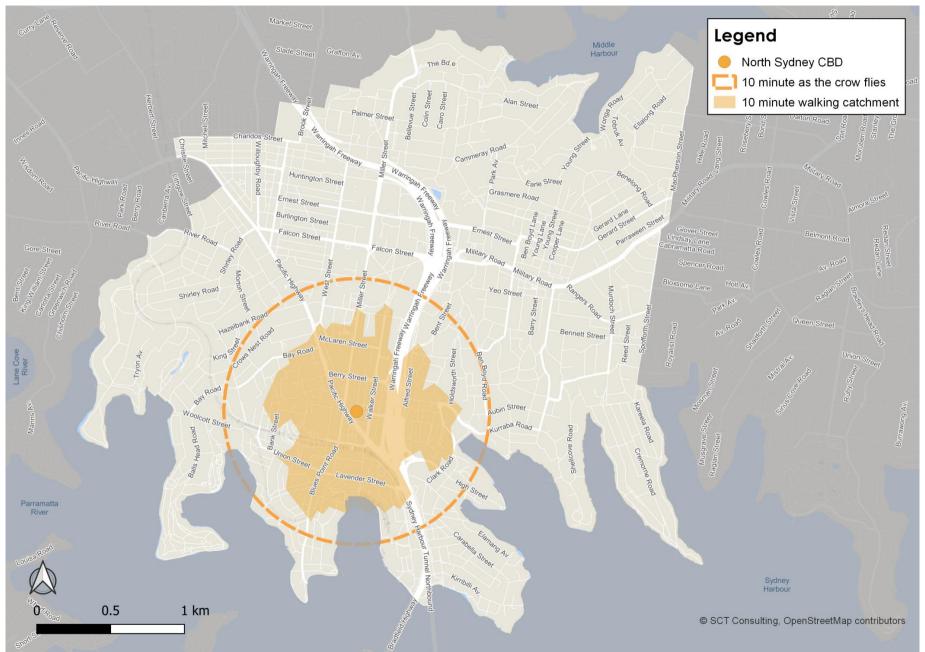
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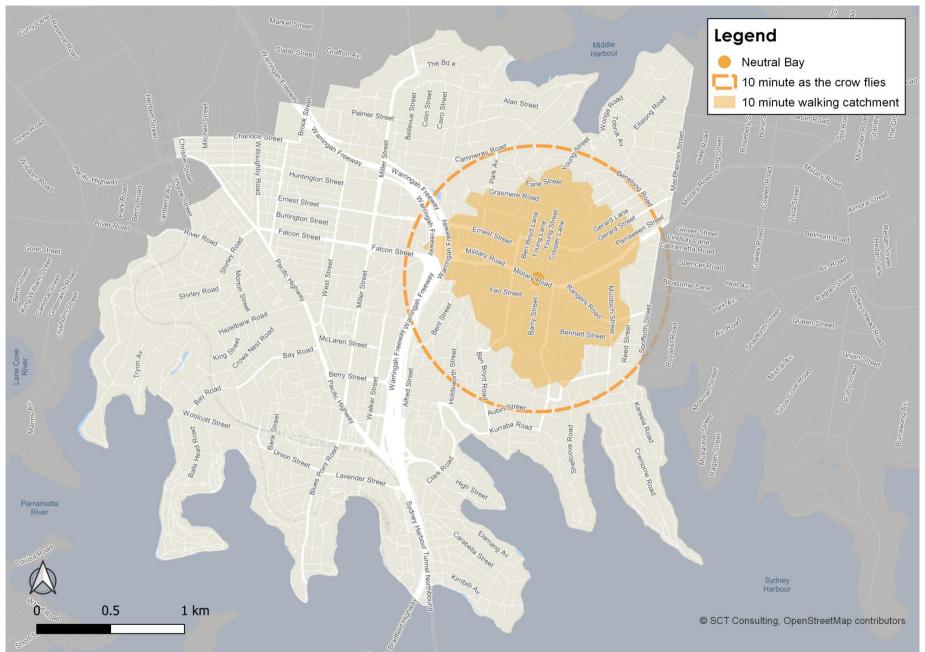
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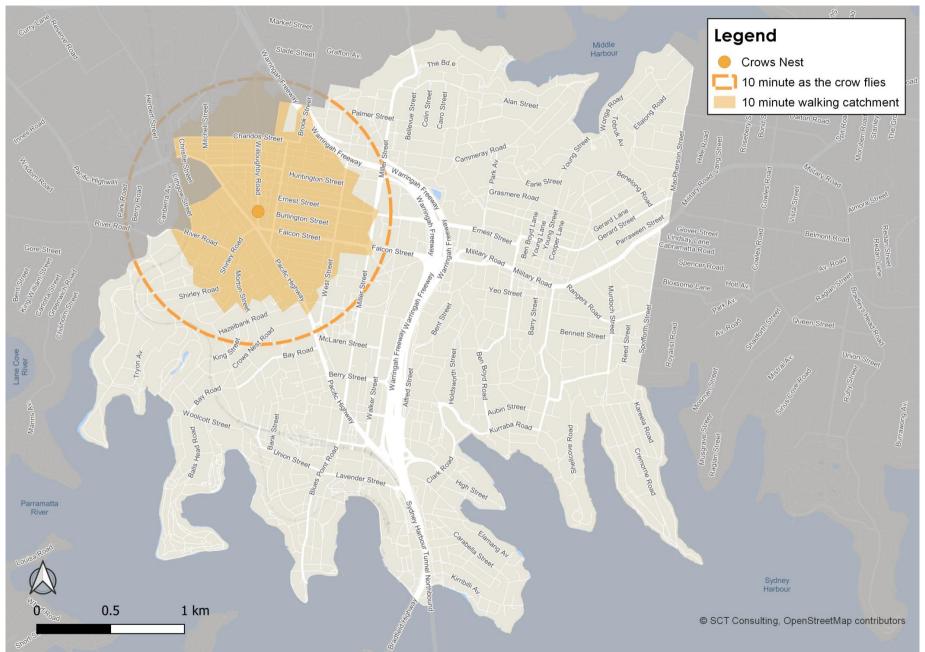
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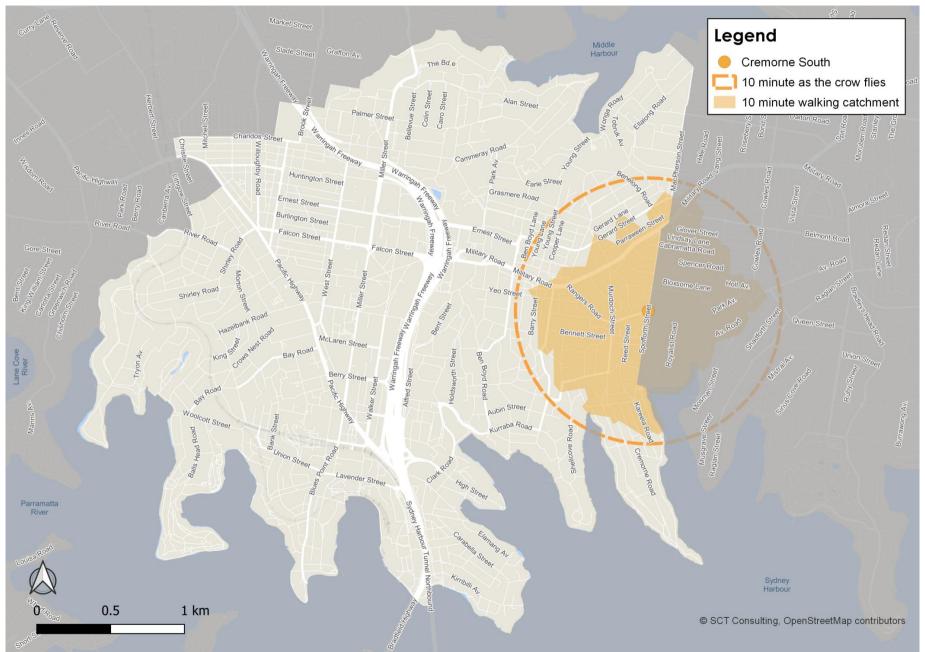
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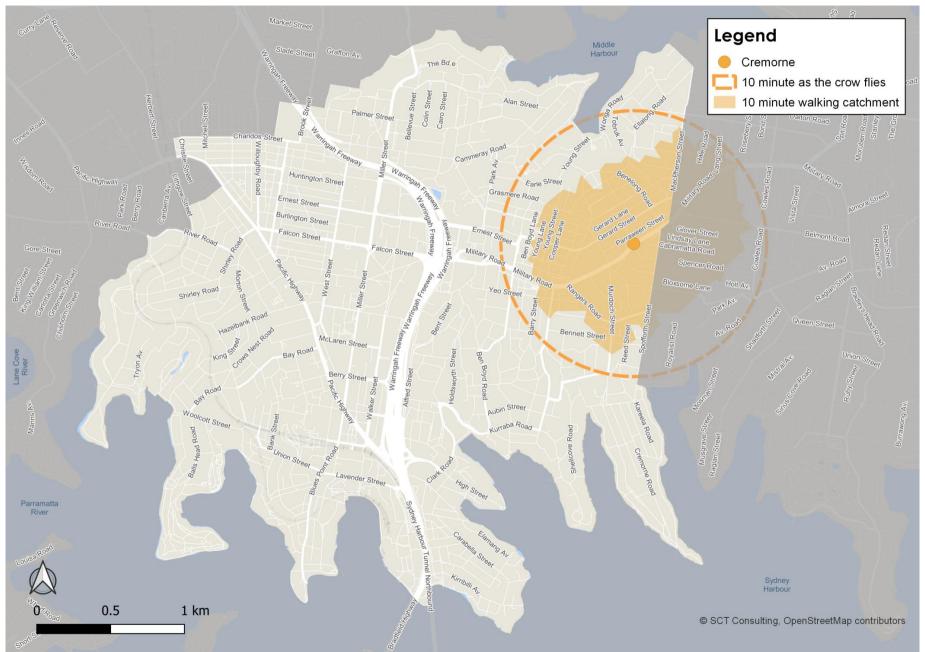
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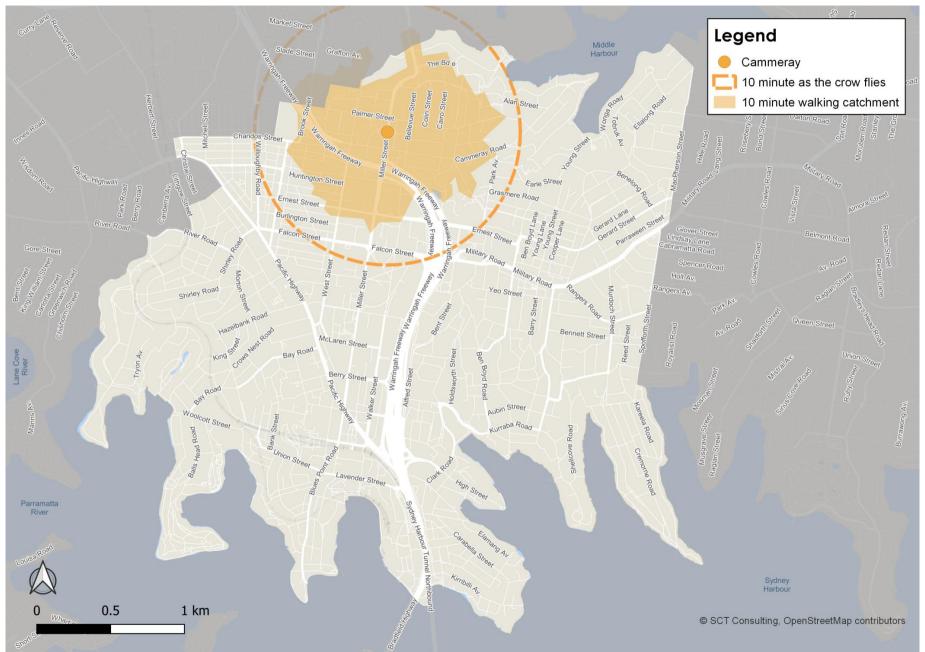
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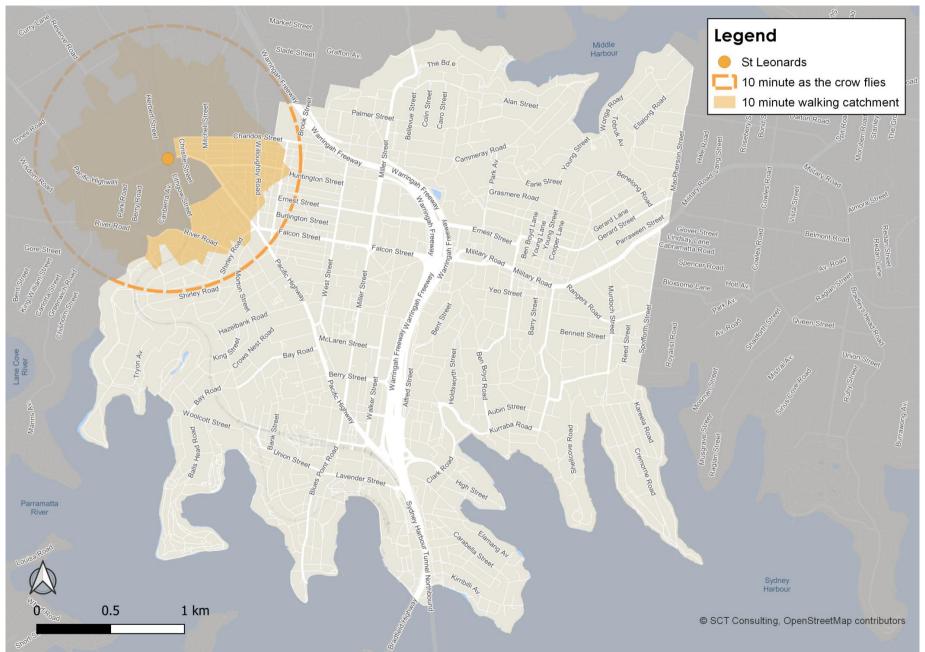
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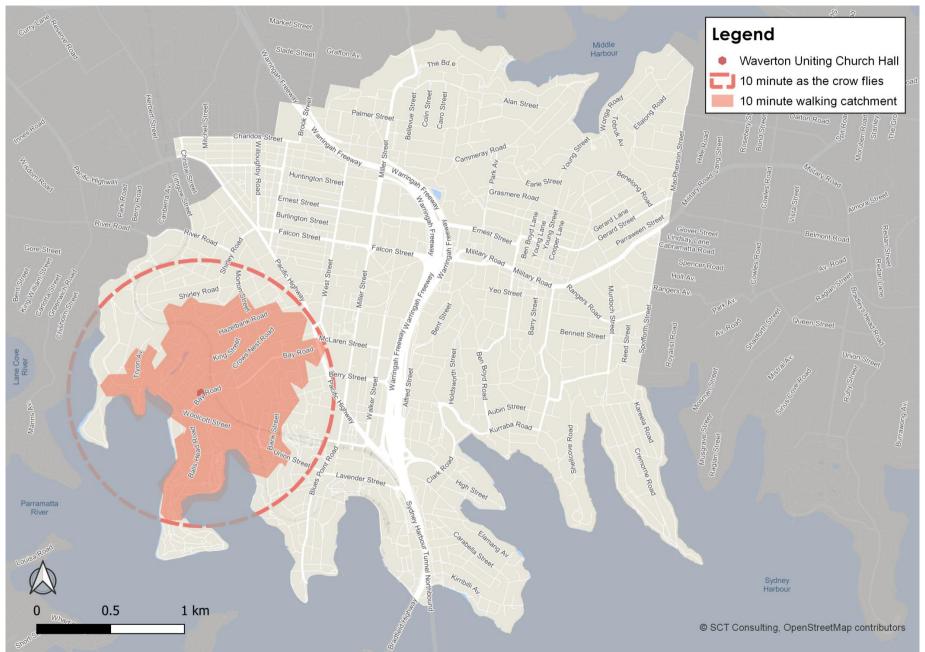
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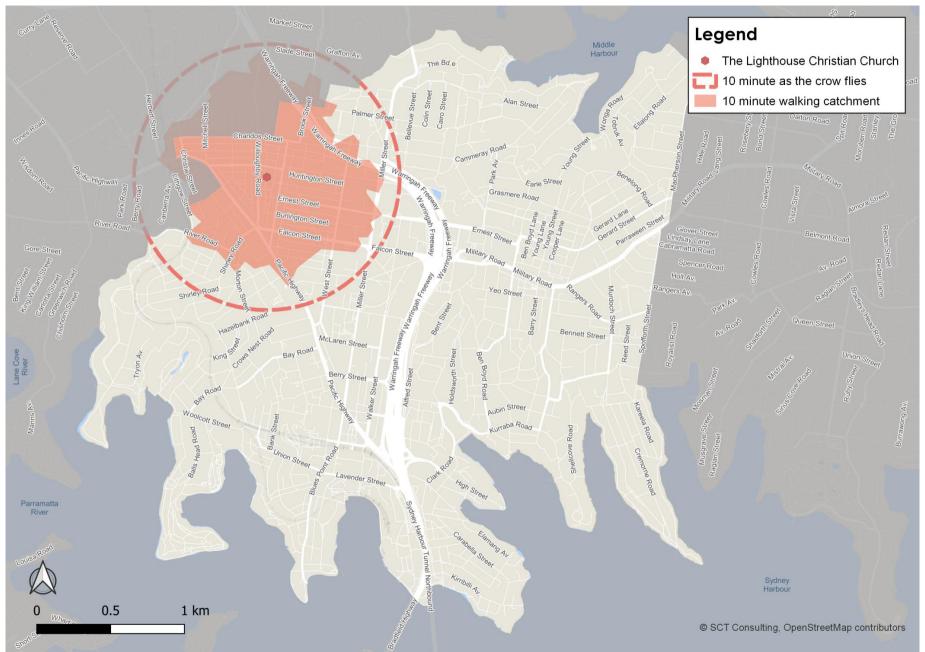
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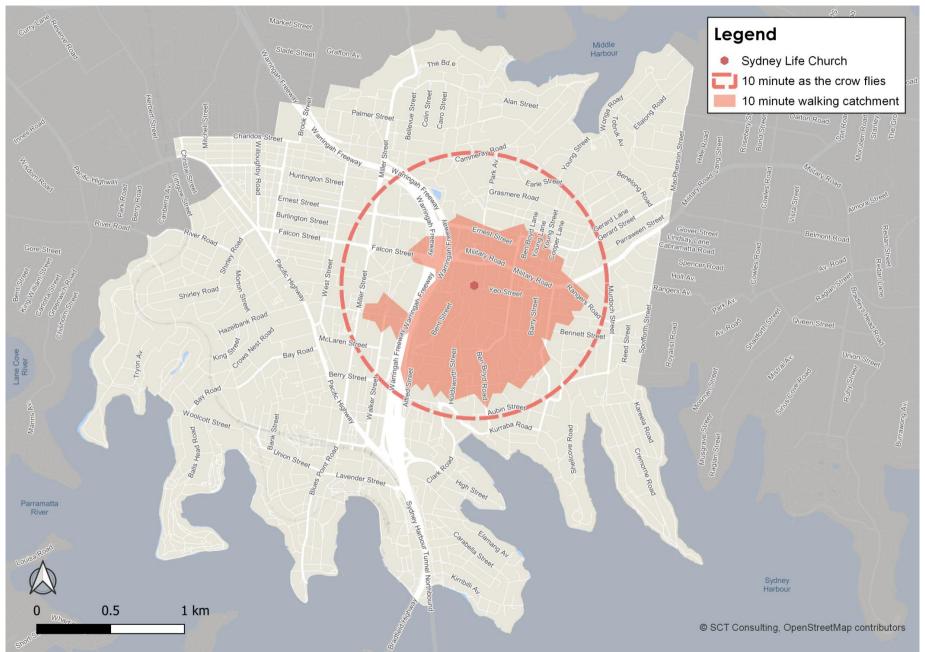
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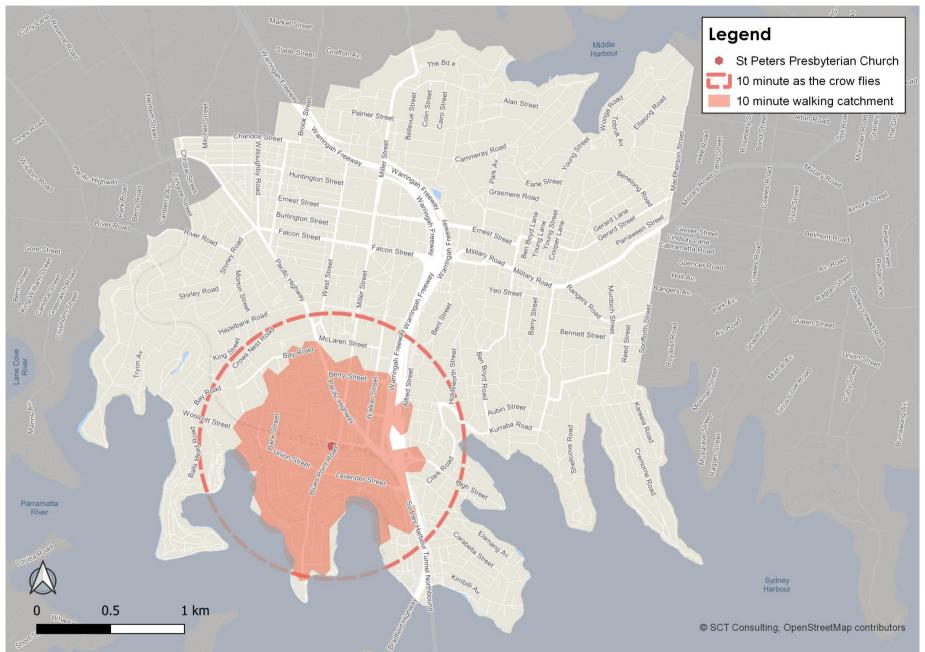
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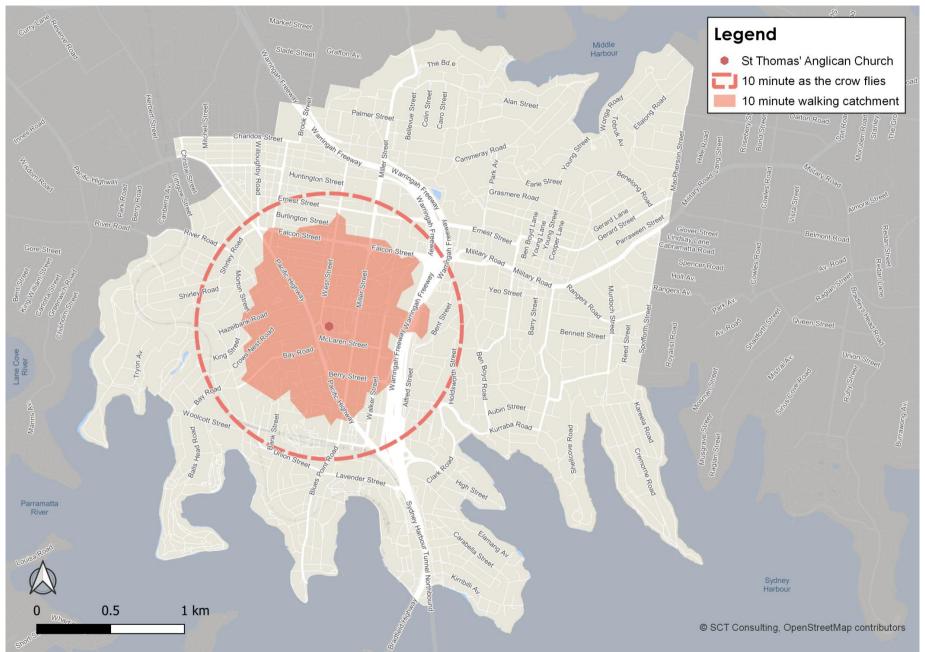
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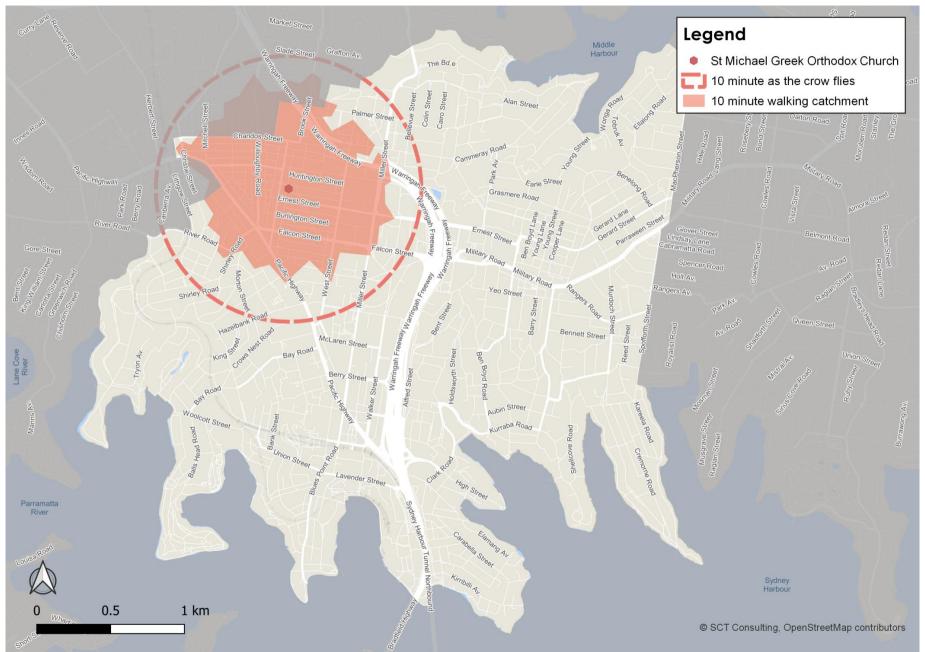
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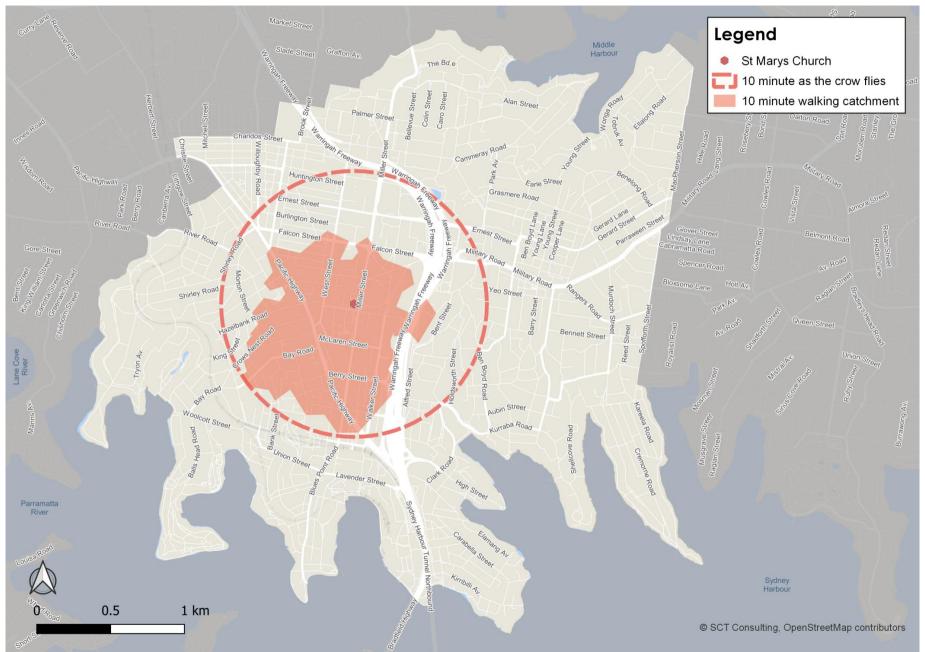
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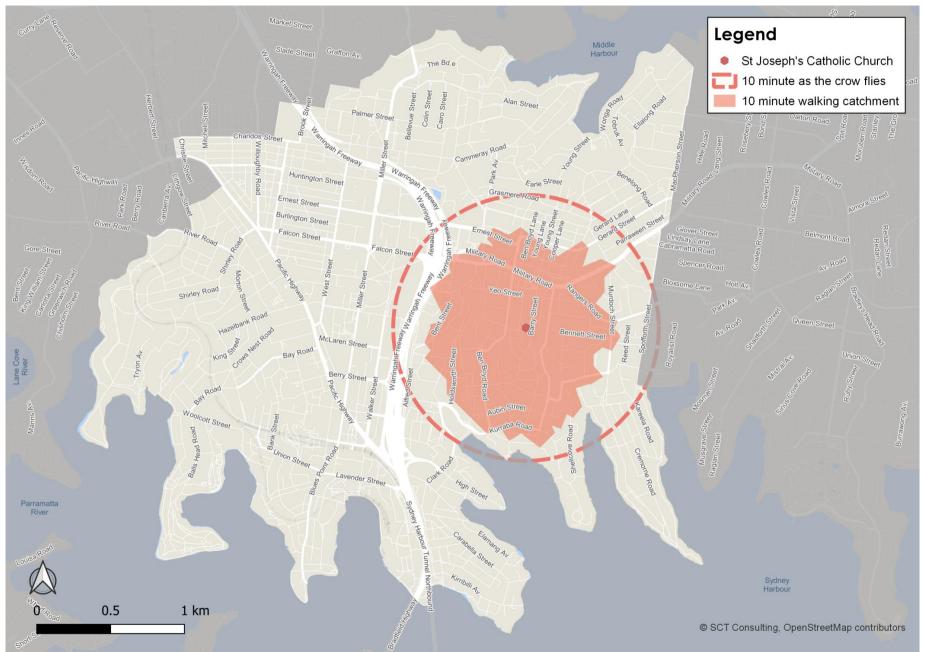
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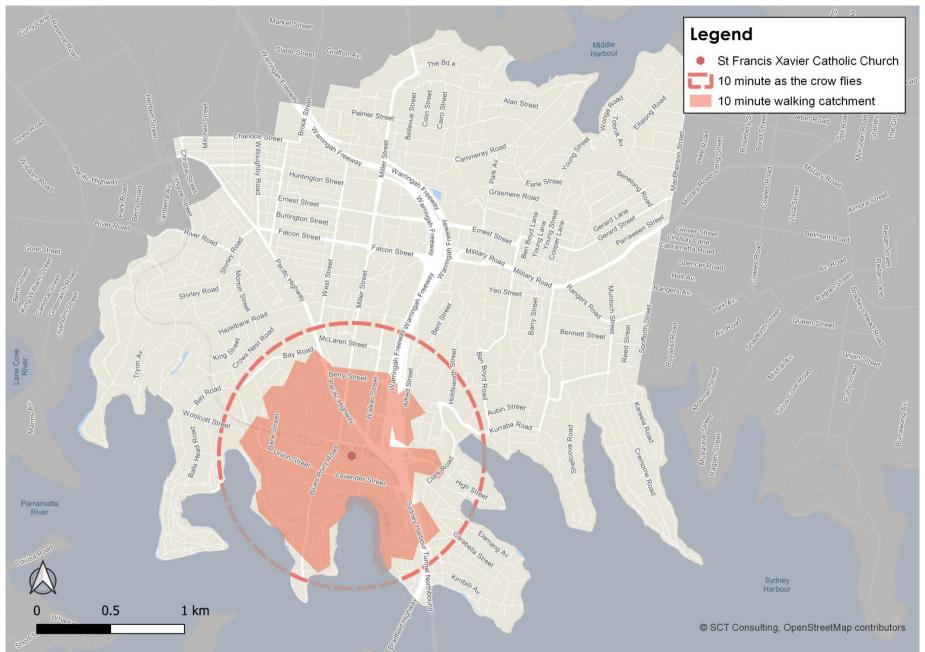
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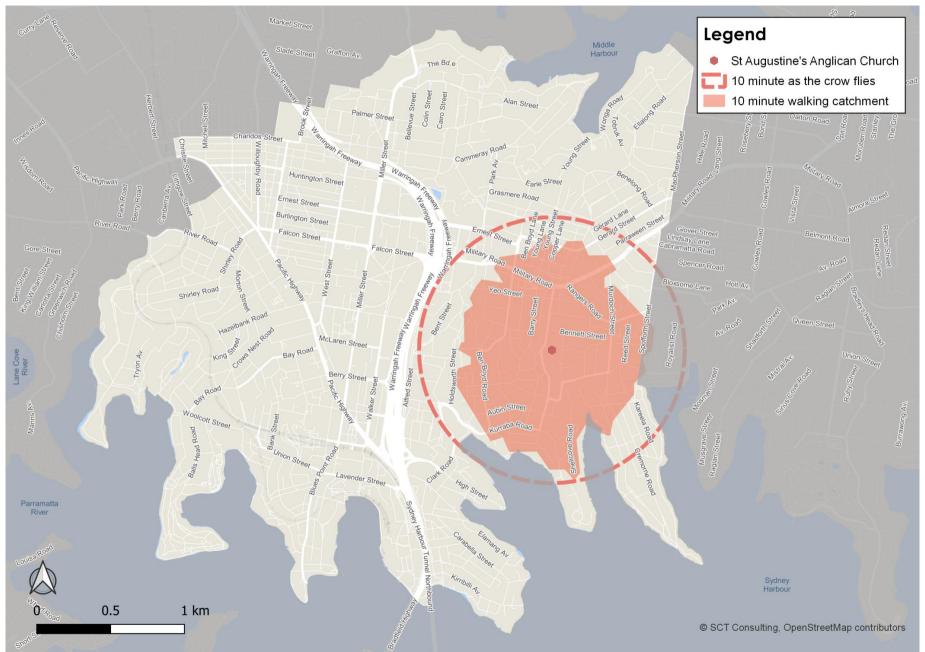
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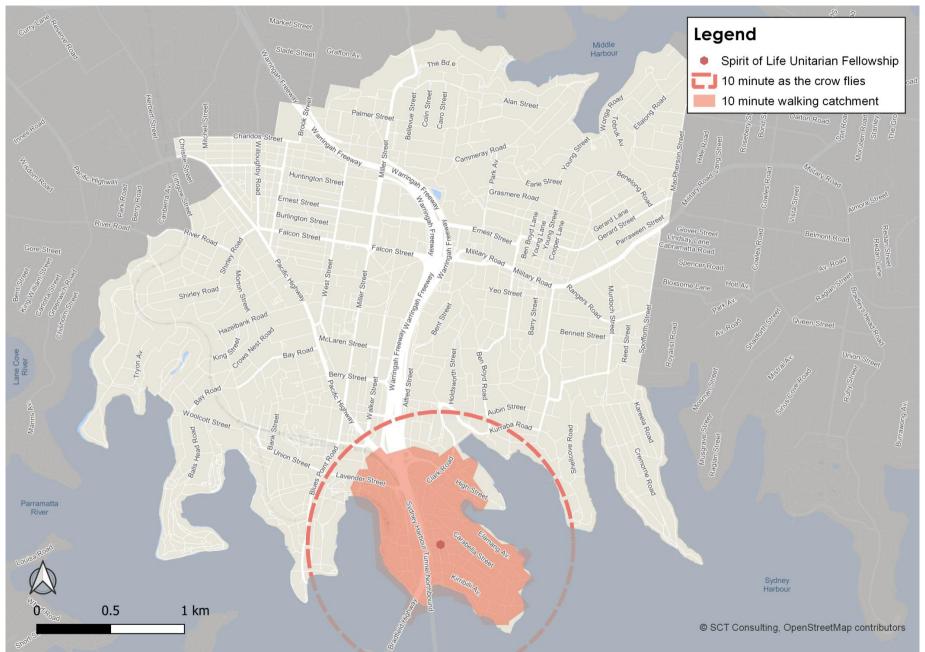
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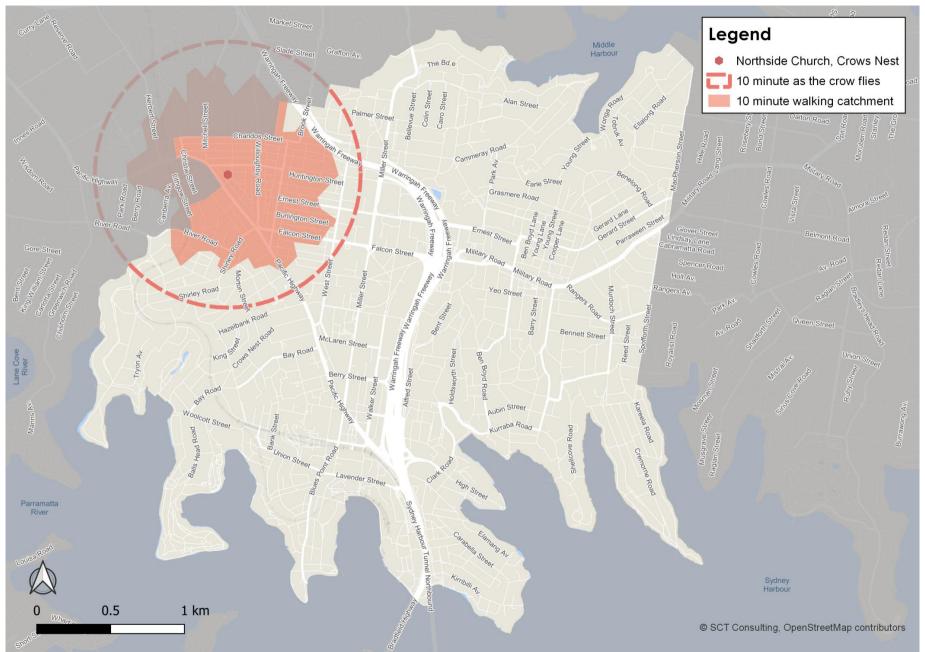
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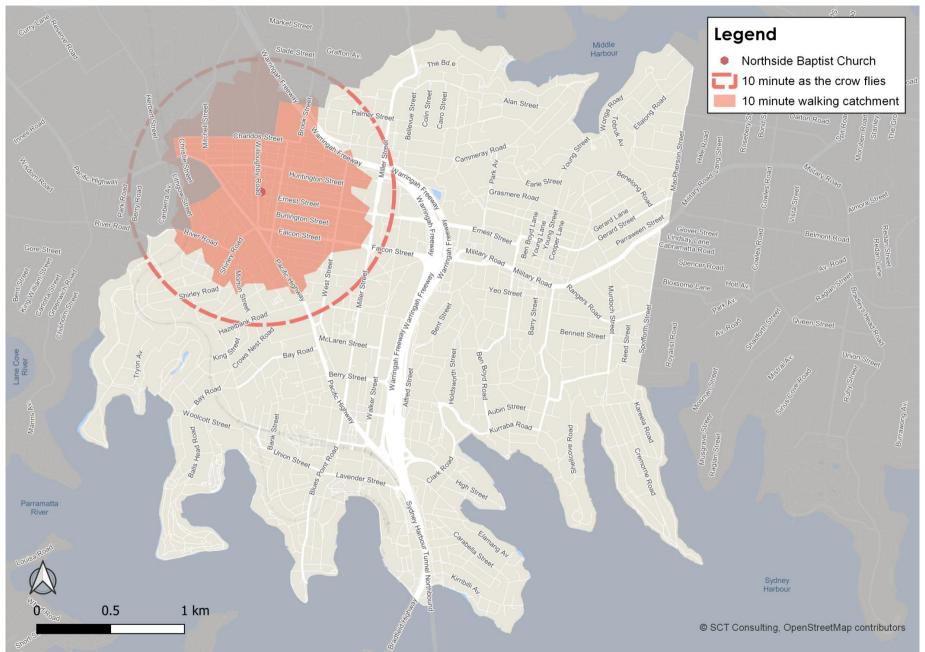
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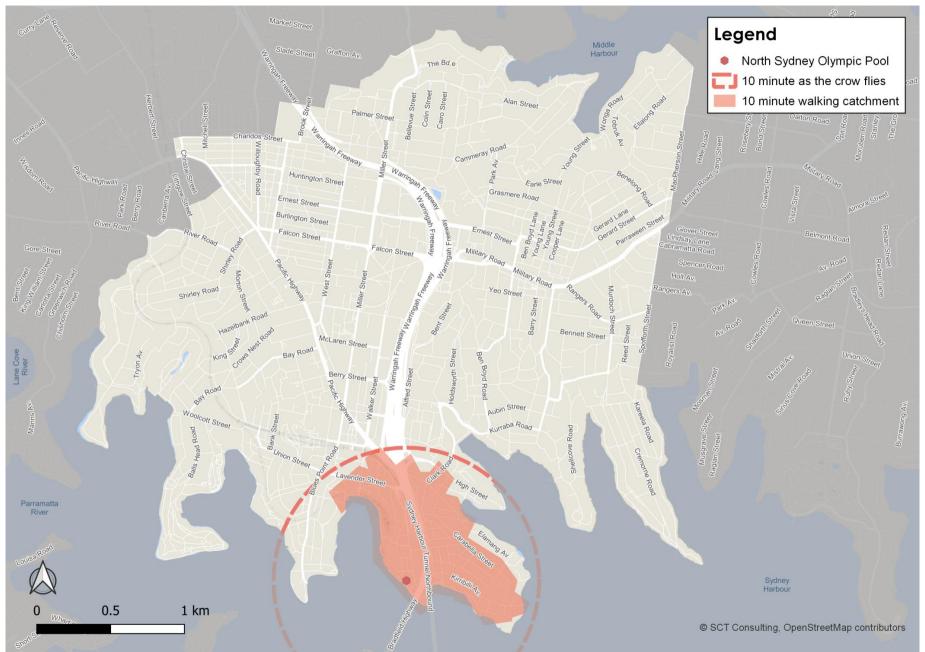
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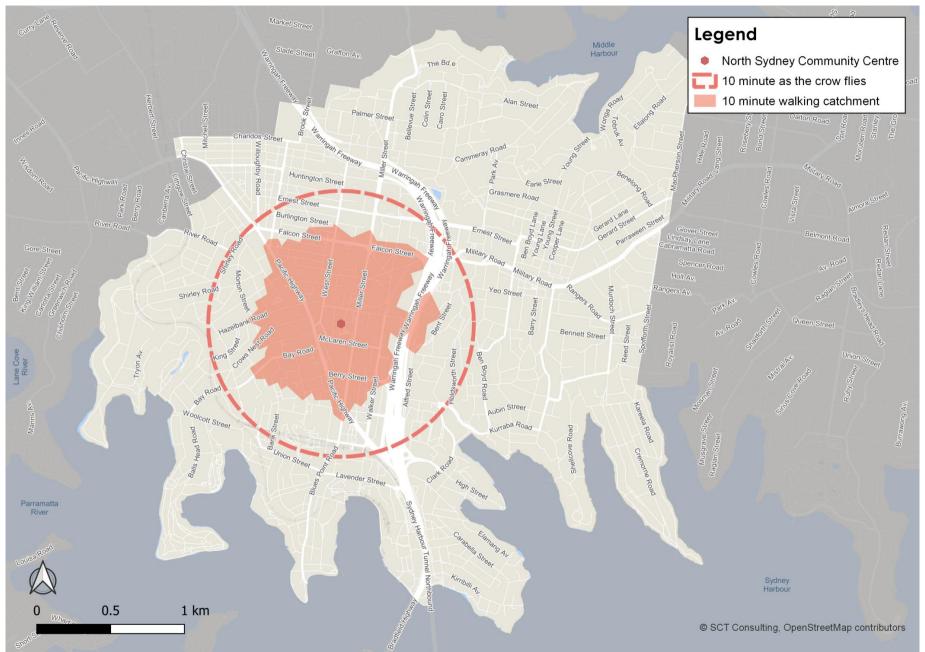
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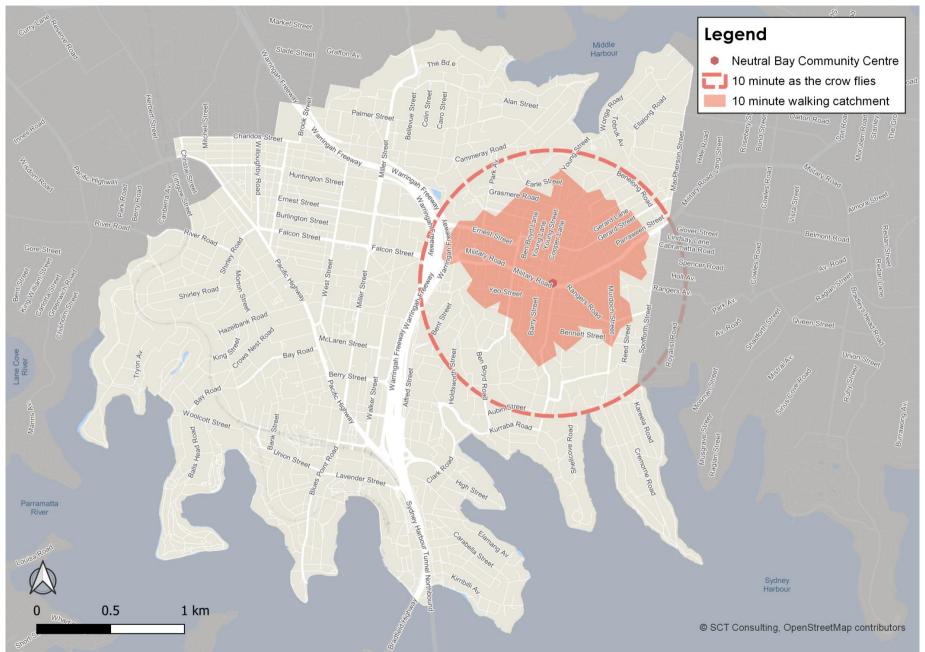
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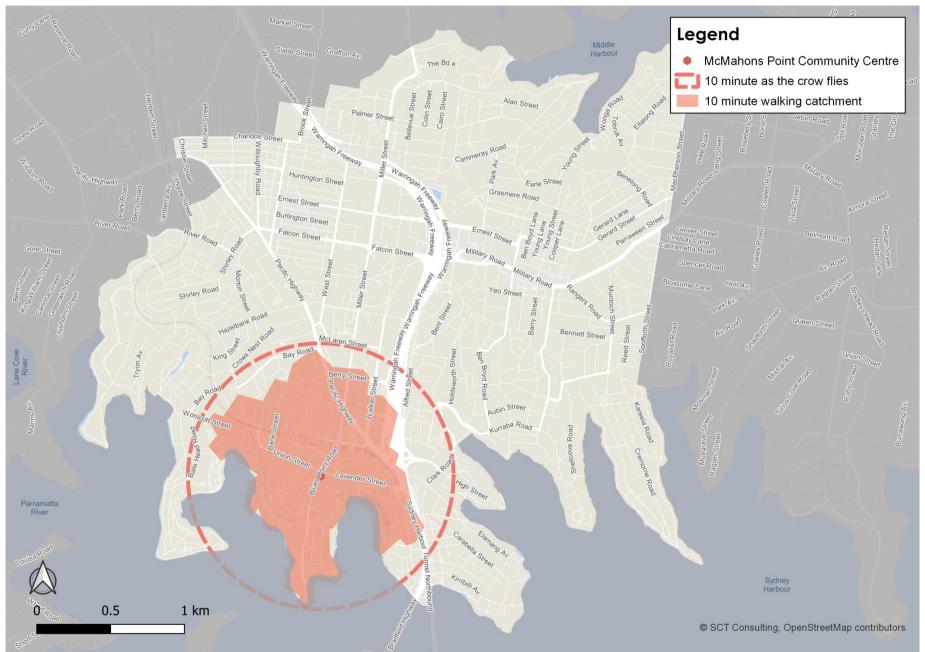
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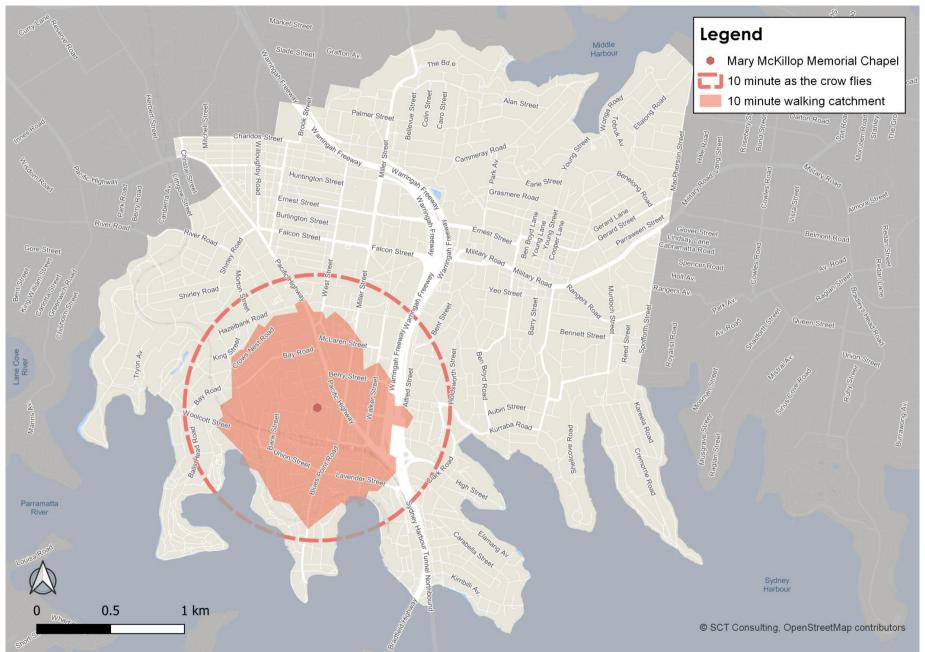
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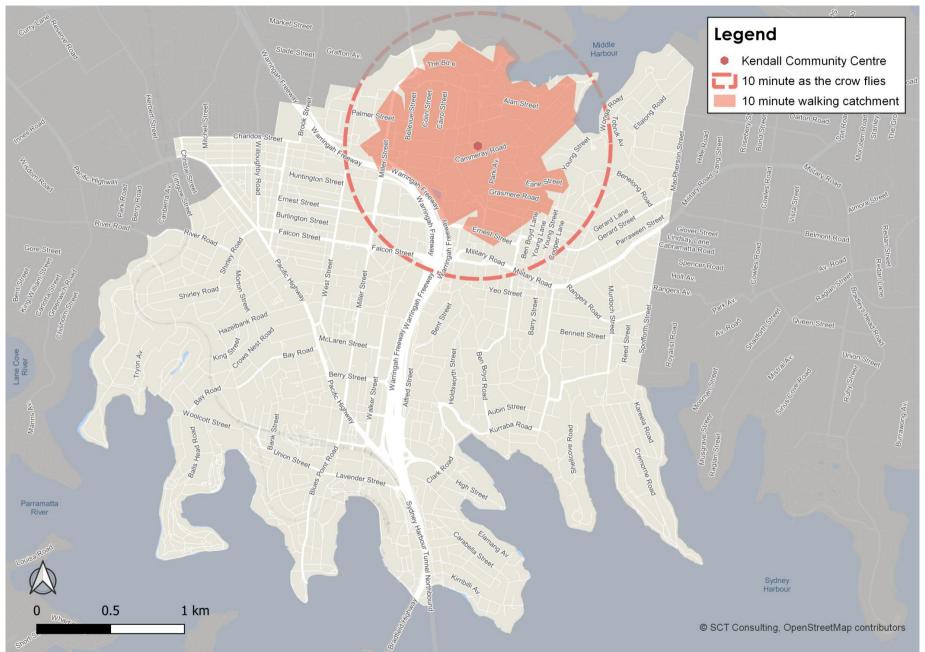
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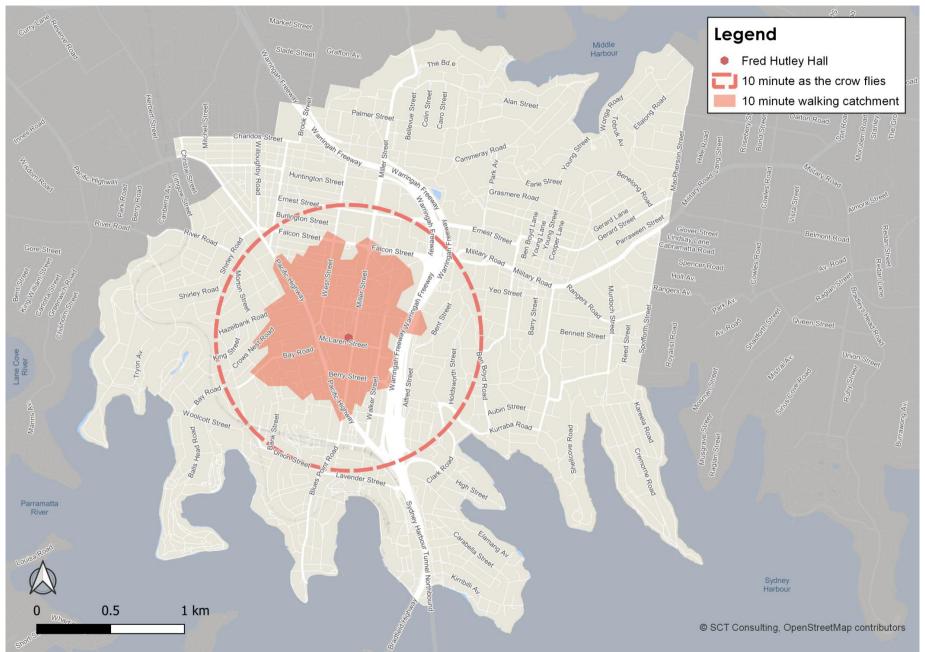
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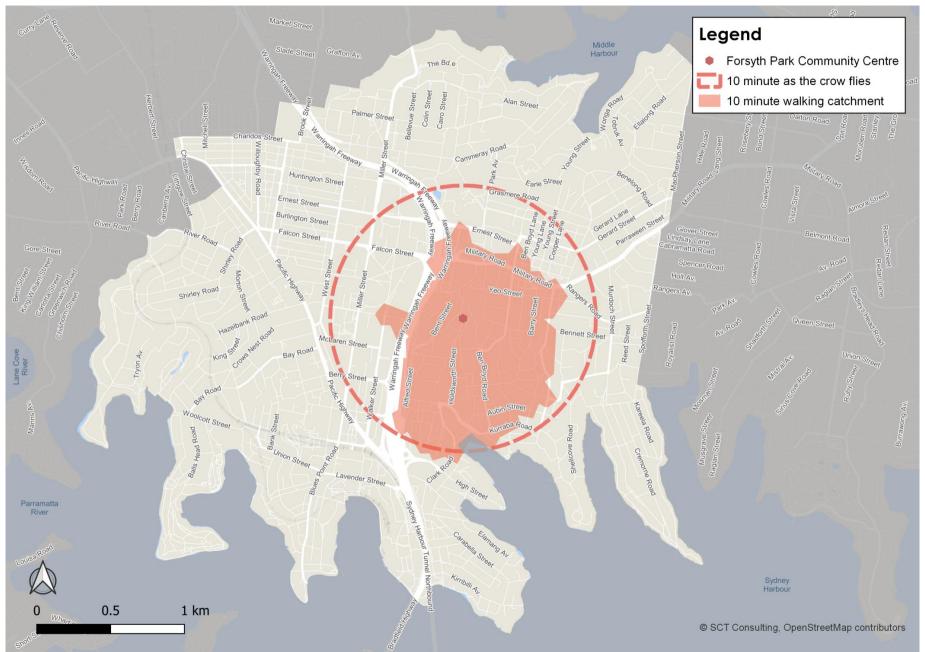
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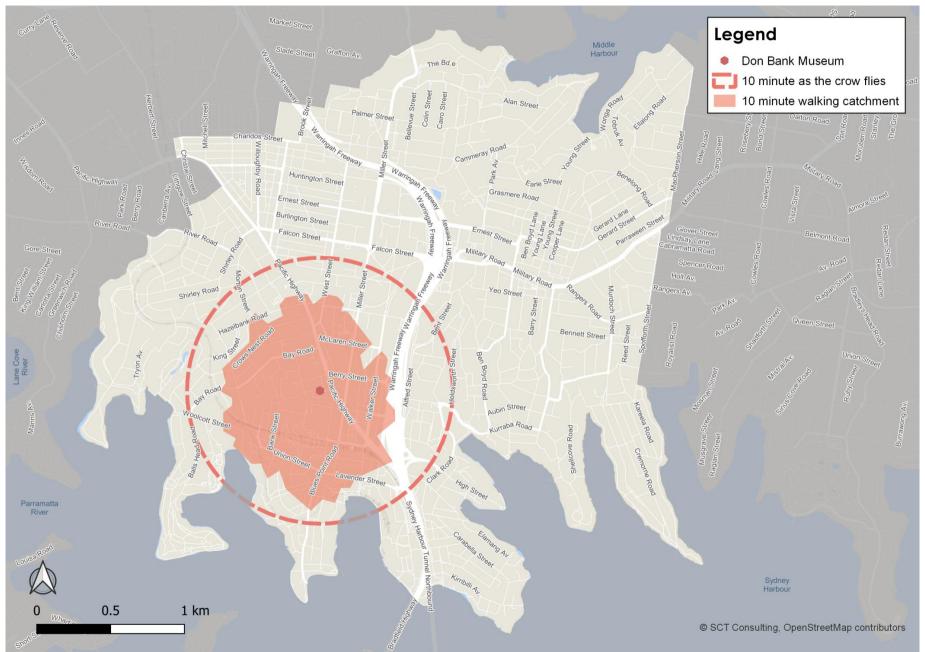
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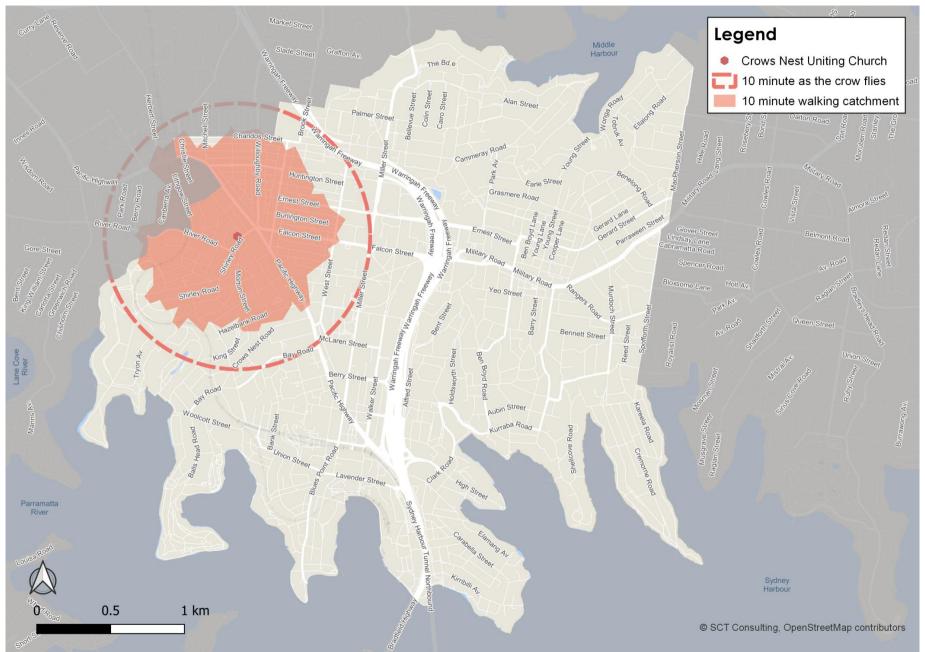
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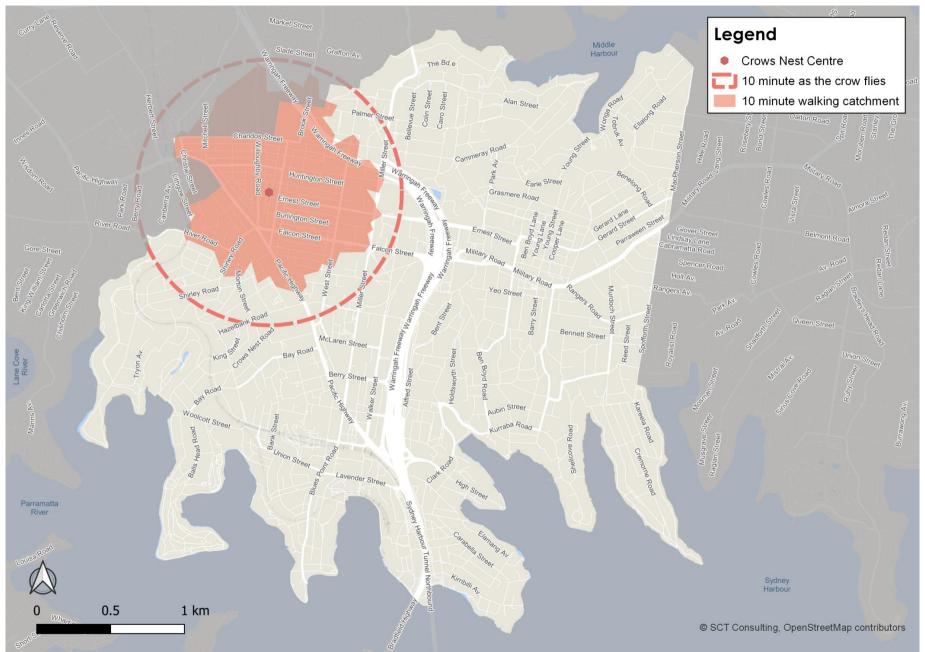
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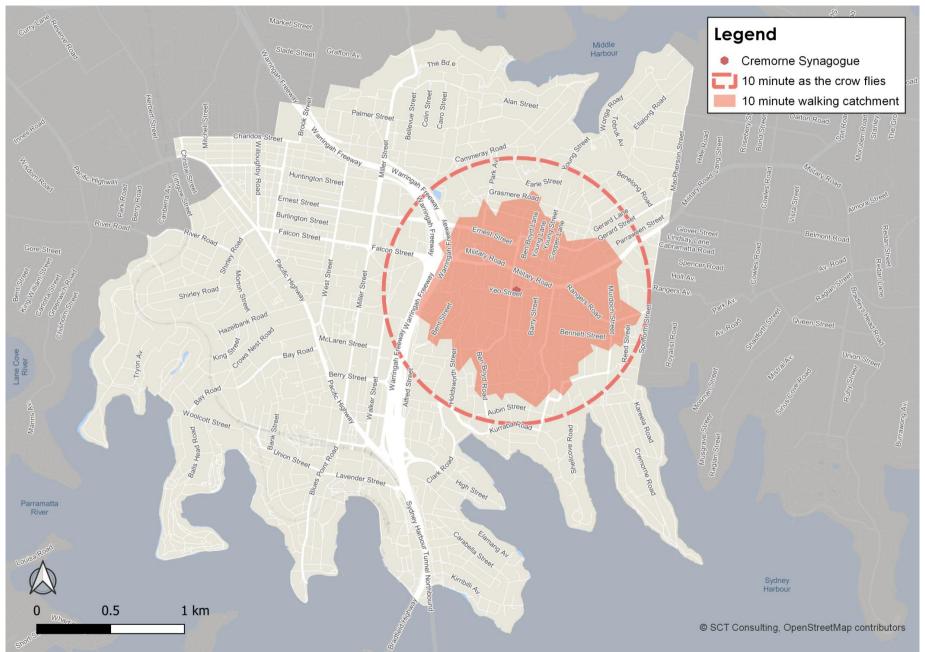
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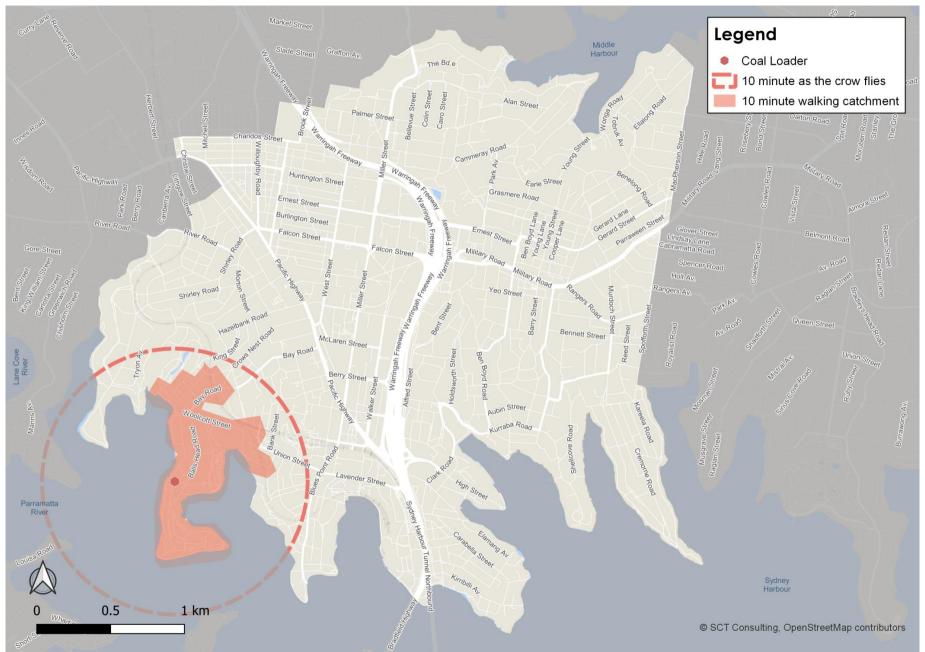
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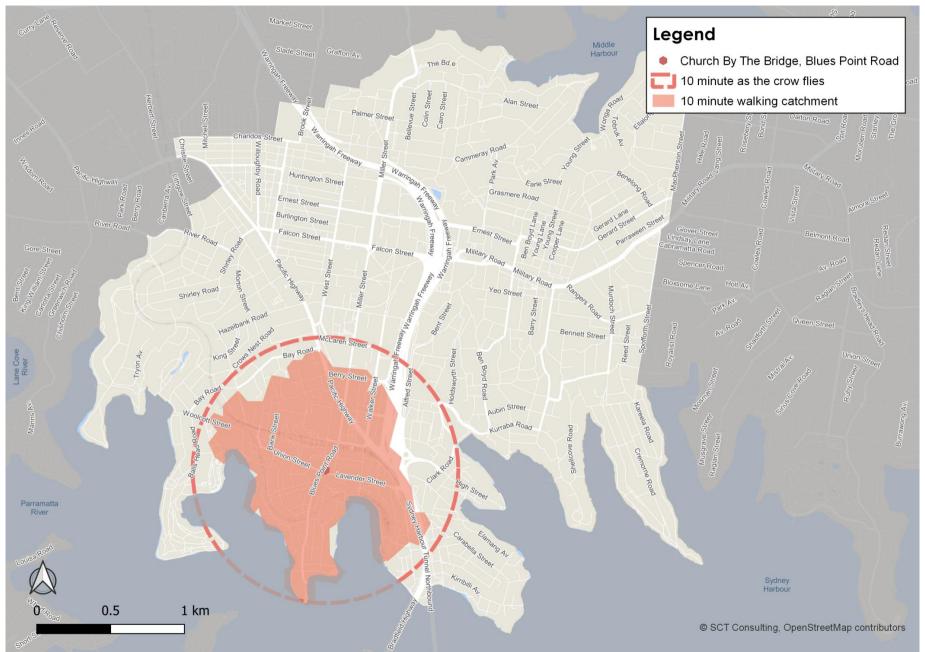
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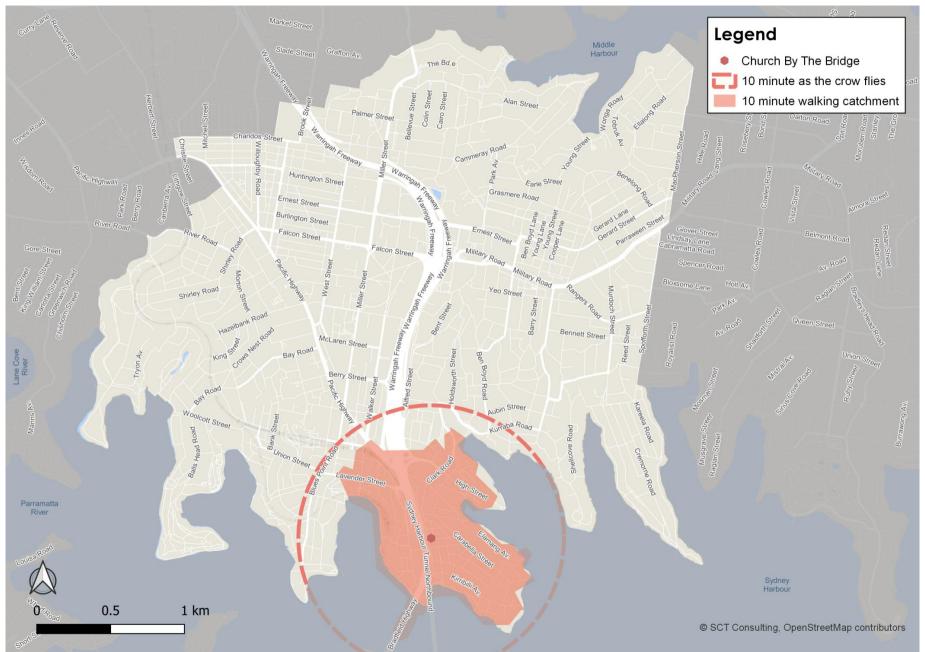
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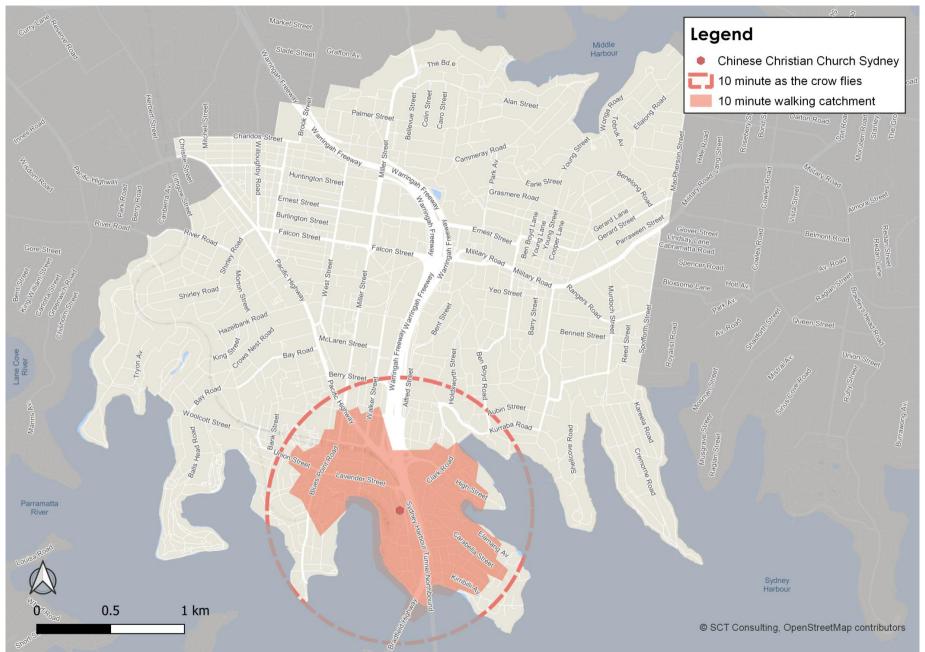
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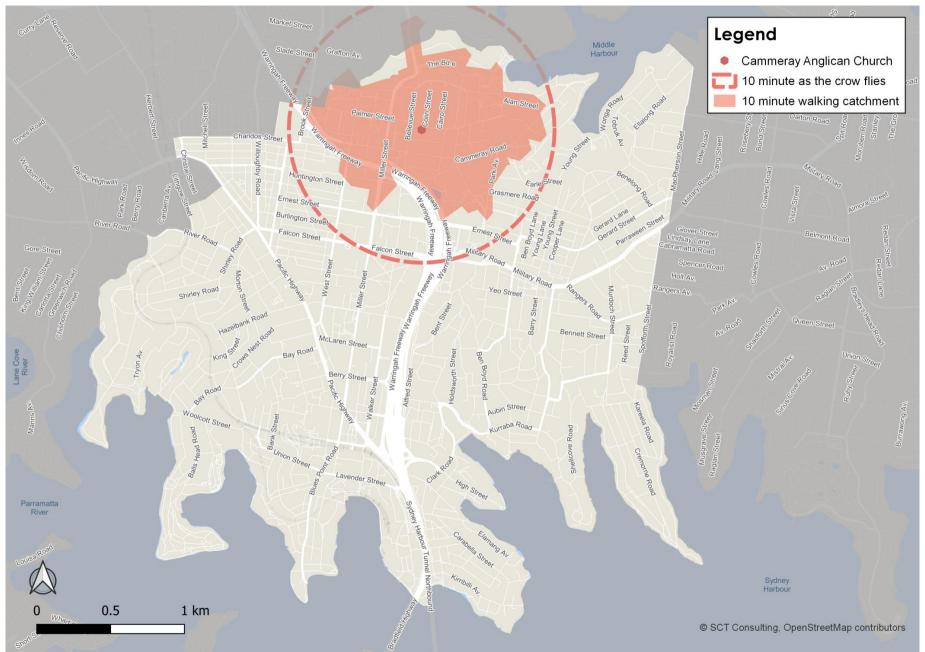
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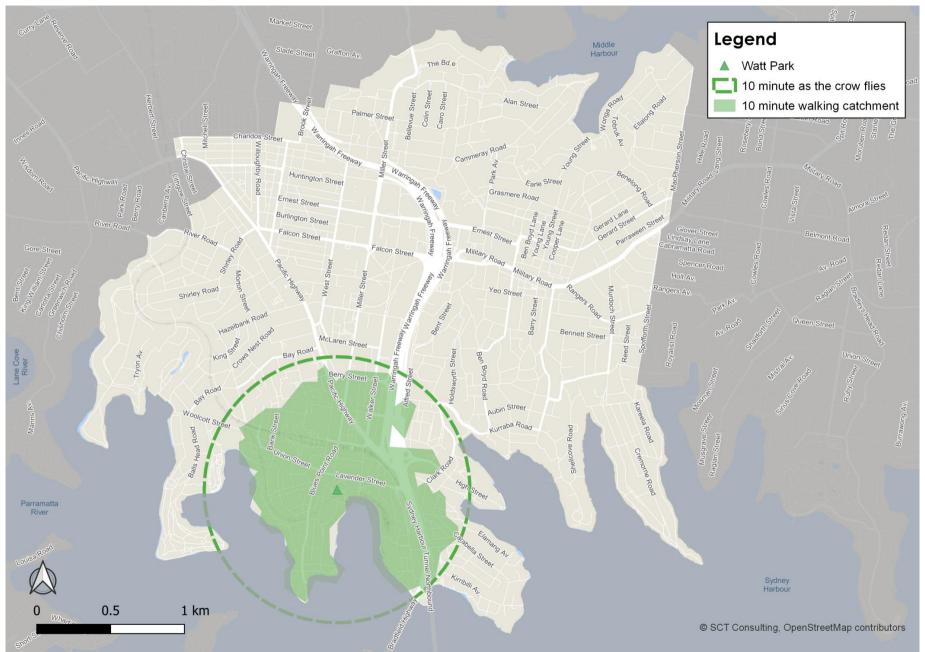
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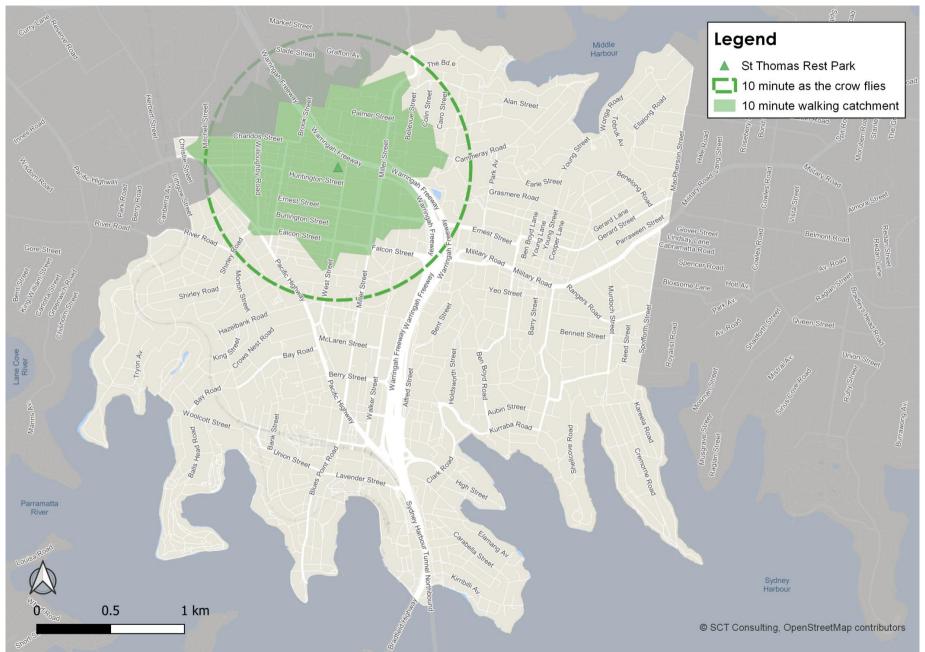
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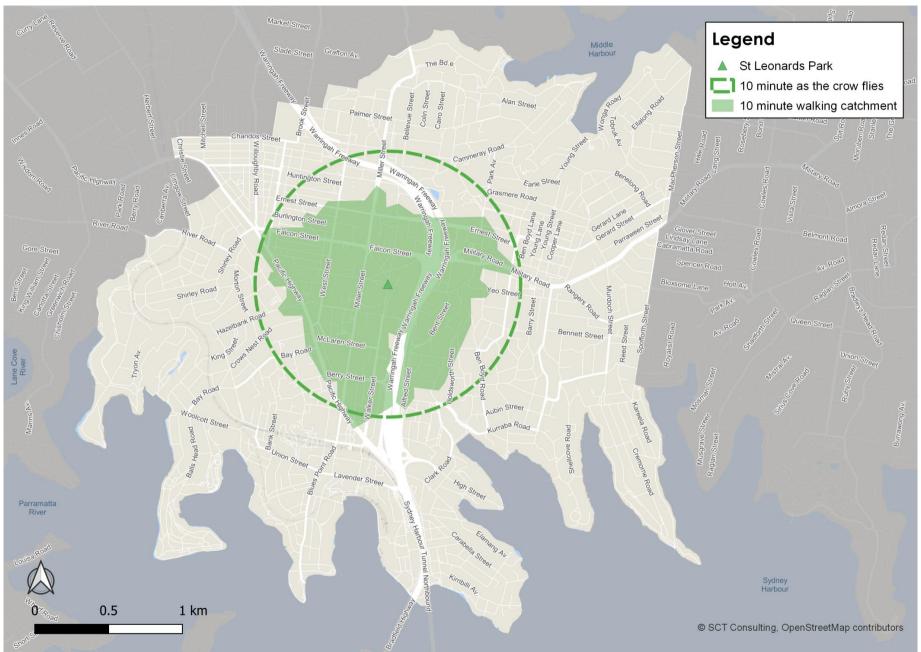
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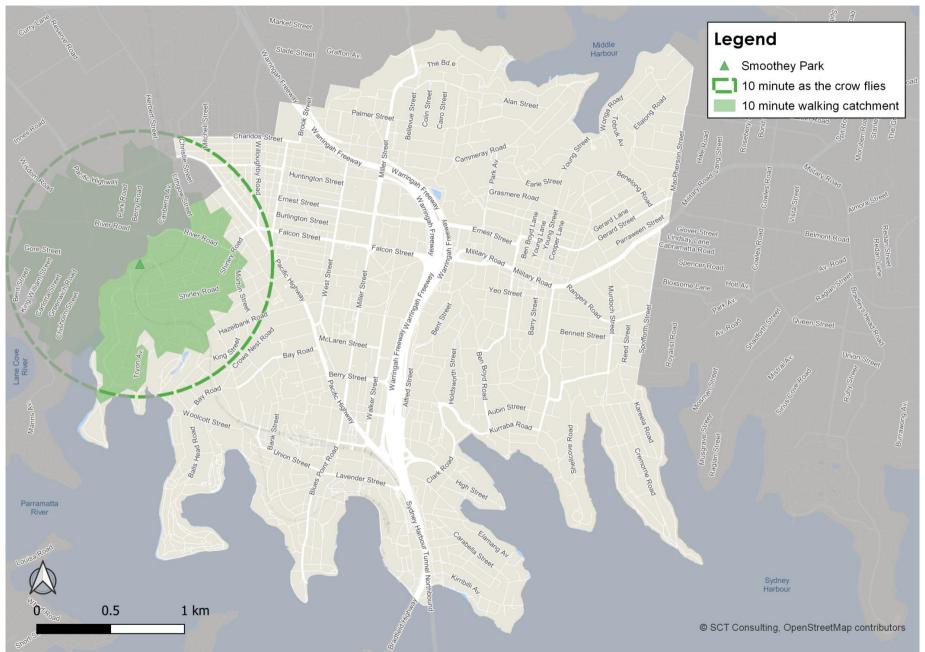
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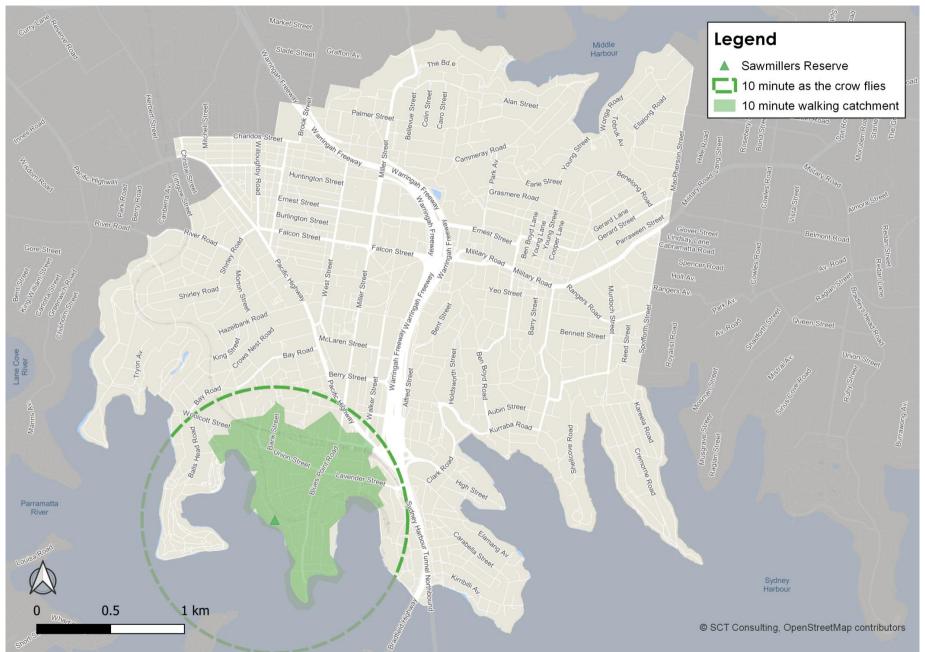
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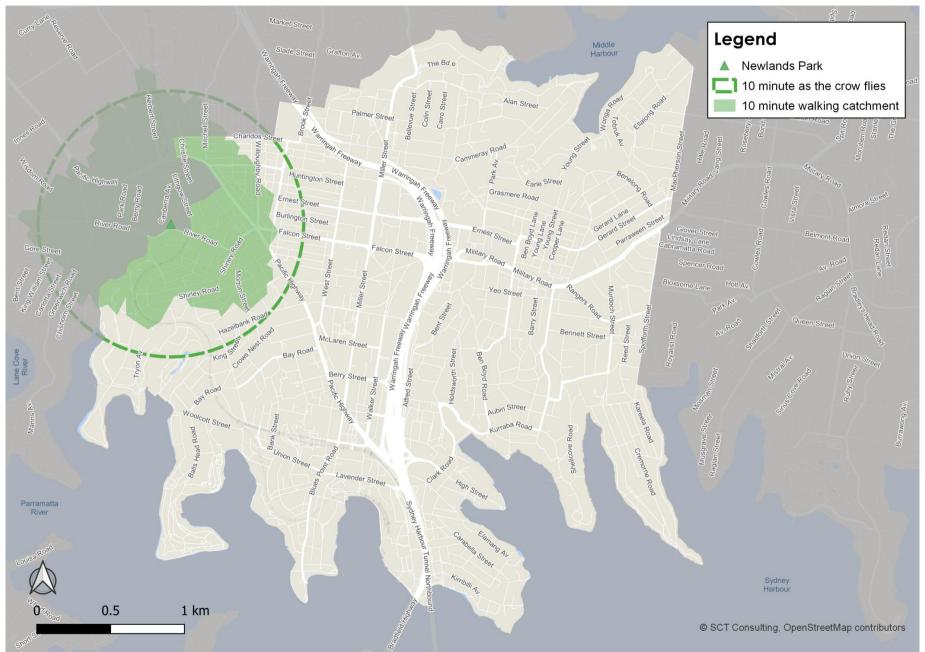
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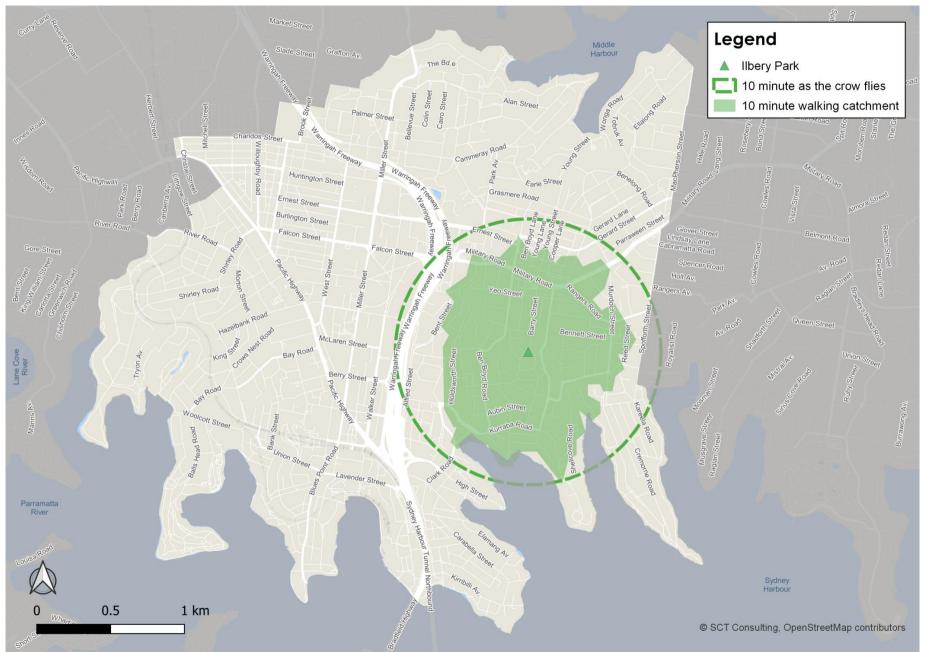
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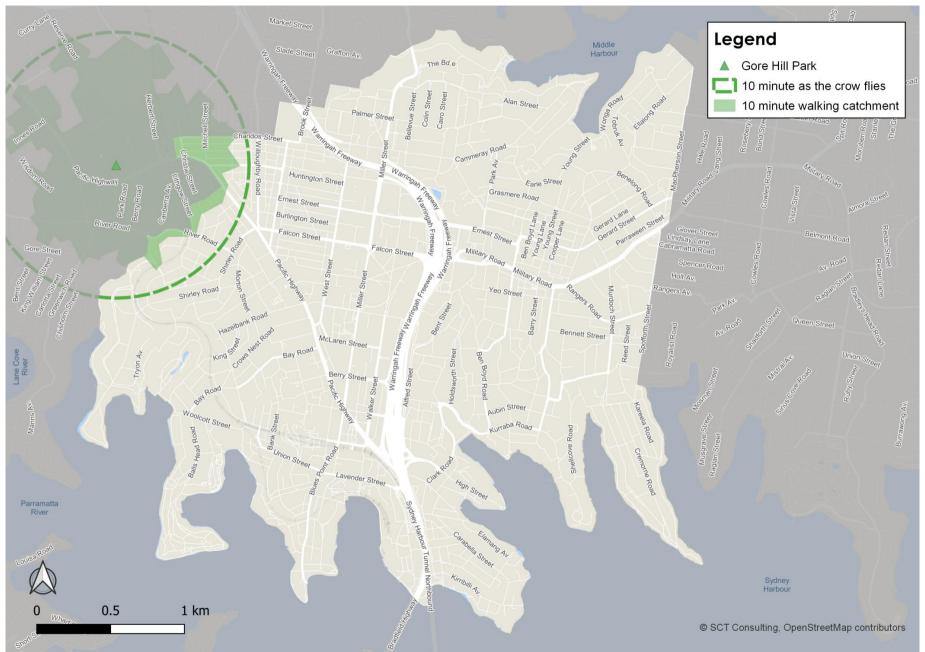
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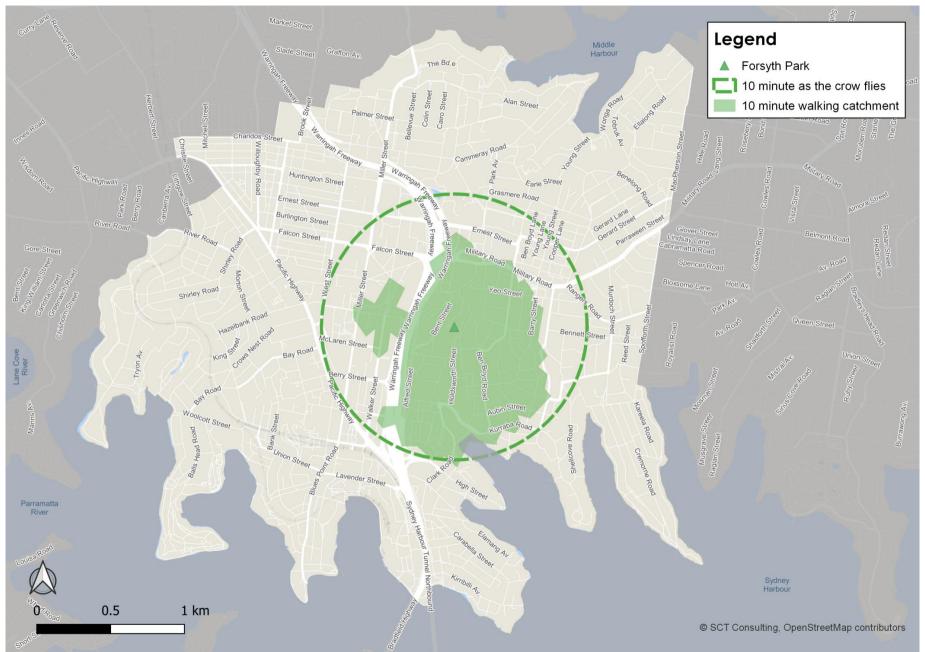
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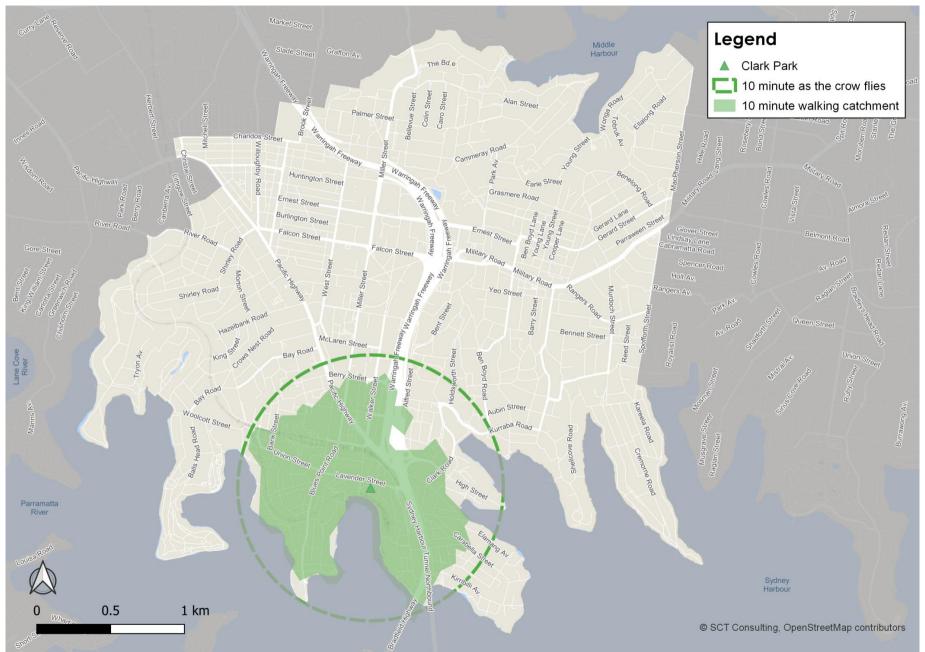
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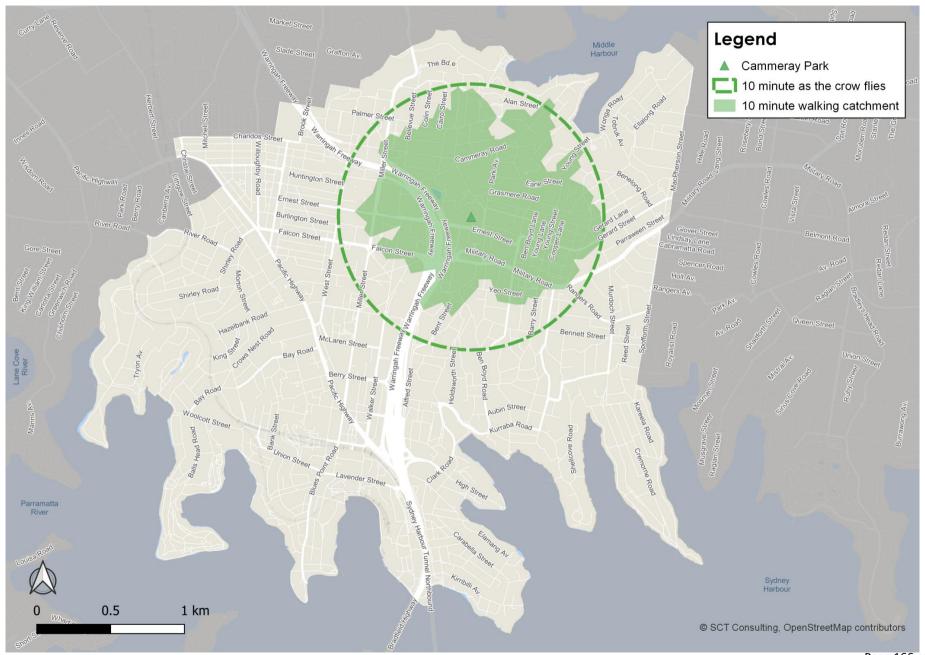
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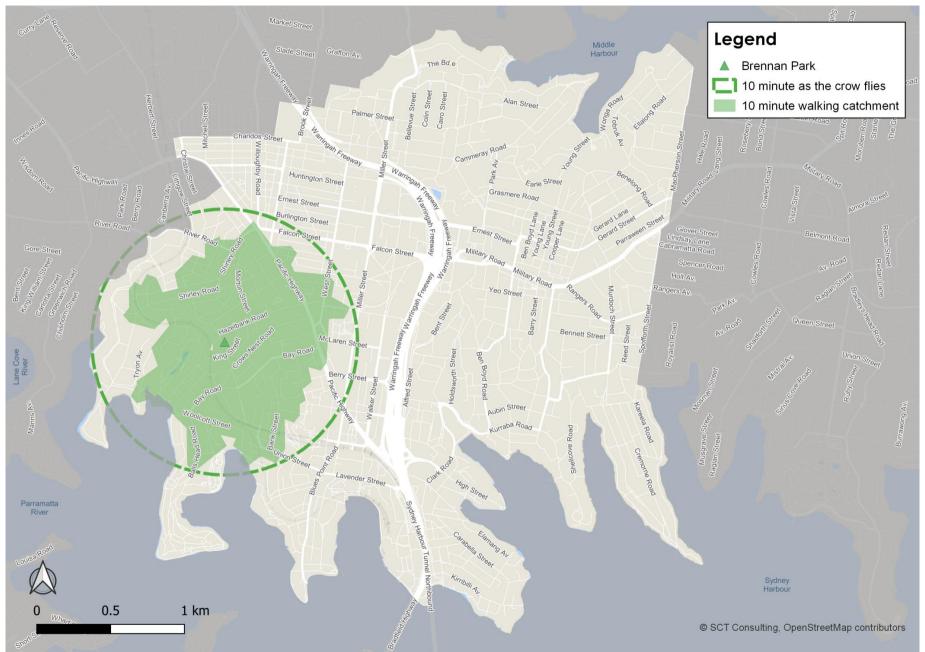
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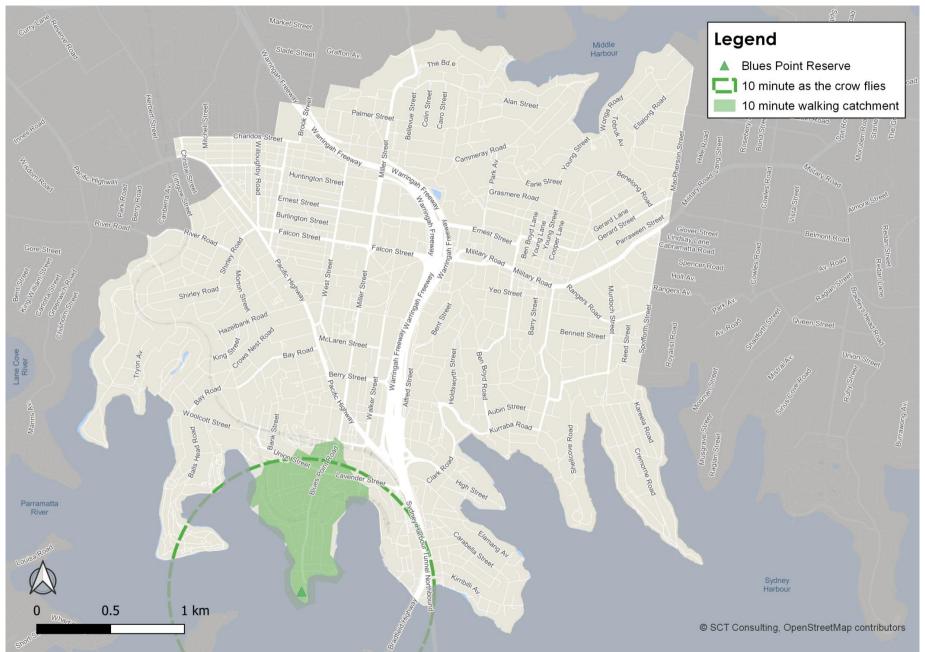
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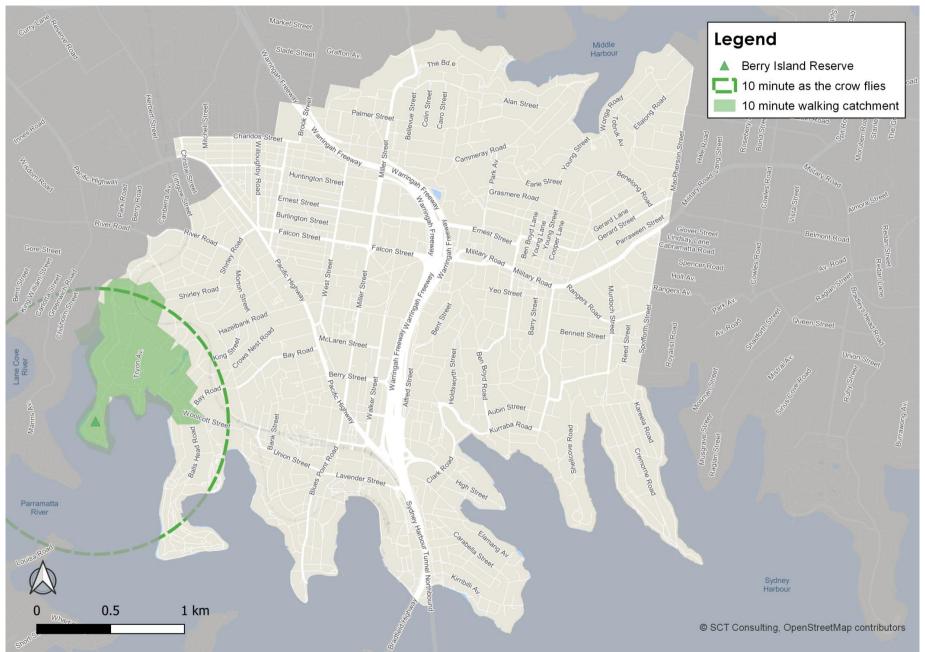
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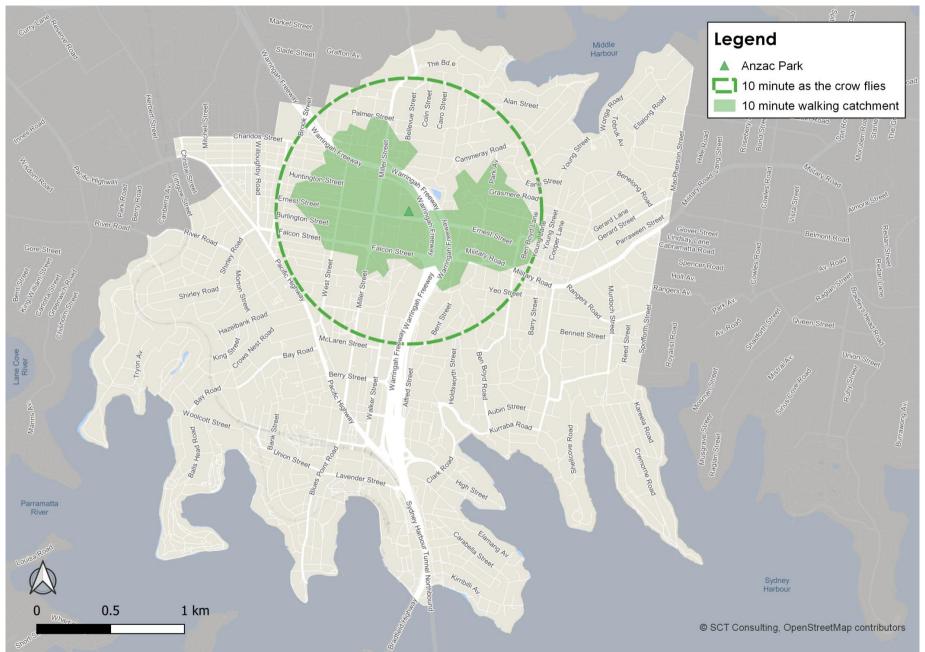
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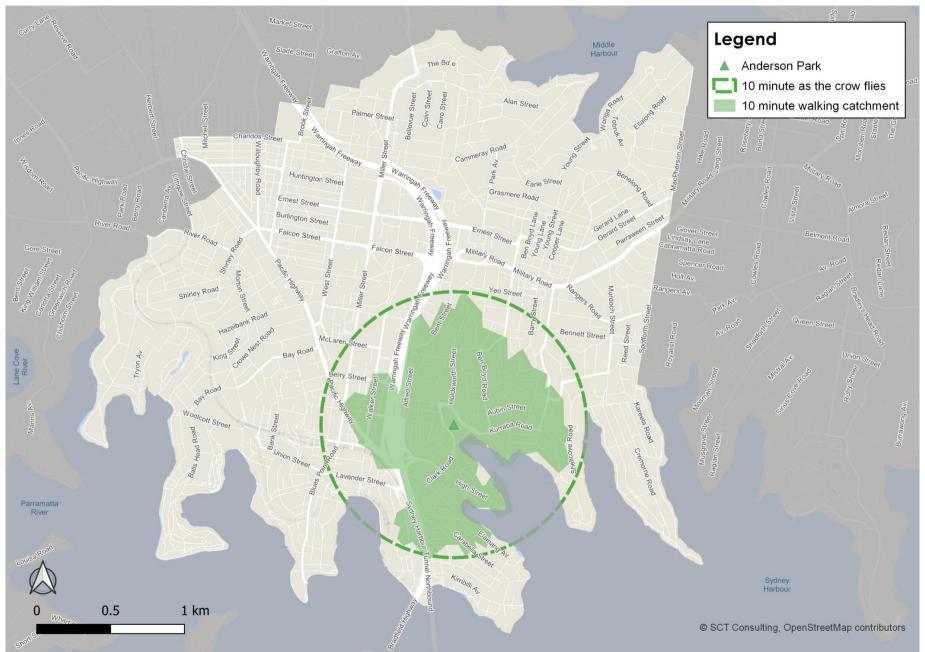
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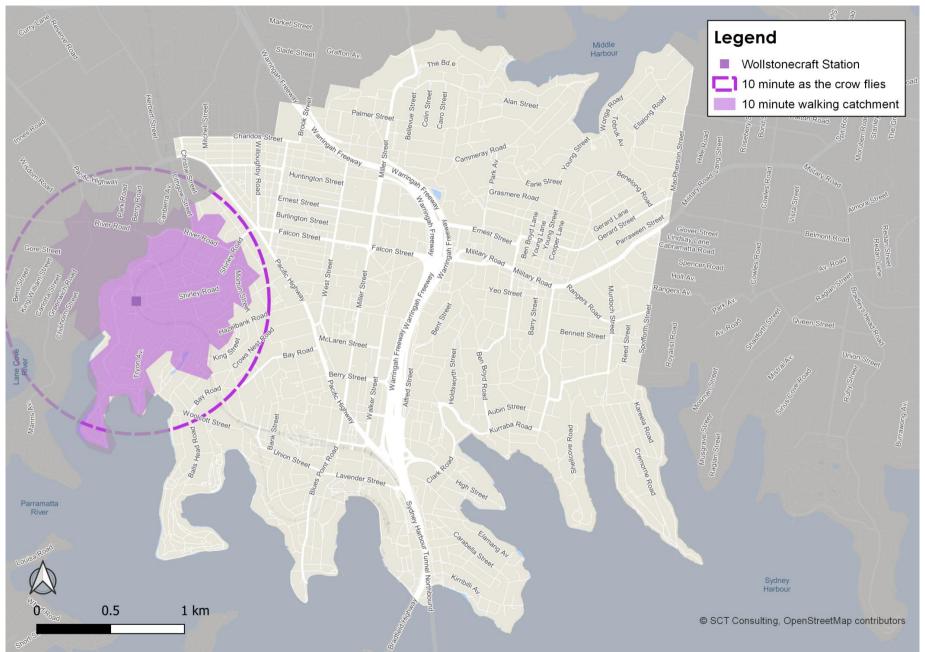
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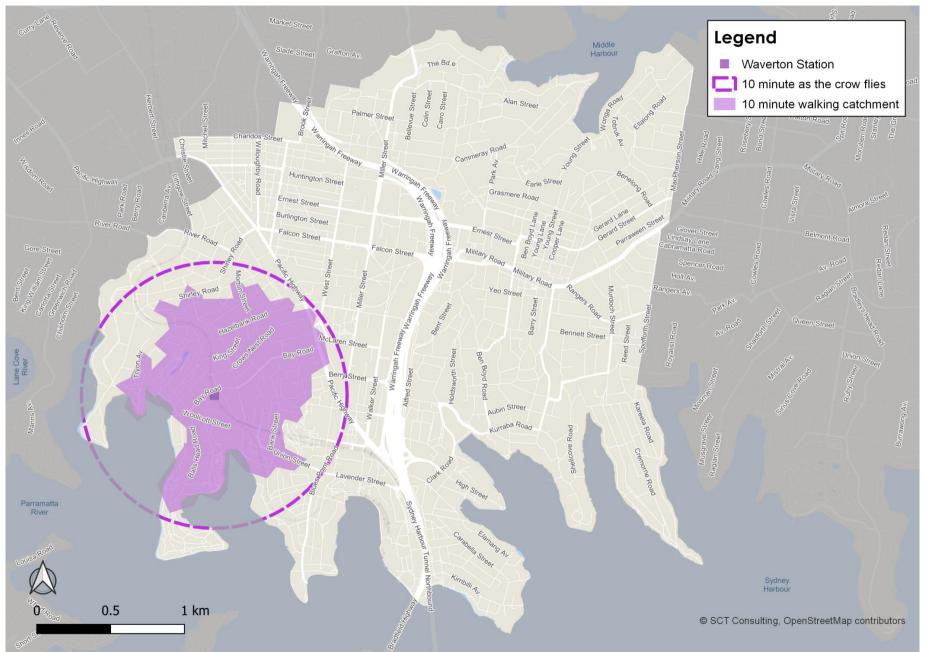
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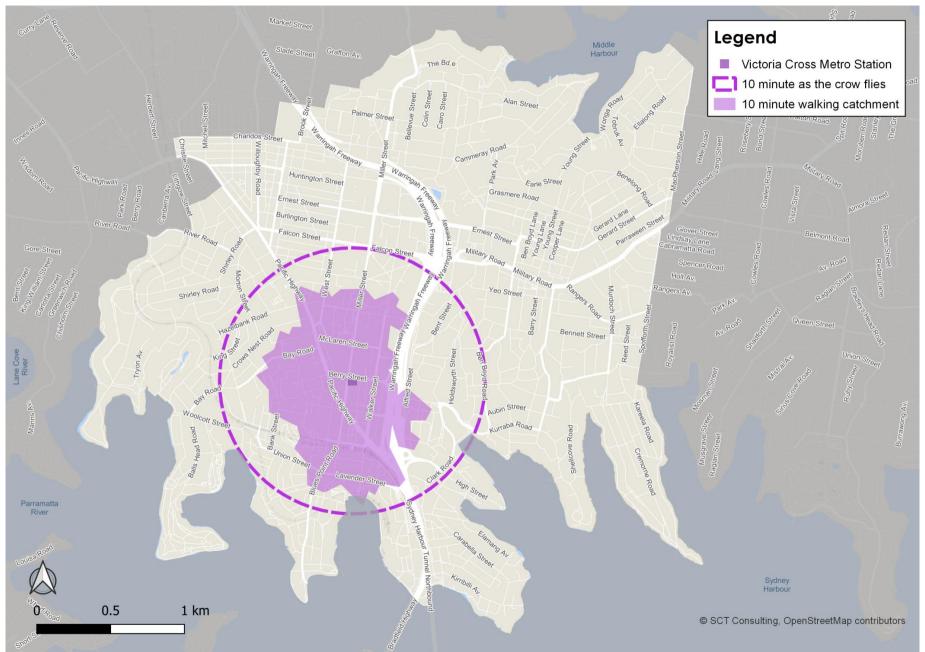
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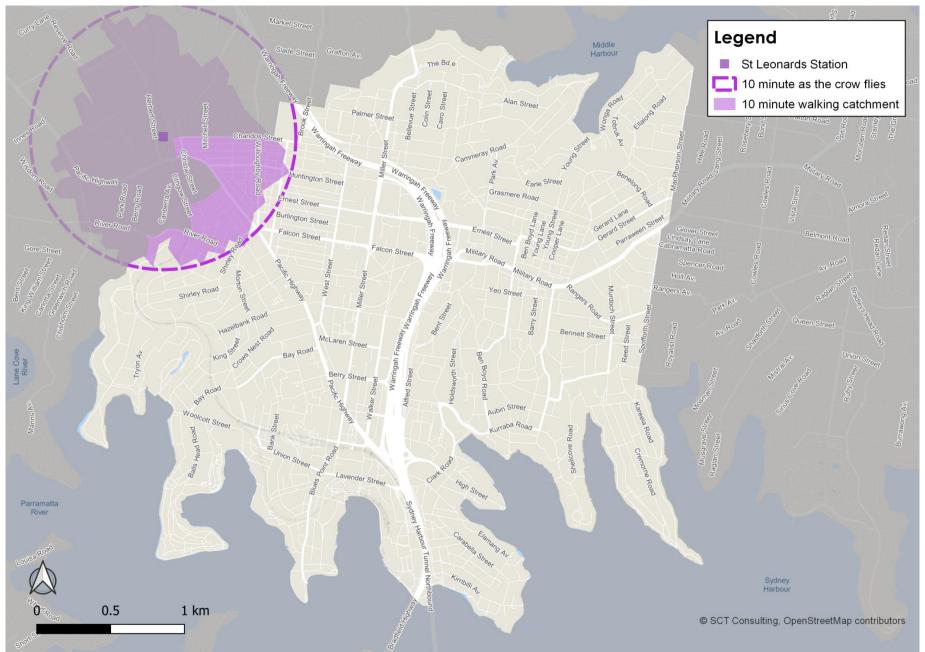
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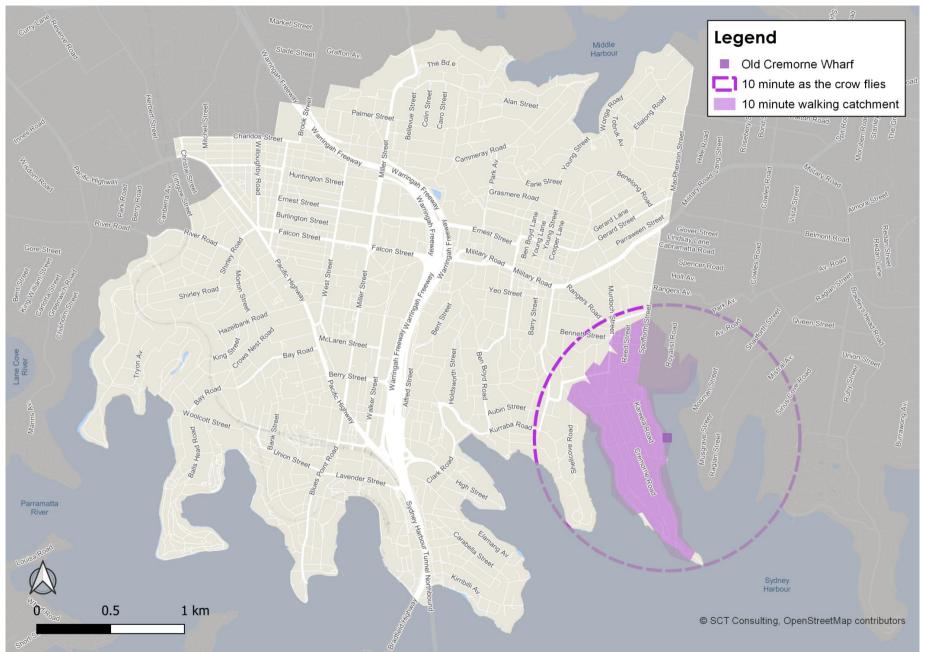
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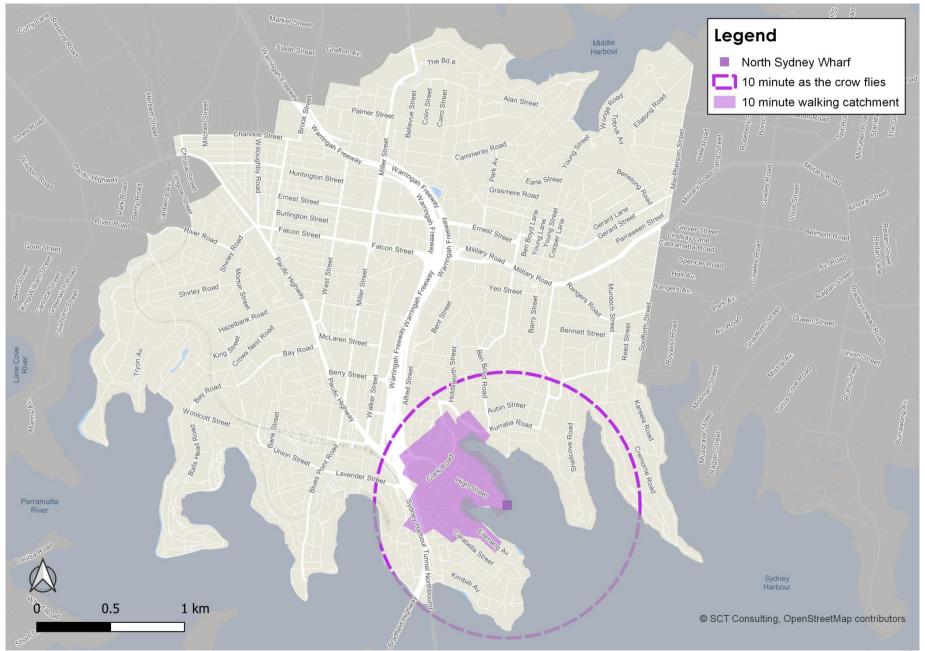
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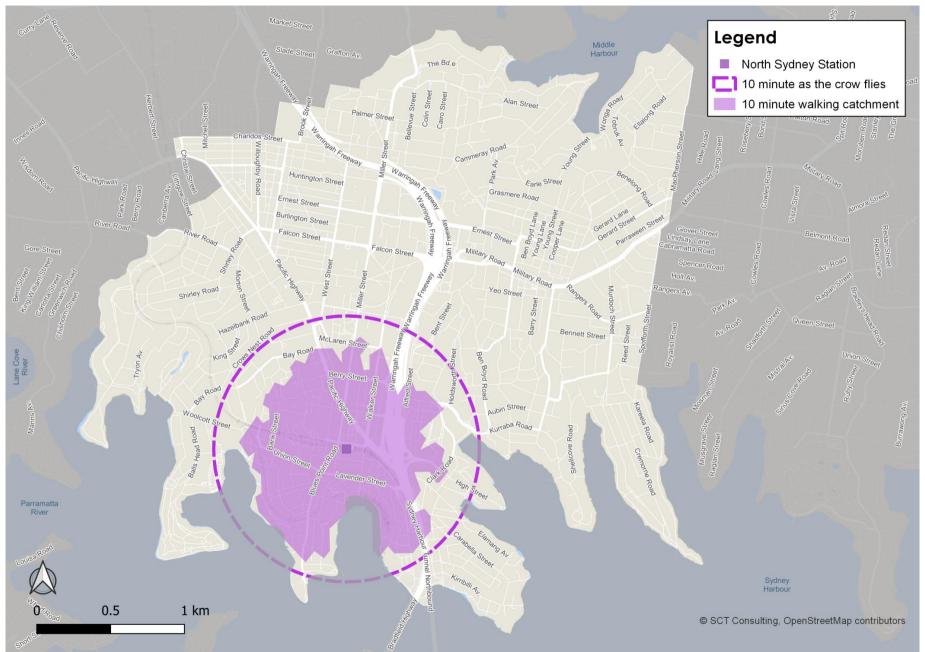
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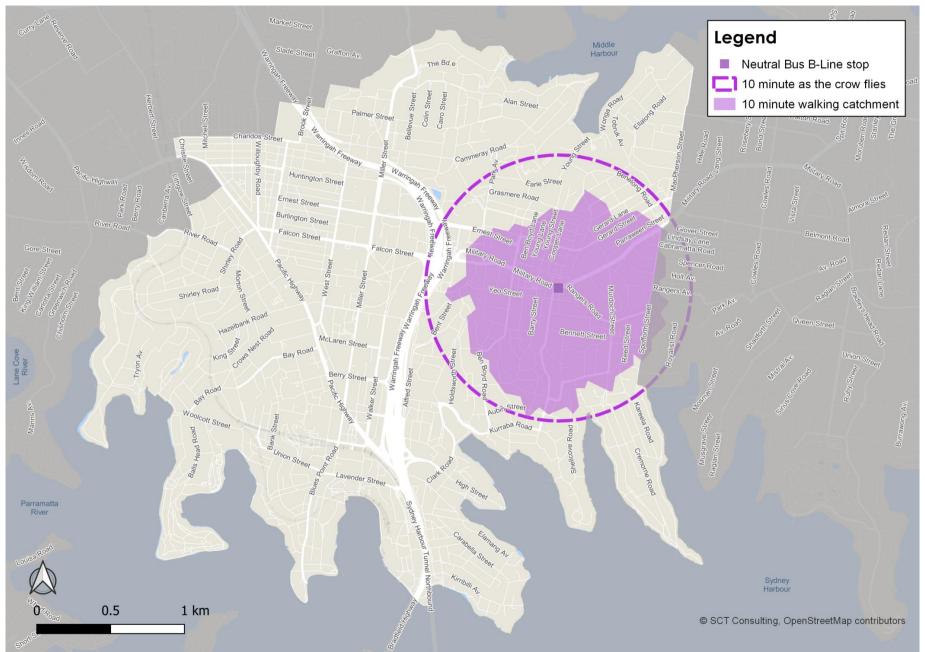
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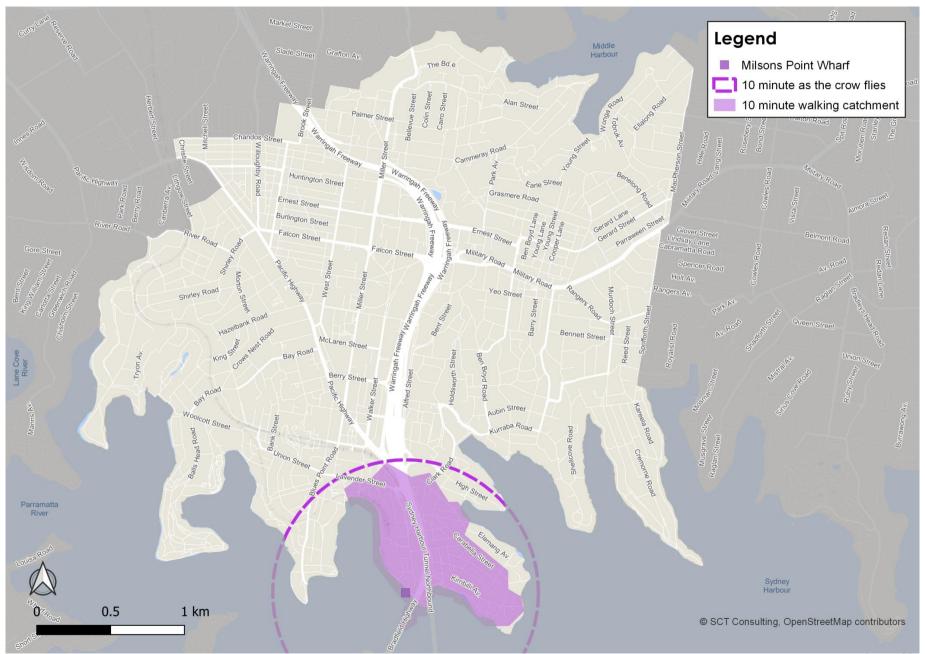
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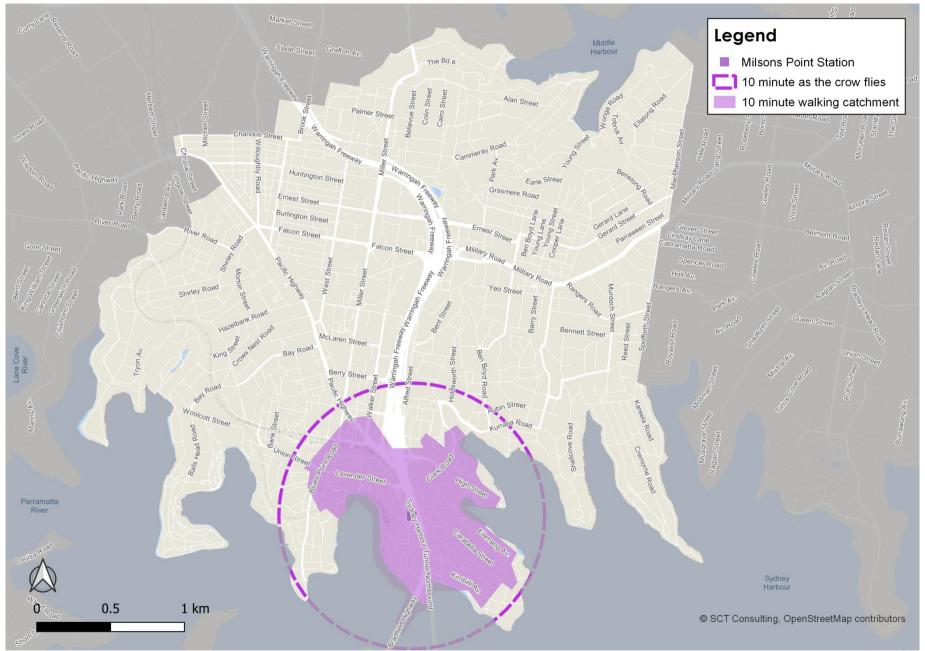
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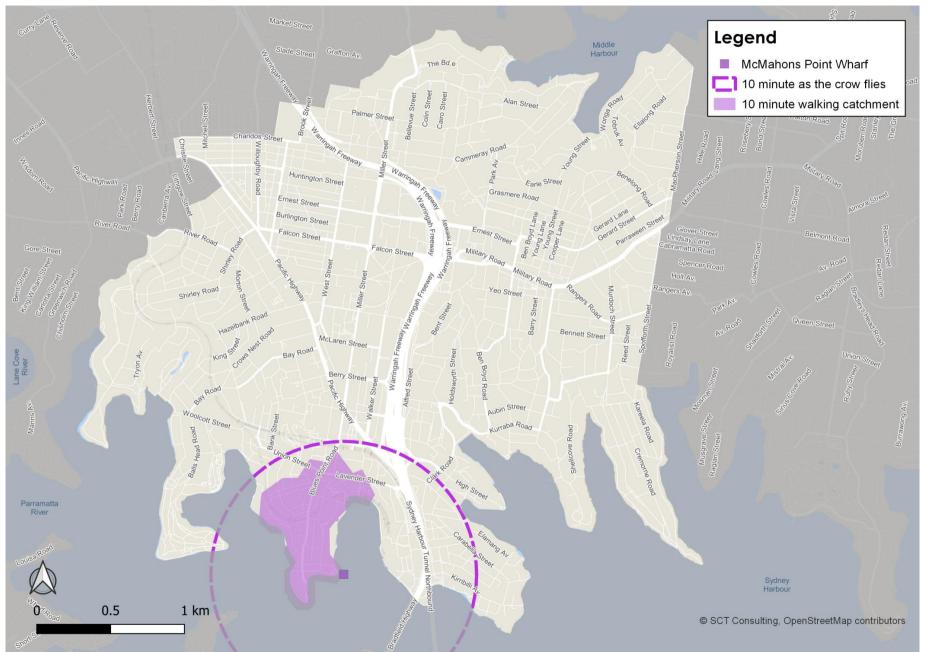
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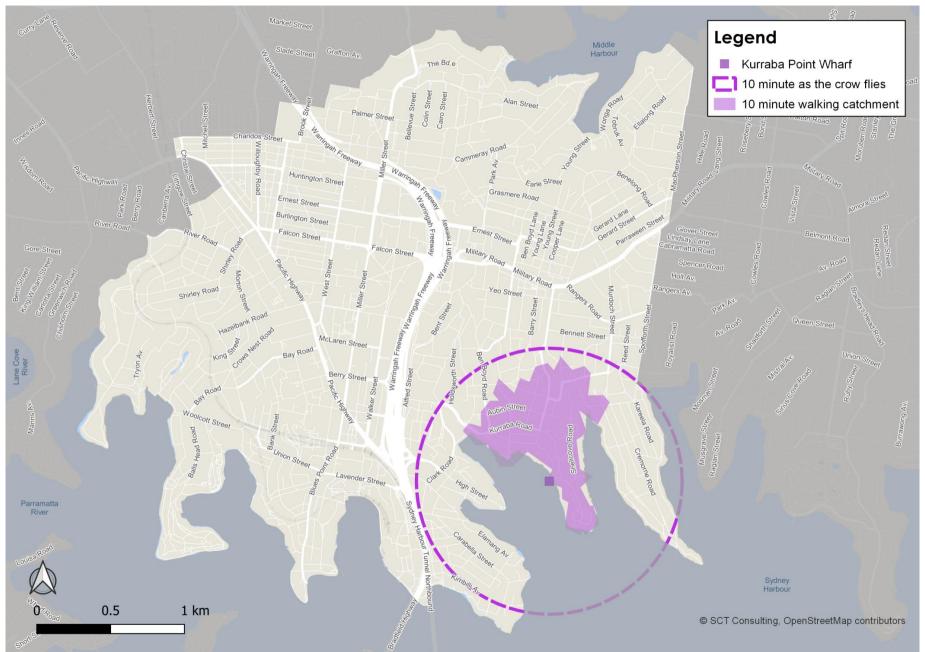
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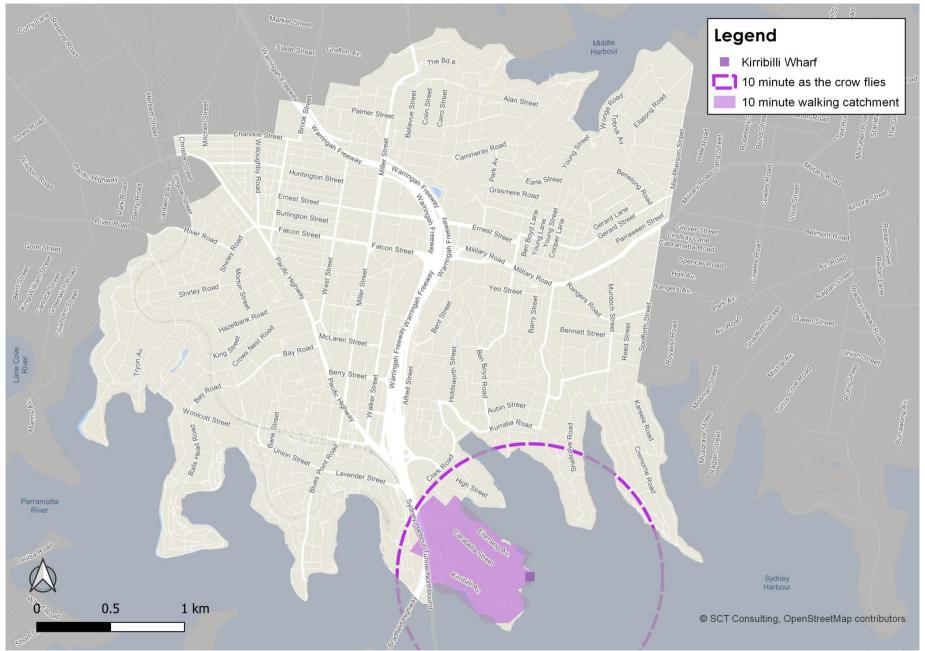
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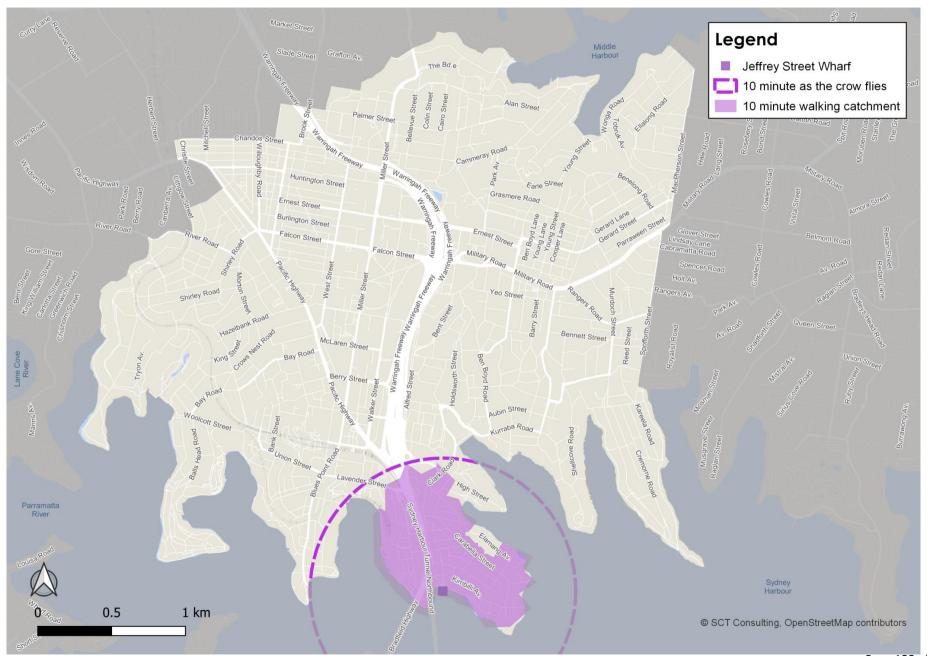
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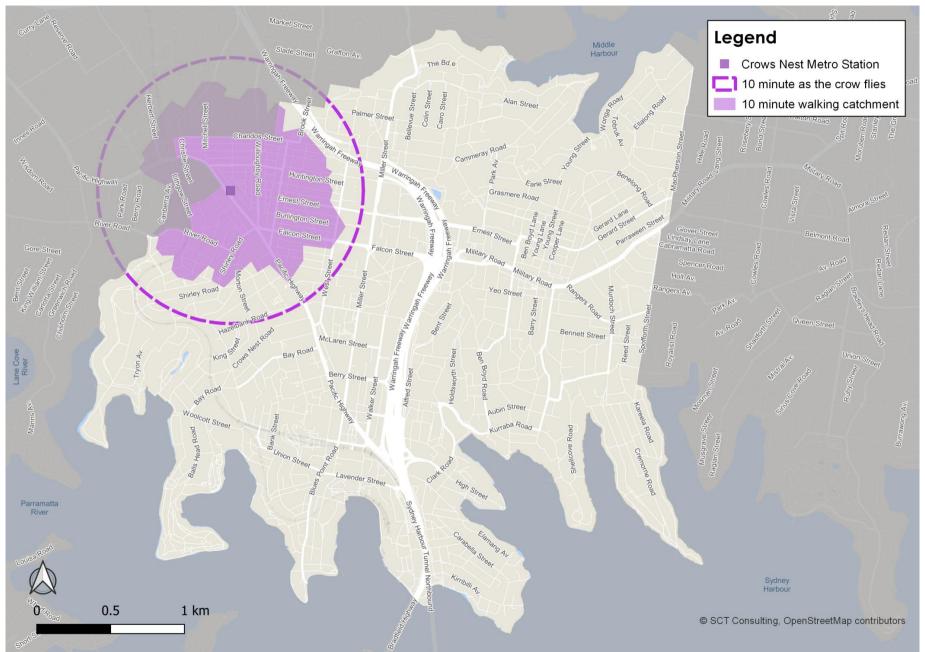
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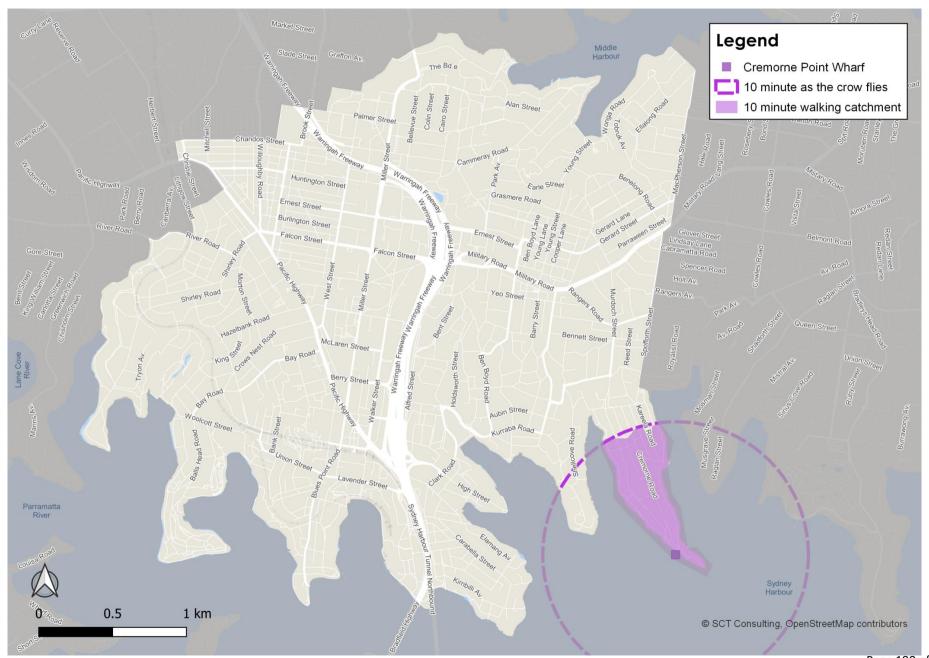
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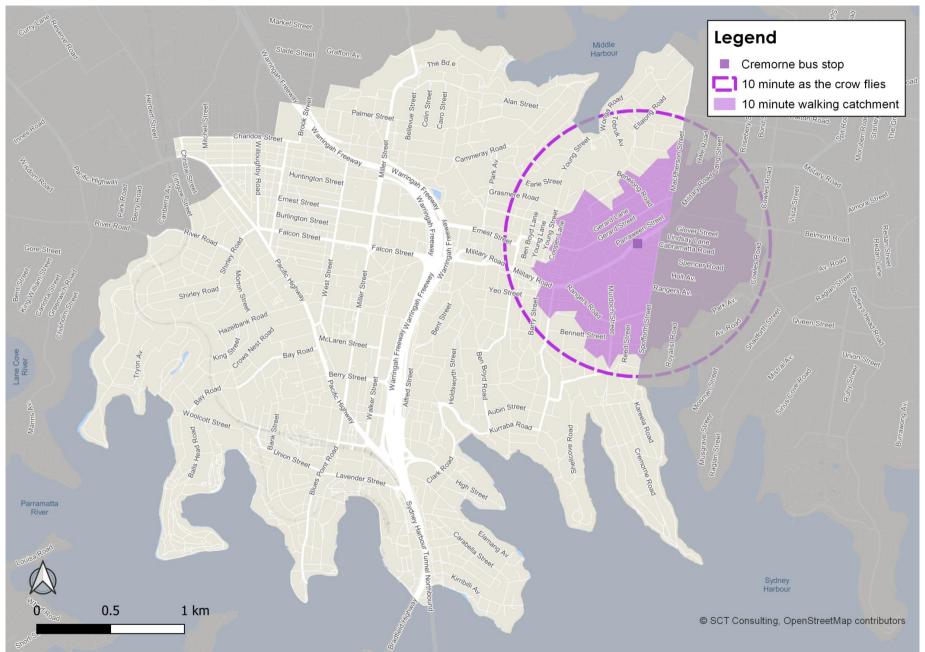
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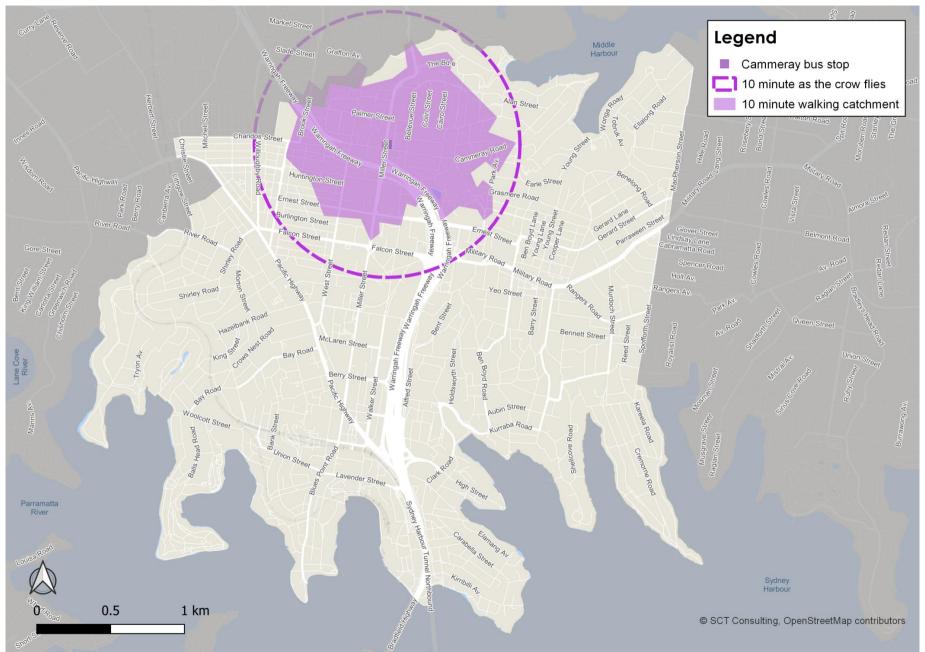
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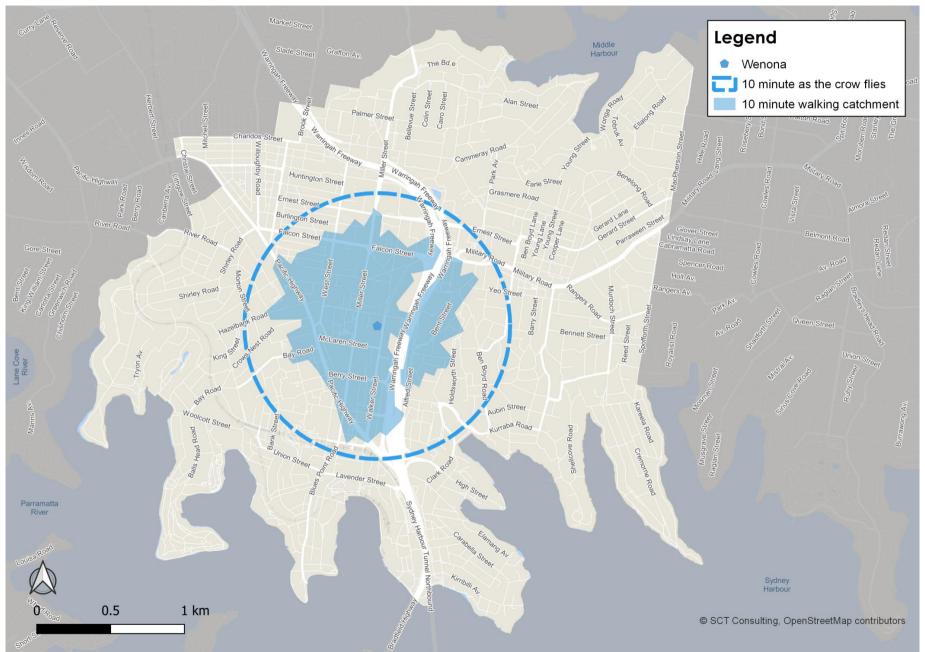
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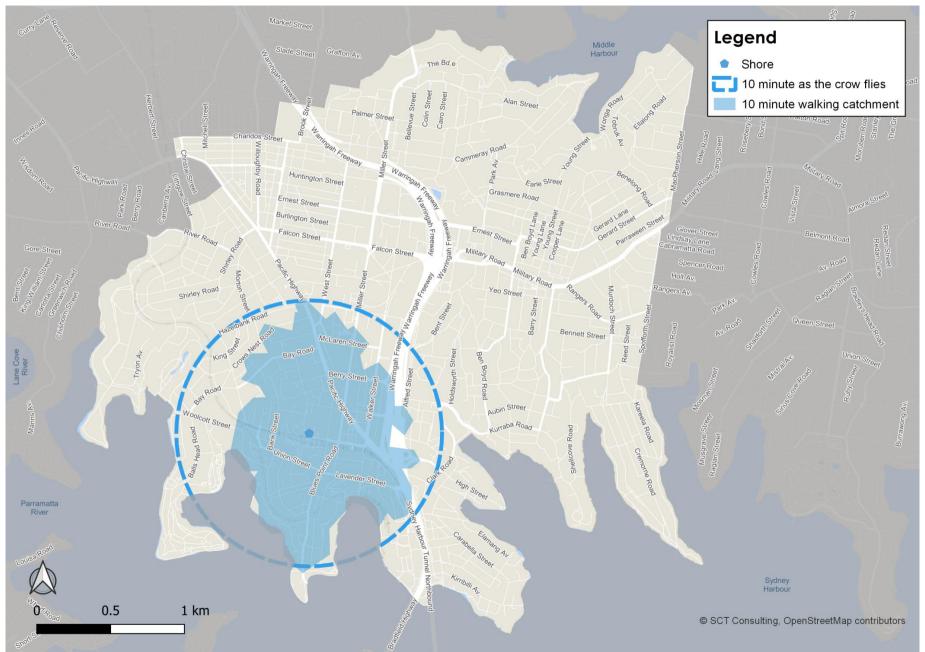
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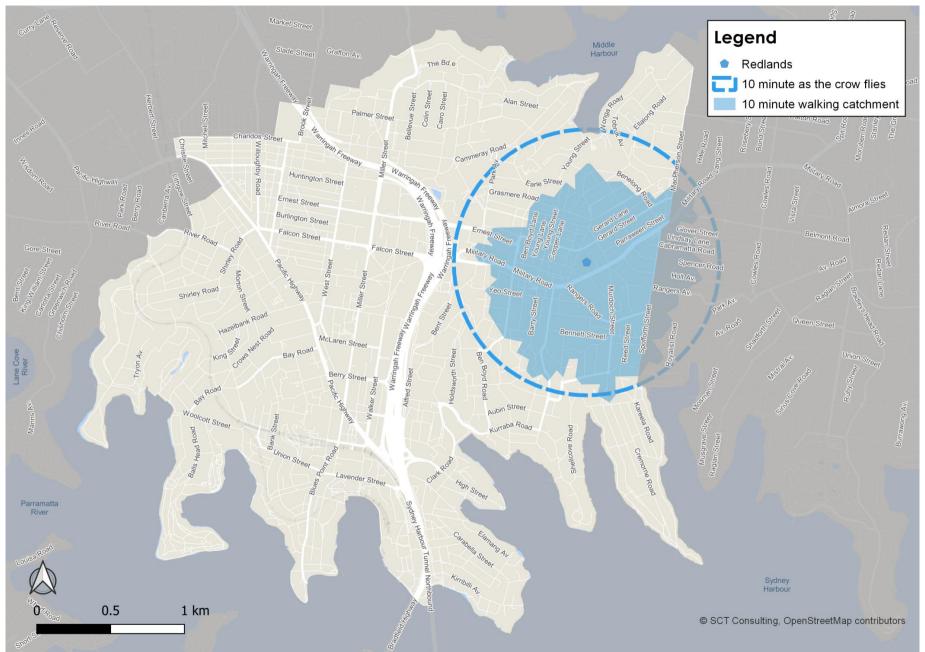
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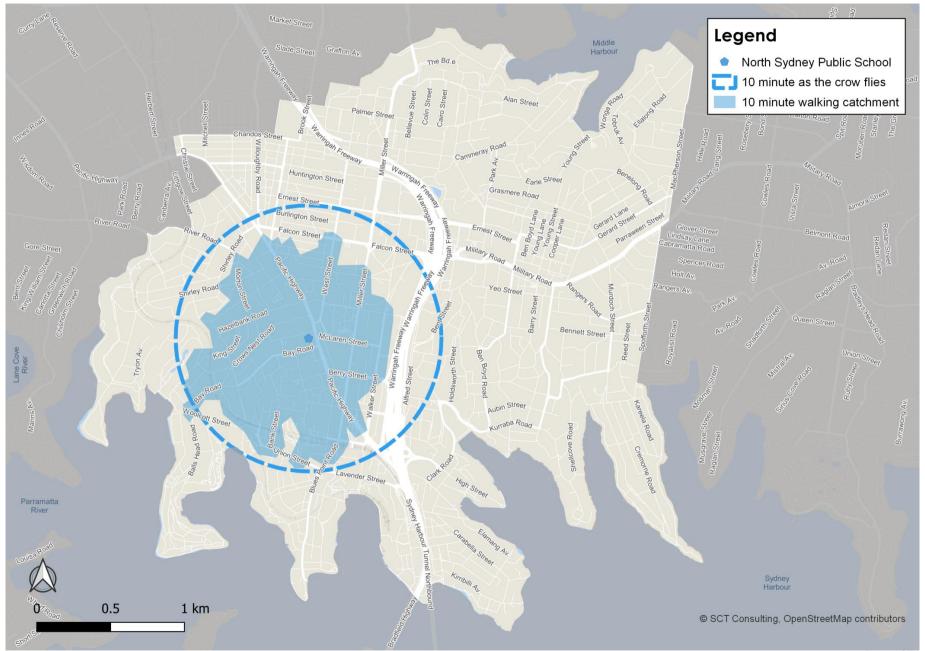
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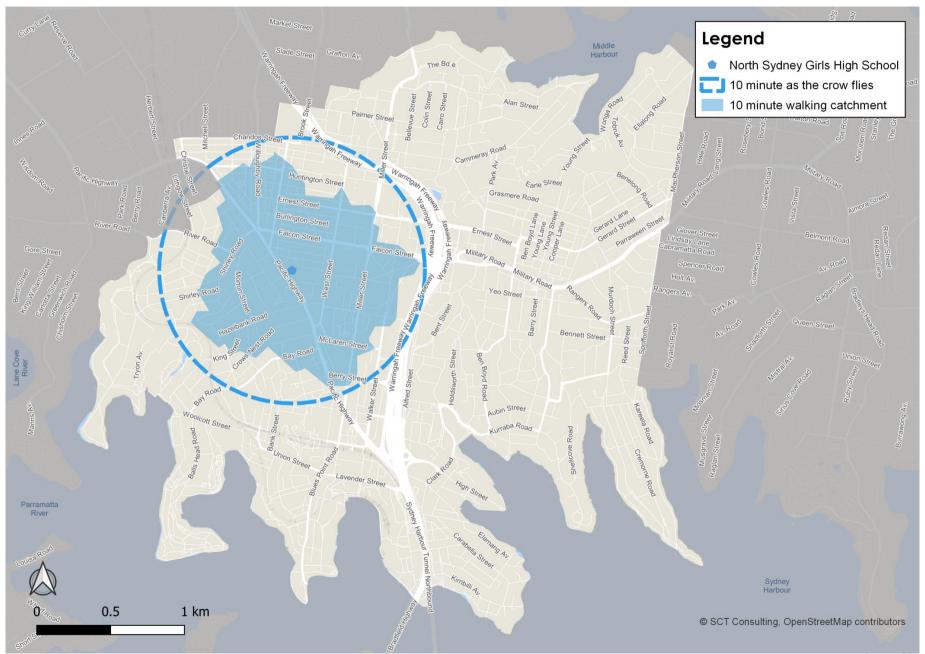
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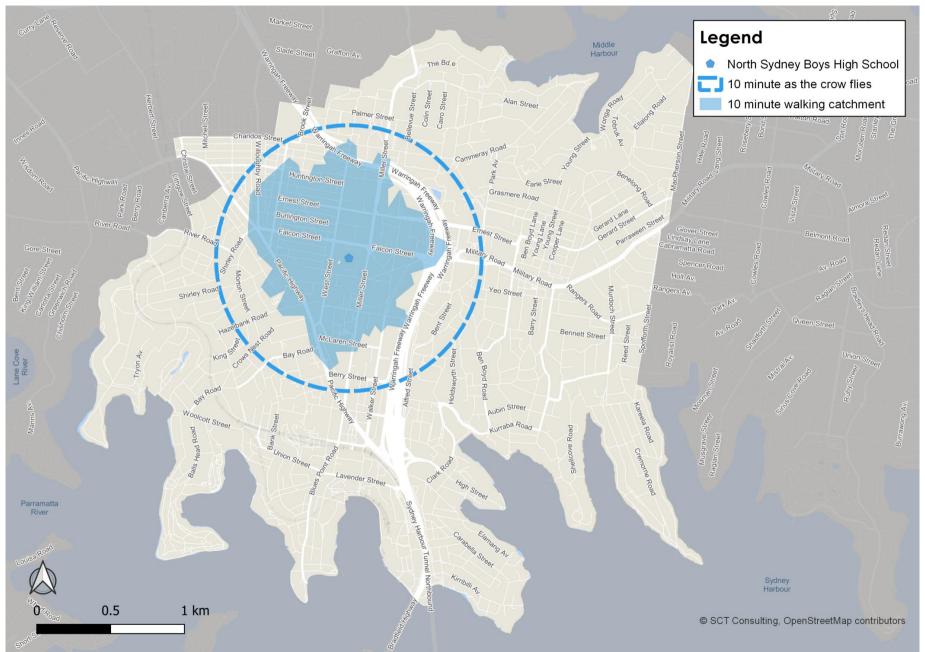
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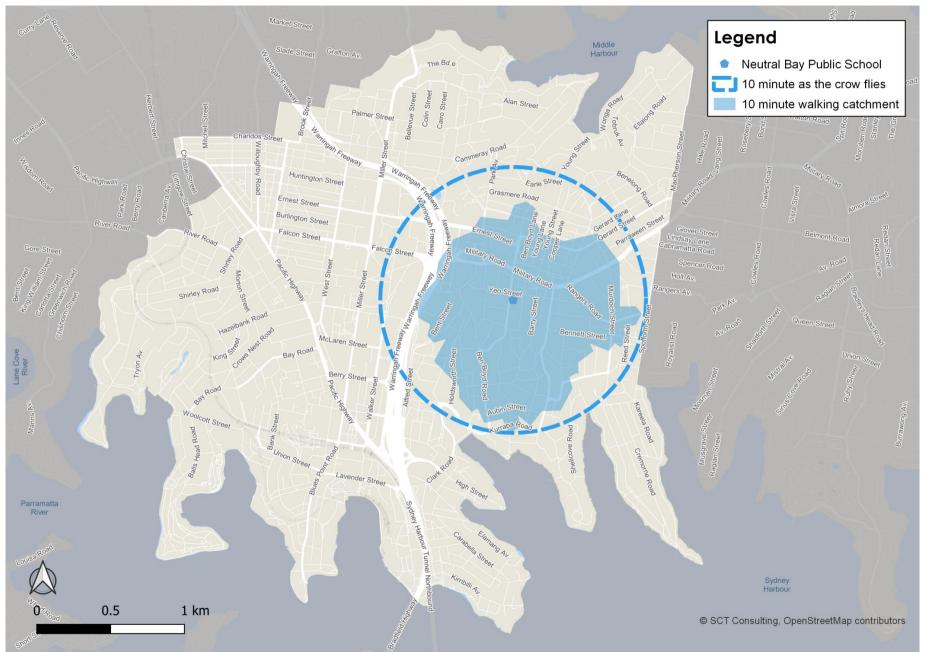
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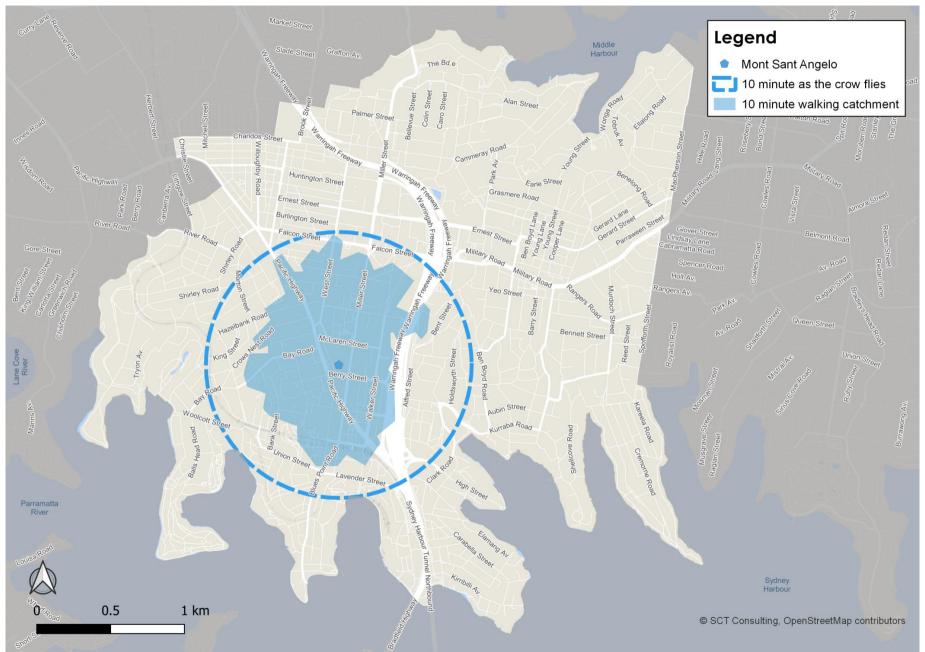
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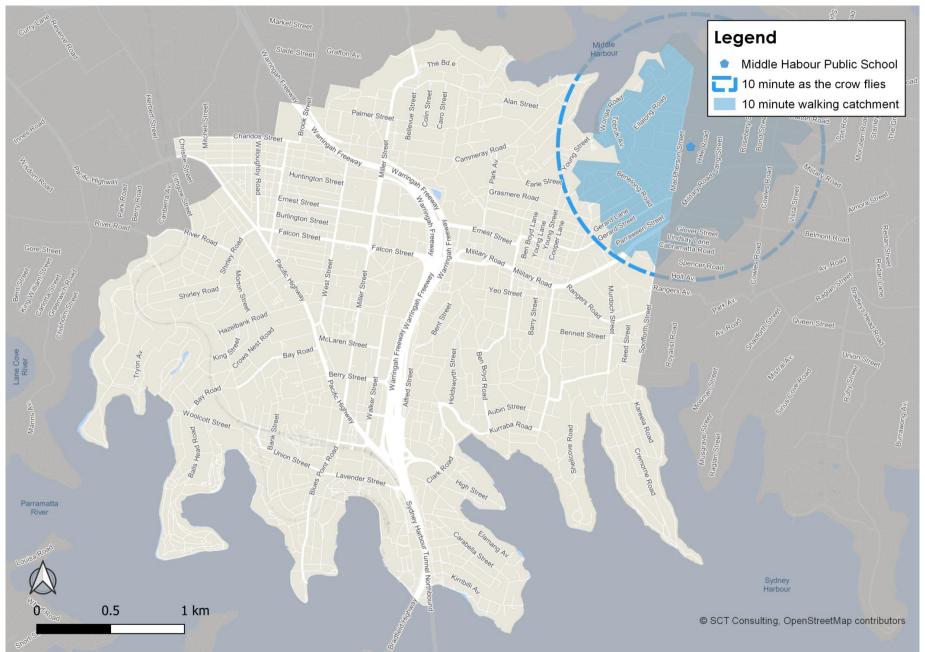
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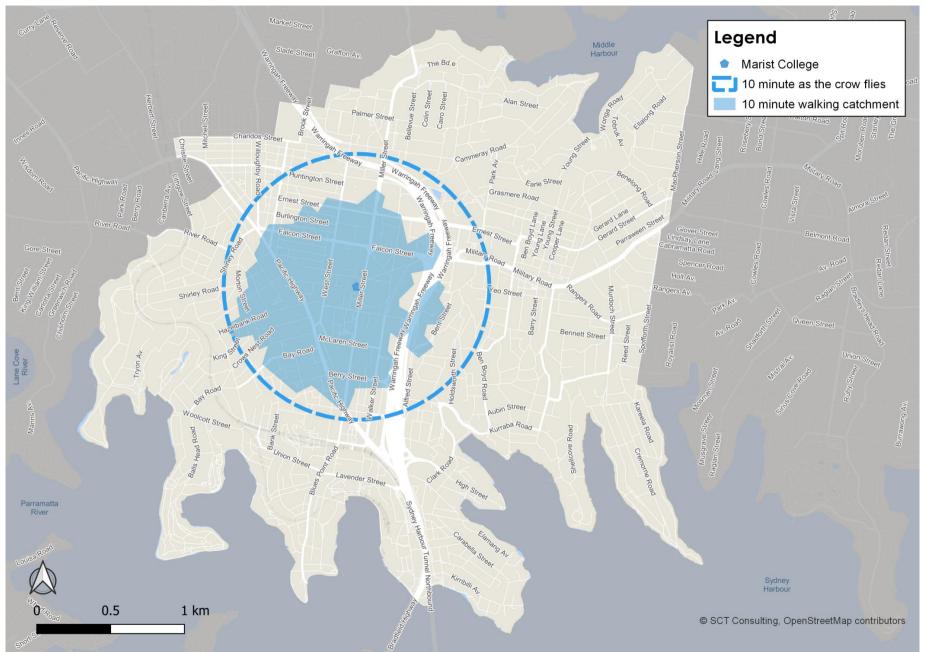
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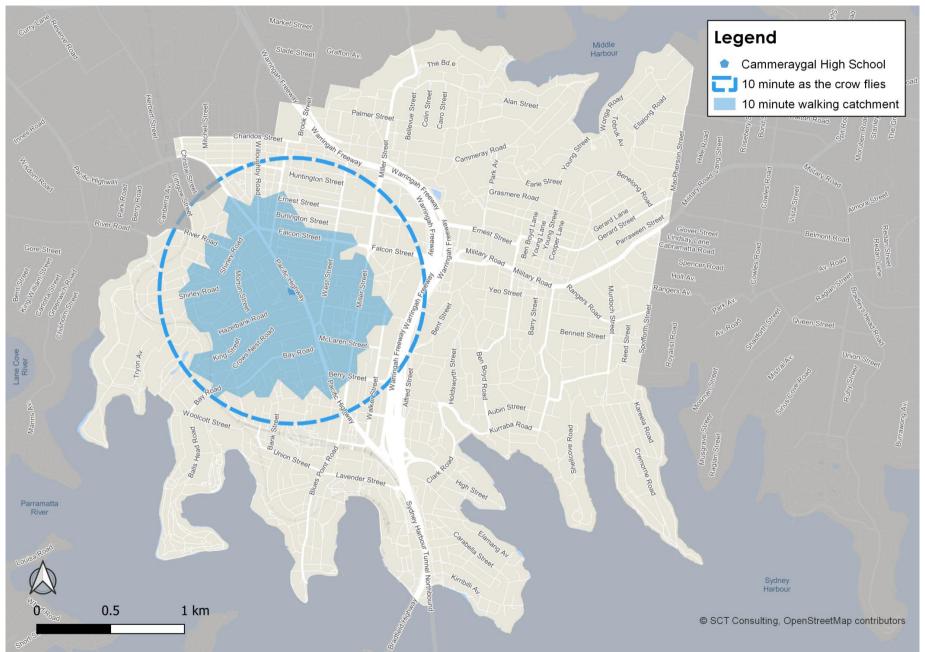
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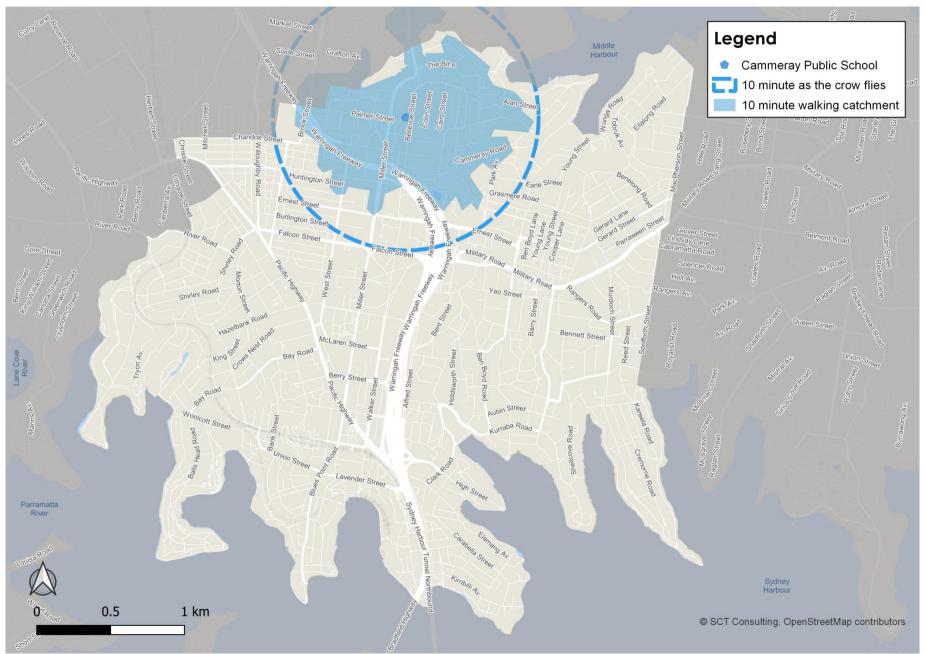
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