

PRIORITISING REGIONAL BICYCLE NETWORK INFRASTRUCTURE

Inner Sydney Regional Bike Plan and Implementation strategy

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Abstract

Around 1-2% of trips in Sydney are taken by bicycle. While research shows that more commuters would like to choose this transport option, the current level of facilities do not provide sufficient encouragement. To address these issues, the Inner Sydney Regional Bike Plan and Implementation Strategy was developed using a creative yet simple approach to integrate the network into existing road corridors and public open space over an eight-year period.

This approach involved three key phases. Firstly, the existing conditions of cycling facilities were studied from a regional perspective. Secondly, the proposed regional network was reviewed and modified in consultation with each of the 15 councils. Thirdly, an implementation strategy was developed to set out how the network could be built between 2010 and 2017, as funding becomes available.

The presentation outlines the methodology used for the staged implementation of the network and discusses the benefits of the approach including:

- > Providing a robust system of ranking and prioritising the cycle routes across the region; and*
- > Ability to estimate the economic benefits for providing the network forecast.*

This approach is being investigated by Auckland Transport to assist with the development of an implementation plan for the Auckland Regional Cycle Network (RCN), taking local conditions, requirements and opportunities into consideration.

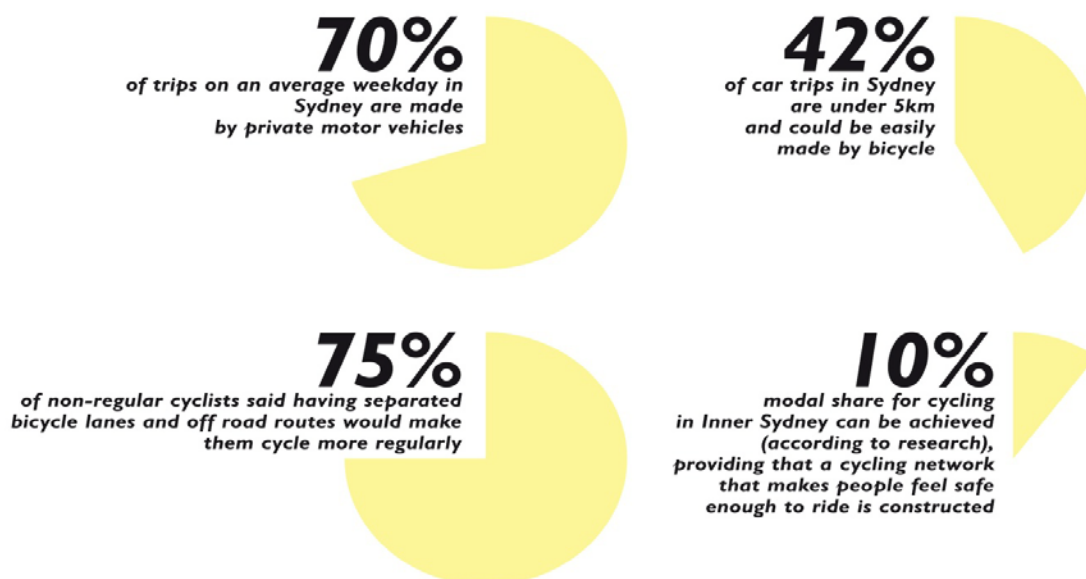
BACKGROUND

The challenge of regional bicycle planning in Sydney lies largely in the number of local councils within the Inner Sydney area. The scope of the ISRBP constitutes an area approximately 18 kilometres east to west and 22 kilometres north to south. Within this area there are 15 separate Local Government Areas (LGAs). Each Council has their own approach to bicycle planning and funding, some proactive others fairly non-existent.

While some neighbouring Councils work together for cross boundary coherency, in totality under these circumstances developing a regional network has to date been problematic. Furthermore any attempts have been based on predominantly on-road bicycle lanes. This typology has been recognised as widely unaccepted by the majority of potential bicyclists (Environmetrics 2006 and 2007). Meanwhile the City of Sydney has been committed to increasing the mode share of bicycle use and working towards developing a separated bicycle network within their jurisdiction.

Research undertaken by the City of Sydney (Environmetrics 2006 and 2007) shows that significant modal shift to bicycles is achievable, provided a separated network is built (Figure 1). However they soon came to the realisation that no matter how advanced their confined network became the elevation of the bicycle as a legitimate form of urban transport would always be compromised if the network stopped at their boundaries.

Figure 1 Findings from City of Sydney research (Environmetrics 2006 and 2007) and reproduced for the Inner Sydney Regional Bike Plan and Implementation Strategy Report (AECOM 2009).



This understanding of limitation led to the City of Sydney commissioning the Inner Sydney Regional Bike Plan and Implementation Strategy (ISRBP). The document subsequently produced forms the basis of a \$179 million funding application to the Federal Government's Infrastructure Australia. Under these circumstances this project could be described as a 'pre-emptive' plan.

There is clear political will from all Councils involved for this Strategy to be implemented. If funding becomes available each Council would be responsible to oversee the implementation of routes within their boundaries. The final report was constructed in such a way that it can be dismantled into discreet Council packages.

THE PROJECT

The ISRBP is a radial and orbital network of strategic bicycle routes that will provide commuters with a practical and safe alternative to motorised transport. As well as mapping the network and developing a suite of typologies to suite varying contexts, an implementations strategy over an eight year period was developed.

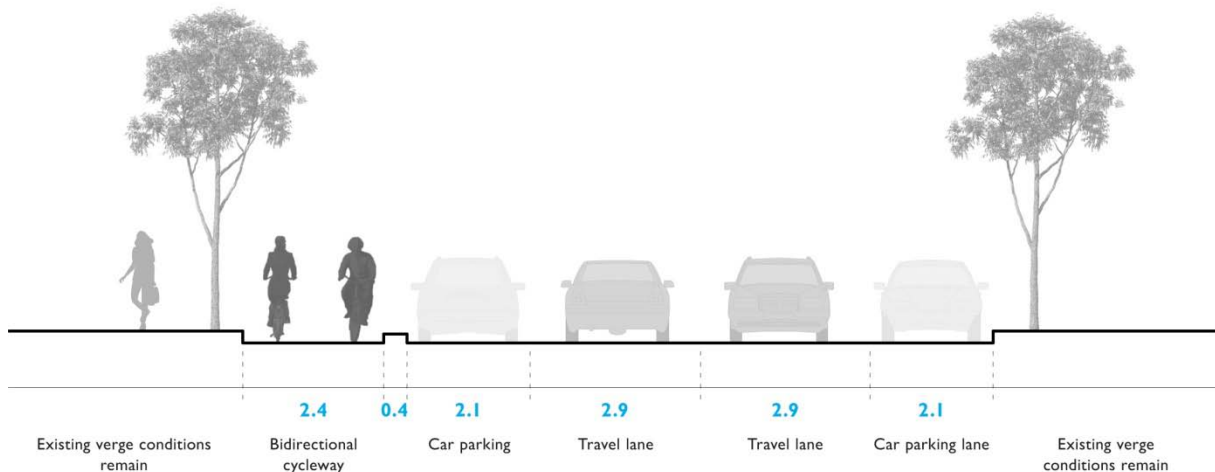
The central objective of the ISRBP is to provide the means for the bicycle to become a viable and appealing transport option for commuters. This means connecting people and their destinations with safe, direct routes. The problem here however was that these direct routes between primary trip generators, often ridgelines possessing the ideal grade for bicycles, have for some time been established as arterial and sub arterial roads with heavy current vehicle demand. These roads are under the control of the NSW Roads and Transport Authority (RTA) and the State Transit Authority (STA). With limited support from these organisations, we were advised that on-road space on these routes for new dedicated cycleways should generally be considered unavailable. However in some cases, less than ideally, shared paths could be utilised. This solution did occur in some situations to achieve connectivity. While perhaps the most significant network constraint, it was one of a series of constraints that required an adaptive approach. The development of the network operated under a set of clear route and typological constraints. These included:

- > RTA and STA roads are to be avoided.
- > The entire 284 kilometre network is to consist of separated cycleways with the exception of some shared paths.
- > A standard bidirectional separated cycleway is to be implemented wherever possible (Figure 2). This standard typology would provide a dedicated cycleway without any net loss of on street parking. This typology, now the hallmark of Sydney's cycleways, was a direct design response to the 12.8 metre road (between kerbs) common in Sydney. This typology cannot be implemented on roads with clearway restrictions.

Figure 2 The standard bidirectional separated cycleway.

Separated bidirectional cycleway on road

(Primary treatment - 12.8m minimum kerb to kerb)



METHODOLOGY

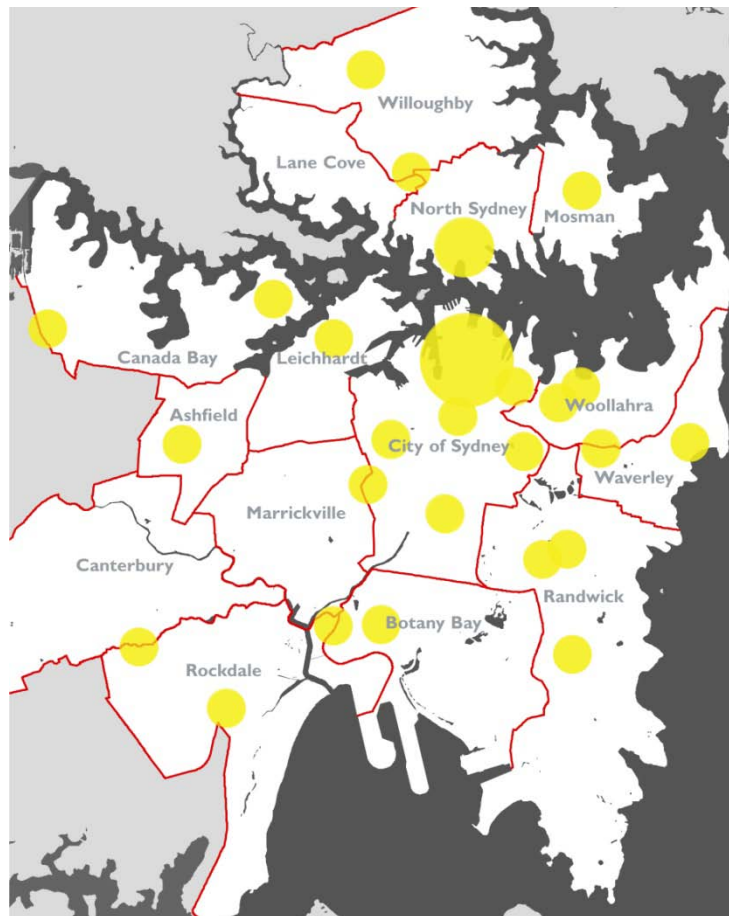
With the directive to provide a viable and appealing transport option for commuters we understood that the central elements of the network would be the hubs of activity; the greatest trip generators. For the purpose of this project we called these the primary nodes. When identifying the primary nodes the following places were taken into consideration: employment centres, commercial centres, transport interchanges and large centralised places of education such as universities – usually a primary node consisted of multiple of these in one centre (Figure 3). We adopted the principle that, according to research (Langdon 2009), cohesive connected corridors produce the best results in bicycle uptake.

The project requisites were simple. We developed a solution that answered them in simple terms. Our approach was founded on building strategic connected corridors with an understanding of the contextual constraints and existing cycleways. We needed consistent corridors connecting places. We also needed a methodology that provided coherent and connected network growth over an eight year period.

In answer to the set of constraints we developed a suite of typologies based on the standard treatment that would still provide a high level of bicycle amenity. In addition, as one third of the network passed through low volume residential streets we proposed modifying these streets as shared or mixed use zones. Proposing these “slow streets” meant that we could significantly reduce the capital works budget, avoid much political angst and provide neighbourhoods with safer streets for all users.

Our methodology operated in two streams; a regional hierarchy and a matrix rating system. This combined process balances the need for connected corridors with ease of planning and construction.

Figure 3 The Inner Sydney Councils and primary nodes.



The Regional Hierarchy

We have established that continuous and legible connections are paramount in a regional bicycle network. Once mapping the alignment of these routes we set out on a process of identifying which were the most important. The result was a regional hierarchy of three tiers. These were:

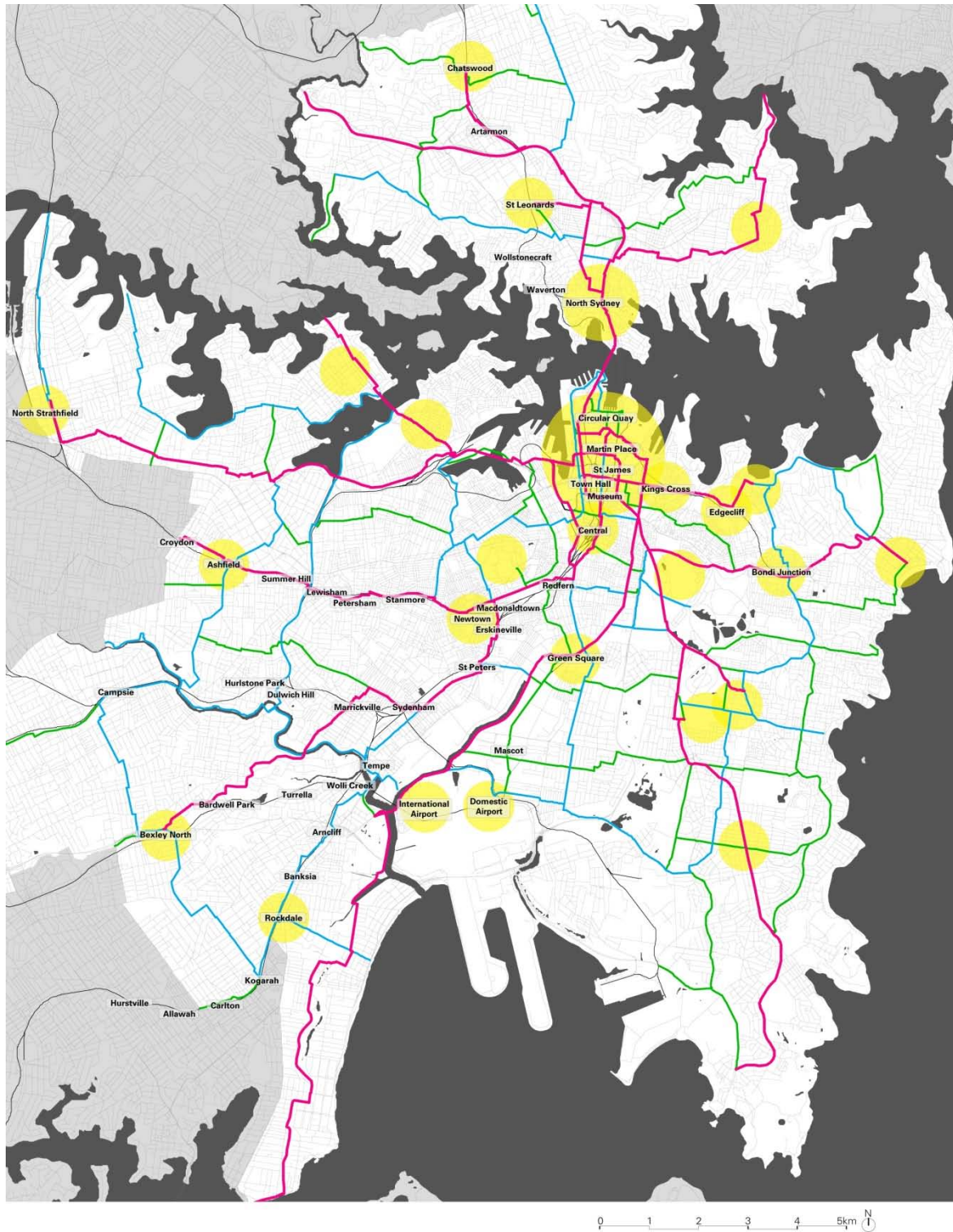
Tier 1 – Radial routes. These are the routes linking the CBD with primary nodes. These routes alone can be seen as radial corridors.

Tier 2 – Circumferential routes. These are the cross links between primary nodes. Once we combine these with the radial routes or we begin to see a regional network forming, rather than a series of corridors.

Tier 3 – Extension routes. These routes extend the regional network to complete connections across the network.

The resulting network is illustrated in Figure 4. Within these tiers routes were broken down into segments. These segments were based on typological consistency and network nodes. These segments were then rated on a matrix.

Figure 4 The route hierarchy and primary nodes (only train stations are labelled). Tier 1 – pink, Tier 2 – blue, Tier 3 – green.



The Matrix Rating System

The regional hierarchy defines three tiers of route importance, beginning with the Tier 1 radial routes. These Tier 1 routes were the most important routes that our approach stated needed to be built first. We would focus on implementing these routes first, then the second tier, then the third. Under an eight year implementation program we were required to deliver, on average, 33.5 kilometres of cycleways each year. To determine what parts of the regional network would be built each year a matrix rating system was developed.

The matrix plots how critical each segment is against its ease or simplicity of planning and construction. The higher the combined value, the higher its priority in the schedule of works. Qualitative criteria for each value guided consistent and informed comparative rating.

Criteria for the critical value included:

- Proximity to a major primary node.
- Connection to a transport interchange.
- Extends on existing cycleway.
- Dangerous gap in network.

Criteria for ease of planning and construction included:

- Road dimensions fit for the standard typology.
- Absence of clearways.
- Number and complexity of intersections.
- Technical issues leading to high costs.

Figure 5 illustrates the portions of each tier implemented in each year.

Figure 5 The matrix rating table and tier implementation share.



RESULT

The regional hierarchy defines three tiers of route importance, while the matrix rating system works through each Tier from 1 to 3 to implement those parts of the network first that have the greatest latent demand. This also means that the network expands organically which minimises the appearance of network gaps.

The result is an implementation strategy that develops the network in a coherent and legible way, building on the previous year's growth to achieve the best possible network connectivity at each stage. At times this network growth relies on existing facilities which are to be upgraded towards the end of the implementation period. This is illustrated in Figure 3 where some existing Tier 1 and 2 segments are upgraded in the last year.

The City of Sydney is moving steadily ahead with the implementation of cycleways, slow traffic streets, shared paths and social initiatives within their boundaries in a bid to turn the bicycle into a legitimate form of urban transport. However throughout the broader Inner Sydney area of 14 Councils there is not a great deal happening in terms of separated cycleways, largely due to a lack of funds, and of course a lack of political will to provide funds. However, the Councils have indicated they are more than happy to implement these cycleways if Federal funding becomes available.

And this is what this project was all about; putting forward a case to secure funding for a consistent regional bicycle network spanning 15 council areas. The ISRBP is currently being pushed by the City of Sydney and the member Councils for Federal funding.

ECONOMICS AND SUSTAINABILITY BENEFITS

AECOM used an incremental choice model to estimate the effects on current levels of cycling of implementing the Inner Sydney Regional Bicycle Network. The incremental choice model was specifically designed to capture the impact on bicycling demand of different cycleway treatments and accounted for different types of transport modes (i.e. car, train, bus and bicycle). Based on the demand estimates derived from the incremental choice model, an economic appraisal was subsequently undertaken. The economic appraisal indicated that the full development of the Inner Sydney Regional Bicycle Network was economically desirable, returning a benefit of around \$4 to the community for every \$1 invested (including \$40.2 million in health benefits, \$129.8 in amenity benefits, \$97.8 million in decongestion benefits and \$24.2 million in greenhouse gas emissions, air and noise pollution).¹

For further details on the demand estimation and economic appraisal undertaken by AECOM please see:

http://www.cityofsydney.nsw.gov.au/aboutsydney/documents/ParkingAndTransport/Cycling/MediaReleases/AECOM_ReportApril2010.pdf

¹ All monetary values were discounted at a real rate of 7 percent per annum over an evaluation period of 30 years and are valued in 2010 prices.

**ADDITIONAL CONTENT TO BE INCORPORATED INTO THIS PAPER AND PRESENTATION
FROM THE AUCKLAND REGIONAL CYCLE NETWORK**

AECOM has been engaged by Auckland City Council to undertake a review and prioritisation of the Auckland Regional Cycle Network. This project will take place primarily during the months between December 2011 and March 2012. The approach for this project will build on the ISRBP methodology. However the differing urban context, implementation timeframes, and client requirements will mean a tailored approach will be developed. It is planned that comparative information will be included in this presentation to highlight differing approaches to regional bicycle planning in differing city conditions.

REFERENCE LIST

- AECOM/STC 2009, *Inner Sydney regional Bike Plan and Implementation Strategy*, City of Sydney
- Environmetrics 2006, Sydney Cycling Research – Internet Survey, City of Sydney
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- Langdon, M. 2009, *Brisbane Corridor Study*, Integrated Transport Planning Division, Queensland Transport