

9. Route Selection Methodology

9.1 Network Parameters

The bicycle network for Gold Coast City was formulated from a synthesis of community feedback, a review of the previous BNOP and the review of major opportunities and constraints.

It was first important to recognise the various requirements and patterns that will define components of the network - community identified the following categories of bikeway systems:

- **commuter cyclists** needing access to employment areas, public transport nodes, tertiary education campuses and other services/facilities along cycle routes that offer good directness and the shortest possible distance between origin and destination;
- **school cycling** facilities, radiating from school properties to surrounding residential catchments, that can safely and harmoniously cater for heavy volumes of school cyclist and pedestrian traffic (where possible);
- **recreation and tourist cycling** paths that offer points of interest, changing landscapes and a number of options related to distance and topography; and
- **sports/training routes** providing a diversity of topography, distance and alignment, the potential for circuit rides and low to moderate traffic volumes.

9.2 Basic Network Structure

The base network structure is the South East Queensland Principal Cycle Network Plan (SEQ PCNP), which has been developed to ensure connectivity between neighbouring authorities and to provide a foundation for local routes within the Gold Coast area.

As shown in Figure 24, the network is created by three Principal bicycle corridors (running north-south), which are bisected at regular intervals by a series of secondary corridors, running east-west between the coast and hinterland. These closely reflect existing cyclist desire lines.

The Principal corridors were selected to facilitate access to Activity Centres and address the community's competing demands for recreational *and* transportation bicycle networks, as follows:

- **The Coastal Corridor** is the city's key recreational and commuting cycling route and runs along the waterfront from Coolangatta to Paradise Point.
- **The Central Corridor** runs parallel to the coastal route, approximately 2-3km inland, from Andrews in the south to Hope Island. It forms a major commuter link, providing direct access to major employment areas and the two university campuses. The Central Corridor bisects the densely populated coastal urban area and evolving communities to the west and south.
- **The Inter-urban Corridor** connects the city's northern urban fringe area (Yatala) and communities, on-route to the coast. It also serves as the gateway between the Brisbane metropolitan area, Logan and the Gold Coast.

The foundation for the bicycle network's primary and secondary corridors was provided by reference to:

- the SEQ Principal Cycle Network Plan November 2007
- existing 2008 bikeway infrastructure
- 2001-cycle route proposals
- Council and State Government feedback;
- established cyclist desire lines;
- schools and community input;
- major trip origins and destinations;
- the City Transport Plan's Local Area Bikeway Plans; and

Once the basic structure was in place, more detailed local area planning was undertaken.

9.3 Local Route Opportunities

The third step involved the identification of potential bicycle routes within the framework defined above. Initially, corridors to be considered included:

- roads (existing and future corridors);
- existing footpaths and bikeways;
- parkland/open space reserves – more emphasis was placed on parks to provide safe off road paths that are suited to less experienced riders;
- rail corridors (existing/operational and proposed);
- drainage corridors; and
- electricity transmission easements.

Transmission easement opportunities were of limited value, but could be utilised in more rural areas to improve cycle access. In most cases there were more cost-effective parallel road-based alternatives available. The health effects of emissions from transmission lines are also a disputed issue, with any adverse impacts yet to be finally proved. (Clouston, 1997:15).

In addition to the information sources nominated above, opportunities identified by community and government stakeholders, CTP Local Area Bikeway Plans, The Gold Coast City Planning Scheme, and other relevant reports/strategies were also reviewed for inclusion.

9.4 Route Suitability

The needs of bicycle users and their requirements of an efficient and useable bicycle network can be best summed up in five key principles listed below. Table 9.1 provides criteria and design considerations for implementing these principles.

Coherence: Bicycle network infrastructure should form a coherent unit by linking popular destinations with local residential streets via principal routes and local routes. The network should be continuous and it should be very clear to the user where the facility leads. Intersections should seek to provide a clear path for bicycle riders as well as for other modes. The quality of network facilities should also be consistent throughout the length of the route regardless of whether the facility uses a separated or shared road profile. Routes should be easy to find from local streets and the

network should be of such a density that there is always a choice of nearby routes available to the user.

Directness: Network infrastructure should be as direct as safely practicable. Long detours should be avoided as human energy is required to propel the vehicle. This should always be balanced against the problems of topography – a slightly longer route may work better because it contours around a hill rather than tackling it at its steepest climb. Regional route design should take into account both the slowness in operating speed of bicycles up-hill and the relatively high speeds when descending. Delays due to prolonged crossing times of major barriers should be avoided and the aim of the designer should be to ensure that riders are able to maintain a safe, comfortable and consistent operating speed throughout the length of the route.

Safety: Well designed bicycle network infrastructure improves and enhances the road safety of riders, pedestrians and motorists. Intersections should be designed to explicitly include bicycles as well as other categories of road users. Special intersection designs that include a path for cyclists are an important element of integrated network design. Mid-block treatments need to provide safe and easy major roadway crossings for riders. The design of bicycle routes past bus stops should be designed for safe accommodation of riders, bus passengers, other pedestrians and vehicles.

Attractiveness: Community support exists for cycling provided it is an enjoyable activity. Enjoyable cycling requires attractively designed and located facilities. Bicycle network infrastructure, such as regional and local routes, should be fitted into the surrounding environment so that the enjoyment of the experience is enhanced. Clear well-placed signposting should indicate major destinations, while centrelines and edgelines should indicate the serious transport intent of the off-road sections of routes. New housing developments should provide easy use and attractive bicycle transport facilities. Bicycle routes should also feel safe and offer good personal security. The community prefers well-lit pathways and open-to-view routes rather than dark and dingy alleyways.

Comfort: The bicycle network has to be easy to use for all types of riders. A smooth well maintained riding surface is essential both for comfort and operating safety. Depending on the speed and volume of other traffic (motor vehicles or pedestrians), some level of separation is often needed. Clearly marked bicycle facilities that allocate operating space to bicycle users are the most appropriate types of facilities on all but low traffic volume and low speed roads. Effective intersection treatment is a critical factor in joining streets to a coherent route or network, as well as providing safe and comfortable crossings of major arterial roads.

Table 9.1 – Key Design Principles of the Bicycle Transport System

Principle	Criteria	Design Considerations		
		Regional routes	Local routes	Mixed traffic streets
Coherence	Continuity of routes	No Breaks in route	Connect to regional route	Easy access to local routes
	Consistent quality of routes and facilities	Minimal quality changes	Minimal quality changes	N/A
	Easy to follow	Regional route signage	Local route signage	All street signs visible
	Freedom of choice of routes	Choice of at least two	Choice of at least one	Less than 250m to a route
Directness	Efficient operating speed	50 km/h design speed	30 km/h design speed	Consistent with street design
	Delay time	15 sec/km	20 sec/km	20 sec/km
	Detour factor * Detour factor is the relationship between the most direct distance taken by the actual route taken. A detour factor of 20% means that the route will be 20% longer than the distance as the crow flies.	20%*	30%*	40%*
Safety	Minimum risk of accident on routes	Monitor use of facility and investigate any links between accidents and design.	Monitor use of facility and investigate any links between accidents and design.	Monitor use of facility and investigate any links between accidents and design.
	Minimum risk of conflict with car traffic			
	Minimum risk of unsafe infrastructure			
Attractiveness	Support for the system	Public support and ownership	Public support and ownership	N/A
	Attractiveness of environment	Well lit and open appearance	Well lit and open appearance	N/A
	Perception of social safety	Minimum reports of vandalism & harassment	Minimum reports of vandalism & harassment	N/A
	System attractiveness	Coordination of all supporting system elements (maps, fittings, signage etc)	Coordination of all supporting system elements (maps, fittings, signage etc)	N/A
Comfort	Smoothness of ride <i>(Refer to Austroads – Part 14 Section 8.5)</i>	Smooth riding surface	Smooth riding surface	Smooth riding surface
	Comfortable gradient	Steep climbs minimised	Steep climbs minimised	N/A
	Minimum obstruction from vehicles	Minimise illegal parking	Minimise illegal parking	N/A
	Reduced need to stop – number of stops (average per km)	0.5	1.0	1.5
	Protection from adverse climate	Shade trees and wind	Shade trees and wind	N/A

Source: RTA – NSW Bicycle Guidelines

The bikeway routes proposed as part of this report were chosen utilising the guidance noted in Table 9.1 above. The route also incorporated information obtained through continual liaison with representatives of GCCC and the school / public consultation carried out as part of this report noted in Section 7.

Further variables were considered when evaluating the proposed routes for the bikeway network. It should be noted that there were conflicts with some of the variables noted below, as not all bikeways can accommodate all types of users; for example some routes will be steeper than others, but more direct as the alternative would be a long detour. The additional variables are noted below:-

(a) Directness and Accessibility

- Directness between origin and destination
- Extent to which other land uses can be served on-route
- Frequency of barriers or conflicts encountered along the route
- The ease by which the distance can be travelled by bicycle
- Potential for direct route integration with adjoining municipalities

(b) Route Attractiveness

- Avoidance of steep grades
- Potential for continuity of route and bikeway treatment type
- Degree to which the route meets the needs of anticipated end users, as opposed to other route options
- Real/perceived threats to personal safety (e.g. lighting, relationship to adjacent development)
- Visual aesthetics (particularly for recreation and bicycle touring)
- Avoidance of heavy traffic fumes

(c) Conditions for Cycling (Road Corridors)

- Traffic volumes, speed and mix (e.g. freight traffic, buses, cars)
- Available space
- Number of existing traffic lanes
- Road reserve width
- Shoulder edge (free bitumen edge, kerb/channel, steep embankment/cut)
- On-street parking (availability, demand and apparent usage)
- Intersection controls / complexity of intersections
- Sight distances (horizontal and vertical)
- Crossfall
- Road surface quality
- Spacing of utilities (and scope for relocation if necessary)
- Service lids and stormwater grates (placement / type)
- Potential for user conflicts (e.g. property access, other users)
- Drainage
- Route accident history

(d) Conditions for Cycling (Non-Road Corridors)

- Available space
- Other user groups (existing / potential)
- Sight distances (horizontal and vertical)
- Crossfall
- Compatibility with existing use (e.g. environmental values, conflict in current use)
- Drainage
- Path surface, quality, width and alignment (if existing)
- Maintenance vehicle access requirements

(e) Ease of Implementation

- Ease or difficulty to implement bikeway infrastructure
- Cost implications and extent of construction required to implement an appropriate bikeway treatment.