



Figure 5-10: Bus mall, central Townsville, showing kerbside stops

(Source: PB)

Bus interchange above rail alignment

Vertical 'stacking' of rail and bus facilities provides a good environment for passenger transfer as well as efficient use of land. The example below is Whitfords, on the Perth Northern Suburbs Railway line. Buses circulate above a rail platform, with lifts, escalators and ramps connecting the two. The entire interchange is within the 'paid' zone so passengers transferring can do so without the inconvenience of revalidating their tickets.

At Whitfords the rail runs in the median of a freeway, so visual amenity is not of major importance. For Maroochydore, if this type of design were adopted, the entire interchange would be contained within a structure with appropriate street frontage.



Figure 5-11: Bus/rail interchange at Whitfords, Perth

5.6.4 Route/station specific issues

Option 1 (Existing Caboolture to Maroochydore Corridor Study at-grade option)

The existing Caboolture to Maroochydore Corridor Study option has the railway station located well to the west of the town centre proposed in the Maroochydore Centre Position Paper, Horton Parade and the Sunshine Plaza. Hence, a large portion of the existing and proposed town centre is *outside* the walking catchment of the interchange.

The other major issue with the existing Caboolture to Maroochydore Corridor Study site is that there is insufficient space at the station for an off-road facility, as a very narrow corridor has been reserved for the railway station. This means either buses will need to use on-street (kerbside) stops and circulate using Carnaby Street, or acquisition of land will be required. This latter option will be expensive as all land in the area is developed or is currently under development. With the use of already busy streets in the Carnaby Street precinct, there is potential for serious local traffic congestion.

The number of buses likely to be using the interchange in the future will present design challenges. Careful detailed design will be required to ensure all bus movements are accommodated within the interchange so that as far as possible, seamless transfer between modes and services is achieved.

The location of the rail corridor directly adjacent to the Maroochy Boulevard also means that there is insufficient space for construction of a road overbridge to connect Dalton Drive to Maroochy Boulevard. As a result, there will be no capacity for bus services entering Maroochydore from the Boulevard to directly access the 'health hub' precinct and the new town centre. All services will need to run the length of the Boulevard and enter via Plaza Parade. This means a less direct service with some inefficient back tracking.

A through-running public network design will be essential for this option, as there will be limited if any capacity of buses to terminate at the railway station. There is also the potential for bus traffic congestion on Plaza Parade if buses terminate at Sunshine Plaza and are required to serve both locations. These issues combine to reduce the attractiveness of this option.

Figure 5-12 shows the public transport map from the Maroochydore Centre Position paper.

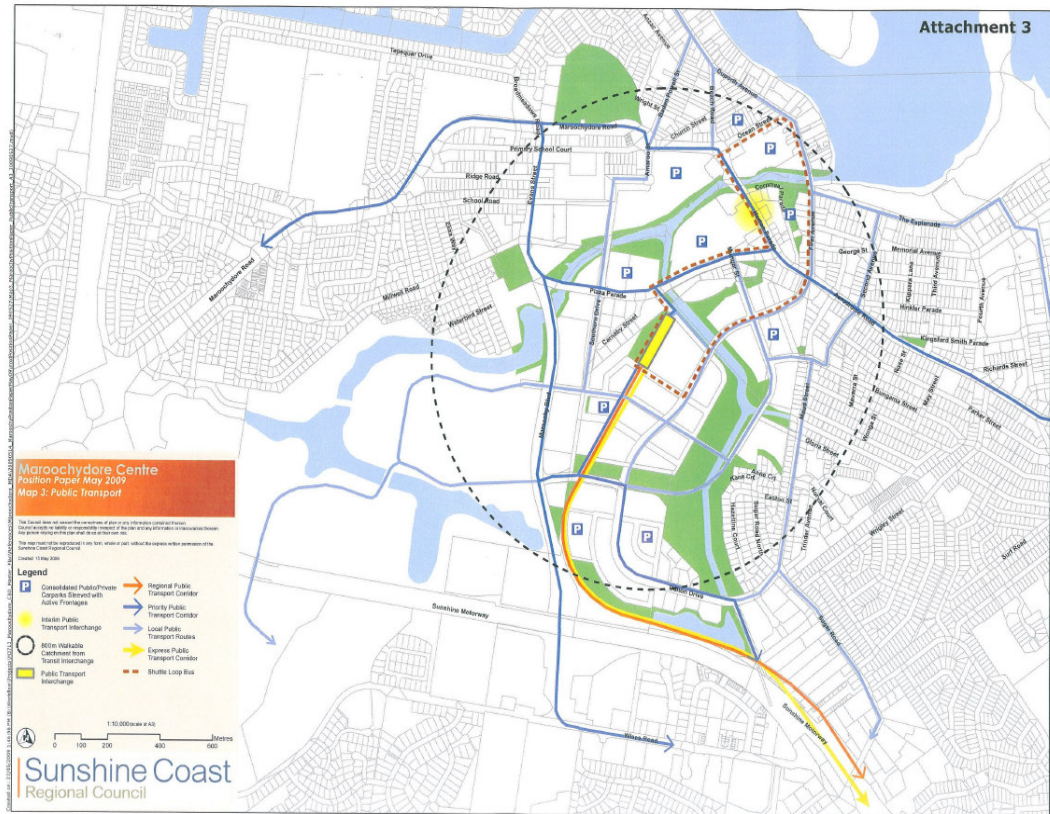


Figure 5-12: Public transport map (Sunshine Coast Regional Council, May 2009)

Carnaby Street station location – common features

A significant portion of the town centre, including Sunshine Plaza, is within 400-800m walking distance of the proposed main bus/rail interchange. However the Aerodrome Road precinct and sea-front are outside the comfortable walking catchment.

Local bus services including a “shuttle loop” are proposed in the latest Council master plan (in the Maroochydore Centre Position Paper) to provide circulation to the upper town centre (south/west of Aerodrome Road) and the Carnaby Street office and mixed use/retail precinct. The likely street network outcomes allow for through link to the health hub precinct and town centre for both local and inter-regional bus services.

An off-road bus station/interchange (e.g. under rail platforms) minimises bus traffic circulation impacts.

Through-routing allows both ends of the town centre to be served while reducing the number of buses traversing Plaza Parade. In this example, express services from the north and west have been through-routed, as have local services between the north (Buderim/Coolum) and southern inland (Sippy Downs) areas.

Option 2 (Carnaby Street, sub-grade)

The sub-grade option has the disadvantage of requiring a specific allocation of land for bus interchange (compared with an elevated option where bus platforms can be 'tucked under' the rail structure).

Land in the town centre is likely to be at a premium and extensive allocation of space for a bus facility is considered undesirable from an urban land form point of view. (The primary reason for the sub-grade option is to hide the transport infrastructure.)

While it is possible to incorporate bus facilities into a quality urban environment (see Christchurch 'Bus Xchange'), it is preferable to minimise use of land for service infrastructure to allow more productive use of the land (such as commercial or retail use). Layover bays for buses between runs takes up valuable real estate and is not desirable. For this reason, through routing becomes more attractive.

Option 3 (Carnaby Street, elevated)

The elevated option is ideal for bus/rail interchange opportunities, as the bus station can be tucked under the rail structure

The footprint of the elevated station is approximately 200 m long by 50 m wide with street frontages on at least three sides. This provides excellent opportunity for provision of both in-service and layover bays on bus platforms tucked under the elevated rail platforms.

The need to serve both bus stations means that careful design of bus routes is required to avoid congestion on Plaza Parade. This means

- through routing of local services
- routing of line haul services first to Sunshine Plaza then to the rail station interchange.

Option 4 (Carnaby Street, at-grade)

Providing a quality bus interchange for the at-grade option can be achieved through the construction of a bus/rail interchange with ground-level rail platforms and elevated bus platforms. This is effectively the inverse of option 3.

It is likely that this option will, in itself, generate a lower quality urban environment due to the degree of severance introduced by the rail line. For this reason, the impact of the bus station on the urban environment is lower than the grade separated options.

The footprint of the elevated station is approximately 100 m long by 50 m wide with street frontages on all four sides. This provides excellent opportunity for provision of both in-service and layover bays, albeit at greater cost than the elevated option.

The need to serve both bus stations means that careful design of bus routes is required to avoid congestion on Plaza Parade. This means:

- through routing of local services
- routing of line haul services first to Sunshine Plaza/Horton Parade then to the rail station interchange.

5.6.5 General recommendations

In order to optimise bus and rail operations in Maroochydore, the Council's centre planning has now addressed:

- configuration of the road network to ensure smooth connectivity (NS spine and EW link)
- provision for bus routes to new areas, especially the town centre core and Wisers Farm
- maximise through running, especially for local services
- minimise terminating services (possibly CoastConnect services only)
- provide layover for terminating services at railway station, if option permits
- extend quality bus corridor treatment along Plaza Parade to Railway Station
- run all services once to both the Horton parade end of Sunshine Plaza and Railway station, assuming option permits.

Ultimately, the details of the Maroochydore bus service plan will be determined after a more detailed examination of travel patterns and a confirmation of the broader bus network. This will guide the detailed planning of this bus interchange.

5.6.6 Conclusion

From the point of view of quality urban environment and convenience for transferring passengers, an elevated rail station with integrated bus platforms below is the best option for the Maroochydore Railway Station.

The existing Caboolture to Maroochydore Corridor Study option is less satisfactory than the Carnaby Street options, as it is located beyond convenient walking distance from the main town centre locations. Additionally limited land supply means that an off-road bus interchange cannot be well integrated, and local streets will need to be used for bus movements.

To minimise the impact of buses, it is strongly recommended that a route network be developed that maximises the number of buses through-routed through Maroochydore and minimises the number of buses terminating in the centre. Where routes are required to terminate, or services need to wait for timing purposes, the railway station interchange should be used in preference to the shopping centre bus station.

5.7 Noise and vibration

A desktop noise assessment of the proposed public rail transport corridor route options has been undertaken to provide information for the selection of a preferred route.

The options were assessed quantitatively and qualitatively to enable a relative comparison of noise and vibration impacts during both the construction and operational phases of the project.

Operational noise levels are normally assessed in terms of LAeq,24hour, L_{max} and also the WHO guidelines for minimisation of sleep disturbance. This assessment was undertaken prior to the release of the Maroochydore Centre Position Paper and so no longer closely reflects the land uses. However, general statements can be made and a largely qualitative assessment of the noise impacts is reported here. For more detail of the earlier work, reference may be made to section **5.7 Noise and vibration** in the draft Maroochydore Station Corridor Study Report available at www.pb.com.au/maroochyscsc and www.transport.qld.gov.au/maroochystation