



# Western Sydney Rail Needs Scoping Study Discussion Paper

A 10,000 Friends of Greater Sydney Response

24 October 2016

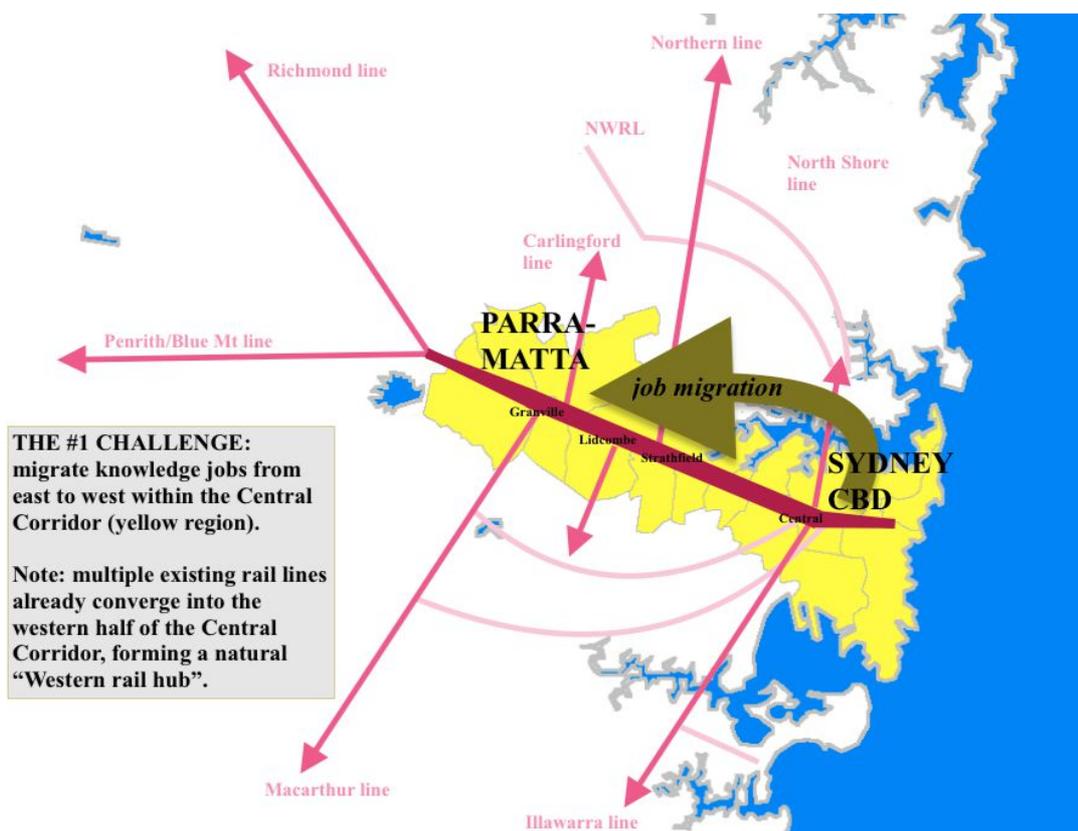
Western Sydney Rail Needs Feedback      Email: [westernsydneyrail@transport.nsw.gov.au](mailto:westernsydneyrail@transport.nsw.gov.au)  
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Dear Team,

## Re: Western Sydney Rail Needs Scoping Study Discussion Paper

MAJOR THEMES referred to in our specific responses (next pages) are:

A. **Agglomerating high productivity knowledge jobs for Western Sydney**, initially by shifting jobs from east to west within the “Dual CBD” Central Corridor between Parramatta and Sydney CBD (see diagram below). Then from 2030's onwards growing specialised jobs at a Badgery's Creek/WSEA “Airport City”.



B. **Transforming Greater Sydney into a unified city**, rather than a loosely connected group of smaller cities, by restructuring Western Sydney passenger flows into a coherent Manhattan-like array of transport corridors:

- Existing – T1/T2 heavy rail
- This decade – WS Light rail: with northern extension (Parramatta to Castle Hill) & western extension (to Prospect)
- By 2020's – BRT & Metro on M4 corridor: connect bus-only lanes on the M4 to existing Northwest & Southwest T-ways, to form a “Brisbane-like” busway network & with provision for metro conversion using rubber tyre metro cars
- By 2030's – Fast express rail: to bring airport & beyond (Narellan/Oran Park) to jobs in Central Corridor in 30mins

C. **Growing rail modal share** (inducing demand away from cars), with investment in trunk rail capacity ahead of demand, and brought forward through financing mechanisms like road tolls, parking space levies, and value capture. Also progressively transfer road assets to public transit use eg. bus only lanes.

## Responses to Specific Questions Raised

### 1. What is the key challenge that should be addressed by rail services for Western Sydney?

Fostering employment growth in Western Sydney hub(s) via a three-pronged strategy:

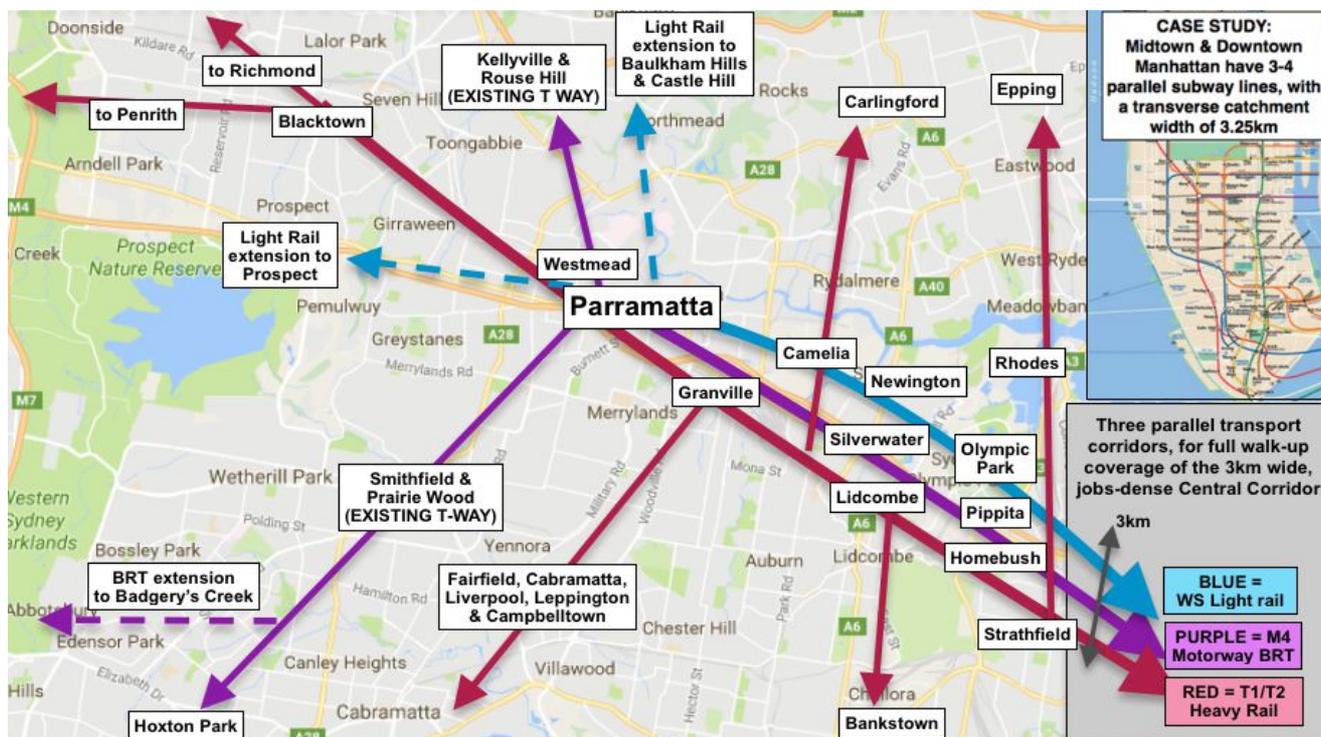
- (a) **Local centres:** Liverpool, Penrith, Norwest, Narellan and Campbelltown are local job centres for their individual districts.
- (b) **Higher order knowledge job agglomeration hub (2016-2030's).** Attracting knowledge jobs away from Sydney CBD can only be done by a transit hub with global connectivity across the wider Western Sydney metropolitan area (not just individual local districts). FROGS has articulated the “**Central Corridor**” concept to promote the migration of knowledge jobs from east to west. The Central Corridor between Westmead and Strathfield is currently the best interconnected Western Sydney “rail hub” (see diagram on first page) and **has a critical mass of “knowledge clusters”** which are jobs-dense precincts providing business services, health services, recreation, research functions and higher education. Unlocking the full potential of this western rail hub, by further deepening it's connections to surrounding/outer Western Sydney districts, is the key focus for the next 15 years.
- (c) **Badgery's Creek/WSEA (2030's-2060's):** from the 2030 onwards, the WSEA/Airport corridor will gain critical mass as a specialised jobs centre, and it's unique rail economics are outlined in answers #6-11 below.

### 2. What areas of Western Sydney are most in need of new or upgraded rail services? Why?

FROGS endorses Transport for NSW year 2051 modeling on Western Sydney transport shortfalls:

- (a) T1/T2 rail into Sydney CBD patronage growth of 50-80%, reaching full capacity by 2031-2041 (Discussion paper, p27).
- (b) T2 Western line (overall) patronage growth of 175%. Parramatta by 2050's becomes as busy as Wynyard is today (Fact Sheet #2) and highly capacity constrained. Thus Western Sydney needs links to a broader jobs corridor & not Parramatta alone.
- (c) Imbalanced past investment in excessive road-dependent infrastructure & underinvestment in rail/metro

**By 2020's:** restructure Western Sydney passenger flows to converge into Central Corridor & add new Y-shaped “**30 min**” links to outer & surrounding districts & thus providing access to jobs, university, sport & health.



The Central Corridor “knowledge hub” has dimensions of 25km x 3km. Hence, three “Manhattan-like” parallel routes, 1km apart, will provide comprehensive walk-up coverage of all destinations (to within 500m):

- (i) **BLUE route (light rail):** extend the planned Olympic Park-Parramatta light rail corridor north to Baulkham Hills & Castle Hill and west to Greystanes & Prospect – these car dependent areas currently don't have any rail services.
- (ii) **PURPLE route (metro/BRT):** existing T-ways from Rouse Hill & Hoxton Park (both currently terminating at the congested Argyle St bus hub) to be connected to M4/Parramatta Road corridor via a bus tunnel under Parramatta CBD. Provide capacity of ~30,000 pax/hr, by upgrading into a “Brisbane Metro” style service (rubber tyre metro vehicles in bus-only lanes on the M4).
- (iii) **RED route (T1/T2 heavy rail):** optimise the capacity with fully independent operational separation of South line, Western line and Northern line, longer trains, simplified stop patterns, signaling/power upgrades & demand management measures.

**By 2030's: build faster rail link (stop spacing 3~10km) linking Dual CBDs to Western Sydney Airport, Narellan & Campbelltown.** This serves as the express transit “glue” to join up slower modalities (i)-(iii) above, and also brings Camden/Campbelltown populations (460,000 by year 2036) to within 30 min travel time of the Central Corridor – providing equity of service & social inclusion for rail deprived areas.

Additionally, given the stations may be very few, the performance of this rail link is highly sensitive to the correct choice of station locations – **a mistake in a single station location decision will potentially destroy the entire economics of a multi-billion dollar rail line.** Whilst Parramatta & Sydney CBD are obvious stops, the number & location of intermediate stops needs further investigation by TfNSW. The scoping study nominates Olympic Park, but we note this stop suffers from numerous limitations: (1) lack of direct access to the M4/Parramatta Road transport links (2) poor heavy rail connectivity (3) much of it's land use is sporting grounds and environmentally sensitive parklands, which can't be redeveloped into other uses. The Olympic Corridor with 1600ha urban renewal lands comprises not just Olympic Park (only 50ha, once parkland/sports grounds excluded) but also Rosehill/Camelia (300ha), Silverwater/Newington (400ha) and Carter St/Flemington/North Strathfield (300ha).

**3. What rail services would help you access employment, health, business and education precincts in Western Sydney?**

See responses #1 and #2 above.

**4. What other challenges should the Scoping Study address?**

**Benchmark Western Sydney bus system:** to Brisbane's “gold standard” (113 million pax/yr patronage, >500 buses per hr frequency, via focused \$1.7b investment on 25km of high quality, fully segregated “trunk” route).

What Western Sydney needs for a comparable bus system is a programme of level crossing removals, and a bus tunnel under Parramatta CBD to join up separate busways into a coherent network – to build a high frequency, high patronage, high speed segregated bus network. (High patronage can then justify conversion to rubber tyre metro, as Brisbane is now planning).

BRT infrastructure investment should be focused on selectively building high quality trunk routes (like existing T-ways, Victoria Rd corridor, WS Airport & M4/Parramatta Rd) - rather than too many widely dispersed (& hence low quality) suburban/”rapid” routes, which are then trapped in a cycle of low patronage & low frequency.

**Definition of Metropolitan Sydney:** it is recommended NSW use the ABS definition and include the Central Coast. Penrith centre is the same distance from Sydney CBD as Gosford centre. Both are commuter areas and need to be recognised in any transport plan.

**Role of Parramatta CBD:** (a) Accelerate & expand Government plans to shift public servants to Parramatta & hence catalyse further deepening of it's employment ecosystem. (b) Use a CBD to CBD rail link to virtually merge Sydney's two CBDs, as well as forming the focus for a radial rail network from outer western districts. A key objective is linking suburbs housing “knowledge” workforces (but poor rail access) to Parramatta CBD.

**5. How could governments best take an active role in encouraging greater use of public transport given the potential benefits to the environment and sustainability?**

Attract patronage away from car/motorway use by use of

- \* faster rail modalities (with feeder rail/bus/park&ride) which reduce travel times & bypasses congestion
- \* cheaper rail-like modalities (light rail, BRT/rubber tyre metro) which enables wider/larger catchments

FROGS recommends the 2017 Transport Masterplan revise the “Tier” structure of the 2012 TfNSW Masterplan to use a stop spacing classification basis, so as to more clearly highlight the station catchment paradigms:

Existing/Under Construction Rail Lines	2012 TfNSW Masterplan	2017 Recommended Masterplan
NWRL, Bankstown/Liverpool to Sydenham	Tier 1 “Metro”: single deck trains with “turn up & go” services	Tier 1 “Crossrail-like” single deck services. Stop spacing: <b>2~4km</b> . Catchments: <b>walkup, park/ride, bus</b>
Airport/Revesby, ESR, Illawarra local tracks, Inner West light rail, SE&CBD light rail, Parramatta Road BRT	Tier 2 “Suburban”: double deck trains with time-tabled services	Tier 2 “Tube-like” services with <b>1km stop spacing</b> . Initially retain double deck, but transition to single deck over longer term. Light rail & BRT routes also classified as Tier 2 services. <b>Walkup, dense urban catchments.</b>
Penrith/Richmond to Sydney Terminal, Macarthur/East Hills	Tier 3 “Intercity”	Tier 3 “Direct express” and “Fast Rail” service with <b>5~10km stops</b> . Catchments: <b>park/ride, local rail/bus</b>

Relocation of NSW public service: as Greater Parramatta CBD has the best rail connectivity and best journey-to-work rail usage of all Western Sydney centres, it's place as the geographic and rail system “centroid” can be recognised (as suggested by the Greater Sydney Commission) through the shifting the whole NSW State Public Service to Parramatta CBD as soon as possible.

**6. What rail services should be delivered as the highest priority service to Western Sydney Airport?**

**A viable airport rail service can be “brought forward” to 2030s** if it leverages the growing & unmet rail commuter demand from Narellan/Oran Park into Parramatta. (See Appendix 1-2 for two possible strategies).

**7. What other rail options should be considered in this study to service a Western Sydney Airport?**

FROGS requests TfNSW publish further comparative analysis of:

- BRT east from Airport along Elizabeth Drive/M12 motorway, leveraging Southwest T-way to link up to both Parramatta & Liverpool. Also, remove level crossings on T-way & make provision for rubber tyre metro.
- BRT south from Airport along Northern Rd, to Oran Park and Narellan, on a fully segregated right of way.
- Options for concurrently constructing/provisioning for rail, busway or rubber tyre metro during construction of the M12 motorway and Northern road widening.

Also, whilst a North-South rail link connecting Macarthur to WSA, St Mary's & Schofields has been identified (Discussion Paper, Option 6), FROG's **preferred North-South rail link is a variation of Option 6 - linking Macarthur, Narellan, Oran Park, WS Airport to Parramatta**, with a goal of a 30 minute travel time from Campbelltown/Narellan to Parramatta. Provide interchange at Parramatta, to light rail (for Castle Hill) or BRT (for Rouse Hill) for further additional north-south connectivity. An intermediate stop between WSA and Parramatta (eg. on Southwest T-way/M7, or alternatively Blacktown) may provide further bus/rail connectivity.

**8. What is the highest priority rail service required for the Western Sydney region?**

See response #2 above, on deepening “30 min links”, from outer/surrounding districts to Central Corridor.

**9. What other rail options should be considered to service other parts of Western Sydney region?**

The scoping study emphasised future heavy rail options exclusively. However, grade separated busway/rubber tyre metro and light rail modalities offer advantages which may be better matched to Western Sydney's low density, motorway dependent transit characteristics, including the ability to handle grades of up to 13%, and compatibility with existing road/motorway systems (see Appendix 1). Each mode has complementary functions, and room exists for all rail modes in a four decade (2016-2056) capital budget.

**10 & 11. Should rail services to a Western Sydney Airport be prioritised over services to other Western Sydney locations? If a rail connection is provided to the proposed Western Sydney Airport, should it be provided when the airport opens or when there is sufficient demand?**

Rail services to Western Sydney airport may be partly prioritised to the extent that:

- (a) “Airport City” is able to attract greater quantity and higher productivity jobs than other Western Sydney locations
- (b) Airports are able to attract disproportionate fare revenues compared to other locations. For example, each Kingsford Smith Airport rail passenger yields 3-4x the fare revenue of non airport rail passengers.
- (c) Equity considerations dictate “Airport city” be placed on equal footing to centres (Penrith, Liverpool) already with rail.

Rail connections may be partly provided ahead of the demand curve, where it can be demonstrated that:

- (a) Demand from more distal airport rail extensions (eg. from Narellan/Oran Park) can augment demand from the airport itself.
- (b) Innovative financing (see response #14 below) can “bring forward” rail investment beyond what demand alone can justify.
- (c) Greater cost efficiencies can be extracted by building airport motorways and rail lines concurrently, eg. building/provisioning for rail in median lanes of airport motorways.
- (d) Having spare capacity and improved service levels of rail will facilitate and induce job creation within an “Airport City” environment enabled by the rail service (eg. by inducing greater air travel share away from Sydney Airport and fostering freight and associated industries).

**12. Is it more important to be able to travel (by rail) to the proposed Western Sydney Airport or to other locations in Western Sydney? Why?**

See answers #10 and #11 on justifications for having some partial degree of prioritisation for an airport rail connection. Additionally, the “A Plan for Growing Sydney” provides regional centre status for Campbelltown, Penrith and Liverpool. The most advanced of these centres is Campbelltown/Macarthur, served by two rail stations, and planned as the centre for the Macarthur Growth Centre to serve 500,000 people in Campbelltown, Camden and Wollondilly. The centre has been developed with a university, including a teaching hospital, a regional TAFE, a general hospital and the largest Regional shopping centre in the South West Growth Area. FROGS has identified a variation of Option 6 (see response #7 above) as a means of providing not just airport rail service but also improved rail service to Campbelltown/Macarthur.

**13. What other assessment criteria should the Scoping Study consider?**

**Delivery flexibility:** chosen technology to have scalability (ie: upgrade path from bus-scale passenger loads to metro-scale loads with minimal structural re-engineering), plus incremental “upgradability” (ie: can be a sequence of progressive upgrade stages with short lead times, rather than one “big hit” long lead time upgrade).

**Multimodal coherence, efficiency & legibility:** chosen option to facilitate improved efficiency, coherence and legibility of the network structure of all modalities, including rail, bus, bike and commuter parking. See Appendices 1-3 for further discussion.

**14. How do you think rail services in Western Sydney should be funded? Government funding, Value sharing, User pays, a combination of the above? How else could future rail services be funded?**

A combination of the above. Key value capture precincts include Camelia, Silverwater/Auburn, Newington, Flemington/Carter St, Homebush/Strathfield & Bays Precinct. Over longer term, housing/commercial opportunities north/south/east of Badgery's Creek. Also consider further financing mechanisms such as:

- (a) Asset transfer from road to busways/metro (eg. transfer two lanes of M4 and M12 for BRT use, with an upgrade path to metro), thus correcting past road/rail investment misallocation mistakes
- (b) Extending parking space levies to Macquarie Park, Norwest, Liverpool, Castle Hill, Rhodes/Olympic Park and Marsden Park, to ensure competitive neutrality with Parramatta (which is the only Western Sydney centre currently subject to the levy).
- (c) Airport taxi surcharges and air passenger flight levies

**Use of debt funding to allow monetisation of value uplift:** The first Sydney Growth Centre, Macarthur, made up of Campbelltown, Camden and Wollondilly was funded by Commonwealth and State loan funds which were repaid within two decades. Given that growth centres are on greenfield sites and the government are largely the planners and developers of key sites, rural land needs to be purchased many years before development of key land uses such as major centres, employment lands and right-of-ways for transport, roads and rail. In the case of the Macarthur Growth Centre, the value added to the serviced commercial land when sold to the private sector or other government departments allowed loan funds to be paid back in record time. However, this can only be optimised when all government agencies (including Treasury) are working closely together.

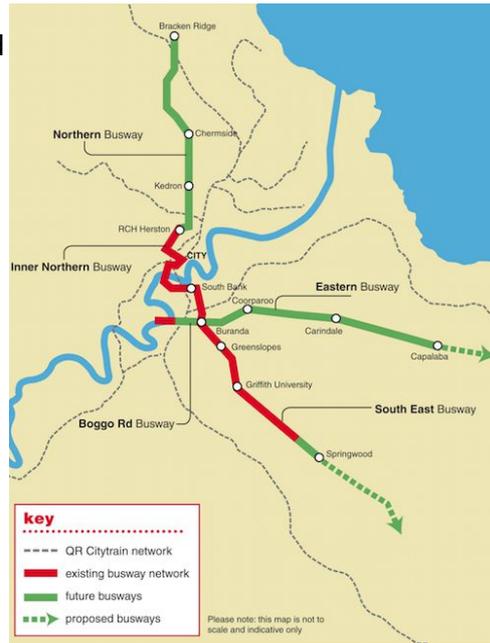
Yours faithfully

Des Dent  
Chief Executive Officer

**Appendix 1: Case study – Faster Buses and Rubber Tyre Metro Conversion**

**Brisbane busway network (\$1.7b cost):** opened in stages 2000-2012 with extremely successful adoption and patronage. Bus services from low density suburban catchments (not served by rail) feed into a 25km network of graded separate bus lanes. Bus patronage in Brisbane now totals 112 million passengers per annum.

**Metro conversion (\$1.5b cost):** is a policy being implemented by freshly re-elected Brisbane City Council. Will use rubber tyre rolling stock (like Paris & Montreal metros) to provide excellent slope tolerance (up to 13%), faster acceleration, tighter turning capability, shorter stopping distances and hence shorter headways. Will take over existing busways outside CBD (but builds new 500m long tunnel in CBD, so as to retain existing CBD bus tunnel section for bus use). Progression into detail design by 2017. Station upgrades, metro rail tracks, electrification and new CBD tunnel costed at \$1.1b and rolling stock at \$200m. Capacity of 30,000 pax/hr.



**Western Sydney busways:**

<p><b>Northwest T way (Parramatta to Rouse Hill &amp; Blacktown)</b></p>	<p>Opened in 2007. Cost: A\$330 million</p> <p>Total length 24km</p> <ul style="list-style-type: none"> <li>- 21 km of exclusive road corridors</li> <li>- 3 km of bus lanes on existing roads in Westmead/Parramatta</li> <li>- 30 bus stations</li> <li>- 10 new bridges</li> <li>- 2 new underpasses</li> <li>- 20 km of off-road cycleway</li> </ul>	
<p><b>Southwest T way (Parramatta to Hoxton Park and Liverpool)</b></p>	<p>Opened 2003. Cost: A\$345 million. Patronage: 2.77 million annual passengers in 2012. Reached full capacity in 2014</p> <p>Total length length 31km</p> <ul style="list-style-type: none"> <li>- 35 bus stations</li> <li>- Bus only lanes on Great Western Highway (Wentworthville) and Argyle St (Parramatta station)</li> <li>- Segregated right of way from Wentworthville, using easement next to Sydney Water pipeline to Prospect Reservoir &amp; then using former freeway reservation to Hoxton Park.</li> <li>- Level road crossings (not grade separated)</li> </ul>	<p>The map shows the busway routes in Western Sydney. The Northwest T-way is highlighted in purple, connecting Parramatta to Rouse Hill and Blacktown. The Southwest T-way is highlighted in blue, connecting Parramatta to Hoxton Park and Liverpool. Other locations marked include Wetherill Park, Prairiewood, Green Valley, Bonnyrigg, Liverpool, Hoxton Park, and various suburbs like Cabramatta, Fairfield, and Yennora.</p>

**Badgery Creek busway:** the Southwest T-way may be connected to dedicated bus lanes on the planned M12 motorway. It is recommended this be combined with a programme of progressive removal of level crossings on the existing T-way to Parramatta.

## Appendix 2: Case Study - Faster Rail Link for a unified Greater Sydney

A “Fast Link” rail interest group strongly supports the need to bring the widespread metropolitan Sydney closer together by introducing faster links using appropriate technology, including rolling stock capable of 160–200kph, and careful minimisation of stops to key employment hubs & key “feeder” bus/rail hubs only. Greater Sydney can thus be unified by such a “FastLink” service connecting Sydney & Parramatta Dual CBDs to Badgery’s Creek Airport, Narellan and Macarthur.

This will become the cornerstone of an intercity network linking Western and Eastern Sydney. By minimising the number of stops, it is affordable to construct longer stations suitable for 240m long trains, providing “future proof” line capacity of 75,000pax/hr, per direction.

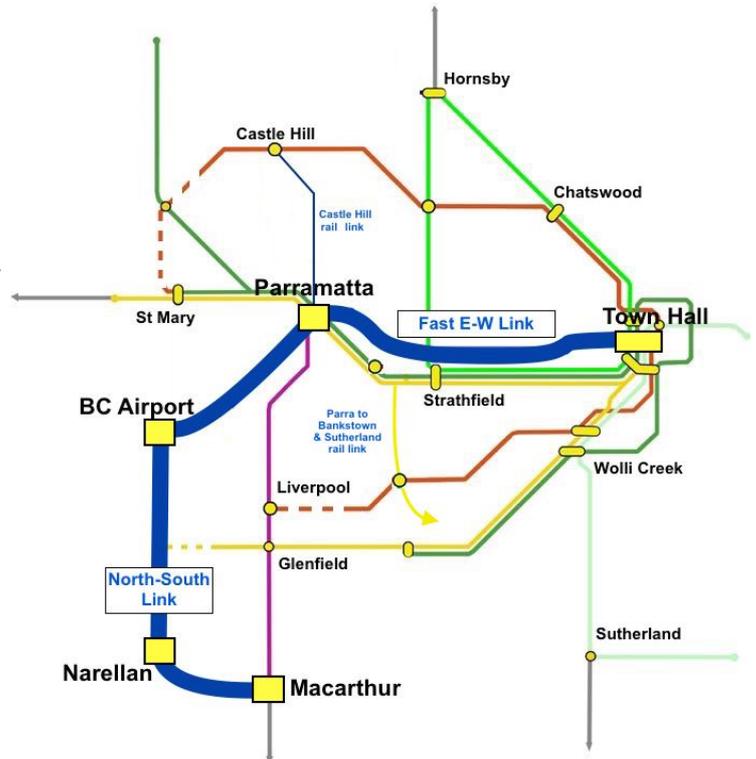
Operational improvements to existing T1 and T2 lines are also facilitated, as all T1 Western line trains can be terminated at Central, thereby enabling these lines to be physically segregated and “untangled”.

In addition to linking east & west, FastLink provides an important component of a new north-south link (across Western Sydney). This new north-south link connects current & future population centres in the Southwest (Camden, Campbelltown, Fairfield) to important employment hubs & populations further north, including to the Northwest, through the use of an interchange at Parramatta, onto T-way and light rail links.

A select few additional intermediate stops at Bays Precinct, within the Olympic Corridor, west of Parramatta (eg. either Blacktown, or the M7/Southwest T-way corridor), and south of the Airport (eg. Bringelly, Oran Park) provide additional “origin” passenger catchments (via park/ride and feeder bus/local rail). These intermediate stops also provide an additional value capture footprint, and in aggregate offer a unique opportunity to assist financing by value capture along the route. Careful study and selection of intermediate stops is required to maximise value capture as well as maximise passenger catchment. Given the high value opportunities unlocked by Fast Link, assistance from the private sector may maximise public benefits.

It is appreciated that the study also recognises that capacity and service to Sydney Airport and the southwest can be significantly enhanced by converting existing track to single deck Metro. FROGS also appreciates the need to be practical in terms of funding rail enhancements and the need to relate to capacity to finance. In this respect it appreciates the desirability of other options but recognises the unlikely ability to fund all. Hence it proposes that other options be retained as desirable if funds become available but thence incorporated with progressive replacement of double deck carriages with single deck Metro to improve operation, frequency and reduce cost to the network.

These lower priority options are shown as dashed lines in diagram above. One such option recognised is the Bankstown to Liverpool Sydney Metro extension. As tracks from Lidcombe to Bankstown will not be used by Sydney Metro, FROGS suggests operating these tracks as a branch of Sector T2 and extending this branch further south, as the basis of a north-south link to Sutherland (with the other branch continuing west to Parramatta & beyond).



## **Appendix 3 – Commuter Car Parks & Bike Friendly Facilities**

### **Commuter Car Parks**

These are important for encouraging the use of rail. However there seems to be confusion during the past few years where large commuter car parks have been provided at major centres such as Penrith and Blacktown, exactly where a concentration of cars should not be encouraged as they will compete for road space with buses feeding key rail stations; taking valuable central area retail and community space and making the area surrounding a rail station less conducive to pedestrian traffic.

The argument that commuter car parks should be at express stops is valid. It is suggested therefore that a few large commuter car parks be provided at rail stations with easy access to arterial roads and not to major centres, rather for example employment zones. These stops could then be express stops giving advantages for those needing to drive to a rail station. (The Seven Hills commuter car park is a good example if it became an express rail stop).

### **Bicycle Storage at Rail Stations and Carriages for Carrying Bicycles**

The San Francisco BART and CALTRAN systems have major bicycle storage facilities at their stations and in some cases special carriages for passengers to carry their bikes from origin to destination.

### **Glossary**

**“South West Priority Growth Area”** is defined as including parts of the Liverpool, Camden and Campbelltown local government areas.

The term **“Metropolitan Sydney”** includes Wollondilly which is a key component of the “Macarthur South Investigation Area”, as defined in the current “A Plan for Growing Sydney” and identified on p13 of the “Scoping Study”, and needs to be included in the definition of the South West Growth Area. This would suggest that some form of public transport along a reconfigured Appin Road needs to be included in public transport options.