



Sydney Metro West Submission

A 10,000 Friends of Greater Sydney (FROGS) Response

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Dear Team,

FROGS is pleased that the Metro West has been confirmed as the next stage of Sydney Metro's rail expansion. FROGS endorses the two key elements of Sydney Metro West (namely the prioritisation of the Parramatta to CBD corridor, and single deck rolling stock). In this submission, FROGS also provides additional feedback relating to station selection, station design and airport connectivity. FROGS would be pleased to discuss these comments with the Metro West team as well as other aspects to help the team achieve the best possible outcome for the Metro West and Sydney.

1. Parramatta to Sydney CBD corridor (referred to also as "Central Corridor")

Greater Sydney suffers from a growth imbalance, with insufficient housing in the eastern half, and insufficient employment in the western half (especially higher paid "knowledge jobs"). However, the key trait of knowledge jobs are their super-specialisation, and consequent reliance on large scale "critical mass" agglomeration economics. Such large scale agglomeration can only be achieved by a transit hub with global connectivity across the wider Greater Sydney metropolitan area (not just individual local districts).

The Central Corridor between Westmead and Strathfield is currently the best interconnected Western Sydney "rail hub".

Importantly, this rail hub already has a critical mass of "knowledge clusters" which are jobs-dense precincts providing business services, health services, recreation, research functions and higher education. However, by 2030, knowledge job growth within this corridor will be highly constrained by rail capacity shortfalls.

Western Sydney 2016 Scoping Study graph (right): the T1 "Western line" and T2 "Inner West line" are the busy existing rail backbones connecting Parramatta to Central. Note that T2 has almost as much passenger demand as T1. However T1 has quad tracks into Central, but T2 only has two tracks. Consequently future overcrowding on T2 may be **worse** than that of T1.

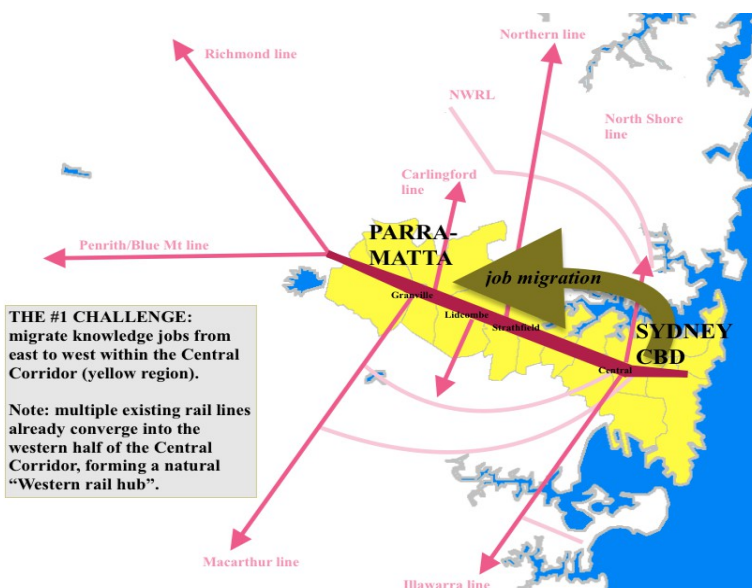
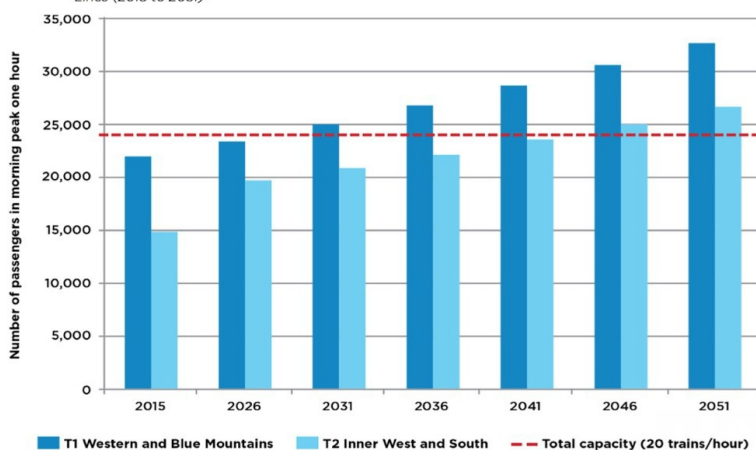


Figure 11 Forecast morning peak hour passenger demand and capacity on the T1 West and T2 Inner West and South Lines (2015 to 2051)⁹



KEY RECOMMENDATION: Sydney Metro West must augment **both** T1 and T2 capacity, in order to fully unlock the jobs potential of the Central corridor. A coherent T1/T2 to Metro **diversion strategy** is needed.

2. Single deck metro rail modality

Transport patterns within the Central Corridor will increasingly evolve away from commuter style transit direct into Sydney CBD, into a pattern of high “on-off” turnover at multiple employment centres and/or intermodal interchange hubs along its length, including Westmead, Parramatta, Camellia, Silverwater, Olympic Park, Bays Precinct, Strathfield (bus/heavy rail interchange), Five Dock and Lilyfield (light rail interchange).

KEY RECOMMENDATION: Single deck rolling stock is better suited to such high turnover “on-off” patterns than Sydney's traditional double deck stock. As a result of their shorter station dwell times and greater acceleration, single deck stock will be able to have higher train frequencies and higher overall transit capacity.

3. Station selection and design considerations

(a) Station spacing: the four announced stations are endorsed, but FROGS recommends 3km between stations as the ideal balance between cost, stopping time and catchment area coverage (especially as autonomous buses & Uber-style shared car services increasingly solve the “last mile” problem & thus enlarge station catchments).

(b) Additional “essential” stations: FROGS identifies four more stations which are essential for a coherent T1/T2 capacity relief/diversion strategy & provide network wide/intermodal connectivity benefits:

ADDITIONAL STATION 1: FIVE DOCK Metro station to service rail “blackspot” (no current rail services)

- Blackspot population of 21,000 residents (ABS 2016 data) + 16,000 more with Parramatta Rd renewal (UG NSW)
- Bus hub & potential light rail interchange point if Dulwich Hill light rail is branched (& extended to Five Dock)

ADDITIONAL STATION 2: STRATHFIELD heavy rail to Metro interchange, links “anywhere to anywhere”

- “Anywhere to anywhere” rail junction, where four urban lines (Inner West/Northern/Leppington/Western lines) & two NSW Train link intercity lines converge. Has eight platforms (double the capacity of Parramatta's T1 station) & twelve bus stands. Frequent trains every 2min (peak) & 4 min (offpeak), for rapid switching onto/off Metro.
- Strathfield bus gateway (south side) services a rail “blackspot” of 74,000 current residents (ABS 2016 data for suburbs of Strathfield, Enfield and Greenacre). By 2051, TfNSW projects Strathfield station will have 15,000 hourly passenger entries/interchanges, making it the largest single “diversion” point at which a new Metro station can relieve T1 and T2 and reduce overcrowding on these lines (by diverting passengers onto Metro).
- Has been identified by the Department of Planning as a priority precinct for future higher density housing (hence expanding the catchment population & value capture scope). Excellent property developer interest & feasibility.

ADDITIONAL STATION 3: CAMELLIA interchange for Western Sydney light rail and urban renewal area

ADDITIONAL STATION 4: WESTMEAD Metro station (and/or metro conversion of T1 “spare” tracks, eg. up to Blacktown): health, education & employment precinct & interchange point for T1 rail catchments located west of Parramatta

(c) Optional “value capture stations”: CANADA BAY, SILVERWATER, LILYFIELD, and PYRMONT to be evaluated by detailed land use studies. The aim of these land use studies (collaborating with Greater Sydney Commission) is to confirm that the benefit of the higher density housing and other land uses (enabled by having a station) exceeds the station capital costs and travel dis-benefits (due to increased end-to-end transit times).

(d) Parramatta station location and design: FROGS recommends Parramatta Metro station **not** provide a direct T1 rail interchange function (to instead be provided by Westmead and Strathfield stations, as above).

- Parramatta Transport Study (City of Parramatta, 2017) concluded Parramatta will have “similar station demand to Wynyard by 2036; there is need to decentralise demand and decongest the Parramatta Interchange”.
- Parramatta Metro station should be provisioned with four platforms, with the two “spare” platforms being used for future west airport link. As a result, Parramatta CBD will have two separate stations of four platforms each.
- The two stations to be 200m apart and hence have separate catchments & rail connectivity profiles. They will operate in parallel to provide maximum capacity as “employment destination” stations (similar to the roles of Victoria Cross station + North Sydney station & Pitt St station + Town Hall in Sydney Metro CBD & SW).

(e) Western Sydney Airport link and CBD to CBD express connectivity (further stages **after** Metro West):

- FROGS has identified fast rail (160-200+kph) to Parramatta as its preferred rail link to Western Sydney airport.
- Initially terminate airport link in Parramatta. In future (years 2030-2040+) extend as express Parramatta CBD to Sydney CBD link (fully segregated from Metro West). This CBD to CBD express link will have its own tunnel and (east of Parramatta) will not have any stops except a new Sydney CBD stop, and a possible HSR interchange.

Appendix 1: Metro West “Overview” Lacks Coherent T1/T2 Capacity Strategy

(a) **Both T1 and T2 line need capacity relief:** the Metro West Project “Project Overview” document identifies three key objectives for Metro West, namely:

- Servicing 420,000 new residents
- Servicing 300,000 new jobs in places like Parramatta, Olympic Park and Bays precinct
- Relief for T1 Western line

FROGS endorses the above objectives, but recommends an additional objective of also relieving the existing T2 Inner West line be added to the above. As outlined in page 1, T2 nearly as much demand as T1 but only has two tracks into Central (whereas T1 has quad tracks). This means T2's future capacity challenges are likely even more daunting than T1. Metro West must be designed to relieve **both** T2 and T1 – not just T1 alone.

(b) **Need to formulate coherent T1/T2 diversion & interchange strategy:** the identified four stations in Metro West “Project Overview” **do not provide (on their own) a coherent T1/T2 capacity relief strategy.** As outlined in (c)-(d) below, Parramatta & Sydney CBDs are not suitable T1/T2 diversion points onto Metro West. In particular, interchange with T1 is not to be encouraged at Parramatta (due to capacity limits of T1 Parramatta's four platforms). Instead Strathfield (with 8 platforms & hence double the interchange capacity of Parramatta) is recommended as the main heavy rail interchange point for Metro West, being strategically located as a midway “pivot” between the two CBDs. Strathfield's unique role in providing a T1 **and** T2 diversion point/capacity relief **and** “anywhere to anywhere” connectivity is seen in TfNSW's modeling of 2019 rail passenger interchange behaviour (see line load graphs below):

Figure 9: South & Inner West Line Loads

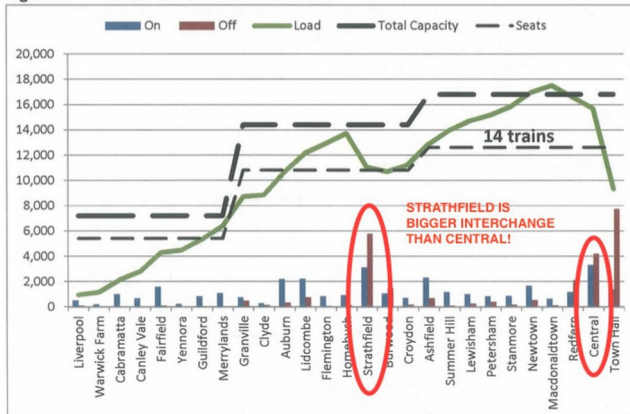
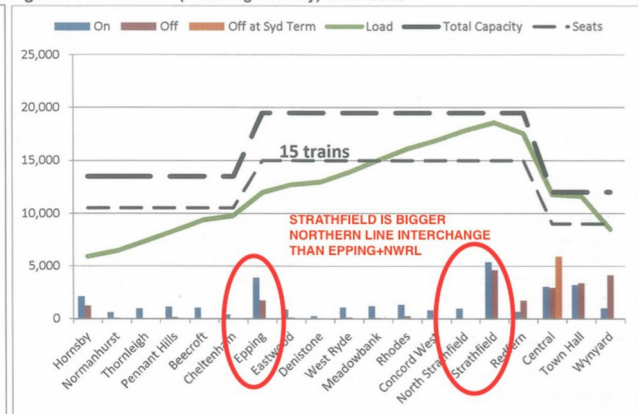


Figure 7: Northern (including Intercity) Line Loads



An additional interchange point west of Parramatta is also recommended (eg. Westmead, or convert the “spare” T1 tracks from Westmead to St Mary into a dedicated metro extension of Metro West).

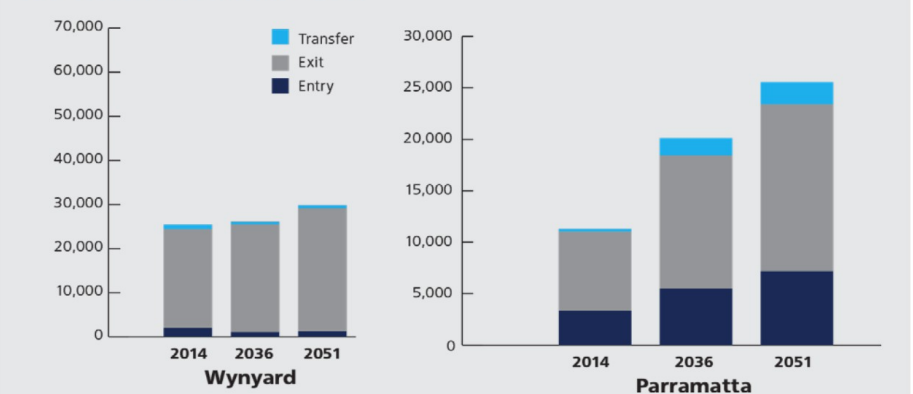
(c) **“Dual CBD” status of Parramatta:** if Parramatta is to become a CBD of similar stature to Sydney CBD, it must have more than one train station. As a benchmark, Sydney CBD (by 2024) will have 10 separate stations. Similarly, North Sydney CBD in 2024 will have two separate stations. It is recommended that Parramatta Metro station provide a distinct catchment by means of a 200m physical separation from Parramatta T1 station.

(d) **Parramatta station capacity:**

Our recommendation for separate Parramatta stations is supported by the Western Sydney Rail Needs Scoping Study (2016), which projects that by 2036, Parramatta station movements will exceed 20,000 passengers per hour (across four platforms). In comparison, Wynyard today handles 25,000 passengers per hour across four platforms and suffers from severe station congestion – it is recognised as a bottleneck for the entire Greater Sydney rail system.

The 2017 Parramatta Transport Study by City of Parramatta confirms even worse station congestion by 2036. **It is important the lessons of Wynyard congestion today are applied to the Parramatta of tomorrow.**

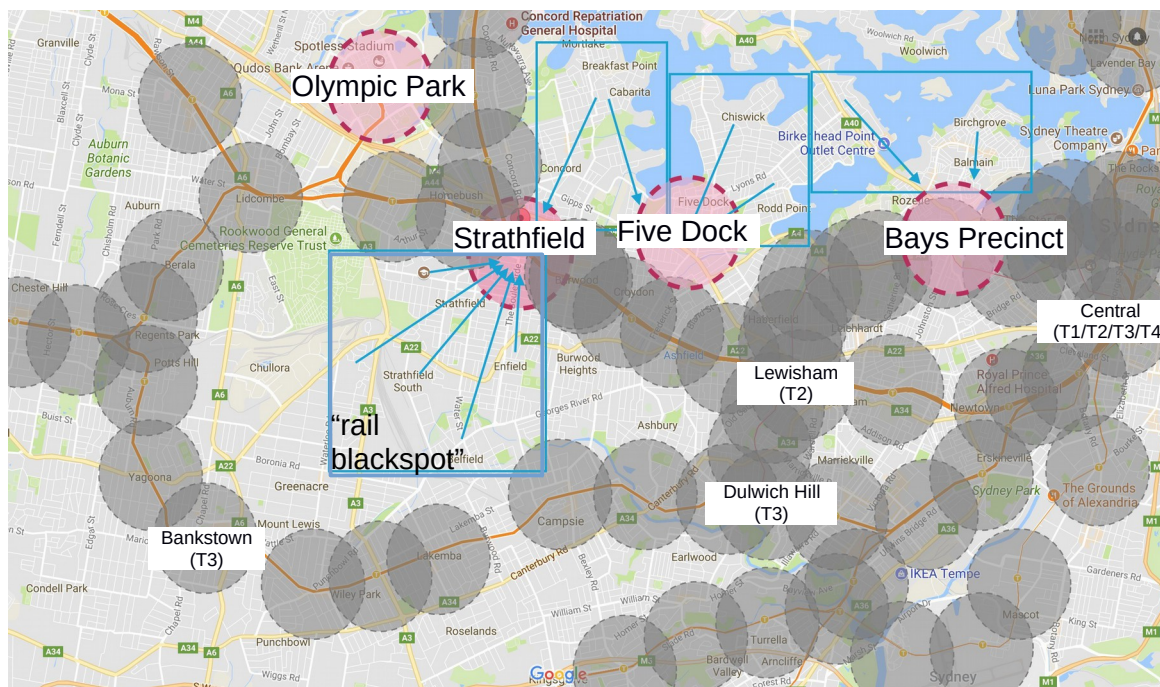
Current and projected morning peak hour CBD station movements – 2051



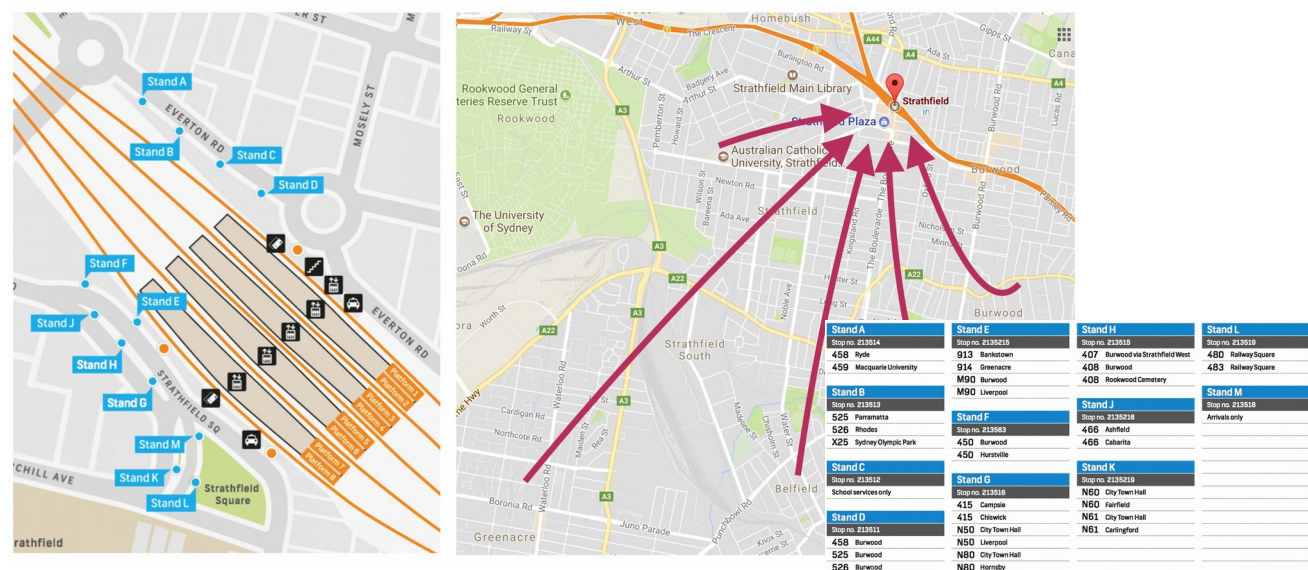
Appendix 2: Five Dock and Strathfield Metro Stations service rail “blackspots”

The 800 metre station catchments for existing T1/T2/T3 stations (gray) and proposed Metro West stations (pink) are shown below. Note that whilst it is unrealistic to provide direct 800m rail coverage for the entire corridor, Five Dock and Strathfield stations can become “feeder bus” hubs, and provide rail coverage for major rail blackspots as shown in the blue rectangles below.

Strathfield Metro station has the unique attribute of being the only potential Metro West station to service “rail blackspot” catchments situated south of T1 rail line (eg. Enfield, Belfield, Strathfield South & Greenacre to south), whereas all other potential Metro West stops are limited to catchments predominantly either north of or on Parramatta road. This rail blackspot has a population of 74,000 residents, according to ABS 2016 data.



The effectiveness of the “feeder bus” model is illustrated by Strathfield station bus gateway, which has 12 bus stands serving over 20 bus routes, plus a spacious station design with eight platforms, all with extra length (200m). As a result Strathfield has the highest patronage of any suburban station in the Parramatta corridor, and these same attributes make it effective as a Metro interchange station.



Alternative interchange options are suboptimal: choosing a heavy rail interchange station other than Strathfield would produce unnecessary passenger churn and inconvenience, eg. North Strathfield does not provide any direct T2 Inner West, T2 Leppington or T1 Western line connectivity (hence requiring additional travel to & transfer at Strathfield anyway), has zero bus connectivity (closest bus corridor is Concord road, which is 400m away), is an inefficient Metro interchange due to 15-30min Northern line wait times (Northern line shares tracks with freight, limiting train frequencies in offpeak hours), does not service the 74,000 population in the rail “blackspot” south of Strathfield, has limited platform capacity with only 3 platforms, and has complex construction (the North Strathfield Freight Underpass is located beneath the station).

Appendix 3: Case Study – Faster Rail Link for a unified Greater Sydney

Once Metro West has been constructed in the 2020s, it could be followed by the construction of an independent FastRail Link. This FastRail Link would itself be constructed in two stages. The three overall stages are thus:

- **Stage One:** Metro West.
- **Stage Two:** FastRail from Western Sydney Airport to Parramatta (terminates at a spare pair of “express” platforms, which are independent from the Metro West Parramatta platforms).
- **Stage Three:** Extension of FastRail (using its own tunnels) from Parramatta to the CBD.

Operating speeds:

- **Stage One:** Metro West would be a conventional metro service operating in the 100-130Km/hr range.
- **Stage Two & Three:** FastRail Link would operate in the 160-200Km/hr range.

Design:

- **Stage One:** Metro West and FastRail Link would share a station at Parramatta but use independent platforms. In the CBD they would also have independent platforms preferably in a shared station.
- **Stage Two** (first part of FastRail Link): would have a minimal number of intermediate stations. There would be a station at Elizabeth Drive as part of the aerotropolis. There would be a station serving the Western Sydney Employment Area and this would serve as a transport hub for the wider area with connections to other tiers of transport. After Stage Two is complete, transit between Parramatta and the WSEA would be roughly 5 minutes. Transit between Parramatta and Western Sydney Airport would be less than 15 minutes.
- **Stage Three** (second part of FastRail Link): would need only one intermediate station. This would be a point of interchange with High Speed Rail from the north. Transit from Parramatta to the CBD would be close to 10 minutes.
- A feasible configuration for the shared Metro West and FastRail Link Parramatta station is a vertically stacked island platform arrangement with platforms for Metro West on one level and platforms for FastRail Link on another level, allowing for easy interchange between lines. This ease of interchange is especially important when only Phase One and Phase Two have been built and at this stage Western Sydney Airport passengers will have to interchange at Parramatta. There are at least two locations in Parramatta where this is deemed feasible. One is immediately under Parramatta Town Square. The other is located north of Macquarie Street, directly north of Parramatta Town Square.

Funding:

- **Stage One:** up front incremental cost of future proofing Metro West as described above (ie: provision of two “spare” platforms) is in the order of several hundred million dollars.
- **Stage Two:** would receive a mix of funding from Federal, State and possibly private sources. It would incur its own value capture.
- **Stage Three:** the long term incremental cost (Phase Three) of having a physically separate FastRail Link, when compared to the scenario where Metro West is simply extended to WSA, is simply the cost of the additional Parramatta to CBD tunnels. This is in the order of several billion dollars. However the end game benefits are substantial. See below.

Benefits:

- Decouples the Metro West route. Instead of the competing demands of speed and connectivity, Metro West can be more focused on connectivity (and other issues such as value capture).
- Decouples the FastRail Link route. The FastRail Link route between Parramatta and the CBD can be optimised for speed.
- Future Proof capacity. Extending Metro West to WSEA and WSA will in future lead to a capacity constraint. Being able to construct Stage Three as and when needed is an important element of future proofing for the entire network.
- Decouples the rolling stock issue. It is possible to optimise the rolling stock for Metro West and the FastRail Link independently.
- Growth. Adds the value of fast transit to the Western Sydney Employment area making it competitive with Macquarie Park. Adds value to WSA and makes its associated aerotropolis more valuable.
- Southwestern Sydney commuters. Interchange at WSA allows much faster transit between the southwest of Sydney and Parramatta by implication much of the rest of Sydney.