

Appendix G

Temporary Transport Strategy



Temporary Transport Strategy

Sydney Metro City & Southwest Sydenham to Bankstown

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1. Introduction

1.1 Background

The Sydney Metro City & Southwest Sydenham to Bankstown project will upgrade all 11 stations between Sydenham and Bankstown to meet current accessibility standards before converting the T3 Bankstown Line to Metro operations. This upgrade will include a variety of construction activities that require the temporary closure of part or all of the line, during periods known as 'possessions'.

This *Temporary Transport Strategy (TTS)* is a framework document that describes how the project will plan and deliver an integrated, multi-modal transport network that will support customer movements during temporary possessions of the Bankstown Line.

Given the conversion of the Bankstown Line will occur in stages over a number of years, each of the possessions will be slightly different. The nature of Metro construction activities will vary each possession, potentially requiring different temporary transport arrangements in response. Additionally, population growth along the Bankstown Line corridor will result in gradually increasing demand, while the delivery of improvements in the road and transport networks may create changed opportunities for travel.

Sydney Metro has investigated several options for how construction work should be scheduled and has determined that a staged program, where the majority of works are completed during school holiday periods, would minimise the overall impact on customers.

This approach will require multiple possessions over a five-year period commencing in July 2019. During each possession period up to 100,000 Bankstown Line customer journeys could be affected each weekday by closures of the line, and most customers would need to travel by other modes to reach their destination.

Transport for NSW is committed to assisting its customers during these periods through the planning and provision of alternative temporary transport services.

Acknowledging this, a *Temporary Transport Plan (TTP)* will be developed for each possession period which will include a *Services Plan* defining the temporary rail and bus services that will operate, and a *Management Plan* describing how wider impacts on the transport network will be managed during the possession. Effectively, the TTS provides guidance on what each individual TTP needs to include, and the process by which it will be developed. Each TTP will be developed to best meet customer needs and minimise adverse impacts to regular public transport services and the road network.

The success of each TTP will be measured in terms of the number of customers who choose to take public transport, walk or cycle during each possession. Each TTP will aim to be sufficiently attractive to encourage as many rail customers as possible to travel via one of these sustainable transport modes.

1.2 Objectives of the Temporary Transport Strategy

The overall objectives of the TTS are to:

- Present the proposed schedule of Bankstown Line possession periods, and temporary alternative transport arrangements that will be needed.
- Define the Bankstown Line stations that will be closed or experience changes to rail services during possessions.
- Identify the types of customers that the Bankstown Line currently serves, and the level of demand they generate.
- Identify the customer objectives to be met by each TTP.
- Define Sydney Metro's approach to planning and managing the requirements of, and impacts on each transport mode as part of developing a TTP for each possession.

1.3 Scope of the Temporary Transport Strategy

The scope of the TTS includes:

- Defining the specific objectives of each component of a TTP.
- Temporary train service plans that provide additional capacity on other rail lines where affected customers may be diverted to, and altered services on sections of the Bankstown Line that are not being converted to Metro operations.
- Integrated temporary bus services to allow customers to travel between closed stations on the Bankstown Line, and to stations on other lines. This includes understanding the opportunities that the regular bus network can provide.
- Planning specialised services for customers who may not be able to use the temporary bus services, such as those with mobility impairments or other special needs.
- Initiatives to encourage and assist customers to walk or cycle to stations on other lines, or to their destinations.
- Infrastructure to support temporary bus services including bus stops and shelters, improvements to walkways and lighting, and wayfinding and information signage.
- Improvements to the road network, such as bus priority measures to support the temporary bus services, and adjustments to traffic signals to mitigate changes in road network demand.
- Understanding the changes in parking demand near rail stations, their impacts, and measures to manage those impacts.
- Customer and stakeholder engagement strategies, including communication, information provision and supporting travel demand management initiatives.

2. Possession Schedule and Affected Customers

2.1 Possession planning and schedule

Conversion of the Bankstown Line to Metro operations will require construction activities that vary in nature, including track realignment, station works, major earthworks and bridge works. As many of these activities need to be undertaken within the rail corridor, to ensure the safety of construction workers and the travelling public, it is necessary to cease rail operations and close the line for extended periods of time.

A variety of options on how to undertake the required closures were considered by Sydney Metro. Based on the potential impacts that closures of the Bankstown Line will have on customers, it was determined to focus construction and rail possessions during school holiday periods for the following reasons:

- Lower demand on the Bankstown Line due to the number of people taking holidays during these periods and the lack of school student travel;
- Reduced traffic volumes on the road network due to the removal of school-based traffic, potentially delivering faster and more reliable journeys on replacement buses;
- Lower demand on parallel rail lines resulting in increased capacity to accommodate Bankstown Line customers who are diverted to these lines; and
- Increased bus fleet and driver availability to operate replacement services as school bus operations cease during holidays.

Only the July and December-January school holiday periods are currently proposed. April and October school holidays were also considered, but these periods are typically busier and can coincide with Easter and sporting finals, respectively.

This indicative possession program would be reviewed during detailed design in line with construction planning to ensure the available possessions are sufficient to complete the works. The schedule of possessions would be reviewed to reduce the overall impacts to the community as far as possible.

Table 1: Draft Schedule for Major Possessions

Possession	Description	Commences	Ends
1	2 Week July Possession	Sat, 6 Jul 2019	Sun, 21 Jul 2019
2	6 Week Dec/Jan Possession	Sat, 21 Dec 2019	Sun, 2 Feb 2020
3	2 Week July Possession	Sat, 4 Jul 2020	Sun, 19 Jul 2020
4	6 Week Dec/Jan Possession	Sat, 19 Dec 2020	Sun, 31 Jan 2021
5	2 Week July Possession	Sat, 3 Jul 2021	Sun, 18 Jul 2021
6	6 Week Dec/Jan Possession	Sat, 18 Dec 2021	Sun, 30 Jan 2022
7	2 Week July Possession	Sat, 9 Jul 2022	Sun, 24 Jul 2022
8	6 Week Dec/Jan Possession	Sat, 17 Dec 2022	Sun, 29 Jan 2023
9	2 Week July Possession	Sat, 8 Jul 2023	Sun, 23 Jul 2023
10	6 Week Dec/Jan Possession	Sat, 16 Dec 2023	Sun, 28 Jan 2024
11	Final Possession	To be determined	By late 2024

The development of the Management Plan for each possession would need to reflect the construction methodology and staging developed by the Contractor. Sydney Metro will work with the Contractor to encourage an approach that minimises impacts associated with possession related works.

The final rail possession for the project is expected to extend for a period of up to six months during 2024 which may include the preceding December/January school holiday period. This possession is required to allow the finalisation of works and the establishment of Metro operations including train testing, system integration and final commissioning. The duration of the final possession cannot be confirmed at this stage and will be dependent on the system operators' testing and commissioning processes.

At the time of the final possession, the first component of Sydney Metro City & Southwest – from Chatswood to Sydenham – is anticipated to have commenced operating, which would provide additional rail capacity northwards from Sydenham towards the Sydney CBD and the broader rail network.

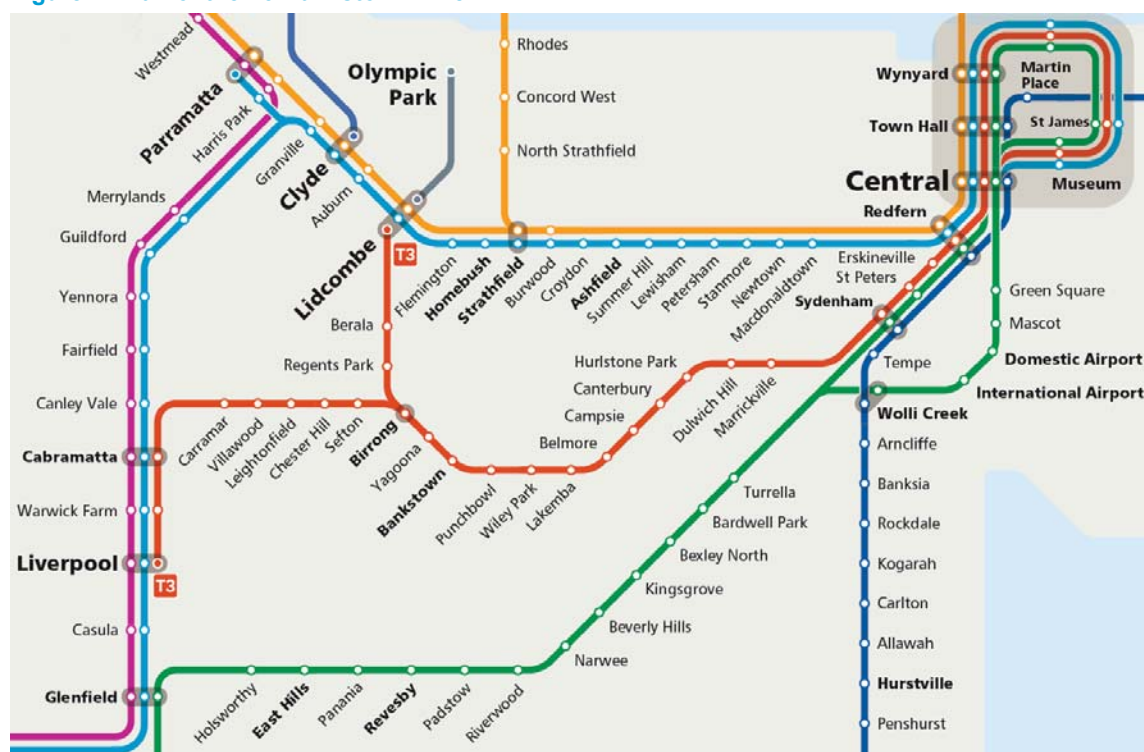
In addition to the ten multi-week possessions described in four additional weekend possessions of the Bankstown Line are planned each year, similar to those currently carried out for track maintenance.

2.2 Geographic extent

2.2.1 West of Sydenham

The Bankstown Line extends from Sydenham to Bankstown and then further west to Yagoona and Birrong before branching into two lines, north to Lidcombe and west to Liverpool via Cabramatta.

Figure 1: Plan of the T3 Bankstown Line



Source: Transport for NSW

Each of the proposed rail possessions would involve closing Marrickville Station through to Punchbowl Station, inclusive.

During the earlier possessions, the construction activity at Bankstown would not allow trains to operate from the Liverpool and Lidcombe branches into Bankstown Station. Due to how the existing tracks are configured, this will also result in the temporary suspension of train services from Yagoona and Birrong. The remaining stations between Liverpool and Lidcombe¹ would remain open during possessions but would be served by altered train services, such as a shuttle service travelling between these two terminus stations.

During later possessions after the works at Bankstown Station are completed, trains would be able to operate from Liverpool to Bankstown, and/or from Lidcombe to Bankstown.

The planning of temporary services will consider the needs of customers west of Bankstown, including those who use Yagoona and Birrong stations, who will no longer be able to travel via the Bankstown Line to destinations east of Bankstown including the CBD.

¹ Warwick Farm, Cabramatta, Carramar, Villawood, Leightonfield, Chester Hill, Sefton, Regents Park and Berala.

2.2.2 East of Marrickville

East of Marrickville, the Bankstown Line continues to the City Circle via Sydenham, St Peters and Erskineville Stations.

Sydenham Station is generally expected to remain operational during possessions and services on the T4 Illawarra Line and T8 Airport & South Line will continue to operate.

St Peters and Erskineville Stations are currently served by Bankstown Line trains, but it is possible to modify train operations so that they are served by either T8 Airport & South Line trains, or T4 Illawarra Line trains. Planning for each TTP will need to consider the best option for serving these two stations given the operating constraints in the rail network at the time.

To enable works to be undertaken at Sydenham Junction, short closures of the entire station and all lines passing through it may be required for up to five days, though this is yet to be confirmed and would be scheduled during early January when customer demand levels are at their lowest.

2.3 Identifying affected customers and demand levels

Customers that use each station along the Bankstown Line have a variety of travel demands especially when comparing the areas in the eastern part of the corridor to those further to the west. As part of the development and refinement of each TTP, a detailed assessment of customer demand will be undertaken to determine who our customers are, where they are travelling to, and when they need to travel. The Opal ticketing system provides a rich dataset for planners to gain this understanding, but this may need to be supported with information from other sources.

The following provides an example of the data that will be used to inform the development of each TTP. The data in this section is based on Opal ticketing data of customer travel from a typical weekday in August 2016.

2.3.1 Daily weekday demand

Currently, up to 54,000 customers travel on the Bankstown Line each weekday resulting in up to 90,000 customer trips. Of these, approximately 72,000 trips start or end at one of the ten stations from Marrickville to Bankstown that will be upgraded.

Over the next seven years, demand is forecast to grow by around 6% per annum. By 2019 when closures of the line commence, demand to travel on the Bankstown Line is expected to exceed 100,000 customer trips per weekday. Fortunately, demand levels during school holiday period are typically at least 15% lower than during school term.

The typical number of weekday customers recorded entering and exiting Bankstown Line stations is presented in Table 2.

Table 2: Typical daily weekday station entries and exits at Bankstown Line stations (2016)

Station	Entries	Exits
Stations west of Bankstown	9,120	8,420
Carramar	530	480
Villawood	550	480
Leightonfield	240	300
Chester Hill	1,130	1,010
Sefton	680	560
Berala	1,880	1,800
Regents Park	1,200	1,170
Birrong	1,110	1,000
Yagoona	1,800	1,620
Stations to be converted to Metro	45,410	43,990
Bankstown	8,920	9,440
Punchbowl	2,800	2,690
Wiley Park	1,880	1,730
Lakemba	3,970	3,800
Belmore	2,860	2,690
Campsie	8,150	8,100
Canterbury	2,280	2,020
Hurlstone Park	1,440	1,250
Dulwich Hill	2,610	2,370
Marrickville	4,320	4,090
Sydenham*	6,180	5,810
Stations east of Sydenham	6,630	5,520
St Peters	3,880	3,100
Erskineville	2,750	2,420
TOTAL	61,160	57,930

Source: Opal data station entries and exits, 17 August 2016 (regular school term weekday)

- Notes:
- 1) Data for Sydenham Station includes patronage on T8 Airport & South Line and T4 Illawarra Line services.
 - 2) Journeys that start and end at a Bankstown Line station will be recorded in both the entries and exits columns.

2.3.2 Weekday AM peak period demand

2.3.2.1 Defining the peak period

For the planning of temporary transport services, the weekday morning peak period represents the most significant challenge as this is when the highest travel demand is observed when measured on an hourly basis. This peak period is typically defined as having a 3.5 hour duration, from 6:00am to 9:30am, in which the hour with the highest observed demand is defined as the AM peak hour. The AM peak hour is also the busiest hour of the day, and represents the highest levels of customer demand that will need to be accommodated by each TTP.

The exact time that the AM peak hour occurs varies depending on location, with locations closer to the Sydney CBD experiencing it later than locations further out. For commuters travelling to the Sydney CBD, the highest demand occurs between 8:00am and 9:00am.

2.3.2.2 Station groupings

For assessment purposes, the Bankstown Line stations that will be converted to Metro between Marrickville and Bankstown are considered 'internal' to the corridor.

Other Bankstown Line stations are considered here as 'external', i.e. east of Marrickville (Sydenham, St Peters and Erskineville), and west of Bankstown (Yagoona, Birrong, Regents Park, Berala, Sefton, Chester Hill, Leightonfield, Villawood and Carramar).

Typical demand levels for the weekday AM peak period are presented in Figure 2 showing the number of customers boarding and alighting at each station on the Bankstown Line, and the station group where they travelled from or to.

2.3.2.3 Travel to and from external stations

In the eastbound direction, currently around 8,800 customers are onboard Bankstown Line trains as they approach Sydenham in the AM peak hour each weekday. 79% of these customers board at one of the ten internal stations – Bankstown to Marrickville – while the remainder board at external stations west of Bankstown.

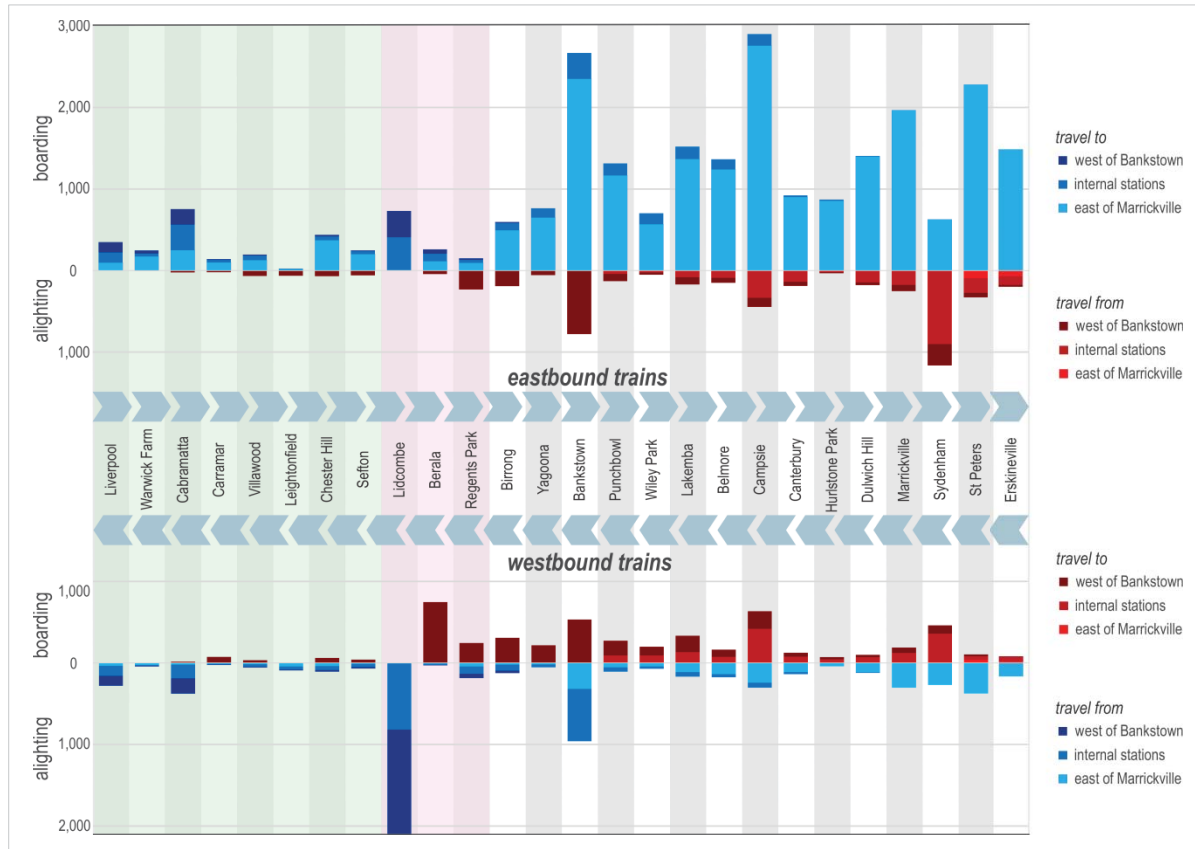
Demand in the westbound direction through Sydenham is lower, with approximately 700 customers onboard in the busiest one-hour period. 82% of these customers alight between Marrickville and Bankstown inclusive, while the remainder continue west of Bankstown. Internal Bankstown to Marrickville customers generate approximately 1,000 westbound journeys in the busiest one-hour period. Of these journeys, 62% continue west of Bankstown.

Lidcombe Station generates a large demand for westbound travel from customers transferring to the T1 Western Line and the T2 Inner West & Leppington Line.

2.3.2.4 Travel between internal stations

The internal stations also generate demand to travel between them – approximately 1,200 customers alight at one of these stations during the busiest one-hour period in the morning peak. Of these customers, 17% commence their journey west of Bankstown, 51% commence their journey from an internal station, and the remainder travel from stations east of Sydenham.

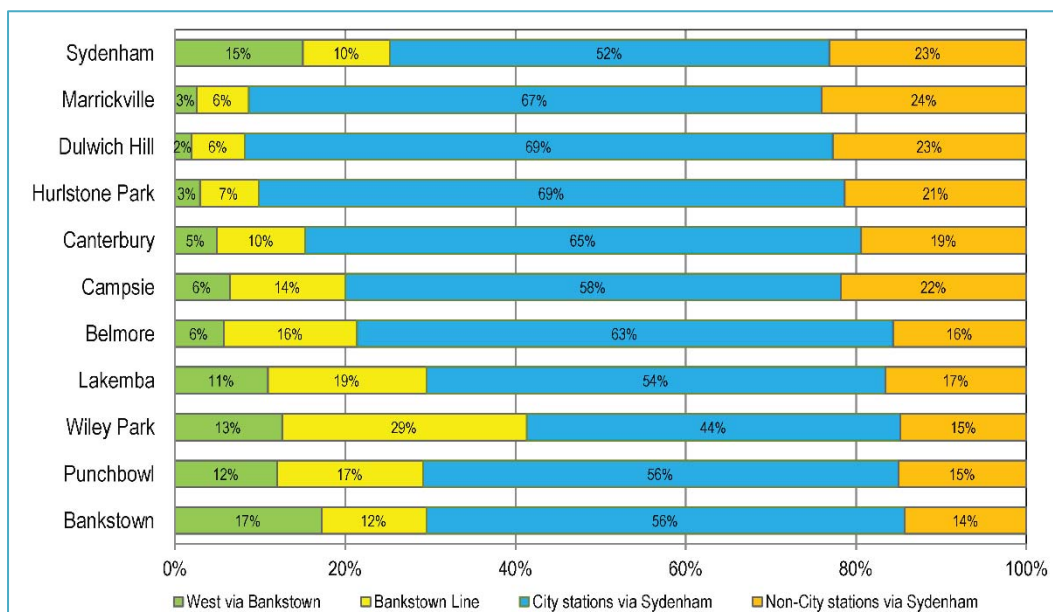
Figure 2: Typical morning peak period travel demand on the Bankstown Line (weekday 6:00am - 9:30am)



Source: Opal card data, 17 August 2016.

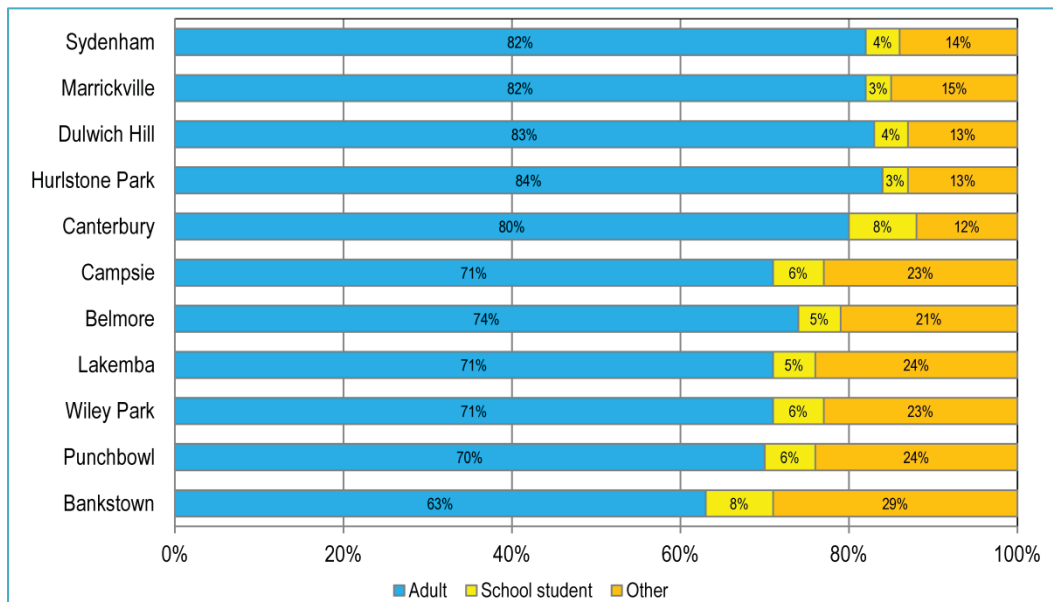
2.3.2.5 Observations

Customer travel patterns and their likely destination vary along the corridor. Figure 3 presents the destinations that customers travel to in the AM peak period, and it can be seen that in the eastern part of the Bankstown Line corridor, nearly 70% of customer travel demand is to stations in the Sydney CBD. Further west, this drops to just over 50%. The share of passengers travelling to the City stations from Sydenham is significantly lower than the other stations in the eastern part of the Bankstown Line corridor because these customers have three rail options to the City from Sydenham Station -- T4 Eastern Suburbs & Illawarra Line, T8 Airport & South Line and T3 Bankstown Line.

Figure 3: Distribution of destinations from Bankstown Line stations (typical weekday, 6:00am to 9:30am)

Source: Opal card data, 17 August 2016

Figure 4 shows the distribution of customer types at each station in the AM peak period, as recorded by Opal ticketing data. In the eastern part of the Bankstown Line corridor, over 80% of customers are classified as adults, reducing to 63% at Bankstown. The higher percentage of school students at some stations reflects that a number of schools are located close to those stations.

Figure 4: Proportion of customer types at Bankstown Line stations (typical weekday, 6:00am to 9:30am)

Source: Opal card data, 17 August 2016.

The "Other" category includes concession card holders and customers entitled to free travel.

2.3.3 Weekday PM Peak period demand

The afternoon peak period is defined as the 3.5 hour period from 3:30pm to 7:00pm although the demand to travel during this period is more evenly distributed across it when compared to the morning peak period. Consequently, the demand in the PM peak one-hour is lower than in the AM peak one-hour.

Approximately 6,000 customers are onboard a westbound Bankstown Line train departing Sydenham Station in the busiest hour each weekday afternoon. Approximately 75% of these customers alight between Bankstown and Marrickville inclusive, while the remaining 25% alight west of Bankstown.

Eastbound demand in the afternoon peak is significantly lower, with approximately 1,500 customers onboard Bankstown Line trains as they approach Sydenham in the PM peak hour.

Demand to travel between internal stations in the afternoon peak period is up to approximately 1,100 customers per hour, of which around 60% is westbound. However, this internal travel demand peak occurs around two hours earlier than the regular commuter peak hour, reflecting the use of the line for travel by school students. During school holidays periods, this student travel demand does not occur although minor increases in travel demand across the off-peak period is observed compared to school term.

3. Temporary Transport Plan Development

3.1 Temporary Transport: Services Planning and Management Planning

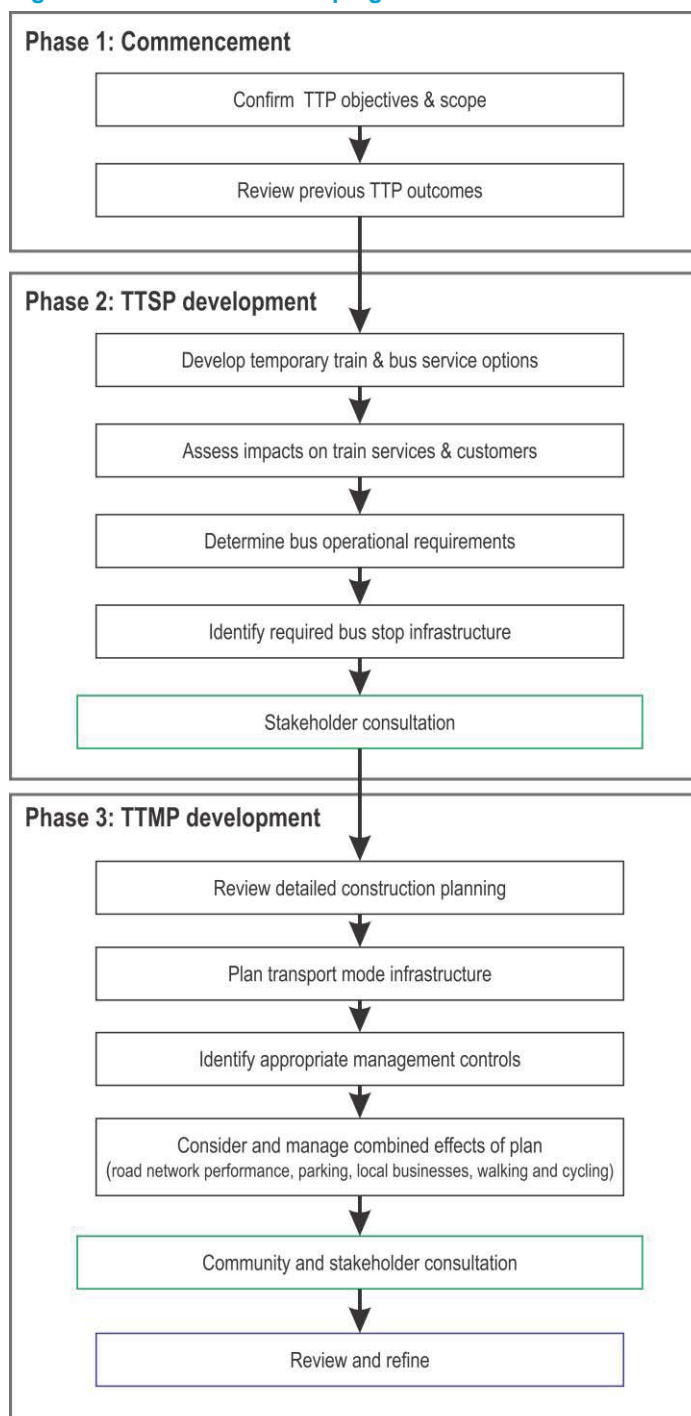
The tasks required to develop each TTP occur in a series of three phases, as shown in Figure 5.

The first phase involves confirming the objectives and scope for the TTP, and reviewing the performance of previous TTPs to determine learnings that can be applied. Development of the first TTP for the Bankstown Line will include a review of Sydney Metro's Epping to Chatswood TTP which will have concluded by that time, and subsequent Bankstown Line TTPs will learn from the ones that preceded it, in an ongoing process of revision and refinement.

The second phase involves the preparation of a *Temporary Transport Service Plan (TTSP)*, which will present the temporary rail and bus services that operate during the possession to meet the needs of affected Bankstown Line customers.

The third phase will result in the preparation of a *Temporary Transport Management Plan (TTMP)*, which will consider the wider impacts created during possessions including those of the line closure, the operation of temporary transport services and the interactions of construction activities.

Figure 5: Process for developing a TTP



3.2 Temporary Transport Plan objectives

The objectives for each of the TTPs have taken into account established Transport for NSW customer service satisfaction drivers, and the Program Objectives and Guiding Principles for Sydney Metro.

Five overarching TTP objectives have been identified and are listed below. Additionally, specific objectives have been developed for the different TTP planning tasks, and these are presented in the following chapters.

Overarching TTP Objectives
Minimise the impact for Bankstown Line customers of temporarily removing train services between Sydenham and Bankstown (or Regents Park) by delivering a comprehensive and effective temporary transport service plan
Minimise, manage or mitigate wider disruptions to other public transport services, local businesses, the community and the road network.
Be accessible by all customers.
Provide a safe environment for customers and workers by eliminating or mitigating conflicts generated by Metro construction works.
Provide a balance between minimising customer impacts and the efficient use of the resources available to deliver temporary transport services.

3.3 Temporary Transport Plan scope

Each TTP will be similar in nature, but would need to consider different construction impacts or changes in the transport network to develop the most effective multi-modal response to the closure of the line. The development of each TTP will require consideration of its scope.

As a minimum, the following would be considered in the development of each TTP.

Temporary Transport Services Plan Scope
Temporary Rail Services
Providing additional train services on the parallel rail lines to the north (T2 Inner West & Leppington Line), and the south (T8 Airport & South Line) of the Bankstown Line to accommodate anticipated increases in demand.
Providing altered train services on the sections of the Bankstown Line that are not being converted to Metro operations (west of Bankstown to Lidcombe and Liverpool, and from Sydenham east to the Sydney CBD).
Temporary Bus Services
Providing temporary bus services that travel along the Bankstown Line which offer optimised stopping patterns to serve customer needs, which may be different to existing train stopping patterns.
Providing temporary bus services between Bankstown Line stations and stations on other rail lines to provide faster travel times.

Temporary Transport Services Plan Scope

Considering potential additional stops for temporary bus services (i.e. in addition to railway stations) as a means of improving customer access to the temporary bus services.

Providing additional frequency on regular bus routes which may offer customers a more attractive alternative to the temporary bus services.

Providing specialised services for customers with impaired mobility who may not be able to use the temporary bus services.

Walking and Cycling

Identifying initiatives that encourage affected customers to cycle and walk as an alternative means of commuting, either to access temporary transport services or to travel all the way to their destination.

Temporary Transport Management Plan Scope

Supporting Infrastructure

Providing bus stops, shelters and seating for customers waiting to catch temporary bus services. Stops will be designed to be safe, accessible and well-lit. Shelters could either be temporary or permanent, depending on the location.

Identifying improvements to the station facilities on the other rail lines that Bankstown Line customers may be diverted to.

Identifying and implementing bus priority measures to improve travel times for temporary bus services.

Identifying and implementing road network improvements to mitigate increased road network demand, such as adjustments to traffic signals.

Walking and Cycling

Identifying and implementing walking and cycling connectivity and amenity improvements along the Bankstown Line to support temporary bus services.

Identifying and implementing walking and cycling improvements at stations on other rail lines to enhance customer experience connecting to alternate train services at unfamiliar locations.

Improving bicycle parking facilities at stations on other rail lines to retain existing customers and attract new customers who choose cycling to access rail stations.

Customer Engagement and Information

Working with stakeholders, including Councils and community organisations, to better understand and communicate with our different types of customers, including those with special needs or from non-English speaking backgrounds.

Developing and delivering comprehensive customer information and notifications before and during the possessions.

Providing wayfinding and information signage at affected stations and TTP bus stops to assist customers to use temporary transport services.

Supporting travel demand management initiatives, such as encouraging car-pooling for customers who choose to drive instead of using the other modes available.

Temporary Transport Services Plan Scope

Out of Scope *The following will not be considered within the scope of each TTP*

Providing temporary bus routes directly into the Sydney CBD or to destinations beyond the railway lines surrounding the Bankstown Line (excepting providing additional frequency on regular bus routes, or dedicated services required during special events). This ensures that any temporary bus routes operating beyond the closed section of the Bankstown line will be designed to take customers quickly and efficiently to a nearby point where they can access the rail network.

Constructing new parking or major new bus interchange facilities at stations on other rail lines.

3.4 TTP development, revision and refinement

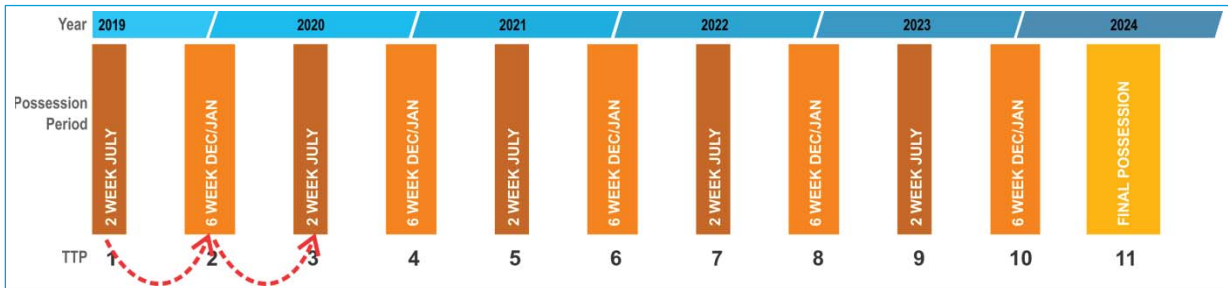
The development of each TTP involves a variety of tasks which are discussed in detail in the following chapters.

The completion of these tasks may not necessarily be sequential, and the successful development of each TTP will be an iterative process where the findings from one task may require that a previous task be revisited. This could include the need to revise the design of bus routes included in the TTSP, if the development of the TTMP finds that their operation would create unacceptable impacts.

Given that construction of the Bankstown Line will occur in stages over nearly five years, each of the possessions will be slightly different. The nature of Metro construction activities will vary from one possession to the next, potentially requiring different temporary transport arrangements in response. Additionally, population growth in the Bankstown Line corridor will result in increased demand, while the delivery of improvements in the road and transport networks may create new opportunities for travel.

A new TTP will be developed for each possession period which will define the initiatives that will be implemented prior to that possession. Following the completion of each possession period, the performance of the TTP will be assessed to determine learnings that can be used to ensure that the next TTP better meets the needs of our customers. Planning for the new TTP would retain the most effective parts of the previous plan while making adjustments necessary for any changes that might occur in the road, rail or bus networks.

Figure 6: Revision of the Temporary Transport Plan between Possessions



The revision and refinement process will apply to both the TTSP which will consider the how well temporary services performed and how well customers responded to them, and the TTMP which will review the previous impacts on and management of the road network, parking, local businesses, active transport, customer accessibility and special event management.

3.5 Baseline Temporary Transport Plan

As an input to the Sydney Metro City & Southwest Sydenham to Bankstown Environmental Impact Statement, a “Baseline” Temporary Transport Plan was developed to provide preliminary estimates of the volume of temporary bus services required to meet customer demand during a possession (refer Appendix A). The traffic and transport assessment of the Baseline TTP is provided in Chapter 10 of the *Environmental Impact Statement* and *Technical Paper* and an assessment of the noise and vibration and business impacts of the Baseline TTP is provided in Chapters 12 and 18, respectively, of the *Environmental Impact Statement*.

4. Temporary Transport Service Plan

The preparation of a Temporary Transport Service Plan requires the planning the rail, bus and specialised support transport services that will operate during possession of the Bankstown Line. This process will be guided by the following service planning objectives.

Primary Objective
Minimise the impact for Bankstown Line customers during possessions by developing an integrated network of rail and bus services that enables them to travel to their intended destinations conveniently, comfortably and safely.
Supporting Objectives
Provide adequate capacity on train services operating on other rail lines where customers could be diverted to.
Minimise disruption to existing train services and customers on other lines resulting from changes in train operations, including the sections of the Bankstown Line not being converted to Metro operations (west of Bankstown to Lidcombe and Liverpool, and east of Sydenham to the Sydney CBD).
Provide temporary bus services of adequate frequency and capacity to convey customers between Bankstown Line stations, and to stations on other lines where adequate capacity on train services is available.
Plan temporary bus routes between stations where regular bus routes already operate, providing additional service options for customers.
Plan temporary bus routes to travel along roads that are already used by regular bus routes, wherever possible.
Ensure that regular bus routes are able to accommodate customers who may choose to travel using these services instead of temporary bus services.
Ensure consistency of temporary bus routes across the day and week, so that customers only need to remember one alternate train station they need to travel to.
Provide an efficient and customer-focussed transfer experience between services and modes.
Provide specialised transport services to ensure that customers with specific mobility needs are able to travel during possessions.

4.1 Options for providing temporary additional rail capacity

For most Bankstown Line customers, travelling to their intended destination would still require them to access train services provided on other rail lines. It has been assumed that many would do so using temporary bus services delivered during each possession, while other affected customers would make their own way to the other rail lines either by car, regular bus services, cycling or walking.

Fortunately, the closure of the Bankstown Line means that the trains that would normally operate on the line may be able to be used to increase the frequency of services on other lines. For example, additional trains could be added to the T2 Inner West & Leppington Line, and/or added to the T8 Airport & South Line.

An important step in the development of each TTSP will be to determine opportunities for increasing rail capacity on parallel lines. Adding services to other lines is a complex undertaking and a number of constraints exist in terms of the capacity of lines, junctions, train fleet and stations.

This planning of temporary train services would be undertaken jointly by Transport for NSW and Sydney Trains.

4.2 Options for temporary bus services

A number of different approaches have been considered by Sydney Metro for providing temporary bus services. Each approach will form a component of the overall temporary bus service plan and provide customers with different choices on how they can travel. These components, shown schematically in Figure 7, are:

- Buses that stop at all stations along the corridor (component 1).
- Buses that only stop at a limited number of stations before continuing an express service to another station (component 2).
- Buses that move passengers to another rail line such as the T8 Airport & South Line and the T2 Inner West & Leppington Line (component 3).
- Increasing the frequency of regular bus services at specific locations, acknowledging that customers may prefer to use those instead of the temporary bus route service (component 4).

These components have been assessed in the Environmental Impact Statement, particularly impacts on traffic and transport performance, infrastructure and facilities, noise and vibration and local business operations.

4.2.1 Buses that stop at all stations along the corridor

The TTSP will include an all-stations replacement bus service between Lidcombe and Sydenham. This will:

- Provide consistency between the existing train service and the temporary bus service; and
- Ensure that customers who are unaware of the temporary interruption to train services would be provided with a like-for-like replacement bus service at all times (during the hours of normal rail operation in the possession periods).

4.2.2 Buses that only stop at a limited number of stations

To provide faster journeys for customers, the TTSP may include limited stops services that skip some stations as part of their journey to or from Sydenham Station. The need for these services is influenced by the number of customers and bus loads that each station will generate at different times of the day.

Figure 7: Temporary Transport Bus Services

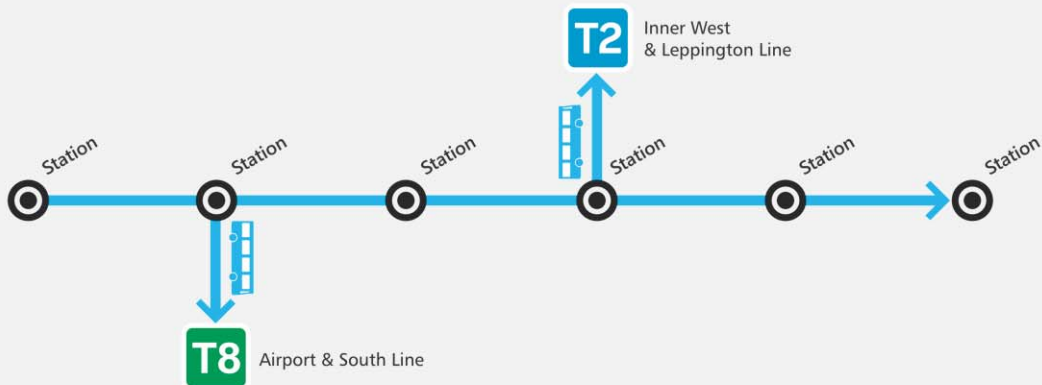
B Temporary transport component 1 – Buses replacing trains stopping at all stations



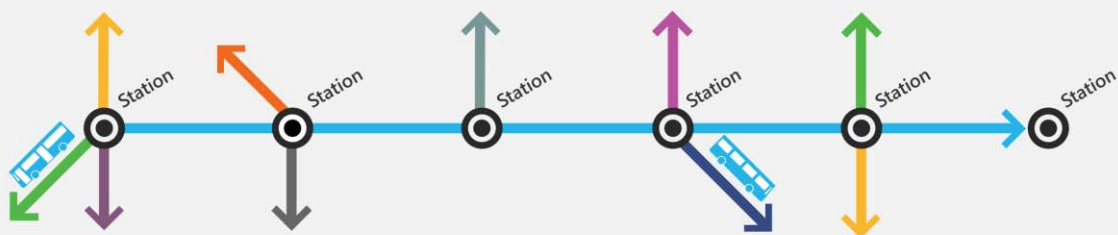
B Temporary transport component 2 – Buses replacing trains skipping some stations to provide faster journeys



B Temporary transport component 3 – Buses moving passengers to another train line



B Temporary transport component 4 – Increase frequency of existing bus services at specific locations



4.2.3 Buses that travel to stations on the T8 Airport & South Line, and T2 Inner West & Leppington Line

It is feasible that a TTSP would provide temporary bus services that travel south to stations on the T8 Airport & South Line, and/or north to stations on the T2 Inner West & Leppington Line.

Candidate stations for the transfer of Bankstown Line customers between bus and train would include:

- Revesby, Padstow, Riverwood, Narwee, Beverly Hills, Kingsgrove, Bexley North, and Bardwell Park stations on the T8 Airport & South Line; and
- Lidcombe, Strathfield, Burwood, Ashfield, Lewisham and Petersham stations on the T2 Inner West & Leppington Line.

Each of these stations can be accessed via reasonably direct routes from one or more Bankstown Line stations. The TTSP, referencing the customer markets, will determine how these stations will be included in the network of temporary bus services.

4.2.4 Increasing the frequency of regular bus services

The regular bus route network provides customers with additional options to travel. Many customers already have the choice to travel by either bus or rail, and the temporary closure of the Bankstown Line may mean they will choose to travel by a local bus route rather than a temporary bus service. Often customers will have a local bus stop closer to their home than the train station, making this option more attractive than the temporary bus service.

In the eastern part of the corridor, from Canterbury to Sydenham, several bus routes travel through the areas surrounding the stations and continue on to the CBD. These routes include the 412, 413, 423 and 428. Other routes such as the 418, 425, 444 and 491 provide connections to stations on other rail lines. The current Opal fare structure offers an inter-modal transfer discount, which allows customers to travel up to 3 km on a bus for negligible cost² if they transfer to or from a train, making the use of regular buses to access other train stations a potentially attractive option.

No bus routes travel directly to the CBD from west of Campsie. However, several bus services provide attractive connections to stations on other rail lines. These include:

- Routes M41 and 400 that connect Campsie to Bexley North Station and to Burwood Station;
- Routes M91 and M92 that connect Bankstown Station to Padstow Station; and
- Route M90 which connects Bankstown Station with Liverpool Station and Strathfield Station.

It is anticipated that these routes would experience increases in demand during closures of the Bankstown Line and additional services may be included to ensure overcrowding does not occur.

² As of June 2017, the Adult Opal fare for a bus journey up to 3 km is \$2.15. A discount of \$2.00 is awarded when customers using an Opal card transfer between bus and rail services, reducing the cost to \$0.15 for a short bus journey taken before or after a train journey.

4.3 Review of temporary train and bus route strategies

The TTSP will review issues and risks associated with providing temporary rail and bus services under each of the identified strategies. This may include:

- Comparison of travel times between different strategies for journeys between the same origins and destinations;
- Adequate train capacity to accommodate customers transferring to or from temporary buses;
- Station accessibility:
 - lifts and/or ramp access;
 - bus access and manoeuvrability;
 - bus stop locations and capacity; and
 - connectivity between bus stops and rail platforms.
- Opportunities for bus turnaround and layover;
- Managing transition periods if the connections to surrounding train lines only operate during limited hours (e.g. peak periods only), to avoid a customer travelling to a station at a time when the connecting services do not operate, or operate at a lower frequency; and
- Managing or mitigating impacts on the performance of the road network (discussed further in Section 5.4).

4.4 Determining service frequencies for temporary train and bus services

The potential demand for temporary rail and bus services was assessed as part of the Environmental Impact Statement and will be further reviewed in the development of the TTSP. Expected customer demand during each possession will help determine the capacity and frequency of service required on both rail and bus services.

For train services, the process will determine whether the volume of demand diverted to the other rail lines can be accommodated by the capacity of train services. This includes the regular train services and any additional temporary services added during possessions.

Capital expenditure requirements (e.g. bus fleet) will also be informed by the outcomes of the demand review process i.e. the frequency of service required to meet the identified level of demand at the nominated travel times.

Key steps in the demand estimation for the TTSP include:

Step 1: Quantification of candidate trips

Candidate trips are customers who may choose to use the temporary bus and train services during the morning peak hour. These trips will be estimated from Opal patronage data and/or from forecast pre-closure rail patronage on the Bankstown Line.

Step 2: Allocation of candidate trips to temporary bus routes

Allocation of candidate trips to the most appropriate temporary bus route, based on their origins and destinations.

Step 3: Determining preliminary peak hour bus frequencies

Determination of preliminary peak hour bus frequencies required to meet customer demand for each bus route in each strategy, as an input into the model. This is done by assuming all existing rail customers are potential TTP bus customers, and providing enough buses to accommodate them all (e.g. dividing the total demand per hour for each route by 50, which is the assumed capacity of a standard bus).

Minimum frequencies could also be set at a policy level to increase customer convenience, rather than be purely demand-driven. For example, a policy decision could be made that if a temporary bus route is to operate at all, then it should operate at 10 minute headways or better.

Step 4: Determining bus route travel times

Determination of travel times for all temporary bus routes in each identified bus strategy, during weekday peak hours and other times of the day and week.

This will use a combination of existing travel time data for buses and general traffic to determine bus travel time estimates that reflect the limited stop nature of the temporary bus routes compared to the network of regular route buses, and include appropriate estimates for bus dwell times at each of the railway stations served.

Step 5: Strategic transport modelling of TTP train and bus services

Each TTSP will be modelled using Transport for NSW's *Public Transport Project Model (PTPM)*³, specifically adapted for the Bankstown Line TTS. The PTPM will provide forecasts of customer demand:

- On each temporary bus route;
- On all operational rail lines;
- On regular bus and light rail services; and
- Demand for park and ride at rail stations.

Model inputs will include future land use projections for the Bankstown Line and Greater Sydney, anticipated changes to the regular bus route network, anticipated road network changes (e.g. WestConnex Stages 2 and 3) and proposed train service plans for the Bankstown Line possessions. The accuracy of travel times estimated in the previous step will be important, as the allocation of demand to public transport services within the model is sensitive to travel time differences between alternative options.

The modelling process will incorporate sensitivity testing which will result in a range of demand forecasts rather than a single point estimate of demand to ensure the following extremes are assessed:

- The highest possible retention of existing Bankstown Line customers as public transport users, representing the maximum possible demand for temporary bus services; and

³ The PTPM is an incremental multi-modal strategic transport model developed by Transport for NSW, and is used on many major public transport planning projects in NSW to calculate transport user benefits to inform economic evaluations and the preparation of project business cases. This model is adapted to meet the specific requirements of individual projects, and for the Bankstown Line TTS this has included refinement of travel zones adjacent to the rail line, coding of alternate rail plans with the Bankstown Line closed, and the development of new park and ride assessment capability.

- The lowest foreseeable retention of existing Bankstown Line customers as public transport users representing the greatest diversion to car travel and the highest impact on road network performance.

Step 7: Estimation of demand outside of peak periods

Estimation of demand for the temporary bus and rail services across the remainder of the weekday (i.e. outside of the morning peak period) and on weekends will be undertaken by proportioning demand experienced at those times against peak hours.

- Opal ticketing data will be used to estimate the relative demand for early morning, off peak, evening peak, night and weekend services compared to the demand for services during the morning peak hour;
- Corresponding service frequencies across the day and across the week will be determined for each temporary bus route (e.g. if the demand at midday is 50% of the morning peak hour demand, the frequency of midday services will most likely be set at half of that during the peak hour);
- Service frequencies will be compared against target minimum service levels to determine whether or not each temporary bus service will be required to run during all time periods, or for example, only during weekday peak periods; and
- Established factors for changes in rail customer demand during school holiday periods will be applied to the demand for temporary bus routes in all time periods to determine if any adjustment in service frequency may be required, depending on the time of year in which each possession of the rail line takes place.

4.5 Assessing impacts on train services and customers on other rail lines

Each TTSP will quantify the potential increase in rail patronage on surrounding lines, and assess this against available capacity, both on the trains and at the stations themselves. The TTSP may then recommend temporary train service changes which would provide additional capacity on surrounding train lines to accommodate the anticipated increases in demand.

Due to the complexities of planning train services, the addition of temporary services will require the preparation of an alternative working timetable. This means that adjustments will be required to the timing and stopping patterns of trains that travel on the T8 Airport & South Line and T2 Inner West & Leppington Line, resulting in impacts to the regular customers of those lines.

In some cases, these impacts may be beneficial as the addition of temporary additional train services will increase the frequency of services at some stations which may in turn change the demand for train services at these stations.

Some of the changes to train services may result in changes to operations in the Sydney CBD, such as trains travelling a different direction around the City Circle.

The following will be assessed, as a minimum:

- Changes in travel times to the most common destinations (e.g. Central, Town Hall, North Sydney, Parramatta) from all rail stations at which timetable changes occur;
- Forecast changes in customer demand from all stations;
- The impact of demand changes on train loads and crowding; and

- Changes to the locations and number of passengers who need to transfer to other rail services.

If the operation of the TTSP results in substantial changes in customer behaviour and impacts on stations, such as the volume of people accessing or transferring at CBD stations, these findings will inform the TTMP and may trigger the need for specific management measures to be developed.

4.6 Determining bus operational requirements

When the numbers of temporary bus routes and frequencies are known, the bus operational requirements for implementing the TTSP will be determined. This will allow a final analysis of the cost and resource requirements for the temporary bus services.

Operational requirements will include:

- Identifying the peak number of buses required to provide the temporary bus services and enhancements to regular bus services identified in the TTSP. The bus fleet calculation will also include spare buses (to cover for maintenance requirements) and standby buses.
- Identifying the pick-up and set-down arrangements for each temporary bus route at each station served.
- Identifying the stations at which standby buses may be required, how many and where they would be positioned.
- At terminal points, identifying the requirement for and location of bus layover areas.
- Identifying how TTP buses and regular bus services will interact at locations served by both.
- Testing the capacity of bus stops to accommodate increased numbers of buses and customers, particularly where TTP buses are required to share bus stop space with buses serving existing bus routes (bus stop capacity constraints at particular locations may influence whether or not an additional intermediate stop for TTP buses is appropriate).
- Identifying the bus stop management requirements, i.e. staff to provide customer information to manage boarding and alighting, and to direct the movement of buses.
- Identifying changes to the provision or location of car parking in station areas in order to accommodate TTSP requirements.
- Identifying road network changes that may deliver improved outcomes for customers and for bus service reliability during possession periods, for example:
 - traffic signal timing changes, and
 - bus priority measures.

The analysis of these requirements including any required supporting infrastructure will be undertaken as part of the development of TTMP.

4.7 Identifying required bus stop infrastructure

To support the operation of temporary buses, supporting infrastructure works associated with the functional and operational needs of the TTSP will be identified for each station. In some cases, permanent infrastructure that provides a benefit outside of possessions may be delivered. Examples of supporting infrastructure include:

- Directional signs to/from the rail station;
- Bus route information displays;
- Temporary or permanent bus shelters that include seating and marquees for weather protection;
- Relocation of bus stop poles;
- Changes to bus zone signs; and
- Improvements to existing infrastructure required to meet DDA requirements in accordance with *Disability Discrimination Act 1992* and *Disability Standards for Accessible Public Transport 2002*.

Managing potential impacts associated with the development of this infrastructure will be undertaken as part of the development of TTMP.

4.8 Specialised transport services

4.8.1 Recognising specific customer mobility impairments and needs

Many Bankstown Line customers have an impairment that restricts their mobility, or may require assistance when using public transport. This includes:

- Mobility impaired users;
- Visual and auditory impairments;
- Cognitive impairments;
- Families with young children;
- Customers travelling with carers or assistance animals;
- Customers travelling with bulky items; and
- Customers with medical conditions.

During closures of the line, the needs of these customers will need to be met by each TTP and in some instances this may require the development of tailored solutions.

Some customers will be able to use the temporary bus services which will be designed to meet or exceed current accessibility standards. It is anticipated that all buses will be equipped with wheelchair ramps and dedicated wheelchair spaces, and bus stops will be designed to ease boarding.

However, some customers who currently travel by train will not be able to travel by bus, such as users of mobility scooters that buses are unable to accommodate. Other customers may have difficulty navigating the temporary bus stops and unfamiliar train stations that temporary bus services will travel to. For these customers, specialised transport services may be required.

4.8.2 Process for planning specialised transport services

Transport for NSW is committed to ensuring that the needs of these customers will be met during closures of the Bankstown Line through a process of:

- Gathering information on the number and types of customers who require any form of assistance when travelling;
- Engaging with community groups and disability support groups who represent customers with specific needs;
- Working with community transport providers to determine the most effective way to provide mobility for affected customers; and
- Committing to provide best practice in information provision for users with visual, hearing or learning impairments.

4.9 Option analysis

The feasibility of scenarios identified for temporary rail and bus services will be assessed against a number of considerations, including:

- Train services and customers on other train lines;
- Impacts on existing bus services;
- Impacts to road network performance and parking availability;
- Walking and cycling opportunities;
- Community and stakeholder feedback, including local businesses;
- Special event requirements; and
- Accessibility requirements for customers.

5. Temporary Transport Management Plan

The Temporary Transport Management Plan will define the processes by which the impacts created by closures of the Bankstown Line, and the operation of temporary train and bus services, will be managed.

Primary Objective
Minimise, manage or mitigate the impacts of closures of the Bankstown Line on other public transport services, local businesses, the community and the road network.
Supporting Objectives
Ensure that bus stop and train station facilities are safe, accessible and of adequate capacity.
Minimise the impacts of temporary bus service operations on the performance of the road network.
Manage or mitigate the impact of temporary bus service operations on on-street parking near rail stations.
Maximise walking and cycling as modes for customers to access stations, or to travel to their destinations.
Ensure the safety of people who walk or cycle during possessions.

5.1 Construction activities

The construction activities required to convert the Bankstown Line to Metro operations will, at times, impact the operation of temporary transport services. The TTMP will be developed in close coordination with construction planning to:

- Understand the impacts of specific construction activities, including bridge closures that will require diversion of buses and other traffic, and station construction that may impact locations intended for use as bus stops or customer access paths.
- Understand construction haulage activities and their impact on road network performance. The use of some local streets by construction vehicles may worsen traffic conditions resulting in the need to divert rail replacement bus services to avoid the roads they use.
- Ensure the safety of customers when as they walk or cycle to access train services, or to other destinations.

5.2 Public transport infrastructure and services

As described in Chapter 4, the operation of the TTSP and the implementation of supporting infrastructure have the potential to create wider impacts.

The TTMP will define how the following will be approached:

- Implementation of temporary bus stops and possible improvements to existing stops, including the planning, design, deployment and removal.
- Operational management of the bus stops including bus marshalls and customer assistance staff.

- Development and management of facilities to support bus operations, such as bus turnarounds and layovers.
- Increases in customer volumes at stations on other rail lines where Bankstown Line customers may divert to, and at CBD stations.
- Increases in customer volumes on the Inner West Light Rail where, unlike the regular bus network, providing additional service frequency may not be possible.

5.3 Specialised transport services

The operation of specialised transport services for customers with mobility requirements will need to be managed carefully to assist customers in using them. Depending on the nature of the services provided, a management framework will be needed to:

- Identify and register the customers who will need to use the services.
- Establish a booking and despatch system to enable customers to request these services.
- Plan for the operation and staffing of pick-up and set-down zones suitable for use by these services.

5.4 Road network performance

The closure of the Bankstown Line and the provision of temporary bus services will impact the performance of the road network, as assessed in the *Environmental Impact Statement*. This is due to a combination of the number of buses required to provide temporary bus services, and the decision some customers will make to drive to their destination or to drive to a different train station to access the rail network. Each TTP will address impacts to general traffic and on the operation of the temporary bus services. This will involve the analysis of key intersections and the development of options to improve their performance, such as modifying how the intersection operates, or by changing the routes that temporary bus services take between stations to avoid congested intersections.

5.5 Parking

The temporary closure of the Bankstown Line will affect the demand for parking at stations along the Bankstown Line, and at stations on the parallel rail lines where people may choose to drive to instead. The TTP will provide an estimate of the changes in demand for park and ride at all stations, allowing an identification of locations where intervention may be required to mitigate the impact of increased demand.

Parking areas along the corridor may be affected by construction activities and the need to provide temporary bus stops. This may affect both designated commuter parking spaces and general on-street parking.

Each TTP will identify what changes would be required to parking arrangements during each possession, potentially including:

- The temporary conversion of commuter car parking spaces and/or on-street parking spaces at some Bankstown Line stations to full-time bus zones to accommodate

customer and operational needs of the TTP buses. This occurs at present during weekend possessions when rail replacement bus services are provided;

- Reducing the available hours of kerbside parking spaces at or near selected train stations so that the spaces can operate as a bus zone at certain times of high demand to accommodate customer and operational needs of the TTP buses;
- The provision of temporary park and ride facilities at other locations within the Bankstown Line catchment, supported by temporary bus routes to connect to rail stations on the parallel rail lines; and
- Temporary changes to on-street parking restrictions near affected stations.

5.6 Walking and cycling

5.6.1 Sydenham to Bankstown Walking and Cycling Strategy

Sydney Metro is developing a *Sydenham to Bankstown Walking and Cycling Strategy* as part of the overall planning for the project. The purpose of the Walking and Cycling Strategy is to investigate recommendations to support the increase of Sydney Metro patronage and overall walking and cycling mode share, and support the reduction in traffic congestion.

This strategy will consider improvements to walking and cycling throughout the Bankstown Line corridor, providing benefit in both the short and long term. The development of the strategy would consider:

- Existing walking conditions. Existing walking network and pedestrian demands within 800 m of each station. This task would consider the existing pedestrian mobility and accessibility requirements.
- Existing cycling conditions. Existing cycling network and bicycle rider demand within a 2.5 km catchment would consider connectivity, on and off-road safety and amenity. This task would identify network gaps and areas of conflict with other road users. Additionally, existing bike parking supply, parking type and user demands would be investigated and assessed for each station.
- Future walking assessment. Future desire lines and demands would identify preferred walking routes and identify priorities for network upgrade.
- Future cycling assessment. A cycling demand assessment would be completed to understand the future context of cycling surrounding and connecting to the Sydenham to Bankstown corridor. This work would also discuss how Sydney Metro and the proposed Active Transport Corridor, to be partially delivered by the project, could change demands and routes for future users. The demand assessment would inform the future provision of bike parking to ensure future mode share is accommodated.
- Mitigation recommendations. Initiatives identified in the strategy would assist in improving the mode share for walking and cycling to and from each station within the project.

5.6.2 Walking and cycling initiatives during possessions

Where feasible, the proposed initiatives will be delivered as early as possible so that they provide benefit during possession of the Bankstown Line and support the TTPs.

Each TTP will consider the potential impacts of the Bankstown Line closure on cyclists and on pedestrians, including:

- Identifying the extent to which pedestrians and bicycle riders may divert to stations on the parallel rail lines;
- Assessing the availability and capacity of end-of-trip facilities at stations which may attract increased numbers of bicycle riders; and
- Assessing the suitability of existing walking and cycling infrastructure to support diverted demand to/from other stations, or for customers who may choose to walk or cycle to their destination rather than use temporary bus services.

5.7 Local businesses

Closures of the Bankstown Line and the implementation of each TTSP have the potential to impact local businesses around the station precincts. This has been assessed in Chapter 18 of the Environmental Impact Statement.

The development of each TTMP will identify location specific requirements, such as the establishment of temporary bus stops near stations that consider the specific needs of adjacent businesses. If possible, options will be considered that benefit local businesses if diverted customers walking past or waiting for buses may generate positive exposure for those businesses.

5.8 Special event management

As discussed in Section 2.1, the possession schedule has been planned to avoid the April school holidays when events such as the Easter Show are held, and the October school holidays when sporting finals are often held.

However, there may still be special events that Bankstown Line customers would want to access, such as concerts held at Sydney Olympic Park or Moore Park.

The needs of each special event will be considered separately. In many cases, the standard TTSP would be able to accommodate the increased customer demand, subject to increasing bus frequencies to peak hour levels if the event occurs during the evening or on a weekend. If customer demand levels are high enough, an adapted version of the TTSP could be implemented where special services carry customers all the way to event destination.

The TTMP framework will also take a proactive approach to inform event organisers of when the Bankstown Line possessions will occur and encourage them to consider this when planning their events, eg the NRL's annual 'Back to Belmore' game.

6. Stakeholder and Customer Engagement

Objectives

Work with councils and other stakeholders to ensure the successful implementation of each TTP.

Develop effective customer communication and information strategies.

6.1 Stakeholder and community engagement

Stakeholder and community engagement has been a hallmark of Sydney Metro and will be critical in developing and delivering each TTP. Sydney Metro has used community feedback over the years to refine various aspects of the project and deliver better outcomes for people affected by construction disruption. That same approach will apply for the TTPs with our commitment to be responsive to community feedback.

Sydney Metro will work closely with community groups to understand the different needs of customers, including those with special needs, or from non-English speaking backgrounds. Sydney Metro has already begun working closely with Sydney Trains, Sydney Coordination Office, bus operators, Councils and other relevant stakeholders to ensure impacts on the community or the local transport network are properly addressed, such as the temporary reallocation of parking spaces for use as bus stops.

The approach to stakeholder and community engagement is outlined in Chapter 4 of the Sydney Metro City & Southwest Sydenham to Bankstown Environmental Impact Statement. Feedback from stakeholders and the community regarding the TTS will be invited during the exhibition of the Environmental Impact Statement and this feedback will inform development of the subsequent TTPs.

6.2 Customer information

Comprehensive customer information and communication strategies will be developed to ensure the community are aware of upcoming possessions, and the temporary rail and bus services that will be available. Information will be tailored to meet the needs of the different customer groups along the corridor, with specific materials to be developed for customers at each Bankstown Line station.

As part of the implementation of each TTP, wayfinding and information signage will be installed at each of the affected stations and TTP bus stops to assist customers to use temporary transport services provided. Sydney Metro will also investigate ways to support travel demand management initiatives to either reduce our customers' need to travel, or reduce the impact of their travel, such as encouraging car-pooling for customers who choose to drive instead of using the other modes available.

TTP 1 will be released to the community in 2018. Community and stakeholder input will be invited at that time, and will be carefully considered as we refine and finalise this first TTP, ready for implementation.

7. Summary

Conversion of the Bankstown Line to Metro operations will require temporary closures of the train line, commencing in July 2019. During these possession periods, up to 100,000 customer journeys could be affected each weekday. Sydney Metro has investigated several options for how these possessions should be scheduled and has determined that a program of multiple possessions, predominantly in school holiday periods, would yield the best outcome for customers.

The Temporary Transport Strategy (TTS) provides a framework that outlines how Sydney Metro will plan and deliver an integrated, multi-modal transport network during these possession periods. Because the possessions will occur over a period of nearly five years, the nature of each possession will be different due to progression in construction activities, and forecasted transport demand growth along the corridor. Therefore, a Temporary Transport Plan (TTP) will be developed for each possession. Each TTP will comprise a service plan (TTSP) and management plan (TTMP), that will define the initiatives to will be implemented for that possession.

The initiatives that each TTP will consider are:

- Temporary train service plans that provide additional capacity on other rail lines where affected customers may be diverted to, and altered services on sections of the Bankstown Line that are not being converted to Metro operations.
- Integrated temporary bus services to allow customers to travel between stations on the Bankstown Line, and to stations on the other lines. This includes understanding the opportunities that the regular bus network can provide.
- Planning specialised services for customers who may not be able to use the temporary bus services, such as those with mobility impairments or other special needs.
- Initiatives to encourage and assist customers to walk or cycle to stations on other lines, or to their destinations.
- Infrastructure to support temporary bus services including bus stops and shelters, improvements to walkways and lighting, and wayfinding and information signage.
- Improvements to the road network, such as bus priority measures to support the temporary bus services, and adjustments to traffic signals to mitigate changes in road network demand.
- Understanding the changes in demand for parking near rail stations, the impacts this may cause and measures to manage those impacts.
- Customer and stakeholder engagement strategies, including communication, information provision and supporting travel demand management initiatives.

APPENDIX A Baseline Temporary Transport Plan

A.1 Overview

As an input to the *Sydney Metro City & Southwest Sydenham to Bankstown Environmental Impact Statement (EIS)*, a “Baseline” Temporary Transport Plan was developed to provide preliminary estimates of the volume of temporary bus services required to meet customer demand during a possession. These estimates were then used to assess the impact of the proposed bus services on the performance of the road network.

The Baseline TTP was developed for this purpose. It focusses solely on the planning of temporary bus services, and does not explore the other multi-modal elements described in the TTS.

A.2 Temporary bus service assumptions

Many customers are already familiar with the rail replacement buses that operate on weekends when rail lines are closed to allow for track maintenance. For the purposes of assessment, a Baseline TTP was developed that closely emulates these weekend rail replacement services. Some adjustments have been made to the weekend service plan to better serve the volume of customers travelling during weekday peak periods.

The Baseline TTP provides bus routes that travel along the Bankstown Line corridor, delivering customers with destinations in the CBD or beyond, to Sydenham Station. Subsequently, customers transfer to train services operating on the T8 Airport & South Line or T4 Illawarra Line.

This section explores how such a plan would operate and whether its performance outcomes for customers and impact on the road network would be acceptable.

A.3 Customer service objectives

Customer service objectives to inform the baseline temporary bus service requirements are:

- Ensure that all stations accessible on the existing train service between Lidcombe and Sydenham will be accessible by temporary bus services without the need to transfer between temporary bus services (i.e. a single seat journey);
- Minimise increases in travel times for the majority of customers who are travelling to/from east of Sydenham, including the CBD;
- Ensure that service frequencies in the peak hours are a minimum of 10 buses per hour. At other times, a minimum of 6 buses per hour are to be provided; and
- Provide adequate bus capacity so that passengers travelling the longest distances on temporary bus services are guaranteed a seat.

A.4 Rail service assumptions

The development of the Baseline TTP is premised on the assumption that Bankstown Station is unavailable for trains to travel to or from the west, and that the Bankstown Line stations will be closed from Marrickville through to Birrong inclusive.

The assumed rail network changes during the possession period are:

- A rail shuttle service is provided on the Bankstown Line between Liverpool and Lidcombe via Regents Park; and
- St Peters and Erskineville will be served by trains operating on the T8 Airport & South Line, or the T4 Illawarra Line.

Consequently, in the Baseline TTP Sydenham, Regents Park and Lidcombe Stations are the focal points for the transfer of customers between temporary bus routes and train services.

A.5 Temporary bus routes

As on weekends, the Baseline TTP is underpinned by an all-stops route that travels from Sydenham to Bankstown, and further to Lidcombe. This route will be part of any TTP, providing a promise to our customers of a simple, easily understood route that will enable them to travel to any of the closed stations on the Bankstown Line, at any time.

However, to meet the customer service objectives, the introduction of additional bus routes with express sections will be required to provide faster connections from the western parts of the corridor, to Sydenham. The proposed routes are described in Table A.1 and shown in Figures A.1 and A.2.

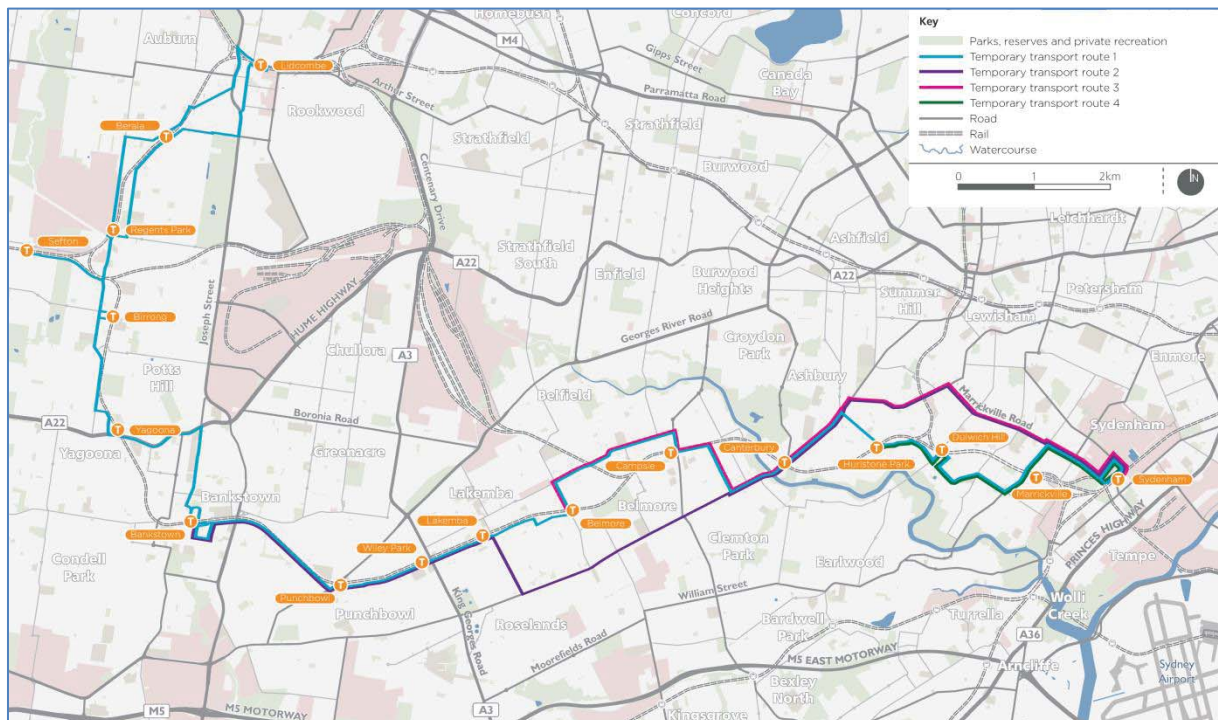
Table A.1: Temporary bus routes serving only stations between Lidcombe and Sydenham

Route	Description	Rationale
1	Lidcombe to Sydenham, all stations	<ul style="list-style-type: none"> • Will provide a consistent, all-hours service during each possession. • All station origin/destination combinations on the existing rail service between Lidcombe and Sydenham are also provided by the replacement bus service. • Some services will operate from Regents Park, instead of Lidcombe, to better serve customers travelling to/from the stations between Regents Park and Liverpool.
2	Bankstown to Sydenham, via Punchbowl, Wiley Park and Lakemba	<ul style="list-style-type: none"> • Travel times to Sydenham for customers from Bankstown, Punchbowl, Wiley Park and Lakemba are reduced compared to the all stops alternative. • The road alignment between Bankstown and Lakemba is reasonably direct and broadly parallel to the rail line. • From Lakemba Station, there is a direct route available to Sydenham via Haldon Street, Canterbury Road and Marrickville Road (i.e. not diverting via the remaining stations).
3	Belmore to Sydenham, via Campsie and Canterbury	<ul style="list-style-type: none"> • Travel times to Sydenham for customers from Belmore, Campsie and Canterbury are reduced compared to the all-stops alternative. • Service reliability and customer capacity are provided for customers at Belmore, Campsie and Canterbury travelling to Sydenham (buses at these locations will be more reliable than if they are required to travel all the way from Lidcombe or Bankstown; capacity constraints are reduced by limiting the number of stations served). • From Canterbury Station there is a direct route available to Sydenham via Canterbury Road and Marrickville Road (i.e. not diverting via the remaining stations).
4	Hurlstone Park to Sydenham, via Dulwich Hill and Marrickville	<ul style="list-style-type: none"> • Service reliability and customer capacity are provided for customers at Hurlstone Park, Dulwich Hill and Marrickville travelling to Sydenham (buses at these locations will be more reliable than if they are required to travel all the way from Lidcombe or Bankstown – important at these stations as travel times to Sydenham are relatively short; capacity constraints are reduced by limiting the number of stations served).

Figure A.1: Schematic representation of Baseline TTP bus routes



Figure A.2: Geographic representation of Baseline TTP bus route alignments



A.6 Required service frequencies

Preliminary transport modelling using PTPM4 was undertaken to inform the minimum bus service frequencies required to serve the volume of customers who travel eastbound in the AM peak hour. These are presented in Table A.2.

Table A.2: Required minimum bus temporary bus route frequencies for the AM peak hour (2023)

Route	Description	Eastbound Frequency	Westbound Frequency
1	Lidcombe to Sydenham, all stations	11 per hour	10 per hour
2	Bankstown to Sydenham, via Punchbowl, Wiley Park and Lakemba	33 per hour	10 per hour
3	Belmore to Sydenham, via Campsie and Canterbury	35 per hour	10 per hour
4	Hurlstone Park to Sydenham, via Dulwich Hill and Marrickville	22 per hour	10 per hour

Note: Additional bus volumes would be generated in the westbound direction, as buses return out-of-service to the route starting point.

A.7 Outcomes

If the Baseline TTP was implemented, it would provide a temporary transport solution that would allow customers to continue to travel to their current destinations. However, a number of issues would arise:

- A minimum of 101 buses per hour would travel through Marrickville destined for Sydenham Station in the AM peak period. This may not be feasible as this number of buses is likely to cause traffic congestion through Marrickville and Sydenham. An assessment of the impact of these buses on intersections throughout the Bankstown Line showed that delays would increase to unacceptable levels at a number of intersections. This analysis is detailed in *Sydney Metro City & Southwest Sydenham to Bankstown upgrade. Technical Paper 1 - Traffic, Transport and Access. AECOM, July 2017*.
- Having this many buses arrive at Sydenham Station in one hour would be difficult to manage given the limited space available to provide bus stops. The large number of passengers arriving on these buses could also be too great for the station to accommodate comfortably, crowding footpath areas and causing queues at the ticket gates.
- Trains arriving at Sydenham Station will have travelled via many other stations, and it is unlikely that passengers boarding would secure a seat. Potentially, the number of passengers arriving at Sydenham would exceed the available capacity on the trains travelling through the station to the CBD.
- Travel times from stations in the western half of the corridor would become unattractively long. It is expected that a trip from Bankstown Station to Sydenham Station would take at least 45 minutes in the AM peak period (compared to 21 minutes on the current limited-stops train services). Additionally, traffic conditions in peak periods often results in delays on the road network and customers would be unable to rely on the temporary bus services to get them to their destinations on time.

These issues demonstrate that a temporary bus plan designed to convey all Bankstown Line customers to Sydenham Station would be unfeasible during weekday peak periods, and that an alternative approach is required.

A.8 Next steps for developing temporary bus service strategies

To mitigate the identified impacts and to provide a better customer outcome, it will be necessary to convey some customers by temporary bus services to stations on other rail lines instead of Sydenham Station.

The Customer Service Objectives will guide the development of each TTP, which will be undertaken to achieve a workable balance between the following key requirements:

- Minimising customer travel times including the reduction of customer waiting and transfer times;
- Conveying customers to rail stations where adequate capacity is available (or can be added) to prevent overloading of train services;
- Distributing temporary bus services so that they travel to several rail stations to reduce the impact on any one station; and
- Achieving consistency between services provided in peak periods and those at other times, where possible.

For customers travelling towards the CBD from west of Campsie, their total journey time would be reduced if a temporary bus service took them to a station on the T8 Airport & South Line. For example, a bus journey from Bankstown Station to Padstow Station would be as short as ten minutes and experience less of the traffic congestion that exists further east. If customers were to board a train at Padstow that had commenced its journey one station to the west, at Revesby, they would be likely to get a seat for their entire journey to the CBD.

Taking this approach for each of the stations from Belmore through to Bankstown could reduce the number of buses that need to travel to Sydenham, creating a more manageable outcome. It would also cost less to operate, require fewer buses, and reduce the impact of these buses on the road network.

A preliminary approach to refining the temporary bus plan, as presented in Figure A.3, would reduce the number of buses that travel to Sydenham Station by 45%, compared to the Baseline TTP.

It may also be possible to convey customers from Campsie and Canterbury Stations to other train lines, which would not necessarily provide a faster journey than travelling via Sydenham, but would act to further reduce the number of buses travelling through Marrickville and Sydenham.

Figure A.3: Refined temporary bus plan approach to reduce bus volumes to Sydenham

