The overall reduction in network efficiency indicates that significant additional capacity is required within the road network and that more sustainable modes need to be provided for development in the area to become sustainable. Therefore, vehicle demand needs to be reduced through demand management strategies such as parking restrictions and parking controls[11]. These strategies should be complemented with additional public transport, walking and cycling provision to ensure that the dependence on cars is reduced.

4.2. Results summary

The analysis above indicates that significant infrastructure upgrades, including the duplication of Forest Road, Queens Road, Park Road and the Avenue and (an unrealistic) modal shift is required to accommodate the full Hurstville Masterplan by the existing road network. However, with minor infrastructure upgrades and mode shift, 66% of the Masterplan development could be achieved, these results are summarised in **Table 4-8.**

[11] Approximately 60% of parking spaces (2355) within Hurstville SLA are currently time unrestricted.

- **Table 4-7 Modelling results summary**

Development Scenario	Road Infrastructure Upgrades[12]	Mode Shift
Full Masterplan – Option 1	To accommodate an additional 4,000 trips in the AM peak hour, an additional lane in each direction would be required on Forest Road, Queens Road, Park Road and The Avenue as well as minor infrastructure upgrades.	Not required
Full Masterplan – Option 2	Minor infrastructure upgrades such as extending right turn bays along Queens Road and Forest Road, would be required to improve the overall operation of the network.	An additional 3000 trips per hour need to be shifted to other modes, including rail, bus, walk and cycle.
75% Masterplan	Some infrastructure upgrades, including additional capacity on Forest Road and Queens Road and extending right turn bays and slip lanes at strategic intersections, would be required to improve the overall operation of the network as well as other minor infrastructure upgrades.	At least an additional 1,200 trips per hour need to be shifted to other modes, including rail, bus, walk and cycle.
66% Masterplan	Minor infrastructure upgrades such as extending right turn bays along Queens Road and Forest Road, would be required to improve the overall operation of the network.	At least an additional 1,000 trips per hour need to be shifted to other modes, including rail, bus, walk and cycle.
50% Masterplan	Minor infrastructure upgrades such as extending right turn bays along Queens Road and Forest Road, would be required to improve the overall operation of the network	At least an additional 600 trips per hour need to be shifted to other modes, including rail, bus, walk and cycle.

The next chapter analyses each of the above options and estimates how many trips would need to be shifted to public transport in order to encourage sustainable transport usage and allow the Masterplan to proceed without major road infrastructure upgrades.

[12] Minor infrastructure improvements include measures such as localised intersection widening, narrowing or removal of medians, partial or full removal of parking/loading facilities, narrowing of footpaths/removal of landscaping, traffic signal optimisation, etc.

4.3. Mode Shift targets

The existing JTW mode shares of strategic commercial and retail centres in Sydney, with good public transport connectivity including good rail and bus services and interchanges were assessed and compared to Hurstville City centre. The strategic commercial and retail centres assessed were Chatswood, St Leonards, Parramatta and Camperdown. The mode share breakdown for each of these centres is presented in **Table 4-8**.

- **Table 4-8 Mode splits precincts with good public transport connectivity**

Mode	Hurstville	Chatswood	St Leonards	Parramatta	Camperdown
Private vehicle	70%	56%	64%	60%	63%
Train	14%	29%	24%	28%	12%
Bus	4%	7%	5%	7%	11%
Walk and Cycle	12%	8%	7%	5%	13%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-8 shows that centres with strong public transport connectivity (i.e. high frequency rail services, extensive bus networks and high-quality interchange facilities) and limited long-term parking availability have an overall private vehicle mode split of between 56% and 63%, and public transport mode split of between 36% to 44%.

It is considered that a private vehicle mode split of between 55% and 65%, and public transport mode split of 35% and 45% is achievable in Hurstville City Centre. To achieve this substantial mode shift would require substantial investment in public transport. Key initiatives currently underway by NSW Transport and Infrastructure, some of which will benefit Hurstville City Centre, include:

- A thousand new buses being added to Sydney's bus networks (an increase of around 25%) together with the completion of 43 strategic bus corridors
- Additional funds being allocated to bus priority
- Western Express Project which increases rail network capacity, including capacity constraints at the Illawarra Line junction
- Completion of the priority missing links in the Metro Sydney Strategic Cycle Network; and
- Various initiatives to improve customer experience and further encourage public transport use.

Additional measures to achieve mode share targets potentially include:

- Development of a detailed transport and mobility access plan for the Hurstville City Centre to incorporate;

- The promotion of reduced parking rates and parking management strategies recommended by the Hurstville City Centre Parking Rate Review;
- Improving the existing cycle and pedestrian amenity within the City Centre area;
- Provide good cycle facilities within the City Centre;
- Promote public transport as an alternative mode;
- Behaviour Change programs to encourage a switch to more sustainable modes.

- Increased rail service provision at Carlton and Allawah stations during peak hours; and
- Increased bus frequency along existing routes and introduce new routes along the Kogarah, Rockdale and Hurstville bus corridor.

4.4. Preferred Masterplan development option

Mode shift assumptions related to each of the development options (**Table 4-7**) were tested and the results are presented in **Table 4-9**.

- **Table 4-9 Projected mode share for each of the development options (assume a 3 hour peak period for JTW trip estimation)**

		Existing Number of JTW Trips	Projected Number of JTW Trips	Projected Mode Share
Full Masterplan Option 1	PT, walk, cycle	1,624	5,206	30%
	Car	3,728	12,146	70%
	Total	5,352	17,352	100%
		Existing Number of JTW Trips	Projected Number of JTW Trips	Projected Mode Share
Full Masterplan Option 2	PT, walk, cycle	1,624	10,624	61%
	Car	3,728	6,728	39%
	Total	5,352	17,352	100%
		Existing Number of JTW Trips	Projected Number of JTW Trips	Projected Mode Share
75% Masterplan	PT, walk, cycle	1,624	5,224	39%
	Car	3,728	8,108	61%
	Total	5,352	13,332	100%
		Existing Number of JTW Trips	Projected Number of JTW Trips	Projected Mode Share
66% Masterplan	PT, walk, cycle	1,624	4,624	39%
	Car	3,728	7,328	61%
	Total	5,352	11,952	100%
		Existing Number of JTW Trips	Projected Number of JTW Trips	Projected Mode Share
50% Masterplan	PT, walk, cycle	1,624	3,724	40%
	Car	3,728	5,528	60%
	Total	5,352	9,252	100%

The analysis above suggests that:

- **Full Masterplan Development Option 1**: although with major road expansion this option could be accommodated, it is considered that in reality there is limited scope to expand the road network. Furthermore, the provision of additional road capacity is not considered a desirable policy from a sustainability perspective. This option would result in only 18% public transport mode split;

- **Full Masterplan Development Option 2**: this option can only be achieved by shifting 3,000 trips per hour to public transport. This would result in a 60% public transport mode share which is considered too optimistic and unlikely to be achieved (Chatswood only achieved 44% public transport mode split);
- **75%, 66% and 50% Masterplan Development Options**: by shifting varying amounts of trips to public transport (1,200 trips for 75% option, 1,000 trips for 66% option and 700 trips for 50% option), all three options have the capacity to achieve a 40% public transport and 60% car mode split without major road infrastructure upgrades. However significant investment would be required in the public transport network. In addition, all three options require 3000 to 4000 additional parking spaces based on the recommended parking rate (additional 10,650 car spaces will be provided, refer to Chapter 2.2).

Based on the analysis above, it is recommended that the 66%Masterplan development option is the preferred development option as it can be strategically accommodated by both the road and public transport networks. It should be noted that a more detailed transport and mobility access plan would be required to be prepared by Hurstville City Council to determine how the required mode shift would be achieved in the study area.

5. Accessibility Impacts of the Preferred Option

5.1. Accessibility impacts for public transport

If a 66% Masterplan Development Option is to be implemented, then 1,000 trips per hour would need to be shifted to public transport/sustainable modes.

Based on the previous existing travel behaviour analysis, it is likely that the majority of these trips would enter Hurstville City Centre during the AM peak period and would originate from the surrounding SLAs[13], including Hurstville, Rockdale and Kogarah. Therefore, it is considered that the mode shift to public transport can only be achieved if improved public transport services are provided from the surrounding residential areas to Hurstville City Centre.

There are currently 14 Hurstville bound rail services stopping at Hurstville Railway Station during the AM peak hour, of which 11 services stop at Kogarah and Rockdale. This equates to a train every 5-6 minutes and this is considered a high level of rail services between Kogarah, Rockdale and Hurstville Stations. However, it should be noted that there are also two other railway stations Carlton and Allawah (located between Kogarah Station and Hurstville Station) within Kogarah and Hurstville SLAs, at which only 5 services stop during the AM peak hour. In addition, these 5 services are not provided with a regular service frequency (maximum 20 minutes gap) during the peak hour. It is therefore recommended that, from a rail perspective, consideration should be given to providing an increased rail service level at Carlton and Allawah Railway Stations. This would assist in promoting a mode shift to rail from those residential areas serviced by those stations.

There are a total of 62 buses currently operating to and from Hurstville City Centre during the AM peak hour at frequencies between 15 and 30 minutes. It is noted that the average frequency of major bus routes along the Kogarah, Rockdale and Hurstville corridor is 30 minutes and these routes do not cover all major residential catchments. Considering that more than 50% of trips would originate from Kogarah, Hurstville and Rockdale SLAs, therefore, it is considered that a mode shift to buses can only be achieved by increasing the bus frequency along existing routes and adding more routes along the Kogarah, Rockdale and Hurstville bus corridor.

5.2. Accessibility impacts for pedestrians and cyclists

Based on the previous JTW analysis, 26% of JTW trips (1,395 trips) into Hurstville City Centre originate from areas within 2km walk and cycle catchment. Of the 1395 trips, only 20% are by walk and cycle. Considering that a 40% walk and cycle mode share can be achieved within the 2km catchment of Chatswood City Centre , there are significant opportunities to promote mode shift to

[13] Based on the previous existing travel behaviour analysis

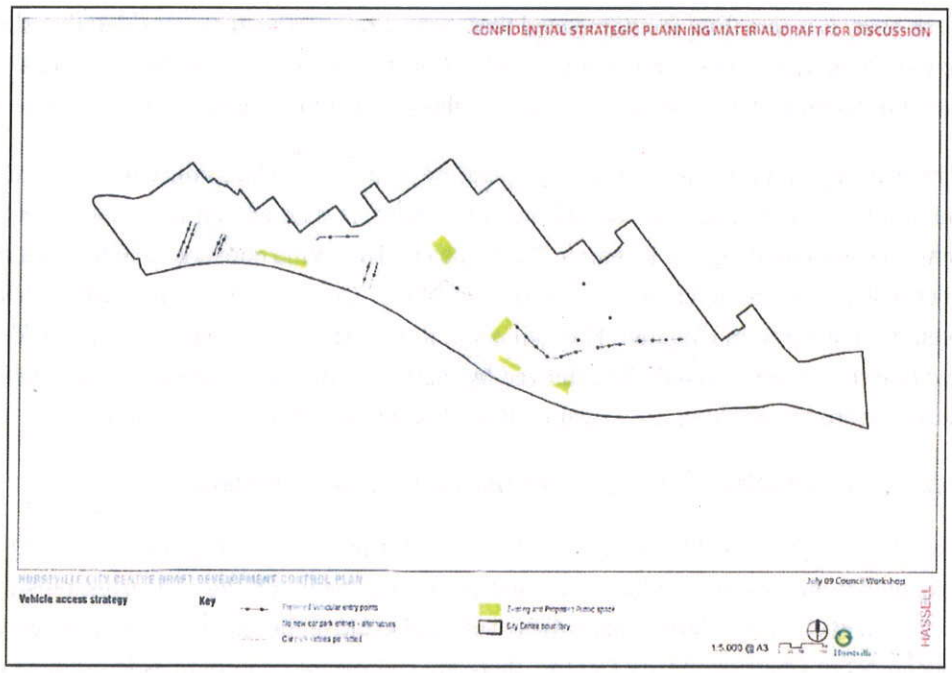
walk and cycle by providing safe and well connected pedestrian and cycle networks to the City Centre.

5.3. Parking and servicing of site

The Hurstville City Centre Development Control Plan vehicle access strategy is illustrated in **Figure 5-1**. There are currently 30 additional points of access recommended, the majority along Humphreys Lane, which is also one-way between Rose Street and Park Road, and will be unable to accommodate significant growth as it is a one-way single lane carriageway with no capacity for expansion and some height restriction issues due to a overhead pedestrian walkway. Given that the majority of sites have no new access points or car park entries this will place significant pressure on existing entrances requiring detailed intersection analysis from an operational and safety perspective.

There is also an issue regarding the movement and loading for servicing vehicles along Forest Road . Consideration should be given to introducing an early morning and late night period for servicing vehicles to access the site to avoid peak traffic. This would need to be reviewed from a safety and logistics perspective and agreed with the RTA.

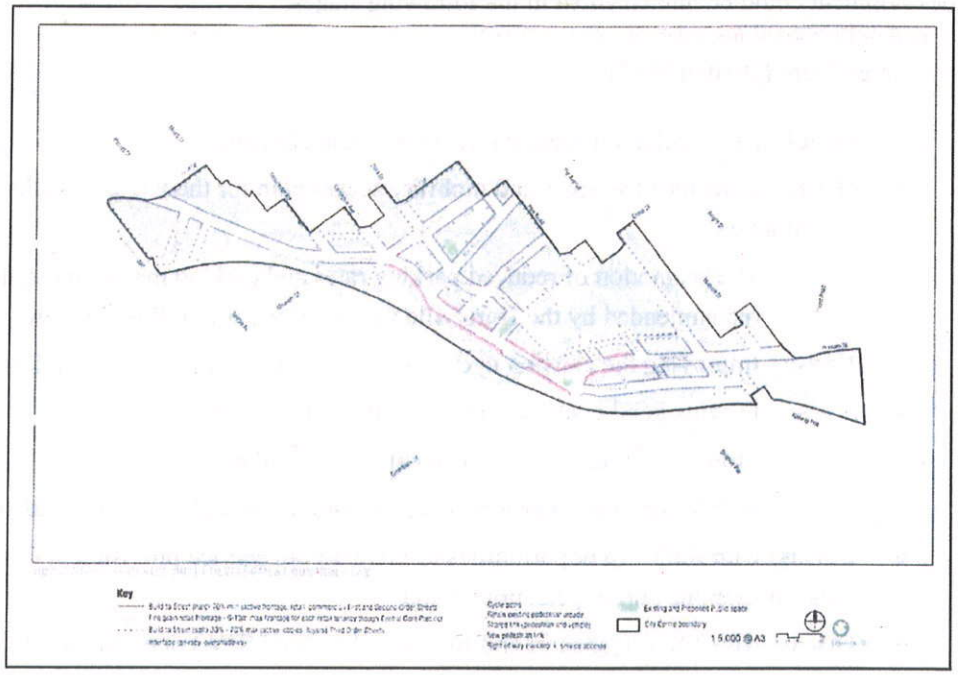
- **Figure 5-1 Hurstville City Centre Draft Development Control Plan Vehicle Access Strategy**



The Hurstville City Centre Draft Development Control Plan is illustrated in **Figure 5-2**. Given the increase in walking and cycling mode shift required to accommodate the level of development

proposed, Hurstville City Council should develop a walk and cycling strategy and associated network within the study area. This strategy should be developed to encourage walking and cycling by providing more amenable and safer environments for these more vulnerable modes. Given the increase in traffic along Forest Road we recommend completing a detailed safety audit across all modes to ensure a pedestrian and cycling friendly environment is created within Hurstville City Centre particularly along Forest Road which is a strategic link and also forms part of the cycle network.

- **Figure 5-2 Hurstville City Centre Draft Development Control Plan**



Based on the mode shift objectives and traffic generation of the proposed development an additional 3,500 parking spaces would need to be provided.

6. Staging and Implementation

The analysis shows that the 66% Masterplan development option could accommodated with minor improvements to the local road network and by improving public transport service provision and the cycle/pedestrian network, achieving a 40% public transport/sustainable modes and 60% car mode split. This option would require shifting 1,000 trips per hour to public transport, walk or cycle.

It is therefore recommended that a 66% Masterplan development be considered by HCC and this development could be implemented in the following stages:

1) Short Term (2010 to 2015);

- Establish a consultation programme with all stakeholders;
- Develop a detailed transport and mobility access plan for the Hurstville City Centre to incorporate;
  - The promotion of reduced parking rates and parking management strategies recommended by the Hurstville City Centre Parking Rate Review;
  - Improving the existing cycle and pedestrian amenity within the City Centre area;
  - Provide good cycle facilities within the City Centre;
  - Promote public transport as an alternative mode;
  - Behaviour Change programs to encourage a switch to more sustainable modes.
- Discuss with RailCorp opportunities to increase rail service provision at Carlton and Allawah stations during peak hours; and
- Discuss with NSW Transport and Infrastructure (and STA) opportunities to increase bus frequency along existing routes and introduce new routes along the Kogarah, Rockdale and Hurstville bus corridor.

2) Medium to Long Term (2015 to 2030);

- Staged implementation of the proposed 66% development in the Amended Masterplan;
- Develop an integrated transport strategy to assist and guide the future planning of the Hurstville City Centre;
  - Review previous parking strategy;
  - Introduce new bus connections and rail connections to the study area in conjunction with the NSW State Government; and