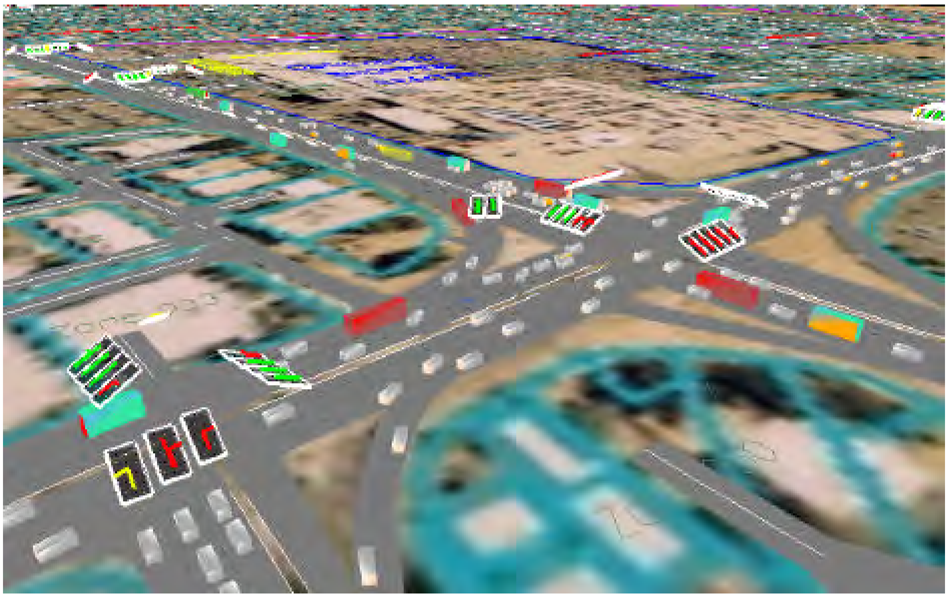
Doncaster Hill Strategy

Traffic Modelling and Analysis

Paramics Simulation

Final Report



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EXECUTIVE SUMMARY

The City of Manningham is preparing a strategy to allow for the intensive development of the Doncaster Hill Area. High-density residential use alongside commercial and retail facilities is being planned to result in a sustainable urban village.

Approximately 3500 residences and an additional 28,500 m^2 of commercial and retail floor space are forecast to be developed along Doncaster Road and Williamsons Road over the next 20 years. The co-location of residents with work, shop and public transport options is expected to result in a sustainable transport future which is a key aim of the project.

GTA Consultants (GTA) has been engaged by Council and Westfield to refine earlier transport assessments by developing a simulation model that tests the feasibility of the proposal from a transport and traffic perspective.

The modelling and analysis undertaken for the years 2001, 2011 and 2021 indicates that the Hill can technically accommodate the travel demands of future residents, workers and visitors if an integrated approach to transport and traffic planning is adopted based on altered travel patterns. This approach includes the integration of transport and land use, integration between different modes of transport to provide genuine travel choice, and integration of a package of infrastructure items with supporting regulatory and policy frameworks at state government and Council level.

The clearest statement about how to achieve the broad aims of the Strategy are to change peoples' travel behaviour by encouraging increased public transport use and reduced levels of car dependency. Council policies and guidelines will form a key element of this task, along with Council acting as an advocate of change in travel behaviour.

The report shows that the Strategy and its growth forecasts are technically able to be accommodated in a transport demand sense under Scenarios C and D. However, Scenario D is a technically superior option that reduces impacts on local streets.

The package of works to achieve all of these aims is set out in Section 11 – Recommendations along with estimates of infrastructure works, staging in Figure 11.1 and costs. The preferred scenario includes a conceptual network of access roads and supporting infrastructure as indicated in Figure 10.4.

This includes the provision of carparking in satellite car parking stations that can be converted to alternative uses in the future in line with reduced car use and ownership levels. The continued use of planning scheme rates for carparking assumes more of the same in relation to car use and ownership, and as such should be re-considered if behavioural change is to occur.

A number of issues remain unresolved such as the location and layout of a new transport interchange with sufficient flexibility and capacity to cater for a range of possible future public transport alternatives. These may include new tram routes and bus routes. The Department of Infrastructure has questioned the logic and flexibility of locating the interchange in Westfield at the rear of the site rather than al alternative more visible location. The discussion in Section 11.2.5 recommends a visible and easily accessible location at or close to the corner of Doncaster Road and Williamsons Road.

The Hill Strategy is referenced in the Manningham Integrated Transport Strategy (MITS) as set out in Section 12 of the report to ensure consistency where relevant.

Further work is currently underway in the form of a parking precinct plan to review Council's car parking policy in view of the Strategy aims for the Hill. In addition, cyclist and pedestrian network overlays should be developed as a masterplanning vision along with guidelines to "tie together" subsequent development proposals and result in a coherent and workable long-term solution for these users.

The Strategy should be reviewed on a regular basis against the progress and outcomes of the Metropolitan Strategy and ongoing public transport planning. The first review is recommended to be in late 2002 and thereafter on an annual basis.

The model is intended to function as a living resource able to be quickly and efficiently updated with new development proposals, public transport options and planning futures. These alternatives can then be tested and more detailed recommendations made on road network changes, land acquisition and developer contributions.

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1 INTRODUCTION

1.1 THE STUDY

The City of Manningham (Council) is preparing a strategy to allow for the intensive development of the Doncaster Hill Area. High-density residential living alongside commercial and retail facilities is being planned to achieve a 'sustainable and smart' urban village.

It is expected that approximately 3500 residences and an additional 28,500 m^2 of commercial and retail floor space will be developed along Doncaster Road and Williamsons Road over the next 20 years.

The co-location of residents with work, shop and public transport options is expected to result in a sustainable transport future which is a key aim of the project.

GTA Consultants (GTA) has been engaged by the City of Manningham (Council) and Westfield Shoppingtown (Westfield) to refine earlier transport assessments by developing a simulation model that tests the technical feasibility of the proposal.

1.2 PREVIOUS TRANSPORT ISSUES

Strategies that have been discussed in the past to achieve a reduction in car usage (and other precinct objectives) include:

1.2.1 Improvements To Pedestrian And Cyclist Safety

- Wide medians along Doncaster Road;
- Shared footways along Doncaster Road with a generous offset from the traffic lanes;
- An increase in the number of signalised crossing points, with crossings at less than 300 m intervals;
- The creation of activity nodes at crossing points, with bus routes and local retail facilities;
- Grade separated crossings at or near the intersection of Williamsons Road/Doncaster Road; and
- Minimisation of driveways along Doncaster Road, with car parks accessed via side streets.

1.2.2 Car Parking

A base level of parking should be provided for tenants on-site, with additional parking available in off-site community parking stations on a user pays basis. This will enable the efficient sharing of car parking between different users and highlight the on-going cost of car ownership through the need to pay a regular tariff.

If car parking demands reduce over time the parking stations can be more easily redeveloped for alternative use than basement car parking.

1.2.3 Traffic Management and Buses

Traffic should be intercepted at the periphery of each precinct and diverted into side streets to access parking spaces.

The use of signalised cross-roads will allow for connectivity between precincts allowing:

- The sharing of parking facilities on both sides of Doncaster Road;
- Permeability for local bus routes;
- Location of bus stops and local retail nodes at intersections that connect into two precincts and provide safe pedestrian crossing points.

1.3 OBJECTIVES

Provide a model for estimating future road and intersection works to mitigate against the impacts of development in the study area at an individual site level, and resulting road reservation requirements. Retain the ability at some future time to model tram extensions and/or bus priority lanes if necessary.

Develop a "living" model able to quickly and accurately test changes to land use forecasts (developer proposals) and road network configurations as required to output network impacts, mitigating works and road reservations required.

1.4 DELIVERABLES

The ultimate outcome of the study will be a model with the ability to do the following:

- Forecast the separate road works required to support expansion at Shoppingtown and Doncaster Hill;
- Allow for quick and accurate assessment of future changes to land use proposals and road network configurations at Shoppingtown and Doncaster Hill;
- Model the impacts of future tram extensions and/or bus priority lanes if required in the future at minimal cost and time;
- Provide planning certainty to set aside road reservations and resulting land acquisitions based on concept sketches; and
- Provide some basis on which to consider long-term developer contributions to infrastructure works across the study area.

2 BACKGROUND

In November 2000, Manningham Council released a strategy plan entitled *Doncaster Hill Strategy 2021* which considered the strategic planning options available to Council in response to a developing pattern of land use and development in the Doncaster Hill Area.

This forecast market demand for a 20 year timeframe and estimated up to 8300 residents and 10000 jobs within the area by 2021. Coupled with these forecasts were the observations that traffic volumes along Doncaster Road would drop significantly due to the extension of the Eastern Freeway and expansion would occur at Westfield.

Following this in January 2001, GTA Consultants was engaged along with other consultants to define guidelines for the strategic development of the Doncaster Hill Area.

Council has subsequently tested the validity of the plans for the *Urban Village* concept and its ability to be accommodated within the land defined in the study. The focus for the work has been on Council adopting a proactive approach to the planning issues in the study area in order to deliver the greatest community benefit.

This report picks up on the work undertaken to date and looks in detail at the capacity of the road network to accommodate future demand growth. It does this by building a MicroSimulation[1] model of Doncaster Hill that considers development in each of the original eight precincts, including Westfield Shoppingtown. Each of the eight precincts has a unique set of stated design objectives, principles and desired outcomes.

The benchmarks for the new Urban Village from a transport perspective include the provision of high quality urban amenity, integrated transport linkages and a pedestrian focus. In other words it should be developed as a *vibrant self-contained urban village*.

Strategy objectives include the development of a strong boulevard character along Doncaster Road, provision of direct access to public transport and proximate car parking, safe attractive streets, economies of movement and pedestrian activity. It went on to state that pedestrian amenity will be a priority, vehicle crossings will be limited and strictly controlled, local residential streets to be protected from increased traffic flows and adequate concealed on-site parking to be provided. It also refers to the provision of an integrated public transport interchange at Shoppingtown to cater for all demands in a prominent and accessible location.

[1] MicroSimulation and the Paramics model are discussed in detail in Section 8 of the report

3 THE STUDY AREA

3.1 DESCRIPTION

A plan showing the extent of the study area is set out in Figure 3.1.

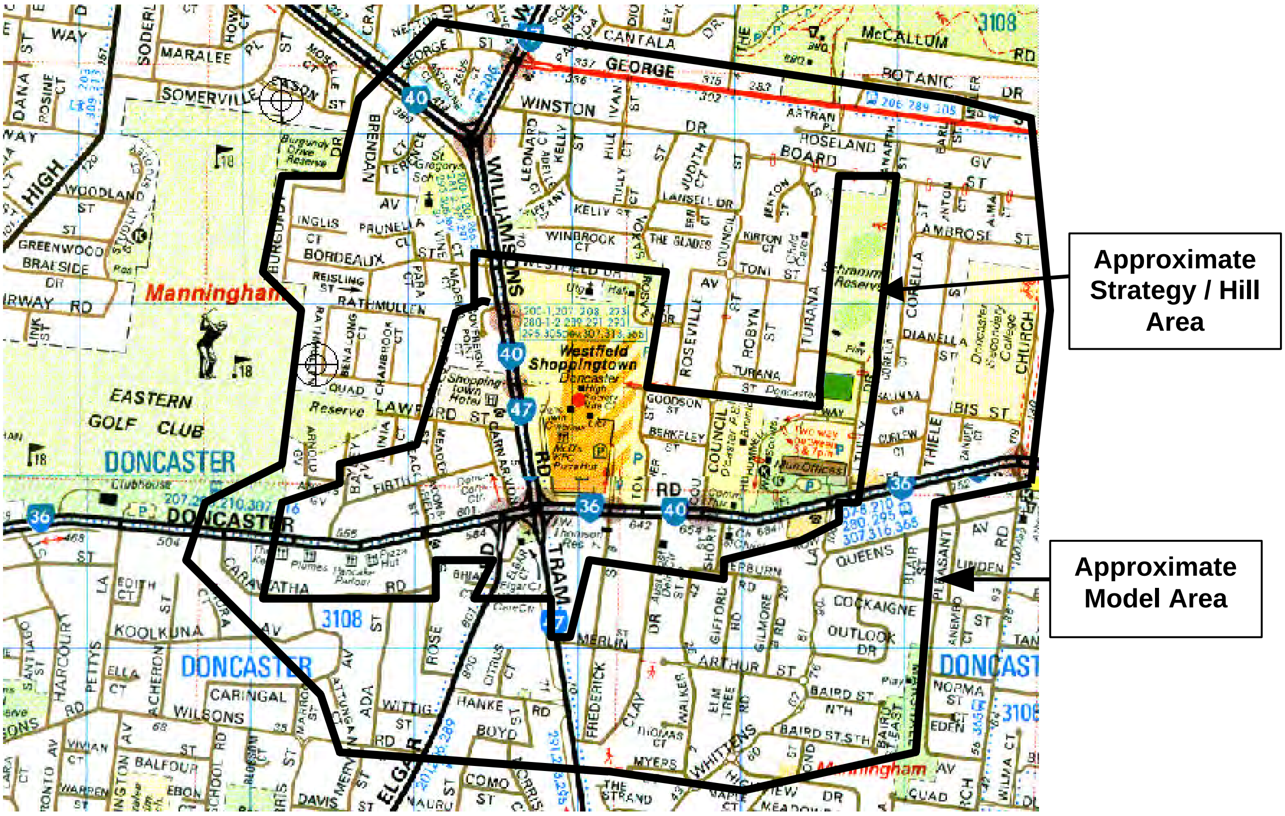


FIGURE 3.1: DONCASTER HILL STUDY AREA ROAD NETWORK
SOURCE: MELWAY

An aerial photograph of the area is set out at Figure 3.2.

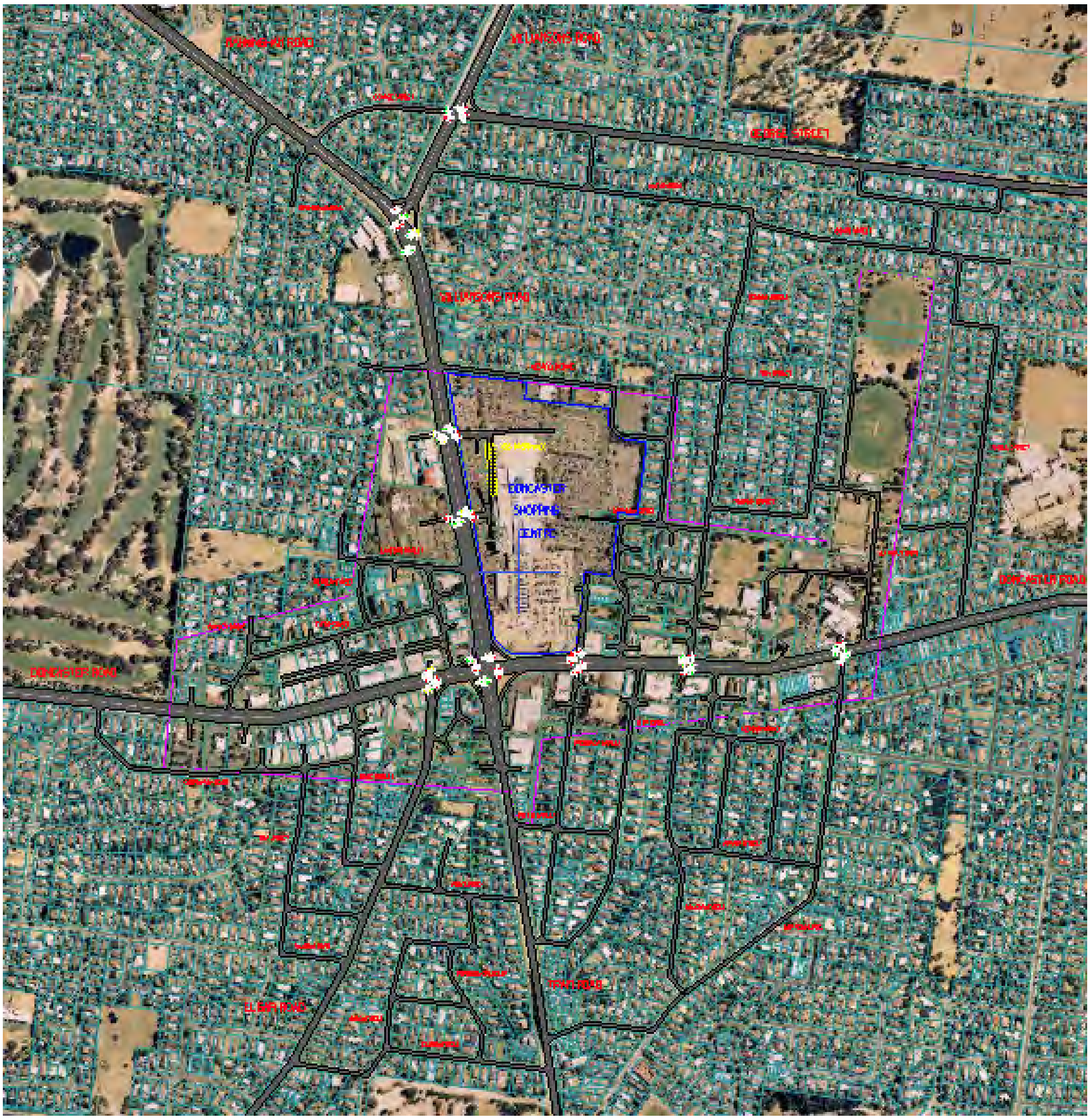


FIGURE 3.2: DONCASTER HILL STUDY AREA AERIAL PHOTOGRAPH

3.2 STUDY AREA PRECINCTS

The Doncaster Hill area is proposed to contain 7 precincts as follows:

- Precinct 1: Municipal precinct encompassing the municipal offices and major recreational area and primary school in the northeast corner of the Hill
- Precinct 2: This precinct lies on the south side of Doncaster Road to the east of Tram Road. Permits have already been issued for the construction of high density residential developments in this precinct.
- Precinct 3: Precinct 3 lies between Westfield Shoppingtown and the Municipal precinct.
- Precinct 4: The existing regional shopping centre, Westfield Shoppingtown, on the northeast corner of Williamsons Road and

Doncaster Road makes up this precinct, which also contains a major bus interchange.

- Precinct 5: This precinct lies on the west side of Williamsons Road, across from Shoppingtown and includes the Crest apartments, the Hill's initial experience of high density residential apartments.
- Precinct 6: Extending west along Doncaster Road, this precinct includes an existing established commercial area.
- Precinct 7: Lying opposite Precinct 6 on the south side of Doncaster Road, this precinct is currently home to a number of family restaurants and other commercial developments.

The development potential for the area includes an additional 85,000 m^2 retail and commercial floor area (currently 106,000 m^2) and an additional 3,595 residential apartments (currently 243) by the year 2021.

4 PREVIOUS REPORTS AND ANALYSIS

A great deal of work precedes this report as discussed briefly in the introduction. This work adopts the output of the earlier reports in terms of Strategy principles and detailed Hill development estimates.

A summary of the relevant reports is set out below.

4.1 MACROPLAN DEVELOPMENT FORECASTS

Development forecasts have been developed for Council for the range of land uses in the study area. These earlier estimates and forecasts underpin most of the development assumptions used in this analysis.

4.2 GTA PREVIOUS TRAFFIC AND PARKING ASSESSMENT

The Council strategy for the development of the Doncaster Hill is for a 'sustainable and smart' urban village. The development potential encompasses medium rise (up to 10 storeys) high-density residential with a mix of retail and commercial floor space at lower levels.

Surrounding an existing regional shopping centre and suburban bus interchange, the location is well situated to encourage reduced car dependency to assist in achieving the aim of sustainability.

With the precinct straddling major arterial roads attention should be directed towards reducing the barriers that are currently present to pedestrians. This should help to develop a high level of connectivity along pedestrian routes and accessibility for pedestrians to the retail, commercial and public transport opportunities in the area.

4.2.1 Car Parking Strategy

A key ingredient to the long term sustainability of an urban village is the minimization of greenhouse gases. A reduction in the dependency and use of cars will assist this aim. This can be achieved through strategies to encourage the use of non-car modes of travel and discourage car ownership.

Through the co-location of high-density residential living with significant retail and commercial areas as well as an established public transport network in the centre of the precinct, Doncaster Hill has the locational ingredients to encourage walk, cycle and public transport trips instead of car trips.

Developing a better pedestrian network and improved amenity will also assist in encouraging non-car modes of transport.

The discouragement of car ownership is also important and can be achieved by reminding owners of the real cost of owning a car. This can be achieved by providing only a basic level of car parking on-site (e.g. one space per apartment) with additional parking only available at nearby parking stations on a monthly or annual paid basis.

This is a long term strategy with residents expected to initially be resistant to giving up the most convenient modes of transport for all but very short trips. In the long term if a reduction in car ownership is achieved, parking stations can be relatively easily redeveloped for alternative uses.

Providing only a basic level of parking accessibility for the retail and commercial uses can also be sustained due to the high density of residents in the immediate vicinity who may be the primary customers. The use of parking stations also allows for the efficient sharing of car parking spaces with office parking spaces being available in the evenings when restaurant demands peak, and on weekends when retail demands peak.

Parking stations should be located within 100 to 200 of the signalised intersections which provide entry into the precincts.

The magnitude of the Development at Doncaster Hill should enable car parking at average rather than 85^{th} percentile rates. This should then permit development at lower rates and act as a stimulant to development as well as reducing vehicle trips and encouraging the use of other modes of transport.

The phenomena of pooled parking recognises that unit parking rates tend to decrease as the size of a development increases. This observation applies equally to single-use developments with a large number of establishments and also for multi-use developments. The reason for this is that the random fluctuations in parking demand associated with one use or establishment will tend to cancel those associated with other uses or establishments, and this cancellation effect becomes more pronounced as the number of uses or establishments increases.

Communal car parking in strategically located car parking stations (particularly where car parking can be shared by different uses at different times of the day) should be integrated as a feature in the development of Doncaster Hill. One particular strategy could be to allow only 1 space / unit on site (2 for penthouses) plus at-grade visitor parking, with any further parking to be provided in communal car parking stations in the immediate vicinity and redeveloped for other uses if reduced car ownership levels can be achieved in the future.

Car parking location and distribution should compliment the access strategy and the embodied principles behind the access strategy (i.e. car parking located off access roads / lanes constructed off the arterial roads).

4.2.2 Traffic Management Strategy

Doncaster Road is presently a six-lane divided arterial road. The median is constrained at most intersections, reduced to a nominal width due to the inclusion of right turn lanes. This cross-section presents a hostile environment to pedestrians discouraging walk trips that involve crossing Doncaster Road as well as public transport trips that inevitably involve crossing the road in at least one direction.

An increase in the number of safe pedestrian crossing points as well as wider medians for staging of crossings is an important step towards improving the amenity of Doncaster Road for pedestrians. Wide building setbacks as well as a minimisation of driveways will also enhance pedestrian amenity. Accordingly car park access points should primarily be located along side or rear streets.

Signalised pedestrian crossings will provide safe and logical access points to local zones for local retail and commercial facilities as well as bus stops. Through the signalisation of key intersections pedestrian crossings can be incorporated into a treatment that also provides access for vehicles into the side streets that lead to the various parking facilities.

4.2.3 Future Road Network

In order to minimise traffic accessing Doncaster Hill from Doncaster Road, links into the precincts in each quadrant should be available from the adjacent north-south arterial roads. I.e. Precinct 2 should be accessible from Tram Road, Precincts 3 – 6 from Williamsons Road and Precinct 7 from Elgar Road.

This may necessitate new signalised intersections on both Tram and Elgar Road in the medium to long term. Precincts 3, 5 and 6 will need to be connected to a signalised intersection on Williamsons Road. These links will also be necessary to manage the performance of the intersection of Doncaster Road/Williamsons Road/Tram Road.

Additional signalised intersections are expected to be required on Doncaster Road to provide a reasonable level of accessibility for pedestrians and vehicles. The spacings of these intersections may be less than 300m to match demand.

Cross-roads should be created wherever possible to maximise the opportunity for turning movements. Indicative locations for signalised cross-roads are Bayley Grove, Council Street and the existing cross-road of Beaconsfield Street/Rose St. These roads will also assist in maximising the sharing of parking facilities with motorists able to more easily move between precincts.

The minor approaches of the signalised intersections on Doncaster Road will typically require a four-lane cross-section. Left and right turn lanes will be required to cater for turning movements, while the wide cross-section will accommodate some on-street visitor parking during off-peak traffic periods.

The median along Doncaster Road is likely to be retained due to the lack of available width for widening. Three through lanes in each direction are expected to be required east of Rose Street in the long term to cater for the projected traffic volumes. The third lane could accommodate on-street parking during the day outside of peak periods. In the short term the third lane should be restricted to cyclists, where possible, until a continuous off-road shared path can be provided.

4.2.4 Bus, Pedestrian and Cyclist Facilities

An aim of the Strategy is to satisfy as many person trips as possible by walk and cycle modes. This will require development of a unified vision or masterplan of pedestrian and cycle networks with associated guidelines to shape future development proposals to be consistent with a long term plan.

A high number of signalised crossing points along Doncaster Road and wide medians should be provided to provide a high level of amenity for pedestrians to encourage non-car trips. This will also help to reduce the barrier effect that arterial roads present to pedestrians and cyclists.

Signalised crossing points will also assist cyclists travelling locally.

Shared footways along both sides of Doncaster Road should also be developed with a generous offset from the edge of traffic lanes. East-west pedestrian links should also be provided from both precinct 6 and 3 to the bus interchange in Precinct 4, providing routes that are direct and minimise exposure to Doncaster Road.

Bus stops should be located close to signalised crossing points along Doncaster Road, with the road network designed to be permeable by a local bus route should demand for such a facility eventuate. The use of signalised cross-roads will assist this. Bus priority at signals should also be considered.

The intersection of Doncaster Road/Tram Road/Williamsons Road is a significant barrier to pedestrians due to the high number of traffic lanes on each approach. The incorporation of grade separated pedestrian crossings on the north and east approaches is one option for consideration. The crossings should be located to best match pedestrian desire lines into Westfield Shoppingtown and the bus interchange.

5 STUDY METHODOLOGY

5.1 GENERAL

The following tasks were undertaken as part of the modelling work, and form the basis for the strategy outcomes and recommendations.

Build and calibrate a Base Case representing no expansion at Shoppingtown or Doncaster Hill. This integrates regional land use and road network changes and their impacts with those occurring at the local (Doncaster Hill) level by using the VicRoads strategic model for major changes such as the Eastern Freeway extension.

Build a Development Case representing expansion at Shoppingtown and Doncaster Hill.

Overlay the Base Case and Development Case demands in the Paramics model and test road network scenarios to accommodate future traffic flows. The results include impacts on arterial roads and the local road network.

5.2 DEFINE SCENARIOS

This task forms the detailed input to the demand component of the model (traffic generation rates, land areas and car parking) as opposed to the physical model and has been agreed to by Council and Westfield:

- Existing year 2001 and future years 2011 and 2021;
- Model periods am peak (8:00 to 9:00), pm peak (5:00 to 6:00) and retail peak on the weekend (eg 12 noon to 1pm);
- Shoppingtown expansion description for a low and high case (floor areas, carparks, road access points and public transport facilities) as provided by Westfield;
- Doncaster Hill growth description for a low and high case (residential/commercial/other land use areas, growth rates by year, development modules (zones), network constraints and opportunities, future public transport objectives) as provided by Council;

5.3 FORECASTING – EXCEL SPREADSHEET

This task takes the agreed scenarios and uses a spreadsheet to convert development areas into traffic generation estimates in an origin-destination matrix form and includes the following information:

- Land use change;
- Population and employment change;
- Changes to travel patterns reflected in mode share changes;
- Public transport generation;
- Traffic generation;

- Estimated Base growth, Shoppingtown growth (at separate carpark and access level) and Doncaster Hill growth (at separate zone or module level) trip tables (OD matrices);
- VicRoads strategic model output (TRIPS) for future year scenarios incorporating impacts of regional land use and road network changes;

5.4 MODEL DEVELOPMENT – PARAMICS MICROSIMULATION SOFTWARE

The Paramics model is built first for the Base Case in 2001 for each of the time periods using information provided by Council, Westfield, GTA and survey results from TTS.

Data Collection for Base Case – Year 2001

- Aerial photograph (electronic) for lanes, intersection layouts and road details for both arterial roads and local roads;
- Digital road centerline map;
- Signal operations data from VicRoads for phasing, timing and linking;
- Field observations for vehicle queuing by GTA;
- Sample travel time surveys by GTA;
- Turning movement surveys from TTS:
- Origin-destination (OD) surveys from TTS;
- Traffic composition and link flows from existing GTA and Council surveys;
- Shoppingtown traffic generation rates and distributions from GTA data;

Network Build for Base Case – Year 2001

- Roads, intersections, signals, zones (corresponding to future development parcels);

The output of this task is an agreed physical representation of the model (roads, streets, intersections, access points, lanes, zones, etc).

5.5 MODEL VALIDATION

Prior to Development Case future year modelling, the existing 2001 year is calibrated and validated to accurately represent existing conditions. A number of parameters are used to perform this task including:

- Travel times;
- Link traffic flows;
- Screenline traffic flows;
- Queue lengths;
- Intersection turning movements.

The calibrated model represents an acceptable match between modeled results and actual conditions and has been done at both the screenline (broad) level and intersection (detailed) level. The model is then used to test development scenarios in the future years of 2011 and 2021.

5.6 MODEL APPLICATION

This task takes the calibrated model and adds the origin-destination traffic demands for the Development Cases for each of the future years and time periods. The following steps are completed:

- Run model for each scenario and collect results in terms of network operating conditions that include link volumes, turning movement volumes, vehicle queues (maximum, average or user defined) and vehicle delays;
- Identify potential problems and constraints;
- Determine required road and intersection works to mitigate impacts of development at the individual site or intersection level as required (ie length of turn lanes required, additional through lanes required, changes to signal phasing or linking);
- Run SIDRA models at a number of key intersections to cross-check the model results and provide additional measures of network performance;

This task runs the model a number of times as required to determine which road and intersection works mitigate most effectively against the impacts of development. This task includes impacts at both the arterial road and local road levels.

6 TRAVEL DEMAND MODEL

6.1 DESCRIPTION

The preparation of traffic volumes for the year 2001 and future years 2011 and 2021 comprises two parts.

The first part is through traffic whose origins and destinations are not influenced by development at Doncaster Hill, but by changes in the wider area road network. These are called external to external (E-E) trips.

The second part is traffic with origins or destinations within Doncaster Hill including those trips that occur within the study area. These are called external to internal (E-I and I-E) trips and vice versa and internal to internal (I-I) trips.

6.2 THROUGH TRAFFIC

The impacts of wider area road network and demographic changes are included in the assessment by incorporating the results of VicRoads strategic network model (TRIPS) in the Paramics model. This is of particular relevance for through traffic.

VicRoads provided TRIPS model output for the existing road network and 2001 traffic volumes on the arterial road in the study area. They also provided forecasts for the future years of 2011 and 2021 with the anticipated road networks existing in each of those future years.

The VicRoads information on traffic volumes was not used explicitly in the Paramics model because the most accurate data on existing 2001 flows was obtained through the surveys. The VicRoads data for years 2011 and 2021 was compared against the 2001 VicRoads volumes to look at regional changes in the traffic volumes through the study area. These changes were then incorporated into the Paramics estimates for future years.

The information provided by VicRoads is included in Appendix A.

6.3 DONCASTER HILL TRAFFIC

Council provided estimates of growth in individual precincts and development parcels (zones) within the area based on earlier forecasts by MacroPlan and ongoing refinement through development applications. The actual land uses and areas have been sourced from Council for 2001. The Macroplan forecasts form the basis of the future years 2011 and 2021 with linear growth rates assumed.

6.4 WESTFIELD TRAFFIC

Westfield provided forecasts on expected growth and expansion plans for Shoppingtown following the expansion. This information relates to cars. Bus estimates are developed from first principles by coding in all individual bus routes and their existing frequencies for the year 2001 and growthing patronage levels. The expanded Westfield is expected to be in operation by 2006 with linear growth beyond that time in line with population growth at approximately 1% pa for the City of Manningham.

6.5 TOTAL TRAFFIC DEMANDS

The steps involved in developing the demand model are as follows:

- Individual land use areas and types are input to the zones sheet;
- Mode split is input to the modes sheet;
- Traffic generation rates and in/out splits are input to the rates sheet;
- Actual traffic volumes for through (external zone to external zone) traffic are input after reviewing the VicRoads model output;
- Total traffic generated by each zone is calculated in the traffic sheet;
- Distribution of traffic is input for each precinct in the OD by Precinct sheet;
- Distribution is then split to individual zones in the Dist'n sheet;
- Origin-destination vehicle trips are calculated in the Mx sheet.

The output from the model is contained in the respective appendices for each of the years 2001, 2011 and 2021 in the sections that follow.

Further information relating to the year 2001 traffic volumes is contained in Section 9. Traffic flows and results for 2011 and 2021 are described in Section 10.

6.6 FORECAST DEVELOPMENT LEVELS AND GROWTH RATES

The existing and future year development levels by land use and precinct are summarised below in Table 6.1.

TABLE 6.1: EXISTING AND FUTURE DEVELOPMENT BY LAND USE AND PRECINCT

Year	2001				2011				2021			
Land Use	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking
Precinct 1	0	0	3089	50	63	0	2774	50	63	0	2774	50
Precinct 2	21	2343	17041	0	1126	3995	27220	0	1126	3995	27220	0
Precinct 3	29	229	0	0	653	1806	2516	0	653	1806	2516	0
Precinct 4 (Westfield SC)	16	53000	793	3673	67	102900	872	5570	67	108045	960	6127
Precinct 5	82	0	2607	0	529	3005	7095	0	529	3005	7095	0
Precinct 6	82	2112	11855	0	428	1954	4967	0	855	3908	9933	0
Precinct 7	13	2886	9910	0	788	4655	14964	0	788	4655	14964	0
Total	243	60570	45295	3723	3654	118316	60408	5620	4081	125415	65462	6177

This information is further aggregated into Westfield and all other precincts at Doncaster Hill in Table 6.2.

TABLE 6.2: EXISTING AND FUTURE DEVELOPMENT BY LAND USE FOR DONCASTER HILL AND WESTFIELD

Year	2001				2011				2021			
Land Use	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking
Doncaster Hill	227	7570	44502	50	3587	15416	59535	50	4014	17370	64502	50
Westfield SC	16	53000	793	3673	67	102900	872	5570	67	108045	960	6127
Total	243	60570	45295	3723	3654	118316	60408	5620	4081	125415	65462	6177

The increases in development by land use for each of the three time periods is shown in Table 6.3.

TABLE 6.3: CHANGES IN LAND USE BETWEEN 2001, 2011 AND 2021 FOR DONCASTER HILL AND WESTFIELD

Year	2001-2011				2011-2021				2001-2021			
Land Use	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking	Resi Units (no of)	Retail	Comm/ Office	Parking
Doncaster Hill	3360	7846	15033	0	427	1954	4967	0	3787	9800	20000	0
Westfield SC	51	49900	79	1897	0	5145	87	557	51	55045	167	2454
Total	3411	57746	15113	1897	427	7099	5054	557	3838	64845	20167	2454

The tables above correspond to the growth profile shown in Figure 6.1, where the gross floor areas in the years 2011 and 2021 are indexed against 2001 as a base year[2].

[2] Note that a nominal figure of 150sqm/residential dwelling has been assumed for the purposes of comparison

FIGURE 6.1: FUTURE DEVELOPMENT GROWTH PROFILE (SQM) BY YEAR FOR DONCASTER HILL AND WESTFIELD

The development areas in Tables 6.1 to 6.3 and the growth profile shown in Figure 6.1 together make up the travel demands that result in future traffic volumes when through traffic changes and growth are added. These results are discussed in Sections 10 and 11 for the years 2011 and 2021 respectively.

7 TRAFFIC SURVEYS

7.1 PREVIOUS DATA

A range of previous traffic surveys have been undertaken and form background and validating material for the analysis. This includes:

- Traffic surveys into and out of Shoppingtown;
- Turning movement surveys along the arterial roads in the study area;
- Traffic volumes on the residential streets in the study area.

In addition to this, surveys were undertaken for this study as outlined in the sections below.

7.2 ORIGIN-DESTINATION SURVEYS

TTS Surveys undertook an origin-destination survey within the study area at 16 stations (each station has two directions of travel) recording vehicles with number plates ending in 0 or 1. This corresponds to a sample rate of 20%. The surveys were undertaken during the hours of 8am to 9am and 5pm to 6pm on Thursday 6th September 2001.

These results are attached as Appendix B.

7.3 TURNING MOVEMENT COUNTS

TTS Surveys undertook turning movement surveys at the following locations during the hours of 8am to 9am and 5pm to 6pm on Wednesday 5th September 2001:

- Elgar Rd / Wilsons Rd;
- Tram Rd /Clay Dve;
- Williamsons Rd / George St;
- Williamsons Rd / Westfield Car Park Entrance;
- Williamsons Rd / Westfield Car Park Entrance / Hotel Entrance;
- Doncaster Rd / Elgar Rd;
- Williamson Rd / Doncaster Rd / Tram Rd;
- Doncaster Rd / Frederick St / Westfield Car Park Entrance; and
- Doncaster Rd / Council St.

These results are attached as Appendix B.

7.4 AUTOMATIC TUBE COUNTERS

TTS Surveys undertook automatic tube counter surveys at the following locations for the seven day period between Monday 3rd September and Sunday 9th September 2001:

- Bayley Gv;
- Carnarvon St;
- Frank St;
- Goodson St;
- Lawford St;
- Meader St;
- Merlin St; and
- Tower St.

These results are summarised in Appendix B for both directions of travel. Results are also available for flows by direction if required

7.5 OVERALL

These surveys were then combined and cross-checked to form the basis of the volumes used for the AM and PM peak hour calibration volumes in the Paramics model.

The AM peak hour existing turning volumes are summarised in Figure 7.1 for the main intersections. The PM peak hour volumes are shown in Figure 7.2.

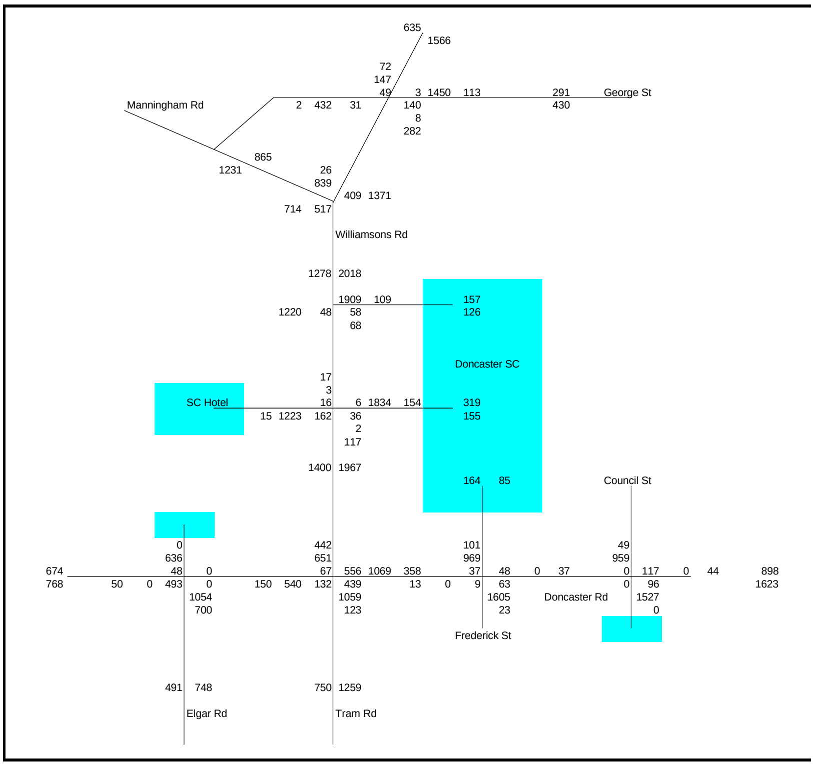


FIGURE 7.1: AM (8-9) PEAK HOUR EXISTING TRAFFIC VOLUMES

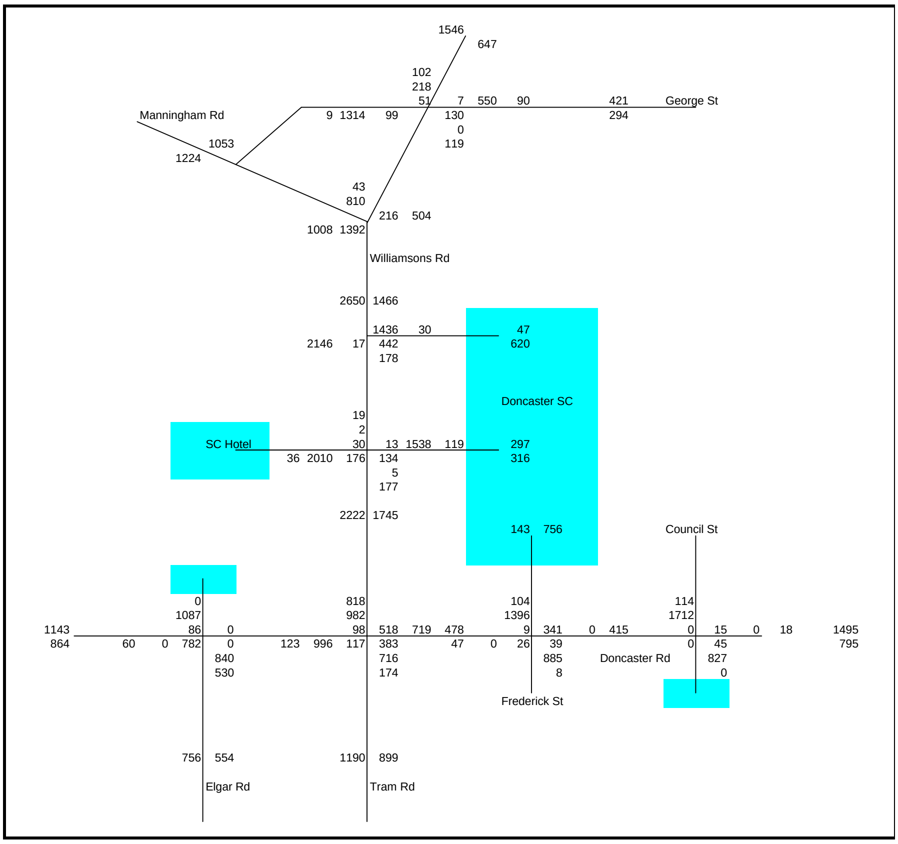


FIGURE 7.2: PM (5-6) PEAK HOUR EXISTING TRAFFIC VOLUMES

8 PARAMICS MICROSIMULATION MODEL

8.1 HISTORY AND APPLICATION

Paramics is a microscopic traffic simulation tool developed by Quadstone in Edinburgh, Scotland and used in a number of countries around the world including universities, traffic authorities and consultants in Australia.

It has been used in this study for its ability to model many elements in a complex transport network including closely spaced and linked intersections, along with its powerful visualisation tool which allows users to view the operation of the network in real time.

8.2 BENEFITS OF MICROSIMULATION

Microscopic traffic simulation (MicroSimulation) is the reproduction of events to imitate the movement of individual vehicles along a road network. It does not mean micro in the sense of individual junctions or very small networks. It therefore fits between a traditional four-step strategic model and a detailed intersection model such as SIDRA.

The traffic demands on a network are dynamic with traffic flows random and heterogenous. Traditional models do not account for the grouping of traffic behind slow vehicles, patterns of lane usage and the impacts of backward travelling shock waves.

MicroSimulation can be used in areas of high congestion levels to accurately model and visualise the movement and behaviour of individual vehicles. The interactions across a whole network can be modelled to include the impacts of queue lengths, driver behaviour and successive traffic signals.

The traffic demands are coded into an origin-destination matrix and loaded incrementally to a road network that has been defined in terms of link characteristics and node junctions. The routing of vehicles through the network is based on a generalised cost relationship that takes into account factors such as vehicle operating cost, travel time and distance.

The traffic impacts are therefore dynamic with the viewer able to watch queue build-ups and dispersions and compare the impacts or changing road network and intersection layouts.

The visual nature of the simulation in real time enables the user to develop a much clearer understanding of the traffic issues and problems than is possible with other modelling approaches.

8.3 BUILDING THE PARAMICS MODEL

8.3.1 Basic Elements

The model comprises the following main elements:

- A template road geometry file created from the electronic base of the Doncaster Area;
- A road network with nodes, links, zones, detailed road cross-section details, intersection layouts, signal phasing and linking, turn bans, parking, clearways and the like;
- A demand matrix between origin-destination pairs for heavy vehicle (HV) and light vehicle (LV) trips and fixed routes and timetables for bus movements;

8.3.2 Detailed Build Process

- Collate car and truck volume data, intersection operating conditions and forecast traffic flows on main roads as background material;
- Develop demand matrices for the AM and PM peak periods in the year 2001 for trips between external zones;
- Develop demand matrices for the AM and PM peak periods in the years 2011 and 2021 for trips between internal and external zones, and trips between internal zones;
- Build a physical model of the road and rail network;
- Run the existing conditions model using the 2001 demand matrices and adjust signal timings, phasing and other parameters to match observed values such as turning movement counts. Further discussion on the calibration and validation step is discussed in the sections that follow;
- Adopt strategic network modelling forecasts from the VicRoads TRIPS model for major road network changes such as the extension of the Eastern Freeway;
- Run different scenarios for rail options and road works; and
- Report results.

8.4 MODEL STRUCTURE

The study area is divided into a number of internal and external zones for the purposes of creating an O-D (origin-destination) demand matrix. All vehicle trips are then generated to and from these zones.

The model assigns trips to the network by choosing the most attractive (lowest "cost") route amongst a number of alternatives by considering travel time, travel distance and vehicle operating cost.

8.5 MODEL INPUTS

A selection of files that make up the input to the model in terms of vehicle types, link types and road link details are included in Appendix C.

The information includes the following:

- Vehicle type file;
- Link type categories file;
- Profiles file showing percentage loading of the demand matrices by time period; and
- Year 2001 seed value comparison run.

The indicative nature of the zones within the model is shown in Figure 8.1.

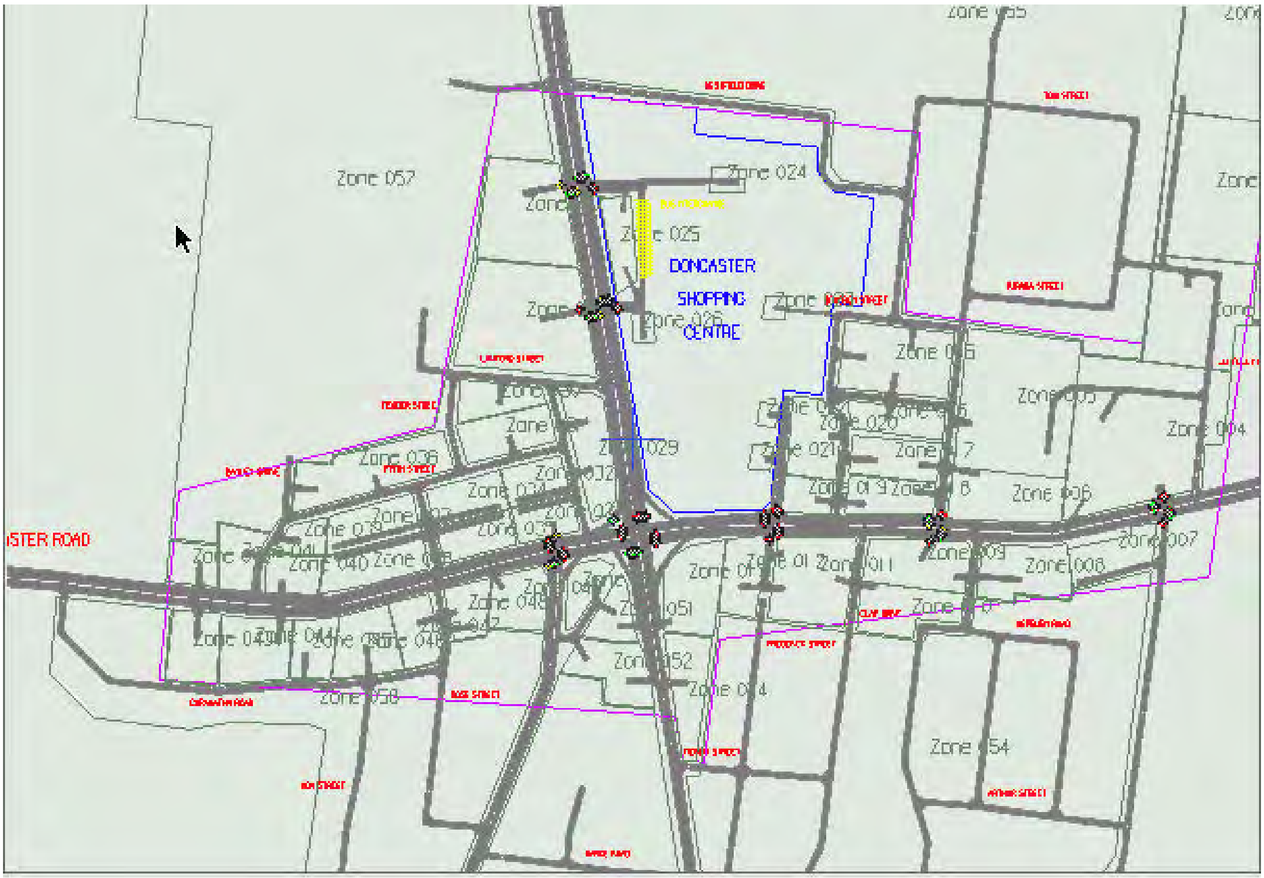


FIGURE 8.1: PARAMICS MODEL ZONE STRUCTURE

The actual zones and precincts are shown in Drawing No. A1530-01 for the existing conditions (2001) and Drawing No. A1530-02 for the future years (2011 and 2021).

9 2001 EXISTING CONDITIONS

9.1 DESCRIPTION

The development of a robust and accurate existing conditions (2001) case is important so that future year model forecasts can be interpreted correctly and used appropriately. The existing conditions model is said to be calibrated when its results are an acceptable match against existing measured conditions.

The calibrated and validated model is then ready for use with new demand matrices and modified networks for the future year scenarios of 2011 and 2021.

The supporting information for the 2001 demands is included in Appendix D.

9.2 MODEL CALIBRATION FOR PEAK PERIODS

Model calibration needs to occur at a number of levels. In the first instance it should match traffic volumes across the main screenlines for an overall view of traffic volumes in the model. Secondly, it should match traffic volumes on individual links and at intersections. Thirdly, it should match other network operating measures such as vehicle delays and queues.

The methodology adopted for this step is as follows for each of the AM and PM commuter peak periods:

- Assign 2001 demand matrix to the network;
- Collect and analyse the model results;
- Compare the results against collected and observed data;
- Make changes as necessary to items including road layout details, traffic demand matrices and operational items such as signal phasing and linking;
- Validate the calibrated base model against independent data (ie data not used in the calibration process above).

The process adopted for the Saturday peak of 12 noon to 1pm is slightly different to that of the weekdays due to the range of traffic data available. The Doncaster Hill (non-Westfield) traffic is derived by applying a 50% in/50% out directional split to the AM and PM peak figures which are then averaged. This average is then multiplied by the surveyed difference between weekday and Saturday traffic volumes as measured by SCRAM traffic data. The factor used for non-Westfield traffic is 0.9. The Westfield traffic is then added as surveyed in GTA surveys in March 2000. The factor used for Westfield traffic is 2.2.

In other words, non-Westfield traffic is slightly lower on Saturday than during the weekday peaks, but Westfield traffic on Saturday is more then double that of weekday peak periods.

The discussion that follows summarises the results of the model in tabular and graphical form and can be read in conjunction with the existing (surveyed) traffic volumes discussed in Section 7.

9.2.1 Screenline Volumes

The screenlines created for the purposes of calibration are shown in Figure 9.1.

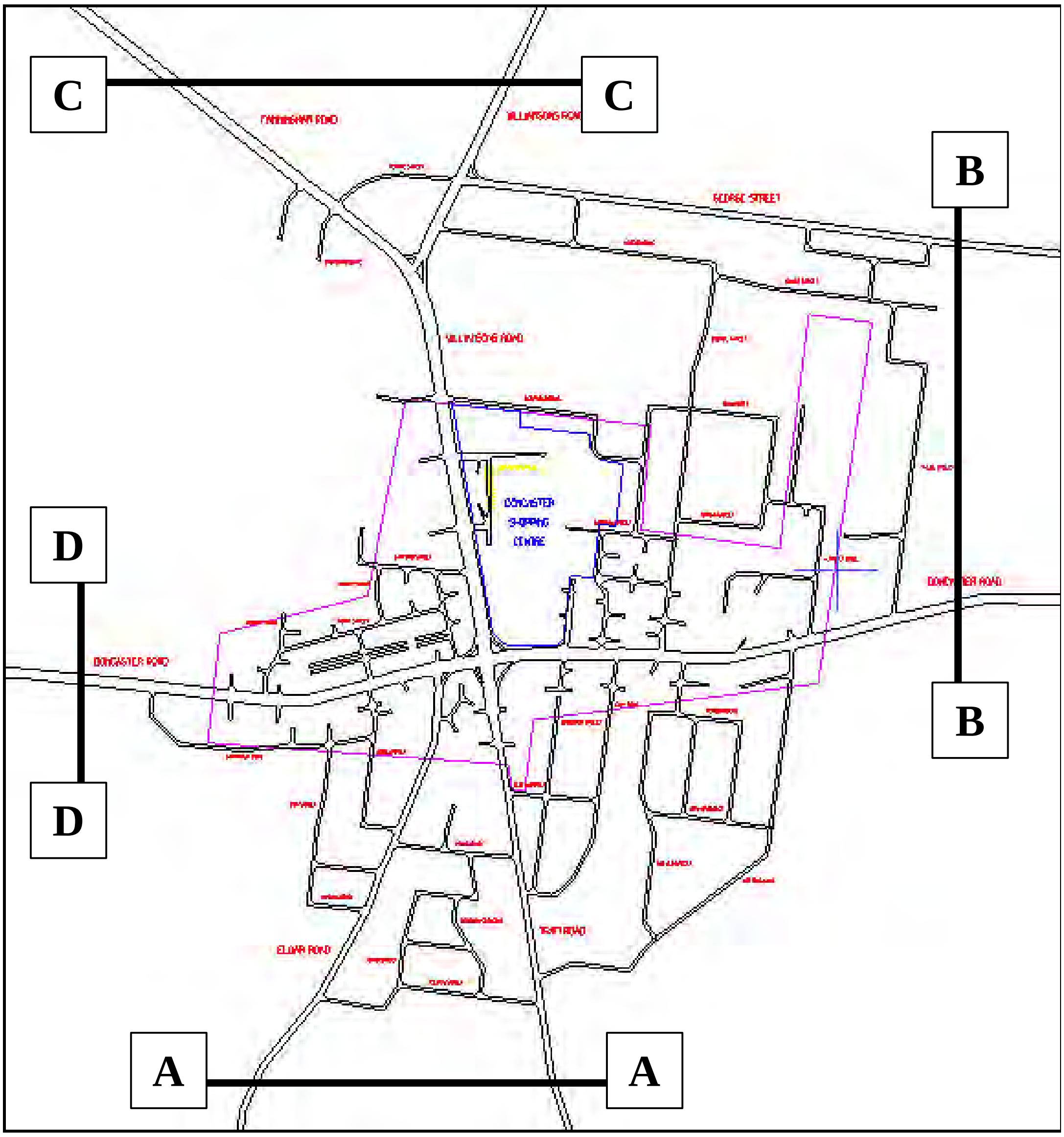


FIGURE 9.1: SCREENLINE LOCATIONS

A comparison of modelled and observed screenline traffic flows is contained in Table 9.1 for the AM peak and Table 9.2 for the PM peak.

TABLE 9.1: 2001 AM PEAK (8-9) SCREENLINE VOLUMES

Screenline	Description	Direction	Observed Flow (vph)	Modelled Flow (vph)	Diff (vph)	Diff (%)
A	Southern end of study area	NB SB	1241 2007	1228 1948	-13 -59	-1% -3%
B	Eastern end of study area	EB WB	1189 2053	1124 2056	-65 3	-5% 0%
C	Northern end of study area	NB SB	1866 2431	1756 2384	-110 -47	-6% -2%
D	Western end of study area	EB WB	674 768	664 778	-10 10	-1% 1%

TABLE 9.2: 2001 PM PEAK (5-6) SCREENLINE VOLUMES

Screenline	Description	Direction	Observed Flow (vph)	Modelled Flow (vph)	Diff (vph)	Diff (%)
A	Southern end of study area	NB SB	1946 1453	2002 1457	56 4	3% 0%
B	Eastern end of study area	EB WB	1975 972	1924 905	-51 -67	-3% -7%
C	Northern end of study area	NB SB	2770 1700	2777 1709	7 9	0% 1%
D	Western end of study area	EB WB	945 768	939 707	-6 -61	-1% -8%

These results show that the AM and PM peak flows at the screenlines correlate closely to the observed (surveyed) flows by direction of travel.

9.2.2 Link Volumes

A comparison of modelled and observed link traffic flows is contained in Table 9.3 for the AM peak and Table 9.4 for the PM peak for a number of the major road links in he study area.

TABLE 9.3: 2001 AM PEAK (8-9) LINK VOLUMES

Link	Road Name	Between	Direction	Observed Flow (vph)	Modelled Flow (vph)	Diff (vph)	Diff (%)
98:97	Elgar Rd	Katrina St & Boyd St	NB	491	451	-40	-8%
97:98	Elgar Rd	Katrina St & Boyd St	SB	748	654	-94	-13%
108:107	Tram Rd	Eastern Fwy & Eildon St	NB	750	777	27	4%
107:108	Tram Rd	Eastern Fwy & Eildon St	SB	1259	1294	35	3%
132:133	Doncaster Rd	Thiele St & Pleasant Av	EB	898	794	-104	-12%
133:132	Doncaster Rd	Thiele St & Pleasant Av	WB	1623	1634	11	1%
7:17	George St	Earl St & Church Rd	EB	291	330	39	13%
17:7	George St	Earl St & Church Rd	WB	430	422	-8	-2%
342:323	Williamsons Rd	Clancys La & George St	NB	635	578	-57	-9%
323:342	Williamsons Rd	Clancys La & George St	SB	1566	1560	-6	0%
21:339	Manningham Rd	Somerville St & Burgundy Dr	N-WB	1231	1178	-53	-4%
339:21	Manningham Rd	Somerville St & Burgundy Dr	S-EB	865	824	-41	-5%
69:332	Doncaster Rd	Pettys La & Carawatha Rd	EB	674	664	-10	-1%
332:69	Doncaster Rd	Pettys La & Carawatha Rd	WB	768	778	10	1%
250:327	Tram Rd	Doncaster Rd & Merlin St	NB	822	864	42	5%
327:250	Tram Rd	Doncaster Rd & Merlin St	SB	1259	1248	-11	-1%
128:129	Doncaster Rd	Council St & Short St	EB	1003	883	-120	-12%
129:128	Doncaster Rd	Council St & Short St	WB	1623	1570	-53	-3%
326:124	Doncaster Rd	Williamsons Rd & Frederick St	EB	1141	1186	45	4%
124:326	Doncaster Rd	Williamsons Rd & Frederick St	WB	1621	1660	39	2%
37:34	Williamsons Rd	SC access & Lawford St	NB	1400	1325	-75	-5%
34:37	Williamsons Rd	SC access & Lawford St	SB	1967	2019	52	3%
31:28	Williamsons Rd	Westfield Dr & SC access	NB	1278	1173	-105	-8%
28:31	Williamsons Rd	Westfield Dr & SC access	SB	2018	2063	45	2%
300:52	Doncaster Rd	Beaconsfield St & Elgar Rd	EB	684	773	89	13%
52:300	Doncaster Rd	Beaconsfield St & Elgar Rd	WB	1104	1084	-20	-2%

TABLE 9.4: 2001 PM PEAK (5-6) LINK VOLUMES

Link	Road Name	Between	Direction	Observed Flow (vph)	Modelled Flow (vph)	Diff (vph)	Diff (%)
98:97	Elgar Rd	Katrina St & Boyd St	NB	756	812	56	7%
97:98	Elgar Rd	Katrina St & Boyd St	SB	554	493	-61	-11%
108:107	Tram Rd	Eastern Fwy & Eildon St	NB	1190	1190	0	0%
107:108	Tram Rd	Eastern Fwy & Eildon St	SB	899	964	65	7%
132:133	Doncaster Rd	Thiele St & Pleasant Av	EB	1554	1516	-38	-2%
133:132	Doncaster Rd	Thiele St & Pleasant Av	WB	678	624	-54	-8%
7:17	George St	Earl St & Church Rd	EB	421	408	-13	-3%
17:7	George St	Earl St & Church Rd	WB	294	281	-13	-4%
342:323	Williamsons Rd	Clancys La & George St	NB	1546	1550	4	0%
323:342	Williamsons Rd	Clancys La & George St	SB	647	670	23	4%
21:339	Manningham Rd	Somerville St & Burgundy Dr	N-WB	1224	1227	3	0%
339:21	Manningham Rd	Somerville St & Burgundy Dr	S-EB	1053	1039	-14	-1%
69:332	Doncaster Rd	Pettys La & Carawatha Rd	EB	945	939	-6	-1%
332:69	Doncaster Rd	Pettys La & Carawatha Rd	WB	768	707	-61	-8%
250:327	Tram Rd	Doncaster Rd & Merlin St	NB	1236	1227	-9	-1%
327:250	Tram Rd	Doncaster Rd & Merlin St	SB	991	1059	68	7%
128:129	Doncaster Rd	Council St & Short St	EB	1730	1543	-187	-11%
129:128	Doncaster Rd	Council St & Short St	WB	872	799	-73	-8%
326:124	Doncaster Rd	Williamsons Rd & Frederick St	EB	1543	1500	-43	-3%
124:326	Doncaster Rd	Williamsons Rd & Frederick St	WB	1315	1384	69	5%
37:34	Williamsons Rd	SC access & Lawford St	NB	2222	2395	173	8%
34:37	Williamsons Rd	SC access & Lawford St	SB	1745	1748	3	0%
31:28	Williamsons Rd	Westfield Dr & SC access	NB	2650	2741	91	3%
28:31	Williamsons Rd	Westfield Dr & SC access	SB	1466	1431	-35	-2%
300:52	Doncaster Rd	Beaconsfield St & Elgar Rd	EB	1173	1140	-33	-3%
52:300	Doncaster Rd	Beaconsfield St & Elgar Rd	WB	900	915	15	2%

These results show the model closely reflects peak hour link flows by direction on the major roads within the study area for the AM and PM commuter peak periods.

Graphs showing the modelled versus observed (surveyed) flows for the same major road links are shown in Figure 9.2 for the AM peak and Figure 9.3 for the PM peak.

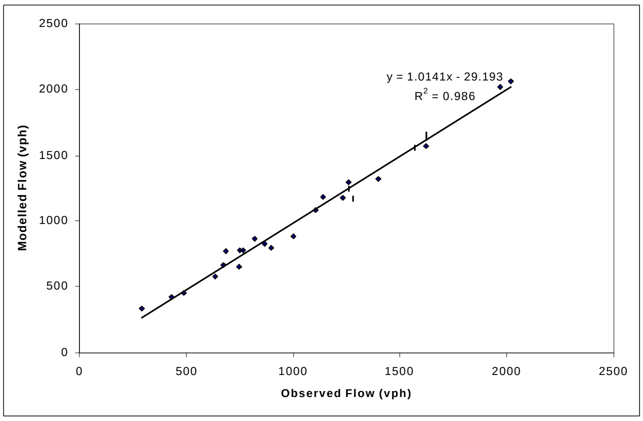


FIGURE 9.2: AM PEAK (8-9) MAJOR LINK MODELLED VS OBSERVED FLOWS

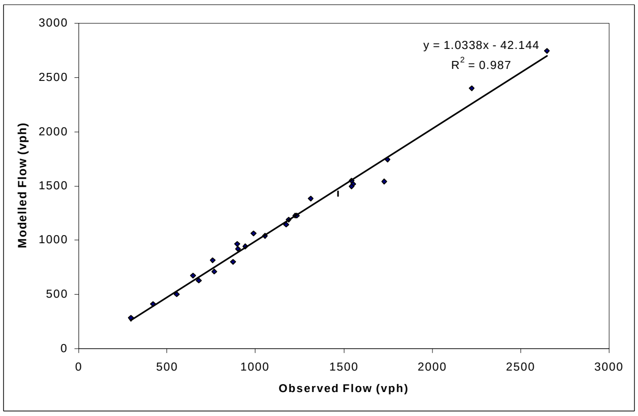


FIGURE 9.3: PM PEAK (5-6) MAJOR LINK MODELLED VS OBSERVED FLOWS

These results show that the major link modelled flows correlate closely to the observed (surveyed) flows for the AM and PM peak commuter periods.

9.2.3 Intersection Turning Movements

Turning movements at intersections were compared for consistency between the modelled and observed figures. The results for the AM peak hour calibrated model turning volumes at the main intersections are shown in Figure 9.4 noting that these should be compared against Figure 7.1. The corresponding results for the PM peak are shown in Figure 9.5 which should be compared against Figure 7.2.

The Saturday results are shown in Figure 9.6.

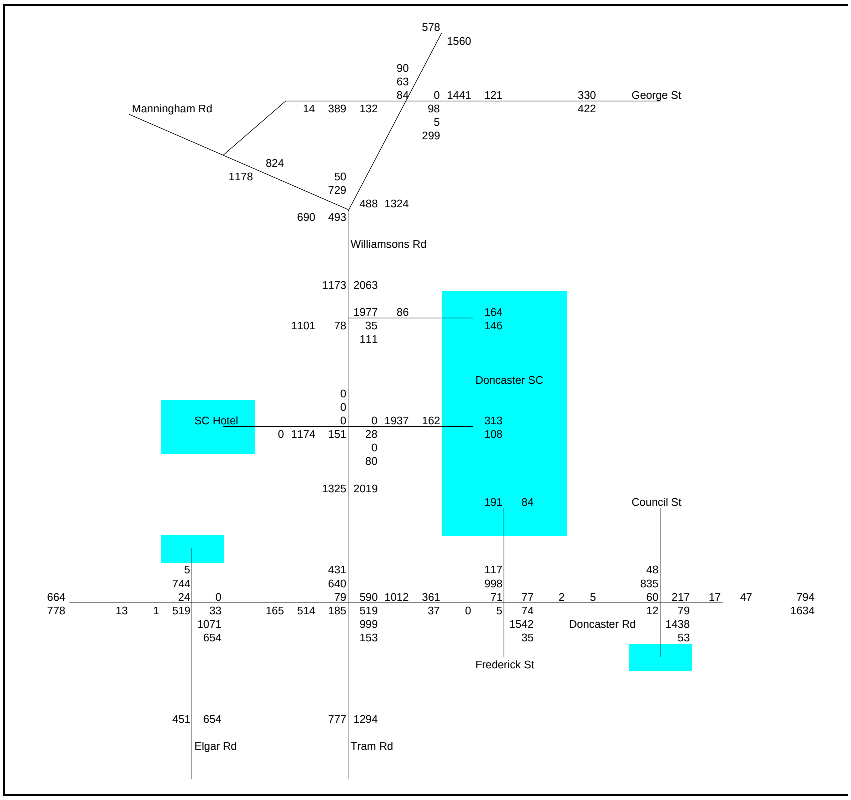


FIGURE 9.4: AM PEAK (8-9) CALIBRATED MODELLED 2001 TURNING VOLUMES AT MAJOR INTERSECTIONS

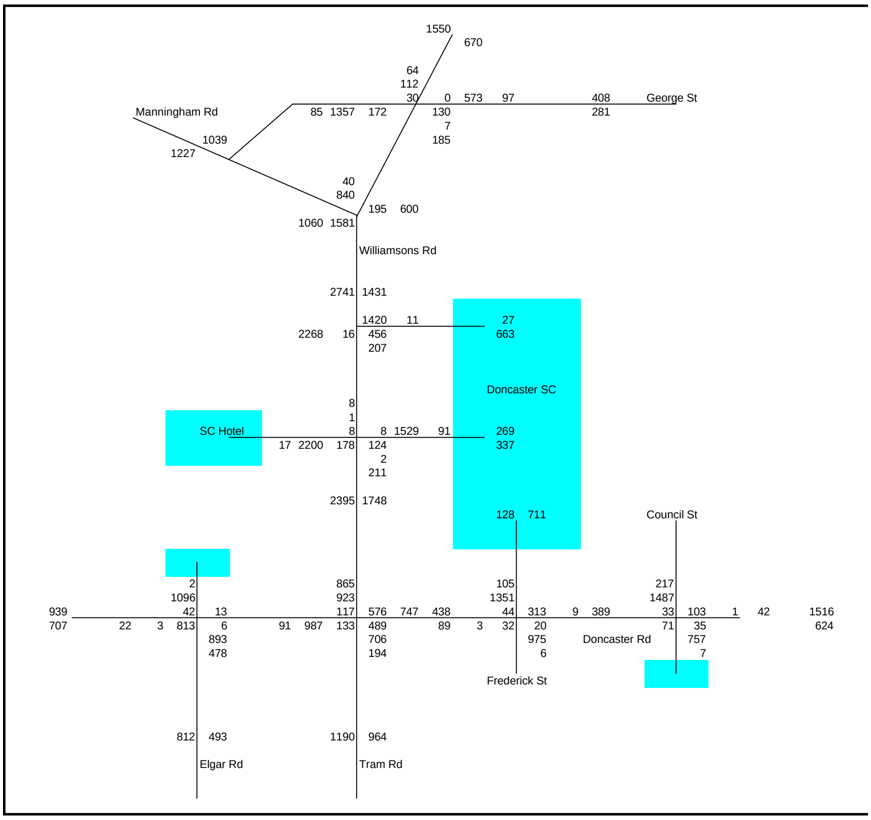


FIGURE 9.5: PM PEAK (5-6) CALIBRATED MODELLED 2001 TURNING VOLUMES AT MAJOR INTERSECTIONS

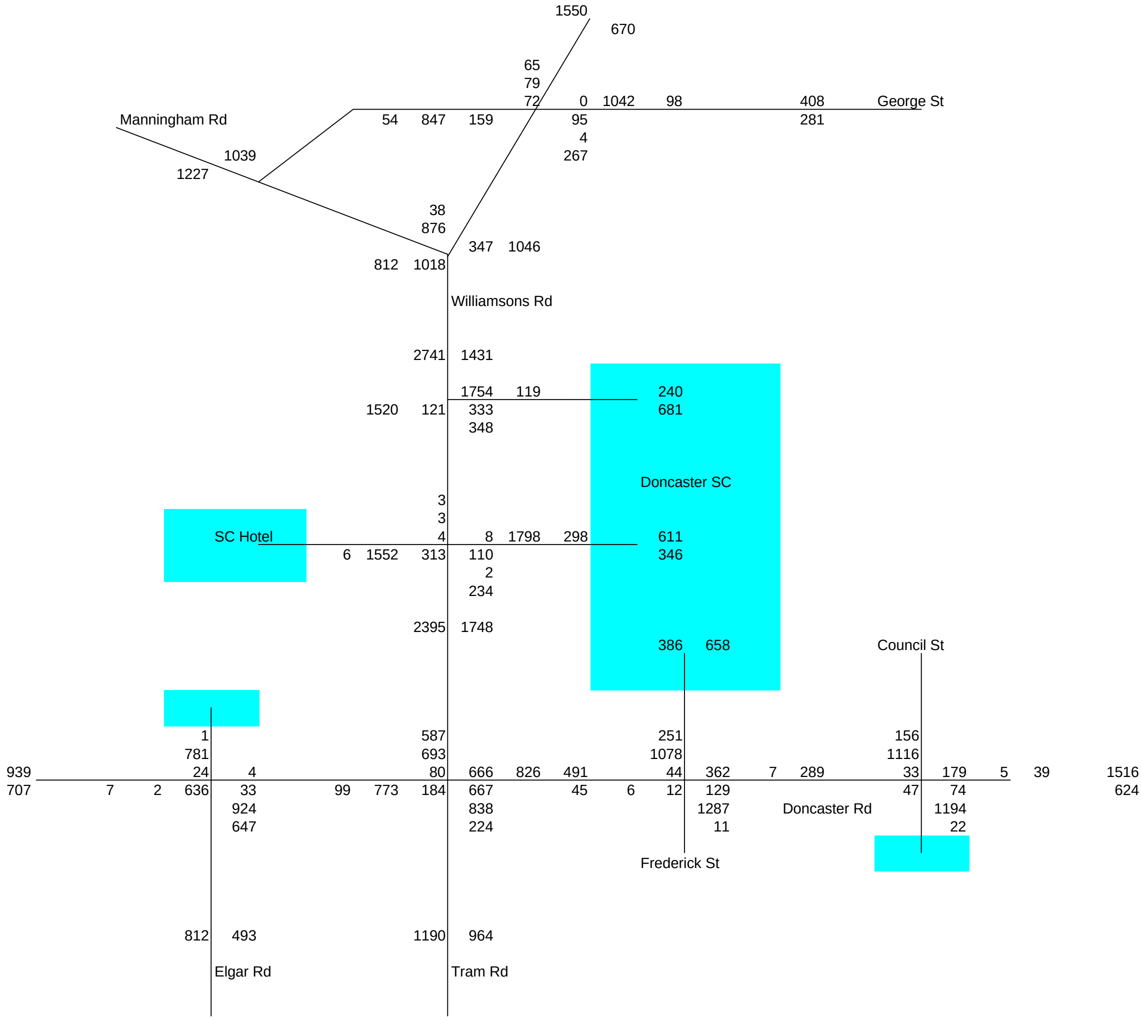


FIGURE 9.6: SATURDAY PEAK (12-1) CALIBRATED MODELLED 2001 TURNING VOLUMES AT MAJOR INTERSECTIONS

The turning volumes in the figures above can be compared to the observed (surveyed) volumes which show a close correlation during the AM and PM peak commuter periods. The Saturday volumes are a mixture of surveyed volumes and factored weekday volumes based on SCRAM data.

9.2.4 Intersection Queues and Delays

The assessment of vehicle queues and delays is undertaken by observing the simulation in real time over the course of the AM and PM peak design hours. The results correlate closely to the observed queues which form on-site.

An example of the maximum modelled vehicle queues in the AM peak is shown in Figure 9.7. The maximum queues for the PM peak are shown in Figure 9.8 with the maximum Saturday queues shown in Figure 9.9.

Note that the results in these figures are the longest queues forming on each approach at all intersections over the full one hour simulation period. In other words they are not the maximum queues forming at any one point in time but the worst case over the full hour.

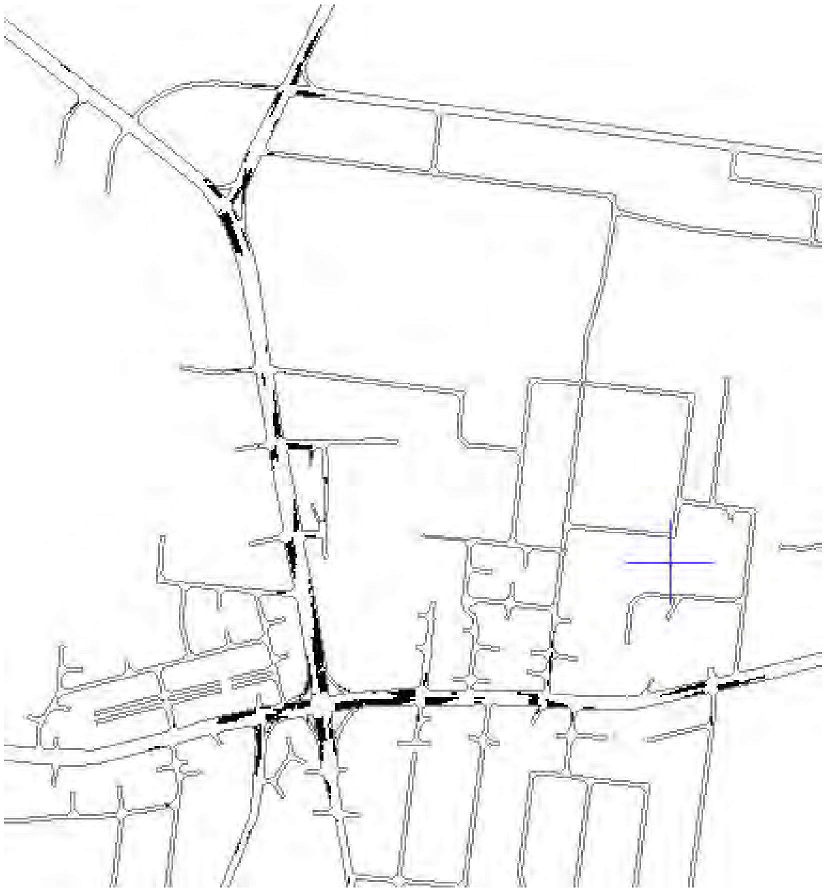


FIGURE 9.7: AM PEAK (8-9) 2001 MAXIMUM VEHICLE QUEUES

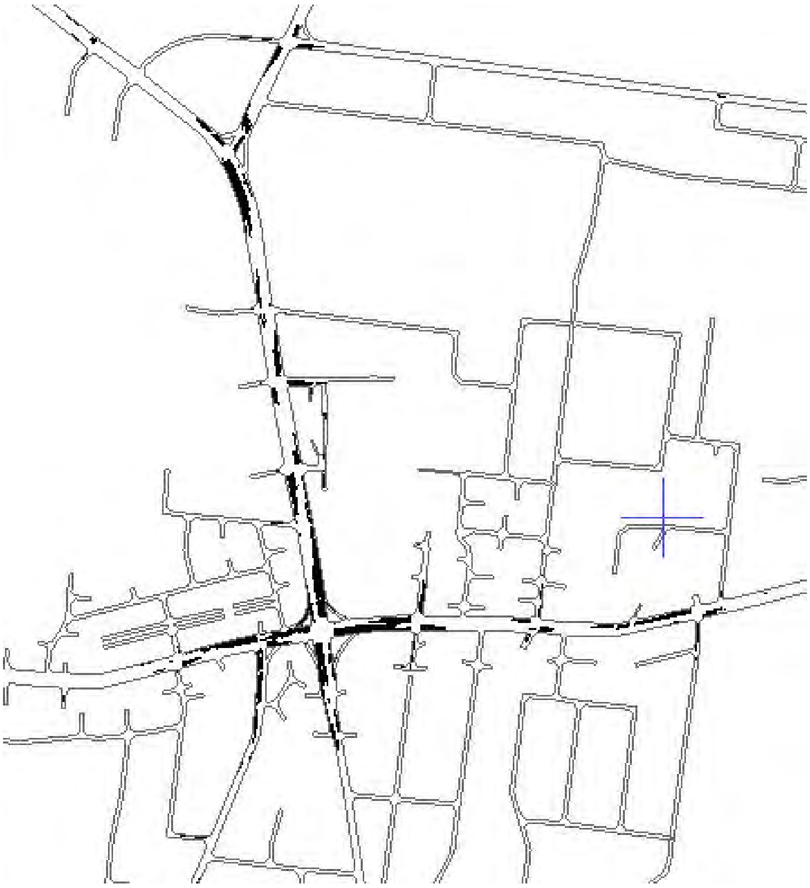


FIGURE 9.8: PM PEAK (5-6) 2001 MAXIMUM VEHICLE QUEUES

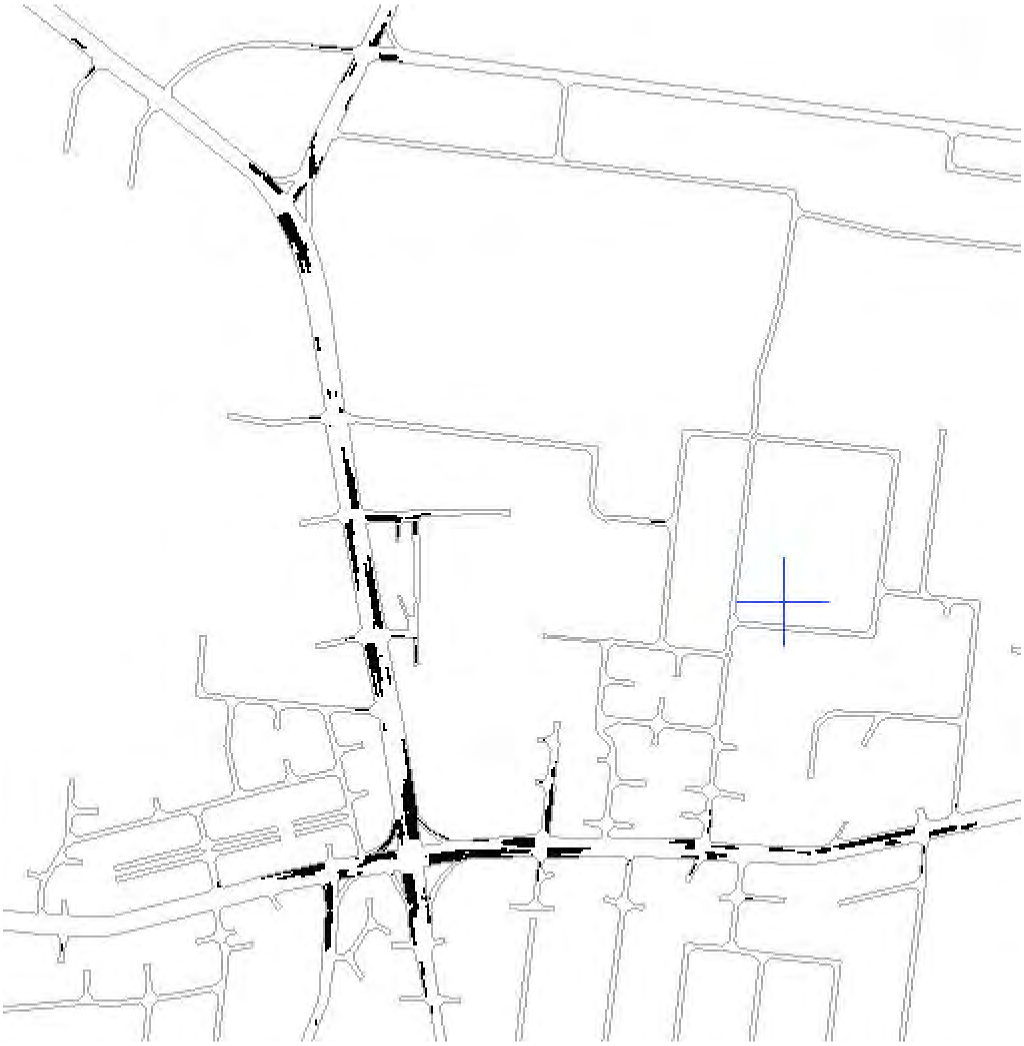


FIGURE 9.9: SATURDAY PEAK (12-1) 2001 MAXIMUM VEHICLE QUEUES

The modelled results show that vehicle queues at the intersections along the major roads are within acceptable limits in the year 2001 AM and PM peak commuter periods. This matches the observations.

9.3 CALIBRATION SUMMARY

The 2001 model has been assessed at a number of levels and over a range of parameters. It is therefore calibrated and ready for use in the assessment of future year scenarios for the AM and PM commuter peak periods as well as the Saturday peak of 12 noon to 1pm.

9.4 EXISTING CONDITIONS RESULTS SUMMARY

The model outputs summary statistics for each run by vehicle type (all, cars and trucks, buses). These results are output over in Table 9.5 for the AM Peak, PM Peak and Saturday Peak runs in 2001.

TABLE 9.5: EXISTING CONDITIONS MODEL STATISTICS FOR 2001

Scenario	Year	Peak	Travel Patterns [1]	Road Network [2]	All Vehicles			Cars and Trucks			Buses		
					Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)
Existing	2001	AM	EX	EX	194.7	43.3	9158	194.3	43.5	9108	248.3	26.4	50
Existing	2001	PM	EX	EX	202.8	40.2	9449	202.5	40.3	9391	240.3	26.4	58
Existing	2001	SAT	EX	EX	188.5	40.9	7617	188.3	40.9	7575	208.6	31.1	43

The results in this table should be compared with the summary results for the future years in the following section.

10 FUTURE YEAR ANALYSIS AND RESULTS

10.1 MODELLED SCENARIOS

A range of scenarios have been modelled for the purposes of assessing development impacts. The description of the scenarios tested is included in Table 10.1.

TABLE 10.1: FUTURE YEAR MODELLED SCENARIOS

		TRAFFIC GROWTH				
SCENARIO	**YEAR**	**WESTFIELD**	**DONCASTER HILL**	**THROUGH**	**TRAVEL PATTERNS [1]**	**ROAD NETWORK [2]**
A	2011 & 2021	✓	✓	✓	Existing	Existing + Westfield changes
B	2011 & 2021	✓	✓	✓	Existing	New (Pseudo ring road)
C	2011 & 2021	✓	✓	✓	↑ Public Transport	Existing + Westfield changes
D	2011 & 2021	✓	✓	✓	↑ Public Transport	New (Access road network)

[1] Existing travel patterns refers to existing car and public transport use. ↑ Public Transport refers to reduced car dependency and increased public transport use.

[2] New road network refers to rear road access to satellite parking stations, new signalised cross roads, bus stops and pedestrian crossings, parking restrictions and local road traffic treatments

10.2 TRAVEL DEMANDS

The manner in which the travel demands are developed is described in Section 6 for the existing travel patterns scenario along with the actual land uses assumed. The results are detailed in Appendix E in terms of land use and traffic generation.

The increased public transport (changed travel patterns) scenario is arrived at by modifying the mode share to reduce car dependency. The target public transport mode share by 2021 is similar to that set out in the government's 20/20 policy that aims to get 20% of all motorised trips on public transport by the year 2020. The manner in which the mode share is altered depends on the trip type with the least change assumed for through (external to external (E-E)) trips and the highest conversion to walk/cycle trips for internal to internal (I-I) trips. This is based on the distance and purpose of the different trip types. Further discussion on this scenario is contained in the text that follows.

The results of the public transport scenario are also detailed in Appendix E.

A comparison of the vehicle demands for the future year of 2021 against 2001 is included in the tables that follow for existing travel patterns (Scenarios A and B) and changed travel patterns (Scenarios C and D) at the screenlines referred to in Section 9.2.1.

The results for the AM Peak are included in Table 10.2 with the PM Peak results in Table 10.3 and the Saturday results in Table 10.3.

TABLE 10.2: AM PEAK SCREENLINE VOLUMES FOR 2021

Screenline	Description	Direction	2001	2021 (Existing Travel Patterns)	% increase	2021 (New Travel Patterns)	% increase
A	Southern end of study area	NB	1287	1562	21%	1436	12%
		SB	2021	3391	68%	3025	50%
B	Eastern end of study area	EB	1125	1477	31%	1358	21%
		WB	2045	2024	-1%	1851	-9%
C	Northern end of study area	NB	1838	2646	44%	2428	32%
		SB	2407	2865	19%	2622	9%
D	Western end of study area	EB	669	676	1%	621	-7%
		WB	769	1209	57%	1109	44%

TABLE 10.3: PM PEAK SCREENLINE VOLUMES FOR 2021

Screenline	Description	Direction	2001	2021 (Existing Travel Patterns)	% increase	2021 (New Travel Patterns)	% increase
A	Southern end of study area	NB	2013	2742	36%	2519	25%
		SB	1494	2428	63%	2215	48%
B	Eastern end of study area	EB	2051	2593	26%	2361	15%
		WB	891	886	-1%	812	-9%
C	Northern end of study area	NB	2722	3462	27%	4221	55%
		SB	1698	1904	12%	1746	3%
D	Western end of study area	EB	930	927	0%	850	-9%
		WB	683	1061	55%	965	41%

TABLE 10.4: SATURDAY PEAK SCREENLINE VOLUMES FOR 2021

Screenline	Description	Direction	2001	2021 (Existing Travel Patterns)	% increase	2021 (New Travel Patterns)	% increase
A	Southern end of study area	NB	1222	1564	28%	1432	17%
		SB	1405	2395	70%	2175	55%
B	Eastern end of study area	EB	1285	1625	26%	1477	15%
		WB	1247	1248	0%	1133	-9%
C	Northern end of study area	NB	1776	2919	64%	2653	49%
		SB	1741	1974	13%	1796	3%
D	Western end of study area	EB	607	611	1%	558	-8%
		WB	583	954	64%	865	48%

10.3 TRIP TYPES

The travel demands discussed previously are comprised of a number of different trip types depending on whether trips are local or through.

The model separates the total trip demands into four categories as follows:

- I-I = internal trips or trips with an origin and a destination within Doncaster Hill (for example a resident driving to the shops);
- I-E = trips with an internal (Doncaster Hill) origin and an external destination (for example a resident travelling to work in the City in the morning or a retail worker returning home at the end of the day);
- E-I = the reverse of I-E above;
- E-E = external trips or trips with an origin and a destination outside Doncaster Hill (for example a person travelling along Tram Road and Williamsons Road between Box Hill and Templestowe).

These four trip types are treated differently in terms of how increased public transport use in Scenarios C and D might affect demands. For example, I-I trips are good candidates to be shifted from private vehicles to walk and shuttle bus trips. By contrast, E-E trips are less likely to shift to public transport.

The split between these trips types is summarised for each Scenario in Table 10.5. Note that the total number of trips in 2021 is lower in Scenarios C and D than A and B because increased bus trips (which carry more people) replace car trips.

TABLE 10.5: TRIP TYPE SUMMARY BY SCENARIO

Scenario	Year	Peak	Trip Types									
			I-I		I-E		E-I		E-E		Total	
Existing	2001	AM	528	6%	1586	19%	2242	26%	4168	49%	8524	100%
		PM	947	10%	2848	31%	1431	15%	4102	44%	9328	100%
		SAT	958	12%	2257	28%	2025	25%	2791	35%	8031	100%
A & B	2021	AM	1284	11%	3802	31%	2296	19%	4831	40%	12213	100%
		PM	1917	14%	5672	40%	1423	10%	5035	36%	14047	100%
		SAT	2041	17%	4563	38%	2068	17%	3330	28%	12002	100%
C & D	2021	AM	1160	10%	3476	31%	2084	19%	4444	40%	11164	100%
		PM	1721	13%	5130	40%	1294	10%	4633	36%	12778	100%
		SAT	1818	17%	4107	38%	1855	17%	3063	28%	10843	100%

10.4 QUALITATIVE SUMMARY OF RESULTS

Table 10.6 provides a snapshot summary of whether the scenario works from a transport and traffic scenario. In other words, does it provide an acceptable level of service to a range of road users in private vehicles, buses and pedestrians and cyclists.

TABLE 10.6: SCENARIO RESULTS - OVERALL

	ACCEPTABLE OPERATING CONDITIONS IN 2021?		
SCENARIO	AM	PM	SAT
A	✓	✗	✓
B	✓	✗	✓
C	✓	✓	✓
D	✓	✓	✓

The results show that all scenarios provide an acceptable level of service in the year 2021 except those for the PM Peak with existing travel patterns. In other words, if full build out of the proposed land uses is to be achieved then a change in travel behaviour (resulting in increased use of public transport) will be required to maintain acceptable transport network conditions for all users.

Acceptable transport network conditions is an overall measure of performance that includes road network congestion levels such as vehicle queues and delays on main roads, vehicle travel times along main roads and minor (local) road traffic volumes.

The summary information in the table above is extended below in Table 10.7 for the AM Peak, Table 10.8 for the PM Peak and Table 10.9 for the Saturday Peak. These tables give a broad level understanding of the network performance in each scenario against a range of measures and parameters.

An explanation of what each item in the tables means follows after Table 10.9.

TABLE 10.7: SCENARIO RESULTS –KEY MEASURES AM PEAK

SCENARIO	YEAR	MAIN ROAD QUEUES	QUEUE BACK?	LOCAL ROAD IMPACTS	PEAK EXTEND	WESTFIELD PERF?
A	2021	High	Yes	High	15 min	Med
B	2021	Med	None	Med	10 min	High
C	2021	Low	None	Med	5 min	High
D	2021	Low	None	Low	5 min	High

TABLE 10.8: SCENARIO RESULTS –KEY MEASURES PM PEAK

SCENARIO	YEAR	MAIN ROAD QUEUES	QUEUE BACK?	LOCAL ROAD IMPACTS	PEAK EXTEND	WESTFIELD PERF?
A	2021	High	Yes	High	>30 min	Low
B	2021	High	Yes	High	>30 min	Low
C	2021	Med	Some	High	25 min	Med
D	2021	Low	None	Low	10 min	High

TABLE 10.9: SCENARIO RESULTS –KEY MEASURES SAT PEAK

SCENARIO	YEAR	MAIN ROAD QUEUES	QUEUE BACK?	LOCAL ROAD IMPACTS	PEAK EXTEND	WESTFIELD PERF?
A	2021	Low	None	Med	10 min	Med
B	2021	Low	None	Med	8 min	Med
C	2021	Low	None	Low	7 min	High
D	2021	Low	None	Low	5 min	High

Main road queues refers to the average length and extent of queuing on the main roads in the model on a scale of low, medium and high.

Queue back refers to the incidence of main road queues forming back to the adjacent intersections during the peak periods.

Local road impacts refers to the volume of traffic and nature of queuing occurring in local (minor) roads on a scale of low, medium and high.

Peak extend refers to whether the model had difficulty accommodating all traffic demands within the peak hour period or whether the peak hour extended due to congestion on the network. The higher the number the worse the performance of the network.

Westfield performance refers to the operating conditions into and out of Westfield at the access points onto Doncaster Rd and Williamsons Rd on a scale of low, medium and high.

The results show that the network performance improves significantly as the increased public transport and new road network scenarios are included.

Although Scenarios C and D are technically feasible. Scenario D has a number of advantages that make it the preferred scenario as follows:

- Reduces private vehicle (car) trips and subsequent demands on the road network by replacing private vehicle cars trips with public transport (bus) trips;
- Reduces pressure on the main road intersections by intercepting much of the locally bound traffic at the periphery of the Hill and diverting it via access roads to the area of the intense land use;
- Manages impacts on the local streets by directing rat-running traffic to a limited number of streets rather than allowing this traffic to use all routes;
- Helps local accessibility and pedestrian connectivity by providing new road links and signalised intersections along Doncaster Road, Williamsons Road and Tram Road.

The results also show that the Saturday peak places the lowest demands on the road network except for high flows into and out of Westfield. The AM Peak has higher demands than the Saturday and results in higher vehicle queues and delays. The PM Peak has the highest demands and lowest network performance with high delays and queues and unstable operating conditions in the scenarios with existing travel patterns.

10.5 QUANTITATIVE SUMMARY OF RESULTS

10.5.1 Network Results

In addition to the graphical output of the model, Paramics also produces a number of summary network statistics relating to vehicle delays, speeds and distances travelled by vehicle type.

Table 10.10 includes a summary of the performance of each scenario for the whole study area network separated into private vehicle (car) and public transport (bus) vehicle types.

TABLE 10.10: ROAD NETWORK STATISTICS BY SCENARIO

Scenario	Year	Peak	Travel Patterns [1]	Road Network [2]	All Vehicles			Cars and Trucks			Buses			
					Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Avg Travel Time (mins/km)
Existing	2001	AM	EX	EX	194.7	43.3	9158	194.3	43.5	9108	248.3	26.4	50	2.3
Existing	2001	PM	EX	EX	202.8	40.2	9449	202.5	40.3	9391	240.3	26.4	58	2.3
Existing	2001	SAT	EX	EX	188.5	40.9	7617	188.3	40.9	7575	208.6	31.1	43	1.9
A	2021	AM	EX	EX	257.2	31.5	11878	257.1	31.6	11832	305.1	20.3	46	3.0
A	2021	PM	EX	EX	478.7	16.1	11221	478.7	16.1	11182	479.7	11.5	40	5.2
A	2021	SAT	EX	EX	297.6	25.4	10418	297.4	25.4	10370	376.5	18.0	48	3.3
B	2021	AM	EX	NEW	238.9	33.6	11980	238.7	33.7	11883	294.9	23.5	97	2.6
B	2021	PM	EX	NEW	749.1	8.6	1748	748.4	8.6	1742	1204.7	1.1	6	54.5
B	2021	SAT	EX	NEW	239.7	30.8	10345	239.5	30.8	10251	273.1	24.2	94	2.5
C	2021	AM	PT	EX	221.2	37.3	11250	221.1	37.3	11151	263.8	26.9	99	2.2
C	2021	PM	PT	EX	355.1	22.7	12028	354.9	22.7	11938	427.2	14.7	90	4.1
C	2021	SAT	PT	EX	244.1	30.7	9800	244.0	30.8	9703	291.2	23.1	97	2.6
D	2021	AM	PT	NEW	216.4	37.4	10891	216.1	37.4	10793	284.0	24.4	97	2.5
D	2021	PM	PT	NEW	262.6	30.2	11591	262.3	30.2	11502	333.4	18.3	89	3.3
D	2021	SAT	PT	NEW	236.5	31.6	9857	236.2	31.7	9762	312.6	22.9	94	2.6

[1] Travel patterns can be either existing (EX) or increased public transport (PT).
[2] Road network can be either existing (EX) or new (NEW).
Network statistics are taken at half-past the beginning of the peak hour.

The results show the best overall performance occurs in Scenario D. Bus travel times are summarised for the network showing the difference between scenarios and the comparison against existing conditions.

Table 10.11 shows the difference in performance of each scenario against existing conditions in the year 2001 expressed as percentages rather then values.

TABLE 10.11: ROAD NETWORK STATISTICS COMPARISON BY SCENARIO

Scenario	Year	Peak	Travel Patterns [1]	Road Network [2]	All Vehicles			Cars and Trucks			Buses			
					Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Mean Delay (secs)	Mean Speed (kph)	Total Distance Travelled (km)	Avg Travel Time (mins/km)
A	2021	AM	EX	EX	32%	-27%	30%	32%	-27%	30%	23%	-23%	-9%	0.3
A	2021	PM	EX	EX	136%	-60%	19%	136%	-60%	19%	100%	-56%	-31%	1.3
A	2021	SAT	EX	EX	58%	-38%	37%	58%	-38%	37%	80%	-42%	13%	0.7
B	2021	AM	EX	NEW	23%	-22%	31%	23%	-23%	30%	19%	-11%	93%	0.1
B	2021	PM	EX	NEW	269%	-79%	-82%	270%	-79%	-81%	401%	-96%	-89%	23.0
B	2021	SAT	EX	NEW	27%	-25%	36%	27%	-25%	35%	31%	-22%	119%	0.3
C	2021	AM	PT	EX	14%	-14%	23%	14%	-14%	22%	6%	2%	96%	0.0
C	2021	PM	PT	EX	75%	-44%	27%	75%	-44%	27%	78%	-44%	56%	0.8
C	2021	SAT	PT	EX	29%	-25%	29%	30%	-25%	28%	40%	-26%	126%	0.3
D	2021	AM	PT	NEW	11%	-14%	19%	11%	-14%	19%	14%	-8%	92%	0.1
D	2021	PM	PT	NEW	29%	-25%	23%	30%	-25%	22%	39%	-31%	54%	0.4
D	2021	SAT	PT	NEW	25%	-23%	29%	25%	-22%	29%	50%	-26%	120%	0.4

The results show the satisfactory performance of Scenarios C and D at the network level. However, they do not record local road impacts which are discussed later in the following text.

The results in Table 10.10 are graphed to show the performance of each scenario relative to each other and against existing conditions. Figure 10.1 shows the mean delay for all vehicles, Figure 10.2 shows the mean speed for all vehicles and Figure 10.3 shows the total distance travelled for all vehicles.

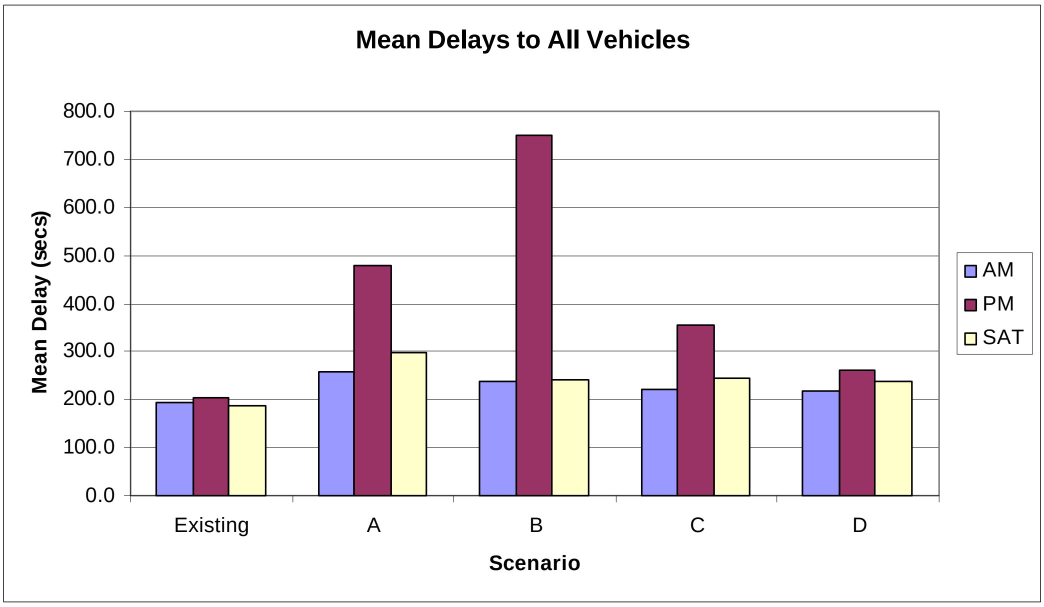


FIGURE 10.1: MEAN VEHICLE DELAYS BY SCENARIO AND TIME PERIOD

The results show that mean vehicle delays improve steadily from Scenario A to Scenario D except for the PM Peak case in Scenario B where excessive road network congestion skews the results.

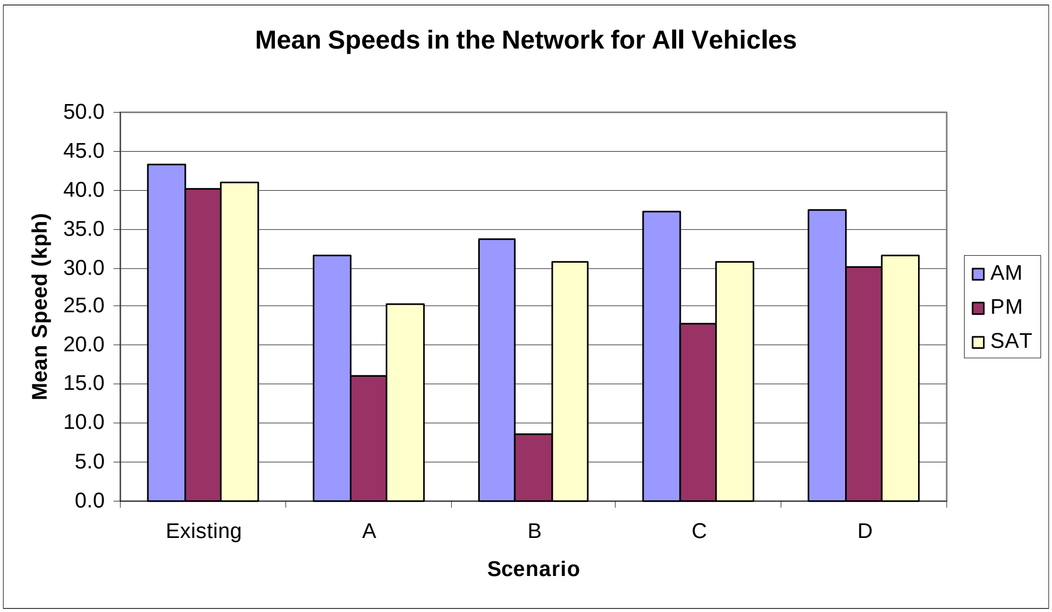


FIGURE 10.2: MEAN VEHICLE SPEEDS BY SCENARIO AND TIME PERIOD

The results show that mean vehicle speeds in the network drop in the future when compared to existing conditions with Scenario D having the best performance and the PM Peak being the worst time period.

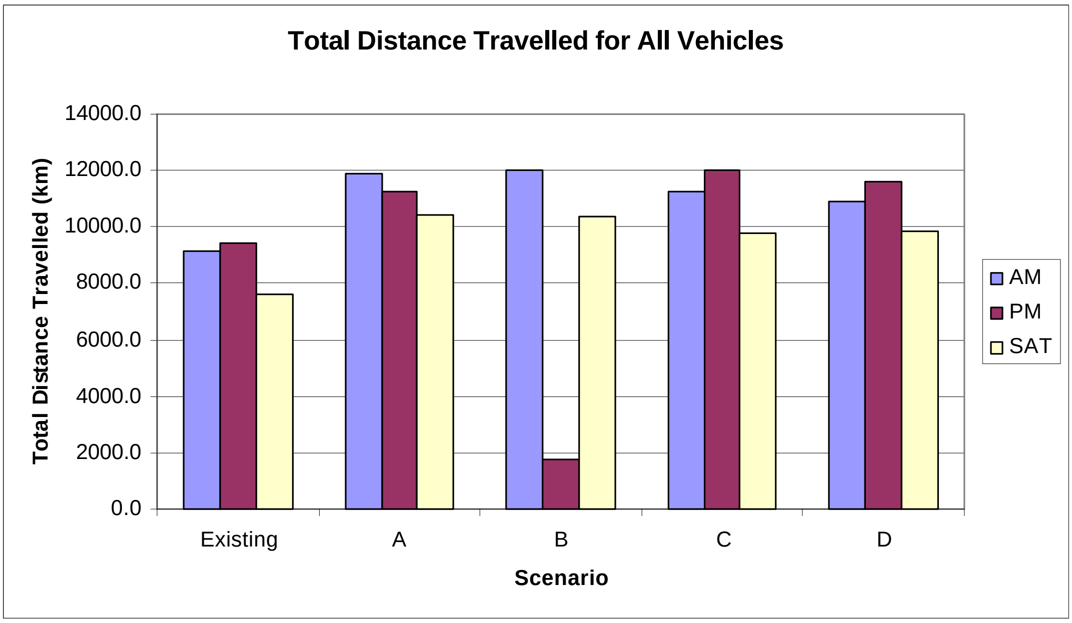


FIGURE 10.3: TOTAL VEHICLE DISTANCE TRAVELLED BY SCENARIO AND TIME PERIOD

The results show that total vehicle distance travelled increases in the future year scenarios except for the PM Peak Scenario B which is heavily congested. However, the changed travel patterns in Scenarios C and D offset higher private vehicle demands with increased public transport use of buses which carry higher person trips for the same vehicle distance travelled.

10.5.2 Main Road Results and Comparison to Freeway Extension

VicRoads recorded traffic volumes on the main roads through the Hill before and after the extension of the Eastern Freeway. These provide a useful reference point against which to compare the expected traffic volumes in future years assuming build out at the Hill according to the land use forecasts.

Table 10.12 shows the before and after VicRoads traffic volumes along Doncaster Road plus the modelled volumes in existing and future years.

TABLE 10.12: DONCASTER ROAD BEFORE/AFTER/MODELLED TRAFFIC VOLUME COMPARISON

Time	Direction	Before Fwy Ext (1995-97)	After Fwy Ext (1998)	% Change ('98-'95)	Model 2001	Model 2021	% Change ('21-'98)
Doncaster Road East of High Street							
AM Peak	EB	1448	484	-67%	664	660	36%
	WB	3416	1070	-69%	778	1068	0%
	Total	4864	1554	-68%	1442	1728	11%
PM Peak	EB	2539	922	-64%	939	841	-9%
	WB	2570	682	-73%	707	869	27%
	Total	5109	1604	-69%	1646	1710	7%
Daily	EB	22383	8023	-64%	8015	7505	-6%
	WB	26575	8924	-66%	7425	9685	9%
	Total	48958	16947	-65%	15440	17190	1%
Doncaster Road East of JJ Tully Drive							
AM Peak	EB	1865	985	-47%	794	957	-3%
	WB	2987	1413	-53%	1634	1469	4%
	Total	4852	2398	-51%	2428	2426	1%
PM Peak	EB	3237	1574	-51%	1516	1515	-4%
	WB	1971	1001	-49%	624	605	-40%
	Total	5208	2575	-51%	2140	2120	-18%
Daily	EB	26422	12597	-52%	11550	12360	-2%
	WB	25113	12091	-52%	11290	10370	-14%
	Total	51535	24688	-52%	22840	22730	-8%

Notes:
1. Before and after volumes taken from VicRoads Freeway Extension Before & After Study
2. Daily VicRoads volumes represent 12 hour (7am-7pm) volumes
3. Modelled volumes for 2021 represent Scenario D traffic flows
4. Daily modelled volumes are estimates based on average of peak hour flows x 10

The results show that Doncaster Road traffic volumes dropped in the order of 50-60% after the freeway was extended. The model results show that these post-freeway extension volumes are not expected to increase significantly due to the effect of the freeway. The full build-out traffic volumes on Doncaster Road in the year 2021 are similar to the 2001 flows which in turn are similar to the after extension surveys in 1998. This agrees with the VicRoads network modelling results showing no net increase along Doncaster Road during the 20 year timeframe of this study. However, both the VicRoads model and the Paramics model show increases along Tram Road and Williamsons Road reflecting the altered freeway access routes now being used in the area.

In other words, the full build out at Doncaster Hill is not expected to return traffic volumes on Doncaster Road to anywhere near the levels that existed prior to the extension of the freeway.

An output showing the 2001 peak traffic volumes against 2021 modelled traffic volumes by scenario is included in Appendix E.

10.5.3 Minor Road Results

Increased traffic volumes on minor (local) roads are due to two reasons as follows:

- Through traffic (E-E trips) using minor roads to avoid congestion on the major roads; and
- Traffic accessing non-residential and residential uses at the Hill (I-E, E-I & I-I trips) via access roads;

Through traffic increases on minor roads are not supported as part of the strategy and as such traffic treatments will be required to discourage or physically prevent these movements. The locations of these treatments depend on the final access road arrangements adopted with a conceptual layout developed as part of Scenario D in Figure 10.4.

Scenario C does not include this system of access roads and minor road traffic treatments therefore congestion on the major roads forces high levels of through traffic along local roads. In other words, although the discussion to date shows that Scenario C results in acceptable network operating conditions, it results in significant impacts on minor roads in the area surrounding the Hill and as such is not recommended as the preferred scenario.

In contrast, the remaining trips accessing land uses within the Hill area and surrounding residential properties have a legitimate reason to use minor roads as long as the extent of this access is managed. Scenario D achieves this and as such is the recommended scenario.

The daily traffic volumes on short sections of the proposed access roads in Scenario D are expected to approximately double. This means that streets currently carrying up to 3000 vpd in 2001 may increase to 6000 vpd in the year 2021 assuming full build out at the Hill. These volumes are considered satisfactory for short sections of road providing access to satellite parking stations and individual sites within the precincts as long as adequate traffic management measures are put in place to protect the amenity of surrounding residential areas.

10.6 DISCUSSION OF SCENARIO PERFORMANCE

10.6.1 Existing Travel Patterns In Future Years (Scenarios A & B)

The extension of the eastern Freeway to Springvale Road in November 1997 significantly reduced traffic volumes along Doncaster Road, and provided an opportunity to accommodate future growth in and around Doncaster.

However, a strategy based largely on car dependency (or existing travel patterns) to service future development is likely to return back to pre-1997 congestion levels on main roads through the study area. However, the performance of these scenarios is unsatisfactory in the critical PM Peak periods and as such demonstrates the need to accept a lower development density if travel behaviour is not changed.

10.6.2 Increased Public Transport Use In Future Years (Scenario C)

A more sustainable approach, and one which protects the amenity of the Hill for future residents and other users, is one that changes travel patterns to make more use of public transport alternatives.

The actual level of public transport use across Doncaster is known at the LGA (local government area) level through journey to work data but not at the detail level of the Doncaster Hill study area. Public transport targets should be relatively localised to be effective. For example, the overall use of public transport across metropolitan Melbourne is in the order of 9% of motorised trips which is targeted to be 20% of motorised trips in the year 2020[3]. However, the corresponding figures for the North Central Corridor Study that covers an area across the north of the CBD are 19% and 41% respectively[4].

There is no commonly available information on case studies of growth in public transport use in urban villages that can be applied as targets for this study. As a result, the indicative target of roughly doubling public transport mode share over the next 20 years has been adopted.

The future role and provision of public transport through, to and within Doncaster Hill has been discussed with the Department of Infrastructure (DoI) on a number of occasions through this study with the discussion in Section 10.6.3 representing the agreed "state-of-play" for public transport provision.

The actual changes to mode share adopted in the model are detailed in Appendix E.

[3] Source: DoI

[4] ibid

10.6.3 Department of Infrastructure Comment on Transit Planning

Current State Government direction is being shaped by the Metropolitan Strategy, which is due for release for discussion in coming months. The State's *Growing Victoria Together* strategy has already highlighted the Government target 20% of motorised trips to be taken by public transport in 2020, up from 9%. This represents more than doubling of public transport usage – localised targets will differ from the general 20% target, and specific targets have not yet been set for Manningham.

The Metropolitan Strategy takes the 20% by 2020 target and sets a framework for its realisation. A combination of improved public transport and reduced car travel will contribute to achieving this goal.

The Doncaster Hill precinct is a good example of a development in which both of these aspects will be addressed: land use and planning decisions such as high density residential development and limitations on parking will contribute to reduced car travel; while public transport improvements will contribute to higher transit usage levels.

Specific public transport improvements are being considered in a number of studies currently underway by the State Government. The Metropolitan Bus, Tram and Train Plans are being developed to ensure that investments requirements to achieve the 20/2020 target are identified and priority actions initiated. The North Central City Corridor Study (NCCCS) is reviewing the region at the western end of the Eastern Freeway, in order to specifically determine a transport strategy appropriate for the transport issues faced by that area.

In the context of these strategies, the State Government is currently considering the following public transport improvements relevant to Doncaster Hill:

- The inclusion of Station Street/Tram Road/Williamsons Road/Manningham Road in a premium cross-town transit network. This could feature either buses or trams, and high levels of on-road transit priority would be applied, as well as other premium features such as real-time information. Both the Metropolitan Bus and Tram Plans are considering the cross-town transit network. This route features in a pre-feasibility study of 24 possible tram network extensions to prioritise any early implementation opportunities.
- The extension of transit services along the Eastern Freeway. Options are for departure at Thompsons Road or at Doncaster Road. Either way, the service would terminate at Doncaster Hill. Busway, light rail and heavy rail are all being considered for this service. The NCCCS and the Metropolitan Tram Plan are both considering this extension, the later in the above pre-feasibility study.
- An extension of the North Balwyn tram (48) along Doncaster Road to Doncaster Hill is also being reviewed in the Metropolitan Tram Plan pre-feasibility study.

- The Metropolitan Bus Plan is undertaking detailed service reviews of buses Melbourne-wide. The Manningham area is included in one of 10 regions, and detailed proposals will be discussed with operators and Council as they are developed. The Bus Plan is expected to recommend an investment strategy late in 2002.

In addition to detailed public transport service improvement strategies, the State Government is also working on the concept of Transit Cities. Five Transit Cities have already been announced for Melbourne, namely, Sydenham, Footscray, Dandenong, Frankston and Ringwood. The concept of Transit Cities is for regional centres that include high levels of service of public transport, as well as optimisation of land uses to ensure very high usage of public transport. The concept seeks most appropriate commercial, retail, and residential developments, and an emphasis on non-motorised transport modes within the locality as well as high dependence on public transport for internal-external travel. To achieve a high level of service for public transport, attention must be paid to the transport interchange facilities in Transit Cities – their quality, location, centrality to the key land uses, and the ability for them to accommodate future expansion of public transport services and infrastructure.

Expansion of the Transit Cities concept to other locations is under consideration in the Metropolitan Strategy. Where local government is able to demonstrate a commitment to the Transit Cities concepts in regional centre development, the attractiveness of those centres is increased.

For the purposes of the Doncaster Hill transport modelling exercise, none of the specific improvements listed above have been modelled, as they are not committed projects. Rather, an assumption has been made that doubling of existing public transport service frequencies over 20 years, using existing routes, will adequately represent improvements brought about by a range of infrastructure and service frequency changes. A subsequent reduction in private car travel (ie from the new transit passengers) has also been assumed.

The shift in travel behaviour forms a core component of the likely future transport success of the strategy for the Hill and is one that will require pro-active and regular promotion, education, and incentives by Council.

10.6.4 Increased Public Transport Use & New Road Network in Future Years (Scenario D)

The most comprehensive transport and traffic design response likely to achieve the urban design and community aims of the strategy is a package of works comprising:

- Increase in public transport use as per Scenario C;
- Creation of satelllite carpark stations with reduced parking provision in high density residential and other uses serviced from the rear via a network of access roads;

- Pedestrianisation of the Hill through the provision of regular signalised crossings along main roads located to form activity nodes with public transport stops;
- Controls on site access and frontage to make the main roads pedestrian friendly while encouraging public transport use and minimising impacts of vehicular traffic on local roads;
- Creation of a network of functional and safe shared paths for pedestrians and cyclists integrating Westfield with the surrounding areas and acting along the desire lines for local and regional movement.

The intent of this scenario is to replicate some elements of the package of recommendations that follow in Section 11. It results in the best performance of the transport network in the year 2021.

An indicative concept plan is included in Figure 10.4 showing how this scenario could work noting the new roads, intersections, crossings, parking stations, public transport nodes and land acquisition required.

Note that the location and alignment of the pedestrian linkages, access roads and other concept plan items are indicative only at this time. More detailed assessments will be required to consider such issues as availability of development sites, transition to surrounding residential land uses and land acquisition.

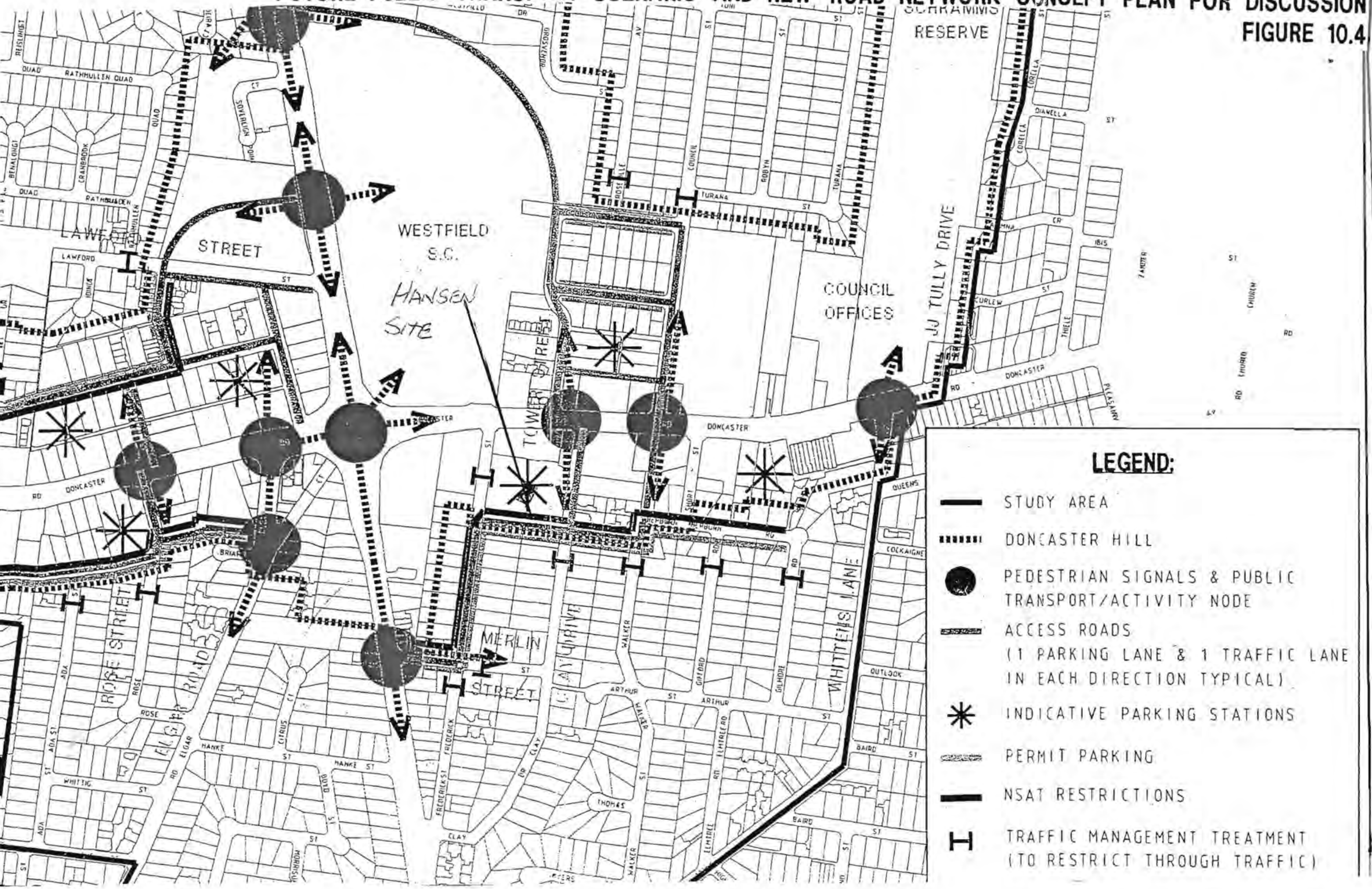
The concept plan is intended to stimulate thinking and reinforce the need for a change in travel behaviour that increases public transport use and reduces car dependency.

FIGURE 10.4: FUTURE PUBLIC TRANSPORT SCENARIO AND NEW ROAD NETWORK CONCEPT PLAN FOR DISCUSSION

DONCASTER HILL STRATEGY

FUTURE PUBLIC TRANSPORT SCENARIO AND NEW ROAD NETWORK CONCEPT PLAN FOR DISCUSSION

FIGURE 10.4



11 RECOMMENDATIONS

11.1 GENERAL TRANSPORT AND TRAFFIC PRINCIPLES

- Provide travel choice and maintain mobility levels;
- Sustainability and integration of transport with land use;
- Increase public transport use and reduced car dependency;
- Provide supporting infrastructure and regulatory system;

11.2 PUBLIC TRANSPORT

11.2.1 Approach

A detailed discussion of public transport planning, options, assumptions and scenarios is set out in Section 10.6.3 from the perspective of the DoI, with Scenarios C and D in Sections 10.6.2 and 10.6.4 respectively.

The summarised list of comments able to be made at this point include:

- Key component of Strategy success is to encourage and support changes in travel behaviour to increase the use of public transport and reduce car dependency by providing genuine transport choice;
- Improved interchanges, intersection priority, new services and extensions;
- Targets should be consistent with state government aims of 20% of all motorised trips by public transport in 2020;
- Requires Council policies, guidelines and possible incentives to achieve targets;
- Strategy implementation should be linked to Metropolitan Strategy outcomes to incorporate future public transport upgrades and initiatives into development proposals and masterplanning;
- Design the interchange at Westfield or an alternative site to include provision for shuttle buses to and from the park'n'ride facility at Hender Street;
- Provision of tram and bus stops at activity nodes (pedestrian and vehicle crossing points) along main roads;

In overall terms the government's aim is to retain mobility levels such that person trips remain unchanged, but to alter the transport modes utilised away from private vehicles to public transport. A passenger effectiveness measure is used when considering potential patronage increases.

11.2.2 Doncaster Hill as an Activity Centre

The DoI discussion referred to Metropolitan Strategy and associated planning work on Activity Centres. Activity Centres need to co-exist with an important part of this being the provision of transport links between them. The resulting implication for Doncaster Hill is the need to include strong linkages to Box Hill.

Further to this, Doncaster's status as a secondary Transit City will be developed and improved as land use and transport develop in an integrated fashion.

11.2.3 Public Transport Provision

Doncaster has an existing well-patronised bus service and as such has a good basis on which to develop improved services and ridership.

The routes to be upgraded and/or added are likely to be cross-town routes linking to surrounding Activity Centres including heavy rail nodes, plus radial routes which adopt Doncaster Hill as a focus or hub in itself.

The manner in which this is likely to occur is expected to follow other strategies in the metropolitan area where a stepwise approach is adopted. An existing bus route may be improved to a Smart-Bus route then an exclusive bus lane then provision of a light rail route.

11.2.4 Accessibility

The Metropolitan Strategy also looks at accessibility issues relating to linkages to and from services and compliance with the Disability Discrimination Act.

The planning implication for Council reinforces the comments made in Section 11.3 regarding facilities for pedestrians. It relates to the detailed urban design fabric within the Hill to make it functional for all users of varying mobility levels.

11.2.5 Location of the PT Interchange

The location of a public transport interchange at the Hill is of significant importance to the success of the Strategy given its reliance on changes in travel behaviour with the encouragement of public transport use.

A performance-based approach to the selection of an interchange location would consider the following:

- It should be easily visible;
- It should have clear access for all modes of travel including buses and light rail;
- It should be flexible to cater for existing and future modes of transport;
- It should provide for local shuttle bus services within the Hill and to/from park-n-ride sites;
- It should be able to be linked via pedestrian routes to the major population and employment centres within the Hill including satellite parking stations.

Using these criteria, the existing location within Westfield immediately adjacent to Williamsons Road is good. It provides minimal increases in bus travel times and provides an opportunity for future light rail routes along major roads such as Tram Road to terminate within the interchange. It is visible to users and therefore safe.

If a bus, light rail or heavy rail link along the freeway was introduced with an extension along Doncaster Road, there is merit in locating the interchange even closer to its intersection with Tram Road/Williamsons Road.

In overall terms given what is known about the current state of public transport planning, the interchange is best located at the intersection of Doncaster Road/Tram Road/Williamsons Road.

The next best alternative is to locate it close to the corner along a major route. Given the function of Shoppingtown as an attractor, it would appear logical to that the routes include Doncaster Road east of Tram Road and Williamsons Road north of Doncaster Road.

11.3 PEDESTRIANS AND CYCLISTS

11.3.1 Approach

The importance of non-motorised trips relates to the encouragement of public transport use and creation of a vibrant area to live in. The manner in which this is expected to occur is as follows:

- Pedestrianisation of the Hill a key component of the Strategy;
- Additional signalised pedestrian crossings at regular spacings along Doncaster Road and Tram Road/Williamson Road;
- Creation of activity nodes at crossing points to focus pedestrian movement;
- Creation of a functional and safe network of shared pedestrian/cyclist paths for trips within and through the Hill along desire lines;
- Inclusion of formal requirements for cyclist facilities in future commercial and residential development within the area to encourage use;
- Shared paths along Doncaster Road with generous offsets from the traffic lanes;
- Utilise the limited access streets for the purposes of a permeable local bus network to service local residents and the like;
- Consider potential for development of a circular shuttle bus route around the Hill linking residential land use to retail, restaurants and commercial;
- Grade separation of pedestrians at the Doncaster Road/Williamsons Road/Tram Road Intersection may be an appropriate design response if it links logically to Westfield expansion, a public transport interchange and/or surrounding land use proposals;

11.3.2 Outcomes

The Strategy recognises the importance of a well-planned and comprehensive network of pedestrian and cyclist networks, paths and linkages as a complement to the land use change.

Further work is required to develop the strategic level pedestrian and cyclist networks within the municipality and the Hill itself. Following this, the detailed fine level paths, linakges and facilities can be developed to support and/or help guide land use development.

11.4 TRAFFIC ACCESS AND CIRCULATION

11.4.1 Approach

In general terms, the management of traffic activity within and through the Hill is to be achieved as follows:

- Intercept locally destined traffic at the periphery of the area and divert it into a limited number of access streets rather than directing through the Hill unnecessarily;
- Minimise vehicular access along main road frontages to maintain a friendly pedestrian environment while maximising access from the rear off a number of limited access roads;
- Protect local street amenity for residents by providing a clear and logical circulation and access strategy to the commercial and retail uses within the area;
- Provide cross roads linking to the side and rear of properties along main roads at the same points as the pedestrian crossings to maximise the efficiency of property access;

11.4.2 Details

The detailed works proposed are set out in the discussion on infrastructure that follows.

11.5 CARPARKING

11.5.1 Policy

The manner in which carparking is provided at the Hill will help to support the proposed changes in land use, and act as the stimulant to the use of public transport as a attractiveness alternative to the private car.

The policy issues to be resolved include the location and quantum of parking for new development and longer term access and pricing issues. This report does not attempt to deal with these issues in any detail at this time. However, it is recognised that Council's car parking policy will require a review to support the changed travel behaviour in the Strategy.

11.5.2 Demands

In order to provide some background to a review of the existing parking policy, an estimate of current and future parking demands by precinct has been prepared and included as Appendix F.

The numbers of relevance are shown under *Increase in Demands from 2001* on the right hand side of the page with total spaces by precinct and corresponding area at an average rate of 30sqm per space. These are in addition to those that are currently required in the year 2001. Note that Precinct 4 is Westfield.

As an example, a zone with a site area of 5500sqm would provide in the order of 5500sqm x 4 floors / 30sqm per space = 733 spaces or 11% of the total additional requirement in the year 2011 (ignoring Westfield).

As a comparison, the total additional parking requirement in the year 2021 is expected to be 7609 spaces. This can probably be accommodated in approximately four sites of 5500sqm, each with a height of 5 or 6 levels assuming that parking was split 50% to constructed buildings and 50% to satellite stations.

These comments and parking requirements are based on existing parking rates rather than the possible reduced rates that may exist in the future. More work is required on parking policy to set parking rates by land use to refine these estimates. The rates used are noted in Appendix F.

Resident visitor parking is included in the numbers above although should be split between on-street and off-street locations when the availability of on-street parking is known.

The parking numbers are peak estimates that do not assume sharing of use although resident parking makes up approx 75% of total (excluding Westfield) and cannot be shared with anything. An analysis based on shared use of a common carparking resource will result in significantly lower numbers than those quoted above.

11.5.3 Outcomes

The approach to parking is expected to result in the following outcomes:

- Develop satellite carparking stations off access roads to accommodate commercial, retail and residential demands;
- Develop Council policies for lower carparking rates to discourage high car ownership rates and to make people aware of the true cost of car use;
- Manage future growth in the area flexibly by allowing for the redevelopment of satellite parking stations if required rather than commercial or residential sites;
- Provide “base” level of parking on-site with additional parking in the satellite parking stations on a commercial or user-pays basis;
- Introduce permits where along access roads where necessary to provide for resident parking;
- Introduce appropriate parking restrictions in residential areas surrounding the Hill to manage any overflow of parking demand by retaining it on access streets and/or within satellite parking stations;

11.6 STREETSCAPES

11.6.1 Approach

In general terms the main Strategy change to streetscapes is to local roads where the increased pressure on access to the precincts will require some adjustment to on-street parking provision.

The approach is to retain the existing kerblines wherever possible and retain on-street parking along the residential side of the street with no standing restrictions on the "Hill" side of the street. Resident permit parking areas may need to be created to manage parking demands by visitors to the Hill. The conceptual nature and extent of these changes are set out in Figure 10.4.

The result of this approach is a balance between retention of existing road cross-sections, provision of on-street parking for residents and visitors and adequate access capacity to the precincts within the Hill.

There are a number of locations where parking bans on both sides of access streets will be required for short distances for capacity purposes. This is typically at the intersections of access streets with Doncaster Road, Tram Road and Williamsons Road.

11.6.2 Outcomes

There is an opportunity for Doncaster Road to have on-street parking during off-peak periods to better serve abutting properties and "soften" the look of the road. This can be achieved in conjunction with additional signalised crossing points to focus pedestrian activity along the building frontages and shift vehicular activity to the side or rear of properties via access roads.

11.7 INFRASTRUCTURE WORKS, STAGING, TIMING AND COSTING

11.7.1 Description

The scenarios described in the report involve the provision of new road-based and public transport infrastructure. The comments below therefore relate to Scenarios C and D for the road and intersection works, and Scenario D for the public transport works.

The nature and extent of much of the road works is shown conceptually in Figure 10.4. The public transport works are described in Section 11.2 above.

11.7.2 Works Staging and Timing

The manner in which the works are constructed is dependent on a range of variables that are not possible to determine at any level of detail at this time. These include the vagaries of market demand, underlying transport demands and the like. As a result the staging shown in Figure 11.1 over is indicative only and is intended to highlight that a staged roll-out of works is likely. It should not be used for detailed planning purposes or site level contributions.

The works are divided into land acquisition, access roads, streetscapes, new signalised intersections, satellite parking stations, upgrades to signalised intersections, public transport works and pedestrian and cyclist provisions.

Insert figure 11.1 (Project timeframe)

11.7.3 Works Costing

The items set out in Figure 11.1 have been costed at a preliminary level to get an order of magnitude feel for the investment in infrastructure required under Scenarios C and D. This costing is included as Table 11.1 with the complete detail as prepared by BSC Consulting Engineers available in Appendix G.

Land acquisition has been excluded at this time. Satellite parking stations are assumed to be a commercial development and as such have not been included as a cost although costing estimates are provided in Appendix G.

Refer also to the exclusions that apply in the notes to the table. It is recommended that functional plans of the works be prepared to more accurately scope the works, before refining the cost estimates on the basis of drawings.

In general, the table contains the following items:

- Provision of new signalised pedestrian crossings, road intersections and public transport stops along Doncaster Road at Bayley Grove, Rose Street, Elgar road, Williamsons Road, Tower Street, Council Street and Gilmore Road;
- Provision of new signalised pedestrian crossings, road intersections and public transport stops along Williamsons Road at the Westfield Access points;
- Provision of new signalised pedestrian crossings, road intersections and public transport stops along Tram Road at Clay Drive;
- Create access roads connecting the main roads of Tram, Williamsons and Doncaster Roads along Rose Street, Clay Drive, Hepburn Road, Council Street, Tower Street, Goodson Street, Meader Street, Firth Street, Bayley Grove and the other new road links identified above;
- Identify a range of appropriate satellite parking station sites;
- Plan for a cyclist and pedestrian shared path network overlay masterplan to be consistent with the road network and land use scenarios and proposals.

TABLE 11.1: DONCASTER HILL STRATEGY PRELIMINARY COST ESTIMATE (PROVIDED BY BSC CONSULTING ENGINEERS)

ITEM	DESCRIPTION	QUANTITY ESTIMATE	UNITS	RATE	AMOUNT
LAND ACQUISITION (1)					
1	DONCASTER Rd / NEW WESTFIELD ACCESS Rd				
2	MEADER ST Extn (bt Williansons Rd & Lawford St)				
3	HEPBURN RD Extn (bt Walker St & Frederick St)				
4	CARAWATHA RD Extn (bt Elgar Rd & Rose St)				
5	ACCESS RD (bt Doncaster Rd & Rosr St)				
6	WALKER ST Extn (bt Doncaster Rd & Hepburn Rd)				
ACCESS ROADS					
7	CARAWATHA RD (bt Rose St & Bayley Gr Extn)	280	m	$147	$41,050
8	CARAWATHA RD Extn (bt Elgar Rd & Rose St)	140	m	$3,216	$450,240
9	BAYLEY GR Extn (bt Doncaster & Carawatha St)	100	m	$3,787	$378,700
10	ROSE St (bt Doncaster Rd & Rose St)	100	m	$147	$14,700
11	MERLIN ST (bt Tram Rd & Frederick St)	90	m	$147	$13,230
12	FREDERICK ST (bt Merlin St & Hepburn Rd Extn)	220	m	$138	$30,360
13	HEPBURN RD Extn (bt Frederick ST & Walker St)	210	m	$1,928	$404,950
14	WALKER ST Extn (bt Hepburn Rd Extn & Doncaster Rd)	120	m	$2,722	$326,600
15	COUNCIL ST (bt Goodson St & Doncaster Rd)	250	m	$147	$36,750
16	GOODSON ST (bt Council St & Tower St)	160	m	$147	$23,520
17	BERKELEY ST (bt Council St & Tower St)	160	m	$147	$23,520
18	ACCESS RD (bt Council St & Tower St)	130	m	$1,632	$212,160
19	NEW WESTFIELD ACCESS RD	550	m	$2,096	$1,152,900
	(bt Doncaster Rd & Williansons Rd)				
20	MEADER ST (bt Firth St & Lawford St)	140	m	$147	$20,580
21	MEADER ST Extn (bt Williamsons Rd & Lawford St)	270	m	$2,369	$639,700
22	LAWFORD ST (Bt Williamsons Rd & Meader St)	200	m	$147	$29,400
23	CANARVON ST (bt Lawford St & Doncaster Rd)	200	m	$147	$29,400
24	BAYLEY GR (bt Doncaster Rd & Firth St)	110	m	$147	$16,200
25	FIRTH ST (bt Bayley Gr & Carnarvon St)	380	m	$147	$55,860
26	BEACONSFIELD ST (bt Doncaster Rd & Firth St)	110	m	$147	$16,200
STREETSCAPES					
27	DONCASTER Rd (bt Carawatha Rd & JJ Tully Dr)	1500	m	$1,500	$2,250,000
NEW SIGNALISED INTERSECTIONS (E1)					
28	DONCASTER RD / NEW WESTFIELD ACCESS RD	1	item	$120,000	$120,000
29	WILLIAMSONS RD / NEW WESTFIELD ACCESS RD	1	item	$120,000	$120,000
30	ELGAR RD/ CARAWATHA RD Extn	1	item	$120,000	$120,000
SATELLITE PARKING STATIONS (2)					
31	CARAWATHA RD / ROSE ST 2*	24000	m^2	$846	$20,300,000
32	CLAY DR / HEPBURN RD 5*	24000	m^2	$821	$19,700,000
33	FIRTH St / CARNARVON St 3*	24000	m^2	$879	$21,100,000
34	FIRTH ST / BAYLEY GR 1*	24000	m^2	$879	$21,100,000
35	COUNCIL ST / BERKERLEY ST 4*	24000	m^2	$804	$19,300,000
36	GILMORE RD / HEPBURN RD 6*	24000	m^2	$813	$19,500,000
UPGRADE (SIGNALISE) INTERSECTIONS (E1)					
37	DONCASTER RD / BAYLEY GR	1	item	$160,000	$160,000
38	DONCASTER RD / ROSE ST Extn / BEACONSFIELD ST	1	item	$160,000	$160,000
39	DONCASTER RD / TOWER ST	1	item	$120,000	$120,000
40	DONCASTER RD / COUNCIL ST / WALKER ST Extn	1	item	$120,000	$120,000
41	WILLIAMSONS RD / WESTFIELD ACCESS RD / MEADER ST	1	item	$140,000	$140,000
42	TRAM RD / MERLIN ST	1	item	$120,000	$120,000
PUBLIC TRANSPORT					
43	NEW BUS INTERCHANGE	1	item		
44	BUS PRIORITY MEASURES (eg Smart Bus service) (4)	5000	m	$250	$1,250,000
45	NEW TRAM SERVICE (Tram Rd) (E2)		m		
46	PARK & RIDE SHUTTLE BUS SERVICES (E3)		m		
47	CIRCULAR SHUTTLE BUS SERVICE (arround Doncaster Hill) (E3)		m		
PEDESTRIAN / CYCLIST PROVISIONS					
48	SHARED PEDESTRIAN / CYCLE PATH (Doncaster Rd) (3)	-	m	$150	
49	GRADE SEPARATED PEDESTRIAN CROSSING	1	item	$3,000,000	$3,000,000
	(Doncaster Rd & Williamsons Rd)		item	$90,000	
50	SIGNALISED PED. CROSSING (Doncaster Rd east of Short St) (E4)				
51	PROVIDE CYCLE LANES ON ACCESS ROADS	4000	m		
	(Included in items 7 to 26)				

TABLE 11.1: DONCASTER HILL STRATEGY PRELIMINARY COST ESTIMATE CONTD (PROVIDED BY BSC CONSULTING ENGINEERS)

* Located parking stations on GTA map.

NOTES:

Costs are in 2002 dollars and are presented for information only- funding sources not indentified
All estimates include GST
(1) Acquisition costs to be provided by Council
(2) Rate is building cost only (not land)
(3) Cost included in streetscape cost estimate
(4) Smart Bus cost covers capital cost only for main roads through study area with operation cost dependent on route

EXCLUSIONS:

(E1) Excludes maintenance cost of $70000
(E2) Medium to long term state Governmewnt planning option
(E3) Excludes operating costs
(E4) Excludes maintenance cost of $40000

Refer to Appendix G for detailed cost estimates.

11.7.4 Land Acquisition

An attempt has been made in the infrastructure works discussion to identify indicative land acquisition requirements required as a part of the strategy. These items include:

- Cross roads and local access roads may require additional lanes at the intersections with main roads. This can be determined by preparing functional layout plans for the new intersections; and
- New access road links require various extents of land acquisition which will require preparation of functional layout plans to resolve.

11.8 SUMMARY

Note that many of the comments above are of a general or conceptual nature only and relate to the strategic nature of this study and report.

The intent is to demonstrate that the proposed land use future can be accommodated in a transport and traffic sense in the future years of 2011 and 2021, not to show the precise road network or development proposals for each site.

Additional work will be required to review Council's parking policy (including rates), develop a location for the public transport interchange and prepare a strategy and network of pedestrian/cyclist linkages and facilities.

12 CONSISTENCY WITH MITS

The Manningham Integrated Transport Strategy (MITS) is currently being undertaken by Council to set policy and strategy with respect to transport issues across the municipality. The following text is taken from an initial draft of the document dated June 2002 in order for the Hill Strategy to be consistent where possible.

The aim of the Manningham Integrated Transport Strategy (MITS) is to provide a sustainable, safe, equitable, efficient transport system for Manningham residents and business people. MITS is intended to complement, rather than to replace, approved Council strategies relating to arterial roads, public transport, road safety, bicycles and land use/development. It is also intended to mesh with integrated transport strategies from other Councils in the region, and with the Department of Infrastructure (DoI) strategies for Melbourne as a whole.

The existing transport system provides well for the majority of people in most parts of Manningham, but there are numerous deficiencies, for example:-

- *bus service coverage is good in the more developed western areas, but is very sparse in the east;*
- *the arterial road network generally provides good coverage and capacity, but parts of Templestowe Road and the northern parts of Thompsons Road and Springvale Road still need widening;*
- *a basic system of community transport is available, but its usage is restricted to HACC-qualified frail aged and disabled persons;*
- *bicycle and pedestrian facilities provide for localised travel and for recreation, but they are not structured to promote their use (as feeder modes to public transport).*

Manningham has a population which is growing only slowly, but the proportion of people over 65 years of age is increasing. Household income and car ownership are uniformly much higher than elsewhere in Melbourne, so most residents can afford, and have become very reliant, on private cars for personal travel. It is only long distance education travel for which public transport (bus) usage predominates.

Over the period from 2001 to 2020, the population of Manningham will only increase from 112,094 to 115,871 persons, so total travel demands will increase only slightly above current levels. However, there will be significant changes within the overall total demands, as follows:-

- *with an ageing population, there will be much greater need for public transport and other non-car transport options;*

- *local employment is expected to increase substantially (especially at Doncaster Hill) so local transport needs will increase;*
- *conversely, transport to and from the Melbourne Central Activities District (CAD) will decrease;*
- *without direct intervention, public transport usage will continue to decline.*

MITS responds to the forecast future travel needs of Manningham in ways which support Council's promotion of ecologically sustainable development and, in particular, promotion of the more sustainable methods of travel, namely public transport, cycle and walk. Fourteen "packages" of actions are recommended, as follows:-

1. *setting targets for sustainable travel in Manningham, consistent with DoI's 20/20/20 targets for metropolitan Melbourne (eg. doubling local public transport travel by 2020);*
2. *advocacy for substantial improvement in public transport services including higher frequency services, full coverage of evening and weekends, better spatial coverage of services throughout Manningham and improved information provision and promotion;*
3. *upgrading of arterial roads, particularly at intersections where priority for buses, cycles and pedestrians can be provided;*
4. *further traffic calming in local streets to reduce vehicle speed, divert trucks and assist vulnerable road users (cyclists and pedestrians);*
5. *linking of cycle paths and lanes, especially those linking to Doncaster Hill, other Activity Centres and schools;*
6. *upgrading of footpaths generally, but especially those leading to local bus stops and within Activity Centres;*
7. *integrated land/use transport planning for Doncaster Hill as the showcase for Council's sustainability policies and as its major contributor towards more sustainable travel;*
8. *similar integrated planning for The Pines and other smaller Activity Centres;*
9. *construction of the Hender Street park 'n' ride facility and advocacy for VicRoads' expansion of the Thompsons Road park 'n' ride facility and Banyule/Connex's expansion of the Heidelberg Railway Station park 'n' ride facility;*
10. *advocacy for the prompt and complete extension of the Eastern Freeway Extension and resistance of the Northern Route;*
11. *promotion of improved circumferential bus services from Box Hill, via Doncaster Hill to Heidelberg;*
12. *advocacy for higher capacity transit services, such as a tram loop via Doncaster Hill connecting Box Hill and North Balwyn, and improved transit services along the Eastern Freeway to the Melbourne CAD;*

13. *education and information for the Manningham community on the behavioural changes which MITS is promoting, that is towards the sustainable travel targets;*
14. *planning for the special travel needs of elderly persons;*
15. *monitoring of travel behaviour in Manningham to assess the extent of achievement of performance targets.*

13 CONCLUSIONS

The Doncaster Hill Strategy for the period to 2021 is an ambitious and exciting urban renewal project centred on developing an urban village with a range of land uses for future residents and visitors.

The servicing of these transport demands in a sustainable and environmentally responsible manner, while providing choice for users, is the challenge that this report responds to.

The simulation modelling undertaken for the years 2011 and 2021 indicates that the Hill can accommodate the travel demands of future residents, workers and visitors if a an integrated approach is adopted to transport and traffic planning based on changed travel behaviour.

The clearest statement about how to achieve the broad aims of the Strategy are to change peoples' travel behaviour by encouraging increased public transport use and reduced levels of car dependency. Council policies and guidelines will form a key element of this task, along with Council acting as an advocate of change in travel behaviour.

The report shows that the Strategy and its growth forecasts are technically able to be accommodated in a transport demand sense under Scenarios C and D. However, Scenario D is a technically superior option that reduces impacts on local streets.

A detailed set of recommendations are set out in Section 11 along with a conceptual road network layout in Figure 10.4 for Scenario D.

A number of issues remain unresolved such as the location and layout of a new transport interchange with sufficient flexibility and capacity to cater for a range of possible future public transport alternatives. These may include new tram routes and bus routes. The Department of Infrastructure has questioned the logic and flexibility of locating the interchange in Westfield at the rear of the site rather than al alternative more visible location. The discussion in Section 11.2.5 recommends a visible and easily accessible location at or close to the corner of Doncaster Road and Williamsons Road.

Further work is required to review Council's car parking policy in view of the Strategy aims for the Hill. In addition, it is recommended that a pedestrian and cyclist strategy be prepared for the Hill to guide and respond to development in the coming years.

The Strategy should be reviewed on a regular basis against the progress and outcomes of the Metropolitan Strategy and ongoing public transport planning so that any infrastructure proposals are given the best chance of success and masterplanning support. This first review is recommended to be in late 2002 and thereafter on an annual basis.

The model is intended to function as a living resource able to be quickly and efficiently updated with new development proposals, public transport options and planning futures. These alternatives can then be tested and more detailed recommendations made on road network changes, land acquisition and developer contributions.

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Various GTA Consultants meetings with Council, Westfield, VicRoads and the Department of Infrastructure.

APPENDIX A – TRAVEL DEMAND MODEL

APPENDIX B – TRAFFIC SURVEYS

APPENDIX C – PARAMICS MODEL

APPENDIX D – 2001 EXISTING CONDITIONS

APPENDIX E – FUTURE YEAR ANALYSIS AND RESULTS

APPENDIX F – FORECAST CARPARKING DEMANDS

APPENDIX G – DETAILED COSTING DATA