



# Strategic Adelaide Model

Integrated Modelling Framework

November 2023 Transport Insights



Government  
of South Australia

Department for Infrastructure  
and Transport

# Overview

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History of Strategic Modelling in DIT

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Integrated Modelling Framework

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Strategic Adelaide Model (SAM)

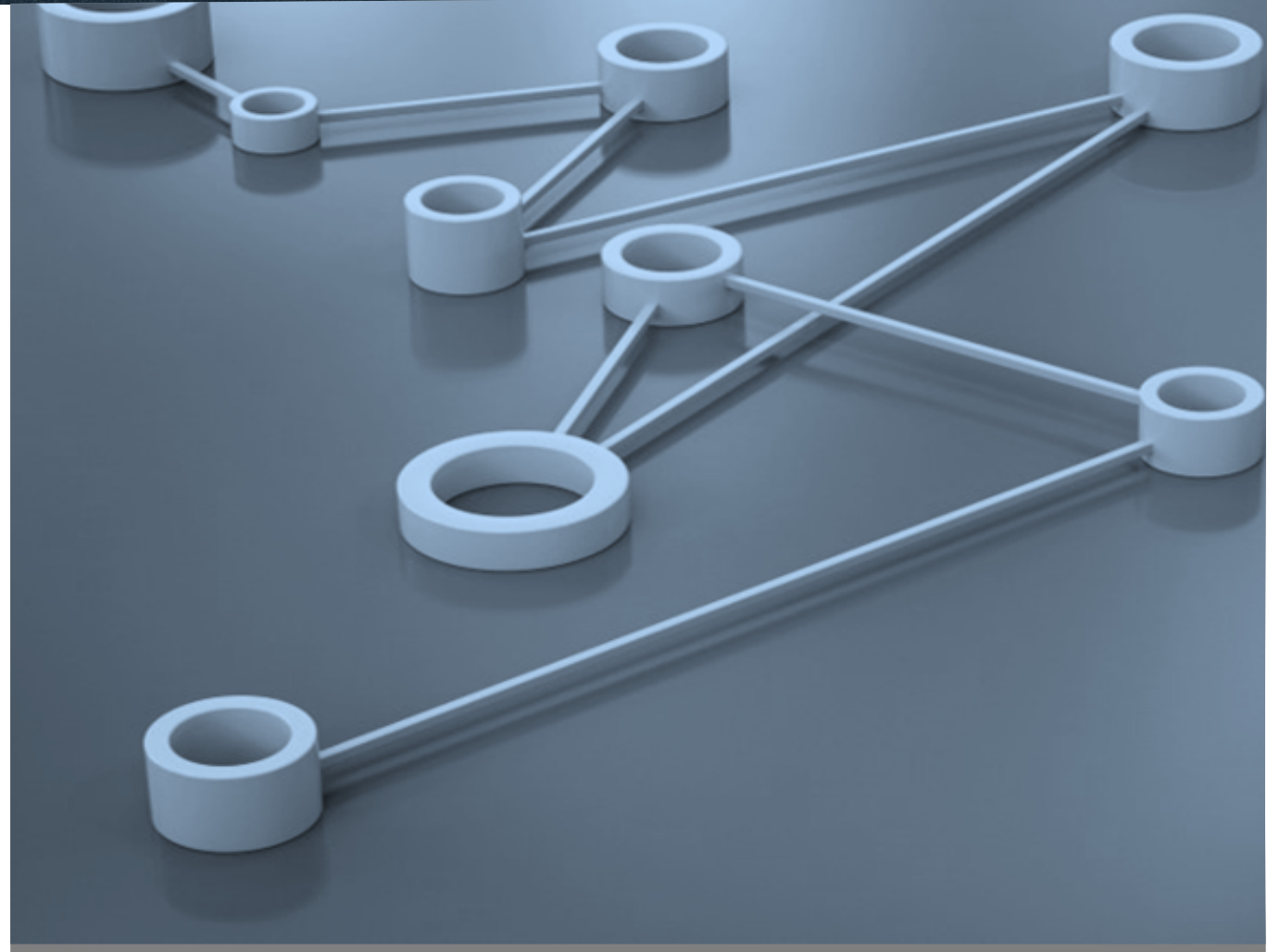
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Insights

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Questions

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# History of Strategic Modelling in DIT



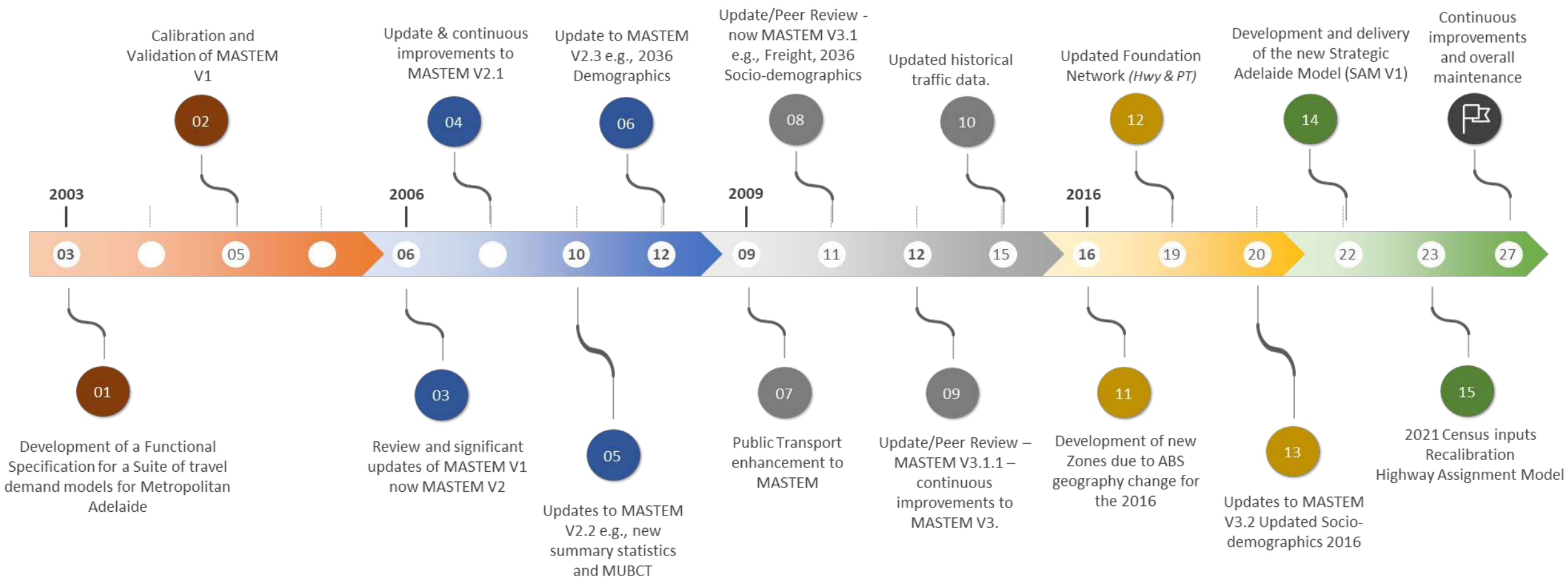
## MASTEM V1

## MASTEM V2

## MASTEM V3

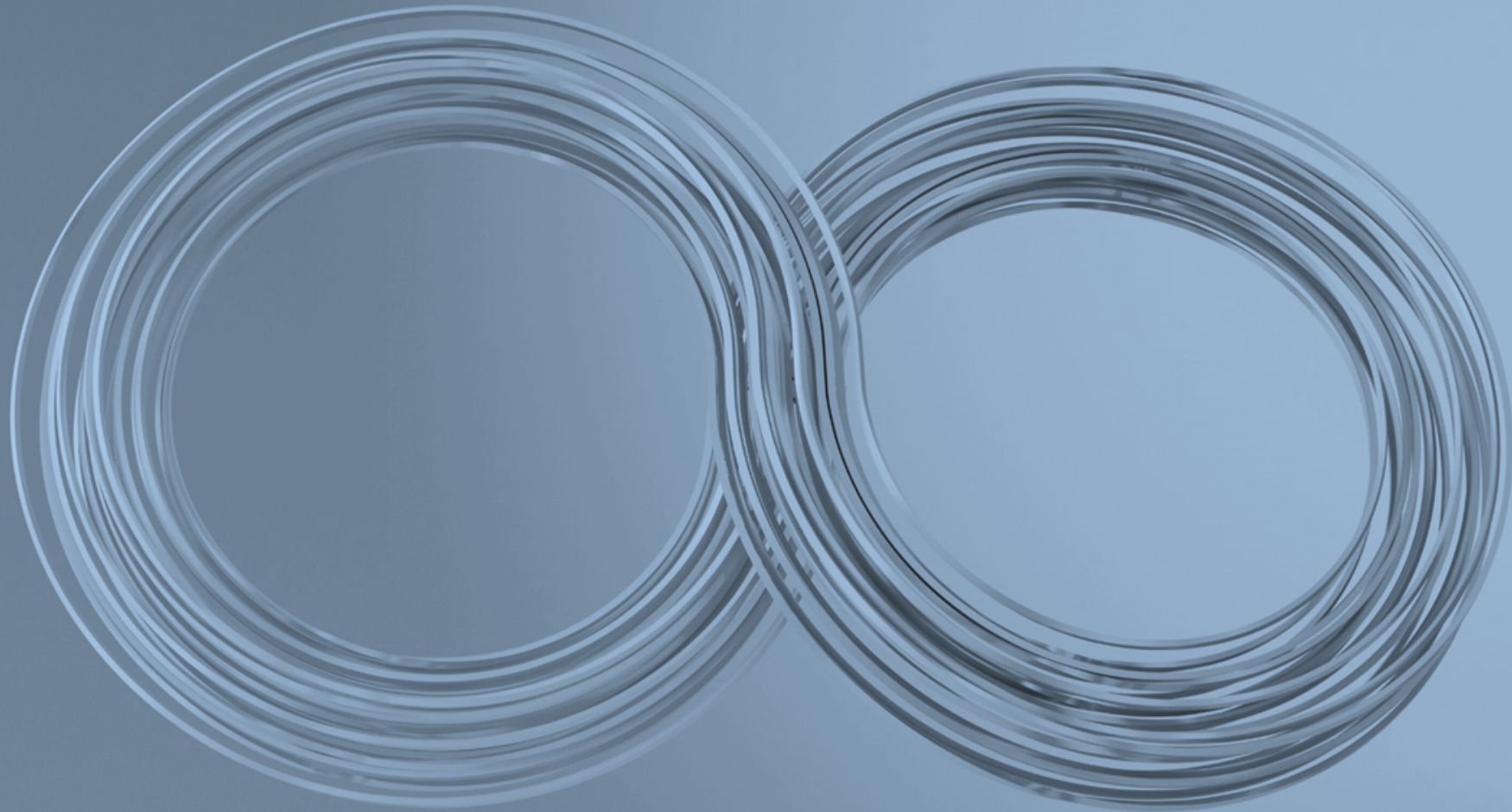
## MASTEM V3.2

## SAM V1



History of Strategic Models in DIT

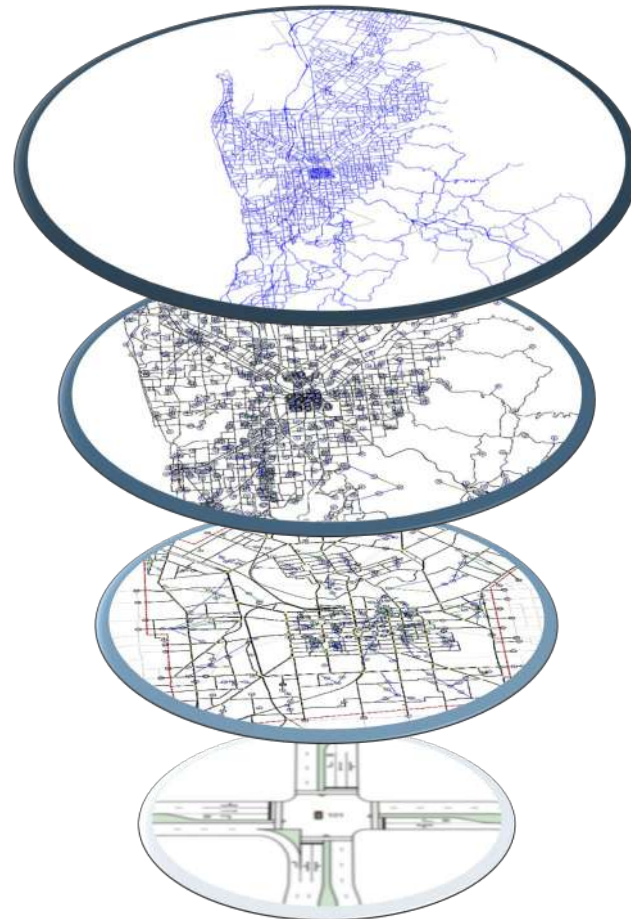
# Integrated Modelling Framework



# DIT's Integrated Modelling Framework

## Input Requirements

Input Data Type	Owner	Data Requirements
Demographics	Population and Dwelling	ABS / PLUS Current and Future
	Employment	ABS / PLUS Current and Future
	Education	ABS / PLUS Current and Future
Network	Road	TNIS Current and Future
	Public Transport	TNIS Current and Future
	Cycling and Walking	TNIS Current and Future
Travel Behaviour	Public Transport Patronage	SAPTA / TA Current
	Freight Flows	TA Current
	Traffic Surveys	TA Current
	Cycling and Walking	TA Current
Land Use	Household Travel Survey	TA Current
	Regions (TAZs)	PLUS / TA Current and Future



## Strategic Modelling (SAM) – Cube

- Assess high-level, network wide impact of changes to land use, demographics and infrastructure (i.e., perform what-if analysis)
- Predict travel demand by mode and in doing so create origin-destination matrices (i.e., flow by zone by mode)

## Tactical Modelling (TAM) – Aimsun

- Allocate demand predictions to the road network in a more granular and realistic manner
- Provide evidence for the assessment and comparison of project options or operational policy changes at the road network level

## Operational Modelling (TAM subarea) – Aimsun

- Provide evidence and assistance for the project design process and option selection at a subnetwork level
- Optimise corridor phase signalling test

## Micro-analytical Modelling – (e.g., SIDRA)

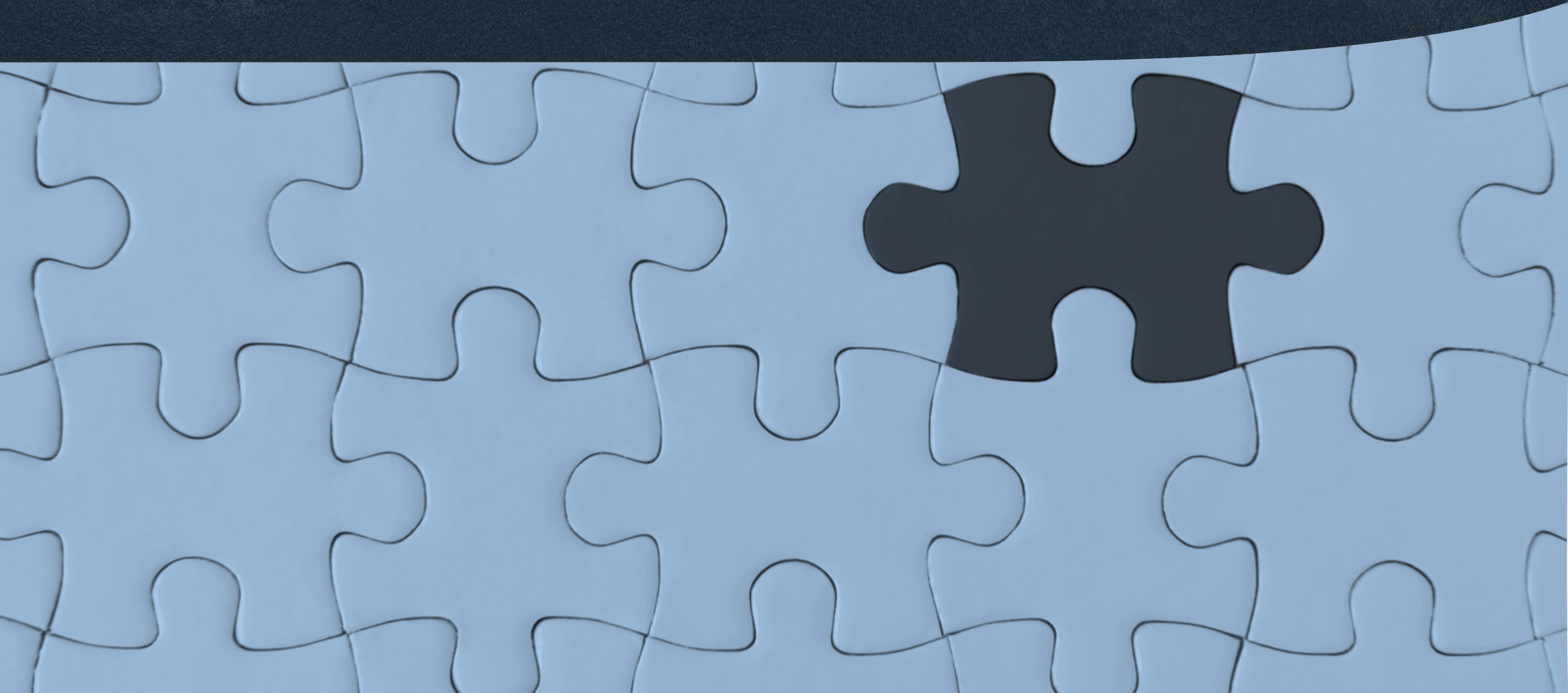
- Optimise signal operation
- Optimise intersection design

# Using the Right Model

Task	Model Type				
	SAM	TAM (Macro)	TAM (Meso)	TAM (Micro)	Micro-analytical (e.g. SIDRA)
Land Use / Transport Planning Policy Development / PT option testing	●	●	●	●	●
Significant Transport Interventions Feasibility / Scoping Study / Economic Analysis	●	●	●	●	●
Development Impact Assessment*	●	●	●	●	●
Road projects option testing	●	●	●	●	●
Detailed Design Traffic Management Plans	●	●	●	●	●
Traffic Operations Incident Management	●	●	●	●	●

\*Depending on the type of DIA, any or more than one model may be needed.

# SAM — Strategic Adelaide Model

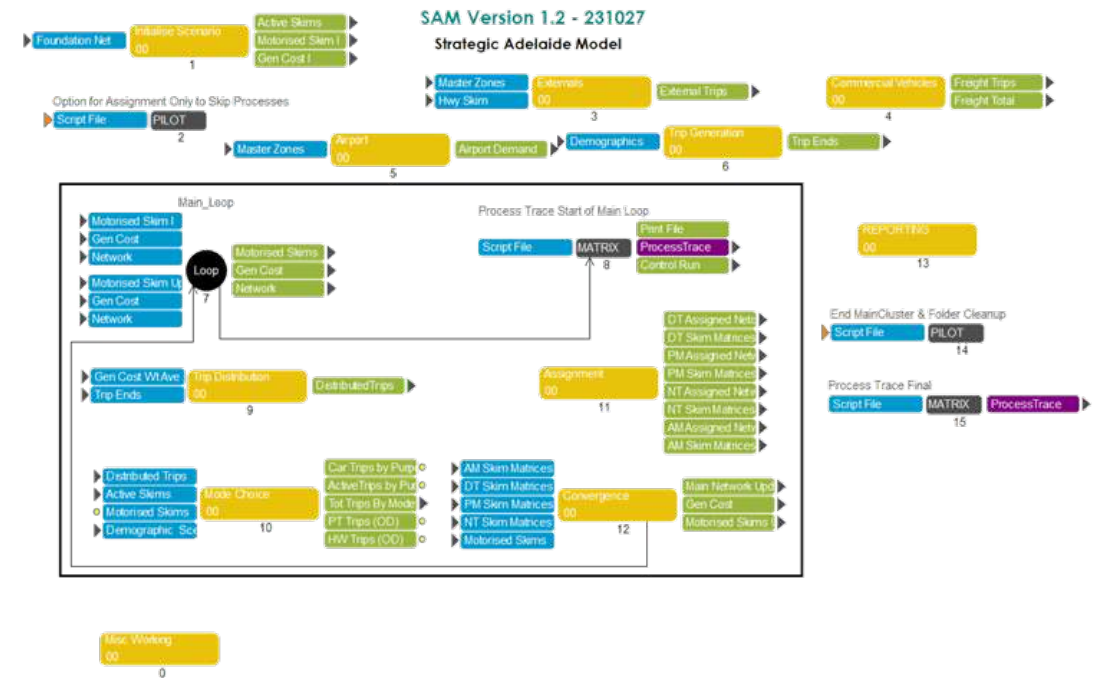




# What is SAM?

## What is SAM?

- **SAM** is a Travel Demand Forecasting Model.
- What is a Travel Demand Forecasting Model?
  - *A set of mathematical relationships describing when, why and how people and goods move.*
- A Travel Demand Forecasting Model can answer the following questions:
  - How many trips will people make? (Trip generation)
  - Where will people travel? (Trip distribution)
  - How will people travel? (Mode choice)
  - What routes will people take? (Trip assignment)



# Primary Objectives for SAM

- Data refresh (*base year 2016*)
- Expansion of zone system and model coverage
- 4 in 1 model
- Significant improvements in coding and documentation within the model
- Improvements in run times
- Greater Quality Assurance

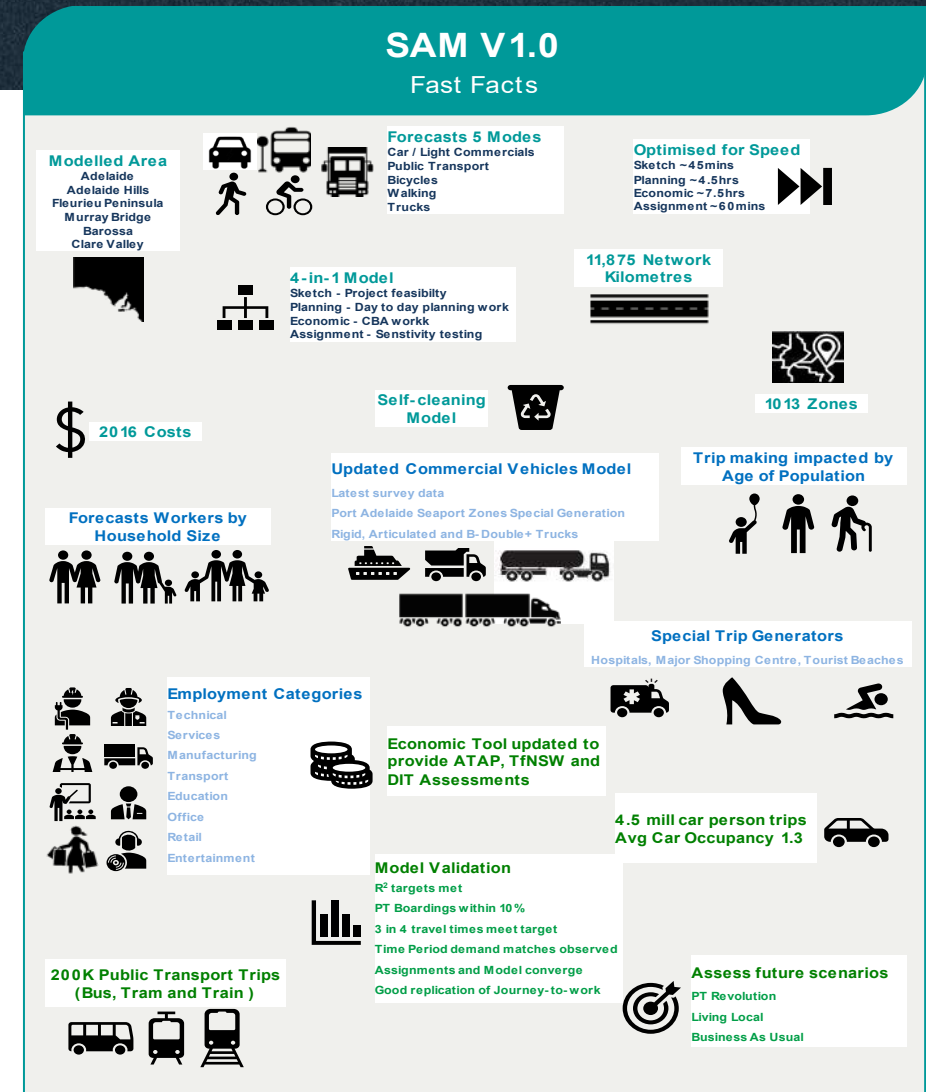
# Validation Criteria

- The validation tests for the strategic model are summarised below. Except where specified, the tests were applied to the base year model (2016) and use observed data from the same general period (2015-2017).
- An independent peer review has also been done.

Model component	Test	Target	Source
Demand matrices	"Trumpet" plots of residuals on screenlines (directional by time period and 24-hour)	As per VicRoads guidelines	VicRoads \$2.3
	Comparison of modelled daily home-based work trips with 2016 Census Journey-to-Work trips <ul style="list-style-type: none"> <li>Volumes by origin and destination (SA2 or SA3)</li> <li>Mode shares by origin and destination (SA2 or SA3)</li> <li>Trip length distributions</li> </ul>	For information only	DIT requirement
Traffic volumes (including freight)	Scatter plots of individual link flows (directional by time period (AM, IP, PM) and 24 hour). Separate plots are to be provided for all vehicles and freight vehicles.	R2 .> 0.9  Y = (1.0 ± 0.1)x N.B. Freight vehicles need not meet these criteria, but fit statistics should still be supplied	VicRoads \$2.4
	Tables of observed and modelled hourly volumes with GEH statistic (directional by time period) with identification of outliers (GEH > 5) in the project corridor	GEH < 5 (>50% of cases)  GEH < 10 (>80% of cases)	VicRoads \$2.7.4
Travel times	Travel times along specified routes by time period (AM, IP, PM), including plots of modelled results and observed travel time ranges.	Modelled time is within the 95% confidence interval or one standard deviation (whichever is larger). The 95% confidence interval is given by  $CI = X \pm t0.025$	VicRoads \$2.6
Public transport	Tables of observed and modelled public transport boardings by route in the project corridor and on feeder roads	For information only	DIT requirement
Model convergence	Measurement of differences on successive assignment iterations	<ul style="list-style-type: none"> <li>%GAP (delta) &lt; 1%</li> <li>RAAD &lt; 1%</li> <li>pDiff (5%) &lt; 95%</li> </ul> N.B. can use similar measures provided by modelling software	VicRoads \$2.1.1
Model sensitivity tests (future year)	Modifying the value of time in generalised cost and path-building, and noting changes in volumes at several points along the project corridor and total vehicle-kilometres travelled: VoT + 10% @ 2041	For information only	ATAP \$5.8.5
	Modifying zonal land use and calculating the change in vehicle-kilometres travelled: Population + 10%; and Employment + 10% @ 2041	For information only	ATAP \$5.8.5

# SAM Updates - general

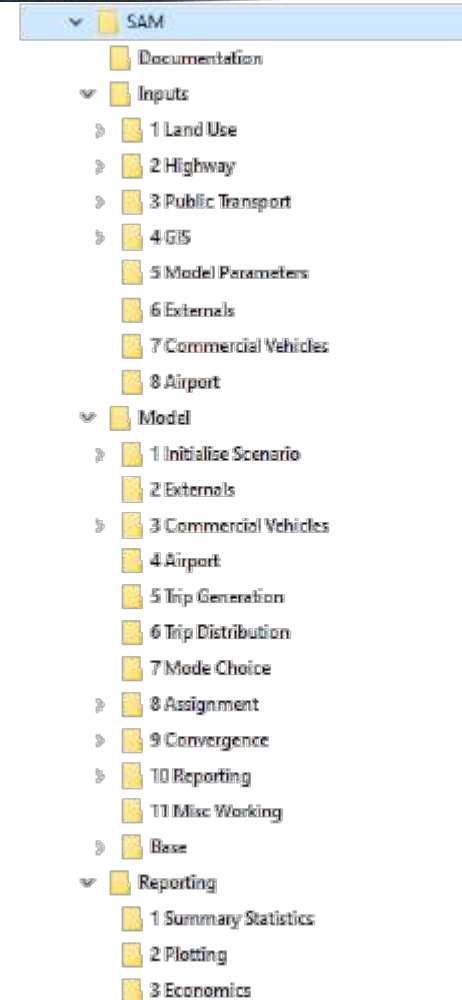
- **Replaced MASTEM**
  - Departments previous Strategic Travel Demand Model
- **Re-based 2016**
  - 2021 re-base in progress
- **Increase and refined Geography**
  - Large model boundary and refined zonal system
- **Additional sub-model and reporting**
  - Sub-area module(s)
  - Sub-area analysis and reporting
- **New Economic Tool – SODUBT**
  - SAM Origin Destination User Benefit Tool (SODUBT) economic module



# SAM Updates - continue

## Folder and File Structure

- The creation of SAM provided an opportunity to simplify the folder structure. The new structure has been designed to split up into all Voyager Files, all input files and all out files.
  1. Documentation;
  2. Input Files;
  3. Model Files; and
  4. Reporting.
- New CUBE applications and scripts have been developed/written to take advantage of the new folder/file structure to ensure a clean and relatively simple structure.



# SAM Inputs

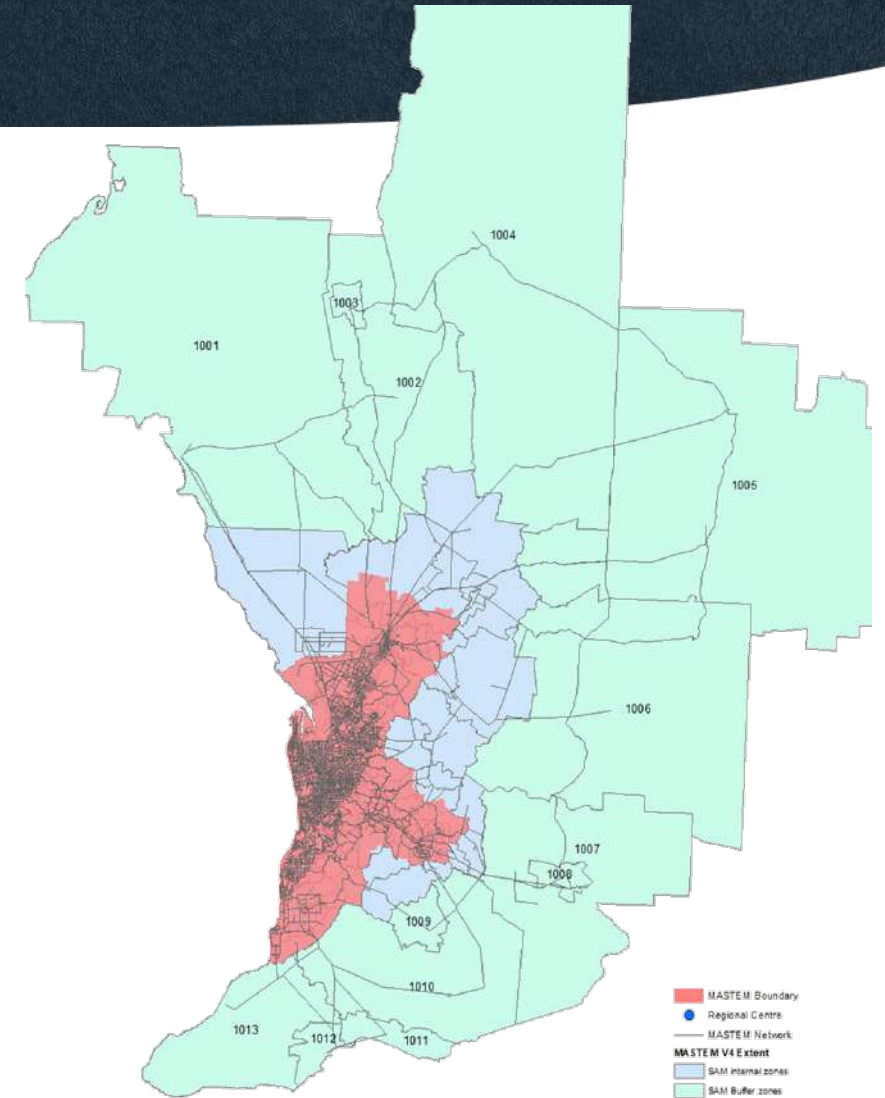
- The following key inputs for each scenario in SAM:
- Each scenario in SAM is defined in the CUBE Scenario manager and controlled by a series of CUBE Catalog Keys.
- A Catalog Key is a series of user definable, scenario-specific variables that define a scenario.
- Within SAM keys have been arranged into the following groups:
  - SAM Model Inputs;
  - Highway Inputs;
  - Special Generators;
  - Public Transport Inputs;
  - Model Parameters; and
  - Reporting Requirements.

The image displays three screenshots of the Strategic Adelaide Model software interface, showing different input categories:

- Top Screenshot:** Shows the "SAM Model Inputs" section. It lists various input files such as "General Parameters", "Household Generation Parameters", "Trip Production Coefficients", "Trip Attraction Coefficients", "Travel Market Segmentation", "Distribution Parameters", "Mode Choice Coefficients", "Parking Cost", "Geographical ASC", "Time of Day Factors", and "External Trip Parameters". Each input has a corresponding file path and "Browse" and "Edit" buttons.
- Middle Screenshot:** Shows the "Model Parameters" section. It lists various input files such as "General Parameters", "Household Generation Parameters", "Trip Production Coefficients", "Trip Attraction Coefficients", "Travel Market Segmentation", "Distribution Parameters", "Mode Choice Coefficients", "Parking Cost", "Geographical ASC", "Time of Day Factors", and "External Trip Parameters". Each input has a corresponding file path and "Browse" and "Edit" buttons.
- Bottom Screenshot:** Shows the "Reporting Requirements" section. It lists various input files such as "Select Link Run", "SLA Links", "Select Link Group Specification", "PT Factors LIC3", "PT System", "Fare System", "PT Fact Dummy Build file", "PT Access Mode Parameters", and "Park Ride Capacity Curve". Each input has a corresponding file path and "Browse" and "Edit" buttons.

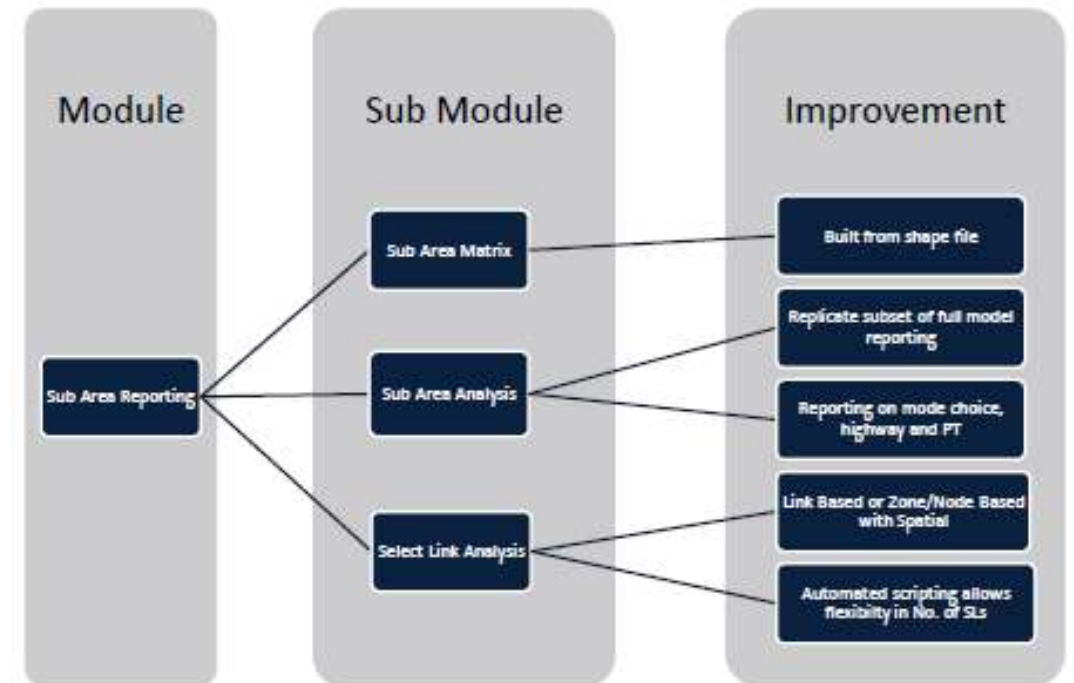
# SAM Geography

- Expansion of zone system and model coverage
  - Study area expanded considerably over MASTEM area
  - 990 internal zones – allowing for future splitting if required
  - External Zone 1001 – 1013 are included as buffer zones
    - New approach to Externals, not adopted in any other model in Australia
    - Buffer zones to enable better modelling of trips near edge of study area



# Sub-Area Module

- Sub-area Reporting Module
- Automated sub-area creation using a shapefile
- 3 Sub Modules
  - Sub Area Matrix
  - Sub Area Analysis
  - Select Link Analysis
- Enhanced Sub-Area model outputs and reporting
  - Summary statistics – full and sub-area
  - Select link and zone reporting





# SAM — 4 in 1 Model



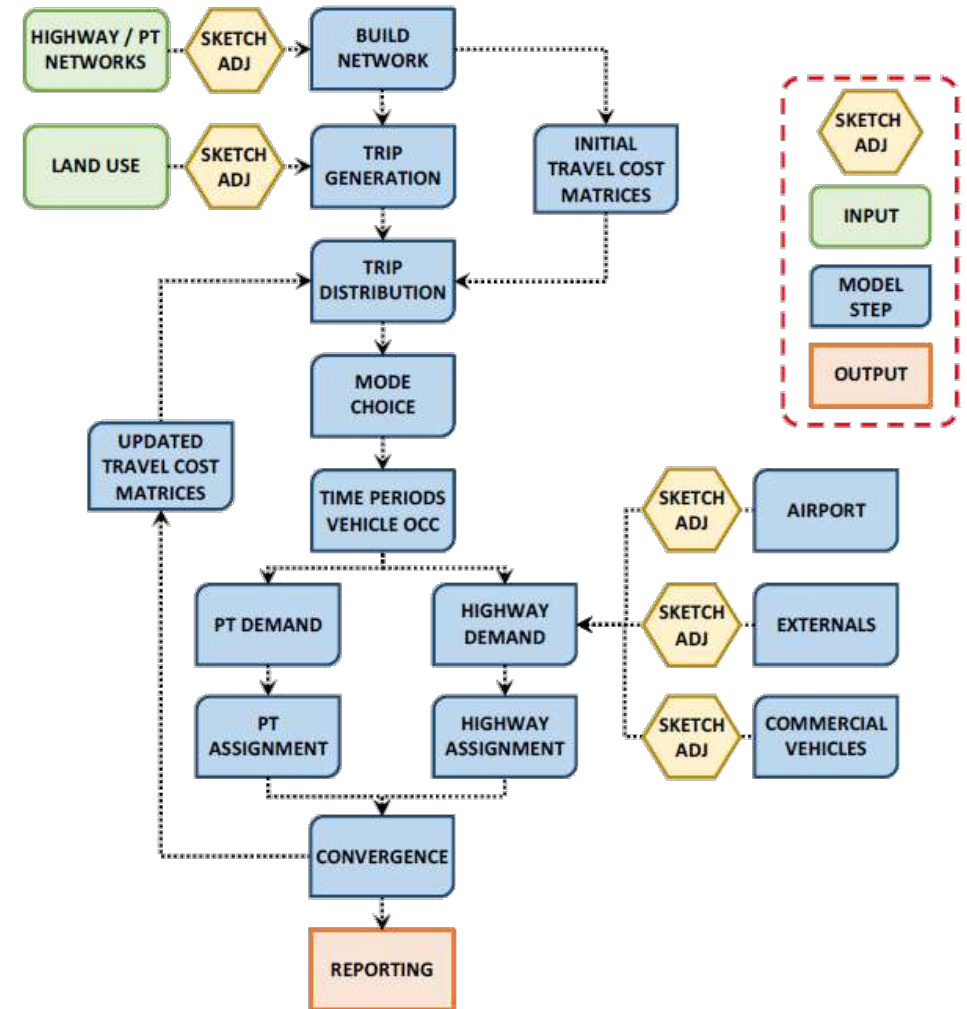
# 4 in 1 Model

4 modules of SAM to provide a range of strategic and planning options

- **SAM-S** sketch model provides ultrafast full model runs at a strategic level
  - Strategy/Policy development
  - Strategic scenario testing
  - 45 – 55 minutes runtimes
- **SAM-P** planning model provides a more detailed scenario planning ability
  - Planning initiative - code amendments
  - Issues identification and prioritisation
  - 3 – 4 hours runtime
- **SAM-E** economic model provides a full model runs with detailed outputs
  - Strategic economic assessment – business case input
  - 6 -7 hours runtime
- **SAM-A** assignment only model
  - Uses the Planning/Economic model assignment output as the base
  - Rapid test of alternative networks or demand
  - 20 – 30 minutes runtime

# SAM-S

- Assumes same study area of SAM
- More aggregate zoning system
- Higher level (feasibility) planning needs less granularity
- Not to be used for concept planning
- Purpose is to provide a very fast model
- SA2 zoning system
- All modifications automated



# SAM-S

- Conversion of SAM-P to SAM-S

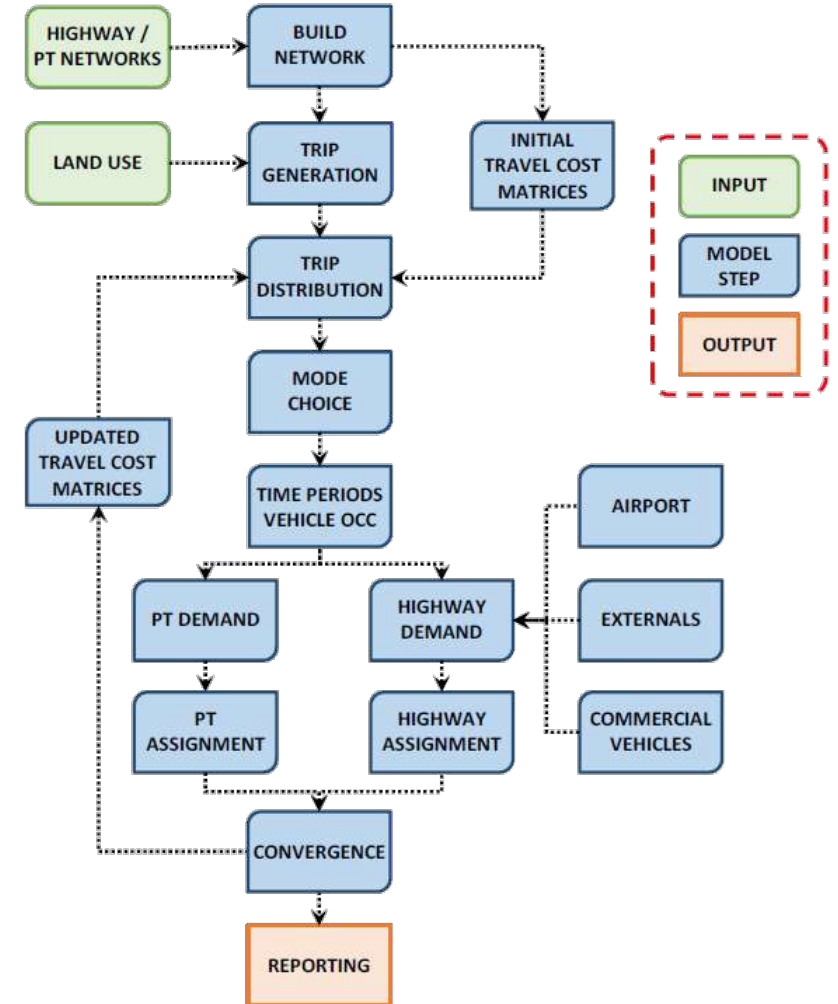
To remove any need for multiple networks, the following approach was adopted:

- A concordance between planning and sketch zones
- One centroid connector from each planning zone is retained
- Centroid location is geocoded based on zone shape
- Each centroid connector's distance is recalculated
- Trip generation totals for the planning zones are produced to provide the number of trips



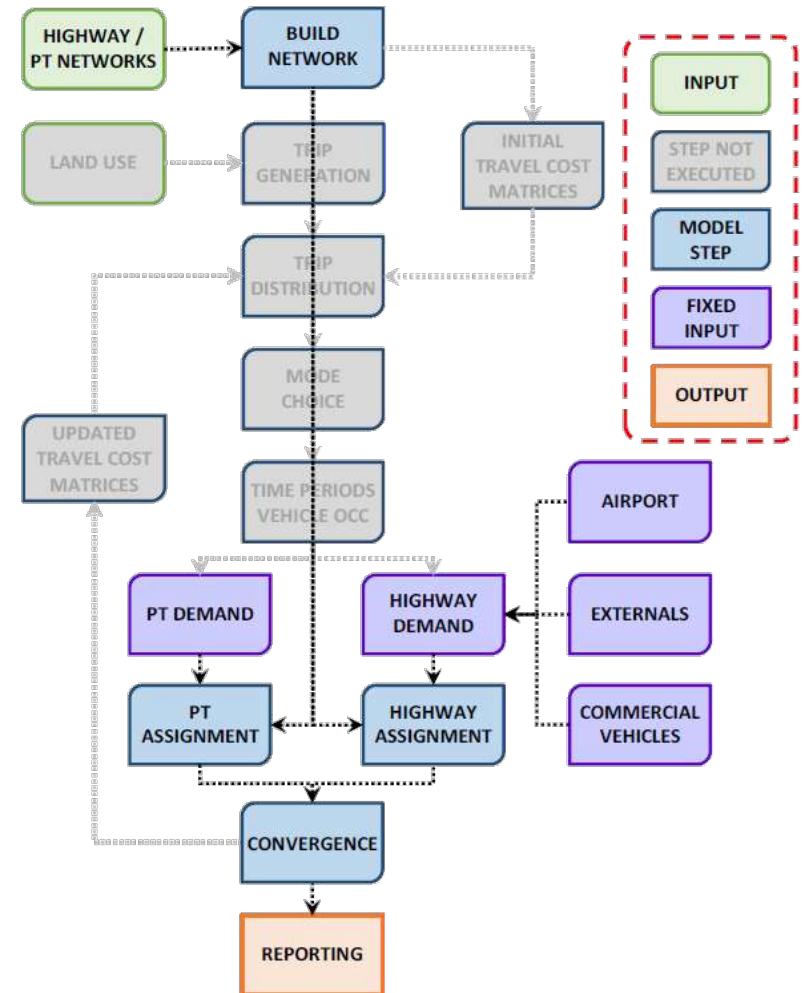
# SAM-P/E

- SAM-P uses integer assignment to speed up runtime – suitable for planning
- SAM-E full model run - to be used for economic work

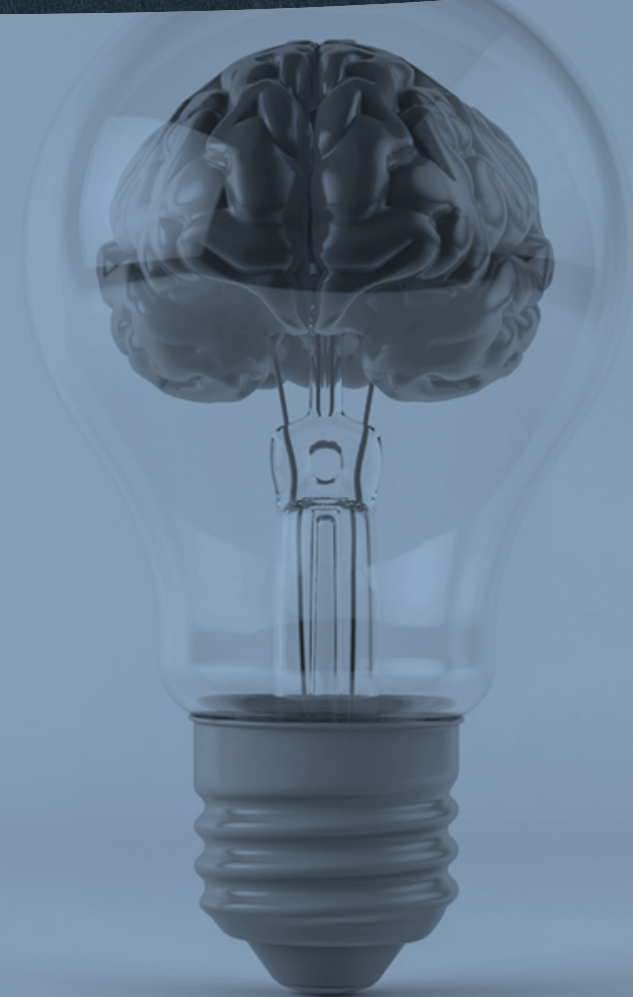


# SAM-AP/AE

- SAM-AP / AE assignment only runs but can be used for planning or economics. Rapid test of alternate networks or demands



# What Can SAM Do?



# What Can SAM Do?

## SAM informs strategic planning:

- Scenario testing
- Strategy development
- Strategic economic assessment
- Issues identification and prioritisation
- Planning initiatives selection
- Provides demand matrices for TAM



# Future Travel Scenarios

Description

## Business as usual

Continue to be a car reliant city

- Land use patterns largely unchanged
- Public Transport market share unchanged
- New technologies do not change travel behaviours



## PT Revolution

Improve and promote PT as the preferred travel choice

- High level of trips to the CBD are by walking, cycling and public transport
- Through CBD movements by cars are eliminated
- Full-radial and orbital CBD Mass network
- Wide range of FMLM options



## Living Local

Shift to reduced travel

- Reduced 'undesirable' private travel and more WFH and deliveries.
- Dispersed transport demand by time and location
- More (and easier) trips for leisure, freight and local delivery



## New Accessibility

Increase private transport, but share with others

- Autonomous and Electric Vehicles
- Dispersed travel demand
- Regional hubs develop
- Wide range of FMLM options
- Targeted BRT Expansion



Key Benefits and Issues

✓ Works at current activity levels.

- × Will not achieve net zero targets due to car dependency and slow technology adoption
- × Congestion will grow with population and activity
- × Accessibility issues are not addressed
- × Continued high infrastructure investment is dependent on continued availability of financing.

- ✓ Can support higher populations with less congestion impact
- ✓ Potential to improve place and accessibility outcomes
- ✓ Potential to increase land development opportunities
- ✓ Can support net zero targets with accelerated electrification

- × No agreed CBD Access Strategy
- × High infrastructure investment is required, dependent on continued availability of financing.
- × Road space reallocation from cars may be resisted.

- ✓ Peak hour congestion reduces
- ✓ Quality of life improves as 'undesirable' travel is reduced
- ✓ Lowest cost to government
- ✓ Increased livability and job choice in regional and fringe areas
- ✓ Can support net zero targets with accelerated electrification

- Potential for road user charging
- Some CBD activity shifts to suburbs or regions.

- × Potential negative impacts of new or increased suburban deliveries and technologies (eg drones)

- ✓ New private sector options may enable enhanced accessibility and mobility at reduced costs.
- ✓ Can support net zero targets with accelerated electrification

- Uncertain impact on congestion
- Shift of activity towards regional hubs

- × Road space reallocation from cars may be resisted.

KPI: Average travel speed

KPI: PT mode share

KPI: % of journeys < 3km

KPI: PT+ shared private mode share

# Future Travel Scenarios Testing

## 01 Business as usual (BAU)

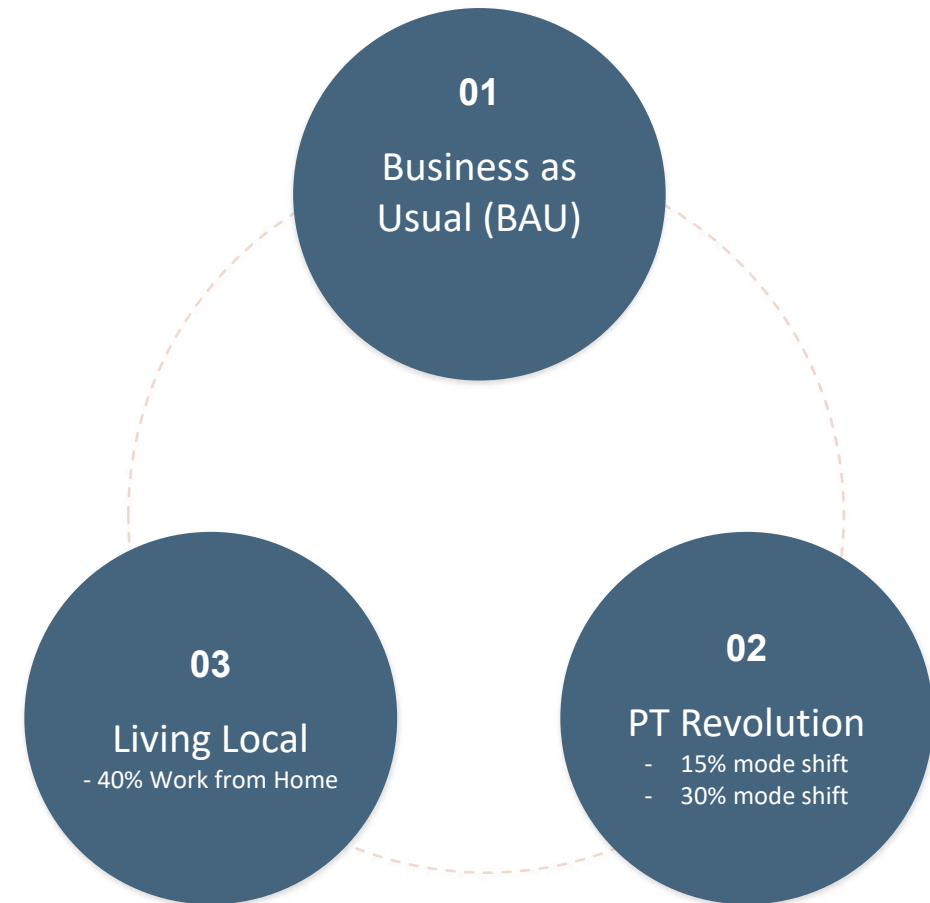
- Continue to be car reliant city
- Land use patterns largely unchanged
- Public Transport market share unchanged
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## 02 PT Revolution (PT-R)

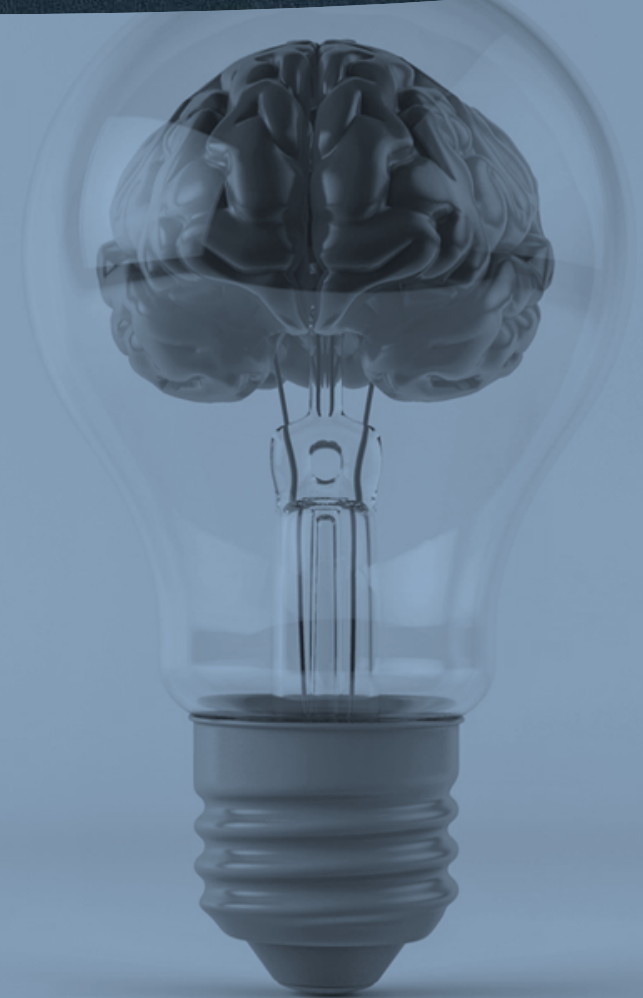
- Improve and promote PT as the preferred choice
- High level of trips to the CBD are by walking, cycling and PT
- Through CBD movements by cars are eliminated
- Full-radial and orbital CBD Mass network
- Wide range of FMLM options

## 03 Living Local (LL)

- Reduced 'undesirable' private travel and more Work From Home (WFH) and deliveries
- Dispersed transport demand by time and location
- More (and easier) trips for leisure, freight and local delivery



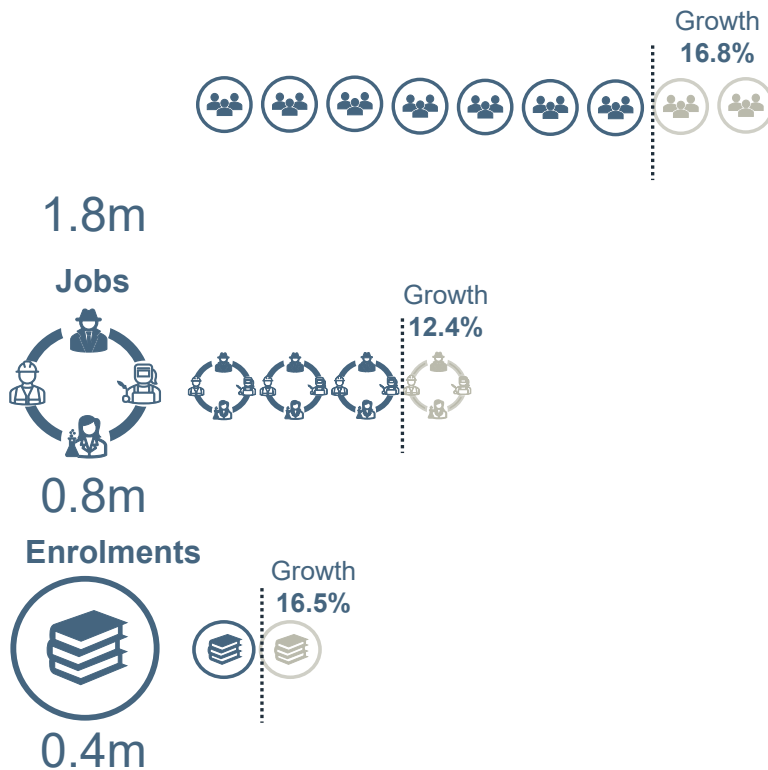
# Insights – PT Revolution 30%



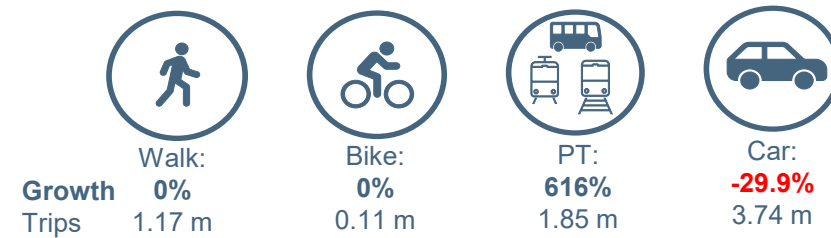
# Summary Statistics

## Growth in population and the economy

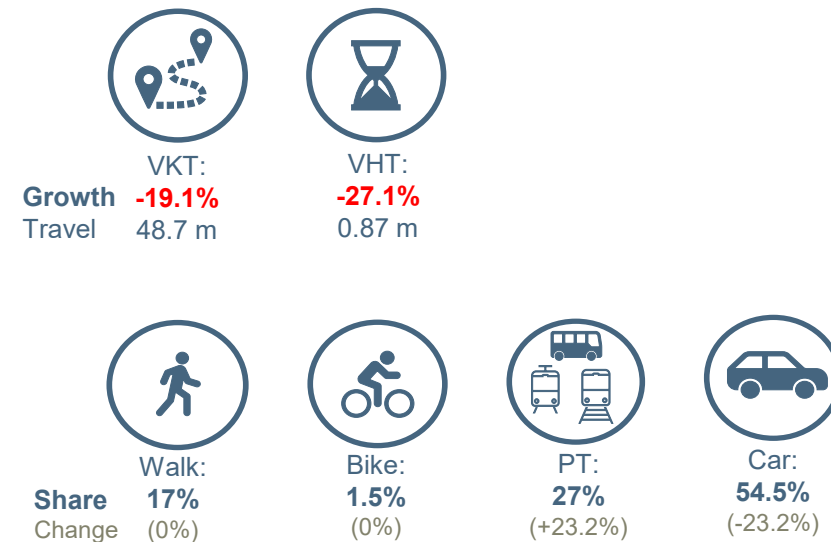
Growth to 2041, 2021 level illustrated by a dotted line



## Demand (in number of person trips made)



## Vehicle Travel Data (in number of vehicle kilometres/hours travelled)

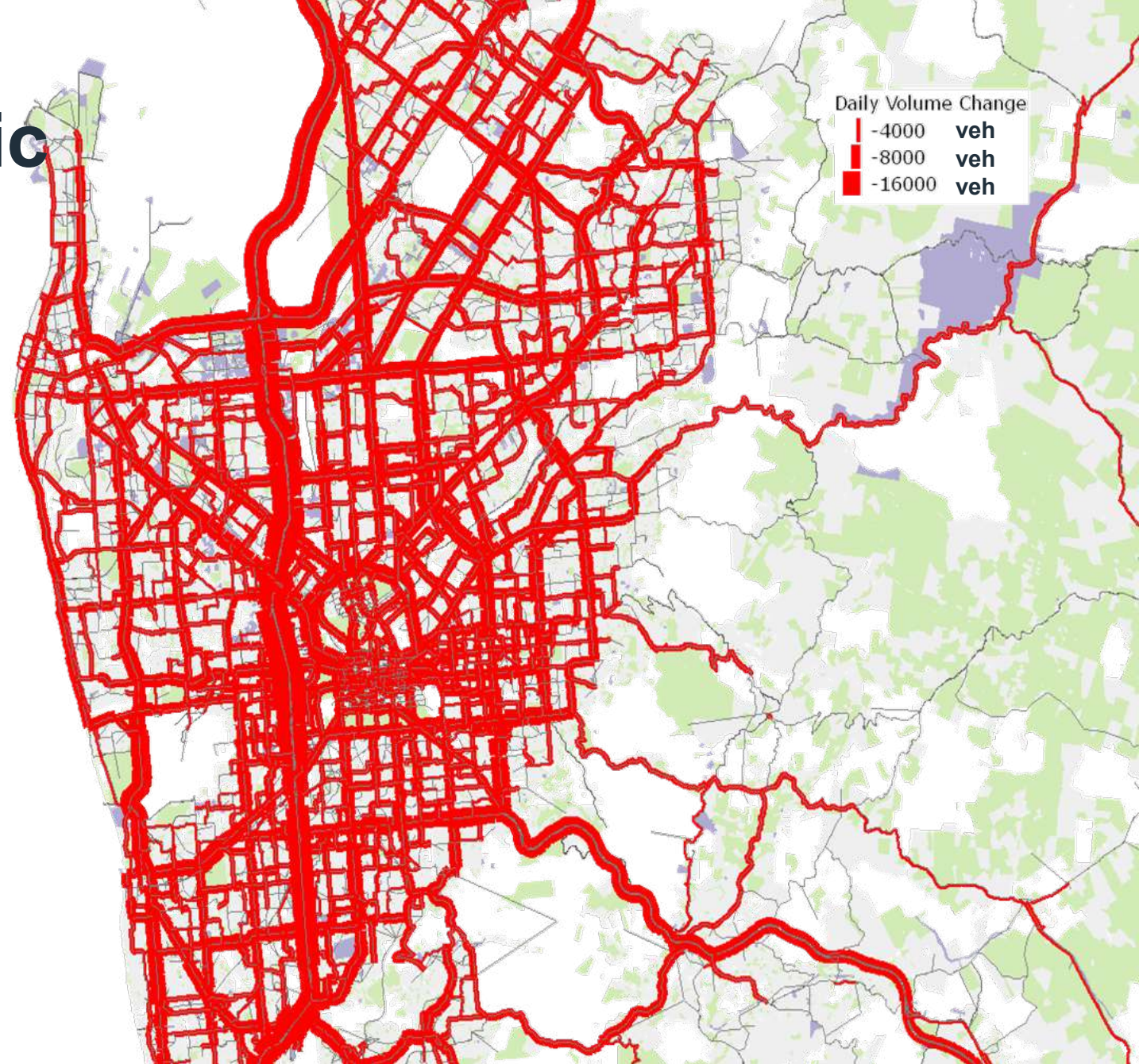


# Change in Daily Traffic

## Between BAU 2041 and PT Revolution 30%

The map shows the change in daily traffic between 2041 BAU and PT Revolution (30%).

- The red shading shows the decrease in daily traffic 2041 BAU and PT Revolution 30%.
- The main decrease in car demand centres around the major corridors such as the North South Corridor (NSC), Old Mount Barker Road, and Salisbury Highway.
- An overall reduction is evident in the daily traffic across the greater metropolitan Adelaide because of increasing the share of public transport mode to 30%.

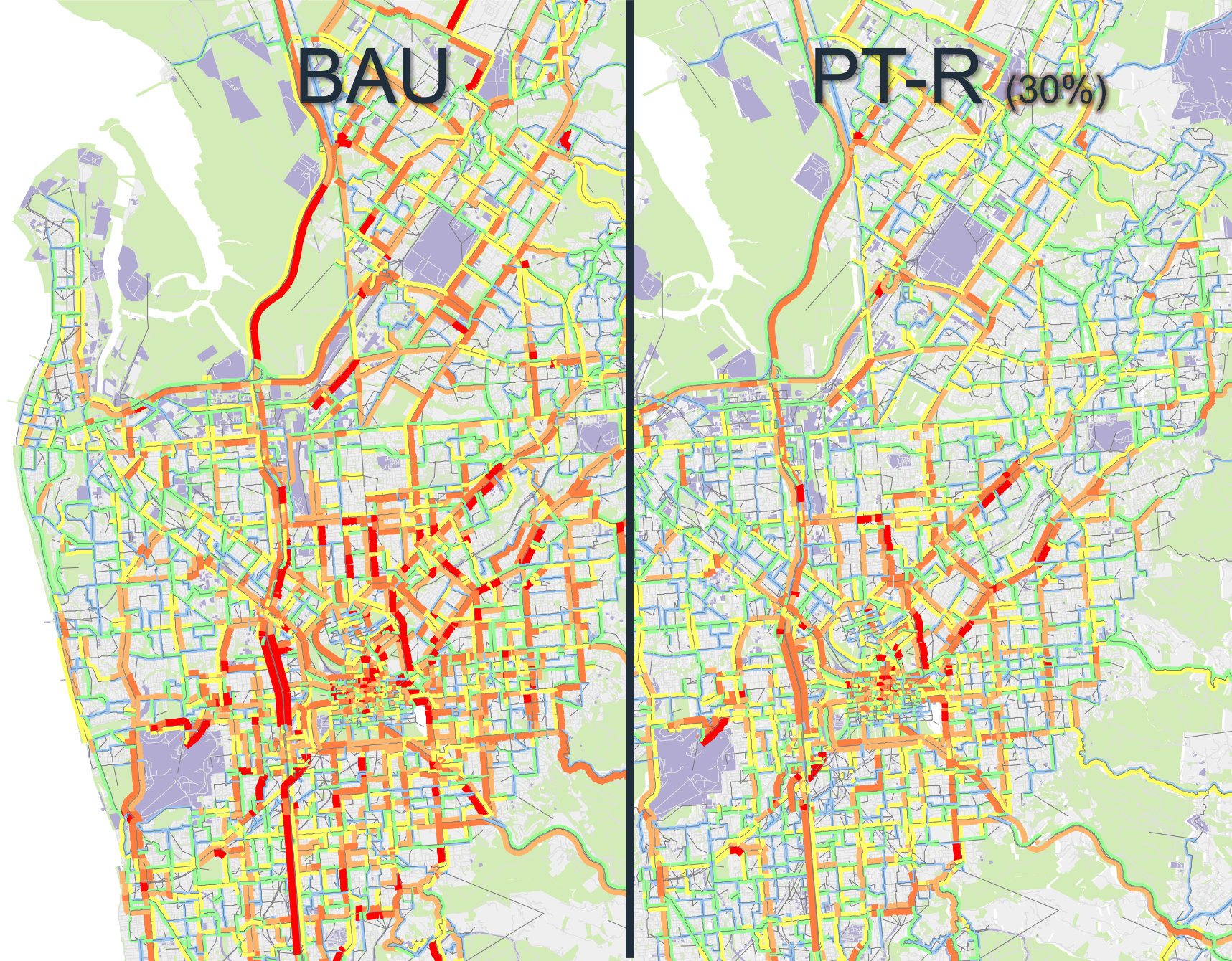
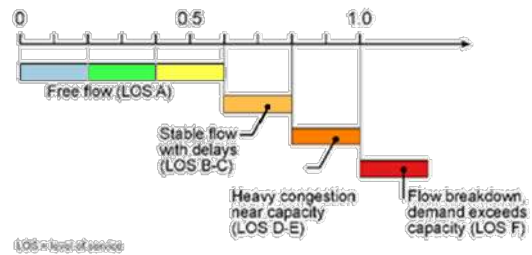


# Change in LOS

Between Base Case and Project Case

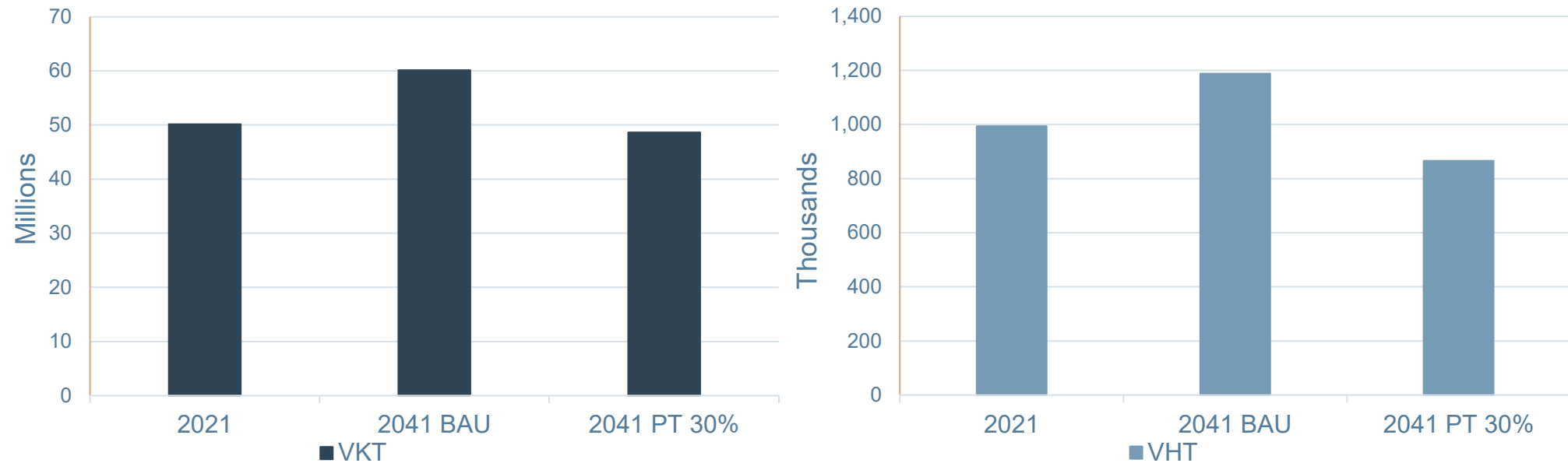
The map shows the Level of Service (LOS) between Base Case and Project Case scenarios.

Improvement to the overall road network performance is evident.



# Vehicle Data - Total

The chart below is showing total vehicle kilometers travelled (VKT), and total vehicle hours travelled (VHT)



- VKT and VHT include data for Cars and Trucks (Rigid, Articulated, B-Double).
- 2041 PT Revolution (30%) will see a decrease in VKT from 60.15 million to 48.64 million. This decrease of 19% in VKT reflects the decrease in the number of passenger car trips.
- 2041 PT Revolution (30%) will see a decrease in VHT from 1.18 million to 866.38 thousand. This decrease of 26% in VHT reflects the decrease in the number of passenger car trips.

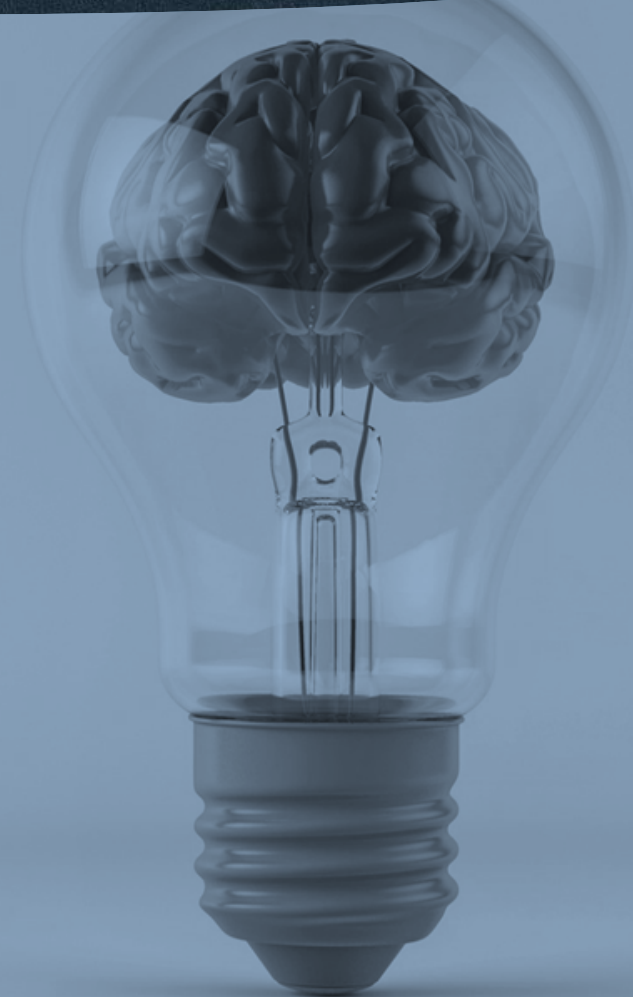
# Trip Characteristics

The table below is showing person trip distance (km), person trip time (mins), and average speed (kmph).

	2041 BAU			2041 PT-R (30%)		
Indicator	Trip Distance (km)	Trip Time (mins)	Avg Speed (kmph)	Trip Distance (km)	Trip Time (mins)	Avg Speed (kmph)
Car	12.41	14.58	51.04	12.86	13.58	56.84
PT	9.61	32.58	17.70	12.39	40.48	18.36
Bike	6.70	26.82	15.00	6.70	26.82	15.00
Walk	1.95	23.37	5.00	1.95	23.37	5.00



# Insights – Other



# Strategic / High Level Analysis

## What-if-analysis

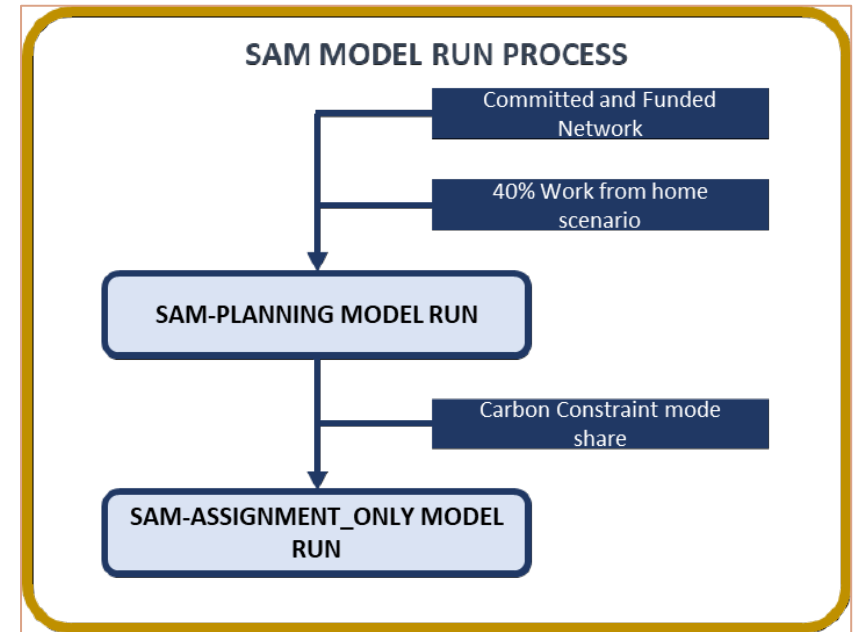
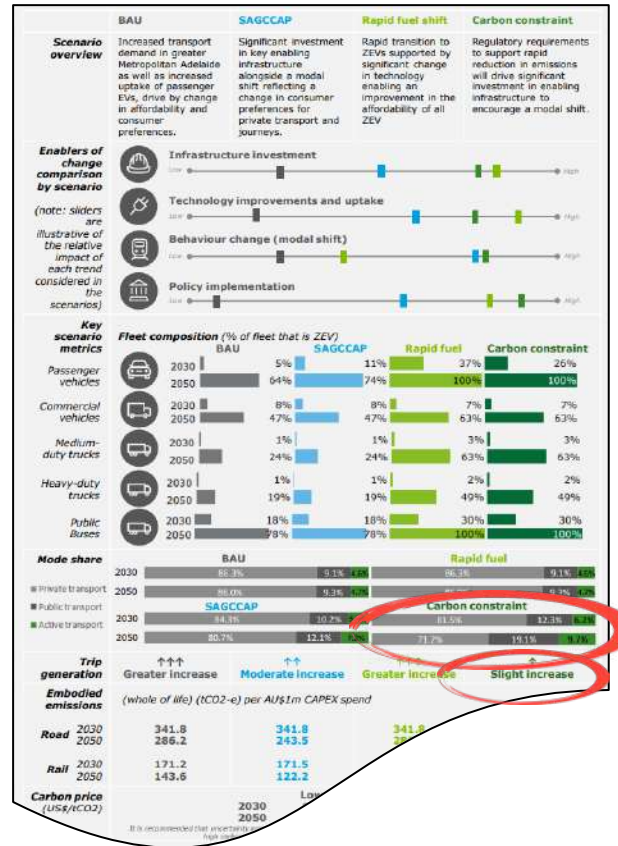
### 01 Business as usual (BAU)

- Continue to be car reliant city
- Land use patterns largely unchanged
- Public Transport market share unchanged
- New technologies do not change travel behaviour

### 02 Carbon Constraint (CC)

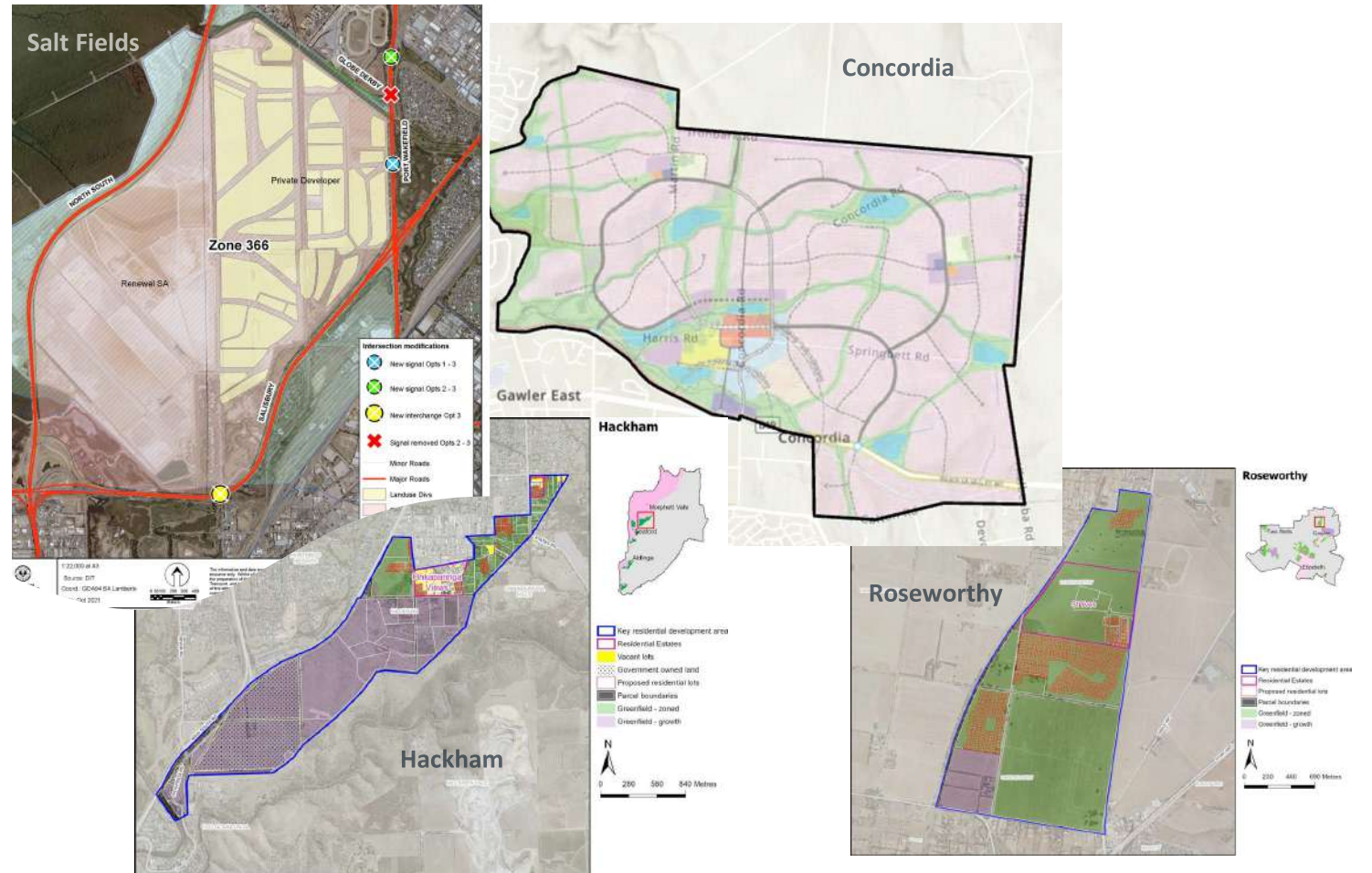
- Mode share shift
  - Doubling of PT% and Active Transport %
- Reduction in travel e.g., Work from Home
- Land use patterns will change
- Reduce emissions

Deloitte's Net Zero Transport Emissions Scenarios



# Code Amendment Assessments

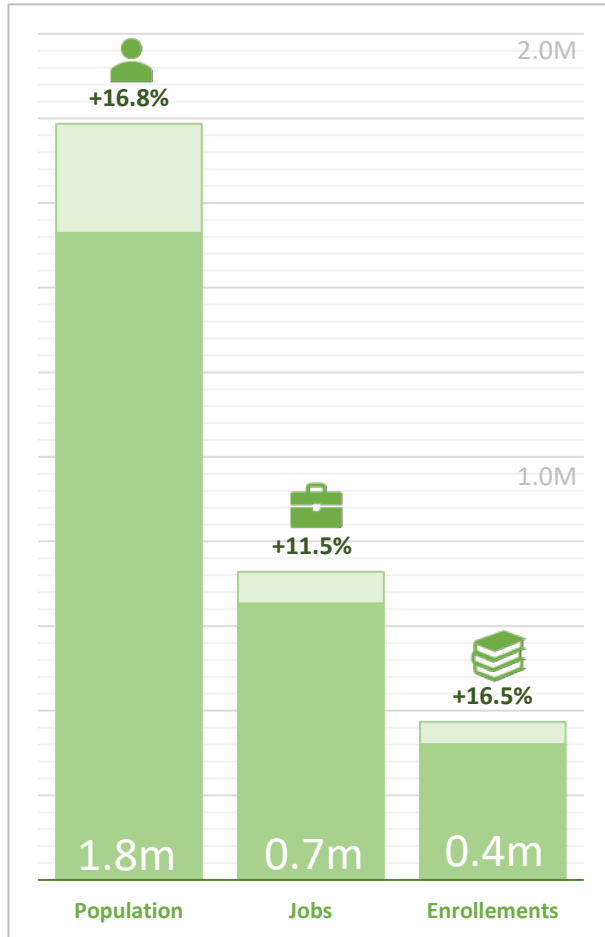
- 01 Salt Fields development
- 02 Hackham development
- 03 Concordia development
- 04 Roseworthy development



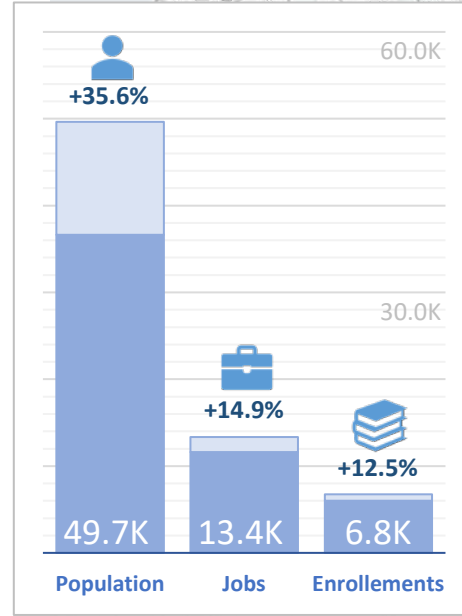
# Socio-demographics

Growth in population and the economy  
 Growth to 2041 BAU, difference to 2021 levels illustrated by lighter bars

## Greater Adelaide



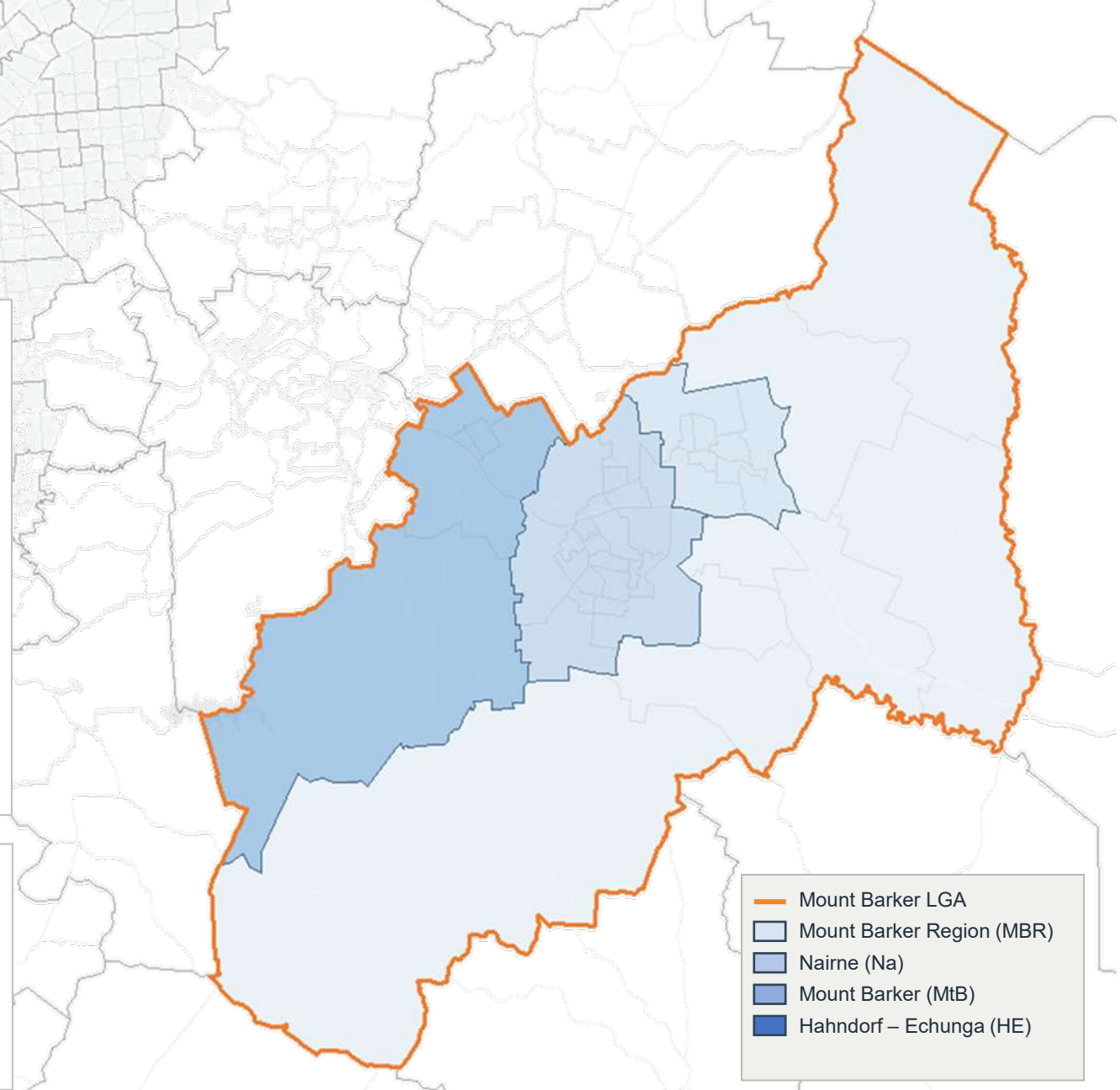
## Mount Barker LGA



## SA2's

SA2	Population	Jobs	Enrollements
MBR	7,293 +13.3%	1,202 -4.3%	269 +2.7%
Na	6,353 +15.6%	518 +3.8%	477 +0.8%
MtB	31,261 +54.5%	9,973 +22.5%	5,384 +15.1%
HE	4,745 +6.3%	1,662 -3.7%	633 +6.2%

Quantities in figures represent total values; percentages represent change from 2021



- Mount Barker LGA
- Mount Barker Region (MBR)
- Nairne (Na)
- Mount Barker (MtB)
- Hahndorf – Echunga (HE)

# Future Scenarios

## 01 Business as usual (BAU)

- The Committed and Funded projects;
- The North South Corridor Reference Design; and
- Land Use Scenario I1 built from the SA cabinet approved projection.

## 02 Low Growth (LLUG)

- The Committed and Funded projects;
- The North South Corridor Reference Design; and
- Land Use Scenario I-low built from the SA 11 regions low projection.

## 03 High Growth (HLUG)

- The Committed and Funded projects;
- The North South Corridor Reference Design; and
- Land Use Scenario I-high built from the SA 11 regions high projection.

01



MEDIUM  
LAND USE  
GROWTH  
(BAU)

02



LOW LAND  
USE  
GROWTH  
(LLUG)

03



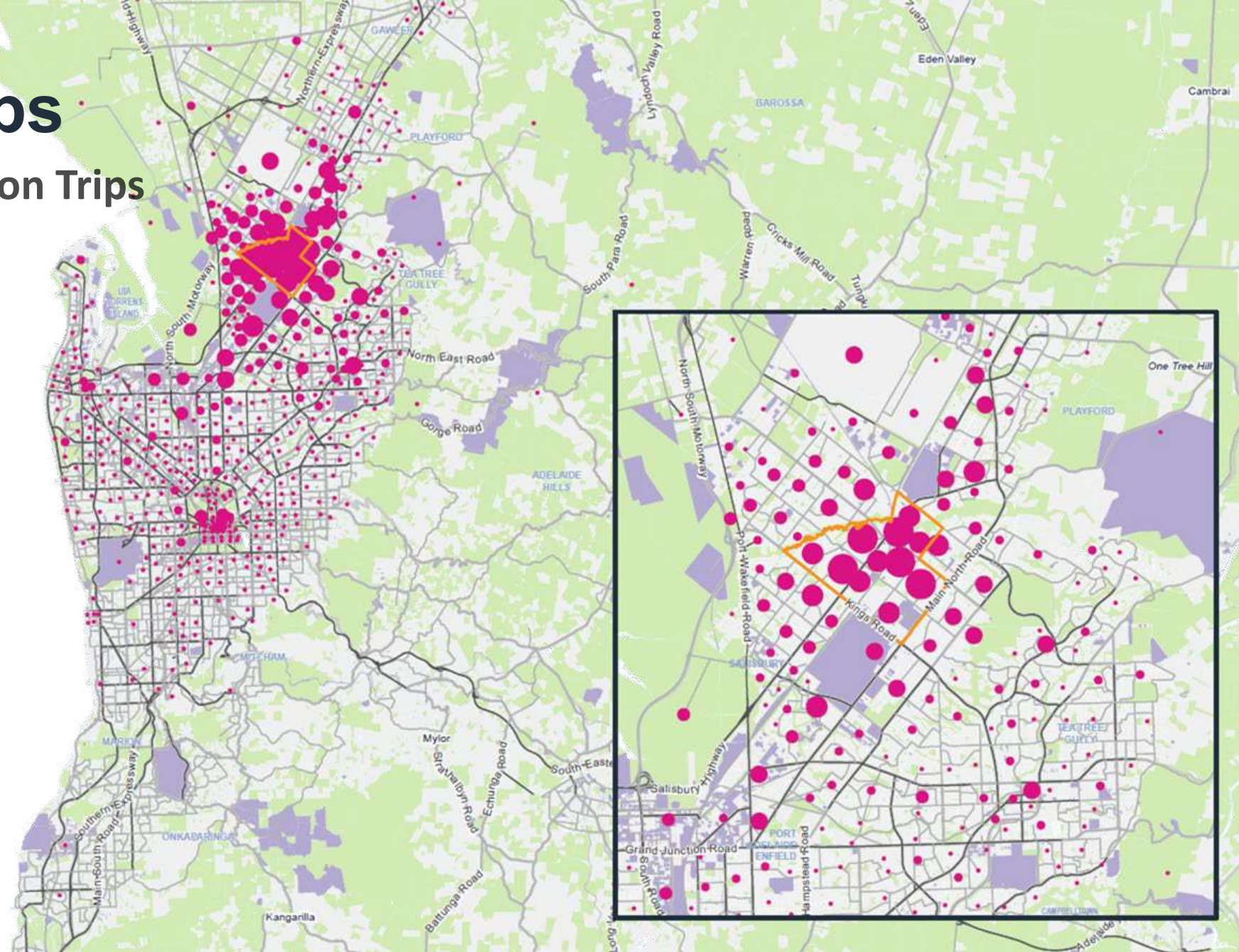
HIGH LAND  
USE  
GROWTH  
(HLUG)

# Destination Maps

## Salisbury 2041 - Total Person Trips

The map shows the total daily person trips from an origin zone(s) to all other destinations.

- The origin zone(s) is the highlighted orange boundary.
- 80,500 total trips assessed
  - 52,800 trips to external destinations (red)
  - 27,700 trips to internal destinations (orange)



# AM Traffic Flow

## Origin - Destination

The map shows the AM Peak Hour (PH) Flow from a SA2 origin for 2041 BAU to all other Destination.

- SA2 boundary is highlighted in orange
- This type of output enables a comparison of the demand / traffic from different regions/zones.

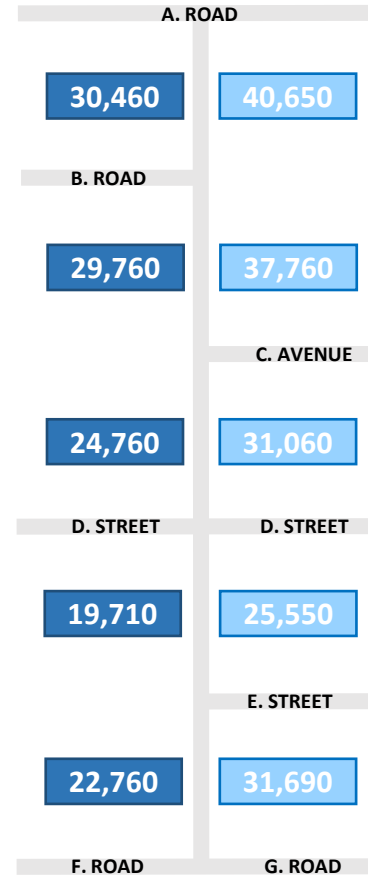


# Traffic Demand Schematics

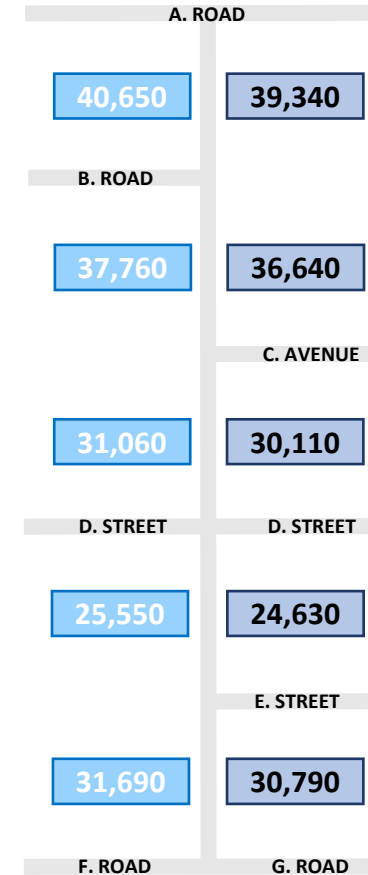
## Bi-directional daily flow

Traffic demand per section of roadway can be exported from the model for all model years and network cases.

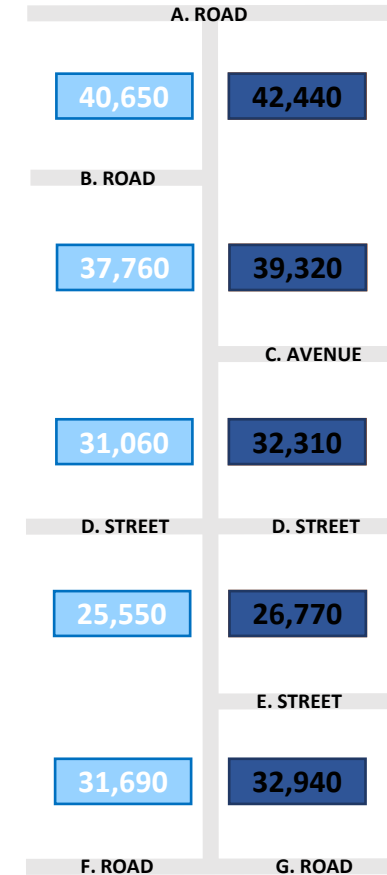
- XX,XXX = Base Case (BC)
- XX,XXX = Future Year BAU
- XX,XXX = Future Year PC 1
- XX,XXX = Future Year PC 2



BC -> FUTURE BAU



FUTURE BAU -> PC 1



FUTURE BAU -> PC 2

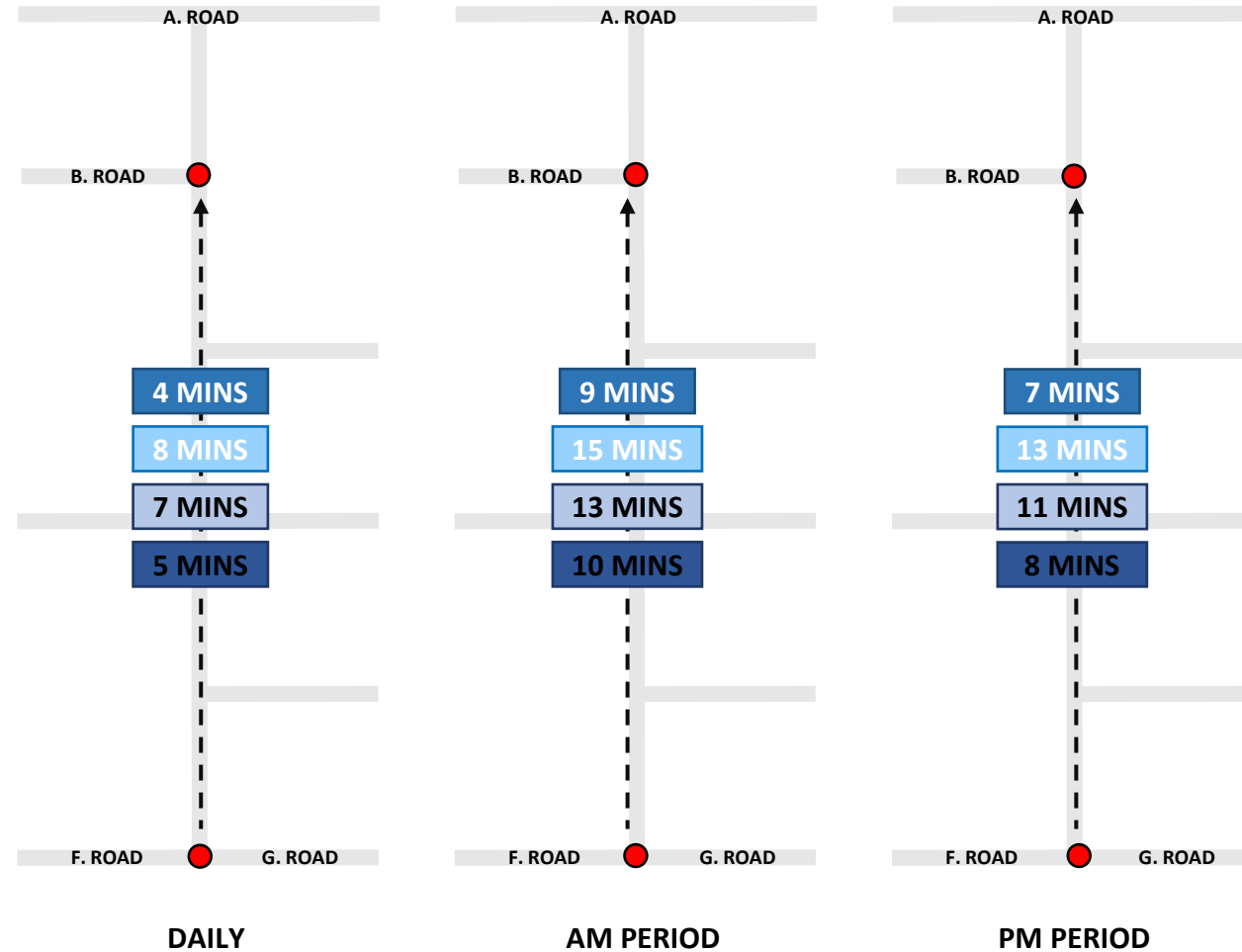


# Corridor Travel Times

## Directional travel times

Model estimates average travel speed per section. This data can be extrapolated to obtain the average travel times per time period per section.

- X MINS** = Base Case
- X MINS** = Future Year BAU
- X MINS** = Future Year PC 1
- X MINS** = Future Year PC 2



# Reporting



# Reporting – Summary Statistics

## SAM Summary Statistics

- An Excel workbook with a variety of statistics
  - Person trips
  - Vehicle trips
  - Mode share
  - Time period (AM, DT, PM,NT)
  - VKT / VHT
- Summary statistics – full and sub-area



Figure 1: Reporting at Full Model Run

Figure 2: Reporting at Sub Area Model

# Reporting – Summary Statistics

## SAM Summary Statistics

- An Excel workbook with a variety of statistics
  - Person trips
  - Vehicle trips
  - Mode share
  - Time period (AM, DT, PM,NT)
  - VKT / VHT
- Summary statistics – full and sub-area

 Government of South Australia Department for Infrastructure and Transport	 TRANSPORT ANALYTICS	User: Chris Mayer
		MASTEM Scenario: S26_PM
		Scenario Run Date: 17/09/23
		Scenario Description: 2026 Planning Network
		Results Extraction Date: 18/09/23
		Model Run: SAM-P

Mode	Trips (Inc IZ)	Trips Exc IZ	Trips Exo IZ	Trips Exc IZ V3	Trips Exo IZ V3
Car Person Trips	4,847,322	4,056,464	85%	3,883,304	88%
PT Trips	226,393	226,393	5%	225,900	5%
Bicycle Trips	83,941	37,643	1%	37,416	1%
Walk Only Trips	1,014,111	258,513	6%	258,434	6%
<b>Person Trips</b>	<b>6,171,763</b>	<b>4,619,015</b>		<b>4,405,614</b>	

Mode	Persons	Vehicles	Vehicle Occupancy
<b>Car Vehicle Trips</b>	<b>4,832,936</b>	<b>3,746,389</b>	<b>1.23</b>
HBW Private Car Trips	767,525	678,962	1.13
Other Private Car Trips	3,249,559	2,337,260	1.39
Light Business Vehicle Trips	533,140	587,639	1.01
Park and Ride Car Trips	222,712	142,468	1.56
<b>Heavy Commercial Vehicle Trips</b>	<b>142,468</b>	<b>142,468</b>	<b>1.00</b>
Rigid	111,307	111,307	1.00
Articulated	23,851	23,851	1.00
B-Double	7,310	7,310	1.00
HPFV	0	0	0.00
<b>Bus Vehicle Trips</b>	<b>136,375</b>	<b>3,438</b>	<b>14.45</b>
<b>Motor Vehicle Trips</b>	<b>5,111,779</b>	<b>3,898,295</b>	<b>-</b>

Mode	Car Vehicle	Rigid	Articulated	B-Double	HPFV
Internal Trips	3,086,330				
Commercial Trips	624,050	106,983	19,870	5,166	0
External Trips	25,748	4,318	3,981	2,144	0
<b>Total Trips</b>	<b>3,746,389</b>	<b>111,307</b>	<b>23,851</b>	<b>7,310</b>	<b>0</b>

PT Mode	Daily	AM Period (7 am - 9 am)	DT Period (9 am - 3 pm)	PM Period (3 pm - 6 pm)	NT Period (6 pm - 7 am)
Bus Trips	136,375	24,158	41,779	54,224	16,213
Train Trips	47,171	10,726	13,719	14,318	7,808
Tram Trips	39,166	7,311	11,832	14,428	5,595
<b>Total PT Person Trips</b>	<b>222,712</b>	<b>42,195</b>	<b>67,330</b>	<b>83,558</b>	<b>29,559</b>

Mode	Total			Average		
	Kilometres Travelled	Hours Travelled	Distance (Km)	Time (Min)	Speed (Km/H)	
Bus Passenger	1,138,043	50,313	8.3	22.1	22.6	
Train Passenger	889,158	15,305	14.2	20.2	42.1	
Tram Passenger	113,889	7,332	2.3	11.2	15.5	
<b>All Passengers</b>	<b>1,921,169</b>	<b>73,554</b>	<b>8.6</b>	<b>19.8</b>	<b>26.1</b>	


  

Mode	Total			Average		
	Kilometres Travelled	Hours Travelled	Trip Distance (Km)	Trip Time (Min)	Speed (Km/H)	
<b>AM Motor Vehicle Trips</b>	<b>6,633,260</b>	<b>151,304</b>	<b>13.82</b>	<b>18.91</b>	<b>43.84</b>	
Car Vehicle Trips	6,234,029	143,590	13.56	18.73	43.42	
Freight Vehicle Trips	399,231	7,714	13.87	23.12	51.55	
<b>DT Motor Vehicle Trips</b>	<b>20,292,391</b>	<b>442,795</b>	<b>10.43</b>	<b>13.66</b>	<b>45.83</b>	
Car Vehicle Trips	18,730,583	413,296	11.88	16.18	44.06	
Freight Vehicle Trips	1,561,808	29,499	21.77	24.23	53.91	
<b>PM Motor Vehicle Trips</b>	<b>10,511,097</b>	<b>237,156</b>	<b>12.06</b>	<b>16.33</b>	<b>44.32</b>	
Car Vehicle Trips	10,170,646	230,840	10.04	13.23	45.32	
Freight Vehicle Trips	340,451	6,315	19.63	22.24	52.34	
<b>NT Motor Vehicle Trips</b>	<b>7,347,480</b>	<b>141,802</b>	<b>12.40</b>	<b>14.36</b>	<b>51.82</b>	


# Reporting – Summary Statistics

## SAM Summary Statistics

- An Excel workbook with a variety of statistics
  - Person trips
  - Vehicle trips
  - Mode share
  - Time period (AM, DT, PM,NT)
  - VKT / VHT
- Summary statistics – full and sub-area



Government of South Australia  
Department for Infrastructure  
and Transport



TRANSPORT  
ANALYTICS

User:	Chris Mayer
MASSEM Scenario:	S_2021NSC
Scenario Run Date:	24/03/22
Scenario Description:	2026 Planning Network (Sub-Area)
Results Extraction Date:	11/05/22
Model Run:	SAM-P
Sub-Area:	Northern Area

### 11.1 Mode Share (Internal Trips)- Daily (Sub-Area)

Mode	Trips (Inc IZ Sub Area)**	Trips Exc IZ Sub Area**	Trips Exc IZ Sub Area	Trips Exc IZ SAM*	Trips Exc IZ SAM*
Car Person Trips	1,210,987	1,108,159	94%	4,086,484	89%
PT Trips	28,243	28,243	2%	226,389	5%
Bicycle Trips	15,833	3,100	1%	37,643	1%
Walk Only Trips	225,275	27,897	2%	230,513	0%
Person Trips	1,480,338	1,167,409		4,613,015	

\*\*Work mode results \*Results for car trips and PT are based on O/D demand matrices, thus include processing post mode choice

### 11.2 Person Trip Network Statistics (Sub-Area)

Mode	Kilometres
Car Person Trips	
PT Person Trips	
Bicycle Trips	
Walk Only Trips	
Person Trips	

### 11.3 Vehicle Trips Daily (Sub-Area)

Mode	Persons	Vehicle	Vehicle Occupancy
<b>Car Vehicle Trips</b>	<b>1,485,438</b>	<b>1,195,081</b>	<b>1.25</b>
HEV/Private Car Trips	263,393	251,251	1.19
Other Private Car Trips	1,014,779	720,256	1.41
Light Business Vehicle Trips	161,946	180,380	1.01
Park and Ride Car Trips	4,812	2,897	1.66
<b>Heavy Commercial Vehicle Trips</b>	<b>57,362</b>	<b>57,362</b>	<b>1.00</b>
Rigid	40,932	40,932	1.00
Articulated	12,716	12,716	1.00
B-Double	3,714	3,714	1.00
HPPV	0	0	-
<b>Bus Vehicle Trips</b>	<b>20,422</b>	<b>3,000</b>	<b>6.81</b>
Motor Vehicle Trips	1,571,922	1,245,523	1.26

### 11.4 Vehicle Network Statistics (Sub-Area)

Mode	Kilometres
Car Vehicle Trips	
HEV/Private Car Trips	
Other Private Car Trips	
Light Business Vehicle Trips	
Park and Ride Car Trips	
<b>Freight Vehicle Trips</b>	
Rigid	
Articulated	
B-Double	
HPPV	
<b>Bus Vehicle Trips</b>	
Motor Vehicle Trips	

### 11.5 Assigned Trips by Generation (Sub-Area)

Mode	Car Vehicle	Rigid	Articulated	B-Double	HPPV
Internal Trips	656,644	-	-	-	-
Commercial Trips	-	22,382	5,111	1,053	0
External Trips	236,125	17,350	7,605	2,631	0
<b>Total Trips</b>	<b>1,152,170</b>	<b>40,432</b>	<b>12,716</b>	<b>3,714</b>	<b>0</b>

### 11.5 PT Passenger Waiting Times (Sub-Area)

Component	Initial Wait	Boarding Penalty	PT Access Penalty	Transfer Wait	Transfer Penalty
Component					
Initial Wait					
Boarding Penalty					
PT Access Penalty					
Transfer Wait					
Transfer Penalty					

### 11.7 PT Person Trips by PT Mode - Assigned Trips Only (Sub-Area)

Mode	Daily	AM Period (7 am - 9 am)	DT Period (9 am - 3 pm)	PM Period (3 pm - 6 pm)	NT Period (6 pm - 7 am)
Bus Trips	20,422	8,424	9,964	3,417	3,417
Train Trips	14,527	2,735	4,322	4,322	2,468
Train Trips	0	0	0	0	0
<b>Total PT Person Trips</b>	<b>42,379</b>	<b>9,219</b>	<b>14,286</b>	<b>13,569</b>	<b>5,405</b>

### 11.8 PT Person Boardings by Mode (Sub-Area)

Mode	Boardings
Bus Boardings	
Train Boardings	
Train Boardings	
<b>Total PT Person Boardings</b>	

### 11.9 PT Time Period In-Vehicle Statistics - Assigned Trips Only (Sub-Area)

Mode	Total			Average		
	Kilometres Travelled	Hours Travelled	Distance (Km)	Time (Min)	Speed (Km/H)	
Bus Passenger	19,863	5,275	6.8	11.1	36.4	
Train Passenger	203,343	4,036	14.0	15.6	50.4	
Train Passenger	0	0	-	-	-	
<b>All Passengers</b>	<b>395,206</b>	<b>9,311</b>	<b>31.2</b>	<b>13.0</b>	<b>42.4</b>	

### 11.10 PT Time Period Non-Transfer (Sub-Area)

Mode	Kilometres
Non-Transfer Mode	
Walk Access/Egress	
PT Access/Egress	
In-Direct Transfer	
<b>Total</b>	

### 11.11 Vehicle Network Statistics by Time Period (Sub-Area)

Mode	Total			Average		
	Kilometres Travelled	Hours Travelled	Trip Distance (Km)	Trip Time (Min)	Speed (Km/H)	
<b>AM Motor Vehicle Trips</b>	<b>1,753,173</b>	<b>29,514</b>	<b>11.00</b>	<b>11.15</b>	<b>53.20</b>	
Car Vehicle Trips	1,639,276	25,005	10.83	11.11	58.53	
Freight Vehicle Trips	113,897	1,509	14.21	12.04	70.80	
<b>DT Motor Vehicle Trips</b>	<b>5,137,322</b>	<b>89,381</b>	<b>6.94</b>	<b>9.82</b>	<b>58.81</b>	
Car Vehicle Trips	4,747,903	82,236	9.83	10.00	57.79	
Freight Vehicle Trips	489,419	6,145	14.66	12.10	72.67	
<b>PM Motor Vehicle Trips</b>	<b>2,704,071</b>	<b>46,460</b>	<b>9.74</b>	<b>10.05</b>	<b>58.20</b>	
Car Vehicle Trips	2,611,303	45,183	8.54	8.87	57.74	
Freight Vehicle Trips	92,768	1,277	14.00	11.54	73.13	

### 11.12 PT Passenger Statistics by Time Period (Sub-Area)

Mode	Kilometres
<b>AM Total</b>	
In-Vehicle	
Out of Vehicle	
<b>DT Total</b>	
In-Vehicle	
Out of Vehicle	
<b>PM Total</b>	
In-Vehicle	
Out of Vehicle	

# SAM Origin Destination User Benefit Tool (SODUBT)

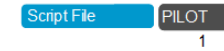
- SODUBT- (SAM Origin Destination User Benefit Tool)**

- Provides an economic \$ comparison between scenarios. Note the SAM-E or SAM-AE (being the economic model run is required).
- 3 sets of economic parameters
  - ATAP
  - TfNSW
  - DIT (combination of the above)
- Expanded to include all the vehicle classes assigned in SAM.
  - Passenger cars
  - LCV
  - Rigid truck
  - Articulated truck
  - B-Double
  - HPV

## SAM ORIGIN DESTINATION USER BENEFIT TOOL (SODUBT)

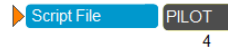
Version 1.0 220619

Start Cluster



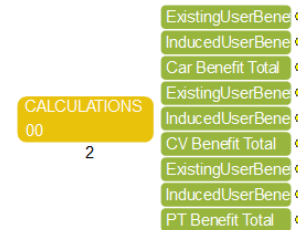
1

Close Cluster

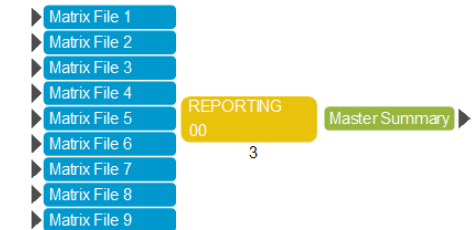


4

### User Benefit Calculations



### Reporting of Results



User:	SAM
MASTEM Scenario:	Y2021_Test
Scenario Run Date:	26-Oct-22
Base Case Description:	Base Case
Project Case Description:	Project Case - Test case for SODUBT Development
Results Extraction Date:	26-Oct-22

1.1 Total User Benefit by Mode

Mode	User Benefit	Proportion
Car Person	\$8,242,900	93%
Commercial Vehicle	\$635,246	7%
Public Transport	-\$8,047	0%
<b>Total</b>	<b>\$8,869,459</b>	
NEW Private Car Person	\$3,780,600	46%
Other Private Car Person	\$4,110,502	50%
Light Business Vehicle Person	\$332,878	4%

1.2 Total User Benefit by User Type

Mode	User Benefit	Proportion
Existing Demand	\$7,370,552	83%
Induced Demand	\$1,457,906	17%
<b>Total</b>	<b>\$8,869,459</b>	

1.3 User Benefit by Mode by Time Period

Mode	AM		PM		OT		NT	
	7 am - 9 am	9 am - 4 pm	4 pm - 6 pm	6 pm - 9 pm	9 am - 3 pm	3 pm - 6 pm	6 pm - 9 pm	9 pm - 12 am
Car Person	\$3,019,921	\$2,330,897	\$2,455,331	\$435,011	\$402,043	\$63,018		
Commercial Vehicle	\$105,111	\$25,074						
Public Transport	\$24,359		\$21,461		-\$40,135			-\$14,572
<b>Total</b>	<b>\$3,199,431</b>	<b>\$2,377,432</b>	<b>\$2,817,239</b>	<b>\$474,357</b>				
NEW Private Car Person	\$1,980,072	\$1,692,891	\$512,313	\$193,324				
Other Private Car Person	\$898,835	\$1,185,547	\$91,756	\$2,256,393	-\$40,504	\$223,744		
Light Business Vehicle Person	\$40,214	\$52,458	\$216,302	\$8,844				

1.4 User Benefit by User Type by Time Period

Mode	AM		PM		OT		NT	
	7 am - 9 am	9 am - 4 pm	4 pm - 6 pm	6 pm - 9 pm	9 am - 3 pm	3 pm - 6 pm	6 pm - 9 pm	9 pm - 12 am
Existing Demand	\$2,960,103	\$1,821,606	\$2,256,393	\$15,916	-\$40,504	\$223,744		-\$15,016
Induced Demand	\$338,727	\$428,250	\$295	\$600,981	\$389	\$129,310		\$524
<b>Total</b>	<b>\$3,199,431</b>	<b>\$2,377,432</b>	<b>\$2,817,239</b>	<b>\$474,357</b>				



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