

UIC Railway Asset Management Global Conference 2019

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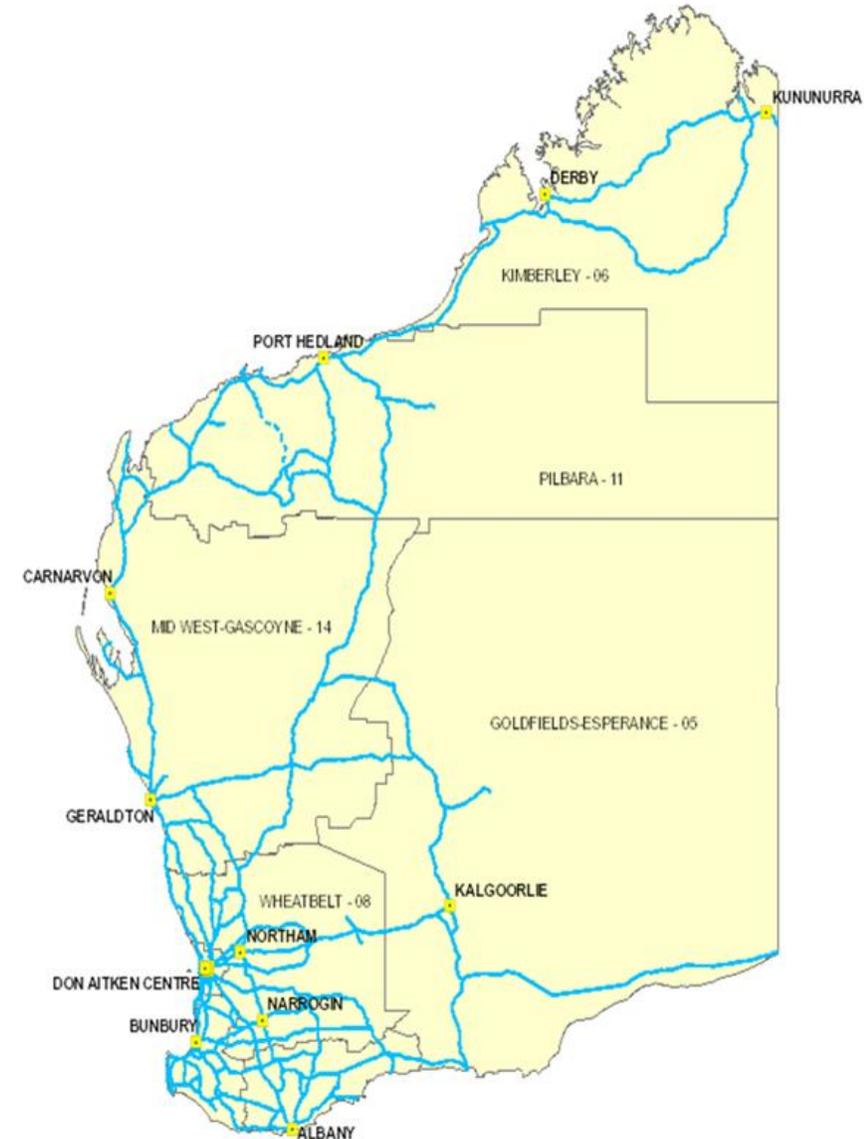
From CFLOS to Route and Network Planning

Asset Management, a step ahead

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CONTENT

- The Context
- Brief description of the CFLOS
- Outline of the route planning process
- Network prioritisation and analysis
- Other considerations
- Conclusions



Main Roads Western Australia

Mission: *provide world class outcomes for our customers through a safe, reliable and sustainable road transport system.*

90 years of existence in 2020

One of the most geographically dispersed road networks

- ▲ 18,528 km of State roads
- ▲ 2.5 million square kilometres
- ▲ 8 Regions

Asset Value: \$47.4 b

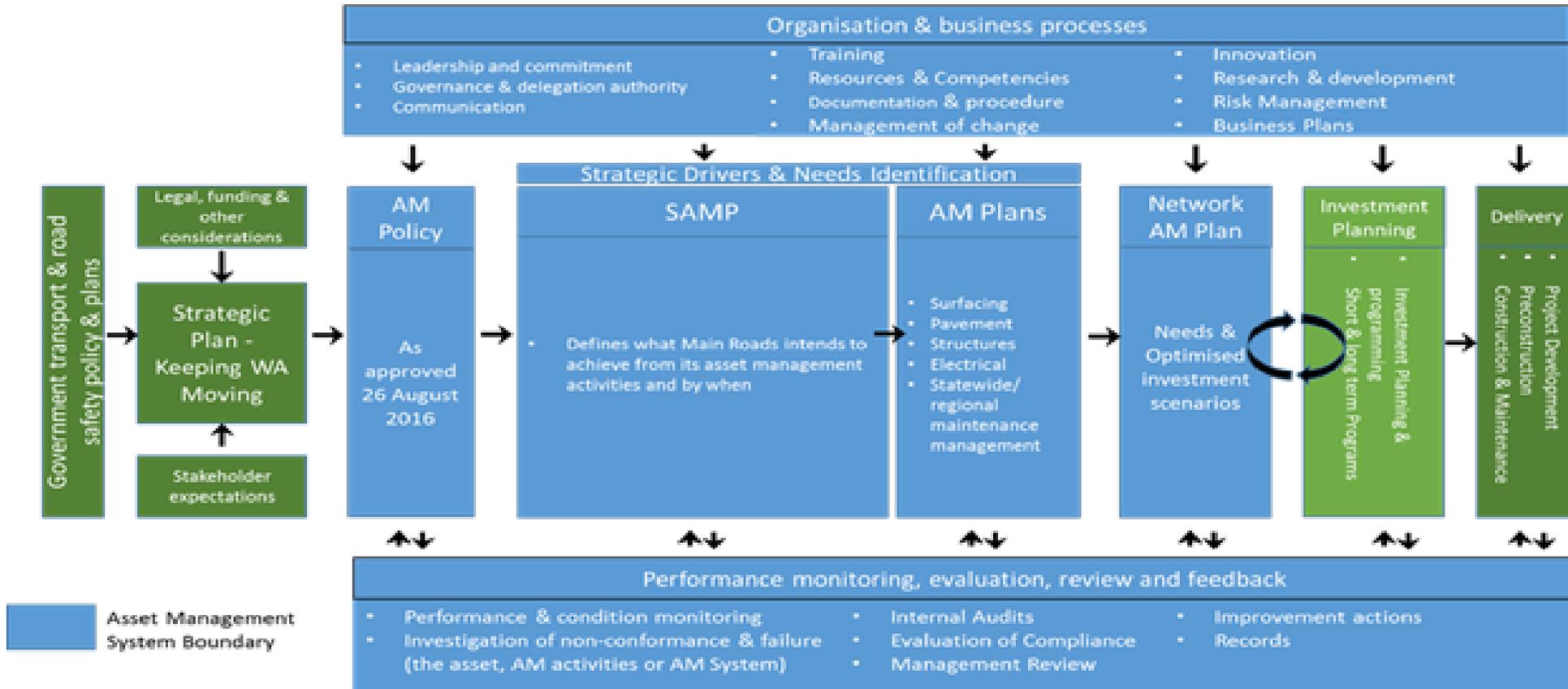
MAIN ROADS SERVICE	PROGRAM EXP \$ MILLION
Road Safety	162.66
Road Management	136.23
Road Efficiency	330.22
Community Access	136.58
Road Maintenance	491.30
State Development	467.40
TOTAL	1724.39



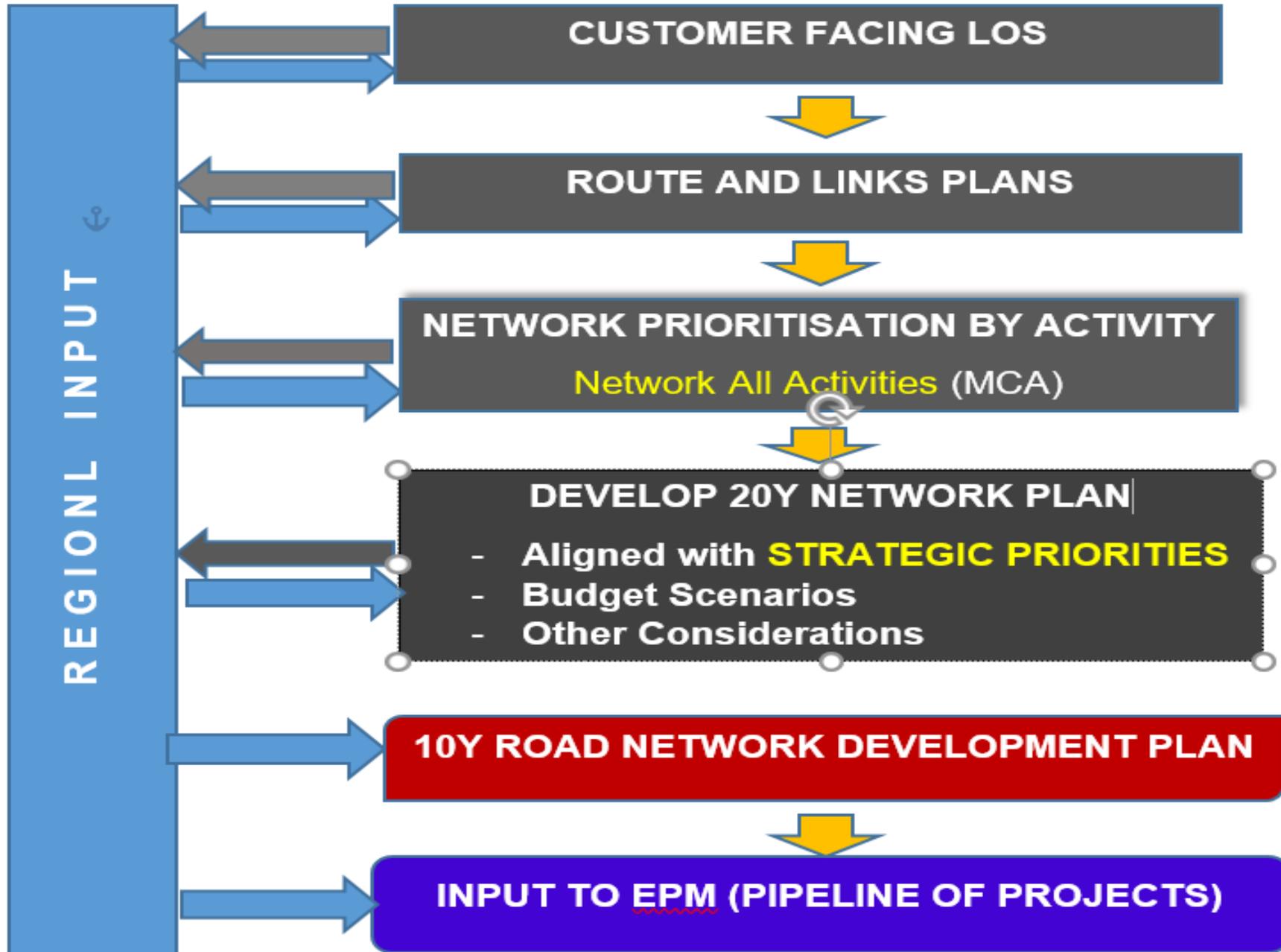
- Road Safety - 9%
- Road Management - 8%
- Road Efficiency - 19%
- Community Access - 8%
- Maintenance - 29%
- State Development - 27%

KEY DRIVERS

- ▲ Auditor General Report
- ▲ ISO 55000 reinvigorated the approach
- ▲ Corporate support
- ▲ Road Safety corporate framework



ROUTE AND NETWORK INVESTMENT PLANNING



THE KEY INPUTS/COMPONENTS

- ❑ Strategic Link Categories - MABCD based on demand;
- ❑ CFLOS – links MR Outcomes, AM Objectives and Customer Expectations
- ❑ Technical Parameters - based on standards, national guidelines
- ❑ MCA Network Prioritisation
- ❑ Corporate Road Inventory, Condition, Road Usage/Demand, and Crash Data
- ❑ Freight/ RAV Networks

LINK CATEGORY MODEL

APPENDIX B

Table 1 2006 Modified Link Category Model

Link Category		Annual freight tonnage	Length weighted AADT and annual freight tonnage			
			> 1,000 000	300 000–1,000 000	100 000–300 000	< 100 000
M	Multilane road	MI	> 12 000	> 12 000	> 12 000	> 12 000
		MFF	> 8 000	> 8 000	> 8 000	> 8 000
AW+	High standard single carriageway with adequate passing lanes		2 000–8 000	4 000–8 000	5 000–8 000	6 000–8 000
AW	High standard single carriageway		800–2 000	2 000–4 000	3 000–5 000	4 000–6 000
BW+	Medium standard single carriageway with adequate passing lanes		300–800	800–2 000	1 000–3 000	1 000–4 000
BW	Medium standard single carriageway		75–300	300–800	500–1 000	600–1 000
CW	Basic standard single carriageway		< 75	75–300	75–500	75–600
DW	Unsealed (or part sealed) formed road		N/A	25–75	20–75	20–75

STRATEGIC PRIORITIES

Main Roads Outcomes	Asset Management Objectives	Required Outcomes
SAFETY – reduce the cost of road trauma to the community	Reduce Road Trauma Risk	-Top 50 Sections with very high and high Road Trauma Risk
Contribute to economic development through improved Freight EFFICIENCY	Provide improved freight access and amenity on significant freight networks. Reduce or eliminate access restrictions.	-Current RAV 7 and RAV10 and PBS networks. -Future RAV extension. -Grain Network
Contribute to economic development through Improved Travel Time RELIABILITY	Reduce travel time delay.	Top 50 Sections with significant Travel Time Delay
Contribute to economic development and support vibrant communities through Improved “all year round” ACCESSIBILITY/ availability of the route	Reduce the duration of road closures due to natural causes.	-Sections with significant duration and incidence of road closure.
	Support local communities through provision of access and connectivity	-Sections that are the unique access/connectivity road to a local community.
CUSTOMER FOCUSED TRAVEL EXPERIENCE	Improve the overall travel experience, access and amenities on tourist routes	-Significant tourist routes.

Performance Indicators	Technical Measures	Customer LOS Description	Level of Service	Overtaking Opportunity
Reliability			Low (red)	No overtaking opportunities available
Overtaking opportunities: provides an indication of the ability to achieve consistent journey times by avoiding unpredictable delays associated with vehicles travelling at slower speeds.	% of road length offering overtaking opportunities (analysed in each direction).	Safe overtaking opportunities every 10 min.	Medium (yellow)	Sufficient sight distance for overtaking available
Overtaking lane length: assesses whether the overtaking lanes which are provided are of a sufficient length.	% of overtaking lanes that fall into certain length categories.	Sufficient length to overtake safely.	High (green)	Physical provisions for overtaking available (dual carriageways, multiple lanes or overtaking lanes)
Turning pockets and passing bulges: provides an indication of the ability to achieve consistent journey times by avoiding unpredictable delays associated with turning vehicles.	% of intersections with turning pockets and passing bulges.	Safe turning movement.		
Road closures: provides an indication of the likelihood of the road being closed (which has the potential to reduce the reliability of the route).	Total number of hours closed per year within a range.	No or limited road closures. Ability to recover quickly after a natural disaster.		
Efficiency				
Design speed: provides an indication of the ability to achieve travel times close to the posted speed limit.	Safe speed (km/h), % of route length within a range.	.		
Delays: provides an overarching indicator which relates to both reliability and efficiency. This indicates the likelihood of delays due to traffic volume, traffic mix and road geometry.	Number of 5min delays per car per km per day as calculated using MRWA Delays Model.	No travel time delays (ability to travel at posted speed).		

ROUTE PLANNING PROCESS

VISION STATEMENT: role and function of the route or link.

STRATEGY: includes width configuration, the type of restricted access vehicle network to be provided, key areas of focus.

PLAN: specific Investment Initiatives, to address (reduce or eliminate) performance deficiencies, with assigned priorities;

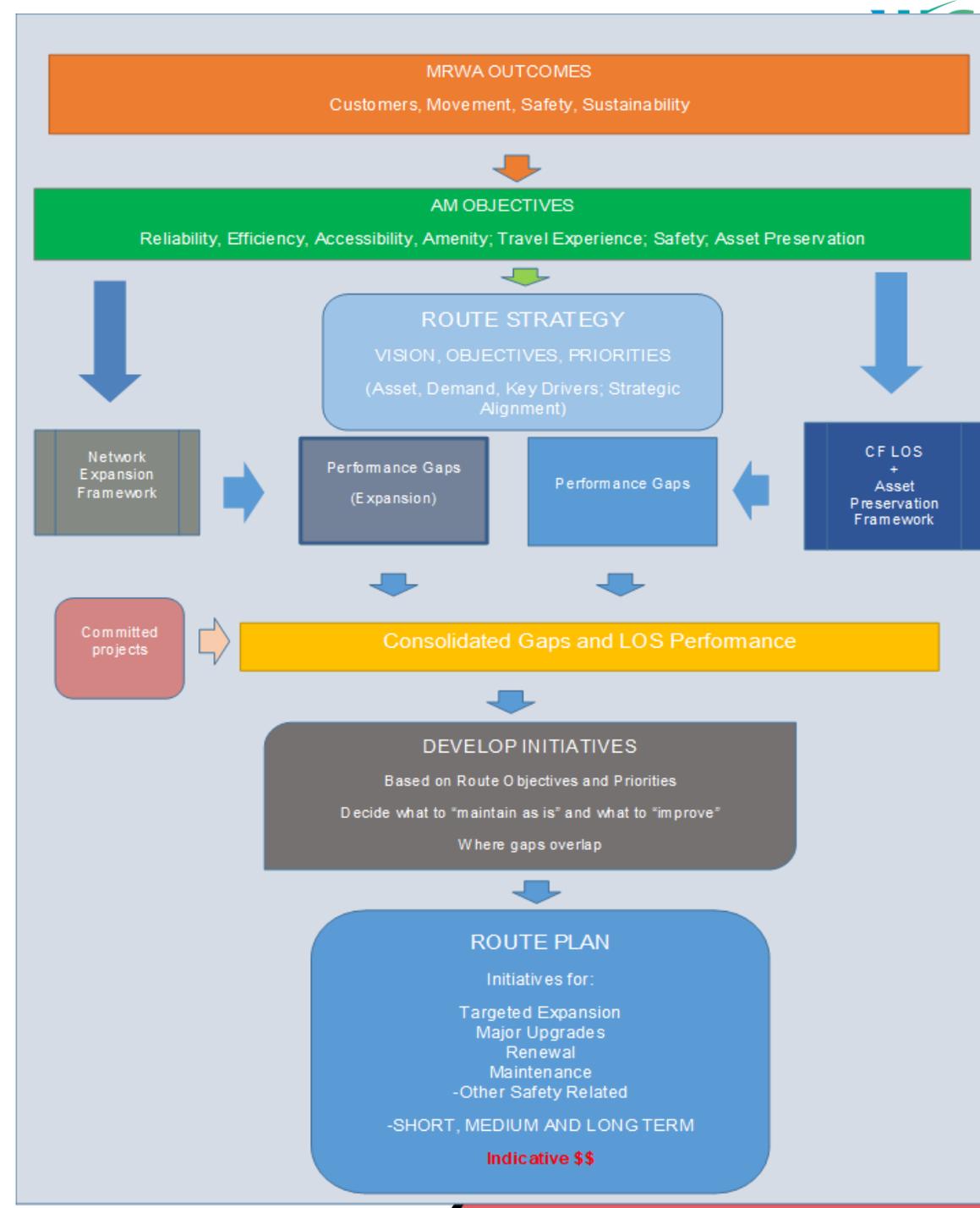
DEMAND DRIVERS AND ASSET INFORMATION

INVESTMENT INITIATIVES include:

New assets: construction of new links or extension of existing, major realignment and reconstruction, construction of new bridges.

Asset improvements: seal and pavement widening, additional overtaking lanes, geometry improvements, provision of new rest areas, installation of safety barriers, line marking.

Asset preservation: e.g. resurfacing and rehabilitation of pavements, bridge strengthening.



Route 8: Perth to Esperance

Level of Service Performance and Investment Initiatives

	Link 64	Link 65	Link 66	Link 52	Link 53	Entire Route
Safety	Yellow	Yellow	Red	Green	Red	Red
Reliability	Yellow	Green	Green	Green	Yellow	Green
Accessibility	Green	Green	Green	Green	Yellow	Green
Amenity	Green	Yellow	Green	Green	Green	Green
Travel Experience	Green	Yellow	Yellow	Yellow	Yellow	Yellow
Link Average	Green	Yellow	Yellow	Green	Yellow	Yellow



NETWORK PRIORITISATION AND ANALYSIS

The aim is to balance **Risk, Cost** and **Performance**.

The methodology includes:

1. Network Prioritisation by each type of investment initiative using Multi Criteria Analysis.
2. Identification of specific Strategic Priorities.
3. Budget Scenarios and Other Considerations.

The Aim is To Balance Risk, Cost and Performance over the AM lifecycle



	COST ESTIMATES BY PRIORITY					TOTAL COST ALL PRIORITIES
	High	High-Med	Med	Med-Low	Low	
Widening Low Cost	266,814,461	120,860,593	90,357,972	43,004,342	30,970,023	552,007,391
Widening Ultimate	1,704,405,840	909,435,856	531,972,507	331,380,059	253,675,127	3,730,869,389
New OVTL	278,370,000	77,564,000	50,998,000	22,110,000	5,534,000	434,576,000
Extent OVTL	12,865,000	11,030,000	11,019,000	11,764,000	11,747,000	58,425,000
Geometry H	181,000,000	138,500,000	72,500,000	33,500,000	25,000,000	450,500,000
Geometry V	415,000,000	281,000,000	251,000,000	248,500,000	213,500,000	1,409,000,000
Rest Areas	27,700,000	16,700,000	15,300,000	15,500,000	13,500,000	88,700,000
Rehabilitation	232,953,000	232,953,000	-	-	-	465,906,000
TOTAL COST 1	999,702,461	597,607,593	240,174,972	125,878,342	86,751,023	2,050,114,391
TOTAL COST 2	2,852,293,840	1,667,182,856	932,789,507	662,754,059	522,956,127	6,637,976,389

*NOTE:

Rehabilitation Needs split 50/50 between High and Medium High Priority

TOTAL COST 1 incl Wide Low Cost, Geom H and the rest of activities

TOTAL COST 2 incl Wide Ultimate, Geom All, and the rest of activities.

- ▲ Very High Cost of Compliance with Standards.
- ▲ Identification of the links where a “Lower cost/intermediate” width configuration can be safely adopted (instead of the “ultimate” configuration).
- ▲ On the balance of cost and risks Identify sites where Extended Design Domain (EDD) for road geometry can be adopted.
- ▲ Vertical Geometry Data not as good as expected.

OTHER CONSIDERATIONS

- ▲ **“Packaging”** - Identifying initiatives that can be combined into a single complex project with multiple benefits and potentially better value for money, and possibly qualification for capital funding.
- ▲ **Timeline** of initiatives, for example delaying rehabilitation where widening is planned in a couple of years;
- ▲ **Delivery Readiness**, considering time required for environmental clearance, land acquisition.
- ▲ **Consistency** of the Level of Service at route and road level to ensure a *seamless* travel experience.
- ▲ **Visibility of progress**, goes hand in hand with the consistency principle – this means addressing certain routes and roads to visibly improve the level of service, instead of trying to address a multitude of network dispersed sites.
- ▲ **Consider “many versus one”**. Where possible, low cost solutions to improve several sites are preferred to a very high cost solution to improve one site. Cost of compliance needs to be analysed, usually full compliance is required for capital complex projects.

CONCLUSIONS

- ❑ It was a worthwhile process that helped us understand the needs of the network and the costs.
- ❑ First time the process was utilised – needs to be formally integrated within the overall investment planning process.
- ❑ Data accuracy needs to be improved to ensure validity of the results.
- ❑ Corporate sign offs are required on several fundamental issues like configuration/width and geometry standards.
- ❑ Continuous improvement is required to ensure annual utilisation, currency and
- ❑ Ongoing communication and reiteration with key stakeholders.
- ❑ Interactive visualisation tool to host the process to be deployed.



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