

Baxter Electrification Preliminary Business Case

July 2019





Prepared by the Major Transport Infrastructure Authority (LXRP) on behalf of the Department of Transport (Transport for Victoria), for the Australian Government



Glossary of Terms

ATAP – Australian Transport Assessment and Planning

BMP – Benefit Management Plan

DELWP – Department of Environment, Land, Water and Planning

DEDJTR – Department of Economic Development, Jobs, Transport and Resources

DTF – Department of Treasury and Finance

Frankston – Frankston City Council local government area

ILM – Investment Logic Map

KPI – key performance indicators

LGA – local government area

LXRA – Level-Crossing Removal Authority

MAC – Metropolitan Activity Centre

Mornington Peninsula – Mornington Peninsula Shire local government area

OD – Origin and Destination

PT – Public Transport

PTV – Public Transport Victoria

TfV – Transport for Victoria

VCC – Value Capture and Creation Plan

VITM – Victorian Integrated Transport Model

VKT – Vehicle Kilometres Travelled

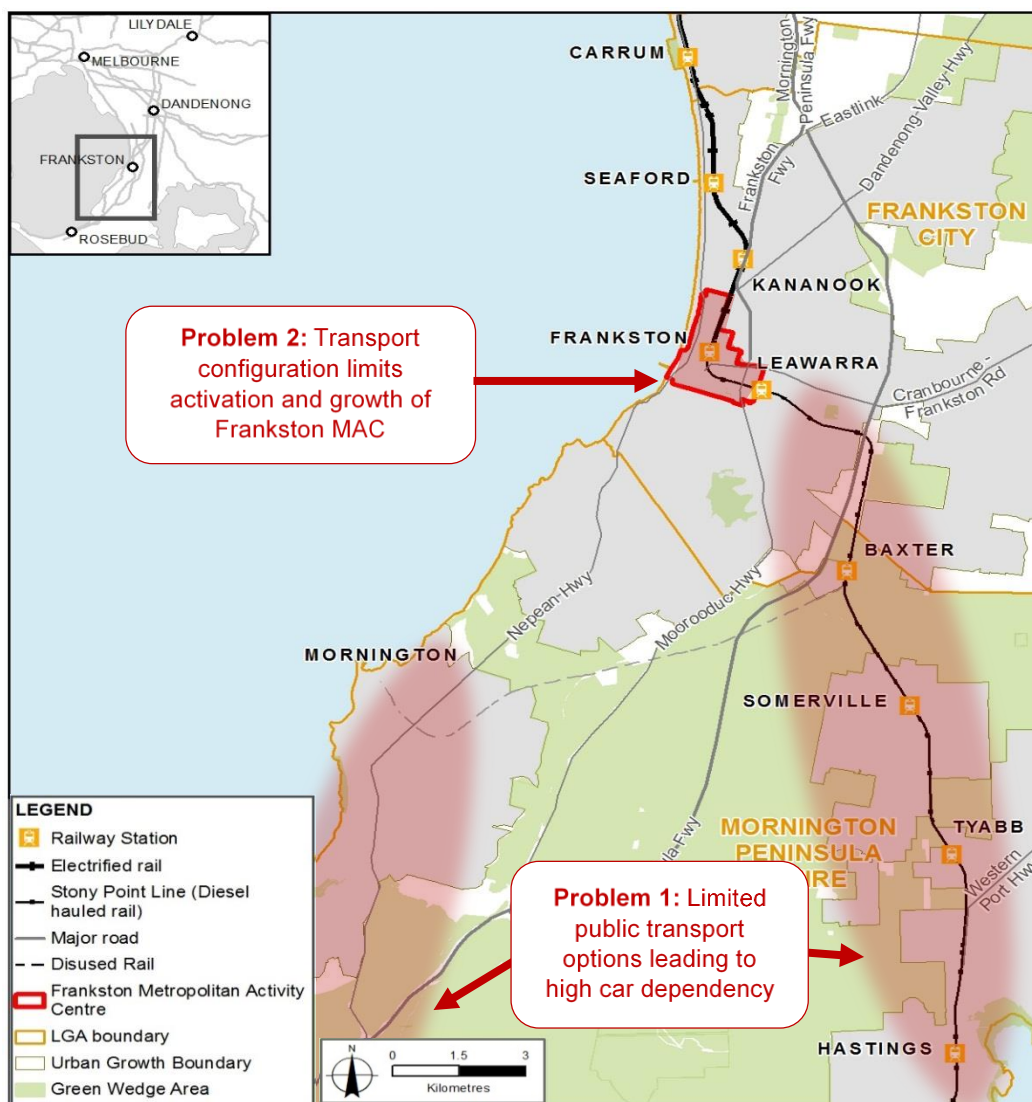
Executive summary

This Preliminary Business Case investigates the need for electrification of the Frankston train line to Baxter. Poor access to public transport in areas around Frankston and the Mornington Peninsula, and poor transport configuration around Frankston Metropolitan Activity Centre, are addressed in this Preliminary Business Case.

Problem definition and context

Frankston and Mornington Peninsula are located to the south east of Melbourne CBD. The area has high car dependency, driven by the lack of access to fast and reliable public transport options. The configuration of transport infrastructure and a lack of local services also limits the growth and activation of the Frankston Metropolitan Activity Centre.

Figure 1 Problem Summary map



Problem 1: Limited public transport options and poor connections between the Peninsula, Frankston and the City results in increased car dependency

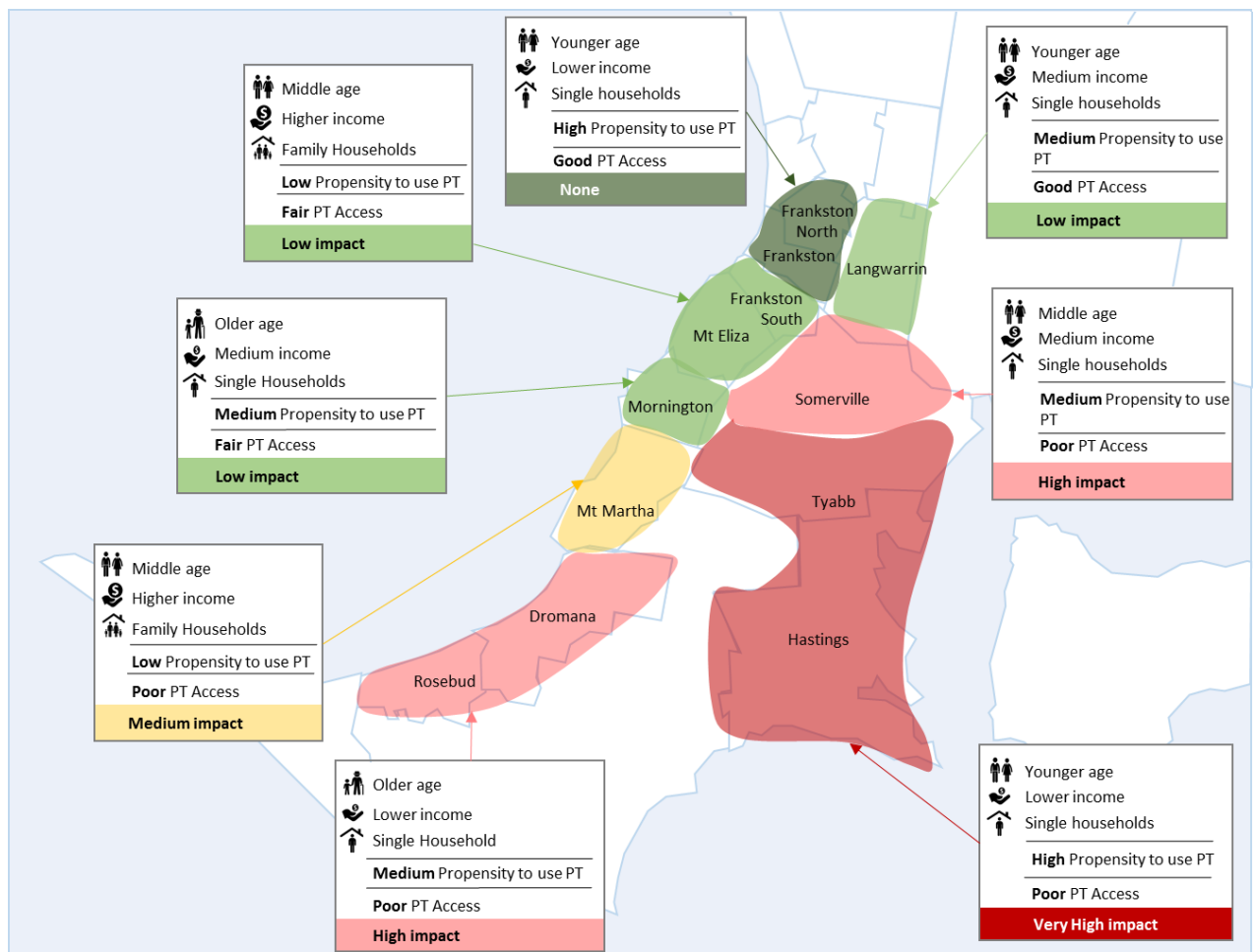
Less than three percent of residents use public transport in the Mornington Peninsula, and less than six percent in Frankston, which is exceedingly low when benchmarked against municipalities with similar characteristics.

The low proportion of commuters using public transport is indicative of several issues in the area, including accessibility, reliability and poor travel times. For residents in Frankston and the Peninsula, less than 10 percent of all jobs are accessible by public transport within an hour.

Frankston Station is the end of the line for all metro services. The Stony Point line continues further south, however offers very infrequent diesel services. As such, Frankston Station has a relatively high patronage, which causes significant constraints on commuter parking and accessing the rail line.

Figure 2 shows the areas of impact due to poor access to public transport, based on socio-demographic factors.

Figure 2 Sociodemographic factors affecting public transport use

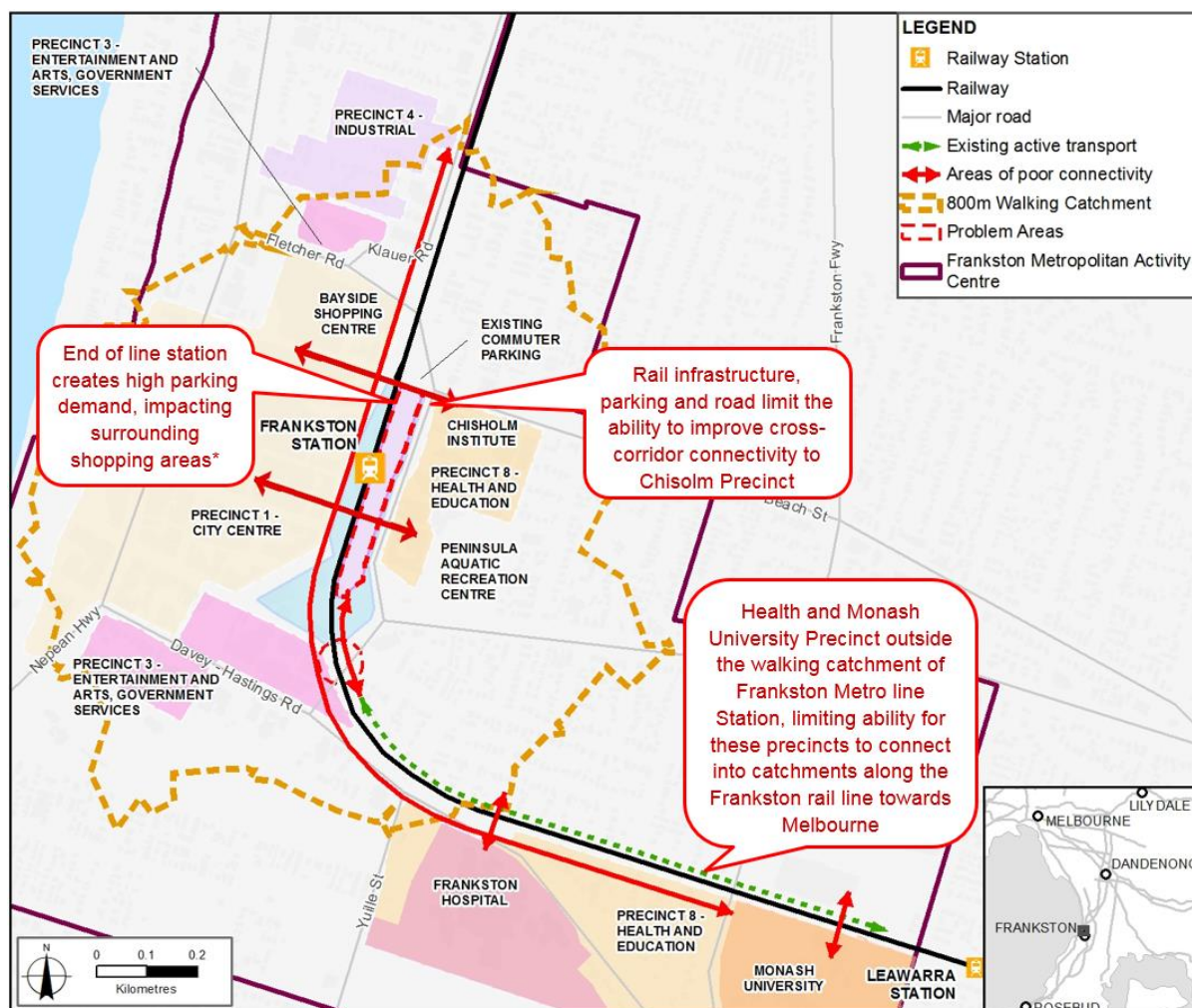


Problem 2: The current transport configuration limits activation and growth opportunities on the Frankston Metropolitan Activity Centre

Frankston is a Metropolitan Activity Centre (MAC) which has limitations on activation and growth, due the transport configuration as follows. Figure 3 provides an illustration of these issues

- **Land use inefficiencies:** Frankston’s transport interchange includes a Park & Ride, terminus metro line station and an interchange for 22 bus routes. As it services a wide catchment, demand for commuter parking exceeds supply, and contributes to a crowded MAC already in high demand from local car parking for workers, shoppers and socialising.
- **Permeability:** transport hubs within MAC require a level of permeability for pedestrians and cyclist access to enhance activity in the area. This is currently limited by existing car parking, roads and rail infrastructure around Frankston Station.
- **Poor access to health & education precinct:** Frankston Hospital and Monash University are both situated outside of Frankston Station’s walking catchment. This limits access to potential catchments north towards Melbourne for health and education.

Figure 3 Frankston Metropolitan MAC



This Preliminary Business Case has defined the qualitative problems associated with the Frankston MAC. The precise degree of impacts for the Frankston MAC, will be required to be fully quantified in the Full Business Case.

For example, the degree by which lack of commuter parking impacts on the Frankston MAC, is a complex issue that has various other contributing factors associated with on-street parking availability, and costs for all-day parking.

Benefits

In order to address these problems, the project will need to achieve clear benefits as follows

Table 1 Benefits and indicators

| Benefits | Indicators |
|---|--|
| KPI 1 – Improve public transport for Frankston and the Peninsula | The increased service availability across the region |
| | A reduction in car dependency. |
| KPI 2 – Improve social and commercial activity in the Frankston area | Precinct Outcomes |
| | Improved public transport access to Frankston East |

This Preliminary Business Case includes a rapid assessment of benefits only. The degree of benefits will be fully measured in the Full Business Case for this project.

Assessment and development of options

A strategic response to pursue reliable access to Frankston station was identified through an assessment process that compared key risks, dis-benefits, interdependencies, timeline and costs. This then informed the development of project options. Table 2 lists the project options and their relevant infrastructure and service provision.

Table 2 Project option description

| Project Option | | Key infrastructure | Rail Services | Bus Services |
|---|-----------------------------|--|--|---|
| Bus Only Option 2A | | Bus priority lanes and intersections works Additional bus interchange at Frankston station | | <u>Fast bus to Hastings</u> : 30 min. peak, 60 min. off peak <u>Fast bus to Rye</u> : 30 min. peak, 60 min. off peak |
| Stony Point Uplift (30 mins) Option 2B-SP30 | | No electrification Passing loops along the Stony Point line New stations at Somerville and Bittern | <u>Stony Point Line</u> : 30 min. peak. 60 min. inter-peak Stony Point to Frankston | <u>Fast bus to Rye</u> 30 min. peak, 60 min off peak |
| Stony Point Uplift (20 mins) Option 2B-SP20 | | No electrification Passing loops along the Stony Point line New stations at Tyabb and Bittern | <u>Stony Point Line</u> 20 min. peak Hastings to Frankston 40 minute all day service, Stony Point to Frankston | <u>Fast bus to Rye</u> 30 min. peak, 60 min. off peak |
| Langwarrin Electrification | 1 Bus Option 3A | Double track to Langwarrin New stations at Frankston East and Langwarrin Park & Ride at Langwarrin | <u>Metro Line</u> : 10 min. peak, 20 min. inter-peak metro services from Langwarrin | <u>Fast bus to Hastings</u> : 30 min. peak, 60 min. inter-peak |
| | 2 Buses Option 3B | 3 level crossing removals Additional rail bridge over Peninsula link Stabling roads at Langwarrin | <u>Stony Point Line</u> : 60 min. peak, 90 min. inter-peak Stony Point to Langwarrin | <u>Hastings & Rye Fast Buses</u> : 30 min. peak, 60 minute inter-peak |
| Baxter Electrification | 1 Bus Option 3C | Double track to Baxter New stations at Frankston East, Langwarrin Park & Ride and Baxter Park & Ride | <u>Metro Line</u> : 10 min. peak. 20 min. inter-peak metro services from Baxter | <u>Fast bus to Hastings</u> : 30 min, peak, 60 min. inter-peak |
| | 2 Buses Option 3D | 5 level crossing removals Additional rail bridge over Peninsula link Stabling roads at Baxter | <u>Stony Point Line</u> : 60 min. peak, 90 min. inter-peak Stony Point to Baxter | <u>Hastings & Rye Fast Buses</u> : 30 min. peak, 60 min. inter-peak |

Each project option was assessed against its ability to achieve the project objectives

Table 3 below provides a summary of the options assessment.

Table 3 Options assessment summary

| | Base Case | Bus Only Option 2A | Stony Point Uplift (30 minutes) Option 2B – SP20 | Stony Point Uplift (20 minutes) Option 2B – SP20 | Langwarrin Electrification | | Baxter Electrification | |
|---|-------------------|--|---|---|---|--|---|----------------------|
| | | | | | 1 Bus Option 3A | 2 Buses Option 3B | 1 Bus Option 3C | 2 buses Option 3D |
| Benefit outcomes | | | | | | | | |
| KPI 1.1 Increased PT Service Availability across Region | No benefits | Modest increase in availability. Minimal improvement in reliability/ freq. | Modest increase in availability. Modest improvement in reliability/ freq. | Modest increase in availability. Modest improvement in reliability/ freq. | Good increase in PT availability. Good improvement of reliability/ freq | Good increase PT availability. Good improvement of reliability/ freq | | |
| KPI 1.2 Reduction in Car Dependency | No benefits | Minor reduction | Minor reduction | Minor reduction and good PT mode shift | Moderate reduction and good PT mode shift | Moderate reduction and good PT mode shift | | |
| KPI 2.1 Precinct Outcomes | No Benefits | Low improvement | Some improvement in connectivity. | Some improvement in connectivity. | Diversion of some car parking. | Diversion of some car parking. | | |
| KPI 2.2 Improved PT access to Frankston East precinct | No Benefits | Low improvement | Some improvement in access. | Some improvement in access. | Good improvement in access for health/ education. | Good improvement in access for health/ education. | | |
| Project outcomes | | | | | | | | |
| Capital Cost | \$0 | \$9-10m | \$150-165m | \$190-210m | \$990m-\$1.1b | \$990m-\$1.1b | \$1.3-1.5b | \$1.3-1.5b |
| Rolling Stock Costs | \$0 | TBC | TBC | TBC | TBC | TBC | TBC | TBC |
| Annual Opex Cost | \$0 | \$5 m | \$10 m | \$12 m | \$7 m | \$10 m | \$10 m | \$13 m |
| PV Benefits (7%) | \$0 | \$16 m | \$72 m | \$125 m | \$463 m | \$450 m | \$531 m | \$544 m |
| PV Costs (7%) | \$0 | \$67 m | \$233 m | \$286 m | \$823 m | \$863 m | \$1,131 m | \$1,170 m |
| NPV (7%) | \$0 | -\$51 m | -\$162 m | -\$161 m | -\$361 m | -\$412 m | -\$600 m | -\$625 m |
| Rapid BCR (7%) | 0 | 0.24 | 0.31** | 0.44** | 0.56 | 0.52 | 0.47 | 0.47 |
| Time | N/A | | | | | | | |
| Risk | Reputational risk | Reputational risk | Risks around shared platform at Frankston | Risks around shared platform at Frankston | Acquisition of property risks | | Acquisition of property risks and groundwater risks | |
| Value Capture/ Creation Opportunity | N/A | Low | Low | Low | Marginal | | Marginal | |

| | Base Case | Bus Only Option 2A | Stony Point Uplift (30 minutes) Option 2B – SP20 | Stony Point Uplift (20 minutes) Option 2B – SP20 | Langwarrin Electrification 1 Bus Option 3A | 2 Buses Option 3B | Baxter Electrification 1 Bus Option 3C | 2 buses Option 3D |
|-----------------------------|---------------------------------------|--|--|--|--|----------------------|--|----------------------|
| Network outcomes | | | | | | | | |
| Compliance with standards | Complies | Complies | Complies | Complies | Complies | | Complies | |
| Protection of Future Assets | None | None | Potential future rolling stock issues/ platform mods | Potential future rolling stock issues/ platform mods | Provides more stabling flexibility Future extensions result in redundant third platform at Langwarrin | | Provides more stabling flexibility, however redundant Baxter Station. | |
| Operational Performance | None | None | Potential reliability issues. | Potential reliability issues. | Good | | Good | |
| Minimise impact | | | | | | | | |
| Property Impacts | No impact | No impact | No impact | No impact | Residential property acquisition. | | Residential property acquisition. | |
| Land use Impacts | No impact | Minimal | Minor adverse impacts | Minor adverse impacts | Visual impacts Hillcrest Rd | | Visual impacts Hillcrest Rd Positive impacts to Baxter businesses. But development pressure in town | |
| Environmental Impacts | No impact | Minimal impacts | Minor noise. Some flora and fauna impacts | Minor noise Some flora and fauna impacts | Moderate noise Up to 10 ha of native veg | | Moderate noise Up to 10 ha of native veg | |
| Temporary Impacts | No impact | Minimal | Minimal | Minimal | Moderate | | Moderate | |
| Traffic Impacts | No impact | Minimal impacts | Minor traffic impacts at level crossings | Minor traffic impacts at level crossings | Localised impacts at Langwarrin | | Localised impacts at Baxter | |
| Assessment result | | | | | | | | |
| Recommendation | Consider in Full Business Case | Could consider in Full Business Case <i>with higher bus frequencies</i> | Could consider in Full Business Case | Consider in Full Business Case <i>Indicative Preferred Option</i> | Could consider in Full Business Case | | Could consider in Full Business Case | |

BCR calculations do not include the cost of any additional rolling stock requirements

** BCR is based on a wide error margin that will require further detailed modelling in the Full Business Case

Recommendation

Based on the initial analysis in the PBC, none of the investment options have demonstrated a strong economic case for priority investment.

- All investment options will provide public transport benefits for Frankston and the Mornington Peninsula. However, the economic costs of all options will exceed the benefits, in particular for the electrification options which require a large capital investment of stabling, stations, level crossing removals, and signalling works.

Of the assessed investment options, the Stony Point Uplift (20 minutes) is the indicative likely preferred. This option:

- requires significantly less capital investment and has less impacts than the electrification options;
- provides additional rail services for population centres at Somerville and Hastings, which would not be provided under the electrification options;
- is estimated to realise a Benefit Cost Ratio (BCR) of 0.44. However, this is based on a wide error margin that will require further detailed modelling in the Full Business Case;
- provides a moderate improvement to rail services, with limited increases in station patronage at the Frankston East precinct. It is not expected to cause significant changes to parking demand at Frankston;
- does not include level crossing removals or significant stabling requirements, and therefore only has minor adverse property, environmental, business, traffic and land use impacts;
- will require further examination of key risks associated with operational issues, service reliability, rolling stock sourcing, timing and costs within the Full Business Case; and
- has the potential to be optimised by providing a 20-minute peak service to Hastings, with a 60-minute all day service from Stony Point. This refinement may offer a more cost-effective outcome while still addressing key needs.

Other Investment options could be further considered in the Full Business Case

- Key findings on the other options are as follows:

Table 3a: Findings on Other Options

| Option | Key Findings |
|---------------------------------|---|
| Bus Only | <ul style="list-style-type: none"> Has the lowest capital investment Has the potential to be optimised to capture more benefits (e.g. a 15-minute service may produce better outcomes); Provides some limited improvements to Frankston East, but is unlikely to reduce parking demand at Frankston station Has little to no environmental or social impact and can be implemented much earlier than other options. |
| Stony Point (30 Minutes) | <ul style="list-style-type: none"> A 30 minute peak service frequency is not attractive enough to impact significantly on mode share and reduce car travel. Even at full utilisation, there is still only a relatively small reduction in car travel when compared with other options. By comparison, the Stony Point Uplift (20 minute) option, can realise a greater mode shift and benefits. |

| Option | Key Findings |
|-----------------------------------|---|
| Langwarrin Electrification | <ul style="list-style-type: none"> • Provides a metro service for the Frankston East precinct, significantly increasing station patronage in this area; • Expected to provide a small reduction in parking demand at Frankston Station, however will also reduce bussing patronage at Frankston station; • Could also provide an additional bus service to Rye (under Option 3B) which will be further examined in the Full Business Case; and • Incorporates level crossing removals at three locations, including the Moorooduc Highway, which will require property acquisition. This option could be optimised by excluding level crossing removals for a more cost-effective outcome, which could be further examined in the Full Business Case. |
| Baxter Electrification | <ul style="list-style-type: none"> • Provides the greatest benefit but has the highest capital cost, which would therefore result in the poorest economic outcome (in Net Present Value terms) • Most of the benefits can still be realised by electrification to Langwarrin for less cost. • The stabling yards may have groundwater impacts. There could also be impacts on the neighbouring Baxter township. • The Mornington Peninsula local council supports electrification of the rail line, but not with Baxter as a terminus station. This is due to concerns over land use impacts and development pressure on Baxter, which is a small township adjacent to Green Wedge land. • Incorporates level crossing removals at five locations, including the Moorooduc Highway, which will require property acquisition. This option could be optimised by excluding level crossing removals for a more cost-effective outcome, which could be further examined in the Full Business Case. |

Next Steps

The Full Business Case (FBC) will require following investigations to occur:

Problem Definition

- Further evaluation on the extent of the Frankston car parking issue. In particular, evidence whether the capacity of station parking creates an impact on all-day parking availability and economic performance of the Frankston centre

Stony Point Uplift Options:

- Improve the model validation for the diesel (Stony Point) services to provide a more accurate estimate of patronage levels and parking demand for the Stony point uplift option
- In conjunction with parking demand assessment, develop station precinct concept layouts for each station on the Stony Point Line.
- Further investigation to determine reliability and platform impacts
- Further investigation to prove / validate the operational viability of the proposed service plan, passing loop length and loop locations
- Further investigation of rolling stock sourcing, options and costs
- Full evaluation of level crossings and associated detailed safety assessments.
- Targeted flora and fauna studies to confirm the environmental risks and approvals required.
- Further optimisation of this option, including opportunities to reduce cost by removing the passing loop at Bittern and optimisation of the Service Plan

Electrification Options (if considered further):

- Full evaluation of level crossing removal options, including input from stakeholders and community
- Targeted flora and fauna studies to confirm the environmental risks and approvals required. A particular focus will be on the area near Langwarrin
- Development of a basic Urban Design Strategy
- Further investigation of congestion issues in the Frankston MAC and assessment of traffic impacts resulting from new stations and/or additional parking at Frankston, Langwarrin Stations.
- Stakeholder and/or community consultation for level crossing removal options, particularly at Moorooduc Highway

Bussing Option (if considered further):

- Refined modelling to better understand the impacts and benefits of the express bus services, including their effect on car trips
- Optimisation of service planning, test increased frequency

Demand Forecast Economic Modelling:

- Determine the impacts and potential synergies of the proposed Frankston Station car park
- Refine the patronage forecast for Frankston East (Leawarra) station, considering the position of the station and growth factors for the surrounding precinct
- Full update of the Cost-Benefit, Analysis, also consider quantifying 'reliability' benefits
- Consider undertaking a wider economic impact assessment to determine the potential positive business and employment impacts for Frankston and Baxter

Stakeholder Consultation

- Stakeholder Consultation with Monash University, Frankston Hospital, Council, Transport operators

Appendix A – Investment Management Standards Outputs



Improving public transport access and efficiency of transport for Frankston and Mornington Peninsula: Baxter Electrification Study

INVESTMENT LOGIC MAP
Initiative

RESPONSE

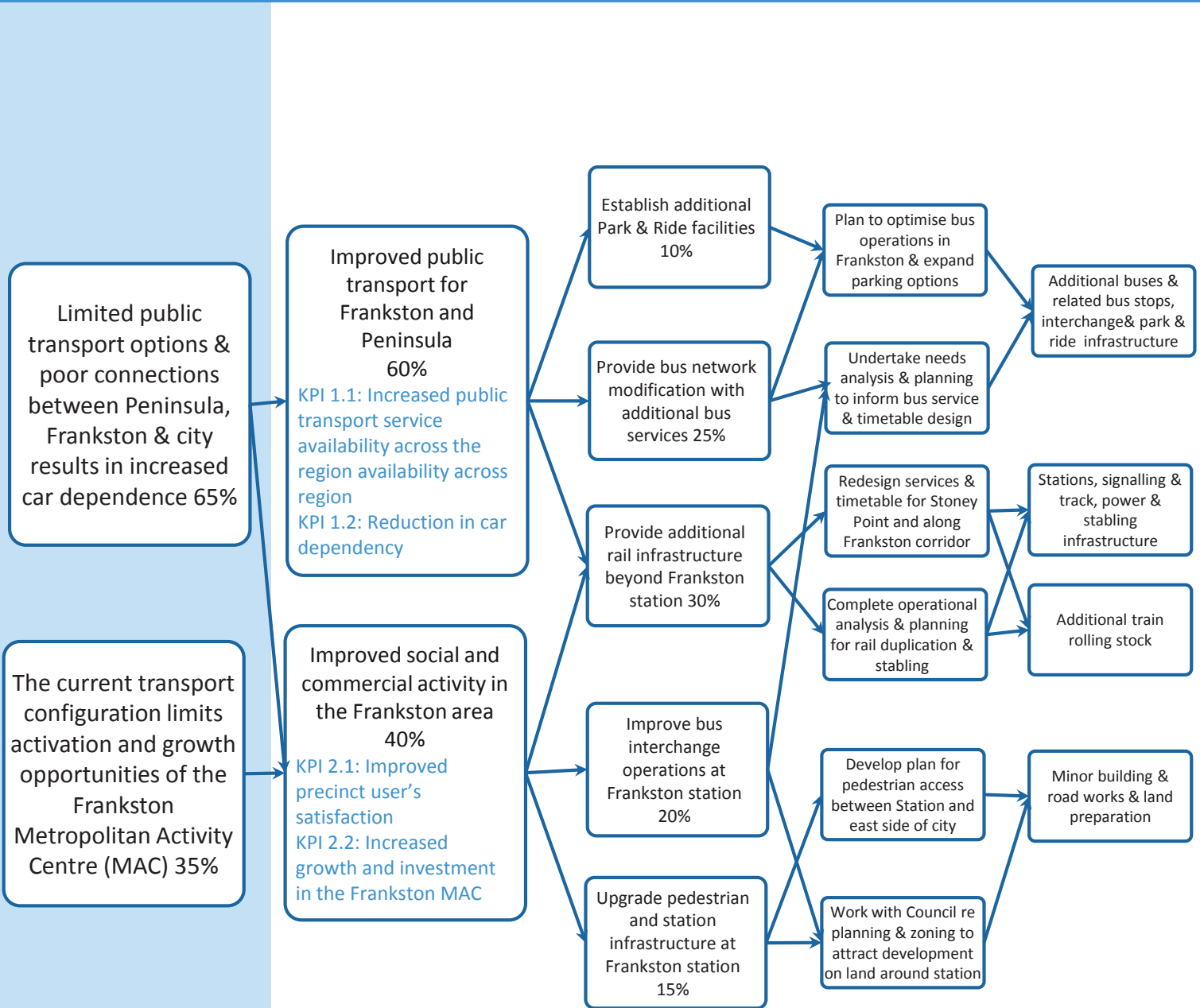
SOLUTION

PROBLEM

BENEFIT

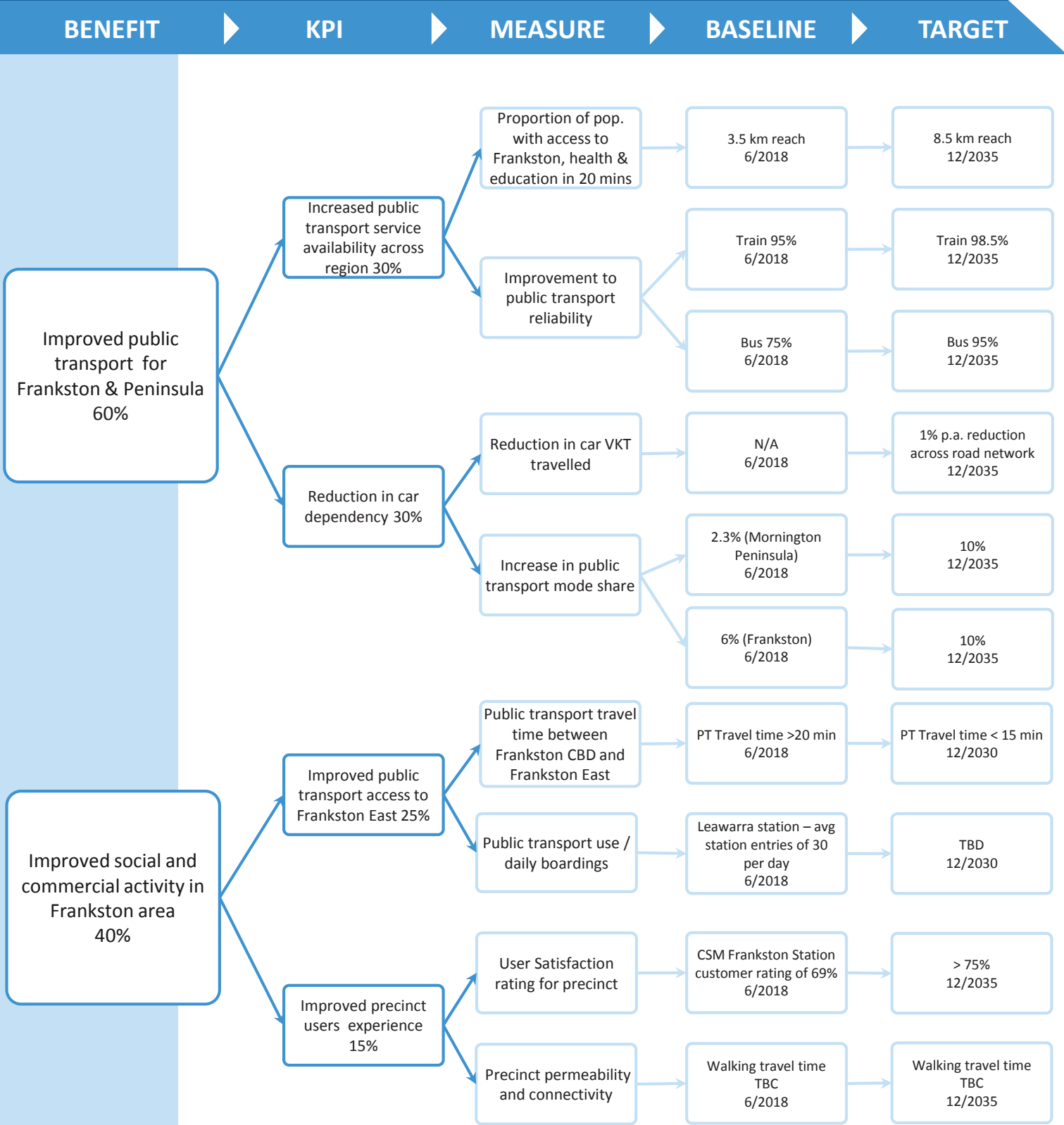
CHANGES

ASSETS



Improving public transport access and efficiency of transport for Frankston and Mornington Peninsula: Baxter Electrification Study

BENEFIT MANAGEMENT PLAN Part 1: Benefit Map



| RESPONSIBILITY FOR DELIVERING THE BENEFITS | | |
|--|--------------|-------------------------------|
| Name | Leanne Price | Position Program Director / / |

Appendix B – Project Scope Summaries



Option 2A: Rapid Buses Rye & Hastings to Frankston



| | | | |
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SUMMARY

SERVICES

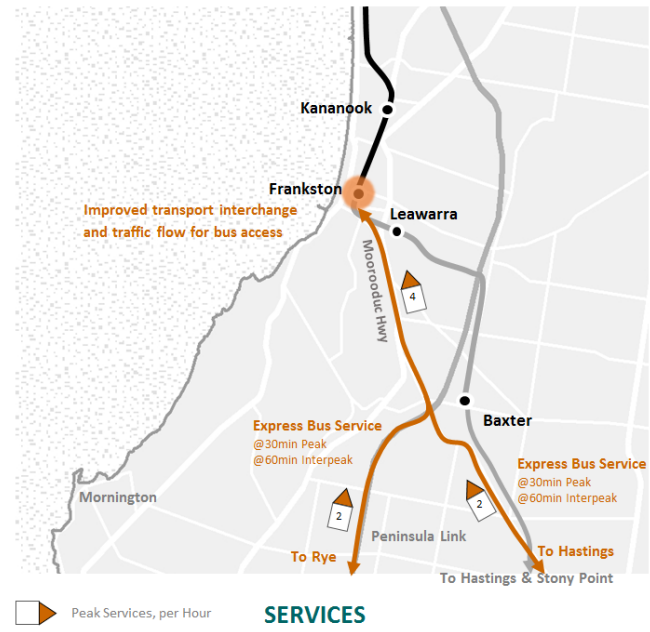
Bus Services from Frankston to Hastings:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Bus Services from Frankston to Rye:

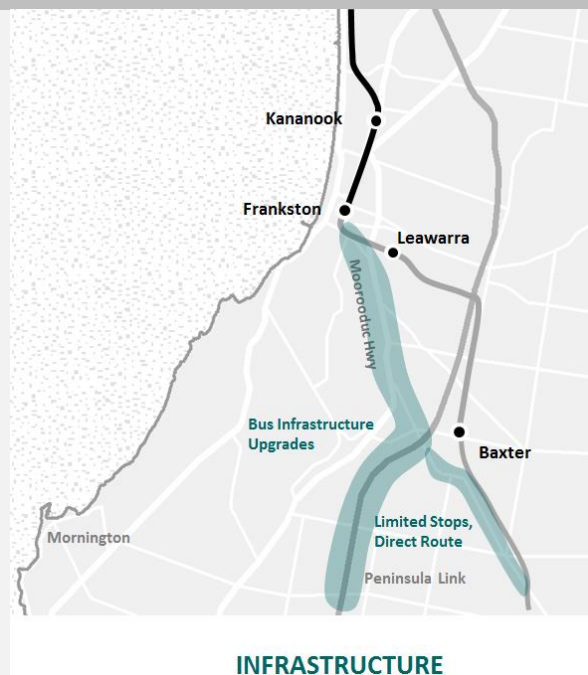
- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Option 2A: Rapid Buses Rye & Hastings to Frankston



INFRASTRUCTURE

- Bus priority lanes
- Premium bus stops
- Signal technology upgrades
- New signals
- Intersection upgrades
- Road signs/line marking
- Reconfiguration of Frankston Station bus stops/layover



Baxter Electrification Preliminary Business Case: Scope Summary
Option 2A: Rapid Buses Rye & Hastings to Frankston



| | | | |
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| Version | | Date | 6/11/2018 |
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| ELEMENTS | | | | | |
|-----------------------------------|---|--------------------|-------|--------------------|-------------------------|
| Item | Description | | | | References/ Assumptions |
| SERVICES | | | | | |
| Service Plan – Western Bus | Stop Location | 2 Hour peak | | 2 Hour peak | |
| | | Starting | Total | Starting | Total |
| | Frankston Station | 4 | 4 | 4 | 4 |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 |
| | Frankston South | 4 | 4 | 4 | 4 |
| | Baxter | 4 | 4 | 4 | 4 |
| | Dromana | 4 | 4 | 4 | 4 |
| | Rosebud | 4 | 4 | 4 | 4 |
| | Rye | 4 | 4 | 4 | 4 |
| Service Plan – Eastern Bus | Stop Location | 2 Hour peak | | 2 Hour peak | |
| | | Starting | Total | Starting | Total |
| | Frankston Station | 4 | 4 | 4 | 4 |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 |
| | Baxter | 4 | 4 | 4 | 4 |
| | Somerville | 4 | 4 | 4 | 4 |
| | Tyabb | 4 | 4 | 4 | 4 |
| | Hastings | 4 | 4 | 4 | 4 |
| Timetable - Western Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | | | | |
| Timetable - Eastern Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | | | | |
| Bus Fleet – Western Bus | <ul style="list-style-type: none"> 5 buses to operate the AM 30 minute peak service to Rye | | | | |
| Bus Fleet – Eastern Bus | <ul style="list-style-type: none"> 3 buses to operate the AM 30 minute peak service to Hastings | | | | |

Baxter Electrification Preliminary Business Case: Scope Summary
Option 2A: Rapid Buses Rye & Hastings to Frankston



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| Version | | Date | 6/11/2018 |
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| ELEMENTS | | |
|-----------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| INFRASTRUCTURE | | |
| Bus Stops | <p>Frankston Station</p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p>Shared Bus Stops (Both Services)</p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter <p><u>Frankston to Hastings Service</u></p> <ul style="list-style-type: none"> • Somerville • Tyabb • Hastings <p><u>Frankston to Rye Service</u></p> <ul style="list-style-type: none"> • Dromana • Rosebud • Rye <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Baxter Electrification Preliminary Business Case: Scope Summary
Option 2A: Rapid Buses Rye & Hastings to Frankston



| | | | |
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| Version | | Date | 6/11/2018 |
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| ELEMENTS | | |
|---|---|--------------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p><u>Road Upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> • 1 x bus interchange and intersection upgrade. • 5 x advanced bus detection and priority phasing • 1 x bus queue jump lane. <p>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</p> <ul style="list-style-type: none"> • 6 x advanced bus detection and priority phasing • 2 x roundabout metering & advance bus detention. <p>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St</p> <ul style="list-style-type: none"> • 1 x intersection modification and realignment and advanced bus detection and priority phasing • 1 x advanced bus detection and priority phasing. • 1 x intersection conversion (to signals). <p>Frankston/Flinders Rd/Mornington Peninsula Fwy (north of Fwy) to Point Nepean Rd/ Dundas St</p> <ul style="list-style-type: none"> • 15 x advanced bus detention and priority phasing. | |
| Noise | No further noise mitigation required | |
| Urban Design | Urban design detail required at Frankston Station. Other locations TBC. This will be investigated further in the full business case | |
| Major Utilities | No major utility conflicts have been identified to date which could have a significant impact on cost/construction. | |
| OTHER SCOPE | | |
| Property & Land | Potential land acquisition for Eastern bus new roundabout (Frankston-Flinders Rd/Graydens Rd intersection) | |
| Integrated Development | No viable IDOs identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |

Baxter Electrification Preliminary Business Case: Scope Summary
Option 2A: Rapid Buses Rye & Hastings to Frankston



| | | | |
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| Version | | Date | 6/11/2018 |
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| ELEMENTS | | |
|--------------------------------|---|--------------------------------|
| Item | Description | References/ Assumptions |
| Vertical Clearance | N/A | |
| Approach Sight Distance | N/A | |
| Line Speed | N/A | |
| Grade | N/A | |
| Power | N/A | |
| Stabling | N/A | |
| Maintenance Access | N/A | |
| DESIGN | | |
| Design Report | Baxter Strategic Bus Routing Options Assessment Report | LXRA-DVPR-14-TR-RPT-023 |
| Design Packages | High level concept design sketches covering the proposed bus routes are included. | LXRA-DVPR-14-TR-RPT-023 |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



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SUMMARY

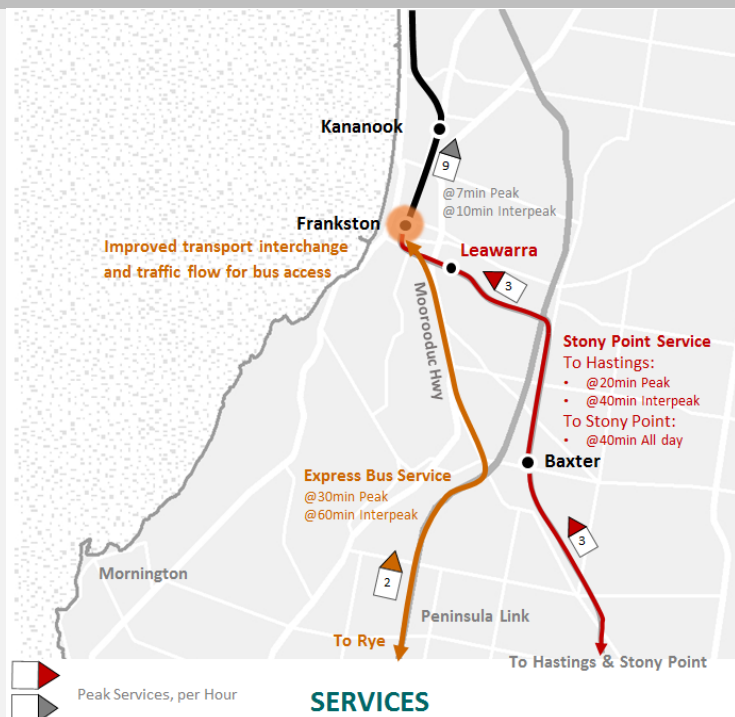
SERVICES

Bus Services from Frankston to Rye:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Train services running from Frankston to Stony Point (through Leawarra and Baxter):

- To Hastings
- 20 min peak service
 - 40 min inter-peak service
- To Stony Point
- 40 min all day service



INFRASTRUCTURE

Rail Infrastructure

- Assumed no new rail infrastructure required at Frankston Station to accommodate the Stony Point service uplift.
 - New passing loop at Langwarrin
 - New passing loop at Tyabb with two new side platforms
 - New passing loop at Bittern with additional side platform.
- Turnback siding & potential DMU stabling at Hastings.
- Potential power upgrade requirements for new signalling (TBC)
 - New signalling infrastructure associated with passing loops
 - Minor station upgrades (scope TBC)

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
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SUMMARY

Level crossing modification to reposition the boom barriers and flashing lights at the following locations associated with passing loops:

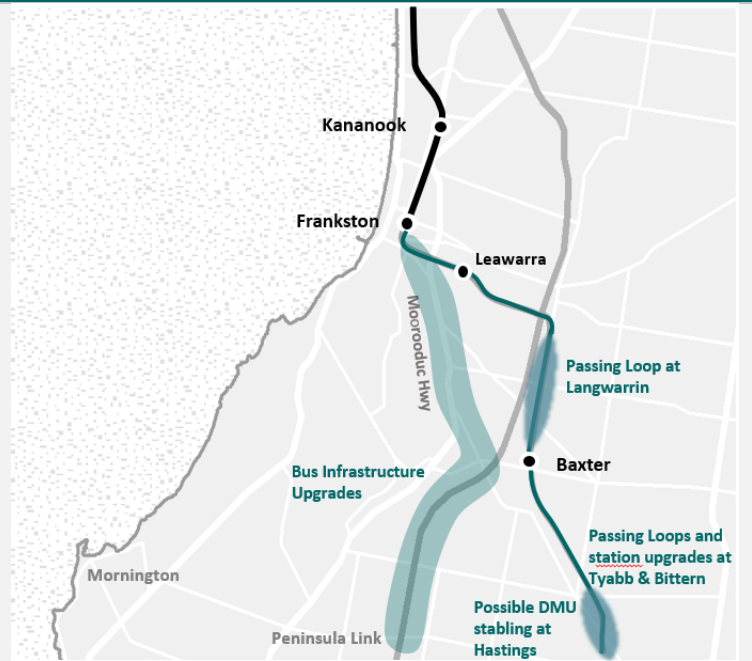
- Robinsons Road
- Golf Links Road

Upgrade to pedestrian level crossings from passive to compliant active crossing with maze associated with the passing loops:

- Tyabb station

Bus Infrastructure Upgrades:

- Bus priority lanes
- Premium bus stops
- Signal technology upgrades
- New signals
- Intersection upgrades
- Road signs/line marking
- Reconfiguration of Frankston Station bus stops/layover



ELEMENTS

| Item | Description | References/ Assumptions |
|------|-------------|-------------------------|
|------|-------------|-------------------------|

SERVICES

| Service Plan - Rail | <table border="1"> <thead> <tr> <th rowspan="2">Station</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Somerville</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Hastings</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Stony Point</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table> | Station | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston | 6 | 6 | 6 | 6 | Somerville | 6 | 6 | 6 | 6 | Hastings | 6 | 6 | 6 | 6 | Stony Point | 3 | 3 | 3 | 3 | |
|---------------------|--|----------|-------------|----------|-------------|--|----------|-------|----------|-------|-----------|---|---|---|---|------------|---|---|---|---|----------|---|---|---|---|-------------|---|---|---|---|--|
| | Station | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Somerville | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Hastings | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stony Point | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | | | | | |
|----------------------------|---|-------------|-------|-------------|-------------------------|--|
| Item | Description | | | | References/ Assumptions | |
| Service Plan – Western Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Frankston South | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Dromana | 4 | 4 | 4 | 4 | |
| | Rosebud | 4 | 4 | 4 | 4 | |
| | Rye | 4 | 4 | 4 | 4 | |
| Timetable – Rail | <ul style="list-style-type: none"> 3 trains per hour during peaks 1.5 train per hour during inter-peak | | | | | |
| Timetable - Western Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour inter-peak and off-peak | | | | | |
| Rolling Stock – Rail | 4 x 2 car DMUs (Sprinters) | | | | | |
| Bus Fleet – Western Bus | 5 buses to operate the AM 30 minute peak service to Rye | | | | | |
| INFRASTRUCTURE | | | | | | |
| Rail Track | Passing Loops <ul style="list-style-type: none"> Langwarrin Tyabb Bittern Modify level crossings at the following locations: <ul style="list-style-type: none"> Robinsons Road Golf Links Road | | | | | |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|----------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> New bus bays for the Rye fast bus on Fletcher Road with real time information (PIDS) Improved pedestrian access <p>All stations between Leawarra and Stony Point</p> <ul style="list-style-type: none"> Minor upgrades e.g. additional canopy coverage at higher patronage stations, formalising car parking areas to provide asphalt surface, signage, lighting and CCTV. | |
| Bridges | N/A | |
| Rail Traction Power | N/A | |
| Rail Signalling | <p>Modify the following systems to support the track configuration and infrastructure changes (passing loops):</p> <ul style="list-style-type: none"> Signals Train Control Existing communication network Signal Power Train Detection System Upgrade and/or new CSR | |
| Stabling | <p>Assumed additional rolling stock for this improved service will be stabled and refuelled at Kananook. Additional Kananook infrastructure required:</p> <ul style="list-style-type: none"> Stabling for 4 x 2 car DMUs DMU refuelling point Second, futureproofed holding road may be required to be constructed for Day 1 of the new service due to operational constraints. TBC. <p>Alternative option for DMU stabling at Hastings</p> | |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|-----------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Bus Stops | <p>Frankston Station</p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p><u>Frankston to Rye Service</u></p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter • Dromana • Rosebud • Rye <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|----------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p>Civil works including <u>drainage associated with passing loops at the following locations:</u></p> <ul style="list-style-type: none"> Langwarrin Tyabb Bittern <p><u>Modification of boom barriers and flashing light positions associated with level crossing upgrades at the following locations:</u></p> <ul style="list-style-type: none"> Robinsons Road Golf Links Road <p><u>Road Upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> 1 x bus interchange and intersection upgrade. 5 x advanced bus detection and priority phasing 1 x bus queue jump lane. <p>Moorooduc Hwy/Hastings Rd & to Frankston Flinders Rd/ Mornington Peninsula Fwy (east of Fwy).</p> <ul style="list-style-type: none"> 4 x advanced bus detection and priority phasing 2 x roundabout metering & advance bus detention. <p>Nepean Hwy/Mornington Peninsula Fwy to Point Nepean Rd/ Dundas St</p> <ul style="list-style-type: none"> 15 x advanced bus detection and priority phasing | |
| Noise | No further noise mitigation required | |
| Urban Design | <ul style="list-style-type: none"> Not required at this level of design | |
| Major Utilities | No major utilities conflicts currently identified | |
| OTHER SCOPE | | |
| Property & Land | No significant land acquisition has been identified to date. | |

Option 2B-SP20: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
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| ELEMENTS | | |
|---|---|---|
| Item | Description | References/ Assumptions |
| Integrated Development | No viable IDOs identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Stony Point | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Stony Point | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | To be determined in full business case | |
| Grade | To be determined in full business case | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |
| Maintenance Access | To be determined in full business case | |
| DESIGN | | |
| Design Report | Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report Stony Point Service Plan Uplift Report | <u>LXRA-DVPR-14-RL-RPT-003</u> <u>LXRA-DVPR-14-TR-RPT-023</u> <u>LXRA-DVPR-14-RL-RPT-0005</u> |
| Design Packages | Concept Design drawings covering the below design packages are available. | |
| | <ul style="list-style-type: none"> Rail Infrastructure, including track, civil, station platforms and pedestrian crossings | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
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SUMMARY

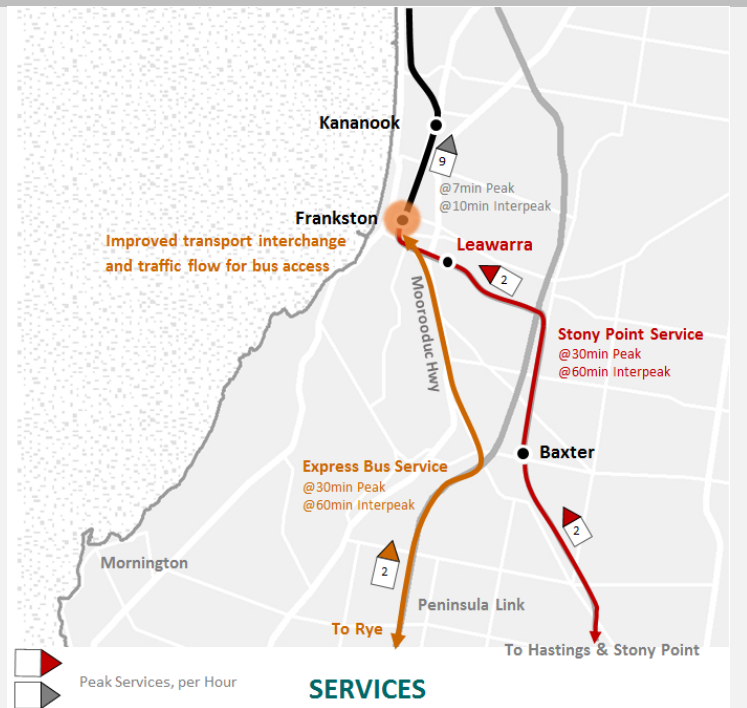
SERVICES

Bus Services from Frankston to Rye:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Train services running from Frankston to Hastings (through Leawarra and Baxter):

- every 30 min during peaks
- every 60 min during interpeak

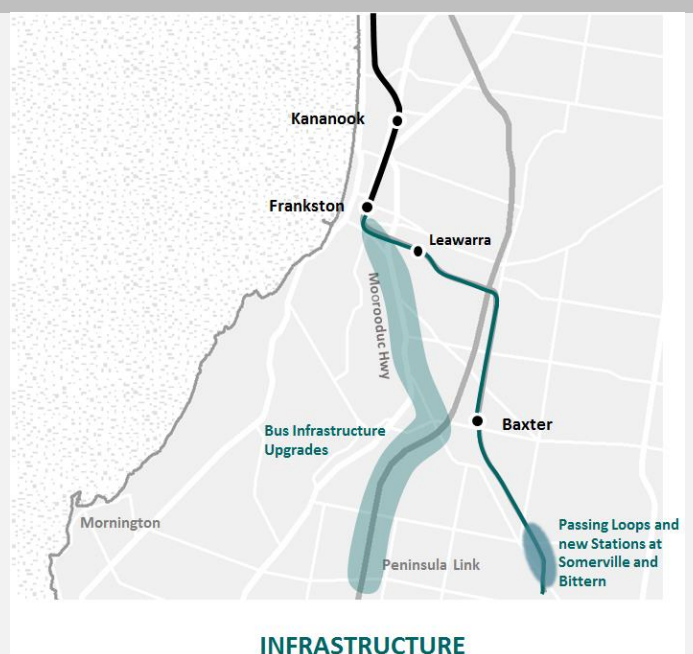


INFRASTRUCTURE

Rail Infrastructure

- Assumed no new rail infrastructure required at Frankston Station to accommodate the Stony Point service uplift.
- New passing loop at Somerville with new side platform
- New passing loop at Bittern with additional side platform
- Potential power upgrade requirements for new signalling (TBC)
- New signalling infrastructure associated with passing loops
- Minor station upgrades (scope TBC)

Level crossing modification to reposition the boom barriers and flashing lights at the



Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
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SUMMARY

following locations associated with passing loops:

- Eramosa Road
- Urquhart Crescent

Upgrade to pedestrian level crossings from passive to compliant active crossing with maze associated with the passing loops:

- Somerville station
- Bittern station

Bus Infrastructure Upgrades:

- Bus priority lanes
- Premium bus stops
- Signal technology upgrades
- New signals
- Intersection upgrades
- Road signs/line marking
- Reconfiguration of Frankston Station bus stops/layover

ELEMENTS

| Item | Description | References/ Assumptions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|--|-------------------------|-------------|----------|-------------|--|----------|-------|----------|-------|-----------|---|---|---|---|------------|---|---|---|---|----------|---|---|---|---|-------------|---|---|---|---|--|
| SERVICES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan - Rail | <table border="1"> <thead> <tr> <th rowspan="2">Station</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Somerville</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Hastings</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Stony Point</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </tbody> </table> | Station | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston | 4 | 4 | 4 | 4 | Somerville | 4 | 4 | 4 | 4 | Hastings | 4 | 4 | 4 | 4 | Stony Point | 4 | 4 | 4 | 4 | |
| | Station | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Somerville | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Hastings | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stony Point | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | | | | | |
|----------------------------|--|-------------|-------|-------------|-------------------------|--|
| Item | Description | | | | References/ Assumptions | |
| Service Plan – Western Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Frankston South | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Dromana | 4 | 4 | 4 | 4 | |
| | Rosebud | 4 | 4 | 4 | 4 | |
| | Rye | 4 | 4 | 4 | 4 | |
| Timetable – Rail | <ul style="list-style-type: none"> 2 trains per hour during the peak 1 train per hour during the interpeak | | | | | |
| Timetable - Western Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour interpeak and off-peak | | | | | |
| Rolling Stock – Rail | 4 x 2 car DMUs (Sprinters) | | | | | |
| Bus Fleet – Western Bus | 5 buses to operate the 30 minute peak service to Rye | | | | | |
| INFRASTRUCTURE | | | | | | |
| Rail Track | Passing Loops <ul style="list-style-type: none"> Somerville Bittern Modify level crossings at the following locations: <ul style="list-style-type: none"> Eramosa Road Urquhart Crescent | | | | | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|----------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> New bus bays for the Rye fast bus on Fletcher Road with real time information (PIDS) Improved pedestrian access <p>All stations between Leawarra and Stony Point</p> <ul style="list-style-type: none"> Minor upgrades e.g. additional canopy coverage at higher patronage stations, formalising car parking areas to provide asphalt surface, signage, lighting and CCTV. | |
| Bridges | N/A | |
| Rail Traction Power | N/A | |
| Rail Signalling | <p>Modify the following systems to support the track configuration and infrastructure changes (passing loops):</p> <ul style="list-style-type: none"> Signals Train Control Existing communication network Signal Power Train Detection System Upgrade and/or new CSR | |
| Stabling | <p>Assumed additional rolling stock for this improved service will be stabled and refuelled at Kananook. Additional Kananook infrastructure required:</p> <ul style="list-style-type: none"> Stabling for 4 x 2 car DMUs DMU refuelling point Second, futureproofed holding road may be required to be constructed for Day 1 of the new service due to operational constraints. TBC. <p>Alternative option for DMU stabling at Hastings</p> | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|-----------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Bus Stops | <p>Frankston Station</p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p><u>Frankston to Rye Service</u></p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter • Dromana • Rosebud • Rye <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

ELEMENTS

| Item | Description | References/ Assumptions |
|-------------------------------|--|-------------------------|
| Major Civil Works | <p>Civil works including <u>drainage associated with passing loops at the following locations:</u></p> <ul style="list-style-type: none"> Somerville Bittern <p><u>Modification of boom barriers and flashing light positions associated with level crossing upgrades at the following locations:</u></p> <ul style="list-style-type: none"> Eramosa Road Urquhart Crescent <p><u>Road Upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> 1 x bus interchange and intersection upgrade. 5 x advanced bus detection and priority phasing 1 x bus queue jump lane. <p>Moorooduc Hwy/Hastings Rd & to Frankston Flinders Rd/ Mornington Peninsula Fwy (east of Fwy).</p> <ul style="list-style-type: none"> 4 x advanced bus detection and priority phasing 2 x roundabout metering & advance bus detention. <p>Nepean Hwy/Mornington Peninsula Fwy to Point Nepean Rd/ Dundas St</p> <ul style="list-style-type: none"> 15 x advanced bus detection and priority phasing | |
| Noise | No further noise mitigation required | |
| Urban Design | <ul style="list-style-type: none"> Not required at this level of design | |
| Major Utilities | No major utilities conflicts currently identified | |
| OTHER SCOPE | | |
| Property & Land | No significant land acquisition has been identified to date. | |
| Integrated Development | No viable IDOs identified at this current time | |

Option 2B-SP30: Stony Point Service Uplift Between Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 10-03-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------------------|---|---|
| Item | Description | References/ Assumptions |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | To be determined in full business case | |
| Grade | To be determined in full business case | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |
| Maintenance Access | To be determined in full business case | |
| DESIGN | | |
| Design Report | <ul style="list-style-type: none"> Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report Stony Point Service Plan Uplift Report | <u>LXRA-DVPR-14-RL-RPT-003</u> <u>LXRA-DVPR-14-TR-RPT-023</u> <u>LXRA-DVPR-14-RL-RPT-0005</u> |
| Design Packages | Concept Design drawings covering the below design packages are available. | |
| | <ul style="list-style-type: none"> Rail Infrastructure, including track, civil, station platforms and pedestrian crossings | |

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
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SUMMARY

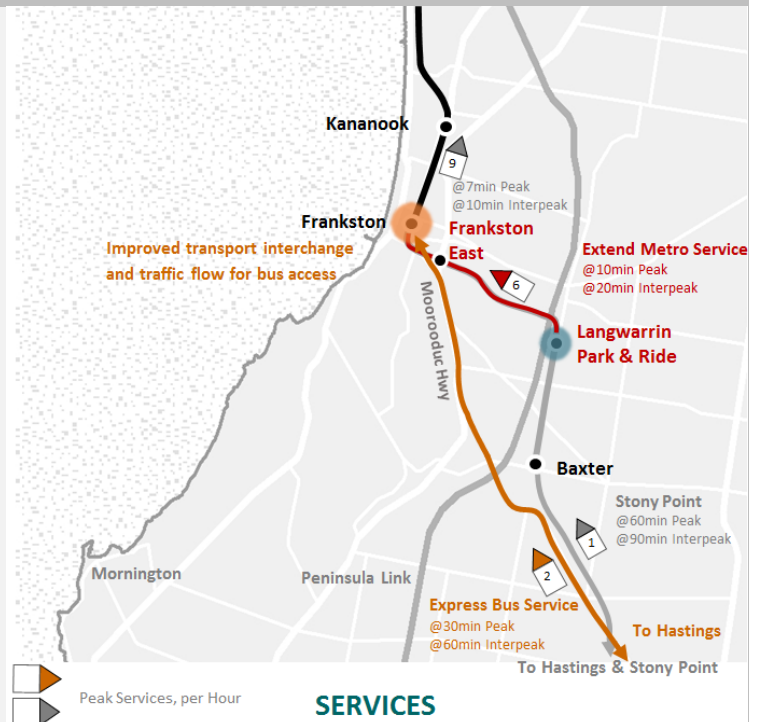
SERVICES

Bus Services from Frankston to Hastings:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Metro services from Frankston to Langwarrin:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



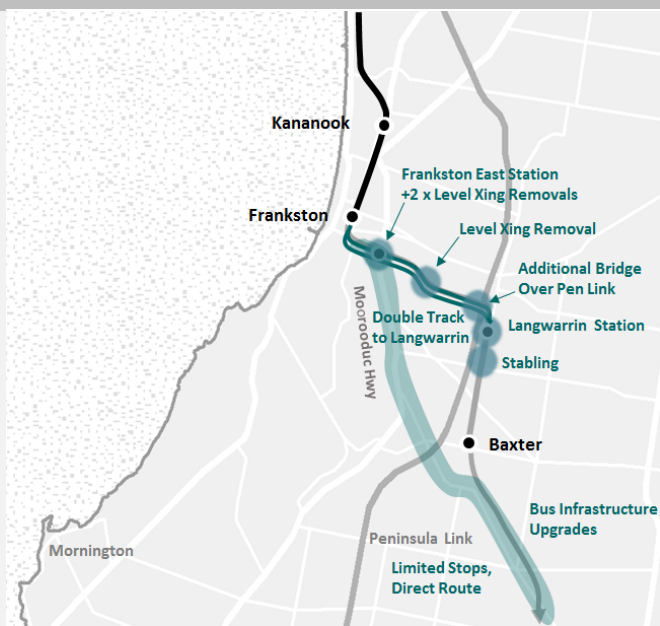
INFRASTRUCTURE

Frankston Station:

- Two additional platforms (island platform)
- Overpass and associated infrastructure and facilities for platform connectivity
- Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration
- Overhead traction power infrastructure associated with new station layout.
- Demolish the existing Frankston traction substation and construct new substation
- Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

Frankston East Station:

- New side platform host station and associated facilities and infrastructure



INFRASTRUCTURE

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
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SUMMARY

-Changes and enhancements to the SUPs to improve connectivity across Moorooduc Hwy

Langwarrin Station:

- New 3 platform premium station and associated infrastructure
- Park and ride for up to 1000 cars and associated infrastructure

Peninsula Link:

-Additional rail bridge over Peninsula Link

Level Crossing Removals:

Potential level crossing removals (TBC if required) between Frankston and Langwarrin Stations:

- Clarendon Rd (road closure)
- Moorooduc Hwy (road under rail)
- Hillcrest Rd (road over rail)

Track and OHW Infrastructure:

-Duplicate 6 km of track and electrify to Langwarrin

Signalling:

-Full re-signalling between Frankston and new Langwarrin Station and associated power upgrades as required

Combined Services Route (CSR):

-New CSR route with diversity between Frankston and Langwarrin

Substations:

- 1 x demolition of existing substation (at Frankston).
- 3 x new 4 megawatt substations (at Frankston, Frankston East and Langwarrin)

Power:

-22kv feeder from Langwarrin zone sub to traction power substations

Train Stabling:

- up to 21 number stabling roads for EMUs
- 1 number stabling road for DMUs

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

SUMMARY

-Associated infrastructure

Bus Infrastructure:

- Bus priority lanes
- Premium bus stops
- Signal technology upgrades
- New signals
- Intersection upgrades
- Road signs/line marking
- Reconfiguration of Frankston Station bus stops/layover

ELEMENTS

| Item | Description | References/ Assumptions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--|-------------------------|-------------|----------|-------------|--|----------|-------|----------|-------|-------------------|----|----|----|----|------------------------------------|----|----|----|----|-------------|---|---|---|---|------------|---|---|---|---|-------|---|---|---|---|----------|---|---|---|---|--|
| SERVICES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan - Rail | <table border="1"> <thead> <tr> <th rowspan="2">Station</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> </tr> <tr> <td>Langwarrin</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> </tr> <tr> <td>Stony Point</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> </tbody> </table> | Station | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston | 18 | 18 | 18 | 18 | Langwarrin | 12 | 12 | 12 | 12 | Stony Point | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | |
| | Station | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston | 18 | 18 | 18 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Langwarrin | 12 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stony Point | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan – Eastern Bus | <table border="1"> <thead> <tr> <th rowspan="2">Stop Location</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston Station</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Monash Health & Education Precinct</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Baxter</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Somerville</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Tyabb</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Hastings</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </tbody> </table> | Stop Location | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston Station | 4 | 4 | 4 | 4 | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | Baxter | 4 | 4 | 4 | 4 | Somerville | 4 | 4 | 4 | 4 | Tyabb | 4 | 4 | 4 | 4 | Hastings | 4 | 4 | 4 | 4 | |
| | Stop Location | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston Station | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Baxter | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Somerville | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Tyabb | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastings | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Timetable – Rail | <ul style="list-style-type: none"> • 10 minute service to/from Langwarrin during the peak. • 20 minute service to/from Langwarrin during the interpeak and off peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Baxter Electrification Preliminary Business Case: Scope Summary
**Option 3A: Full Duplication/Electrification to
 Langwarrin & Fast Bus to Hastings**



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------------|--|-------------------------|
| Item | Description | References/ Assumptions |
| Timetable - Eastern Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | |
| Rolling Stock – Rail | Additional 3 EMUs to operate the extended service to Langwarrin from Frankston. | |
| Bus Fleet | 3 buses to operate the 30 minute peak service to Hastings | |
| INFRASTRUCTURE | | |
| Rail Track | <p>Duplication</p> <ul style="list-style-type: none"> Duplicate track from Frankston to Langwarrin (approximately 6 km) <p>Electrification/Modifications</p> <ul style="list-style-type: none"> Electrify from Frankston to Langwarrin (approximately 5 km dual track) <p>Upgrade to level crossings at the following locations (should removal not be required):</p> <ul style="list-style-type: none"> Clarendon St Moorooduc Hwy Hillcrest Rd | |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> Two addition platforms (island platform) Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms New bus bays with real time information (PIDS) for Hastings fast bus <p>Frankston East Station:</p> <ul style="list-style-type: none"> New host station with two side platforms and associated station facilities <p>Langwarrin Station:</p> <ul style="list-style-type: none"> New 3 platform premium station and associated infrastructure | |
| Bridges | New bridge over Peninsula Link to accommodate the additional rail track | |

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|----------------------------|--|-------------------------|
| Item | Description | References/ Assumptions |
| Rail Traction Power | Provision of the following: <ul style="list-style-type: none"> • Demolition of existing Frankston substation • 3 x new 4 megawatt substations • 22kv feeder from Langwarrin zone sub to traction power substations • New OHW infrastructure between Frankston and Langwarrin and for the associated stabling | |
| Rail Signalling | <ul style="list-style-type: none"> • Full re-signalling of Frankston Station and station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration • New signalling between Frankston and Langwarrin for extended electric services | |
| Stabling | Up to 22 no. new stabling roads to be constructed at Langwarrin, with a minimum of: <ul style="list-style-type: none"> • 5 No. 160m EMUs to replace the stabling lost at Frankston • 3 No. 160m EMU's to operate to Langwarrin • 1 No. 160m road for Stony Point DMUs | |
| Bus Stops | <p><u>Frankston Station</u></p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p><u>Frankston to Hastings Service</u></p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter • Somerville • Tyabb • Hastings <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Baxter Electrification Preliminary Business Case: Scope Summary
**Option 3A: Full Duplication/Electrification to
 Langwarrin & Fast Bus to Hastings**



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p><u>Civil works including drainage associated with:</u></p> <ul style="list-style-type: none"> • New stations • Stabling yard • New formation for rail duplication • Other civil works associated with substations and other fixed infrastructure • Removal of level crossings (if required). <p><u>Road upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> • 1 x bus interchange and intersection upgrade. • 5 x advanced bus detection and priority phasing • 1 x bus queue jump lane. <p>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</p> <ul style="list-style-type: none"> • 6 x advanced bus detection and priority phasing • 2 x roundabout metering & advance bus detention. <p>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St</p> <ul style="list-style-type: none"> • 1 x intersection modification and realignment and advanced bus detection and priority phasing • 1 x advanced bus detection and priority phasing. • 1 x intersection conversion (to signals). | |
| Noise | At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds | |
| Urban Design | <ul style="list-style-type: none"> • To be detailed in full business case | |
| Major Utilities | No major utility conflicts have been identified to date which could have a significant impact on cost/construction | |
| OTHER SCOPE | | |

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Property & Land | <p>5.3 hectares (approximately) of land acquisition required at Langwarrin for new stabling</p> <p>Property acquisitions will be required in association with level crossing removals at the following locations:</p> <ul style="list-style-type: none"> • Moorooduc Hwy • Hillcrest Rd <p>Potential change in ownership of land associated with level crossing upgrades (should removals not be required) and increased number of tracks at the following locations:</p> <ul style="list-style-type: none"> • Clarendon St • Moorooduc Hwy • Hillcrest Rd | |
| Integrated Development | No viable opportunities identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | No change to line speeds | |
| Grade | No change to grades proposed | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |
| Maintenance Access | To be determined in full business case | |
| DESIGN | | |

Option 3A: Full Duplication/Electrification to Langwarrin & Fast Bus to Hastings



| | | | |
|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
|----------------|---|-------------|------------|

| ELEMENTS | | |
|------------------------|---|---|
| Item | Description | References/ Assumptions |
| Design Report | <ul style="list-style-type: none"> Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report | <p><u>LXRA-DVPR-14-RL-RPT-003</u></p> <p><u>LXRA-DVPR-14-TR-RPT-023</u></p> |
| Design Packages | <p>Concept Design drawings covering the below design packages are available.</p> <ul style="list-style-type: none"> Rail Infrastructure, including track, civil and traction power Roadworks | <p><u>Drawings referenced in relevant reports.</u></p> |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
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SUMMARY

SERVICES

Bus Services from Frankston to Hastings:

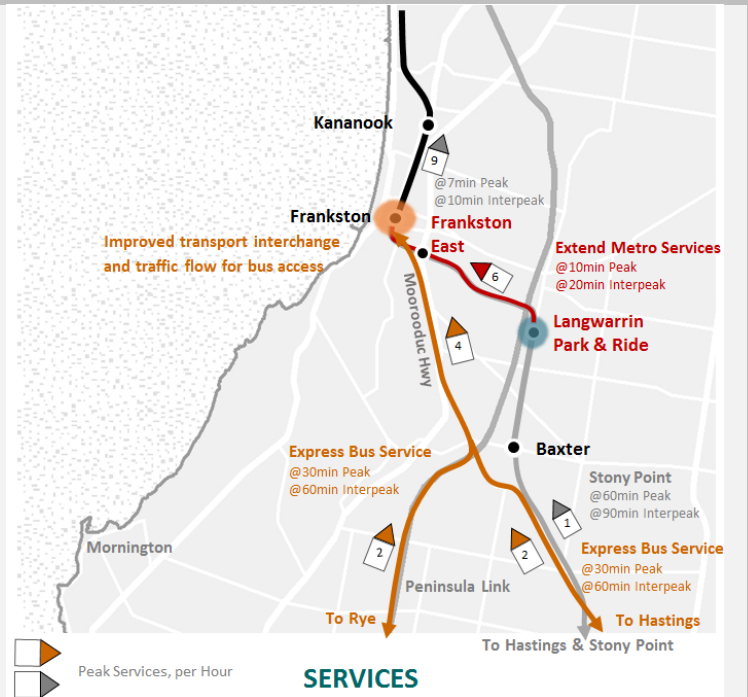
- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Bus Services from Frankston to Rye:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Metro services from Frankston to Langwarrin:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



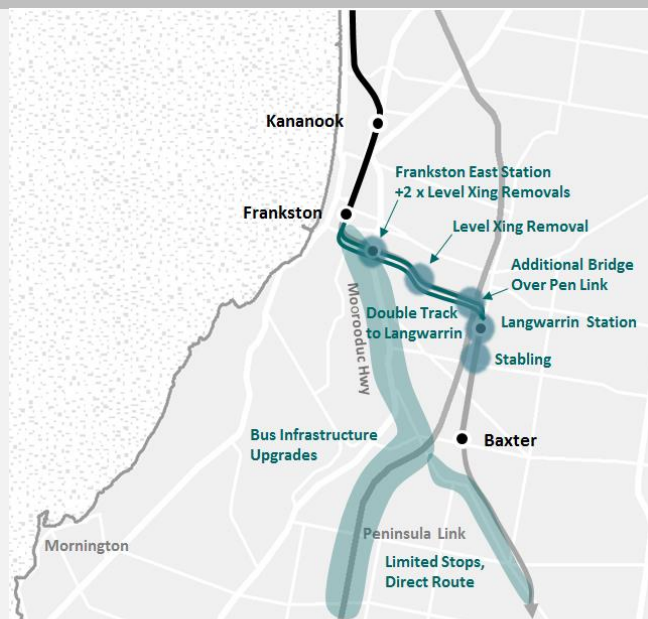
INFRASTRUCTURE

Frankston Station:

- Two additional platforms (island platform)
- Overpass and associated infrastructure and facilities for platform connectivity
- Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration
- Overhead traction power infrastructure associated with new station layout.
- Demolish the existing Frankston traction substation and construct new substation
- Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

Frankston East Station:

- New side platform host station and associated facilities and infrastructure



INFRASTRUCTURE

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

SUMMARY

-Changes and enhancements to the SUPs to improve connectivity across Moorooduc Hwy

Langwarrin Station:

- New 3 platform premium station and associated infrastructure
- Park and ride for up to 1000 cars and associated infrastructure

Peninsula Link:

-additional rail bridge over Peninsula Link

Level Crossing Removals:

Potential level crossing removals (TBC if required) between Frankston and Langwarrin Stations:

- Clarendon Rd (road closure)
- Moorooduc Hwy (road under rail)
- Hillcrest Rd (road over rail)

Track and OHW Infrastructure:

-Duplicate 6 km of track and electrify to Langwarrin

Signalling:

-Full re-signalling between Frankston and new Langwarrin Station and associated power upgrades as required

Combined Services Route:

-New CSR route with diversity between Frankston and Langwarrin

Substations:

- 1 x demolition of existing substation (at Frankston).
- 3 x new 4 megawatt substations (at Frankston, Frankston East and Langwarrin)

Power:

-22kv feeder from local zone sub to traction power substations

Train Stabling:

- up to 21 number stabling roads for EMUs
- 1 number stabling road for DMUs

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

SUMMARY

-Associated infrastructure

Bus Infrastructure:

- Bus priority lanes
- Premium bus stops
- Signal technology upgrades
- New signals
- Intersection upgrades
- Road signs/line marking
- Reconfiguration of Frankston Station bus stops/layover

ELEMENTS

| Item | Description | References/ Assumptions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--|-------------------------|-------------|----------|--------------|--|----------|-------|----------|-------|-------------------|----|----|----|----|------------------------------------|----|----|----|----|-----------------|---|---|---|---|--------|---|---|---|---|---------|---|---|---|---|---------|---|---|---|---|-----|---|---|---|---|---|
| SERVICES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan – Rail | <table border="1"> <thead> <tr> <th rowspan="2">Station</th> <th colspan="2">2 Hour peak</th> <th colspan="2">23 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> </tr> <tr> <td>Langwarrin</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> </tr> <tr> <td>Stony Point</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> </tbody> </table> | Station | 2 Hour peak | | 23 Hour peak | | Starting | Total | Starting | Total | Frankston | 18 | 18 | 18 | 18 | Langwarrin | 12 | 12 | 12 | 12 | Stony Point | 2 | 2 | 2 | 2 | • | | | | | | | | | | | | | | | | | | | | |
| | Station | | 2 Hour peak | | 23 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston | 18 | 18 | 18 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Langwarrin | 12 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stony Point | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan – Western Bus | <table border="1"> <thead> <tr> <th rowspan="2">Stop Location</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston Station</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Monash Health & Education Precinct</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Frankston South</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Baxter</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Dromana</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Rosebud</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Rye</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </tbody> </table> | Stop Location | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston Station | 4 | 4 | 4 | 4 | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | Frankston South | 4 | 4 | 4 | 4 | Baxter | 4 | 4 | 4 | 4 | Dromana | 4 | 4 | 4 | 4 | Rosebud | 4 | 4 | 4 | 4 | Rye | 4 | 4 | 4 | 4 | • |
| | Stop Location | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston Station | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston South | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Baxter | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Dromana | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rosebud | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rye | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | | | | | |
|----------------------------|--|-------------|-------|-------------|-------------------------|---|
| Item | Description | | | | References/ Assumptions | |
| Service Plan – Eastern Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | • |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Somerville | 4 | 4 | 4 | 4 | |
| | Tyabb | 4 | 4 | 4 | 4 | |
| | Hastings | 4 | 4 | 4 | 4 | |
| Timetable - Rail | <ul style="list-style-type: none"> 10 minute service to/from Langwarrin during the peak. 20 minute service to/from Langwarrin during the interpeak and off peak. | | | | • | |
| Timetable - Western Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | | | | • | |
| Timetable - Eastern Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | | | | • | |
| Rolling Stock – Rail | Additional 3 – 4 trains to operate the extended service to Langwarrin from Frankston. | | | | • | |
| Bus Fleet – Western Bus | <ul style="list-style-type: none"> 5 buses to operate the 30 minute peak service to Rye | | | | • | |
| Bus Fleet – Eastern Bus | <ul style="list-style-type: none"> 3 buses to operate the 30 minute peak service to Hastings | | | | • | |
| INFRASTRUCTURE | | | | | | |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|----------------------------|--|-------------------------|
| Item | Description | References/ Assumptions |
| Rail Track | <p>Duplication</p> <ul style="list-style-type: none"> Duplicate track from Frankston to Langwarrin (approximately 6 km) <p>Electrification/Modifications</p> <ul style="list-style-type: none"> Electrify from Frankston to Langwarrin (approximately 5 km dual track) <p>Upgrade to level crossings at the following locations (should removal not be required):</p> <ul style="list-style-type: none"> Clarendon St Moorooduc Hwy Hillcrest Rd | |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> Two addition platforms (island platform) Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms New bus bays with real time information (PIDS) for Hastings fast bus <p>Frankston East Station:</p> <ul style="list-style-type: none"> New host station with two side platforms and associated station facilities <p>Langwarrin Station:</p> <ul style="list-style-type: none"> New 3 platform premium station and associated infrastructure | |
| Bridges | New bridge over Peninsula Link to accommodate the additional rail track | |
| Rail Traction Power | <p>Provision of the following:</p> <ul style="list-style-type: none"> Demolition of existing Frankston substation 3 x new 4 megawatt substations 22kv feeder from Langwarrin zone sub to traction substations New OHW infrastructure between Frankston and Langwarrin and for the associated stabling | |
| Rail Signalling | <ul style="list-style-type: none"> Full re-signalling of Frankston Station and station limits and up to the interface with Kananook New signalling between Frankston and Langwarrin for extended electric services | |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Stabling | <p>Up to 22 no. new stabling roads to be constructed at Langwarrin, with a minimum of:</p> <ul style="list-style-type: none"> • 5 No. 160m EMUs to replace the stabling lost at Frankston • 3 No. 160m EMU's to operate to Langwarrin • 1 No. 160m road for Stony Point DMUs | |
| Bus Stops | <p><u>Frankston Station</u></p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p>Shared Bus Stops (Both Services)</p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter <p><u>Frankston to Hastings Service</u></p> <ul style="list-style-type: none"> • Somerville • Tyabb • Hastings <p><u>Frankston to Rye Service</u></p> <ul style="list-style-type: none"> • Dromana • Rosebud • Rye <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Baxter Electrification Preliminary Business Case: Scope Summary
**Option 3B: Full Duplication/Electrification to
 Langwarrin & Fast Buses to Rye & Hastings**



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p>Civil works including drainage associated with:</p> <ul style="list-style-type: none"> • New stations • Stabling yard • New formation for rail duplication • Other civil works associated with substations and other fixed infrastructure • Removal of level crossings (if required). <p><u>Road Upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> • 1 x bus interchange and intersection upgrade. • 5 x advanced bus detection and priority phasing • 1 x bus queue jump lane. <p>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</p> <ul style="list-style-type: none"> • 6 x advanced bus detection and priority phasing • 2 x roundabout metering & advance bus detention. <p>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St</p> <ul style="list-style-type: none"> • 1 x intersection modification and realignment and advanced bus detection and priority phasing • 1 x advanced bus detection and priority phasing. • 1 x intersection conversion (to signals). <p>Frankston/Flinders Rd/Mornington Peninsula Fwy (north of Fwy) to Point Nepean Rd/ Dundas St</p> <ul style="list-style-type: none"> • 15 x advanced bus detention and priority phasing. | |
| Noise | At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds | |
| Urban Design | <ul style="list-style-type: none"> • To be detailed in full business case | |
| Major Utilities | No major utility conflicts have been identified to date which could have a significant impact on cost/construction | |
| OTHER SCOPE | | |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Property & Land | <p>5.3 hectares (approximately) of land acquisition required at Langwarrin for new stabling</p> <p>Property acquisitions will be required in association with level crossing removals at the following locations:</p> <ul style="list-style-type: none"> • Moorooduc Hwy • Hillcrest Rd <p>Potential change in ownership of land associated with level crossing upgrades (should removals not be required) and increased number of tracks at the following locations:</p> <ul style="list-style-type: none"> • Clarendon St • Moorooduc Hwy • Hillcrest Rd | |
| Integrated Development | No viable opportunities identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | No change to line speeds | |
| Grade | No change to grades proposed | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |
| Maintenance Access | To be determined in full business case | |
| DESIGN | | |

Option 3B: Full Duplication/Electrification to Langwarrin & Fast Buses to Rye & Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|------------------------|--|--|
| Item | Description | References/ Assumptions |
| Design Report | Baxter Electrification – Rail Concept Design Report | <u>LXRA-DVPR-14-RL-RPT-003</u> |
| | Baxter Strategic Bus Routing Options Assessment Report | <u>LXRA-DVPR-14-TR-RPT-023</u> |
| Design Packages | Concept Design drawings covering the below design packages are available. | <u>Referenced in relevant reports.</u> |
| | <ul style="list-style-type: none"> Rail Infrastructure, including track, civil and traction power | |
| | <ul style="list-style-type: none"> Roadworks | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



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| Version | 1 | Date | 03-10-2018 |
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SUMMARY

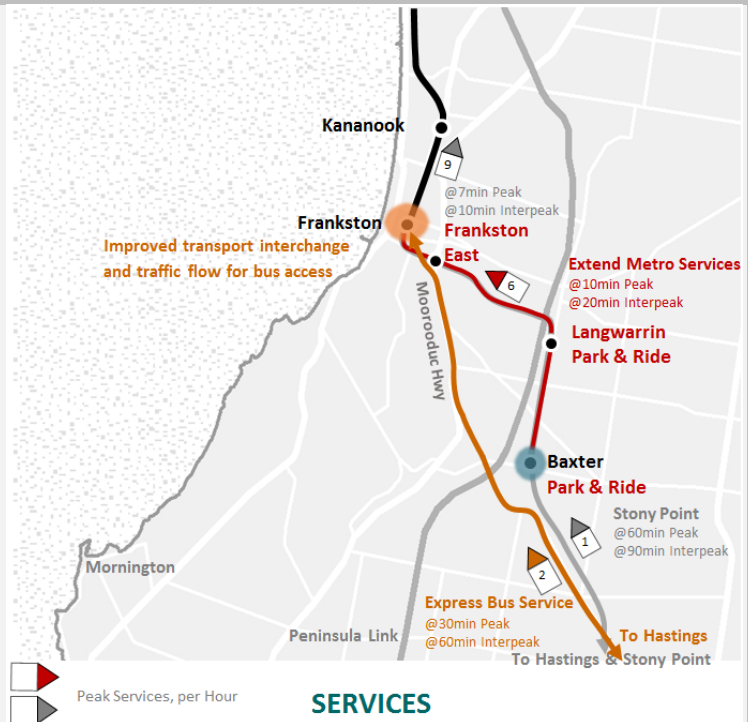
SERVICES

Bus Services from Frankston to Hastings:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Metro services from Frankston to Baxter:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



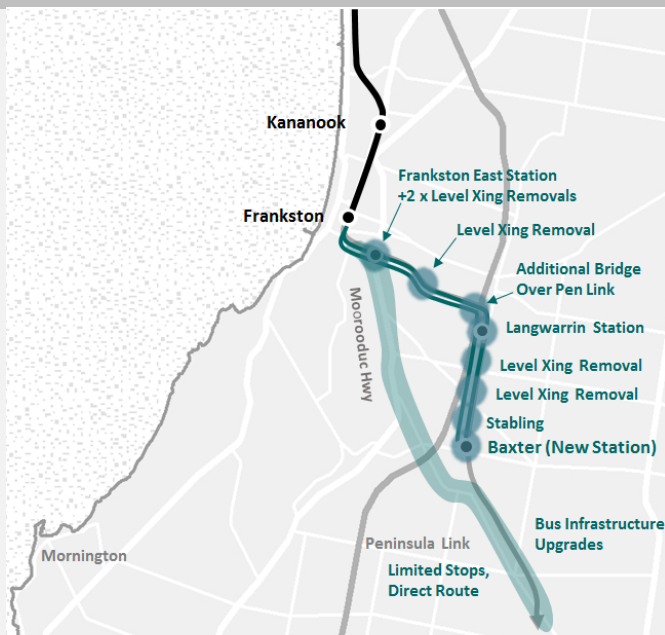
INFRASTRUCTURE

Frankston Station:

- Two additional platforms (island platform)
- Overpass and associated infrastructure and facilities for platform connectivity
- Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration
- Overhead traction power infrastructure associated with new station layout.
- Demolish the existing Frankston traction substation and construct new substation
- Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

Frankston East Station:

- New side platform host station and associated facilities and infrastructure
- Changes and enhancements to the SUPs to



INFRASTRUCTURE

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
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SUMMARY

improve connectivity

Langwarrin Station:

- New 2 platform premium station and associate infrastructure
- Park and ride for up to 1000 cars and associated infrastructure (subject to demand TBC)

Baxter Station:

- New 3 platform premium station and associate infrastructure
- Park and ride for up to 750 cars and associated infrastructure

Peninsula Link:

- Additional rail bridge over Peninsula Link

Level Crossing Removals:

Potential level crossing removals (TBC if required) between Frankston and Baxter Stations:

- Clarendon Rd (road closure)
- Moorooduc Hwy (road under rail)
- Hillcrest Rd (road over rail)
- Robinsons Rd (road under rail)
- Golf Links Rd (road over rail)

Track and OHW Infrastructure:

- Duplicate 8km of track and electrify to Baxter

Signalling:

- Full re-signalling between Frankston and new Baxter Station and associated power upgrades as required

Combined Services Route:

- New CSR route with diversity between Frankston and Baxter

Substations:

- 1 x demolition of existing substation (at Frankston)
- 4 x new 4 megawatt substations (at Frankston, Frankston East, Langwarrin and Baxter)

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
|----------------|---|-------------|------------|

SUMMARY

Power:

-22kv feeder from Langwarrin zone sub to traction substations. New buried cable route within rail corridor

Train Stabling:

-up to 21 number stabling roads for EMUs
 -1 number stabling road for DMUs
 -Associated infrastructure

Bus Infrastructure:

-Bus priority lanes
 -Premium bus stops
 -Signal technology upgrades
 -New signals
 -Intersection upgrades
 -Road signs/line marking
 -Reconfiguration of Frankston Station bus stops/layover

ELEMENTS

| Item | Description | References/ Assumptions |
|------|-------------|-------------------------|
|------|-------------|-------------------------|

SERVICES

| | | | | | |
|----------------------------|--------------------|--------------------|-----------|--------------------|-----------|
| Service Plan - Rail | Station | 2 Hour peak | | 2 Hour peak | |
| | | Starting | Total | Starting | Total |
| | Frankston | 18 | 18 | 18 | 18 |
| | Langwarrin | 12 | 12 | 12 | 12 |
| | Baxter | 12 | 12 | 12 | 12 |
| | Stony Point | 2 | 2 | 2 | 2 |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | | | | | |
|----------------------------|--|-------------|-------|-------------|-------------------------|--|
| Item | Description | | | | References/ Assumptions | |
| Service Plan – Eastern Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Somerville | 4 | 4 | 4 | 4 | |
| | Tyabb | 4 | 4 | 4 | 4 | |
| | Hastings | 4 | 4 | 4 | 4 | |
| Timetable - Rail | <ul style="list-style-type: none"> 10 minute service to/from Baxter during the peak. 20 minute service to/from Baxter during the interpeak and off peak. | | | | | |
| Timetable - Eastern Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | | | | | |
| Rolling Stock – Rail | Additional 3 – 4 EMUs to operate the extended metro services to Baxter from Frankston. | | | | | |
| Bus Fleet | 3 buses to operate the 30 minute peak service to Hastings | | | | | |
| INFRASTRUCTURE | | | | | | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|----------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Rail Track | <p>Duplication</p> <ul style="list-style-type: none"> Duplicate track from Frankston to Baxter (approximately 8 km of total new track) <p>Electrification/Modifications</p> <ul style="list-style-type: none"> Electrify from Frankston to Baxter (approximately 8 km dual track) <p>Upgrade to level crossings at the following locations: (should removal not be required):</p> <ul style="list-style-type: none"> Clarendon St Moorooduc Hwy Hillcrest Rd Golf Links Road Robinsons Road Baxter-Tooradin Rd | |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> New island platform with two platform faces Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms New bus bays with real time information (PIDS) for Hastings fast bus <p>Frankston East Station:</p> <ul style="list-style-type: none"> New host station with two side platforms and associated station facilities <p>Langwarrin Station:</p> <ul style="list-style-type: none"> New host station with two side platforms and associated station facilities <p>Baxter Station:</p> <ul style="list-style-type: none"> New 3 platform premium station and associate infrastructure | |
| Bridges | New bridge over Peninsula Link to accommodate the additional rail track | |
| Rail Traction Power | <p>Provision of the following:</p> <ul style="list-style-type: none"> Demolition of existing Frankston substation 4 x new 4 megawatt substations 22kv feeder from local zone sub to traction power substations New OHW infrastructure between Frankston and Baxter and for the associated stabling | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|------------------------|--|--------------------------------|
| Item | Description | References/ Assumptions |
| Rail Signalling | <ul style="list-style-type: none"> • Full re-signalling of Frankston Station and station limits and up to the interface with Kananook • New signalling between Frankston and Baxter for extended electric services | |
| Stabling | <p>Up to 22 no. new stabling roads to be constructed at Baxter, with a minimum of:</p> <ul style="list-style-type: none"> • 5 No. 160m EMUs to replace the stabling lost at Frankston • 3 No. 160m EMU's to operate to Langwarrin • 1 No. 160m road for Stony Point DMUs | |
| Bus Stops | <p><u>Frankston Station</u></p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p><u>Frankston to Hastings Service</u></p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter • Somerville • Tyabb • Hastings <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
|---------|---|------|------------|
| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------|---|-------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p><u>Civil works including drainage associated with:</u></p> <ul style="list-style-type: none"> • New stations • Stabling yard • New formation for rail duplication • Other civil works associated with substations and other fixed infrastructure • Removal of level crossings (if required). <p><u>Road upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> • 1 x bus interchange and intersection upgrade. • 5 x advanced bus detection and priority phasing • 1 x bus queue jump lane. <p>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</p> <ul style="list-style-type: none"> • 6 x advanced bus detection and priority phasing • 2 x roundabout metering & advance bus detention. <p>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St</p> <ul style="list-style-type: none"> • 1 x intersection modification and realignment and advanced bus detection and priority phasing • 1 x advanced bus detection and priority phasing. • 1 x intersection conversion (to signals). | |
| Noise | At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds | |
| Urban Design | To be detailed in full business case | |
| Major Utilities | No major utility conflicts have been identified to date which would have a significant impact on cost/construction | |
| OTHER SCOPE | | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



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| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|---|---|--------------------------------|
| Item | Description | References/ Assumptions |
| Property & Land | <p>7.4 hectares (approximately) of land acquisition required at Baxter for new stabling</p> <p>Property acquisitions in association with level crossing removals (if required) and duplication of track at the following locations:</p> <ul style="list-style-type: none"> • Moorooduc Hwy • Hillcrest Rd • Golf Links Rd <p>Potential change in ownership of land associated with level crossing upgrades (should removals not be required) and duplication of track at the following locations:</p> <ul style="list-style-type: none"> • Clarendon St • Moorooduc Hwy • Hillcrest Rd • Robinson Rd • Golf Links Rd • Baxter- Tooradin Rd | |
| Integrated Development | No viable opportunities identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | No change to line speeds | |
| Grade | No change to grades proposed | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |
| Maintenance Access | To be determined in full business case | |

Option 3C: Full Duplication/Electrification to Baxter & Fast Bus to Hastings



| | | | |
|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|------------------------|---|---|
| Item | Description | References/ Assumptions |
| DESIGN | | |
| Design Report | <ul style="list-style-type: none"> Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report | <p><u>LXRA-DVPR-14-RL-RPT-003</u></p> <p><u>LXRA-DVPR-14-TR-RPT-023</u></p> |
| Design Packages | <p>Concept Design drawings covering the below design packages are available.</p> <ul style="list-style-type: none"> Rail Infrastructure, including track, civil and traction power Roadworks | <u>Referenced in relevant reports.</u> |

Baxter Electrification Preliminary Business Case: Scope Summary

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



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| Version | 1 | Date | 03-10-2018 |
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SUMMARY

SERVICES

Bus Services from Frankston to Hastings:

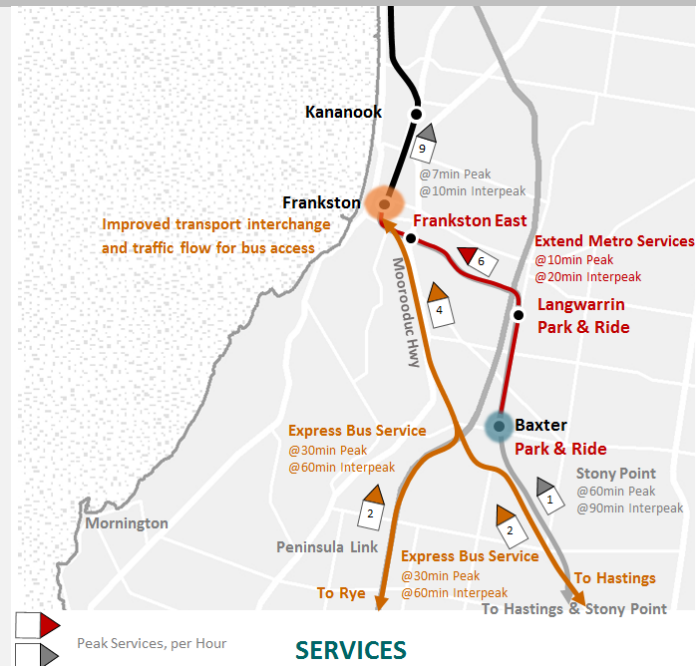
- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Bus Services from Frankston to Rye:

- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Metro services from Frankston to Baxter:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



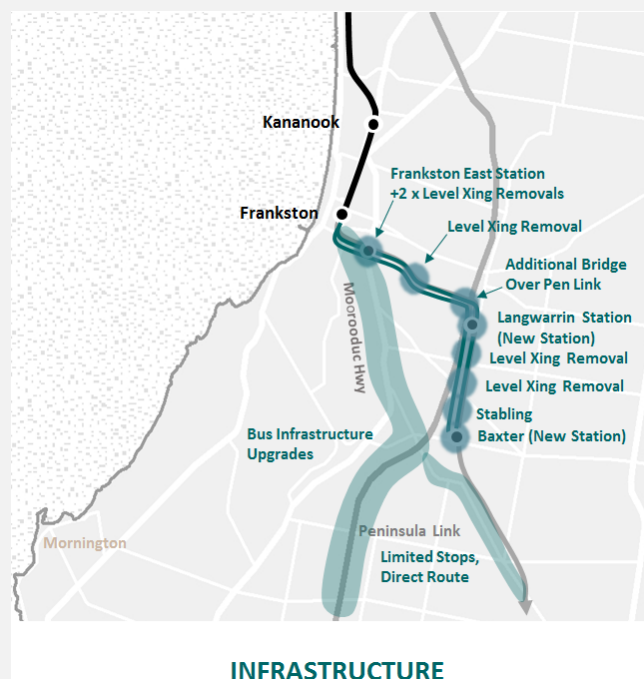
INFRASTRUCTURE

Frankston Station:

- Two additional platforms (island platform)
- Overpass and associated infrastructure and facilities for platform connectivity
- Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration
- Overhead traction power infrastructure associated with new station layout.
- Demolish the existing Frankston traction substation and construct new substation
- Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

Frankston East Station:

- New side platform host station and associated facilities and infrastructure
- Changes and enhancements to the SUPs to improve connectivity



Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



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| Version | 1 | Date | 03-10-2018 |
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SUMMARY

Langwarrin Station:

- New 2 platform premium station and associate infrastructure
- Park and ride for up to 1000 cars and associated infrastructure (subject to demand
- TBC)

Baxter Station:

- New 3 platform premium station and associated infrastructure
- Park and ride for up to 750 cars and associated infrastructure

Peninsula Link:

- Additional rail bridge over Peninsula Link

Level Crossing Removals:

Potential level crossing removals (TBC if required) between Frankston and Baxter Stations:

- Clarendon Rd (road closure)
- Moorooduc Hwy (road under rail)
- Hillcrest Rd (road over rail)
- Robinsons Rd (road under rail)
- Golf Links Rd (road over rail)
- Baxter-Tooradin Rd

Track and OHW Infrastructure:

- Duplicate 8km of track and electrify to Baxter

Signalling:

- Full re-signalling between Frankston and new Langwarrin Station and associated power upgrades as required

Combined Services Route:

- New CSR route with diversity between Frankston and Baxter

Substations:

- 1 x demolition of existing substation
- 4 x new 4 megawatt substations (at Frankston, Frankston East, Langwarrin and Baxter)

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



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| Version | 1 | Date | 03-10-2018 |
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SUMMARY

Power:

-22kv feeder from Langwarrin zone sub to traction substations

Train Stabling:

-up to 21 number stabling roads for EMUs
 -1 number stabling road for DMUs
 -Associated infrastructure

Bus Infrastructure:

-Bus priority lanes
 -Premium bus stops
 -Signal technology upgrades
 -New signals
 -Intersection upgrades
 -Road signs/line marking
 -Reconfiguration of Frankston Station bus stops/layover

ELEMENTS

| Item | Description | References/ Assumptions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|--|-------------------------|-------------|----------|-------------|--|----------|-------|----------|-------|-----------|----|----|----|----|------------|----|----|----|----|--------|----|----|----|----|-------------|---|---|---|---|--|
| SERVICES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Service Plan - Rail | <table border="1"> <thead> <tr> <th rowspan="2">Station</th> <th colspan="2">2 Hour peak</th> <th colspan="2">2 Hour peak</th> </tr> <tr> <th>Starting</th> <th>Total</th> <th>Starting</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frankston</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> </tr> <tr> <td>Langwarrin</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> </tr> <tr> <td>Baxter</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> </tr> <tr> <td>Stony Point</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> </tbody> </table> | Station | 2 Hour peak | | 2 Hour peak | | Starting | Total | Starting | Total | Frankston | 18 | 18 | 18 | 18 | Langwarrin | 12 | 12 | 12 | 12 | Baxter | 12 | 12 | 12 | 12 | Stony Point | 2 | 2 | 2 | 2 | |
| | Station | | 2 Hour peak | | 2 Hour peak | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Starting | Total | Starting | Total | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Frankston | 18 | 18 | 18 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Langwarrin | 12 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Baxter | 12 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stony Point | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | | | | | |
|----------------------------|---|--------------------|-------|--------------------|-------------------------|---|
| Item | Description | | | | References/ Assumptions | |
| Service Plan – Western Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | • |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Frankston South | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Dromana | 4 | 4 | 4 | 4 | |
| | Rosebud | 4 | 4 | 4 | 4 | |
| | Rye | 4 | 4 | 4 | 4 | |
| Service Plan – Eastern Bus | Stop Location | 2 Hour peak | | 2 Hour peak | | • |
| | | Starting | Total | Starting | Total | |
| | Frankston Station | 4 | 4 | 4 | 4 | |
| | Monash Health & Education Precinct | 4 | 4 | 4 | 4 | |
| | Baxter | 4 | 4 | 4 | 4 | |
| | Somerville | 4 | 4 | 4 | 4 | |
| | Tyabb | 4 | 4 | 4 | 4 | |
| | Hastings | 4 | 4 | 4 | 4 | |
| Timetable - Rail | <ul style="list-style-type: none"> • 10 minute service to/from Baxter during the peak. • 20 minute service to/from Baxter interpeak. | | | | | |
| Timetable - Western Bus | <ul style="list-style-type: none"> • 2 buses in each direction per hour during the AM and PM peaks • 1 bus per hour during interpeak and off-peak | | | | | |

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
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| Item | Description | References/ Assumptions |
| Timetable - Eastern Bus | <ul style="list-style-type: none"> 2 buses in each direction per hour during the AM and PM peaks 1 bus per hour during interpeak and off-peak | • |
| Rolling Stock - Rail | Additional 3 EMUs to operate the extended metro services to Baxter from Frankston. | • |
| Bus Fleet – Western Bus | 5 buses to operate the 30 minute peak service to Rye | • |
| Bus Fleet – Eastern Bus | 3 buses to operate the 30 minute peak service to Hastings | • |
| INFRASTRUCTURE | | |
| Rail Track | <p>Duplication</p> <ul style="list-style-type: none"> Duplicate track from Frankston to Baxter (approximately 8 km of total new track) <p>Electrification/Modifications</p> <ul style="list-style-type: none"> Electrify from Frankston to Baxter (approximately 8 km dual track) <p>Upgrade to level crossings at the following locations (should removal not be required):</p> <ul style="list-style-type: none"> Clarendon St Moorooduc Hwy Hillcrest Rd Golf Links Road Robinsons Road Baxter-Tooradin Rd | |

Baxter Electrification Preliminary Business Case: Scope Summary
**Option 3D: Full Duplication/Electrification to
 Baxter & Fast Buses to Rye & Hastings**



| | | | |
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| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|------------------------|--|-------------------------|
| Item | Description | References/ Assumptions |
| Stations | <p>Frankston Station</p> <ul style="list-style-type: none"> • New island platform with two platform faces • Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms • New bus bays with real time information (PIDS) for Hastings fast bus <p>Frankston East Station:</p> <ul style="list-style-type: none"> • New host station with two side platforms and associated station facilities <p>Langwarrin Station:</p> <ul style="list-style-type: none"> • New host station with two side platforms and associated station facilities <p>Baxter Station:</p> <ul style="list-style-type: none"> • New 3 platform premium station and associated infrastructure | |
| Bridges | New bridge over Peninsula Link to accommodate the additional rail track | |
| Traction Power | <p>Provision of the following:</p> <ul style="list-style-type: none"> • Demolition of existing Frankston substation • 4 x new 4 megawatt substations • 22kv feeder from Langwarrin zone sub to traction substations • New OHW infrastructure between Frankston and Baxter and for the associated stabling | |
| Rail Signalling | <ul style="list-style-type: none"> • Full re-signalling of Frankston Station and station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration • New signalling between Frankston and Baxter for extended electric services | |
| Stabling | New stabling to be constructed at Baxter | |

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



| | | | |
|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
|----------------|---|-------------|------------|

| ELEMENTS | | |
|------------------|---|--------------------------------|
| Item | Description | References/ Assumptions |
| Bus Stops | <p><u>Frankston Station</u></p> <ul style="list-style-type: none"> • Bus interchange and intersection modifications to assist bus services. • Improved pedestrian access <p>Shared Bus Stops (Both Services)</p> <ul style="list-style-type: none"> • Frankston Station (Fletcher Rd) • Monash Health & Education Precinct • Frankston South (Robinson Rd) • Baxter <p><u>Frankston to Hastings Service</u></p> <ul style="list-style-type: none"> • Somerville • Tyabb • Hastings <p><u>Frankston to Rye Service</u></p> <ul style="list-style-type: none"> • Dromana • Rosebud • Rye <p>New premium bus stops with PIDS at all of the above locations.</p> | |

Baxter Electrification Preliminary Business Case: Scope Summary
Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



| | | | |
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| Version | 1 | Date | 03-10-2018 |
|---------|---|------|------------|

| ELEMENTS | | |
|--------------------------|--|-------------------------|
| Item | Description | References/ Assumptions |
| Major Civil Works | <p><u>Civil works including drainage associated with:</u></p> <ul style="list-style-type: none"> • New stations • Stabling yard • New formation for rail duplication • Other civil works associated with substations and other fixed infrastructure • Removal of level crossings (if required). <p><u>Road Upgrades</u></p> <p>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection</p> <ul style="list-style-type: none"> • 1 x bus interchange and intersection upgrade. • 5 x advanced bus detection and priority phasing • 1 x bus queue jump lane. <p>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</p> <ul style="list-style-type: none"> • 6 x advanced bus detection and priority phasing • 2 x roundabout metering & advance bus detention. <p>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St</p> <ul style="list-style-type: none"> • 1 x intersection modification and realignment and advanced bus detection and priority phasing • 1 x advanced bus detection and priority phasing. • 1 x intersection conversion (to signals). <p>Frankston/Flinders Rd/Mornington Peninsula Fwy (north of Fwy) to Point Nepean Rd/ Dundas St</p> <ul style="list-style-type: none"> • 15 x advanced bus detention and priority phasing. | |
| Noise | At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds | |
| Urban Design | <ul style="list-style-type: none"> • To be detailed in full business case | |
| Major Utilities | No major utility conflicts have been identified to date which would have a significant impact on cost/construction | |
| OTHER SCOPE | | |

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



| | | | |
|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|---|---|--------------------------------|
| Item | Description | References/ Assumptions |
| Property & Land | <p>7.4 hectares (approximately) of land acquisition required at Baxter for new stabling</p> <p>Property acquisitions in association with level crossing removals (if required) and duplication of track at the following locations:</p> <ul style="list-style-type: none"> • Moorooduc Hwy • Hillcrest Rd • Golf Links Rd <p>Potential change in ownership of land associated with level crossing upgrades (should removals not be required) and duplication of track at the following locations:</p> <ul style="list-style-type: none"> • Clarendon St • Moorooduc Hwy • Hillcrest Rd • Robinson Rd • Golf Links Rd • Baxter- Tooradin Rd | |
| Integrated Development | No viable opportunities identified at this current time | |
| Environment-Flora & Fauna | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| Environment-Heritage | To be determined. Current desktop investigations are limited to between Frankston and Baxter | |
| WAIVERS/ DEVIATIONS FROM STANDARDS | | |
| Vertical Clearance | To be determined in full business case | |
| Approach Sight Distance | To be determined in full business case | |
| Line Speed | No change to line speeds | |
| Grade | No change to grades proposed | |
| Power | To be determined in full business case | |
| Stabling | To be determined in full business case | |

Option 3D: Full Duplication/Electrification to Baxter & Fast Buses to Rye & Hastings



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|----------------|---|-------------|------------|
| Version | 1 | Date | 03-10-2018 |
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| ELEMENTS | | |
|---------------------------|---|--|
| Item | Description | References/ Assumptions |
| Maintenance Access | To be determined in full business case | |
| DESIGN | | |
| Design Report | Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report | <u>LXRA-DVPR-14-RL-RPT-003</u> <u>LXRA-DVPR-14-TR-RPT-023</u> |
| Design Packages | <p>Concept Design drawings covering the below design packages are available.</p> <ul style="list-style-type: none"> • Rail Infrastructure, including track, civil and traction power • Roadworks | <u>Referenced in reports</u> |