

# ARDP

ATAP UPDATE  
February 2016



AUCKLAND RAIL  
DEVELOPMENT  
PROGRAMME

KiwiRail 



# Agenda

## Introduction

- Purpose
- Context

## ARDP

- Overview
- Assumptions

## Interim Outputs

- Decade 1
- Decade 2
- Decade 3

## Summary & Conclusions

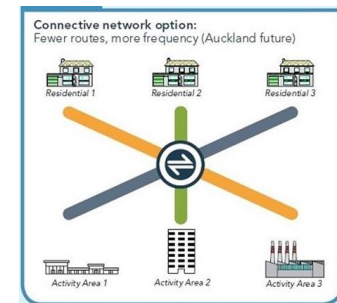
- Summary
- Emerging Conclusions

# Purpose

- To provide an overview of the Auckland Rail Development Programme (ARDP)
- To inform the Auckland Transport Alignment Process (ATAP) of the interim outputs of this programme

# The Role of Rail

- Every week in Auckland
  - 300,000 journeys are made by rail
  - 3100 passenger services operate
  - 78,000kms are travelled by passenger trains
  - 370,000 tonnes of freight are shifted by rail
- High capacity spine of Auckland's Rapid Transit Network (RTN) in the South and West
- Connects Auckland to other cities and ports as an alternative to road freight
- Auckland has committed to investment in rail rapid transit and is now seeing the benefits.



# Recent Investment – A Step Change

- Britomart Station (2003)
- Rail Development Plan 2006
  - Investment pathway for 10min services and 16m pax p.a
- DART and AEP
  - c.\$1.1bn invested in track, electrification, re-signalling, stations
  - c.\$500m invested in new rolling stock and depot
  - Refurbished DMUs and SA's replaced by new EMUs this year.



# Recent Investment – A Step Change



- More**
- Capacity
  - Services
  - Trains
  - Efficient
- Better**
- Performance
  - For the environment
  - Stations
  - Safety



# Recent Investment – A Step Change



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# Recent Investment – A Step Change

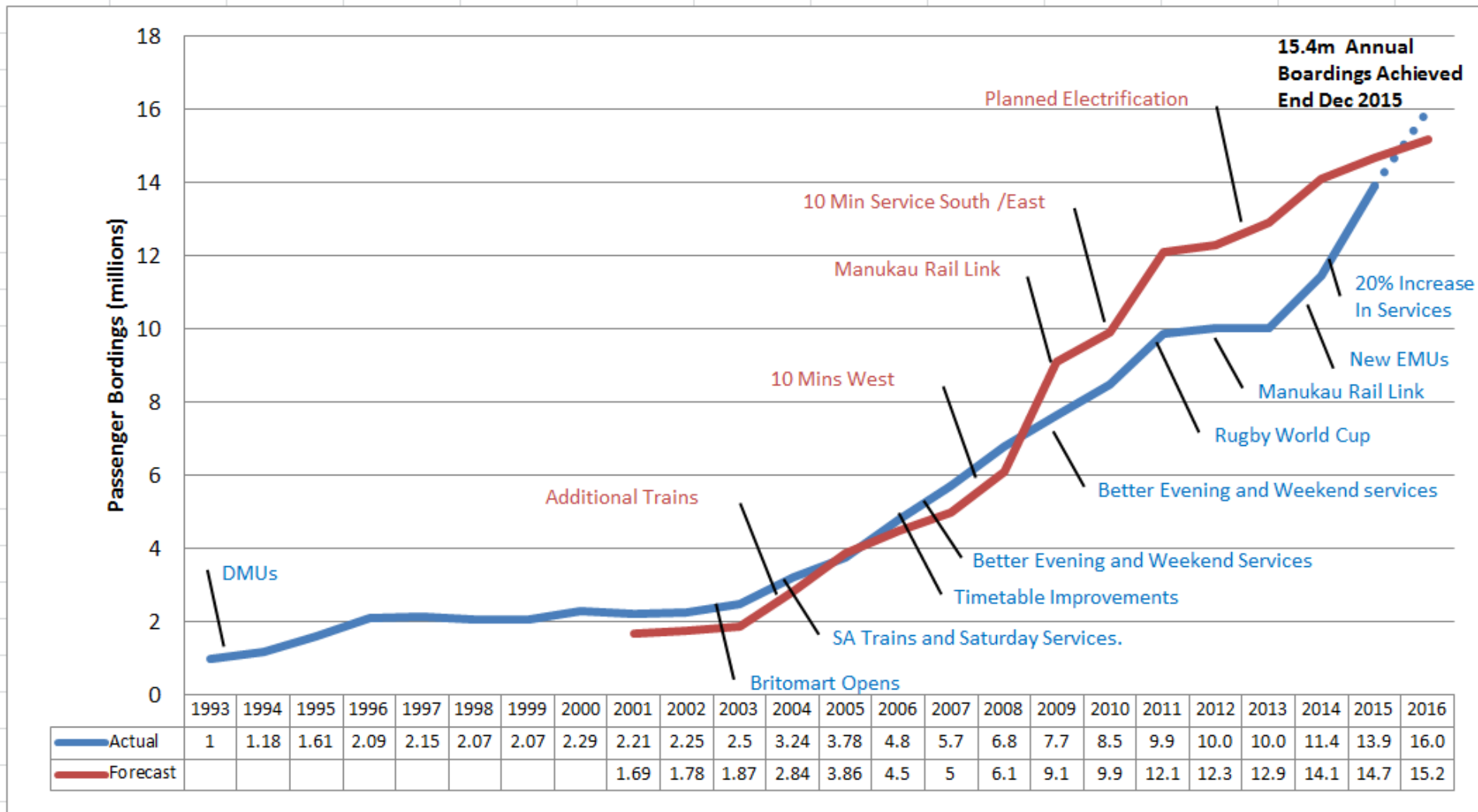




# Recent Investment – A Step Change

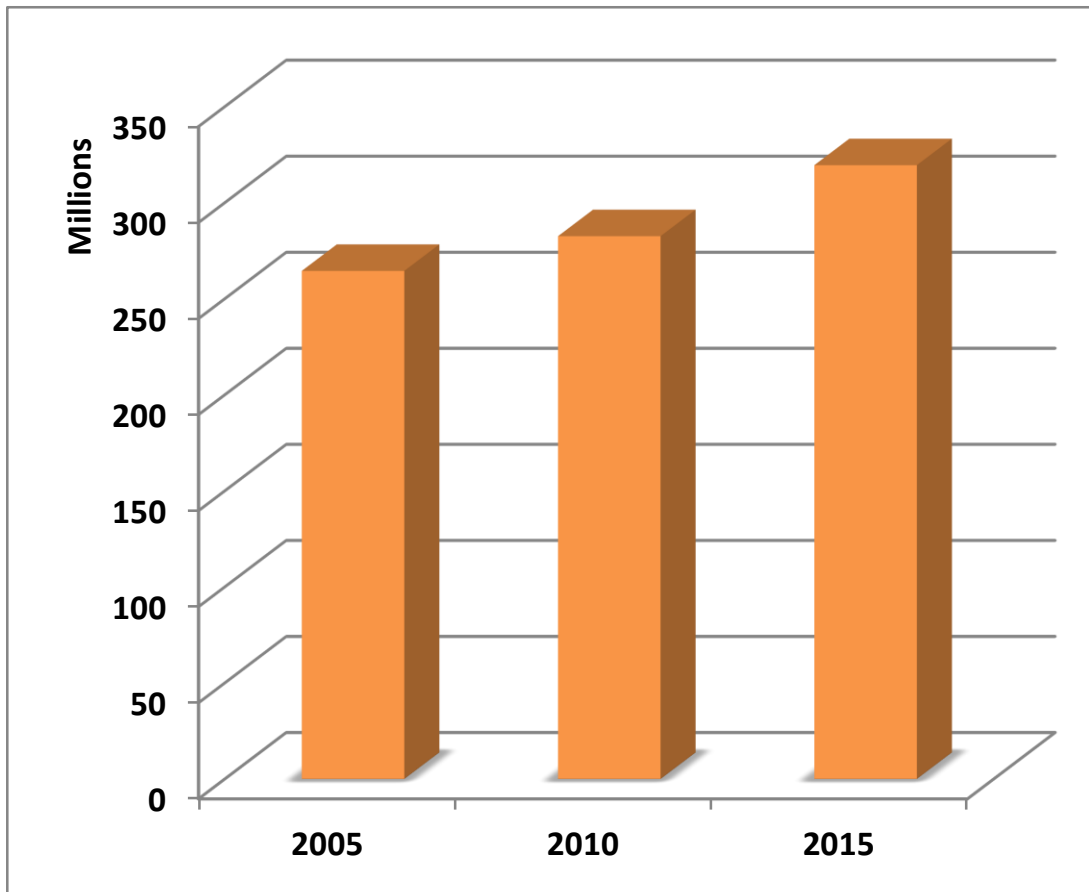


# What Have We Achieved

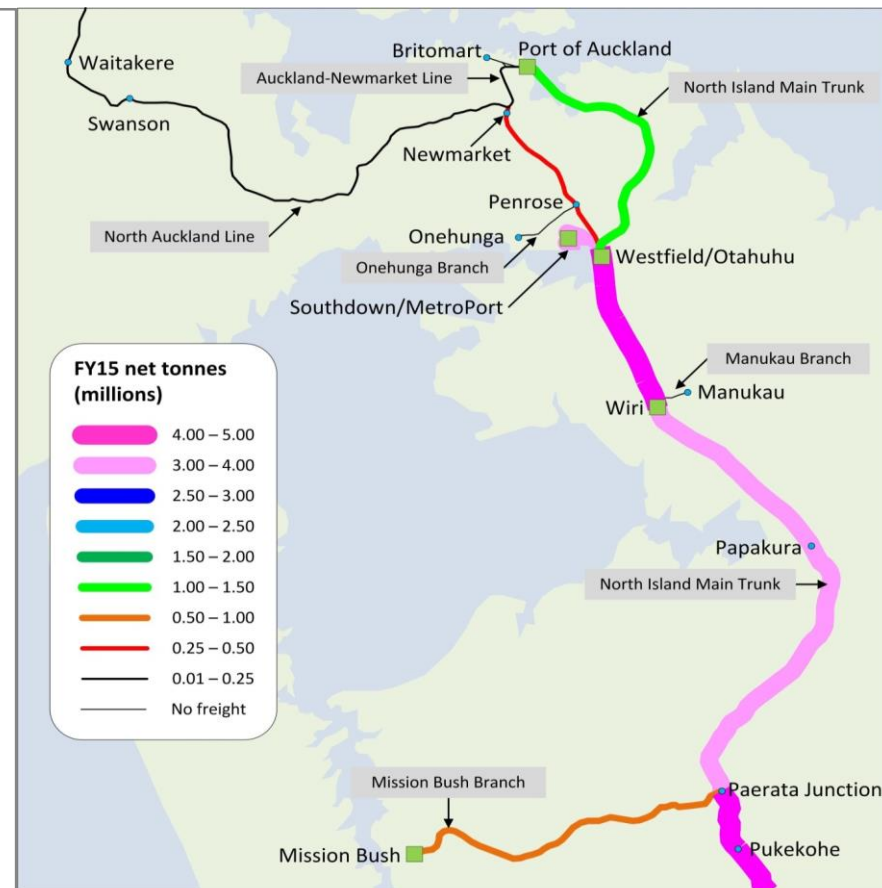


# What Have We Achieved

Net Tonne Kms

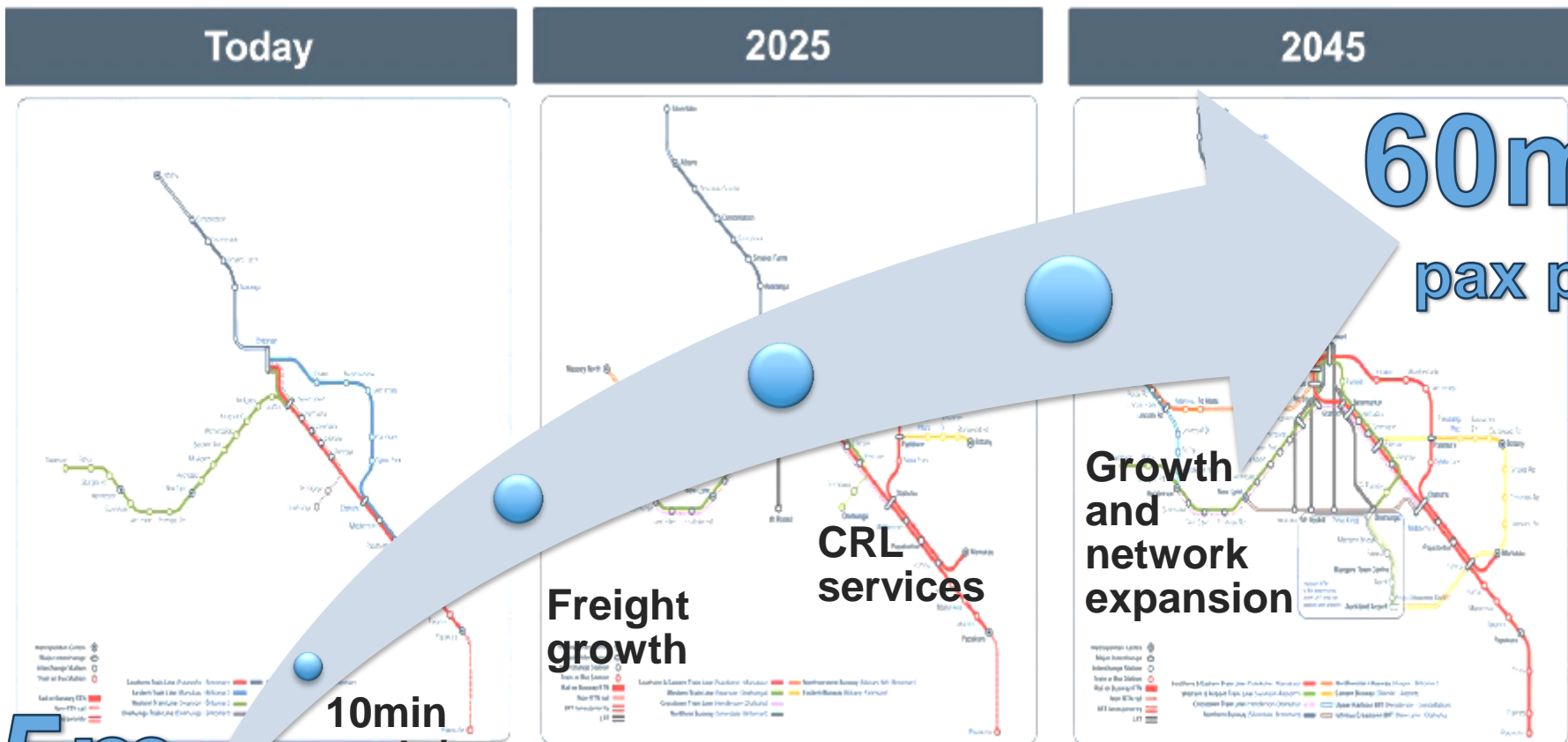


Net Tonnes



# What Next for Rail

## Supporting Auckland's Growth



60m?  
pax p.a

15m  
pax p.a

10min  
peak /  
15min off  
peak

Freight  
growth

CRL  
services

Growth  
and  
network  
expansion

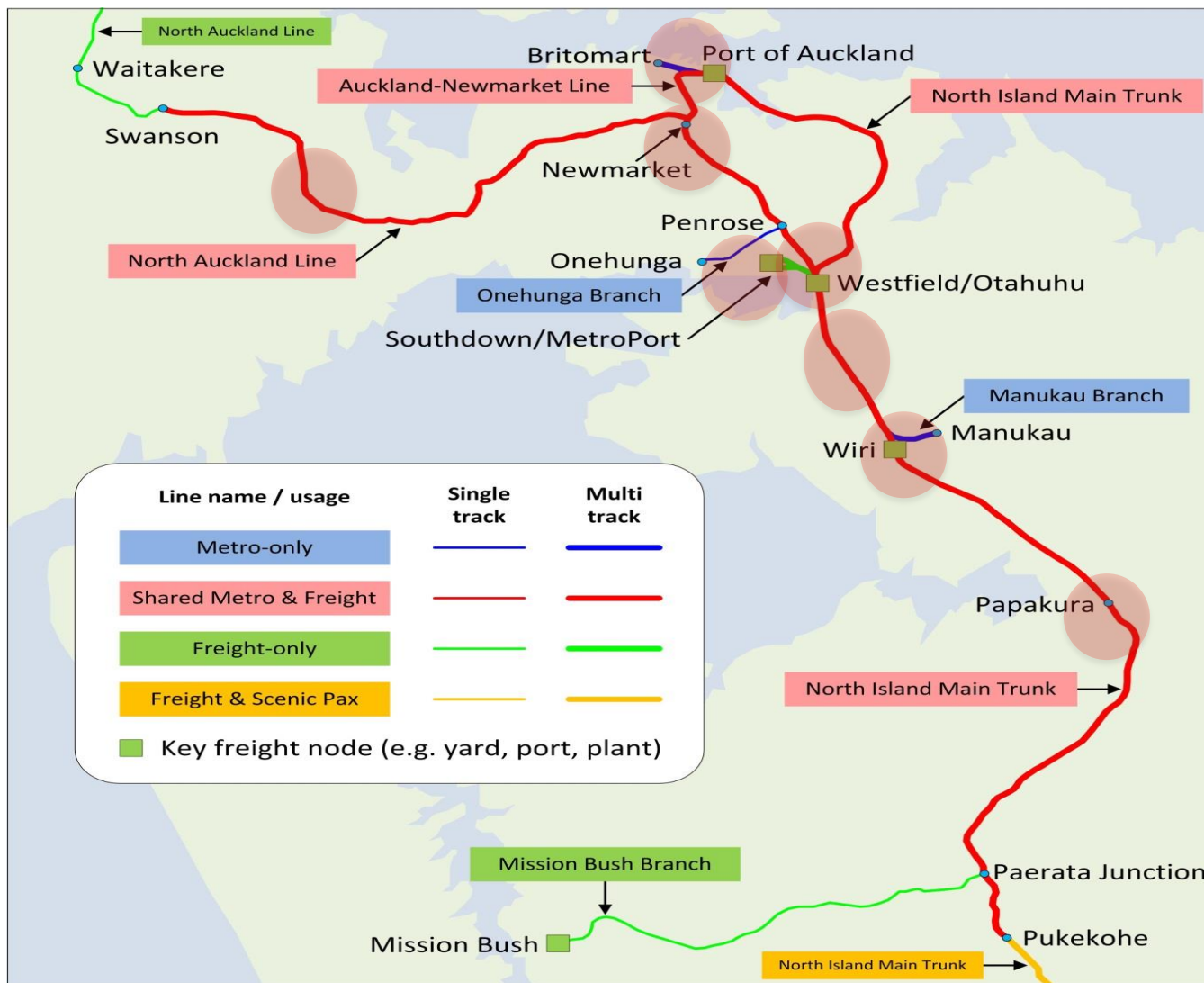
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# Current Constraints



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- Decade 3

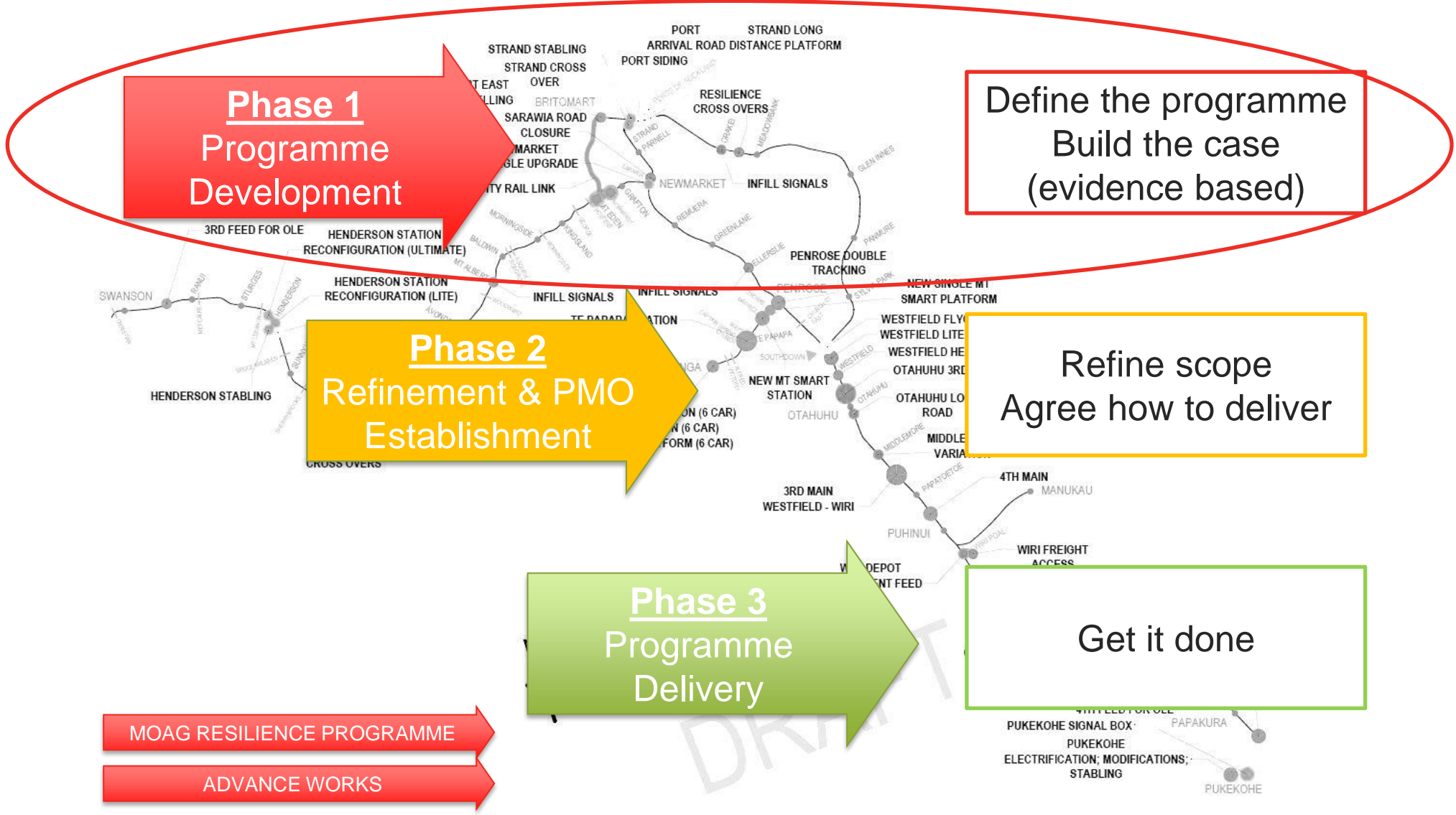
## Summary & Conclusions

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# Auckland Rail Development Programme (ARDP)

- Joint AT/KR initiative
- Output
  - Update of existing Rail Development Implementation Pathway (2014)
  - Agreed, prioritised programme of investment – *Master Plan for Auckland Rail based on defined service levels*
- Milestones
  - **End 2015 – Interim output for ATAP**
  - July 2016 – Updated output (Phase 1)
    - ➔ FY17 3<sup>rd</sup> Main construction + resilience works
    - ➔ FY18 ARDP construction start

# Phased approach





# Work Undertaken to Date

- Review of existing network capacity and short term improvements
- Review of infrastructure requirements required to accommodate forecast freight and passenger demand
- Review of wider network infrastructure required to deliver proposed service patterns
- Development / refinement of concept designs and cost estimates - focus on works required within the next decade
- Further testing of infrastructure in OpenTrack simulation model
- Development of longer term 'Master Plan' alignment designs for key constraint areas (Westfield, Quay Park, Wiri, Newmarket)
- Refinement of alignment designs to future proof for possible 3<sup>rd</sup> and 4<sup>th</sup> Main Lines (NIMT).

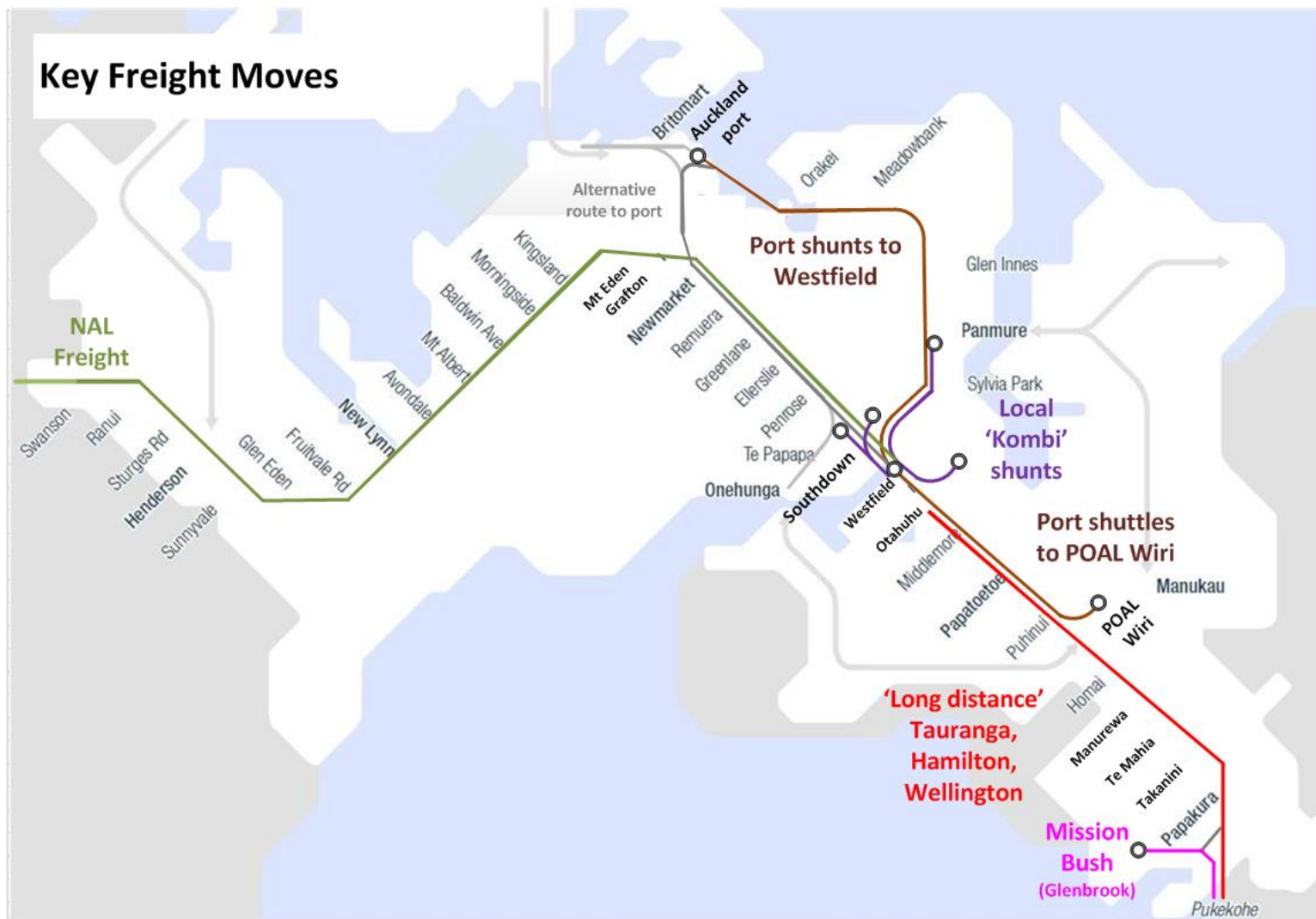
# Assumptions

- All stops 10 min peak / 15 min off peak passenger service.
- CRL proposed service patterns
- CRL high growth patronage forecasts
- KR / NFDS freight forecasts (limited information available)
- NAL to Northland remains open but no growth

# Service Assumptions

Decade 1 FY 2016 – 2025	Decade 2 FY2026 – 2035	Decade 3 FY2036 - 2045
15 Minute Off Peak and Weekend Services (7am – 7pm)	Papakura – Pukekohe Electric Services	Increased frequency of services to accommodate growth – Peak Overlays run for more of the peak
10 Minute 'Clockface' Service (South)	Increased frequency of passenger services to accommodate growth – Peak Overlays in part of peak	Additional service from West to East added (Mt Albert to Glen Innes assumed)
CRL Services	Growth in freight services	Limited additional growth in freight services
Growth in freight services (double weekly shuttles)		

# Service Assumptions





# Caveats and Exclusions

- **Network Extensions** – excluded may change timing of, or require additional, infrastructure. (South, North West, Airport, etc, Inter-Regional)
- **Sensitivity Testing** – not in scope – changes to underlying assumptions (growth, operating patterns, r/s capability) may have material impact on conclusions reached
- **Trade Offs** - Potential trade offs between passenger and freight services not yet examined
- **Journey times** - short term improvements, including reduced dwell times assumed. Pathway for achieving these yet to be confirmed.
- ***Interim outputs only – further work required to confirm detailed investment pathway***

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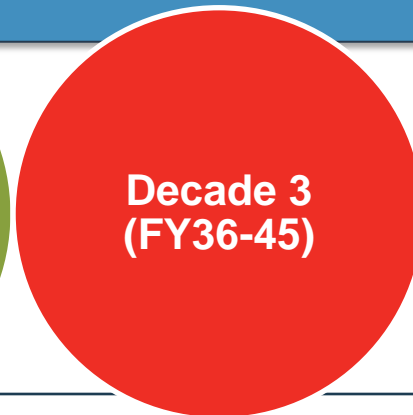
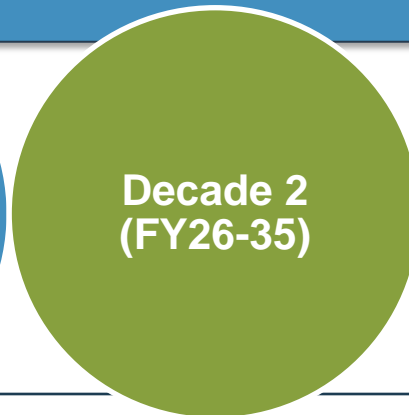
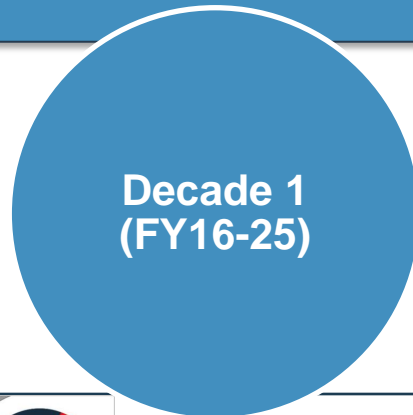
## Interim Outputs

- Decade 1
- Decade 2
- Decade 3

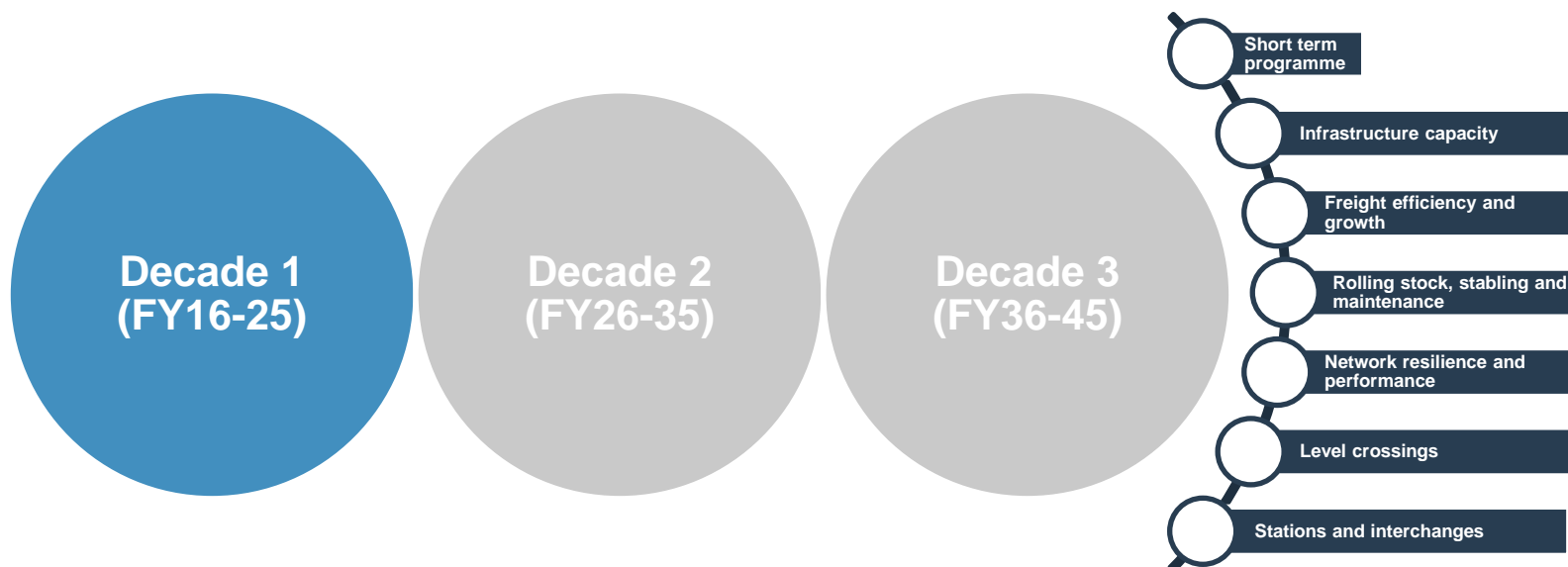
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# Interim Outputs

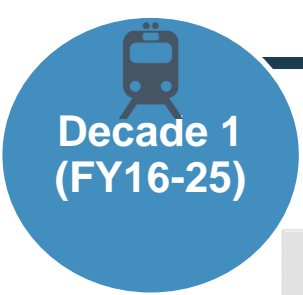


# Decade 1 FY16 – FY25



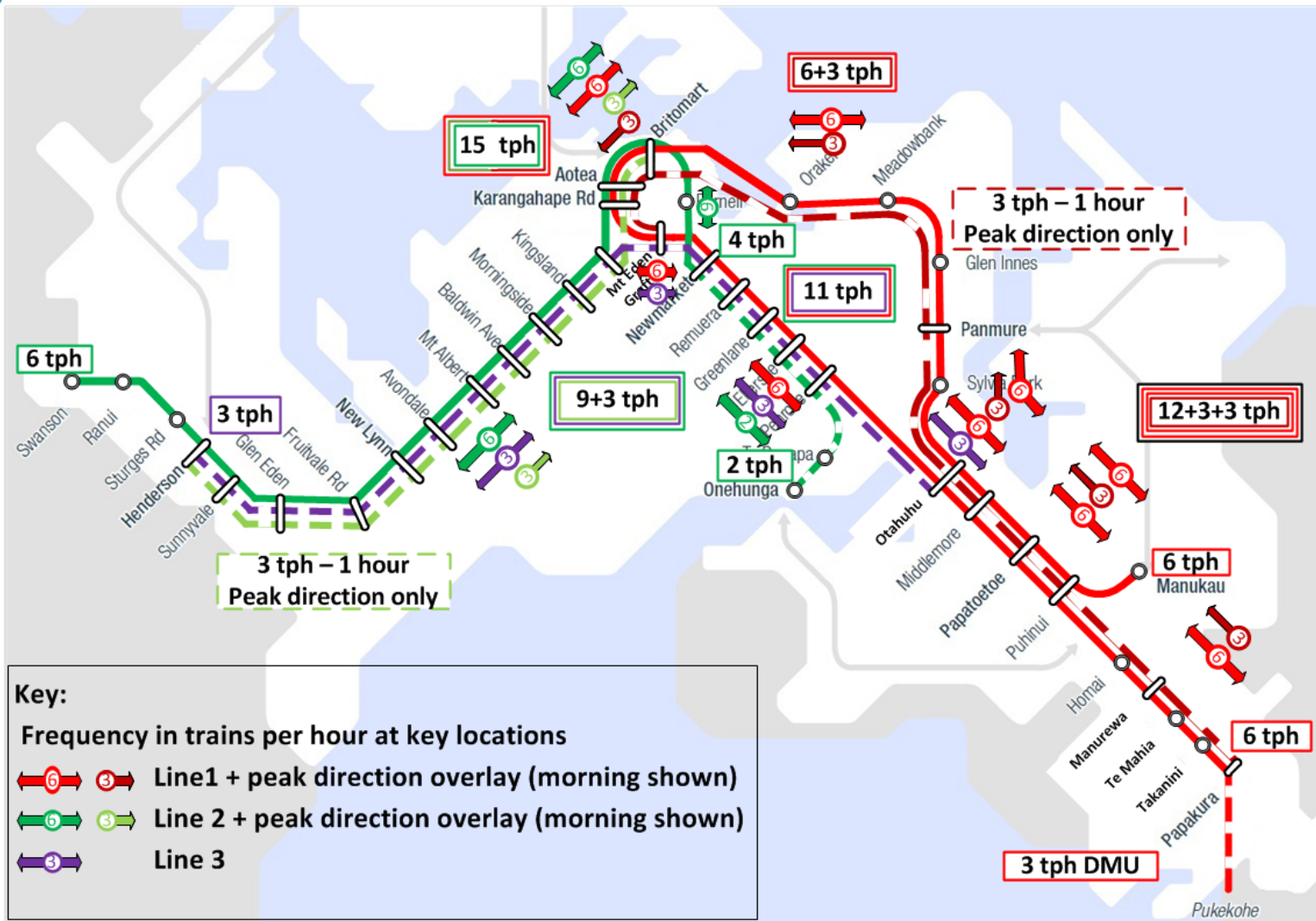






Decade 1  
(FY16-25)

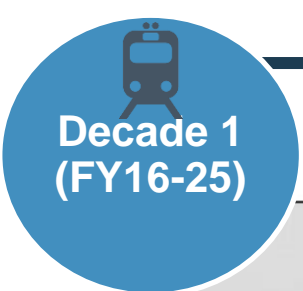
# 2025 Services



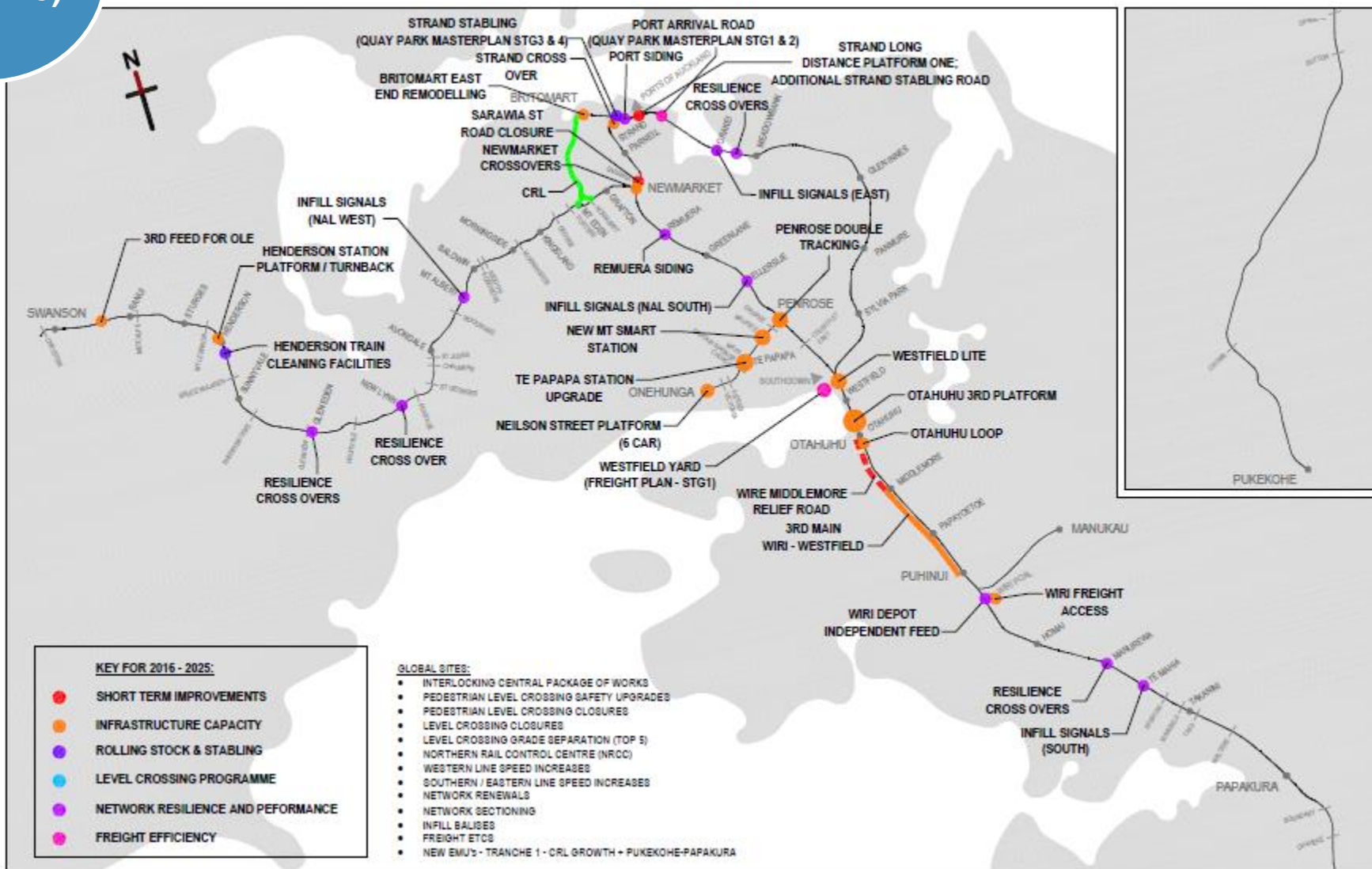
# Decade 1 Overview


Decade 1  
(FY16-25)

- Short Term Resilience works incl. currently deferred renewals
  - Deliver an integrated network control centre (NRCC)
  - Complete 3<sup>rd</sup> Main Wiri-Westfield
  - Implement 10min clockface and 15min off-peak timetable
  - Improve freight access at POAL, Wiri and Westfield
  - More efficient handling of longer freight shuttles
  - Remove some level crossings (closure / grade separation)
  - Upgrade Onehunga Branch Line for 3tph / 6-Car trains
  - CRL works completed and services commence (March 2023)
  - Procure c.21 3-Car EMUs for growth & expand Strand stabling
  - Rail patronage forecast c.30m p.a. by 2025 (15.4m at Dec 2016)



# Decade 1





Decade 1  
(FY16-25)

# Short Term Improvements

A programme of immediate capital investment to improve service resilience and performance

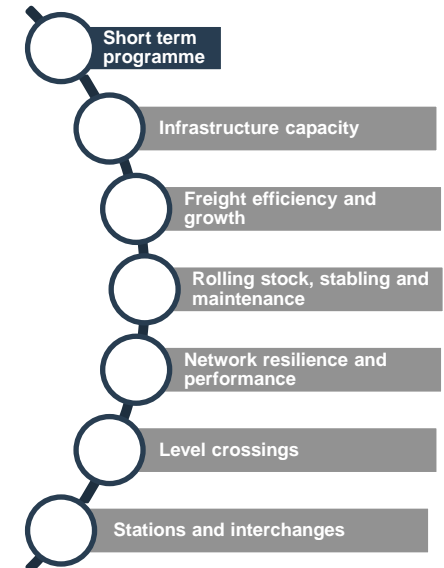
- Subject to funding availability
- Excludes concurrent programme of operational improvements

Priority elements include:

- Funding current renewals shortfall

Other elements include:

- Wiring of sidings (resilience)
- Signal interlocking changes / Vector curves
- Sarawia St level crossing closure
- Pedestrian crossing safety upgrades
- Long distance facilities at the Strand

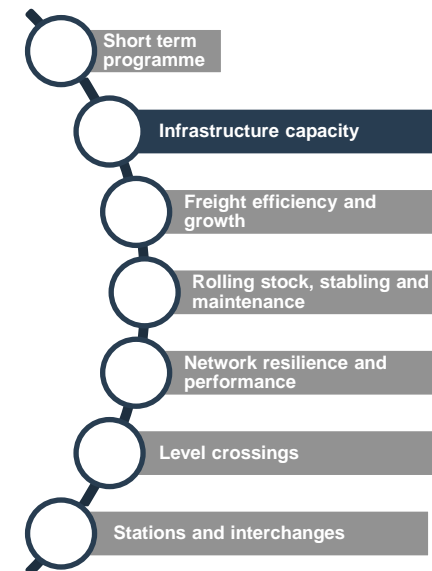


# Infrastructure Capacity

Decade 1  
(FY16-25)

Additional infrastructure to address key constraints

- 3<sup>rd</sup> Main Wiri – Westfield (incl Wiri POAL)
- Westfield Jcn
- CRL main works (tunnel and connections)
- Henderson, Newmarket, Otahuhu, Britomart, Strand, 3<sup>rd</sup> Traction Power Feed.
- Onehunga Branch Line upgrade
- Onehunga Branch Line works uncertain pending Airport rail decision – min required for 3tph-6car.
- A robust 15min Off Peak / 10 min even interval passenger service requires further capacity.
- Reduction in spend may require compromise to passenger or freight services (or both)







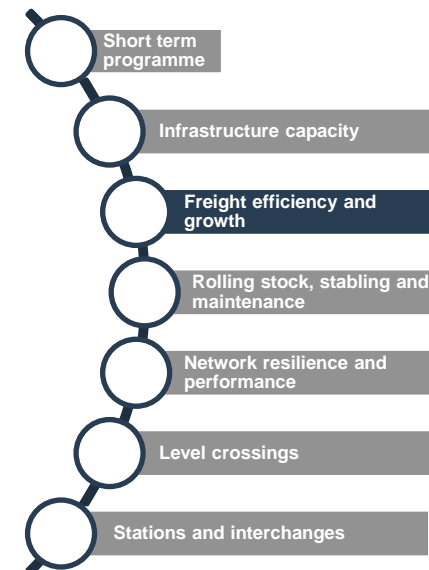
Decade 1  
(FY16-25)

# Freight Efficiency and Growth

Enabling longer freight trains and improved access to Port/Yards for growth.

- Westfield, Otahuhu and Southdown Yards
- POAL Arrival Road
- Freight ETCS fitment

Other operational changes will be required to interwork with intensive metro operations.





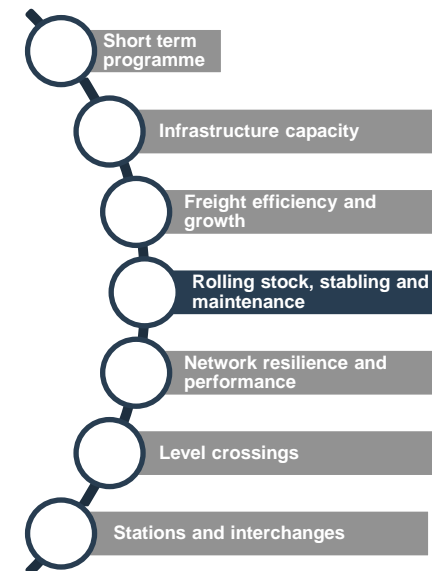
Decade 1  
(FY16-25)


# Rolling Stock and Stabling

Procurement of new EMUs to accommodate passenger growth

- Timing uncertain – patronage driven
- Assumes additional units required this decade
- c.21 3-Car units given minimum practical order
- Sufficient for growth into the 2<sup>nd</sup> decade, incl. Pukekohe electrification
- Linked to need for a 3<sup>rd</sup> traction power feed
- Additional stabling – Strand
- Additional train wash - Henderson

Deferral of spend would constrain growth – 3 car trains operating peak services via CRL.





Decade 1  
(FY16-25)

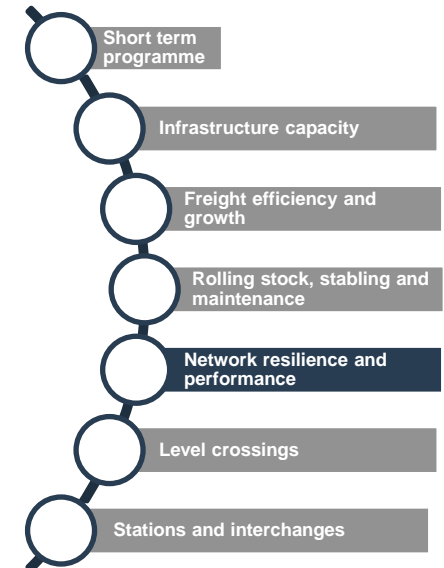
# Resilience and Performance

Investment to ensure resilient and reliable network

- Auckland/Northern Control Centre
- Accelerate work to address renewals backlog
- Additional crossovers
- Infill signals and speed improvements
- Additional sidings
- Network electrification sectioning
- Wiri Depot independent feed

Impact of investment renewals programme not yet well developed – new assets must be maintained and renewed.

Existing standards, approaches need review





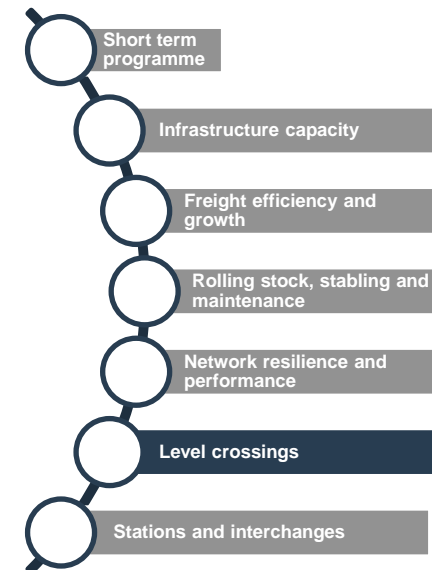
Decade 1  
(FY16-25)

# Level Crossings

Implement policy of removal (grade separation or closure) of all level crossings in electrified area

- More than doubling of train frequencies will exacerbate current issues – safety, delays to road users.
- Assume 5 closures and 5 separations within the decade (in addition to 2 addressed by CRL+ Sarawia St)
- Onehunga branch a particular issue
- Further work required

Existing standards for level crossing protection require review



Decade 1  
(FY16-25)

# Level Crossings

Level Crossing		2014	2016	Potential frequency post 2021	Potential frequency post 2031
Morningside Drive	Trains per hour peak	8	12	21	26
	% each hour barrier down	17%	25%	44%	54%
Glenview Road	Trains per hour peak	8	12	21	26
	% each hour barrier down	15%	23%	40%	50%
Manuroa Road	Trains per hour peak	15	15	18	18
	% each hour barrier down	35%	35%	42%	42%
Woodward Road	Trains per hour peak	8	12	21	26
	% each hour barrier down	17%	25%	44%	54%
Bruce McLaren Road	Trains per hour peak	8	12	21	26
	% each hour barrier down	18%	28%	48%	60%
Normanby Road	Trains per hour peak	8	12	21	26
	% each hour barrier down	11%	17%	30%	37%
St Jude Street	Trains per hour peak	8	12	21	26
	% each hour barrier down	16%	23%	41%	51%
Sarawia St	Trains per hour peak	18	28	28	28
	% each hour barrier down	40%	62%	62%	62%





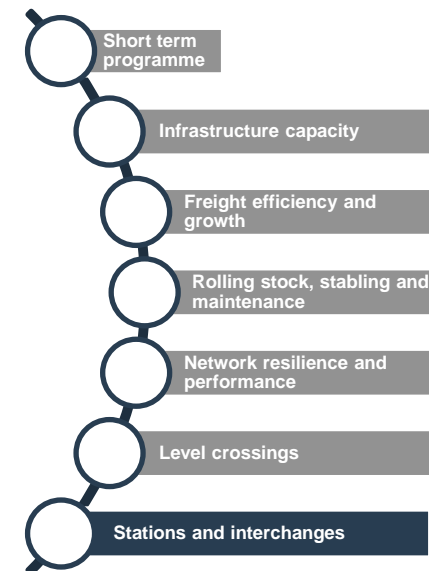



Decade 1  
(FY16-25)

# Property

Property purchase will be required in some areas

- Works confined within existing rail corridor where possible
- Retention of rail land in relevant areas essential.
- Competing objectives to sell/develop for commercial gain
- Early protection/acquisition of land may be beneficial
- Placeholder estimate only – further design work required. Some costs included within unit rates and not identified separately

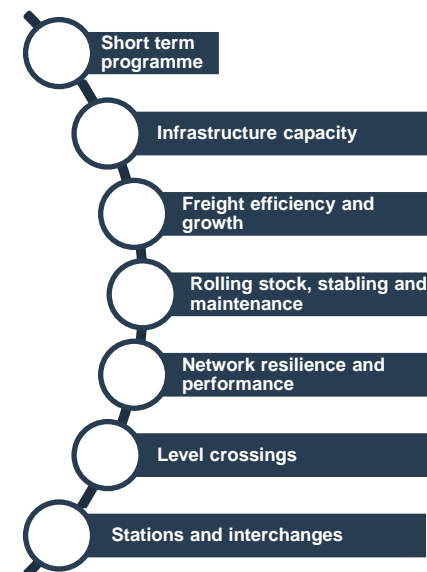




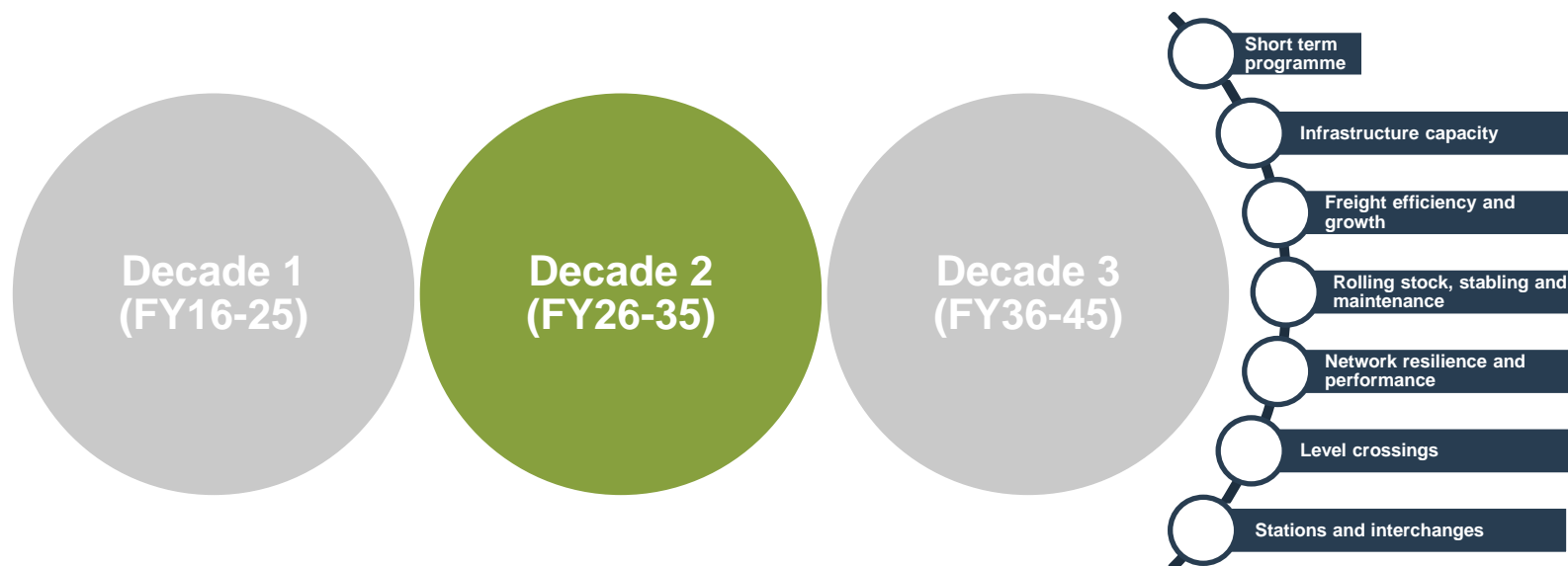
Decade 1  
(FY16-25)

# Emerging Conclusions

- Total spend dependent on assumptions made and timing of investment
- Compromises / trade offs (passenger, freight, performance, reliability) may reduce or defer capital requirement
- *If service enhancements are desired, the identified infrastructure is likely to be required to deliver performance and reliability*
- Delivery programme dependent on resources and network access – spend now to reduce disruption later?



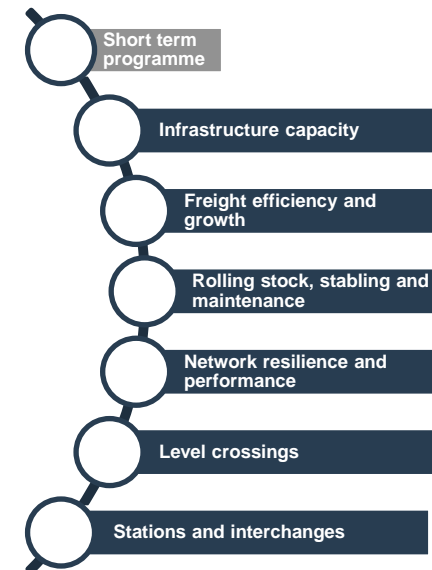
# Decade 2 FY26 – FY35



# Decade 2 Overview

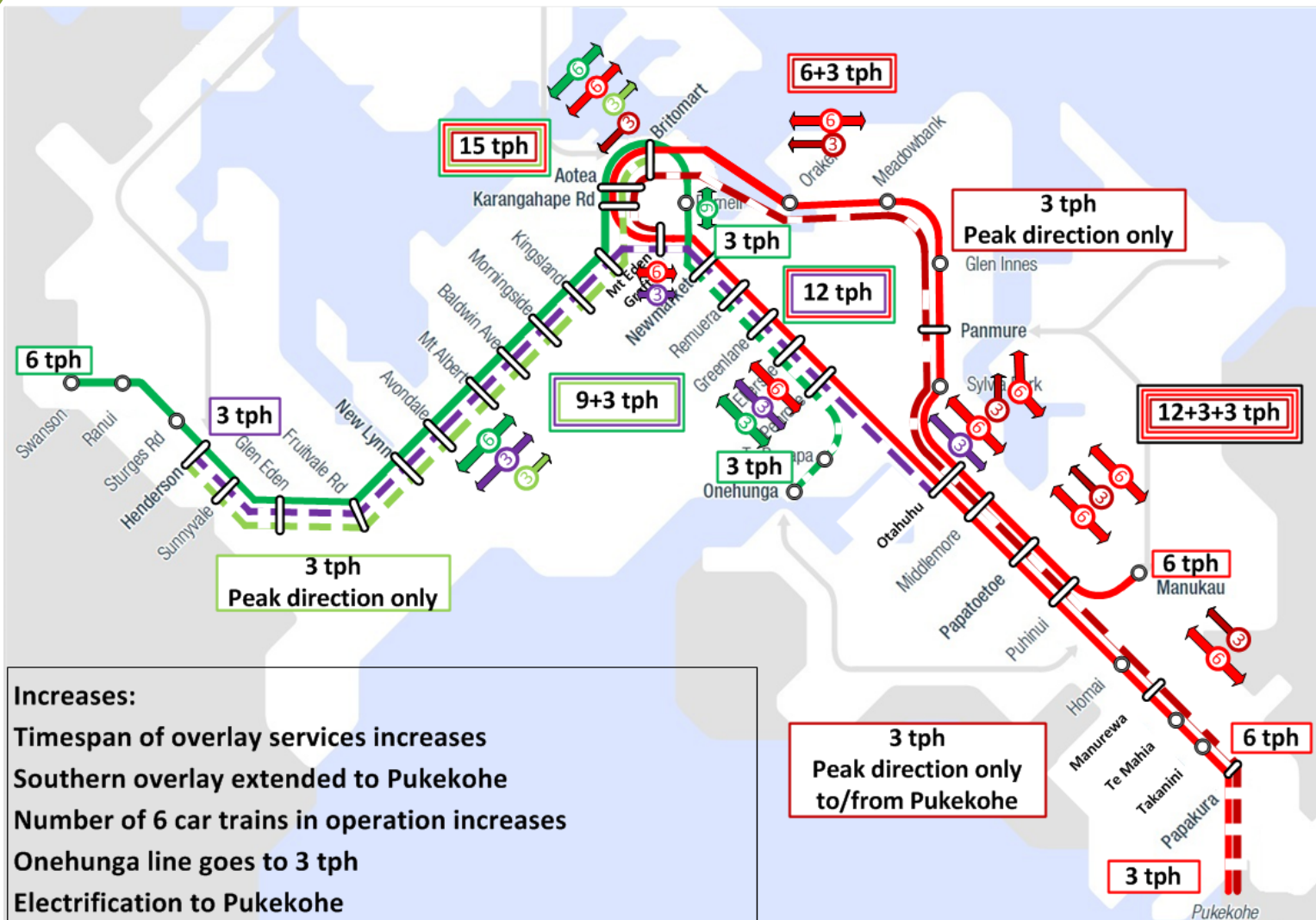
Decade 2  
(FY26-35)

- Electrify Pukekohe to Papakura by 2030
- Construct a 4<sup>th</sup> Main between Wiri and Westfield to de-conflict Westfield Junction (alternative to grade separation)
- Procure new EMUs for electrification and growth (c.21 x 3-car)
- Additional stabling at Henderson and Pukekohe
- Northern concourse at Newmarket Station in addition to PnR and Station enhancements
- Complete level crossing programme
- Rail patronage forecast to reach c.50m by 2035



Decade 2  
(FY26-35)

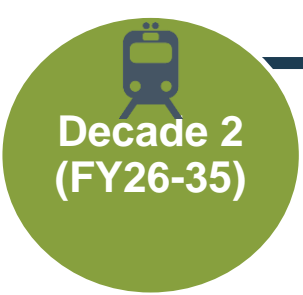
# 2035 Services



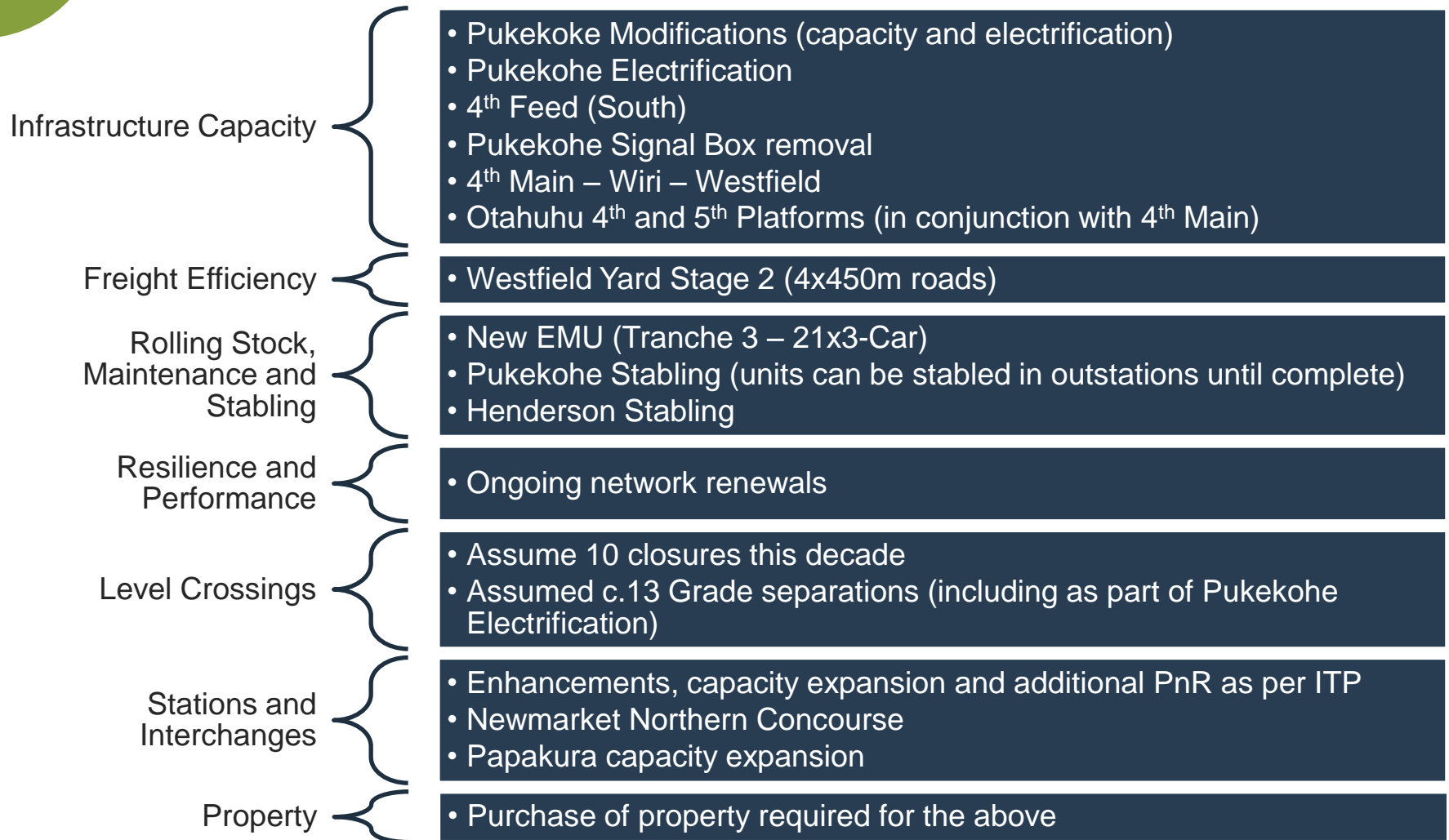
**Increases:**

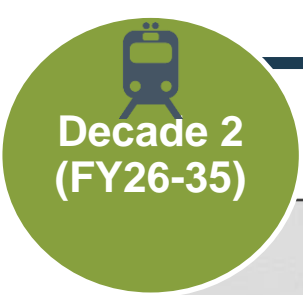
- Timespan of overlay services increases
- Southern overlay extended to Pukekohe
- Number of 6 car trains in operation increases
- Onehunga line goes to 3 tph
- Electrification to Pukekohe



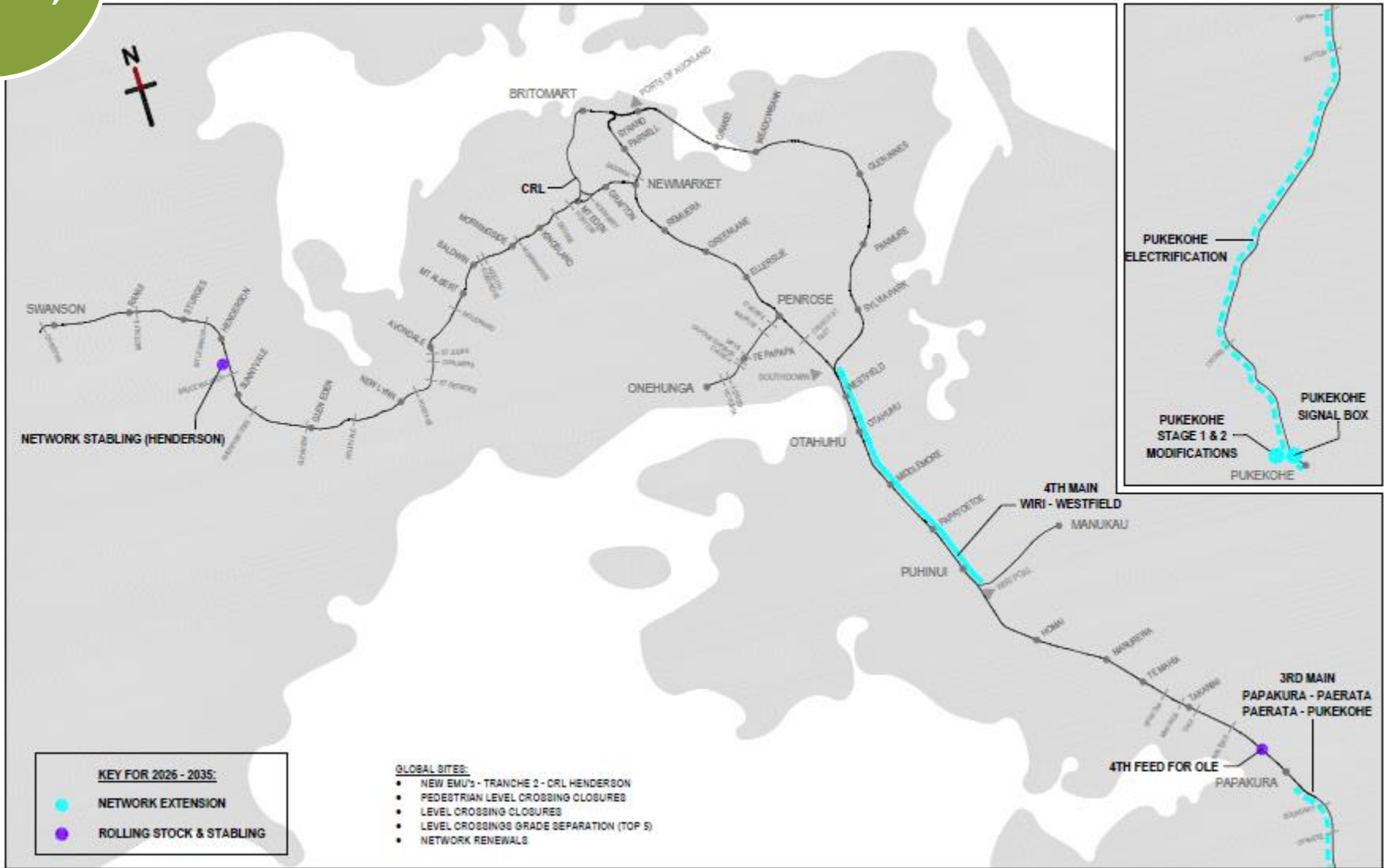


# Decade 2

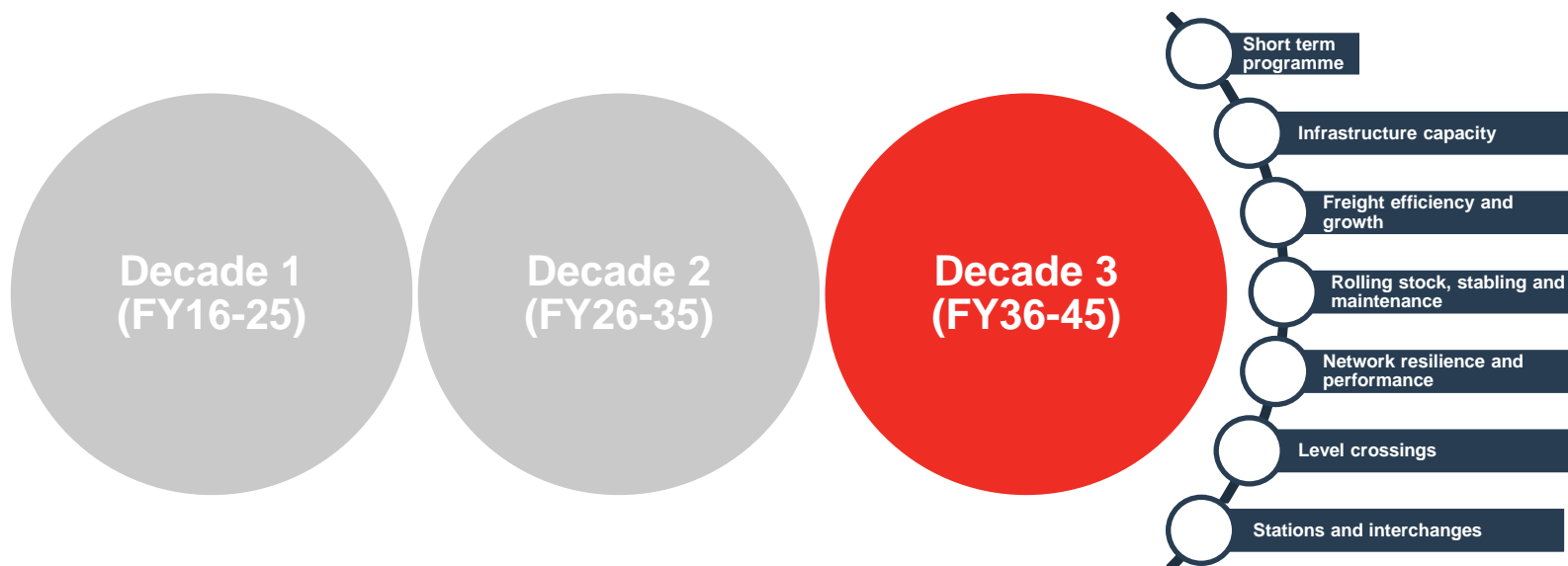




# Decade 2



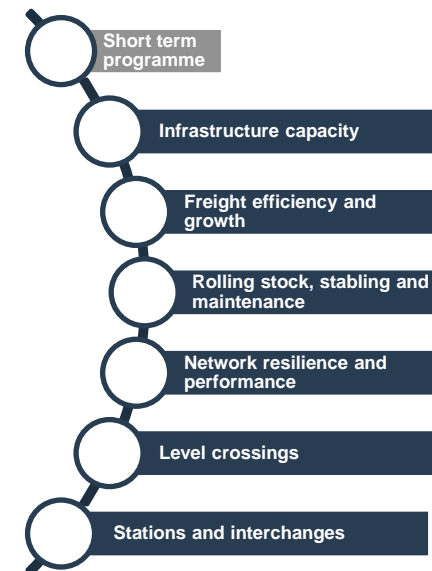
# Decade 3 FY36 – FY45

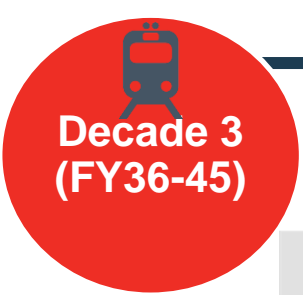


# Decade 3 Overview

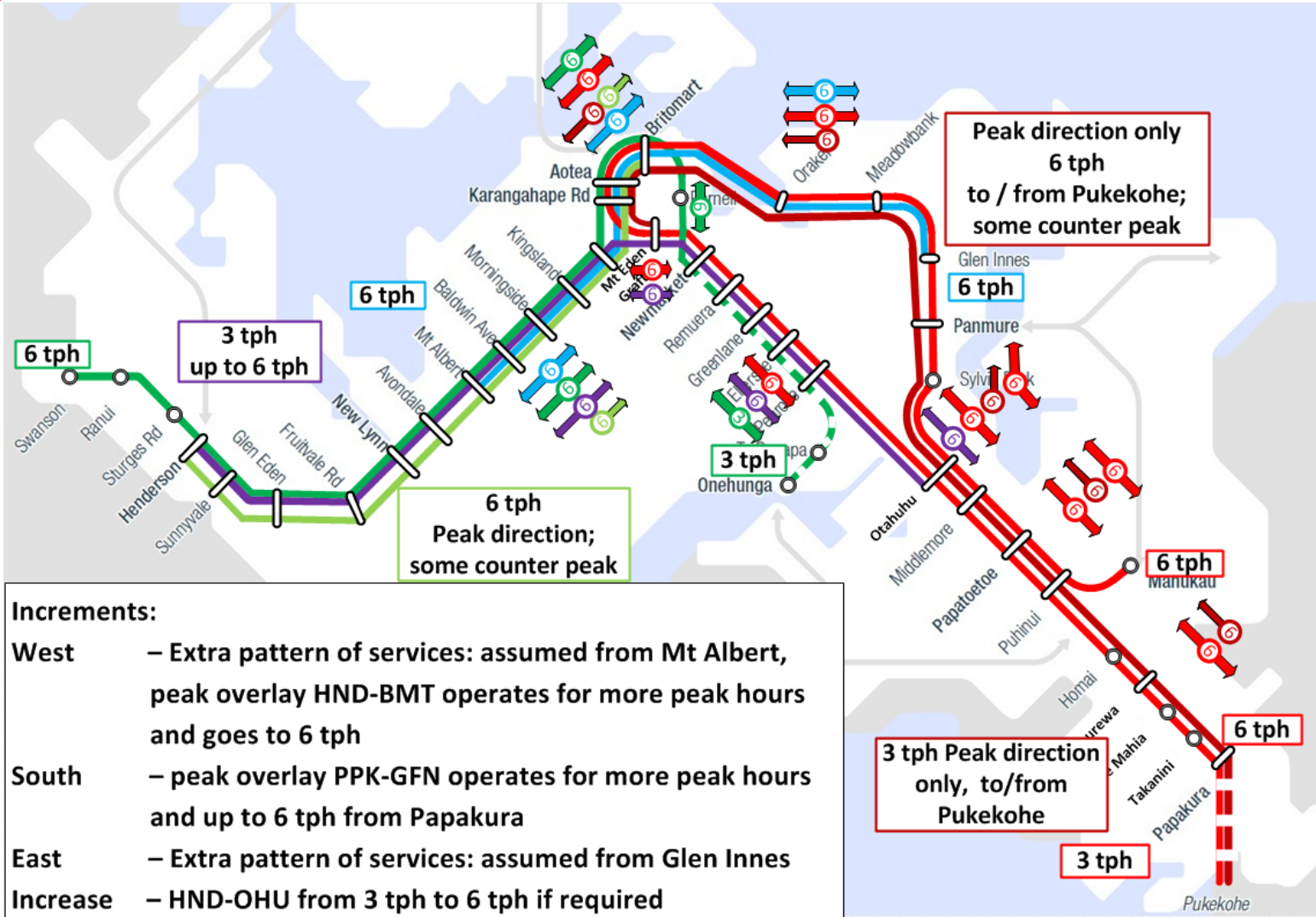
Decade 3  
(FY36-45)

- Demand accommodated by running all peak overlay services as 6-car trains for longer periods
- Additional service from West to East required (making use of full 24tph capacity of CRL and requiring ETCS Level 2)
- Procure c.24 x3-car EMUs
- New maintenance facility and stabling at Henderson
- 4<sup>th</sup> Platform at Henderson
- Complete 3<sup>rd</sup> Main to Pukekohe
- Complete 4<sup>th</sup> Main to Papakura
- Rail patronage forecast to reach c.60m by 2045





# 2045 Services



**Increments:**

- West** – Extra pattern of services: assumed from Mt Albert, peak overlay HND-BMT operates for more peak hours and goes to 6 tph
- South** – peak overlay PPK-GFN operates for more peak hours and up to 6 tph from Papakura
- East** – Extra pattern of services: assumed from Glen Innes
- Increase** – HND-OHU from 3 tph to 6 tph if required

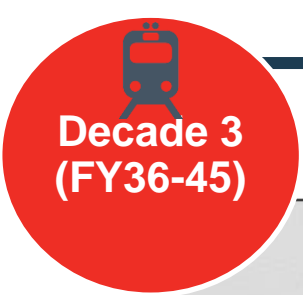


**Decade 3  
(FY36-45)**

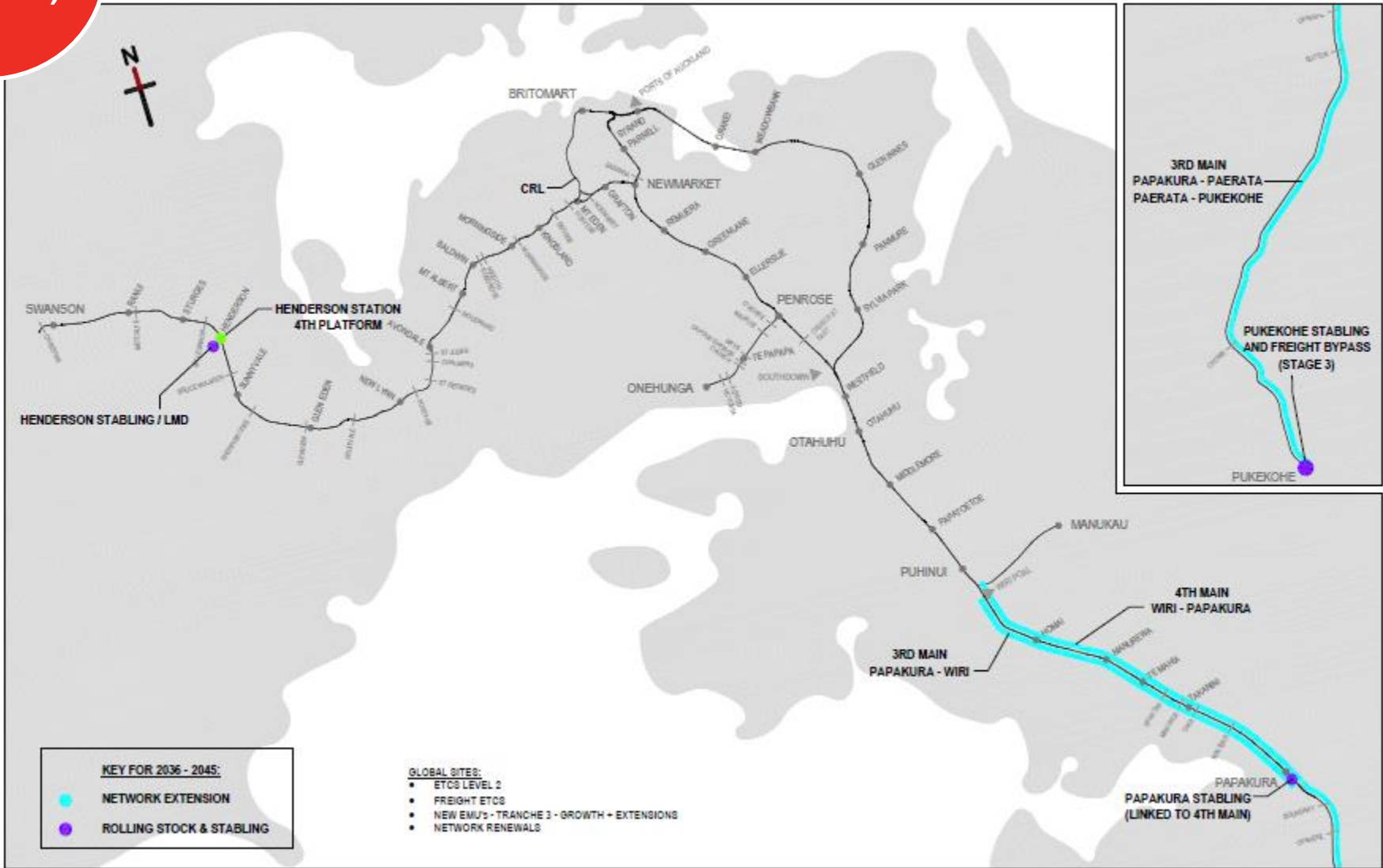
# Decade 3

Infrastructure Capacity	<ul style="list-style-type: none"> <li>• 3<sup>rd</sup> Main – Wiri - Papakura – Paerata – Pukekohe</li> <li>• 4<sup>th</sup> Main – Wiri-Papakura</li> <li>• Henderson 4<sup>th</sup> Platform</li> <li>• ETCS Level 2</li> </ul>
Freight Efficiency	<ul style="list-style-type: none"> <li>• Nil identified</li> </ul>
Rolling Stock, Maintenance and Stabling	<ul style="list-style-type: none"> <li>• New EMU (Tranche 4 – 24x3-Car)</li> <li>• Henderson LMD</li> <li>• Henderson Stabling</li> </ul>
Resilience and Performance	<ul style="list-style-type: none"> <li>• Ongoing network renewals</li> </ul>
Level Crossings	<ul style="list-style-type: none"> <li>• Programme assumed complete</li> </ul>
Stations and Interchanges	<ul style="list-style-type: none"> <li>• Enhancements, capacity expansion and additional PnR as per ITP</li> </ul>
Property	<ul style="list-style-type: none"> <li>• Purchase of property required for the above.</li> </ul>

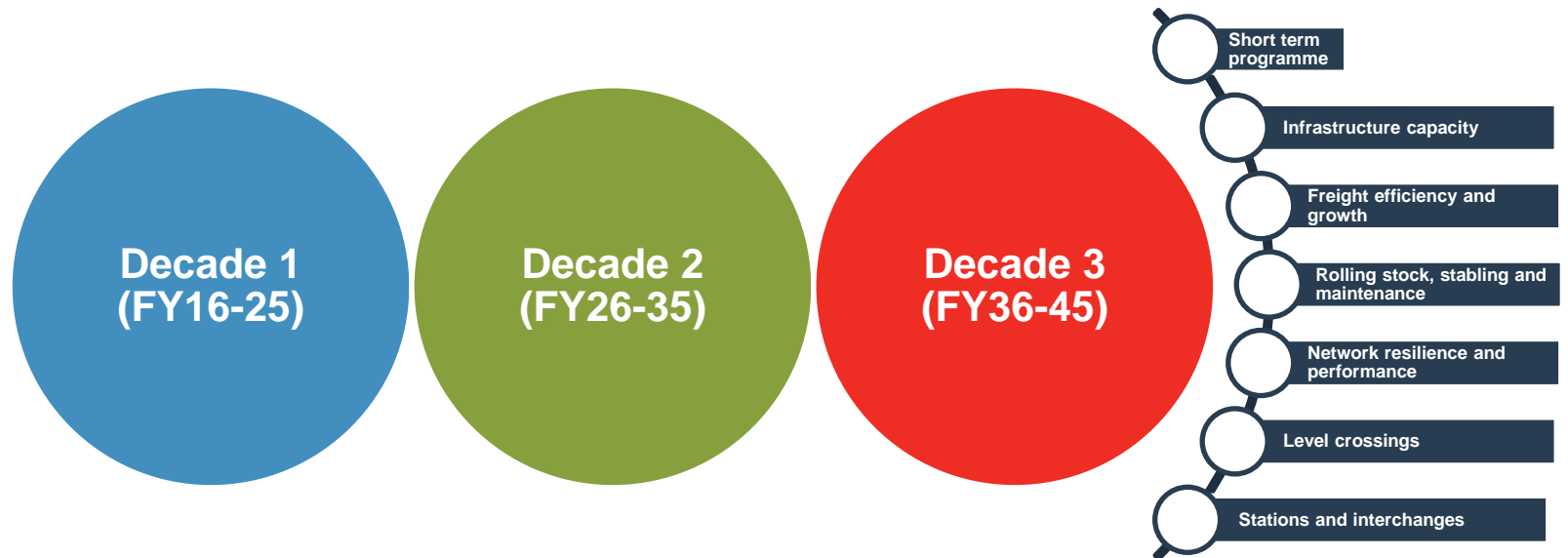




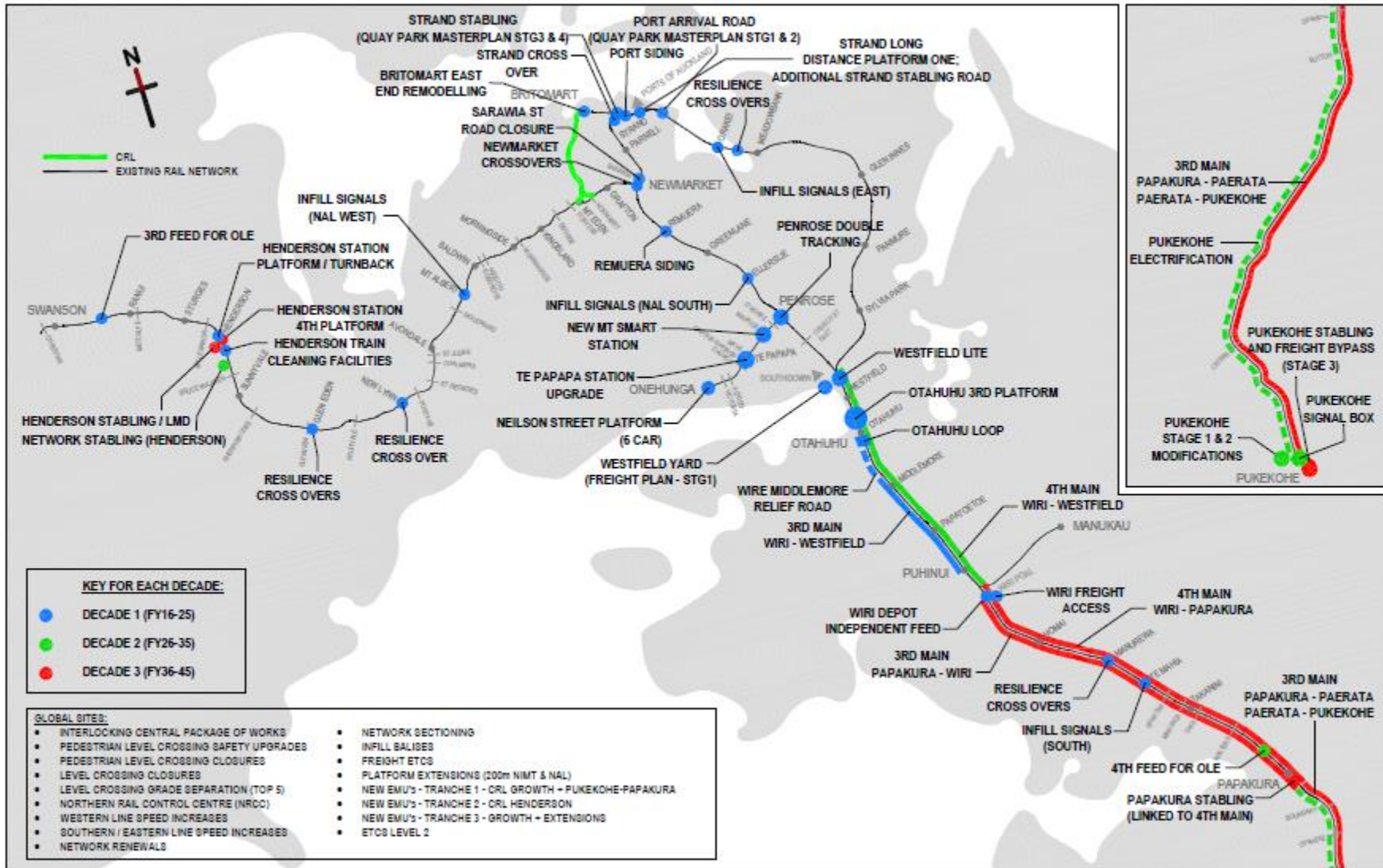
# Decade 3



# Summary



# Overview 2016 - 2045



# Summary Capex (\$m)

Decade 1  
(FY16-25)

Decade 2  
(FY26-35)

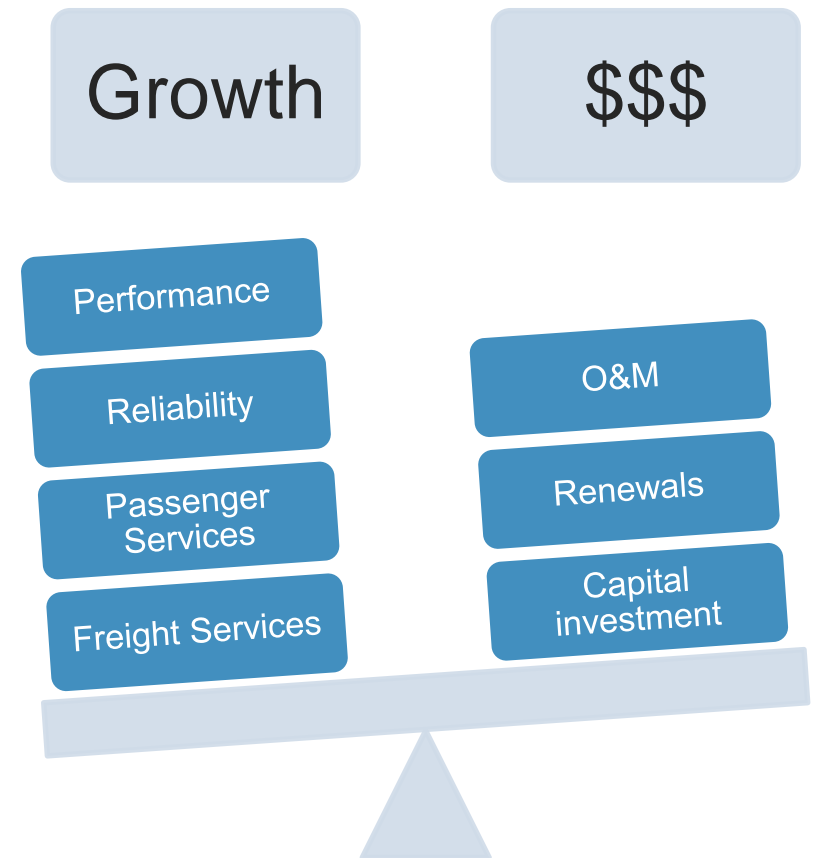
Decade 3  
(FY36-45)

Programme	FY2016-2025 \$m	FY2026-2035 \$m	FY2036-2045 \$m
Short Term Programme	29		
Infrastructure Capacity	311	647	682
Freight Efficiency and Growth	74	7	-
Rolling Stock, Stabling and Maintenance	277	246	342
Network Resilience and Performance	179	-	-
Level Crossings	203	382	-
Stations and Interchanges	46	48	18
Property	7	8	60
<b>Total</b>	<b>1,125</b>	<b>1,339</b>	<b>1,102</b>

\$2015 uninflated

# Emerging Conclusions

- Investment in capacity and resilience is required – including CRL
- Reduced/deferred spend may be possible with compromises /trade offs – not yet tested
- Programme dependent on network access and resources – make best use of network closures
- Works more disruptive as services and patronage increase
- Level crossings – significant issue for road and rail







# Thank you.

