



THE BENEFITS OF

# ELEVATED RAIL

CASE STUDY TWO:  
THE FRANKSTON LINE

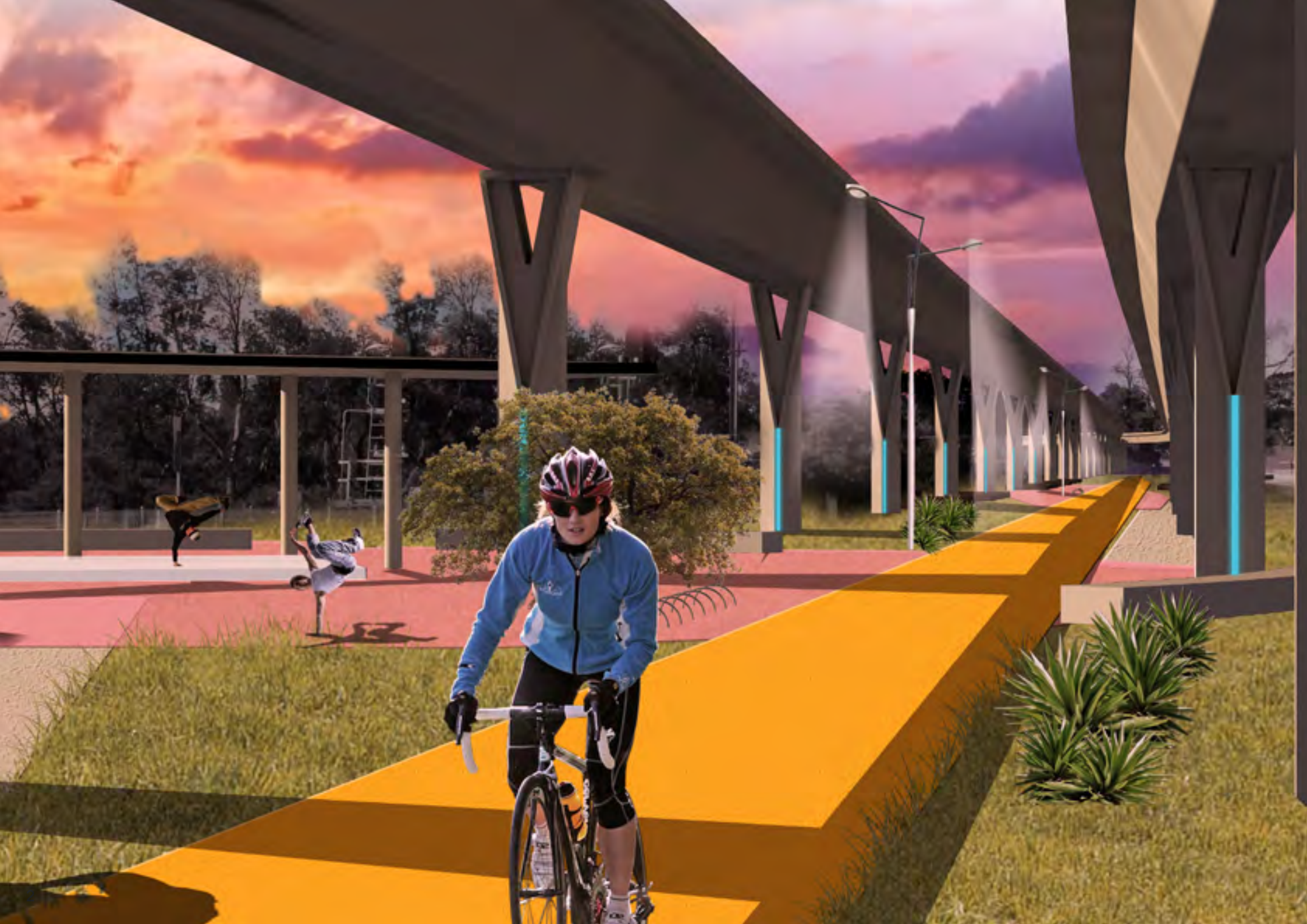
Lessons from the graduate design  
research studio 'RailUP!' 2015



msd

Melbourne  
School of Design





# PREFACE

This design studio is part of our on-going investigations of public transport futures for Melbourne.

Since 2005, we have worked with many students and colleagues at the University of Melbourne and RMIT University to incorporate understanding of the technical and operational requirements for effective public transport networks into contemporary architectural and urban design processes. Much of this work has been supported by a large cohort of industry partners in state and local government, and the private sector. Its directions have been set though research made possible through Australian Research Council grants.

In 2012, we turned our attention to the experiences of passengers in and around stations. We wanted to know how station design could best contribute to greater public transport use by encouraging pedestrians and cyclists, improving bus-train interchanges, and by integrating and creating space for socially useful urban development.

The 'Transit for All' project was supported by the University of Melbourne's Carlton Connect Initiative Fund and 15 industry partners. From this project, student designs for new stations across the Melbourne suburban rail network were used

to stimulate critical debate among the networks of public and private sector professionals responsible for much of Melbourne's recent work on new stations and level-crossing removals.

We began that project with an agnostic position on the relative merits of rail-under or rail-over options for level-crossing removals. However, after reviewing the work produced over three iterations of our design-research process, it became clear that elevated rail had some distinct advantages over the typical 'trenched-rail' designs being constructed around Melbourne.

In 2015, we sought to continue this independent design research. We sought to examine the potential effects of elevated rail in two very different rail corridors in Melbourne, and approached the Level Crossing Removal Authority for support for our work. In the next stage of this research, we wanted to test the proposition that elevated rail has significant benefits. We have done this in several ways. Firstly, we investigated the legacy of historic grade separations in Melbourne, which has included many lines elevated on embankments, lowered in trenches, or crossed by road over and under-passes (Woodcock & Stone 2016, The Benefits of Level Crossing Removals). Secondly, we ran another design research studio.

The students who participated in this intensive 12-week studio undertook a complex analysis of the context for level crossing removals along the southern part of the Frankston corridor (Case Study Two) before producing a series of design proposals. Key elements of these analyses and design propositions are included in this booklet.; analysis and propositions for the Upfield Line are Case Study One, a separate booklet.

As part of this work, we have brought masters students from the Melbourne School of Design into direct contact with the industry professionals who are shaping the delivery of the government's program of level-crossing removals. This booklet outlines the designs and the analytic thinking behind them that were produced by the students through 12 weeks of intense effort. We thank them for the enthusiasm and skill that they brought to the task. We also thank the many professionals who contributed to the process.

We present this work as a contribution to the public debate on level-crossing removals and more widely, on the re-vitalisation of Melbourne's public transport.

Ian Woodcock  
John Stone

# The Benefits of Elevated Rail. Case Study TWO: The Frankston Line

## Lessons from MSD Studio 'RailUP!' July-October, 2015

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# INTRODUCTION

Building on the process and outcomes of previous '*Transit for All*' studios, an architectural design studio was offered to masters students through the Melbourne School of Design at the University of Melbourne in Semester 2, 2015. The studio, titled 'RailUP!' set out to explore the potential of elevated rail as a method for level-crossing removal in Melbourne rail corridors.

Previous research (eg. Woodcock 2016; Woodcock & Stone 2015; Woodcock & Wollan 2013) had shown that in principle, elevated rail offers considerable advantages to rail operators and local communities over typical 'trenched' designs currently being built in Melbourne. This studio aimed to investigate the validity of this proposition in specific locations: the Frankston and Upfield rail corridors. We did not confine our attention to the 50 level crossings

Public open space under viaduct, Clinton Oh 2015.



LEFT: Public open space corridor under viaduct, Chee Heng

identified by the Victorian state government for removal. Instead, we addressed level crossings as part of a larger interconnected system along Melbourne's train network. This network includes the roads, pedestrian and cycle paths in communities adjacent to rail corridors.

This document presents the outcomes of our investigations of the Frankston line between Moorabbin and Frankston.

## Method

The studio used a design-research approach to explore options for elevated rail along the Frankston line. The students began by analysing existing conditions along the Frankston corridor, while also examining local and international precedents for elevated structures. Key stakeholders including PTV, VicRoads and Kingston City Council, as well as numerous planning, design and construction professionals, provided valuable guidance and expertise during this process.

Key components of the corridor context included: the width of the rail corridor; the proximity of adjacent development; distributions of land use, especially local public open spaces, pedestrian and cycle networks; planning schemes controls (including heritage) and future land use intensification. Comparisons of community and open space connectivity with various scenarios for level crossing removal were made.

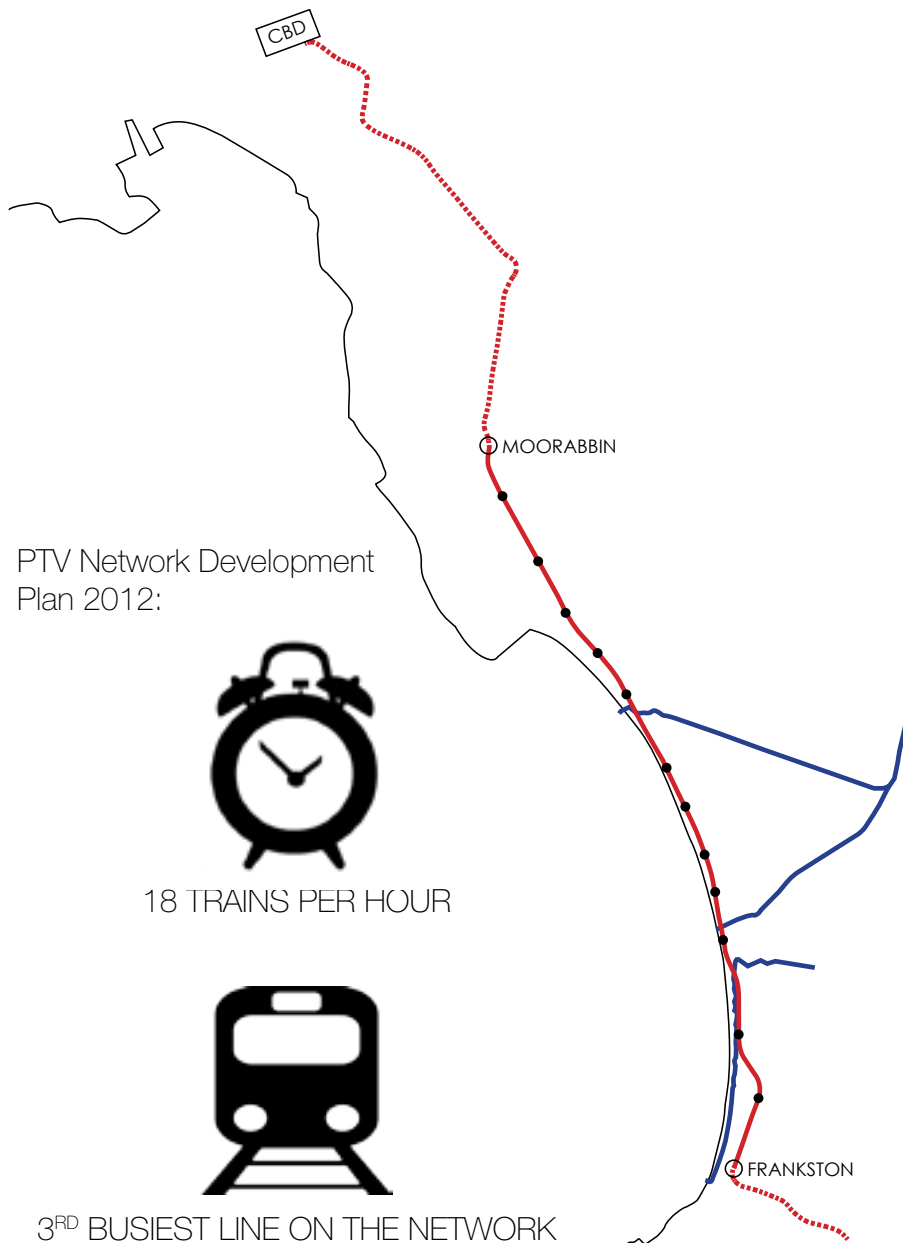
This analysis was integrated into a series of design studies that tested the implications of various viaduct and station design options in their local context. These studies explored the implications of different viaduct heights, means of approach, circulation, as well as place-making strategies.

The design proposals addressed a series of essential criteria covering amenity, connectivity, accessibility, disruptiveness, safety, economic development and future proofing. These criteria are explained in detail on p.19. The main body of this booklet includes the most promising proposals produced in the studio under each category. It also provides an overview of design proposals for elevated rail at each station from Southland to Kananook.



SOUTHLAND  
STATION

# CASE STUDY 02: FRANKSTON CORRIDOR



LEFT: Proposed Southland Station, Nicola Inskip

Of the 26 level crossing between the stations at Moorabbin and Frankston, only eight are earmarked for removal by 2022. This leaves an additional 18 level crossings that will either remain at grade, or wait patiently to be removed: along with the numerous other non-mandated level crossings across the Melbourne rail network.

Elevated rail offers the opportunity to remove additional level crossings in a unified manner that can minimise disruption, maximise community connectivity and enhance corridor amenity.

On the Frankston line, the removal of additional crossings is prudent. Many are close together and the removal of some crossings in isolation will make it difficult to remove others in the future. This can be seen at Charman Road, Cheltenham, where removal of the level crossing would also require work at Park Road because the two are less than 300m apart. The crossing at Edithvale Road is another example. Here, it is possible to remove the crossing in isolation, but doing so would make it difficult to remove the nearby crossing at Lochiel Avenue in the future due to the location of the ramp.

In addition, an elevated rail approach is particularly appropriate due to the proximity of the Frankston line to the bay. Grade separations that require the road or rail to be submerged, as in the case of trench rail, would place the line beneath the water table with the consequent likelihood of flooding in the sunken portion. This risks damage to track, stations and trains along with enormous disruption to services with associated congestion impacts.

In their current alignment, rail tracks act as a barrier impeding access to the beach from the east. This is due to the limited number of safe crossing points for cars and pedestrians along the length of the line. Elevating the tracks can remove this barrier and offers the opportunity to completely reconceive the movement patterns and connections between local communities. Removing the barrier of at-grade rail allows re-imagining of the entire public space between Station St and Nepean Hwy, dramatically improving access to the attractions, services and amenity of the whole corridor. This includes the possibility of reconfiguring the Nepean Highway and Station Street into a single boulevard. This reconfiguration could also include a dedicated 'bike highway' on the rail reserve rather than a single bike lane on a road shared with cars, buses and delivery vehicles.

Elevated rail not only opens up access to the waterfront, but it could also allow the creation of a continuous green network through a new linear park connecting existing green spaces along the entire corridor.

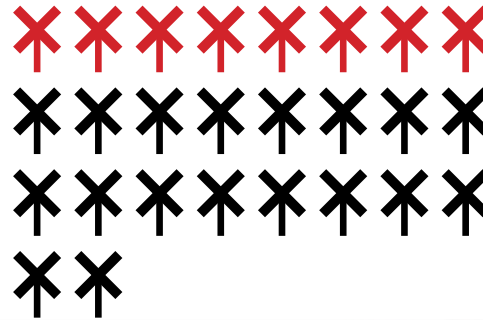
# EXISTING CROSSINGS

LEVEL CROSSINGS  
MOORABBIN - FRANKSTON

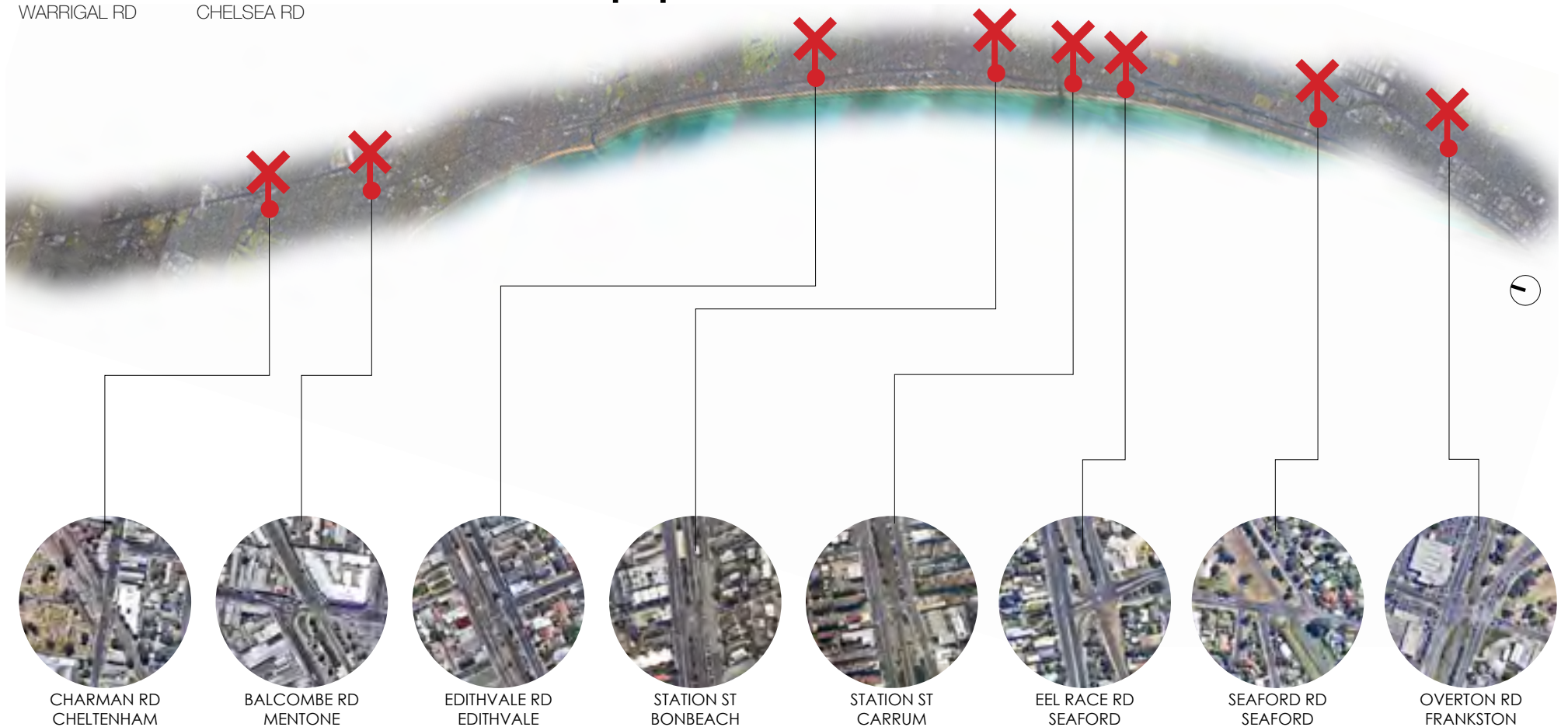
EXLEY RD  
DANE RD  
WICKHAM RD  
HIGHETT RD  
PARK RD  
CHARMAN RD  
LATROBE ST  
BALCOMBE RD  
WARRIGAL RD

PARKERS RD  
MCDONALD ST  
BEAR ST  
STATION ST  
STATION ST  
LOCHIEL AVE  
EDITHVALE RD  
STATION ST  
CHELSEA RD

ARGLE AVE  
BONDI RD  
STATION ST  
EEL RACE RD  
ARMSTRONGS RD  
STATION ST  
SEAFORD RD  
OVERTON RD



26 LEVEL CROSSINGS TOTAL  
8 MANDATED



CHARMAN RD  
CHELTENHAM

BALCOMBE RD  
MENTONE

EDITHVALE RD  
EDITHVALE

STATION ST  
BONBEACH

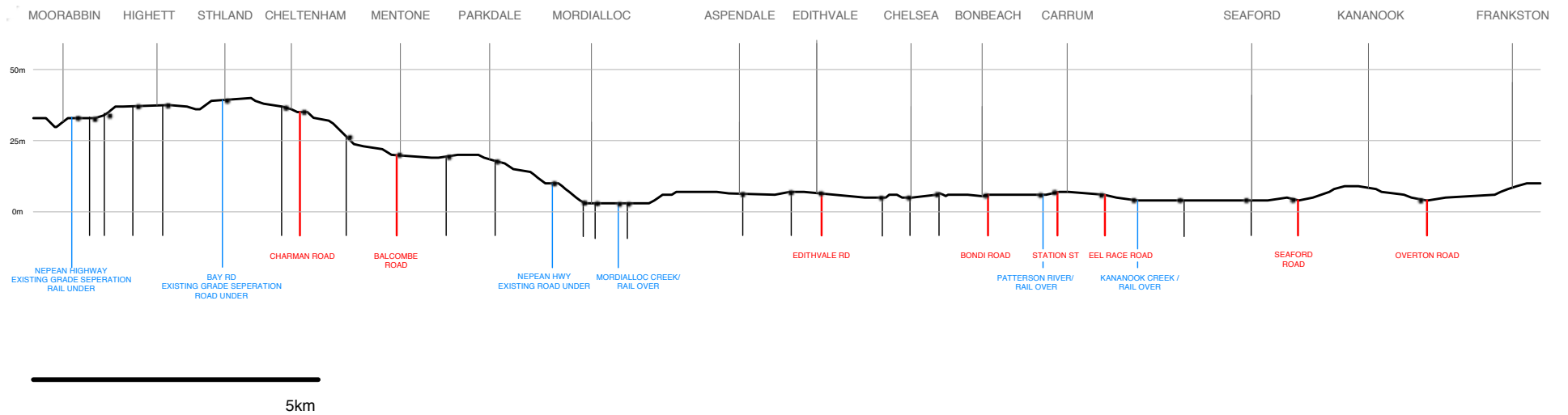
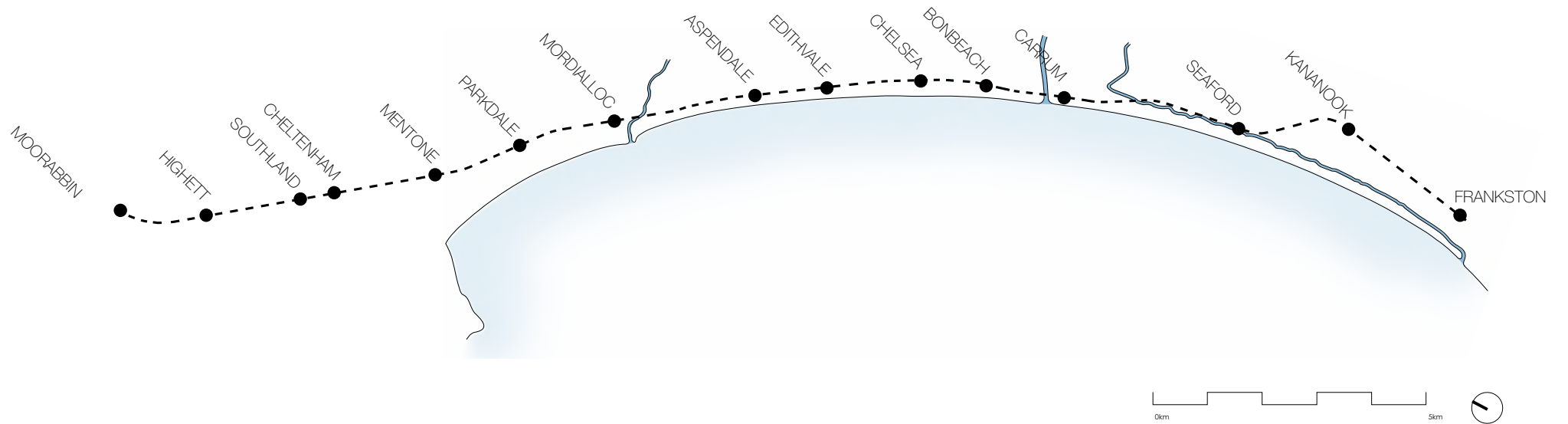
STATION ST  
CARRUM

EEL RACE RD  
SEAFORD

SEAFORD RD  
SEAFORD

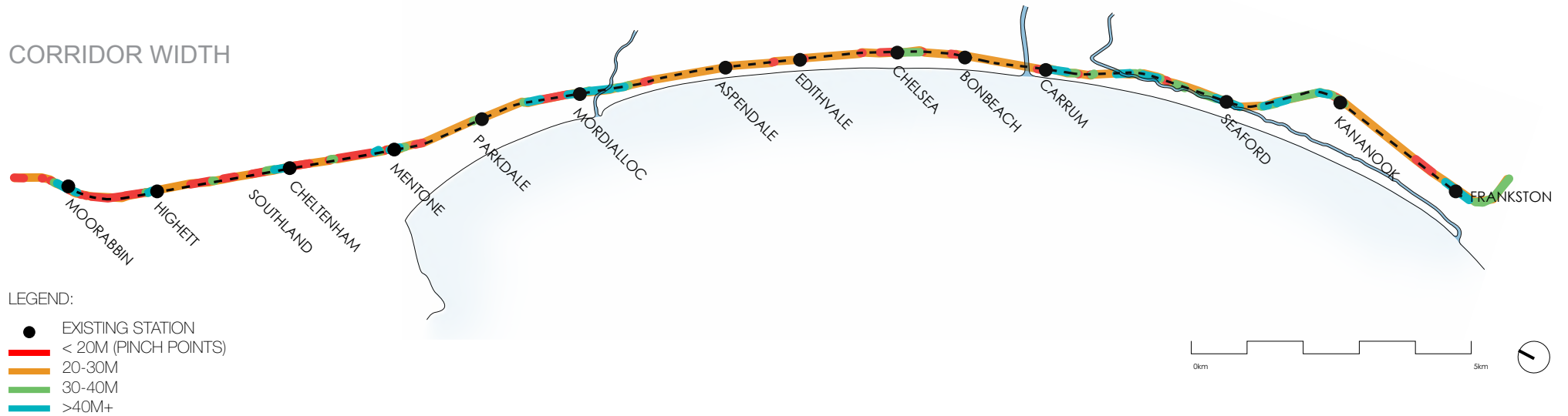
OVERTON RD  
FRANKSTON

# EXISTING ALIGNMENT

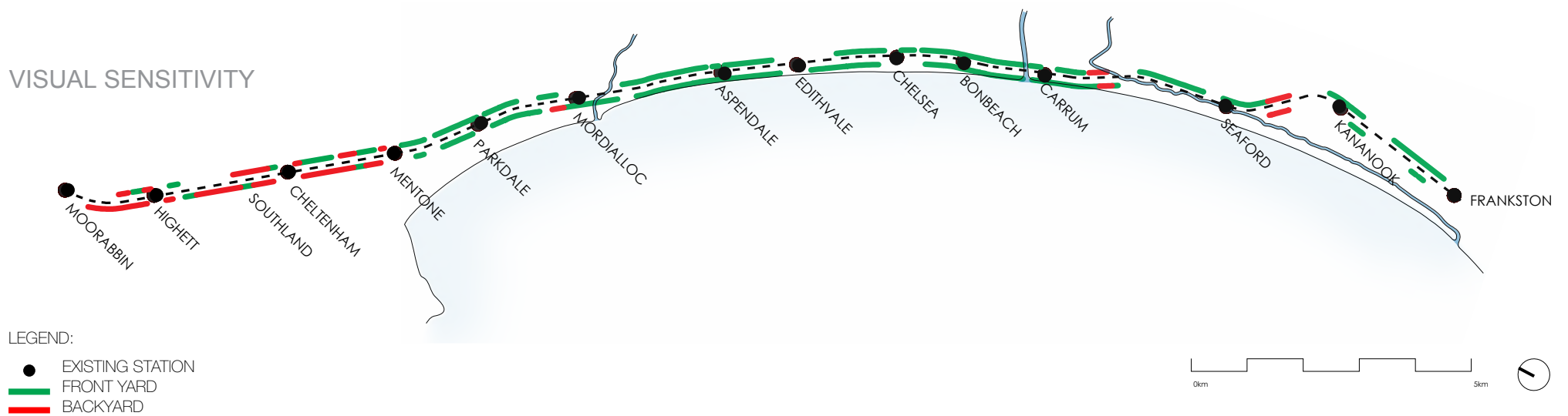


# ALIGNMENT ANALYSIS

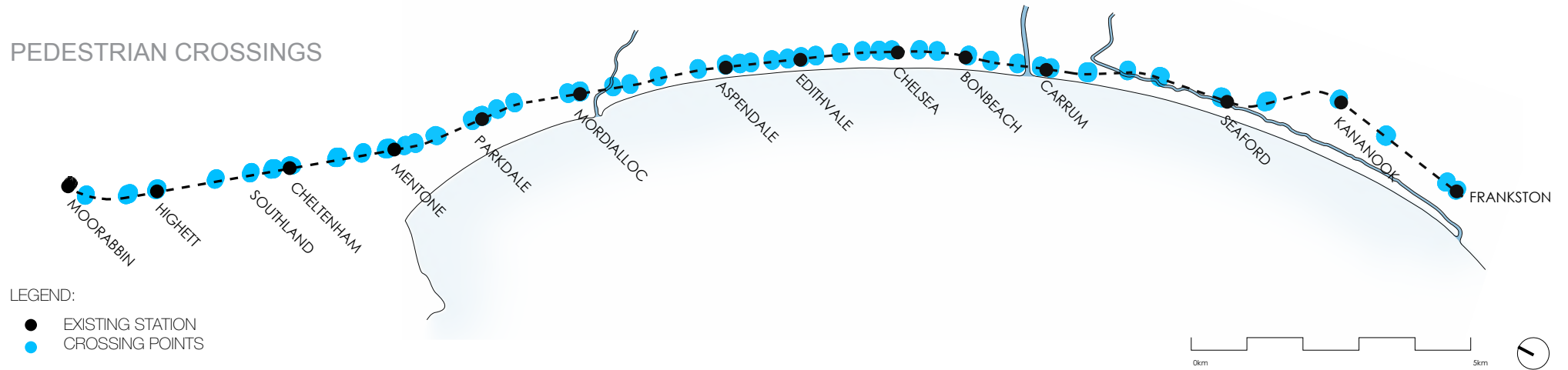
## CORRIDOR WIDTH



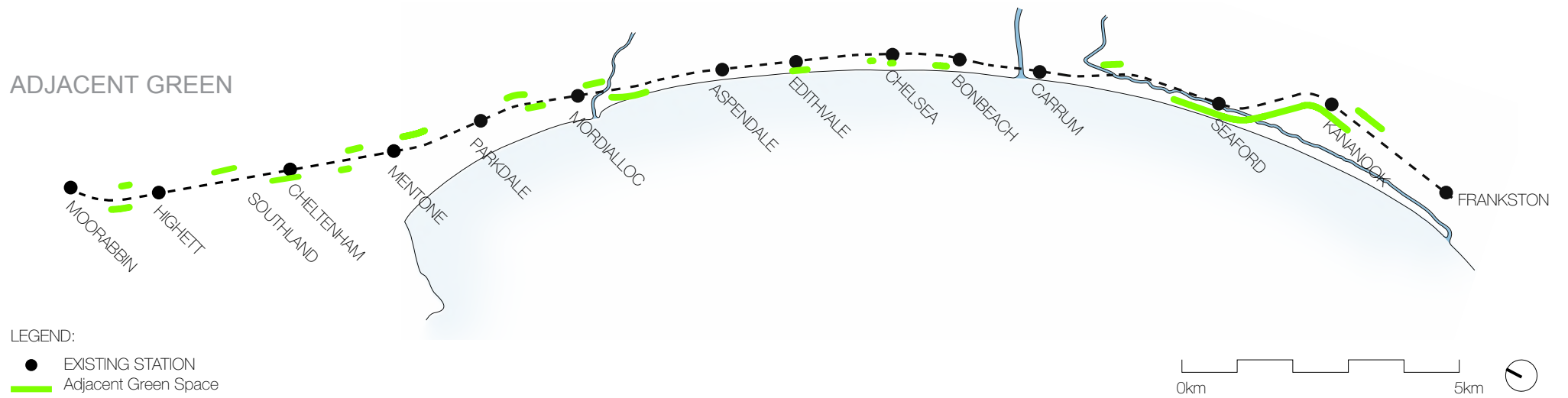
## VISUAL SENSITIVITY



## PEDESTRIAN CROSSINGS



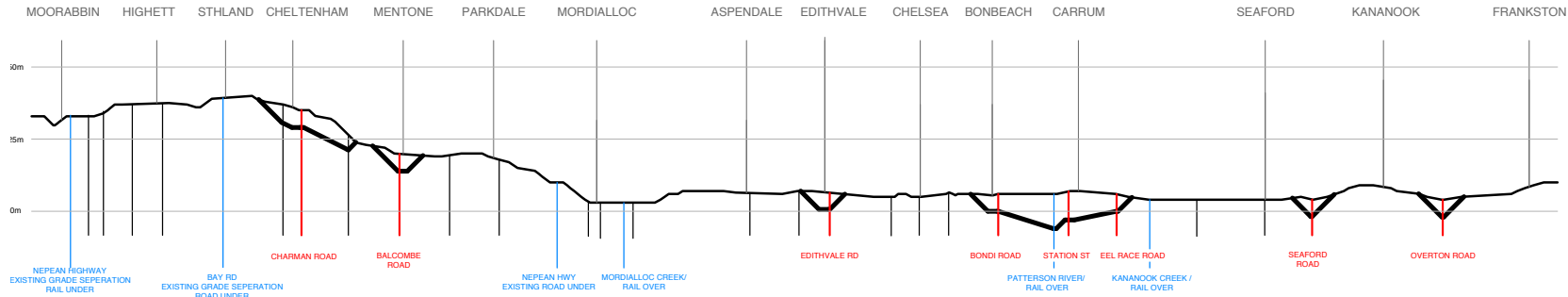
## ADJACENT GREEN



# ALIGNMENT SCENARIOS - TRENCH MANDATED CROSSINGS

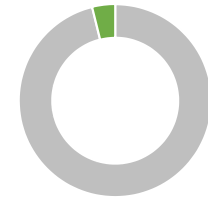
The alignment scenarios below explore trench rail solutions at the 8 mandated level crossing removal locations with 1:50 and 1:100 gradients for comparison. Shallower gradients are preferable for rail operations and to minimise the perception of a 'roller coaster' experience for passengers.

## TRENCH OPTION 1 - MANDATED ONLY 1:50 RAIL GRADIENT

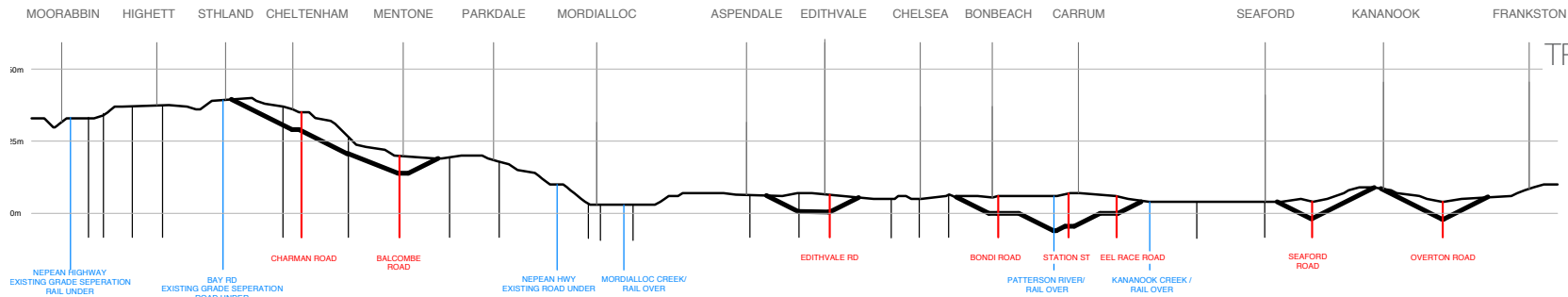


## CONNECTIVITY

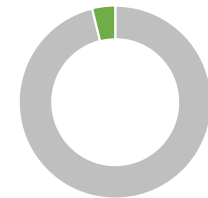
Mandated Trench 1:50



## TRENCH OPTION 2 - MANDATED ONLY 1:100 RAIL GRADIENT



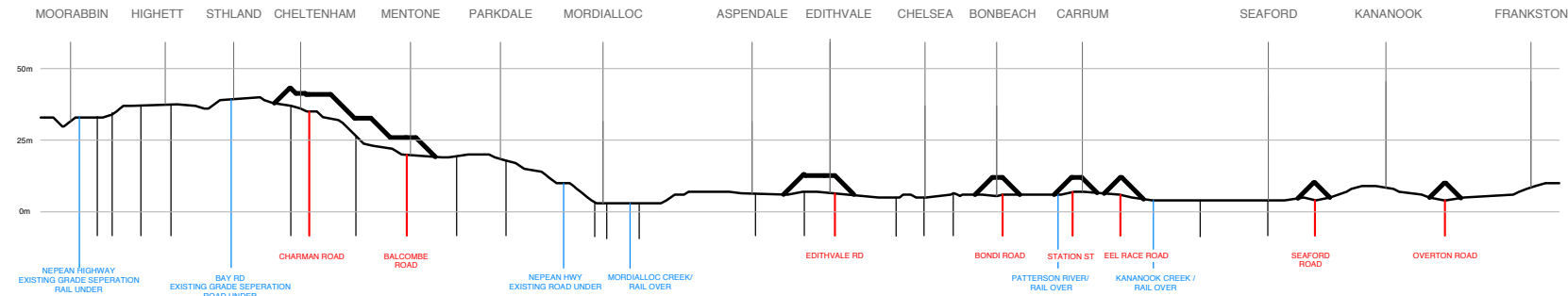
TRENCH SOLUTION 1:100



# ALIGNMENT SCENARIOS - ELEVATE MANDATED CROSSINGS

The alignment scenarios below explore elevated rail solutions at the 8 mandated level crossing removal locations with 1:50 and 1:100 gradients for comparison. Shallower gradients are preferable for rail operations and to minimise the perception of a 'roller coaster' experience for passengers.

## ELEVATED OPTION 1 - MANDATED ONLY 1:50 RAIL GRADIENT

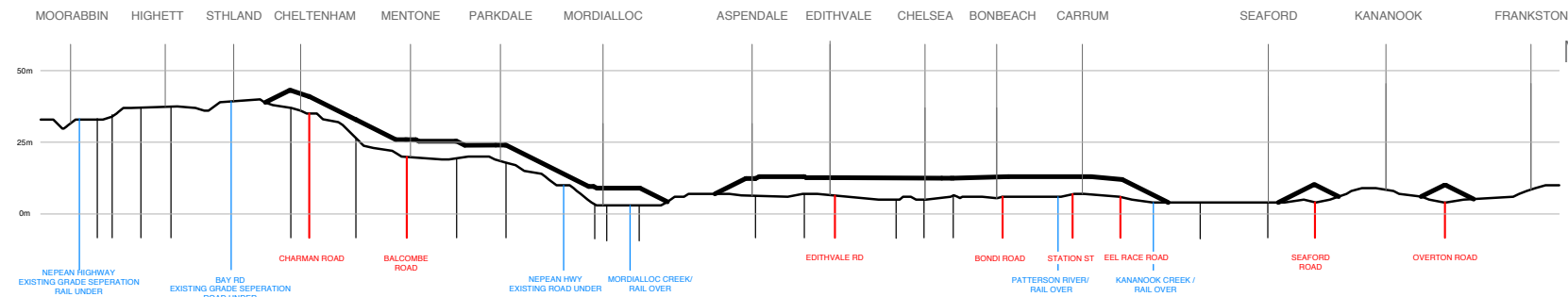


## CONNECTIVITY

MANDATED ELEVATED 1:50



## ELEVATED OPTION 2 - MANDATED ONLY 1:100 RAIL GRADIENT



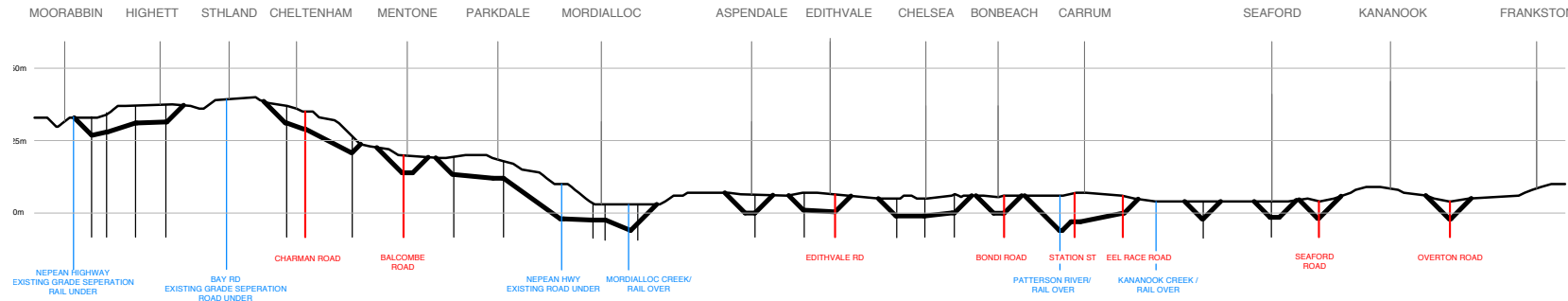
MANDATED ELEVATED 1:100



# ALIGNMENT SCENARIOS - ALL TRENCHED

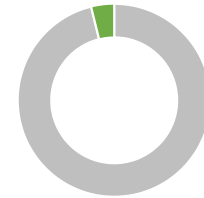
The alignment scenarios below explore trench rail solutions at all level crossing locations with a 1:50 and 1:100 gradient for comparison. Shallower gradients are preferable for rail operations and to minimise the perception of a 'roller coaster' experience for passengers.

## TRENCH OPTION 3 - ALL TRENCH 1:50 RAIL GRADIENT

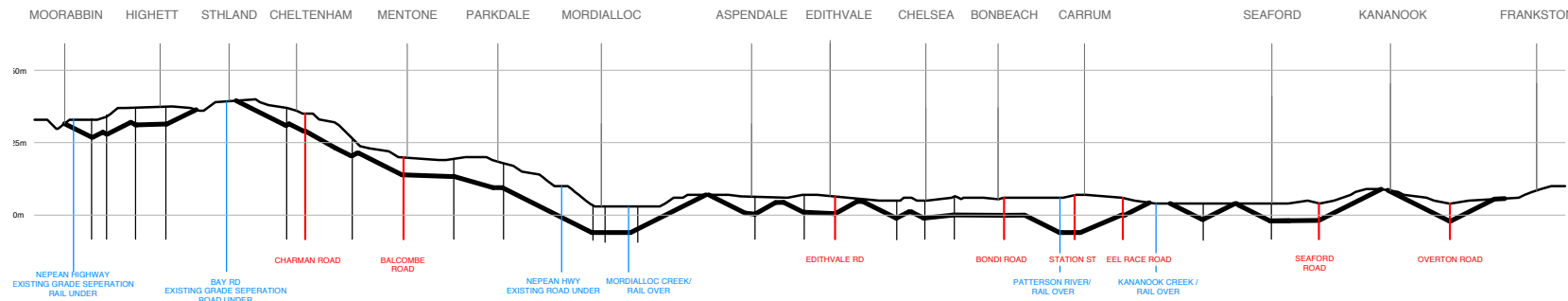


## CONNECTIVITY

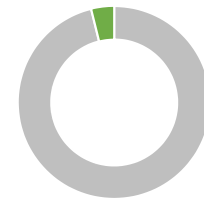
### TRENCH SOLUTION 1:50



## TRENCH OPTION 4 - ALL TRENCH 1:100 RAIL GRADIENT



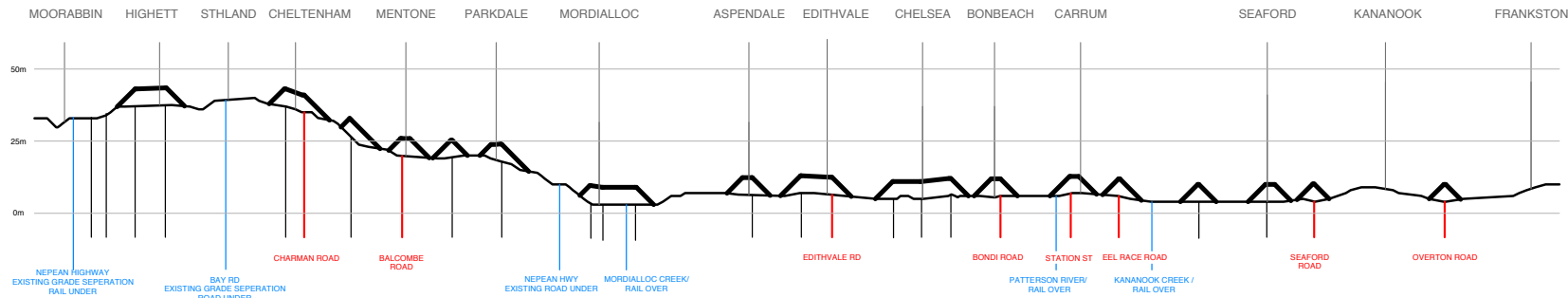
### TRENCH SOLUTION 1:100



# ALIGNMENT SCENARIOS - ALL ELEVATED

The alignment scenarios below explore elevated rail solutions for all level crossing locations at 1:50 and 1:100 rail gradients for comparison. In these scenarios, all railway ramps that end close together are connected to create sections of continuous elevated rail on viaducts. Shallower gradients are preferable for rail operations and to minimise the perception of a 'roller coaster' experience for passengers.

## ELEVATED OPTION 3 - ALL ELEVATED 1:50 RAIL GRADIENT

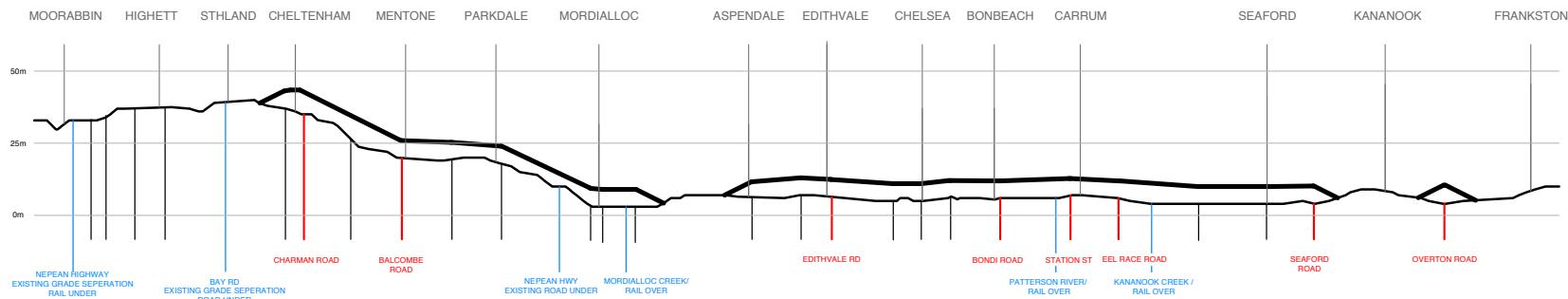


## CONNECTIVITY

ALL ELEVATED 1:50



## ELEVATED OPTION 4 - ALL ELEVATED 1:100 RAIL GRADIENT



ALL ELEVATED 1:100





# THE BENEFITS

Each benefit addresses a number of questions:

## 01 Amenity

- How easily can new public space be created under and around elevated structure?
- Can it be activated for community and recreational uses, both passive and active?
- How does the elevated structure itself contribute to the character of the local community?

## 02 Connectivity + Accessibility

- How does the elevated rail impact ground level connectivity after the grade separation?
- How easily can the new space integrate nearby land uses?
- How accessible are the stations themselves?
- How well does the design facilitate and encourage inter-modal transfer?
- How direct are the paths for passengers transferring between trains, buses and trams?

## 03 Disruptiveness + Safety

- How much disruption would the design cause during construction: to rail services, private and commercial traffic? Which would produce most construction traffic, dirt and noise?
- How much disruption would be caused to major services, utilities, drainage, high water tables, and other difficult ground conditions?
- How can noise and overlooking be minimised?
- How safe are the spaces created for all users?
- What levels of safety can be provided for pedestrians, cyclists, public transport users and those with mobility issues in particular?
- 

## 04 Economic Development

- Can retailing, hospitality, commercial and community-based land uses, that provide employment, contribute to local economic activity and social capital be developed and integrated?
- How feasible would these types of land use be in the short, medium and longer term?

## 05 Future Proofing

- How well does the design allow for future change? For example: changes in land use, expansion of public transport interchange facilities, expansion of cycling facilities, upgrades to improve amenity, weather protection, wayfinding?
- To what extent can negative impacts of the design be ameliorated, minimised, remediated?



Basketball court under viaduct, Chee Heng

# 01 AMENITY

Elevated rail creates the opportunity to develop parks and gardens for public use on what is currently underutilised land. These spaces can be active spaces which facilitate specific events and activities, or passive open spaces which can contribute to the local environment and waterways.

The railway viaduct, if well-designed, can contribute to place making and add to the character and identity of the local built environment. This is particularly useful within activity centres where at grade level crossings can be transformed into gateways and community markers.

Also to be considered is the experience of railway commuters and other passengers. Photos taken at 12m elevation along the Frankston line show views to the bay and distant mountain ranges. Furthermore, these photos indicate that the viaduct would largely be invisible from the beach.

If the space beneath the elevated rail structure is converted into public open space, up to 20km or 400,000 square metres (i.e. 40 hectares) of new public open space could be created. This would dramatically enhance existing open space strategies outlined by the relevant local councils.

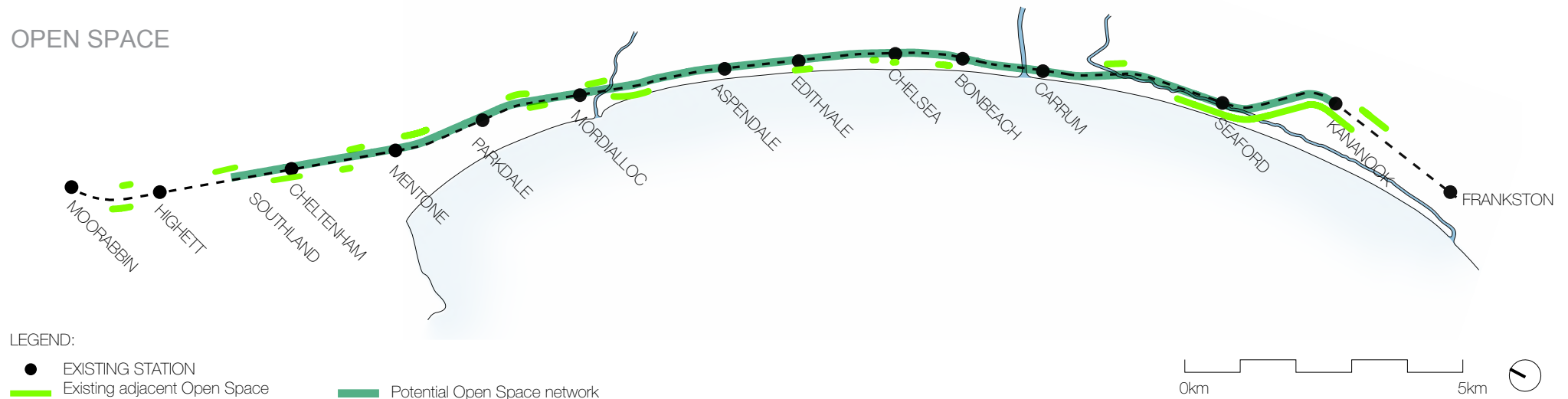


LEFT: New station at Springvale (trenched station)

RIGHT: View taken from 12m high at Chelsea station

Note: while there would be an excellent view of the bay from an elevated station, even at this height, the beach is not visible. This means that elevated stations and the viaducts connecting them would not be visible from the beach in many instances.

## OPEN SPACE



# 01 AMENITY

## The Structure

It's possible to construct and finish the elevated structure in a variety of materials. Examples explored in the studio included concrete, brick, steel and timber- as well as varying colours, textures and patterns. Examples of viaducts and rail bridges from around the world provide precedents for this.

In some instances, these materials changed along the length of the viaduct, responding to local conditions.



Concrete, Brick, steel- Leyla Beiglari.



Textured Concrete- Victor Eric Goh.



Sculpted Concrete- Edward Grutzner.



Concrete with metal cladding- Xinye Feng.



Concrete with soffit coffering pattern- Vincenzo Armenia



Concrete, timber- Amirah Aziz

## The Space Below

Elevating the train line releases land in the rail reserve, creating new public space below that can be used for community spaces. Parks, community gardens, bike paths, market and event spaces, nature reserves, playgrounds, sports grounds and recreational areas are some of the many possibilities. One of the many benefits of longer sections of elevated rail is connecting adjacent spaces that are currently divided by rail.



Market - Chee Heng



Community garden - Hamish Collins



Water catchment/environmental corridor - Nicola Inskip



Basketball court - Chee Heng



Cycling, jogging and pedestrian paths - Joshua Stellini



Playground- Xinye Feng



BEFORE



AFTER

ABOVE: Existing line near Cheltenham with proposed path and water catchment/environmental corridor - Nicola Inskip.

BELOW: Proposed community garden, Amirah Aziz



BEFORE



AFTER



BEFORE



AFTER

ABOVE: Narrow Shared Bike Path, Xinye Feng becomes a corridor for commuter cyclists and walkers. BELOW: Proposed public space beneath viaduct within commercial centre, Chee Heng



BEFORE



AFTER



Section through proposal for elevated Cheltenham Station - Nicola Inskip





Multi-purpose cycling, jogging and walking path along viaduct - Joshua Stellini

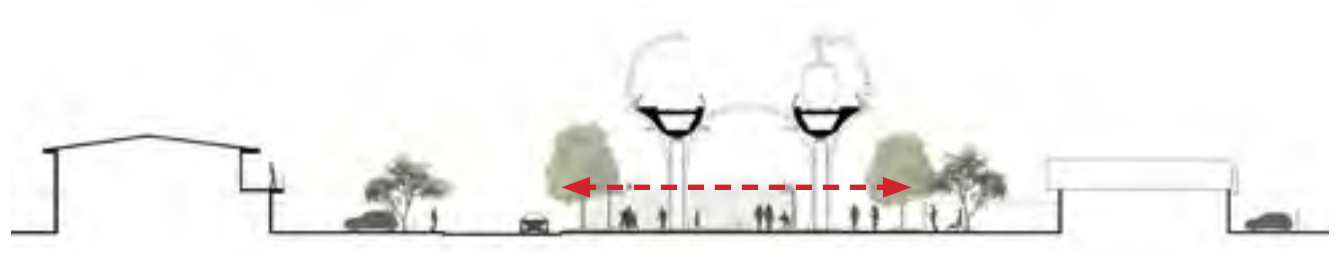
# 02 CONNECTIVITY + ACCESSIBILITY

Removing level crossings with an elevated structure will relieve road congestion around level crossings as well as create an opportunity to consider new road connections.

Furthermore, connectivity for pedestrians and cyclists will be greatly enhanced, as opportunities to safely cross the train line will no longer be limited to infrequent points along the line, but possible anywhere along the unobstructed ground plane. An elevated rail solution will benefit the community far beyond the immediate context of the existing level crossing.

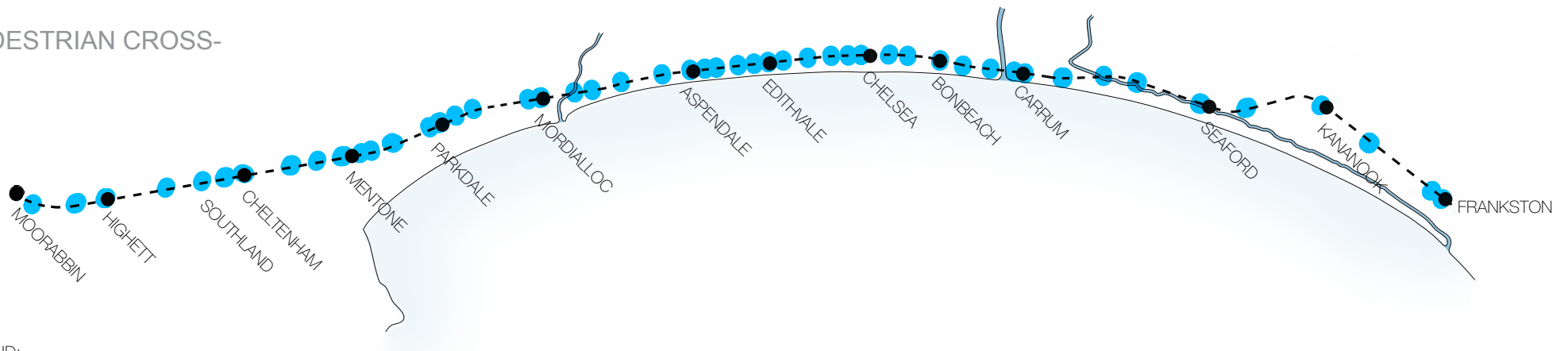
This connectivity will also improve access to the stations themselves, increasing rail patronage, further reducing road congestion.

Accessibility to station platforms, especially for people with mobility issues, heavy luggage, young children etc., is enhanced by including elevators and escalators, ensuring universal access for all.



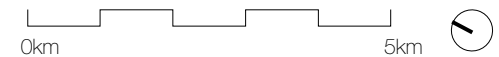
ABOVE: Ground level connectivity under viaduct- Victor Eric Goh

## PEDESTRIAN CROSS-



LEGEND:

- EXISTING STATION
- EXISTING CROSSING POINTS





ABOVE: Proposed Market and Retail space at Cheltenham - Nicola Inskip

BELOW: Level crossing removal using elevated rail at Seaford - Chris Marinopoulos



## Intermodal Transfers

Melbourne's public transport suffers from many places where interchange between different services and modes is difficult. This can be due to long walking distances between different modes, poor visibility and wayfinding, and lack of co-ordinated timetables and low-frequency services.

Level crossing removal creates opportunities to remedy these problems. Elevated rail can create the most effective way to provide more direct access between trains, buses (and trams). For example bus stops can be located directly below railway platforms, or directly adjacent to station entries instead of being positioned down side streets, or well-away from station entries on cross-streets.

Elevated stations can be configured to have two or more entries. This improves accessibility and extends station catchments, enhancing local integration between public transport and land uses. This can allow passengers to do more things using public transport rather than driving.

This strengthens the entire public transport network and will help reduce the growing demand for parking at train stations.



ABOVE: Proposed Chelsea Station bus stops - Joshua Stellini.

BELOW: Cheltenham Station Forecourt with bus stops - Nicola Inskip





Community Garden adjacent to aged care facility- Hamish Collins

# 03 DISRUPTIVENESS + SAFETY

Elevated rail minimises disruption caused both during and after construction. The viaduct can be constructed alongside/above an operational railway in relatively narrow rail corridors where lowering the line would require major shutdowns of rail services and the use of major earthmoving equipment. New elevated rail tracks are far less noisy than existing at-grade rail and crossings, and can be further attenuated where required, along with overlooking through the use of screens and barriers.

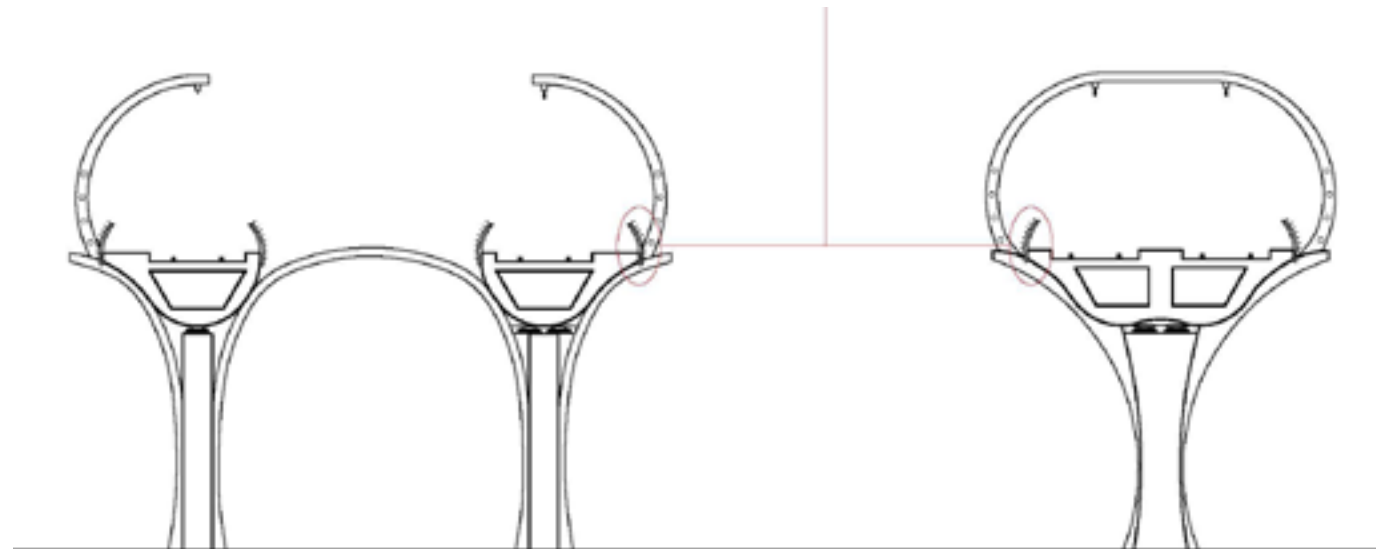
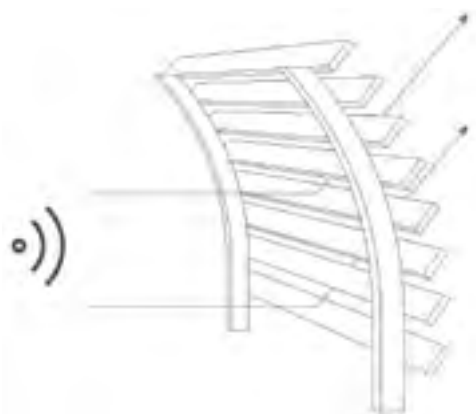
In addition, removal of all level crossings means that safety along the entire corridor is dramatically improved as risks of collisions between trains and cars, cyclists or pedestrians is eliminated. This increased safety along the entire corridor will encourage greater usage of the new spaces, increasing passive surveillance of public space.

These benefits are particularly important along the northern section of the case study area, where the corridor is predominantly narrow (~20m) with many adjacent backyards.



ABOVE: Visual barrier example, before and after - Nicola Inskip.

BELOW: Viaduct Section and sound attenuation barrier detail - Victor Eric Goh.



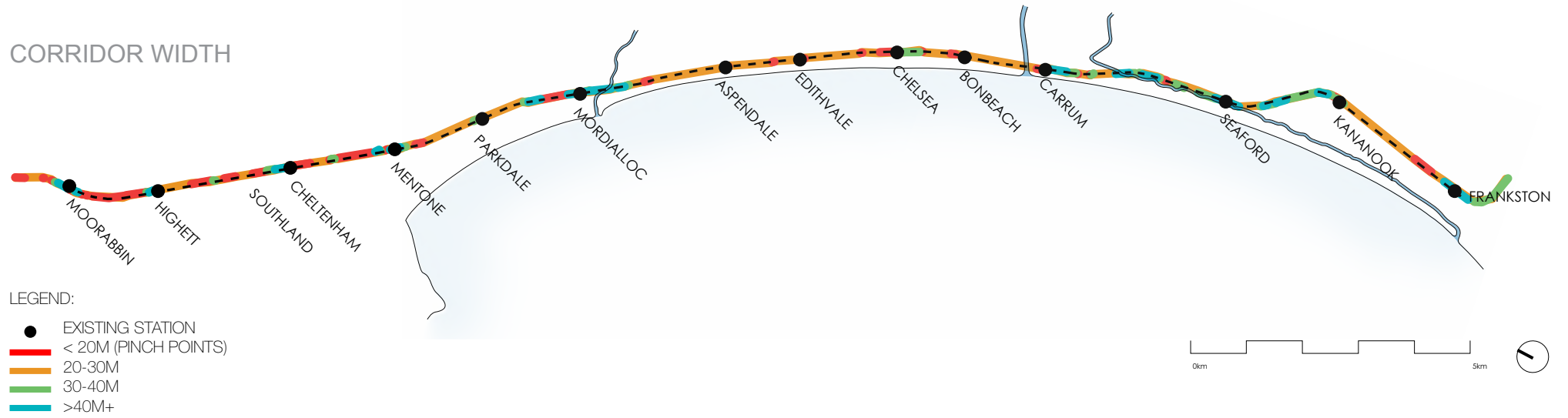
# 03 DISRUPTIVENESS + SAFETY

## CONSTRUCTION SEQUENCE

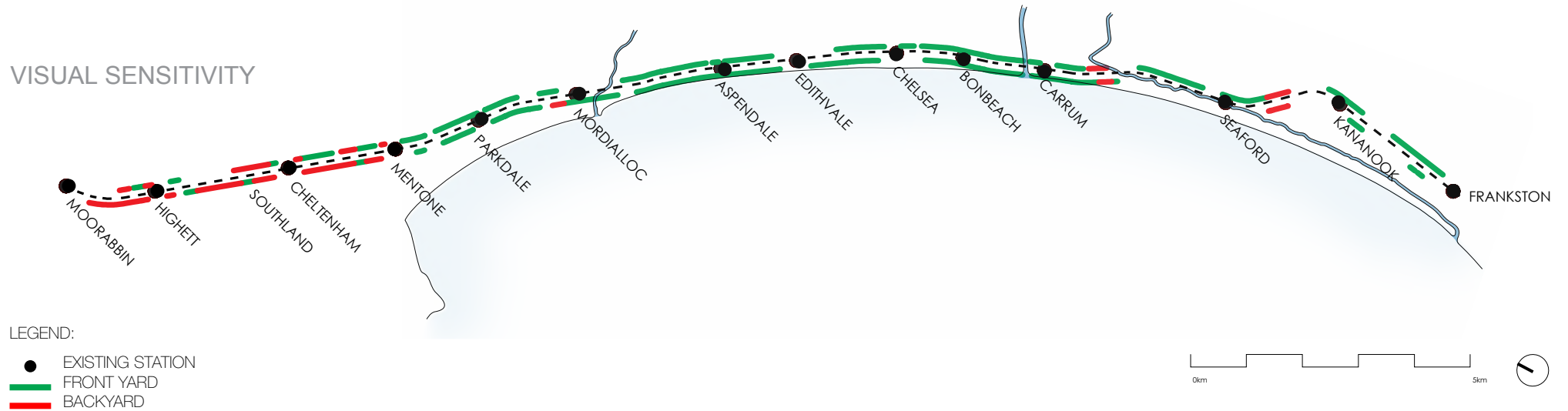


ABOVE: Construction Sequence, Edward Grutzner

## CORRIDOR WIDTH



## VISUAL SENSITIVITY





MENTONE STATION

Integrated retail and commercial space - Edward Grutzner

# 04 ECONOMIC DEVELOPMENT

The integration of retail spaces or other building types at street level is aided by freeing up of space by elevating the rail line. Land uses such as retail, hospitality, commercial and community uses can provide employment and contribute to local economic activity. A particularly good example of this can be seen in Melbourne at Glenferrie Station, which was built in 1918 as part of a corridor grade separation project.

Building below an elevated structure is more financially viable than building over a trenched railway – especially away from the city centre where land values and building heights are lower. By contrast, building over open railway cuttings entails significant structure and increased height to make it financially viable and the profits would be insufficient even so to defray the additional costs of lowering the line, especially in an area with a high watertable.

Furthermore, with elevated rail, development can be easily integrated at a later date, with the space – especially away from the city centre where land values and building heights are lower. By contrast, building over open railway cuttings entails significant structure and increased height to make it financially viable and the profits would be insufficient even so to defray the additional costs of lowering the line, especially in an area with a high watertable.

Examples explored in the studio included supermarkets, open plan office space as well as leasable retail, hospitality light industrial and creative spaces.



ABOVE: Section through Chelsea Station with retail and commercial space - Joshua Stellini

BELOW: Edithvale Station integrated with existing retail - Hamish Collins





BEFORE

Existing Chelsea Station



AFTER

Proposed Chelsea Station - Joshua Stellini



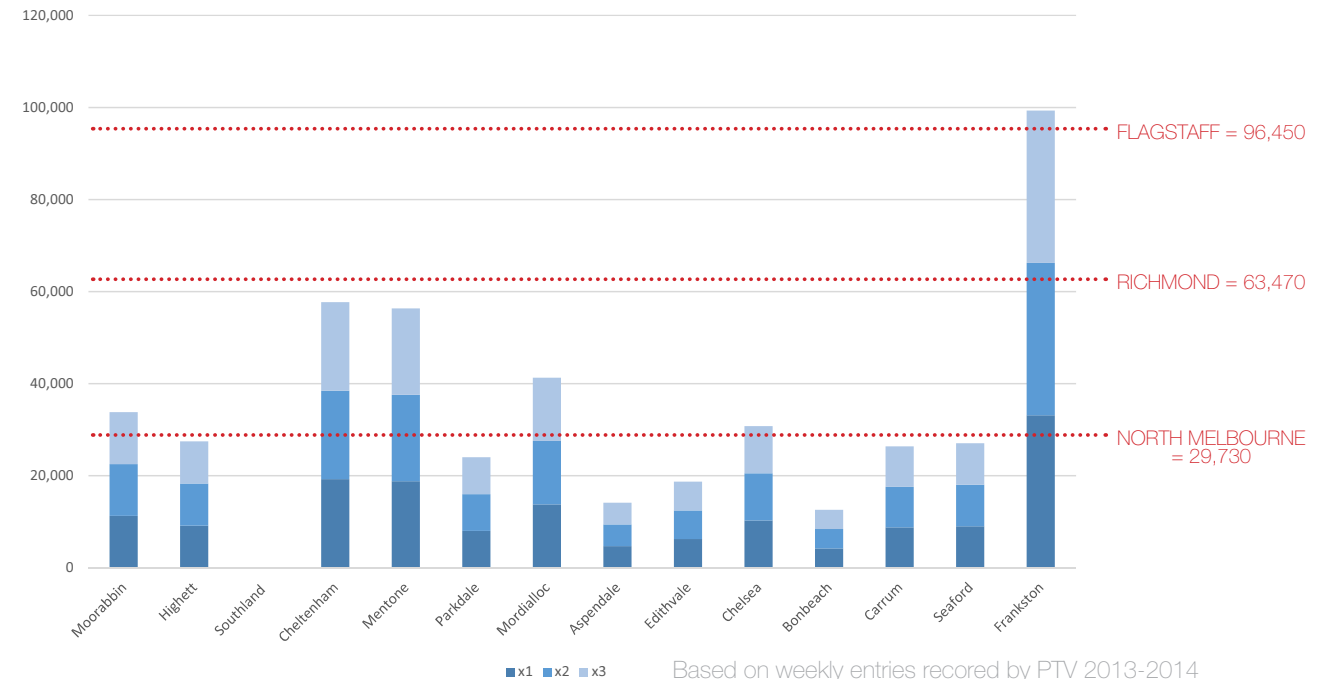
# 05 FUTURE PROOFING

The space created under the railway offers flexibility of use essential to adapting to the future of Melbourne. This is evident in the variety of land uses possible such as open space, retail or community facilities as well as the structure itself. Some other examples included a library, workshops, innovation hubs and business centres.

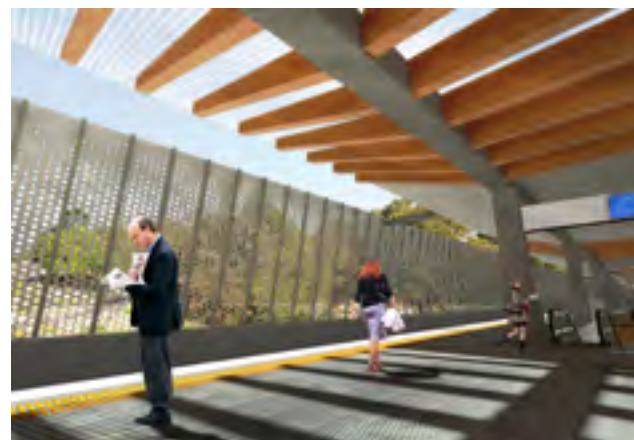
Elevated rail is well suited to meeting the demands of a rapidly growing city, and many of the designs developed included the ability to add additional tracks at a later date – keeping the option of expanding the passenger network or creating a dedicated freight line open. This could be achieved by a modular frame system or by adding a separate viaduct at a later date.

Along the Frankston line some stations, such as Cheltenham and Mentone, are over a century old and at the end of their service life. With elevated rail, it is feasible to build over and preserve such historic buildings while creating transport infrastructure capable of coping with the increased demand for public transport today and well into the future.

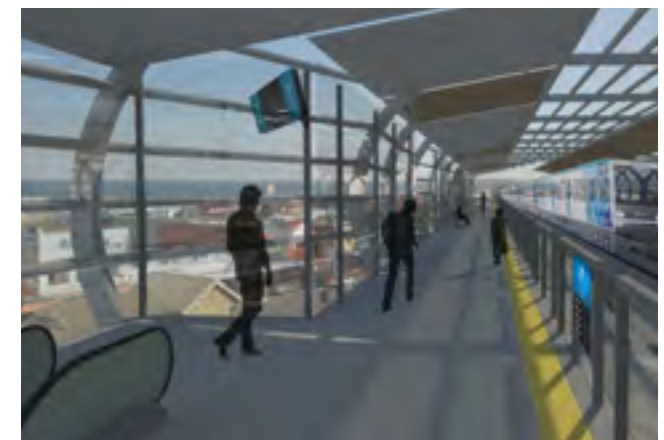
## AVERAGE WEEKLY PATRONAGE PROJECTIONS



Platform view at Bonbeach - Chee Heng

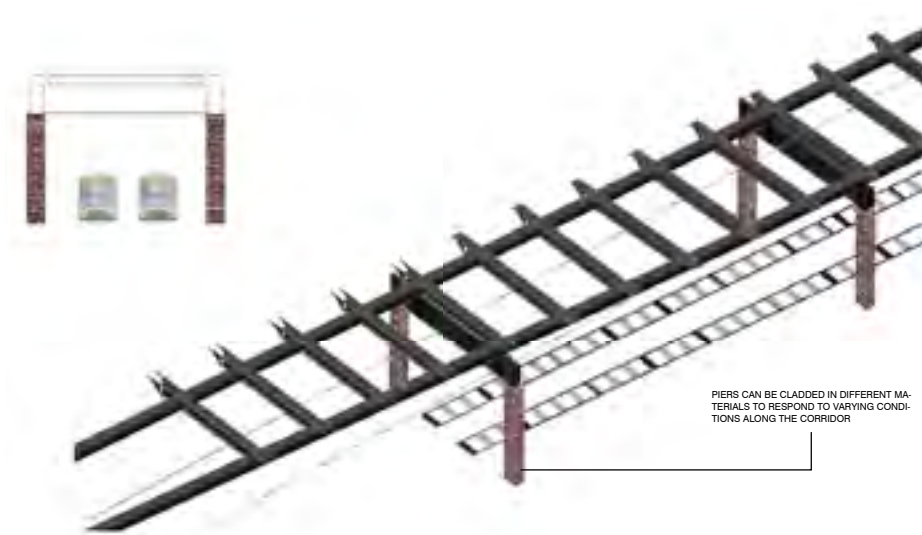


Platform view at Cheltenham - Nicola Inskip



Platform view at Mordialloc - Victor Eric Goh

# 05 FUTURE PROOFING



ABOVE: Modular Frame viaduct - Justine Lenkiewicz

BELOW: Spaces below viaduct - Justine Lenkiewicz





TOP: Proposed Bonbeach Station - Chee Heng

MIDDLE: Proposed Chelsea Station - Joshua Stellini.

BOTTOM: Proposed Station at Southland - Nicola Inskip

Renew  
someone's  
faith in  
mankind.  
Smile at  
them.  
for good.ca

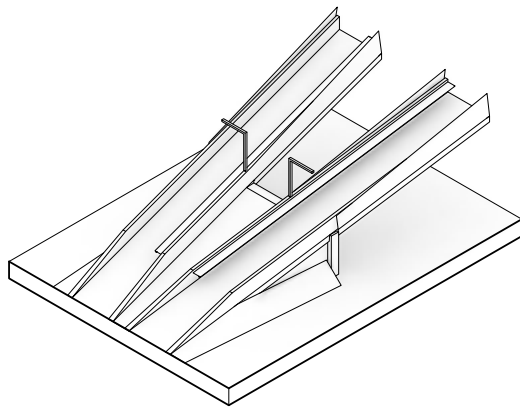


Cheltenham  
PT

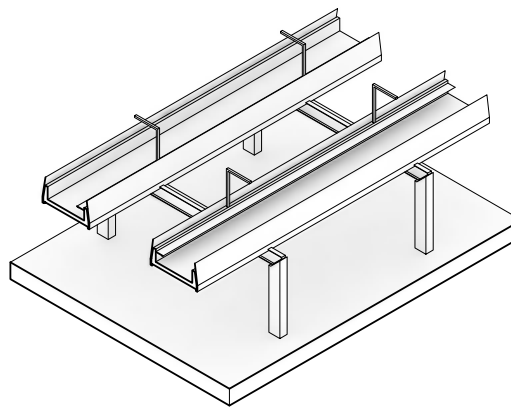


# FRANKSTON LINE DESIGN PROPOSITIONS

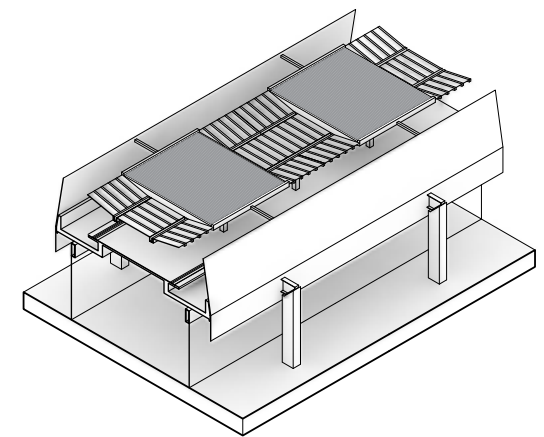
The studio approached the task of exploring elevated rail along the Frankston line by dividing up the case study area and allocating a segment to each student. A unique strategy was developed and applied to each segment, resulting in a continuous elevated proposal. Though each segment varied in size, each student explored how the viaduct ramped up, interacted with the adjacent context and integrated with station facilities. All students therefore explored how things could work as a continuous elevated railway or as a series of rail bridges, with designs for ramps (and abutments) as well as viaducts, pier supports and stations.



RAMP / ABUTMENT



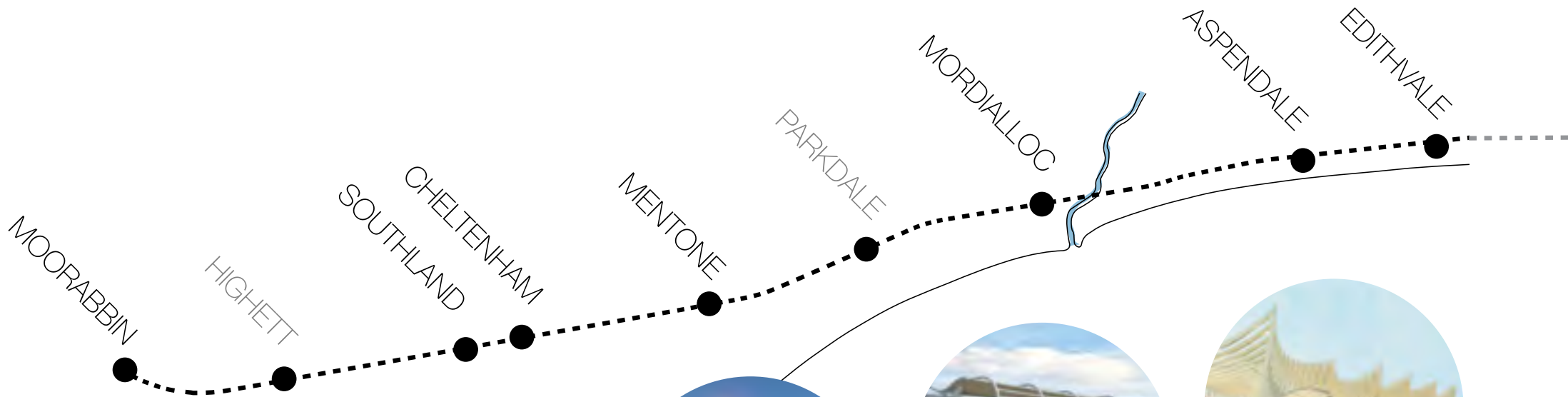
VIADUCT / PIER SUPPORTS



STATION

ABOVE: Viaduct segments - Nicola Inskip  
LEFT: Cheltenham Station Concourse - Nicola Inskip

# NEW STATION DESIGNS



SOUTHLAND  
Nicola Inskip



CHELTENHAM  
Nicola Inskip



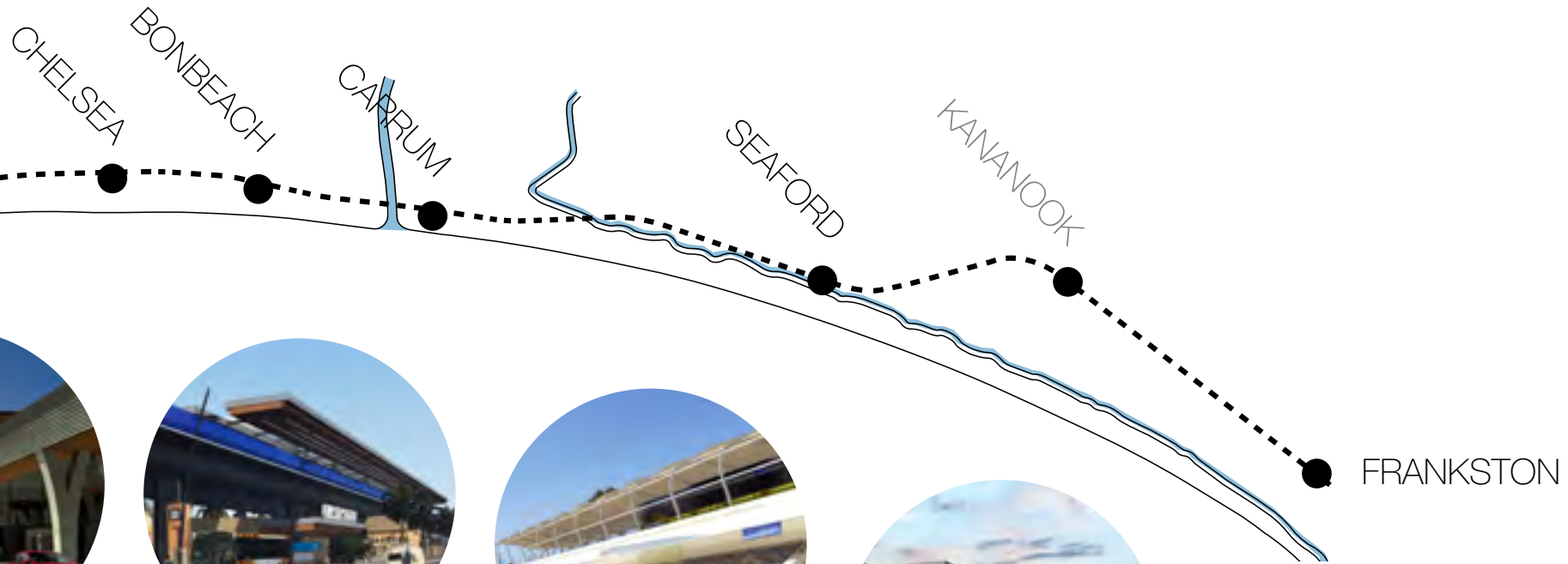
MENTONE  
Edward Grutzner



MORDIALLOC  
Victor Eric Goh



ASPENDALE  
Onon Tam



EDITHVALE  
Hamish Collins



CHELSEA  
Joshua Stellini



BONBEACH  
Chee Heng



CARRUM  
Clinton Oh



SEAFORD  
Christopher Marinopoulos

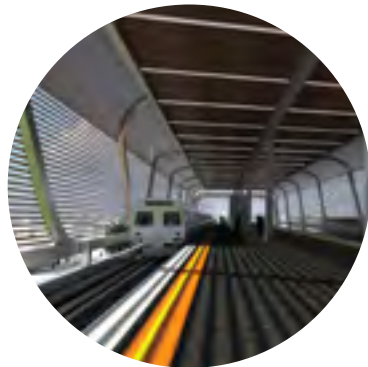
# PLATFORM VIEWS



SOUTHLAND  
Nicola Inskip



CHELTENHAM  
Nicola Inskip



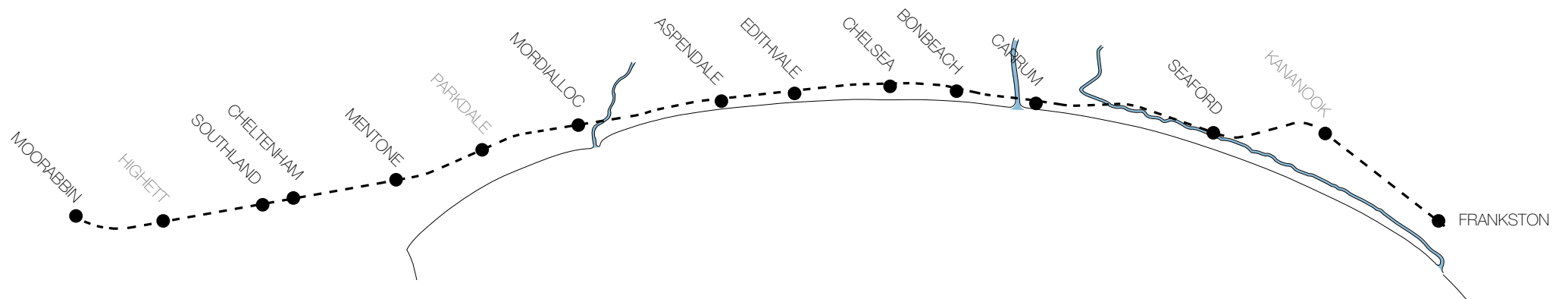
MENTONE  
Edward Grutzner



MORDIALLOC  
Victor Eric Goh



ASCENDALE  
Onon Tam



EDITHVALE  
Hamish Collins



CHELSEA  
Joshua Stellini



BONBEACH  
Chee Heng



CARRUM  
Clinton Oh



SEAFORD  
Christopher Marinopoulos

# PARKS AND OPEN SPACE



SOUTHLAND  
Nicola Inskip



CHELTENHAM  
Nicola Inskip



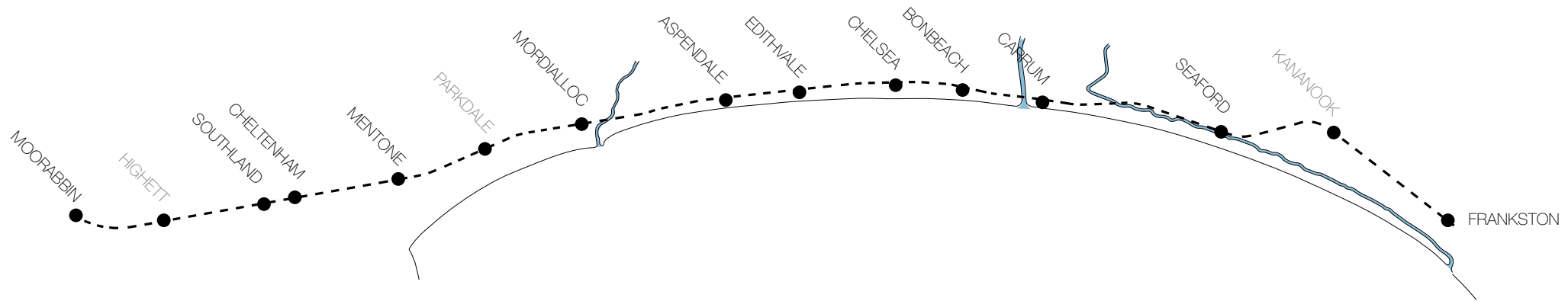
MENTONE  
Edward Grutzner



MORDIALLOC  
Victor Eric Goh



ASPENDALE  
Onon Tam



EDITHVALE  
Hamish Collins



CHELSEA  
Joshua Stellini



BONBEACH  
Chee Heng



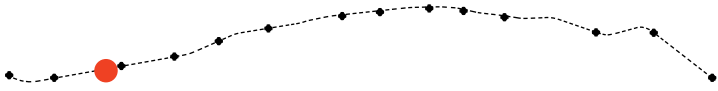
CARRUM  
Clinton Oh



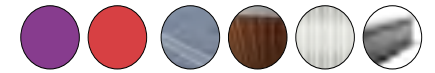
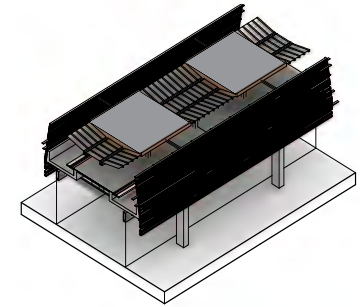
SEAFORD  
Christopher Marinopoulos

# SOUTHLAND

Nicola Inskip



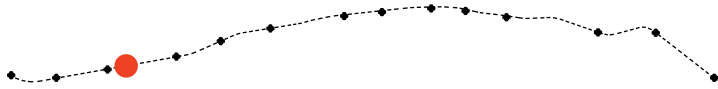
SOUTHLAND MATERIALS SELECTION



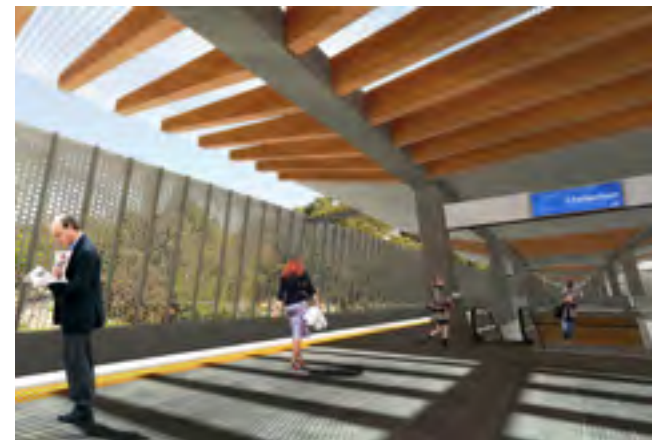


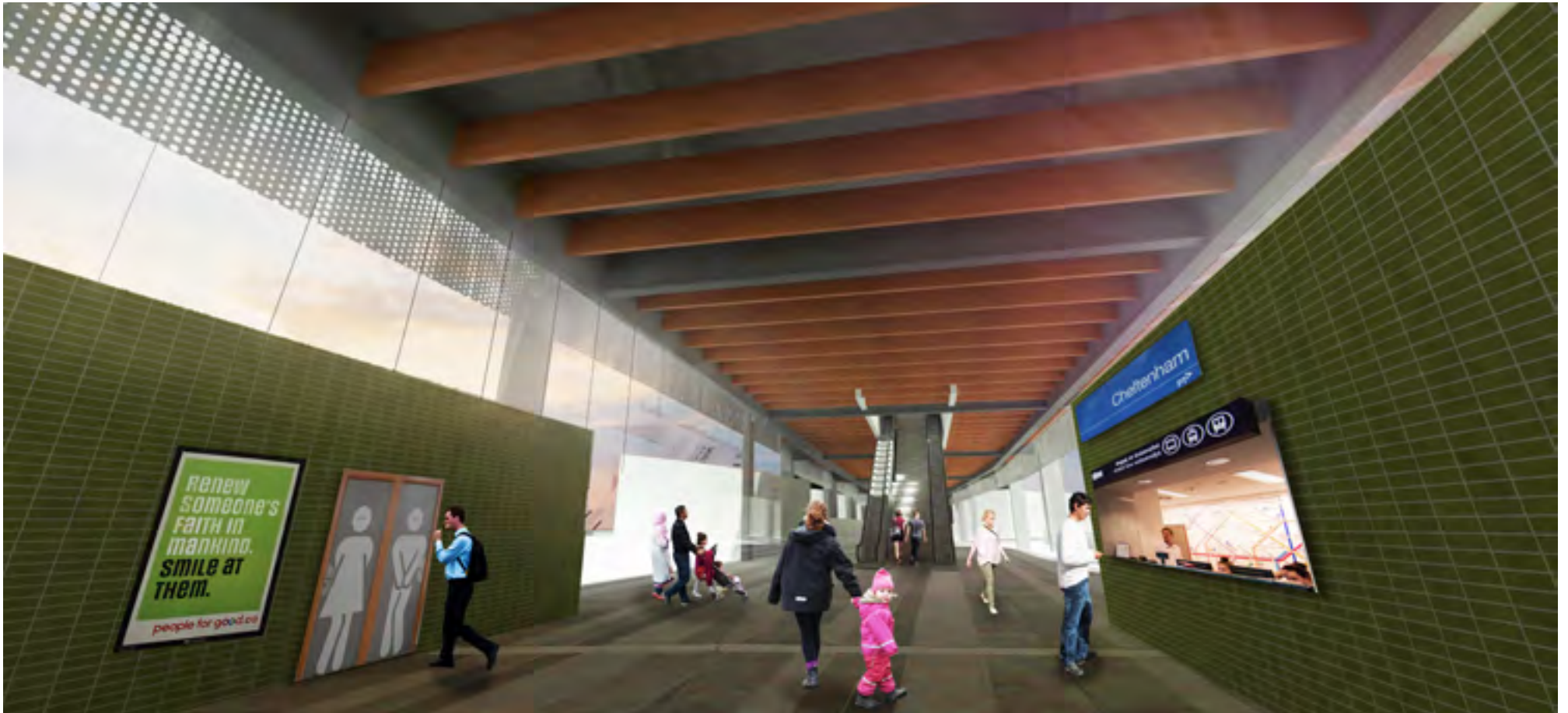
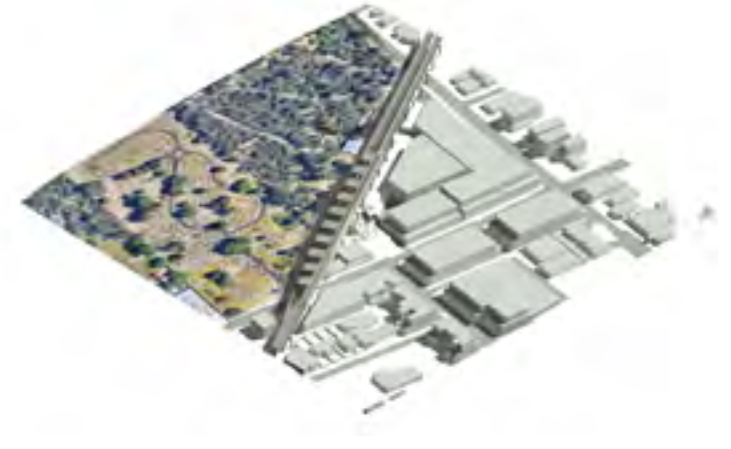
# CHELTENHAM

Nicola Inskip



MANDATED ONLY  
CHARMAN RD | CHELTENHAM





# MENTONE

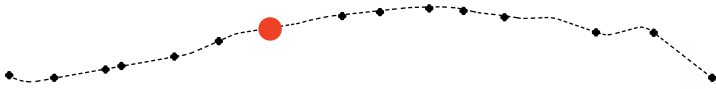
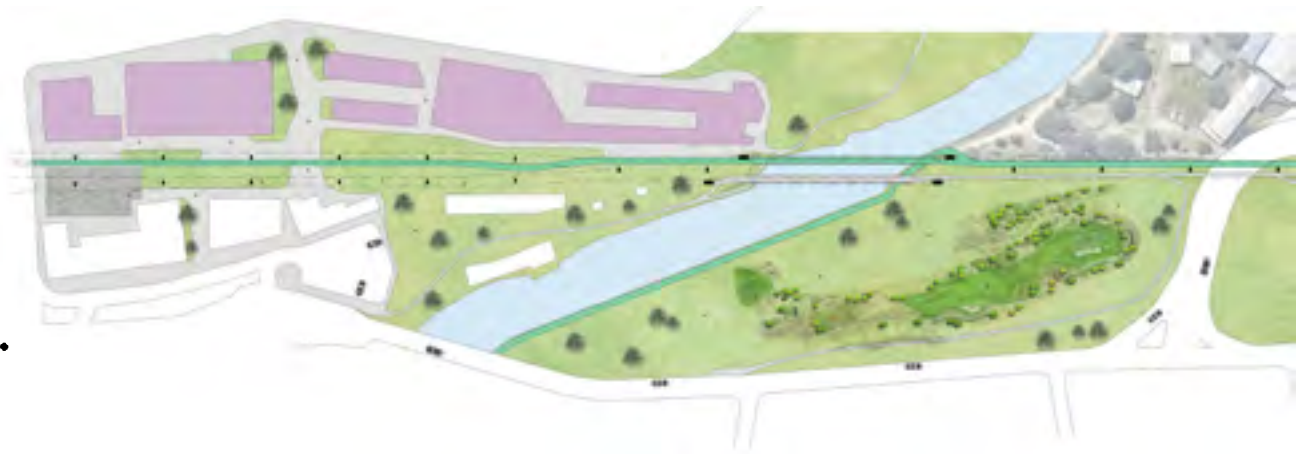
Edward Grutzner

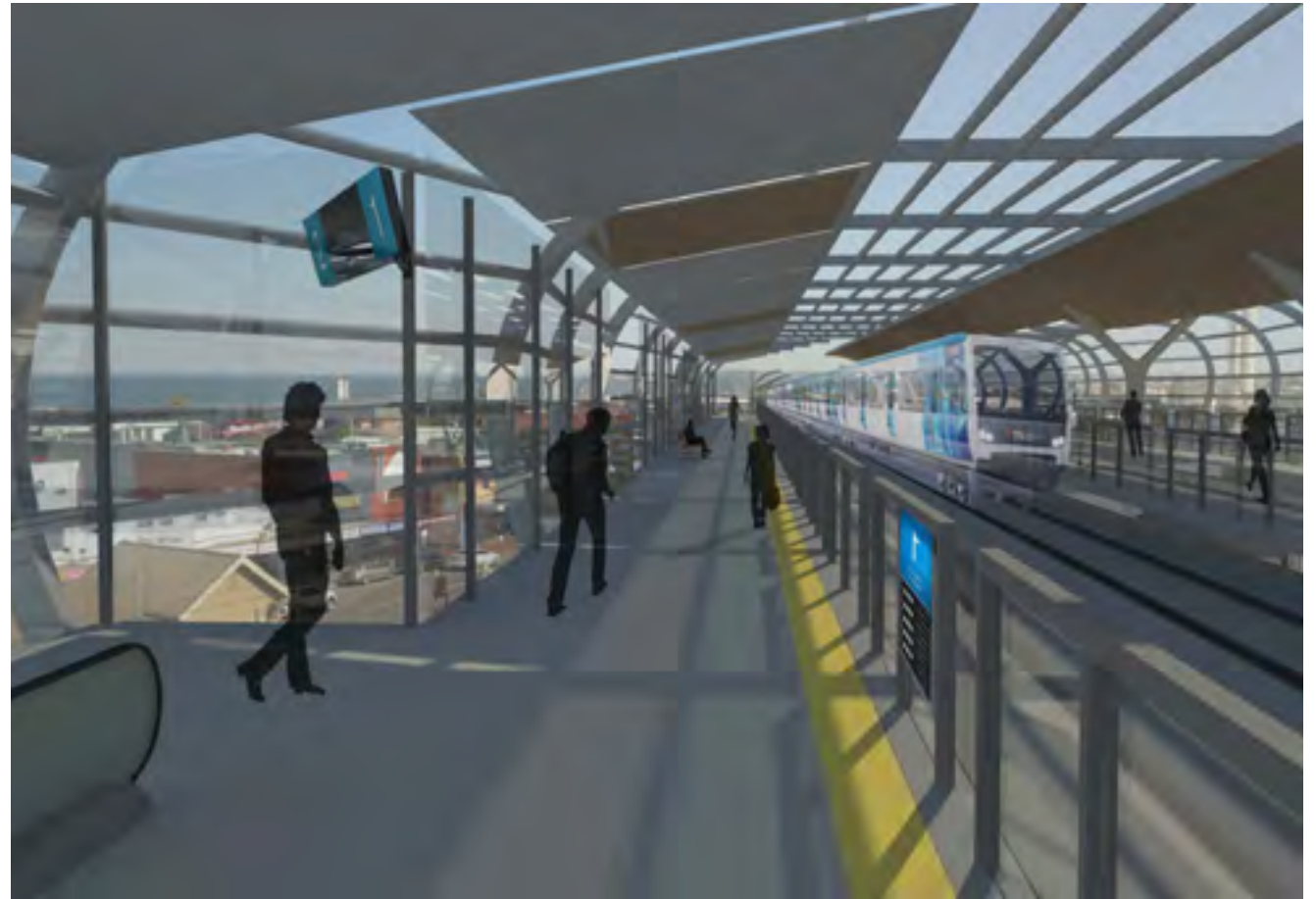
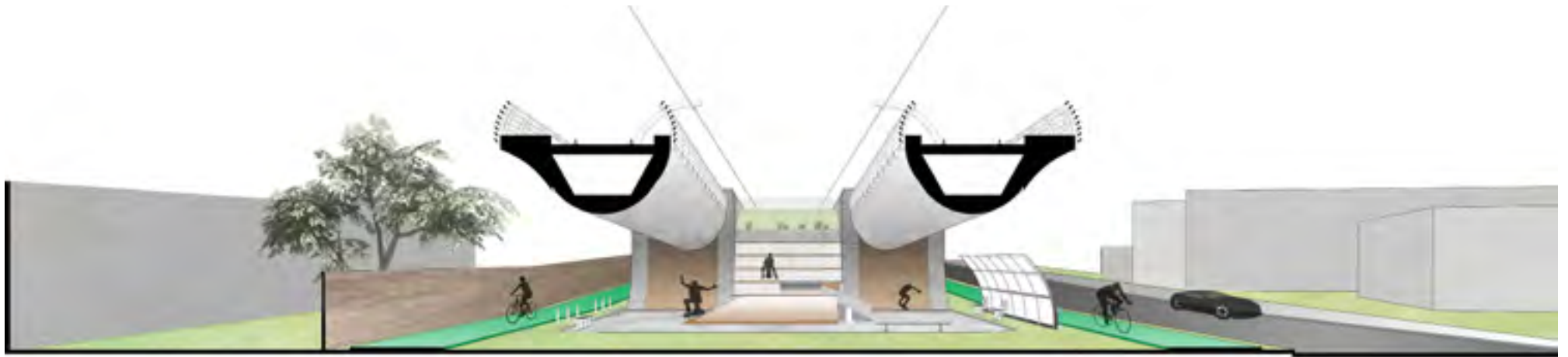




# MORDIALLOC

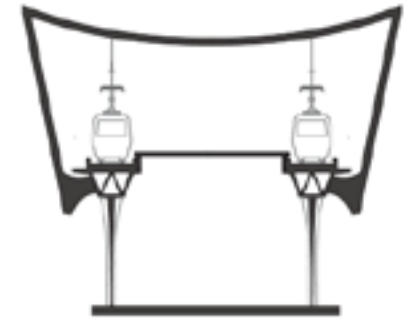
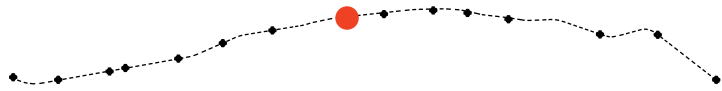
Victor Eric Goh



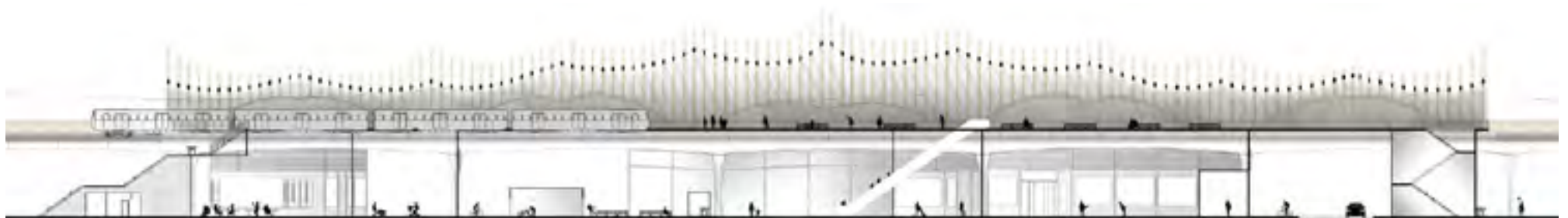


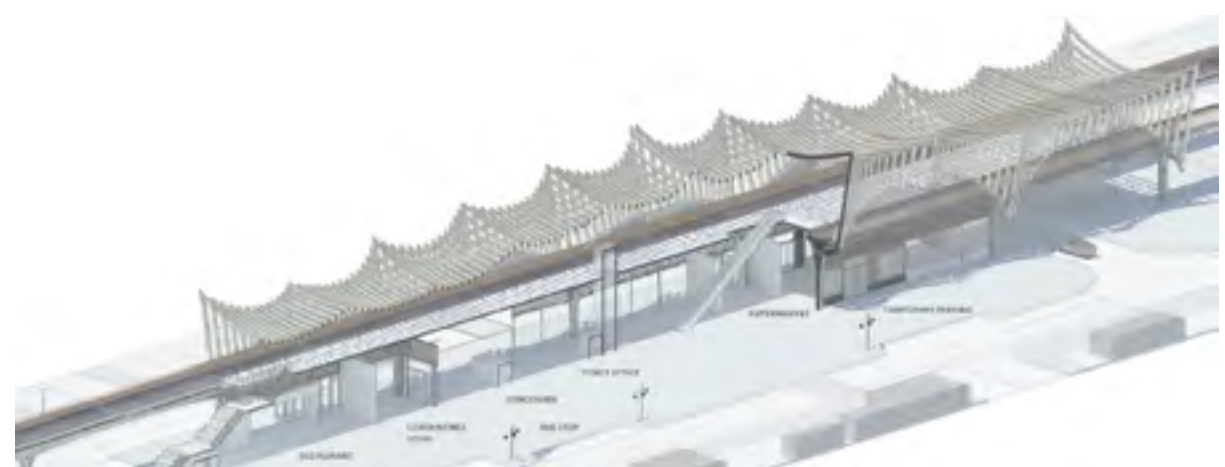
# ASPENDALE

Onon Tam



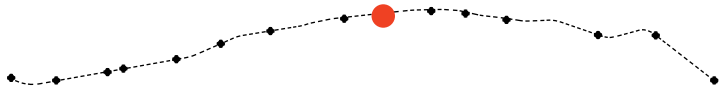
1. STATION PORTAL FRAME CANOPY (WITH PLATFORM)





# EDITHVALE

Hamish Collins

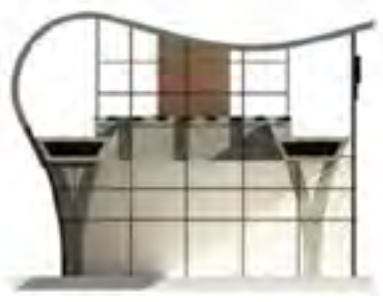




SOUTH ELEVATION 1:500

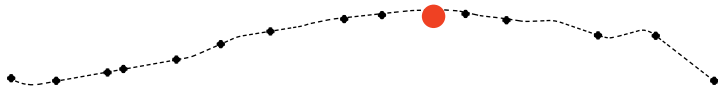


NORTH ELEVATION 1:500

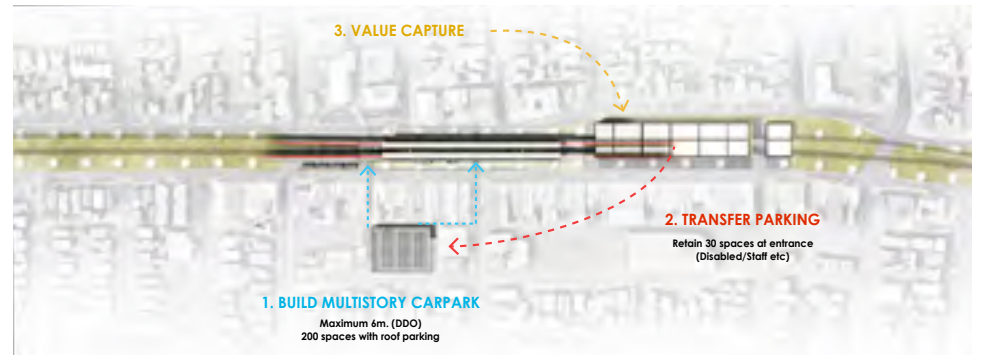


# CHELSEA

Joshua Stellini



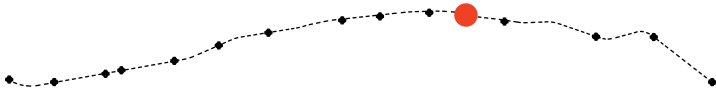
## CARPARK TRANSFER





# BONBEACH

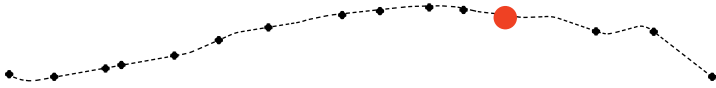
Chee Heng





# CARRUM

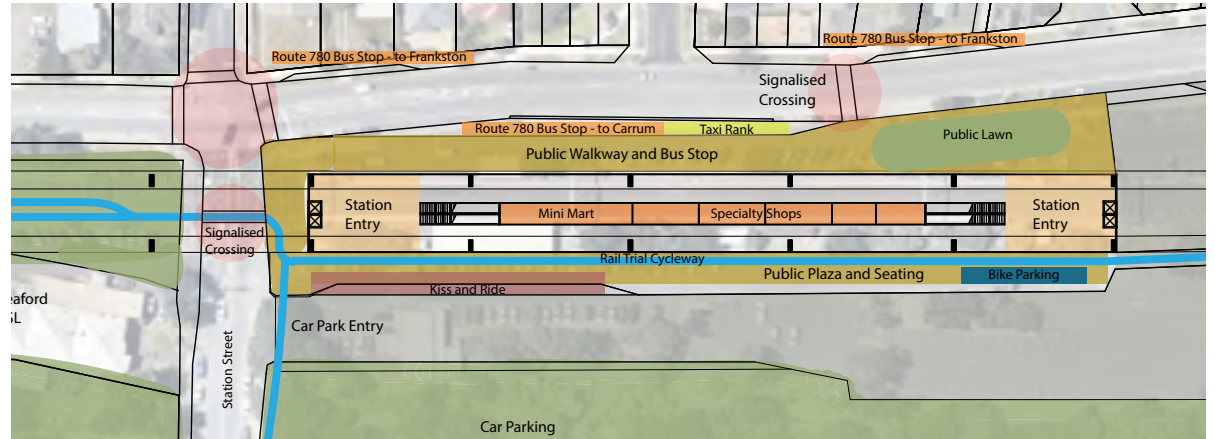
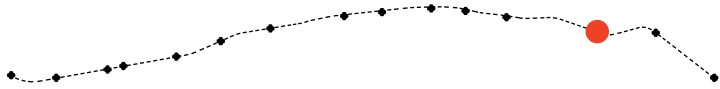
Clinton Oh





# SEAFORD

Christopher Marinopoulos







# CONCLUSION

This booklet has presented an analysis of existing urban conditions and design propositions for elevated rail to remove all level crossings along the Frankston rail corridor south of Moorabbin.

The Victorian State Government has committed to removing 8 crossings from the 26 that currently exist in this rail corridor, leaving 18 that will remain until such time as they are removed in the future.

We have argued elsewhere (Woodcock & Stone 2015) that the prioritisation of level crossing removal should not only be about fixing local road congestion, it should be about enabling improvements to Melbourne's public transport, facilitating access for cyclists and pedestrians, and better integration with land use. We have also argued that, if well done, elevated rail is the preferred mode for removal of level crossings unless rail operations would be negatively impacted.

In other work (Woodcock & Stone 2016; Woodcock 2016; Woodcock & Wollan 2013) we have argued that the benefits of elevated rail over the other cost-effective options for suburban level crossing removals go beyond mere differences of construction cost (which are only modest). These benefits have been further explored in this design investigation of an extended corridor of elevated rail. The benefits of elevated rail are such that the longer the corridor, the greater they become in terms of public open space released and the new public connectivity that is created.

The students' analysis of various scenarios for trenching versus elevating, removing only the 8 mandated crossings versus all 26 clearly show the significant gains in community connectivity with elevated rail. Notably, the only gains with trenched rail are at the crossings themselves.

These findings raise questions of scale and scope in relation to the future. To what degree does Melbourne need to act now, to be able adequately respond to a projected doubling of patronage in future, without the transport network becoming gridlocked?

On the one hand, the mandated 8 crossing removals, if done as elevated rail, would result in a series of rail bridges. While this may minimise visual impact, for the at-grade segments still in place, the corridor would remain divided. There would still be 18 crossings to delay cars, buses, cyclists and pedestrians. With current rail frequencies some may not regard this as much of a problem. However, the proposed future peak frequencies of up to 18 trains per hour are higher than Melbourne's current busiest corridor between Caulfield and Dandenong where level crossing removal has become critical.

As has been noted in this booklet earlier, large scale removal of crossings using elevated rail not only future proofs the railway for substantial service improvements. It also allows the entire public realm between Moorabbin and Frankston to be re-imagined. For most of the corridor, the rail line is flanked by Station St to the east and the Nepean Hwy to the west. Elevating the line in long segments would allow a re-thinking of the entire public realm from boundary to boundary, some 400,000 square metres of new public space reclaimed from underutilised rail reserve.

Here, the amenity of the Bayside could be dramatically transformed. High-frequency, reliable rail services with bay views, improved bus access, continuous safe bike paths, walking trails, new landscaping and plantings, and a variety of active and passive recreation spaces would combine to enhance economic activity and substantially increase local land values.

The transformative potential of integrating public transport and land use through imaginative urban design around elevated rail is evidenced through the explorations by the students' work summarised in this booklet.

Some may find these propositions challenging. After all, it is a long time since elevated rail was built in Melbourne. Yet around the world, from Berlin to Vancouver, cities have been building elevated rail on viaducts with great success. Unlike trenched rail, where communities remain severed from each other and the only way pedestrian connectivity can be increased is with lengthy overpass bridges, elevated rail opens up connections and creates possibilities.

Furthermore, it is worth noting that we are at a moment in time where cities around the world with larger legacies of elevated rail are seeking to make better use of the spaces beneath their viaducts. Many have held international design competitions for ideas to upgrade and activate these extensive public realms. Places such as Vancouver, Miami, Toronto, New York, Berlin and Singapore (to name a few) are coming to similar conclusions as our students about the variety of things that can be done with the enormous public resource of land beneath elevated rail.

It is our hope that the imagination of our students can contribute to the important emerging lively public debate about level crossing removals in Melbourne, and the broader issues of transforming our city into one that is genuinely accessible to all via active and public transport.

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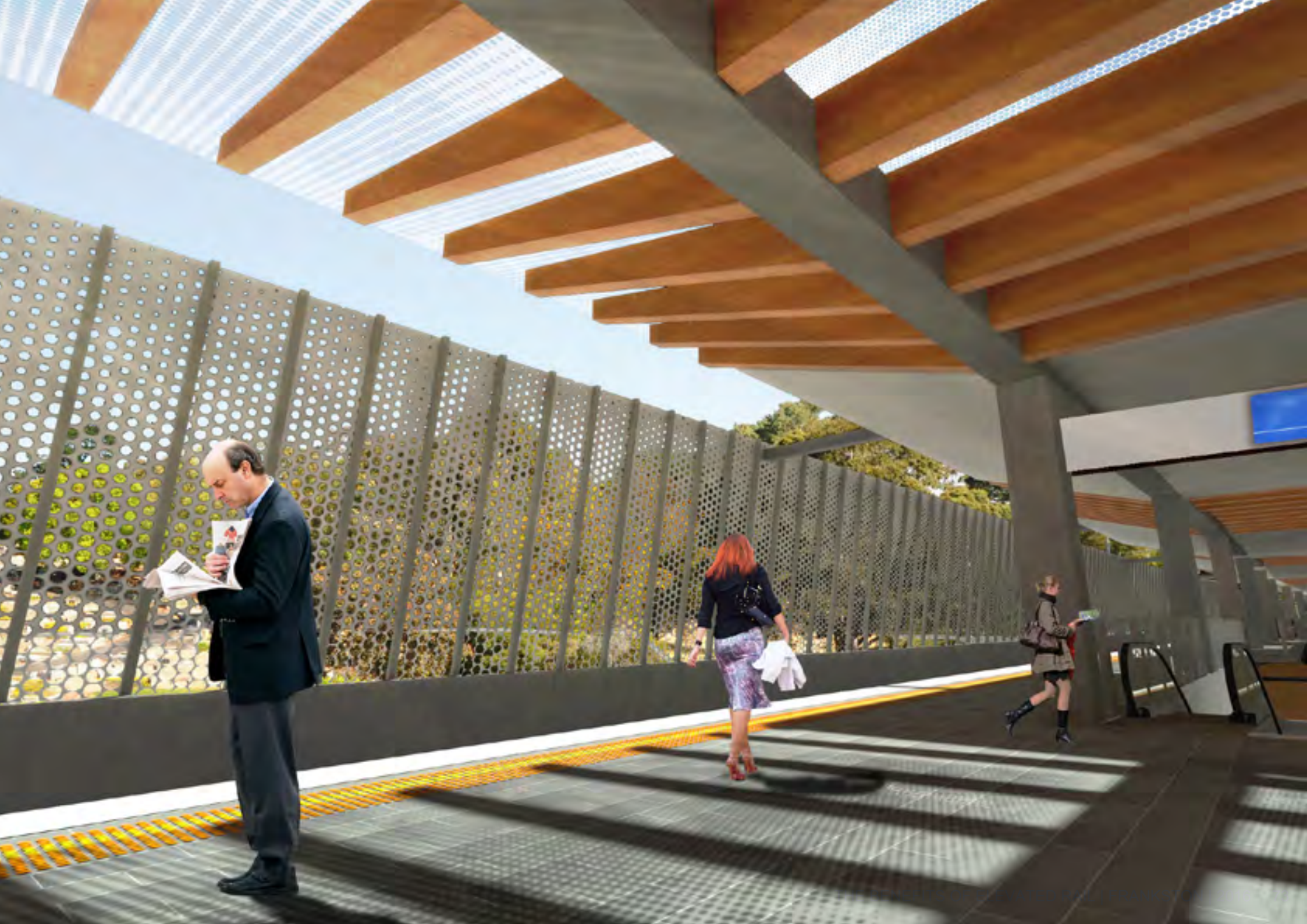
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