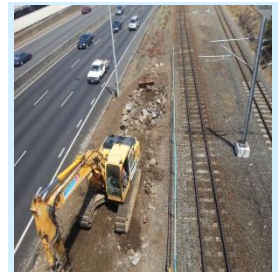




# **Ellerslie** Motorway Widening Project : Construction Management under tight constraints

**Gansen Govender** | Design Manager / Engineers Rep

**Danny Witono** | Engineers Rep Assistant



# AGENDA

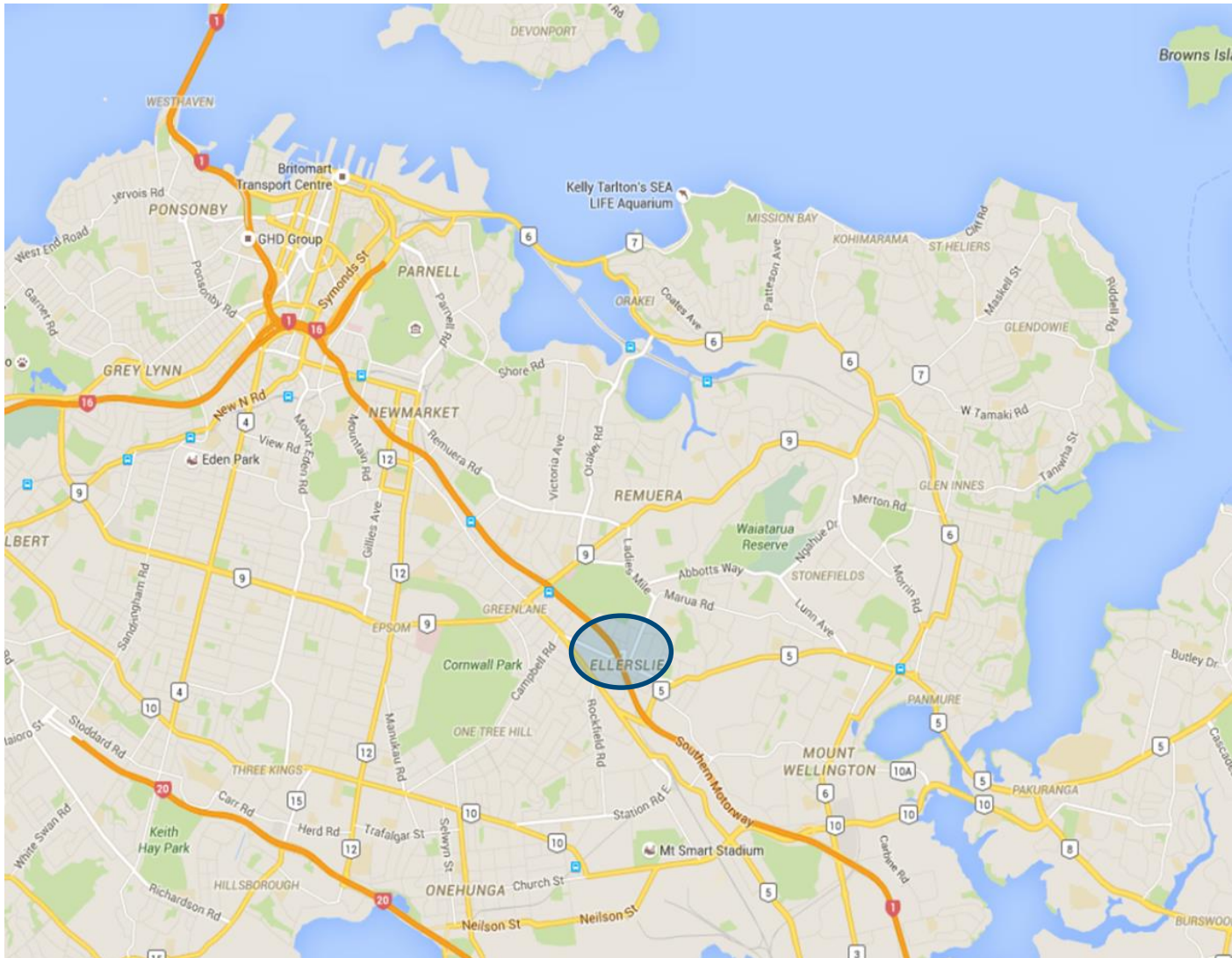
- Project Team
- Location
- Introduction
- Background
- Constraints
- Value Engineering
- Innovation
- Conclusion

# PROJECT TEAM



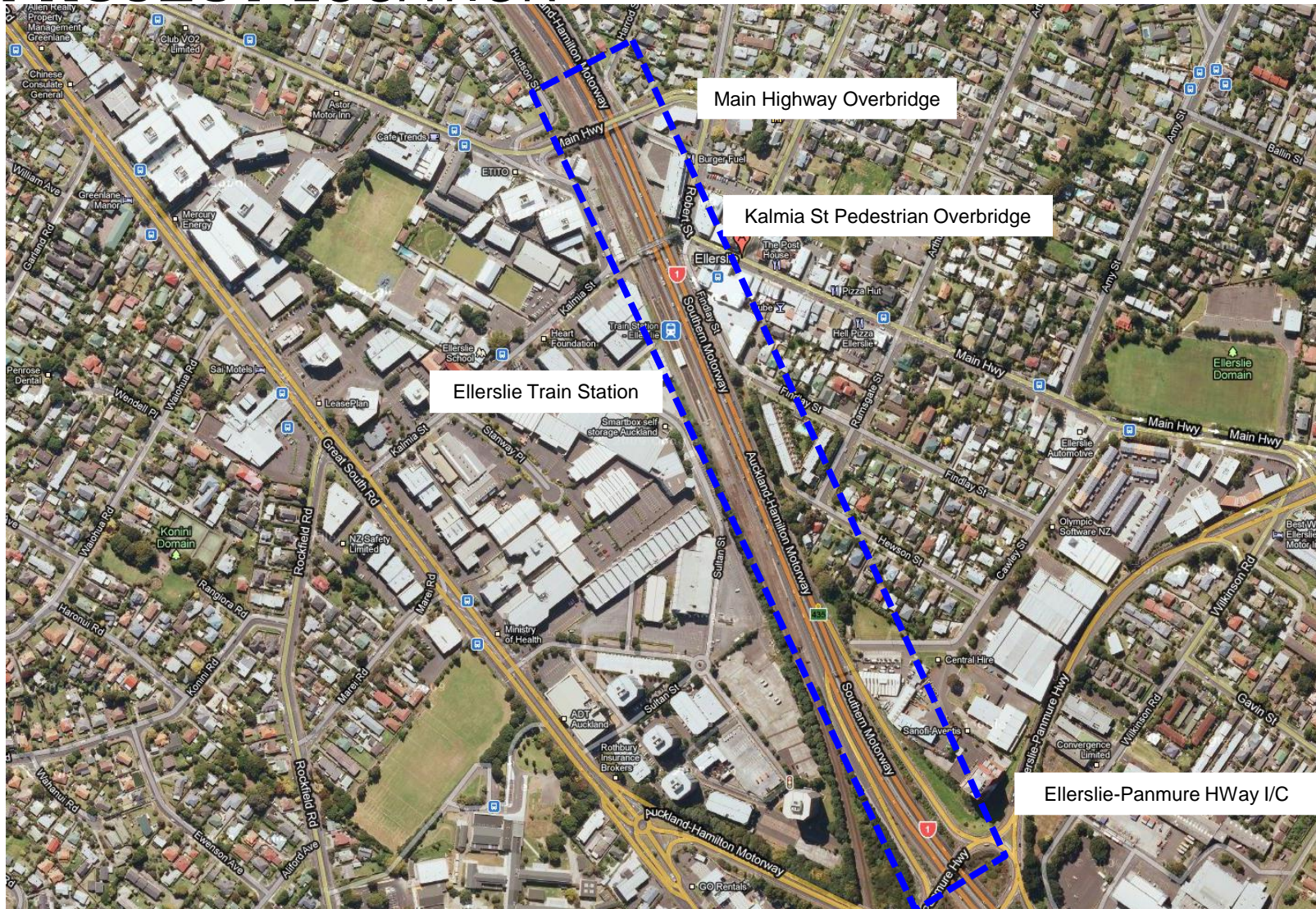


# PROJECT LOCATION





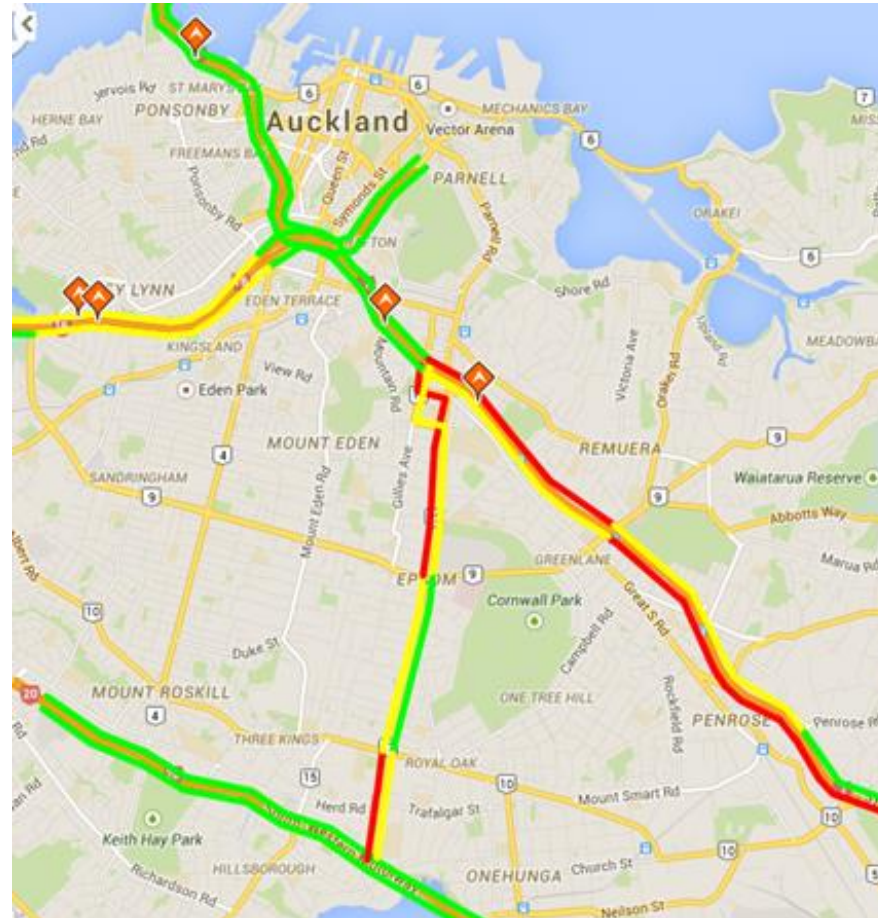
# PROJECT LOCATION





# Introduction – Main Issues

- Congestion on the motorway – traffic volumes increase



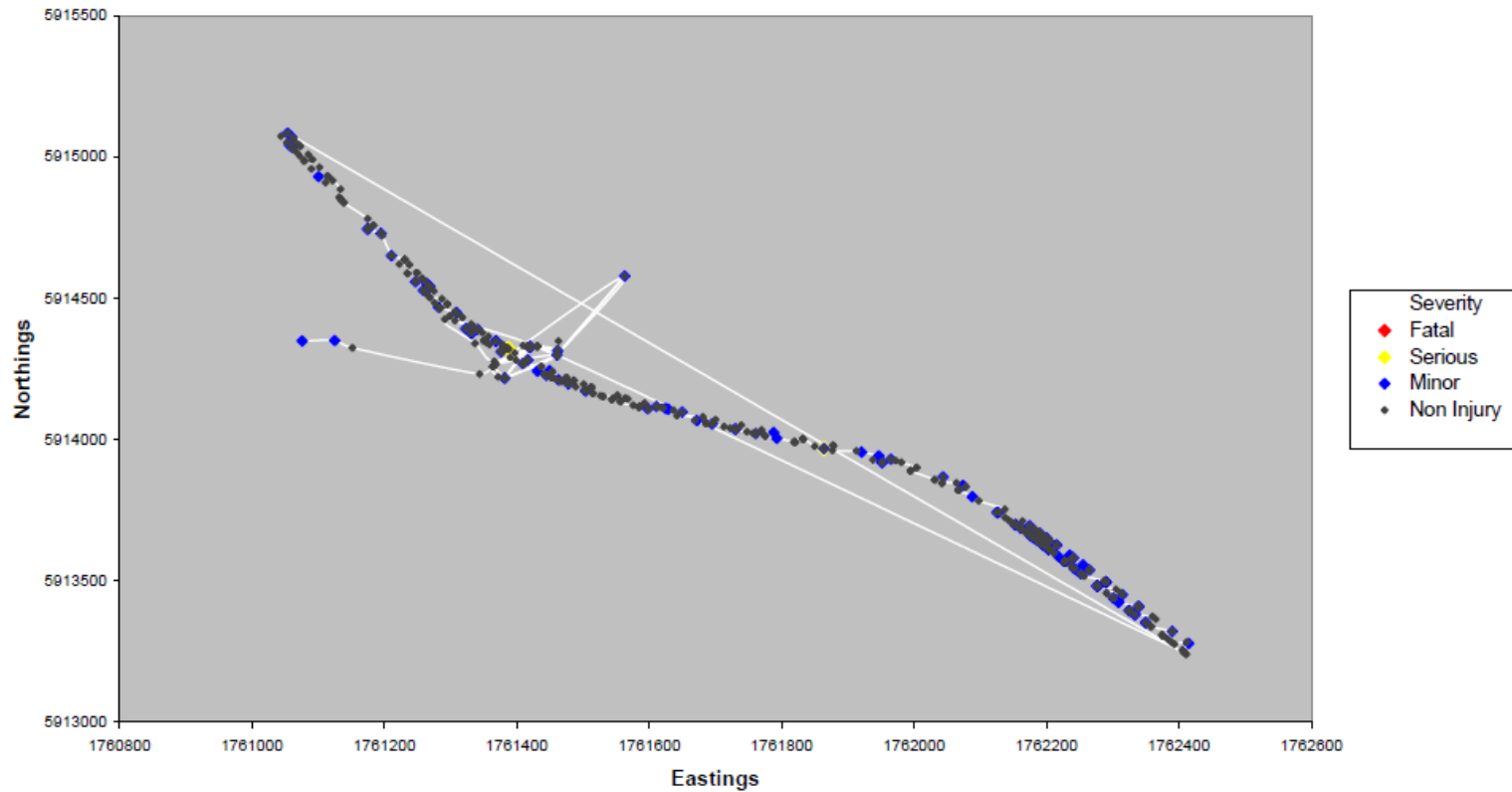
# Introduction – Main Issues

- Short Merging length - Safety Issues on SH1 causes shockwave in traffic downstream



# Introduction – Main Issues

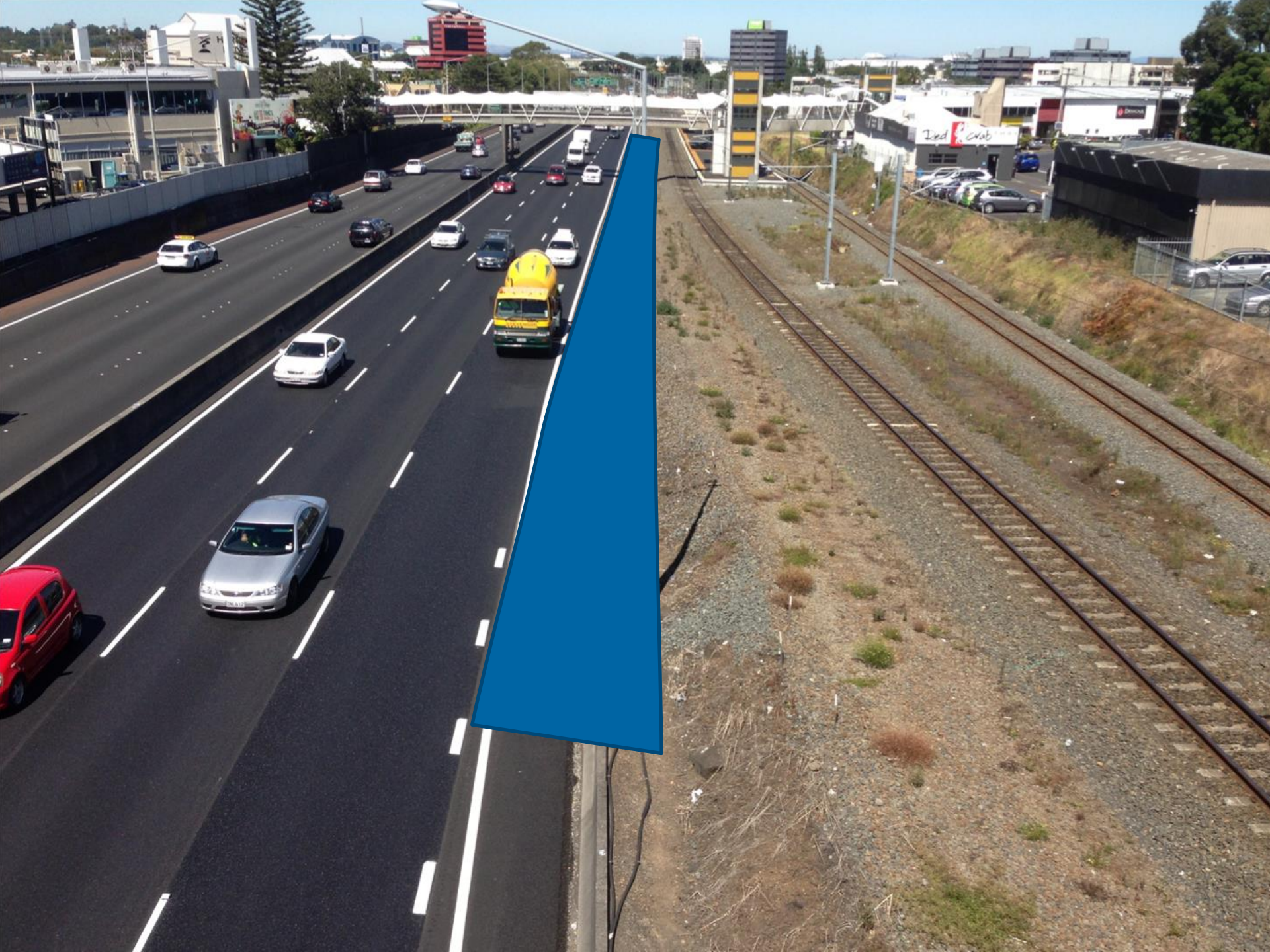
- Crashes on the motorway – nose to tail



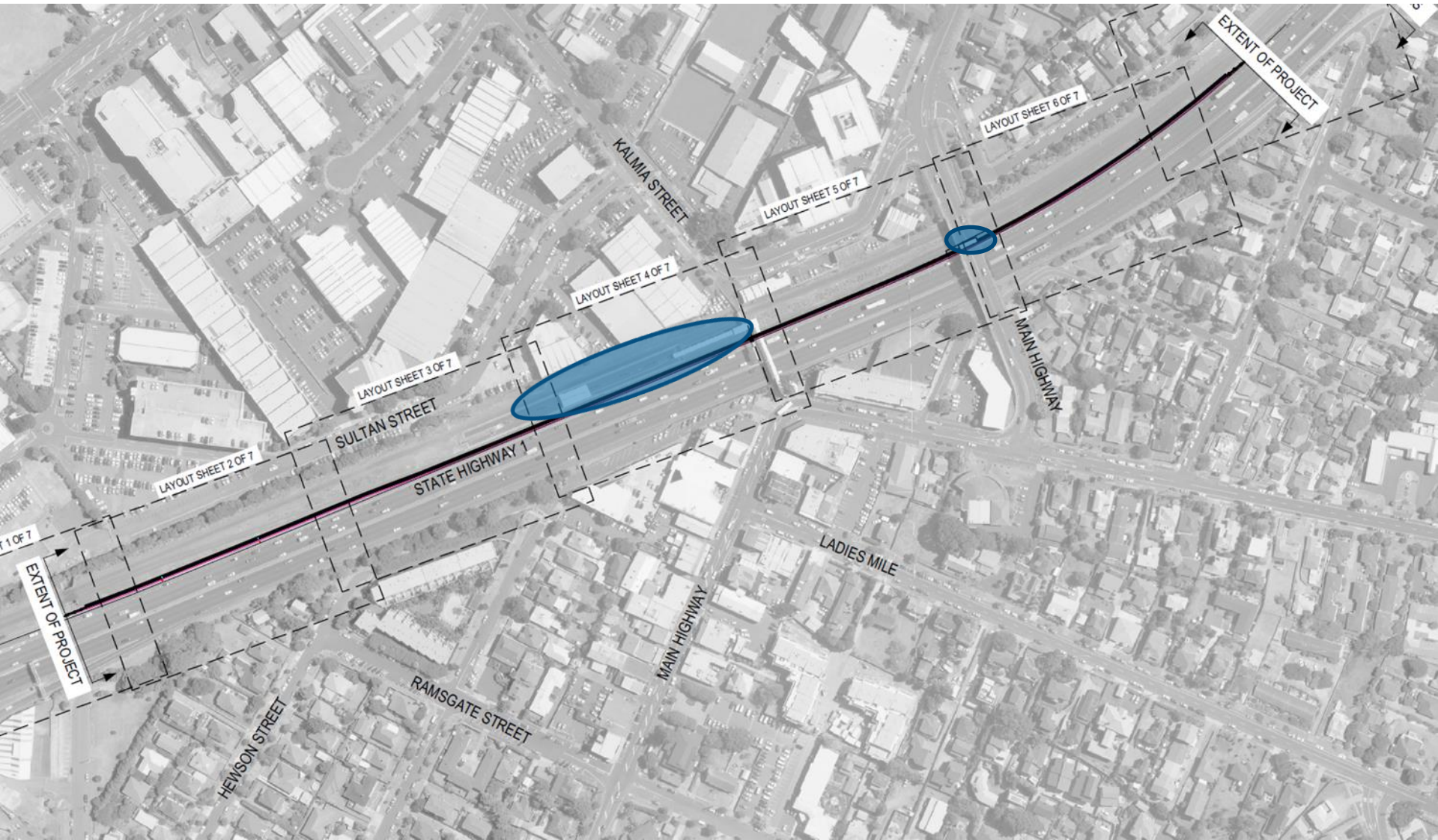


**What are we trying to achieve?**











# BACKGROUND

- NZTA realised that this section was a bottleneck in the network
- Due to the issue with space, NZTA divided the project into 3 stages:
  - Stage 1 Enabling works (Completed)
  - Stage 2 Relocation of the bridge Pier (Completed)
  - Stage 3 Motorway Widening (Under Construction)

# Background

- Stage 1 – Enabling Works – Slew the tracks, narrow and extend the station platform, new canopies , new lift shaft and new footbridge covering



# Background



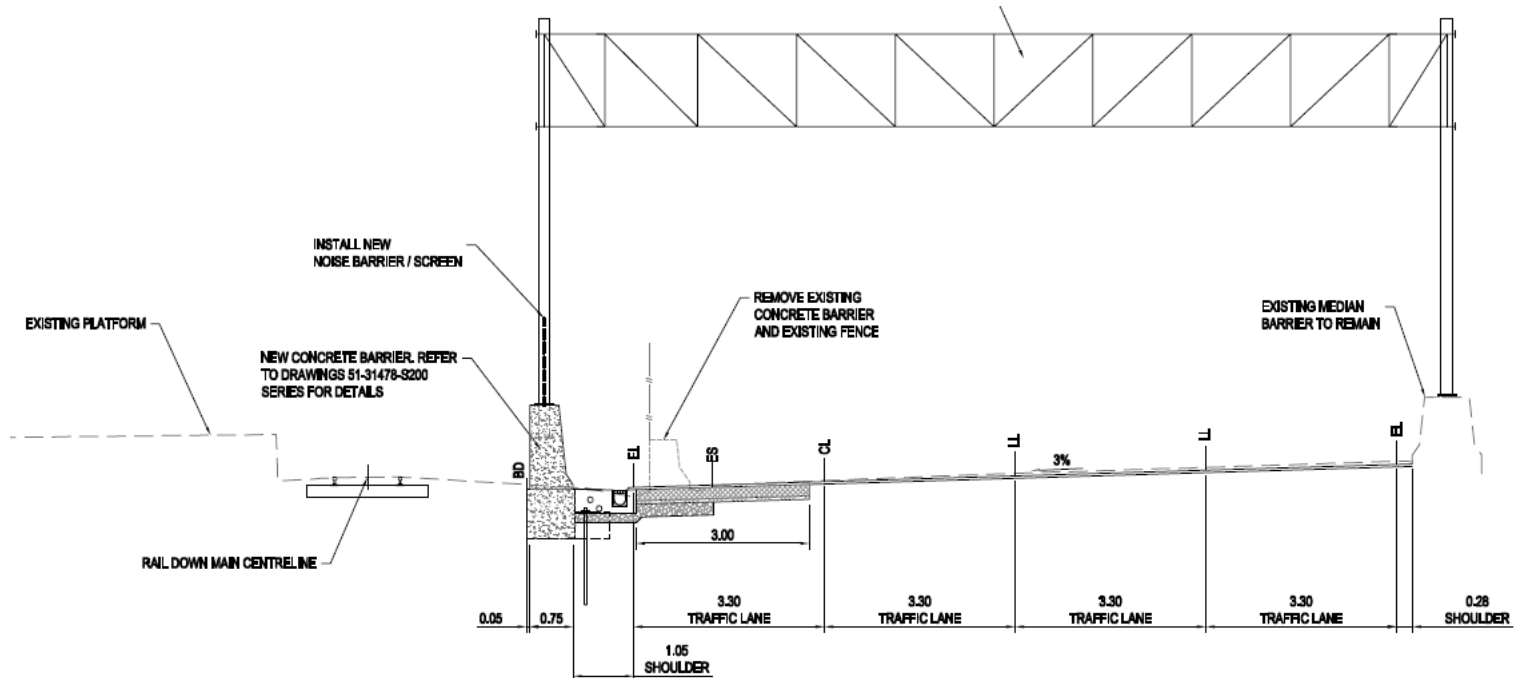
- Stage 2 – Relocation of Main Highway Bridge Pier





# Background

- Stage 3 – Motorway Widening



TYPICAL CROSS SECTION  
AT VMS GANTRY  
SCALE 1:50

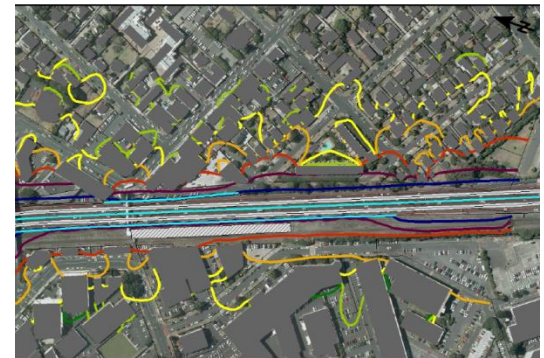
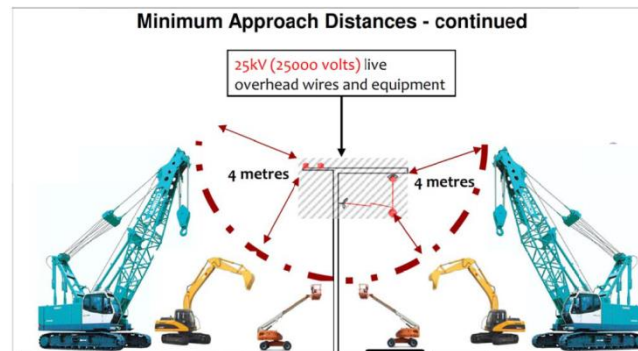
**SO.....WHAT IS DIFFERENT ?**



# CONSTRAINTS

## 3 Main Challenges in the Project Construction

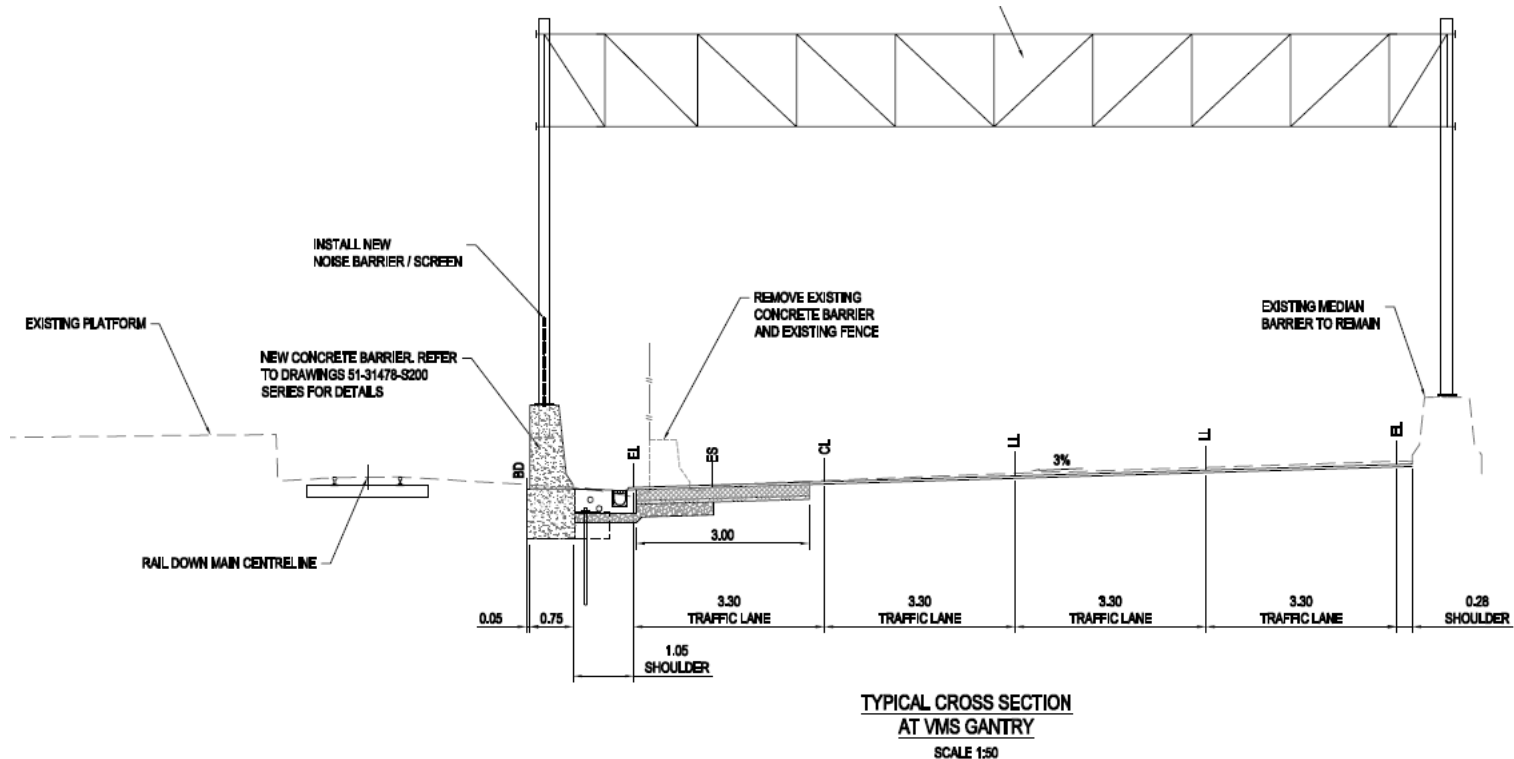
- Physical
- Operational
- Intangible





# Constraints – Setting the scene

- Design Constraints



# CONSTRAINTS

- PHYSICAL
  - Ground Condition – Basalt
  - Construction Space
  - Live 24kV Overhead Lines
  - Busy Operating Motorway
  - KiwiRail Assets



# CONSTRAINTS



- OPERATIONAL
  - Minimum Approach Distance to live wire and rail overhead
  - Rail Protection, ESO's, Isolation and Blocking
  - Night works – work hours
  - Health and Safety – Training, Site Entry card



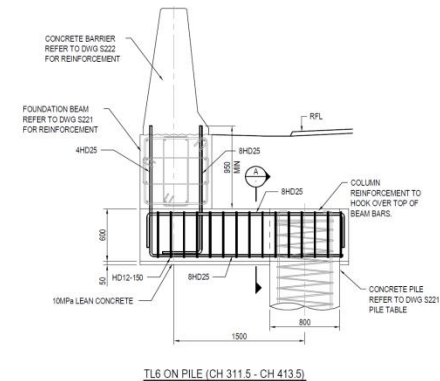
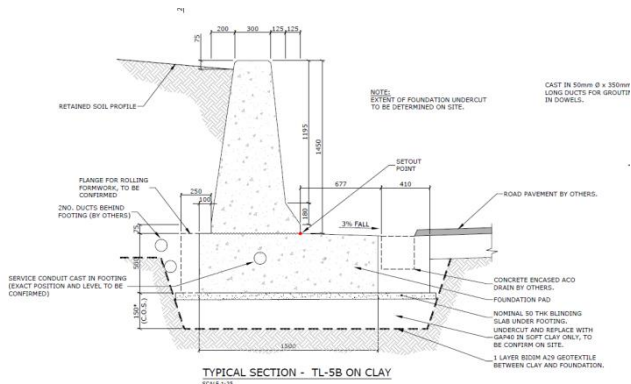
# CONSTRAINTS

- INTANGIBLES
  - Dust and fumes onto motorway
  - Programme (BoL, Night Works)
  - Noise limitations for all work especially at night
  - Stakeholder and motorist perception of increased congestion – large media coverage



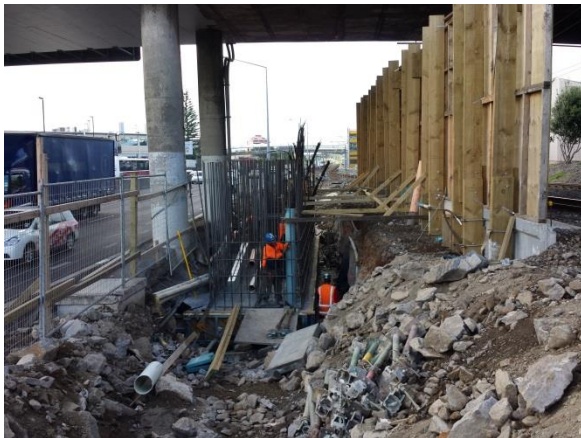
# VALUE ENGINEERING

- Advice on alternative design which reduced the number of piles and mini-piles to be installed and saved approx \$500,000
- Working with the contractor on alternative methodology which allowed continuous operation, not dependant on access from the rail



# INNOVATION

- Narrowing of the lanes on the motorway using orange paint as lane lines (first in) NZ on a project
- Use of TL4 W-Section as temporary barrier – project dispensation due to space limitation. First project to use W-Section on Southern Motorway
- Timber Hoarding





# EVOLVING CONSTRAINTS

- Language barrier – incidents
- Use of buggy for paving – inadequate space



# CONCLUSION

- Two prong attack from the rail corridor and the motorway
- The project team excelled in creating innovation to complete this project within the tight constraints of the project site and external factors
- Through sheer determination, collaboration the additional Auxiliary Lane was opened for use on the 29 January 2016 – ahead of schedule







**“Start by doing what's necessary; then do what's possible; and suddenly you are doing the impossible.”**

**St Francis of Assisi**