

Appendix H

**Grade separation of Railway
Road/Roberts Line – transport
assessment**



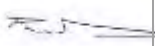
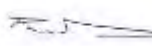

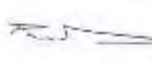
Roberts Line Transport Solutions for the Te Utanganui Masterplan

Palmerston North City Council

19 April 2023

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2							

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Contents

1.	Introduction	1
1.1	Purpose	1
1.2	Scope and limitations	1
2.	Design	2
2.1	Design Parameters	2
2.2	Roberts Line/Richardsons Line	2
2.3	Roberts Line/NIMT/Railway Road	2
2.4	Foodstuffs and PNCC Water Bore	3
2.5	Unexplored Options	3
3.	Goals Achieved?	4

1. Introduction

1.1 Purpose

Palmerston North City Council (PNCC) requested more detail on how transport solutions may work along Roberts Line to preserve as much access flexibility as possible, while considering grade separation at both the Roberts Line / Richardsons Line and the Roberts Line / Railway Road intersections. This flexibility would include (but is not limited to):

- east-west access from the existing North East Industrial Zone (NEIZ) into the KiwiRail hub
- northerly access from the existing NEIZ into the eventual freight ring road
- access for traffic from the north and south (including from the NEIZ extension areas C, D and E) into the KiwiRail hub.

The starting assumptions are that grade separation will be needed at the Railway Road / Roberts Line intersection by 2032, and that a round-about will be an appropriate solution for the Roberts Line / Richardsons Line intersection by 2032. However, over the longer term (2052), it is expected that grade separation may be required at the Roberts Line / Richardsons Line intersection.

The goals of the proposed transport analysis are therefore to:

- accommodate grade separation at the two intersections
- ensure that the shorter-term solution (a round-about) at the Roberts Line / Richardsons Line intersection is cognisant of future upgrades to reduce overall cost and re-work
- preserve as much as possible north-south and east-west connectivity on Roberts Line through the grade separation process, and if possible, to avoid disruption to direct access onto Roberts Line from existing occupants of the NEIZ.

1.2 Scope and limitations

This report has been prepared by GHD for Palmerston North City Council and may only be used and relied on by Palmerston North City Council for the purpose agreed between GHD and Palmerston North City Council as set out in section 1.1 of this report.

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

2. Design

2.1 Design Parameters

Design parameters considered during this preliminary concept design for Roberts Line are:

- From the Waka Kotahi for Bridge design manual, GHD has adopted the minimum clearance of 6.1 metres from the existing road level to the soffit of the proposed bridges. Allowing for concrete Super T bridge construction, GHD has used a bridge surface level of 8.0 metres above road level.
- Michael Than from Railize has advised that there is limited scope for lowering of the NIMT through the Roberts Line intersection, and insufficient to be considered further in this preliminary concept design.
- The existing ground surface used is LIDAR sourced from LINZ.
- From the Waka Kotahi State Highway Geometric Design Manual, the vertical alignment meets minimum standards for 60km/h design speed and 0.2m object height for safe stopping distances.
- Bridge widths provide for two 3.5 metre lanes, two 1.5 metre shoulders and two 0.5 metre wide barriers. The rail overbridge also includes a 3.5 metre shared pathway. The road overbridge does not include a shared pathway.
- Shared path on the western side of Roberts Line at ground level at the road overbridge and round-about.
- Vehicle tracking for heavy commercial vehicles (B-Train).

Drawing SK001 provides an overall view of Roberts Line for a complete project that includes both bridges and the round-about.

2.2 Roberts Line / Richardsons Line

SK003 shows the round-about with the road overbridge at Roberts Line and Richardson Line. A 70 metre long three span bridge will be required for Roberts Line to pass over the round-about. The road overbridge allows vehicles travelling along Roberts Line to pass uninterrupted over the round-about.

Each side of the road overbridge, traffic lanes are provided for vehicles travelling north and south to leave Roberts Line and approach the round-about, and to leave the round-about and enter onto Roberts Line. Each approach to the round-about diverges into 2 lanes allowing for vehicles to continue turning to the left or to the enter the round-about.

Travelling north, from above the centre of the round-about, the level on the road overbridge at 8 metres requires 370 metres for the vertical alignment to return to ground level. A further 180 metres is required to the start of and end of diverge and converge lanes as shown on SK002.

A shared path is provided on the western side of Roberts Line with specific crossing points over roads and under the road overbridge.

Both edges of the approaches to the road overbridge are proposed for construction using near vertical mechanically stabilised earth (MSE) with concrete panel facing to minimise the construction footprint required compared with earth embankments.

2.3 Roberts Line / NIMT / Railway Road

SK005 shows the rail overbridge at Roberts Line and Railway Road/North Island Main Trunk line (NIMT). A 25 metre long single span bridge will be required for Roberts Line to pass over Railway Road and the NIMT.

North of the rail overbridge on each side of the Roberts Line, traffic lanes are provided for vehicles travelling north to leave Roberts Line and approach the round-about, and travel south along Roberts Line to leave the round-about and enter onto Roberts Line.

Travelling south, from the road level at 8 metres on the centre of the rail overbridge requires 425 metres for the vertical alignment to return to ground level, due in part to the lower ground level compared to the level of the NIMT.

A shared path on the western side will be included in the rail overbridge and continue through to the Richardsons Line round-about.

As for the Richardsons Line road overbridge, both edges of the approaches to the rail overbridge are proposed for construction using near vertical mechanically stabilised earth (MSE) with concrete panel facing to minimise the construction footprint required compared with earth embankments.

To meet design parameters for vertical alignment between the road and rail overbridges results in the level of Roberts Line between the two bridges being 4 metres above the ground level as shown on SK020.

A rail underpass has not been considered at this point but the description of proposed work above would apply equally to a rail underpass below ground rather than above ground.

2.4 Foodstuffs and Water Bore Access

SK004 and SK005 show that in providing the rail overbridge and exit and entry lanes onto Roberts Line, the proposed work will encroach into Foodstuffs property to the west and border the water bore property to the east.

With near vertical MSE walls and the complete project being 4 metres above the ground level between the overbridges, access to the Foodstuffs site from Roberts Line would no longer be possible. This may require Foodstuffs to be reconfigured so that access was through the NEIZ or from Richardsons Line. Access to the water bore would require on the east side of Roberts Line an additional road or service lane from the Richardsons Line round-about, or access via the KiwiRail hub.

To provide a connection for Railway Road south of Roberts Line in both directions to Roberts Line north of the NIMT would require an additional lane to the west and east. The west lane would further encroach into Foodstuffs property. The east lane would have to travel around the east side of the PNCC water bore. The Rail overbridge would also increase in length to maintain a south bound lane for Railway Road. This does not provide access for Railway Road south of Roberts Line to Roberts Line south of the NIMT.

SK001 shows Railway Road ending south of Roberts Line with a cul-de-sac and access to the Foodstuffs staff carpark.

2.5 Unexplored Options

A rail underpass at Roberts Line / NIMT / Railway Road nor a road underpass at Roberts Line / Richardsons Line have been considered at this point beyond the following comment:

- Costs could be expected to be similar to overbridges.
- MSE walls would be replaced with retaining walls. Fill embankments would be replaced with excavation.
- Bridges lengths for underpasses could possibly be shorter than bridges for over bridges.
- Likely groundwater levels would require permanent pumping infrastructure to remove stormwater runoff from any rainfall event.
- Roberts Line, Richardsons Line and Railway Road would remain at the existing ground level so potential to maintain Roberts Line / Railway Road connection in both directions. There would still be encroachment into Foodstuffs requiring reconfiguration of their building and operations.

A multi-plate tunnel for the NIMT from south of and past Roberts Line has not been considered at this point beyond the following comment:

- Costs for a longer multi plate arch could be similar to the shorter bridge for the rail overbridge.
- Potential to maintain Roberts Line / Railway Road connection in both directions with a signalised intersection above the multi-plate arch.
- There would still be encroachment into Foodstuffs requiring reconfiguration of their building and operations. There would likely be encroachment into properties at 279 and 283 Railway land, DKSH and bare land respectively.

3. Goals Achieved?

Have the goals of this proposed transport analysis been achieved?

- *To accommodate grade separation at the two intersections.*

The preliminary concept designs show that overbridges at the NIMT / Railway Road and Richardsons Line can be accommodated but will result in Foodstuffs losing their access on to Roberts Line and encroachment onto their property. Significant reconfiguring of the Foodstuffs site and building and operations would be required.

- *To ensure that the shorter-term solution (a round-about) at the Roberts Line / Richardsons Line intersection is cognisant of future upgrades to reduce overall cost and re-work.*

The short-term solution would be to construct the NIMT rail over bridge and the Richardsons Line round-about with side lanes as shown, leaving a planted strip between the side lanes north and south of the round-about to accommodate the long-term solution of the Richardsons Line overbridge.

- *Preserve as much as possible north-south and east-west connectivity on Roberts Line through the grade separation process, and if possible, to avoid disruption to direct access onto Roberts Line from existing occupants of the NEIZ.*

The NIMT overbridge will remove Foodstuffs access to Roberts Line and encroachment into their property will require significant reconfiguration of their property. The NIMT rail overbridge will also remove the connection between Railway Road south of Roberts Line. This will require an alternative route for Railway Road traffic through the NEIZ, possibly through the undeveloped land between the Foodstuffs and Progressive sites, onto Richardsons Line and further onto Roberts Line and the rail hub.

4. Attachments

Drawings (7) SK001 – SK005, SK020 – SK021



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MERGING AND DIVERGING LANES
REFER SK002

ROBERTS LINE

RICHARDSONS LINE

TIE INTO ENTRANCE OF RICHARDSONS LINE
AND FUTURE RAIL HUB

ELONGATED ROUNDABOUT
REFER SK003

RAILWAY ROAD

MERGING AND DIVERGING LANES
REFER SK004

RAILWAY BRIDGE
REFER SK005

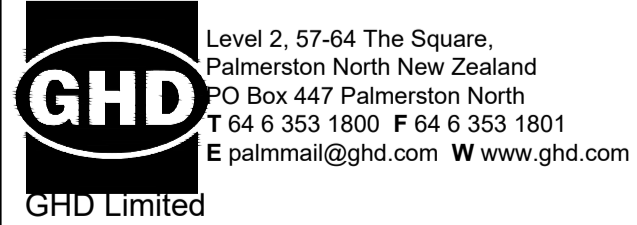
TERMINATION OF RAILWAY ROAD
USING CUL-DE-SAC.
ACCESS MAINTAINED TO FOODSTUFFS SHOWN

RICHARDSONS LINE

ROBERTS LINE

TIE IN FOR END OF RAMP.
REFER SK005

Rev	Description	Checked	Approved	Date
A	CONCEPT			20/02/23
Author	C. O'DONNELL	Drafting Check		
Designer	S. DOIDGE	Design Check		

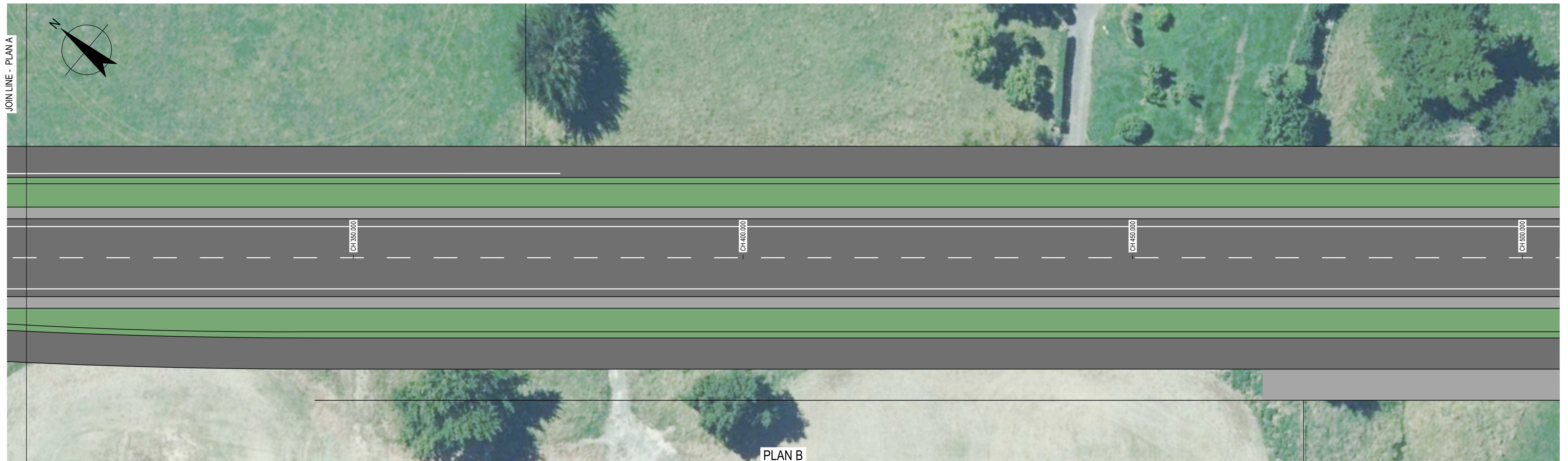
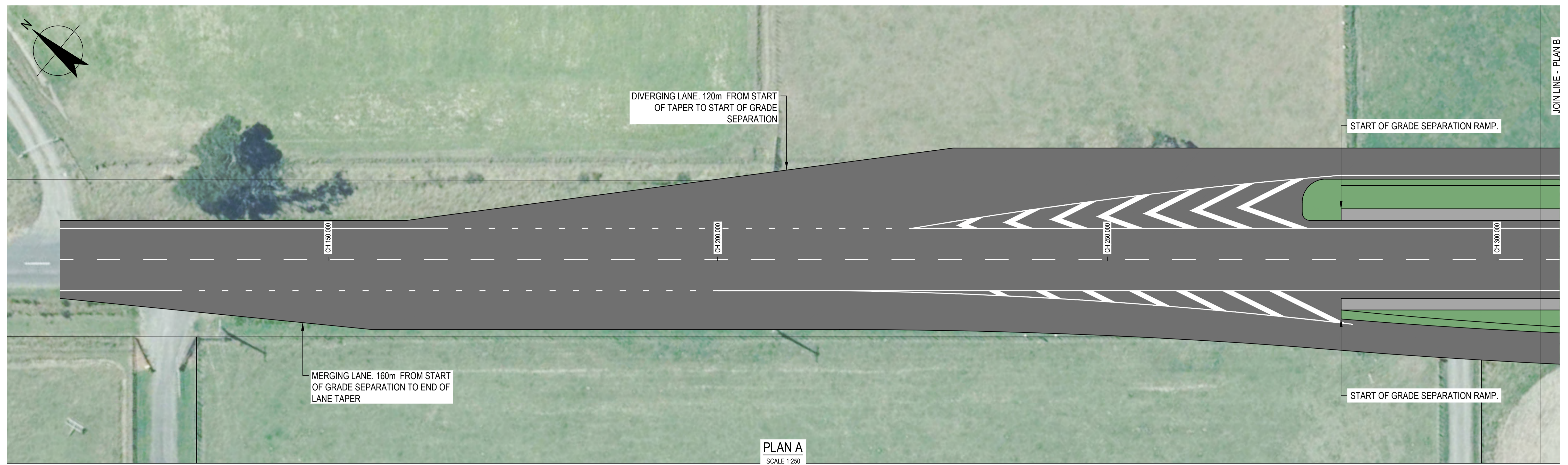


Project No.
12566838

Client PALMERSTON NORTH CITY COUNCIL
Project ROBERTS LINE - RICHARDSONS LINE
PROPOSED GRADE SEPARATION
Status CONCEPT

Drawing Title PROPOSED LAYOUT PLAN
Status Code S2
Drawing No. 12566838-SK001

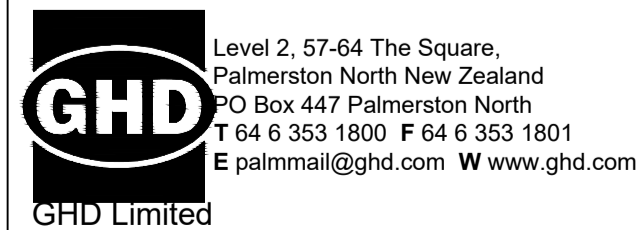
Size A1
Rev A



Rev	Description	Checked	Approved	Date
Author	C. O'DONNELL		Drafting Check	
Designer	S. DOIDGE		Design Check	

Plot Date: 21 February 2023 - 11:20 am Plotted by: Clay O'Donnell

File Name: N:\NZ\Auckland\Projects\209\112566838\CADD\Drawings\12566838-SK001_SK002_SK003.dwg



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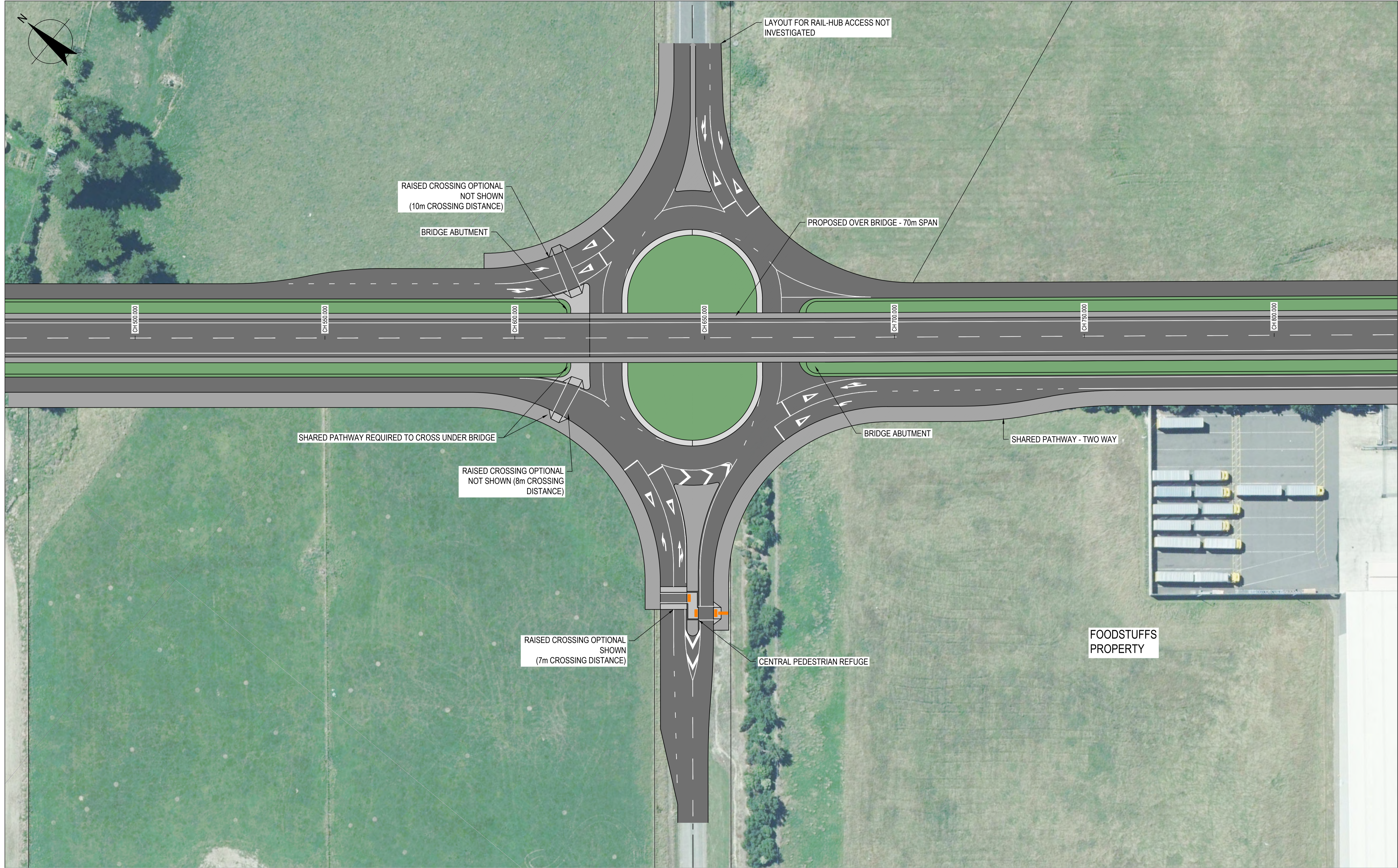
Client PALMERSTON NORTH CITY COUNCIL
Project ROBERTS LINE - RICHARDSONS LINE PROPOSED GRADE SEPARATION
Status CONCEPT

Drawing Title
ROBERTS LINE PROPOSED ROADING PLAN

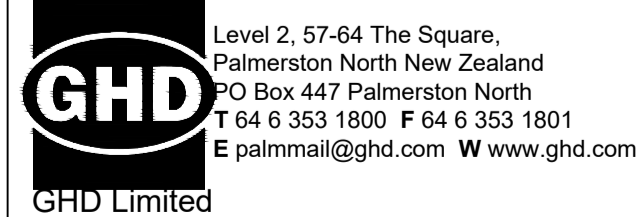
Status Code
S2

Drawing No.
12566838-SK002

Size
A1
Rev
A



Rev	Description	Checked	Approved	Date
Author	C. O'DONNELL	Drafting Check		
Designer	S. DOIDGE	Design Check		



Project No.
12566838

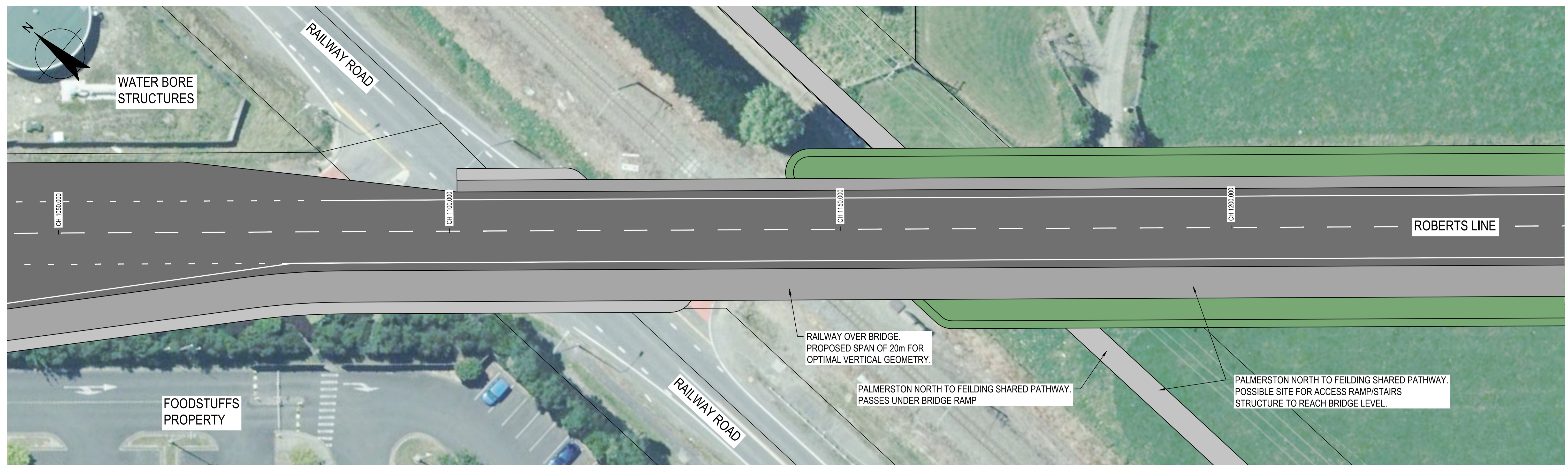
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Project ROBERTS LINE - RICHARDSONS LINE PROPOSED GRADE SEPARATION
Status CONCEPT

Drawing Title
ROBERTS LINE ROUNDABOUT PLAN

Status Code
S2

Drawing No.
12566838-SK003

Size
A1
Rev
A



Rev	Description	Checked	Approved	Date
Author	C. O'DONNELL	Drafting Check		
Designer	S. DOIDGE	Design Check		

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Project No. 12566838

Client PALMERSTON NORTH CITY COUNCIL
 Project ROBERTS LINE - RICHARDSONS LINE PROPOSED GRADE SEPARATION
 Status CONCEPT

Drawing Title ROBERTS LINE RAILWAY BRIDGE PLAN

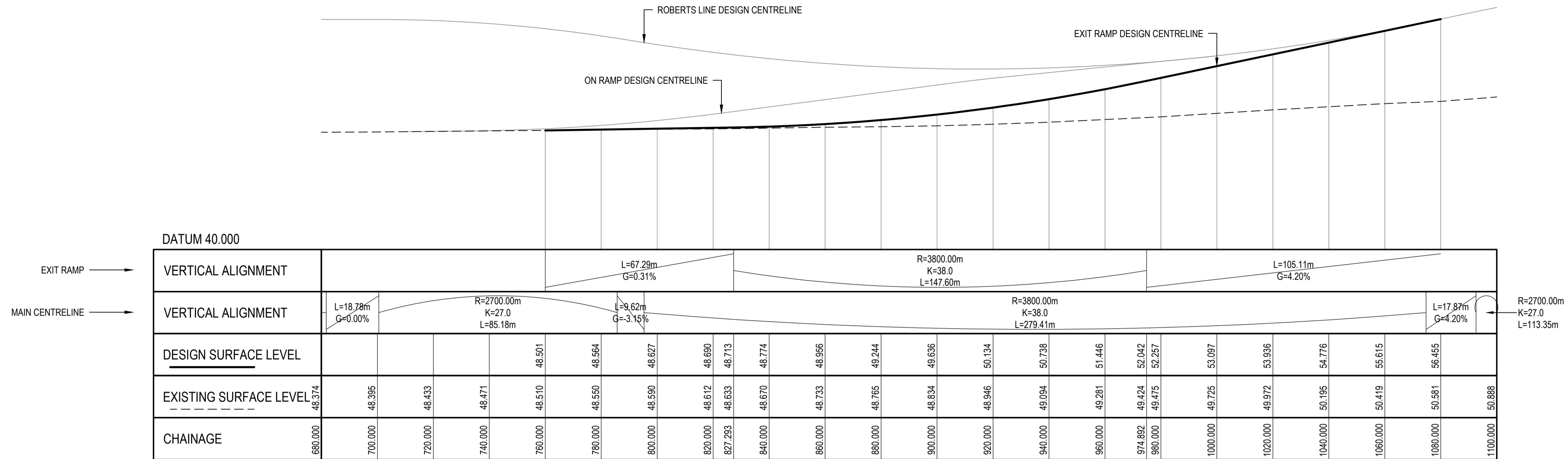
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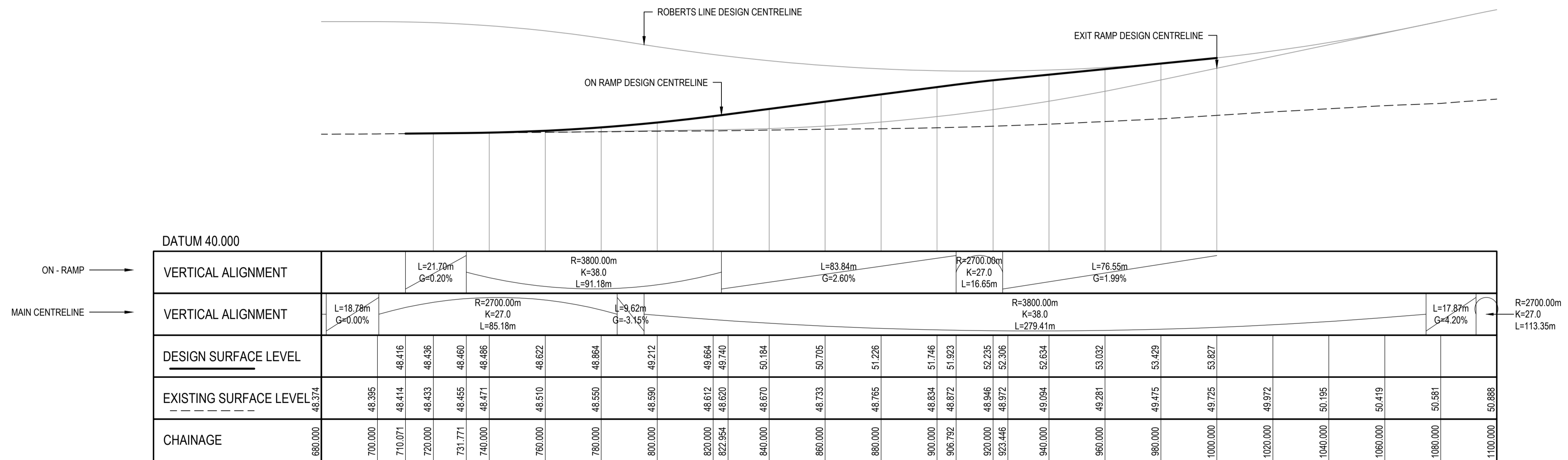
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Rev A

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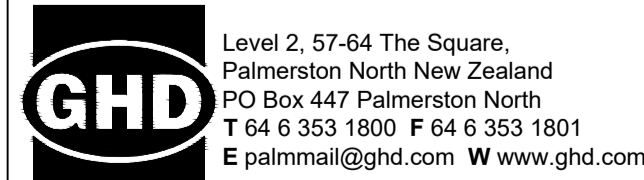
LONGITUDINAL SECTION - ROBERTS LINE



LONGITUDINAL SECTION - ROBERTS LINE

Rev	Description	Checked	Approved	Date
A	CONCEPT			20/02/23

Author C. O'DONNELL Drafting Check
 Designer S. DOIDGE Design Check



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 Project ROBERTS LINE - RICHARDSONS LINE
 PROPOSED GRADE SEPARATION

Drawing Title PROPOSED LAYOUT PLAN

Status CONCEPT

Status Code S2

Drawing No.
12566838-SK021

Size
A1

Rev
A