









Rail Level Crossing Grade Separation Feasibility Study Final Report – Volume 1

Reference: 236852
Prepared for: Auckland

Transport
Revision: 07
12 December 2014

Document control record

Document prepared by:

Aurecon New Zealand Limited

Level 4, 139 Carlton Gore Road Newmarket Auckland 1023 PO Box 9762 Newmarket Auckland 1149 New Zealand

T +64 9 520 6019

F +64 9 524 7815

E auckland@aurecongroup.com

W aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Doc	Document control aurecon							
Repo	rt title	Final Report – Volume 1	Final Report – Volume 1					
Docu	ment ID		Project numbe	r	236852			
File p	ath							
Clien	t	Auckland Transport	Client contact		Andrew Firth			
Rev	Date	Revision details/status	Prepared by	Prepared by Author		Approver		
0	31 July 2013	Draft for AT to comment	T Pang	T Pang		A Mein		
1	30 August 2013	AT comments included	T Pang	T Pang	L Beban	A Mein		
2	2 September 2013	Draft for AT to Review	T Pang	T Pang	A Mein	A Mein		
3 3 November 2013		Final Pilot Report as Agreed by AT	T Pang	T Pang	A Mein	A Mein		
4 11 February 2014		Draft Full Report for AT to Comment	J Atuluwage/ T Pang	T Pang	A Mein	A Mein		
5 13 October 2014		Final Report	T Pang	T Pang	A Mein	A Mein		
6 25 November 2014 Final		Final Report	T Pang/S Lalpe	T Pang	A Mein	A Mein		
7 12 December 2014		Final Report	S Lalpe	T Pang	A Mein	A Mein		
Curre	Current Revision 07							

Approval							
Author signature	Como	Approver signature	ben				
Name	T Pang	Name	A Mein				
Title	Senior Engineer	Title	Associate Transport				

Rail Level Crossing Grade Separation Feasibility Study

Date 12 December 2014 Reference 236852 Revision 07

Aurecon New Zealand Limited

Level 4, 139 Carlton Gore Road Newmarket Auckland 1023 PO Box 9762 Newmarket Auckland 1149 New Zealand

T +64 9 520 6019 **F** +64 9 524 7815

E auckland@aurecongroup.com

 $\boldsymbol{W} \ \ \text{aurecongroup.com}$

Contents

1	Intro	duction	3
	1.1	Background	3
	1.2	Scope of Works	4
	1.3	Options Assessment Criteria	6
	1.4	Reference Materials	6
	1.5	Limitation of this Report	7
2	Syste	em Wide Assumptions & Caveats	8
	2.1	Road Geometric Assumptions	8
	2.2	Rail Geometric Assumptions	8
	2.3	Indicative Road Bridge (Typical Construction for Road over Rail Bridge)	9
	2.4	Indicative Rail Bridges (Typical Construction for Rail over Road Bridge)	9
	2.5	Indicative Pedestrian Subways and Bridges	9
	2.6	Future Rail Development and Service Patterns	9
	2.7	Preliminary Indicative Costs	10
	2.8	Adjoining Properties Access Assumptions	12
	2.9	Property Purchase Assumptions	12
	2.10	Road Upgrade or Development	13
	2.11	Local Property Development	13
3	Site '	I: Morningside Drive	14
	3.1	Site Description	14
	3.2	Site Constraints	14
	3.3	Grade Separation Site Specific Assumptions	15
	3.4	Options Assessment	15
	3.5	Road & Rail Considerations	16
4	Site '	2: Woodward Road	18
	4.1	Site Description	18
	4.2	Site Constraints	18
	4.3	Grade Separation Site Specific Assumptions and Caveats	19
	4.4	Options Assessment	19
	4.5	Road & Rail Considerations	20
5	Site '	14: St Jude Street	21
	5.1	Site Description	21
	5.2	Site Constraints	21
	5.3	Grade Separation Site Specific Assumptions and Caveats	22
	5.4	Road & Rail Considerations	22
	5.5	Options Assessment	22

6	Site '	16: Saint Georges Road	24
	6.1	Site Description	24
	6.2	Site Constraints	24
	6.3	Grade Separation Site Specific Assumptions and Caveats	25
	6.4	Road & Rail Considerations	25
	6.5	Options Assessment	25
7	Site '	17: Portage Road	27
	7.1	Site Description	27
	7.2	Site Constraints	27
	7.3	Grade Separation Site Specific Assumptions and Caveats	28
	7.4	Road & Rail Considerations	28
	7.5	Options Assessment	28
8	Site '	19: Glenview Road	30
	8.1	Site Description	30
	8.2	Site Constraints	30
	8.3	Grade Separation Site Specific Assumptions and Caveats	31
	8.4	Options Assessment	31
	8.5	Road & Rail Considerations	32
9	Site 2	21: Bruce McLaren	34
	9.1	Site Description	34
	9.2	Site Constraints	34
	9.3	Grade Separation Site Specific Assumptions and Caveats	35
	9.4	Road & Rail Considerations	35
	9.5	Options Assessment	35
10	Site 2	25: Metcalfe Road	37
	10.1	Site Description	37
	10.2	Site Constraints	37
	10.3	Grade Separation Site Specific Assumptions and Caveats	38
	10.4	Road & Rail Considerations	38
	10.5	Options Assessment	38
11	Site 3	34: Walters Road	40
	11.1	Site Description	40
	11.2	Site Constraints	40
	11.3	Grade Separation Site Specific Assumptions and Caveats	41
	11.4	Road & Rail Considerations	41
	11.5	Options Assessment	41
12	Site	35: Taka Street	43
	12.1	Site Description	43
	12.2	Site Constraints	43

	12.3	Grade Separation Site Specific Assumptions and Caveats	44
	12.4	Road & Rail Considerations	44
	12.5	Options Assessment	44
13	Site 3	36: Manuroa Road	46
	13.1	Site Description	46
	13.2	Site Constraints	46
	13.3	Grade Separation Site Specific Assumptions and Caveats	47
	13.4	Road & Rail Considerations	47
	13.5	Options Assessment	47
14	Site 4	43: O'Rorke Road	49
	14.1	Site Description	49
	14.2	Site Constraints	49
	14.3	Grade Separation Site Specific Assumptions and Caveats	50
	14.4	Road & Rail Considerations	50
	14.5	Options Assessment	50
15	Site 4	44: Maurice Road	52
	15.1	Site Description	52
	15.2	Site Constraints	52
	15.3	Grade Separation Site Specific Assumptions and Caveats	53
	15.4	Road and Rail Considerations	53
	15.5	Options Assessment	53
16	Site 4	45: Mays Road	55
	16.1	Site Description	55
	16.2	Site Constraints	55
	16.3	Grade Separation Site Specific Assumptions and Caveats	56
	16.4	Road & Rail Considerations	56
	16.5	Options Assessment	56
17	Site 4	46: Captain Springs Road	58
	17.1	Site Description	58
	17.2	Site Constraints	58
	17.3	Grade Separation Site Specific Assumptions and Caveats	59
	17.4	Road & Rail Considerations	59
	17.5	Options Assessment	59
18	Site 4	47: Church Street	61
	18.1	Site Description	61
	18.2	Site Constraints	61
	18.3	Grade Separation Site Specific Assumptions and Caveats	62
	18.4	Road & Rail Considerations	62
	18.5	Options Assessment	62

19	Preliminary Planning Assessment		
	19.1	Bridge Structure	64
	19.2	Other Resource Consent Considerations	65
20	Sumr	nary of the Reviews	66
	20.1	Project Expected Estimate (Total Costs)	66
	20.2	Possible Future Considerations (NAL)	67
	20.3	Possible Future Considerations (NIMT)	67
	20.4	Possible Future Considerations (OBL)	67

Appendices

Appendix A

Level Crossings information

Appendix B

FE Summaries

Appendix C

Concept Drawings - See Volume 2

Appendix D

Planning Related information

///////////////////////////////////////	//////////////////////////////////////	///////////////////////////////////////	(//////////////////////////////////////	///////////////////////////////////////	.///////
Blank Page	///////////////////////////////////////	'//////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	///////

Executive summary

TBC with AT

Key messages

TBC with AT

Blank Page	

1 Introduction

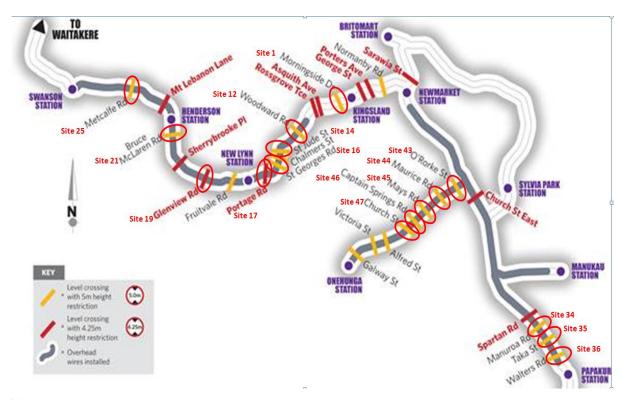
1.1 Background

AT has initiated an investigation into the feasibility of the removal of all of the 31 public at-grade rail road level crossings within the Auckland metro train area (Papakura to Swanson). Removal of each rail road level crossing would constitute either the closure of the crossing to road vehicles (provision would be investigated for a grade separated crossing for pedestrians and cyclists) or the grade separation of the level crossing.

AT had made an initial assessment of all 31 level crossings and identified those where closure of the road connection across the level crossing could be feasible, primarily from a road network operations perspective. Ten level crossing locations were identified as *potential* closure candidates and a further five locations noted as *possible* closure candidates. Further work is being undertaken by AT to test these initial assessments.

Of the 31 rail road level crossings assessed, the remaining 16 locations have been identified as likely requiring grade separation to facilitate the removal of the current at-grade facility.

This **Rail Level Crossing Grade Separation Feasibility Study** (The Study) has assessed these 16 locations, circled on map 1 and listed in table 1 below.



Map 1 - level crossing locations

Site	AT Project ID	Crossing Name	KRN Line	Kmage
1	NAL – W – 06	Morningside Drive	NAL	12.80
12	NAL – W – 11	Woodward Road	NAL	15.80
14	NAL – W – 13	St Jude Street	NAL	17.40
16	NAL – W – 15	St Georges Road	NAL	18.23
17	NAL – W – 16	Portage Road	NAL	18.88
19	NAL – W – 18	Glenview Road	NAL	22.43

21	NAL – W – 20	Bruce McLaren Road	NAL	25.55
25	NAL – W – 23	Metcalfe Road	NAL	29.50
34	NIMT - S - 07	Walter Road	NIMT	649.19
35	NIMT - S - 08	Taka Street	NIMT	650.38
36	NIMT - S - 10	Manuroa Road	NIMT	650.89
43	OBL – 01	O'Rorke Road	OBL	0.59
44	OBL – 02	Maurice Road	OBL	1.03
45	OBL - 03	May Road	OBL	1.89
46	OBL – 04	Captain Springs Rd	OBL	2.13
47	OBL - 05	Church Street	OBL	2.23

Note: NAL - North Auckland Line, NIMT - North Island Main Trunk, OBL - Onehunga Branch Line

Table 1: 16 Sites Assessed

, The output of this feasibility study will be used to inform the business case for progressing with any grade separation initiatives and, following approval to proceed, the development of a grade separation programme. This is a high level assessment intended to inform decision making only. Further work will be needed to provide a more detailed review to understand the safety, operational and system impacts of each level crossing on both the rail and road networks.

The Study summarised in this report has been undertaken in two phases:

Phase One:— Pilot study of 3 level crossings assessment (completed in July 2013)

Phase Two:- The remaining 13 level crossing sites using the agreed methodology derived in Phase One.

All of the level crossings included within the Study are public road crossings which consist of a vehicle crossing with at least one pedestrian crossing alongside.

Phase One included development of the assessment methodology including the detailed assumptions underpinning the infrastructure, property requirements and impacts, constructability, cost estimates and key site specific aspects important in consideration of possible options. Following agreement of the methodology and assumptions, assessments were undertaken on three pilot locations (St Judes, Morningside and Bruce McLaren).

1.2 Scope of Works

- . The Study has included the development of a simple, consistent approach to assessing the feasibility of grade separating an existing public at-grade road level crossing, ensuring that the methodology is robust and able to meet AT's goals and objectives. The Scope of works for the Study was as follows:
- Site assessment for three pilot level crossing sites. The three pilot sites were collaboratively chosen with the AT project team. These sites were:-
 - Morningside Drive (Site 1)
 - St Jude Street (Site 14)
 - Bruce McLaren Road (Site 21)

- Develop a template solution for each of the following three grade separation treatment options:
 - Road bridge over rail on existing road alignment with the railway retained at its current level (Road Over)
 - Rail trench under road with the road retained at its current level (Rail Under)
 - Hybrid of i and ii consisting of partial raising of road and lowering of rail to achieve required train clearance beneath road bridge.

For the template solution for each option develop a list of key design assumptions.

- Develop plans showing road over, rail under and a hybrid option showing the extent of infrastructure, services relocations, property access adjustments and an assessment of properties required to be purchased.
- Develop an assessment of the benefits and challenges associated with the options developed for each site.
- Develop an indicative preliminary budgetary cost estimate for each option.
- Deliverables of the study included a site assessment of each current level crossing location which consisted of the following:
 - Crossing layout
 - Surrounding land use
 - Future planned developments that may affect the crossing
 - Approach road type and traffic volumes
 - Daily train volumes (passenger and freight)
 - Known level crossing issues
 - Major overhead and underground services
- Level crossing grade separation options

It was agreed with the AT project team at the commencement meeting of the 12th June 2013 that a simple robust assessment methodology be developed and used consistently for all sites to ensure that the goals and objectives are met.

The agreed assessment methodology for each site is outlined below:

- Review of each site using Auckland Council GIS system
- 2. Review KRN S&I diagrams to confirm the crossing locations
- 3. Obtain existing rail alignment from KRN. If unavailable, the rail alignment was assumed to be based on the available GIS information
- 4. The road alignment was assumed to be based on available GIS information
- 5. Overlay the existing road and rail alignments to establish the level crossing profile
- 6. Develop three options for consideration as follows.:
 - Option 1: Road Over
 - Option 2: Rail Under
 - Option 3: Hybrid of Road over and Rail under (note this was only developed if both options 1 and 2 were shown to be feasible)
- 7. Produce a plan showing option footprint and extent of property required.
- 8. Review options with AT project team and agree which to complete assessment work and produce cost estimates for, and which to park due to insurmountable issue making option unfeasible.
- Complete assessment and develop cost estimates for options above as agreed with the AT project team
- 10. Apply visual and access impact lines to assess the extent of the infrastructure intrusion on the adjoining properties.
- 11. Identify property requirements including those required to enable construction of rail trench.

1.3 Options Assessment Criteria

Option assessments at each level crossing site for each of the three options were undertaken using the following criteria:-

- On-line impacts to existing highway alignment and rail alignments,
- Other impacts beyond the level crossing to the highway and rail alignments,
- Impact to adjacent properties
- Construction disruption, costs and likely duration.

Each option for each site was rated with High (H), Medium (M) or Low (L). The rating was derived to simply rate the impact, in a simplistic manner, together with highlighting areas that should be further considered at a later stage. From the rating a preferred option and a second best option were determined..

A note section has been included to highlight possible challenges and potential alternatives that may be worthwhile considering in future stages of the project. It also notes any options considered unfeasible and discounted from the Study.

The assessment includes indicative costs. This is to illustrate the cost difference between options as well as the overall budget requirement to deliver the option. The cost estimate includes property costs (as provided by AT). It is noted that these costs are indicative only and based on high level initial design assessment using specific constraints and assumptions, and is appropriate to inform AT's initial level crossing removal budget and programme requirements.

1.4 Reference Materials

The following were received from AT and other sources, which form the basis of this study.

Material Description	Date/ Rev	From / Notes
Acts and Regulations		
Local Government Act	1974	
Railway Act	2005	
Standards		
Auckland Rail Station Development Guide		AT
Traffic Control Device Manual Pt9 Level Crossing		NZTA
KRN Track Code T003		KRN Wellington library
KRN Track Code T100 and Code Supplements		KRN Wellington library
KRN Track Code T200		KRN Wellington library
KRN W201 Rail Bridge Design Brief		KRN Wellington library
KRN W605 Road Over Rail Bridge		KRN Wellington library
KRN S&I Diagram		KRN Wellington library
Part 4: Intersections and Crossings - General		Austraods
Track information		
KRN S&I Diagram		KRN Wellington library
Records		
Traffic counts		AT
Reports, Plans		
Railway Level Crossing Study	2004	AT/Opus
Level Crossing – Road Traffic Impact Assessment	2006	AT/Opus
Rail Level Crossing – Pedestrian Counts	2013	AT/Gravitas
CRL Network Wide Rail Operational Issues	2013	AT/Aurecon
Others		
Bus routes / Time Table		MAXX Web Site

Material Description	Date/ Rev	From / Notes
Rail Time Table		MAXX Web Site
Over Height/Weight Vehicle Routes		NZTA Web Site
Height Restrictions for Level Crossing in Auckland		KiwiRail

Table 2: Key reference used in this Study

1.5 Limitation of this Report

This Study was developed in conjunction with the AT Project Team to establish a feasibility reporting template for the removal of rail level crossings and a proposed methodology with which to assess the merits of potential options.

The report developed presents some possible solutions to be considered for each of the level crossing sites. There may be further options at each site (outside of the Study project scope) that are more appropriate that should be investigated as part of further work into grade separation. The identified generic construction costs are also presented. These costs have not been developed for individual sites but rather developed to assess possible costs for each option identified. The construction cost template has been designed to enable scheduled items to be easily updated as part of future assessment work. It was not the intention of this study to derive site specific cost estimates beyond that required for indicative budgetary purposes.

2 System Wide Assumptions & Caveats

2.1 Road Geometric Assumptions

A number of geometric assumptions pertaining to the road design have been developed and agreed with the AT Project. The road geometric assumptions are presented in the following table. These project design parameters have been used to develop the concept options. Individual site specific requirements have necessitated some assumptions to be revisited; these are highlighted in the assumptions for each site.

Item	Assumption
Road Maximum Grade	5%
Property Access From Road Maximum Grade	1/8 (12.5%)
Road Bridge Width	2 Lanes general traffic lanes 3.5m each
	Cycle lane either side of road 1.5m each
	Pedestrian Either side of Cycle way 2.0m each Total clear width 14m
Road Bridge Vertical Clearance to track	
	1.4m (bridge deck + topping)
	6.5m road to rail separation
Road Bridge (Horizontal Clearance)	Total clear span 10m (also see 2.2 below)
Parking	No parking on grade separated road corridor
Oversize Vehicle Allowance	Accommodate 10m by 6m wide box load

Table 3: Assumptions relating to Road

2.2 Rail Geometric Assumptions

A number of rail geometry assumptions have been presumed for the purposes of this assessment. These assumptions have been agreed with AT and are presented in the following table. In some areas these standards have been adjusted to meet specific requirements of the site considered. These assumptions will need to be agreed before being used for any further investigative work.

ltem	Assumption		
Rail Maximum Grade	2% desirable (2.5% maximum) for freight ¹		
Rail Bridge Width	Assume 2 track layout 3 m wide 4 m clearance Total clear width 10m		
Rail Bridge Vertical Clearance	5.5m clearance rail to soffit		
	1.3m (bridge deck + track)		
	6.8m track to road separation		
Rail Bridge Horizontal Clearance	Total clear span 14m		
Platform Length Minimum	150m (assuming loading platform)		
	Assume longitudinal platform is level		
Platform Gradient	1% maximum		
Access To Stations	Assume combination of lift and stair		
	Stair 2.2m wide		
	Lift 3.5m wide		
	Pedestrian waiting area on bridge 5m by 5m		

^{1 –} maximum grade for EMU's is 4% Table 4: Assumptions relating to Rail

2.3 Indicative Road Bridge (Typical Construction for Road over Rail Bridge)

The proposed solution for each Road over Rail option used in this Study is governed by the extent of the new bridge over the rail and road approaches along the existing road alignment and the railway operational requirements including rail station connectivity if required, during the construction and operational phases of the project. The following assumptions were presumed for each site:

- The bridge structure will carry the road cross section as stated in Section 2.1 of this document,
- The bridge structure will consist of single hollow-core deck units to the required deck width to provide a minimal deck thickness to minimise the extent of the road approach works,
- hollow-core units will be transversely post-tensioned together to allow load sharing,
- allowance for station connection will be provided on the bridge, if required,
- side protection will be as per NZTA requirement for the type of road and traffic on the bridge,
- the deck will be supported by reinforced concrete abutment headstocks on bored cast in-situ piles,
- approaches will be in the form of reinforced earth panel (or similar) retaining walls.

2.4 Indicative Rail Bridges (Typical Construction for Rail over Road Bridge)

The structural form and configuration for the rail over road bridges may vary from site to site, which will influenced by the site constraints, construction methodology and programme, as well as operational requirement during the implementation phase of the project. The following assumptions were made to produce comparable options for each site:

- the superstructure will carry a ballasted track formation,
- it will consist of single hollow-core deck units to make up the required deck width,
- hollow-core units will be transversely post-tensioned together to allow load sharing,
- allowance for future provision of Maintenance walkways will be provided on both sides of the bridge but only a handrail will be installed,
- the superstructure will be supported on reinforced concrete abutment headstocks supported on bored cast in-situ piles,
- approaches retaining walls will either be bored pile retaining walls or post and panel retaining walls similar to those currently in used across the network.

2.5 Indicative Pedestrian Subways and Bridges

There are no pedestrian subways or bridges required for the three selected sites for The Study. However, for other sites where a pedestrian subway or footbridge may be required, basic space and cross sectional requirements should be based on the Auckland Rail Station Development Guide. For a subway, a 2.5m square structure in form of precast concrete box units should be appropriate, with approach retaining walls and ramps. For footbridges, the typical station bridge in the Auckland Rail Station Development Guide can be utilised as a template with either ramps or lifts to cater for the vertical transfer of mobility impaired persons.

2.6 Future Rail Development and Service Patterns

There are a number of rail related improvement and development projects either recently completed or being implemented, which may have major and immediate impact to the level crossing replacement project and should be considered with any subsequent studies. These projects could have a direct influence on the project definition requirement, general design philosophy and/ or specific construction methodology. These issues will require further discussion and guidance from the AT project team. The following table provides the list of current known key projects that will require further understanding with any future work.

No	Project	Principal	Date
1	Re-Signalling (complete)	KiwiRail	2010 – mid 2013
2	Electrification	KiwiRail	2010 – end 2014
3	Introduction of new Electric Rolling Stock	AT	2010 – mid 2016
4	Third Main – South of Otahuhu	KiwiRail	2011 – tba
5	DART Project	KiwiRail	Completed
6	Platform Extensions	AT	2014
7	Further station upgrades	AT	2014-tba

Table 5 - Existing projects that impact the outcome of the Study

The following table indicates some of the future projects that may impact on any design consideration with future work

No	Project	Principal	Date
1	City Rail Link	AT	tba
2	Airport Rail Line	NZTA	Uncommitted
3	SH1 to SH20 East and West Link	NZTA	Uncommitted
4	SH16 Upgrade	NZTA	Uncommitted
5	Duplication of Onehunga Line		
6	Onehunga and Avondale Rail Link		

Table 6 - Future projects that may impact the sites

The following table indicates possible future train demands (Train per Hour – TPH) through the crossings for each of the 16 sites. These were sourced from AT as provisional train frequencies. They are subject to change. AT should be consulted for the latest train plan frequencies.

Site	AT Project ID	Crossing Name	KRN Line	2016 TPH	2021TPH	2031 TPH
1	NAL – W – 06	Morningside Drive	NAL	12	21	26
12	NAL – W – 11	Woodward Road	NAL	12	21	26
14	NAL – W – 13	St Jude Street	NAL	12	21	26
16	NAL – W – 15	St Georges Road	NAL	12	21	26
17	NAL – W – 16	Portage Road	NAL	12	21	26
19	NAL – W – 18	Glenview Road	NAL	12	21	26
21	NAL – W – 20	Bruce McLaren Road	NAL	12	21	26
25	NAL – W – 23	Metcalfe Road	NAL	12	12	12
34	NIMT - S - 07	Walter Road	NIMT	15	18	18
35	NIMT - S - 08	Taka Street	NIMT	15	18	18
36	NIMT – S – 10	Manuroa Road	NIMT	15	18	18
43	OBL – 01	O'Rorke Road	OBL	4	6	12
44	OBL – 02	Maurice Road	OBL	4	6	12
45	OBL - 03	May Road	OBL	4	6	12
46	OBL – 04	Captain Springs Rd	OBL	4	6	12
47	OBL – 05	Church Street	OBL	4	6	12

Table 7 - Assumed Train Plan Frequencies

2.7 Preliminary Indicative Costs

The indicative cost for each site has been derived in accordance with NZTA's Cost Estimation Manual (SM14). These estimates are not intended as detail costs estimates for each option. Rather they should be considered as indicative rough order of costs for the purposes of providing an indication of

the quantum of investment required and for comparing options prior The costestimates are in line with the level required of the design.

The indicative high level cost estimates (in Appendix B) detail the probable costs associated with the provision of infrastructure relating to the following:

- road over rail, ,
- rail under road,
- hybrid of these (assumed 50/50 combination of road over rail and rail under road)

It should be noted that costs may vary as the design process progresses through future pieces of work. As the design process progresses the constraints and conditions of each site will be better understood, and the costs able to better reflect these. In the course of this feasibility Study, the following cost assumptions have been made to reflect the current understanding of site conditions.

Item	Description	Assumption
Prope	rty Related Costs	
	Property Costs	The property costs are based on the Land Capital Values (LCV), which is derived from the Latest Land Values (LLV) and Land Improvement Values (LIV), which were supplied by AT, (Further assessment of these shall be carried out in future studies)
	Property cost for construction and temporary rail alignments ¹	Cost of Property required for the construction and temporary track alignments are allowed for Option 2 – Rail Trench and Option 3 - Hybrid. The principal of working spaces applied for the options are as indicated on the drawing XXXXX in Appendix C of this document
	Property acquisition agents fees	2.5% of transactions (for both purchase and disposal) values
Investi	igation and Reporting	
	consultancy fees	1.5% of Total Physical works & Contractor PG Cost
	AT managed costs	0.5% of Total Physical works & Contractor PG Cost
Design	n and project documentation	
	consultancy fees	3.5% of Total Physical works & Contractor PG Cost
	AT managed costs	1.0% of Total Physical works & Contractor PG Cost
Contin	gency and Funding Risk	
	Contingency	Due to the early nature of this study in the project life cycle, a 50% contingency on the base estimate has been included
	Funding Risk	Due the high level natural of the study, a funding risk assessment has not been done
Eleme	nt Costs	
1.1	MSQA	3.0% of Total Physical works & Contractor PG Cost
1.2	AT-managed costs	1.5% of Total Physical works & Contractor PG Cost
1.3	Consent monitoring fees	1.2% of Total Physical works & Contractor PG Cost
2.1	Management of environmental compliance requirements	5.0% of Earthwork, ground improvement and drainage costs
2.2	Preparation and management of compliance managements plans	2.0% of Earthwork, ground improvement and drainage costs
3.1	Site Clearance, demolition	Allowed a Lump Sum of \$500,000 for the activities
10.1	AT cost of other authority and utility companies costs (after cost share) and contractors margins	Allowed a Lump Sum of \$1,000,000 (as a minimum) for the activities, and increased if the site was more complicated or in the city centre location
12.1	Temporary traffic diversions	Allowed a Lump Sum of \$150,000 (as a minimum) for the activities, and increased if the site was more complicated or in the city centre location

Item	Description	Assumption
12.2	Traffic management physical works costs	Allowed a Lump Sum of \$100,000 (as a minimum) for the activities, and increased if the site was more complicated or in the city centre location
13.1	Establishment, temporary site accommodation, disestablishment	5.0% of Total Physical works cost
13.2	Contractor's supervision	1.5% of Total Physical works cost
13.3	Overheads, insurances	12.5% of Total Physical works cost
13.4	Temporary works design and traffic management planning	1.0% of Total Physical works cost
13.5	Project plans, traffic management plans, environmental management plans, reporting	1.0% of Total Physical works cost
13.6	As-built requirements	0.5% of Total Physical works cost
14	Extraordinary construction costs – Rail works	Temporary track (and platform, where appropriate) related costs included for Option 2 and 3 ¹ , Blocks of Line, Network electrical isolation costs, etc.

¹ – based on the assumption that the rial network remains operational during construction requiring temporary realignment of tracks with possible property acquisition in areas where the existing rail corridor is not wide enough to accommodate the temporary track plus the construction area for the rail trench.

Table 8 - Cost Assumptions

2.8 Adjoining Properties Access Assumptions

A key output of the Study was to identify for each grade separation option which properties surrounding the level crossings would have their existing access compromised. To ascertain the affected properties, an assumed maximum gradient of 1 in 8 has been applied to the proposed design. Where an existing property access is impacted by a road bridge structure, a new site access of maximum 1 in 8 gradient was applied. This 1 in 8 gradient reflects what is considered acceptable grade to access the land/ property from the structure itself. Where a revised access of 12% was not achievable, alternative access was provisioned.

The new access ramp extends from the road bridge structure into the adjacent property to identify the area required to accommodate any revised access to the property. Yellow hatching on the drawings, Appendix C, associated with each proposed option presents the potential extent of any access ramp from the road bridge structure and accordingly identifies the potential properties that may be required to be purchased as part of the project to accommodate the design.

This is considered a highly conservative approach to identify the properties with affected access. Further investigation of specific sites would likely derive alternative access options. These alternative access options could be in the form of a newly provided access road running parallel to the proposed structure, or alternative access through other parts of the site.

Propoerty purchase in the vicinity of each level crossing may provide an opportunity to redevelop an area to integrate the grade separated structure (bridge or rail trench) with surrounding development. This was discussed with the AT project team; future development options that integrate with grade separation will be investigated in subsequent phases of this project.

2.9 Property Purchase Assumptions

Where the existing property access is compromised by the proposed road bridge structure, acquisition of the property was assumed. This assumption generally captured the properties adjacent to the new grade separated road. This assumption does not include purchase of properties whose current access remains viable however the property is close to a new road bridge.

Delivery of the options listed in the Study assumes that the property is purchased, and the costs reflect the current value of the properties. If upgrade or development of any of the properties occurs this would likely impact both the ability to acquire the properties and the associated cost. It is

suggested that properties required to deliver each option be identified and properties secured to mitigate this risk.

2.10 Road Upgrade or Development

The scope of the Study did not include assessment of the impact of proposed network wide road upgrades or developments in and near the level crossings. These should be investigated and assessed as part of any future work.

2.11 Local Property Development

The scope of the Study did not include assessment of proposed future development in the vicinity of the level crossings. The study has assumed that the adjacent land uses will be as presently identified in the Council's District Plan.

Any significant development in the vicinity should be identified and implications of this on the individual site investigated. These implications would include to traffic generation, site access and how the development would integrate with the proposed road bridge structure.

3 Site 1: Morningside Drive

Road Name:	Morningside Drive (01)	Control Type KRN Line:		NAL
Project ID	NAL-W-06	(As in TCDM Part 9:Section 6) Km'age:		12.80
Xing Name:	Morningside Drive Ped Dn	Active/FLBs ¹ (Veh Control) KRN S&I:		2993
	Morningside Drive	Active/FLBs & HABs ²	Nos of Track	3
	Morningside Drive Ped Up	Active/FLBs (Veh Control)	Nearest Stn:	Morningside

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

3.1 Site Description

The existing Morningside Drive level crossing is located in the Albert – Eden Local Board area, and is 12.8km from the start of North Auckland Line (NAL), adjacent to the Morningside Rail Station. This section of Morningside Drive is bounded by New North Road (70m) to the north and McDonald Street (65m) to the south. The 12.5m wide existing road carriageway is flanked by two 3.5m wide footways and berms which lead to the vehicular level crossing and separate pedestrian level crossings on both side of the road. The road alignment is relatively flat along the length. Morningside Drive is classified as a collector road and carries local bus services. The neighbouring area is surrounded by commercial properties with high density private dwellings situated to the south west corner of the crossing. Both commercial and



Photo 1: Morningside Drive crossing looking eastward

residential properties have direct access onto Morningside Drive via either commercial or residential road vehicle crossings.

There are three railway tracks (up, down and siding approach roads) crossing over the existing level crossing. The Morningside Station has a 150m long island platform on the western side of the crossing. The platform is accessed by a pedestrian underpass at the western end from New North Rd, and by a pedestrian level crossing (Ped up) at the eastern end of the station. The railway comes out from a small cutting to the east into an embankment after the station to the west, which leads onto rail over road bridges (38A and 38B) that pass over New North Rd 800m from the level crossing at NAL chainage 13.5km.

During large crowd events at Eden Park Kingsland Station is used as stage event trains to the west and back to Britomart. To facilitate efficient expedient loading of trains post event, trains are stacked back to the west of Kingsland station and occasionally require the closure of the level crossing to accommodate queued trains.

3.2 Site Constraints

From	Infrastructure Constraints	Operational Constraints
Road	 12.5m wide carriageway width 2 x 3.5m wide footway and berm 70m to a major intersection with New North Road 46 degree skew to the rail 5.0m height restriction for OLE 	 Collector Road carrying 7,274 (AADT) Bus route 220, 221, 222, 223 and 224 1,198 pedestrian movements per day (825 peak) On street parking on approaches
Rail	 gradient of 1.2% located west of the Station no vertical curves within station and siding area/stabling yard Path and ramp link to east end of the platform, the platform end will require widening for lift and stair 	 Close proximity to the Morningside Station 3 tracks layout from east at crossing then into 4 tracks to the west after crossing Junction and track works for the stabling yard Freight traffic uses this section of track

² – HABs = Half Arm Barriers:

From	Infrastructure Constraints	Operational Constraints
	to connect to a road bridge Kingsland Station 120 m west of the crossing Rail bridges 700m west of the crossing, any lowering would likely require lowering of New North Rd Station underpass from western end of platform	
Properties	Large commercial units to the NW, NE and SE Large high density residential unit to the SW	Vehicle property accesses from commercial and residential units
Services	Overhead electricity wire 150 Sewer under western footpath 100 water main under western footpath	Height restriction from the electrical overhead wire 5.0m
Others	TBC	TBC

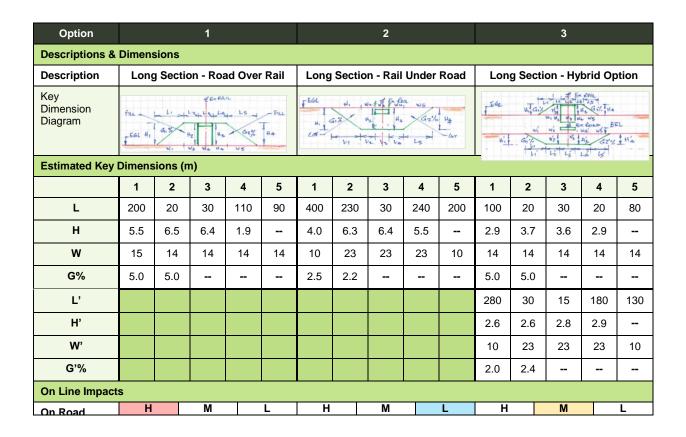
Table 9 - Specific Site Constraints - Morningside Drive Level Crossing

3.3 Grade Separation Site Specific Assumptions

Road Related	Rail Related	Others		
2 x 3.5m wide Lane	Max gradient 2% desirable (2.5%)	 Private way gradient 12.5% (1 in 8) 		
Cycle Lane 1.5m, Pedestrian 2.0m	maximum) compensated grade for			
Max gradient 5% Road	freight			
Road/Rail separation 6.5m (road over)	 Rail to road separation 6.5m (rail 			
 Speed as existing (50km/hr) 	under)			
	Gradient at station set as existing			
	Alignment speed as existing			
	Horizontal alignment as existing			

Table 10 - Specific Assumptions - Morningside Drive Level Crossing

3.4 Options Assessment



Option		1			2			3		
Alignment	Elevated road will impact to driveways and adjacent streets			As existing		Elevated road will impact to driveways and adjacent streets				
On Railway	Н	M	L	Н	M	L	Н	М	L	
Alignment	As existing			NAL up & c	W4 (width al down mains, sidings) high	plus	NAL up & o	W4 (width al down mains, sidings) high	plus	
Other Area Imp	acts									
On Road	Н	M	L	Н	М	L	Н	М	L	
Infrastructure	Elevated road will require elevation of New North Road intersection		Rail over Road Bridge BR 38A&B west across New North Road required to be at lower level; New North Rd also would require lowering ² and 3		None					
On Railway	Н	M	L	Н	M	L	Н	M	L	
Infrastructure		n access at e evel with lift a		accesses for	n platforms a or both ends ft and stairs		New station platforms and accesses for both ends to street level with lift and stairs			
Impacts on Oth	ers									
Adjacent	Н	M	L	Н	M	L	Н	М	L	
Properties	A number of for the align	of properties nment	required	A number of properties required for temporary rail alignment		A number of properties required for temporary rail alignment and final road levels				
Impacts from C	onstruction									
Complexity &	Н	М	L	Н	M	L	Н	М	L	
Disruption		level crossir sures will be		Managed disruption to rail services and temporary bridge for highway traffic		Managed disruption to rail services and temporary bridge for highway traffic				
Costs	Н	M	L	Н	M	L	Н	М	L	
Construction										
Property										
Total										
Likely	Н	M	L	Н	M	L	Н	M	L	
Duration	8	to 12 Month	S	12	2 to 24 Mont	hs	C	ver 24 Montl	hs	
Other Issues										
1	The future training services pattern and proposed CRL will have major effect to the operation of this level crossing									
2	Option 2 exceeds maximum grade on the eastern approach to the Crossing. To gain a complying grade Kingsland station will need to be lowered At the Western end the track is not able to rise out of the ground fast enough not to compromise the New									
3	North Rd L	Inderpass Br	idge.							
4		The implementation of the grade separation should be coinciding with the station and area wide development to provide better economic returns.								

Table 11 - Output Summary for Morningside Drive Level Crossing

3.5 Road & Rail Considerations

Option 2, rail under road, is shown to exceed maximum grade on the eastern approach to the level crossing. To gain a complying grade to the east, Kingsland station would need to be lowered. To the west, bringing the track back up at the maximum allowable grade would still require the rail bridge over New North Rd to be lowered with a consequential requirement to lower New North Rd. These points should be better understood during the next stage of option assessment.

The level crossing on Morningside Drive is in close proximity to the New North Road signalised intersection (70m). In order to provide sufficient clearance and maintain the assumed maximum 5%

gradient, the road alignment of New North Road is required to be raised. In total a 325m section of New North Road will need to be raised, in some sections as much as 2m across.

Additional constraints to be considered in a future assessment of the site include potential access to both McDonald Street and Taylors Road.

4 Site 12: Woodward Road

Road Name:	Woodward Road (12)	Control Type	KRN Line:	NAL
Project ID	NAL-W-11	(As in TCDM Part 9:Section 6):	Km'age:	15.80
Xing Name:	Woodward Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&I: 3024	
	Woodward Road	Active/FLBs ¹ & HABs ²	Nos of Track 2	
	Woodward Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Mt Albert

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

4.1 Site Description

The existing Woodward Road level crossing is located in the Albert-Eden Local Board area, at 15.80km from the start of North Auckland Line (NAL) and approximately 400m to the Southwest of Mt Albert Station. The crossing is 70m northeast from the intersection of Woodward Road, New North Road and Richardson Road, and 60m southwest of Fersey Ave (a residential street). The 9m wide existing carriageway is flanked a 3.5m wide footway and wide grass berm on each side of the road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. The highway alignment is relatively flat at and either side of the crossing (rises to 2% at the Woodward Road, New North



Road and Richardson Road intersection). The rail alignment from Mt Albert station is almost flat to the crossing then increases down the slope to approximately 1.6%.

The road is classified as a district arterial and is a designated overweight and over dimension route.

The area to the north is residential, to the south west a combination of residential and corner commercial retail units

Photo 2: Woodward Road crossing looking southward

and the south east corner houses a petrol station. There are a number of commercial and residential vehicle access ways off Woodward Rd. There are 2 tracks (up and down NAL) crossing over Woodward Rd.

4.2 Site Constraints

From	Infrastructure Constraints	Operational Constraints
Road	 9m wide carriageway width 2 x 3.5m wide footway and berm 70m to a major intersection with New North Road and Richardson Road 60m to a minor intersection with Jersey Ave 46 degree skew to the rail 5.0m height restriction for OLE 	 District arterial road carrying 11,474 (AADT) Oversize and overweight vehicles route No current bus routes use crossing On street parking on approach 722 Pedestrian movements per day (430 peak)
Rail	 gradient of 1.6% located south of the crossing . gradient of 0% located north of the crossing two tracks layout The eastern approach is governed by the location of Mt Albert Station The western approach is limited by the possible proofing for the South Down Line junction 	Close proximity to the Mt Albert station Freight trains uses this section of track
Properties	Surrounded by residential units Petrol station located on the southeast corner	Highway vehicle accesses from commercial and residential units
Services	Overhead electricity wire 100/200 water mains under western side footpath Fibre optic cable along northern side of railway	• TBC

² – HABs = Half Arm Barriers:

	line840 water main under crossing and the intersection	
Others	• TBC	• TBC

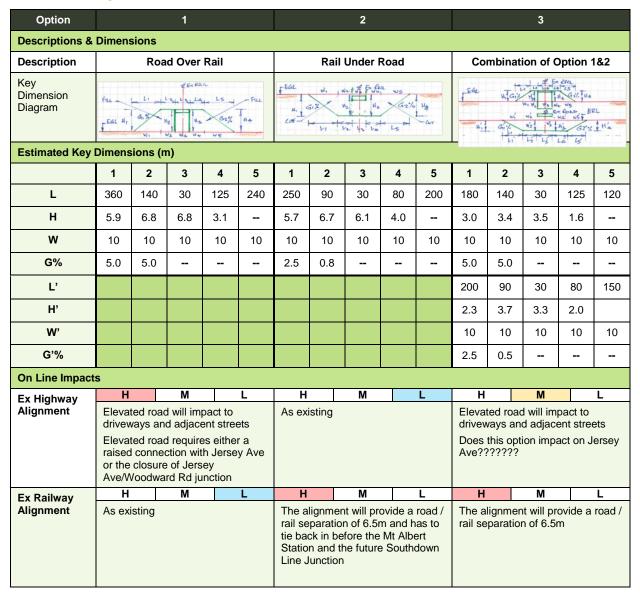
Table 16 - Specific constraints for Woodward Road Level Crossing

4.3 Grade Separation Site Specific Assumptions and Caveats

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 7% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) 	Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing	Private drive gradient 12.5% (1 in 8)

Table 12 - Specific Assumptions - Woodward Road Level Crossing

4.4 Options Assessment



Option		1			2			3	
Other Area Imp	acts								
Ex Highway	Н	М	L	Н	М	L	Н	М	L
Infrastructure	through an North Roa Elevated raised con or the clos Ave/Wood	e elevated rond beyond the distribution of the	e New n either a Jersey Ave	None			end within intersection	e elevated ro the New Nor n	
Ex Railway	Н	M	L	Н	M	L L	Н	M	L
Infrastructure	None				ign needs to lignment with n Line			ign needs to lignment with n Line	
Impacts on Oth	ers								
Adjacent	Н	M	L	Н	M	L	Н	М	L
Properties	A number of properties required for the alignment including Jersey Ave.		A number of properties required for temporary rail alignment		A number of properties required for temporary rail alignment and final road levels				
Impacts from C	onstruction	ı							
Complexity &	Н	M	L	Н	M	L	Н	M	L
Disruption		level crossi sures will be		Major disruption to rail services and temporary bridge for highway traffic		Major disruption to rail services and temporary bridge for highway traffic			
Costs	Н	M	L	Н	М	L	Н	М	L
Construction									
Property									
Total									
Likely	Н	M	L	Н	M	L	Н	M	L
Duration	8	3 to 12 Month	าร	1:	2 to 24 Mont	hs	C	ver 24 Montl	าร
Other Issues	ner Issues								
1	The future	train service	pattern and	proposed CF	RL will require	e further con	sideration on	ce known	
2	Future des	sign should c	onsider any f	uture tie in w	ith the South	ndown Line A	lignment		
3	Alternate l	ocations for	grade separa	ted crossing	should be in	cluded as pa	rt of future st	tudy	
4			d (i.e. divert trong the Road		utt Ave) coul	d potentially	reduce the d	irect impact t	0
	_								

Table 13 - Output Summary for Woodward Road Level Crossing

4.5 Road & Rail Considerations

The existing alignment of Woodward Road is a two lane two way road of straight alignment, traversing in a north-south direction, with a major intersection located 70m to the south of the crossing (New North Road). A minor intersection with Jersey Ave is 60m from northern side of rail tracks. Both intersections are required to be raised 2.0m and 6.5m, respectively. This is required to enable Woodward Road to pass over the rail tracks with a minimum 5.5m clearance from track to underneath of the road bridge with a maximum road vertical gradient of 5%.

The rail alignment for the option 2 is restricted by the location of Mt Albert Station platforms and the possible junction of the future Southdown Line.

5 Site 14: St Jude Street

Road Name:	St Jude Street (14)	Control Type	KRN Line:	NAL
Project ID	NAL-W-13	(As in TCDM Part 9:Section 6):	Km'age:	17.40
Xing Name:	St Jude Street Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&I: 3024	
	St Jude Street	Active/FLBs ¹ & HABs ²	Nos of Track 2	
	St Jude Street Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Avondale

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

5.1 Site Description

The St Jude Street level crossing is located in the Whau Local Board are and is at 17.4km from the start of North Auckland Line (NAL), adjacent to the Avondale Rail Station. This section of St Jude Street is bounded by the Great North Rd/Wingate St/Saint Georges Rd intersection (150m) to the west and the Blockhouse Bay Road/New North Rd/Crayford St intersection (250m) to the northeast. The 12.5m wide existing carriageway is flanked by two 3.5m wide footpaths and berms which lead to the vehicular level crossing with both pedestrian level crossings set back from the carriageway. The highway alignment is relatively steep grade at 8% (east to west).



Photo 3: St Jude Street Crossing looking westward

St Jude Street is classified as district arterial and is designated as an oversize and overweight vehicles route. It

is surrounded by residential dwellings, with high density 4-storey residential complex situated to the south west corner of the crossing. There are residential property access onto St Jude St.. Both Donegal Street and Layard Street are adjacent to the crossing.

There is a local retail area at the bottom of St Jude St. St Jude Anglican church is 50m northeast of the level crossing.

There are railway tracks (up and down) crossing over the existing crossing. The Avondale Station has two 150m long side platforms and is 90m north of the crossing. The platform is accessed by a ramp and steps with pedestrian level crossing to the north end and by a pedestrian rail level crossing (Ped up) at the southern end which also serves as the St Jude St footpath crossing. The railway grade is from a steep incline (2.6%) and comes out into a small cutting at the station.

5.2 Site Constraints

From	Infrastructure Constraints	Operational Constraints
Road	 12.5m wide carriageway width at the level crossing 2 x 3.5m wide footway and berm Two major intersections within 300m radius 46 degree skew to the rail on radius Steep gradient over the entire length of the road Layard Street is adjacent to the crossing and behind the down platform 5m height restriction for OLE 	 District arterial road carrying 19,812 (AADT) 426 pedestrian movements per day (310 peak) Oversize and Overweight vehicles route No current bus routes use road On street parking on approach
Rail	 A gradient of 2.6% located west of the Station two tracks layout with platform grade at 1% path and ramp link to south end of the platform 	Close proximity to the Avondale Station Close proximity of the Chalmers St Level Crossing Close proximity of the Avondale pedestrian crossing Freight trains uses this section of track

² – HABs = Half Arm Barriers:

From	Infrastructure Constraints	Operational Constraints
Properties	Large apartment units to the SW Residential units surround the site	Driveway accesses from commercial and residential units
Services	Overhead electricity wire 150 Sewer under existing platform Telecom cable under eastern footpath	Further clarification of services is required
Others	• N/A	• N/A

Table 14 - Site Constraints for St Jude Street Level Crossing

5.3 Grade Separation Site Specific Assumptions and Caveats

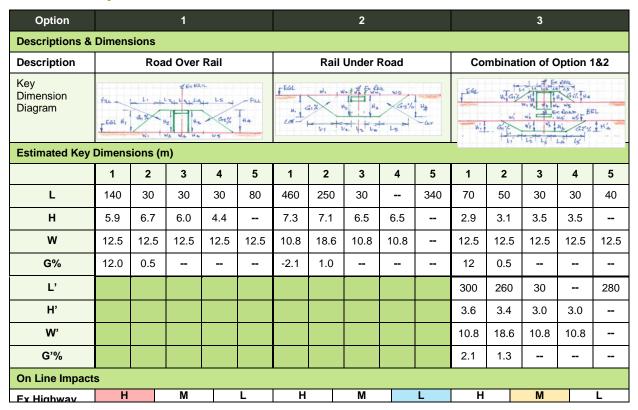
Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 12% Road Road/Rail separation 6.5m (road over) Speed as existing Consideration of sight safe stopping distance 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Property access gradient 12.5% (1 in 8)

Table 15 - Local assumptions for St Jude Street Level Crossing

5.4 Road & Rail Considerations

Due to the close proximity of St Jude Street to the Great North Road intersection, a steep gradient of 12% is required to achieve road over rail clearance. It is considered that this is a maximum gradient and that an iterative design exercise could reduce this. The design presented is considered a conservative approach.

5.5 Options Assessment



Option		1			2			3	
Alignment	driveways and the side roonegal Stayard Stayar	pad will impa and adjacen bad intersect t, Geddes Si with St Jude be closed to join to other	t streets ions of and St would vehicle				vay will impad and adjacen		
Ex Railway	Н	M	L	Н	M	L	Н	М	L
Alignment	As existing			extensive re	nent will requetaining wal rail corrido	ls on both	extensive	ment will requiretaining wall e rail corrido	s on both
Other Area Imp	acts								
Ex Highway	Н	М	L	Н	M	L	Н	М	L
Infrastructure	intersection	ay will go be n to Great N		the closure Chalmers S need to be during cons Blockhouse Bridge will the track no under the re	il alignment of the cross of th	sing at treet would r closed e over Rail binning as owered by 3.8m	restricted construction		
Ex Railway	Н	M	L	Н	M	L	Н	M	L
Infrastructure	new road le required	n access at evel with ran		New Station platforms and accesses for both ends to street level with lift and stairs		New Station platforms and accesses for both ends to street level with lift and stairs			
Impacts on Oth		T							T -
Adjacent Properties	A number of for the align	Mof properties	required	A number of properties required for temporary alignment		H M L A number of properties required for both final and temporary alignments			
Impacts from C	onstruction								
Complexity &	Н	М	L	Н	M	L	Н	М	L
Disruption		level crossi sures will be		Major disruption to rail services and temporary bridge for highway traffic		Major disruption to rail services and temporary bridge for highway traffic			
Costs	Н	М	L	Н	M	L	Н	M	L
Construction									
Property									
Total									
Likely	Н	M	L	Н	M	L	Н	M	L
Duration	8 to 12 Months 12 to 24 Months Over 2			hs	C	Over 24 Mont	hs		
Other Issues									
Other Issues			will require th	ne closure or	grade sepa	ration of the I	evel crossin	g at Chalmer	s St.
	The new ra	ail alignment	will require the		<u> </u>	ration of the I	evel crossin	g at Chalmer	s St.
1	The new ra	ail alignment ail alignment	will require a	new Avonda	le Station	ration of the I		-	s St.
1 2	The new ra	ail alignment ail alignment ail alignment	will require a	new Avonda	le Station		oad over Ra	il Bridge	s St.

Table 16 - Output Summary for St Jude Street Level Crossing

6 Site 16: Saint Georges Road

Road Name:	Saint Georges Road (16)	Control Type	KRN Line:	NAL
Project ID	NAL-W-15	(As in TCDM Part 9:Section 6): Km'age: 18.23		18.23
Xing Name:	Saint Georges Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C: 3024	
	Saint Georges Road	Active/FLBs ¹ & HABs ²	Nos of Track 2	
	Saint Georges Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Avondale

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

6.1 Site Description

The Saint Georges Road level crossing is located in the Whau Local Board area, at 18.23km from the start of North Auckland Line (NAL) and 900m to the south of Avondale station. The level crossing is 330m north of a "T intersection" between Wolverton Road and Saint Georges Road, and 150m to the south of Kelvinside Tce. The 9.5m wide existing carriageway is flanked by 3.5m wide footpaths on either side of the road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both road and railway alignments are relatively flat at the crossing. A median traffic island installed on either side of the rail tracks is used to separate opposing traffic



Photo 4: General view of the Xing looking northward

The road is classified as a district arterial and is currently used as a bus route. It is surrounded on the western side by

residential properties and on the eastern side by high density residential apartments which back onto a an industrial/commercial estate area centred around Lansford Cres. There are a number of property driveways which exit onto Saint Georges St. The residential apartments at the southeast are accessed off Saintly Lane which is 40m to the south of the level crossing.

The gradient of the railway is set at the maximum grade for freight traffic, being from the east is around 2% and steepens slightly towards the west. It flattens then to 0.0% as it passes across the Whau River

6.2 Site Constraints

From	Infrastructure Constraints	Operational Constraints
Road	 9.5m wide carriageway width 2 x 3.5m wide footpath and berm 330m to a major intersection 30 degree skew to the rail Access road to residential apartments is located 40m to the SE of the crossing 	 Road carrying 8,862 (AADT) Adjacent local roads Bus routes 191,193 On street parking on approach 326 pedestrian movements per day (234 peak)
Rail	 gradient of 0.8% located south of the crossing . gradient of 2.3% located north of the crossing two tracks layout Rail bridge over Whau River approximately 420m SW of crossing 	Maximum gradient of track in vicinity means grade changes have a far reaching impact including the St Jude Street, Chalmers Street and Portage Rd level crossings Freight traffic uses this section of track
Properties	Directly surrounded by residential properties and apartments, with commercial/industrial park adjacent.	Driveways from commercial and residential units accessing onto Saint Georges St
Services	Overhead electricity wire675 Sewer across the crossing	• TBC

² – HABs = Half Arm Barriers:

	100/150 water mains under crossingFibre optic cable under crossing	
Others	TBC	TBC

Table 17 - Specific constraints for Woodward Road Level Crossing

6.3 Grade Separation Site Specific Assumptions and Caveats

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) Sight Line 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Alignment speed as existing Horizontal alignment as existing Rail bridge (Bridge 58) located west of the crossing is to be retained 	Property access gradient 12.5% (1 in 8)

Table 18 - Specific Assumptions - St Georges Road Level Crossing

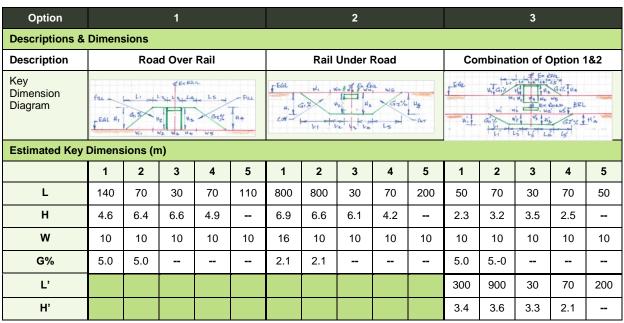
6.4 Road & Rail Considerations

The existing alignment of Saint Georges Road is a two lane two way road of straight alignment, traversing in a north-south direction. There are no major road constraints on this site. The road over rail option for Saint Georges Road, with a minimum track clearance of 5.5m over the rail tracks and a maximum gradient of 5%, does not impact on either Kelvinside Tce or the Wolverton Rd/St Georges Road intersection.

Both a Rail Under Road and a combination of a Road Over/ Rail Under option have been considered. However both options require a considerable length of track to the north to be lowered which includes having to grade separate both Chalmers St and the St Jude St level crossings (Chalmers St Options could also include closure). These excessive rail adjustments may make the rail under options financially unviable.

The excessive track gradient of 2.5% (compensated for horizontal geometry) for both options extends over 1.5km from the Saint Georges Road crossing, before tying into existing. If the options are to be included for the future design, the study area should extend to north of the Avondale Station.

6.5 Options Assessment



Option		1			2				3		
W'							16	10	10	10	10
G'%							1.9	1.1			
							1.9	1.1			
On Line Impact	s H	l M	L	Н	М	L	н		М		1
Ex Highway Alignment	Elevated road will impact to driveways and adjacent streets		As existing		Elevated road will impact to driveways and adjacent streets						
Ex Railway	Н	M	L	H	M	L	H	مالات مالات	M	141	L
Alignment	As existing			W2 width allows for NAL up & down mains, plus additional width for Avondale station. G'1 & G'2 either side of Avondale station (1% through station)			W2 width allows for NAL up & down mains, plus additional width for Avondale station. G'1 & G'2 either side of Avondale station (1% through station)				
Other Area Imp	acts										
Ex Highway	Н	M	L	Н	M	L	Н		M		L
Infrastructure	New highway would require diversion of Saintly Lane to reduce the property impacts			St level cros	Both Chalmers Street and St Jude St level crossings will require grade separation (Chalmers St options could also include closure)			Both Chalmers Street and St Jude St level crossings will require grade separation (Chalmers St options could also include closure)			
Ex Railway	Н	M	L	H	M	L	Н		M		L
Infrastructure	As Existing			Track lowering will be required between Blockhouse Bay Road and east abutment of Whau Creek Bridge (Bridge 58) New Avondale Station will be required			Track lowering will be required betweennorth of Avondale Station and east abutment of Whau Creek Bridge (Bridge 58) New Avondale Station will be required				
Impacts on Oth	ers										
Adjacent	Н	М	L	Н	M	L	Н		М		L
Properties	A number of properties required for the alignment			A number of properties required for temporary alignment		A number of properties required for both final and temporary alignments					
	Tor the dilg										
Impacts from C											
Impacts from C Complexity &			L	Н	M	L	Н		M		L
<u> </u>	onstruction H Temporary railway clo	ı	sing and	Major disruj and tempor traffic	otion to rail	services	Major and te traffic		M ion to rary bridge		ces
Complexity &	onstruction H Temporary	M level cross	sing and	Major disrupand tempor	otion to rail	services	Major and te		ion to ra		ces
Complexity & Disruption	onstruction H Temporary railway clo	M / level cross	sing and e required	Major disruj and tempor traffic	otion to rail ary bridge	services for highway	Major and te traffic		ion to ra y bridge		ces hway
Complexity & Disruption	onstruction H Temporary railway clo	M / level cross	sing and e required	Major disruj and tempor traffic	otion to rail ary bridge	services for highway	Major and te traffic		ion to ra y bridge		ces hway
Costs Construction	onstruction H Temporary railway clo	M v level cross sures will b	sing and e required	Major disru and tempor traffic	otion to rail ary bridge	services for highway	Major and te traffic H		ion to rary bridge		ces hway
Costs Construction Property Total Likely	onstruction H Temporary railway clo H	M v level cross sures will b	sing and e required	Major disru and tempor traffic H	M	services for highway	Major and te traffic	emporai	M M M	e for hig	ces hway
Costs Construction Property Total Likely Duration	onstruction H Temporary railway clo H	M v level cross sures will b	sing and e required	Major disru and tempor traffic H	otion to rail ary bridge t	services for highway	Major and te traffic H	emporai	ion to rary bridge	e for hig	ces hway
Costs Construction Property Total Likely	onstruction H Temporary railway clo H	M v level cross sures will b	sing and e required	Major disru and tempor traffic H	M	services for highway	Major and te traffic H	emporai	M M M	e for hig	ces hway
Costs Construction Property Total Likely Duration	onstruction H Temporary railway clo H	M v level cross sures will b M M M B to 12 Mon	sing and e required	Major disru and tempor traffic H H	M M to 24 Mon	services for highway	Major and te traffic H	Ove	M M M er 24 Mo	e for hig	ces hway
Costs Construction Property Total Likely Duration Other Issues	onstruction H Temporary railway clo H H New highw property in When inve	M velocities will b M M M M Sto 12 Mon Vay alignme Inpacts	ing and e required L ths ent for Option 2	Major disruj and tempor traffic H 12	M to 24 Mon	services for highway L L ths	Major and te traffic H	Ove	M M r 24 Mo	nths	ces chway

Table 19 – Output Summary for Saint Georges Road Level Crossing

7 Site 17: Portage Road

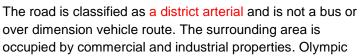
Road Name:	Portage Road (17)	Control Type	KRN Line:	NAL
Project ID	NAL-W-16	(As in TCDM Part 9:Section 6):	Km'age:	18.88
Xing Name:	Portage Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&I:	2997
	Portage Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Portage Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	New Lynn

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

7.1 Site Description

The existing Portage Road level crossing is located in the Whau Local Board area, at 18.88km from the start of North Auckland Line (NAL) and to the east of New Lynn Rail Station. The crossing is 300m north of the Portage Road/ Clark Street intersection . The 11.5m wide existing carriageway is flanked by a 3.5m wide footpath and grass berm on either side of the road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both highway and railway alignments are relatively flat at the crossing.





park is located on the southeast corner of the crossing. There are a number of commercial vehicle accesses in this section of Portage Road.

There are railway tracks (up and down) crossing over the existing crossing. 150m to the east of the crossing is rail bridge (Bridge 58) over the Whau Creek in the Olympic Park Reserve. On the northern side of the rail track a pedestrian walkway connects Portage road to Veronica Street to the west. To the west the railway passes the 300m through the New Lynn Rail station trench to the underground New Lynn Rail station. The trench passes under Veronica St 109m west of the crossing.

7.2 Site Constraints

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footway and berm 300m to a major intersection 90 degree skew to the rail 4.25 headroom restriction for the OLE 	 Roads carrying 10,833 (AADT) Close proximity to Clark St and New North Road High volume of commercial vehicles On street parking on approach 121 pedestrian movements per day (peak 76)
Rail	 gradient of 0.0% located south of the crossing . gradient of 1.2% located north of the crossing two tracks layout Whau River rail bridge 150m to the east Road bridge approximately 190m west of crossing New Lynn Rail Trench to the west of crossing Pedestrian walkway crossing to Veronica Close proximity to Veronica Street overpass 	Close proximity to the New Lynn Station Freight traffic uses this section of track
Properties	Surrounded by industrial/ commercial units Olympic park on SE corner	Highway vehicle accesses from commercial and industrial units
Services	 Overhead electricity wires 150/200 water mains under crossing Fibre optic cable to the south of crossing 	

² – HABs = Half Arm Barriers:

Others	TBC	

Table 20 - Specific constraints - Portage Road Level Crossing

7.3 Grade Separation Site Specific Assumptions and Caveats

Road Related	Rail Related	Others
2 x 3.5m wide Lane	Max gradient 2% desirable (2.5%	Private way gradient 12.5% (1 in 8)
Cycle Lane 1.5m, Pedestrian 2.0m	maximum) compensated grade for	
Max gradient 5% Road	freight	
Road/Rail separation 6.5m (road over)	 Rail to road separation 6.5m (rail 	
 Speed as existing (50kph) 	under)	
	 Gradient at station set as existing 	
	 Alignment speed as existing 	
	 Horizontal alignment as existing 	

Table 21 - Specific Assumptions - Portage Road Level Crossing

7.4 Road & Rail Considerations

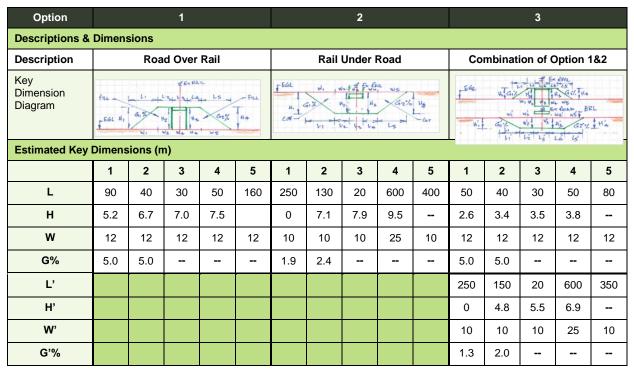
Portage Road is single lane in either direction with minor changes in horizontal alignment within the crossing and 150m to the north,.

The road over rail option follows the existing horizontal alignment as per the Study scope. However, the elevated road alignment should avoid including these minor horizontal alignment because it makes it difficult to achieve the required vertical alignment, super-elevation, and sight distances. It is recommended to provide a large continuous curve instead of these minor horizontal direction changes. This may impact on additional properties.

A Rail Under Road option was considered; it would require the Whau River rail bridge, the and the recently completed New Lynn rail trench and station all to be lowered. This option was discussed with the AT team and was deemed unfeasible to pursue further due to significant cost and operational impacts.

A Combination Road Over / Rail Under was also considered; it would also require changes to the Whau River rail bridge and New Lynn Station and was deemed unfeasible.

7.5 Options Assessment



Option		1			2		3		
On Line Impact	S								
Ex Highway	Н	М	L	Н	М	L	Н	M	L
Alignment		oad will impa and adjacen		As existing				oad will impa and adjacen	
Ex Railway	Н	М	L	Н	М	L	Н	М	L
Alignment	As existing			the recent of Rail Trench the Whau (ignment to occumpleted Nones well as Creek Rail Bacceptable	New Lynn dropping Bridge	the recent Rail Trenc the Whau	lignment to g completed N h as well as o Creek Rail B acceptable I	ew Lynn dropping ridge
Other Area Imp	acts								
Ex Highway	Н	M	L	Н	M	L	Н	M	L
Infrastructure	existing ali	ay will be tie gnment with of the cross	in 200m	constructio shopping a	c disruption n for New Ly rea		construction shopping a	ic disruption on for New Ly area	
Ex Railway	Н	М	L	Н	M	L	Н	M	L
Infrastructure	As Existing			Complete reconstruction of New Lynn Rail Trench and Station – significant rail services disruption			Complete reconstruction of New Lynn Rail Trench and Station – significant rail services disruption		
Impacts on Oth	ers								
Adjacent	Н	М	L	Н	М	L	Н	М	L
Properties	A number of for the alignment	of properties nment	required	A number of properties required for temporary alignment A number of properties require for temporary alignment					
Impacts from C	onstruction								
Complexity &	Н	М	L	Н	М	L	Н	М	L
Disruption		level crossi sures will be		Major disruption to rail services and temporary bridge for highway traffic			Major disruption to rail services and temporary bridge for highway traffic		
Costs	Н	М	L	Н	M	L	Н	M	L
Construction									
Property									
Total									
Likely	Н	M	L	Н	M	L	Н	M	L
Duration	8	to 12 Month	ns ————————————————————————————————————	0	ver 24 Mont	ths		Over 24 Mont	hs
Other Issues									
1		Rail Trench				l 3 will signific ver rail bridge			
2	The horizo	ntal curves f	or the highwa	ay alignment	should be re	emoved.			
3		, ,	Park would r		located				

Table 22 - Output Summary for Portage Road Level Crossing

8 Site 19: Glenview Road

Road Name:	Glenview Road (19)	Control Type	KRN Line:	NAL
Project ID	NAL-W-18	(As in TCDM Part 9:Section 6):	Km'age:	22.43
Xing Name:	Glenview Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C:	2997
	Glenview Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Glenview Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Glen Eden

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

8.1 Site Description

The existing Glenview Road level crossing is located in the Waitakere Local Board area, at 22.43km from the start of North Auckland Line (NAL) and at the western end of Glen Eden Rail Station (includes historic rail buildings). 40m to the south of the level crossing is the "T intersection" of Glenview Road and West Coast Road which is in the heart of the Glen Eden shopping centre. On the southwest corner of the level crossing is a large carpark currently used as the Glen Eden Rail station park n ride site. 50m to the north of the crossing Glenview Rd intersects with Clayburn Road and Waikumete Rd Glen Eden Primary school is located on the eastern side

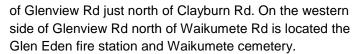




Photo 6: Glenview Road crossing looking southward

The 12.5m wide existing carriageway is flanked by a 3.5m wide footpath and wide grass berm on the western side of the road. On the eastern side the footpaths feed into the level crossing mazes on both sides which join the station platform access ramps. The level crossing consists of a vehicular crossing (2 lanes eastern side, median, one lane west) with two separated pedestrian level crossings. Glenview Rd is at a 6% grade through the crossing. Immediately north of the road crossing the highway veers 45° to the right. The rail is on a 1.0% grade falling from the east.

The road is classified as a district arterial and is not a bus or over dimension vehicle route. It is surrounded by commercial/retail units and the Glen Eden Rail station. The commercial retail units and the park n ride carpark have direct access onto Glenview Road via either road vehicle crossings. There are railway tracks (NAL up and down) crossing over the existing crossing. The western end of the rail Station platforms is located 20m east of the crossing.

From	Infrastructure Constraints	Operational Constraints
Road	12.5m wide carriageway width (across the rail track) 2 x 3.5m wide footway and berm 40m to a major intersection and Glen Eden shops 50m to a minor road intersection 45 degree skew to the rail 4.25m headroom restriction for OLE Wiakumete cemetery to north west Glen Eden Fire station to north west Glen Eden Primary school to north east	 Road carrying 11,434 (AADT) Local Roads and off-road public parking around the crossing On street parking on north east approach only 2,044 pedestrian movements per day (1,166 peak)

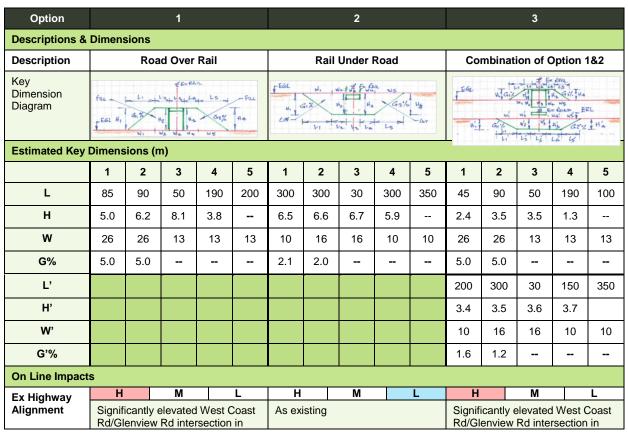
² – HABs = Half Arm Barriers:

Rail	 gradient of 1.0% located east of the crossing . gradient of 0% located west of the crossing two tracks layout Glen Eden station immediately to the east of the crossing Pedestrian bridge 180m to the east of crossing 	Adjacent to the Glen Eden station Freight traffic uses this section of track
Properties	Surrounded by commercial properties, rail station, carpark Glen Eden shops 40m to the south	Highway vehicle accesses from commercial units
Services	Overhead electricity wires 150 water mains under crossing Fibre optic cable under crossing Vector transmission line to the north of crossing	• TBC
Others	Gle Eden Primary School adjacent to crossing Wiakumete cemetery near crossing Steep topography around crossing, which makes the on line tie in relatively difficult	• TBC

Table 23 – Site Constraints – Glenview Road Level Crossing

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5.5% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

Table 24 - Specific Assumptions - Glenview Road Level Crossing



Option		1			2		3			
	the Glen Eden shops requires 440m of West Coast Rd to also be raised. Elevated road will impact to driveways and adjacent streets						the Glen Eden shops requires West Coast Rd to also be raised. Elevated road will impact to driveways and adjacent streets			
Ex Railway	Н	M	L	Н	М	L	Н	M	L	
Alignment	As existing			either side excess of a would be re	existing top of the cross 1.2km of trace equired to late the prop	ing, in ck lowering	either side excess of would be r	date the prop	ing, in ck lowering	
Other Area Imp	acts									
Ex Highway	Н	M	<u> </u>	Н	M	L	Н	M	L	
Infrastructure		ay will also West Coast		As existing	l		New highw raising of	vay will also i West Coast	require Road	
Ex Railway	Н	M	L	Н	M	L	Н	М	L	
Infrastructure		n access at new road le		accesses f	New Station platforms and accesses for both ends to street level with lift and stairs			New Station platforms and accesses for both ends to street level with lift and stairs		
Impacts on Oth	ers									
Adjacent	Н	М	L	Н						
	Extreme impact to existing shopping area in addition to other properties along the raised alignment			П	М	L	Н	М	L	
Properties	shopping a properties	npact to exis irea in additi	ting on to other	The lowering the adjace	ng of station	will impact	Extreme ir shopping a properties alignment. The loweri the adjace	mpact to exis area in additi along the rai ing of station ent properties	ting on to other ised will impact both	
Properties	shopping a properties alignment	npact to exisurea in additial	ting on to other	The lowering the adjacenduring con-	ng of station	will impact both	Extreme ir shopping a properties alignment. The loweri the adjace during con	mpact to exis area in additi along the rai ing of station ent properties	ting on to other sed will impact both	
Properties Impacts from C	shopping a properties alignment	npact to exisurea in additial	ting on to other	The lowering the adjacenduring con-	ng of station	will impact both	Extreme ir shopping a properties alignment. The loweri the adjace during con	mpact to exis area in additi along the rai ing of station ent properties	ting on to other ised will impact both	
Properties	shopping a properties alignment onstruction H Temporary	npact to exis rea in additi along the ra	on to other ised	The lowering the adjaced during consalignment	ng of station nt properties struction and	will impact s both d at the final	Extreme ir shopping a properties alignment. The loweri the adjace during con alignment H Major disre	mpact to exis area in additi along the rai ing of station ent properties astruction and	will impact both dat the final	
Impacts from C Complexity &	shopping a properties alignment onstruction H Temporary	mpact to exister a distribution of the rate of the rat	on to other ised	The lowering the adjaced during consalignment H Major disruand tempo	mg of station nt properties struction and M uption to rail	will impact s both d at the final	Extreme ir shopping a properties alignment. The loweristhe adjace during con alignment H Major disriand tempo	mpact to exis area in additi along the rai ing of station ent properties astruction and M uption to rail	will impact both dat the final	
Impacts from C Complexity & Disruption	onstruction H Temporary railway closs	mpact to exister a management of the rate	ting on to other ised L ng and e required	The lowering the adjaced during conalignment H Major disruand tempo traffic	mg of station nt properties struction and M uption to rail rary bridge f	will impact s both d at the final L services or highway	Extreme ir shopping a properties alignment. The loweri the adjace during con alignment H Major disread temporary	mpact to exis area in additi along the rai ing of station ent properties astruction and M uption to rail orary bridge for	will impact both d at the final L services or highway	
Impacts from C Complexity & Disruption Costs Construction	onstruction H Temporary railway closs	mpact to exister a management of the rate	ting on to other ised L ng and e required	The lowering the adjaced during conalignment H Major disruand tempo traffic	mg of station nt properties struction and M uption to rail rary bridge f	will impact s both d at the final L services or highway	Extreme ir shopping a properties alignment. The loweri the adjace during con alignment H Major disread temporary	mpact to exis area in additi along the rai ing of station ent properties astruction and M uption to rail orary bridge for	will impact both d at the final L services or highway	
Impacts from C Complexity & Disruption Costs	onstruction H Temporary railway closs	mpact to exister a management of the rate	ting on to other ised L ng and e required	The lowering the adjaced during conalignment H Major disruand tempo traffic	mg of station nt properties struction and M uption to rail rary bridge f	will impact s both d at the final L services or highway	Extreme ir shopping a properties alignment. The loweri the adjace during con alignment H Major disread temporary	mpact to exis area in additi along the rai ing of station ent properties astruction and M uption to rail orary bridge for	will impact both d at the final L services or highway	
Impacts from C Complexity & Disruption Costs Construction Property Total Likely	shopping a properties alignment onstruction H Temporary railway closs H	mpact to exister a material and the rate of the rate o	L ng and required L	H Major disruand tempo traffic	M uption to rail rary bridge f M M	will impact s both d at the final L services for highway L L	Extreme ir shopping a properties alignment. The loweristhe adjace during con alignment H Major dismand temporaristic H	mpact to exisarea in additional along the rail along the rail along the rail along of station and the rail along the rail alon	will impact both d at the final L services or highway	
Impacts from C Complexity & Disruption Costs Construction Property Total	shopping a properties alignment onstruction H Temporary railway closs H	mpact to exister a management of the management	L ng and required L	H Major disruand tempo traffic	mg of station nt properties struction and M uption to rail rary bridge f	will impact s both d at the final L services for highway L L	Extreme ir shopping a properties alignment. The loweristhe adjace during con alignment H Major dismand temporaristic H	mpact to exis area in additi along the rai ing of station ent properties astruction and M uption to rail brary bridge for	will impact both d at the final L services or highway	
Impacts from C Complexity & Disruption Costs Construction Property Total Likely Duration	shopping a properties alignment onstruction H Temporary railway closs H	M level crossisures will be M wer 24 Mont	L ng and required L	H Major disruand tempo traffic H	M uption to rail rary bridge f M M uption 40 M M M ver 24 Montage f	will impact is both did at the final lead to the	Extreme ir shopping a properties alignment. The loweristhe adjace during con alignment H Major dismand temportraffic H	mpact to exisarea in additional along the rail along the rail along the rail along of station and the results of the results o	will impact both d at the final L services or highway L hs	

Table 25 - Output Summary for Glenview Road Level Crossing

8.5 Road & Rail Considerations

The existing alignment of Glenview Road in the vicinity of the crossing is a three lane two way road with flush medians (solid for 5m either side of the crossing), traversing in a north-south direction. A major intersection with West Coast Road is located 40m to the south, and a minor intersection with Waikumete Road and Clayburn Road is 50m to the north.

To deliver a road over rail solution along the existing road alignment the West Coast Rd/Glenview Rd intersection would require raising 8.5m and the Waikumete Rd/Clayburn Rd 2.7m giving a minimum 5.5m clearance over the existing rail tracks with maximum road gradient of 5%. 440m of West Coast Rd would also need to be raised causing an extreme impact to the Glen Eden shops. This was

discussed with the AT project team; it was agreed that due to the extreme impact this option would have on the Glen Eden shops, the option was dismissed as not being feasible to pursue further.

A Rail under Road option was considered; to lower the track and merge the vertical alignment back into the existing would require over 1.2km of track rebuild. The combination of Road Over / Rail Under option was also considered; this option would require over 1.0km of track rebuild. These options were discussed with the AT team and both deemed unfeasible to pursue further.

9 Site 21: Bruce McLaren

Road Name:	Bruce McLaren Road (21)	Control Type	KRN Line:	NAL
Project ID	NAL-W-20	(As in TCDM Part 9:Section 6):	Km'age:	25.55
Xing Name:	Bruce McLaren Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C:	2997
	Bruce McLaren Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Bruce McLaren Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Sunnyvale

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

9.1 Site Description

The existing Bruce McLaren Road level crossing is located in the Henderson – Massey Local Board area, at 25.55km from the start of North Auckland Line (NAL) and to the north of Sunnyvale Rail Station (at 25.0km). Henderson rail station is approximately 800m north of the crossing. The crossing is 10m west of the "T junction" intersection between Bruce McLaren Road and Railside Avenue. (Note: Southern leg of Railside Avenue is a no through road. The 11.5m wide existing carriageway is flanked by two 3.5m wide footpaths on Bruce McLaren Road. Railside Avenue only has a footpath on the eastern side. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both highway and railway alignments are relatively flat at the crossing.



Photo 7: Bruce McLaren Xing looking North West

The road is classified as collector/ district arterial and is an existing bus route. It is surrounded by low levels industrial units. An access road immediately to the west of the crossing leads to the Henderson Train Stabling Yard and adjacent industrial complex located at the northwest corner of the crossing. There are a number of commercial property vehicle accesses off Bruce McLaren in the vicinity of the crossing..

There are two railway tracks (up and down) passing the level crossing. The rail entrance of the Henderson stabling yard is located some 500m north of the crossing Any future southern entrance into the stabling facility would likely impact the level crossing.

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footway and berm 7m to a major intersection 90 degree skew to the rail 5.0m Headroom clearance for OLE 	 Local Road 10,760 (AADT) High volume of commercial vehicles Bus routes 154, 163 On street parking on approach 206 pedestrian movements per day (106 peak)
Rail	gradient of 0.8% located south of the crossing . gradient of 0% located north of the crossing two tracks layout Rail turnout to yard at 500m north of the crossing Close proximity of Sunnyvale Station	Close proximity to the Sunnyvale (500m away) Junction and track works for the stabling yard Freight traffic uses this section of track
Properties	Surrounds by industrial/ commercial units Stabling yard highway entrance at NW of the Xing	Highway vehicle accesses from commercial units
Services	Overhead electricity wire to the west 150 Sewer just north of the crossing footpath	• TBC

² – HABs = Half Arm Barriers:

	150/200 water mains under crossing	
Others	TBC	TBC

Table 26 - Site Constraints - Bruce McLaren Road Level Crossing

Road Related	Rail Related	Others
2 x 3.5m wide Lane	Max gradient 2% desirable (2.5%)	Private way gradient 12.5 (1 in 8)%
Cycle Lane 1.5m, Pedestrian 2.0m	maximum) compensated grade for	
Max gradient 5% Road	freight	
Road/Rail separation 6.5m (road over)	Rail to road separation 6.5m (rail	
Speed as existing	under)	
,	Gradient at stations set as existing	
	Alignment speed as existing	
	Horizontal alignment as existing	

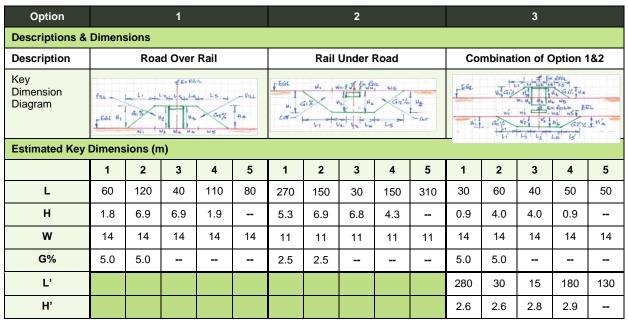
Table 27 - Specific Assumptions - Bruce McLaren Road Level Crossing

9.4 Road & Rail Considerations

The existing alignment is a two lane two way road, traversing in a east-west direction. A major intersection with Railside Avenue is located 7m to the east, and a major access to the adjoining industrial estate is located 10m west of the rail tracks. The unrestricted vehicle path is from Bruce McLaren into Railside Ave. Railside Ave traffic from the south of the crossing travelling north are required to give way.

Due to the major traffic flow characteristic (most of the traffic turn right from Railside Avenue into Bruce McLaren Road), the proposed road over rail option catered for this movement as the main alignment with secondary ramps to provide links to properties east of the junction. A Service road/ramp is provided beneath the new elevated road alignment to reduce the impact on the major access to the neighbouring industrial estate. This allows the proposed elevated road alignment to be over the rail tracks of minimum 5.5m with a maximum highway gradient of 5%.

For the rail under road option, the lowered rail alignment was constrained by the location of Sunnyvale station to the south and the entrance layout of the stabling yard (to the north, adjacent to Henderson Station). The option can be achieved requiring over 900m of track to be lowered. The combination of Road Over / Rail Under option would provide better tie in constraints at both ends. However, both these options will deny the opportunity to provide future a south end entrance to the stabling yard.



Option			1					2					3		
W'											11	11	11	11	11
G'%											2.0	2.4			
On Line Impact	S														
Ex Highway	H M L			Н		M		L	Н		M		L		
Alignment	current	alignn	nt is off nent to design sta	conform		As exi	sting				currer	nt align	ent is off ment to esign st	conforn	
Ex Railway	Η		M		L	Н		M		L	Н		M		L
Alignment	As exis	sting						ı walls wi alignmen		equired		ning wa ew aligr	alls will b nment	e requi	red for
Other Area Imp	acts														
Ex Highway	Н		M		L	Н		М		L	Н		M		L
Infrastructure	access	ses to a	d will impadjacent uthern e nue	proper		As exi	sting				acces and to	ses to	d will im adjacen outhern e nue	t proper	
Ex Railway	Н		M		L	Н		М		L	Н		M		L
Infrastructure	As Exis	sting				southe	ern end	ection be d stabling will be l	yard		Future connection between the southern end stabling yard and the main line will be lost				
Impacts on Oth	ers														
Adjacent	Н		М		L	Н		M		L	Н		M		L
Properties	A num for the		propertie ent	es requ	ired	A number of properties required for temporary alignment			A number of properties required for temporary alignment						
Impacts from C	onstruc	tion													
Complexity &	Н		M		L	Н		М		L	Н		M		L
Disruption		be m	l operat anaged, nised.			Major disruption to rail services and temporary bridge for highway traffic			Major disruption to rail services and temporary level crossing bridge will be required for highway traffic						
Costs	H		М		L	Н		M		L	Н		M		L
Construction															
Property															
Total															
Likely	Н		M		L	Н		M		L	Н		M		L
Duration		8 to	12 Mor	nths			12	to 24 Mo	nths			Ove	er 24 Mo	onths	
Other Issues															
1			be slight				g junct	ion to ca	ter fo	the high	way traf	fic flow	and imp	orove th	е
2	Ramp	for the	east se	ction of	the Rai	lside Av	enue (westbou	nd tra	ffic) woul	d be red	quired			
3	Service		ss for th	e NW ii	ndustria	l estate	and sta	abling ya	rd wo	uld need	to be co	onsider	ed for th	e optio	า 1
4			d 3 may e McLar		re with f	uture pla	ans to	create a	south	ern link ir	nto the H	Henders	son trair	stablin	g yard

Table 28 - Output Summary for Morningside Drive Level Crossing

10 Site 25: Metcalfe Road

Road Name:	Metcalfe Road (25)	Control Type	KRN Line:	NAL
Project ID	NAL-W-23	(As in TCDM Part 9:Section 6):	Km'age:	29.50
Xing Name:	Metcalfe Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C:	2998
	Metcalfe Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Metcalfe Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Ranui

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

10.1 Site Description

The existing Metcalfe Road level crossing is located in the Henderson – Massey Local Board area, at 29.50km from the start of North Auckland Line (NAL) and to the east of Ranui Rail Station (at 29.75km). The crossing is bounded by a "T intersection" between Metcalfe Road and Ranui Station Road to the north and a "T intersection" between Metcalfe Road and Pooks Road to the south. A further 30m south of the Pooks Rd junction is a small roundabout controlling the intersection of Munroe Rd and Metcalfe Rd.

The 11.5m wide existing carriageway is flanked by two 3.5m wide footpaths. The level crossing consists of a vehicular crossing complete with short length raised median islands



Photo 8: Metcalfe Road Xing looking eastward

with two separated pedestrian level crossings. The highway is on around a 4% grade through the crossing, with the rail at around a 0.8% grade.. The road is classified as collector/ district arterial and is on an existing bus route. It is not a designated over dimension route. It is mostly surrounded by residential properties. On the north east corner is a Jehovah's Witness centre. Ranui rail station platforms begin 80m from the crossing. There are a number of property driveways existing onto Metcalfe Rd.

There are two railway tracks (up and down) passing over the existing crossing. The Ranui Station has two 150m long island platforms on the western side of the crossing. The platforms are accessed by footpaths on either side of the railway track, extending from the crossing to the station. Ramps are located on the footpath to lead up onto the platforms on both sides. A pedestrian rail level crossing is located 240m away from the level crossing at the western end of the station to allow pedestrians to cross between platforms.

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footway and berm 20m both north and south to major intersections 45 degree skew to the rail 5.0m Headroom clearance for OLE 	 The road has 14,330 (AADT) Adjacent local roads High volume of residential vehicles Bus routes 087,097,14 On street parking on northern approach 204 pedestrian movements per day (128 peak)
Rail	 gradient of 1.3 % located east of the crossing gradient of 0.5% located west of the crossing two tracks layout adjacent to the Ranui rail station 	Close proximity to the Ranui Station (90m away) Freight traffic uses this section of track
Properties	Surrounded by residential units	Highway vehicle accesses from residential units

² – HABs = Half Arm Barriers:

	Jehovah's witness centre on north east corner	
Services	Overhead electricity wire to the west	TBC
	225 Sewer just west of crossing	
	100/180/355 water mains under crossing	
	Fibre optic cable under crossing	
Others	TBC	TBC

Table 29 - Specific constraints - Metcalfe Road Level Crossing

Road Related	Rail Related	Others
2 x 3.5m wide Lane	Max gradient 2% desirable (2.5%	Private way gradient 12.5% (1 in 8)
Cycle Lane 1.5m, Pedestrian 2.0m	maximum) compensated grade for	
Max gradient 5% Road	freight	
Road/Rail separation 6.5m (road over)	Rail to road separation 6.5m (rail	
Speed as existing	under)	
	Gradient at station set as existing	
	Alignment speed as existing	
	Horizontal alignment as existing	

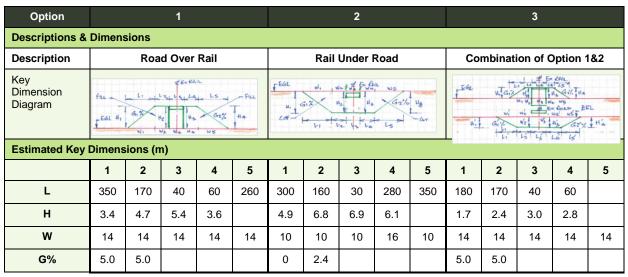
Table 30 - Specific Assumptions - Metcalfe Road Level Crossing

10.4 Road & Rail Considerations

The existing alignment of Metcalfe Road is a two lane two way road, traversing in a north-south direction. Major intersections with Pooks Road (60m from crossing) and Munroe Road (40m from crossing) are located on the southern side of the crossing, and another major intersection with Ranui Station Road is 20m to the north of the crossing.

For the road over rail option, the Pooks Rd and Munroe Rd intersections are brought together to form a four way intersection with Metcalfe Rd. Both this resulting four way intersection and the Ranui Station intersection require raising 3.0m and 6.0m, respectively. This would enable Metcalfe Road to pass over the rail tracks with a minimum of 5.5m with a maximum highway gradient of 5%.

In terms of proximity between Ranui Station Road and the rail tracks, it is recommended in the future design to disconnect Ranui Station Road with Metcalfe Road, where traffic could make a detour through Elwarth Way and Duxfield Drive. For both track lowering options, consideration of the close proximities of Ranui Station needs to be taken into account for the alignment development. The alignment for Option 2 has been developed to provide a smooth run in and run out on the eastern approach, at the same time providing a future connection to the work basin / stabling yard (The old KiwiRail Ranui work yard). The alignment for Option 3 has not taken these into the consideration.



Option			1				2					3		
Ľ										150	80	30	280	250
H'										3.3	3.7	4.0	3.3	
W'										10	10	10	16	10
G'%										0.9	2.4			
On Line Impact	s					1								
Ex Highway	Н		M	L	Н		M		L	Н		М		L
Alignment	impact drivew Realig	s to ad ays nment	jacent h	ve major ighways and ooks- ersections	As ex	isting						d will ha ways a		
F. D. H.	Н		М	L	Н		М		1	Н		М	1	ı
Ex Railway Alignment	As exis	sting		_	Ranu and re alignr provid	i Stati ealign nent v de a s	on would ment of the would be remooth run eastern ap	e vert equire in an	ical d to d run	Ranui and re alignn provid	ealignm nent wo le a sm	would ent of th uld be r ooth rur stern ap	ne vertion equired in and	al I to run
Other Area Imp	acts													
Ex Highway	Н		M	L	Н		М		L	Н		M		L
Infrastructure		ctions		peyond r side of the		As existing			New highway will go beyond intersections on either side of the level crossing					
Ex Railway	Н		M	L	Н		М		L	Н		M		L
Infrastructure		evated		t east end to el with lift	acces	New Station platforms and accesses for both ends to street level with lift and stairs			street	New Station platforms and accesses for both ends to street level with lift and stairs				
Impacts on Oth	ers				•									
Adjacent	Н		M	L	Н		М		L	Н		M		L
Properties	A num for the			es required	None							properti ay align		ired
Impacts from C	onstruc	tion												
Complexity &	Н		М	L	Н		М		L	Н		М		L
Disruption				sing and be required		empoi	ption to ra ary bridge				emporai	ion to ra y bridge		
Costs	Н		М	L	Н		М		L	Н		М		L
Construction														
Property														
Total														
Likely Duration	Н	12 to	M o 24 Moi	nths	Н		M 2 to 24 Mo	nths	L	Н	Ove	M r 24 Mc	onths	L
Other Issues														
1	Outflov	w from	ponds to	the east m	ay be affe	cted c	due to low	ering o	of vertical	rail alig	nment			
2	The hi	ghway	works c	an be reduc	ed by mak	ing so	ome of the	local	roads to	a no thr	ough ro	ad		
3	Option	s could	l be imp	lemented wi	th station	redev	elopment							
	Options could be implemented with station redevelopment													

Table 31 - Output Summary for Metcalfe Road Level Crossing

11 Site 34: Walters Road

Road Name:	Walters Road (34)	Control Type	KRN Line:	NIMT
Project ID	NIMT-S-07	(As in TCDM Part 9:Section 6)	Km'age:	649.19
Xing Name:	Walters Road Ped Dn	Active/FLBs ¹ (Veh Control)	KRN S&I:	3043
	Walters Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Walters Road Ped Up	Active/FLBs ¹ (Veh Control)	Nearest Stn:	Takanini

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

11.1 Site Description

The current Walters Road level crossing is located in the Papakura Local Board area, at 650km from the start of the North Island Main Trunk (NIMT) and to the south east of Takanini train station (1.4km). 280m to the southwest of the crossing is a five exit roundabout intersection between Great South Road, Walters Road, Inlet Road and Longford Park Drive This section of Walters Road is bounded by Tironui Road (240m southwest), Braeburn Place (100m northeast) and Arion Road (140m northeast). The 12.5m wide existing carriageway is flanked by a 3.5m wide footpath and wide grass berm on either side of the road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both highway and railway alignments are relatively flat at the crossing.



Photo 9: Walters Road crossing looking northeastward

The road is classified as collector/ district arterial and is not

a bus or designated as an over dimension vehicle route. It is surrounded by commercial units on the western and north-eastern sides and residential on the south-eastern side.. The new Takanini Village shopping centre including the Takanini Warehouse occupies the north east corner, serviced by Arion Rd.. Both commercial and residential properties have direct access onto Walters Road via either commercial or residential road vehicle crossings. There are railway tracks (up and down approach roads) crossing over the existing crossing.

The Takanini area has drainage challenges being relatively flat and with peat being a major solil component in the area.

From	Infrastructure Constraints	Operational Constraints
Road	 12.5m wide carriageway width 2 x 3.5m wide footway and berm 280m to a major intersection 10m to a minor intersection with Arion Road 70 degree skew to the rail 5.0m Headroom clearance for OLE 	 The road has 7,000 (AADT) High volume of commercial vehicles On street parking on approach 175 pedestrian movements per day (110 peak) Local roads and property accesses Close proximity to Southgate Retail Centre and Takanini Village Development
Rail	gradient of 0.6% located south of the crossing gradient of 0.5% located north of the crossing two tracks layout	Close proximity to Taka St crossing (1.2km) Close proximity to Subway Rd crossing (1.3km) Freight traffic uses this section of track
Properties	Surrounded by commercial and retail units and residential properties in the southeast corner	Highway vehicle accesses from commercial and residential units
Services	Overhead electricity wire Fibre Optic Cable just to the east of crossing 180/200 water mains adjacent to crossing	• TBC
Others	• TBC	• TBC

² – HABs = Half Arm Barriers:

Road Related	Rail Related	Others
 2 x 3.0m wide lane (due to close proximity of neighbouring properties) Cycle Lane 1.2m (due to close proximity of neighbouring properties), Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)
J , ,	ğ ş	

Table 33 - Specific Assumptions -Walters Road Level Crossing

11.4 Road & Rail Considerations

The existing alignment of Walters Road is a two lane two way road of straight alignment, traversing in a northeast-southwest direction. A minor intersection with Arion Road is located 140m east of the crossing.

For the road over rail option this intersection would need to be raised a maximum of 1.2m. This would allow Walters Road to pass over the rail tracks with a minimum clearance of 5.5m with a maximum highway gradient of 5%. No particular allowance was made for the newly completed Takanini Village Development, as its main access is located off the Arion Road, and because the final highway alignment could be positioned southward to reduce the impact to the properties on the northern side of the road (this would further impact the properties on the southside however).

For Options 2 and 3 rail lowering alignment, no specific considerations were made other than those specified on the KiwiRail standards. However, confirmation of the location of a future 3rd main should be ascertained for future design development.

Option	1					2			3						
Descriptions & Dimensions															
Description		Roa	d Over	Rail			Rail	Under	Road		Co	mbinat	ion of C	Option 1	1&2
Key Dimension Diagram	FRE L. L. L. L. L. L. L. L. FILL EGL H, G. 20 Hz W. W. W. W. W. W.			FEGL LOF	W	Az Ha	Gz/b	Hg Car	#1.	Wind Gride	W1 W2 W3 N	He Go! HA WE WE BE WA' WE F M'S GZ-/.	± 44		
Estimated Key	Dimens	sions (n	n)										State April 1		
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
L	140	60	30	70	100	250	80	20	200	250	70	60	30	70	50
Н	5.7	7.1	7.1	4.9		5.0	6.5	6.8	5.5		2.9	3.6	3.1	2.5	
5.0	13	13	13	13	13	10	10	10	10	10	13	13	13	13	13
G%	5.0	5.0				2.3	2.5				5.0	5.0			
L'											200	80	20	100	250
H'											3.1	3.8	3.9	3.6	
W'											10	10	10	10	10
G'%											1.1	2.2			

Option		1			2			3			
On Line Impact	On Line Impacts										
Ex Highway	H M L			Н	M	L	Н	M	L		
Alignment		oad will impa and adjacen		As existing				oad will impa and adjacen			
Ex Railway	Н	M	L	Н	М	L	Н	M	L		
Alignment	As existing			require adj	ntal alignme ust to suit th n methodolo	e	require ad	ontal alignme just to suit th on methodolo	e		
Other Area Imp	acts										
Ex Highway	Н	M	L	Н	M	L	Н	M	L		
Infrastructure	southward	ay may nee to maintain akanini Villag	access to	As existing			southward	vay may nee I to maintain akanini Villag	access to		
Ex Railway	Н	M	L	Н	М	L	Н	M	L		
Infrastructure	ure As existing The area is known to have poor ground conditions, which would have major impacts (risks) on the have			ground co have majo	The area is known to have poor ground conditions, which would have major impacts (risks) on the rail under road option						
Impacts on Oth	ers										
Adjacent	Н	M	L	Н	M	L	Н	M	L		
Properties	A number of for the alig	of properties nment	required	properties may needed for temporary track during construction			A number of properties required for temporary alignment				
Impacts from C	onstruction			•			•				
Complexity &	Н	М	L	Н	М	L	Н	M	L		
Disruption		level crossi sures will be		Major disruption to rail services and temporary bridge for highway traffic			Major disruption to rail services and temporary bridge for highway traffic				
Costs	Н	М	L	Н	М	L	Н	М	L		
Construction											
Properties											
Total											
Likely	Н	M	L	Н	M	L	Н	M	L		
Duration	8 to 12 Months 12 to 24 Months Over 24 Months						hs				
Other Issues											
1	The conne	ctivity to the	adjacent reta	il areas need	ds to be con	sidered for th	e road over	rail option.			
2											
3	The requirement and location of a future 3 rd main needs to be confirmed										

Table 34 – Output Summary for Walters Road Level Crossing

12 Site 35: Taka Street

Road Name:	Taka Street (35)	Control Type	KRN Line:	NIMT
Project ID	NIMT-S-08	(As in TCDM Part 9:Section 6)	Km'age:	650.38
Xing Name:	Taka Street Ped Dn	Active/FLBs ¹ (Veh Control)	KRN S&I:	3043
	Taka Street	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Taka Street Ped Up	Active/FLBs ¹ (Veh Control)	Nearest Stn:	Takanini

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

12.1 Site Description

The existing Taka Street level crossing is located in the Papakura Local Board area, at 650.38km from the start of North Island Main Trunk and 240m to the southeast of Takanini Rail Station. 220m west of the level crossing is the major intersection of Great South Road, Walter Strevens Drive and Taka St. Immediately adjacent (10m to the west) is the Taka St junction with Takanini Road. . Takanini School Road is 290m to the east.

The 10.5m wide existing carriageway is flanked by a 3.5m wide footpath and grass berm on either side of Taka Street. The level crossing consists of a vehicular crossing with two



Photo 10: Taka Street crossing looking south west

separated pedestrian level crossings. Both highway and railway alignments are relatively flat at the crossing.

The road is classified as collector/ district arterial, is not a bus route nor designated as an over

The road is classified as collector/ district arterial, is not a bus route nor designated as an over dimension vehicle route. It is surrounded by residential properties on three sides. On the southwest side immediately next to the crossing is the Takanini lodge. A Z service station occupies the site on the corner of Great South Rd and Taka St. Access to Takanini road is located adjacent to crossing, just 10m to the west. There are a number of residential vehicle access ways together with the access from the Takanini lodge and the Z service station exiting onto Taka St..

There are two railway tracks (up and down) crossing over the existing crossing. Takanini Station has a 155m long island platform 240m northwest of the Taka Street level crossing. The platform can be accessed from the Taka St crossing via a pedestrian footpath on the western side of the railway line and a pedestrian ramp up on to the platform at the southern end.

The Takanini area has drainage challenges being relatively flat and with peat being a major solil component in the area.

Confirmation of the location of a future 3rd main should be ascertained for future design development

From	Infrastructure Constraints	Operational Constraints
Road	 10.5m wide carriageway width 2 x 3.5m wide footpaths and berms 220m to a major intersection 10m to a minor intersection with Takanini Road 60 degree skew to the rail 5.0m Headroom clearance for OLE 	 The road has 3,200 (AADT) Adjacent accesses and local roads connections High volume of residential vehicles On street parking on approach 332 pedestrian movements per day (212 peak)
Rail	gradient of 0.0% located SE of the crossing . gradient of 0.0% located NW of the crossing two tracks layout	Close proximity to the Takanini station (240m) Close proximity to Manuroa Rd crossing (500m) Freight traffic uses this section of track

² – HABs = Half Arm Barriers:

	Takanini Rail Station Platform island240m to the NW of crossing	
Properties	Surrounded by resiential properties, Takanini lodge and the Z service station	Highway vehicle accesses from commercial and residential units
Services	 Overhead electricity Fibre optic cable running parallel to railway line 200 water mains under crossing 140m southeast is the 110/ 220kv Transpower line 	• TBC
Others	TBC	TBC

Table 35 - Specific constraints for Taka Street Level Crossing

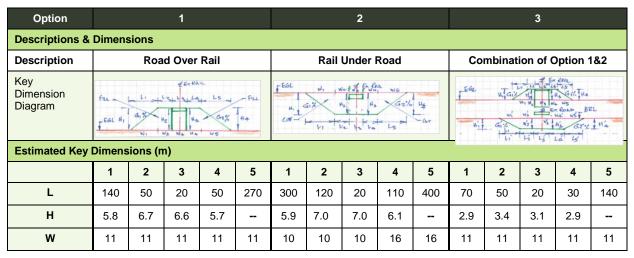
Road Related	Rail Related	Others
 2 x 3.0m wide Lane (due to close proximity of neighbouring properties) Cycle Lane 1.2m (due to close proximity of neighbouring properties), Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

Table 36 - Specific Assumptions -Taka Street Level Crossing

12.4 Road & Rail Considerations

The existing alignment of Taka Street is a two lane two way road of straight alignment, traversing in roughly an east-west direction. The intersection with Takanini Road is located 10m to the west of the crossing. In the road over rail option the Takanini Rd intersection would need to be raised a minimum of 6.5m, which would allow Taka Street to pass over the rail tracks o with a minimum 5.5m clearance at a maximum highway maximum gradient of 5%. Given the proximity between Takanini Road and rail tracks, it is recommended to close the northern entrance into Takanini Rd off Taka St(traffic would access Takanini Rd off Beach Road or Glenora Rd both off Great South Road.

Under Option 2(rail under road), lowering of the track would require Takanini Rail station to be rebuilt at a lower level and the Manuroa Road level crossing would need to be lowered. Under option 3 (combination of road over and rail under), only Takanini station would need to be rebuilt. The AT project team noted that the future of the Takanini rail station including its location is the subject of a current investigation.



Option			1					2					3		
G%	5.0	5.0				2.4	1.0	-			5.0	5.0			
Ľ,											250	70	20	110	300
H'											3.8	3.9	3.9	3.1	
W'											10	10	10	16	16
G'%											2.5	1.0			
On Line Impact	s														
Ex Highway	Н		M		L	Н		M		L	Н		M		L
Alignment	drivew into th servic	vays (ind ie Takai	d will imp cluding nini lodg n)and T	the acco	he Z	As Ex	J						d will im d adjac		ets
Ex Railway	Н		M		L	Н		M	<u></u>	<u> </u>	Н		M		<u>L</u>
Alignment	As exi	sting				Takar		track im ition and g	•	oa Rd		red rail i	track im ion	pacts	
Other Area Imp	acts														
Ex Highway	Н		M		L	Н		M		L	Н		M		L
Infrastructure	adjust	ment m	ersection ay be re reat Son	equired											
Ex Railway	Н		M		L	Н		М		L	Н		M		L
Infrastructure			ccess a el with li			groun have	e area is known to have poor und conditions, which would re major impacts (risks) on the under road option				The area is known to have poor ground conditions, which would have major impacts (risks) on the rail under road option				
Impacts on Oth	ers														
Adjacent	Н		М		L	Н		М		L	Н		M		L
Properties		nber of periods alignm	oropertie ent	es requi	red	As existing				A number of properties required for temporary alignment					
Impacts from C	onstruc	ction													
Complexity &	Н		М		L	Н		M		L	Н		M		L
Disruption			vel cros es will b				empora	tion to ra					ion to ra y bridge		
Costs	Н		М		L	Н		M		L	Н		M		L
Construction		•													
Property															
Total															
Likely Duration	Н	0 +0	M 12 Mor	othe	L	Н		M to 24 Mc	ntho	L	Н	Ove	M er 24 Mc	nthe	L
Other Issues		0 10	12 IVIOI	1015			12	10 Z4 IVIC	111115			Ove	1 Z4 IVIC	711115	
1	The in	nnact o	n the Ma	anuroa l	Rd leve	l crossi	na nee	ds to be	conside	ered for	the rail	under r	nad onti	on	
•	1110 111	puot OI				. 0.0001	.g .ice	40 10 DE	- Constant	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ano ran	andor II	Jaa opti	O11.	
2	The re	equirem	ent and	location	n of a fu	ıture 3 rd	main r	needs to	be con	firmed					

Table 37 – Output Summary for Taka Street Level Crossing

13 Site 36: Manuroa Road

Road Name:	Manuroa Road (36)	Control Type	KRN Line:	NIMT
Project ID	NIMT-S-10	(As in TCDM Part 9:Section 6)	Km'age:	650.89
Xing Name:	Manuroa Road Ped Dn	Active/FLBs ¹ (Veh Control)	KRN S&I:	3043
	Manuroa Road	Active/FLBs ¹ & HABs ²	Nos of Track	2
	Manuroa Road Ped Up	Active/FLBs ¹ (Veh Control)	Nearest Stn:	Takanini

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

13.1 Site Description

The existing Manuroa Road level crossing is located in the Papakura Local Board area, at 650.89km from the start of North Island Main Trunk and 250m to the northwest of the Takanini Rail Station. The crossing is bounded by Oakleigh Avenue (100m) and Princess St (200m) to the east, and 160m west to the major Great South Road-, Beaumaris Way - Manuroa Road intersection. The 10.5m wide existing carriageway is flanked a 3.5m wide footpath and grass berm on either side of the road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both highway and railway alignments are relatively flat at the crossing.



Photo 11: Manuroa Road crossing looking south west

The road is classified as collector and is not a public bus route. It is surrounded by a high density of residential properties. Located on the north east corner is the Top kids day-care centre which has two accesses onto Manuroa Rd 10m and 40m respectively from the crossing. There are a number of residential vehicle access which will be affected by the works.

There are railway tracks (up and down) crossing over the existing crossing. The Takanini Station has a 155m long island platform to the southeast side of the crossing. There is no current formal access to this platform from the crossing although there is an unformed track along the western edge that appears used for pedestrian access..

From	Infrastructure Constraints	Operational Constraints
Road	 10.5m wide carriageway width 2 x 3.5m wide footpaths and berms 160m to a major intersection 100m to a minor intersection with Oakleigh Ave 60 degree skew to the rail 5.0m Headroom clearance for OLE 	 The road has 11,214 (AADT) Adjacent access connections High volume of residential and commercial vehicles On street parking on approach 202 pedestrian movements per day (117 peak) Used by overweight vehicles
Rail	gradient of 0.0% located south of the crossing . gradient of 0.8% located north of the crossing two tracks layout Takanini Station approx. 250m southeast of crossing Possible future 3 rd main	Close proximity to the Takanini Station (250m away) Freight traffic uses this section of track
Properties	High density of residential homes	Highway vehicle accesses from commercial and private units
Services	 Overhead electricity wire 150 Sewer just northwest of the crossing 100/225/230 water mains adjacent to crossing Fibre optic cable running parallel to railway line 	• TBC

² – HABs = Half Arm Barriers:

Others	• TBC	TBC

Table 38 - Specific constraints for Manuroa Road Level Crossing

Road Related	Rail Related	Others
 2 x 3.0m wide Lane (due to close proximity of neighbouring properties) Cycle Lane 1.2m (due to close proximity of neighbouring properties), Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing (50kph) 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

Table 39 - Specific Assumptions - Manuroa Road Level Crossing

13.4 Road & Rail Considerations

The existing road alignment of Manuroa Road is a two lane two way road of straight alignment, traversing in an east-west direction.

The major intersection with Great South Road is located 160m to the west, and a minor intersection with Oakleigh Ave is 100m to the east. Both intersections are required to be raised by a minimum of 0.3m and 3.5m, respectively. This would allow Manuroa Road to pass over the rail tracks of a minimum clearance of 5.5m with a maximum highway gradient of 5%.

A Rail Under Road (option 2) was considered. As with Taka St rail under road option, the lowering of the rail to pass under Manuroa Rd would require both a rebuild of Takanini station and the lowering of the Taka St level crossing.

Under option 3 (combination of road over and rail under), only Takanini station would need to be rebuilt. The AT project team noted that the future of the Takanini rail station including its location is the subject of a current investigation.

Option	1						2					3			
Descriptions &	Descriptions & Dimensions														
Description		Roa	d Over	Rail			Rail	Under	Road		Co	mbinat	ion of C	Option '	1&2
Key Dimension Diagram	FILE LI LEGENALL LS FILE FILE WE WE WE WS				1. 612 We have us 62% up					Ede Wings of the w					
Estimated Key	Dimens	ions (n	1)											-4 5	
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
L	120	40	20	60	100	400	130	20	150	300	60	40	20	60	50
Н	5.3	6.7	6.8	5.4		5.4	6.8	6.9	6.0		2.7	3.4	3.3	2.7	
W	11	11	11	11	11	16	16	10	10	10	11	11	11	11	11
G%	5.0	5.0				1.3	1.0				5.0	5.0			
Ľ'											400	80	20	100	150
H'											3.3	3.8	3.7	2.5	
W'											16	16	10	10	10

Option		1					2					3		
G'%										1.0	1.7			
On Line Impact	s													
Ex Highway	Н	M		L	Н		М		L	Н		М		L
Alignment		road will ims and adjac		ets	As Exis	ting						ad will im nd adjac		
Ex Railway	Н	M		L	Н		М		L	Н		М		L
Alignment	As existing	ng	·			ni Sta	track imp		St level		ed rai	I track imation	pacts	
Other Area Imp	acts													
Ex Highway	Н	M		L	Н		М		L	Н		М		L
Infrastructure	adjustme	Il intersection nt may be in to Great So	equired		ground have m	cond ajor i	known to itions, wh mpacts (i ad option	ich wo	ould	groun have	d cond major	known to ditions, w impacts (ad option	hich w (risks)	ould
Ex Railway	Н	M		L	Н		М		L	Н		М		L
Infrastructure	Station a opportun	ccess impre ities.	ovement		New Station platforms and accesses for both ends to street level with lift and stairs					New Station platforms and accesses for both ends to street level with lift and stairs				
Impacts on Oth	ers													
Adjacent	Н	M		L	Н		M		L	Н		M		L
Properties	A number for the al	r of propert gnment	ies requ	ired	A number of properties required for temporary alignment				A number of properties required for temporary alignment					
Impacts from C	onstructio	n												
Complexity &	Н	M		L	Н		М		L	Н		М		L
Disruption		ry level cro osures will				Major disruption to rail services and temporary bridge for highway traffic				Major disruption to rail services and temporary bridge for highway traffic				
Costs	Н	М		L	Н		М		L	Н		М		L
Construction														
Property														
Total														
Likely	Н	M		L	Н		M		L	Н		M		L
Duration		8 to 12 Mc	nths			12	to 24 Mo	nths			Ov	er 24 Mo	onths	
Other Issues			The impact on the Taka St level crossing needs to be considered for the rail under road option.											
Other Issues 1	The impa	ct on the T	aka St le	evel cro	ssing nee	ds to	be consi	dered	for the ra	ail unde	r road	option.		
	The impa	ict on the T	aka St le	evel cro	ssing nee	ds to	be consi	dered	for the ra	ail unde	r road	option.		
		ict on the T								ail unde	r road	option.		

Table 40 – Output Summary for Manuroa Level Crossing

14 Site 43: O'Rorke Road

Road Name:	O'Rorke Road (43)	Control Type	KRN Line:	OBL
Project ID	OBL-01	(As in TCDM Part 9:Section 6)	Km'age:	0.59
Xing Name:	O'Rorke Road Ped Dn	Active/FLBs ¹ (Veh Control)	KRN S&I:	2994
	O'Rorke Road	Active/FLBs ¹ & HABs ²	Nos of Track	1
	O'Rorke Road Ped Up	Active/FLBs ¹ (Veh Control)	Nearest Stn:	Penrose

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

14.1 Site Description

The existing O'Rorke Road level crossing is located in the Maungakiekie – Tamaki Local Board area and is at 0.59km from the start of Onehunga Branch Line (OBL), adjacent to the Penrose Rail Station. The crossing is within the "T intersection" between O'Rorke Road and Station Road East. The traffic signals controlling this intersection span the crossing. This section of O'Rorke Road is bounded by Station Road East (5m) to the north and Rockridge Avenue (280m) to the south. The Maurice Rd level crossing is 450m to the west.

The 12.5m wide existing road carriageway is flanked by two 3.5m wide footpaths which lead to the vehicular level crossing and separated pedestrian level crossings on either side. The road alignment is relatively flat along the length. O'Rorke Rd is classified as a collector road and does not currently act as a



Photo 12: O'Rorke Road Xing looking south east

y local bus route. It is a designated oversize and overweight vehicle route and is largely surrounded by large scale industrial units. O'Rorke Rd is in a highly industrial area and carries a correspondingly higher proportion of commercial and heavy vehicles. There are a number of commercial vehicle accesses which exit onto O'Rorke Rd. There are no residential properties that have direct access to this section of the road. There is one main railway track crossing over the existing crossing. The Penrose Station – Onehunga branch (known as platform 3) has a 100m long side platform and is 300m away from the O'Rorke Rd level crossing. The platform is accessed by a ramp further north off Station Rd (East). The main Penrose station which serves passengers travelling north/south is accessed via a ramp from the northern end of platform 3 and a pedestrian footbridge over the existing railway line. The railway grade is from a steep incline (2.2%) and becomes level at the station.

High voltage overhead powerlines cross the level crossing along the alignment of the rail track.

The AT project team indicated that at some stage in the future, a second track may be installed along the Onehunga line to allow increased frequency of service.

From	Infrastructure Constraints	Operational Constraints
Road	 12.5m wide carriageway width 2 x 3.5m wide footpaths within a major intersection 90 degree skew to the rail 5.0m Headroom clearance for OLE 	Collector road carrying 9,781 (AADT) 227 pedestrian movements per day(151 peak) Oversize and overweight vehicle route No current bus routes use the crossing High volume of commercial vehicles No on street parking on approach
Rail	 gradient of 0.7% located north east of the crossing gradient of 1.3% located west of the crossing one track layout Penrose Station platform 3 approximately 300m to 	Close proximity to Penrose station and pedestrian overbridge crossing Close proximity to the Maurice Road Level Crossing (450m)

² – HABs = Half Arm Barriers:

From	Infrastructure Constraints	Operational Constraints
	the east of the crossing	
Properties	Surrounded by large industrial/ commercial units	Accesses from commercial and industrial units
Services	Overhead electricity wire 110/ 220kv Transpower line over existing crossing parallel to railway line 375 stormwater drain under crossing 250 Water mains under w footpath of O'rorke Rd 630 water main under eastern footpath	Further clarification of services is required
Others	TBC	TBC

Table 41 - Site constraints -O'Rorke Road Level Crossing

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

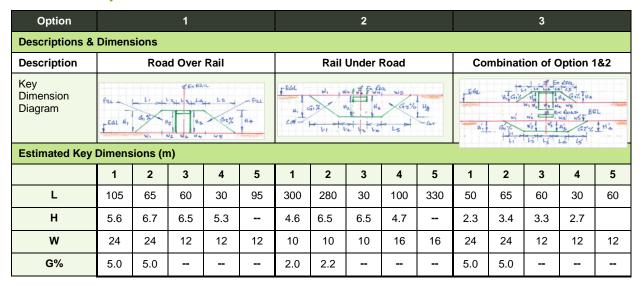
Table 42 - Specific Assumptions -O'Rorke Road Level Crossing

14.4 Road & Rail Considerations

The existing alignment of O'Rorke Road in the vicinity of the crossing is a four lane two way road, traversing in a north to south direction. The crossing is within the major signalised intersection with Station Road. The minor intersection of Olive Road and Station Rd East is 50m west from the crossing. Both of these intersections would need to be raised up to allow O'Rorke Road to pass over the rail tracks with a minimum clearance of 5.5m and a maximum road gradient of 5%. A key consideration is the road over rail option is the clearance to the 110/ 220kv overhead Transpower line.

A Rail under Road option (Option 2) was considered. This would require track lowering back through Penrose station platform 3 and along the NAL back as far as the Great South Rd overbridge. This was discussed with the AT project team; the option was deemed too intrusive and unfeasible to pursue further.

Option 3 (combination of road over and rail under) would also require lowering of Penrose station platform 3 but would not impact the NAL.



		1			2				3			
Ľ'							230	100	30	80	125	
H'							1.9	3.5	3.5	0.7		
W'							10	10	10	10	16	
G'%							2.1	2.5				
On Line Impact	6							2.0				
•	H	М	L	Н	M	L	Н		M		L	
Ex Highway Alignment	Elevated ro driveways a Signalised	pad will imp and adjace	ent streets	As existing			Elevat drivew Signa	vays an lised int	d will im d adjac tersection	ent stre		
	elevated.	М	L	Н	М	T L	elevat	ed.	М	1	_	
Ex Railway Alignment	As existing			Would red	uire portion	of NAL plus be lowered	Would	Would require Penrose platform 3 to be lowered				
Other Area Imp	acts											
Ex Highway	Н	M	L	Н	М	L	Н		M		L	
Infrastructure	length of S	tation Road sed with im	pacts to the	Major imp	act to the N	AL	sectio also b	n of Sta	d will ind ation Ro d with ir rsection	ad Eas		
Ex Railway	Н	M	L	H New Ctet	M	L	H	Station .	M		L	
Infrastructure	As existing			accesses	on platforms to street lev for Penrose	el with lift	acces	ses to s	platform street le Penros	vel with		
Impacts on Oth	ers											
Adjacent	Н	М	L	Н	М	L	Н		М		L	
Properties	A number of for the align Possible re 220kv Tran power lines	nment. elocation of aspowerove	f the 110/	A number of properties required for the alignment			A number of properties required for temporary alignment. Possible relocation of the 110/ 220kv Transpoweroverhead power lines required					
Impacts from C	onstruction			•								
Complexity &	Н	М	L	Н	М	L	Н		М		L	
Disruption	Temporary level crossing and railway closures will be required		Major disruption to rail services (Onehunga and NAL) and temporary bridge for highway traffic			Major disruption to rail services (Onehunga)and temporary bridge for highway traffic						
	Taimay oron			traffic								
	Н	М	L	traffic H	М	L	н		М		L	
Costs	·	M	L		M	L	Н		M		L	
Costs Construction	·	M	L		M	L	н		M		L	
Costs Construction Property	·	M	L		M	L	Н		M		L	
Costs Construction Property Total Likely	H	M M	L	Н	M M M M 2 to 24 Mor	L	Н		M M M er 24 Mc	onths	L	
Costs Construction Property Total Likely Duration	H	M	L	Н	M	L			M	onths	L	
Costs Construction Property Total Likely Duration Other Issues	H 8 .The grade package –	M to 12 Mon	L	H ach of the ley along the	M 12 to 24 Mor evel crossing Onehunga i	L nths	H hunga lir	Ove	M er 24 Mc	ooked a	L at as a	
Costs Construction Property Total Likely Duration Other Issues	H 8 The grade package – travelling u The rail une	M separation the rail pas nder one in der road (C	Luths a solution for easenger journe	H ach of the leady along the n back to grave major el	M 2 to 24 Mor evel crossing Onehunga I ade then un	L nths	Hunga lir	Ove	M Mor 24 Mod	ooked a oppose	L at as a	
Costs Construction Property Total Likely Duration Other Issues	H 8 .The grade package – travelling u The rail unchas thus be	separation the rail pas nder one ir der road (Ceen discour	n solution for essenger journentersection the	H ach of the ley along the n back to grave major eler investiga	M 2 to 24 Mor evel crossing Onehunga I ade then un ffect to the N	L nths gs on the Onel ne needs to be der again. IAL and existing the state of the	Hunga lir e relativ	Ove	M Mor 24 Mod	ooked a oppose	L at as a	
Costs Construction Property Total Likely Duration Other Issues 1	H 8 .The grade package – travelling u The rail une has thus be The require	separation the rail pas nder one in der road (Ceen discourement of further separation).	L solution for e seenger journe ntersection the Option 2) will hanted from furth	H ach of the lead	M 2 to 24 Mor evel crossing Onehunga I ade then un effect to the N tion	L nths gs on the Onel ine needs to be der again. IAL and existing the confirme the confirment in the	Hunga lir e relativ	Ove	M Mor 24 Mod	ooked a oppose	L at as a	

Table 43 – Output Summary for O'Rorke Road Level Crossing

15 Site 44: Maurice Road

Road Name:	Maurice Road (44)	Control Type	KRN Line:	OBL
Project ID	OBL-02	(As in TCDM Part 9:Section 6):	Km'age:	1.03
Xing Name:	Maurice Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&I:	2975
	Maurice Road	Active/FLBs ¹ & HABs ²	Nos of Track	1
	Maurice Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Те Рарара

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

15.1 Site Description

The existing Maurice Road level crossing is located in the Maungakiekie – Tamaki Local Board area and at 1.03km from the start of Onehunga Branch Line (OBL), 440m west of O'Rorke Rd level crossing and adjacent to the Winstones sidings (~750m west), Mays Rd crossing (860m west) and Te Papapa Station (~900m west).

The crossing is 40m south of the "T intersection" of Maurice Road and Station Road East. Maurice Road is bounded by Station Road East (40m) to the north and Church Street (650m) to the south of the crossing. The 11.5m wide existing carriageway is flanked by two 3.5m wide footpaths which lead to the vehicular level crossing and two separated pedestrian level crossings. Both highway (2%) and railway alignments (0.6%) are relatively flat at the crossing.



Photo 13: Maurice Road crossing looking northward

The road is classified as a collector and is not a bus or over dimensioned vehicle route. It is largely surrounded by large industrial units. There are a number of commercial vehicle accesses which exit onto Maurice Rd. Off Station Rd East 80m to the east is the intersection with Fairfax Avenue and the west 80m is a major entrance into an industrial/warehouse area.

There is one main railway track crossing over the existing crossing. There are no current platforms adjacent to the crossing (a platform to serve major events at Mt Smart stadium has been suggested in the vicinity).

High voltage overhead powerlines cross the level crossing along the alignment of the rail track.

The AT project team indicated that at some stage in the future, a second track may be installed along the Onehunga line to allow increased frequency of service.

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footway 40m to a major intersection with Station Road East 60 degree skew to the rail 5.0m Headroom clearance for OLE 	 Collector road carrying 4,793 (AADT) 84 Pedestrian movements per day (53 peak) High volume of commercial vehicles On street parking on approach No current bus routes use the crossing
Rail	 Gradient of 0.8% to the east of crossing Gradient of 1.8% to the west of crossing one track layout 	Bounded by O'Rorke Rd level crossing (40m) Mays Rd (860m) level crossings
Properties	Surrounded by industrial/ commercial units	Highway vehicle accesses from commercial units
Services	Overhead electricity wire	Further clarification of services is required

² – HABs = Half Arm Barriers:

	 110/ 220kv Transpower line over existing crossing parallel to railway line 150 Sewer line south of the crossing 250 water retail pipe parallel to road 	
Others	TBC	• TBC

Table 44 - Specific constraints for Maurice Road Level Crossing

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

Table 45 - Specific Assumptions - Maurice Road Level Crossing

15.4 Road and Rail Considerations

The existing alignment of Maurice Road is a two lane two way road, traversing in a north to south direction. On the north side of the crossing the north bound lane separates into one left turn one right turn lane. Traffic from the north off Station Rd East merge into one sigle lane on the north side of the crossing. A major intersection with Station Road is located 40m from the crossing. The Fairfax Avenue intersection is 80m to the east along Station Rd East.. Both of these intersections would need to be raised up to allow Maurice Road to pass over the rail tracks with a minimum clearance of 5.5m and a maximum road gradient of 5%. A key consideration is the road over rail option is the clearance to the 110/ 220kv overhead Transpower line.

Both Rail under Road options (Options 2 and 3) were considered; the rail track could be lowered without impacting on other level crossings..

Option			1					2					3		
Descriptions &	Dimens	sions													
Description		Roa	d Over	Rail			Rail Under Road				Combination of Option 1&2				1&2
Key Dimension Diagram	FILE LY LES FILE FILE FILE FILE FILE WE WAS WAS WAS WAS WAS					4. 612 45 45 62% 44 62% 44 60 60 60 60 60 60 60 60 60 60 60 60 60				Let					
Estimated Key	Dimens	ions (n	n)												
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
L	125	75	90	100	70	260	75	30	95	150	65	75	90	100	40
Н	4.9	6.7	6.5	2.9		4.6	6.5	6.5	4.8		2.4	3.4	3.5	1.5	
W	26	26	13	13	13	10	10	10	10	10	26	26	13	13	13
G%	5.0	5.0				2.3	2.2				5.0	5.0			
Ľ'											230	100	30	80	125
H'											2	3.5	3.5	1	
W'											10	10	10	10	10

Option		1			2					3			
G'%								2.0	1.2				
On Line Impact	s												
Ex Highway	H	M	L	H	M		L	Н	1 1	M		L	
Alignment		road will in and adjac	ent streets	As existing						d will im nd adjace			
Ex Railway	H	М	L	Н	M	\perp	L.	Н		M	\perp	L	
Alignment	As existing	9			Single track alignment may double tracking in the future					e future	nt ma	y double	
Other Area Imp	acts												
Ex Highway	Н	M	L	Н	М		L	Н		M		L	
Infrastructure	New highwintersection		As existing	1			New h	nighway ection t	/ will go o Statio	beyor n Roa	nd d		
Ex Railway	Н	M	L	Н	М		L	Н		М		L	
Infrastructure	As existing			Alignment widening	may restric	ct future	е	Alignr widen		ay restri	ct futu	ire	
Impacts on Oth	ers												
Adjacent	Н	M	L	Н	М		L	Н		M		L	
Properties	for the alig	nment elocation o		As existing	As existing				A number of properties required for temporary alignment. Possible relocation of the 110/				
	220kv Tra power line	•	verhead							power ov equired	/erhe	ad 	
Impacts from C	onstruction	1											
Complexity &	Н	M	L	Н	М	\perp	L	Н		M		L	
Disruption	Temporary railway clo		ssing and be required	Major disru and tempo traffic					empora			I services for highway	
Costs	Н	М	L	Н	М		L	Н		М		L	
Construction													
Property													
Total													
Likely	Н	M	L	Н	M		L	Н		M		L	
Duration	8	3 to 12 Mo	nths	1	2 to 24 Mo	nths			Ove	er 24 Mo	nths		
Other Issues													
1	package -	the rail pa	n solution for ea assenger journe intersection the	ey along the 0	Onehunga d	line ne	eds to b	-					
2	The road of 220kv Elec		tion (both Optice	ons 1 and 3)	may have	major i	mpact to	cleara	nce of ⁻	Transpo	wer 1	10/	
3	The requir	ement of f	uture Onehung	a rail line dur	olication is	to be c	onfirmed						
T-1-1- 40 O-4-													

Table 46 - Output Summary for Maurice Road Level Crossing

16 Site 45: Mays Road

Road Name:	Mays Road (45)	Control Type	KRN Line:	OBL
Project ID	OBL-03	(As in TCDM Part 9:Section 6):	Km'age:	1.89
Xing Name:	May Road Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C:	2975
	May Road	Active/FLBs ¹ & HABs ²	Nos of Track	1
	May Road Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Те Рарара

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

16.1 Site Description

The existing Mays Road level crossing is located in the Maungakiekie – Tamaki Local Board area and at 1.89km from the start of Onehunga Branch Line (OBL), adjacent to the Te Papapa Station (40m west) and Winstone Siding (110m east). The crossing is bounded by Felix Street (160m) to the North West and Church Street (190m) to the South. Captain Springs Rd level crossing is 240m west with the and Church St level crossing a further 100m west.

The 9m wide existing carriageway is flanked by two 3.5m wide footway and wide grass berms on Mays Road. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. Both highway (2.5%) and railway alignment(1%) are relatively flat at the crossing.



Photo 14: Mays Road Xing looking south east

The road is classified as distributor arterial and is not a bus or over dimension vehicle route. It is surrounded on three sides by low levels industrial and commercial units and on the north west corner by a high density residential apartment complex. There are a number of commercial and residential vehicle accesses that exit onto Mays Rd. Felix Street consists mainly of residential properties.

There is one main railway track (with sidings to the west) passing over the existing crossing. The Te Papapa platform is 95m long and is 40m west of the level crossing. The platform is accessed by a ramp from the south side of the Mays Road level crossing. The railway grade is flat from the crossing to the station.

High voltage overhead powerlines cross the level crossing along the alignment of the rail track.

The AT project team indicated that at some stage in the future, a second track may be installed along the Onehunga line to allow increased frequency of service.

From	Infrastructure Constraints	Operational Constraints
Road	 9m wide carriageway width 2 x 3.5m wide footway and berm 190m to a major intersection Close to 90 degree skew to the rail 5.0m Headroom clearance for OLE 	 Distributor arterial road carrying 20,369(AADT) 134 pedestrian movement per day (84 peak) High volume of commercial vehicles On street parking on the south east side of Mays Rd only No bus routes over the crossing
Rail	 gradient of 1.7% located east of the crossing one track layout WInstone's siding on the east side of the crossing 	Close proximity to the Te Papapa Station Close proximity to the Captain Springs Rd and Church St level crossings
Properties	Surrounded on three sides by industrial/ commercial units	Highway vehicle accesses from commercial and private units

² – HABs = Half Arm Barriers:

	Residential apartment block located on the NW corner of crossing	
Services	Overhead electricity wires 110/ 220kv Transpower line over existing crossing parallel to railway line 150 Sewer just south of the crossing and 225 sewer just east of the crossing 150/200/1500 water mains under crossing Water wholesale chamber adjacent to crossing	Further clarification of services is required
Others	TBC	TBC

Table 47 - Specific constraints - Mays Road Level Crossing

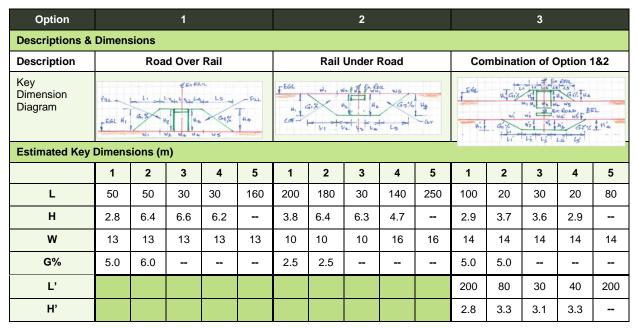
Road Related	Rail Related	Others
2 x 3.5m wide Lane	Max gradient 2% desirable (2.5%	Private way gradient 12.5% (1 in 8)
 Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 6% Road (to avoid 	maximum) compensated grade for freight	
works on Church Street)	Rail to road separation 6.5m (rail	
Road/Rail separation 6.5m (road over)	under)	
Speed as existing	Gradient at station set as existing	
	Alignment speed as existing Horizontal alignment as existing	

Table 48 - Specific Assumptions - Mays Road Level Crossing

16.4 Road & Rail Considerations

The existing alignment of Mays Road is a two lane two way road, traversing in a roughly north to south direction. For the Road over Rail option, the road approach ramps and bridge do not impact either Felix St or Church Street to the south and Felix Street, and would allow Mays Road to pass over the rail tracks with a minimum clearance of 5.5m at a maximum road gradient of 5%. A key consideration is the road over rail option is the clearance to the 110/ 220kv overhead Transpower line.

A Rail Under Road option was considered; lowering the rail track to pass under Mays Rd would require a lowering (or other treatment) to both the Captain Springs Rd and Church Street level crossings as well as the rebuild of the Te Papapa station. The Combination Road Over / Rail Under option was considered; this option would avoid having to alter either the Captain Springs Road or Church St level crossings.



Option		1			2				3		
W'							10	10	10	16	16
G'%							2.1	0.1		-	
On Line Impact	s										
Ex Highway	Н	М	L	Н	М	L	Н		М		L
Alignment	driveways	oad will impa and adjacer trian access ation	nt streets,	As existing	Elevated road will impact driveways and adjacent streets, and pedestrian access onto Te Papapa station						
Ex Railway	Н	М	L	Н	M	L	Н		М		L
Alignment	As existing)			act Te Papa rings Rd an ssings	•	Would	d impac	ct Te Pap	oapa st	ation
Other Area Imp	acts										
Ex Highway	Н	М	L	Н	M	L	Н		М		L
Infrastructure		oad footpring urch St if ma %.			sings at Cap ad and Chu acted						
Ex Railway	Н	M	L	Н	М	L	Н		М	L	L
Infrastructure		n access at evel with lift		New Station platforms and accesses for both ends to street level with lift and stairs			New station access at east end to new road level with lift and stair				
Impacts on Oth	ers										
Adjacent	Н	М	L	Н	M	L	Н		M		L
Properties	for the alig Possible re	elocation of the	the 110/	A number of properties required for temporary alignment			A number of properties required for temporary alignment Possible relocation of the 110/ 220kv Transpower overhead power lines required				
Impacts from C	<u> </u>										
Complexity &	Н	М	L	Н	М	L	Н		М		L
Disruption		Temporary level crossing and railway closures will be required and temporary bridge for highway traffic Major disruption to rail services and temporary bridge for highway traffic				and temporary bridge for highway					
Costs											L
	Н	M	L	Н	М	L	Н		М		-
Construction	Н	M	L	Н	M	L	Н		IVI		_
Construction Property	Н	M	L	Н	M	L	Н		M		
	Н	M	L	н	M	L	Н				
Property Total Likely	Н	M M B to 12 Mont	L	Н	M	L	Н	Ove	M	nths	L
Property Total Likely Duration	Н	M	L	Н		L		Ove		nths	L
Property Total Likely Duration Other Issues	H	M M 3 to 12 Mont	L hs	H 12	M 2 to 24 Mont	L L	Н		M	nths	L
Property Total Likely Duration	H New vertice The grade package —	M 8 to 12 Mont	L	H 12 rel crossings ach of the levely along the C	M 2 to 24 Mont at Captain S el crossings Onehunga lir	L chs Springs Rd an on the Oneh ne needs to b	H d Churc	ch St.	M Mer 24 Mo	oked a	L t as a
Property Total Likely Duration Other Issues 1	New vertice The grade package – travelling u	M B to 12 Montal al alignment separation the rail passunder one in	hs will affect levelsolution for easenger journe	H 12 rel crossings ach of the level y along the Control of the	M 2 to 24 Mont at Captain S Ple crossings Onehunga lir de then und	L hs Springs Rd an on the Oneh ne needs to b er again.	H d Churc unga lin e relativ	ch St. e need rely sm	M er 24 Mo	oked a	L t as a ed to
Property Total Likely Duration Other Issues 1 2	H New vertice The grade package – travelling to 220kv Electrical	M B to 12 Monte al alignment separation the rail passunder one in over rail optic tricity Line	L hs will affect lev solution for ea senger journe tersection the	H 12 rel crossings ach of the level y along the Con back to grains 1 and 3) related to the control of the level y along the Control of the co	M 2 to 24 Mont at Captain S el crossings Onehunga lir de then und	L chs Springs Rd an on the Oneh ne needs to b ler again. ajor impact to	H dd Churdunga line relativ	ch St. e need rely small	M er 24 Mo	oked a	L t as a ed to

Table 49 - Output Summary for Mays Road Level Crossing

17 Site 46: Captain Springs Road

Road Name:	Captain Springs Road (46)	Control Type	KRN Line:	OBL
Project ID	OBL-04	(As in TCDM Part 9:Section 6):	Km'age:	2.13
Xing Name:	Captain Springs Rd Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&C:	2975
	Captain Springs Rd	Active/FLBs ¹ & HABs ²	Nos of Track	1
	Captain Springs Rd Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Те Рарара

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

17.1 Site Description

The existing Captain Springs Road level crossing is located in the Maungakiekie – Tamaki Local Board area and at 2.13km from the start of Onehunga Branch Line (OBL), with Te Papapa Rail Station 150m to the east. The crossing is 60m north of the signalised intersection of Captain Springs Road and Church Street. Grotto St is 100m north of the crossing; Church St is 60m to the south. The 11.5m wide existing carriageway is flanked by 3.5m wide footpaths, with wide grass berms on the north side . The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. The highway alignment is relatively flat at the crossing. The rail is at a 2.3% grade



Photo 15: Captain Springs Road Xing looking northward

The road is classified as local/collector road and is used by school buses (not public buses). It is not a designated over

dimension route. . It is surrounded by low level industrial units on the eastern side and residential units on the west.

Both commercial and residential properties have direct property access onto Captain Springs Road via either commercial or residential road vehicle crossings.

The Church St level crossing is only 100m further southwest from the Captain Springs Rd level crossing. They are separated by a small pocket park.

There is one main railway track passing over the existing crossing. The Te Papapa Station has a 95m long island platform on the eastern side of the crossing. The platform is accessed from Captain Springs Rd by a ramp along the southern sie of the rail track.

High voltage overhead powerlines cross the level crossing along the alignment of the rail track.

The AT project team indicated that at some stage in the future, a second track may be installed along the Onehunga line to allow increased frequency of service.

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footpaths and berm on north side 60m to a major intersection 46 degree skew to the rail 5.0m Headroom clearance for OLE 	Local/collector road carrying 5,115(AADT) 250 Pedestrian movement per day (157 peak) Current school bus route through the crossing High volume of commercial vehicles On street parking on approaches
Rail	 gradient of 1.2% located north east of the crossing. one track layout Te Papapa station 150m north east of the 	Close proximity to Te Papapa Station Close proximity to the Church St level crossing

² – HABs = Half Arm Barriers:

From	Infrastructure Constraints	Operational Constraints
	crossing Pedestrian access ramp to station on the east side of the crossing	
Properties	Surrounded by industrial/ commercial units on the east side of crossing Residential properties located to the west of the crossing	Highway vehicle accesses from commercial and private units
Services	Overhead electricity wires 150 Sewer just east of crossing 100/200 water mains under crossing 110/ 220kv Transpower overhead power lines immediately south of crossing 750/675 stormwater drains to the west of crossing	• TBC
Others	TBC	TBC

Table 50 - Specific constraints - Captain Springs Road Level Crossing

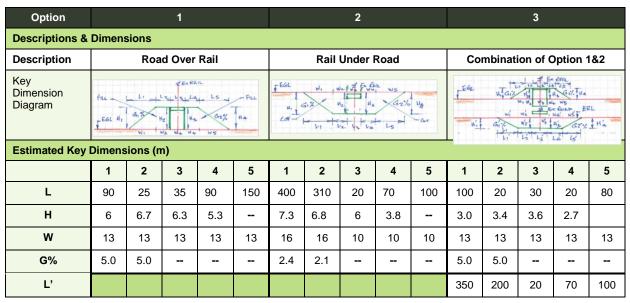
Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing 	Private way gradient 12.5% (1 in 8)
	Alignment speed as existingHorizontal alignment as existing	

Table 51 - Specific Assumptions - Captain Springs Road Level Crossing

17.4 Road & Rail Considerations

The existing alignment of Captain Spring Road is a two lane two way road, traversing in a north to south direction. The Road over Rail option would require the Captain Springs Rd/Church St intersection to be raised some 6m and would require the Church St level crossing to also be raised. This significant intervention would see 420m of Captain Springs Rd and some 300m of Church St needing to be rebuilt. This would allow Captain Spring Road to pass over the rail tracks with a minimum clearance of 5.5m with a maximum road gradient of 5%. A key consideration is the road over rail option is the clearance to the 110/ 220kv overhead Transpower line.

The Rail Under Road options (both option 2 and option 3) were considered; they both would require lowering (or other treatment) to both the Mays Road and Church Street level crossings and the rebuilding of Te Papapa station.



Option			1					2					3		
H'											4.8	3.6	2.6	2.3	
W'											16	16	10	10	10
G'%											2.3	1.0			
On Line Impact	S									1					
Ex Highway	H M L							M		L	Н		M		L
Alignment	drivew	ays an	d will im d adjace or inters	ent stre	ets	As existing					drivev	vays an	d will im d adjac or inters	ent stre	ets
Ex Railway	Н .		M		L	Would	Limpa	M ct Te Pap	nana et	L	Would	Limpac	M t To Par	nana st	L
Alignment	As existing						Rd and	d Church			Would impact Te Papapa station, Mays Rd and Church St level crossings				
Other Area Impacts															
Ex Highway	Н		M		L	Н		М		L .	Н		М		L
Infrastructure	New highway will not go beyond intersections					Churc		ng at Ma et will be			Churc		g at Ma t will be		
Ex Railway	H Name a		M		L	New S	Station	M platform	s and	<u> </u>	New s	station a	M access a	at east e	L end to
Infrastructure	New station access at east end to new road level with lift and stair					acces	ses for	both en and stai	ds to st	reet	New station access at east end new road level with lift and stair				
Impacts on Oth	ers														
Adjacent	. н		M		<u>L</u>	. Н		M		<u>L</u>	Н		M		<u>L</u>
Properties	A number of properties Required for the alignment						A number of properties required for temporary alignment A number of properties red for temporary alignment					ired			
	220kv		cation o ower ovequired								Possible relocation of the 110/ 220kv Transpower overhead power lines required				
Impacts from C	onstruc	tion													
Complexity &	Н		M		L	H M L H M						L			
Disruption			vel cros res will l			Major disruption to rail services and temporary bridge for highway traffic					Major disruption to rail services and temporary bridge for highway traffic				
Costs	Н		M		L	Н		M		L	Н		M		L
Construction															
Property															
Total					_					_					
Likely Duration	н	8 to	12 Moi	nths	L	Н	12	M to 24 Mc	onths	L	Н	Ove	M r 24 Mc	onths	L
Other Issues															
1	New v	ertical a	alignme	nt will a	ffect lev	el cross	ings a	t Captair	Spring	gs Rd an	d Churc	ch St.			
2	packa	ge – the	e rail pa	ssenge	r journe	y along	the Or	crossing nehunga e then u	line ne	eds to b					
3			r rail op city Line		th Optic	ons 1 an	d 3) m	ay have	major i	mpact to	cleara	nce of T	ranspo	wer 110)/
	The re	quirem	ent of fu	uture O	nehunga	a rail lin	e dupli	cation is	to be c	onfirmed	t				
		The requirement of future Onehunga rail line duplication is to be confirmed The OBL platform at Te Papapa Station and Siding will be impacted by the rail options													

Table 53 - Output Summary for Captain Springs Road Level Crossing

18 Site 47: Church Street

Road Name:	Church Street (47)	Control Type	KRN Line:	OBL
Project ID	OBL-05	(As in TCDM Part 9:Section 6):	Km'age:	2.23
Xing Name:	Church Street Ped Up	Active/FLBs ¹ (from Veh Control)	KRN S&I:	2975
	Church Street	Active/FLBs ¹ & HABs ²	Nos of Track	1
	Church Street Ped Dn	Active/FLBs ¹ (from Veh Control)	Nearest Stn:	Те Рарара

¹ – FLBs = Flashing Lights and Bells.

Both ¹ and ² come from NZ Transport Agency's *Traffic control devices manual* part 9 Level crossings

18.1 Site Description

The existing Church St level crossing is located in the Maungakiekie – Tamaki Local Board area and at 2.23km from the start of Onehunga Branch Line (OBL), with Te Papapa Rail Station 250m to the east. The crossing is 60m west of the signalised intersection of Captain Springs Road and Church Street. Mountjoy Place is 170m west of the crossing; Captain Springs Road is 60m to the east. The 25m wide existing carriageway is flanked by 3.5m wide footpaths, with wide grass berms on the north side. The level crossing consists of a vehicular crossing with two separated pedestrian level crossings. The highway alignment is relatively flat at the crossing. The rail is at a 2.3% grade.



Photo 15: Captain Springs Road Xing looking northward

The road is classified as local/collector road, is not on a bus route and is not a designated over dimension route. . It is surrounded by residential to the west a pocket park to the north east and retail to the south east.

Surrounded by residential to the west a pocket park to the north east and retain to the south east.

Both commercial and residential properties have direct property access onto Church St via either commercial or residential road vehicle crossings.

The Captain Springs Road level crossing is only 100m further northeast from the Church St level crossing. They are separated by a small pocket park.

There is one main railway track passing over the existing crossing.

High voltage overhead powerlines cross the level crossing along the alignment of the rail track.

The AT project team indicated that at some stage in the future, a second track may be installed along the Onehunga line to allow increased frequency of service.

From	Infrastructure Constraints	Operational Constraints
Road	 11.5m wide carriageway width 2 x 3.5m wide footway and berm 60m to a major intersection with Captain Springs Road 45 degree skew to the rail 5.0m Headroom clearance for OLE 	 Collector road carrying 13,000 (AADT) 194 Pedestrians per day (100 peak) High volume of commercial vehicles On street parking on approach
Rail	gradient of 2.3% located north east of the crossing one track layout Te Papapa station 250m north east of the crossing	Close proximity to Captain Springs Road level crossing Proximity to Mays Road level crossing
Properties	Surrounded by commercial units to the SE of the	Highway vehicle accesses from commercial and

² – HABs = Half Arm Barriers:

	crossing Resiential properties to the north and west of the crossing	residential units
Services	Overhead electricity wire 110/ 220kv Transpower overhead power lines parallel to rail track600 Sewer across the level crossing 150/100 water mains under crossing	• TBC
Others	TBC	TBC

Table 54 - Specific constraints - Church Street Level Crossing

Road Related	Rail Related	Others
 2 x 3.5m wide Lane Cycle Lane 1.5m, Pedestrian 2.0m Max gradient 5% Road Road/Rail separation 6.5m (road over) Speed as existing 	 Max gradient 2% desirable (2.5% maximum) compensated grade for freight Rail to road separation 6.5m (rail under) Gradient at station set as existing Alignment speed as existing Horizontal alignment as existing 	Private way gradient 12.5% (1 in 8)

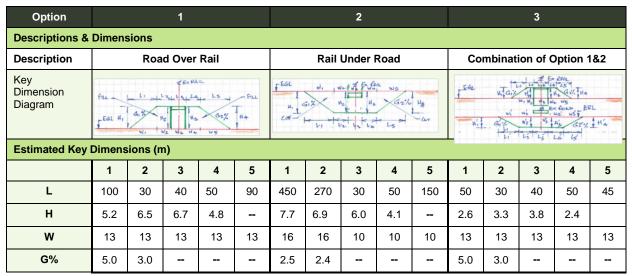
Table 55 - Specific Assumptions - Church Street Level Crossing

18.4 Road & Rail Considerations

The existing alignment of Church Street through the level crossing is a two lane two way road, traversing in an east to west direction.

The Road over Rail option would require the Captain Springs Rd/Church St intersection to be raised some 6m and would require the Captain Springs Rd level crossing to also be raised. This significant intervention would see 420m of Captain Springs Rd and some 300m of Church St needing to be rebuilt. This would allow Church St to pass over the rail tracks with a minimum clearance of 5.5m with a maximum road gradient of 5%. A key consideration is the road over rail option is the clearance to the 110/220kv overhead Transpower line.

The Rail Under Road options (both option 2 and option 3) were considered; they both would require lowering (or other treatment) to both the Mays Road and Captain Springs Rd level crossings, and the rebuilding of Te Papapa station.



Oution			4					^ _					2 -		
Option			1					2					3		
L'											200	370	30	50	50
H'											3.5	3.7	3.2	1.7	
W'											16	16	10	10	10
G'%											2.4	2.4	-	-	
On Line Impact	s														
Ex Highway	Н		М		L	Н		М		L	Н		М		L
Alignment	Elevated driveway including	ys and	d adjace	ent stree	ets	As ex	sting				drivew	vays an	d will imp d adjace or inters	ent stre	ets
Ex Railway	H M L							M	Ι.	L	Н		M		L
Alignment	As exist	ing					Rd an	ct Te Pap d Captair ngs			Mays		t Te Pap Captair gs		
Other Area Imp	acts														
Ex Highway	Н		M		<u>L</u>	. н		M		<u>L</u>	Н		M		<u>L</u>
Infrastructure	New hig					Churc		ng at May et will be			Churc		g at Mag t will be		
Ex Railway Infrastructure	H		M		L	and a	ccesse	moapa stations for both with lift an	n ends	to		nd to n	M apa stati ew road		
Impacts on Oth	ore														
Adjacent	H		М		L	Н	1	М		L	н		М		L
Properties	A number for the a Possible 220kv T power lii	ilignm e reloc ransp	ent cation of ower ov	f the 110		A number of properties required for temporary alignment				A number of properties required for temporary alignment Possible relocation of the 110/220kv Transpower overhead power lines required					
Impacts from C	onstructi	on													
Complexity &	Н		M		L	Н		M		L	Н		М		L
Disruption	Tempora railway					Major disruption to rail services and temporary bridge for highway traffic				Major disruption to rail services and temporary bridge for highway traffic					
Costs	Н		М		L	Н		М		-	Н		М		L
0					on III										
Construction								IVI		L					
Construction															
											п				
Property	Н	8 to	M 12 Mor		L	Н	12	M to 24 Mo	nths	L	н	Ove	M r 24 Mo	nths	L
Property Total Likely	Н	8 to	M		L	_	12	M	nths			Ove	M	nths	L
Property Total Likely Duration			M 12 Mor	nths		Н		M		L	Н		M	nths	L
Property Total Likely Duration Other Issues	New ver	tical a	M 12 Mor	nths nt will af	fect leven for ear	Herel cross	ings a	M to 24 Mo	oad an	L d Capta e Oneheds to be	H in Sprin unga lin	gs Rd e need	M r 24 Mo	oked at	
Property Total Likely Duration Other Issues	New ver The grapackage travelling	tical and seperated the seperate of the sepera	M 12 Mor alignmen paration rail parer one in	nths nt will af a solution ssenger ntersect tion (bot	fect leven for early journe	Hel cross	e leve	M to 24 Mo at Mays R el crossing nehunga	oad an s on th line nee	L d Capta e Onehreds to be	H in Sprin unga lin e relativ	gs Rd e need ely smo	M or 24 Mo to be lo poth as o	oked at	d to
Property Total Likely Duration Other Issues 1 2	New ver The grapackage travelling The road 220kv E	de sep e – the g und d over lectric	M 12 Mor alignment paration e rail parer one in	nths Int will af a solution ssenger intersect tion (both	ifect leven for each journet ion the	H rel cross ach of th y along n back t	e leve the O o grad d 3) m	M to 24 Mo at Mays R el crossing nehungal de then ur	oad angs on the line need ander ag	L d Capta e Oneheds to be ain.	H in Sprin unga lin e relativ	gs Rd e need ely smo	M or 24 Mo to be lo poth as o	oked at	d to

Table 56 – Output Summary for Church Street Level Crossing

19 Preliminary Planning Assessment

This section details a preliminary planning assessment undertaken as part of the Study This is intended to provide a high level understanding of potential resource management constraints associated with the proposed structures in the road way. The assessment does not provide information relating to the individual sites but rather provides an understanding of the overarching considerations associated with any structure in the road corridor as discussed further in Section 20 that follows.

19.1 Bridge Structure

The construction of a bridge within the road reserve and over rail designation has been assessed under the Auckland Council District Plan: Isthmus Section (ACDP: I), the Auckland Council District Plan: Papakura Section (ACDP: P), and the Auckland Council District Plan: Waitakere Section (ACDP: W). This assessment is summarised in the following sections.

19.1.1 Auckland Council District Plan: Isthmus Section

Rules for the construction of bridges and works within the road reserve are provided for in Chapter 4A: General Rules – Network Utilities section. The rail designation in the Isthmus has an underlying zoning of Special Purpose 3 Zone (Transport Corridor) covered in Chapter 10: Special Purpose Zone. The relevant rules from the two chapters are outlined in **Appendix D1**. Overall, the construction of bridges within the road reserve and rail designation (Special Purpose 3 Zone) in ACDP: Isthmus would likely be a **Permitted Activity**, provided grade of access standards are met under Rule 12.8.2.1(c).

The nine sites included in this preliminary assessment within the Isthmus area are the rail crossings on Morningside Drive(Kingsland), Woodward Road (Mount Albert), St Jude Street (Blockhouse Bay), St George Road (Avondale), O'Rorke Road (Penrose), Maurice Road (Penrose), Mays Road (Onehunga), Captain Spring Road (Onehunga), and Church Street (Onehunga). The surrounding land-uses for these sites are characterised by a combination of residential, business, industrial, open space, mixed-uses, railway and strategic roads. The surrounding land-uses for each of the sites are outlined in more detail in **Appendix D2**.

19.1.2 Auckland Council District Plan: Papakura Section

Rules for the construction of bridges and works within the road reserve and rail area are provided for in Chapter 11: Network Utilities, Transport and Roading. The relevant rules from the chapter are summarised in **Appendix D3**. The construction of a bridge within the road reserve and rail designation would likely be a **Controlled Activity** under the ACDP: P due to the structure exceeding the permitted height and ground coverage. This activity status assumes the bridge meets the height in relation to boundary requirements and is no greater than 9m in height.

Three sites in the Papakura area were included in this preliminary assessment, including rail crossings on Walters Road (Takanini), Taka Street (Takanini), and Manuroa Road (Takanini). The surrounding land-uses for these sites are generally a mix of residential, commercial, and industrial activities. **Appendix D4** outlines the surrounding land-uses for each of the sites in more detail.

19.1.3 Auckland Council District Plan: Waitakere Section

Rule 5.2(b) of the Transport Environment Chapter of the ACDP: W allows for any activity involving infrastructure associated with transport in the current rail corridor. The relevant rules from the chapter are summarised in **Appendix D5**. Overall, the construction of a bridge within the road reserve and rail designation under the ACDP: W would likely constitute a **Discretionary Activity** because the bridge structure exceeds the Permitted and Controlled Activity standards for height above ground level and above-ground area.

The four sites included in this preliminary assessment in the Waitakere area are the rail crossings on Portage Road (New Lynn), Glenview Road (Glen Eden), Bruce McLaren Road (Henderson), and Metcalfe Road (Henderson). The surrounding land-uses for these sites is characterised by town

centres and suburban shopping centres, industrial/employment areas, residential activities, and open space. The surrounding land-uses for each of the sites are outlined in more detail in **Appendix D6**.

19.2 Other Resource Consent Considerations

Other consents associated with construction of the bridge will be required and will likely include:

- Construction Noise/vibration
- Earthworks
- Stormwater discharge (construction and operation)
- Works within tree drip line/tree removal

19.2.1 Proposed Auckland Unitary Plan (PAUP)

There are a number of areas of the PAUP that may potentially need to be considered/included in the resource consent application for the proposed bridge construction, including:

- Earthworks in Mana Whenua site and place of value/significance
- Earthworks 1% AEP flood plain
- Outstanding Natural Landscape
- Outstanding Natural Feature
- Significant Ecological Area
- Stormwater discharge

19.2.2 Stakeholder Consultation/Engagement

Stakeholder consultation/engagement is anticipated with the following:

- KiwiRail
- Directly affected property owners and occupiers
- Adjacent property owners and occupiers
- Local Boards
- Iwi

19.2.3 Specialist Assessment to support Assessment of Environmental Effects

The following specialist assessments are anticipated to support the Assessment of Environmental Effects:

- Urban Design Treatment/Framework
- Landscaping
- Visual impact assessment
- Cultural Impact Assessment (if site is in or near a Site and Place of Value/Significance to Mana Whenua)
- Noise/Vibration
- NES Contaminated Land
- Traffic
- Geotechnical

20 Summary of the Reviews

20.1 Project Expected Estimate (Total Costs)

The following table illustrate the Project Expected Estimate (total costs without funding risks):

Site	Location	Option 1	Highway Flyov	er	Option 2 i	Railway under Ex H	lighway		Option 3 50/50	
		Infrastructure	Property	Total	Infrastructure	Property	Total	Infrastructure	Property	Total
1	Morningside Drive									
12	Woodward Road									
14	St Jude Street									
16	Saint Georges Road									
17	Portage Road						ı		I	I
19	Glenview Road		ı	ı			ı		ı	ı
21	Bruce McLaren Road									
25	Metcalfe Road									
34	Walters Road									
35	Taka Street									
36	Manuroa Road									
43	O'Rorke Road									
44	Maurice Road									
45	Mays Road									
46	Captain Springs Rd									
47	Church Street									

Table57 - Indicative Project Expected Estimate summary

20.2 Possible Future Considerations (NAL)

Possible considerations for future Investigations and designs stages should include:

- Morningside Drive and Woodward Road impact to the proposed CRL service patterns
- St Jude Street and St Georges should be investigated as a single package
- Portage Road road over rail option should only be considered for this site
- Glenview Road;, alternative site options outside of the existing road alignment need to be identified for grade separation.
- Bruce McLaren should consider the requirements of stabling facilities at Henderson
- Metcalfe Rd solution should be developed in conjunction with any future Ranui station redevelopment

20.3 Possible Future Considerations (NIMT)

Possible considerations for future Investigations and designs stage should include:

- Walters Road solution should assess the shopping areas to the north of the crossing.
- Taka Street and Manuroa Road with Takanini Station development should be considered as a single package

20.4 Possible Future Considerations (OBL)

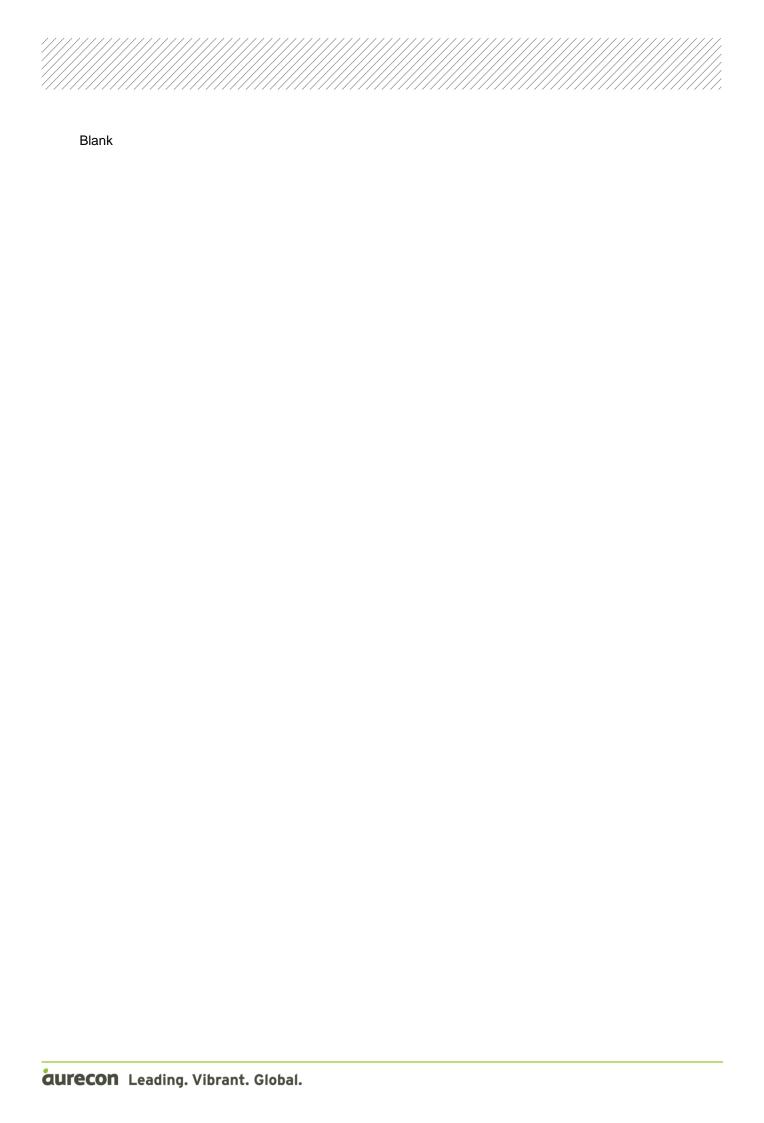
Possible considerations for future Investigations and designs stage should include:

- The impact of the overhead 110/220KV power line on the Road over Rail option
- O'Rorke Road Option 2 is not feasible, as it requires significant additional track to join back into the NAL in the Penrose area
- Mays Road, Captain Springs Road and Church Street should be considered as a single package, given their close proximity to one another.

Appendices



Appendix A Level Crossings information









Level Crossing Info

	AT P	rojec	t ID	Road Name
Nor	th Auc	klan	d Lir	ne
01	NAL-		01	Church Street East
				Church Street East Ped Dn
02	NAL-	W-	01	Kingdon Street Pedestrian
03	NAL-		02	Normanby Road
				Normanby Road Ped Up
				Normanby Road Ped Dn
04	NAL-	W-	03	Mount Eden Pedestian 1
				Mount Eden Pedestian 2
05	NAL-	W-	04	Porters Avenue Ped Up
				Porters Avenue Ped Dn
				Porters Avenue
06	NAL-	W-	05	George Street Ped Dn
				George Street Ped Up
				George Street
07	NAL-	W-	06	Morningside Drive Dn
				Morningside Drive Up
				Morningside Drive
80	NAL-	W-	07	Asquith Avenue
				Asquith Avenue Ped Up
				Asquith Avenue Ped Dn
09	NAL-	W-	80	Rossgrove Terrace
				Rossgrove Terrace Ped Up
				Rossgrove Terrace Ped Dn
10	NAL-		09	Baldwin Avenue Pedestrian
11	NAL-		10	Llyod Avenue Pedestrian
12	NAL-	W-	11	Woodward Road
				Woodward Road Ped Dn
				Woodward Road Ped Up
13	NAL-	W-	12	Crayford Street Pedestrian
14	NAL-	W-	13	St Jude Street
				St Jude Street Ped Up
45	NIAI	14/	4.4	St Jude Street Ped Dn
15	NAL-	VV-	14	Chalmers Street
				Chalmers Street Ped Up
16	NAL-	۱۸/	15	Chalmers Street Ped Dn
10	INAL-	v v -	15	St Georges Road St Georges Road Ped Up
				St Georges Road Ped Dn
17	NAL-	١٨/_	16	Portage Road
''	INAL	٧٧	10	Portage Road Ped Up
				Portage Road Ped Dn
18	NAL-	W-	17	Fruitvale Road
. •	" "	••	••	Fruitvale Road Ped Up
				Fruitvale Road Ped Dn
19	NAL-	W-	18	Glenview Road
-		-	-	Glenview Road Ped Up
				Glenview Road Ped Dn
20	NAL-	W-	19	Sherrybrooke Place
				Sherrybrooke Place Ped Up
_				Sherrybrooke Place Ped Dn
21	NAL-	W-	20	Bruce McLaren Road
				Bruce McLaren Road Ped Up
				Bruce McLaren Road Ped Dn
22	NAL-	W-	??	Corban Estate Pedestrian
23	NAL-	W-	21	Mt Lebanon Lane
				Mt Lebanon Lane Ped Up
				Mt Lebanon Lane Ped Dn

Level Clos		_					
Crossing	Туре		Control (as defined in Pt 9)		Kmage	Usage	Non OHL
Road			Half Arm Barriers	H	1.42		
Pedestrian	Down		Active		1.42		
Pedestrian		ΔΙοηρ	Active	1 1	8.94		
Road	Otaria	Alone	Half Arm Barriers	1 1	10.15		
Pedestrian	Up		Active		10.15		
Pedestrian			Active		10.15		
Pedestrian	Stand	Alone	Active	1	10.73		
Pedestrian	Stand	Alone	Active		10.73		
Pedestrian	Up		Active	1 1	10.86		
Pedestrian	Down		Active		10.86		
Road			Half Arm Barriers	IJ	10.86		
Pedestrian					11.37		
Pedestrian	Up				11.37		
Road	_		Half Arm Barriers	4 1	11.37		
Pedestrian			Active		12.80		
Pedestrian	Up		Active		12.80		
Road Road			Half Arm Barriers Half Arm Barriers	- 1	12.80		
Pedestrian	Lln		Active		14.03 14.03		
Pedestrian	•		Active		14.03		
Road	DOWN		Half Arm Barriers	1 1	14.13		
Pedestrian	Un		Active		14.13		
Pedestrian			Active		14.13		
Pedestrian		Alone	Active	1 1	14.34		
Pedestrian			7101170	1 1	14.90		
Road			Half Arm Barriers	1	15.80		
Pedestrian	Down		Active		15.80		
Pedestrian	Up		Active		15.80		
Pedestrian	Stand	Alone	Active	1	14.90		
Road			Half Arm Barriers	1	17.40		
Pedestrian	Up		Active		17.40		
Pedestrian	Down		Active	11	17.40		
Road			Half Arm Barriers		17.64		
Pedestrian	- 1		Active		17.64		
Pedestrian	Down		Active	4 1	17.64		
Road			Half Arm Barriers		18.23		
Pedestrian			Active		18.23		
Pedestrian Road	Down		Active Half Arm Barriers	11	18.23 18.88		
Pedestrian	Un		Active		18.88		
Pedestrian			Active		18.88		
Road	DOWN		Half Arm Barriers	1 1	20.94		
Pedestrian	Up		Active		20.94		
Pedestrian			Active		20.94		
Road			Half Arm Barriers	1 1	22.43		
Pedestrian	Up		Active		22.43		
Pedestrian			Active		22.43		
Road			Half Arm Barriers	1	24.20		
Pedestrian			Active		24.20		
Pedestrian	Down		Active		24.20		
Road	-		Half Arm Barriers		25.55		
Pedestrian	-		Active		25.55		
Pedestrian			Active	Į Į	25.55		
Pedestrian	Stand	Alone	Active	Į Į	27.14		
Road			Half Arm Barriers		27.37		
Pedestrian			Active		27.37		
Pedestrian		Λl~~ -	Active	١I	27.37	C+~+!	
Pedestrian	Siand	HIOUG	Active	J I	28.08	Station	







Level Crossing Info

	AT Pr	ojed	t ID	Road Name
25	NAL-	W-	23	Metcalfe Road
				Metcalfe Road Ped Up
				Metcalfe Road Ped Dn
26	NAL-	W-	24	Ranui Pedestrian
27	NAL-	W-	25	O'Neills Road Pedestrian
				C. tomo i toda i ododina.
Nor	th Islar	nd M	lain 1	Frunk
	NIMT-		01	Tuhimata Road Pedestrian
29	NIMT-	S-	02	Crown Road
30	NIMT-	S-	03	Sutton Road
	NIMT-			Opheke Road
32	NIMT-	S-	05	Boundary Road
33	NIMT-	S-	06	Tironui Pedestrian
	NIMT-			Walter Road
•		_	•	Walter Road Ped Dn
35	NIMT-	S-	08	Taka Street
- •		-		Taka Street Ped Up
				Taka Street Ped Dn
36	NIMT-	S-	09	Takanini Pedestrian 1
-	[****	J		Takanini Pedestrian 2
37	NIMT-	S-	10	Manuroa Road
J1	11171 1 -	J-	10	Manuroa Road Ped Up
				Manuroa Road Ped Dn
20	NIMT-	0	11	
38	INIIVI I -	5-	11	Spartan Road
		_	40	Spartan Road Ped Dn
39	NIMT-	S-	12	Ta Mahia Pedestrian 1
				Ta Mahia Pedestrian 2
40	NIMT-	S-	13	Homai South Pedestrian
				Homai North Pedestrian
41	NIMT-	S-	14	Papatoetoe Pedestrian 2
				Papatoetoe Pedestrian 1
42	NIMT-	S-	15	Glen Innes South Pedstrian
				Glen Innes North Pedstrian
One	hunga	Bra	nch	l ine
One	hunga OBL-	Bra	nch 01	Line O'Rorke Road
	OBL-	Bra		O'Rorke Road
		Bra		
43	OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up
	OBL- OBL- OBL-	Bra		O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road
43	OBL- OBL- OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn
43 44	OBL- OBL- OBL- OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up
43	OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road
43 44	OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road
44 45	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road May Road Ped Dn May Road Ped Up
43 44	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road May Road Ped Dn May Road Ped Up Captain Springs Rd
44 45	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Ped Dn Maurice Road Ped Dn Maurice Road Ped Up May Road May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Up
44 45	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Up May Road May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Church Street Ped Up
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Church Street
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Church Street Alferd Street
44 45 46 47	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04 05	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Chirch Street Ped Dn Alferd Street Ped Dn Alferd Street Ped Dn
44 45 46	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Church Street Alferd Street
44 45 46 47	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04 05	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Dn Maurice Road Ped Dn May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Chirch Street Ped Dn Alferd Street Ped Dn Alferd Street Ped Dn
44 45 46 47	OBL- OBL- OBL- OBL- OBL- OBL- OBL- OBL-	Bra	01 02 03 04 05	O'Rorke Road O'Rorke Road Ped Dn O'Rorke Road Ped Up Maurice Road Maurice Road Ped Up May Road Ped Up May Road Ped Dn May Road Ped Dn May Road Ped Up Captain Springs Rd Captain Springs Rd Ped Dn Captain Springs Rd Ped Up Church Street Church Street Ped Dn Chirch Street Ped Up Alferd Street Alferd Street Ped Up Victoria Street

Pedestrian Up Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Road Hali Road Hali Road Hali Road Hali Pedestrian Stand Alone Road Hali Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Up Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Stand Alone Road Hali Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	f Arm Barriers Active Active Active Active
Pedestrian Down Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Road Hall Road Hall Road Hall Road Hall Pedestrian Stand Alone Road Hall Pedestrian Down Road Hall Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down	Active Active Active
Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Road Hali Road Hali Road Hali Road Hali Pedestrian Stand Alone Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active Active
Pedestrian Stand Alone Road Hal Pedestrian Stand Alone Road Hal Pedestrian Down Road Hal Pedestrian Down Pedestrian Down Road Hal Pedestrian Down Pedestrian Down Road Hal Pedestrian Down Road Hal Pedestrian Down Pedestrian Down Road Hal Pedestrian Down Road Hal Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Down	Active
Pedestrian Stand Alone Road Hal Pedestrian Stand Alone Road Hal Pedestrian Down Road Hal Pedestrian Down Pedestrian Down Pedestrian Up Pedestrian Down Road Hal Pedestrian Down Road Hal Pedestrian Down Road Hal Pedestrian Down Road Hal Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Up Road Hal Pedestrian Down	
Road Hair Road Road Alone Road Road Road Road Road Road Road Road	
Road Hair Road Road Alone Road Road Road Road Road Road Road Road	
Road Hali Road Hali Road Hali Road Hali Road Hali Road Hali Pedestrian Stand Alone Road Hali Pedestrian Down Road Hali Pedestrian Up Pedestrian Down Pedestrian Stand Alone Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Road Hair Road Hair Road Hair Road Hair Road Hair Road Hair Road Road Road Road Hair Road Road Hair Road Road Road Road Road Road Road Road	f Arm Barriers
Road Hair Pedestrian Stand Alone Road Hair Pedestrian Down Road Hair Pedestrian Up Pedestrian Down Pedestrian Stand Alone Pedestrian Up Pedestrian Up Pedestrian Down Road Hair Pedestrian Down Road Hair Pedestrian Down Road Hair Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hair Pedestrian Down Pedestrian Up	f Arm Barriers
Pedestrian Stand Alone Road Hair Pedestrian Down Road Hair Pedestrian Up Pedestrian Down Pedestrian Stand Alone Road Hair Pedestrian Down Road Hair Pedestrian Up Pedestrian Down Road Hair Pedestrian Down Road Hair Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Down	f Arm Barriers
Road Pedestrian Down Road Hair Pedestrian Up Pedestrian Down Pedestrian Stand Alone Pedestrian Up Pedestrian Down Road Hair Pedestrian Down Road Hair Pedestrian Down Road Hair Pedestrian Down Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Up	f Arm Barriers
Pedestrian Down Road Hali Pedestrian Up Pedestrian Down Pedestrian Stand Alone Road Hali Pedestrian Up Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Road Dedestrian Up Pedestrian Down Pedestrian Stand Alone Road Hali Pedestrian Up Pedestrian Up Pedestrian Up Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali	f Arm Barriers
Pedestrian Up Pedestrian Down Pedestrian Stand Alone Road Hali Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up	Active
Pedestrian Down Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	f Arm Barriers
Pedestrian Stand Alone Pedestrian Up Pedestrian Down Road Hali Pedestrian Down Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Stand Alone Road Hair Pedestrian Up Pedestrian Down Road Pedestrian Down Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hair Pedestrian Up	Active
Road Hali Pedestrian Up Pedestrian Down Road Hali Pedestrian Down Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up	Passive
Pedestrian Up Pedestrian Down Road Hal Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hal Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Down Pedestrian Up Road Hal Pedestrian Down	Passive
Pedestrian Down Road Hair Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hair Pedestrian Down Pedestrian Up Road Hair Pedestrian Down	f Arm Barriers
Road Hali Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Up Road Hall	Active
Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down	f Arm Barriers
Pedestrian Stand Alone Pedestrian Dawn Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Stand Alone Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Up Road Hall Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up	Active
Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up	Active
Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up	Active
Pedestrian Stand Alone Pedestrian Stand Alone Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up	Active
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	f Arm Barriers
Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up	Active
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	f Arm Barriers
Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Up Road Hall Pedestrian Down	f Arm Barriers
Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Up Road Hall Pedestrian Down Pedestrian Up Road Hall Pedestrian Down	f Arm Barriers
Road Hali Pedestrian Down Pedestrian Up Road Hali Pedestrian Down	Active
Pedestrian Down Pedestrian Up Road Hall Pedestrian Down	Active
Pedestrian Up Road Halt Pedestrian Down	
Road Hal Pedestrian Down	f Arm Barriers
Pedestrian Down	f Arm Barriers Active
Dodostrion Un	Active
Pedestrian Up	Active Active
Road Hal	Active Active f Arm Barriers
Pedestrian Down	Active Active f Arm Barriers Active
Pedestrian Up	Active Active f Arm Barriers Active Active
Road Hal	Active Active f Arm Barriers Active Active f Arm Barriers Active Active Active

Kmage	Usage	Non OHL
29.50		
29.50		
29.50 29.75		
29.75 31.39		
31.39		
632.95		Non OHL
633.57		Non OHL
643.36		Non OHL
644.60		Non OHL
645.53		Non OHL
648.85 649.19		
649.19		
650.38		
650.38		
650.38		
650.57	station	
650.57	station	
650.89		
650.89		
650.89	1.16	
651.46 651.46	H'way H'way	
651.46 652.32	H'way station	
652.32	station	
655.62	station	
655.77	station	
660.52	station	
660.52	station	
672.53	station	
672.72	station	
0.59		Bi D'tional
0.59		Bi D'tional
0.59		Bi D'tional
1.03 1.03		Bi D'tional Bi D'tional
1.03		Bi D'tional
1.89		Bi D'tional
1.89		Bi D'tional
1.89		Bi D'tional
2.13		Bi D'tional
2.13		Bi D'tional
2.13		Bi D'tional
2.23		Bi D'tional
2.23		Bi D'tional Bi D'tional
2.23 2.77		Bi D'tional
2.77 2.77		Bi D'tional
2.77		Bi D'tional
2.98		Bi D'tional
2.98		Bi D'tional
2.98		Bi D'tional
3.32		Bi D'tional

Appendix B FE Summaries







Printed Date: 12/12/2014

Client Pof.	NAL-W-06 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	Morningside Drive (Site 7)	Prepared By:	750002 TP	
Location.	NAL 12.8km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	спескей Бу.	<u>JL</u>	
	These estimates are exclusive of escalation and GST.	Ontion	1 - Highway Fly	ovor
		Ориоп	i i - Higilway Fiy	
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			<u> </u>
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С				
U	Total design and project documentation Construction			
1	MSQA			
'				
	- consultancy fees			
	- the AT managed costs			<u> </u>
	- consent monitoring fees			<u> </u>
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls			
9	Traffic services			
10	Service relocations			
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prope	erty cost expected estimate			
nvestigation	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
			/	
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate			
-	and reporting 95th percentile estimate			
	project documentation 95th percentile estimate			
Construction	95th percentile estimate			
Date of esting	mate	Cost index (Qtr/Y	/ear)	
	ternal peer review by	Signed		
	cepted by the AT	Signed		
_sumate ac	cepted by the AT	oignea		





D F C G P Project propert Investigation a Design and pro Construction e H F I Project propert Investigation a Design and pro Construction a Design and pro Construction a Design and pro Construction 9			(A+B+C+D)	
D F C G P Project propert Investigation a Design and pro Construction e H F I 99 Project propert Investigation a Design and pro Construction a Design and pro Construction a	tetaining walls irraffic services dervice relocations andscaping irraffic management and temporary works irreliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate try cost 95th percentile estimate and reporting 95th percentile estimate significant of the project documentation of the percentile estimate for opect documentation 95th percentile estimate significant of the percentile estimate for opect documentation 95th percentile estimate significant of the	(A+B+C+D) (E+F)	(A+B+C+D)	
The state of the s	tetaining walls irraffic services dervice relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate and reporting expected estimate expected estimate Sub-total base physical works Total construction (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate expected estimate Sunding risk (Assessed/Analysed) Sth percentile project estimate ty cost 95th percentile estimate and reporting 95th percentile estimate oject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Table 1 Project propert Investigation a Design and processing to the Project propert Investigation a Design and processing and project propert Investigation a Design and professional project propert Investigation and professional professio	tetaining walls irraffic services dervice relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate ty cost 95th percentile estimate and reporting 95th percentile estimate oject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
D F C G P Project propert Investigation a Design and pro Construction e H F I 9: Project propert Investigation a	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected estimate Sub-total base physical works Total construction Project expected estimate try cost expected estimate and reporting expected estimate Sunding risk (Assessed/Analysed) Sth percentile project estimate try cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
13 P. 14 E. 14 P. 14 P. 15 Project propert propert propert propert propert propert propert propert project pro	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate funding risk (Assessed/Analysed) Sth percentile project estimate try cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
13 P. 14 E. 19 P. 14 P. 19 P.	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected destimate coject documentation expected estimate expected estimate funding risk (Assessed/Analysed) Sth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
D F C G P Project propert Investigation a Design and pro Construction e H F	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate supported the project documentation expected estimate expected estimate funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
D F C G P Project propert Investigation a Design and pro Construction e	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate	(A+B+C+D)		
D F C G P Project propert Investigation a Design and pro	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate oject documentation expected estimate	(A+B+C+D)		i i
D F C G P Project propert Investigation a Design and pro	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate oject documentation expected estimate	(A+B+C+D)		i i
D F C G Project propert	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate and reporting expected estimate	(A+B+C+D)		i i
13 P 14 E D E P F C G P Project propert	tetaining walls traffic services tervice relocations andscaping traffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate	(A+B+C+D)		i i
13 P 14 E D E P F C G P	tetaining walls raffic services service relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		i i
13 P. 14 E. D P. F C	tetaining walls paraffic services dervice relocations andscaping paraffic management and temporary works dereliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed)	(A+B+C+D)		i i
13 P 14 E D E P	Retaining walls Fraffic services Fraffic services Frederic relocations Frandscaping Fraffic management and temporary works Frederininary and general Frederic Rail) Sub-total base physical works Total construction Froject base estimate (A+B+C+D)			i i
13 P 14 E	tetaining walls raffic services service relocations andscaping raffic management and temporary works treliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			i i
13 P 14 E	tetaining walls raffic services service relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works			i i
13 P	tetaining walls raffic services service relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail) Sub-total base physical works			i i
13 P	tetaining walls raffic services service relocations andscaping raffic management and temporary works reliminary and general extraordinary construction costs (inc Rail)			i i
13 P	tetaining walls raffic services service relocations andscaping raffic management and temporary works reliminary and general			
	retaining walls fraffic services fervice relocations andscaping fraffic management and temporary works			
	tetaining walls Traffic services Service relocations andscaping			
11 La	tetaining walls raffic services fervice relocations			
	tetaining walls raffic services			
	tetaining walls			
	· ·			
	ridae.			
	avenierit and sunacing			
	lavement and surfacing			
	rainage			
	Ground improvements			
	arthworks			
	nvironmental compliance			
P	Physical works			
1	Sub-total base MSQA			
	- consent monitoring fees			
1	- the AT managed costs			
	- consultancy fees			
' "	- · · ·			
1 /	//SQA			
c	Construction			
С	Total design and project documentation			
	- the AT managed costs			
1	- consultancy fees			
	- · ·			
	Design and project documentation:			
В	Total investigation and reporting			
1	- the AT managed costs			
1	- consultancy fees			
Ir	nvestigation and reporting:			
Α	Nett project property cost			
Item D	escription	Base estimate	Contingency	Funding risk
•		Option 2 - Ra	ailway Under H'\	vay @ERL
T	hese estimates are exclusive of escalation and GST.			
	• .			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	IAL 12.8km	Checked By:	SL	
	Morningside Drive (Site 7)	Prepared By:		
	AT Level Crossing Feasibility Studies	Job No:	236852 TP	
	` '			
Client Bef: N	IAL-W-06 (Rev 01)	Date:	24/11/2014	





		Signed		
Date of eath		(407)	,	
Date of estir	nate	Cost index (Qtr/Y	ear)	
Construction	95th percentile estimate			
	project documentation 95th percentile estimate			
_				
	and reporting 95th percentile estimate			
	erty cost 95th percentile estimate		(3.71)	
	95th percentile project estimate		(G+H)	
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
Construction	expected estimate			
-	project documentation expected estimate			ļ
_				1
	and reporting expected estimate			1
	erty cost expected estimate			1
	Project expected estimate	(E+F)		1
F	Contingency (Assessed/Analysed)	(A+B+C+D)		1
Е	Project base estimate (A+B+C+D)			
D	Total construction			
_	Sub-total base physical works			
1**	· · · · · · · · · · · · · · · · · · ·			
	Extraordinary and general Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
11	Landscaping			
-	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			i
5	Drainage			
4	Ground improvements			
3	Earthworks			
2	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			i i
	- consultancy fees			
1	MSQA			
	Construction			
С	Total design and project documentation			
	-			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
			Option 3 - 50/50	
L	These estimates are exclusive of escalation and GST.		Dation 2 FO/FO	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Checked By:	SL	J
	NAL 12.8km	Prepared By:	SL	
	Morningside Drive (Site 7)		230632 TP	
	AT Level Crossing Feasibility Studies	Job No:	236852	
Client Ref:	NAL-W-06 (Rev 01)	Date:	24/11/2014	1





	cented by the AT	Signed		
		Signed		
Date of esti	mate	Cost index (Qtr/Y	ear)	
Construction	95th percentile estimate			
	project documentation 95th percentile estimate			
_	and reporting 95th percentile estimate			
•	erty cost 95th percentile estimate		(6+11)	
	95th percentile project estimate		(G+H)	
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
Construction	expected estimate			1
_	project documentation expected estimate			4
_	and reporting expected estimate			1
				-
_	erty cost expected estimate	(LTI)		1
G	Project expected estimate	(E+F)		1
F	Contingency (Assessed/Analysed)	(A+B+C+D)		1
Е	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
13	Preliminary and general			
12	Traffic management and temporary works			
11	Landscaping			
10	Service relocations			
9	Traffic services			
8	Retaining walls			
	Bridges Potaining walls			
7	· ·			
6	Pavement and surfacing			
5	Drainage			
4	Ground improvements			i i
3	Earthworks			i i
2	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	_			
	- the AT managed costs			
	- consultancy fees			
1	MSQA			1
	Construction			1
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
		Option	1 - Highway Fly	/over
	These estimates are exclusive of escalation and GST.		=	
	• .			
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	NAL 15.80	Checked By:	JA	J
	Woodward Road (Site 11)	Prepared By:		1
	AT Level Crossing Feasibility Studies	Job No:	236852 TP	1
	· · · ·			1
Client Ref	NAL - W - 11 (Rev 01)	Date:	24/11/2014	1
				-





Estimate ex	cented by the AT	Signed		
	ternal peer review by	Signed		
Date of esti	mate	Cost index (Qtr/Y	'ear)	
Construction	95th percentile estimate			
	project documentation 95th percentile estimate			
_	and reporting 95th percentile estimate			
•	erty cost 95th percentile estimate		(3.11)	
ı	95th percentile project estimate		(G+H)	
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
Construction	expected estimate			1
_	project documentation expected estimate			-
_	and reporting expected estimate			1
				-
	erty cost expected estimate	(ETI)		1
G	Project expected estimate	(E+F)		1
F	Contingency (Assessed/Analysed)	(A+B+C+D)		1
E	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
13	Preliminary and general			
12	Traffic management and temporary works			
10	Landscaping			
10	Service relocations			
9	Traffic services			
8	Retaining walls			
7	Bridges			
6	Pavement and surfacing			
5	Drainage			i i
4	Ground improvements			i i
3	Earthworks			
2	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	_			
	- the AT managed costs			i i
	- consultancy fees			
1	MSQA			<u> </u>
	Construction			1
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
_				
Item	Description	Base estimate	Contingency	Funding risk
		Option 2 - R	anway Under H	way were
	THOSE COMMITTEES ARE EXCUSIVE OF COCARACION AND CO.T.	Ontion 2 P	ailway Under H'	way @EDI
	These estimates are exclusive of escalation and GST.			
Notes:	used as budgetary or construction cost estimates.			
	The figures in this document are for outline indicative costs comparison and should not		-	•
	NAL 15.80	Checked By:	JA	1
	Woodward Road (Site 11)	Prepared By:	TP	1
	AT Level Crossing Feasibility Studies	Job No:	236852	1
Client Ref:	NAL - W - 11 (Rev 01)	Date:	24/11/2014	





Printed Date: 12/12/2014

Client Pof.	NAL - W - 11 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	Woodward Road (Site 11)	Prepared By:	7P	
Location.	NAL 15.80	Checked By:	JA	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	спескей Бу.	<i>37</i> 4	
	· ·			
	These estimates are exclusive of escalation and GST.		Option 3 - 50/50	
			Jption 3 - 50/50	
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			1
	- the AT managed costs			i i
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			ī i
	- the AT managed costs			
С	Total design and project documentation			
-	Construction			
1	MSQA			
ļ	- consultancy fees			
				<u> </u>
	- the AT managed costs			<u> </u>
	- consent monitoring fees			<u> </u>
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls			
9	Traffic services			
10	Service relocations			
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			l i
Е	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prope	erty cost expected estimate			
nvestigation	and reporting expected estimate			
esign and p	project documentation expected estimate			
	expected estimate			
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate		(G+A)	
_	and reporting 95th percentile estimate			
	project documentation 95th percentile estimate			
Construction	95th percentile estimate			
ate of esti	mate	Cost index (Qtr/Y	rear)	
	ternal peer review by	Signed		
stimate ac	cepted by the AT	Signed		





Project: AT Level Crossing Feasibility Studies Location: St Jude Street (Site 14) NAL 17.4km The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates. These estimates are exclusive of escalation and GST. Option 1 - Highway Flyo Item Description Base estimate Contingency A Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs Total investigation and reporting Design and project documentation: - consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - consultancy fees - the AT managed co	I	24/11/2014	Date:	NAL W 12 (Pay01)	Client Bef
Decision St Jude Street (Site 14)					
NAL 17.4km The figures in his document are for outline indicative costs comparison and should not reference to the figures in his document are for outline indicative costs comparison and should not reference. These estimates are exclusive of ecoeletion and GST. Option 1 - Highway Flyor Item Description Base estimate Contingency Investigation and reporting: - consultancy fees - the AT managed costs - consultancy fees - the AT managed costs - consultancy fees - the AT managed costs - the AT managed costs - consultancy fees - the AT managed costs - the AT managed cost				•	
The figures in this document are for outline indicative costs companion and should not used as budgleary or construction cost estimates. These estimates are exclusive of escalation and GST Option 1 - Highway Flyo Base ostimate Contingency A Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs Total investigation and reporting: - consultancy fees - the AT managed costs C Total design and project documentation: - consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - consent monitoring fees - the AT managed costs - consultancy fees - the AT managed costs - consultancy fees - the AT managed costs - consent monitoring fees - the AT managed costs - consent monitoring fees - consent monit			-		Location.
Item Description Base estimate Contingency A Nett project property cost Contingency - consultancy fees - the AT managed costs - consultancy fees - the AT managed costs -	ļ	<u> </u>	Oncored By.	The figures in this document are for outline indicative costs comparison and should not	Notes:
Item Description Base estimate Contingency					
Investigation and reporting:	rover	1 - Highway Fly	Ontion	These estimates are exclusive or escalation and GST.	ļ
A Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs B Total investigation and reporting Design and project documentation: - consultancy fees - the AT managed costs C Total design and project documentation I MSQA - consultancy fees - the AT managed costs - consultancy fees			•		_
Investigation and reporting:	Funding risk	Contingency	Base estimate	Description	Item
Investigation and reporting:				Nett project property cost	Δ 1
- consultancy fees - the AT managed costs B					
B Total investigation and reporting Design and project documentation: - consultancy fees - the AT managed costs - the AT managed costs C Total design and project documentation 1 MSQA - consultancy fees - the AT managed costs - the AT managed costs - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Investigation and reporting 95th percentile estimate					
B					
Design and project documentation:					R
- consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - the AT managed costs - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Project property cost expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) 1 95th percentile project estimate Investigation and reporting expected estimate Investigation and reporting sthe percentile estimate Investigation and reporting 95th percentile estimate					
C Total design and project documentation Construction					
Construction MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) E Project base estimate Construction expected estimate I Wall AB+C+D) F Contingency (Assessed/Analysed) Construction expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I syst percentile estimate H Funding risk (Assessed/Analysed) I syst percentile estimate Investigation and reporting 95th percentile estimate					
Construction ### A consultancy fees - the AT managed costs - consent monitoring fees Physical works Environmental compliance Environmental compliance Rentworks Fround improvements Drainage Retaining walls Traffic services Traffic services Retaining walls Preliminary and general Extraordinary construction costs (inc Rail) Froget property cost expected estimate Project property cost expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I service to cost imate (A+B+C+D) I services I main temporation (A+B+C+D) I ma					
- consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) For Contingency (Assessed/Analysed) F Contingency (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Project property cost expected estimate H Funding risk (Assessed/Analysed) F Project property cost 95th percentile estimate H Funding risk (Assessed/Analysed) Investigation and reporting 95th percentile estimate					C
- consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Raili) E Project base estimate F Contingency (Assessed/Analysed) C Project expected estimate H Funding risk (Assessed/Analysed) C Project property cost expected estimate C Design and project documentation expected estimate H Funding risk (Assessed/Analysed) F Unding risk (Assessed/Analysed) C Onstruction of Estimate H Funding risk (Assessed/Analysed) I Sth percentile estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					1
- the AT managed costs - consent monitoring fees Sub-total base MSOA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) B Project property cost expected estimate Project property cost expected estimate Investigation and reporting expected estimate Project property cost expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) Project property cost 9th percentile estimate Investigation and reporting 95th percentile estimate					'
- consent monitoring fees Sub-total base MSQA Physical works Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) A Project expected estimate (A+B+C+D) I Style property cost expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) 9 Style property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					
Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Sub-total base physical works F Contingency (Assessed/Analysed) G Project base estimate Investigation and reporting expected estimate Construction expected decumentation expected estimate Construction expected property cost estimate F Unding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Unding risk (Assessed/Analysed) F Unding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Unding risk (Assessed/Analysed)				_	
Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) B E Project base estimate F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) Froject property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				_	
Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) F Contingency (Assessed/Analysed) G Project base estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) F Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					
3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) F Contingency (Assessed/Analysed) G Project base estimate Project property cost expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) F Under the project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					2
4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Froject base estimate F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Inding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Gostingency (Assessed/Analysed) F Inding risk (Assessed/Analysed)				·	
5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) F Contingency (Assessed/Analysed) G Project base estimate Project property cost expected estimate Investigation and reporting eyste percentile estimate Investigation and reporting 95th percentile estimate					
6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) F Contingency (Assessed/Analysed) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Investigation and reporting expected estimate Investigation and reporting 95th percentile estimate				· ·	•
7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Sub-total base physical works Total construction F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Inject property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				-	-
Retaining walls Traffic services Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Total construction E Project base estimate G Project expected estimate Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) Froject property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate				_	
Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) F Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					
Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F F Funding risk (Assessed/Analysed) F F F Funding risk (Assessed/Analysed) F F F F F F F F F F F F F F F F F F F	i				
Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) F Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Funding risk (Assessed/Analysed)				Service relocations	10
Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate				Landscaping	11
Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) F Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate				Traffic management and temporary works	12
Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percentile estimate				Preliminary and general	13
D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				Extraordinary construction costs (inc Rail)	14
E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				Sub-total base physical works	
F Contingency (Assessed/Analysed) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				Total construction	D
G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				Project base estimate (A+B+C+D)	E
G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate			(A+B+C+D)	Contingency (Assessed/Analysed)	F
Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				Project expected estimate	G
Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				erty cost expected estimate	Project prope
H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				and reporting expected estimate	Investigation
H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				project documentation expected estimate	Design and բ
I 95th percentile project estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate				expected estimate	Construction
I 95th percentile project estimate (G+H) Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate		(A+B+C+D)		Funding risk (Assessed/Analysed)	н
Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate					
Investigation and reporting 95th percentile estimate		(5.1.1)			
		-			
- saigh and project decamentation compercentio commute		-			_
Construction 95th percentile estimate		-			
Date of estimate Cost index (Qtr/Year)		ear)	-		
Estimate external peer review by Signed					
Estimate accepted by the AT Signed			Signed	cepted by the AT	Estimate ac





Project proper Investigation a Design and pro Construction e H F I 9 Project proper Investigation a Design and pro Construction 9			(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e H F I 9 Project proper Investigation a Design and pro Construction 9	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate And reporting expected estimate and reporting expected estimate expected estimate Sub-total base physical works Total construction (A+B+C+D) Project base estimate Analysed) Project expected estimate Expected estimate Expected estimate Expected estimate Analysed) Posth percentile project estimate Analysed project documentation 95th percentile estimate Expected documentation 95th percentile estimate Expected documentation 95th percentile estimate Expected estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
Project proper Investigation a Design and pro Construction e H F I 9 Project proper Investigation a Design and pro	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate expected destimate Expected estimate Expected estima	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pro Construction e H F I 9 Project proper Investigation a Design and pro	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate expected destimate Expected estimate Expected estima	(A+B+C+D)	(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e H F I 9 Project proper Investigation a	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Poth percentile project estimate try cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e H F I 9 Project proper	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate Toject documentation expected estimate Expected estimate Try cost estimate Funding risk (Assessed/Analysed) Poth percentile project estimate Try cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e H F	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reporting risk (Assessed/Analysed) Sth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate Expected estimate Expected estimate Expected estimate Expected estimate Expected estimate	(A+B+C+D)	(A+B+C+D)	
G P Project proper Investigation a Design and pro Construction e	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
G P Project proper Investigation a Design and pro	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reject documentation expected estimate	(A+B+C+D)		i i
G P Project proper Investigation a Design and pro	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reject documentation expected estimate	(A+B+C+D)		i i
G P Project proper Investigation a	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate	(A+B+C+D)		i i
G P	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate	(A+B+C+D)		i i
G P	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		i i
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		i i
F In	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			i i
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			i i
E P	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			i i
D	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			i i
1	Preliminary and general Extraordinary construction costs (inc Rail)			i i
14 E	Preliminary and general			
	roffic management and temporary works			
	ervice relocations andscaping			
_	Service relocations			
	raffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			
	Drainage			i i
4 G	Ground improvements			
3 E	Earthworks			
2 E	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	_			
	- the AT managed costs			
	- consultancy fees			
1 N	MSQA			
_	Construction			
С	Total design and project documentation			
 				
]	- the AT managed costs			
	- consultancy fees			
D	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
Ir	nvestigation and reporting:	_		
Α	Nett project property cost			
Item D	Description	Base estimate	Contingency	Funding risk
		Option 2 - Ra	allway Under Hi	way wekl
1	These estimates are exclusive of escalation and GST.	Ontion 2 D	ailway Under H'v	way @EDI
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		энсоква Бу.	<u> </u>	
	NAL 17.4km	Checked By:	SL	1
	St Jude Street (Site 14)	Prepared By:	TP	1
	AT Level Crossing Feasibility Studies	Job No:	236852	1
Client Ref: N	NAL-W-13 (Rev01)	Date:	24/11/2014	





Printed Date: 12/12/2014

Client Pof.	NAL-W-13 (Rev01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	St Jude Street (Site 14)	Prepared By:	7P	
Location.	NAL 17.4km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	спескей Бу.	JL.	
	These estimates are exclusive of escalation and GST.		Option 3 - 50/50	
I				
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			<u> </u>
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			-
С				
C	Total design and project documentation Construction			
1	MSQA			
'	- consultancy fees			-
	- the AT managed costs			
	_			<u> </u>
	- consent monitoring fees			<u> </u>
	Sub-total base MSQA			
	Physical works			
	Environmental compliance			<u> </u>
3	Earthworks			<u> </u>
4	Ground improvements			<u> </u>
5	Drainage			<u> </u>
	Pavement and surfacing			<u>. </u>
	Bridges Retaining wells			<u> </u>
8 9	Retaining walls Traffic services			<u> </u>
10	Service relocations			<u> </u>
	Landscaping			
12	Traffic management and temporary works			
	Preliminary and general			<u> </u>
	Extraordinary construction costs (inc Rail)			
1-7	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
	,	(A - B - C - D)		
	Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D) (E+F)		
	erty cost expected estimate	(C+F)		
	and reporting expected estimate			
_				
-	project documentation expected estimate			
JUNSTRUCTION	expected estimate			
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate			
nvestigation	and reporting 95th percentile estimate			
esign and p	project documentation 95th percentile estimate			
Construction	95th percentile estimate			
ate of esti	mate	Cost index (Qtr/Y	(ear)	
		Signed	- Cai j	
		Signed		
.sumate ac	cepted by tile AT	Signed		





Cliont Bat	NAL W 45 (Pov.04)	5	24/44/2044	
	NAL - W - 15 (Rev 01) AT Level Crossing Feasibility Studies	Date:	24/11/2014	
	<u> </u>	Job No:	236852	
	St Georges Road (Site 16) NAL 18.23	Prepared By:	TP SL	
		Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.			
•		Option	1 - Highway Flyd	over
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
	Earthworks			
4	Ground improvements			
	Drainage			
	Pavement and surfacing			
	Bridges			
	Retaining walls			
-	Traffic services			<u> </u>
	Service relocations			
	Landscaping Traffic management and temporary works			
	Preliminary and general			
	Extraordinary construction costs (inc Rail)			
17	Sub-total base physical works			
D	Total construction			
	Project base estimate (A+B+C+D)			
	Contingency (Assessed/Analysed)	(A+B+C+D)		
	Project expected estimate	(E+F)		
	erty cost expected estimate	(=)		
	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
			(A+B+C+D)	
	Funding risk (Assessed/Analysed) 95th percentile project estimate			
	erty cost 95th percentile estimate		(G+H)	
	and reporting 95th percentile estimate			
_				
	project documentation 95th percentile estimate		ŀ	
	95th percentile estimate			
Onstruction				
	nate	Cost index (Qtr/Y	'ear)	
Date of estir		Cost index (Qtr/Y Signed	'ear)	





Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate and reporting 95th percentile estimate surject documentation 95th percentile estimate		(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate and reporting 95th percentile estimate surject documentation 95th percentile estimate and reporting 95th percentile estimate surject documentation 95th percentile estimate surject documentation 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate expected documentation 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate expected documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate expected documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate and reporting expected estimate expected estimate Project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate extry cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate erroject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate end reporting expected estimate uroject documentation expected estimate expected estimate Extraordinary construction costs (inc Rail)	(A+B+C+D)	(A+B+C+D)	
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate project documentation expected estimate expected estimate expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate and reporting expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail)			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works Preliminary and general			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping Traffic management and temporary works			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations Landscaping			
Pavement and surfacing Bridges Retaining walls Traffic services Service relocations			
Pavement and surfacing Bridges Retaining walls Traffic services			
Pavement and surfacing Bridges Retaining walls			
Pavement and surfacing Bridges			
Pavement and surfacing			
-			
-			
Drainage			_
Ground improvements			
Earthworks			
·			
-			
· ·			
			i i
- consent monitoring fees			
- the AT managed costs			
Construction			
Total design and project documentation			
•			
- · · ·			
· •			
- consultancy fees			
Investigation and reporting:			
Nett project property cost			
Description	Base estimate	Contingency	Funding risk
	Option 2 - Ra	ailway Under H'	way @ERL
These estimates are exclusive of escalation and GST.	0-4-0-5	allorery Charles 1	@ED!
	Shooma By.	<u> </u>	
NAL 18.23		SL	1
St Georges Road (Site 16)	Prepared By:	TP	1
AT Level Crossing Feasibility Studies	Job No:	236852	
NAL - W - 15 (Rev 01)	Date:	24/11/2014]
			•
	AT Level Crossing Feasibility Studies St Georges Road (Site 16) NAL 18.23 The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates. These estimates are exclusive of escalation and GST. Description Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs Total investigation and reporting Design and project documentation: - consultancy fees - the AT managed costs Total design and project documentation Construction MSQA - consultancy fees - the AT managed costs - consultancy fees - the AT managed costs Sub-total base MSQA Physical works Environmental compliance	AT Level Crossing Feasibility Studies St Georges Road (Site 16) NAL 18.23 Checked By: The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates. These estimates are exclusive of escalation and GST. Option 2 - R Description Rease estimate Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs Total investigation and reporting Design and project documentation: - consultancy fees - the AT managed costs Total design and project documentation Construction MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance	AT Level Crossing Feasibility Studies St Georges Road (Site 16) NAL 18.23 The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates. These estimates are exclusive of escalation and GST. Option 2 - Railway Under Hills Description Nett project property cost Investigation and reporting: - consultancy fees - the AT managed costs Total investigation and reporting - consultancy fees - the AT managed costs Total design and project documentation: - consultancy fees - the AT managed costs Total design and project documentation Construction MSQA - consultancy fees - the AT managed costs Total design and project documentation Construction MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance





Design and p Construction H I Project prope Investigation Design and p Construction Date of estin		(A+B+C+D) (E+F) Cost index (Qtr/Y	(A+B+C+D) (G+H)	
Design and p Construction H I Project prope Investigation Design and p Construction	Project expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	(E+F)	(A+B+C+D) (G+H)	
Design and p Construction H I Project prope Investigation Design and p	Project expected estimate enty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate enty cost documentation 95th percentile estimate	` '	(A+B+C+D)	
Design and p Construction H I Project prope Investigation Design and p	Project expected estimate enty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate enty cost documentation 95th percentile estimate	` '	(A+B+C+D)	
Design and p Construction H I Project prope Investigation	Project expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate and reporting 95th percentile estimate	` '	(A+B+C+D)	
Design and p Construction H I Project prope	Project expected estimate enty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate	` '	(A+B+C+D)	
Design and p Construction H	Project expected estimate enty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	` '	(A+B+C+D)	
Design and p Construction	Project expected estimate enty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)	` '	(A+B+C+D)	
Design and p Construction	Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	` '		
Design and p	Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate	` '		
Design and p	Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate	` '		
_	Project expected estimate erty cost expected estimate and reporting expected estimate	` '		
	Project expected estimate erty cost expected estimate	` '		
	Project expected estimate	` '		
		` '		
	Contingency (Assessed/Analysed)	(A+B+C+D)		
F				•
E	Project base estimate (A+B+C+D)			
D	Total construction			
_	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
	Landscaping			
-	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			i
5	Drainage			
4	Ground improvements			
3	Earthworks			
	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			i i
	- consultancy fees			
1	MSQA			
	Construction			
	Total design and project documentation			
С				
	- the AT managed costs			
	- consultancy fees			
1	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
	•• • .			
Item	Description	Base estimate	Contingency	Funding risk
			Option 3 - 50/50	
	These estimates are exclusive of escalation and GST.		ntion 2 F0/F0	
	· ·			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Glieckeu by:	JL .	
	NAL 18.23	Checked By:	SL	
	St Georges Road (Site 16)	Prepared By:	7P	
-	AT Level Crossing Feasibility Studies	Job No:	236852	
Client Ref:	NAL - W - 15 (Rev 01)	Date:	24/11/2014	





Olissa Data	NAL W 40 (D 04)	5.1	04/44/0044	
	NAL - W - 16 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852 TP	
Location:	Portage Road (Site 17) NAL 18.88	Prepared By: Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not	Спескей Бу.	JL .	
wotes.	used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.	Ontion	ı 1 - Highway Fly	ovor
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			I I
	Sub-total base MSQA			1 1
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls			
9	Traffic services			
10	Service relocations			<u>. </u>
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
D	Sub-total base physical works Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate			
	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate		,	
	and reporting 95th percentile estimate			
-	project documentation 95th percentile estimate			
	95th percentile estimate			
		Continue (C)	()	
Date of estinate		Cost index (Qtr/Y	ear)	
	ternal peer review by	Signed		
Estimate ac	cepted by the AT	Signed		





Client Bef	NAL-W-20 (Rev 01)	Data	24/11/2014	
	AT Level Crossing Feasibility Studies	Date: Job No:	236852	
	Bruce McLaren Road (Site 21)	Prepared By:	7P	
Location.	NAL 25.55km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	Oncored By.	ÖL	
	These estimates are exclusive of escalation and GST.			
	These estimates are exclusive or escalation and GST.	Ontion	1 - Highway Fly	over
_				
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees - the AT managed costs			
С				
<u> </u>	Total design and project documentation Construction			
1	MSQA			
ı	- consultancy fees			
	- the AT managed costs			<u> </u>
	- consent monitoring fees			
	- consent monitoring rees Sub-total base MSQA			
2	Physical works Environmental compliance			
3	Earthworks			
4	Ground improvements			<u> </u>
5	Drainage			
6	Pavement and surfacing			-
7	Bridges			1
8	Retaining walls			i i
9	Traffic services			i i
10	Service relocations			Ī Ī
11	Landscaping			Ī
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			<u> </u>
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prop	erty cost expected estimate			
Investigation	and reporting expected estimate			
Design and	project documentation expected estimate			
Construction	expected estimate			
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate		(0+11)	
	and reporting 95th percentile estimate		-	
_	project documentation 95th percentile estimate		ŀ	
	95th percentile estimate		-	
	·			
Date of esti		Cost index (Qtr/Y	ear)	
	ternal peer review by	Signed		
Estimate ac	cepted by the AT	Signed		





Printed Date: 12/12/2014

Client Ref:	NAL-W-20 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	Bruce McLaren Road (Site 21)	Prepared By:	7P	
Location.	NAL 25.55km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	Oncoked by.	ÖL	
	These estimates are exclusive of escalation and GST.			
	These estimates are exclusive or escalation and COT.	Ontion 2 - R	ailway Under H'w	av @FRI
			-	
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
•	- consultancy fees			-
	- the AT managed costs			<u>. </u>
	- consent monitoring fees			<u> </u>
	Sub-total base MSQA			
2	Physical works Environmental compliance			
3	Earthworks			
4	Ground improvements			<u> </u>
5	Drainage			<u> </u>
6	Pavement and surfacing			i i
7	Bridges			i i
8	Retaining walls			
9	Traffic services			<u> </u>
10	Service relocations			i
11	Landscaping			i i
12	Traffic management and temporary works			i i
13	Preliminary and general			ì
14	Extraordinary construction costs (inc Rail)			ī ī
	Sub-total base physical works			Ī Ī
D	Total construction			I I
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate	(=.7)		
	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate			
_	and reporting 95th percentile estimate			
	project documentation 95th percentile estimate			
Construction	95th percentile estimate			
Date of esti	mate	Cost index (Qtr/Y	(ear)	
Estimate ex	ternal peer review by	Signed		
Estimate ac	cepted by the AT	Signed		





Client Ref	NAL-W-20 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	Bruce McLaren Road (Site 21)	Prepared By:	TP	
	NAL 25.55km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	,		
	These estimates are exclusive of escalation and GST.			
		(Option 3 - 50/50	
Item	Description	Base estimate	Contingency	Funding risk
1.0		Date terminate	Containgoney	T unumg nok
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			î î
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			1
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			i i
	- consent monitoring fees			i i
	Sub-total base MSQA			<u> </u>
	Physical works			-
2	Environmental compliance			
3	Earthworks			i i
4	Ground improvements			ìi
5	Drainage			i i
6	Pavement and surfacing			
7	Bridges			I I
8	Retaining walls			
9	Traffic services			
10	Service relocations			
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prope	erty cost expected estimate			
nvestigation	and reporting expected estimate			
Design and p	project documentation expected estimate			
Construction	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
I	95th percentile project estimate		(G+H)	
Project prope	erty cost 95th percentile estimate			
	and reporting 95th percentile estimate		ļ	
	project documentation 95th percentile estimate		ļ	
	95th percentile estimate		ļ	
	·	Coot indox (Ot-D	/oor)	
Date of estin		Cost index (Qtr/\	rear)	
		Signed Signed		
stimate ac	cepted by the AT	Signed		





		-	,	1
	NAL - W - 23 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
Location:	Metcalfe Road (Site 25)	Prepared By:	TP	
	NAL 29.50	Checked By:	JA	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.			
		Option	1 - Highway Fly	over
Item	Description	Base estimate	Contingency	Funding risk
	.			
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
4				
1	MSQA			
	- consultancy fees			<u> </u>
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			Ī
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			i i
7	Bridges			î î
8	Retaining walls			i i
9	Traffic services			i i
10	Service relocations			ì
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			<u> </u>
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate	(=:1)		
	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
Constituction	expedied estillate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
I	95th percentile project estimate		(G+H)	
Project prop	erty cost 95th percentile estimate			
Investigation	and reporting 95th percentile estimate			
Design and	project documentation 95th percentile estimate			
_	95th percentile estimate			
		Continue (C)	(a.a.v)	
Date of esti		Cost index (Qtr/Y	ear)	
Estimate ex	ternal peer review by	Signed		
Estimate	anniad builba AT	O:I		





Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr Construction 9 Date of estim	Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate expected documentation expected estimate expected estimate Expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate Try cost 95th percentile estimate		(A+B+C+D)	
Project proper Investigation a Design and pr Construction e H F I 9 Project proper Investigation a Design and pr Construction 9	Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate And reporting expected estimate Exp	(A+B+C+D) (E+F)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr	Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate expected estimate Funding risk (Assessed/Analysed) Other project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr	Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate expected estimate Funding risk (Assessed/Analysed) Other project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and processing and processing and processing and project proper Investigation a	Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate expected destimate expected estimate expe	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rity cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Poth percentile project estimate rity cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rity cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction e	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate expected estimate expected estimate expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction e	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
Project proper Investigation a Design and pr	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Project proper Investigation a Design and pr	Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Project proper Investigation a	Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate	(A+B+C+D)		
Project proper	Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate	(A+B+C+D)		
	Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
G	Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		
	Sub-total base physical works Total construction Project base estimate (A+B+C+D)			
F C	Sub-total base physical works Total construction			
E F	Sub-total base physical works			
D	Sub-total base physical works			
	·			<u> </u>
14 E	extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
	. •			
	ervice relocations andscaping			
	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			
	Drainage			i i
4	Ground improvements			
3 E	Earthworks			
2 E	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			i i
	- consultancy fees			
1 /	MSQA			<u> </u>
	Construction			1
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	nvestigation and reporting:			
Α .	Nett project property cost			
Item C	Description	Base estimate	Contingency	Funding risk
		Option 2 - Ri	anway Under Hi	way wekl
1	THESE ESTIMATES ARE EXCLUSIVE OF ESCALATION AND CO.T.	Ontion 2 D	ailway Under H'	way @EDI
	These estimates are exclusive of escalation and GST.			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Silconed by.	0/1	1
	NAL 29.50	Checked By:	JA	1
	Metcalfe Road (Site 25)	Prepared By:	TP	1
	AT Level Crossing Feasibility Studies	Job No:	236852	1
Client Ref: N	NAL - W - 23 (Rev 01)	Date:	24/11/2014	1





F G F Project proper Investigation a Design and pr Construction 6 F I S Project proper Investigation a Design and pr Construction 9 Construction 9 Date of estim			(A+B+C+D)	
F F G F Project proper Investigation a Design and pr Construction a F F F F F F F F F F F F F F F F F F F	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
F G F Project proper Investigation a Design and pr Construction e H F I S Project proper Investigation a Design and pr	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and pr Construction e H F I S Project proper Investigation a Design and pr	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F C G F Project proper Investigation a Design and pr Construction 6 F G F Project proper Investigation a	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and pr Construction 6 H F I S Project proper	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and pr Construction 6	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and pr Construction 6	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
F C G F Project proper Investigation a Design and procession for the Construction of t	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
F C F Project proper Investigation a Design and pr	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		i i
F C F Project proper Investigation a Design and pr	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		i i
F C F Project proper Investigation a	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate	(A+B+C+D)		i i
F C F Project proper	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate	(A+B+C+D)		i i
E F C G F	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		i i
E F	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		i i
E F	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			i i
	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			i i
D	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			i i
	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			i i
	Service relocations Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail)			i i
14 E	Service relocations Landscaping Traffic management and temporary works Preliminary and general			
	Service relocations Landscaping Traffic management and temporary works			
	Service relocations Landscaping			
	Service relocations			
	-			
	Troffic convices			
	Retaining walls			
	Bridges Potaining walls			
	· · · · · · · · · · · · · · · · · · ·			
	Pavement and surfacing			
	Drainage			
	Ground improvements			
	Earthworks			i
	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
· ' '	- · ·			
	MSQA			
	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	- · · ·			
_	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
I.	Investigation and reporting:			
Α	Nett project property cost			
Item [Description	Base estimate	Contingency	Funding risk
•			Option 3 - 50/50	
7	These estimates are exclusive of escalation and GST.			
	,			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	NAL 29.50	Checked By:	JA	
	Metcalfe Road (Site 25)	Prepared By:		
	AT Level Crossing Feasibility Studies		236852 TP	
	` ′	Job No:	236852	
Client Ref	NAL - W - 23 (Rev 01)	Date:	24/11/2014	





Client Pof:	NIMT-S-07 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	Walters Road (Site 34)	Prepared By:	750032 TP	
Location.	NIMT 649.19km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.	Oncored by:	OL.	
	These estimates are exclusive of escalation and GST.			
	These estimates are exclusive or escalation and GST.	Ontion	n 1 - Highway Fly	over
		-		
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees - the AT managed costs			
С				
- C	Total design and project documentation Construction			
1	MSQA			
Į.	- consultancy fees			
	- the AT managed costs			<u> </u>
	_			<u> </u>
	- consent monitoring fees			
	Sub-total base MSQA			
2	Physical works Environmental compliance			
2 3	Earthworks			<u> </u>
4	Ground improvements			<u> </u>
5	Drainage			<u> </u>
6	Pavement and surfacing			<u> </u>
7	Bridges			
8	Retaining walls			1
9	Traffic services			<u> </u>
10	Service relocations			
11	Landscaping			1
12	Traffic management and temporary works			ii
13	Preliminary and general			1
14	Extraordinary construction costs (inc Rail)			i i
	Sub-total base physical works			
D	Total construction			ī i
Е	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate	(2.1)		
	and reporting expected estimate			
_	project documentation expected estimate			
	expected estimate			
	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate			
_	and reporting 95th percentile estimate			
	project documentation 95th percentile estimate			
Construction	95th percentile estimate			
Date of esti	mate	Cost index (Qtr/Y	′ear)	
Estimate ex	ternal peer review by	Signed		
	cepted by the AT	Signed		
		J		





8 Ret 9 Tra 10 Ser 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro Project property Investigation an Design and proj Construction exp I Project property Investigation an Design and proj Construction exp Construction exp I Project property Investigation an Design and proj Construction 95 Date of estimate	Indiscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction T		(A+B+C+D)	
8 Ret 9 Tra 10 Set 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro Project property Investigation an Design and proj Construction ex H Fu I 95i Project property Investigation an Design and proj Construction ex	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) Ontingency (Assessed/Analysed) Oject expected estimate of reporting expected estimate and reporting expected estimate spected estimate unding risk (Assessed/Analysed) oth percentile project estimate of cost 95th percentile estimate of reporting 95th percentile estimate spected documentation 95th percentile estimate of the percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
8 Ret 9 Tra 10 Set 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Pro Project property Investigation an Design and proj Construction ext Project property Investigation an Design and proj Construction ext Project property Investigation an Design and proj	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate igect documentation expected estimate spected estimate conding risk (Assessed/Analysed) oth percentile project estimate of cost 95th percentile estimate of reporting 95th percentile estimate of reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
8 Ret 9 Tra 10 Set 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Pro Project property Investigation an Design and proj Construction ext Project property Investigation an Design and proj Construction ext Project property Investigation an Design and proj	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate igect documentation expected estimate spected estimate conding risk (Assessed/Analysed) oth percentile project estimate of cost 95th percentile estimate of reporting 95th percentile estimate of reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Pro Project property Investigation an Design and proj Construction ext H Fu I 95: Project property Investigation an	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of reporting expected estimate did reporting expected estimate spected estimate unding risk (Assessed/Analysed) oth percentile project estimate of cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro Project property Investigation an Design and proj Construction ext H Fu I 955	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) Ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate differentiate estimate spected estimate	(A+B+C+D)	(A+B+C+D)	
8 Ref 9 Tra 10 Set 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro Project property Investigation an Design and proj Construction ext H Fu I 95	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate iject documentation expected estimate spected estimate cupic documentation expected estimate spected estimate inding risk (Assessed/Analysed) oth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Project property Investigation an Design and proj Construction ext	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate iject documentation expected estimate spected estimate	(A+B+C+D)	(A+B+C+D)	
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro Project property Investigation an Design and proj Construction ex	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate eject documentation expected estimate expected estimate	(A+B+C+D)		
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Project property Investigation an Design and proj	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate iject documentation expected estimate	(A+B+C+D)		i i
8 Ref 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Project property Investigation an Design and proj	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate iject documentation expected estimate	(A+B+C+D)		i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D F Co G Pro Project property Investigation an	affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate of cost expected estimate and reporting expected estimate	(A+B+C+D)		i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D E Pro G Project property	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate v cost expected estimate	(A+B+C+D)		i i
8 Ret 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co G Pro	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed) oject expected estimate	(A+B+C+D)		i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext D E Pro F Co	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction oject base estimate (A+B+C+D) ontingency (Assessed/Analysed)	(A+B+C+D)		i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction toject base estimate (A+B+C+D)			i i
8 Ret 9 Tra 10 Ser 11 Lar 12 Tra 13 Pre 14 Ext	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works Total construction			i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works			i i
8 Rei 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre 14 Ext	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail) Sub-total base physical works			i i
8 Ret 9 Tra 10 Sei 11 Lar 12 Tra 13 Pre	ndscaping affic management and temporary works eliminary and general traordinary construction costs (inc Rail)			i i
8 Ret 9 Tra 10 Ser 11 Lar 12 Tra 13 Pre	ndscaping affic management and temporary works eliminary and general			
8 Ret 9 Tra 10 Set 11 Lar 12 Tra	ndscaping affic management and temporary works			
8 Rei 9 Tra 10 Sei 11 Lar	ndscaping			
8 Ref 9 Tra 10 Ser	.			
8 Ref 9 Tra				
8 Ret	rvice relocations			
	affic services			
/ IRri/	oges taining walls			
	idges			
	vement and surfacing			
	ainage			
4 Gro	ound improvements			
3 Ear	rthworks			
2 Env	vironmental compliance			
	nysical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
1 M S	SQA			
	onstruction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
De	esign and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
Inv	vestigation and reporting:			
Α	Nett project property cost			
_				
Item De:	escription	Base estimate	Contingency	Funding risk
		Option 2 - Ra	ailway Under H'v	way @EKL T
The	ese estimates are exclusive of escalation and GST.	Ontion 2 D	oilwoy Lloder III	way @EBI
	• •			
	e figures in this document are for outline indicative costs comparison and should not ed as budgetary or construction cost estimates.			
		энсоква ву.	<u> </u>	
	MT 649.19km	Checked By:	SL	1
	alters Road (Site 34)	Prepared By:	TP	1
	Γ Level Crossing Feasibility Studies	Job No:	236852	1
Client Ref: NI	MT-S-07 (Rev 01)	Date:	24/11/2014	





				Ī
	NIMT-S-07 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
Location:	Walters Road (Site 34)	Prepared By:	TP	
	NIMT 649.19km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.			
		(Option 3 - 50/50	
Item	Deceription	Bass satimate	Contingency	Funding risk
item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	•			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			i i
	Physical works			•
2	Environmental compliance			
3	Earthworks			i i
4	Ground improvements			1 1
5	Drainage			1
6	Pavement and surfacing			
7	Bridges			i
8	Retaining walls			<u> </u>
9	Traffic services			i
10	Service relocations			ì
11	Landscaping			i
12	Traffic management and temporary works			i i
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			i i
D	Total construction			i i
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate	(671)		
	and reporting expected estimate			
_				
-	project documentation expected estimate			
Construction	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
ı	95th percentile project estimate		(G+H)	
Project prop	erty cost 95th percentile estimate			
Investigation	and reporting 95th percentile estimate			
Design and	project documentation 95th percentile estimate			
	95th percentile estimate			
		0 11 1 12		
Date of esti	****	Cost index (Qtr/\	rear)	
Estimate ex	ternal peer review by	Signed		
C-4:4	(0		





Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr Construction 9			(A+B+C+D)	
Project proper Investigation a Design and pr Construction e H F I 9 Project proper Investigation a Design and pr Construction 9	Contingency (Assessed/Analysed) Project expected estimate Inty cost documentation expected estimate Inty cost documentation expected estimate Inty cost estimate Inty cost 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr	Project base estimate Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate reject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Distribution project estimate Try cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F I 9 Project proper Investigation a Design and pr	Project base estimate Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate reject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Distribution project estimate Try cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and processing and processing and processing and project proper Investigation a	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate Interporting expected estimate Into project documentation expected estimate Interporting expected estimate Interporting risk (Assessed/Analysed) Interporting estimate Inty cost 95th percentile estimate Interporting 95th percentile estimate Interporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6 H F S S Project proper	Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Posth percentile project estimate rty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction 6	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rity cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Sth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction e	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
Project proper Investigation a Design and pr Construction e	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
Project proper Investigation a Design and pr	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Project proper Investigation a Design and pr	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Project proper Investigation a	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate	(A+B+C+D)		
Project proper	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate	(A+B+C+D)		
	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
	Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		1
	Project base estimate (A+B+C+D)			1 1
				1 1
E F	Total construction			
D				
	Sub-total base physical works			
14 E	extraordinary construction costs (inc Rail)			
	Preliminary and general			
	raffic management and temporary works			
	andscaping			
	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges Patricing wells			
	· •			
	Pavement and surfacing			
	Drainage			
	Ground improvements			
	Earthworks			
	Environmental compliance			
	Physical works	_		
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
' "				
1 /	MSQA			
C	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	- · ·		_	
_	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
li	nvestigation and reporting:			
Α	Nett project property cost			
Item D	Description	Base estimate	Contingency	Funding risk
		Option	1 - Highway Fly	/over
7	These estimates are exclusive of escalation and GST.			
	, ,			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Checked By:	SL	J
	Faka Street (Site 35)	Prepared By:		1
	·		236852 TP	1
	AT Level Crossing Feasibility Studies	Job No:		1
Client Ref N	NIMT-S-08 (Rev 01)	Date:	24/11/2014	1





		Option 2 - R	ailway Under H'v	way @ERL
		Option 2 - R	ailway Under H'v	way @ERL
Item	Description	Base estimate	Contingency	Funding risk
•	Matter de la constant			
Α	Nett project property cost Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage Programme and a strain			
6 7	Pavement and surfacing			
8	Bridges Retaining walls		-	
9	Traffic services			
10	Service relocations			
11	Landscaping			i i
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prop	erty cost expected estimate			
Investigation	and reporting expected estimate			
Investigation Design and	project documentation expected estimate			
Investigation Design and				
Investigation Design and	project documentation expected estimate		(A+B+C+D)	1 1
Investigation Design and Construction	project documentation expected estimate expected estimate		(A+B+C+D) (G+H)	
Investigation Design and Construction H I Project prop	project documentation expected estimate n expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate			
Investigation Design and Construction H I Project prop Investigation	project documentation expected estimate a expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate a and reporting 95th percentile estimate			
Investigation Design and Construction H I Project prop Investigation Design and	project documentation expected estimate a expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate			
Investigation Design and Construction H I Project prop Investigation Design and	project documentation expected estimate a expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate a and reporting 95th percentile estimate			
Investigation Design and Construction H I Project prop Investigation Design and	project documentation expected estimate a expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate a and reporting 95th percentile estimate project documentation 95th percentile estimate a 95th percentile estimate	Cost index (Qtr/Y	(G+H)	
Investigation Design and Construction H I Project prop Investigation Design and Construction Date of esti	project documentation expected estimate a expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate a and reporting 95th percentile estimate project documentation 95th percentile estimate a 95th percentile estimate	Cost index (Qtr/Y	(G+H)	





O!! . = -	AULIT C CC (D CC)		04/11/05:::	I
	NIMT-S-08 (Rev 01)	Date:	24/11/2014	
	AT Level Crossing Feasibility Studies	Job No:	236852	
Location:	Taka Street (Site 35)	Prepared By:		
	NIMT 650.38km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.			
		(Option 3 - 50/50	
Item	Description	Base estimate	Contingency	Funding risk
item	Description	Dase estillate	Contingency	Fullding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- consultancy tees - the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			_
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls			
9	Traffic services			
10	Service relocations			
11	Landscaping			<u> </u>
12	Traffic management and temporary works			<u>. </u>
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
_	Sub-total base physical works			
D E	Total construction			
	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
	erty cost expected estimate			
_	and reporting expected estimate			
Design and	project documentation expected estimate			
Construction	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
•	erty cost 95th percentile estimate		(5111)	
	and reporting 95th percentile estimate			
_	project documentation 95th percentile estimate			
	95th percentile estimate			
CONSTRUCTION	Sour porsonale estimate			
Date of esti	mate	Cost index (Qtr/)	rear)	
Estimate ex	ternal peer review by	Signed		





D F C G Project propert Investigation and pro Construction extended and pro Construction and pro Construction and pro Construction and pro I Project propert Investigation and pro Construction and pro Construction 990 Date of estimates			(A+B+C+D) (G+H)	
D E Project propert Investigation and processing and processing and processing and processing and project propert Investigation and Design and processing a	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) Contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate and reporting expected estimate oject documentation expected estimate cunding risk (Assessed/Analysed) 5th percentile project estimate ty cost 95th percentile estimate oject documentation 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D) (G+H)	
13 Project propert Investigation and Design and processing and pro	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate oject documentation expected estimate expected estimate funding risk (Assessed/Analysed) 5th percentile project estimate ty cost 95th percentile estimate und reporting 95th percentile estimate oject documentation 95th percentile estimate oject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
13 Project propert Investigation and Design and processing and pro	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate oject documentation expected estimate expected estimate funding risk (Assessed/Analysed) 5th percentile project estimate ty cost 95th percentile estimate und reporting 95th percentile estimate oject documentation 95th percentile estimate oject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
D F C G Project propert Investigation an Design and pro Construction ex H F I Project propert Investigation and pro Construction ex	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) Contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate and reporting expected estimate cipiect documentation expected estimate expected estimate unding risk (Assessed/Analysed) 5th percentile project estimate ty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
13 Pr 14 Exists D E Pr F C G Pr Project propert Investigation and proceed propert Construction exists H File Project propert Investigation exists and proceed properties and proceed project properties and project project properties and project properties and project project properties and project project properties and project pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate and reporting expected estimate piject documentation expected estimate expected estimate unding risk (Assessed/Analysed) 5th percentile project estimate ty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
13 Pr 14 Ex D E Pr F C G Pr Project propert Investigation and pro Construction ex H Fr I 95	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate expected estimate cupected documentation expected estimate cupected estimate	(A+B+C+D)	(A+B+C+D)	
D E Project propert Investigation and proc Construction ex	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate oject documentation expected estimate expected estimate unding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
D F C G Project propert Investigation an Design and pro Construction es	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate	(A+B+C+D)		
D E Project propert Investigation and product and product program and product product program and product	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate oject documentation expected estimate	(A+B+C+D)		i i
D E Project propert Investigation and product and product program and product product program and product	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate und reporting expected estimate oject documentation expected estimate	(A+B+C+D)		i i
13 Pr 14 Ex D E Pr F C G Pr Project propert Investigation an	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate ty cost expected estimate and reporting expected estimate	(A+B+C+D)		i i
13 Pr 14 Ex D F C G Pr Project propert	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate (A+B+C+D) contingency (Assessed/Analysed) roject expected estimate ty cost expected estimate	(A+B+C+D)		i i
13 Pr 14 Ex D E Pr F C	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction roject base estimate Contingency (Assessed/Analysed) roject expected estimate	(A+B+C+D)		i i
13 Pr 14 Ex D E Pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		i i
13 Pr 14 Ex D Pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			i i
13 Pr 14 Ex D	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works Total construction			i i
13 Pr 14 Ex	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail) Sub-total base physical works			i i
13 Pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail)			i i
13 Pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general xtraordinary construction costs (inc Rail)			i i
13 Pr	raffic services ervice relocations andscaping raffic management and temporary works reliminary and general			
	raffic services ervice relocations andscaping raffic management and temporary works			
	raffic services ervice relocations andscaping			
11 La	raffic services ervice relocations			
	raffic services			
				<u>i</u>
	otolining wells			
	ridges			
	· · ·			
	avement and surfacing			
	rainage			
	round improvements			
	arthworks			
	nvironmental compliance			
P	Physical works	_		
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
' '				
	ISQA			
С	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	- · ·			
_	esign and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
In	nvestigation and reporting:			
Α	Nett project property cost			
Item De	escription	Base estimate	Contingency	Funding risk
_		Option	1 - Highway Fly	over
TI	hese estimates are exclusive of escalation and GST.			
	• ,			
	The figures in this document are for outline indicative costs comparison and should not seed as budgetary or construction cost estimates.			
	IIMT 650.89km	Checked By:	SL	
	Ianuroa Road (Site 37)	Prepared By:		
	· ·		236852 TP	
-	T Level Crossing Feasibility Studies	Job No:		
Client Ref- N	IIMT-S-010 (Rev 01)	Date:	24/11/2014	





Investigation a Design and processing and processin		(A+B+C+D) (E+F) Cost index (Qtr/Y	(A+B+C+D)	
Investigation a Design and pi Construction of H I Project proper Investigation a Design and pi Construction 9	Project expected estimate Intry cost expected estimate Intry cost expected estimate Intry cost expected estimate Introduction expected estimate Introduct	(E+F)	(A+B+C+D)	
Investigation a Design and procession of the project proper investigation a Design and proper investigation and properties and properties are also and properties and properties are also also and properties are also also also also also also also also	Project expected estimate inty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate inty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate		(A+B+C+D)	
Investigation a Design and pi Construction of H I Project proper Investigation a	Project expected estimate Intry cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate Intry cost 95th percentile estimate and reporting 95th percentile estimate		(A+B+C+D)	
Investigation a Design and pi Construction of H I Project proper Investigation a	Project expected estimate Intry cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate Intry cost 95th percentile estimate and reporting 95th percentile estimate		(A+B+C+D)	
Investigation and property construction of the project property construction and project project property construction and project project project property construction and project p	Project expected estimate inty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate inty cost 95th percentile estimate		(A+B+C+D)	
Investigation and processing and pro	Project expected estimate inty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate		(A+B+C+D)	
Investigation and purchased Design and purchased Construction 6	Project expected estimate orty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)		(A+B+C+D)	
Investigation and purcessign and purcessign and purcessign and purcessign and purcessign and purcessign are purcessign.	Project expected estimate Inty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate			
Investigation and property of the control of the co	Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate			
Investigation and property of the control of the co	Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate			
Investigation a	Project expected estimate orty cost expected estimate and reporting expected estimate			
	Project expected estimate erty cost expected estimate			
Droject rese	Project expected estimate			
G I				
	Continuency (Assessed/Analysed)	(A±R::C:D)		
E F	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14 E	Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	· · ·			
	Landscaping Traffic management and temporary works			
	Landscaping			
-	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			li i
5 [Drainage			l i
4 (Ground improvements			
3 E	Earthworks			
2 E	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			l i
	- consultancy fees			
1 /	MSQA			
	Construction			1
-				
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:		_	
Α	Nett project property cost			
Item [Description	Base estimate	Contingency	Funding risk
ltom [Decarintian	Base setimete	Cantinganav	Funding rick
-		Option 2 - Ra	ailway Under H'	way @ERL
1	These estimates are exclusive of escalation and GST.			
ι ο ι ο ο ο	used as budgetary or construction cost estimates.			
	The figures in this document are for outline indicative costs comparison and should not			
<u> </u> 1	NIMT 650.89km	Checked By:	SL	J
	Manuroa Road (Site 37)	Prepared By:	TP	1
	AT Level Crossing Feasibility Studies	Job No:	236852	4
				1
Client Pof:	NIMT-S-010 (Rev 01)	Date:	24/11/2014	1





F G F Project proper Investigation at Design and processing and project proper Investigation at Design and processing and project properties and project project properties and project project properties and project			(A+B+C+D)	
F G F Project proper Investigation a Design and proper Construction a Project proper Investigation a Design and proper Investigation a Design and proper Construction a	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
F G F Project proper Investigation a Design and proper Investigation a Design and project proper Investigation a Design and project proper Investigation and project project proper Investigation and project project proper Investigation and project project proper Investigation and project proje	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and processing and processing and processing and project proper Investigation a	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F (G F) Project proper Investigation at Design and processing and processing and project proper F) Froject proper F)	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F (G F) Project proper Investigation at Design and processing and processing and project proper F) Froject proper F)	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate rty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
F G F Project proper Investigation a Design and processing and processing the F F F F F F F F F F F F F F F F F F F	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)	
F (G F Project proper Investigation a Design and processing and processing the F Project Proje	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
F (G F Project proper Investigation a Design and processing and pr	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
F G F Project proper Investigation a Design and proper investigation of the control of the contr	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
F G F Project proper Investigation a Design and pro	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
F (G F Project proper Investigation a	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate and reporting expected estimate	(A+B+C+D)		
F (G F Project proper	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate rty cost expected estimate	(A+B+C+D)		
F (Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
E F	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		
E	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			
	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			
D	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			
	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail)			
	Landscaping Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail)			
14 E	Landscaping Traffic management and temporary works Preliminary and general			
	Landscaping Traffic management and temporary works			
	Landscaping			
	•			
	Traffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			
	Drainage			
	· •			
	Ground improvements			
	Earthworks			
	Environmental compliance			
1	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
'				
1	MSQA			
(Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
. ''	- · · ·			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
ı	Investigation and reporting:			
Α	Nett project property cost			
Item [Description	Base estimate	Contingency	Funding risk
		(Option 3 - 50/50	
7	These estimates are exclusive of escalation and GST.			
	used as budgetary or construction cost estimates.			
Notes:	The figures in this document are for outline indicative costs comparison and should not			
1	NIMT 650.89km	Checked By:	SL	
Location:	Manuroa Road (Site 37)	Prepared By:	TP	1
	AT Level Crossing Feasibility Studies	Job No:	236852	ĺ
		Date:		l
Client Ref:	NIMT-S-010 (Rev 01)	Date:	24/11/2014	Ī





	cented by the AT	Signed		
	ternal peer review by	Signed		
Date of esti	mate	Cost index (Qtr/Y	'ear)	
Construction	95th percentile estimate			
	project documentation 95th percentile estimate			
_	and reporting 95th percentile estimate			
-	erty cost 95th percentile estimate		(6411)	
	95th percentile project estimate		(G+H)	
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
Construction	expected estimate			
	project documentation expected estimate			
_	and reporting expected estimate			
	erty cost expected estimate			
_		(E+F)		
G	Project expected estimate	(E+F)		
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
Е	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
13	Preliminary and general			
12	Traffic management and temporary works			
11	Landscaping			
10	Service relocations			
9	Traffic services			
8	Retaining walls			
7	Bridges Detaining wells			
	· ·			
6	Pavement and surfacing			
5	Drainage			
4	Ground improvements			
3	Earthworks			
2	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
į				
1	MSQA			
	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
'		Option	1 - Highway Fly	over
	These estimates are exclusive of escalation and GST.			
140163.	used as budgetary or construction cost estimates.			
Notes:	The figures in this document are for outline indicative costs comparison and should not			
	OBL 0.59km	Checked By:	SL	
Location:	O'Rorke Road (Site 43)	Prepared By:	TP	
	AT Level Crossing Feasibility Studies	Job No:	236852	
	OBL-01 (Rev 01)	Date:	24/11/2014	
O!! . = -	PDI 04 (P. 04)	1	04/44/07::	1





Froject proper Investigation Design and property property property property investigation Design and property p	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate 95th percentile estimate		(A+B+C+D)		
G Project proper Investigation Design and project proper Investigation Project proper Investigation Design and project proper Investigation Design and project proper Investigation	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate project documentation 95th percentile estimate project documentation 95th percentile estimate project documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)		
Froject proper Investigation Design and proper Investigation H Project proper Investigation Design and proper Investigation	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)		
G Project proper Investigation Design and proper Investigation I Project proper Investigation Design and proper Investigation	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)		
G Project proper Investigation Design and project proper Investigation H I Project proper Investigation	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)		
G Project proper Investigation Design and project proper Investigation Design and project proper Investigation Inv	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)		
G Project prope Investigation Design and p Construction H I	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)		
G Project prope Investigation Design and p Construction H	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)		
G Project prope Investigation Design and p Construction	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate	(A+B+C+D)			
G Project prope Investigation Design and p	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)			
G Project prope Investigation Design and p	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)			
G Project prope Investigation	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate	(A+B+C+D)			
G Project prope	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate	(A+B+C+D)			
G	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)			
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)			
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)				
F	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction				
E	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction				
D	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works				
_	Preliminary and general Extraordinary construction costs (inc Rail)				
14	Preliminary and general				i i
	· · ·				<u>į</u>
	I Fallic Hallagethetic and temporary works				
	Traffic management and temporary works				
11	Landscaping			=	
10	Service relocations				
9	Traffic services				
8	Retaining walls				
7	Bridges				
6	Pavement and surfacing				
5	Drainage				
	Ground improvements				
3	Earthworks				
2	· · · · · · · · · · · · · · · · · · ·				
	Environmental compliance				
	Physical works				
	Sub-total base MSQA				
	- consent monitoring fees				
	- the AT managed costs				
	- consultancy fees				
1	MSQA			_	-
1					
-	Construction				
С	Total design and project documentation				
	- the AT managed costs				
	- consultancy fees				
	Design and project documentation:				
В	Total investigation and reporting				
	- the AT managed costs				
	- consultancy fees				
	Investigation and reporting:				
Α	Nett project property cost				L
Item	Description	Base estimate	Contingency	Fun	nding risk
		Option 2 - Ra	ailway Under H'	way @	ERL
	These estimates are exclusive of escalation and GST.	6 :	9 11 1 12		
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.				
		Silected by.	OL .	1	
	OBL 0.59km	Checked By:	SL	1	
	O'Rorke Road (Site 43)	Prepared By:	TP	1	
Project:	AT Level Crossing Feasibility Studies	Job No:	236852		
Client Ref:	OBL-01 (Rev 01)	Date:	24/11/2014		
				1	





Design and p Construction H I Project prope Investigation Design and p Construction Date of esti	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F) Cost index (Qtr/Y	(A+B+C+D) (G+H)	
Design and p Construction H I Project prope Investigation Design and p Construction	Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D) (G+H)	
Design and p Construction H I Project prope Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Design and p Construction H I Project prope Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Design and p Construction H I Project prope Investigation	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Design and p Construction H I Project proper	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Design and p Construction	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)	
Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate	(A+B+C+D)		
Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)		
Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate	(A+B+C+D)		
_	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate	(A+B+C+D)		
1101/0011001100	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate	(A+B+C+D)		
	Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
_	Contingency (Assessed/Analysed)	(A+B+C+D)		
G				
F	,			
E	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
13	Preliminary and general			
12	Traffic management and temporary works			
11	Landscaping			
10	Service relocations			ì
9	Traffic services			
8	Retaining walls			i
7	Bridges			
6	Pavement and surfacing			
5	Drainage			
4	Ground improvements			
3	Earthworks			
2	Environmental compliance			
_	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			Ī
	- the AT managed costs			
	- consultancy fees			
1	MSQA		_	
_				
	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	·			
	- consultancy fees			
	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
			Option 3 - 50/50	
	These estimates are exclusive of escalation and GST.			
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Silected by.	<u> </u>	ı
	OBL 0.59km	Checked By:	SL	1
	O'Rorke Road (Site 43)	Prepared By:	TP	1
Project:	AT Level Crossing Feasibility Studies	Job No:	236852	1
Client Ref:	OBL-01 (Rev 01)	Date:	24/11/2014	J
		-		1





H I I I I I I I I I I I I I I I I I I I	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	Cost index (Qtr/Y	(A+B+C+D) (G+H)	
H I I I I I I I I I I I I I I I I I I I	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	Cost index (Qtr/Y	(G+H)	
H Project prope Investigation Design and p	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate			
H Project prope Investigation Design and p	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate			
H Project prope	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate and reporting 95th percentile estimate			
H Project prope	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate			
H I	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate			
н	roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)			
l	roject documentation expected estimate expected estimate		(A+B+C+D)	
	roject documentation expected estimate			
Construction	roject documentation expected estimate			
_	and reporting expected estimate			
	erty cost expected estimate			
		(LTF)		ł
	Project expected estimate	(A+B+C+D) (E+F)		ł
	Contingency (Assessed/Analysed)	(A+B+C+D)		ł
E	Project base estimate (A+B+C+D)			
D	Total construction			
	Sub-total base physical works			
14	Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
	Landscaping			
	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	· ·			
	Pavement and surfacing			
	Drainage			
	Ground improvements			
	Earthworks			
	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	- consultancy fees			
' '				
1	MSQA			
(Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	- · · ·			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
ı	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
		Option	1 - Highway Fly	vover
	These estimates are exclusive of escalation and GST.			
	· ·			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	OBL 1.03km	Checked By:	SL	I
	Maurice Road (Site 44)	Prepared By:	TP	ł
_	AT Level Crossing Feasibility Studies	Job No:	236852	
-	` '		•	
Client Ref:	OBL - 02 (Rev 01)	Date:	24/11/2014	Ī





Project proper Investigation a Design and pr Construction e Investigation a Project proper Investigation a Design and pr Construction 9	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected destimate expected estimate Expect		(A+B+C+D) (G+H)	
G F Project proper Investigation a Design and pr Construction e H F I 9 Project proper Investigation a Design and pr Construction 9	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate And reporting expected estimate and reporting expected estimate expected estimate Sub-total base physical works Total construction (A+B+C+D) Project base estimate Analysed) Project expected estimate Expected estimate Expected estimate Expected estimate Analysed) Posth percentile project estimate Analysed project documentation 95th percentile estimate Expected documentation 95th percentile estimate Expected documentation 95th percentile estimate Expected estimate	(A+B+C+D) (E+F)	(A+B+C+D) (G+H)	
Project proper Investigation a Design and proper Investigation a Project proper Investigation a Design and proper Investigation and In	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate expected destimate expected estimate Expected estimate	(A+B+C+D)	(A+B+C+D)	
G Project proper Investigation a Design and proper Investigation a Project proper Investigation a Design and proper Investigation and Investi	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate expected destimate expected estimate Expected estimate	(A+B+C+D)	(A+B+C+D)	
G F Project proper Investigation a Design and pr Construction e H F I 9 Project proper Investigation a	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate expected documentation expected estimate expected estimate Funding risk (Assessed/Analysed) Poth percentile project estimate try cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
G F Project proper Investigation a Design and pr Construction e H F I 9 Project proper	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Try cost expected estimate and reporting expected estimate Toject documentation expected estimate Expected estimate Try cost estimate Funding risk (Assessed/Analysed) Poth percentile project estimate Try cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
G F Project proper Investigation a Design and pr Construction e H F	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reporting risk (Assessed/Analysed) Sth percentile project estimate	(A+B+C+D)	(A+B+C+D)	
G Project proper Investigation a Design and pr Construction 6	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Ity cost expected estimate and reporting expected estimate oject documentation expected estimate expected estimate Expected estimate Expected estimate Expected estimate Expected estimate Expected estimate	(A+B+C+D)	(A+B+C+D)	
G Project proper Investigation a Design and pr	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
G F Project proper Investigation a Design and pr	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reject documentation expected estimate	(A+B+C+D)		Ī Ī
G F Project proper Investigation a Design and pr	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate reject documentation expected estimate	(A+B+C+D)		Ī Ī
G F Project proper Investigation a	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate and reporting expected estimate	(A+B+C+D)		Ī Ī
G F Project proper	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate Contingency (Assessed/Analysed) Project expected estimate try cost expected estimate	(A+B+C+D)		Ī Ī
G F	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		Ī Ī
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		Ī Ī
F Ic	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			Ī Ī
	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction			Ī Ī
E P	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			Ī Ī
D	Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			Ī Ī
	Preliminary and general Extraordinary construction costs (inc Rail)			Ī Ī
14 E	Preliminary and general			
	ranic management and remonrary WORKS			
	andscaping raffic management and temporary works			
	ervice relocations andscaping			
	Service relocations			
	raffic services			
	Retaining walls			
	Bridges			
	Pavement and surfacing			
	Drainage			i i
4 G	Ground improvements			
3 E	Earthworks			
2 E	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	_			
	- the AT managed costs			
	- consultancy fees			
1 /	MSQA			
	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
	nvestigation and reporting:			
Α .	Nett project property cost			
Item D	Description	Base estimate	Contingency	Funding risk
		Option 2 - Ra	ailway Under H'	way wekl
1	These estimates are exclusive of escalation and GST.	Ontion 0 D	مثالييمير المطعم اللا	way @EBI
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Checked By:	JL	ı
	DBL 1.03km		SL	1
	Maurice Road (Site 44)	Prepared By:	7P	i
	AT Level Crossing Feasibility Studies	Job No:	236852	ĺ
Client Ref: C	DBL - 02 (Rev 01)	Date:	24/11/2014	1



Feasibility Estimate



Printed Date: 12/12/2014

Project: AT Level Crossing Feasibility Studies Location: Maurice Road (Site 44) OBL 1.03km The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates. These estimates are exclusive of escalation and GST. Option 3 - 50/50	Client Bot.	ORL - 02 (Pay 01)	Detail	24/11/2014	
Location: Maurice Road (Site 44)					
OBI 1.03km Checked By SL					
The Signes in the aboutment as for contine indicative costs companion and should not used as budgeting or construction case elements.	Location.				
These estimates are exclusive of escaletion and GST.	Notes:	The figures in this document are for outline indicative costs comparison and should not	Checked by.	OL.	
Liter Description Base estimate Contingency Funding rise		· ·			
Nest project property cost		These estimates are exclusive or escalation and GST.		Option 3 50/50	
Investigation and reporting:					
Investigation and reporting: - consultancy fees - the AT managed costs B	Item	Description	Base estimate	Contingency	Funding risk
Investigation and reporting: - consultancy fees - the AT managed costs B	Δ	Nett project property cost			
- consultancy fees - the AT managed costs B					
B Total investigation and reporting					
Design and project documentation: - consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - the AT managed costs - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance Earthworks Ground improvements - D Drainage - Payment and surfacing - Retaining walls - Payment and surfacing - Traffic management and temporary works - Retaining walls - Traffic pervices - Traffic management and temporary works - Traffic management and temporary w		-			
Design and project documentation: - consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance Environmental compliance Bridges Retaining walls - pavement and surfacing - printip services - project process - consultancy fees - pavement and surfacing - pavement a	В.				
- consultancy fees - the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - consent monitoring fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Eartworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works F Contingency (Assessed/Analysed) G Project property cost expected estimate Investigation and reporting estimate Investigation and reporting estimate estimate Investigation and reporting estimate estimate Investigation and report					
- the AT managed costs C Total design and project documentation MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Eartworks 1 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Project base estimate Project property cost expected estimate Project property cost expected estimate H Funding risk (Assessed/Analysed) Construction expected estimate Investigation and reporting expected estimate Project property cost 95th percentile estimate Project property cost 95th percentile estimate Project operoperty cost 95th percentile estimate Posign and project documentation expected estimate Project property cost 95th percentile estimate Project property cost 95th percentile estimate Posign and project documentation 95th percentile estimate Position 95th percentile estimate Date of estimate Stimate external peer review by Signed					
Construction MSQA - consultancy fees - the AT managed costs - consent monitoring fees - the AT managed costs - consent monitoring fees Sub-total base MSQA - physical works - consent monitoring fees - the AT managed costs - consent monitoring fees Sub-total base MSQA - physical works - consent monitoring fees - the AT managed costs - consent monitoring fees - physical works - consent monitoring fees - physical works - consent monitoring fees - physical works - physical					
Construction MSQA - consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) H Funding risk (Assessed/Analysed) (A+B+C+D) I Signed Cost index (Qtr/Year) Signed	C				
- consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works Environmental compliance Environmental co					
- consultancy fees - the AT managed costs - consent monitoring fees Sub-total base MSOA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 111 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) 1 Signed Cost index (Qtr/Year) Signed	1				
- the AT managed costs - consent monitoring fees Sub-total base MSQA Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Perliminary and general 14 Extraordinary construction costs (inc Raili) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) 1 Seth percentile estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate	•				
- consent monitoring fees Sub-total base MSOA Physical works Environmental compliance Enviro					<u> </u>
Sub-total base MSQA Physical works Environmental compliance Environ		_			<u> </u>
Physical works 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) 5 Drinage 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) 5 Sub-total base physical works 7 Total construction 15 Project base estimate 16 Project base estimate 17 Contingency (Assessed/Analysed) 18 Project property cost expected estimate 19 Project property cost expected estimate 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) 16 Project base estimate 17 Contingency (Assessed/Analysed) 18 Project documentation expected estimate 19 Construction expected estimate 10 Construction expected estimate 10 Service relocation expected estimate 11 Service relocation expected estimate 12 Service relocation expected estimate 13 Service relocation expected estimate 14 Funding risk (Assessed/Analysed) 19 Service relocation expected estimate 10 Service relocation expected estimate 10 Service relocation expected estimate 11 Service relocation expected estimate 12 Service relocation expected estimate 13 Service relocation expected estimate 14 Service relocation expected estimate 15 Service relocation expected estimate 16 Service relocation expected estimate 17 Service relocation expected estimate 18 Service relocation expected estimate 19 Service relocation expected estimate 10 Service relocation expected estimate 10 Service relocation expected estimate 10 Service relocati		_			<u> </u>
Environmental compliance 2 Environmental compliance 3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) A Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) A Project property cost expected estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
3 Earthworks 4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) E Project base estimate F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Construction expected destimate H Funding risk (Assessed/Analysed) 1 95th percentile project estimate Investigation and reporting 95th percentile estimate Design and project documentation expected estimate Construction expected destimate Investigation and reporting 95th percentile estimate Construction expected destimate Construction expected destimate Construction expected destima					
4 Ground improvements 5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) E Project base estimate Construction F Contingency (Assessed/Analysed) G Project expected estimate Project property cost expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) F Inding risk (Assessed/Analysed) (A+B+C+D) F Unding risk (Assessed/Analysed) (A+B+C+D) F Unding risk (Assessed/Analysed) Cost index (Qtr/Year) F Solit index (Qtr/Year) F Signed		·			<u> </u>
5 Drainage 6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (ine Rail) 5 D Total construction F Contingency (Assessed/Analysed) 6 Project expected estimate 7 Construction expected estimate 8 Project documentation expected estimate 9 Project property cost expected estimate 1 Project property cost systemate 1 Project orgonary construction expected estimate 9 Project orgonary construction expected estimate 1 Project property cost expected estimate 9 Project orgonary cost expected estimate 1 Project orgonary cost expected estimate 9 Project orgonary cost 95th percentile estimate 9 Project property cost 95th percentile estimate 9 Design and project documentation 95th percentile estimate					
6 Pavement and surfacing 7 Bridges 8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) A B-C+C+D State Project property cost 95th percentile estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) A B-C+C+D State Project property cost 95th percentile estimate Design and project documentation 95th per	•	·			
8 Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate Peroject documentation expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate	-				
Retaining walls 9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) Construction expected estimate Investigation and reporting expected estimate Construction expected estimate Construction expected estimate Investigation and reporting expected estimate Construction 95th percentile estimate Constructi	-	-			
9 Traffic services 10 Service relocations 11 Landscaping 12 Traffic management and temporary works 13 Preliminary and general 14 Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) 1 95th percentile project estimate Investigation and reporting 95th percentile estimate Investigation and reporting 95th percen	•				
Service relocations Landscaping Traffic management and temporary works Traffic management and temporary works Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Investigation and reporting 95th percentile estimate Design and project documentation expected estimate Investigation and reporting 95th percentile estimate Construction expected documentation 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate	_	-			
Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Investigation and reporting 95th percentile estimate Investigation and reporting	-				
Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Investigation and reporting 95th percentile estimate Construction expected estimate Design and project documentation expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction expected estimate Construction posth percentile estimate Construction posth percentile estimate Construction 95th percentile 95th percentile 95th percentile 95th percentile 95th percentile 95th perc					
Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works D Total construction E Project base estimate (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Construct					<u> </u>
Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Investigation and reporting 95th percentile estimate Design and project documentation expected estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Signed					<u> </u>
Sub-total base physical works Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) G Project expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
Total construction E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	14				<u> </u>
E Project base estimate (A+B+C+D) F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Signed	_				<u> </u>
F Contingency (Assessed/Analysed) (A+B+C+D) G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate Construction expected estimate H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
G Project expected estimate Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	E				
Project property cost expected estimate Investigation and reporting expected estimate Design and project documentation expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
Investigation and reporting expected estimate Design and project documentation expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed			(E+F)		
Design and project documentation expected estimate H Funding risk (Assessed/Analysed) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	_				
H Funding risk (Assessed/Analysed) (A+B+C+D) I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed					
I 95th percentile project estimate Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by GHH)	Construction	expected estimate			
Project property cost 95th percentile estimate Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
Investigation and reporting 95th percentile estimate Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	I	95th percentile project estimate		(G+H)	
Design and project documentation 95th percentile estimate Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	Project prop	erty cost 95th percentile estimate			
Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	Investigation	and reporting 95th percentile estimate		ļ	
Construction 95th percentile estimate Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed	-			ļ	
Date of estimate Cost index (Qtr/Year) Estimate external peer review by Signed				•	
Estimate external peer review by Signed			011 1 (0:5	()	
				rear)	
Estimate accepted by the AT					
	Estimate ac	cepted by the AT	Signed		

3/3





Client Bet	OBL - 03 (Rev 01)	D-4	24/11/2014	
		Date:		
	AT Level Crossing Feasibility Studies	Job No:	236852 TP	
Location:	May Road (Site 45) OBL 1.89km	Prepared By: Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not	Checked By.	JL .	
740100.	used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.	Ontion	ı 1 - Highway Fly	over
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
	Bridges			
8	Retaining walls			
9	Traffic services	<u> </u>		<u>. </u>
10 11	Service relocations Landscaping			
12	Traffic management and temporary works			<u> </u>
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			i i
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(E+F)		
Project prope	erty cost expected estimate			
nvestigation	and reporting expected estimate			
Design and p	project documentation expected estimate			
Construction	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
	95th percentile project estimate		(G+H)	
	erty cost 95th percentile estimate		,	
	and reporting 95th percentile estimate		ľ	
-	project documentation 95th percentile estimate		ľ	
	95th percentile estimate		ľ	
Date of esting	·	Cost index (Ot-N	(oar)	
		Cost index (Qtr/Y	eai)	
	ternal peer review by	Signed Signed		
estimate ac	cepted by the AT	Signed		



Estimate accepted by the AT



	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
_	Physical works			
2 3	Environmental compliance			
4	Earthworks Ground improvements			
5	Drainage			
6	Pavement and surfacing			i i
7	Bridges			
8	Retaining walls			
9	Traffic services			<u> </u>
10	Service relocations			
11	Landscaping Treffic management and temporary works			<u>i</u>
11 12	Traffic management and temporary works			
11 12 13	Traffic management and temporary works Preliminary and general			
11 12	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail)			
11 12 13	Traffic management and temporary works Preliminary and general			
11 12 13 14	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works			
11 12 13 14	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			
11 12 13 14 D	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed)	(A+B+C+D)		
11 12 13 14 D E	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D)			
11 12 13 14 D E F G Project prop	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
11 12 13 14 D E F G Project prop Investigation	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate	(A+B+C+D)		
11 12 13 14 D E F G Project prop Investigation Design and	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate	(A+B+C+D)		
11 12 13 14 D E F G Project prop Investigation Design and Construction	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate	(A+B+C+D)		
11 12 13 14 D E F G Project prop Investigation Design and	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Extraordinary and general Sub-total base physical works Total construction A+B+C+D)	(A+B+C+D)	(A+B+C+D)	
11 12 13 14 D E F G Project prop Investigation Design and Construction H I	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)		
11 12 13 14 D E F G Project prop Investigation Design and p Construction H I Project prop	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate erty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
11 12 13 14 D E F G Project prop Investigation Design and Construction H I Project prop	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
11 12 13 14 D E F G Project prop Investigation Design and Construction H I Project prop Investigation Design and Construction	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate enty cost documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
11 12 13 14 D E F G Project prop Investigation Design and Construction H I Project prop Investigation Construction Construction Construction Construction Construction	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate and reporting 95th percentile estimate project documentation 95th percentile estimate and reporting 95th percentile estimate project documentation 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
11 12 13 14 D E F G Project prop Investigation Design and Construction H I Project prop Investigation Design and Construction University of the Construction Design and Construction Design and Construction Date of esti	Traffic management and temporary works Preliminary and general Extraordinary construction costs (inc Rail) Sub-total base physical works Total construction Project base estimate (A+B+C+D) Contingency (Assessed/Analysed) Project expected estimate enty cost expected estimate and reporting expected estimate project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate enty cost 95th percentile estimate and reporting 95th percentile estimate 95th percentile estimate enty cost 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	

Signed





				•
	OBL - 03 (Rev 01)	Date:	24/11/2014	
Project:	AT Level Crossing Feasibility Studies	Job No:	236852	
Location:	May Road (Site 45)	Prepared By:	TP	
	OBL 1.89km	Checked By:	SL	
Notes:	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			'
	These estimates are exclusive of escalation and GST.			
	Those scanners are exclusive or escalation and eer.	(Option 3 - 50/50	
			•	
Item	Description	Base estimate	Contingency	Funding risk
	N			
Α	Nett project property cost			
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
	Construction			
1	MSQA			
	- consultancy fees			
	- the AT managed costs			
	_			<u> </u>
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls			
9	Traffic services			
10	Service relocations			
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		
G	Project expected estimate	(A+B+C+D) (E+F)		
_		(E+F)		
	erty cost expected estimate			
-	and reporting expected estimate			
_	project documentation expected estimate			
Construction	expected estimate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
1	95th percentile project estimate		(G+H)	
Project prop	erty cost 95th percentile estimate			
	and reporting 95th percentile estimate			
	project documentation 95th percentile estimate			
	95th percentile estimate			
Construction	Sour Percentile estimate			
Date of esti	mate	Cost index (Qtr/Y	ear)	
Estimate ex	ternal peer review by	Signed		
Estimate ac	cepted by the AT	Signed		





Investigation and purchased Design and purchased Construction Services Date of estimates	rty cost 95th percentile estimate and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate nate ernal peer review by	Cost index (Qtr/Y	rear)	
Investigation and purce Construction 9	and reporting 95th percentile estimate roject documentation 95th percentile estimate 95th percentile estimate	Cost index (Qtr/V	(ear)	
Investigation and property of the control of the co	and reporting 95th percentile estimate roject documentation 95th percentile estimate			
Investigation and property of the contract of	and reporting 95th percentile estimate roject documentation 95th percentile estimate			
Investigation a	and reporting 95th percentile estimate			
I Hrojoot propo				
	95th percentile project estimate		(G+H)	
	Funding risk (Assessed/Analysed)			
н г	Funding rick (Assassed/Anglysed)		(A+B+C+D)	
	expected estimate			1
Design and pr	roject documentation expected estimate			1
Investigation a	and reporting expected estimate			
Project proper	rty cost expected estimate			
G F	Project expected estimate	(E+F)]
F (Contingency (Assessed/Analysed)	(A+B+C+D)		
E F	Project base estimate (A+B+C+D)]
D				
ח	Total construction			
''	Sub-total base physical works			
	Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
	Landscaping			
10	Service relocations			
	Traffic services			i i
	Retaining walls			i i
7 E	Bridges			
6 F	Pavement and surfacing			
5 [Drainage			
4	Ground improvements			1
3 E	Earthworks			
	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	_			
	- consent monitoring fees			
	- the AT managed costs			1
	- consultancy fees			
1 /	MSQA			
	Construction			
С	Total design and project documentation			
_	-			
	- the AT managed costs			
	- consultancy fees			
ı	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
ļ!	Investigation and reporting:			
Α .	Nett project property cost			
	N			
Item [Description	Base estimate	Contingency	Funding risk
		Option	1 - Highway Fly	
Ľ	These estimates are exclusive of escalation and GST.	Ontion	1 - Highway Ch	/OVAr
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
		Shooked by.	<u> </u>	ı
	OBL 2.13km & OBL 2.23km	Checked By:	SL	
	Captain Spring Road (Site 46) & Church Street (Site 47)	Prepared By:	TP	
	AT Level Crossing Feasibility Studies	Job No:	236852	
Client Ref: 0	OBL - 04 & OBL - 05 (Rev 01)	Date:	24/11/2014	1





Client Ref:	OBL - 04 & OBL - 05 (Rev 01)	Date:	24/11/2014	
Project:	AT Level Crossing Feasibility Studies	Job No:	236852	
	Captain Spring Road (Site 46) & Church Street (Site 47)	Prepared By:	TP	1
	OBL 2.13km & OBL 2.23km	Checked By:	SL	1
Notes:	The figures in this document are for outline indicative costs comparison and should not	-,-		4
	used as budgetary or construction cost estimates.			
	These estimates are exclusive of escalation and GST.			
		Option 2 - Ra	ailway Under H'	way @ERL
Item	Description	Base estimate	Contingency	Funding risk
Α	Nett project property cost			1 1
	Investigation and reporting:			
	- consultancy fees			
	- the AT managed costs			i i
В	Total investigation and reporting			
	Design and project documentation:			
	- consultancy fees			
	- the AT managed costs			
С	Total design and project documentation			
_	Construction			
1	MSQA	_		
	- consultancy fees			
	- the AT managed costs			
	- consent monitoring fees			
	Sub-total base MSQA			
	Physical works			
2	Environmental compliance			
3	Earthworks			
4	Ground improvements			
5	Drainage			
6	Pavement and surfacing			
7	Bridges			
8	Retaining walls		1 =	i i
9	Traffic services			
10	Service relocations			
11	Landscaping			
12	Traffic management and temporary works			
13	Preliminary and general			
14	Extraordinary construction costs (inc Rail)			
	Sub-total base physical works			
D	Total construction			
E	Project base estimate (A+B+C+D)			
F	Contingency (Assessed/Analysed)	(A+B+C+D)		1
G	Project expected estimate	(E+F)		1
Project prop	erty cost expected estimate	,		1
	and reporting expected estimate			1
_	project documentation expected estimate			1
	expected estimate			1
Constituction	expected collinate			
Н	Funding risk (Assessed/Analysed)		(A+B+C+D)	
ı	95th percentile project estimate		(G+H)	
Project prop	erty cost 95th percentile estimate			
Investigation	and reporting 95th percentile estimate			
Design and project documentation 95th percentile estimate				
-	95th percentile estimate			
Date of estimate Cost index (Qtr/Year)				
Estimate ex	ternal peer review by	Signed		
Estimate ac	cepted by the AT	Signed		





Investigation Design and p Construction H I Project prope Investigation Design and p Construction Date of estin		(A+B+C+D) (E+F) Cost index (Qtr/Y) Signed	(A+B+C+D)	
Investigation Design and p Construction H I Project prope Investigation Design and p Construction	Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate Irroject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate Irroject documentation expected estimate Irroject documentation estimate Irroject documentation 95th percentile estimate Irroject documentation 95th percentile estimate 95th percentile estimate	(A+B+C+D) (E+F)	(A+B+C+D)	
Investigation Design and p Construction H I Project prope Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate Project expected estimate Project documentation estimate Project project estimate Project documentation 95th percentile estimate Project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction H I Project prope Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate Project expected estimate Project documentation estimate Project project estimate Project documentation 95th percentile estimate Project documentation 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction H I Project prope Investigation	Contingency (Assessed/Analysed) Project expected estimate Inty cost expected estimate and reporting expected estimate Irroject documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate Irroy cost 95th percentile estimate and reporting 95th percentile estimate	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction H I Project prope	Contingency (Assessed/Analysed) Project expected estimate Project expected estimate Project documentation expected estimate Project documentation expected estimate Expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate Project estimate	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction H	Contingency (Assessed/Analysed) Project expected estimate Proty cost expected estimate and reporting expected estimate Project documentation expected estimate expected estimate Funding risk (Assessed/Analysed) 95th percentile project estimate	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate Funding risk (Assessed/Analysed)	(A+B+C+D)	(A+B+C+D)	
Investigation Design and p Construction	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate expected estimate	(A+B+C+D)		
Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Investigation Design and p	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate and reporting expected estimate roject documentation expected estimate	(A+B+C+D)		
Investigation	Contingency (Assessed/Analysed) Project expected estimate rrty cost expected estimate and reporting expected estimate	(A+B+C+D)		
	Contingency (Assessed/Analysed) Project expected estimate erty cost expected estimate	(A+B+C+D)		
re rolect brobe	Contingency (Assessed/Analysed) Project expected estimate	(A+B+C+D)		
	Contingency (Assessed/Analysed)	(A+B+C+D)		
	Project base estimate (A+B+C+D)			
E				
D	Total construction			
	Sub-total base physical works			I I
14	Extraordinary construction costs (inc Rail)			
	Preliminary and general			
	Traffic management and temporary works			
	Landscaping			
	Service relocations			
	Traffic services			
	Retaining walls			
	Bridges			
	· · · · · · · · · · · · · · · · · · ·			
	Pavement and surfacing			
	Drainage			
	Ground improvements			
	Earthworks			
	Environmental compliance			
	Physical works			
	Sub-total base MSQA			
	- consent monitoring fees			
	- the AT managed costs			
	·			
·	- consultancy fees			
1	MSQA			
-	Construction			
С	Total design and project documentation			
	- the AT managed costs			
	- consultancy fees			
	Design and project documentation:			
В	Total investigation and reporting			
	- the AT managed costs			
	- consultancy fees			
1	Investigation and reporting:			
Α	Nett project property cost			
Item	Description	Base estimate	Contingency	Funding risk
		C	option 3 - 50/50	
	These estimates are exclusive of escalation and GST.			
	The figures in this document are for outline indicative costs comparison and should not used as budgetary or construction cost estimates.			
	OBL 2.13km & OBL 2.23km	Checked By:	SL	
	Captain Spring Road (Site 46) & Church Street (Site 47)	Prepared By:	TP	
	AT Level Crossing Feasibility Studies	Job No:	236852	
-	` '	Date:		
Client Befr	OBL - 04 & OBL - 05 (Rev 01)	Deter	24/11/2014	Ī

Appendix C Concept Drawings – See Volume 2



Appendix D Planning Related information

Rule Reference	Provision	Activity Status
4A.4.6 B.(ii)	(ii)The construction (including earthworks),	Permitted
Network Utilities	operation and maintenance of roads is a	
Permitted Activities	permitted activity throughout the Isthmus and	
	includes:	
	 Bridges for roads, tramways, railways 	
	and underpasses and retaining walls	
10.7.3	Any facility designed primarily for the	Permitted
Special Purpose Zone	movement of people and/or goods	
12.8.2.1	Every parking and loading space shall have	Likely to comply
Access To Sites	access from a road, in accordance with the	
	following standards:	
	(c) The grade of access shall not be steeper	
	than 1 in 4 for land zoned residential, and 1 in	
	8 for land zoned other than residential. For	
	curved ramps and driveways, the gradient is	
	measured along the inside radius.	
	Ramps or driveways terminating on a grade	
	steeper than 1 in 20 prior to the road reserve	
	shall be provided with a platform not steeper	
	than 1 in 20, located adjacent to the road	
	boundary. For land zoned residential the	
	length of the platform shall not be less than	
	4m, and for land zoned other than residential,	
	not less than 6m. Where the driveway gradient	
	is steeper than 1 in 8, a transition section will	
	be required to avoid inadequate ground	
	clearance.	

Auckland Council District Plan (I) Abstract

Subject Site	Zoning	Zone Description
Morningside Drive	Business 4	Low to medium intensity light industrial and service uses.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
Woodward Road	Residential 6A	Medium intensity residential neighbourhoods.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
	MU	Mixed Use
	Residential 2B	Generously sized lots, wide roads and low densities.
	Residential 7A	Range of building types, including three and four storey multi-unit developments.
	Business 1	Existing small centres which can be found throughout the residential areas of the City
St Jude Street	Residential 5	Low intensity detached homes, mainly low rise (1-2 storeys), at lower densities (1-2 units per site) on sites with relatively generous areas of open space.
	Mixed Use	Zone contains residential activity, coupled with a range of business and leisure activities, creating a unique and diverse mixed use urban environment.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
St George Road	Residential 6A	Medium intensity residential neighbourhoods.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
O'Rorke Road	Business 5	Low to medium intensity industrial activity.
	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
Maurice Road	Business 5	Low to medium intensity industrial activity.
	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.

Subject Site	Zoning	Zone Description
Mays Road	Business 5	Low to medium intensity industrial activity.
	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
Captain Spring	Business 5	Low to medium intensity industrial activity.
Rd	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
	Business 6	Heavy, noxious or otherwise unpleasant industrial activity within the City.
	Residential 6A	Medium intensity residential neighbourhoods.
	Open Space 1	Land of particular scenic, heritage, natural or habitat value.
	Open Space 2	Open space for informal recreation
	Open Space 3	Sites in the district which are used primarily for organised sports and recreation.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.
Church Street	Business 5	Low to medium intensity industrial activity.
	Business 4	Low to medium intensity light industrial and service uses are the dominant activities.
	Business 6	Heavy, noxious or otherwise unpleasant industrial activity within the City.
	Residential 6A	Medium intensity residential neighbourhoods.
	Open Space 1	Land of particular scenic, heritage, natural or habitat value.
	Open Space 2	Open space for informal recreation
	Open Space 3	Sites in the district which are used primarily for organised sports and recreation.
	Special Purpose 3	Applies to all existing railway rights of way and to particular strategic roads.

Surrounding Land uses for the Level Crossings in Auckland (I)

Rule Reference	Provision	Activity Status/ compliance
Part 10 Definitions	Network Utilities means any activity relating to: vi. construction, operation or maintenance of	N/A
11.8.1 Permitted Activities	roads and railway lines 4. Any above-ground network utility where the structures for that activity: i. have a ground coverage of less than 50m²; and ii. have a height not exceeding 7.5m; and	Does not comply: The bridge structure will likely be approximately 6m to 7m in height and exceed 50m² ground coverage.
11.8.2 Controlled Activities	iii. are on allotments less than 200m² in area. 4. The construction of new roads and associated facilities including retaining walls, culverts and bridges and traffic signs and control devices. All controlled activities must meet the following standards and terms set out in Rules 4.9.8.1, 4.10.8.1, 4.11.7.1, 4.12.8.1, 4.13.8.2, 4.14.8.1 and 4.15.8.2 as appropriate to the zone concerned: Residential 1, 2 and 3	Complies: The height of the structure is less than 9m. Height in relation to boundary is not applicable because the proposal is not a building.
Augkland Council Dictrict Plan	Max height: 9m Height in relation to boundary: No part of any building shall exceed a height of 2 metres plus the shortest horizontal distance between that part of the building and the nearest lot boundary.	

Auckland Council District Plan (P) Abstract

Subject Site	Zoning	Zone Description
Walters Road	Urban Commercial 2	Subject to commercial development which supplements and complements the Central Business Area.
	Urban Industrial 3	Medium industrial zone
	Reserve	Wide range of uses ranging from local amenity and passive recreation to large scale reserves often containing significant sporting and recreational facilities.
	Urban Residential 1	Standard residential zone incorporating much of the residential land in the District.
	Urban Residential 2	Enables the establishment of more intensive residential activities as well as a limited range of non-residential activities.
	Urban Residential 3	Provides for residential activities in the Keri Hill area. Some parts of Keri Hill have problems of instability and further development will be subject to favourable geotechnical reports.
Taka Street	Urban Residential 1	Standard residential zone incorporating much of the residential land in the District.
	Urban Industrial 1	Light industrial zone and provides opportunities for small, localised activities.
	Reserve	Wide range of uses ranging from local amenity and passive recreation to large scale reserves often containing significant sporting and recreational facilities.
Manuroa Road	Urban Residential 1	Standard residential zone incorporating much of the residential land in the District.

Surrounding Land uses for the Level Crossings in Auckland (P)

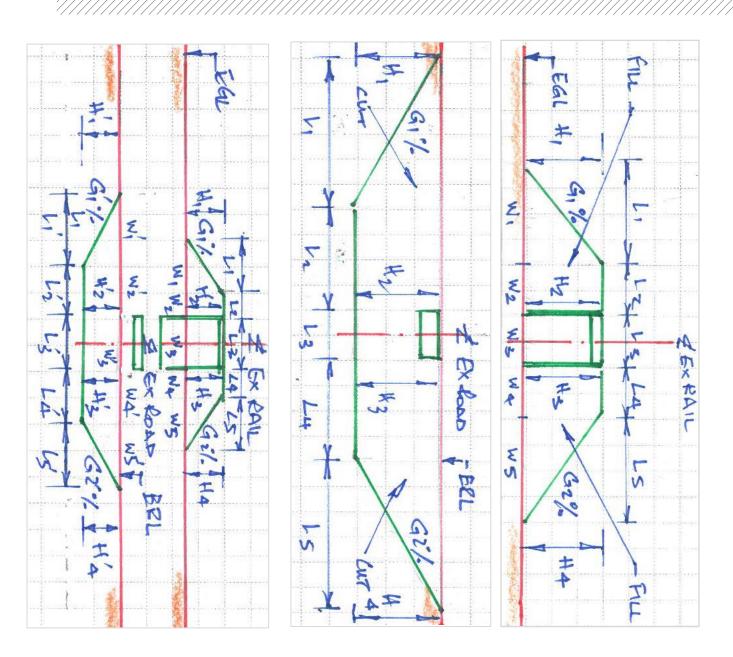
Rule Reference	Provision	Activity Status
5.1 (b) Permitted Activities (Transport Environment Chapter)	 (i) is an above-ground sewage, stormwater or water pipe and has a height not exceeding 1.0 metre above ground level; and a diameter not exceeding 300mm; and extends for an above-ground distance not exceeding 25.0 metres at any one place; 	N/A
5.1 (b) Permitted Activities (Transport Environment Chapter)	(ii) is any other infrastructure which has a height not exceeding 1.5 metres above ground level and covers an above ground area not exceeding 2m².	Does not comply: The bridge structure will likely be approximately 6m to 7m in height and exceed 2m² in above ground coverage.
5.2 (a) Controlled Activity (Transport Environment Chapter)	Activities meeting the following performance standards are Controlled Activities: Any activity involving infrastructure not meeting the standards specified in Rule 5.1 where the activity has a height not exceeding 2.5 metres above ground level and covers an above ground area not exceeding 6m²	Does not comply: The bridge will likely be approximately 6m to 7m in height and exceed 6m² in above ground coverage.
5.2 (b) Controlled Activity (Transport Environment Chapter)	Any activity involving infrastructure associated with transport in the current rail corridor referenced as NZR1 and shown on the Human Environment Maps as at 15 October 1995.	Controlled: The bridge structure will be constructed over the current rail corridor.
Rule 5.3 Discretionary Activity (Transport Environment Chapter)	Activities meeting the following performance standard are Discretionary Activities: Any activity involving infrastructure or connections not meeting the standards specified in Rules 5.1 or 5.2, provided that no new infrastructure having a height exceeding 12 metres may be located on a sensitive ridgeline, headland, cliff or scarp.	Discretionary: The height and area of the bridge structure will not meet Rules 5.1 and 5.2, but will be lower than 12m.

Auckland Council District Plan (W) Abstract

Subject Site	Zoning	Zone Description
Portage Road	Working Environment	Covers the industrial/employment areas
	Community Environment	Covers the town centres, suburban shopping centres and blocks of shops
	Open Space	Covers land owned by the council, the Auckland Regional Council or other public agencies.
Glenview Road	Living 1	Covers urban and suburban residential areas
	Community	Covers the town centres, suburban shopping centres and blocks of shops.
Bruce McLaren Road	Working Environment	Covers the industrial/employment areas
Metcalfe Road	Living Zone	Covers urban and suburban residential areas
	Open Space	Covers land owned by the council, the Auckland Regional Council or other public agencies.

Surrounding Land uses for the Level Crossings in Auckland (W)

Appendix E Option Assessment – Key Dimension Diagrams







Aurecon New Zealand Limited

Level 4, 139 Carlton Gore Road Newmarket Auckland 1023 PO Box 9762 Newmarket Auckland 1149 New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Aurecon offices are located in:

Angola, Australia, Botswana, China, Ethiopia, Ghana, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.