

Lincoln Road Corridor Road Improvements Project

Construction Sequencing and Traffic Management

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Rev. No.	Date	Description	Prepared By	Reviewed By	Approved By
1	August 2015	For Discussion	Paul Schischka	Gary Black	Graeme Stanton

1. Introduction

- 1.1. MWH NZ Limited (MWH) has been engaged by Auckland Transport (AT) to provide advice on the construction sequencing and traffic management considerations relating to the Lincoln Corridor Improvements Project (the Project).
- 1.2. This report sets out a possible construction sequence and covers the traffic management required at each stage. This report does not aim to provide the definitive construction programme, but rather to give a possible construction phasing scenario to support the project's statutory requirements while minimising delays for motorists travelling along the corridor.

2. Status of this Document

- 2.1. This document is a living document which is intended to be updated as the design develops.
- 2.2. At the time of preparation of this first revision of this document, August 2015, no consultation has been carried out with utility companies or Auckland Transport's Road Corridor Access Team. However the co-operation of these important stakeholders will be critical to the success of the project and it is expected that this document will be updated following receipt of their input later in the design process. This first revision is intended to help facilitate discussion with outside parties and should not be considered to be a final statement on traffic management or construction staging.
- 2.3. Traffic modelling will be required to confirm the staging proposed in this document and is intended that this report will be updated once this modelling is complete. Appendix C is reserved for information pertaining to this modelling.

3. Project Scope of Works

- 3.1. The Lincoln Road project site extends from SH16 in the north down to approximately 100 metres south of the intersection with Te Pai Place and Pomaria Road as shown in Figure 1 below:

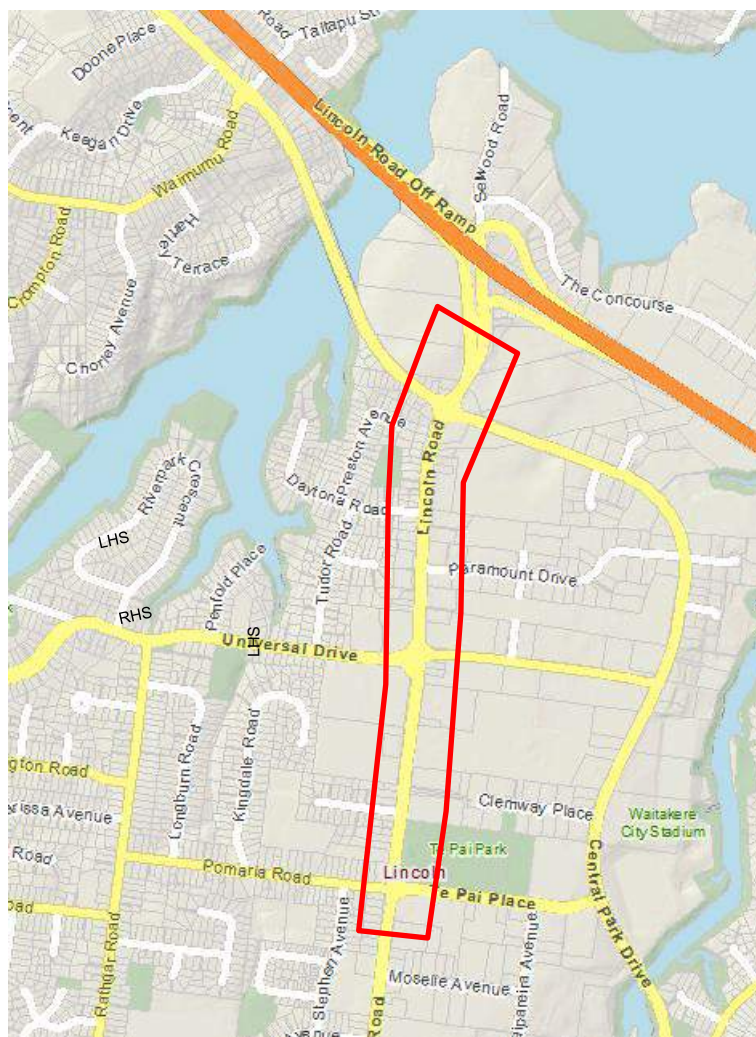


Figure 1 Project Site

4. Staging Philosophy

4.1. The overall philosophy of this construction staging methodology is to:

- Break the work into stages of controllable lengths in order to minimise disruption and allow the contractor to focus their activities but not to constrain them from operational efficiencies.
- Minimise disruption to affected residents and businesses by adopting a “dig once” approach. For this project this means the Contractor starts and completes a construction stage including all reinstatement work.
- Undertake night time work when there is a need to install services across the carriageway or where the work has a significant impact on traffic flow.
- Maximise the traffic flow at all times by maintaining 4 traffic lanes on Lincoln Road.
- Maintain pedestrian access at all times on both sides of Lincoln Road and side roads.

5. Construction Staging and Phasing

5.1. The project has been divided into 8 construction stages as shown below.

- 5.2. The staging diagrams, shown in Appendix A, graphically detail the extent of each stage and the traffic management approach needed to optimise the construction workspace and traffic flow.

Stage	Road	Extent of Work
1	Lincoln Road / Triangle Road	Lincoln Road west side between Triangle Road and SH16 tie-in Triangle Road north side between Lincoln Road and extent of works
2	Lincoln Road / Central Park Drive	Lincoln Road east side between Triangle Road and SH16 tie-in, including raised median Central Park Drive north side between Lincoln Road and extent of works
3	Central Park Drive	Central Park Drive south side between Lincoln Road
4	Lincoln Road / Universal Drive	Lincoln Road west side between Triangle Road and Universal Drive Universal Drive north side between Lincoln Road and extent of works
5	Lincoln Road / Universal Drive Extension	Lincoln Road east side between Central Park Drive and Universal Drive Extension Central Park Drive Extension between Lincoln Road and extent of works
6	Universal Drive Extension	Universal Drive Extension south side between Lincoln Road and extent of works
7	Lincoln Road / Pomaria Road / Universal Drive	Lincoln Road between Universal Drive and southern extent of works Pomaria Road both sides from Lincoln Road to extent of works
8	Lincoln Road / Te Pai Place	Lincoln Road between Universal Drive Extension and southern extent of works Te Pai Place both sides from Lincoln Road to extent of works

6. Comments on Staging

- 6.1. It is expected that by the time work starts on Auckland Transport's Lincoln Road project the Lincoln Road interchange project will be complete. At the time of preparing this report, discussions between MWH and the NZTA Lincoln Road Interchange project team indicate that NZTA intends to finish all permanent works within their designation, as well as construct a temporary tie-in in Lincoln Road between the edge of the designation and the Triangle Road / Central Park Drive intersection. However this may change as the project progresses.
- 6.2. In order to unlock the capacity improvements provided by the new interchange arrangement as soon as possible the proposed staging starts at the north end of the project adjacent to the interchange and works southward along Lincoln Road.

- 6.3. Typically each stage runs between two major signalised intersections. This allows relatively long runs, which will allow improved construction efficiency and minimise the number of joints and temporary connections on new services. One side of the road will be worked on at a time, with the western (northbound) side first followed by the eastern (southbound) side, including the raised median.
- 6.4. The installation of the raised median will block all right turn movements in and out of adjacent properties. Signal phasing at major intersections will need to be updated once work on the raised medians in each section commences in order to permit U-turn movements.
- 6.5. Stages are not of equal size and works in each stage are not expected to be of equal duration.

7. Typical Order of Work within Each Stage

- 7.1. Works within each stage will typically progress in the following order:

Cordon off the work area and install temporary traffic management

- Install a water filled barrier down the outside edge of the existing footpath to separate the works area in the berm from the footpath. Gaps in the barrier will need to be provided to allow access to adjacent properties, combined with appropriate traffic control measures.

Erosion and sediment control

- Install erosion and sediment control

Site clearance

- Clear any street trees and minor structures, for instance bus shelters, within the works zone.
- In areas where land acquisition is required, remove the existing fence and install temporary fencing on the amended property boundary. Relocate any letter boxes.

Retaining walls

- In locations where applicable, construct retaining walls.

Common services trench

- Excavate the new services trench, install new services, backfill then switch over service connections for adjacent properties. It is necessary to switch over services to allow the existing services in the pavement widening area to be decommissioned ahead of widening works.

Stormwater works

- Install new stormwater works including catchpits and reticulation.

Copenhagen path

- Construct the Copenhagen path / footpath / shared path, and kerb and channel.
- Update temporary traffic management for pavement widening works
- Move pedestrians onto the new Copenhagen Path and place water filled barrier along the cyclist side of the path to separate them from the works area.
- Move the traffic lanes over toward the opposite of the road in order to maximise the space available inside the works zone. On Lincoln Road the typical cross section during this part of the works will be four 3.2m wide general traffic lanes, without a flush median. Opposing directions of travel will be separated by a row of cones and temporary lane markings will be provided. The traffic lanes and works area will be separated by water filled barriers.

Pavement widening works

- Widen the pavement to the edge of the Copenhagen path / footpath / shared path.

Raised median

- Where the corresponding stage on the opposite side of the road has been completed install the new raised median.

8. Service Road between Daytona Place and Triangle Road

- 8.1. The design includes construction of a new service road which runs behind residential properties on the west side of Lincoln Road between Daytona Place and Triangle Road. This service road will be a cul de sac which will connect to Lincoln Road between property numbers 296 and 300. Some land acquisition will be required to construct this service road.
- 8.2. The stormwater treatment system recommended for the project is a filter cartridge type system within an underground chamber. This chamber will be located in the head of the service road cul de sac. The stormwater reticulation network for the project connects back to this chamber.
- 8.3. It is proposed that construction of the service road be included in Stage 1 of the construction staging. This will allow the new stormwater system to be connected back to the chamber as the works progress southward and upstream.

9. Working Hours for Construction Activities

- 9.1. The AT standard hours for construction of a Level 2 road is 0900 to 1600 hours. The contractor is required to comply with these hours of work for construction activities. Any works outside of these hours would be subject to the approval of AT and compliance with appropriate environmental requirements such as noise levels.
- 9.2. It is expected that some works around the intersections will be completed at night time, due to the volume of traffic during the day. Any night time work will be subject to the approval of AT.

10. Temporary Traffic Management (TTM)

- 10.1. The temporary traffic management layout required for each of the construction stages is shown on the staging diagrams in Appendix A.
- 10.2. The traffic management proposed for Lincoln Road that comprises two traffic lanes in each direction, without a flush median.
- 10.3. For safety reasons, it is desirable to keep operating speeds low during the works and for that reason it is proposed to narrow traffic lanes adjacent to work zones down to 3.2m wide and create side friction by separating opposing lanes with a row of traffic cones and to separate traffic lanes from work areas by use of water filled plastic crash barriers. Traffic lane widths on side roads around the intersection Lincoln Road are less than 3.2m where space is limited. The Code of Practice for Temporary Traffic Management (COPTTM) permits lanes to be reduced to 2.75m wide if 30kph speed restriction and 'Safe Hit' flexible delineators are used.
- 10.4. The Contractor is required to provide flexibility in his traffic management arrangement. Should the actual traffic volumes differ from the expected traffic flows, the contractor may be required to alter the layout. Any changes will be subject to discussion and agreement with Auckland Transport.
- 10.5. In general if additional work space is needed then a 2.75m lane width is permitted under COPTTM but with a 30km/hr speed limit. Given the intersection workspace restraints, traffic volumes and worker safety issues, a 30km/hr speed restriction should apply for the entire duration of the project.
- 10.6. This report provides guidelines for the contractor to build his construction methodology and work sequencing plan. It does not form any kind of approval for Traffic Management for the construction phase. Auckland Transport's TTM specification require the successful project contractor to prepare a temporary traffic management plan and submit it to Auckland Transport for approval prior to the commencement of construction.

11. Traffic Volumes

- 11.1. Traffic surveys for Lincoln Road and major side roads were undertaken in April 2015. On Lincoln Road the highest traffic volumes were record between Universal Drive and Central Park Drive.

- 11.2. The seven day annual average daily traffic (AADT) for Lincoln Road between Universal Drive and Central Park Drive is 41,837 vehicles with 8.4% heavy commercial vehicles(HCV%).
- 11.3. There may be a need to reduce traffic down to two lanes, one each direction, for short periods, particularly for final surfacing layer works or road marking. In these instances then the work should be undertaken at night between 9pm (646vph) and 6am (821vph).
- 11.4. Refer to Appendix B for more traffic data.

12. Work Space

- 12.1. Given the high traffic volumes, the aim is to maximise the carriageway width while providing a safe work area with the minimum 1 metre lateral safety zone required under COPTTM. It is expected the contractor will, in most instances, construct retaining wall and combined service trench from the road side and only venture onto private property for service connection or reinstatement activities.
- 12.2. Water filled plastic barriers should be used to separate the construction work space from the traffic live lane in all instances and it is expected that construction methodology would include the use of smaller zero-tail-swing excavators.
- 12.3. As shown in the TTM Typical Intersection Layout in Appendix A, the construction workspace is constrained at intersections and consideration should be given for off peak / night work and the use of smaller excavation equipment.

13. Pedestrian Access and Safety

- 13.1. Pedestrian access will be maintained along both sides of Lincoln Road and side roads throughout the construction. Pedestrian areas will be cordoned off from work zones, typically by the use of water filled barriers where practical.

14. Property Access

- 14.1. Access to properties adjacent to the site will need to be maintained throughout the works. This will require that breaks be left in the water filled barriers condoning off the site at vehicle crossings. Temporary works will be required in places during construction where new and existing levels differ.
- 14.2. In some cases, for instance concrete pours for vehicle crossings, work may need to be done outside of business hours in order to minimise disruption to adjacent businesses.

15. Passenger Transport Operations

- 15.1. The passenger transport services along the length of the project are to remain active during construction. AT in discussion with the contractor will identify temporary bus stop locations. Where space permits, the contractor will be required to provide temporary bus shelters. The existing shelters can be removed and reused to provide the temporary shelters, as required.

16. Emergency Vehicle Access

- 16.1. The road is to remain open to emergency vehicles both travelling along the corridor and for emergency access to the existing properties within the extent of the project. Access for emergency vehicles to the properties along the corridor is to remain open, 24 hours per day, for the duration of the works.
- 16.2. The Contractor is to prepare specific documents relating to construction activities. This includes, but not limited to, the following:
 - Methodology of Construction Works – making specific reference to the proposals to ensure access is maintained

- Timing and duration of construction works
- Arrangements for temporary facilities to ensure access
- Emergency contact details

17. Construction Traffic Routes

- 17.1. Construction traffic should be limited to the main arterial routes and use of local roads stemming from Lincoln Road should be discouraged. Construction traffic would put added maintenance pressure on the local roads and increase the risk for residents exiting their property.

18. Possible Detour Routes

- 18.1. Over the course of the project there will inevitably be travel delays and congestion given the road is a key arterial and a main route to SH16. A comprehensive project communication plan should encourage motorists to use alternative routes such as Te Atatu Road and Central Park Drive to relieve the congestion.
- 18.2. The proposed staging allows four lanes to be kept open throughout the project on Lincoln Road, although the removal of the flush median may result in some increased delays as vehicles waiting to turn right will need to do so in one of the lanes.

19. Services Works

- 19.1. The proposed construction works include a significant element of services' diversions works along both sides of the project corridor that includes a number of road crossings.
- 19.2. For each stage of the work proposed staging provides for services relocation work to be carried out before construction of the new Copenhagen path or pavement works.
- 19.3. Due to the operational requirements of each of the services companies, there are a number of elements of services' diversions that will need to be completed in one operation. The contractor will need to fully understand the requirements of the service companies including any operation spanning more than one construction stage when finalising their proposed traffic management strategy and preparing traffic management plans.

20. Construction Traffic

- 20.1. Construction traffic generated by the project will mostly consist of trucks bringing materials and plant to site and also removing surplus material and plant which are no longer required from the site. Light vehicles, including cars, vans and utes, will also be used for this purpose and also to convey construction personnel to and from the site.
- 20.2. Most trucks will be rigid, non-articulated vehicles without trailers with lengths not exceeding 12.6m, however articulated vehicles with trailers and total lengths up to 19m in length will be used in some cases, particularly for delivery of pavement aggregate to site.
- 20.3. Plant which is expected to be used at the site, and which will be delivered and removed by truck, includes rollers, excavators, pavers, milling machines, mobile cranes, and similar plant typical of the type employed for road construction.

21. Impact on Local and Wider Road Network

- 21.1. At the time of the preparation of this first revision of this document, dated August 2015, no traffic modelling has been carried out for the proposed traffic management and therefore the impact of the project on the local and wider road cannot be quantified.

- 21.2. Traffic modelling will be undertaken once the design is at a more developed stage and feedback has been received from service companies with assets which require relocation. If required the construction staging outlined in this report will be modified based on the outcome of the modelling in order to ensure that any congestion resulting from the works is kept at acceptable levels.

22. Effects Management

- 22.1. The following consent conditions are recommended to mitigate transport, traffic and access effects.
- Prior to commencement of construction activities the consent holder shall provide to the Team Leader Western Monitoring evidence that a detailed design safety audit that incorporated vehicle accesses has been completed and a decision by the client has been made with regard to the audit's recommendations. The consent holder shall provide to Council a signed copy of the tracking table of the audit.
 - Prior to the commencement of construction activities, the consent holder shall provide to the Team Leader Western Monitoring, an approved Construction Traffic Management Plan. Temporary Traffic Management provisions should be made specifically addressing control of construction access to the site and traffic control adjacent to the site, and the protection of the public.
 - A copy of the Traffic Management Plan, together with the verification letter shall be kept on the site at all times. All measures for the protection of the public and other personnel set out in the verified Plan shall be maintained and complied with at all times until such time as the works are completed.

23. Traffic Modelling Results

- 23.1. To be developed once more information is available

24. Service Liaison Feedback

- 24.1. To be developed once more information is available

APPENDIX A - Lincoln Road Corridor Staging

DO NOT SCALE - IF IN DOUBT, ASK

200 mm

150

100

90

80

70

60

50

40

30

20

10

0

A1

ORIGINAL SIZE



NOTES

1. STAGES 2, 5 AND 8 INCLUDE CONSTRUCTION OF THE RAISED MEDIAN ISLAND ON LINCOLN ROAD

50 0 50 100m

SCALE 1:2500

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	REVISIONS						

SURVEYED	By Others (As Built)	
DRAWN	Anuradha Alure	17/08/2015
DRAWING CHECK	Paul Schischka	18/08/2015
DRAWING REVIEW	NOT REVIEWED	
DESIGNED	Paul Schischka	17/08/2015
DESIGN CHECK	Jarrod Pettigrew	17/08/2015
DESIGN REVIEW		
APPROVED		

Paper Printing	1
PDF Printing	6
No. of Issues	6
Internal Revision	8



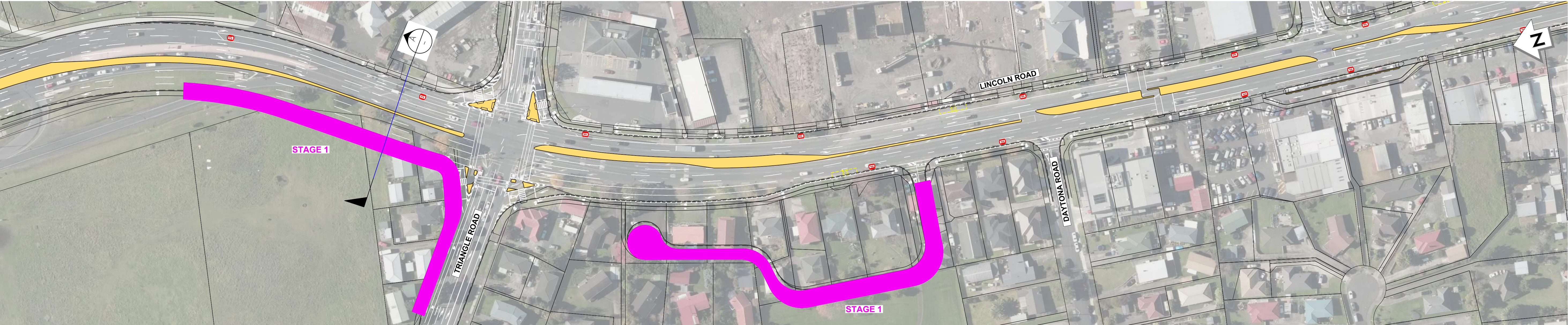
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Rev.	A

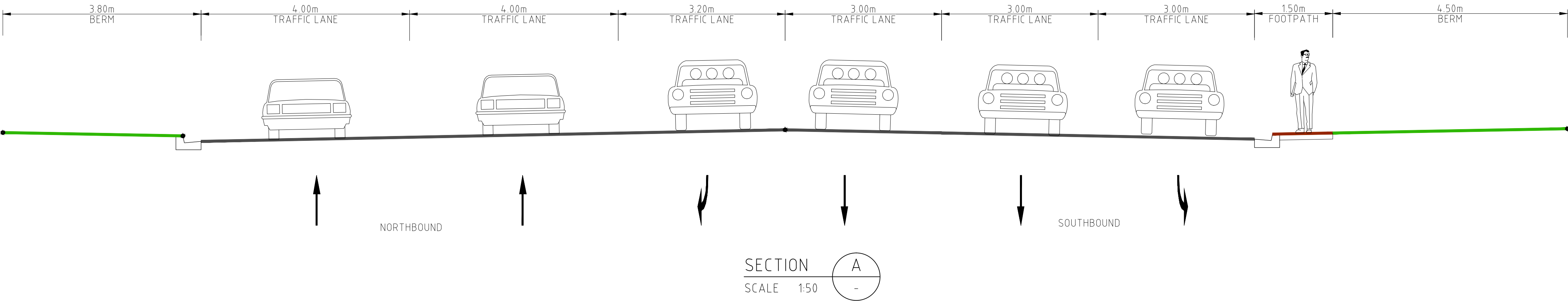
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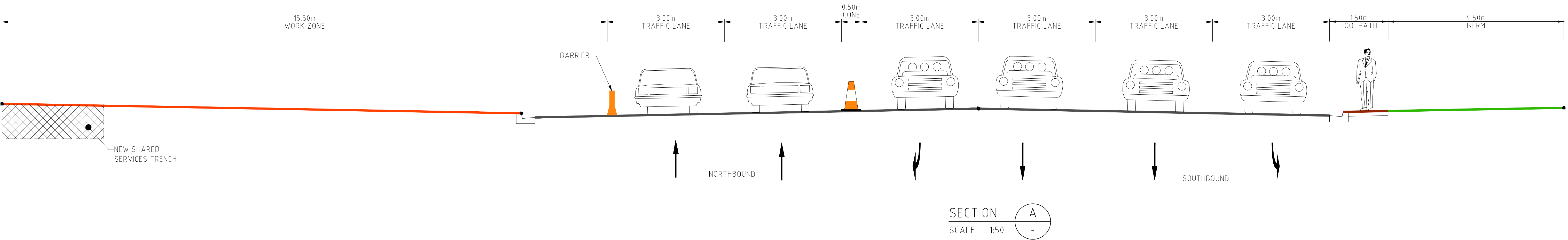
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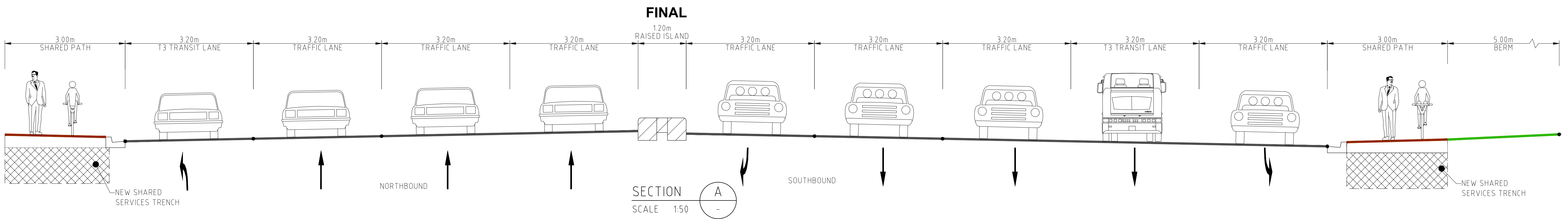
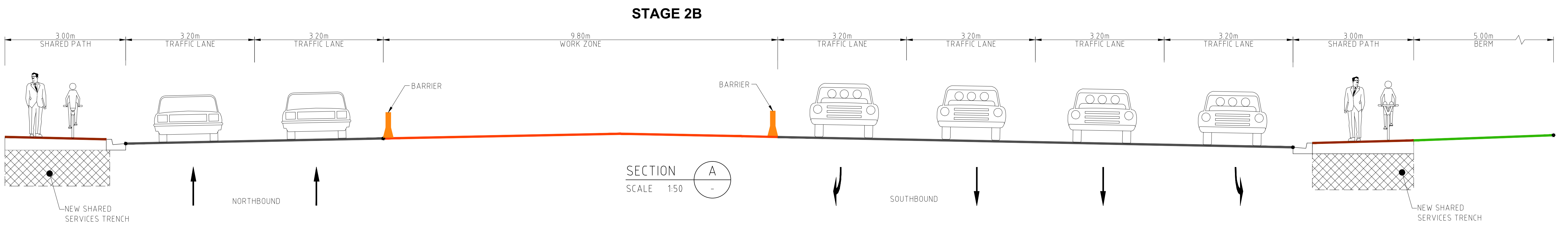
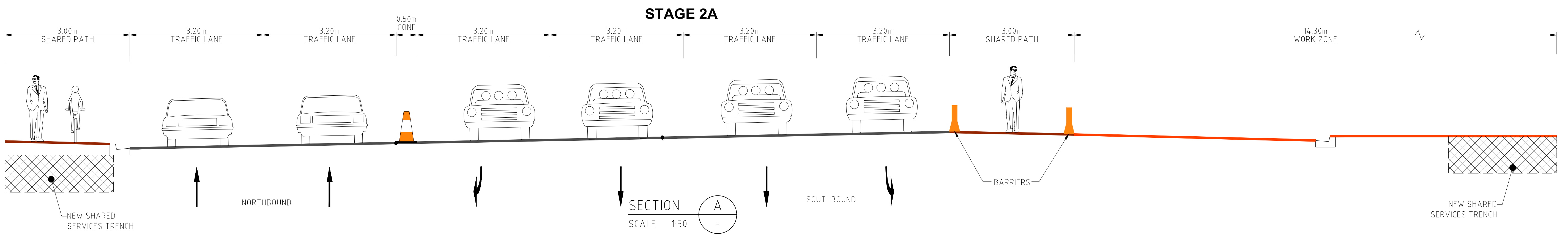
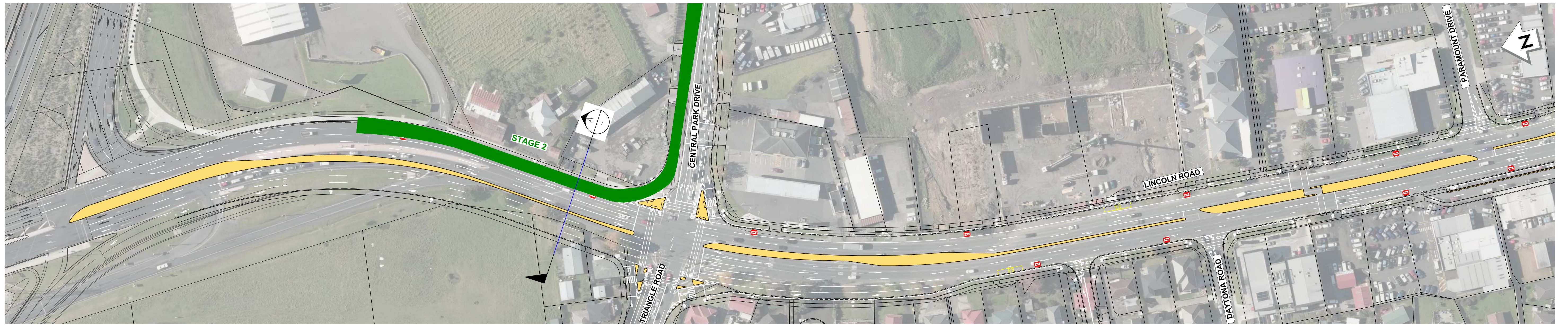
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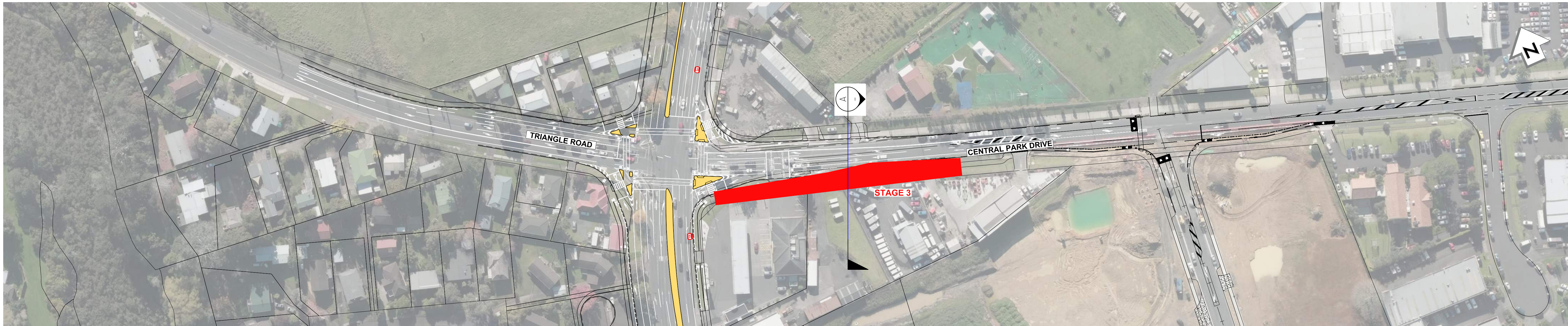
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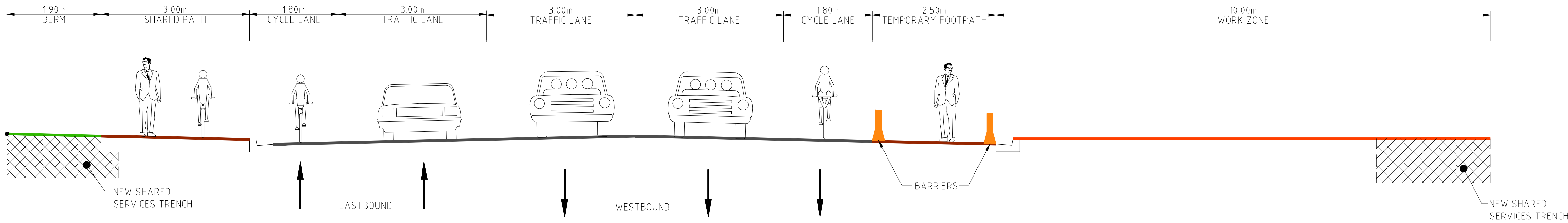
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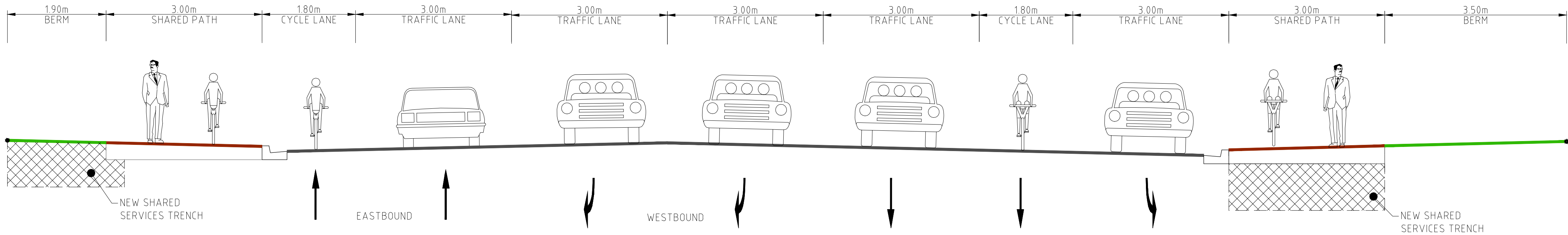
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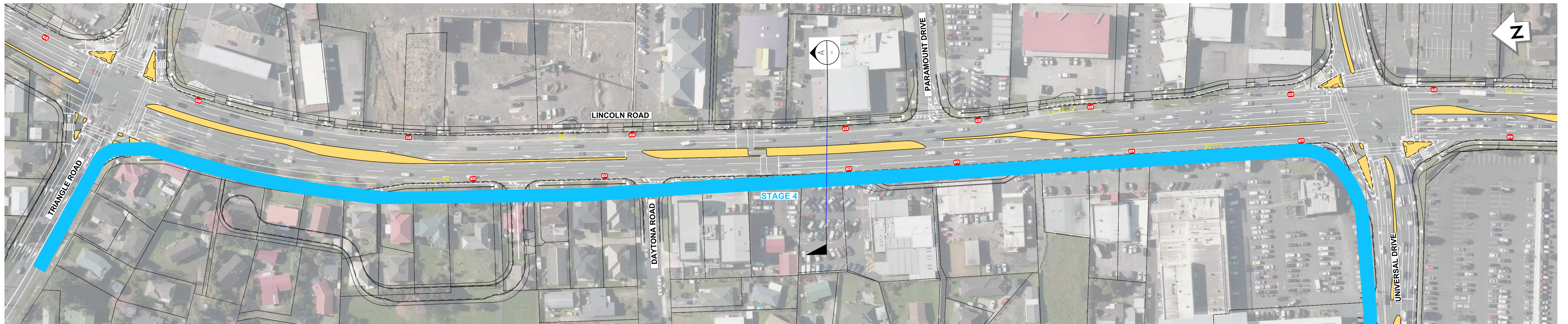
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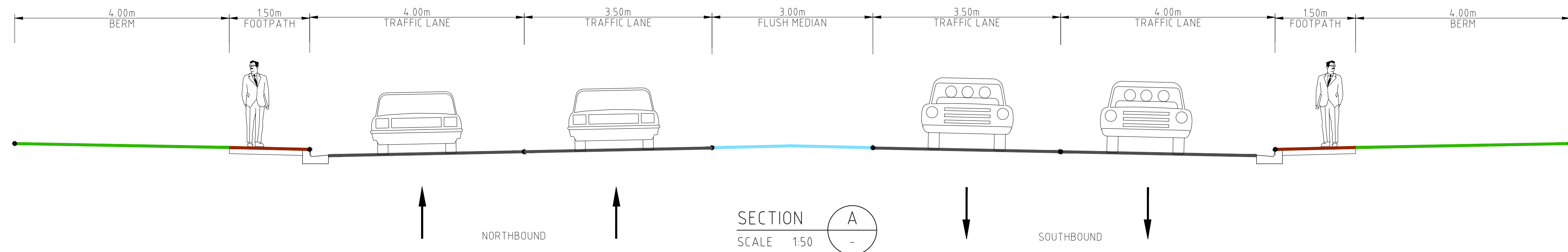
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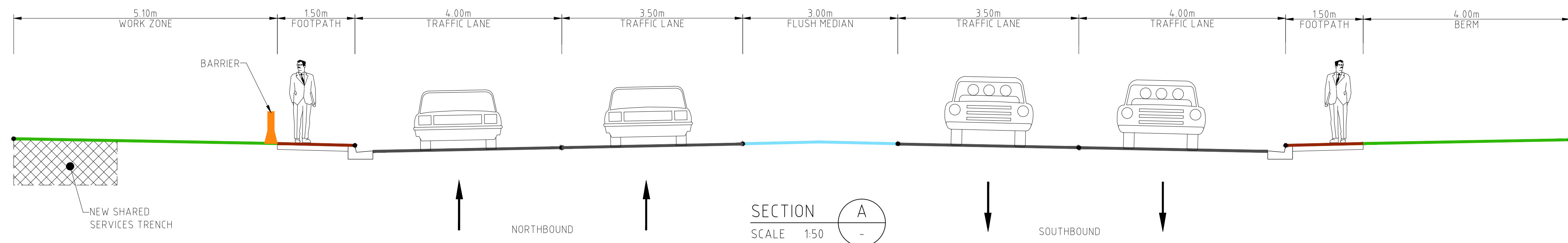
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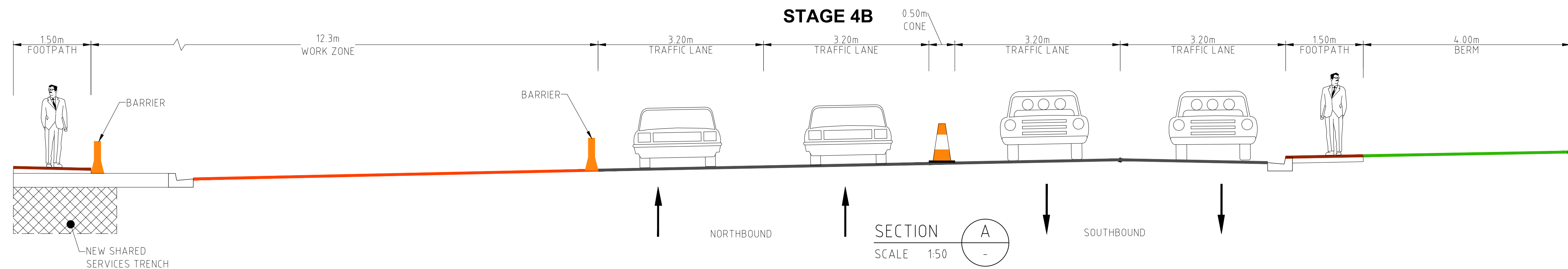
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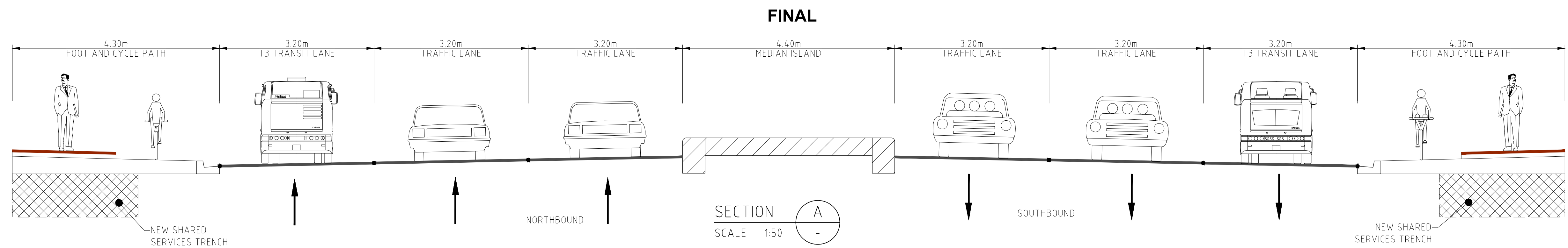
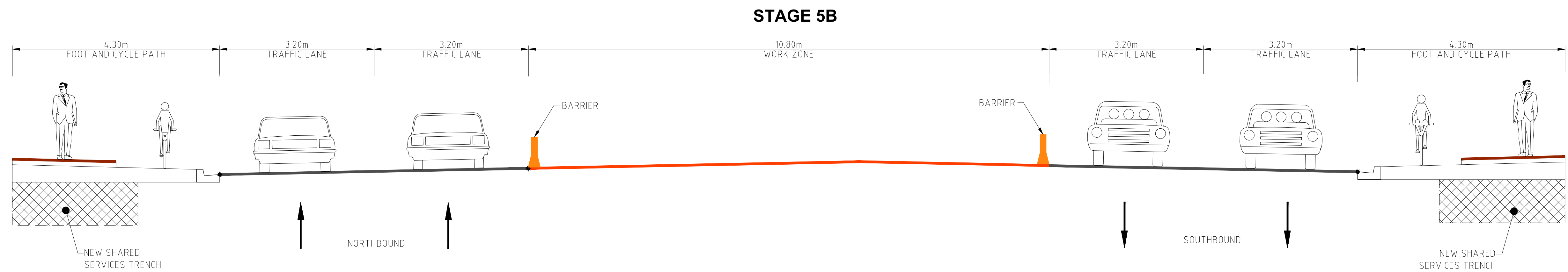
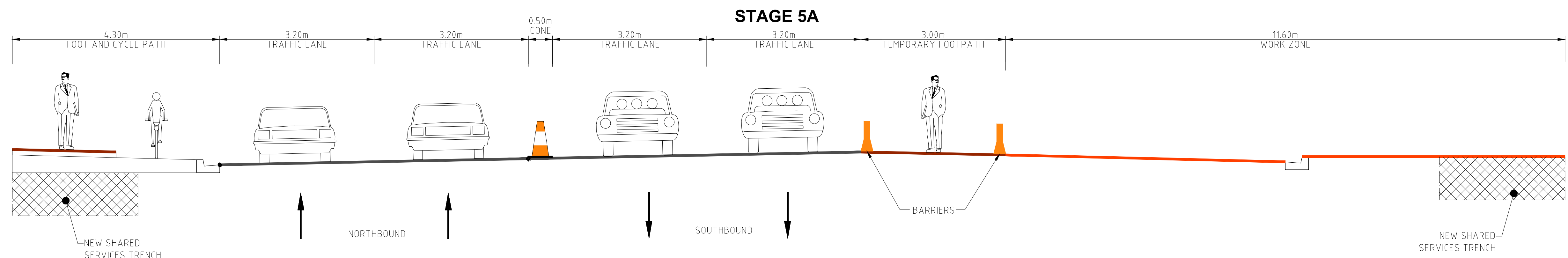
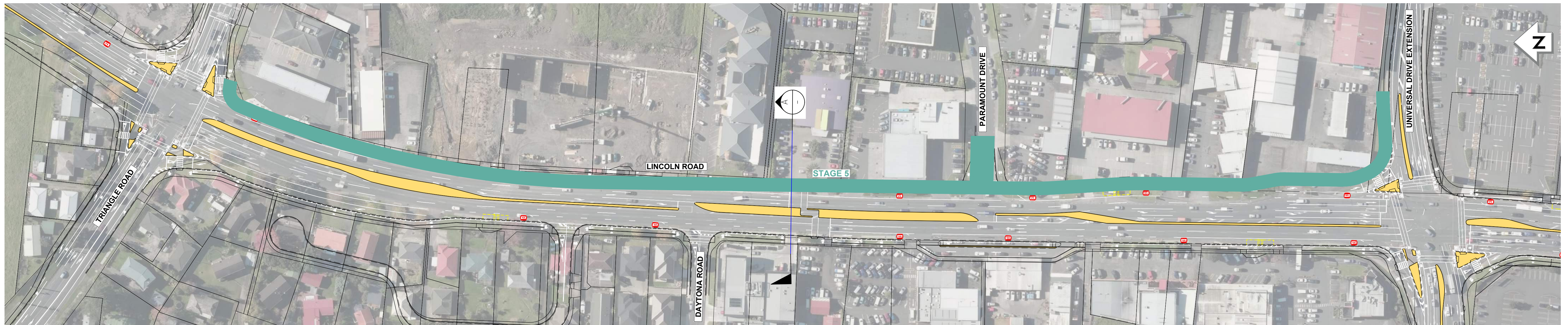
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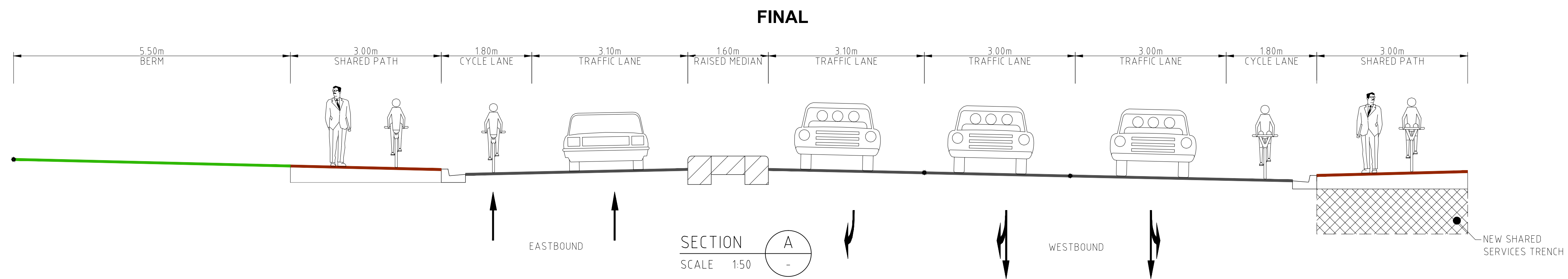
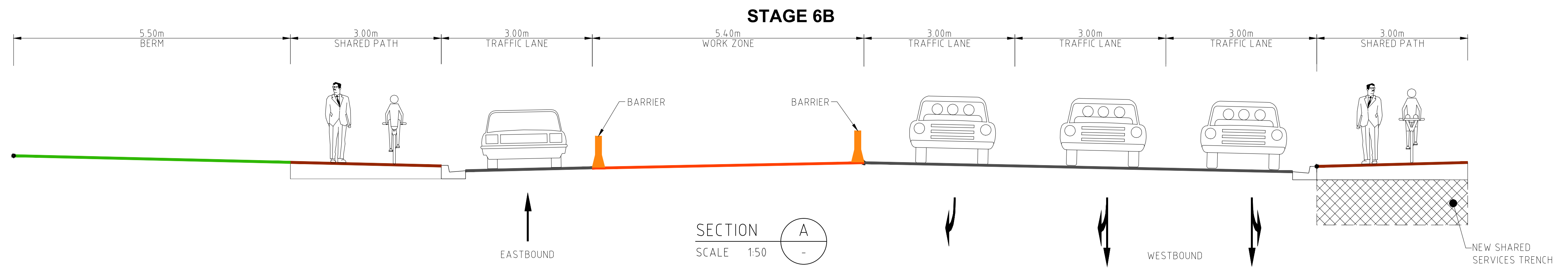
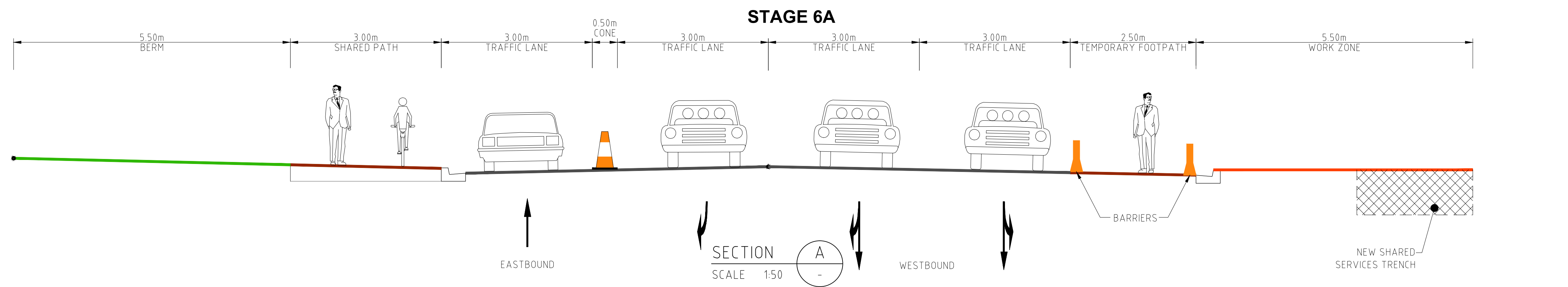
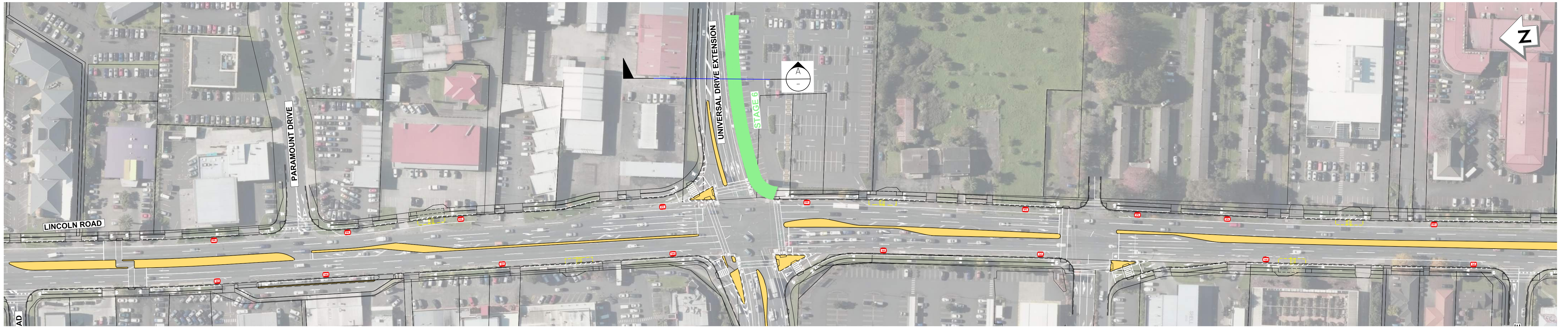
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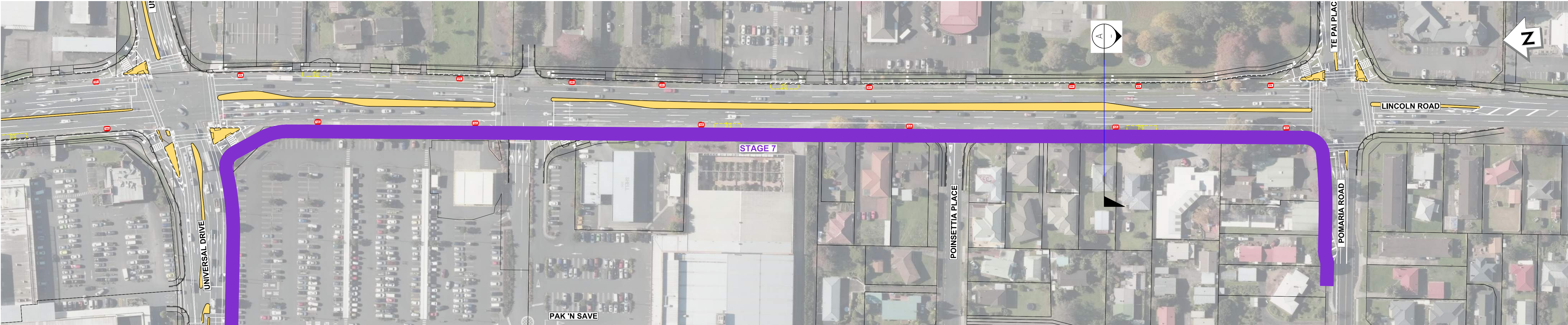
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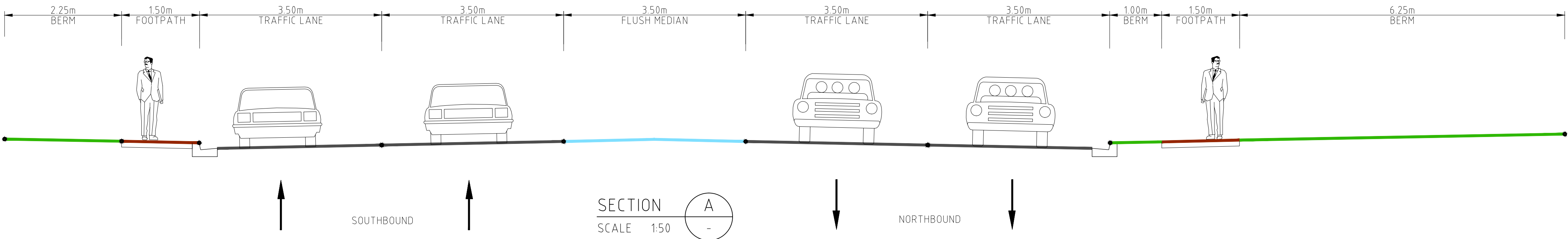
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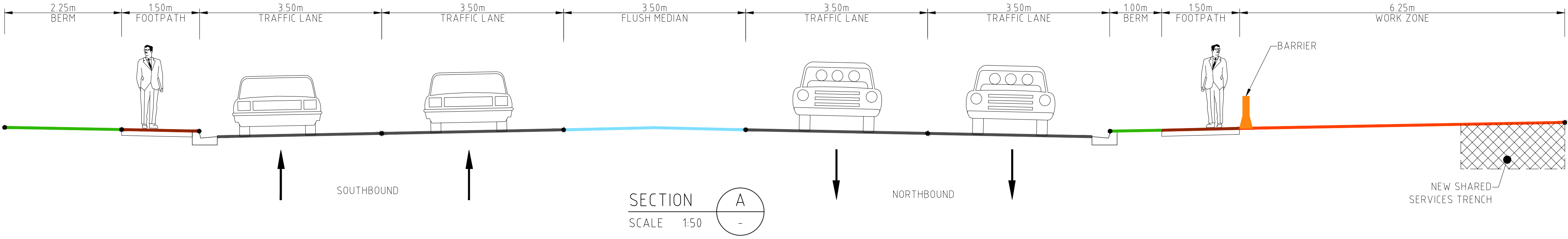
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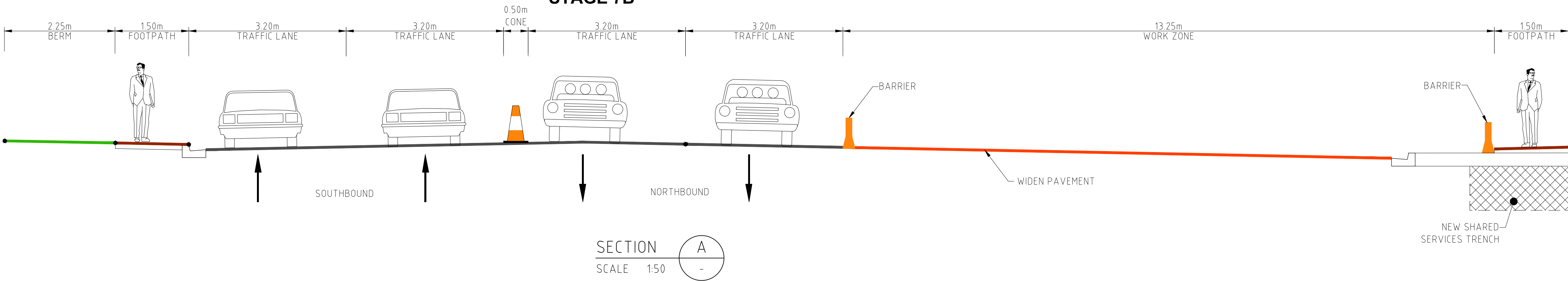
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STAGE 7A



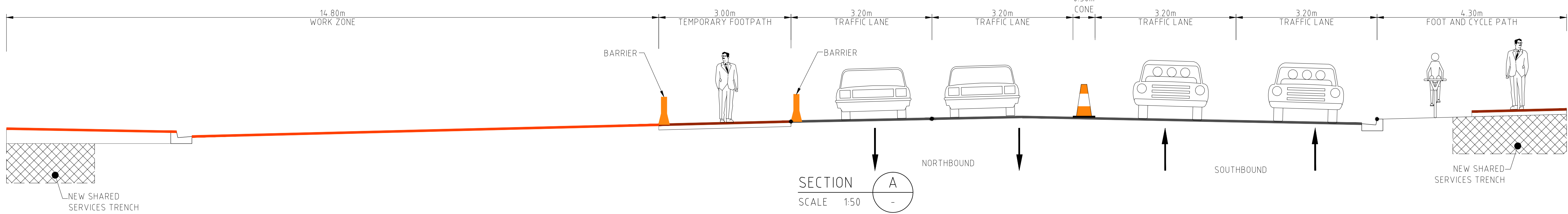
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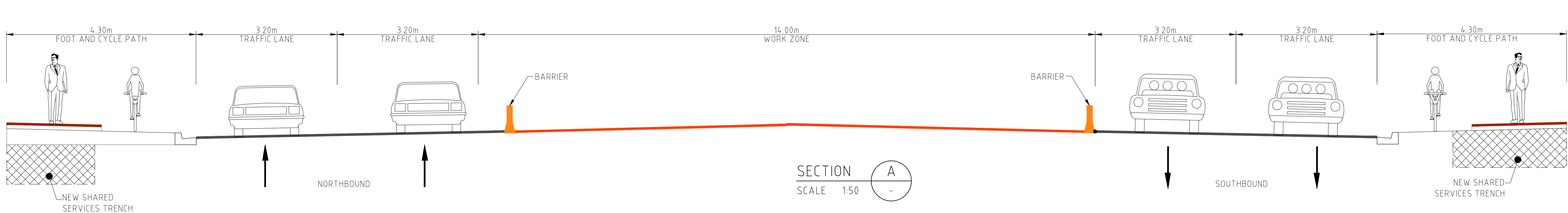
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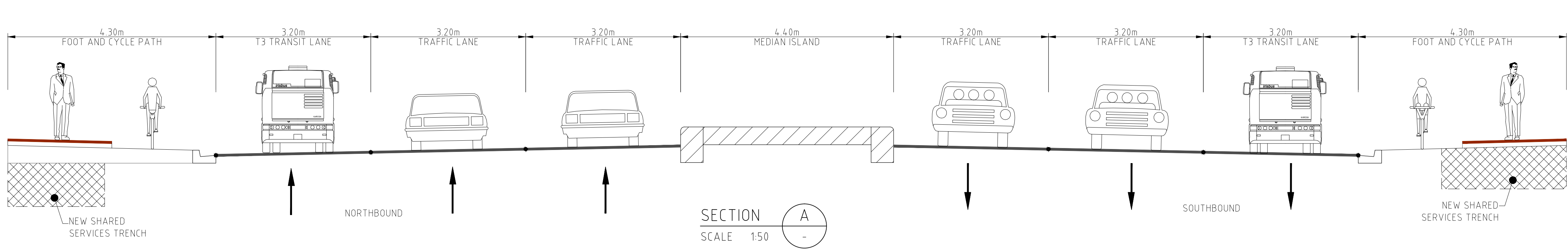
STAGE 8A



STAGE 8B



FINAL



LINCOLN ROAD CONSTRUCTION STAGING
STAGE 8

Appendix B

LINCOLN ROAD BETWEEN TE PAI PL AND UNIVERSAL DR, HENDERSON

E1745259 N5919419

From	To	Fri 1/5/15			Sat 2/5/15			Sun 3/5/15			Mon 4/5/15			Tue 5/5/15			Wed 6/5/15			Thu 7/5/15			Weekday Average			Week Average				
		North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both		
AM_1	800	900	532	936	1868	700	753	1453	464	867	867	919	964	1883	397	896	1893	962	938	1900	924				947	934	1881	843	815	1644
PM_1	1215	1315	1091	1160	2351	1476	1025	2500	1194	1212	2406	1015	1101	2116	1080	1145	2225	1085	1181	2266	1164				1087	1147	2234	1156	1137	2298
ADOT_1	1615	1715	1242	1269	2511	1093	1103	2196	879	981	1860	1220	1181	2401	975	1263	2238	1262	1234	2496	1036				1147	1227	2384	1011	1172	2284
ADOT_1	24H	00-00	16467	16801	31268	16204	15112	31316	12780	13078	25858	14554	14906	29460	15242	15552	30794	16056	15955	32011	15748				15613	15804	21417	15293	15234	3045

LINCOLN ROAD BETWEEN UNIVERSAL DR AND CENTRAL PLACE DR, HENDERSON

E1745128 N5920077

From	To	Fri 1/5/15			Sat 2/5/15			Sun 3/5/15			Mon 4/5/15			Tue 5/5/15			Wed 6/5/15			Thu 7/5/15			Weekday Average			Week Average		
		North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both	North	South	Both
		800	900	1381	1229	2610	1213	1014	2227	750	674	1424	1288	1229	2517	1218	1302	2520	1192	1382	2574	1085						
AM_2	1215	1315	1091	1160	2351	1476	1025	2500	1194	1212	2406	1015	1201	2116	1080	1145	2225	1085	1181	2266	1164							
PM_2	1615	1715	1242	1269	2511	1093	1103	2196	879	981	1860	1220	1181	2401	975	1263	2238	1262	1234	2496	1036							
ADOT_2	24H	00-00	24780	21567	46347	23007	20088	43115	18985	16765	35750	21871	19061	40932	22619	19783	43402	22931	20265	43196	21528							

CENTRAL PLACE DRIVE Eastbound OF LINCOLN ROAD

E1745781 N5920213

		Thu 30/4/15						Fri 1/5/15						Sat 2/5/15						Sun 3/5/15						Mon 4/5/15						Tue 5/5/15						Wed 6/5/15						Weekday Average						Week Average					
From	To	Westbound			Eastbound			Both			Westbound			Eastbound			Both			Westbound			Eastbound			Both			Westbound			Eastbound			Both			West		East		Both		West		East		Both							
		800	900	593	829	1422	487	780	1267	358	444	802	802	146	220	366	461	743	1204	484	800	1284	493	745	1196	493	775	1272	424	652	1075																								
AM_3	1215	1315	544	548	1092	590	627	1217	539	805	1344	503	434	937	548	588	1136	504	546	1050	511	517	1028	539	565	1104	534	581	1115																										
IP_3	1615	1715	606	616	1422	511	810	1341	555	429	984	343	405	748	370	820	1390	533	889	1422	557	876	1413	559	842	1401	528	721	1249																										
PM_3	24H	00-00	8621	9918	18539	8232	9480	17712	6813	7057	13870	5259	5263	10522	8118	8295	16413	8368	9290	17658	8547	9890	18437	8377	9375	17752	7708	8456	16164																										

DAYTONA RD Westbound OF LINCOLN RD AT NUMBER 1

E1745287 N5920119

		Thu 30/4/15			Fri 1/5/15			Sat 2/5/15			Sun 3/5/15			Mon 4/5/15			Tue 5/5/15			Wed 6/5/15			Weekday Average			Week Average		
From	To	Westbound	Eastbound	Both	Westbound	Eastbound	Both	Westbound	Eastbound	Both	Westbound	Eastbound	Both	Westbound	Eastbound	Both	Westbound	Eastbound	Both	Westbound	Eastbound	Both	West	East	Both	West	East	Both
800	900	46	73	119	80	63	143	43	27	70	24	40	27	66	103	69	40	149	53	95	127	57	71	128	49	58	107	
1215	1315	102	33	135	107	40	147	127	47	174	77	30	107	80	33	113	100	28	128	97	32	129	87	33	130	99	35	133
1615	1715	129	50	179	110	36	146	76	35	111	50	29	79	97	35	152	96	51	147	102	57	159	107	50	157	94	45	139
24H	00:00	1335	735	2070	1460	792	2252	1076	553	1629	852	440	1292	1098	697	1795	1196	753	1949	1211	788	1999	1260	753	2013	1375	680	1855

MOSELLE AVE Eastbound OF LINCOLN ROAD AT NUMBER 6

E1745289 N5918985

From	To	Thu 30/4/15				Fri 1/5/15				Sat 2/5/15				Sun 3/5/15				Mon 4/5/15				Tue 5/5/15				Wed 6/5/15				Weekday Average			Week Average		
		Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound		Both		Both			
		800	900	367	115	282	178	113	291	111	913	202	202	14	411	166	100	275	139	87	226	115	113	294	107	162	269	96	117	322					
AM_5	1215	1315	176	172	348	181	141	322	192	210	402	100	92	192	159	134	293	148	124	272	162	132	294	141	165	306	144	160	303						
PM_5	1615	1715	164	208	372	143	165	308	80	114	194	68	48	116	116	147	263	166	184	350	151	189	340	179	148	327	151	127	278						
PM_5	2449	00:00	2158	1982	4140	2181	1760	3941	1689	1762	3451	940	770	1710	1817	1569	3466	1993	1733	3726	2108	1779	3887	1765	2055	3820	1622	1844	3466						

Appendix C

Lincoln Road Traffic Management Modelling

This Appendix reserved for traffic modelling in later revisions of this report.