

Network Information Book

Main South A

Berrima Junction (inc) to Harden (exc) & Moss Vale (inc) to Unanderra (exc)

OGW-30-28

Applicability

Interstate Network

Publication Requirement

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2.9	11 Oct 2023	Configuration Management Administrator	Corridor Assets & Operational Representatives	Configuration Manager	Head of Operations Standards

Amendment Record

Amendment Version #	Date Reviewed	Clause	Description of Amendment
1.0	12 Sep 16		Initial issue
2.0	8 Sep 17	Various	General information sections covering Train Control Centres, Level Crossings, Ruling Grades and Wayside Equipment updated.

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			Exeter wayside equipment text updated. Cunningar location information moved to Main South B NIB. Moss Vale sidings, Lynwood siding and Goulburn route locking information revised and updates to diagrams Berrima Jct, Moss Vale, Bundanoon, Medway, Towrang, Goulburn, Joppa Jct, Fish River, Jerrawa – Yass Jct, Robertson – Mt Murray, Summit Tank – Dombarton Diagram legend updated
2.1	18 Mar 2019		Board extent section 1.1 updated with Main South D Board Controlled Territory information. Safe Working System section 1.2, Adjacent Train Control Centres section 1.4, Interlockings & Sidings section 1.5.1 & Level Crossings section 1.7 updated. Various diagrams updated.
2.2	3 Apr 2020	1.7, 1.17	Level crossing table and drawing legend updated. Towrang-Goulburn, Goulburn South, Joppa Junction, Yarra – Breadalbane & Mt Murray diagrams updated. Updates to various diagrams for eTap introduction.
2.3	2 Dec 2020	1.2, 1.4, 1.7, 2.11, 2.12, 2.15, 3.2, 3.3	Safe Working System and Adjacent Train Control Centres sections updated. Towrang level crossings updated in section 1.7 & 2.11. Robertson and Mt Murray locations updated. Robertson to Mt Murray, Mt Murray, Towrang, Towrang to Joppa Junction, Goulburn, Jerrawa to Yass Junction & Yass Junction diagrams updated.
2.4	28 May 2021	1.5.1, 1.7, 1.10, 1.14, 2.4, 2.14	Interlockings and Sidings section updated. Coolalie Road Jerrawa level crossing updated. Maximum Train Length details updated. Wayside Equipment section updated. Usage note added to diagrams
2.5	3 Sep 2021	1.17, 2.5, 2.6, 2.13, 2.14	Drawing legend updated. Penrose location updated. New Gunning location added. Bundanoon, Penrose, Yarra-Breadalbane, Fish River & Gunning diagrams updated.
2.6	28 Jan 2022	1.1, 1.4, 1.17 2.12, 2.13	Board Extent updated. Adjacent Train Control section and Joppa Junction location Country Regional Network references updated. Drawing Legend updated. Berrima Junction, Goulburn & Goulburn South diagrams updated.
2.7	27 Jan 2023	1.7, 2.13, 3	Level Crossings table updated. Joppa Junction CRN Interface Agreement number updated. Dombarton slip detector removed and Calwalla to Dombarton diagrams updated.
2.8	1 Jun 2023	Various	Level Crossings table updated. Landmarks added to Jerrawa – Yass Junction and Yass Junction diagrams. Tallong & Dombarton diagrams updated. Moss Vale Junction to Mt Murray diagrams updated.
2.9	11 Oct 2023	Various	Interlockings & Sidings and Level Crossings table updated. Moss Vale location text updated. Unanderra to Moss Vale locations reordered. Dombarton diagram updated.

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1 General Information

1.1 Board Extent

Berrima Junction inclusive signals BJ87(140.908km) & 87.4 (141.021km) to Harden exclusive signals HN11 (379.070km) & 379.6 (379.600km) and Joppa Junction signal G6 (232.025km) Moss Vale (inclusive) to Unanderra exclusive signals WG1032/WG1034 (90.471km)

This area is controlled by the Main South A Network Controller, Network Control Centre South (NCCS)

Phone: (02) 6924 9807 Emergency: (02) 6924 9867

Train Transit Manager: (02) 6924 9837

Main South “D” Board Controlled Territory (Mon-Fri 0700 to 1500)

Medway Jct (exclusive) to Harden (exclusive)

Phone: (02) 6924 9805 Emergency: (02) 6924 9865

Train Transit Manager: (02) 6924 9835

Main South “A” Board Controlled Territory (During operation of the Main South “D” Board)

Berrima Jct (inclusive) to Medway Jct (inclusive)

Moss Vale (inclusive) to Unanderra (exclusive)

1.2 Safeworking System

Berrima Junction to Harden – Double Line Uni-directional Rail Vehicle Detection

Unanderra to Dombarton – Double Line Bi-directional Rail Vehicle Detection

Dombarton to Moss Vale– Single Line Bi-directional Rail Vehicle Detection

1.3 Applicable Rules

The ARTC Network Rules and Procedures apply to the sections covered by this Information Book.

1.4 Adjacent Train Control Boards / Centres

ARTC Sydney 3	Berrima Jct	02 6924 9803	Emergency	02 6924 9863
ARTC Main South B	Harden	02 6924 9808	Emergency	02 6924 9868
Pacific National	Medway Jct	02 8745 4331	Emergency	02 8745 4320
Enfield Train Control	Berrima Jct			
Sydney Trains	Unanderra	02 9289 4857	Emergency	02 9289 4827
South Coast Control				
Sydney Trains	Unanderra	02 9289 4809	Emergency	02 9289 4869
Shift Manager RMC				
Wollongong Complex	Unanderra	02 4223 5599		
Country Regional Network	Canberra line	02 4028 9502	Emergency	02 4028 9542

1.5 Section Operating Equipment

1.5.1 Interlockings and Sidings

Km	Interlocking, Station, Platform or Siding	Length of Passenger Platform in Metres
Main South Line		
143.246	Berrima Junction	
145.711	Moss Vale	Up main No. 1, 215 Down main No. 2, 234
155.881	Exeter	Up and Down main Nos. 1 & 2, 92
162.269	Bundanoon	Up and Down main Nos. 1 & 2, 154
171.403	Penrose	Up and Down main Nos. 1 & 2, 92
177.139	Wingello	Up and Down main Nos. 1 & 2, 137
185.381	Tallong	Up and Down main Nos. 1 & 2, 61
190.087	Medway	
192.906	Marulan	Up main No. 1, 149 Down main No. 2, 126
196.441	Lynwood	
208.524	Towrang	
222.463	North Goulburn	
224.904	Goulburn station	Up main No. 1, 174 Down main No. 2, 174 Back platform No. 3, 175
230.486	Joppa Junction	
247.890	Breadalbane	
271.023	Fish River	
278.556	Gunning	Up main No. 1, 91 Down main No. 2, 97
297.670	Jerrawa	
309.940	Coolalie	
318.011	Yass Junction	Up and Down main Nos. 1 & 2, 140
354.140	Binalong	Up and Down main Nos. 1 & 2, 146
365.189	Galong	Up and Down main Nos. 1 & 2, 137
Unanderra to Moss Vale		
96.968	Dombarton	
108.135	Summit Tank	Main 30
118.992	Mt Murray	Loop 31
128.306	Robertson	Main 62
139.900	Calwalla	

1.6 Train Braking Requirements

Brake Holding Tests for the Rearmost Vehicles (retention tests)

The following apply:

1. The operator **shall** put into place systems for conducting brake holding tests.
2. The number of vehicles (or for articulated or permanently coupled vehicles the number of triple valve control units) required to conform to the requirements of this sub-section shall be:
 - a. Three (3) for freight trains operated in New South Wales;
 - b. Two (2) for freight trains not entering New South Wales; and
 - c. One (1) for all passenger trains where a guard is provided or three (3) for passenger trains without guards.
3. The vehicle operator shall ensure that air and hand brakes operate correctly.
4. The air brakes on the vehicles **shall** remain effectively applied for a period of time, based on train length, considered sufficient for a member of the train (locomotive) crew to reach the vehicles and secure handbrakes in the event of a breakaway en route.
5. This time **shall** be ten (10) minutes plus three (3) minutes for each 100 metres or part thereof of train length. For example, a train 1240 metres long will require a holding (retention) time of $13 \times 3 + 10 = 49$ minutes.
6. If any of the required number of vehicles (as specified in item (2) above) fail the above test (as specified in item (5) above), generally known as a holding or retention test, the faulty vehicle(s) **shall** be repaired or the train remmarshalled to ensure compliance with the requirements of items (3) and (4) above.
7. Brake holding tests successfully completed will remain valid for the departure within a period of 24 hours from completion of the test. After that period, the vehicles **shall** be re-tested.

Freight Trains

On freight trains, the maximum number of inoperative or isolated brakes permitted on a train **shall** be either of the following:

1. One conventional two-bogie vehicle for every ten (10) vehicles in the train where the vehicle is isolated as a unit.
2. One bogie for every ten (10) bogies in the train where individual bogies can be isolated or the isolation of triple valve control units affects more than two (2) bogies. This applies, only on the proviso that the total un-braked mass of the train **shall not** exceed 10% of the total train mass (excluding the mass of the hauling locomotives).

Item (1) above applies where the only vehicles isolated are conventional two-bogie vehicles. In all other cases, the requirements of item (2) **shall** be followed.

For the purposes of this clause, a four-wheel (two-axle) vehicle **shall** be counted as one bogie, and locomotives under power **shall not** be counted as train vehicles.

1.7 Level Crossings

ALCAM ID is the number allocated from the Australian Level Crossing Assessment Model used by rail and road managers across Australia. It's a national database for assessing risk which is overseen by a National Committee and supported by the Rail Industry Safety Standards Board (RISSB).

ALCAM ID	Road Name	Line Segment	KM	Traffic Type	Access	Control Type
	Moss Vale Jct	Main South	145.510	Take Off	Railway use only	
4390	Moss Vale Service Lxing	Main South	145.820	Road	Railway use only	No Control
1569	Yarrawa Street Pedestrian Lxing Moss Vale	Main South	146.893	Pedestrian	Public	Automatic Gates
1570	Exeter Pedestrian Lxing	Main South	155.825	Pedestrian	Public	Pedestrian Booms
1571	Bundanoon Pedestrian Lxing	Main South	162.182	Pedestrian	Public	Pedestrian Booms
1572	Penrose Pedestrian Lxing	Main South	171.350	Pedestrian	Public	Pedestrian Booms
569	Murrimba Road Wingello	Main South	177.219	Road	Public	Half Boom Flashing Lights
	Tallong Service Lxing	Main South	183.680	Road	ARTC only	Locked Gates
1520	Tallong Road Pedestrian Lxing	Main South	185.417	Pedestrian	Public	Maze
4206	Glen Rock Private Lxing	Main South	189.540	Road	Private	Stop Signs
1521	Marulan Pedestrian Lxing	Main South	192.975	Pedestrian	Public	Pedestrian Booms
4391	Marulan Road Service Lxing	Main South	193.570	Road	Railway use only	Locked Gates
4207	Marulan Private Lxing	Main South	196.580	Road	Private	Stop Signs
571	Carrick Road Lxing Marulan	Main South	204.970	Road	Public	Half Boom Flashing Lights
4208	Towrang Private Lxing	Main South	207.847	Road	Private	Stop Signs
572	Mills Road Lxing Towrang	Main South	208.571	Road	Public	Half Boom Flashing Lights
1908	Murrays Flat Road Lxing Towrang	Main South	216.235	Road	Public	Half Boom Flashing Lights
4210	Towrang Private Lxing	Main South	216.477	Road	Private	Stop Signs
4212	Towrang Private Lxing	Main South	217.543	Road	Private	Stop Signs
4213	Gorman Road Lxing North Goulburn	Main South	218.670	Road	Private	Stop Signs
574	Blackshaw Road Lxing Goulburn	Main South	224.180	Road	Public	Half Boom Flashing Lights
575	Coles Lane Lxing Yarra	Main South	235.186	Road	Public	Half Boom Flashing Lights

ALCAM ID	Road Name	Line Segment	KM	Traffic Type	Access	Control Type
4215	Breadalbane Private Lxing	Main South	243.936	Road	Private	Stop Signs
576	Old Parkesbourne Road Breadalbane	Main South	246.612	Road	Public	Stop Signs
1522	Carinya Pedestrian Xing Breadalbane	Main South	246.850	Pedestrian	Public	Path
577	Parkesbourne Road Breadalbane	Main South	248.278	Road	Public	Stop Signs
578	Gurrendah Road Lxing Cullerin	Main South	249.066	Road	Public	Half Boom Flashing Lights
579	Old South Road Lxing Cullerin	Main South	256.489	Road	Public	Half Boom Flashing Lights
4392	Cullerin Service Lxing	Main South	263.030	Road	Railway use only	No Control
4217	Razorback Private Lxing	Main South	266.749	Road	Private	Stop Signs
4218	Razorback Private Lxing	Main South	269.465	Road	Private	Stop Signs
4219	Fish River Private Lxing	Main South	271.617	Road	Private	Stop Signs
4220	Gunning Private Lxing	Main South	275.150	Road	Private	Stop Signs
1523	Gunning Platform Pedestrian Lxing	Main South	278.638	Pedestrian	Public	Path
4221	Gunning Private Lxing	Main South	280.831	Road	Private	Stop Signs
4222	Gunning Private Lxing	Main South	283.985	Road	Private	Stop Signs
580	Oolong Road Lxing	Main South	288.173	Road	Public	Half Boom Flashing Lights
581	Broadway Road Lxing Jerrawa	Main South	293.041	Road	Public	Stop Signs
4223	Jerrawa Private Lxing	Main South	295.800	Road	Private	Stop Signs
582	Broadway Road Lxing Jerrawa	Main South	296.823	Road	Public	Half Boom Flashing Lights
583	Coolalie Road Jerrawa	Main South	298.594	Road	Public	Half Boom Flashing Lights
4224	Jerrawa Private Lxing	Main South	299.720	Road	Private	Stop Signs
584	Bushs Road (Echo Road)	Main South	305.212	Road	Public	Stop Signs
4225	Coolalie Private Lxing	Main South	307.103	Road	Private	Stop Signs
585	Coolalie Road (Coolalie Siding Road)	Main South	309.899	Road	Public	Stop Signs
586	Bango Road	Main South	310.724	Road	Public	Stop Signs
4226	Yass Jct Private Lxing	Main South	315.331	Road	Private	Stop Signs
4227	Yass Jct Private Lxing	Main South	316.337	Road	Private	Stop Signs
4228	Yass Jct Private Lxing	Main South	317.503	Road	Private	Stop Signs

ALCAM ID	Road Name	Line Segment	KM	Traffic Type	Access	Control Type
4229	Yass Jct Private Lxing	Main South	319.958	Road	Private	Stop Signs
4232	Yass Jct Private Lxing	Main South	322.050	Road	Private	Stop Signs
4233	Bowning Private Lxing	Main South	324.540	Road	Private	Stop Signs
587	Kelly's Road	Main South	334.060	Road	Public	Stop Signs
588	Goondah Road	Main South	340.075	Road	Public	Half Boom Flashing Lights
4235	Goondah Private Lxing	Main South	344.780	Road	Private	Stop Signs
589	Amours Road Lxing Binalong	Main South	355.550	Road	Public	Stop Signs
590	Amours Road Lxing Binalong	Main South	357.140	Road	Public	Stop Signs
591	Linden Road Lxing Cunningham	Main South	367.383	Road	Public	Stop Signs
Unanderra to Moss Vale Branch Line						
4412	Dombarton Service Lxing	Unanderra – Moss Vale	93.220	Road	Railway use only	No Control
4413	Dombarton Service Lxing	Unanderra – Moss Vale	97.905	Road	Railway use only	Stop Signs
4256	Dombarton Private Lxing	Unanderra – Moss Vale	100.052	Road	Private	Stop Signs
4399	Summit Tank Service Lxing	Unanderra – Moss Vale	100.222	Road	Railway use only	Stop Signs
4400	Summit Tank Service Lxing	Unanderra – Moss Vale	104.100	Road	Railway use only	Stop Signs
4401	Summit Tank Service Lxing	Unanderra – Moss Vale	105.280	Road	Railway use only	Stop Signs
4257	Summit Tank Private Lxing	Unanderra – Moss Vale	106.677	Road	Private	Stop Signs
	Summit Tank Service Crossing	Unanderra – Moss Vale	108.510	Road	Railway use only	No Control
4258	Summit Tank Private Lxing	Unanderra – Moss Vale	109.975	Road	Private	Stop Signs
4259	Summit Tank Private Lxing	Unanderra – Moss Vale	112.093	Road	Private	Stop Signs
4402	Mt Murray Service Lxing	Unanderra – Moss Vale	115.250	Road	Railway use only	No Control
4403	Mt Murray Service Lxing	Unanderra – Moss Vale	116.400	Road	Railway use only	Stop Signs
4407	Mt Murray Service Lxing	Unanderra – Moss Vale	118.790	Road	Railway use only	Stop Signs

ALCAM ID	Road Name	Line Segment	KM	Traffic Type	Access	Control Type
4408	Mt Murray Service Lxing	Unanderra – Moss Vale	119.627	Road	Railway use only	Stop Signs
4260	Mt Murray Private Lxing	Unanderra – Moss Vale	120.342	Road	Private	Stop Signs
4409	Mt Murray Service Lxing	Unanderra – Moss Vale	120.750	Road	Railway use only	No Control
4261	Mt Murray Private Lxing	Unanderra – Moss Vale	123.500	Road	Private	Stop Signs
1311	Fountaindale Road Lxing Robertson	Unanderra – Moss Vale	126.688	Road	Public	Half Boom Flashing Lights (duplicated)
1312	Camp Street Lxing Robertson	Unanderra – Moss Vale	127.579	Road	Public	Stop Signs
1313	Meryla Street Lxing Robertson	Unanderra – Moss Vale	128.084	Road	Public	Half Boom Flashing Lights
1314	Hoddle Street Pedestrian xing Robertson	Unanderra – Moss Vale	129.127	Pedestrian	Public	Fenced path
1314	Hoddle Street Lxing Robertson	Unanderra – Moss Vale	129.135	Road	Public	Half Boom Flashing Lights
4262	Robertson Private Lxing	Unanderra – Moss Vale	129.673	Road	Private	No Control
1844	Old Kangaloon Road Lxing Robertson	Unanderra – Moss Vale	130.560	Road	Public	Stop Signs
4263	Robertson Private Lxing	Unanderra – Moss Vale	131.528	Road	Private	Stop Signs
4264	Robertson Private Lxing	Unanderra – Moss Vale	132.059	Road	Private	Stop Signs
4265	Robertson Private Lxing	Unanderra – Moss Vale	134.179	Road	Private	Stop Signs
4266	Robertson Private Lxing	Unanderra – Moss Vale	134.714	Road	Private	Stop Signs
4267	Robertson Private Lxing	Unanderra – Moss Vale	135.424	Road	Private	Stop Signs
4268	Robertson Private Lxing	Unanderra – Moss Vale	136.096	Road	Private	Stop Signs
4269	Robertson Private Lxing	Unanderra – Moss Vale	136.814	Road	Private	Stop Signs
4270	Calwalla Private Lxing	Unanderra – Moss Vale	138.682	Road	Private	Stop Signs
4271	Calwalla Private Lxing	Unanderra – Moss Vale	139.706	Road	Private	Stop Signs
1315	Sheep Wash Road Lxing Calwalla	Unanderra – Moss Vale	140.398	Road	Public	Primary Flashing Lights

ALCAM ID	Road Name	Line Segment	KM	Traffic Type	Access	Control Type
1316	Iona Park Road Lxing Calwalla	Unanderra – Moss Vale	145.335	Road	Public	Half Boom Flashing Lights
1317	Suttor Road Lxing Moss Vale	Unanderra – Moss Vale	149.936	Road	Public	Primary Flashing Lights
1318	McCourt Road North Fork Lxing Moss Vale Jct	Unanderra – Moss Vale	150.371	Road	Public	Stop Signs

1.8 Emergency Local Releases

Marulan emergency crossover refer to section 2.9.

1.9 Maximum Permanent Speeds and Permanent Speed Restrictions

Refer the Route Access Standard - Defined Interstate Rail Network Section Pages D51 and D52 for all speed information.

1.10 Maximum Train Length

Maximum train length is 1800 metres for the Main South Line to Albury.

Maximum train length is 1500 metres for the Unanderra to Moss Vale line.

1.11 Structure Clearances

Refer Route Access Standards for Rolling Stock Outlines.

1.12 Tunnel Locations

Section / location	Name of Tunnel	Length of tunnel in metres	km from Sydney
Summit Tank - Dombarton	Rockfall Shelter (Snow Chute)	136	98.947 – 99.083
Summit Tank - Dombarton	Illawarra Range No 1	102	99.243 – 99.345
Summit Tank - Dombarton	Illawarra Range No 2	629	102.555 – 103.184

1.13 Communications

The National Train Communications System (NTCS) is the Primary communications system for the ARTC controlled rail network and is mandatory for all operators to operate their locomotives using a NTCS ICE (In-Cabin Equipment) Unit as the primary communications device.

A standard ICE unit is installed with the following components

- Telstra NextG™ transceiver
- Iridium satellite transceiver
- UHF Radio
- GPS

The ICE unit primary communications is via the Telstra NextG™ and backup communications is provided via the Iridium Satellite network. The ICE unit will automatically call the Junee network control centre when the routine and emergency buttons are pressed.

The UHF radio is used for the Local train Radio - Train to Train and train to track side communications.

UHF Local Train Radio (LTR) frequency details

Frequency: 418.425 MHz (UHF),

Bandwidth: 12.5 KHz,

EIRP: 41W (remote/low density areas), 8.3W (medium & high density areas)

Tx CTCSS: 162.2 Hz

Rx CTCSS: 162.2 Hz

Selcall: disabled

Alternate Communication for this section is by mobile or satellite phones.

1.14 Wayside Monitoring Systems

Exeter (Up Main only) WCM, RAILBAM & Wheel Profile 155.400km

Joppa Junction (Up and Down Main) DED 230.295km

Robertson to Mt Murray Embankment Slip Detectors 123.231km, 123.275km & 123.540km

Dombarton Rockfall Detectors 99.082 – 99.110km & 99.344 – 99.641km &

Embankment Slip Detector 98.741km

WCM - Wheel Condition Monitor

RAILBAM – Bearing Acoustic Monitor

DED – Dragging Equipment Detector

1.15 Ruling Gradients

Berrima Junction to Moss Vale	1 in 75
Moss Vale to Berrima Junction	1 in 80
Moss Vale to Goulburn	1 in 66
Goulburn to Moss Vale	1 in 66
Goulburn to Demondrille	1 in 40
Demondrille to Goulburn	1 in 66
Demondrille to Harden	1 in 40
Harden to Demondrille	1 in 75
Moss Vale to Robertson	1 in 75
Robertson to Summit Tank	1 in 75
Summit Tank to Robertson	1 in 60
Summit Tank to Unanderra	All downhill
Unanderra to Summit Tank	1 in 30

1.16 Curve and Gradient Data

For all Curve and Gradient data, refer to the ARTC Internet.

https://extranet.artc.com.au/eng_network-config_cd.html

1.17 Drawing Legend

	Standard gauge track		Dual gauge track
	Advisory Sign or Location Sign		Speed sign
	Pedestrian Crossing		Passive Protection Level Crossing
	Active Protection Level Crossing – Flashing Lights		Active Protection Level Crossing – Lights and Boom
	Bridge or Overpass		Underpass
	River/Creek or Significant river bridge or Viaduct		Station or Platform
	Tunnel		Crossover
	Turnout		Catchpoint
	Derail		Points Operating Mechanism
	Point Indicator		Mechanical Frame
	Automatic Signals		Controlled Signals
	Dwarf Signals		Signal number reference
	Distant Signal		Repeater Signal
	Overheight Detectors		Wayside Equipment

2 Main South Line Locations and Sections Information

2.1 Berrima Junction (BRM)

General Arrangements

The Network Controller at NCCS co-ordinates all rail traffic movements to the Berrima Junction interface point from the ARTC network and controls the points and signals governing entry to and exit from the sidings.

Pacific National Enfield train control is responsible for all rail traffic from the Berrima Junction interface point to Omya Australia sidings, Ingham's siding and Berrima works.

The ARTC Network Controller and Pacific National Enfield Train Control provider must provide the estimated arrival times and other relevant information regarding rail traffic, to each other in order to facilitate the planning of train paths.

Refer interface agreement IA1227 for further details.

Rail Traffic Entering Blue Circle Southern Cement (BCSC) Sidings

The operator shall obtain permission from Pacific National Enfield train control prior to requesting access to the siding from ARTC.

The Network Controller at NCCS must provide the estimated arrival time of rail traffic at Berrima Junction to Pacific National Enfield Train Control and confirm the route to be taken into Berrima Junction Sidings.

Rail Traffic Entering the ARTC Network

Pacific National Enfield train control must provide the estimated time of arrival at Berrima Junction and other relevant information of rail traffic required to enter the ARTC Network to the Network Controller at NCCS.

Track Work Procedure

Pacific National Enfield train control provider must contact the Network Controller at NCCS if required, to apply blocking facilities to prevent access to Berrima Junction sidings.

Track Work staff will work in accordance with Pacific National Enfield Train Control direction.

Following completion of the work the BCSC train control provider must advise the ARTC Network Controller that the blocking facilities may be removed.

Operation of Points and Signals

The points and signals at Berrima Junction are controlled from NCCS.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of power-operated points in an emergency

All points worked from NCCS are electrically power-operated.

If these points fail to operate correctly, the Network Controller must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

The Emergency Switch Machine Lock (ESML) for 188 and 189 points is located on the wall of the Traffic Hut at Berrima Junction.

Signalling Power Supply Indicators**AC power supply**

Normal, Emergency and Fail power supply indicator lights are provided for the AC signalling power supplies in the Berrima Junction area.

The green "Normal" indication will be displayed when all the AC power supplies are available.

The yellow "Emergency" indication will be displayed when there is a partial failure of some part of the power supply or when the motor generator is in operation.

The red "Fail" indication will be displayed when a total failure of some part of the power supply has occurred.

DC power supply

Normal, Warning and Fail power supply indicator lights are provided for the DC signalling power supplies in the Berrima Junction area.

The green "Normal" indication will be displayed when all the DC power supplies are available.

The yellow "Warning" indication will be displayed when there is a partial failure of some part of the power supply.

The red "Fail" indication will be displayed when a total failure of some part of the power supply has occurred.

General instructions

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

When there is any alteration or interruption to the AC or DC power supplies, the Network Controller must promptly inform the Signals maintenance representative.

Emergency generator

The emergency AC power supply at Berrima Junction will be connected after a short delay (normally about 10 seconds, but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

If the motor generator set is operating for an extended period, the red "Fail" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

Signal lamp indicators

When a filament failure occurs a “Signal Lamp Filament Fail” indicator alarm will appear on the Phoenix screen at NCCS.

When the indicator alarm is displayed, the Network Controller must promptly inform the Signals maintenance representative.

2.2 Moss Vale Junction (MVJ)

General Arrangements

Moss Vale Junction is the location where the branch line to Unanderra joins the Sydney to Melbourne line.

Inspection Road length 604m

Operation of Points and Signals

The points and signals at Moss Vale Junction, North Fork and Inspection Road are operated from NCCS.

Operation of Power-operated Points in an Emergency

Operation of power operated points in an emergency will be in accordance with ARTC Network Rules and Procedures.

ESML cabinets for the points at Moss Vale Junction are located on the Down side on the Main line at the junction.

The Signals maintenance representative must be promptly advised of any failure.

Shunting Limit Boards

Two shunting limit boards are provided at Moss Vale Junction. The boards are located as follows:

Down main line

On the Down side of the Down main line near 110B catchpoints. This board is inscribed "Limit of shunt on Down main line" and applies to shunting movements in the Up direction on the Down main line.

Branch line

Midway between 128A points and Down home branch signals MV21 and MV23. This board is inscribed "Shunting limit in Up direction" and applies to shunting movements in the Up direction on the branch line towards Calwalla.

Stop Boards

A notice board inscribed "STOP" is located on the Up side of the Inspection road near 110B catchpoints.

Suttor Road Level Crossing

Type F flashing lights and bells are provided at Suttor Road level crossing at 149.936km.

The warning equipment is automatically controlled by track circuit for Down and Up trains, subject to the clearance of the signals on each side of the crossing.

If a train closely approaches Down home signal MV21 or Up home/starting signal MV26 or MV24 at stop, the setting of the applicable signal route will cause the level crossing warning indicators to be displayed but clearing of the signals will be delayed for 15 seconds.

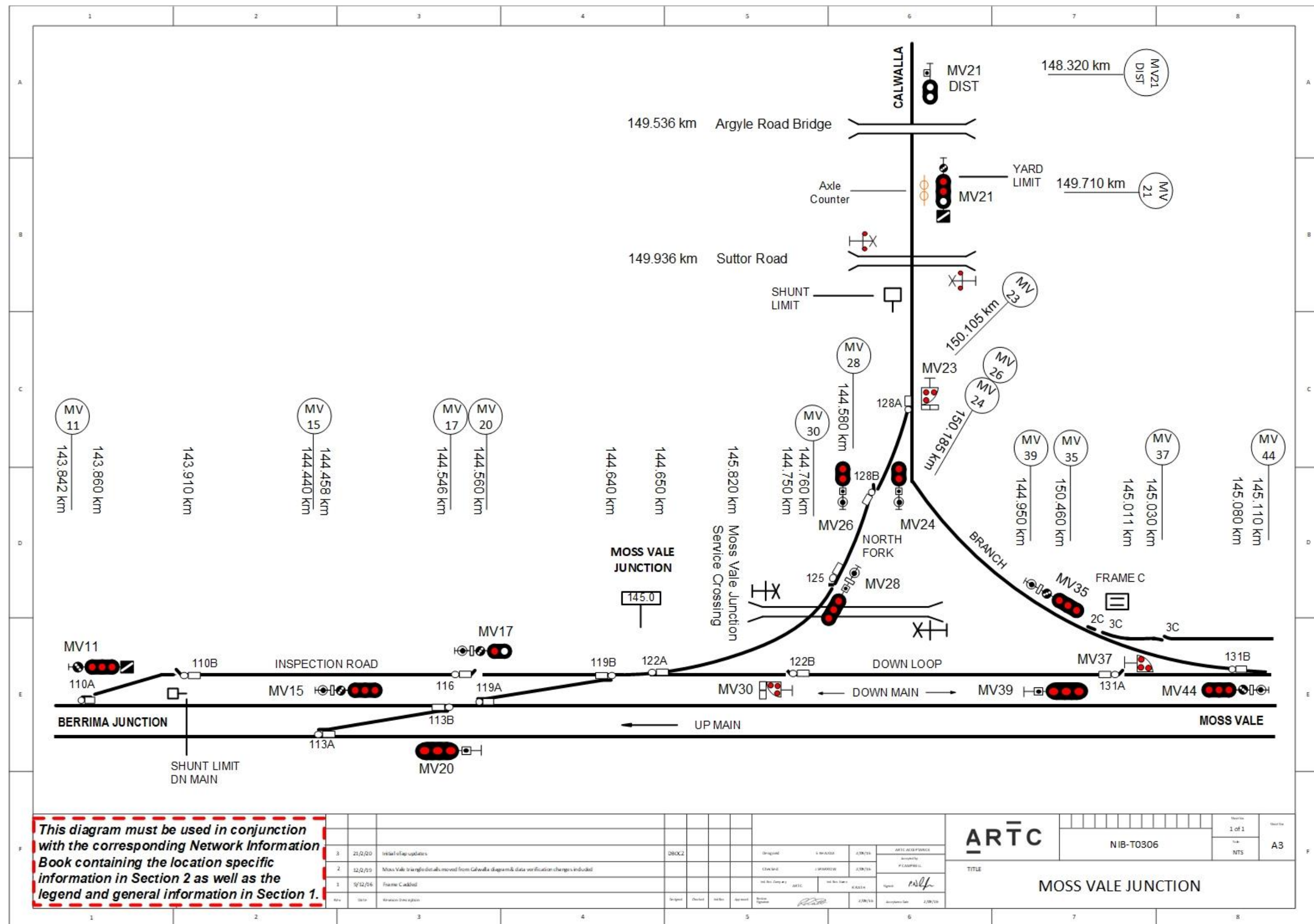
If it becomes necessary to hold a train at signal MV21, MV26 or MV24 after the signal has been cleared, the level crossing warning indicators will continue to be displayed for a period of 120 seconds after the signal is returned to stop and will then cancel automatically.

Special arrangements if there is a failure of the signals protecting Suttor Road level crossing

Main South Line Locations and Sections Information

If Down home signal MV21 or Up home/starting signal MV26 or MV24 fails, the Network Controller NCCS must not authorise a train to pass these signals at stop until:

- either the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the Handsignaller(s) at the level crossing that the road traffic is clear of the crossing.



2.3 Moss Vale (MVL)

Siding lengths

Inspection Road	604m	
North Fork	461m	
Inspection Road + North Fork	1038m	
Down Loop	260m	
Inspection Road + Down Loop	1094m	
Down Refuge (clear of Branch)	591m	
Down Loop + Down Refuge	1060m	
Inspection Road + Down Loop + Down Refuge	1894m	
Up Refuge	380m	
Up Refuge + Dead End	440m	

No 2 Branch Siding, No 3 Branch Siding and Stock Siding are leased to Pacific National. Refer interface agreement IA1225 for further details.

Operation of Points and Signals

The points, frame releases and signals at Moss Vale are operated from NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Authority to shunt within Moss Vale Up Yard

An operating agreement for Moss Vale Up Yard requires all rail movements within Moss Vale yard to be authorised by the Station/Duty Manager, Moss Vale station.

As a result, train crews must contact the Station/Duty Manager via WB radio prior to shunting within any portion of Moss Vale Up yard bounded by D and E frames. This also includes departures from the Endeavour Storage sidings.

The Network Controller NCCS is required to contact the Station/Duty Manager prior to allowing rail traffic entry to the Up yard via D or E frames.

Train crews entering the Up yard via D or E frame must stop clear before the first set of non-interlocked points when entering the yard to confirm authority to proceed from Station/Duty Manager via WB radio.

Train crews will remain in charge of setting designated/required routes and points for shunting movements within the yard.

For trains departing the Up yard requiring the operation of D or E frames, crews will continue to operate these frames as normal, however permission must still be obtained from the Network Controller NCCS to operate D and E frames and depart the UP yard.

Station/Duty manager may also be contacted via mobile phone on 0466 544 029

Ground Frames**Frame C**

Frame C is located on the Up side of the Branch line adjacent to the points and provides access to Nos 1 and 2 Branch sidings.

Frame C is unlocked by a key from releasing switch C, which is electrically released by 134 from NCCS.

Frame D

Frame D is located on the Up side of the Up Refuge siding adjacent to the points and provides access to Nos 1 and 2 Storage sidings and the car siding.

Frame D is unlocked by a key from releasing switch D, which is electrically released by 150 from NCCS.

Frame E

Frame E is located on the Up side of the Shunting neck adjacent to the Down loop line and provides access to the Storage sidings.

Frame E is unlocked by a key from releasing switch E, which is electrically released by 146 from NCCS.

Frame F

Frame F is located on the Down side of the Down refuge loop adjacent to the points and provides access to the Goods siding.

Frame F is unlocked by a key from releasing switch F2, which is electrically released by 155 from NCCS.

Signalling Power Supply Indicators

All signal power alarms will be indicated via the Phoenix control system at NCCS.

Normal, Emergency, Alarm and Fail power supply indicator lights are provided on the Phoenix control panel in NCCS for the power supplies in the Moss Vale area.

General instructions

An alarm will show on the Phoenix Screen to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

When there is any alteration or interruption to the AC or DC power supplies, the Network Controller must promptly inform the Signals maintenance representative.

Emergency generators

The emergency AC power supply at Moss Vale will be connected after a short delay (normally about 10 seconds, but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

If the motor generator set is operating for an extended period, the red "Fail" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Restrictions for when brake examinations on trains in the Up and the Down refuge sidings are taking place

Brake examinations will be carried out in accordance with ARTC Network Rules and Procedures.

Yarrawa Street Level Crossing

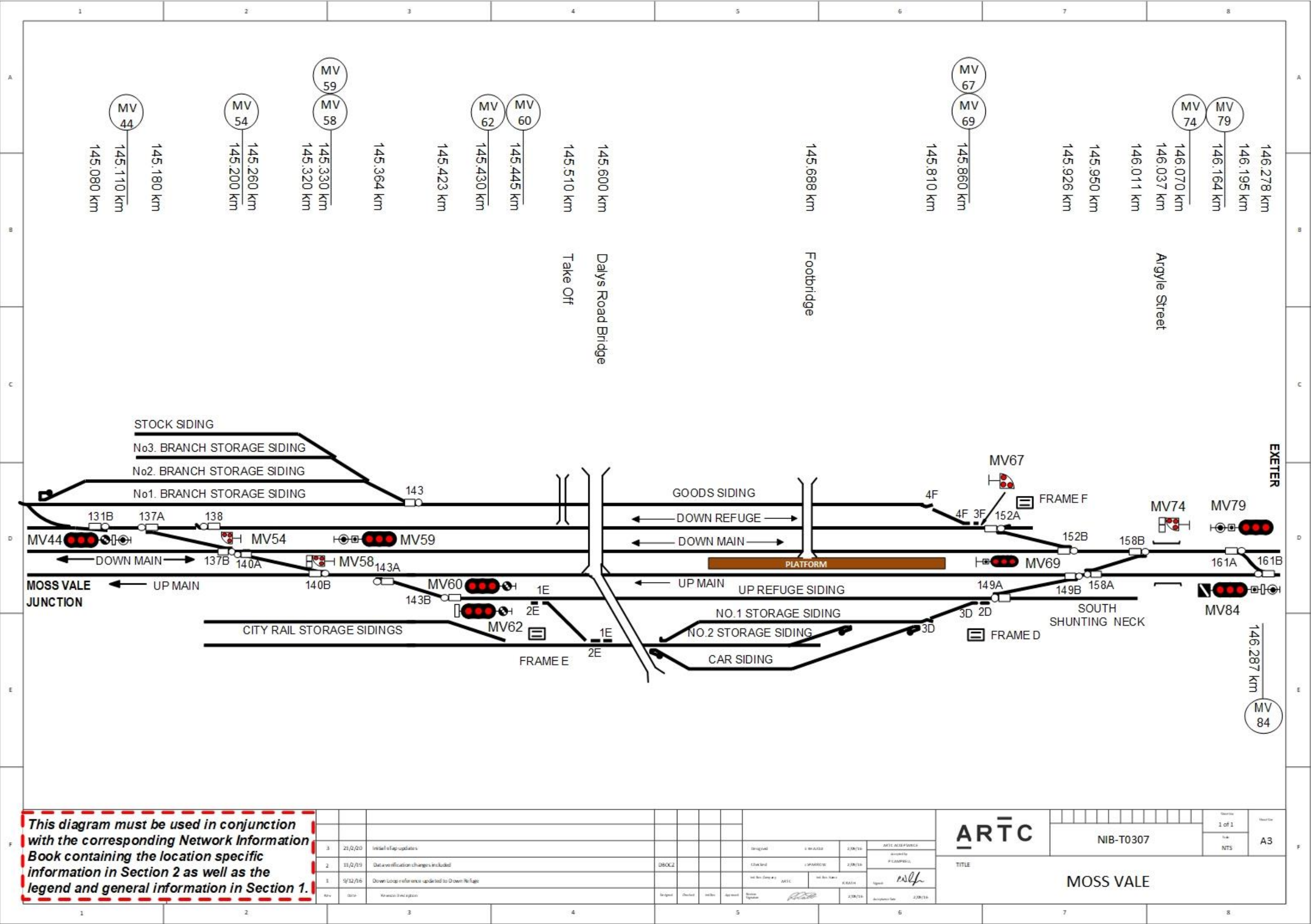
Pedestrian barriers, lights and audible warning device are provided at Yarrawa Street level crossing at 146.893km.

The warning equipment is operated by track circuits for Up and Down trains.

Half pilot staff for the Calwalla – Moss Vale section

A half pilot staff is provided in a pilot staff lock inside a locked box next to the Up home/starting signal for the Moss Vale – Calwalla section.

The half pilot staff for the Moss Vale – Calwalla section is inscribed, "Moss Vale branch – MV24 / MV26".



2.4 Exeter (EXT)

Operation of Points and Signals

The signals at Exeter are operated by NCCS.

Exeter Pedestrian Level Crossing

Pedestrian boom barriers, sirens, and red "Don't Walk" lights are provided at Exeter pedestrian level crossing at 155.825km.

For Down trains the activation strike point and Crossing Approach Warning sign are located at 154.588km. For Up trains the activation strike point and Crossing Approach Warning sign are located at 157.186km.

Rail traffic must not accelerate between the trackside sign advising approach to a Type F level crossing fitted with predictor circuitry and the level crossing. Where a train stops within the approach to the crossing the driver must not increase speed above 25km/h until the train passes the crossing.

Wayside Equipment

The following wayside equipment is installed at 155.400km on the Up Main line.

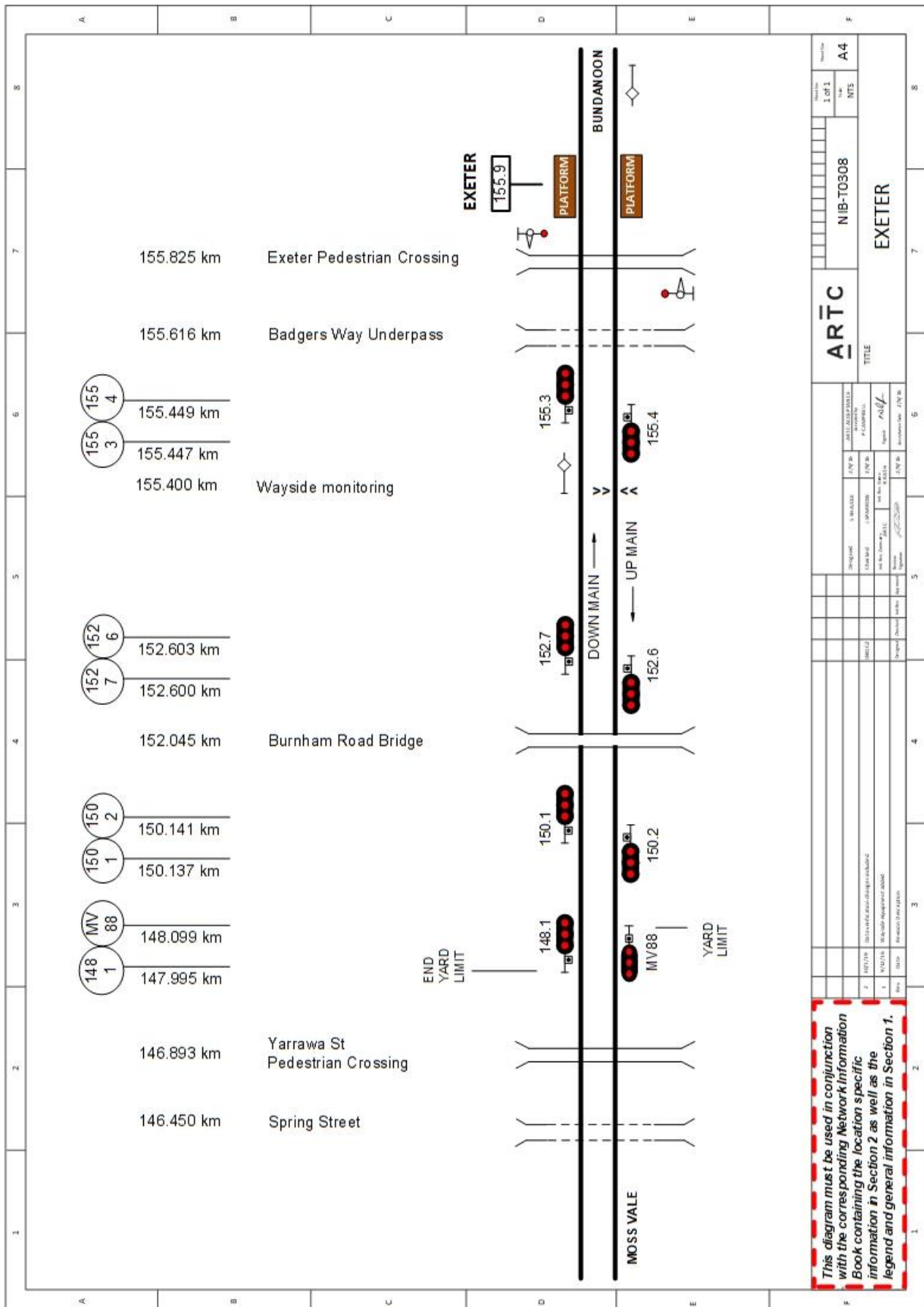
Device	Description
WCM	Wheel Condition Monitor
Wheel Profile	Monitors wheel profiles. This system records wheel profile information but does not notify alarms to the Network Controller.
RAILBAM	Bearing Acoustic Monitor. Used to detect trending rail wheel bearing faults and emergency withdrawals from service. This system does not notify alarms to the Network Controller.

Responding to a wayside equipment alarm

When the alarm box is displayed on the Wayside Detector screen, the Network Controller must:

- acknowledge the alarm
- contact the Driver of the train that activated the detector and instruct the Driver to immediately bring the train to a stand
- advise the Driver to inspect the train to identify the problem and to advise the Network Controller of the status of the problem and the action that must be taken to resolve it

Main South Line Locations and Sections Information



2.5 Bundanoon (BUN)

Siding length 420m

Operation of Points and Signals

The ground frame releases at Bundanoon are operated by NCCS.

The 3B facing crossovers are operated by Frame B which is released by Fortress Key from Releasing Switch B located adjacent to Frame B. The release for Releasing Switch B is provided remotely by 100 release at NCCS. Removal of the Fortress Key from the releasing switch will place automatic signals 158.3 and 160.7 on the Down Main line, along with 162.4 and 165.6 on the Up Main line at stop. The 'A' light on 160.7 and 162.4 signals will also be extinguished.

The trailing crossover 2C points and Up Refuge siding 4C points are operated from Frame C. The trailing crossover points, 2C are released by Fortress Key from Releasing Switch C1. The release for Releasing Switch C1 is provided remotely by 101 release at NCCS. Removal of the Fortress Key from Releasing Switch C1 will place automatic signals 160.7 and 162.3 on the Down Main line, along with 162.4 and 165.6 on the Up Main line at stop. The 'A' light on 162.3 and 162.4 signals will also be extinguished. The Up Siding points, 4C are released by Fortress Key from Releasing Switch C2. The release for Releasing Switch C2 is provided remotely by 102 release at NCCS. Removal of the Fortress Key from Releasing Switch C2 will place automatic signals 162.4 and 165.6 on the Up Main at stop. The 'A' light in 162.4 signal will also be extinguished.

Bundanoon Pedestrian Level Crossing at 162.182 km

Pedestrian boom barriers and red stop lights are provided at the pedestrian level crossing at the Exeter end of the platforms.

NOTE: *The warning bell will only ring while the pedestrian boom is descending.*

The warning equipment is automatically controlled by track circuit for Down and Up trains, subject to the clearance of the signals on either side of the crossing. The equipment is also manually controlled by operator's pushbutton switches for shunting movements.

For Down trains the activation strike point and Crossing Approach Warning sign is located at 160.473km. For Up trains the activation strike point and Crossing Approach Warning Board is located at 163.780km. The Crossing Approach Warning sign are blue-edged to indicate an approach electronically controlled (predictor) level crossing.

Rail traffic must not accelerate between the trackside sign advising approach to a Type F level crossing fitted with predictor circuitry and the level crossing. Where a train stops within the approach to the crossing the driver must not increase speed above 25km/h until the train passes the crossing.

For shunting movements that will obstruct the pedestrian crossing 'Shunter's Push Buttons' are provided adjacent to the pedestrian crossing and Frame C. The crossing warning equipment will operate automatically when the train departs the siding and enters the Up Main Line. The crossing warning equipment will cease to operate automatically when the rear of the shunting movement has cleared the pedestrian crossing. If the shunting movement is not performed, the pedestrian crossing warning equipment must be cancelled by pressing the 'CANCEL' button for one second in either of the shunter's push button boxes. The crossing warning equipment can also be activated by pressing the 'START' button for one second in either of the shunter's push button boxes.

Main South Line Locations and Sections Information

If a train closely approaches 160.7 Down home signal at stop, or 162.4 Up home signal at stop, an attempt to clear the signals will cause the level crossing warning indications to be displayed but the signals will not clear until the booms are horizontal.

Operator's pushbutton units

Two operator's pushbutton units are provided in boxes inscribed "Shunter's switch", one attached to a post located on the Exeter side of the pedestrian crossing and one in the signalbox.

If the movement is not proceeded with, the warning indications must be cancelled by pressing the "Cancel" pushbutton in either operator's pushbutton unit for one second.

The operator's pushbutton unit must be kept closed and secured by an SL lock when not in use.

NOTE: *If the "Start" pushbutton has been pressed and a passing Up main line train has just cleared the level crossing and the boom barriers have started to rise, there will be a delay of 15 seconds from the time the booms reach the vertical position until the stop lights, bell and boom barriers again commence to operate.*
Failure of the level crossing warning equipment to cancel after the passage of a shunting movement on the Down main line may be caused by the approach of an Up main line train.

Special arrangements if there is a failure of the signals protecting Bundanoon pedestrian level crossing

If either Down home signal 160.7 or Up home signal 162.4 fails, the Network Controller must not authorise a train to pass these signals at stop until either:

- the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the Handsignaller(s) at the level crossing that the road traffic is clear of the crossing.

Shunting Arrangements

Shunting in the Up direction on the Down main line or shunting from the Down main line to the Up main line over 3B crossover.

For a shunting movement in the Up direction on the Down main line, the Rail Traffic Crew must depress the "Start" pushbutton in the operator's pushbutton unit adjacent the pedestrian level crossing for one second before handsignalling the movement to proceed.

For a shunting movement from the Down main line to the Up main line over 3B crossover, the shunting movement must be brought to a stand at the Exeter end of the crossover and the pushbutton depressed. The train must then be handsignalled over the crossover onto the Up main line.

In both cases, the level crossing warning equipment will automatically cancel when the rear of the train clears the level crossing.

NOTE: *As there is no time release provided for the Down main line, No. 100 release cannot be given to release 3B points if a train is standing on the track circuit for 3B points.*

Shunting in the Down direction on the Up main line or shunting from the Up main line to the Down main line over 3B crossover

For a shunting movement in the Down direction on the Up main line, or towards the Down main line via 3B crossover, the Rail Traffic Crew must depress the "Start" pushbutton in the operator's

Main South Line Locations and Sections Information

pushbutton unit adjacent the pedestrian level crossing for one second before handsignalling the movement to commence.

When the rear of a shunting movement in the Down direction on the Up main line has cleared the level crossing on the Up main line, the Rail Traffic Crew must depress the "Cancel" pushbutton for one second.

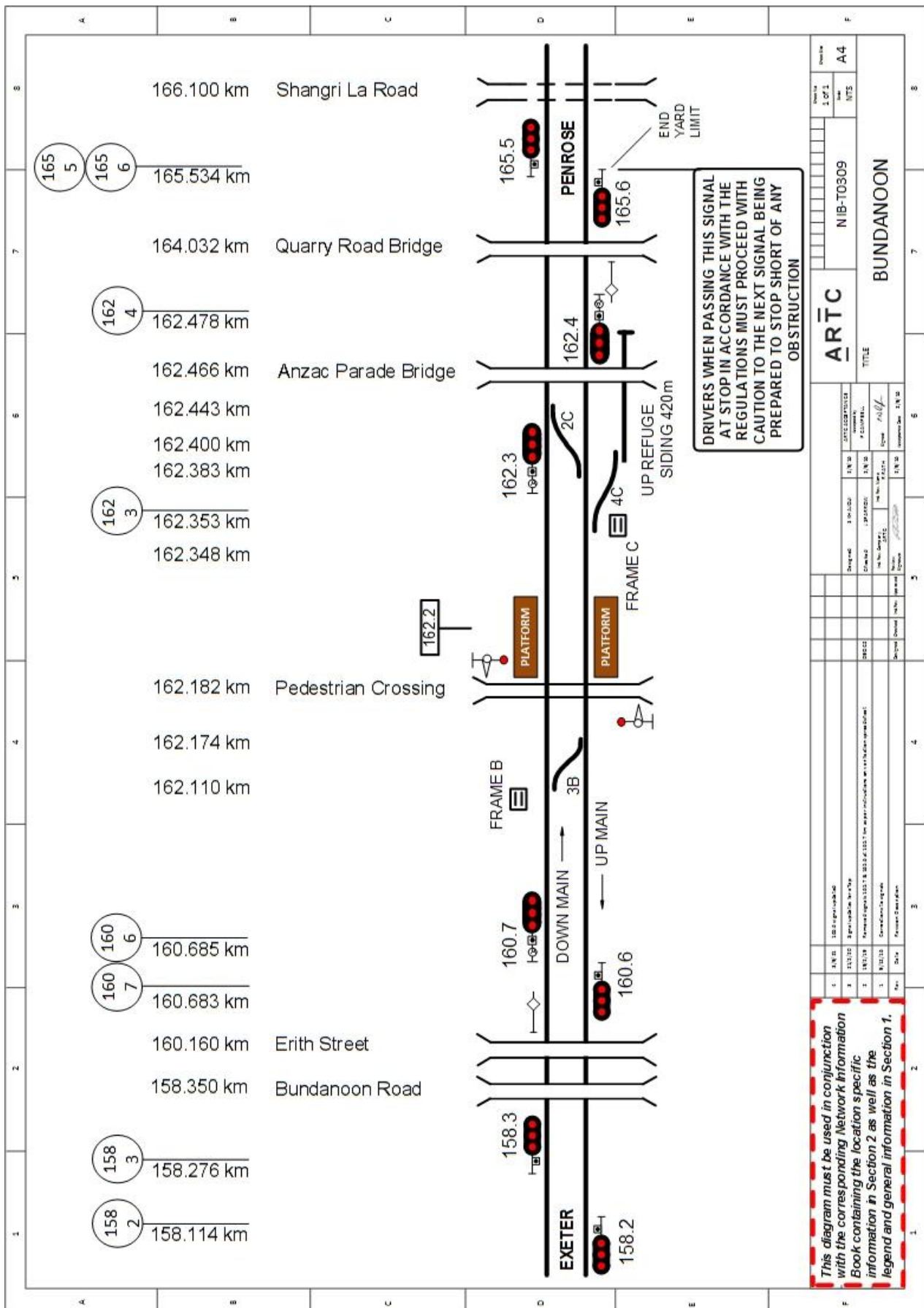
In the case of a movement from the Up main line towards the Down main line via 3B crossover, the warning indications will cancel automatically.

Signalling Power Supply Indicators

An alarm will show on the Phoenix Screen to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

When there is any alteration or interruption to the power supply, the Network Controller must promptly inform the Signals maintenance representative.

Main South Line Locations and Sections Information



2.6 Penrose (PRS)

The signals at Penrose are operated by NCCS.

Signal numbers PE1 and PE2 are designated as Home/Starting signals.

Yard Limits

Down Main

The yard limits on the Down Main are PE1 signal (167.844km) to 170.9 signal (171.000km).

Up Main

The yard limits on the Up main are PE2 signal (167.846km) to 165.6 signal (165.534km).

An advisory sign is provided at signal 165.6 (165.534km) stating, "Drivers when passing this signal at stop according to the regulations, must proceed with caution to the next signal, being prepared to stop short of any obstruction."

Penrose Pedestrian Crossing 171.350km

For Down trains the activation strike point and Crossing Approach Warning Board are located at 169.782km. For Up trains the activation strike point and Crossing Approach Warning Board are located at 173.156km. The Crossing Approach Warning Boards are blue-edged to indicate an approach electronically controlled (predictor) level crossing.

Drivers must maintain and not accelerate train speed when in the approach to Penrose pedestrian crossing.

2.7 Wingello (WGO)

Wingello has a goods siding and down refuge siding.

Up Goods Siding length 130m

Down Refuge length 390m (Leased to Pacific National refer interface agreement IA1225 for further details)

Operation of Points and Signals

The groundframe releases at Wingello are operated by NCCS.

Ground Frames

Lever B

Lever B is located on the Up side of the Up main line adjacent to the crossovers and provides access to the goods siding.

Lever B is released by a Fortress Key from Releasing Switch B located adjacent to Lever B. The release for Releasing Switch B is provided remotely by 110 release at NCCS. Removal of the Fortress Key from the releasing switch will place automatic signals 178.6 and 180.8 on the Up Main at stop. The 'A' light on 178.6 signal will also be extinguished.

Frame E (Down Refuge siding) will be released by a Fortress Key from Releasing Switch E located adjacent to Frame E. The release for Releasing Switch E is provided remotely by 113 release at NCCS. Removal of the Fortress Key from the releasing switch will place automatic signals 173.5 and 176.3 on the Down Main at stop. The 'A' light on 176.3 signal will also be extinguished.

Facing and Trailing Crossovers

Facing and trailing crossovers are provided between the Down and the Up main lines at the Bundanoon end of the yard.

The facing crossover is operated by frame D, which is located on the Up side of the Up main line between lever B and frame C and is secured by point clip and SL lock when not in use.

The trailing crossover is operated by frame C, which is located on the Up side of the Up main line opposite the points and is not secured with a point clip and SL lock when not in use.

Frame C (trailing crossover) and Frame D (facing crossover) are released by a Fortress Key from Releasing Switch CD located near Frames C and D. The release for Releasing Switch CD is provided remotely by 111 release at NCCS. Removal of the Fortress Key from the releasing switch will place automatic signals 173.5 and 176.3 on the Down Main, along with 178.6 and 180.8 on the Up Main at stop. The 'A' light on 176.3 and 178.6 signals will also be extinguished. Facing point locks are provided on the points at both ends of the crossovers and are locked in both the normal and the reverse positions. It is unnecessary to clip and lock the points when using either crossover, provided that the facing point lock lever is in the normal position.

Wingello Level Crossing

Type F flashing lights and bells and half-boom barriers are provided at Wingello level crossing at 177.219km.

The warning equipment is automatically controlled by track circuit for Down and Up trains, subject to the clearance of the signals on each side of the crossing.

Main South Line Locations and Sections Information

For Down trains the activation strike point and Crossing Approach Warning sign is located at 175.307km. For Up trains the activation strike point and Crossing Approach Warning Board is located at 178.679km. The Crossing Approach Warning signs are blue-edged to indicate an approach electronically controlled (predictor) level crossing.

Rail traffic must not accelerate between the trackside sign advising approach to a Type F level crossing fitted with predictor circuitry and the level crossing. Where a train stops within the approach to the crossing the driver must not increase speed above 25km/h until the train passes the crossing.

For shunting movements that will obstruct the level crossing 'Shunter's Push Buttons' are provided adjacent to the level crossing and Frame E. The crossing warning equipment will operate automatically when the train departs the siding and enters the Down Main Line. The crossing warning equipment will cease to operate automatically when the rear of the shunting movement has cleared the crossing. If the shunting movement is not proceeded with, the crossing warning equipment must be cancelled by pressing the 'CANCEL' button for one second in either of the shunter's push button boxes. The crossing warning equipment can also be activated by pressing the 'START' button for one second in either of the shunter's push button boxes.

If a train closely approaches Up home signal 178.6 or Down home signal 176.3 at stop, the setting of the applicable signal route will cause the level crossing warning indicators to be displayed, but clearing of the signals will be delayed for 15 seconds.

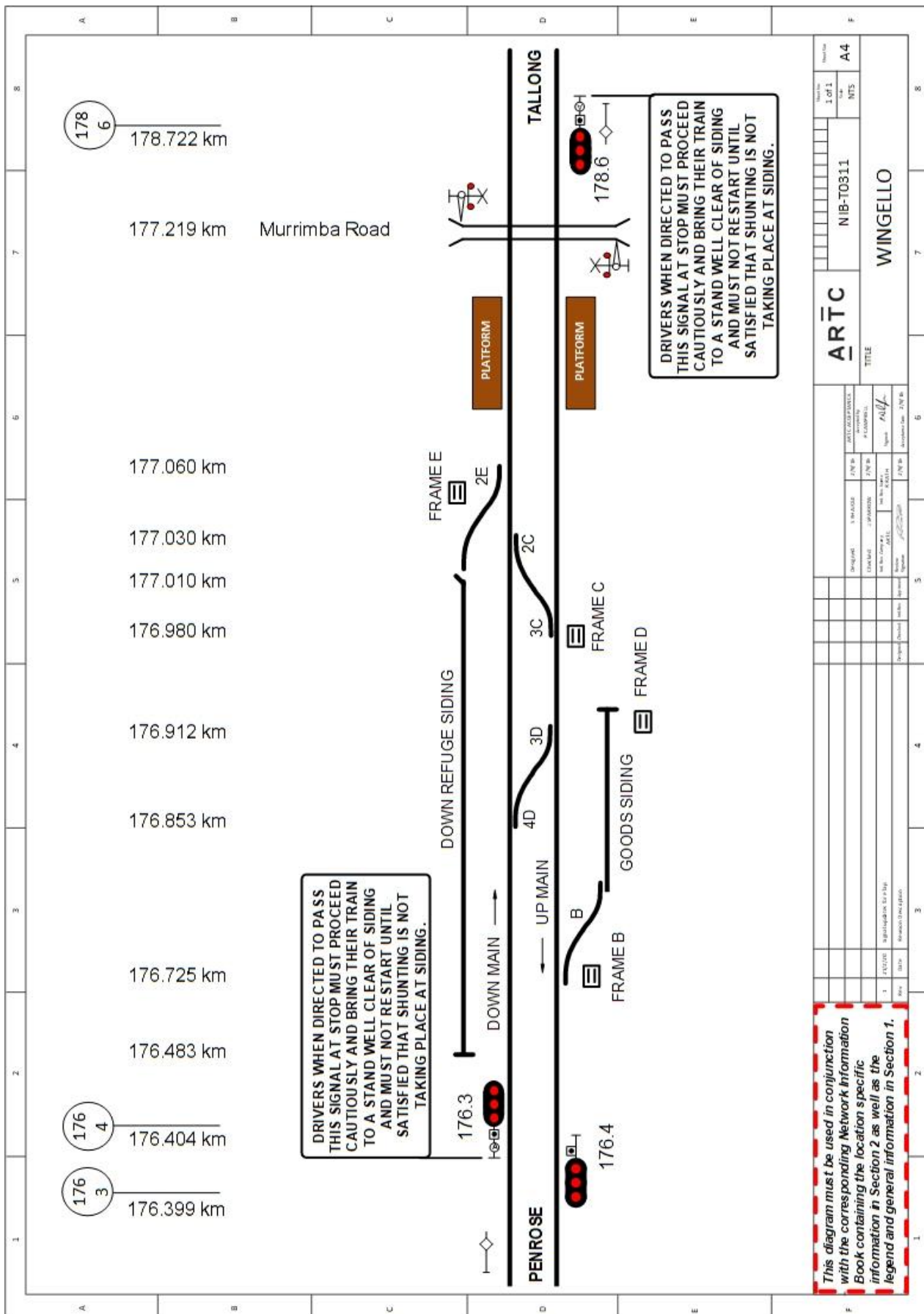
If it becomes necessary to hold a train at signal 178.6 or 176.3 after the signal has been cleared, the level crossing warning indicators will continue to be displayed for a period of 120 seconds after the signal is returned to stop and will then cancel automatically.

Special arrangements if there is a failure of the signals protecting Wingello level crossing

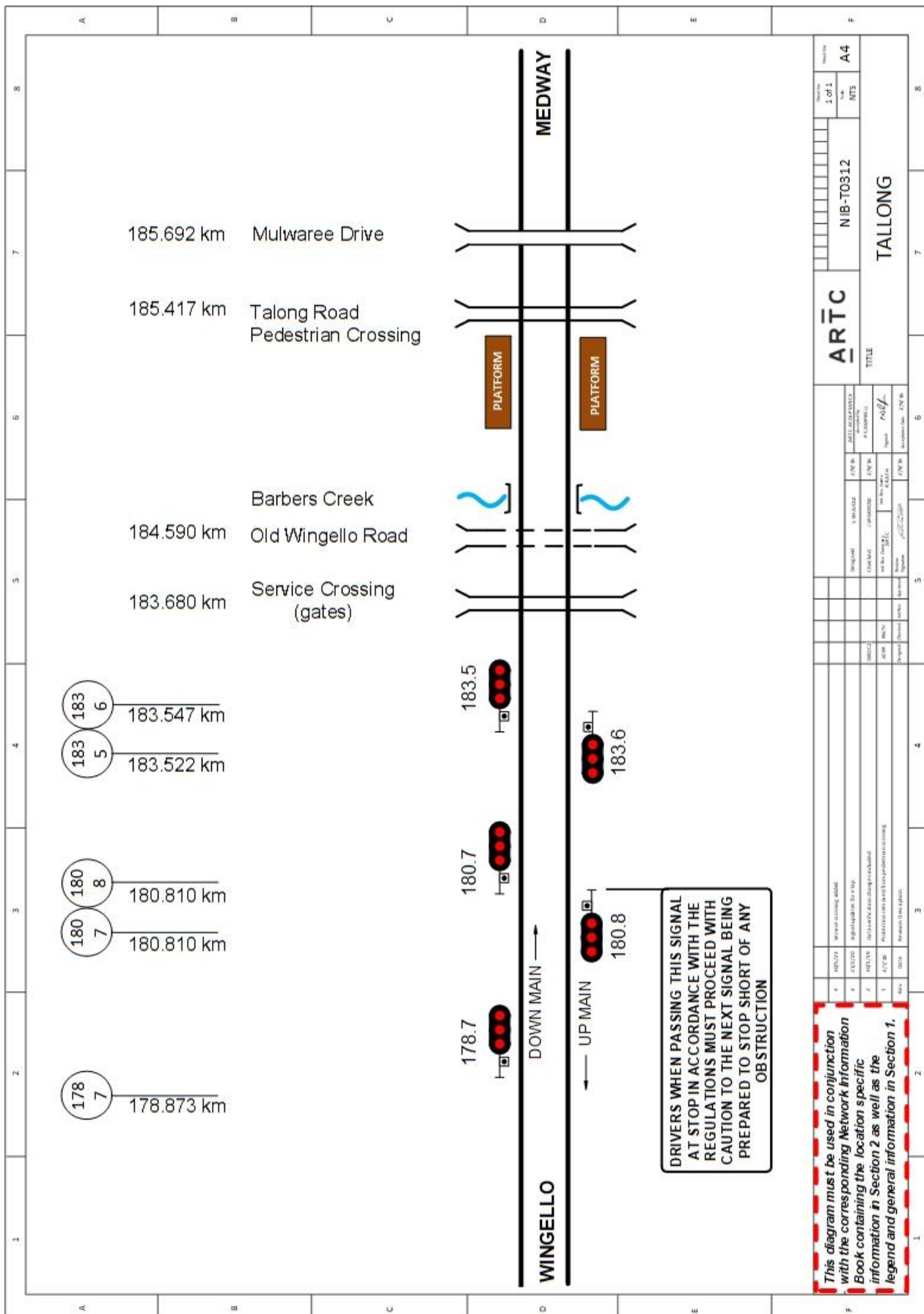
If either Up home signal 178.6 or Down starting signal 176.3 fails, the instructions for failed level crossings must be carried out.

The Network Controller must not authorise a train to pass these signals at stop until:

- either Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the Handsignaller(s) at the level crossing that the road traffic is clear of the crossing.



Main South Line Locations and Sections Information



2.8 Medway (MEJ)

General Arrangements

The Network Controller at NCCS co-ordinates all rail traffic movements to the Medway Junction interface point from the ARTC network and controls the points and signals governing entry to and exit from the sidings.

Pacific National Enfield Train Control is responsible for all rail traffic from the Medway Junction interface point to towards Marulan Quarry.

The ARTC Network Controller and Pacific National Enfield Train Control must provide the estimated arrival times and other relevant information regarding rail traffic, to each other in order to facilitate the planning of train paths.

Refer interface agreement IA1222 for further details.

Rail Traffic Entering BCSC Sidings at Medway Junction

The operator shall obtain permission from Pacific National Enfield Train Control prior to requesting access to the sidings from ARTC.

The Network Controller at NCCS must provide the estimated arrival time and other relevant information of rail traffic at Medway Junction to Pacific National Enfield Train Control.

Rail Traffic Entering the ARTC Network

Pacific National Enfield Train Control must provide the estimated time of arrival at Medway Junction and other relevant information of rail traffic required to enter the ARTC Network to the Network Controller at NCCS.

Track Work Procedure for Work in the BCSC Sidings at Medway Junction and the BCSC Line between Medway Junction and Medway Quarry Stop Board:

Track work in the BCSC sidings and the BCSC line between Medway and Medway Quarry Stop Board will be performed under the ARTC NSW Rules & Procedures.

Track work staff will contact Pacific National Enfield Train Control and advise the location of the work and the expected duration of the work. BCSC train control provider will contact the Network Controller at NCCS if required, to apply blocking facilities to prevent access to Medway Junction sidings.

Following completion of the work the Pacific National Enfield Train Control must advise the ARTC Network Controller that the blocking facilities may be removed.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power-operated Points in an Emergency

Nos. 51 and 52 points worked from the NCCS are electrically power-operated.

If these points fail to operate correctly, the Network Controller must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

Main South Line Locations and Sections Information

The Signals maintenance representative must be promptly advised of the circumstances.

Signalling Power Supply Indicators

An alarm will show on the Phoenix Screen to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

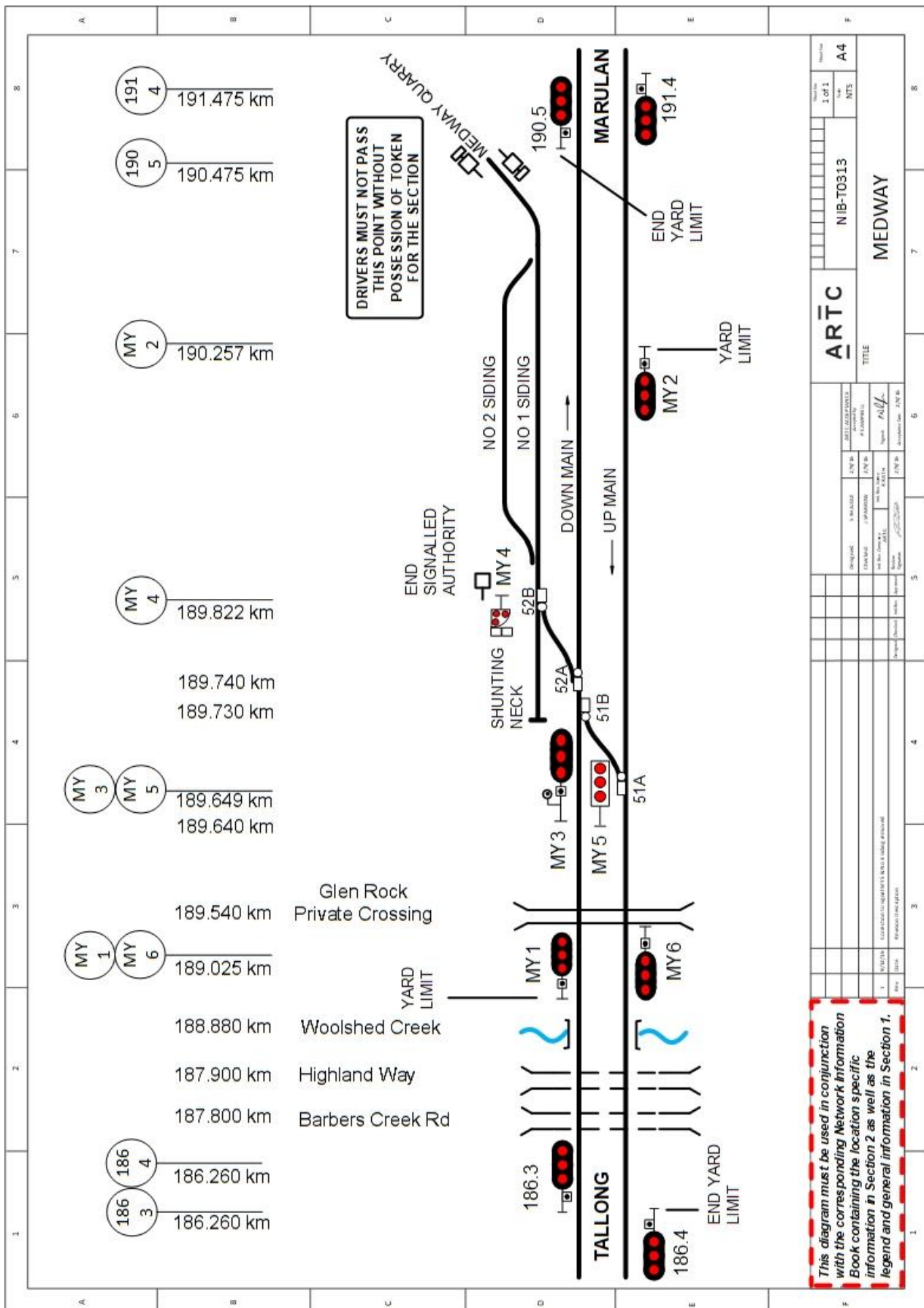
When there is any alteration or interruption to the AC or DC power supplies to the signalling, the Network Controller must promptly inform the Signals maintenance representative.

Additional Indicators

Signal lamp indicators

When a filament failure occurs a "Signal Lamp Filament Fail" indicator alarm will appear on the Phoenix screen at NCCS.

When the indicator alarm is displayed, the Network Controller must promptly inform the Signals maintenance representative.



2.9 Marulan (MAR)

General Arrangements

Goods Siding 317m

Releasing switches BC and DE, pedestrian level crossing testing and emergency switches are located on the Up side of the Up main line at the Goulburn end of Marulan station.

Ground Frames

Ground Frames have releasing switches on site with Annett keys locked with SL locks.

Lever B

Lever B is located on the Down side of the Goods siding adjacent to the crossovers and provides access from the Down main line to the Goods siding.

Lever B is unlocked by a key from releasing switch BC.

Lever D

Lever D is located on the Up side of the Up main line adjacent to the crossover. The trailing crossover is located between the Down main line and the Up main line.

Lever D is unlocked by a key from releasing switch DE.

WARNING: Facing point locks are not provided on the points at either end of lever D crossover, and the Qualified Worker operating the points must ensure that the points are secured in either the normal or the reverse position by a point clip and SL lock.

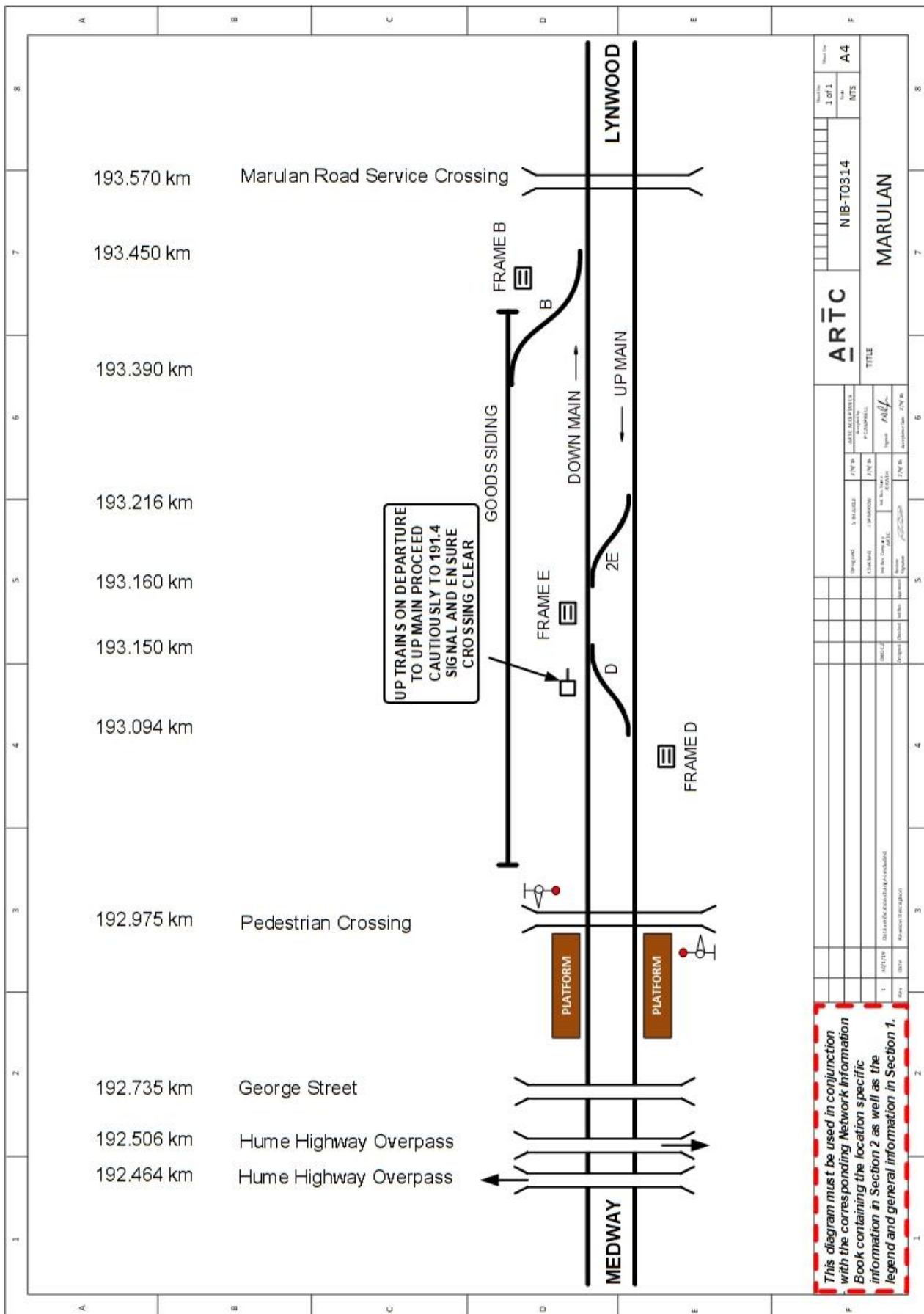
Emergency Crossover (Frame E)

Facing emergency crossover (frame E) is located between the Up main line and the Down main line at Marulan.

The crossover is operated by frame E, which is located on the Down side of the Down main line next to the crossover.

When the crossover is not in use, the points at each end of the crossover must be secured by a point clip and XL lock in the normal position.

Main South Line Locations and Sections Information



2.10 Lynwood Siding (LNW)

Operation of Points and Signals

Permission from Lynwood Quarry Siding operator must be obtained for rail traffic to enter this siding. The points and signals to enable entry from the main line are then operated by NCCS.

As a local panel is not provided at Lynwood, the interlocking cannot be operated locally.

The power operated points 61A, 61B, 62A, and 62B are controlled by track circuits and cannot be moved until the track circuit(s) controlling the points are unoccupied.

The points on the run-around within the Lynwood Siding are operated locally by throw over levers and are non-interlocked.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power operated Points in an Emergency

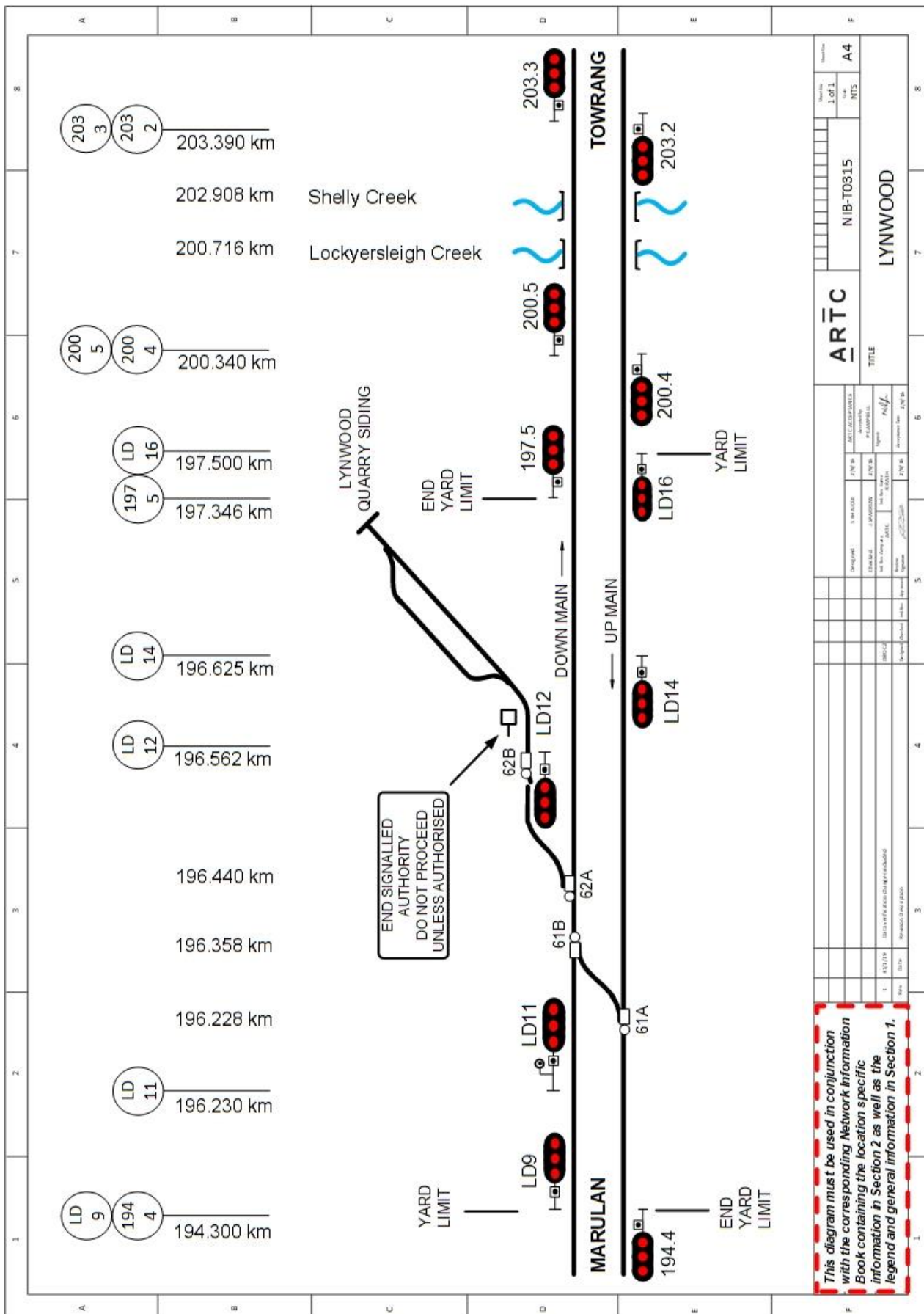
Points 61A, 61B, 62A, and 62B are electrically powered, controlled and operated from NCCS.

If these points fail to operate correctly, they may be operated manually in accordance with the network procedure ANPR 743 Manually Operating Hand throw Electric Points.

Signs

Signs inscribed "END SIGNALLED AUTHORITY" and "DO NOT PROCEED UNLESS AUTHORISED" are provide adjacent to the catchpoints at the entry to Lynwood Siding. For Down direction rail traffic the signs are located at 196.521km.

Main South Line Locations and Sections Information



2.11 Towrang (TOW)

Perway Siding 230m

Operation of Points and Signals

The signals at Towrang are operated by track circuits.

Ground Frames

Ground Frames are operated via Annetts Keys held in the provisioning centre at Goulburn.

Frame B

Frame B is located on the Down side of the main line adjacent to the points and provides access to the Perway siding.

2.11.1 Mills Road Level Crossing 208.571km

General Operational Arrangements

The Level Crossing is configured as a Predictor Level Crossing in both the Up and Down Directions, rail traffic must not accelerate after passing the approach trackside warning sign in accordance with ANGE 216 Level Crossings.

The level crossing will cease to operate when the rail traffic clears the level crossing.

Level Crossing Approach Warning Signs:

Installed on the Down Main at 206.572km

Installed on the Up Main at 210.175km

Up Direction Rail Vehicles on Up Main approaching 208.8 signal at stop

Rail Vehicles approaching 208.8 signal at stop will activate the crossing after passing the approach trackside warning signs. After 15 seconds of the Rail Vehicle coming to a stand at 208.8 signal, Mills Rd level crossing will recover.

Drivers to pass signal 208.8 at stop in accordance with ARTC Network Rule

ANSG 608 Passing signals at STOP

Rail Vehicle movements towards Mills Rd level crossing will reactivate the level crossing.

2.11.2 Murrays Flat Rd Level Crossing 216.235km

General Operational Arrangements

The Level Crossing is configured as a Predictor Level Crossing in both the Up and Down Directions, rail traffic must not accelerate after passing the approach trackside warning signs in accordance with ANGE 216 Level Crossings.

The level crossing will cease to operate when the rail traffic clears the level crossing.

Level Crossing Approach Warning Signs:

Installed on the Down Main at 214.394km

Installed on the Up Main at 218.155km

Up Direction Rail Vehicles on Up Main approaching 217.6 Signal at stop

Rail Vehicles approaching 217.6 signal at stop will activate the crossing after passing the approach trackside warning signs. After 15 seconds of the Rail Vehicle coming to a stand at 217.6 Signal, Murrays Flat Rd level crossing will recover.

Drivers to pass signal 217.6 at stop must do so in accordance with ARTC Network

Rule ANSG 608 - Passing signals at STOP.

Rail Vehicle movement towards Murrays Flat Rd level crossing will reactivate the level crossing.

Down Direction Rail Vehicles on Down Main approaching 214.7 Signal at stop

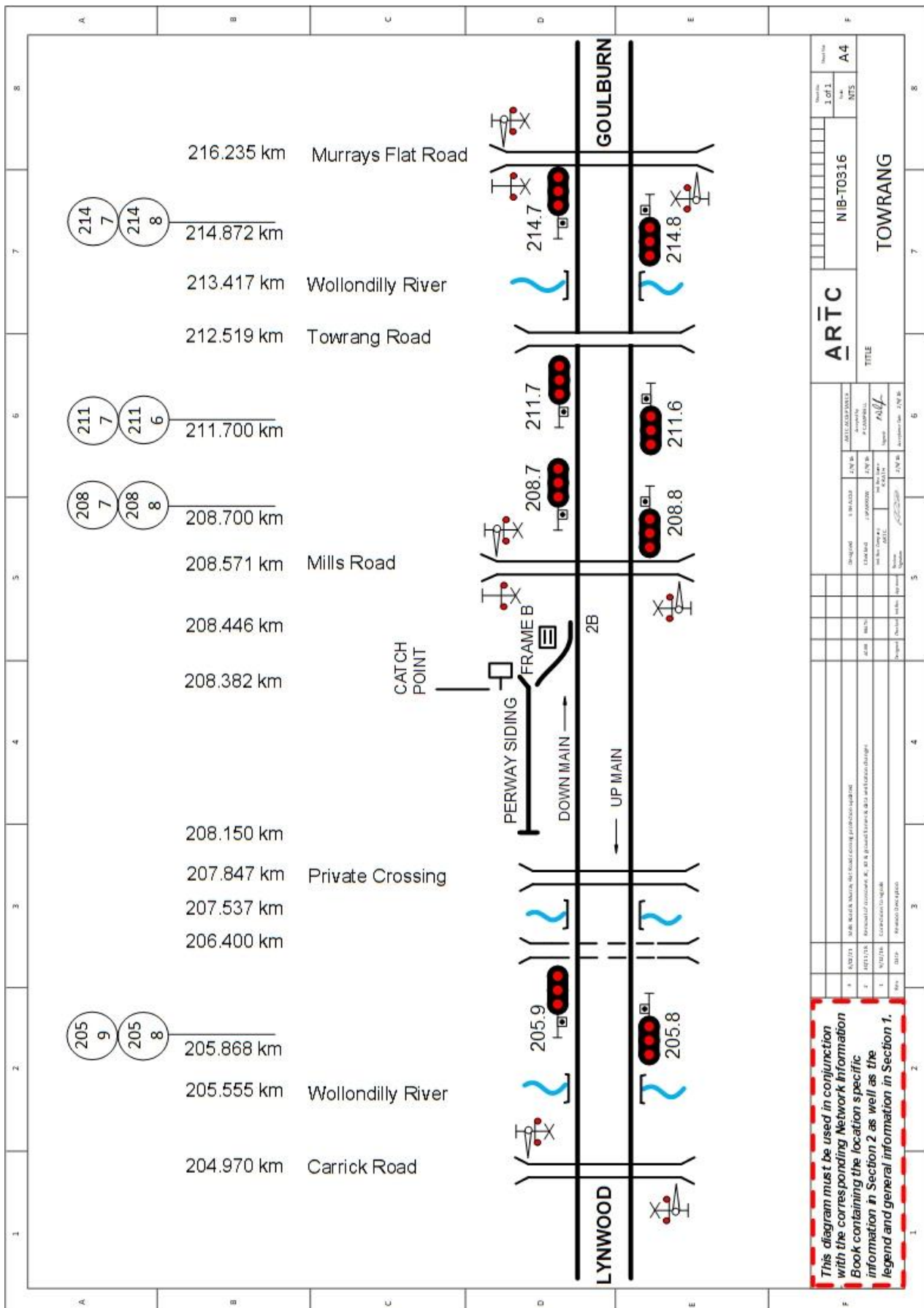
Rail Vehicles approaching 214.7 Signal at stop will activate the crossing after passing the approach trackside warning signs. After 15 seconds of the Rail Vehicle coming to a stand at 214.7 Signal, Murrays Flat Rd level crossing will recover.

Drivers to pass signal 214.7 at stop must do so in accordance with ARTC Network

Rule ANSG 608 - Passing signals at STOP.

Rail Vehicle movement towards Murrays Flat Rd level crossing will reactivate the level crossing.

Main South Line Locations and Sections Information



2.12 Goulburn (GLB)

General Arrangements

Goulburn is a yard location with sidings operated by ground frames. Joppa Junction is included as part of the consolidated Goulburn yard.

ARTC currently lease sidings in Goulburn Yard to private operators but do retain the use of the following sidings within the yard;

No 2 Down Car Siding No 9 Down Plant Siding

No 3 Down Car Siding No 10 Down Siding

No 4 Down Car Siding No 11 Down Siding

Refer interface agreements IA1219 and IA1225 for further details.

Operation of Points and Signals

The points, frame releases and signals for Goulburn interlocking are operated by the Network Controller at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Releasing Approach Locking

Approach locking is provided on all routes, except signals Nos. G20 (Up outer home) and G78 (Up starting, main), to prevent a route that has been set from being altered until the approaching train has been brought to a stand.

Releasing Route Locking

Route locking is applied to all converging and opposing routes.

Release of the route locking (only if shunt signals used) by automatic time release may be obtained for the following routes.

train standing at signal no.	release available on points nos.	amount of time required for release	train standing at signal no.	release available on points nos.	amount of time required for release
G22(M)A	109	30 secs	G47	119 or 115	30 secs
G40	117	60 secs	G67	133	30 secs
G42	119	60 secs	G75	135	30 secs
G45	117 or 117 & 115	30 secs.			

Emergency Time Release Buttons

Release of route locking between approach shunting signals and ground frame electric releases is given automatically by the presence of the shunting portion of the train on the track circuit immediately on the facing side of the ground frame points.

Operation of Power-operated Points in an Emergency

All points worked from NCCS are electrically power-operated.

If these points fail to operate correctly, the Network Controller must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

Signalling Power Supply Indicators

All power supplies are indicated to the Network Controller at NCCS

Additional indicators

All signal filament indicators are indicated to Network Controller at NCCS

Blackshaw Road Level Crossing

Full boom barriers with type F flashing lights and bells at Blackshaw Road level crossing at 224.182km are controlled from NCCS.

The operation of the level crossing warning equipment is interlocked with the protecting signals.

Control of Equipment in an Emergency

Failure of signal protecting the level crossing

If Down home signal or Up home/starting signal fails, the Network Controller NCCS must not authorise a train to pass these signals at stop until:

- either the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the Handsignaller(s) at the level crossing that the road traffic is clear of the crossing.

Before authorising a train to proceed past a signal at stop, the Network Controller must ensure that the level crossing is and will remain clear of road traffic.

The Network Controller must not clear a signal until an assurance has been received from the Handsignaller that the boom barriers are lowered and the crossing is clear of road traffic.

The Network Controller must promptly notify the Signals maintenance representative if there is an equipment failure of any kind at the level crossing.

Shunting Limit Sign

A shunting limit sign is provided at Goulburn on the Down side of the Down main line next to Down home signal G75. This sign is inscribed "Shunting limit on Down main" and applies to shunting movements in the Up direction on the Down main line at Goulburn.

Ground Frame Interlocking Arrangements

All ground frames in the Goulburn area are unlocked by keys from releasing switches, which are released from NCCS.

To obtain the release, the train must be advanced to the points concerned on the authority of the protecting shunting signal, or of a handsignal if the movement is from a siding. After bringing the portion of the train to be shunted to a stand on the facing side of the points, the shunting signal route must be normalised, if applicable, and the appropriate releasing lever operated.

Ground Frames**Frame R**

Frame R is located on the Down side of the Down main line adjacent to the crossovers and provides access from the Back platform road to the Down main line.

Frame R is unlocked by a key from releasing switch R. Releasing switch R is electrically released from 124 release at NCCS.

Frame Q

Frame Q is located on the Up side of the Up main line adjacent to the crossovers and provides access to the Top dock sidings.

Frame Q is unlocked by a key from releasing switch Q. Releasing switch Q is electrically released from 122 release at NCCS.

Frame N

Frame N is located on the Down side of the Down main line adjacent to the crossovers and provides access to the Back platform road and the Down sidings.

Frame N is unlocked by a key from releasing switch N. Releasing switch N is electrically released from 120 release at NCCS.

Frame J

Frame J is located on the Up side of the Refuge loop adjacent to the crossovers and provides access to the Up sidings.

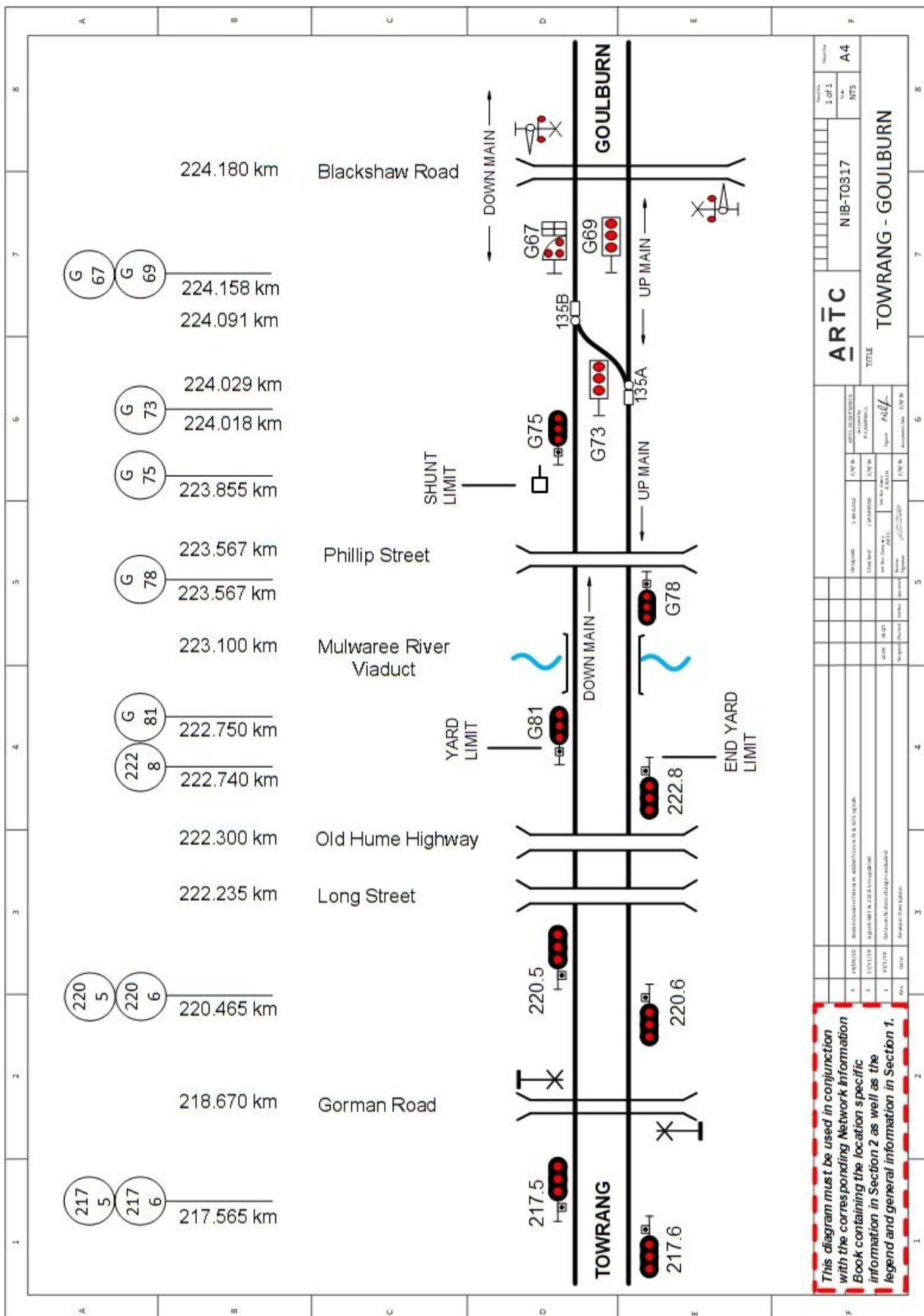
Frame J is unlocked by a key from releasing switch J. Releasing switch J is electrically released from 112 release at NCCS.

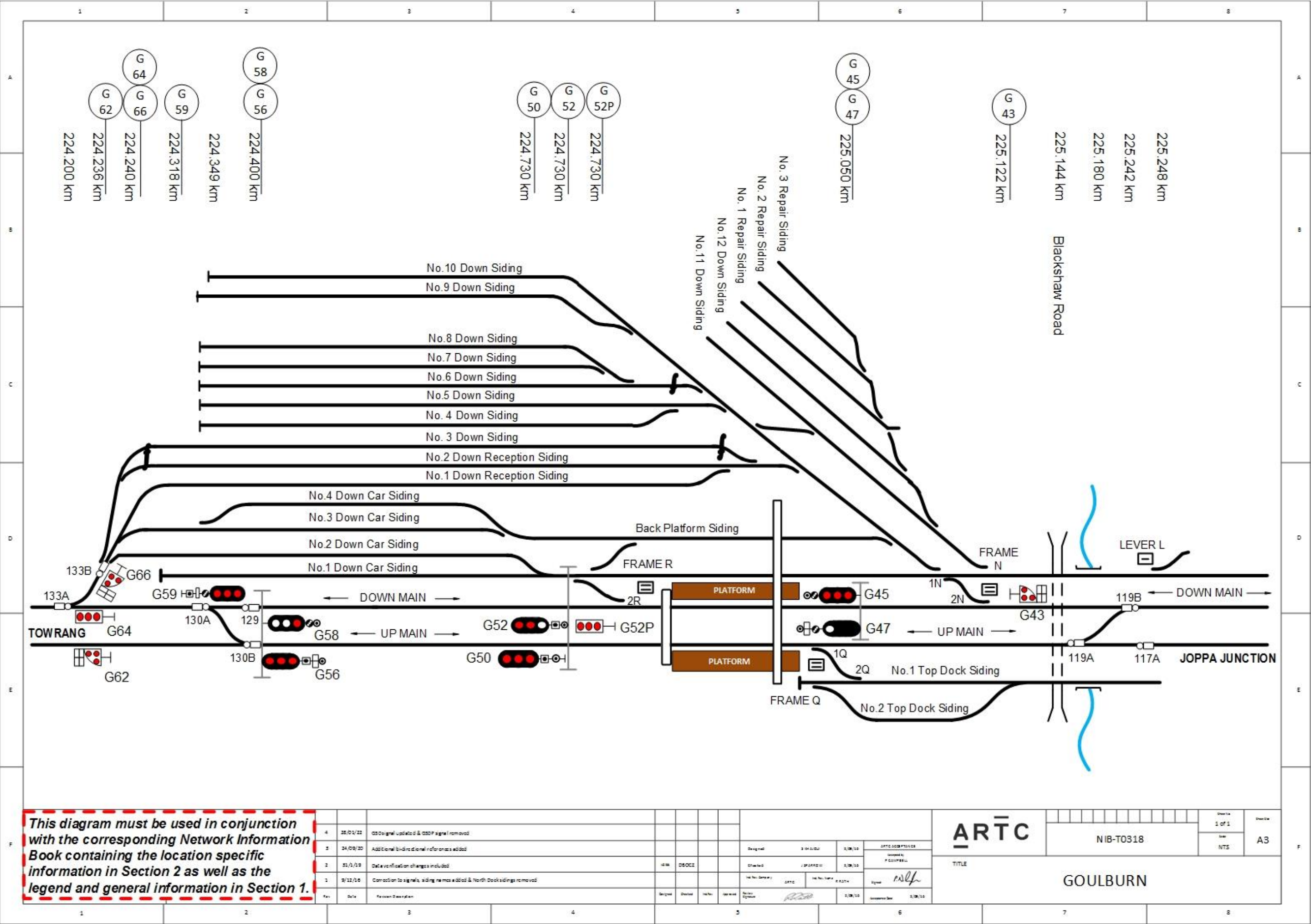
Frame G

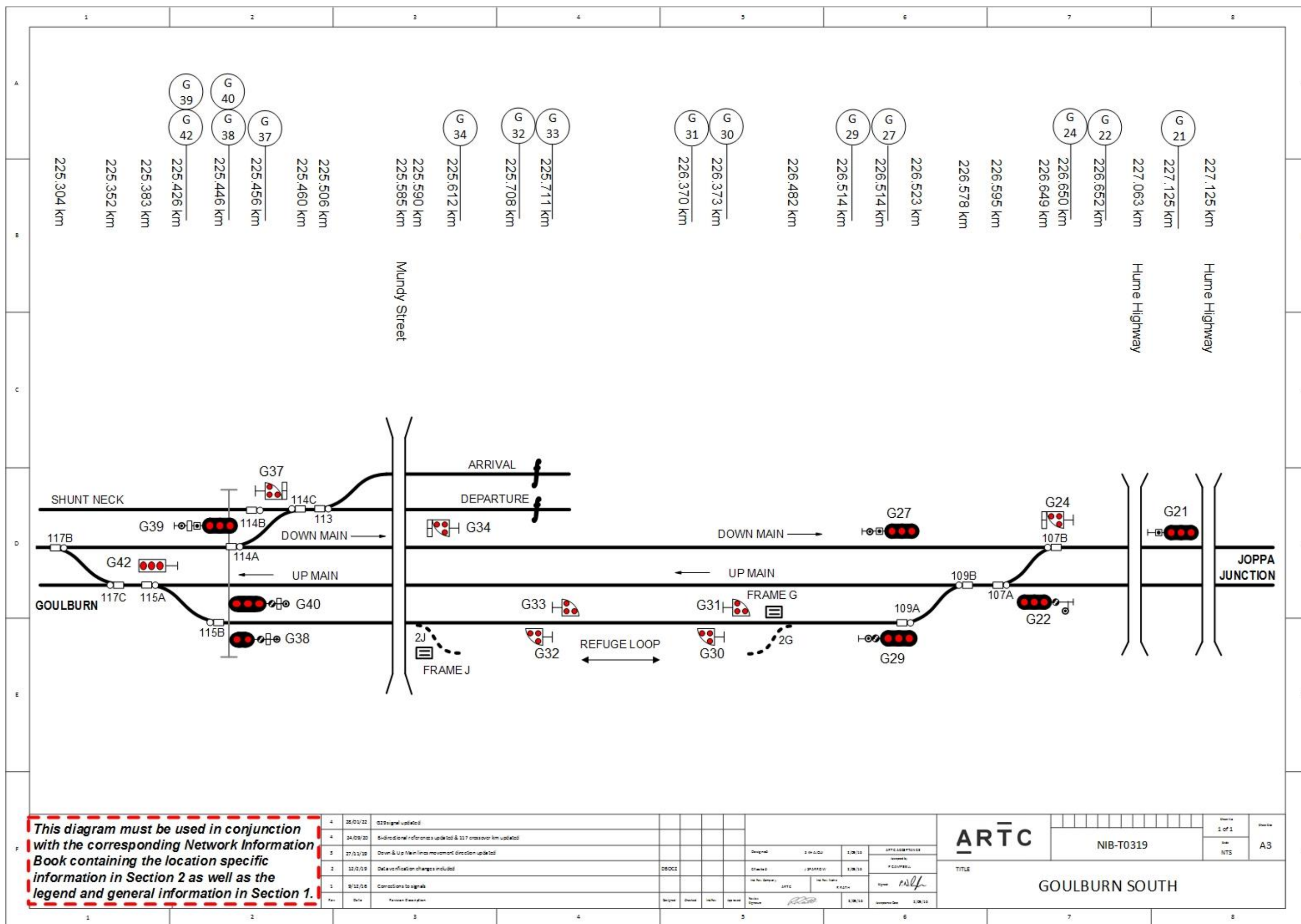
Frame G is located on the Up side of the Refuge loop adjacent to the crossovers and provides access to the Up sidings.

Frame G is unlocked by a key from releasing switch G. Releasing switch G is electrically released from 110 release at NCCS.

Main South Line Locations and Sections Information







2.13 Joppa Junction (JPJ)

2.13.1 General Arrangements

Joppa Junction is part of the consolidated Goulburn yard. It is also a Begin and End Train Order Location for the Country Regional Network (CRN).

The operational interface between ARTC and CRN is at G6 signal in the Up direction (Up Home Signal Main). The operational interface in the Down direction is at G7 signal. ARTC will have operational control of the overlap area.

Refer to interface agreement IA3000.08 for further details.

Limit of Authorities

The End Train Order Working sign adjacent to signal G6 facing to Up direction trains is the limit of an authority by the CRN Network Controller. The Begin Train Order working sign adjacent to signal G6 facing to Down direction trains will be the limit of ARTC controlled territory.

G7 Signal at Joppa Junction

All trains that require to proceed towards Canberra must obtain the relevant Train Order from the CRN Network Controller before proceeding beyond G7 signal.

Operation of Points and Signals

The points and signals for Joppa Junction interlocking are operated by the Network Controller at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Dragging Equipment Detectors

Dragging equipment detectors for the Down and the Up main lines are located at 230.295km at Joppa Junction. When dragging equipment is detected, the indication for the applicable detector will be displayed on Phoenix at the NCCS.

Responding to a dragging equipment alarm

When dragging equipment indication is displayed the Network Controller must:

- acknowledge the alarm
- contact the Driver of the train that activated the detector and instruct the Driver to immediately bring the train to a stand
- advise the Driver to inspect the train to identify the problem and to advise of the status of the problem and the action that must be taken to resolve it

2.13.2 Country Regional Network Interface Requirements

Work on Track

The following instructions will apply if work on track will be conducted which:

- extends into the UGLRL controlled area, or
- requires protection to be provided by the UGLRL Network Control Officer.

Where any work on track activity within the ARTC Network requires protection from the adjacent CRN Network, the UGLRL Network Control Officer, ARTC Network Controller and the Protection Officer must establish a conference call to agree upon:

- affected rail traffic movements
- location of work
- required protection arrangements
- duration of work.

Local Possession Authorities (LPA)

The limits of an LPA must not extend beyond the Operational Interface. This is the G7 signal in the Down Direction (231.220km) and the G6 signal in the Up Direction (232.025km)

Back-to-Back LPAs

Where back-to-back LPAs are implemented, the following instructions will apply:

- Worksites and rail traffic that need to move from CRN territory to ARTC territory are authorised and supervised by the ARTC Possession Protection Officer (PPO).
- Worksites and rail traffic that need to move from ARTC territory to CRN territory are authorised and supervised by the UGLRL PPO.

Where work is being undertaken at or over the interface boundary the following will apply:

- The UGLRL PPO and the ARTC PPO must confer and come to a clear understanding of the worksite protection to be established over the CRN and ARTC interface boundary.
- When the work at or over the interface boundary is completed, the UGLRL PPO and ARTC PPO must ensure that possession protection is removed.

UGLRL only LPA

Where a UGLRL only LPA is to be obtained, the UGLRL Possession Protection Officer must request the ARTC Network Controller Junee to protect the possession limit by placing blocking facilities to exclude rail traffic entry to the CRN for the duration of the possession.

Where work is being undertaken within 500m of the protecting limits, a Work on Track Authority adjoining the entry end limit must be implemented for the duration of the work.

ARTC only LPA

Where work is being undertaken within 500m of the protecting limits, a Work on Track Authority adjoining the entry end limit must be implemented for the duration of the work.

Track Occupancy Authority (TOA)

The UGLRL Network Control Officer is responsible for implementing a TOA when a worksite is established on the CRN Network up to the Operational Interface.

The ARTC Network Controller Junee is responsible for implementing a TOA when a worksite is established on the ARTC Network up to the Operational Interface.

When a TOA worksite extends beyond the Operational Interface or the worksite is located within 500m of the Operational Interface, separate TOA's must be issued by the UGLRL Network Control Officer and the ARTC Network Controller.

Track Work Authorities (TWA)

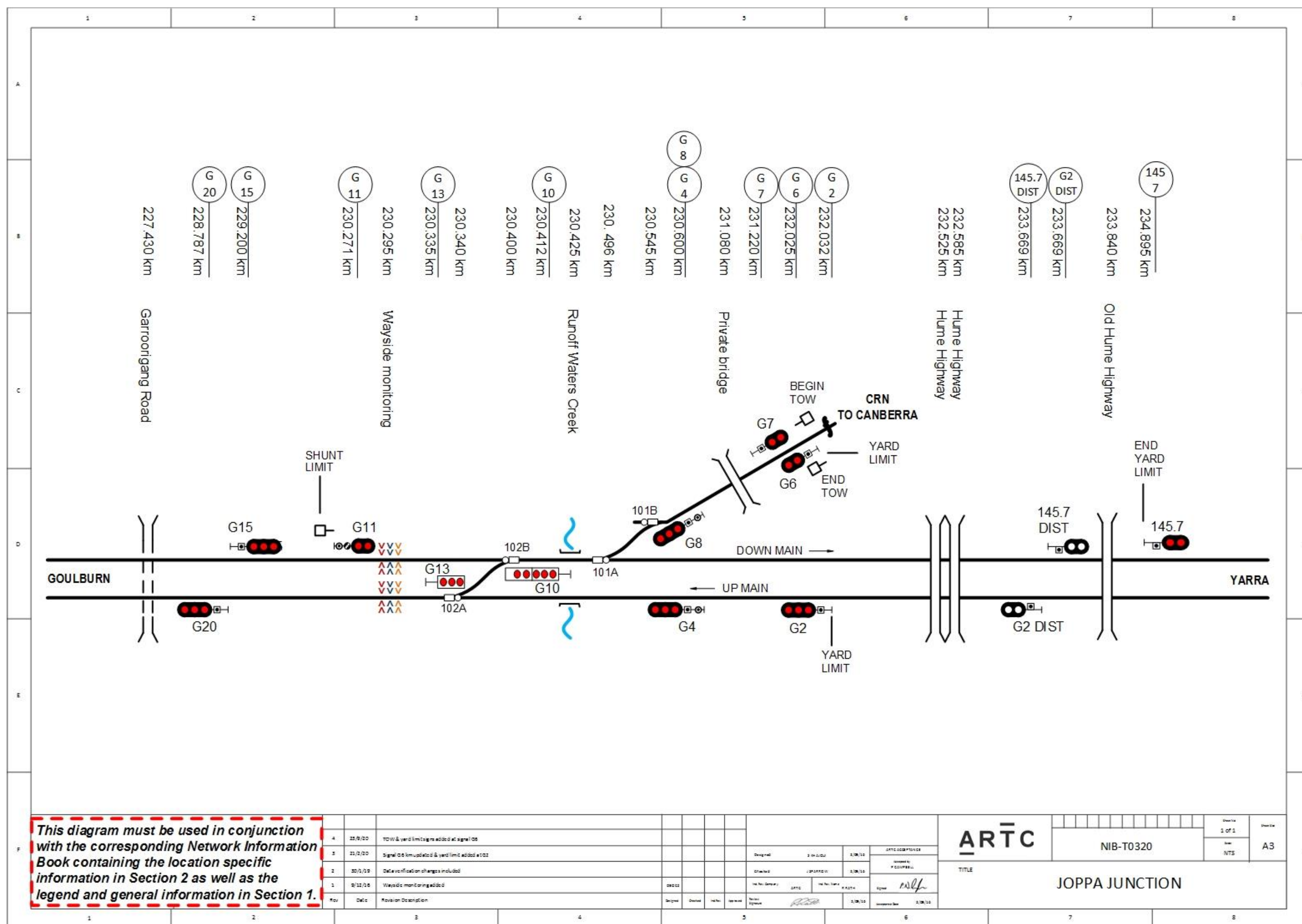
The ARTC Network Controller Junee is responsible for implementing a TWA when a worksite is established on the ARTC Network up to the Operational Interface.

The UGLRL Network Control Officer is responsible for implementing a TWA when a worksite is established on the CRN Network up to the Operational Interface.

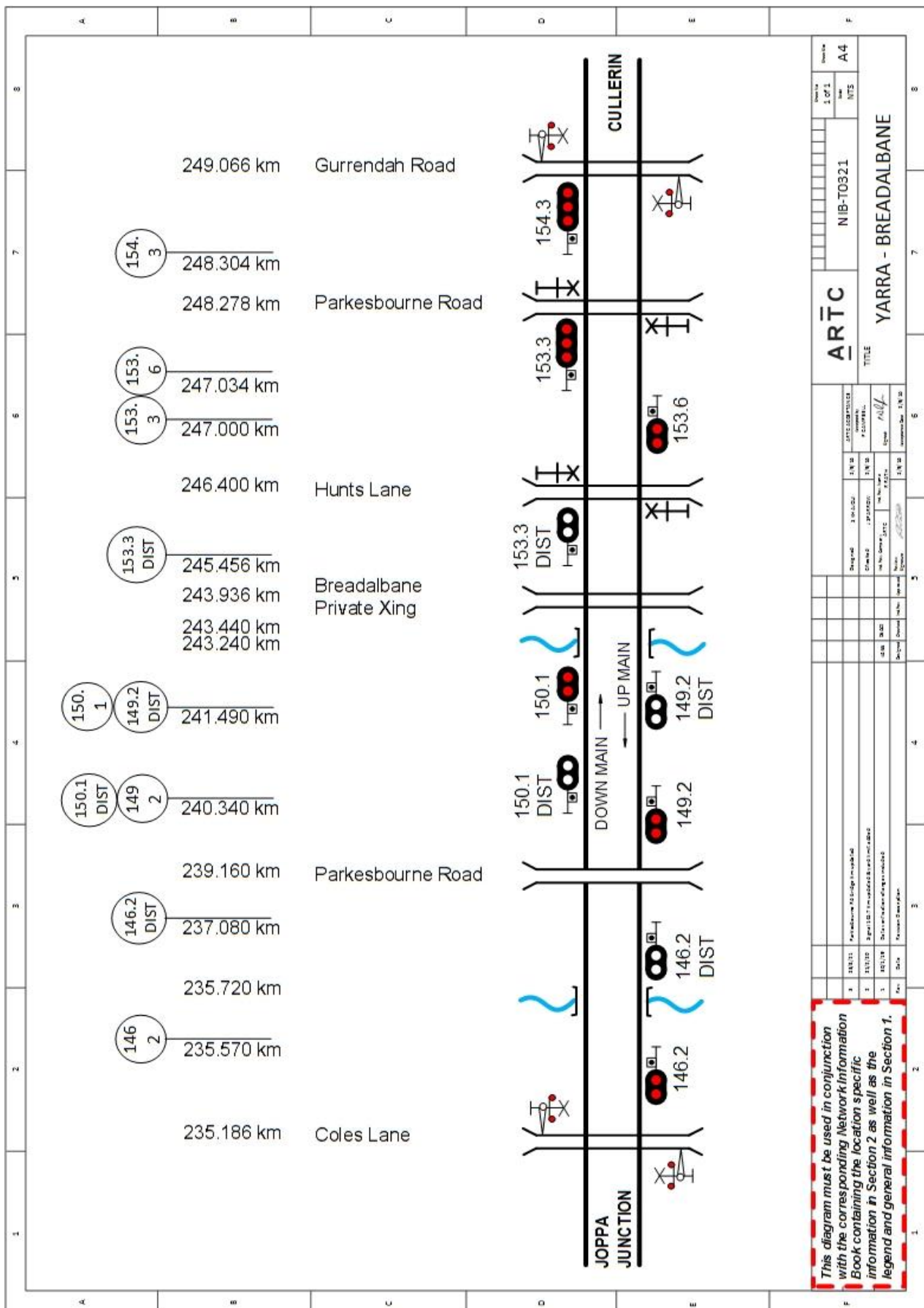
TWAs must not extend beyond the operational interface.

Route Control Blocking (RCB)

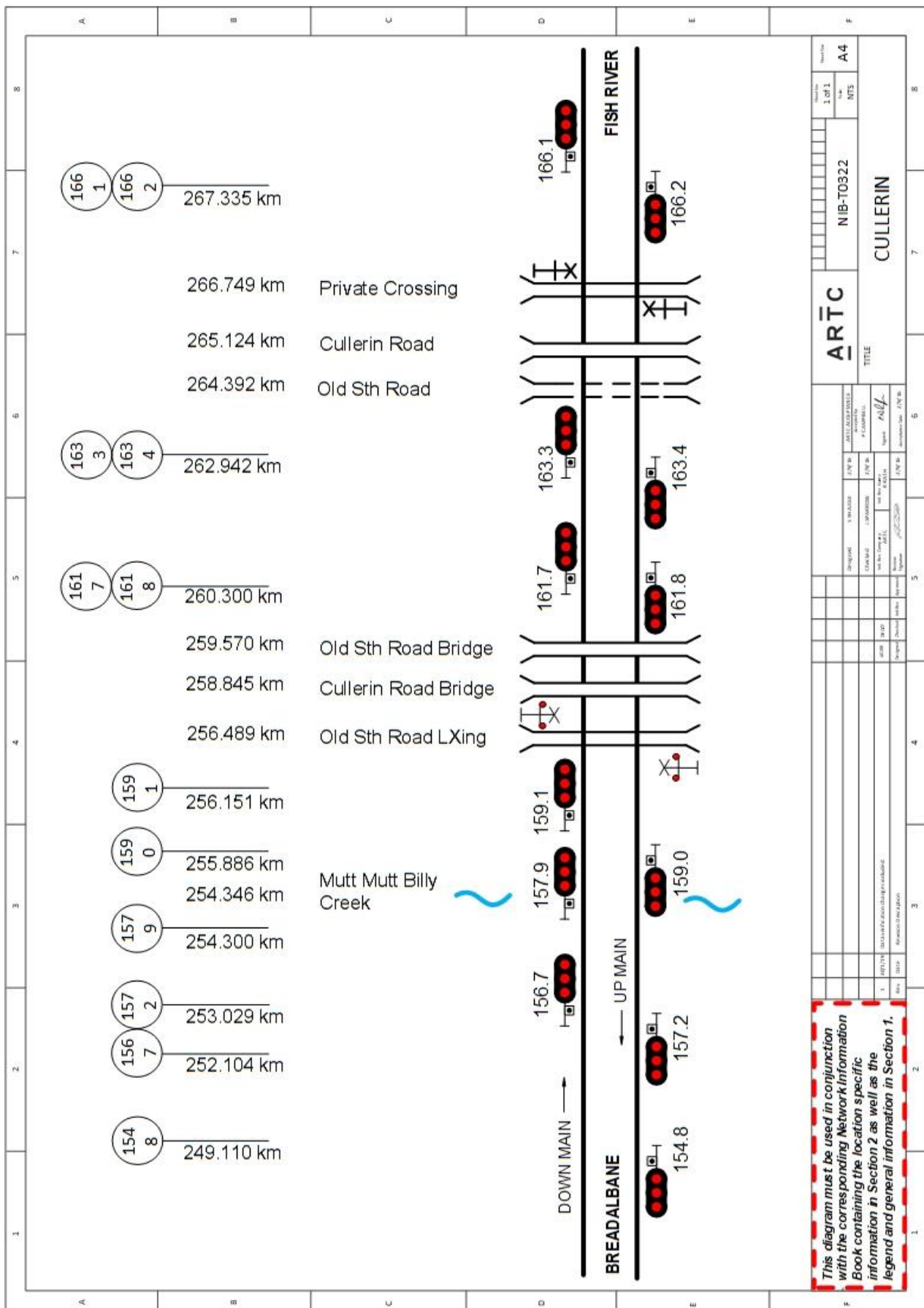
The use of RCB is not permitted in the ARTC Network.



Main South Line Locations and Sections Information



Main South Line Locations and Sections Information



2.14 Gunning (GNI)

The signals at Gunning are operated by NCCS.

The Signal numbers GG1 and GG2 are designated as Home/Starting signals.

Yard Limits

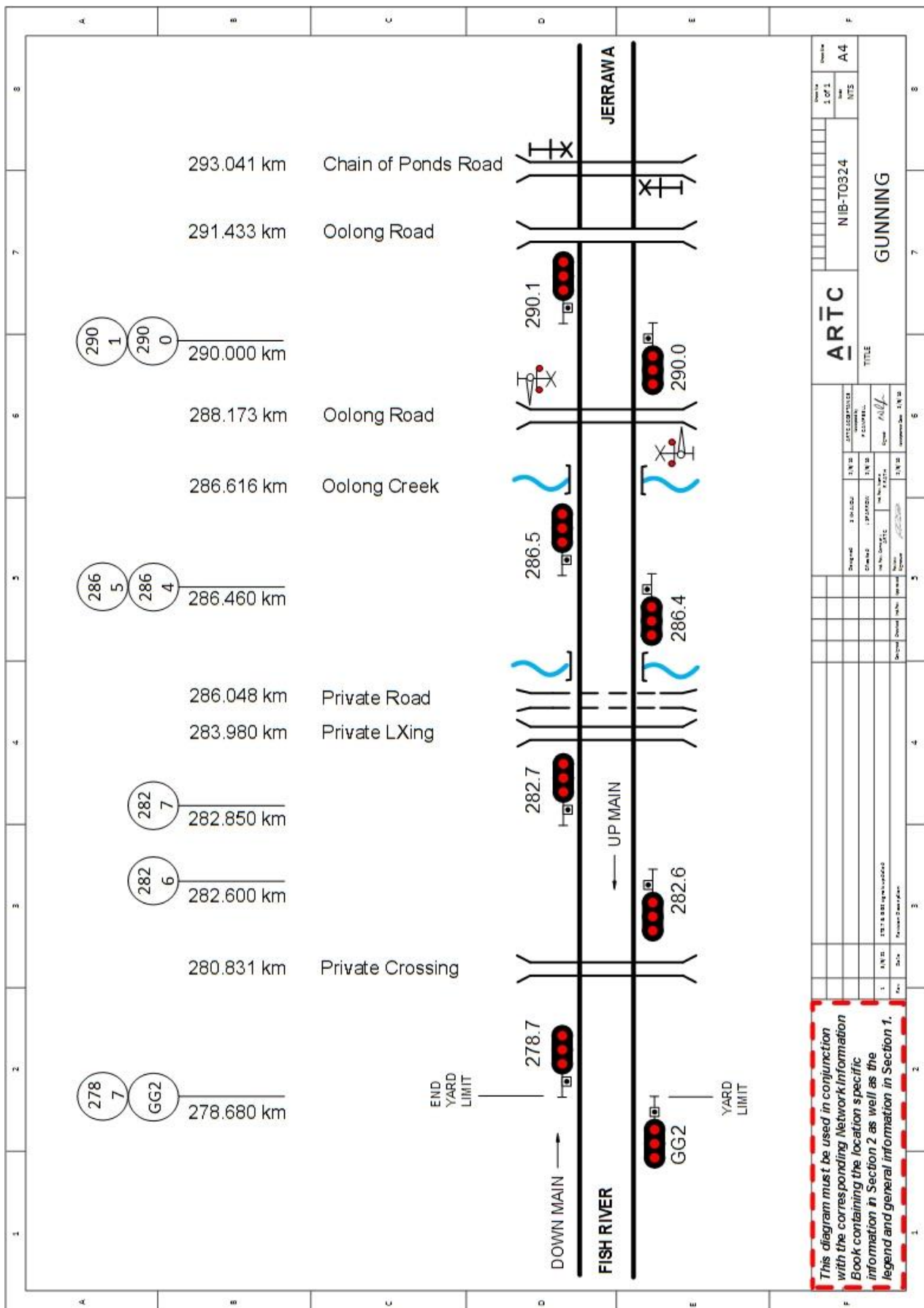
Down Main

The Yard Limits on the Down Main line are from GG1 signal (274.400km) to 278.7 signal (278.680km).

Up Main

The Yard Limits on the Up Main line are GG2 signal (278.680km) to 274.4 signal (274.400km).

Main South Line Locations and Sections Information



2.15 Jerrawa (JWA)

General Arrangements

Down Refuge Siding 320m

Goods Siding 170m

Frame E down main to down sidings and frame B trailing cross-over are released from NCCS via 100 and 101 releases.

The Network Controller at NCCS will be able to;

- Provide the release without track occupied when requested and after 60 seconds the release will be available in the field or
- Provide the release with the track occupied when requested after 11 minutes the release will be available in the field.

Note: If the controller restores the release during this period the timing will restart.

Frame B must be clipped and XL locked when not in use

WARNING: facing point locks are not provided at either end of frame B cross-over and the qualified worker when operating the points must ensure that the points are secured in either the normal or reverse position by a point clip and XL lock.

Coolalie Road Level Crossing 298.594km

The Level Crossing is configured as a Predictor Level Crossing in both the Up and Down Directions, rail traffic must not accelerate after passing the approach trackside warning sign in accordance with ANGE 216 Level Crossings.

Trackside warning signs are located at 297.069km on the Down Main line and 300.514km on the Up Main line.

The level crossing will cease to operate when the rail traffic clears the level crossing.

Down Direction Rail Vehicles on Up Main Approaching 297.9 Signal at stop

Rail Vehicles approaching 297.9 signal at Stop will activate the crossing after passing the approach trackside warning signs. After 15 seconds of the Rail Vehicle coming to a stand at 297.9 signal, Jerrawa Road level crossing will recover.

Drivers to pass signal 297.9 at Stop in accordance with ARTC Network Rule ANSG 608 Passing signals at STOP

Rail Vehicle's movement towards Jerrawa Road level crossing will reactivate the level crossing.

2.16 Yass Junction (YJN)

General Arrangements

Yass Junction has sidings accessed by ground frame from the main line.

The signalling arrangements at Yass Junction permit bi-directional movements on both the Down and the Up main lines within the interlocking.

Ground Frame

Frame B

Frame B is located on the Down side of the Down main line adjacent to the crossovers and provides access to No. 1 siding.

Frame B is unlocked by a key from releasing switch B.

Releasing switch B is electrically released from 54 release at NCCS (or Yass Junction, when switched in).

Operation of Points and Signals

The points, frame release and signals at Yass Junction are operated from NCCS.

All points worked from the NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

A local control panel has also been provided in the traffic hut near 55 and 56 points at the Albury end of Yass Junction platforms to allow the interlocking to be operated locally. All indications displayed on the local control panel are also displayed in NCCS.

The door of the traffic hut is locked by an electrical release lock that is controlled by the Network Controller at NCCS.

Switching the Control Panel in or out

A three-position key-locked switch is provided in the control panel at Yass Junction to allow the control panel to be switched out (closing), switched in (local), or switched to remote control (remote).

Indicator lights inscribed "closing", "local control", and "remote" respectively are provided to indicate when the control panel is switched in, switched out, or switched to remote control.

Allowing the Signals to Re-clear Automatically

Two buttons inscribed with the letter A (Automatic) are provided next to signals Nos. 193.6 and 200.1 on the control panel for the Down and Up main lines. When the buttons are operated, the following signals will clear automatically after the passage of a train:

Down signals YJ1, YJ5 and YJ11

Up signals YJ10, YJ20 and YJ24

NOTE: Automatic signal operation only works when the route is set for the principal route.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power-operated Points in an Emergency

All points worked from NCCS or the local control panel are electrically power-operated.

If these points fail to operate correctly, the Network Controller must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Signalling Power Supply Indicators

Two groups of power supply indicator lights are provided on the control panel at Yass Junction for the AC and DC signalling power supplies in the Yass Junction area. The groups are headed "North Yard" and "South Yard", and show the following indications:

"AC supply"

The green "Normal" indication will be displayed when normal AC power supplies are available.

The yellow "Emergency" indication will be displayed when a partial loss of AC supply occurs and the emergency power supply is available.

The red "Low Fuel/Fail" indication will be displayed when a complete loss of AC supply occurs or fuel supplies in an emergency generator become low.

"DC supply"

The green "Normal" indication will be displayed when the normal DC power supplies are available.

The yellow "Warning" indication will be displayed when a partial loss of DC supply occurs.

The red light "Fail" indication will be displayed when a complete loss of DC supply occurs.

General instructions

An alarm is provided to warn of any alteration to the power supply and the Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies to the signalling, the Signaller must promptly inform the Signals maintenance representative.

Additional Indicators**Signal lamp indicators**

Four groups of signal lamp indicator lights are provided on the control panel to indicate the condition of the signal lamps in the Yass Junction area.

The groups are headed "North auto", "North yard", "South yard", and "South auto", and show the following indications:

- a flashing yellow indicator light inscribed "Filament fail" will be displayed when a partial failure of a signal lamp is detected
- a red indicator light inscribed "Lamp fail" will be displayed when a total failure of a signal lamp is detected.

Earth leakage indicator

A yellow indicator light inscribed "Earth fault" will be displayed on the control panel when there is an earth leakage detected on the signalling system.

Main South Line Locations and Sections Information

Whenever the indicator light is displayed, an audible alarm will sound and, when the indicator light goes out, the alarm will sound again. In each situation, the alarm will continue to sound until cancelled by the Signaller.

General instructions

When a "Warning" or a "Fail" indicator is displayed following a fault, an audible alarm will sound which must be cancelled by the Signaller pushing the "Alarm cancel" pushbutton next to the indicators.

When any of these additional indicators is displayed or extinguished, the Signaller must promptly inform the Signals maintenance representative.

Shunting Limit Signs

Two shunting limit signs are provided at Yass Junction. The signs are located as follows:

On the Down side of the Down main line on the Jerrawa side of Down home, Down main signal YJ5. This sign is inscribed "Shunting limit on Down main line" and applies to shunting movements in the Up direction on the Down main line.

On the Up side of the Up main line at approximately 319.500km. This sign is inscribed "SHUNTING LIMIT ON UP MAIN" and applies to shunting movements in the Down direction on the Up main line.

Notice Signs

Notice signs, inscribed "TRAINS MUST NOT PASS THIS SIGN UNTIL SIGNAL CLEARS", are located on the Down side of the Down main line and on the Up side of the Up main line approximately 300 metres from signals YJ8 and YJ10 respectively.

The signs are provided because of the limited visibility of the level crossing at 315.331km, which is available to Drivers when trains are standing at signal YJ8 or No. YJ10.

When an Up train is to be crossed at Yass Junction, the Driver of the train being crossed must bring the train to a stand at the applicable notice sign and must not pass the sign until the signal displays a proceed indication.

Special instructions when Pilot staff working is in operation on either side or both sides of Yass Junction

If it is necessary for Pilot Staff working to be introduced on either side or both sides of Yass Junction, the following arrangements will apply:

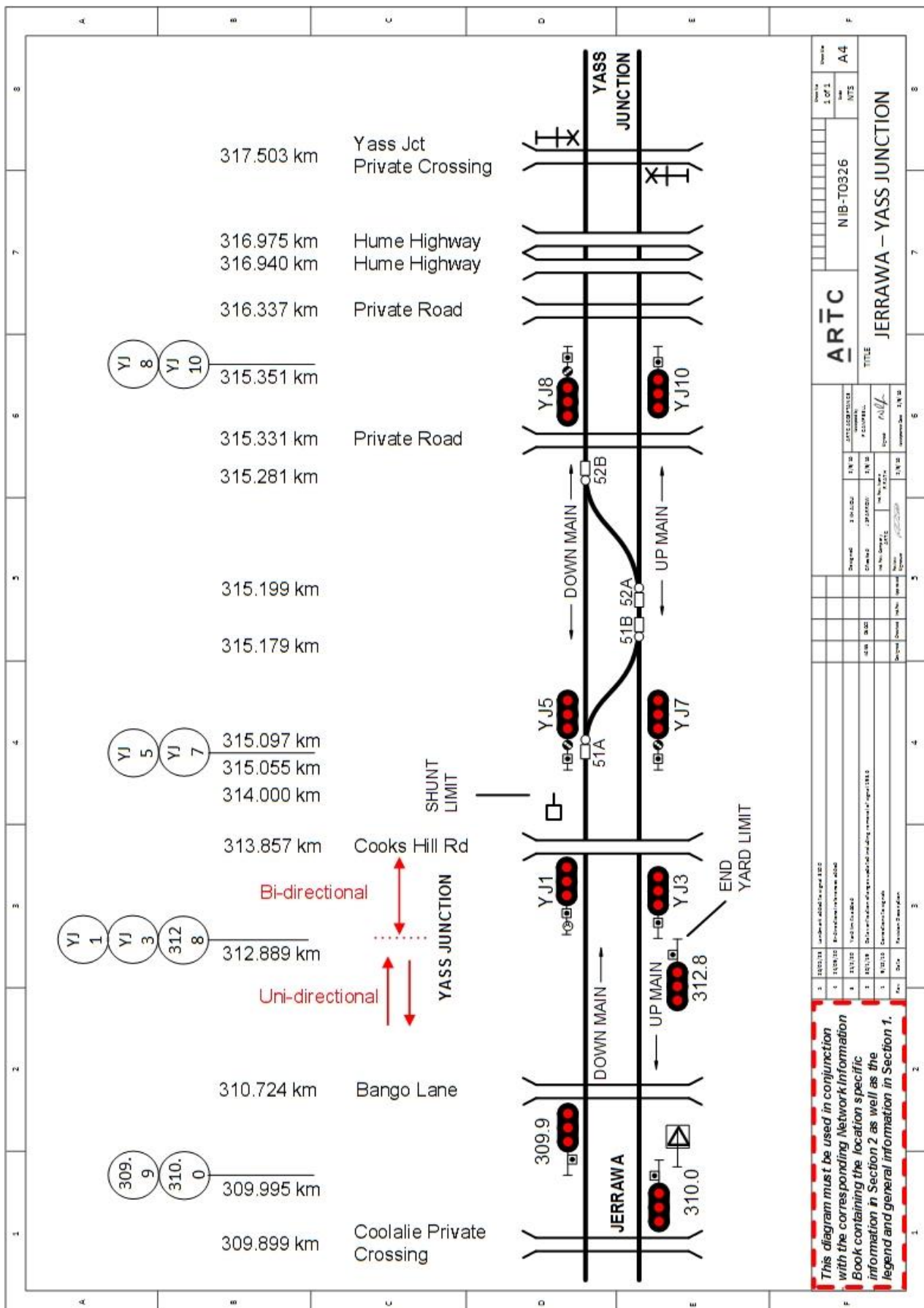
Trains exiting the Pilot Staff working section in the wrong-running direction

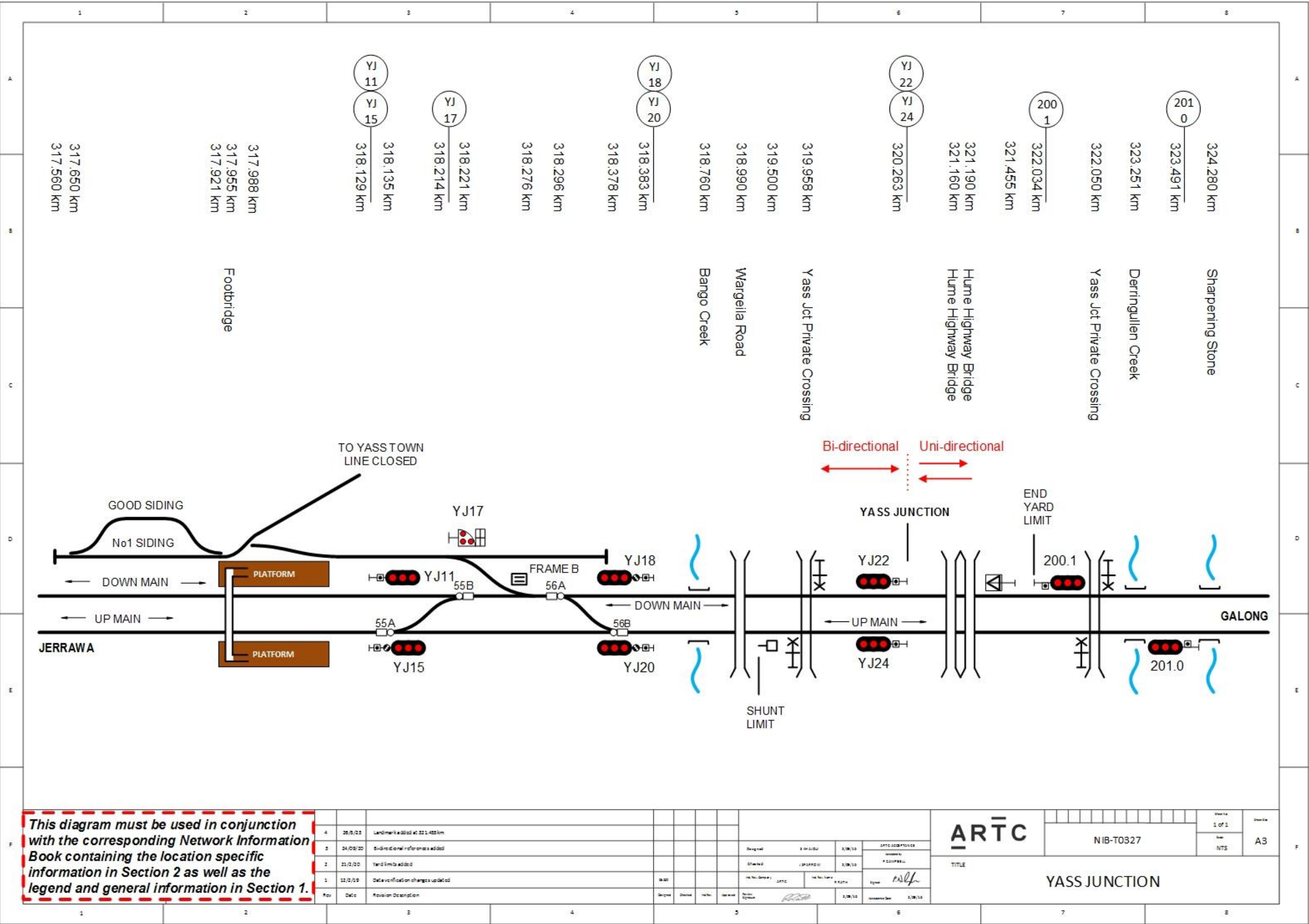
To control the exit of trains in the wrong-running direction from an adjacent pilot staff section, the following equipment is provided:

- a landmark together with signals YJ3 (Down accept, Up main) and YJ7 (Down home, Up main) for the Down direction
- and a landmark together with signals YJ18 (Up home, Down main) and YJ22 (Up accept, Down main) for the Up direction.

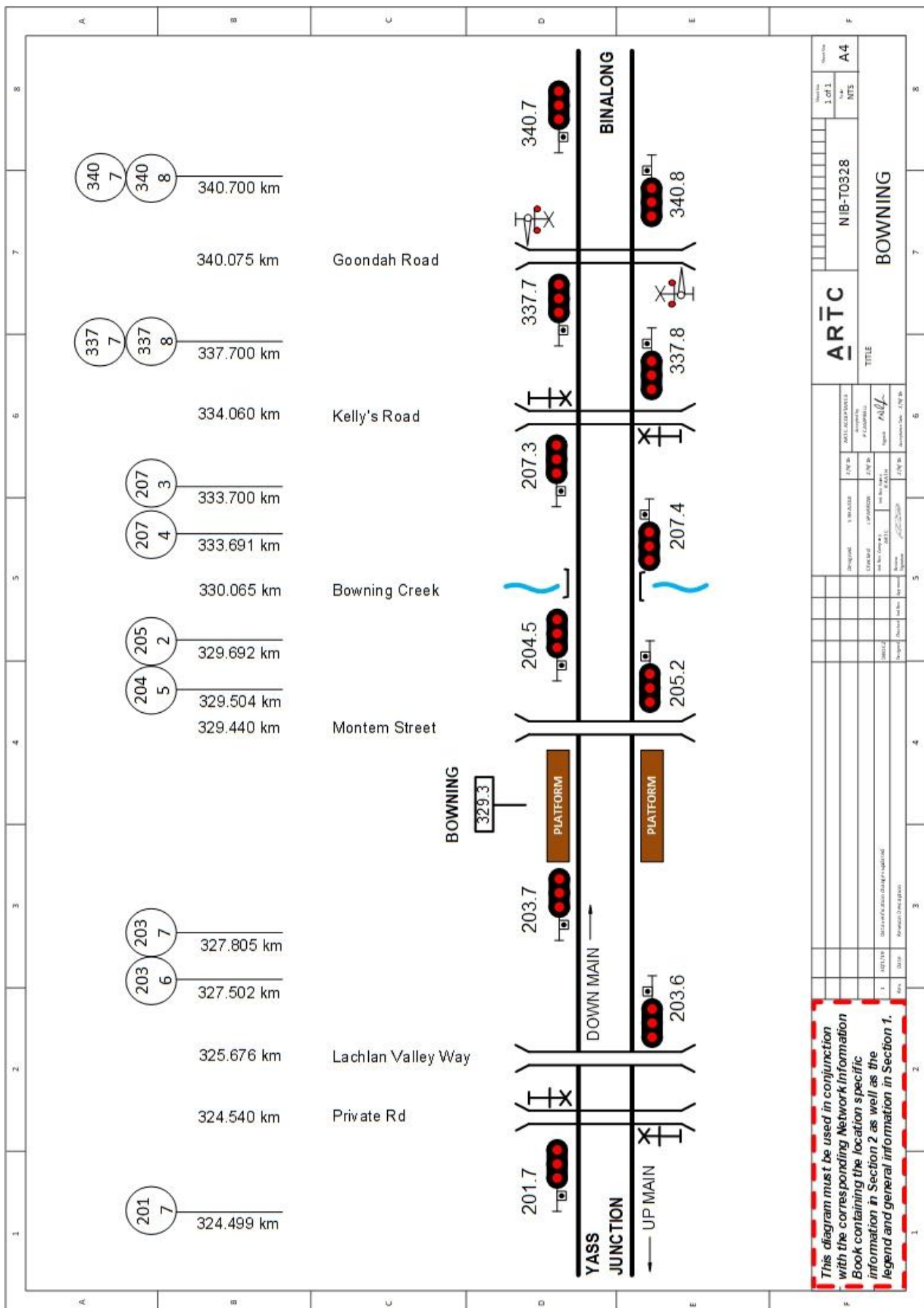
Distant warning and stop signs will not be used.

Main South Line Locations and Sections Information





Main South Line Locations and Sections Information



2.17 Galong (GAL)

Galong has sidings accessed from the main line by ground frames.

Goods Siding 385m

Grain Siding 305m

Operation of Points and Signals

The points at Galong are operated from ground frames controlled by releases provided by the Network Controller at NCCS as listed below:

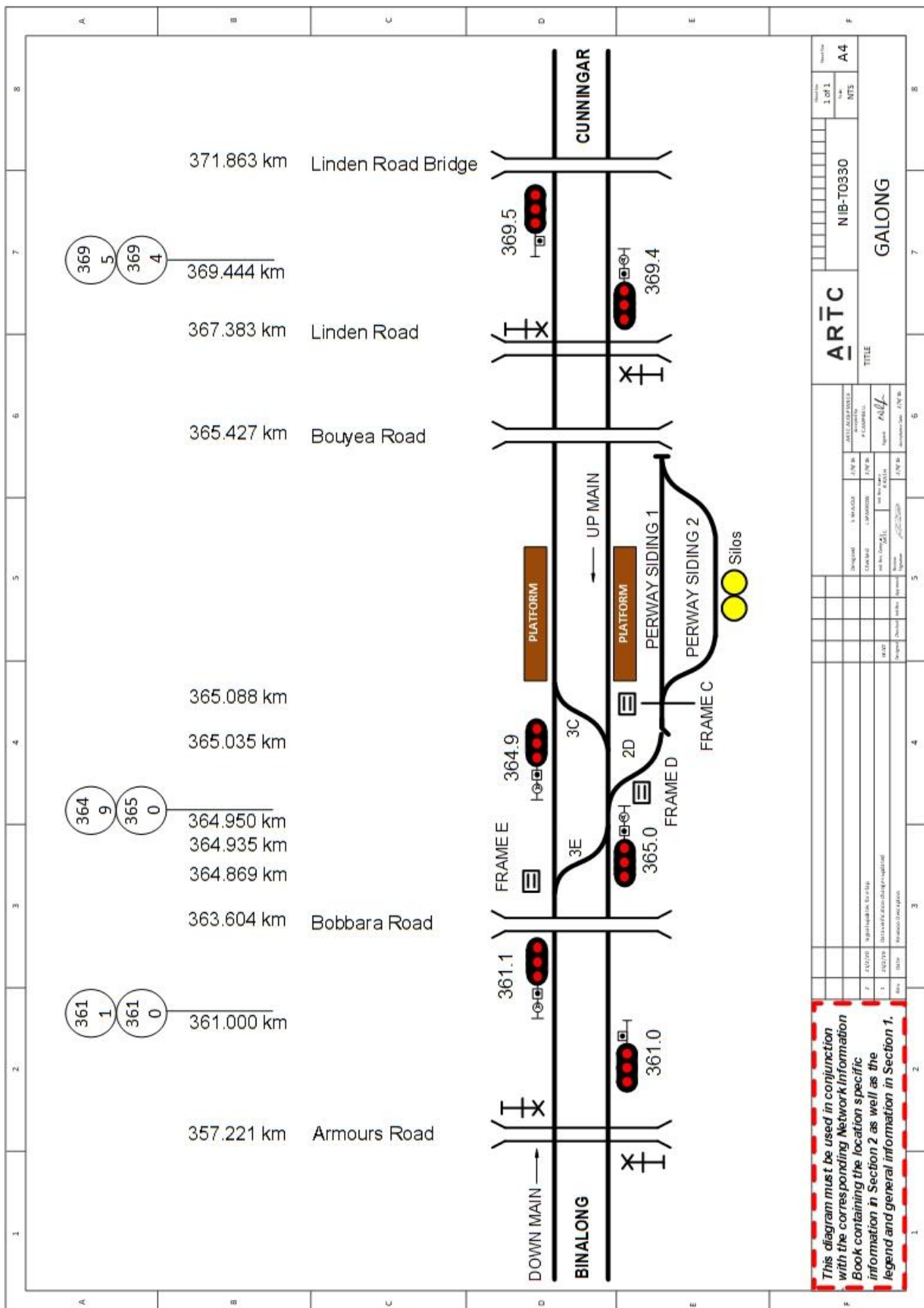
- C Frame trailing crossover from the Down Main to the Up Main released by 100 release at NCCS
- D Frame from the Up Main to the Up Sidings released by 101 release at NCCS.
- E Frame for the facing crossover from the Down Main to the Up Main released by 102 release at NCCS.

The Network Controller at NCCS will be able to:

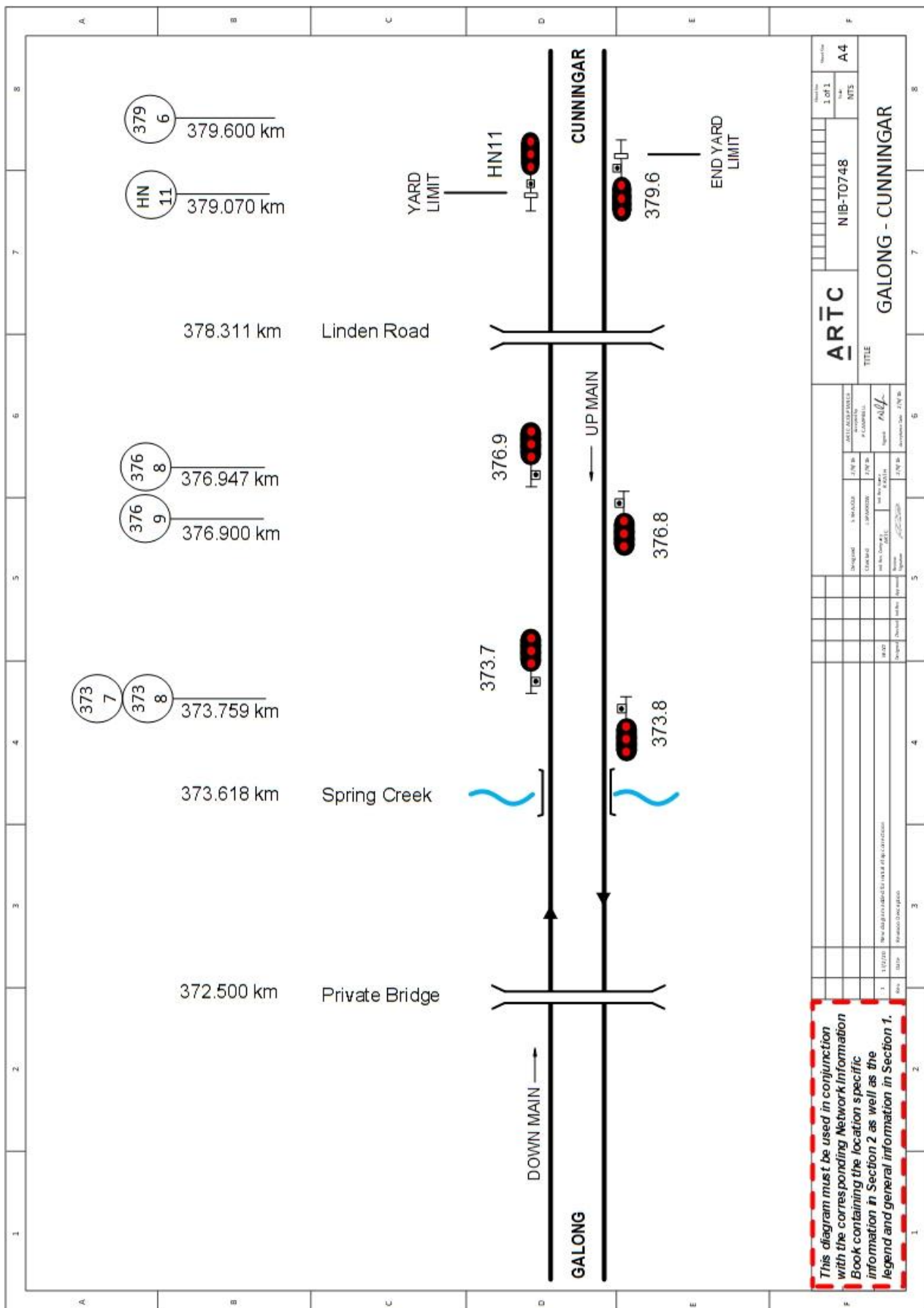
- Provide the release without track occupied when requested and after 60 seconds the release will be available in the field or
- Provide the release with track occupied when requested and after 600 seconds (10 minutes) the release will be available in the field.

Note: If the Network Controller restores the release during this period the timing will restart.

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Main South Line Locations and Sections Information



3 Unanderra to Moss Vale Branch Line

Location of Embankment Slip Detectors and Notice Signs

The following table shows the location of all embankment slip detectors, their distance from Sydney, and between which locations the embankment slip detectors are located:

km from Sydney	Detector location
123.231 (Slip 3)	Mount Murray – Robertson
123.275 (Slip 2)	Mount Murray – Robertson
123.540 (Slip 1)	Mount Murray – Robertson

Signs are provided on either side of each of the embankment slip sites for Slips 1,2 & 3, facing to Down and Up trains/track vehicles respectively.

Digitised Voice Slip Detectors (123.231 – 123.540km)

Digitised-voice slip detectors are provided to cover Slips 1, 2 & 3 located between 123.231km and 123.540km in the Mount Murray – Robertson section.

These slip detectors apply to the movement of trains in both the Down and the Up directions.

Drivers and Track Vehicle Operators approaching the slip site must have their ICE radios or other communication device for track vehicles switched on.

A sign (with silver lettering on a blue background), inscribed "SLIP AREA – LISTEN FOR RADIO MESSAGE", is provided at the approaches to the slip sites in both the Down and Up directions.

Radio Messages

When a train is approaching the slip site, a message will be transmitted by the digitised-voice slip detector over the train radio. The transmission will advise the slip site name, the kilometrage, and the condition of the slip site. The message will be transmitted at least twice.

The message transmitted will be one of the following:

Message	Action for Drivers
"Slip site clear"	Drivers/Track Vehicle Operators may proceed normally
"Stop, stop, slip detected"	Drivers/Track Vehicle Operators must bring their train/track vehicle to a stand before the slip site and advise the Network Controller of the circumstances

If a slip is detected when rail traffic is approaching the slip area, the Network Controller must inform the track supervisor to inspect the line and establish if it is safe for traffic.

Radio Message not Received

A sign inscribed "SLIP AREA – IF NO RADIO MESSAGE HAS BEEN RECEIVED BY THIS POINT, STOP TRAIN AND CONTACT NETWORK CONTROLLER", is provided at the end of these slip sites.

If no message is received, the Driver / Track Vehicle Operator must stop the train/vehicle clear of the slip site and then inspect the three green indicator lights enclosed in an SL-locked weatherproof box, located on the equipment hut.

Provided that all three green indicator lights are displayed, the Driver / Track Vehicle Operator must promptly advise Network Control Centre of the slip condition and may then proceed normally.

If any of the indicator lights is out, the Driver / Track Vehicle Operator must advise Network Control Centre that a slip has been detected.

The Network Controller and Driver / Track Vehicle Operator then must carry out the procedures as though they had received a slip detector message.

When a Driver / Track Vehicle Operator reports that no message has been received from the slip detector, the Network Controller must instruct the Signals maintenance representative at Moss Vale to attend the slip site.

If the equipment is to be temporarily booked out of use, the Civil Engineering Manager must ensure that the two approaching notice signs are each covered with a sign, advising Drivers / Track Vehicle Operators that the equipment is out of use.

Location of Rock fall Detectors and Notice Signs

The following table shows the location of all rock fall detectors, their distance from Sydney, between which stations the rock fall detectors are located, and the protecting signals for that rock fall detector:

km from Sydney	Detector location	Protecting signal Down	Protecting signal Up
99.344 – 99.641	Dombarton	WG1061D	WG1058
99.082 – 99.110	Dombarton	WG1061D	WG1058

Signs are provided on either side of each of the rock fall sites, facing to Down and Up trains/track vehicles respectively.

Signs are provided on the following signals:

- WG1058 Up home signal
- WG1061D Down home/starting signal.

Activation of Rock fall Detectors

When rock fall occurs, signals WG1058 and WG1061D will be placed at stop.

Indicator lights are provided on the indicator diagram at NCCS and the local control panel at Dombarton shows the condition of the rock fall detectors.

Responding to a warning from rock fall detectors

Each of the following conditions must be treated as an indication of track obstruction or damage and the instructions for protecting the affected site must be carried out by the Signaller:

- when a red rock fall detector light is displayed
- when both detector lights are out and the Signals maintenance representative has not advised that an rock fall detector(s) has been switched to the "override" position
- when the alarm sounds
- when there are conflicting indications between any two of the following:
 - the protecting signals on site

- the signal repeater in NCCS (or Dombarton, when switched in)
- the warning equipment in NCCS (or Dombarton, when switched in)
- when there is a failure of the signalling system at the local control panel at Dombarton.

When the Network Controller detects any indication of track obstruction or damage applicable to the location controlled by a local control panel that is switched in, the Network Controller must immediately inform the Signaller at the local control panel of the circumstances.

Protecting the affected site and restoring the line for normal use

When protecting the affected site

When the affected site has to be protected, the Signaller operating the local control panel or the Network Controller must:

- immediately ensure that all controlled signals on all lines in the affected area are at stop
- place and keep blocking facilities on these signals
- try to stop all rail traffic heading towards the obstruction by any means available
- inform the Network Controller of the circumstances
- inform the Civil maintenance representative(s) and request them to attend
- NOT allow rail traffic to proceed over the affected section until the line is certified safe for traffic by the Civil Engineering Manager (or an employee authorised by that officer).

When the Civil maintenance representative(s) are requested to attend, they must:

- inspect the site and determine the condition of the line and the rock fall detector(s)
- if the line is unsafe for traffic, inform the Network Controller and take whatever steps are necessary to restore the line for normal use
- if the line is safe for traffic, inform the Network Controller of the circumstances.

When the line has been certified safe for traffic

After the line has been certified safe for traffic, the Civil maintenance representative must reset the rock fall detector equipment to allow the protecting signals to clear.

When the Signaller operating the local control panel or the Network Controller has been assured by the local Civil Engineering Manager (or an employee authorised by that officer) that the line has been certified safe for traffic and that the rock fall detecting equipment has been restored to normal, the Signaller operating the local control panel or the Network Controller may then clear all controlled signals to allow rail traffic to proceed.

If the immediate protecting signal(s) will not clear after the line has been certified safe for traffic, the Signaller operating the local control panel or the Network Controller must authorise the Driver/Track Vehicle Operator to pass the signal(s) at stop in accordance with the instructions on the plate attached to the signal.

When the line has been certified safe for traffic but the detector is found to be defective, the Civil maintenance representative(s) must inform the Signaller operating the local control panel or the Network Controller that the detector is defective and then follow the instructions as shown under the heading of "Booking the Equipment Temporarily out of Use" (see next page).

EXCEPTION: *As an exception to the Network Rules and Procedures, it will be permissible to issue a Track Occupancy Authority (TOA) with a train occupying the section in accordance with the instructions shown in the paragraph below.*

Responding to a warning from an embankment slip or rock fall detector (Dombarton – Summit Tank section) when a train is occupying the section

Due to the lack of road access in the Dombarton – Summit Tank section, the following exception to the Network Rules and Procedures for Track Occupancy Authority is permitted.

When an embankment slip or rockfall detector is activated in the Dombarton – Summit Tank section and a train has already entered the section and cannot be safely removed, the Civil maintenance representative may be issued a Track Occupancy Authority for the section, provided the following conditions are met.

- The Driver of the train must be issued a CAN restraining the train until further notice.
- The Driver must secure the train and give an assurance to the Signaller not to move the train until the restraining CAN has been lifted and advice has been received that the line has been inspected and is safe for traffic.
- The Driver must be advised that a TOA will be issued for the section to enable an inspection to take place.
- The TOA issued to the Civil maintenance representative must also include a notation relating to the location of the restrained train along with the work to be performed.

When the section has been inspected and is fit for traffic, the TOA must be fulfilled before the restraining CAN is lifted.

Failure of rock fall detectors

If a rock fall detector warning light or audible warning is activated and an inspection reveals that the rock fall detectors are defective and cannot be promptly repaired, the rock fall detector(s) concerned must be booked out of use.

When the equipment is being booked out of use, the key-locked emergency switch must be placed in the "override" position. This will allow normal operation of the immediate protecting signals.

Booking the equipment temporarily out of use

When the equipment has to be temporarily booked out of use, the Civil and Signals maintenance representatives must:

- inform the Signaller operating the local control panel or the Network Controller of the circumstances
- if the rock fall detector(s) cannot be promptly restored to normal operation, book the rock fall detector(s) out of use on an Infrastructure Booking Authority
- if the equipment is to be booked out of use for an extended period of time, report the matter to the local Civil Engineering Manager and the local Signals Engineering Manager
- while the rock fall detector(s) is booked out of use and the remaining rock fall detector is insufficient to monitor the site, arrange for a Civil maintenance representative to remain at the site and to continually monitor the site until the rock fall detector(s) and associated

equipment have been brought back into use or a supplementary monitoring system has been installed

- turn the key-locked emergency switch to the "override" position
- advise the Signaller operating the local control panel or the Network Controller of the action taken
- ensure that both rock fall detector lights have gone out on the track indicator diagram.

Restoring the equipment to normal use

When the rock fall detector(s) equipment has been repaired, the Civil and Signals maintenance representatives must:

- advise the Signaller operating the local control panel or the Network Controller that the equipment will be restored
- turn the key-locked emergency switch to the "normal" position
- book the rock fall detector(s) back into use on the Infrastructure Booking Authority
- advise the Signaller operating the local control panel or the Network Controller of the action taken.

Routine maintenance, testing and adjustment of rock fall detectors

All routine maintenance, testing and adjustment of rock fall detectors must be jointly conducted by nominated Civil and Signals maintenance representatives, who must inform the Signaller operating the local control panel or the Network Controller before the work is carried out and when it is completed.

Ensuring that the Signaller is aware of the status of the equipment

Before the work commences, the Civil and Signals maintenance representatives must:

- inform the Signaller operating the local control panel or the Network Controller that they are going to temporarily turn off the equipment
- turn the key-locked emergency switch to the "override" position.

When the work is completed and before leaving the rock fall site, the Civil and Signals maintenance representatives must:

- turn the key-locked emergency switch to the "normal" position
- inform the Signaller operating the local control panel or the Network Controller that the equipment has been restored.

Temporarily disconnecting a rock fall detector(s)

If a rock fall detector is to be temporarily disconnected:

either the remaining rock fall detector must be sufficient to monitor the condition of the track at that site

or, if the remaining rock fall detector is insufficient to monitor that rock fall site, the local Civil Engineering Manager must arrange for a Civil maintenance representative to monitor the site until:

- either a supplementary monitoring system has been installed
- or the rock fall detector that had been disconnected has been brought back into use.

The Civil maintenance representative will:

- disconnect the nominated rock fall detector by turning the key on the override switch
- inform the Signaller operating the local control panel or the Network Controller that the nominated rock fall detector has been disconnected.

The Civil maintenance representative must compile the Infrastructure Booking Authority.

Disconnecting and permanently removing a rock fall detector(s)

The local Signals Engineering Manager will arrange for the Signals maintenance representative to carry out the necessary work to disconnect and remove the rock fall detector in conjunction with the Civil engineering representative.

When authorised by the local Signals Engineering Manager, the Signals maintenance representative and the Civil engineering representative will:

- disconnect and remove the nominated rock fall detector(s) by turning the key on the override switch
- compile and jointly sign the Infrastructure Booking Authority
- inform the Signaller operating the local control panel or the Network Controller that the nominated rock fall detector(s) has been permanently removed.

Axle counters

Axle counting equipment is in use between Moss Vale and Mount Murray.

NOTE: The ICE radio system is the primary communications system for contact with the Network Control Centre between Moss Vale and Unanderra

3.1 Dombarton (DMB)

General Arrangements

Dombarton is the junction of the Down and the Up bi-directional main lines to Unanderra and the single line to Moss Vale. Refer interface agreement IA1903 for further details.

The operational interface between ARTC and Sydney Trains is signals WG1032 and WG1034 in the Up direction, and WG1031 and WG1033 in the down direction.

Special working for Up trains from Summit Tank

The signalling system allows Up home/starting signals Nos. 31-26 and 31-28 at Summit Tank to be cleared for a train to depart Summit Tank when the previous Up train has passed signal No. WG1054 complete.

Operation of Points and Signals

The points and signals at Dombarton are operated from NCCS.

A local control panel has also been provided in the traffic hut to allow Dombarton to be operated locally. Not all indications displayed on the local control panel are displayed on the control panel at Wollongong.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Switching the Control Panel in or out

A two-position key-locked switch is provided in the local control panel to allow it to be switched in (local) or switched out (remote).

Indicator lights inscribed "remote" and "local" respectively are provided to indicate when the control panel is switched in or switched to remote control.

When not in use, the closing key must be kept in the box provided and secured with an SL lock in the traffic hut.

Allowing the signals to re-clear automatically

Two buttons inscribed "Down auto re-clearing" and "Up auto re-clearing", are provided on the control panel for the Down and the Up main lines. When the buttons are operated, the following signals will clear automatically after the passage of a train:

Down signal WG1051

Up signal WG1052

Automatic signal operation only works when the route is set for the principal route.

An additional white button inscribed "Down main accept, auto", is provided on the control panel to enable Down outer home signal WG1051 to be cleared by pressing only one button instead of clearing each signal.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power-operated Points in an Emergency

All points worked from NCCS and the local control panel are electrically power-operated.

If these points fail to operate correctly, the Network Controller or the Signaller operating at the local control panel must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Signalling Power Supply Indicators

Normal, Warning and Fail power supply indicator lights are provided on the control panel for the AC and DC power supplies in the Dombarton area.

The green "Normal" indication will be displayed when all the AC or DC power supplies are available.

The yellow "Warning" indication will be displayed when there is a partial failure of some part of the power supply and also when the motor generator is in use.

The red "Fail" indication will be displayed when a total failure of some part of the power supply has occurred.

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

An alarm to warn of any alteration to the power supply is also provided on the Local Control Panel and the attending Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies, the Signaller operating the local control panel or Network Controller must promptly inform the Signals maintenance representative.

Emergency generator

An emergency generator is provided for the AC power supply in the Dombarton area and will be connected after a short delay (normally about 10 seconds, but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

Indication that a motor generator set is operating will be given by the displaying of the yellow "Warning" light and the ringing of the bell.

When normal supply is again available, the yellow light will go out and the motor generator set will automatically cut off.

If a motor generator set is operating for an extended period, the red "Fail" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

The following additional indicators are provided on the control panel.

98.7/Rock fall indicators

Two lights are provided on the control panel to show the condition of the embankment rock fall detectors located at 99.490km and 99.129km.

A green light inscribed "Normal" will be displayed when the rock fall detectors are normal and the rock fall area is safe for trains to proceed.

A red light inscribed "Alarm" will be displayed when the rock fall detector fails or an embankment rock fall has been detected.

The instructions in the case of an embankment rock fall are as shown in section 2.18 of this document.

Signal lamp indicators

A yellow indicator light inscribed "Filament fail" will be displayed when a partial failure of a signal lamp is detected.

A red indicator light inscribed "Lamp fail" will be displayed when a total failure of a signal lamp is detected.

Section indicators

A yellow indicator light inscribed "Clear" will be displayed when the sections on either side of Dombarton are unoccupied and blocking facilities have not been applied on the section.

A red indicator light inscribed "Blocked" will be displayed when blocking facilities have been applied on the section.

Supervisory fail indicator

A red light inscribed "Supervisory fail" is provided in the control panel at Dombarton to indicate when there is a failure of the supervisory control system.

Fire indicators

A red indicator light inscribed "Alarm" will be displayed if a fire occurs.

A yellow indicator light inscribed "System Fault" will be displayed when the battery voltage for the alarm system is low.

Telephone call indicator

A yellow light inscribed "Call lights" will be displayed when the maintenance call pushbutton is pushed and remains on until the pushbutton is cancelled.

General instructions

When a "Warning" or a "Fail" indicator is displayed following a fault, an audible alarm will sound which must be cancelled by the signaller pushing the alarm cancel pushbutton next to the indicators.

When any of these additional indicators is displayed or becomes extinguished, the Signaller operating the local control panel must promptly inform the Signals maintenance representative.

X, Y or Z Maintenance Releasing Switches

X, Y or Z maintenance releasing switches are provided in conjunction with bidirectional signalling and must be operated in accordance with the instructions for using X, Y, Z keys.

The location of these keys is as follows:

Section	Location of maintenance switches
Unanderra – Dombarton	Near signal WG1028U

Blocking Switches

A blocking switch is provided on the local control panel to prevent clearing of signals into a blocked or obstructed section, and is inscribed, "Dombarton – Summit Tank Down Section".

When not in use, the key for the blocking switch must be kept in the box provided and secured with an SL lock in the traffic hut.

The blocking switch is of the rotary switch type (key-locked), coloured black and operates in three positions, left, centre and right.

For normal operation, the switch must be in the centre position and when it is required to use the facility, the switch must be placed in the left-hand "Blocked" position.

To resume normal working after using the blocking facility, the switch must be placed in the right-hand "Clear" position and then to the centre position.

Half Pilot Staffs

Half pilot staffs are provided in the pilot staff locks inside a locked box near the home/starting signals for the Unanderra – Dombarton and Dombarton – Summit Tank sections and are inscribed as follows:

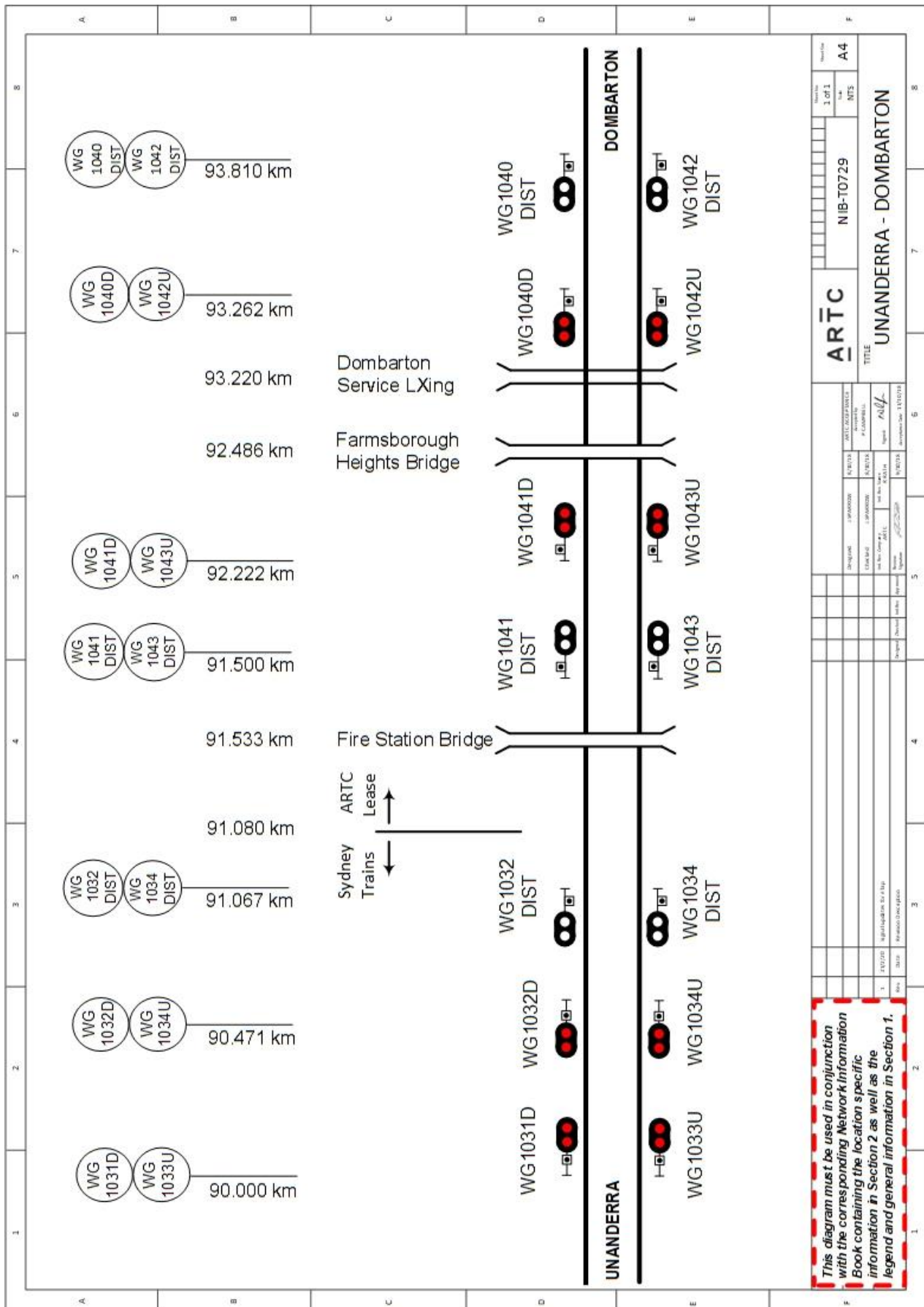
"Dombarton WG1050 Down Main (to Unanderra)" and is coloured yellow

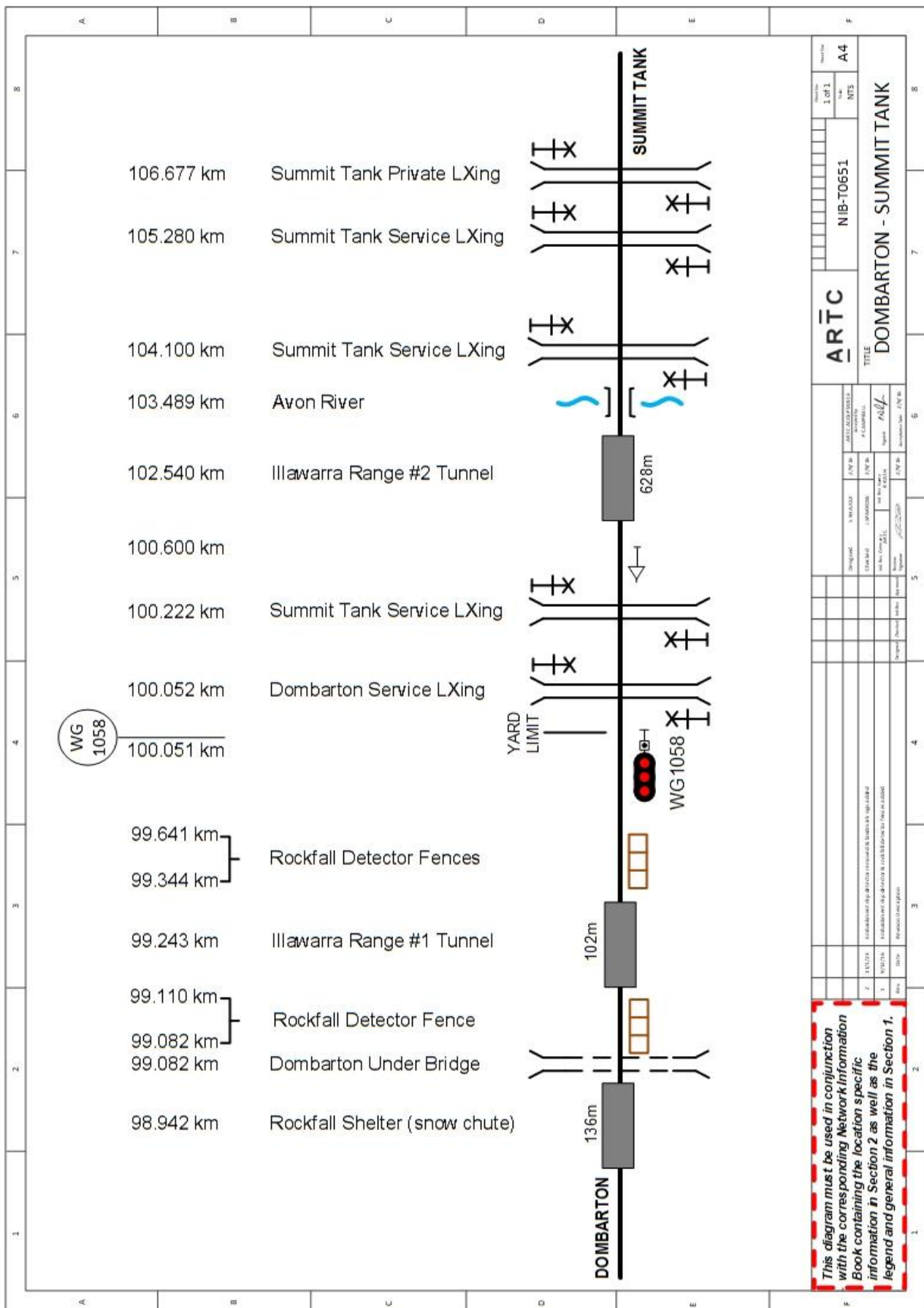
"Dombarton WG1052 Up main (to Unanderra)" and is coloured blue

"Dombarton WG1055 Mainline (to Summit Tank)".

Section	Line	Signal no.
Unanderra – Dombarton	Down main	WG1050
Dombarton – Unanderra	Up main	WG1052U
Dombarton – Summit Tank	Main line	WG1055D

The half pilot staff from signal WG1055D is also the authority to pass signal WG1057U during Pilot Staff working.





3.2 Summit Tank (SMT)

Summit Tank is a loop location.

Loop length 725m

Operation of Points and Signals

The points and signals at Summit Tank are operated from NCCS.

A local control panel has also been provided in the traffic hut to allow Summit Tank to be operated locally. Not all indications displayed on the local control panel are displayed on the control panel at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Operation of Power-operated Points in an Emergency

51 and 55 points worked from Network Control Centre South and the local control panel are electrically power-operated.

If these points fail to operate correctly the Network Controller or the signaller operating at the local control panel must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Switching the Control Panel in or out

A three-position key-locked switch is provided in the control panel to allow it to be switched in (local), switched out (closing), or switched to remote control.

Indicator lights inscribed "local control", "closing" and "remote control" respectively are provided to indicate when the control panel is switched in, switched out, or switched to remote control.

When not in use, the keys for the control panel must be kept in the box provided and secured with an SL lock in the traffic hut.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operator's Pushbuttons

Operator's pushbuttons are provided next to Down and Up home signals (31- 5 and 31-6) and Down and Up home/starting signals for the main line (31-25 and 31-26).

The purpose of the pushbuttons is to enable the Driver:

- to clear the shunting signal on the home signal
- or to clear the starting signal

when the Summit Tank is switched out and remote control is not functional. A white light will be displayed in the pushbutton unit when the pushbuttons can be operated.

Signalling Power Supply Indicators

The following power supply indicator lights are provided on the control panel for the AC and DC power supplies in the Summit Tank area.

The green "Normal" indication will be displayed when all the AC or DC power supplies are available.

The yellow "Standby" indication will be displayed when the emergency AC power supply from the motor generator is in use.

The yellow "Alarm" indication will be displayed when a partial loss of the DC power supply has occurred.

The red "Fail" indication will be displayed when a total failure of some part of the power supply has occurred.

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

An alarm to warn of any alteration to the power supply is also provided on the Local Control Panel and the attending Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies, the Signaller operating the local control panel or Network Controller must promptly inform the Signals maintenance representative.

Emergency generator

An emergency generator is provided for the AC power supply in the Summit Tank area and will be connected after a short delay (normally about 10 seconds, but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

Indication that a motor generator set is operating will be given by the displaying of the yellow "Standby" light and the sounding of the alarm.

When normal supply is again available, the yellow light will go out and the motor generator set will automatically cut off.

If a motor generator set is operating for an extended period, the red "Fail" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

The following additional indicators are provided on the control panel.

Signal lamp indicators

A yellow indicator light inscribed "Filament fail" will be displayed when a partial failure of a signal lamp is detected.

A red indicator light inscribed "Lamp fail" will be displayed when a total failure of a signal lamp is detected.

Section indicators

A yellow indicator light inscribed "Clear" will be displayed when the sections on either side of Summit Tank are unoccupied and blocking facilities have not been applied on the section.

A red indicator light inscribed "Blocked" will be displayed when blocking facilities have been applied on the section.

Location indicators

A yellow indicator light inscribed "Warning" will be displayed when there is a partial failure of the local control supervisory system

A red indicator light inscribed "Alarm" will be displayed when there is a total failure of the local control supervisory system. When the alarm indication is displayed, the Signaller at the local control panel must contact the Signaller at Wollongong signalbox and the Signals maintenance representative.

Telephone call indicator

A yellow light inscribed "Call lights" will be displayed when the maintenance call pushbutton is pushed and remains on until the pushbutton is cancelled.

General instructions

When an "Alarm" or a "Fail" indicator is displayed following a fault, an audible alarm will sound, which must be cancelled by the Signaller pushing the alarm cancel pushbutton next to the indicators.

When any of these additional indicators is displayed or becomes extinguished, the Signaller must promptly inform the Signals maintenance representative.

Setting the Through Route

Two buttons inscribed "Down" and "Up" are provided on the control panel to enable all main line running signals in the Down or the Up direction to be cleared by pressing only one button instead of clearing each signal. The through route button must be pressed to set the route.

If it is required to cancel a through route without the passage of a train, each signal that has been automatically cleared by the operation of the through route setting button must be cancelled.

Blocking Switches

Four blocking switches are provided on the local control panel to prevent clearing of signals into a blocked or obstructed section, and are inscribed as follows:

"Dombarton – Summit Tank Up section"

"Main line"

"Loop line"

"Summit Tank – Mount Murray Down section"

When not in use, the key for the blocking switches must be kept in the box provided and secured with an SL lock in the signalbox.

The blocking switches are of the rotary switch type (key-locked), coloured black, and operate in three positions, left, centre and right.

For normal operation, the switch must be in the centre position and, when it is required to use the facility, the switch must be placed in the left-hand "Blocked" position.

To resume normal working after using the blocking facility, the switch must be placed in the right-hand "Clear" position, and then to the centre position.

Half Pilot Staffs

Half pilot staffs are provided in the pilot staff locks inside a locked box near the home/starting signals for the Summit Tank – Mount Murray and Dombarton – Summit Tank sections.

The half pilot staff for the section Summit Tank – Mount Murray is inscribed "Summit Tank – 31/25".

The half pilot staff for the section Dombarton – Summit Tank is inscribed "Summit Tank – 31/26".

Bank Locomotives

Attached to the front

When it is necessary to detach bank locomotives that are attached to the front of a train, the train must be brought to a stand at Down home signal 31- 5.

The Network Controller (or signaller at Summit Tank local control panel, when switched in) must then clear the route to allow the bank locomotive to enter either the loop line or the main line.

When the bank locomotive(s) has arrived in clear in the loop line or the main line, the Signaller can then set the route for the train to proceed on the other line.

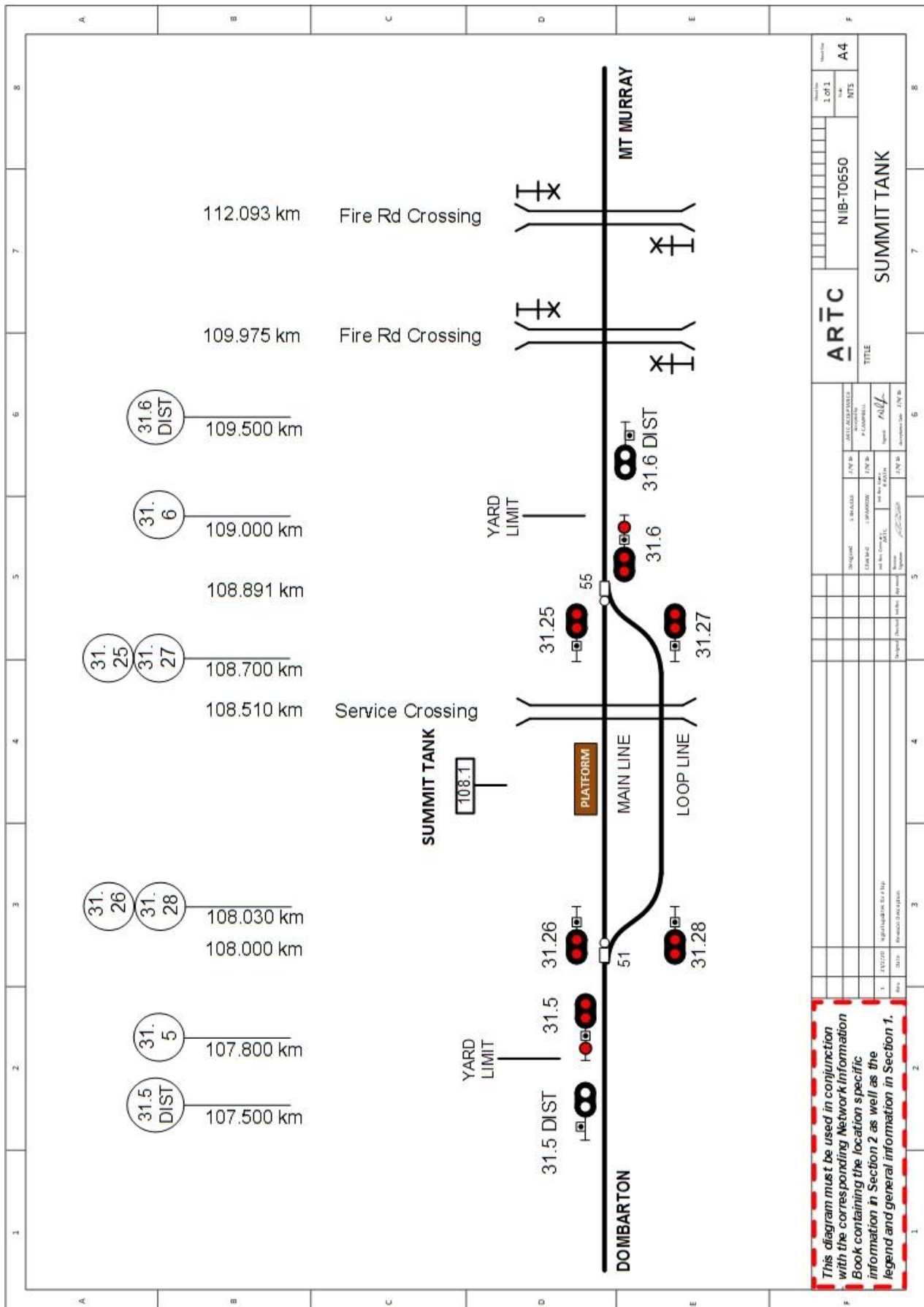
If either the loop line or the main line is occupied, the Network Controller (or signaller at Summit Tank local control panel, when switched in) must clear the shunting signal to allow the bank locomotive(s) to enter the respective line.

Attached to the rear

Bank locomotives that are attached to the rear of trains must be detached on the Moss Vale side of Up home/starting signal 31- 26 or 31- 28.

Crossing out of Gauge Trains at Summit Tank

WARNING: Owing to the sharp curves giving insufficient clearance, out of gauge trains must not cross other trains at Summit Tank.



3.3 Mount Murray (MTM)

Mount Murray is a loop location.

Loop length 1030m

Operation of Points and Signals

The points and signals at Mount Murray are operated from NCCS.

A local control panel has also been provided in the traffic hut to allow Mount Murray to be operated locally. Not all indications displayed on the local control panel are displayed on the control panel at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Operation of Power-operated Points in an Emergency

51 and 55 points worked from NCCS and the local control panel are electrically power-operated.

If these points fail to operate correctly, a transit alarm will sound and the Network Controller or Signaller operating at the local control panel must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Switching the Control Panel in or out

A two-position key-locked switch is provided in the control panel to allow it to be switched in (local) or switched out (remote).

Indicator lights inscribed "local" and "remote" respectively are provided to indicate when the control panel is switched in or switched to remote control.

When not in use, the keys for the control panel must be kept in the box provided and secured with an SL lock in the traffic hut.

Setting the Through Route

Two buttons inscribed "Down" and "Up" are provided on the control panel to enable all main line running signals in the Down or the Up direction to be cleared by pressing only one button instead of clearing each signal. The through route button must be pressed to set the route.

If it is required to cancel a through route without the passage of a train, each signal that has been automatically cleared by the operation of the through route setting button must be cancelled.

Locking

Type	Provided
Approach	Yes
Route	Yes

Signalling Power Supply Indicators

The following power supply indicator lights are provided on the control panel for the AC and DC power supplies in the Mount Murray area.

A yellow light inscribed "Power on" will be displayed when all the AC or DC power supplies are available.

A yellow light inscribed "Location warning" will be displayed when there is a partial failure of some part of the power supply.

A yellow light inscribed "Generator on" will be displayed when the motor generator is in use.

A red light inscribed "Location alarm" will be displayed when a total failure of some part of the power supply has occurred.

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

An alarm to warn of any alteration to the power supply is also provided on the Local Control Panel and the attending Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies, the Signaller operating the local control panel or Network Controller must promptly inform the Signals maintenance representative.

Emergency generator

An emergency generator is provided for the AC power supply in the Mount Murray area and will be connected after a short delay (normally about 10 seconds, but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

Indication that a motor generator set is operating will be given by the displaying of the yellow "Generator on" light and the sounding of the alarm.

When normal supply is again available, the yellow light will go out and the motor generator set will automatically cut off.

If a motor generator set is operating for an extended period, the red "Location alarm" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

The following additional indicators are provided on the control panel.

Signal lamp indicators

A yellow indicator light inscribed "Signal filament fail" will be displayed when a partial failure of a signal lamp is detected.

A red indicator light inscribed "Signal lamp fail" will be displayed when a total failure of a signal lamp is detected.

Fire indicators

A red indicator light inscribed "Alarm" will be displayed if a fire occurs.

A yellow indicator light inscribed "System Fault" will be displayed when the battery voltage for the alarm system is low.

Section indicators

A yellow indicator light inscribed "Clear" will be displayed when the sections on either side of Mount Murray are unoccupied and blocking facilities have not been applied on the section.

A red indicator light inscribed "Blocked" will be displayed when blocking facilities have been applied on the section.

Section alarm indicator

A red indicator light inscribed "Section Alarm" will be displayed when there is a failure of the axle counting equipment.

Telephone call indicator

A yellow light inscribed "Call lights" will be displayed when the maintenance call pushbutton is pushed and remains on until the pushbutton is cancelled.

General instructions

When a "Warning" or an "Alarm" indicator is displayed following a fault, an audible alarm will sound, which must be cancelled by the signaller pushing the alarm cancel pushbutton next to the indicators.

When any of these additional indicators is displayed or becomes extinguished, the Signaller must promptly inform the Signals maintenance representative.

Blocking Switches

Four blocking switches are provided on the local control panel to prevent clearing of signals into a blocked or obstructed section, and are inscribed as follows:

"Mount Murray – Summit Tank Up section"

"Main line"

"Loop line"

"Mount Murray – Robertson Down section".

When not in use, the key for the blocking switches must be kept in the box provided and secured with an SL lock in the traffic hut.

The blocking switches are of the rotary switch type (key-locked), coloured black, and operate in three positions, left, centre and right.

For normal operation, the switch must be in the centre position and, when it is required to use the facility, the switch must be placed in the left-hand "Blocked" position.

To resume normal working after using the blocking facility, the switch must be placed in the right-hand "Clear" position, and then to the centre position.

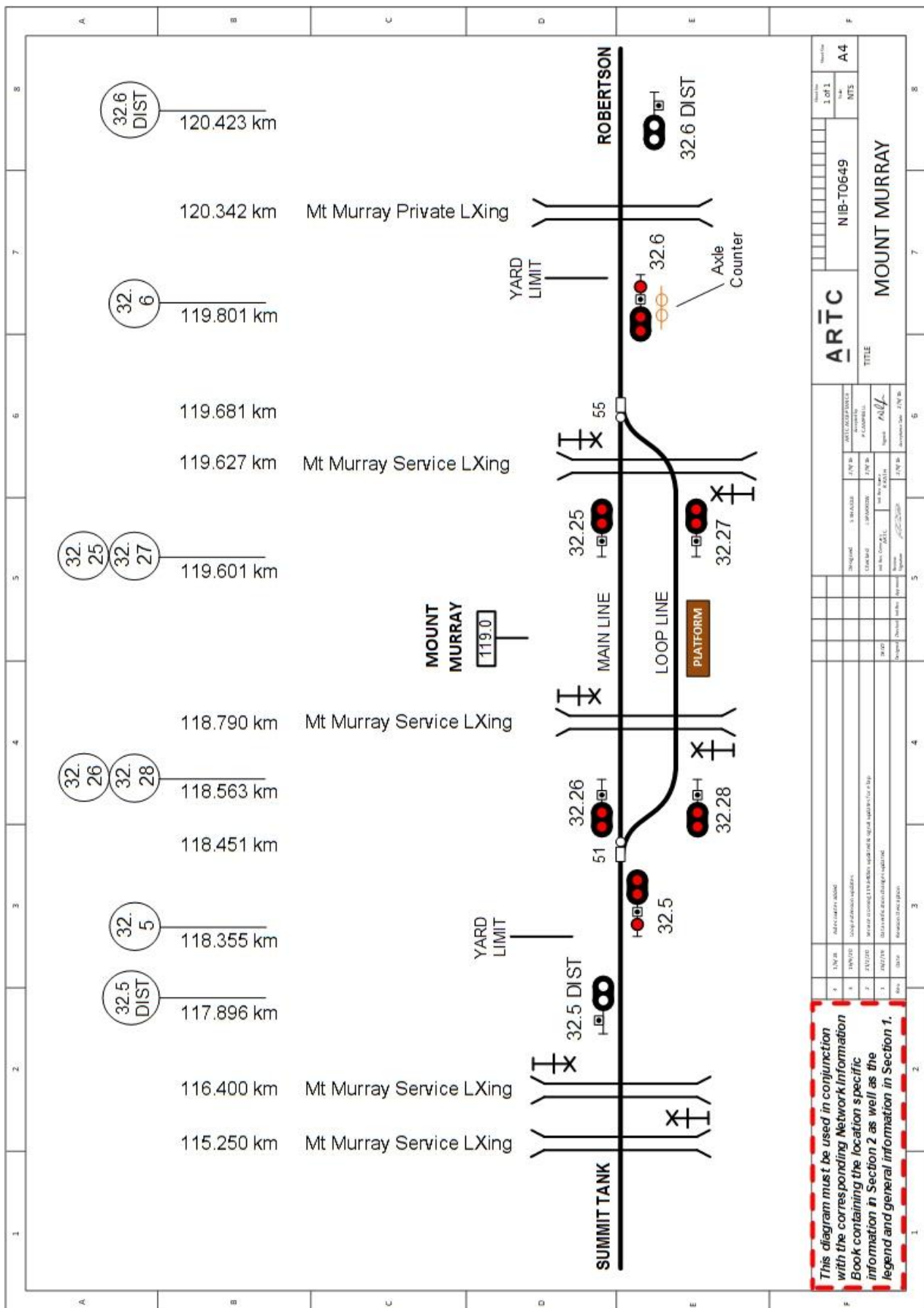
Half Pilot Staff

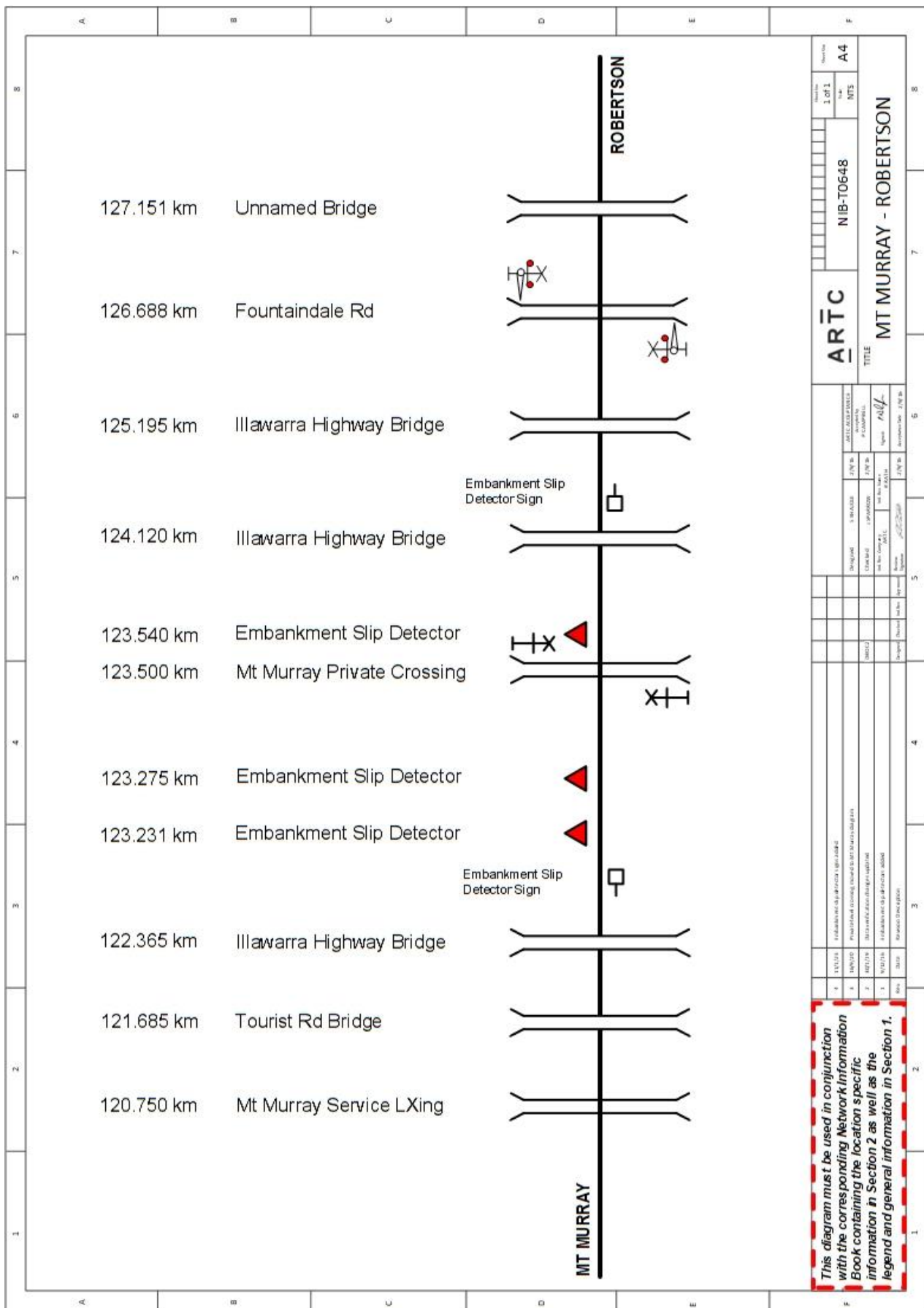
Half pilot staff is provided in the pilot staff locks inside a locked box near the home/starting signals for the Mount Murray – Summit Tank section.

The half pilot staff for the section Mount Murray – Summit Tank is inscribed "Mount Murray – 32/26".

Special Instructions for Crossing of Trains

Owing to the amount of noise created by placing Down trains in the loop line for crossing purposes, when it is necessary for a Down train to cross an Up train, the Down train must be held at Down home signal 32-5 until the Up train has been placed clear in the loop line, unless specifically directed otherwise by the Network Controller.





3.4 Robertson (RTS)

Robertson is a loop location and also has a siding operated by ground frame.

Loop length 660m

Siding length 217m

Operation of Points and Signals

The points, frame release and signals at Robertson are operated from NCCS.

A local control panel has also been provided in the traffic hut to allow Robertson to be operated locally. Not all indications displayed on the local control panel are displayed on the control panel at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Switching the Control Panel in or out

A three-position key-locked switch is provided in the control panel to allow it to be switched in (local), switched out (closing) or switched to remote control (remote).

Indicator lights inscribed "local control", "closing" or "remote control" respectively are provided to indicate when the control panel is switched in or switched to remote control.

When not in use, the closing key must be kept in the box provided secured with an SL lock in the traffic hut.

Setting the Through Route

Two buttons inscribed "Down through" and "Up through" are provided on the control panel to enable all main line running signals in the Down or the Up direction to be cleared by pressing only one button instead of clearing each signal. The through route button must be pressed for at least one second to set the route.

If it is required to cancel a through route without the passage of a train, each signal that has been automatically cleared by the operation of the through route setting button must be cancelled.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power-operated Points in an Emergency

51 and 55 points worked from NCCS and the local control panel are electrically power-operated.

If these points fail to operate correctly, the Network Controller or the Signaller operating at the local control panel must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Signalling Power Supply Indicators

The following power supply indicator lights are provided on the control panel for the AC and DC power supplies in the Robertson area.

The green "Normal" indication will be displayed when all the AC or DC power supplies are available.

The yellow "Stand by" indication will be displayed when the emergency AC power supply from the motor generator is in use.

The yellow "Alarm" indication will be displayed when a partial loss of the DC power supply has occurred.

The red "Fail" indication will be displayed when a total failure of some part of the power supply has occurred.

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration.

An alarm to warn of any alteration to the power supply is also provided on the Local Control Panel and the attending Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies, the Signaller operating the local control panel or Network Controller must promptly inform the Signals maintenance representative.

Emergency generator

An emergency generator is provided for the AC power supply in the Robertson area and will be connected after a short delay (normally about 10 seconds but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

Indication that a motor generator set is operating will be given by the displaying of the yellow "Stand by" light and the ringing of the bell.

When normal supply is again available, the yellow light will go out, the green light will be displayed, and the motor generator set will automatically cut off.

If a motor generator set is operating for an extended period, the red "Fail" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

The following additional indicators are provided on the control panel.

Signal lamp indicators

A yellow indicator light inscribed "Filament fail" will be displayed when a partial failure of a signal lamp is detected.

A red indicator light inscribed "Lamp fail" will be displayed when a total failure of a signal lamp is detected.

Section indicators

A yellow indicator light inscribed "Clear" will be displayed when the sections on either side of Robertson are unoccupied and blocking facilities have not been applied on the section.

A red indicator light inscribed "Blocked" will be displayed when blocking facilities have been applied on the section.

Indicator lights inscribed "Clear" and "Blocked" are also provided for the main line and the loop line.

Section alarm indicator

A red indicator light inscribed "Section Alarm" will be displayed when there is a failure of the axle counting equipment.

Location indicators

A yellow indicator light inscribed "Fail" will be displayed when there is partial failure of the local control supervisory system.

A red indicator light inscribed "Alarm" will be displayed when there is a total failure of the local control supervisory system. When the alarm indication is displayed, the Signaller at the local control panel must contact the signaller at Wollongong signalbox and the Signals maintenance representative.

Telephone call indicator

A yellow light inscribed "Call lights" will be displayed when the maintenance call pushbutton is pushed and remains on until the pushbutton is cancelled.

General instructions

When a "Warning" or a "Fail" indicator is displayed following a fault, an audible alarm will sound which must be cancelled by the Signaller pushing the alarm cancel pushbutton next to the indicators.

When any of these additional indicators is displayed or extinguished, the Signaller must promptly inform the Signals maintenance representative.

Ground Frame

Frame C

Frame C is located on the Up side of the main line adjacent to the points and provides access to the Perway siding.

Frame C is unlocked by a key from releasing switch C, which is released by 81 release at NCCS or the local control panel.

Emergency release key

An emergency release key is provided to release frame C in the event of a failure of releasing switch C. The key is located in a release lock in the local control panel.

When the key is taken from the releasing lock, it will place all signals at Robertson to stop.

Operator's Pushbuttons

Operator's pushbuttons are provided next to Down and Up home signals (33- 5 and 33-6), and Down and Up home/starting signals for the main line (33- 25 and 33-26).

The purpose of the pushbuttons is to enable the Driver:

- to clear the shunting signal on the home signal
- or to clear the starting signal

when Robertson is switched out and remote control is not functional.

A white light will be displayed in the pushbutton unit when the pushbuttons can be operated.

To Enter Robertson via the main line or the loop line

The Driver must bring the train to a stand at the home signal and depress the "Cancel" pushbutton to place the signal to stop.

When the white light is displayed, the Driver or the Qualified Worker must depress either the "Shunt main", "Loop", or "Shunt loop" pushbutton, depending on the movement to be made.

To Depart Robertson

When the train is ready to depart, the Driver or the Qualified Worker must depress the pushbutton for the applicable home/starting signal.

Blocking Switches

Four blocking switches are provided on the local control panel to prevent clearing of signals into a blocked or obstructed section, and are inscribed as follows:

"Calwalla – Robertson Down section"

"Main line"

"Loop line"

"Robertson – Mount Murray Up direction".

When not in use, the key for the blocking switches must be kept in the box provided and secured with an SL lock in the traffic hut.

The blocking switches are of the rotary switch type (key-locked), coloured black, and operate in three positions, left, centre and right.

For normal operation, the switch must be in the centre position and, when it is required to use the facility, the switch must be placed in the left-hand "Blocked" position.

To resume normal working after using the blocking facility, the switch must be placed in the right-hand "Clear" position, and then to the centre position.

Half Pilot Staff

Half pilot staff is provided in the pilot staff locks inside a locked box near the home/starting signals for the Robertson – Calwalla section.

The half pilot staff for the section Robertson - Calwalla is inscribed "Robertson – 33/25".

Hoddle Street Level Crossing

Type F flashing light highway signals, warning bells and boom barriers are in use at Hoddle Street level crossing at 129.150km.

The highway signals, bells and booms are automatically controlled by track circuit for Down and Up main line trains, subject to the clearing of the protecting signal.

If an Up train is closely approaching Up home signal 33- 6, or Down home/starting signal 33-25 or 33- 27, at stop, the setting of the applicable signal route will cause the level crossing warning indications to be displayed but clearing of the signal will be delayed for 15 seconds.

If it becomes necessary to hold a train at signal 33-6, 33- 25 or 33- 27 after the signal has been cleared, the level crossing warning indications will continue to be displayed for a period of 120 seconds after the signal is returned to stop and will then be cancelled automatically.

Special arrangements if there is a failure of the signals protecting Hoddle Street level crossing

If either Up home signal 33- 6 or Down home/starting signal 33- 25 or 33- 27 fails, the Network Controller (or Robertson, when switched in) must not authorise a train to pass these signals at stop until:

- either the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the handsignaller(s) at the level crossing that the road traffic is clear of the crossing.

If either Down home/starting signal 33-25 or 33- 27 fails, the Network Rules and Procedures for special working must be carried out.

Meryla Street Level Crossing

Type F flashing light highway signals, warning bells and boom barriers are in use at Meryla Street level crossing at 128.084km.

The highway signals, bells and booms are automatically controlled by track circuit for Down and Up main line trains, subject to the clearing of the protecting signals.

If a train is closely approaching Down home signal 33- 5, or Up home/starting signal 33- 26 or 33- 28, at stop, the setting of the applicable signal route will cause the level crossing warning indications to be displayed but clearing of the signal will be delayed for 15 seconds.

If it becomes necessary to hold a train at signal 33- 5, 33- 26 or 33- 28 after the signal has been cleared, the level crossing warning indications will continue to be displayed for a period of 120 seconds after the signal is returned to stop and will then be cancelled automatically.

A bell timer is provided at the level crossing to switch off the bell between the hours of 2200 and 0600.

Special arrangements if there is a failure of the signals protecting Meryla Street level crossing

If either Down home signal 33- 5 or Up home/starting signal 33- 26 or 33- 28 fails, the Network Controller (or Robertson, when switched in) must not authorise a train to pass these signals at stop until:

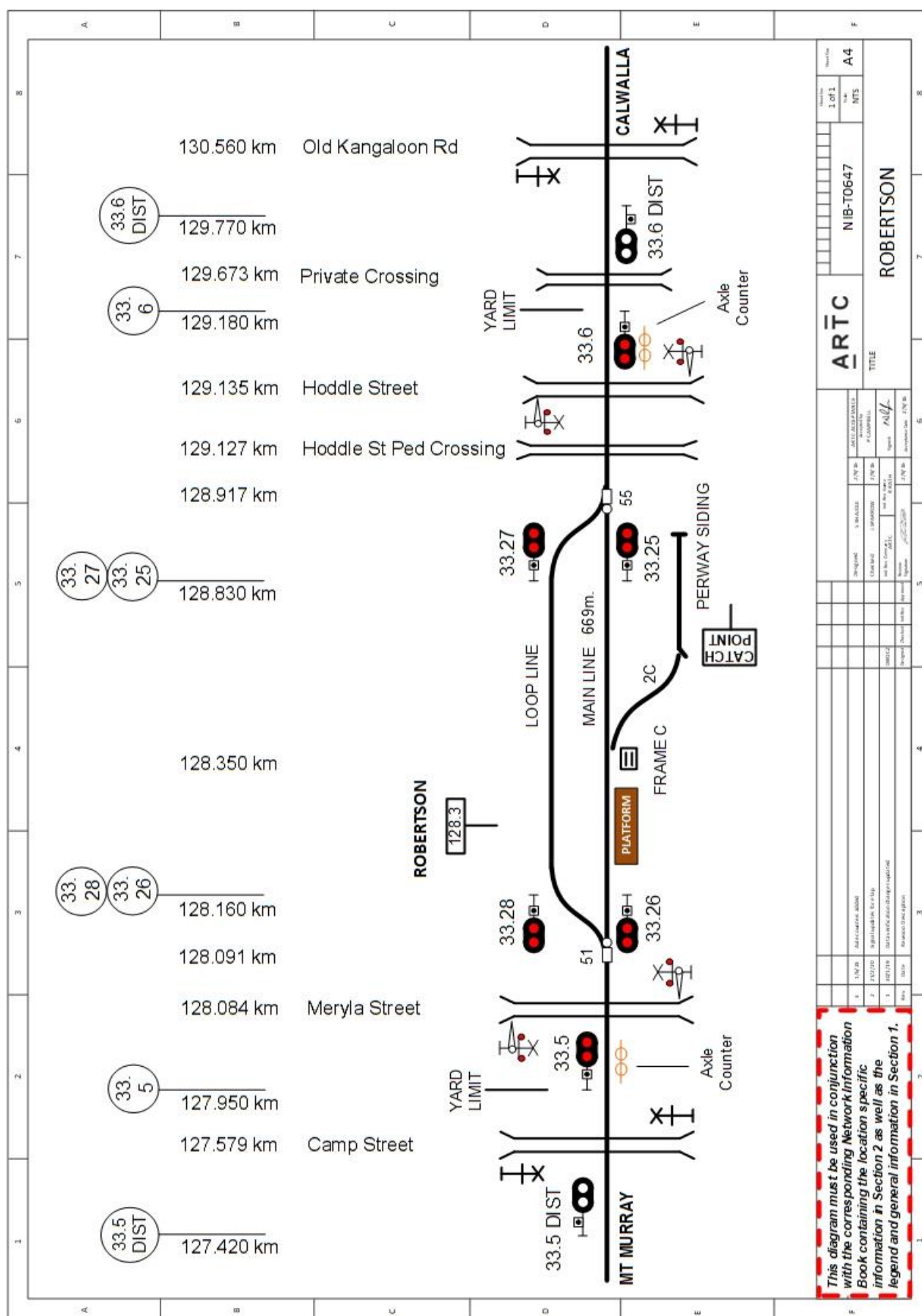
- either the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the handsignaller(s) at the level crossing that the road traffic is clear of the crossing.

If either Up home/starting signal 33- 26 or 33- 28 fails, the Network Rules and Procedures for special working must be carried out.

Fountaindale Road Level Crossing

Type F flashing lights, warning bells and boom barriers are in use at Fountaindale Road level crossing at 126.675km.

Trackside approach warning signs are located at 126.716km in the Down direction and 127.216km in the Up direction.



3.5 Calwalla (CLW)

Calwalla is a loop location.

Loop length 690m

Operation of Points and Signals

The points and signals at Calwalla are operated from NCCS.

A local control panel has also been provided in the traffic hut to allow Calwalla to be operated locally. Not all indications displayed on the local control panel are displayed on the control panel at NCCS.

All points worked from NCCS are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

Switching the Control Panel in or out

A two-position key-locked switch is provided in the control panel to allow it to be switched in (local) or switched out (remote).

Indicator lights inscribed "local control" and "closing" respectively are provided to indicate when the control panel is switched in or switched to remote control.

When not in use, the keys for the control panel must be kept in the box provided and secured with an SL lock in the traffic hut.

Setting the Through Route

Two buttons inscribed "Down" and "Up" are provided on the control panel to enable all main line running signals in the Down or the Up direction to be cleared by pressing only one button instead of clearing each signal. The through route button must be pressed to set the route.

If it is required to cancel a through route without the passage of a train, each signal that has been automatically cleared by the operation of the through route setting button must be cancelled individually.

Locking

Type	Provided
Approach	Yes
Route	Yes

Operation of Power-operated Points in an Emergency

51 and 55 points worked from NCCS and local control panel are electrically power-operated.

If these points fail to operate correctly, the Network Controller or the Signaller operating at the local control panel must try to restore the points to their previous position to allow trains to continue running. However, if it is necessary to alter the route, the points may be manually operated.

The Signals maintenance representative must be promptly advised of the circumstances.

Signalling Power Supply Indicators

The following power supply indicator lights are provided on the control panel for the AC and DC power supplies in the Calwalla area.

A yellow light inscribed "Power on" will be displayed when all the AC or DC power supplies are available.

A yellow light inscribed "Location warning" will be displayed when a partial loss of some part of the power supply has occurred.

A yellow light inscribed "Generator on" will be displayed when the motor generator is in use.

A red light inscribed "Location alarm" will be displayed when a total failure of some part of the power supply has occurred.

An alarm will show on the Phoenix Screen at NCCS to warn of any alteration to the power supply and the Network Controller must acknowledge the alteration

An alarm to warn of any alteration to the power supply is also provided on the Local Control Panel and the attending Signaller must acknowledge the alteration by depressing the alarm pushbutton.

When there is any alteration or interruption to the AC or DC power supplies, the Signaller operating the local control panel or Network Controller must promptly inform the Signals maintenance representative.

Emergency Generator

An emergency generator is provided for the AC power supply in the Calwalla area and will be connected after a short delay (normally about 10 seconds but up to a minute in some circumstances), and emergency power will then be supplied from the motor generator set.

Indication that a motor generator set is operating will be given by the displaying of the yellow "Generator on" light and the ringing of the bell.

When normal supply is again available, the yellow light will go out, the green light will be displayed, and the motor generator set will automatically cut off.

If a motor generator set is operating for an extended period, the red "Location alarm" light will show when the fuel supply is reduced to a quantity sufficient for a further 2 hours' running.

Additional Indicators

The following additional indicators are provided on the control panel.

Signal lamp indicators

A yellow indicator light inscribed "Signal filament fail" will be displayed when a partial failure of a signal lamp is detected.

A red indicator light inscribed "Signal lamp fail" will be displayed when a total failure of a signal lamp is detected.

Fire indicators

A red indicator light inscribed "Alarm" will be displayed if a fire occurs.

A yellow indicator light inscribed "System Fault" will be displayed when the battery voltage for the alarm system is low.

Section indicators

A yellow indicator light inscribed "Clear" will be displayed when the sections on either side of Calwalla are unoccupied and blocking facilities have not been applied on the section.

A red indicator light inscribed "Blocked" will be displayed when blocking facilities have been applied on the section.

Indicator lights inscribed "Clear" and "Blocked" are also provided for the main line and the loop line.

Section alarm indicator

A red indicator light inscribed "Section Alarm" will be displayed when there is a failure of the axle counting equipment.

Telephone call indicator

A yellow light inscribed "Call lights" will be displayed when the maintenance call pushbutton is pushed and remains on until the pushbutton is cancelled.

General instructions

When a "Warning" or a "Fail" indicator is displayed following a fault, an audible alarm will sound which must be cancelled by the signaller pushing the alarm cancel pushbutton next to the indicators.

When any of these additional indicators is displayed or extinguished, the signaller must promptly inform the Signals maintenance representative.

Blocking Switches

Four blocking switches are provided on the local control panel to prevent clearing of signals into a blocked or obstructed section, and are inscribed as follows:

"Calwalla – Moss Vale Down section"

"Loop line"

"Main line"

"Robertson – Calwalla Up section".

When not in use, the key for the blocking switches must be kept in the box provided and secured with an SL lock in the traffic hut.

The blocking switches are of the rotary switch type (key-locked), coloured black, and operate in three positions, left, centre and right.

For normal operation, the switch must be in the centre position and, when it is required to use the facility, the switch must be placed in the left-hand "Blocked" position.

To resume normal working after using the blocking facility, the switch must be placed in the right-hand "Clear" position, and then to the centre position.

Half Pilot Staffs

Half pilot staffs are provided in the pilot staff locks inside a locked box near the home/starting signals for the Calwalla – Moss Vale and Robertson – Calwalla sections.

The half pilot staff for the section Calwalla – Moss Vale is inscribed "Calwalla – 34/25".

The half pilot staff for the section Calwalla – Robertson is inscribed "Calwalla – 34/26".

Sheepwash Road Level Crossing

Type F flashing lights and bells are provided at Sheepwash Road level crossing at 140.398km.

The warning equipment is automatically controlled by track circuit for Down and Up trains, subject to the clearance of the signals on each side of the crossing.

If a train is closely approaching Up home signal 34-6, or Down home/starting signal 34-25 or 34-27, at stop, the setting of the applicable signal route will cause the level crossing warning indicators to be displayed but clearing of the signal will be delayed for 15 seconds.

If it becomes necessary to hold a train at signal 34-6, 34-25 or 34-27 after the signal has been cleared, the level crossing warning indicators will continue to be displayed for a period of 120 seconds after the signal is returned to stop and will then cancel automatically.

Special arrangements if there is a failure of the signals protecting Sheepwash Road level crossing

If either Up home signal No. 6 or Down home/starting signal 34-25 or 34-27 fails, the Network Controller (or Calwalla, when switched in) must not authorise a train to pass these signals at stop until:

- either the Network Rules and Procedures for warning trains have been carried out
- or an assurance has been obtained from the handsignaller(s) at the level crossing that the road traffic is clear of the crossing.

If either Down home/starting signal 34-25 or 34-27 fails, the Network Rules and Procedures for special working must be carried out.

