

# Network Information Book

## Sydney 3

### Leightonfield (exc) to Berrima Junction (exc) & Mittagong Junction to Braemar

OGW-30-27

#### Applicability

Interstate Network

#### Publication Requirement

Internal / External

#### Primary Source

Local Appendices Metropolitan 060 & 065 and South Volume 2  
Route Access Standard - Defined Interstate Rail Network Section Pages D46 and D51

#### Document Status

Version #	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
2.8	18 Dec 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	10 Aug 2016		First Issue

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2.0	5 Sep 2017	Various	General Information sections updated including the removal of section 1.6 Unfenced Lines and diagram legend updated. Location information for Glenlee, Douglas Park, Maldon and Yerrinbool updated. Burradoo Wayside location added. Addition of diagrams for Cabramatta, Picton, Picton – Tahmoor & Bargo and various diagrams updated with signals corrections.
2.1	15 Mar 2019	Various	Glenfield points & Tennessee signal information updated as detailed in safe notices. Section 1.2 Safe Working System updated. Shared corridor details added to section 1.3. Section 1.5.2 Interlocking's & Sidings updated. Section 1.7 Level Crossing updated. Section 1.8 Emergency Local Releases updated. Corrections to various diagrams.
2.2	16 Apr 2020	1.3, 1.16, 2.2	Shared Corridor procedures updated in section 1.3. Drawing legend updated. Moorebank Intermodal Terminal details added. Glenfield, Glenlee, Picton – Tahmoor, Tahmoor, Mittagong and Bowral diagrams updated, Updates to various diagrams for eTap introduction.
2.3	15 Jun 2020	1.7, 2.14	Mittagong Junction diagram updated to include Braemar branch line details and new level crossing added in section 1.7.
2.4	5 May 2021	1.4, 1.13, 2.7, 2.13 & 2.15	Adjacent Train Control Centres & Wayside Equipment sections updated. Aylmerton crossovers text removed. Cabramatta, Menangle, Aylmerton & Burradoo diagrams updated.
2.5	26 Nov 2021	1.1, 1.2, 1.3, 1.5, 1.16, 2.4, 2.13	Board Extent, Safeworking System, Applicable Rules, Section Operating Equipment, Drawing Legend, Glenlee & Mittagong sections updated. Various diagram corrections.
2.6	7 Nov 2022	2.2, 2.3 2.8, 2.9	Tahmoor location updated with long km reference. Glenfield, Macarthur, Picton-Tahmoor & Tahmoor diagrams updated.
2.7	11 Apr 2023	1.7, 2.1, 2.10	Level Crossings table, Cabramatta & Tennessee diagrams updated.
2.8	18 Dec 2023	1.7, 1.16, 2.2, 2.4, 2.10 2.12.1, 2.13	Level Crossings table updated. Lookout Working Restrictions section added. Warwick Farm location added. Telephone references removed from Glenfield, Glenlee & Mittagong Junction locations. Cabramatta, Liverpool, Glenfield, Menangle, Tennessee and Burradoo diagrams updated

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## 1 General Information

### 1.1 Board Extent

Leightonfield exclusive LF12 (24.482km) to Berrima Junction exclusive BJ87(140.908km) / 87.4 (141.021km)

Mittagong Junction to Braemar clear of frame B (125.020km) to stop block (121.920km)

This area is controlled by the Sydney 3 Network Controller, Network Control Centre South (NCCS).

Contact Numbers:

Phone: (02) 6924 9803

Train Transit Manager: (02) 6930 5311

Emergency: (02) 6924 9863

### 1.2 Safeworking Systems

Leightonfield to Glenlee – Single Line Bi-Directional Rail Vehicle Detection System

Glenlee to Berrima Junction – Double Line Uni-Directional Rail Vehicle Detection System

Mittagong Junction to Braemar – Train Staff and Ticket (No Ticket)

### 1.3 Applicable Rules

#### Safeworking - Network Rules and Procedures

ARTC Network Rules and Procedures will apply to the Metropolitan Freight Network and the Southern Sydney Freight Line.

To ensure consistent application of Network Rules and Procedures in the Sydney Trains and ARTC shared rail corridor areas where the Southern Sydney Freight Line and Metropolitan Freight Network operates, ARTC and Sydney Trains have agreed to variations to their respective Network Rules and Procedures which will apply as detailed. **ANWT 304 Track Occupancy Authority and ANPR 701 Using a Track Occupancy Authority**

In exception to the requirement in ARTC Rule ANWT 304 page 4, Authorisation, Attended locations and ANPR 701 page 3, Obtaining a Track Occupancy Authority, Network Controllers, Network Control Officers and Protection Officers must compile a Track Occupancy Authority form (ANRF 002B) when a Track Occupancy Authority is wholly within the yard limits of an ARTC attended location.

#### ANWT 308 Absolute Signal Blocking

In exception to the requirement in ARTC Rule ANWT 308 page 4, Protection Methods, Protection Officers when requesting Absolute Signal Blocking (ASB) on the ARTC Network must make sure that:

- two consecutive controlled signals can be set at STOP with blocking facilities applied, or
- an ESML handle can be removed to exclude rail traffic, or
- one controlled signal can be set at STOP with blocking facilities applied, and
  - a set of points can be secured to prevent access, or

- an easily-reached safe place is available and a Lookout is provided.

Network Controllers and Network Control Officers must make sure that when Protection Officers request an ASB on the ARTC / Sydney Trains shared rail corridor that the above requirements are observed.

### NWT 310 Lookout Working

In addition to the requirements of Sydney Trains Rule NWT 310, Sydney Trains will ensure that persons working under NWT 310 Lookout Working, Protection Officers when requesting Lookout Working must make sure that:

- Work in the Danger Zone using the Lookout Working method must be done in daylight hours only, for a maximum of two (2) hours, and
- If the work is to continue beyond this time, it is to be treated as a new application.

Network Controllers and Network Control Officers must make sure that when Protection Officers request Lookout Working on the ARTC / Sydney Trains shared rail corridor that the above requirement is observed.

The above exceptions are summarized in the following table:

### ADDITIONAL REQUIREMENTS

SYDNEY TRAINS	ARTC
<b>NWT 304</b>	<b>ANWT 304</b>
NIL	A Track Occupancy Authority form (ANRF 002B) must be compiled when a Track Occupancy Authority is wholly within the yard limits of an ARTC attended location.
<b>NWT 308 (Absolute Block)</b>	<b>ANWT 308</b>
NIL	<ul style="list-style-type: none"> <li>• two consecutive controlled signals can be set at STOP with blocking facilities applied, or</li> <li>• an ESML handle can be removed to exclude rail traffic, or</li> <li>• one controlled signal can be set at STOP with blocking facilities applied, and <ul style="list-style-type: none"> <li><input type="checkbox"/> a set of points can be secured to prevent access or</li> <li><input type="checkbox"/> an easily-reached safe place is available and a Lookout is provided.</li> </ul> </li> </ul>
<b>NWT 310</b>	<b>ANWT 310</b>
<ul style="list-style-type: none"> <li>• Work in the Danger Zone using the Lookout Working method must be done in daylight hours only, for a maximum of two (2) hours, and</li> <li>• if the work is to continue beyond this time, it is to be treated as a new application.</li> </ul>	NIL

## 1.4 Adjacent Train Control Boards / Centres

ARTC Sydney 2	(02) 6924 9804	Emergency	(02) 6924 9864
ARTC Main South A	(02) 6924 9807	Emergency	(02) 6924 9867
Sydney Trains	(02) 9379 4733		

## 1.5 Section Operating Equipment

### 1.5.1 Interlockings and Sidings

Km	Interlocking, Station, Platform or Siding	Length of Passenger Platform in Metres
32.974	Warwick Farm Crossing Loop	
39.347	Glenfield Crossing Loop	
59.970	Glenlee triangle (Sada)	
62.853	Menangle Park	Up & Down main Nos. 1 & 2, 50
65.262	Menangle	Up main No. 1, 50 Down main No. 2, 86
73.272	Douglas Park	Up main No. 1, 55 Down main No. 2, 88
81.550	Maldon Allied Mills siding	
82.434	Maldon, Blue Circle Southern Cement sidings	
84.400	Picton Up Refuge Siding	
85.249	Picton	Up main No. 1, 123 Down main No. 2, 122
85.570	Picton (Thirlmere Branch)	
94.493	Tahmoor	Up & Down main Nos. 1 & 2, 92
97.639	Tahmoor Colliery (Balloon Loop)	
102.830	Bargo	Up & Down main Nos. 1 & 2, 77
113.330	Tennessee Emergency Crossover	
116.314	Yerrinbool	Up & Down main Nos. 1 & 2, 80
123.806	Aylmerton Emergency Crossover	
130.064	Mittagong Junction (Braemar Branch)	
131.474	Mittagong Down Refuge Siding	
131.571	Mittagong	Up main No. 1, 109 Down main No. 2, 153
131.780	Mittagong Crossover	
136.342	Bowral	Up & Down main Nos. 1 & 2, 159
138.843	Burradoo	Up & Down main Nos. 1 & 2, 76

**Platforms at which passenger trains must not set back**

If a passenger train partially overruns any of the platforms shown in the table below, the train must not set back to the platform.

At all other platforms not listed in the table below the instructions as shown in the applicable Network Rules and Procedures must be carried out.

**Platforms at which passenger trains must not set back - Glenlee to Moss Vale**

Station	Platform
Menangle	Down Platform
Douglas Park	Both platforms



## 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
	Liverpool Service Lxing	SSFL	35.045	Emergency Only	Hospital	Bollards
	Casula Service Lxing	SSFL	38.838	Emergency Only		Bollards
	Glenfield Service Lxing	SSFL	39.590			Locked gates
	Campbelltown Service Lxing	SSFL	54.490		Sydney Trains	Locked gates
4272	Campbelltown Service Lxing	SSFL	55.245	Road	Sydney Trains	Half Boom Flashing Lights
	Rail Services Take Off	Main South	58.350		ARTC	Take Off
	Menangle Park Pedestrian Signalled Lxing	Main South	62.812	Pedestrian	Public	Pedestrian Booms Upper Quadrant
	Menangle Pedestrian Lxing	Main South	65.383	Pedestrian	Public	Pedestrian Booms Upper Quadrant
4386	Menangle Service Lxing	Main South	66.275	Road	ARTC	Locked gates
566	Camden Road Douglas Park	Main South	73.256	Road	Public	Half Boom Flashing Lights
566	Camden Road Pedestrian Lxing Douglas Park	Main South	73.265	Road	Public	Half Boom Flashing Lights
4199	Douglas Park Private Lxing	Main South	76.122	Road	Private	
4200	Douglas Park Private Lxing	Main South	76.383	Road	Private	
4201	Maldon Private Lxing	Main South	78.060	Road	Private	
4202	Maldon Private Lxing	Main South	78.496	Road	Private	
4203	Maldon Service Lxing	Main South	81.151	Road	Private	
567	Maldon Bridge Road Maldon	Main South	82.439	Road	Public	Half Boom Flashing Lights
4387	Rail Services Lxing	Main South	93.650		ARTC	Take Off – Up only
	Tahmoor Pedestrian Lxing	Main South	94.468	Pedestrian	Public	Swing Gate

	Rail Services Lxing	Main South	100.500		ARTC	Take Off – Down only
4388	Rail Services Lxing	Main South	104.150		ARTC	Take Off – Down only
4389	Rail Services Lxing	Main South	111.420		ARTC	Take Off – Down only
	Tennessee Service Lxing	Main South	113.500		ARTC	Locked gates
	Yerrinbool Pedestrian Lxing	Main South	116.270	Pedestrian	Public	Swing Gate
	Rail Services Take Off	Main South	124.000		ARTC	Take Off – Up & Down
	Mittagong Jct Pedestrian Lxing	Main South	131.707	Pedestrian	Public	Pedestrian Boom Upper Quadrant
	Bowral Pedestrian Lxing	Main South	136.955	Pedestrian	Public	Swing Gate
1901	Burradoo Station Pedestrian Lxing	Main South	138.885	Pedestrian	Public	Pedestrian Booms
4204	Burradoo Private Lxing	Main South	138.900	Road	Private	Locked gate
568	Burradoo Road	Main South	139.396	Road	Public	Half Boom Flashing Lights
4205	Burradoo Private Lxing	Main South	139.448	Road	Private	Stop signs
	Braemar Avenue Braemar	Mittagong Junction - Braemar	122.505	Road	Public	Stop signs

## 1.8 Emergency Local Releases

Tennessee emergency crossover refer to section 2.11

Aylmerton emergency crossover refer to section 2.13

## 1.9 Maximum Permanent Speeds and Permanent Speed Restrictions

Refer the Route Access Standard - Defined Interstate Rail Network Section Pages D45 for all speed information.

## 1.10 Maximum Train Length

Maximum train length is 1800 metres.

## 1.11 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.

## 1.12 Tunnel Locations

Section / location	Name of Tunnel	Length of tunnel in metres	km from Sydney
Picton – Mittagong	Picton	183	87.668 - 87.851
Picton – Mittagong	Yerrinbool	247	120.656 - 120.903
Picton – Mittagong	Aylmerton	950	122.315 - 123.265
Mittagong - Moss Vale	The Gib	516	134.625 - 135.141

### 1.13 Wayside Monitoring Systems

Menangle – Up Main DED, HBD 67.250km

Burradoo – Down Main DED, HBD 138.000km

DED – Dragging Equipment Detector

HBD – Hot Box Detector

### 1.14 Ruling Gradients

Leightonfield to Macarthur	1 in 100
Macarthur to Leightonfield	1 in 100
Macarthur to Picton	1 in 70
Picton to Macarthur	1 in 80
Picton to Berrima Junction	1 in 75
Berrima Junction to Picton	1 in 80

### 1.15 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](https://extranet.artc.com.au/eng_network-config_cd.html)

### 1.16 Lookout Working Restrictions

Lookout working is not permitted on the SSFL Main Line and Loop Line at Warwick Farm  
31.841km to 34.008km.

## 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 Locations and Sections Information

### 2.1 Southern Sydney Freight Line Service / Emergency Level Crossings

#### 2.1.1 General Arrangements

Service / emergency level crossing are located across the Southern Sydney Freight Line to enable emergency access to the network if required.

These access points are not gazetted for public use.

#### 2.1.2 35.045km (Liverpool)

Located on the main Southern Sydney Freight Line at 35.045km

Liverpool Hospital emergency crossing and access point

Protected by bollards located on the rail corridor boundary

#### 2.1.3 38.838km (Casula)

Located on the main Southern Sydney Freight Line at 38.838km

Protected by bollards located on the rail corridor boundary

#### 2.1.4 39.590km (Glenfield)

Located on the main Southern Sydney Freight Line at 39.590km

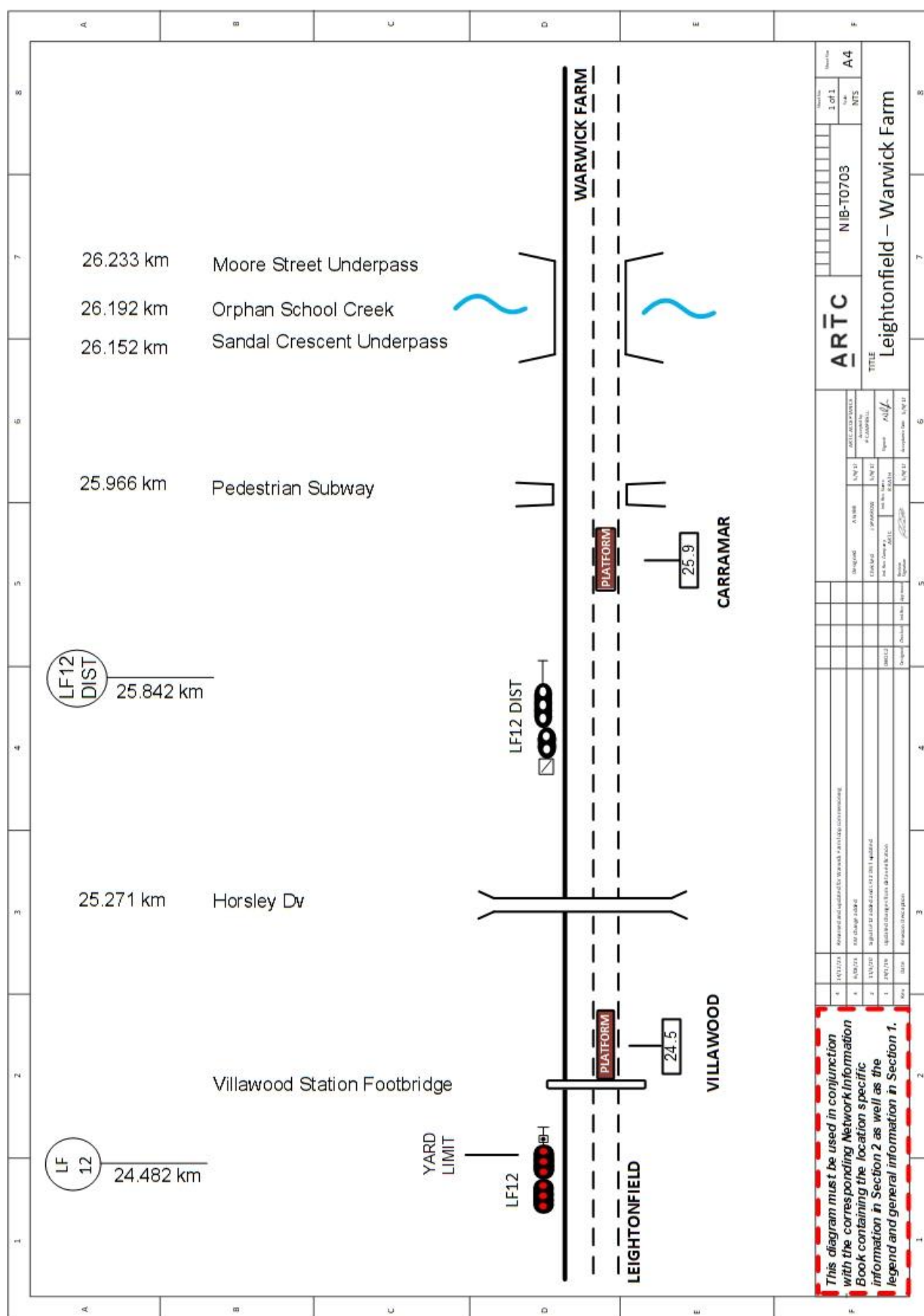
Locked boundary gates on rail corridor

#### 2.1.5 54.245km (Campbelltown)

Located on the main Southern Sydney Freight Line at 54.245km

Locked boundary gates on rail corridor for Sydney Trains service vehicles accessing Campbelltown Yard

## Locations and Sections Information





## 2.2 Warwick Farm Loop (WKR)

### General Arrangements

Operations along the single line (RVD) Southern Sydney Freight Line is remotely controlled by the ARTC Network Control Centre South (NCCS).

Warwick Farm Crossing Loop is a simultaneous entry crossing loop capable of holding a train 1300 metres in length.

Access to the Loop is via the City end (Leightonfield) using number 240 points and the Country end (Glenfield) using number 241 points.

All points and signals are controlled by the Network Controller at NCCS Junee.

Rail Vehicle Detection for the Warwick Farm Crossing Loop are controlled by axle counters with supervisory reset functionality.

The points are operated using Siemens D84M type points machines.

In the Up direction, when Signals WF4 or WF6 are displaying a STOP aspect, trains travelling at 25km/hr or less on approach to WF8 or WF10 will be provided with a low-speed aspect. This allows the train to proceed to the next signal (WF4 or WF6) with a reduced overlap. A simultaneous entry Down direction rail traffic movement is able to occur via 240 points under these conditions.

In the Down direction, when Signals WF9 or WF11 are displaying a STOP aspect, trains travelling at 25km/hr or less on approach to WF5 or WF7 will be provided with a low-speed aspect. This allows the train to proceed to the next signal (WF9 or WF11) with a reduced overlap. A simultaneous entry Up direction rail traffic movement is able to occur via 241 points under these conditions.

### Motor Operated Points

Motor points 240 are located at the City end (Leightonfield) entrance to the Loop.

Motor points 241 are located at the Country end (Glenfield) entrance to the Loop.

### Emergency Operation of motor operated points

In the event of a failure and under the direction of the Network Controller, the points motors can be manually operated using the Emergency Operating Lock Keys located at:

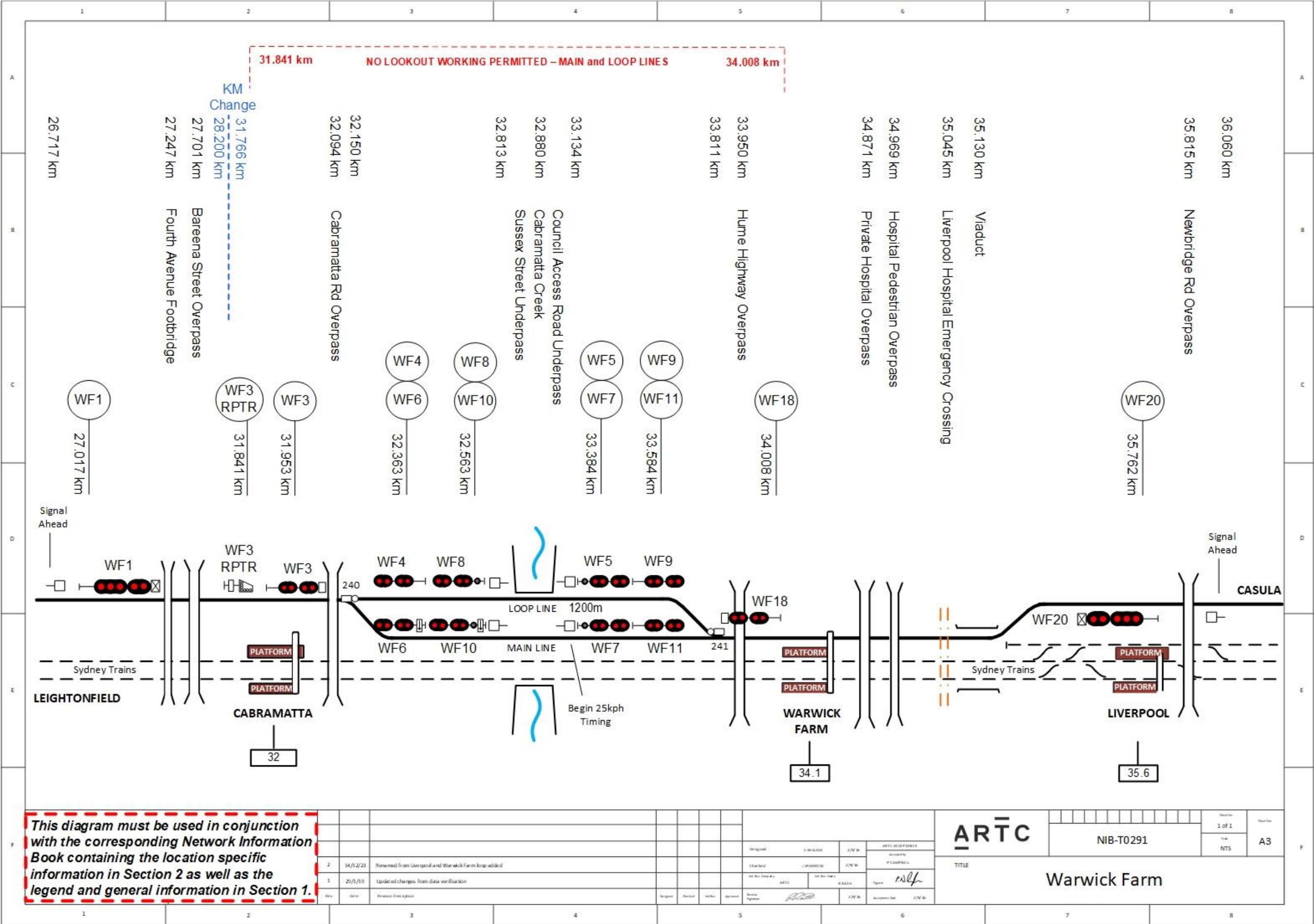
- WF3 Signal Location for 240 points and
- 241 points EOL cabinet for 241 points.

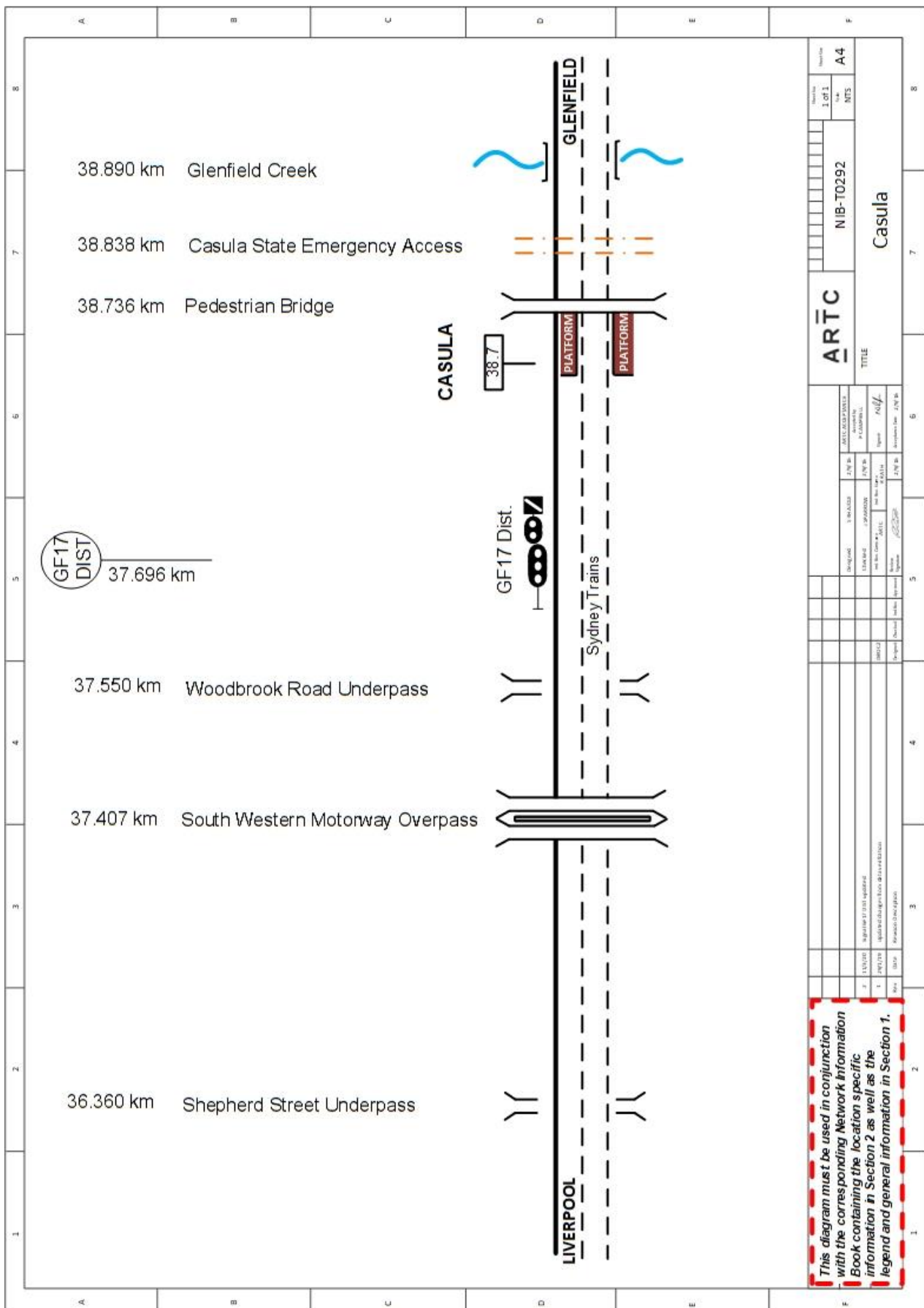
The signals maintenance representative must be promptly advised of failure circumstances.

### Signs

“Signal Ahead” signs are located at 26.717 km, 300m on the approach to WF1 signal and at 36.060 km, 300m on the approach to WF20 signal. The “Signal Ahead” signs are advisory signs advising Rail Traffic Crew of the distance to the signal ahead.

“Begin 25kph Timing” signs are located at 32.813 km, 250m on the approach to WF8 and WF10 signals and at 33.135 km, 250m on the approach to WF5 and WF7 signals. The “Begin Timing” signs advise the Rail Traffic Crew of the required speed for signals WF5, WF7, WF8 and WF10 to be able to clear to a Low Speed aspect when signals WF9, WF11, WF4 and WF6 ahead are displaying a STOP aspect.





## 2.3 Glenfield (GFJ)

### General Arrangements

Operations along the single line (RVD) Southern Sydney Freight Line is remotely controlled by the ARTC Network Control Centre South (NCCS).

A crossing loop and access to Moorebank Intermodal Terminal is provided at Glenfield.

Moorebank Intermodal Terminal is accessed via the Northern connection using 224 turnout and the Southern connection using 225 turnout.

The through movement of trains from the Main Line to the Loop line is signalled by the NCCS.

All points and signals controlled from the NCCS are controlled by axle counters

### Glenfield loop

Glenfield Loop is capable of holding 1850 metre trains.

Up and Down trains may travel through the Glenfield loop line on the authority of the fixed signals.

Time out required after train arrives for a cross before road will set for second train.

### Moorebank Intermodal Terminal

Signals MT1, MT3, MT11 and MT13 are operated under dual control mode from either the NCCS or the SIMAT IMEX control centre. The dual control operational procedure is detailed in OPE-PR-039 Moorebank Intermodal Terminal Operational Interface Procedure

The relevant interface agreement is IA1902.

### Operation of Power-operated Points in an Emergency

All main line and loop line points are electrically controlled from the NCCS.

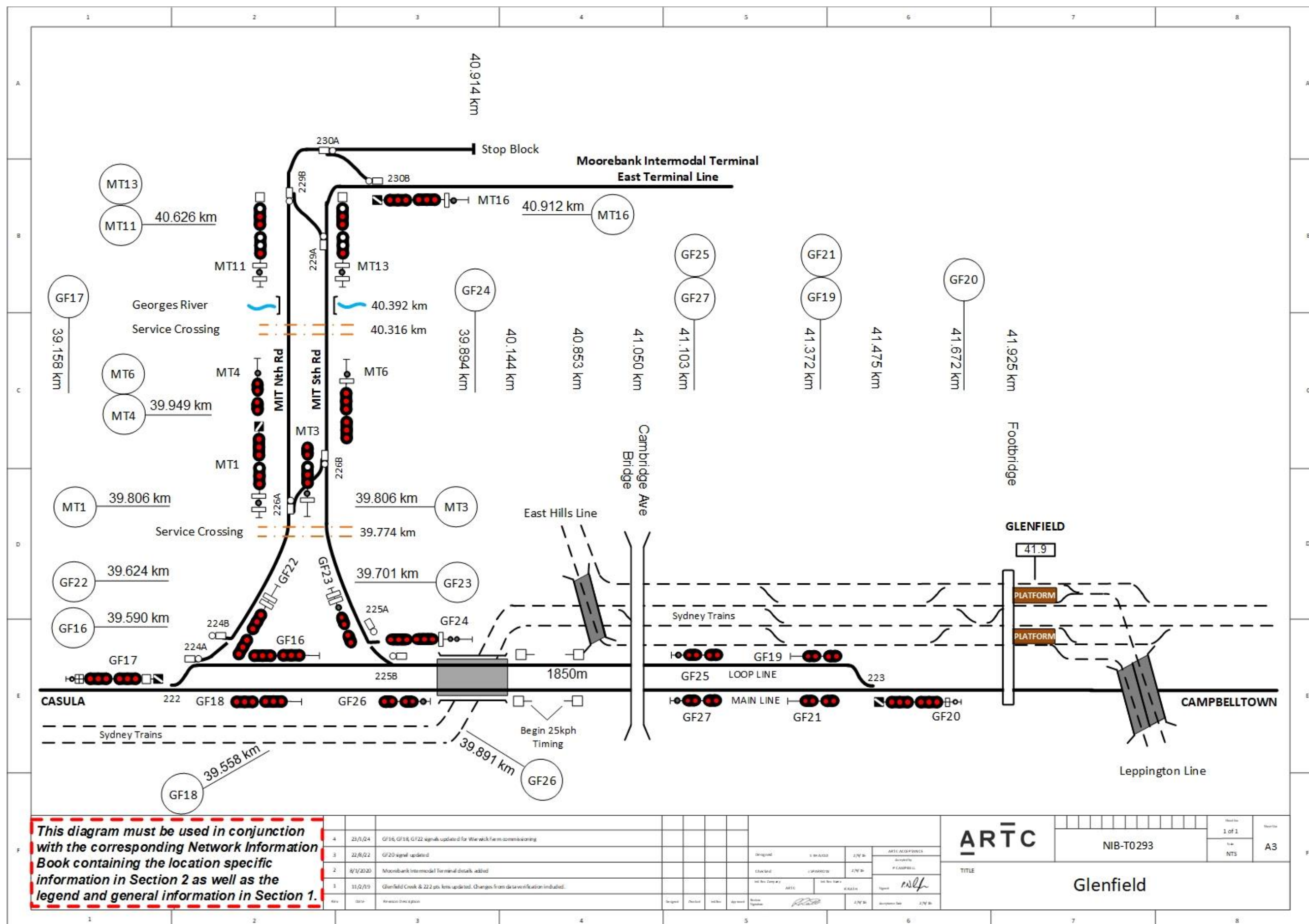
If these points fail to operate correctly, a transit alarm will sound and Network Controller must try to restore the points to their previous position to allow trains to continue running.

If it is necessary to alter the route, Emergency Operating Locks (EOLs) are provided so points may be manually operated

Emergency Operating locks are provided for the Emergency manual operation of points 222, 223, 224 & 225 points and catch points.

The signals maintenance representative must be promptly advised of failure circumstances.





## 2.4 Campbelltown (CTN)

### General Arrangements

Operations along the single line Southern Sydney Freight Line are remotely controlled by the ARTC Network Control Centre South (NCCS).

A Service level crossing is provided across the Southern Sydney Freight Line at 55.245km to provide access for Sydney Trains staff and contractors to the Sydney Trains Campbelltown Yard area.

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*NOTE: Campbelltown is not a location on the ARTC network*

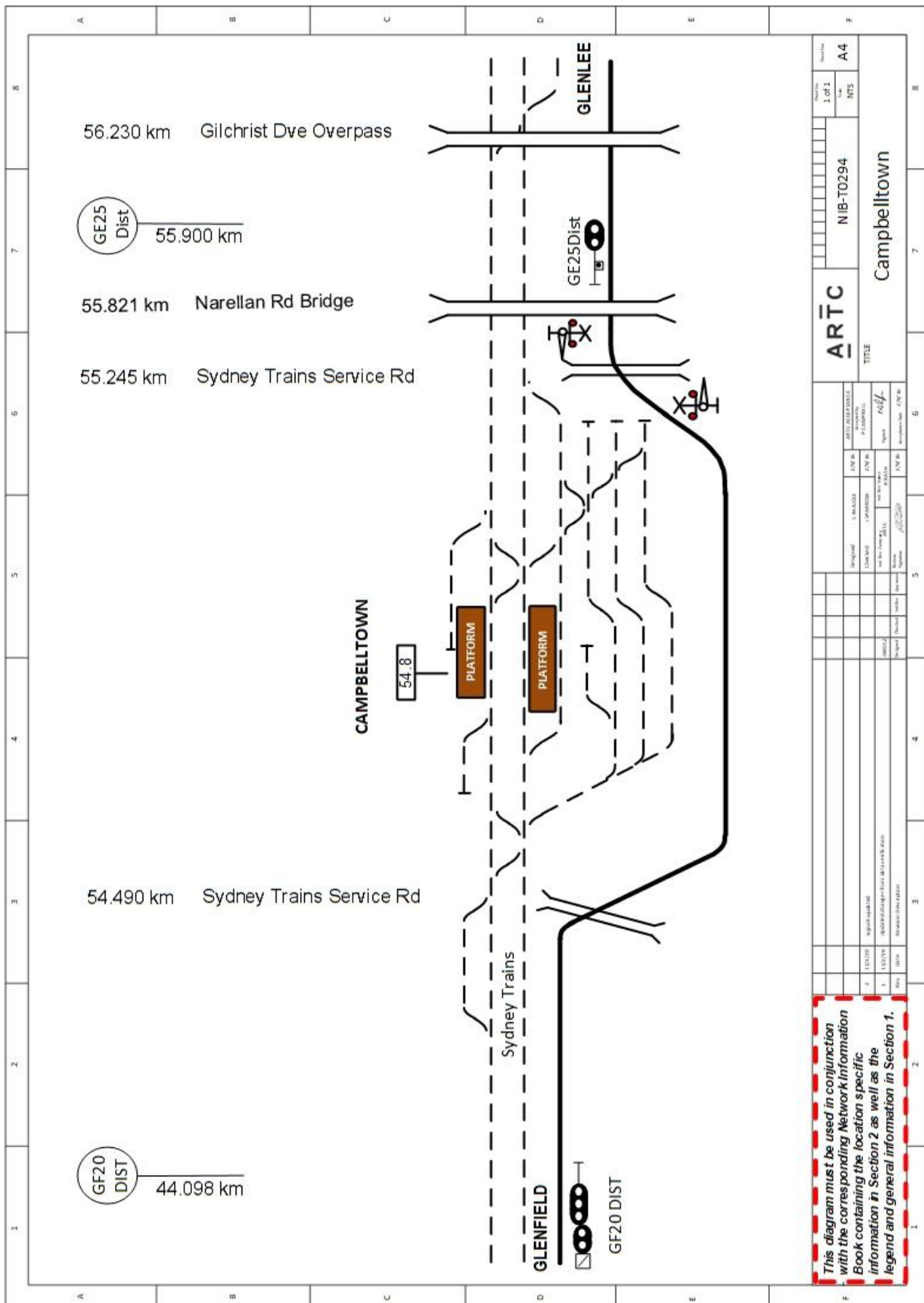
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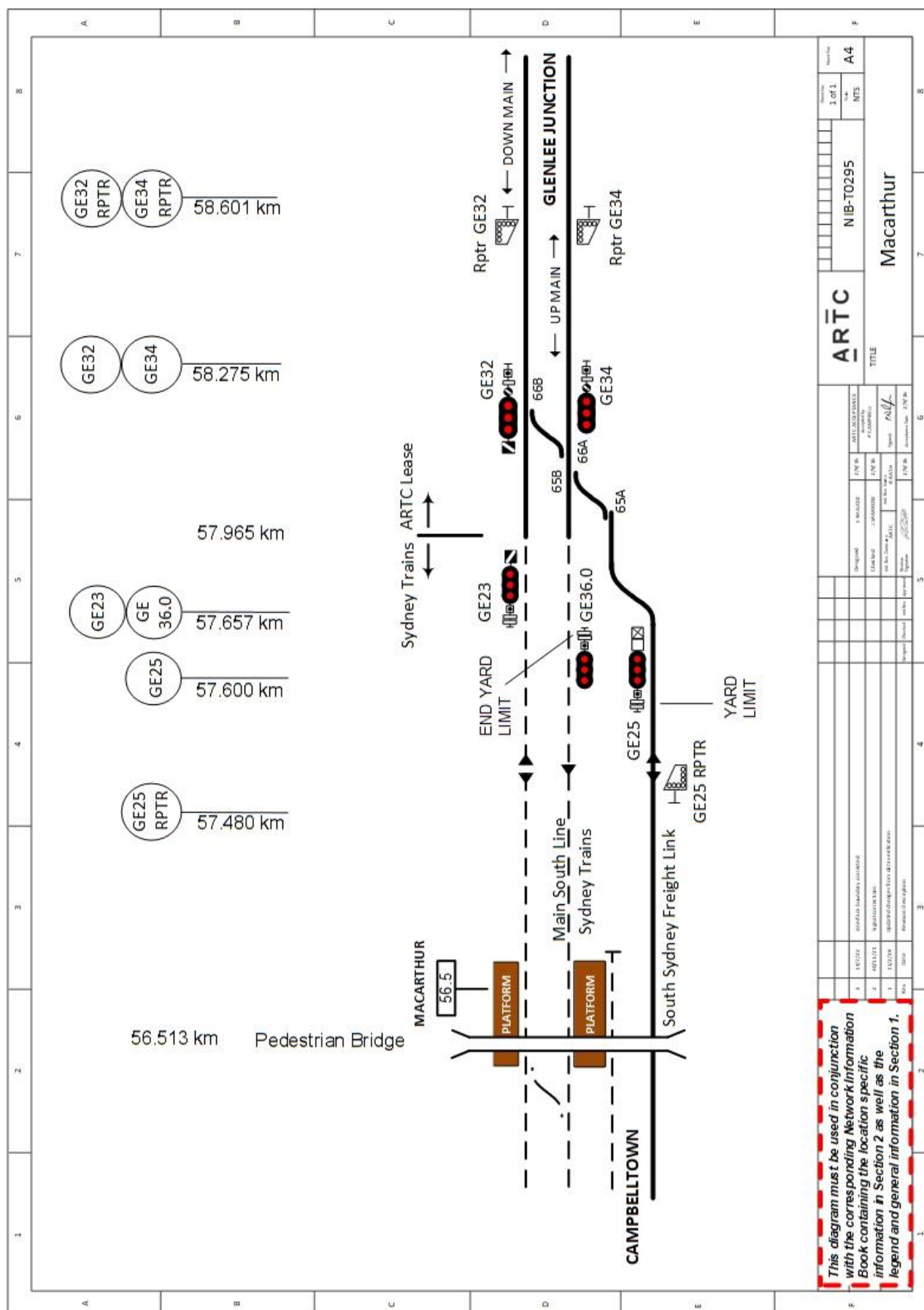
### Campbelltown Service Level Crossing (55.245km)

The SSFL Campbelltown Service level crossing is equipped with flashing lights and boom barriers. The level crossing is not integrated into the signalling system and as such operates as an “overlay” level crossing.

A Frauscher axle counter system is used for Up and Down train detection and the level crossing equipment is controlled and monitored by Safe Flash & Cerberus respectively.

A Test switch, Manual Operations switch and Emergency switch is provided and mounted on the wall of the Level Crossing equipment bungalow







## 2.5 Glenlee (GLE)

### General Arrangements

The signalling arrangements at Glenlee have been provided to permit bi-directional movements on both the Down and Up Mains within the Interlocking. Access to the Glenlee private siding will be via North Fork (60.063km) and South Fork (60.450km). Catch Points are located on the North Fork at 60.142km and the South Fork at 60.470km.

### Yard Limit Signs

The Down Main Yard Limits (from Macarthur) are from signal GE23 (57.657km) to automatic signal 40.5 (64.920km).

The Main Line Yard Limits (from SSFL) are from signal GE25 (57.600km)

The Up Main Yard Limits are at signal GE58 (65.820km).

### End Signalling Authority Signs

End Signalling Authority Signs are placed on the North and South Forks prior to entering into the Glenlee yard sidings

### Operation of Power-operated Points in an Emergency

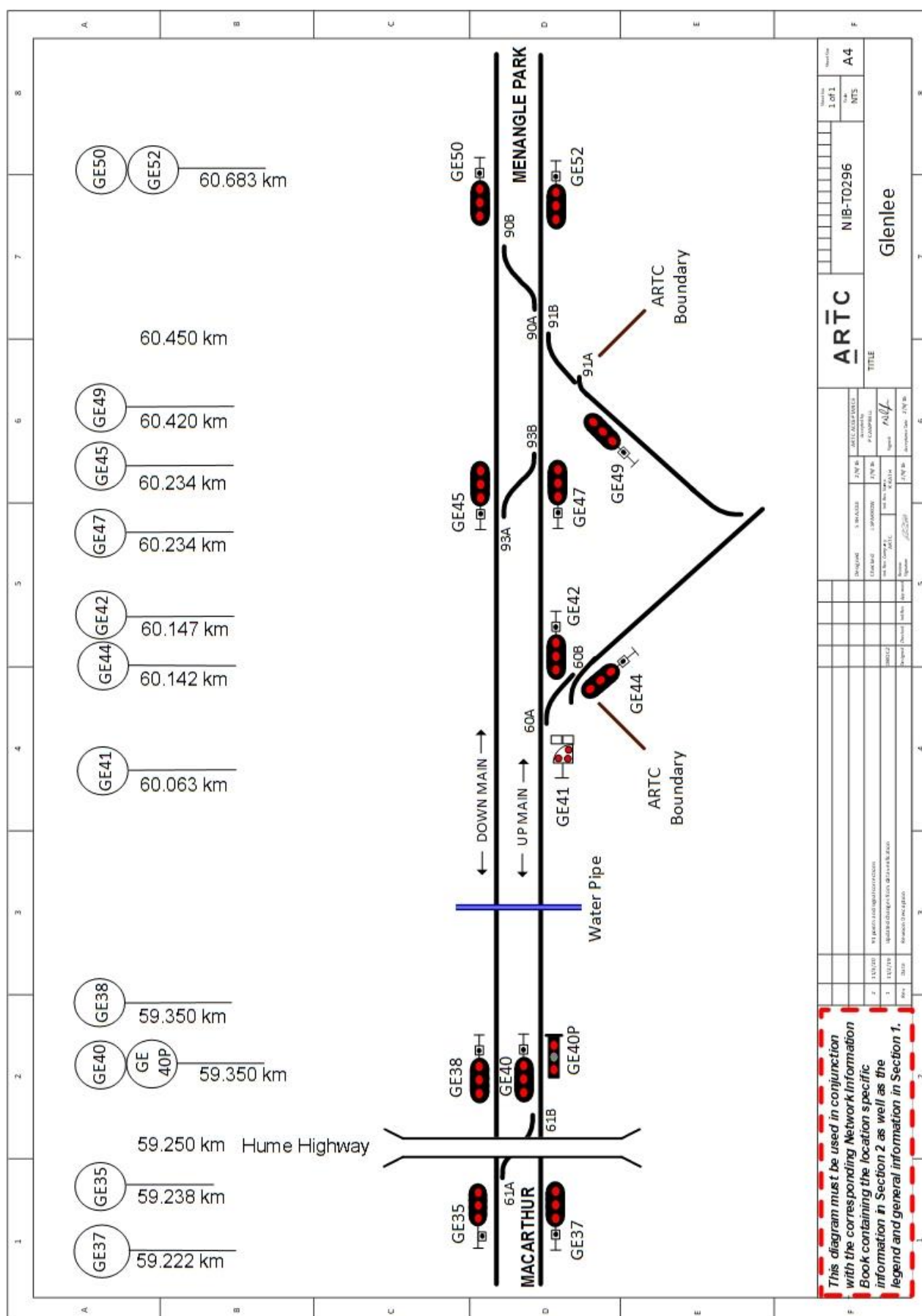
All main line points are electrically controlled from the NCCS.

If these points fail to operate correctly, a transit alarm will sound and the Network Controller must try to restore the points to their previous position to allow trains to continue running.

If it is necessary to alter the route, Emergency Switch Machine Locks (ESML's) are provided so points may be manually operated.

Emergency Switch Machine Locks (ESML's) are provided for the Emergency manual operation of points and catch points.

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



## 2.6 Menangle Park (MGP)

The signalling arrangements at Menangle Park have been provided to permit bidirectional movements on both the Down and Up Mains within the interlocking at 63.060km.

## 2.7 Menangle (MGL) – Wayside Detector Site

### Description and Operation

Device	Description
DED	Dragging Equipment Detectors. Used to identify and report on vehicles with protrusions below the vehicle at or near the height of the rail head, typically a dragging brake hose or chain.
HBD	Hot Bearing Detectors. These devices accurately measure the temperature of bearings as they pass over this device under normal operating conditions. Hot bearings are traditionally referred to as “Hot Boxes”.
HWD	Hot Wheel Detectors. These devices accurately measure the temperature of wheels as they pass over this device under normal operating conditions.

### General Arrangements

This equipment is located on the Up Main line. When other than normal measurements are recorded by HBD, HWD and DED Wayside Monitoring Devices, alarms are reported to the NCCS Network Controller Main South A via the Wayside Client Terminal.

When an issue is detected, an audible alarm will sound on the Network Controller’s Wayside Client Terminal and the recorded alarm details displayed on the screen.

Train Crews will be notified of HBD, HWD and DED alarms directly using digitized voice alarm messages transmitted via the WB (450.050) radio.

The Network Controller must confirm the alarm status with Train Crews to ensure their understanding when inspecting for defects.

If no alarm condition is recorded Train Crews receive a “NO Defect” message via the WB (450.050) radio.

This equipment does not impact train operations, it is passive detection and recording of rolling stock.

All Track Maintenance equipment for example Tampers, Regulators and Rail Grinders that may impact the equipment must contact the NSW Wayside Team Leader (02) 4979 7475 prior to conducting any work between the wayside signs.

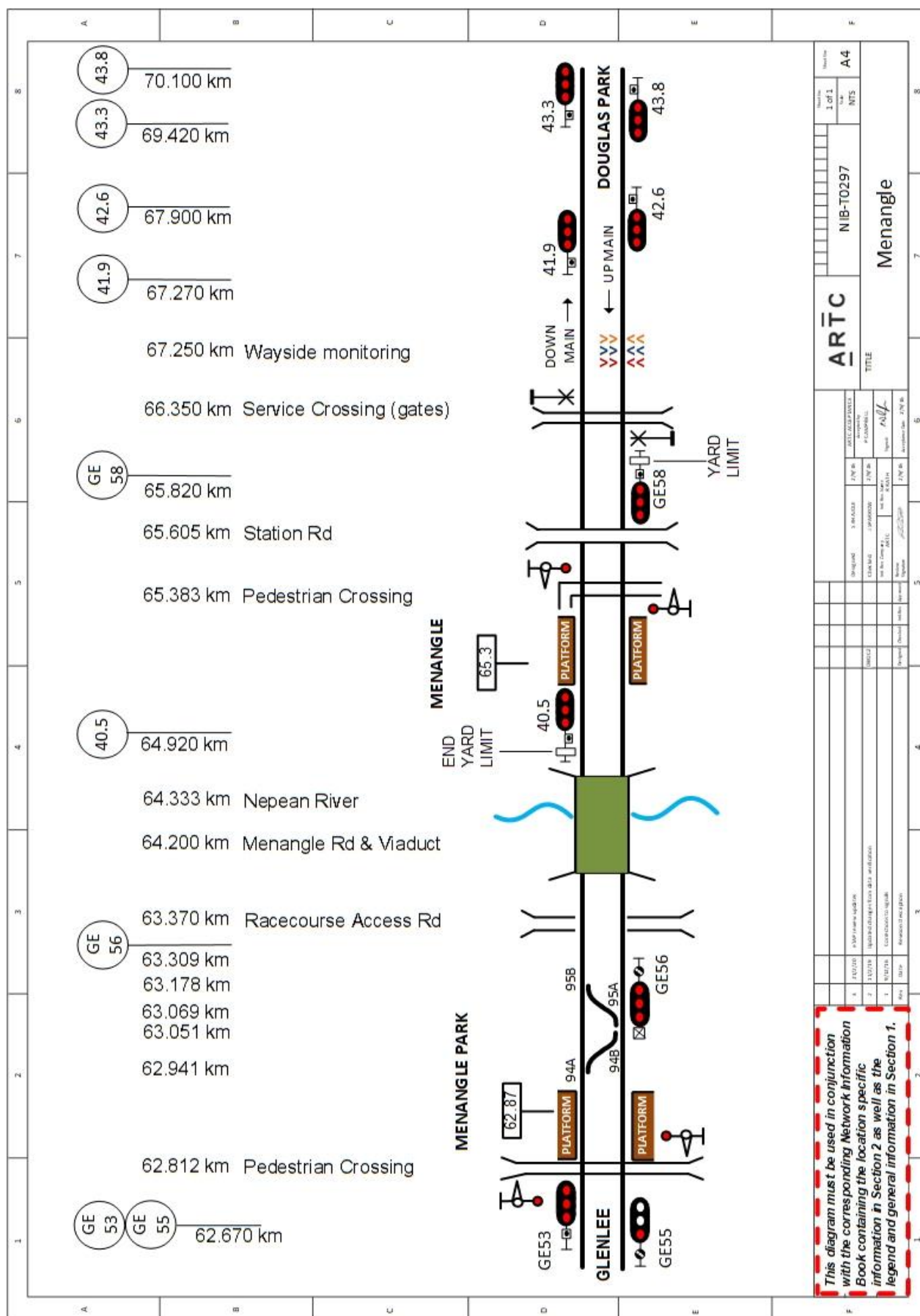
Example of Wayside Detector Signage

CAUTION

WAYSIDE MONITORING EQUIPMENT

BEFORE COMMENCING ANY TRACK RELATED WORKS WITHIN THIS AREA YOU MUST CONTACT ARTC ON (02) 4979 7000

The Network Controller and Train Crew are to come to understanding as to a safe place and protection required if the train needs to be inspected due to a defect.

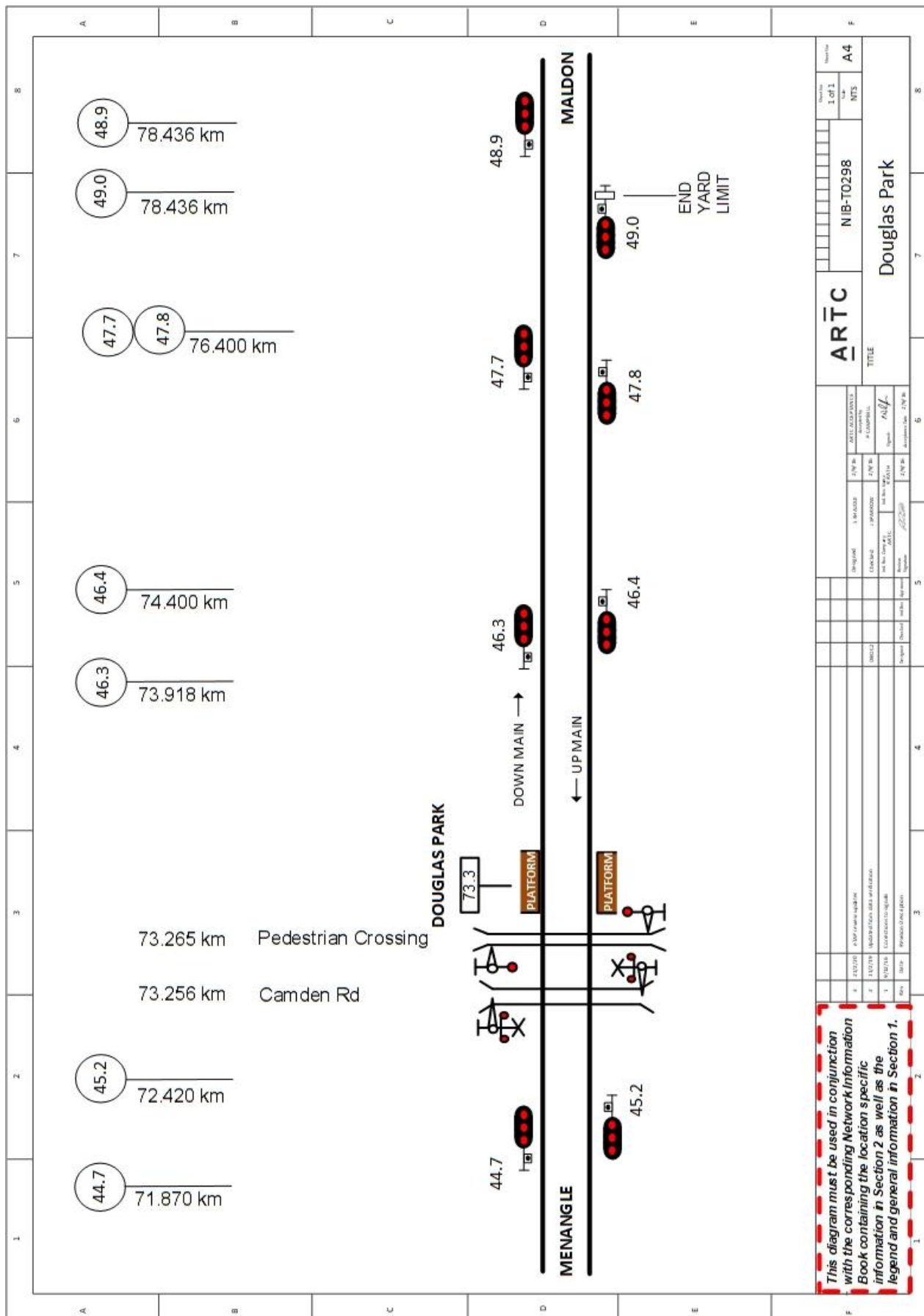


## **2.8 Douglas Park (DPK)**

### **Camden Road Level Crossing**

Type F flashing lights and bells, half-boom barriers and pedestrian boom barriers are provided at Camden Road level crossing at 73.270km.

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.



## 2.9 Maldon (MAD)

### General Arrangements

Bi – Directional signalling is in operation for the Up and Down main lines at Maldon Interlocking. The former Maldon and Picton interlocking have been amalgamated and referred to as Maldon

Up refuge sidings are located at 84.400km and are accessed via 110 turnout from the Up main.

Lever D is located on the Up side of the Up Refuge and provides access to the Goods siding. It is secured by a standard clip and SL lock.

### Private Sidings

Allied Mills private sidings are located at 81.550km and are accessed via 105 turnout from the Up main. Refer interface agreement IA1235 for further details.

Blue Circle cement sidings are located at 82.434km and are accessed via 108 turnout from the Down main. Access beyond the ARTC interface is via Lever B. Lever B is located on the Up side of No.1 Cement siding adjacent to the catchpoints and controls access from the Cement Sidings Nos. 1 and 2. Refer interface agreement IA1237 for further details.

Transport Heritage NSW Branch line (Thirlmere) is located at 85.57km and is accessed via 3C turnout from the Up main line after release is given by NCCS to operate C Frame. Lever C is located on the Up side of the branch line adjacent to the points and provides access to the branch line. Lever C is electrically released by MN125 in the NCCS. Refer interface agreement IA1236 for further details.

### Operation of Points and Signals

The points and signals are operated by the Network Control Centre South (NCCS).

The branch line points and signals are operated from a ground frame.

### Operation of Power operated Points in an Emergency

Nos. 100, 105, 106, 108, 110, 112 and 114 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 operated manually in accordance with ARTC Network Rules and Procedures.

Emergency Operation Locks (EOL) are positioned adjacent all points that are operated from NCCS.

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

### Locking

Type	Provided
Approach	Yes
Route	Yes



**Maldon Bridge Road Level Crossing**

Automatic half boom barriers and type F flashing light highway signals and warning bells are in use at Maldon Bridge Road level crossing at 82.439km.

The warning equipment is automatically controlled by track circuit for Up and Down trains as well as trains entering or departing the sidings, subject to the clearing of signals on all approaches to the crossing.

If it becomes necessary to hold a train at any of the approach signals 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 has been returned to stop and then will cancel automatically.

**Shunting Limit Signs**

Shunting limit signs are provided at Maldon on the Up and Down main lines. The Down main sign is located at 81.120km facing Up direction rail traffic and is inscribed "SHUNTING LIMIT ON DOWN MAIN". The Up main sign is located at 86.200km facing Down direction rail traffic and is inscribed "SHUNTING LIMIT ON UP MAIN".

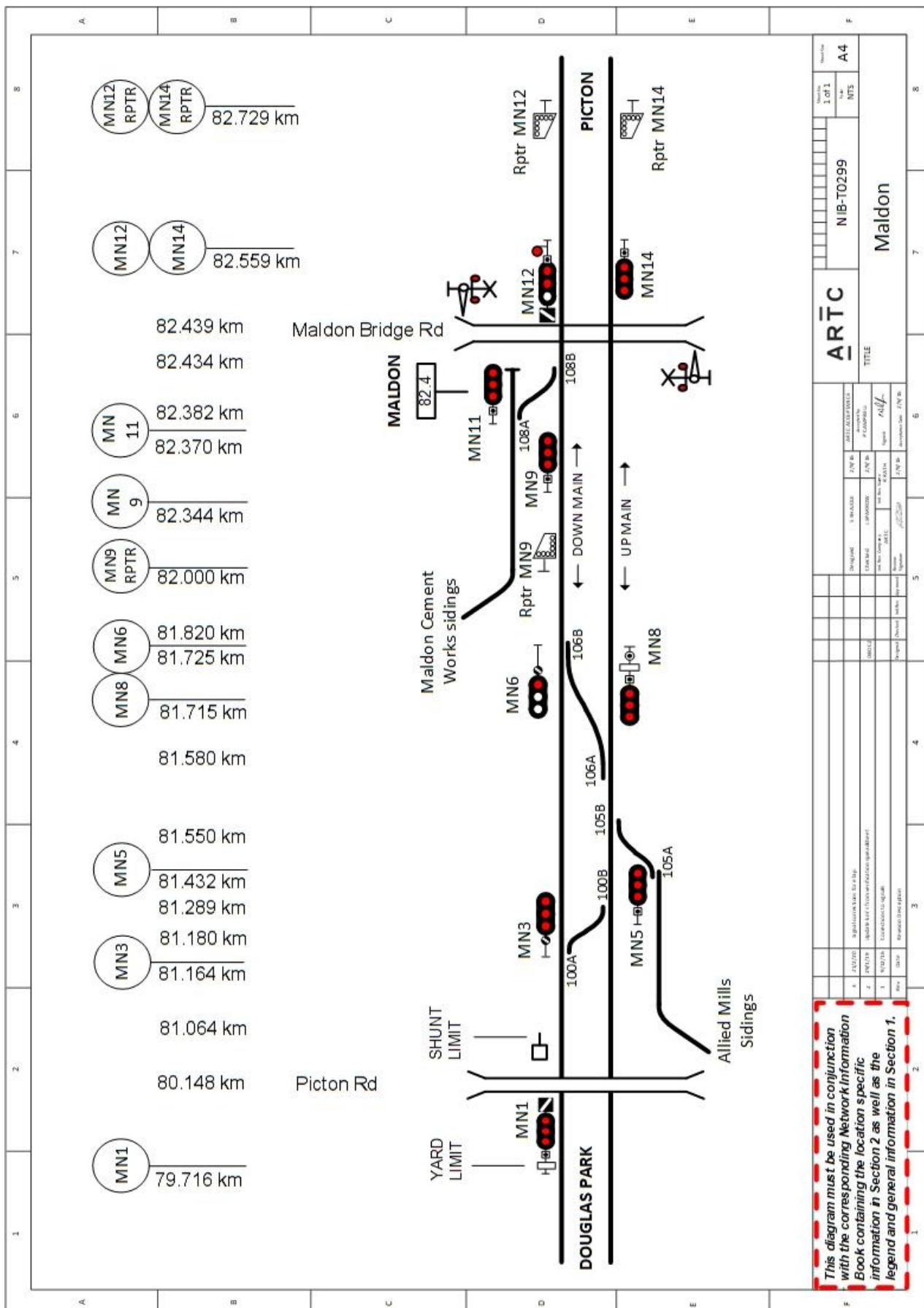
**Arrangements for the Branch Line (Transport Heritage NSW Thirlmere)**

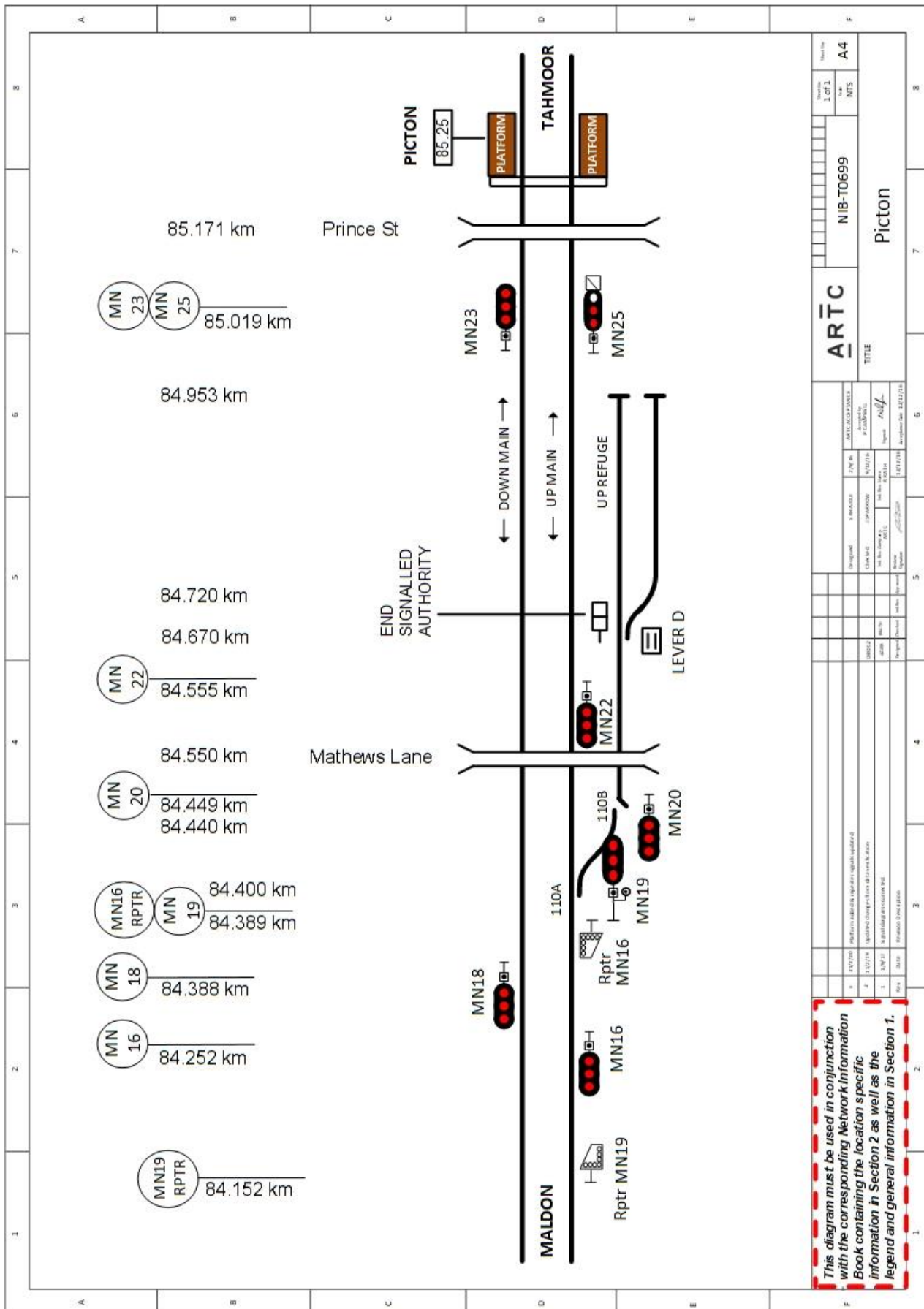
The Up home signal for the branch line is fixed at stop, and is located on the Up side of the branch line near No. 3C catchpoints. A subsidiary shunting signal No. 4C is provided on the signal post below the marker light.

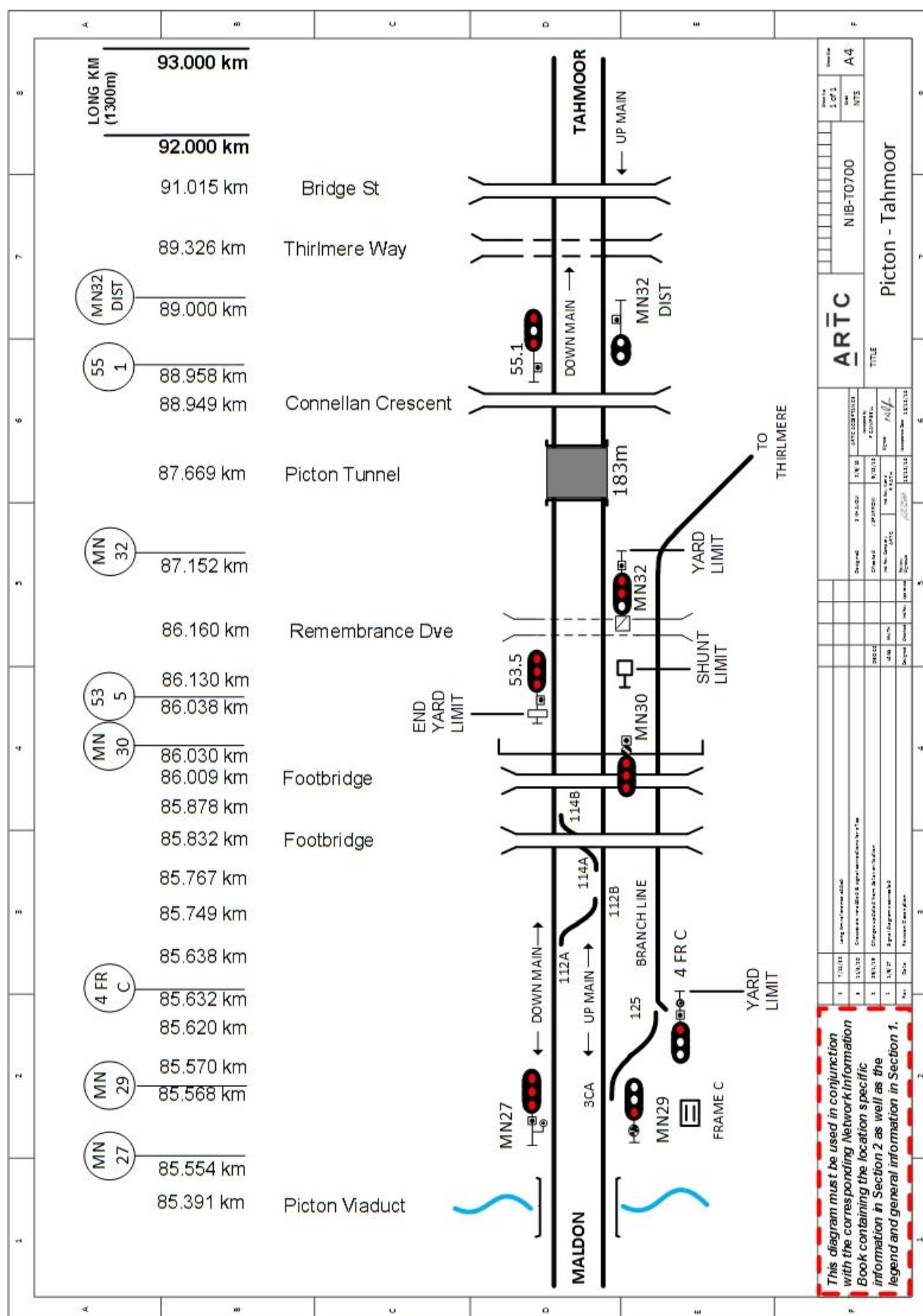
A running turnout signal No. 6C for rail traffic entering the branch line is located on the signal post of MN29 below the marker light. The Ordinary Train Staff in the Staff Hut must be turned in the Staff Contact Lock provided to enable clearing of the signal.

Staff and Ticket working is in operation on the branch line.









## 2.10 Tahmoor (TCJ)

Due to long wall mining at Tahmoor, a deviation was made around Redbank Tunnel between 92 and 93km including an additional 300 metres of track resulting in a long km (1300m) in this area.

### 2.10.1 Tahmoor Siding (TAH)

#### General Arrangements

Tahmoor siding is located on the Up side of the Up main line between the emergency crossovers at Tahmoor and Bargo. The coal siding connects to the Up main line by trailing points at 97.639km and a facing crossover is provided between the Down and the Up main lines.

Entry of Down trains into the siding is controlled by Down home shunting signal No. 303(B), and the departure of Up trains from the siding is controlled by Up home/starting signal No. 306 and shunting signal No. 308(B). Refer interface agreement IA1234 for further details.

#### Operation of Points and Signals

The points and signals controlling the entry to and exit from the siding are operated by Network Controller Main South A at NCCS.

A local control panel is provided in the traffic hut at the siding to allow the interlocking to be operated locally. All indications displayed on the local control panel are also displayed on the control panel in NCCS.

All points worked by Network Controller Main South A are controlled by track circuit and cannot be moved unless the track(s) controlling the points is unoccupied.

#### Switching the Control Panels in or out

The following facilities are provided on the Local Control Panel at Tahmoor siding

two key-locked switches to allow the local control panel to be switched in (local) or switched out (closing). (One switch is inscribed "Local" and the other is inscribed "Closing". The keys for the switches are located in a box secured by an SL lock in the traffic hut.)

a white indicator light inscribed "Closing" to indicate when the main line signals at the siding are in automatic operation.

#### Locking

Type	Provided
Approach	Yes
Route	Yes

#### Operation of Power-operated Points in an Emergency

Motor points are operated as per ARTC Network Rules and Procedures.

#### Signalling Power Supply Indicators

AC power supply

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 and also when the motor generator is in use.

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

#### DC power supply

A green indicator light inscribed "DC power" will be displayed when all the DC power supply is available. When there is any loss of DC power, the light will go out.

#### General instructions

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

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 Tahmoor Colliery 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 "Emergency" light and the ringing of the bell.

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

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 minimum quantity sufficient for a further 2 hours' running.

### **Additional Indicators**

#### Signal lamp indicators

A red 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.

When either of the indicator lights is displayed, the Network Controller must promptly inform the Signals maintenance representative.

#### Supervisory fail indicator

When there is any alteration or interruption to the supervisory control system that affects the working of trains, the Network Controller must promptly advise the Signals maintenance representative.

If the failure is likely to cause extended delays to trains, the Network Controller must arrange for the local control panel at Tahmoor Colliery to be brought into use.

### **Shunting limit sign**

A shunting limit sign is provided at Tahmoor siding. The sign is located on the Down side of the Down main line at 96.060 kms. This sign is inscribed "Shunting limit on Down main line" and applies to trains shunting in the Up direction on the Down main line.

### **Working Trains to and from the Siding**

The entry and exit of trains to and from the siding are on the authority of the fixed signals.

When loading has been completed, the train must proceed to the home/starting signal and the driver must then act on the indication displayed by that signal.

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**WARNING:** *Irrespective of the indications displayed by the loading indicators, drivers must always observe and act on the indications displayed by the signals applying to the track on which their train is proceeding, or on the Qualified Worker's handsignals or instructions.*

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### **Special Arrangements for push/pull Trains**

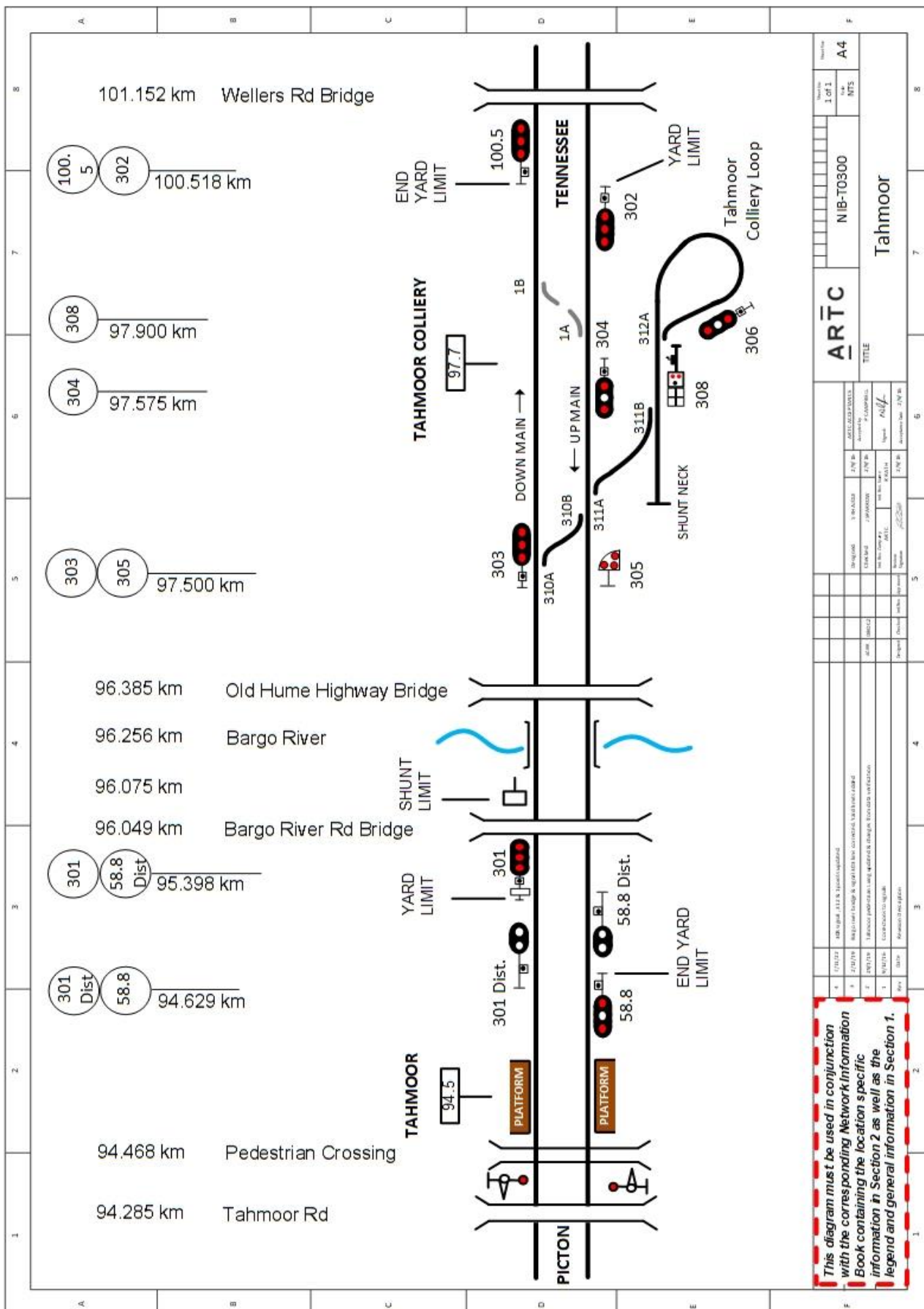
Push/pull trains may arrive at the siding on the Up main line and be hauled to the arrival road to load. They may then be hauled to the Down main line to change operating ends and depart in the Down direction.

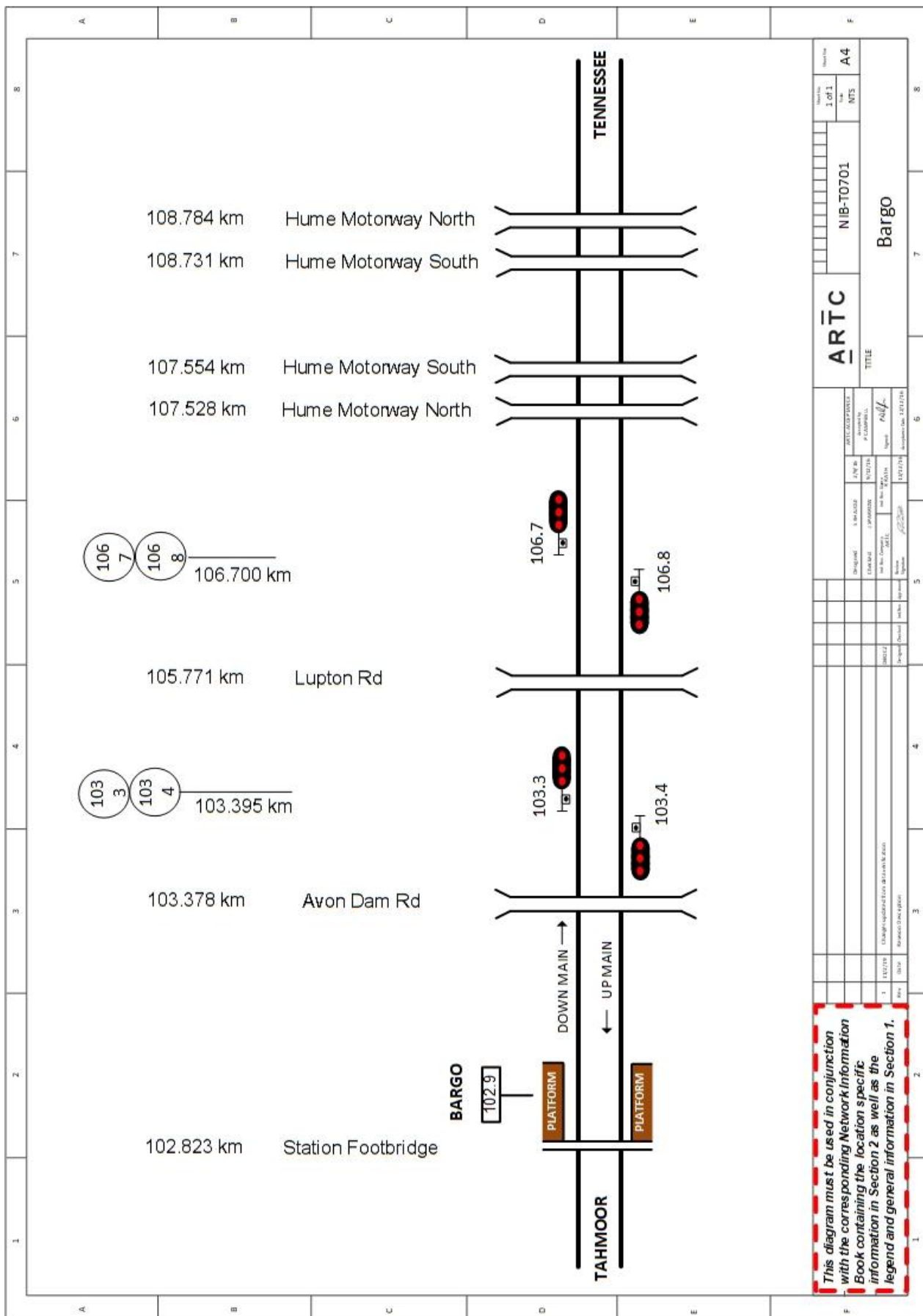
### **Special Arrangements for 42 wagon push/pull Trains**

After the train has arrived on the arrival road at the siding clear of signal No. 308, the driver of the trailing locomotive may take control of the train. After signal No. 308 is cleared, the train will proceed into the shunting neck in order for the train to clear the coal loader.

When the train is clear of the coal loader, the driver of the lead locomotive will resume control of the train and carry out loading operations as normal.









## 2.11 Tennessee (TSE)

### Emergency Crossovers (frames A and B)

Emergency crossovers, frame A (facing) and frame B (trailing), are provided between the Down and the Up main lines at 113.300km and 113.405km respectively.

The crossovers are operated by frames A and B, which are located on the Up side of the Up main line next to the respective points.

When either of the crossovers is not in use, the points at each end of the crossover must be secured in the normal position by point clips and XL locks, and No. 1 lever in frames A and B must be secured in the normal position by special clips and XL locks.

Frames A & B are unlocked from a TE100 release provided from NCCS.

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.

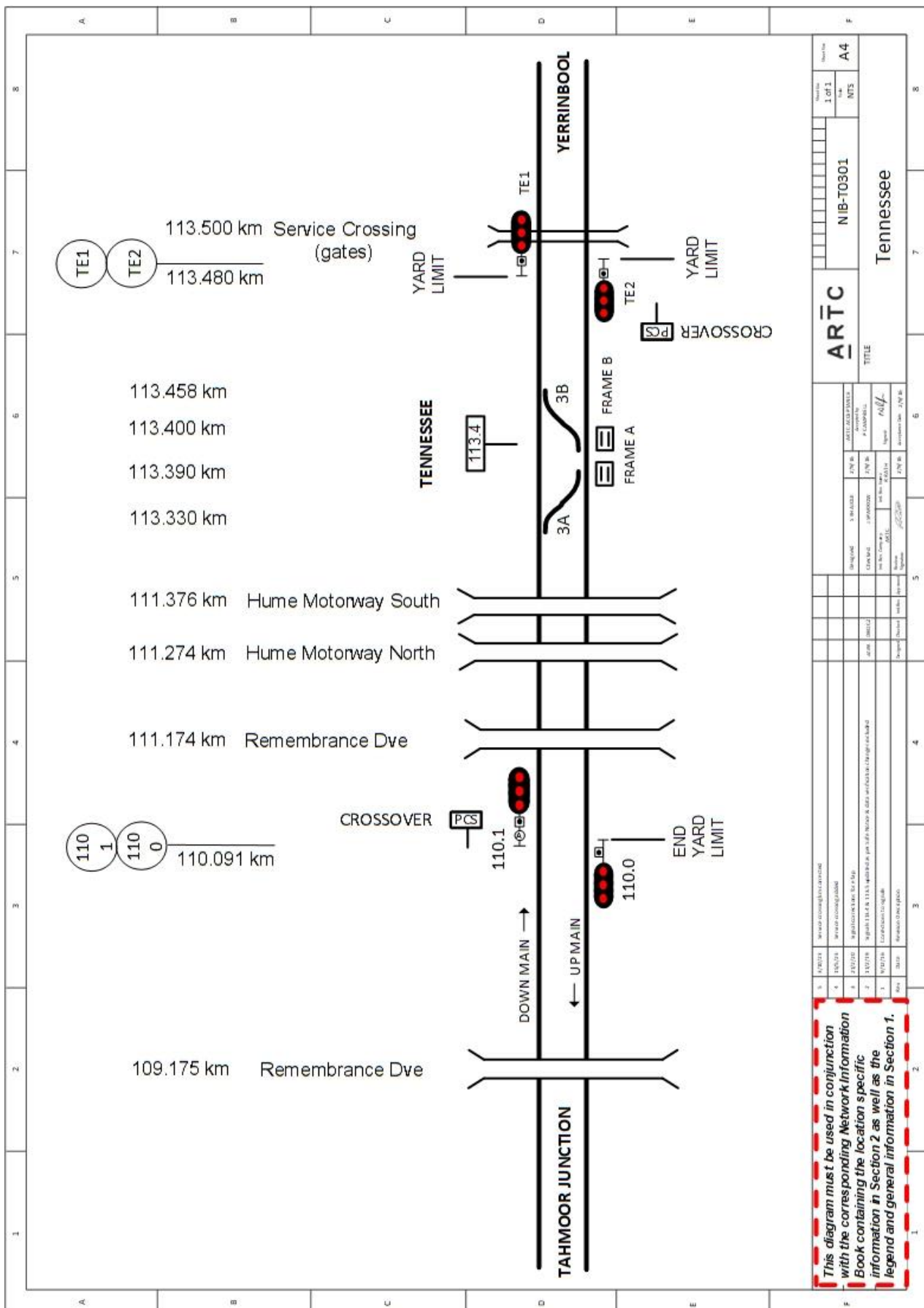
### Prohibitive Signs

The following sign is provided for 110.1 and TE2 signals:

DRIVERS WHEN DIRECTED TO PASS THIS SIGNAL AT STOP MUST PROCEED WITH CAUTION AND BRING THEIR TRAIN TO A STAND WELL CLEAR OF THE CROSSOVER AND MUST NOT RESTART UNTIL SATISFIED THAT IT IS SAFE TO DO SO

The following sign is provided for 116.0 signal:

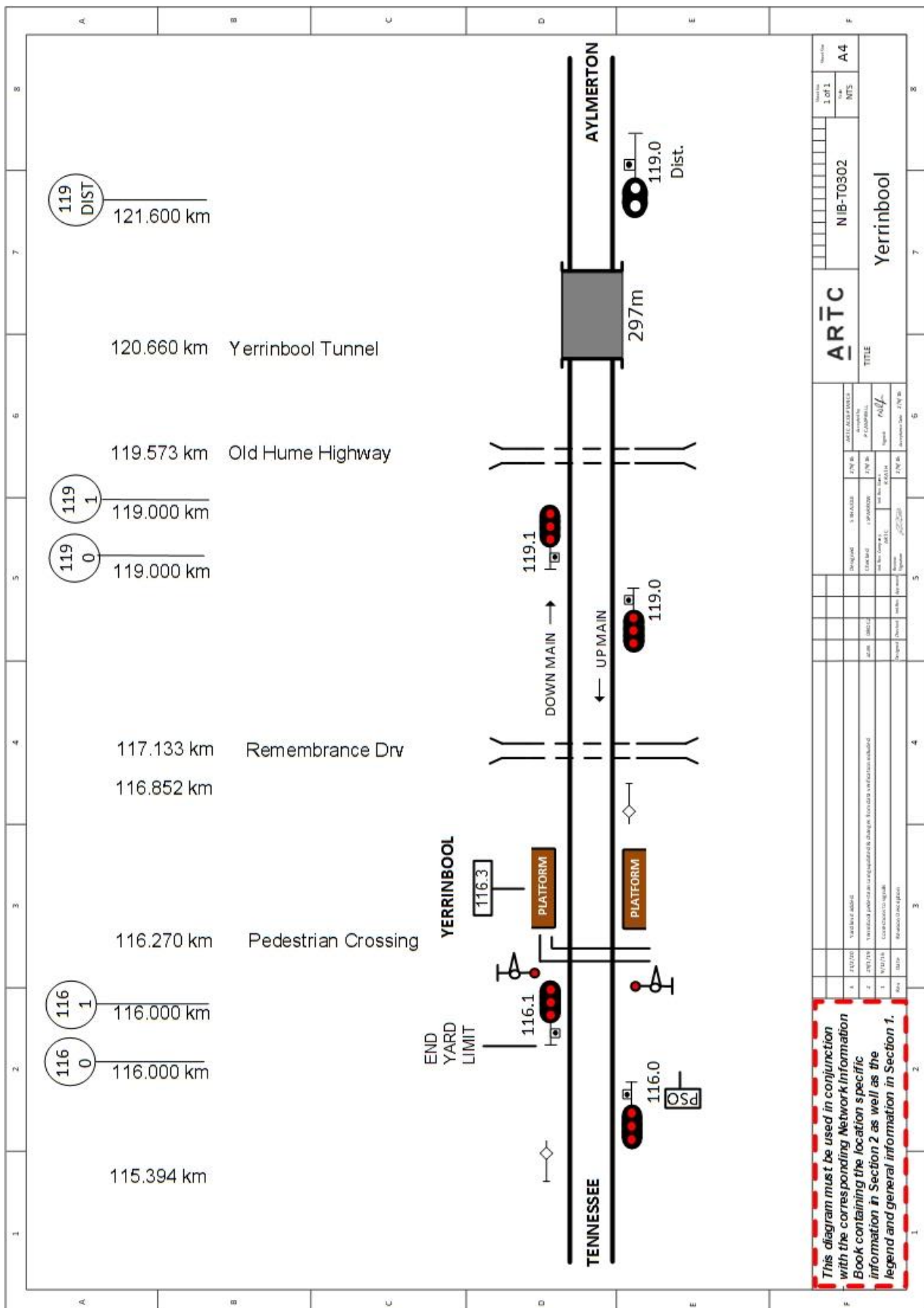
DRIVERS WHEN PASSING THIS SIGNAL AT STOP IN ACCORDANCE WITH THE REGULATIONS MUST PROCEED WITH CAUTION TO THE NEXT SIGNAL BEING PREPARED TO STOP SHORT OF ANY OBSTRUCTION.

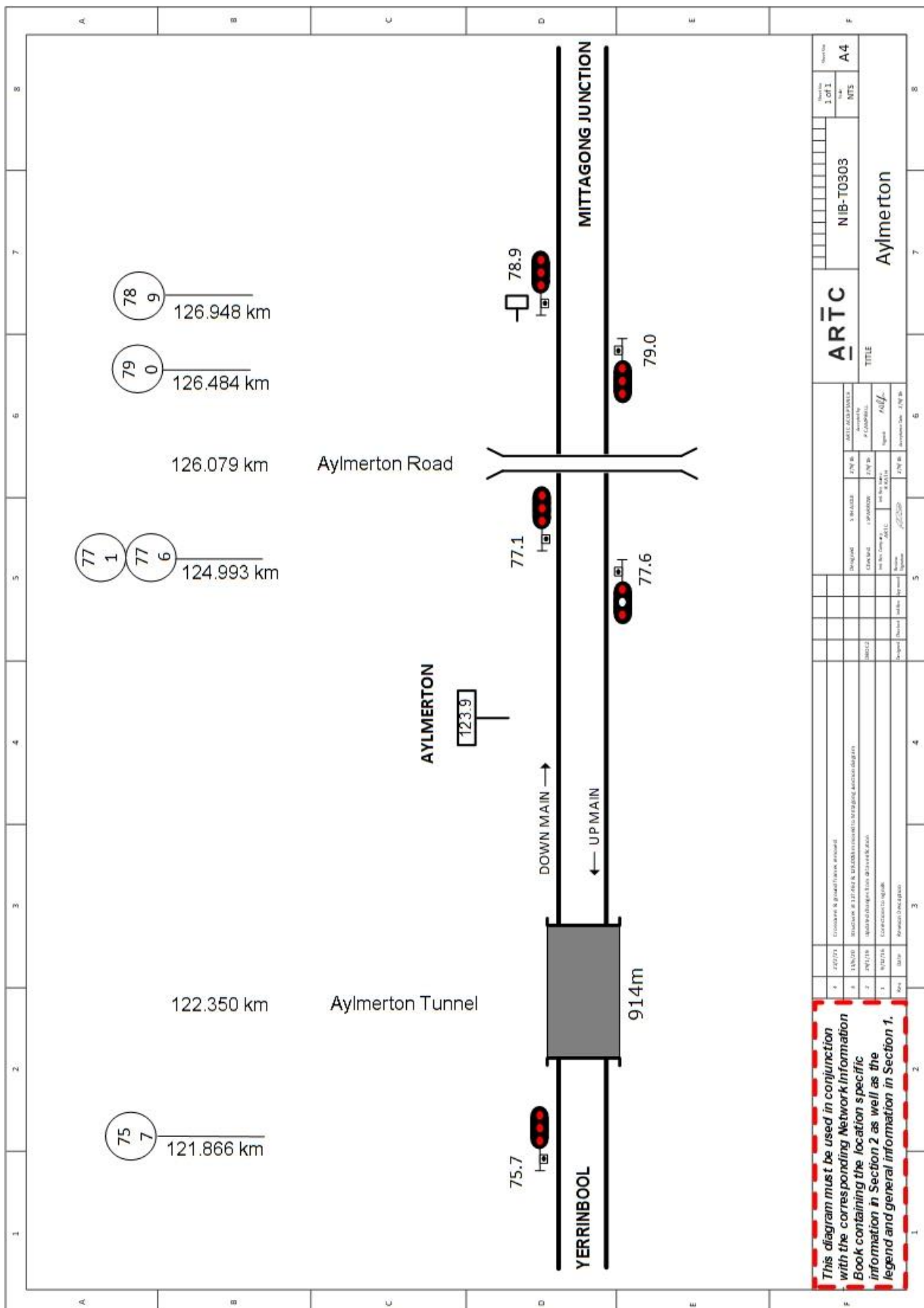


## 2.12 Yerrinbool (YRB)

### **Pedestrian Crossing**

Yerrinbool pedestrian crossing is a predictive type crossing with approach warning signs at 115.394km on the Down Main and 116.852km on the Up Main.





## 2.13 Mittagong Junction (MTJ) and Mittagong (MIT)

### 2.13.1 Mittagong Junction and Braemar branch line

#### General Arrangements

The staff for the section Mittagong Junction – Braemar is located in a locked steel cabinet secured by an SL lock, located adjacent to frames B and C.

#### Operation of Points and Signals

The Down home signal at Mittagong Junction is fixed in the stop position.

All interlocked points at Mittagong Junction are operated from ground frames that are released by keys from releasing switches.

#### Ground Frames

##### Frame B

Frame B is located on the Up side of the Up main line adjacent to the points and provides access to the Braemar branch line.

No. 1 lever in frame B is unlocked by a key from releasing switch B, which is mounted on a post adjacent to frame B.

Releasing switch B is electrically released by track circuit.

When releasing switch B is operated, it will place Up automatic signal No. 80.8 to stop, and prevent No. 81.4 Up starting signal at Mittagong from being cleared.

##### Frame C

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

No. 1 lever in frame C is unlocked by a key from releasing switch C, which is mounted on a post located adjacent to frame C.

Releasing switch C is electrically released by track circuit.

Releasing switch C cannot be operated until releasing switch B has been operated.

When releasing switch C is operated, it will place Down automatic signals Nos. 78.9 and 80.7 to stop.

If a train is closely approaching either signal No. 80.8, No. 78.9 or No. 80.7, the release(s) cannot be obtained until after the train has passed the signal(s).

#### Braemar Branch Line

The branch line runs from the Down home signal at Mittagong Junction (which is fixed in the "Stop" position) to the notice sign inscribed "Stop, end of staff section" (which is located on the terminal side of Braemar Avenue level crossing at Braemar).

Staff and ticket working is in operation on the Mittagong Junction – Braemar branch line.

Staff tickets are not authorised for use on this section.

A notice sign inscribed "TRAINS ARE NOT TO PASS THIS POINT WITHOUT THE STAFF FOR THE SECTION", is provided on a post on the Up side of the branch line facing trains travelling in the Up direction.

Drivers of all trains proceeding to the branch line must be in possession of the staff for the section before passing this sign.

### **Entering and exiting the Braemar branch line**

When an Up train is required to enter the branch line from the Up main line:

- the train must be stopped clear of frame B points to allow the release to be obtained
- permission must be obtained from the Network Controller Main South A before operating frame B
- the staff for the Mittagong Junction – Braemar section must be obtained from the steel cabinet and the points set for the branch line
- when the train is clear of frame B points, the points and the release must be returned to normal. The Network Controller Main South A must be advised when this has been done.

When a Down train is required to exit the branch line to the Down main line:

- the train must be stopped at the Down home signal to allow the releases to be obtained
- permission must be obtained from the Network Controller Main South A before operating frames B and C
- when the points are set from the branch line, the Driver must proceed past the home signal and onto the Down main line clear of frame C points
- when the train is clear of frame C points, the staff must be secured in the steel cabinet and frames B and C returned to normal. The Network Controller Main South A must be advised when this has been done.

### **Notice signs**

A notice sign inscribed:

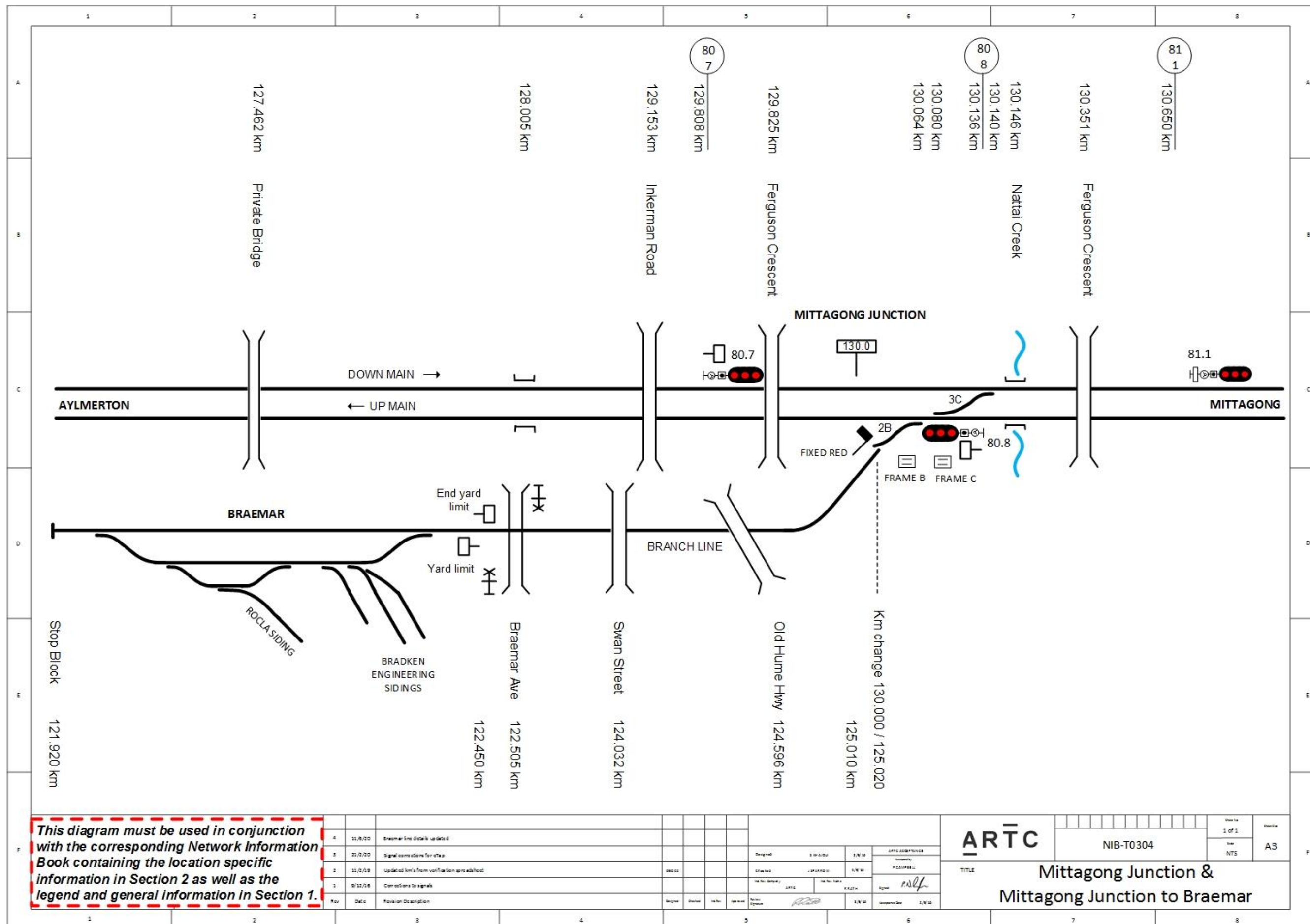
"DRIVERS WHEN PASSING THIS SIGNAL AT STOP IN ACCORDANCE WITH THE REGULATIONS MUST PROCEED CAUTIOUSLY AND BRING THEIR TRAIN TO A STAND WELL CLEAR OF MITTAGONG JUNCTION SIDING, AND MUST NOT RESTART UNTIL SATISFIED THAT SHUNTING IS NOT TAKING PLACE AT THE SIDING"

has been provided next to the following automatic signals:

Down signals      Nos. 78.9 and 80.7

Up signal          No. 80.8.







### 2.13.2 Mittagong

#### General Arrangements

Mittagong is a location with a signal box provided that may be cut in for local control.

#### Operation of Points

While Mittagong signal box is not cut in, points are not available for use.

#### Operation of Signals

While Mittagong signal box is not cut in, signals at this location will be treated as automatic (permissive).

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*NOTE: 81.6 signal has a repeater signal attached to the footbridge.*

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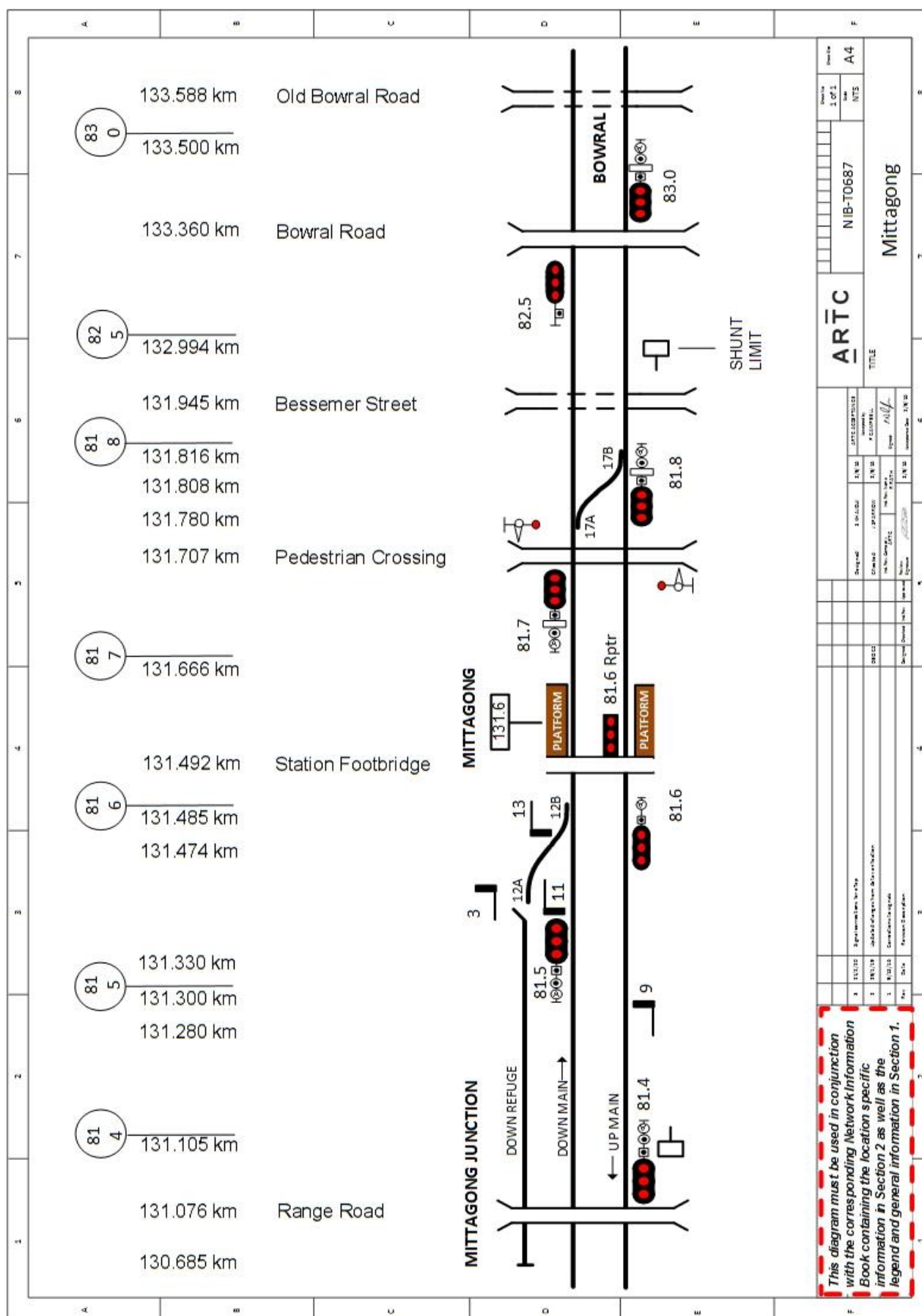
#### Operation of power-operated points in an emergency

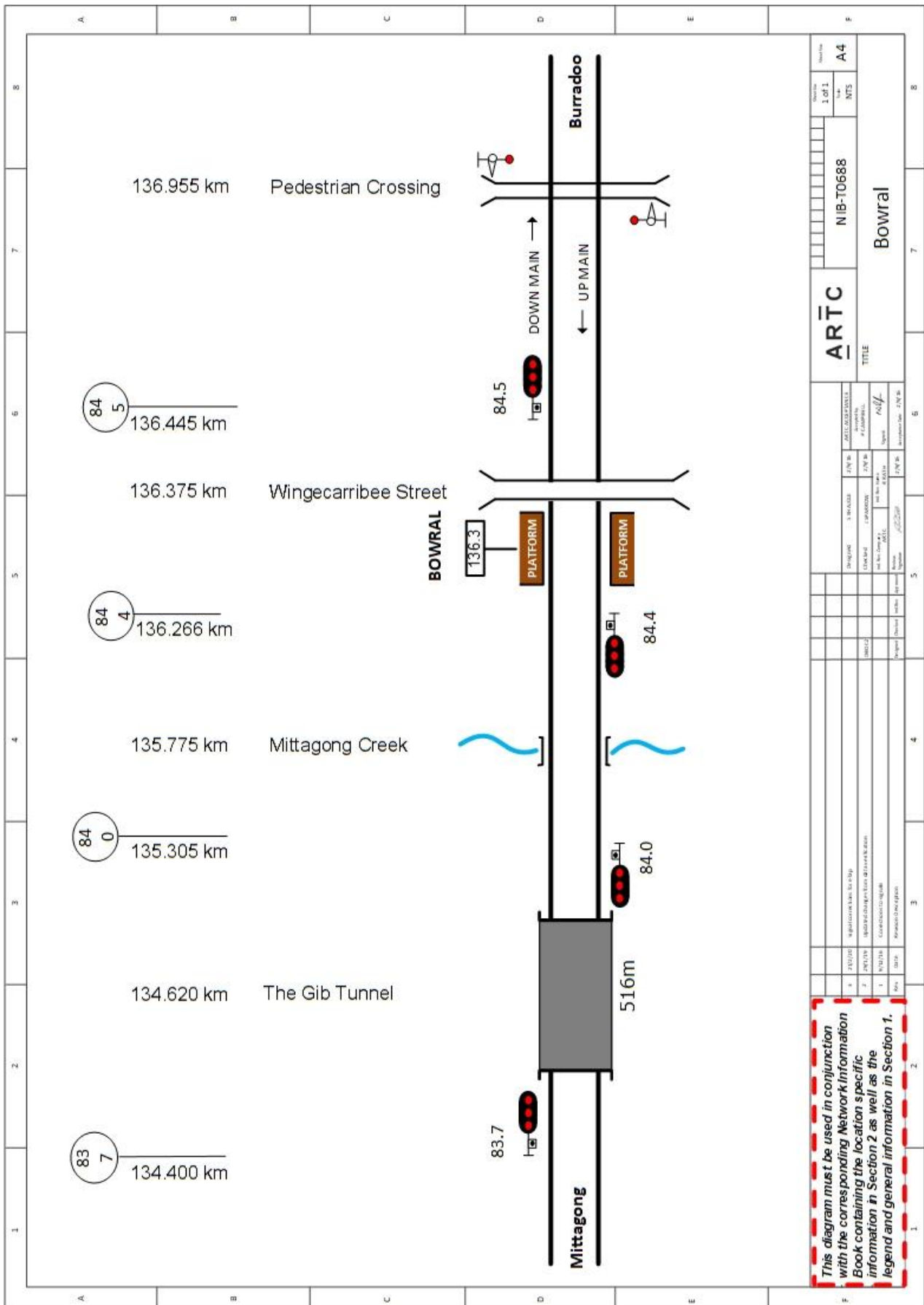
Motor points are operated as per ARTC Network Rules and Procedures.

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

If either Down home signal No. 2, Down starting signal No. 4, Up home signal No. 27A, or shunting signal No. 14, No. 16, No. 18, No. 19 or No. 27B fails, the Network Controller Sydney 3 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.





## 2.14 Burradoo (BOO) – Wayside Detector Site

### Description and Operation

Device	Description
DED	Dragging Equipment Detectors. Used to identify and report on vehicles with protrusions below the vehicle at or near the height of the rail head, typically a dragging brake hose or chain.
HBD	Hot Bearing Detectors. These devices accurately measure the temperature of bearings as they pass over this device under normal operating conditions. Hot bearings are traditionally referred to as “Hot Boxes”.
HWD	Hot Wheel Detectors. These devices accurately measure the temperature of wheels as they pass over this device under normal operating conditions.

### General Arrangements

This equipment is located on the Down Main line. When other than normal measurements are recorded by HBD, HWD and DED Wayside Monitoring Devices, alarms are reported to the NCCS Network Controller Main South A via the Wayside Client Terminal.

When an issue is detected, an audible alarm will sound on the Network Controller’s Wayside Client Terminal and the recorded alarm details displayed on the screen.

Train Crews will be notified of HBD, HWD and DED alarms directly using digitized voice alarm messages transmitted via the WB (450.050) radio.

The Network Controller must confirm the alarm status with Train Crews to ensure their understanding when inspecting for defects.

If no alarm condition is recorded Train Crews receive a “NO Defect” message via the WB (450.050) radio.

This equipment does not impact train operations, it is passive detection and recording of rolling stock.

All Track Maintenance equipment for example Tampers, Regulators and Rail Grinders that may impact the equipment must contact the NSW Wayside Team Leader (02) 4979 7475 prior to conducting any work between the wayside signs.

Example of Wayside Detector Signage



The Network Controller and Train Crew are to come to understanding as to a safe place and protection required if the train needs to be inspected due to a defect.

