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SIGNALLING RECORD SOCIETY OF VICTORIA INC



A mystery shot by David Langley: where is this, when (roughly) and why are there four Annett locks on two levers? It would appear to be a Victorian frame, but multiple Annett locks were more typically associated with New South Wales. In case the reproduction is not sufficiently clear, it should be noted that the frame has 25 levers, though this was not its original size. Answers on the metaphorical postcard to the editor (or by email) and the best answers will be published in the next issue.

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MINUTES OF MEETING HELD FRIDAY MARCH 19, 2010, AT THE SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: - Wilfrid Brook, Brett Cleak, Graeme Cleak, Glenn Cumming, Graeme Dunn, Michael Formaini, Ray Gomerski, Chris Gordon, Judy Gordon, Bill Johnston, Chris King, Keith Lambert, Steve Malpass, Andrew McLean, Laurie Savage, Brian Sherry and Ray Williams.

Apologies: - Mark Bau, Jon Churchward, David Langley, Tom Murray, Greg O'Flynn, Peter Silva, Rod Smith, Stuart Turnbull, Andrew Waugh, Andrew Wheatland & Bob Whitehead.

In the absence of the President, the Vice - President, Mr. Bill Johnston, took the chair & opened the meeting @ 20:37 hours, following the 2010 Annual General Meeting.

Minutes of the November 2009 Meeting: - Accepted as published. Michael Formaini / Brett Cleak. Carried.

Business Arising: - Nil.

Minutes of the February 2010 Meeting: - Accepted as published. Michael Formaini / Brett Cleak. Carried.

Business Arising: - Nil.

Correspondence: - Post card received from Tom Murray, slumming it aboard the Queen Mary 2.

Letter to Surrey Hills Neighbourhood Centre with payment for use of meeting room for 2010.

Letter to Bramley White of Lilydale welcoming him to membership of the SRSV.

Letter to Donald Sharp of Melton South welcoming him to membership of the SRSV.

Steve Malpass / Michael Formaini. Carried.

Reports: - Glenn Cumming reported on the successful visit to the Puffing Billy Railway for the February 2010 Meeting. Thanks to Andrew Wheatland for arranging the visit.

General Business: - The Secretary advised that membership renewals are now due.

Keith Lambert provided details about various works in the Metropolitan District. A summary of the discussion follows: -

- * The track slew at Laverton has been completed.
- * A new crossover will be provided at Craigieburn this weekend.
- * Works for the alterations at Westall are about to commence.
- * Sandringham Signal Box has been re-blocked with new foundations.
- * The shell of the former Flinders Street "A" Box has been renovated and is now an art centre.
- * Works for the new stabling sidings at Newport have commenced.
- * The project to electrify to Sunbury is to commence this year.
- * Works for the Regional Rail Link project will commence this year. The cutting at Footscray will be widened.

Chris King asked if axle counters between Sydenham - Sunbury will be replaced by track circuits for the electrification.

Keith Lambert noted that Sydenham - Sunbury might be remote controlled from Craigieburn.

Brett Cleak reported that tenders had been called for power signalling between Ballarat - Maryborough with signals at Creswick and Clunes and a maintenance siding at Clunes. Maryborough will be re-signalled.

Glenn Cumming noted a rumour surfaced this week that Tourello Loop will be retained and provided with signals, point motors and remote control.

Brett Cleak reported that the new Standard Gauge crossing loops at Kilmore East and Tallarook had been commissioned. Broadford Loop has been abolished.

Brett Cleak advised that the rules for Train Staff and Ticket have been inserted into the ARTC Rule Book to allow for operations between Benalla - Oaklands.

Laurie Savage asked if any of the hump shunt signals from Melbourne Yard had survived.

Brian Sherry asked about works at Brighton Beach. A tender has been called for three stabling sidings. A small unit lever signal control panel will be provided in the signal box.

Brian Sherry asked about the status of Platform No.1 at Werribee. An additional train stop for Up trains had been provided and No.1 Platform had been returned to service.

Chris Gordon advised that design work for the Greensborough - Hurstbridge re-signalling project was progressing. The new stabling sidings at Eltham will require planning approval.

Laurie Savage asked what tramway signal boxes still exist on the Melbourne tram system. The Franklin Street building is still there but is it still used?

Andrew McLeans asked if anybody had a gradient diagram for the scenic railway at Luna Park.

Ray Williams provided an update on progress at the Yarra Valley Tourist Railway at Healesville.

Railmotor RM22 has now been accredited to operate to the crossing at Tarrawarra, approximately 4.5 kilometres. Ballast and drainage improvements have been undertaken. Level crossing works at Yarra Glen for the truck bypass will see the provision of boom barriers.

Chris King asked about controls at Lower Ferntree Gully. Keith Lambert noted that there was an issue with holding the Vicroads traffic lights at red.

Meeting closed at 22:17 hours.

The next meeting will be on Friday 21 May, 2010 at the Surrey Hills Neighbourhood Centre, Bedford Avenue, Surrey Hill, commencing at 20:00 hours (8.00pm).

SIGNALLING ALTERATIONS

The following alterations were published in WN 3/10 to WN 15/10 and ETRB A circulars. The alterations have been edited to conserve space. Dates in parenthesis are the dates of publication, which may not be the date of the alteration.

- 18.09.2009 **Warrnambool - Dennington** (TON 167/10, WN 12)
On 18.9., the section of line from 270.486 km to Dennington was transferred to the control of Victrack. TON 349/09 is cancelled.
- 30.01.2010 **Westall** (SW 15/10, WN 5)
On Saturday, 30.1., No 2 Siding was made a dead end siding with a clear length of 83 metres. Catch 15 at the Up end of No 2 Siding was abolished together with Dwarf 16. Note that Nos 2 and 3 Sidings remain booked out of use as per SW 343/09. Diagram 7/10 (Westall to Yarraman) replaced 39/08.
- 31.01.2010 **Ballan** (SW 6/10, WN 3)
On Sunday, 31.1., active road traffic advance warning signs will be provided at Daylesford Road (80.769 km). Diagram 68/09 (Bacchus Marsh West - Gordon) replaced 42/05.
- 02.02.2009 **Maryborough** (SW 11/10, WN 4)
On Tuesday, 2.4., Derail 21 and Dwarf 22 for moves from the Locomotive Siding was relocated 6 metres in the Down direction. Derail 21 was also equipped with a dual control point machine (currently manually operated) in lieu of direct rodded operation. A new set of points facing Down trains was provided in the Moolort line and secured normal. Amend Diagram 124/07 (Maryborough).
- 05.02.2010 **Mangagatang - Robinvale** (TON 32/10, WN 5)
On Friday, 5.2., the line between Mangatang Block Point and Robinvale was booked out of service. Baulks were provided at 457.300 km.
- 09.02.2010 **Benalla - Oaklands**
On Tuesday, 9.2., the line from Benalla to Oaklands was reopened as a standard gauge line. The line is worked by Train Staff (no Tickets) with the single section Benalla - Oaklands under the control of the Train Controller, Junee. The Train Staff is in the custody of the Sectional Co-ordinator, Seymour - Wodonga West Line Absolute Occupation Section 2. Section 2 extends from Violet Town (170.500 km) to Alumatta (232.500 km).
The following locations were returned to use: St James (Staff locked), Yarrowonga (Plunger and Staff Locking), Sloane (Staff), Warragoon (Staff), Sanger (Staff), Wangamong (Staff), Oaklands (HLB). All other locations have been removed.
At Benalla a crossover is provided from the East Line to the West Line, a set of points in the West Line to the Yarrowonga line, and a catch point in the Yarrowonga line. These connections are situated on the Up side of Nunn St. The points/catch points are equipped with Vossloh-Cogifer dual control point machines and are clipped normal. A safeworking cabin is provided adjacent to Nunn Street, Benalla.
Benalla yard area is defined as the section of line from Nunn Street to Roe Street, and this track retains main line status in the yard. A short loop siding is provided in the yard. The points are secured by hand locking bars and padlocks and scotch blocks are provided at both ends of the siding. A board for Up trains lettered 'Stop Do not proceed without authority from the Train Controller' is erected on the Down side of Nunn Street. Only one train is permitted to operate in Benalla Yard at one time.

When a train operates on the line the Sectional Co-ordinator will act as Signaller Benalla. When a Down train is required to operate to the Oaklands line, the Sectional Co-ordinator must obtain absolute occupation of the East Line Violet Town Loop - Benalla Loop section. Protection of the absolute occupation must be applied. The Sectional Co-ordinator, with the Train Staff, must meet the train at Violet Town Loop and pilot the train to the main line crossover. The Co-ordinator will then line the switches for the Oaklands line, and the competent person assisting must confirm that the route is correctly set. The Co-ordinator will operate the Nunn Street level crossing protection equipment. When the boom barriers are down, the Driver can be handed the Train Staff and authorised to proceed. Once the train has arrived complete inside the catch points, the Co-ordinator will cancel the operation of the level crossing equipment, inform the Driver that the train is complete, secure the points normal with the clips, walk the route to confirm that the points are set correctly and arrange for the assistant to check the position of the points, advise the Train Controller and return the Absolute Occupation.

11.02.2010 **Sea Lake Block Point - Mittyack** (TON 49/10, WN 6)

On Thursday, 11.2., the line between Sea Lake Block Point and Mittyack was booked out of service due to track condition. Baulks were provided at 422.800 km.

12.02.2010 **Sulky Loop** (SW 14/10 & 19/10, WN 5 & 6)

On Friday, 12.2, Sulky Loop was disestablished as a Train Order Crossing Loop. The Train Order Section is now North Ballarat - Tourello Loop.

The Up and Down end points were secured normal for the former Up line. The Up and Down Location Boards, the Up Repeating signal at 166.480 km and the bi-directional end of train detection system were abolished.

13.02.2010 **North Ballarat - Tourello** (SW 14/10, 19/10, & 20/10, WN 5 & 6)

On Saturday, 13.2., the existing flashing lights at Midland Highway (166.081 km) were provided with boom barriers and road traffic active advance warning signs. The level crossing will now be operated by a predictor. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing and Section 36 predictor boards were provided. The 40 km/h speed restriction for Down trains approaching the Midland Highway was abolished.

Diagram 108/09 (Sulky - Talbot) replaced 36/06.

17.02.2010 **Mildura Cement Siding** (SW 16/10 & 17/10, WN 6)

Between Thursday, 11.2., and Wednesday, 17.2., the siding was extended at both ends to a clear length of 658 metres. The main line between the former Down end points and Benetook Ave, around 320 metres, was slued.

The existing points, small point levers, and rodded catch points at each end of the siding were abolished. The master key lock at the former Up end points, and the Annett lock and Master/Annett key exchanger at the Down end were abolished.

The new points at the Up end are located 20 metres on the Down side of Cowra Ave, and the new Down end points are located 82 metres on the Up side of Benetook Ave. Catch points are provided at each end of the siding. The catch points and the main line points are worked by dual control point machines operated in the hand operating mode. A large Master/Annett key exchange apparatus is provided at each main line points. The catch points are secured by Annett locks. The catch points are fitted with miniature Master key locks, and the main line points are secured by miniature Master key locks.

V5PSW keyswitches are provided to manually control the level crossing protection equipment at Cowra Ave and Benetook Ave during shunting. New notice boards are erected at each end of the siding lettered "Shunting trains must not enter the roadway until flashing lights are operating".

When a train is to shunt the siding, the competent employee will obtain the corridor master key from the driver and use it to obtain the Annett key from the Master/Annett exchange apparatus. This will stop the flashing lights. The Annett key is then used to unlock the catch points which can then be closed using the hand operating lever of the dual control point machine. The plunger of the miniature Master key lock can then be operated to lock the catch points closed and to release the drawer of the lock.

Opening the drawer will allow the miniature Master key to be removed. It can then be taken to the adjacent main line points and used to unlock the miniature Master key lock securing the points normal. The main line points can then be reversed.

Amend Diagram 30/07 (Yatpool - Irymple). Operating Procedure 85 was reissued.

19.02.2010 **Bairnsdale** (TON 106/10, WN 9)

On Friday 19.2, the Up end of No 4 Road was booked back into use for Track Machines. There is a clear standing room of 120 metres to baulks provided at the Up end of the goods shed.

21.02.2010 **Marshall** (SW 12/10 & 22/10, WN 4, 5 & 6)

On Sunday, 21.2., road traffic active advance warning signs were provided at Barwon Heads Road (78.805 km). The existing predictor boards will be replaced by Section 36 predictor boards. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing.

Diagram 122/09 (Marshall) replaced 92/09.

21.02.2010 **Bungaree North Line** (SW 21/10, WN 6)

On Sunday, 21.2., the existing flashing lights at Bungaree - Wallace Road (98.444 km) were equipped with boom barriers and road traffic active advance warning signs. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing and the existing predic-

tor boards will be replaced by Section 36 predictor boards. Diagram 70/09 (Gordon - Warrenheip) replaced 26/06.

22.02.2010 **Laverton** (SW 27/10, WN 8)

On Monday, 22.2., the existing relay interlocking was replaced by a Westrace interlocking. The points and signals were renumbered as follows (the number in brackets is the new number): GG673 (LAV731), LAV2 (LAV725), LAV4 (LAV722), LAV6 (LAV729), LAV8 (LAV720), LAV10 (LAV721), LAV12 (LAV723), LAV14 (LAV735), LAV16 (LAV732), LAV18 (LAV739), LAV20 (LAV730), LAV32 (LAV703), Points 3 (632), Points 7 (639), Points 11 (622), Points 17 (601). Note that Points 15 were not renumbered. Homes 6, 18, and 36 were converted to LED heads.

Diagrams 19/10 (Altona Junction - Laverton) and 17/10 (Altona Junction - Westona - Laverton) replaced 7/09 and 125/06 respectively.

(23.02.2010) **Somerton** (SW 28/10, WN 7)

Points 487 have been booked out of service due to track condition. Access to the sidings is only permitted if a Signal Maintenance Technician attends, books the points back in, operates the points, and books the points out again after the shunting has completed.

(23.02.2010) **Westall** (SW 24/10, WN 7)

The clear length of Siding No 1 is 290 metres. Amend Diagram 7/10 (Westall - Yarraman).

(23.02.2010) **Glenhuntly - Highett** (SW 30/10, WN 7)

Diagram 69/09 (Glenhuntly - Highett) replaced 3/07 as in service.

24.02.2010 **Talbot Loop** (SW 25/10 & 32/10, WN 7 & 8)

On Wednesday, 24.2., Talbot Loop was disestablished as a Train Order Crossing Loop. The new Train Order section will be Tourello Loop - Maryborough.

The main line points were removed. The non-trailable point machine, ST21 lock, and rodded wheel crowder and derail to No 3 Road were abolished. All signage, including the location boards, was abolished.

The existing flashing lights at Ballarat - Maryborough Road (209.269 km) were converted to boom barriers. The existing predictor boards at Ballarat - Maryborough Road (209.269 km) and Scandinavian Cres (209.531 km) will be replaced by Section 36 predictor boards. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossings.

Amend Diagram 189/09 (Sulky - Talbot).

24.02.2010 **North Bendigo** (SW 24/10, WN 7)

On Wednesday, 24.2., the existing flashing lights at the Midland Highway (164.700 km) were equipped with boom barriers and road traffic active advance warning signs were provided. Operation of the level crossing will now be by predictors. Remote monitoring equipment was provided. Diagram 98/09 (North Bendigo - Elmore) replaced 34/07.

26.02.2010 **Wallan Loop - Broadford Loop - Tallarook Loop - Seymour Loop**

At 2130 hours Friday, 26.2., the CTC System between Wallan Loop and Seymour Loop was suspended to commission the new extended Passing Lanes 3 (Kilmore East/Mount Piper) and 4 (Tallarook). Trains will be worked by pilots with the sections Wallan Loop - Broadford Loop - Seymour Loop, however Broadford Loop will not be available for crossing trains. The pilots will have absolute occupation of their section and must accompany every train through the section. They must also be present at Kilmore East or Seymour when it is necessary to use the grade crossings. Signallers were provided at Wallan Loop, Broadford Loop, and Seymour Loop.

Signals WLN/6 & WLN/U6 (Wallan Loop), BRF/2, BRF/4, BRF/U4, BRF/6, BRF/U6, & BRF/8 (Broadford Loop), and SEY/4 & SEY/U4 will be fixed at stop. Up Automatic ES1712 will be fixed to show Normal Speed Warning. Signals ES3117 and ES3242 will be extinguished and crossed. Signals ES1951, ES2047, ES2048, ES2367, ES2368, ES2572, ES2875, ES3116, KME6 & KME10 (Kilmore East), and TLK/2, TLK/4, TLK/U4, TLK/6, TLK/U6, & TLK/8 (Tallarook Loop) will be abolished.

27.02.2010 **Elaine** (SW 27/10, WN 7)

On Sunday, 27.2., the existing flashing lights at the Midland Highway (123.064 km) were equipped with boom barriers and road traffic active advance warning signs were provided. Operation of the level crossing will now be by predictors. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing and predictor boards as shown in Section 36 Rule 9 were provided.

27.02.2010 **Broadford Loop**

On Sunday, 27.2., the up and down main line points were removed. Broadford Loop will remain available for follow on rail movements.

28.02.2010 **Oak Park** (SW 29/10, WN 8)

On Sunday, 28.2., Down Automatic E489 was converted to a United Group TC2 Tri-colour LED.

01.03.2010 **Broadmeadows - Roxburgh Park - Craigieburn** (SW 334/09, 344/09, 13/10, 17/10, & 34/10, WN 47, 48, 4, 5 & 7)

On Monday, 1.3, new Down Automatic E809 (23.177 km) and Up Automatic E838 (24.095 km) were provided as part of a project to provide a 3 minute headway. The track circuits were altered, and a new Craigieburn interlocking (separate from the Broadmeadows interlocking) was provided. Diagrams 53/

09 (Glenbervie - Somerton) and 51/09 (Craigieburn) replaced 33/09 and 31/09.

01.03.2010 **Broadford - Tallarook** (SW 31/10, WN 8)

On Monday, 1.3., the existing boom barriers at Dockerys Rd (85.433 km) and Sharp's and Taylor's Rd (87.397 km) will be upgraded. Operation of the level crossing will be by predictors. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing and predictor boards as shown in Section 36 Rule 9 were provided. Remote monitoring equipment is provided. Amend Diagram 118/07 (Broadford - Tallarook).

01.03.2010 **Traralgon** (SW 29/10, WN 7)

On Monday, 1.3., the existing flashing lights at McNairn Road (160.221 km) were equipped with boom barriers. The level crossing is now operated by a level crossing predictor. Remote monitoring equipment is provided.

The points to the Traralgon Cement Siding will remain booked out of service with the points secured normal.

Diagram 4/10 (Traralgon - Sale) replaced 38/09.

(02.03.2010) **Clunes** (SW 35/10, WN 8)

A 140 metre track maintenance siding has been provided, but not commissioned. The points to the new siding face Down trains and are located at 192.400 km between Boundary Road (192.286 km) and the former station platform.

(02.03.2010) **Albion - St Albans** (SW 37/10, WN 8)

Diagram 9/10 (Albion - St Albans) replaced 97/06 as in service.

02.03.2010 **Nagambie** (SW 30/10, WN 7)

On Tuesday, 2.3., the passive crossing at Racecourse Road (127.542 km) on the Down side of Nagambie was equipped with boom barriers. Operation of the level crossing will be by predictors. Trains travelling at more than 50 km/h at the predictor boards may accelerate prior to passing over the level crossing and predictor boards as shown in Section 36 Rule 9 were provided. Remote monitoring equipment is provided. Diagram 6/10 (Nagambie - Toolamba) replaced 6/09.

02.03.2010 **Wallan Loop - Broadford Loop - Tallarook Passing Lane - Seymour Loop**

On Tuesday, 2.3., Tallarook Passing Lane was commissioned for use and the CTC brought back into operation between Tallarook Passing Lane and Seymour Loop. Tallarook Loop will be temporarily controlled from a control panel by the Operations Co-ordinator at the SIA offices Seymour. The signaler will be withdrawn from Broadford Loop.

Signals WLN/6 and WLN/U6 (Wallan Loop) and TLK4 & TLK16 (Tallarook Passing Lane) will be fixed at Stop. Up Automatic ES1712 and Down Automatic ES801 will be fixed to show Normal Speed Warning. All points and signals at Broadford Loop will be abolished. The pilot keys for the section Broadford Loop - Tallarook Loop - Seymour Loop were abolished. Signals ES587, ES746, KME2, KME4, KME16, KME24, KME28, ES661, EES661, MPR6, MPR8, MPR18 will remain out of use.

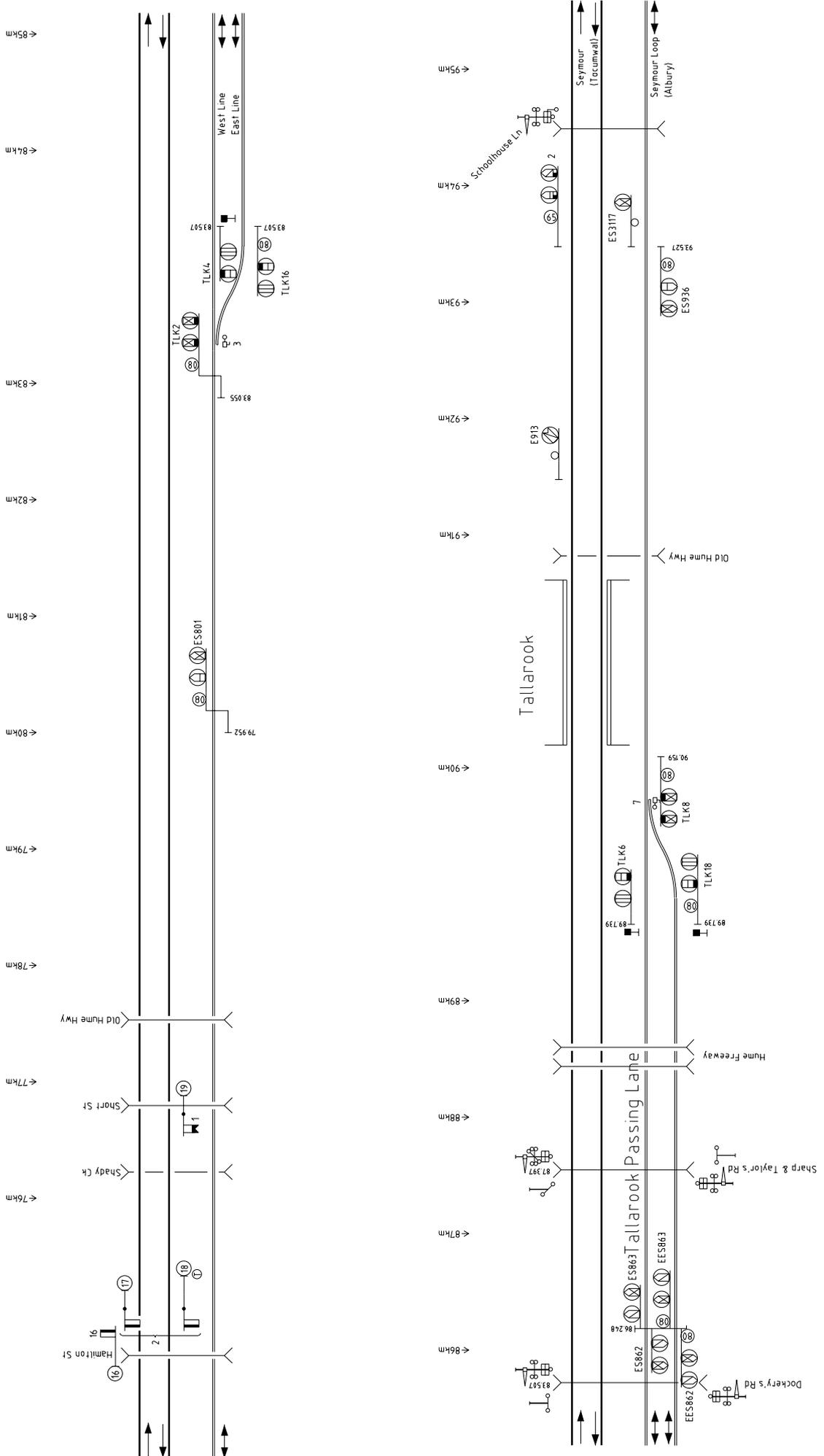
All Home signals at Tallarook Passing Lane are classified as Home Departure Signals (including the arrival Homes TLK/2 and TLK/8). This means that authority to pass the Home at Danger can only be authorised under the Rules for CTC, Section 17, Book of Rules. The intermediate Automatics in the passing lane (ES862, EES862, ES863, and EES863) can be passed at danger under the verbal authority of the Train Controller, but before giving this authority, the Train Controller must ensure that the track ahead of the signal is clear and that blocking has been applied to prevent an opposing movement.

When the route is set from the single line to the East Line at TLK/2 or TLK/8, and the automatic signal in advance is at Stop, the Home will display Medium Speed Warning (R/Y) - not R/Y/80 - and the preceeding Automatic will display Reduce to Medium Speed (Y/G) - not Y/G/80. Homes TLK/2 and TLK/8 will only display the '80' indicator when route is set for the East line and the Automatic signal in advance is at proceed.

The intermediate Automatic signals on the West Line (ES862 and ES863) will be held at Stop if the Home in advance is at Stop with the route into the single line section not called. They will approach clear to Medium Speed Warning (R/Y) when the approach track circuit has been occupied for 145 seconds. The approach operation is to prevent trains from blocking the level crossing in the rear of the signal. They will display a Normal Speed Warning (Y/R) if the Home in advance is at Stop, but the route into the single line section has been called. The intermediate Automatic signals on the East Line (EES862 and EES863) operate in the same way - note that the '80' indicator will only be displayed when the Home in advance is displaying Clear Medium Speed/80 (R/G/80). In particular, when the route is set for the single line, but the Home in advance is at Stop, the Automatic signal will display Normal Speed Warning (Y/R), not Medium Speed Warning/80 (R/Y/80).

Points 3 and 8 are equipped with dual control Vossloh Cogifer point machines equipped with selector and hand operating levers. When the points are placed in the hand operating mode and set to the required position they must be secured by two point clips.

If remote control fails, the interlocking will operate in a simple automatic mode. Approaching Down trains will be automatically routed into the West line and Up trains into the East line. Push buttons are provided at the TLK/4, TLK/6, TLK/16, and TLK/18. These have 'clear' and 'cancel' pushbuttons. When operated by the Driver (under instructions from the Train Controller) the points will be set and the appropriate signal will clear. A time release will apply when the 'cancel' button is pressed.



- 05.03.2010 **Beaufort - Ararat** (SW 33/10, WN 8)
On Friday, 5.3., the existing passive crossing at Middle Creek Road (181.460 km) was equipped with boom barriers. Operation will be by predictors, and remote monitoring equipment will be provided.
- 05.03.2010 **Wallan Loop - Kilmore East/Mount Piper Passing Lane - Tallarook Passing Lane** (SW 34/10, WN 9)
On Friday, 5.3., the Kilmore East/Mount Piper Passing Lane was commissioned for use and the CTC brought back into operation between Wallan Loop - Kilmore East/Mount Piper Passing Lane - Tallarook Passing Lane. Broadford Loop was abolished.
The details for Tallarook Passing Lane generally apply to the Kilmore East/Mount Piper Passing Lane, except that the approach releasing of the intermediate Automatic signals is not provided.
Diagrams 10/09 (Heathcote Junction - Kilmore East), 68/08 (Broadford - Tallarook), and 114/09 (Seymour) replaced 86/08, 118/07, and 94/09 (respectively).
- 05.03.2010 **Bairnsdale** (SW 37/10, WN 9)
On Friday, 5.3., Operating Procedure 130E will be reissued to allow the keyswitches to be operated by a competent employee or a train driver, and to reflect the recommissioning of Nos 3 and 4 Roads (TON 439/09 and 106/10 respectively).
- 07.03.2010 **Ringwood East** (SW 40/10, WN 9)
On Sunday, 7.3., the flashing lights at Dublin Rd were converted to LED as part of a traffic light co-ordination project.
- 07.03.2010 **Berwick** (SW 39/10, WN 9)
On Sunday, 7.3., the crossover was replaced by tangential points operated by M23A WBS point machines.
- (09.03.2010) **Seymour** (SW 36/10, WN 9)
The standard gauge sidings in the Seymour Loco Depot have been removed for rebuilding. The sidings are baulked on the Down side of the catch points. Amend Diagram 114/09 (Seymour).
- 09.03.2010 **Laverton** (SW 38/10 & 43/10, WN 9)
Between Friday, 5.3., and Tuesday, 9.3., the new No 1 Platform was commissioned to the west of the existing island platform. The platform faces of the existing island platform were renumbered No 2 and 3.
The West Line was slued to run through the new No 1 Platform and Platform No 2 was temporarily taken out of use. Up Home LAV732 was replaced by a new post and a co-acting signal LAV732P was provided located on a signal gantry. The route indicator will display 'E' when the route is set for the East Line and 'L' when it is set for the Laverton Loop.
Diagram 25/10 (Altona Junction - Laverton) replaced 19/10.
- 10.03.2010 **Cope Cope** (TON 121/10, WN 10)
On Wednesday, 10.3., the siding was booked out of service due to sleeper condition.
- 13.03.2010 **Werribee** (SW 44/10, WN 10)
On Saturday, 13.3., an additional train stop was provided for Up Home 12. The train stop is located 15 metres from the Up end of Platform 1. The routing restriction in SW 20/10 is cancelled.
- 16.03.2010 **Birchip AWB Siding** (TON 123/10, WN 10)
In accordance with SW 147/06, authority is given for Birchip AWB Siding to be used for grain traffic on Tuesday 16.3.
- 16.03.2010 **Watchem** (TON 124/10, WN 10)
In accordance with SW 139/07, authority is given for Watchem Crossing Loop to be used for crossing trains on Tuesday 16.3.
- 21.03.2010 **Flinders St** (SW 46/10, WN 11)
On Sunday, 21.2., Home 331 was converted to a multi aspect Style U LED signal. Home 336 was converted to a tri-colour LED signal.
- 22.03.2010 **Broadmeadows - Craigieburn** (SW 45/10, WN 10 & 11)
On Monday, 22.3., the following alterations took place as part of the three minute headway project:
The following signals were provided: Down Automatics E665 (18.776 km) and E705 (20.040 km); and Up Automatics E678 and coacting signal (19.200 km) and E734 (20.958 km). Up Automatic BMS510 was relocated 240 metres in the Up direction. Down Automatic SOM591 was relocated 618 metres in the Down direction.
At Craigieburn Down Home CGB523, fixed at Stop, was provided at the Down end of the Up platform was provided. Train stops were provided at Homes CGB518 and CGB523. Dwarf CGB535 was relocated 193 metres in the Up direction. Crossover 433 (25.321 km) was commissioned. Crossover 419 and Points 421 (not in service) are detected by the signalling system.
Diagrams 619/09 (Glenberve - Somerton) and 39/10 (Craigieburn) replaced 53/09 and 51/09 respectively.
- 23.03.2010 **Unsignalled moves** (SW 52/10, WN 12)
After conducting a non-signalled move, another train or track maintenance vehicle is not permitted to be signalled towards the area from which the non-signalled move was made until the first train or track vehicle is clear beyond the protecting signal, or the Signaller has confirmed that it is clear of the fouling

- 27.03.2010 **Westall** (SW 56/10, WN 12)
On Saturday, 27.3., the pedestrian crossing at 22.870 km was closed. The automatic pedestrian gates were removed. Diagram 21/10 (Westall - Yarraman) replaced 7/10.
- (30.03.2010) **Signalling trains approaching level crossings** (SW 49/10, WN 12)

point of any adjoining line by personal observation or by information from the operator in charge of the train or track maintenance vehicle.

Due to recent train overruns, where a signalbox controls the signals over a level crossing and a platform is on the approach side of a level crossing, the signaller is to signal the train across the level crossing before the train arrives at the platform. This applies at Glenhuntly (Up), Mordialloc (Up and Down when switched in), Springvale (Up when switched in), Brighton Beach (Down when switched in), Kensington (Up), Coburg (Upfield signalbox) (Down when switched in), Essendon (Up when switched in), St Albans (Down when switched in), Aircraft (Newport signalbox) (Up).

At Aircraft, Home LAV730 must be set in Express mode and in fleeting mode where practicable. At Macaulay, Home NME522 must remain in the fleeting mode.

- 31.03.2010 **Traralgon** (TON 174/10, WN 13)
On Wednesday, 31.3., No 2 Road was booked back into service. TON 127/10 is cancelled.
- 06.04.2010 **Westall** (SW 60/10, WN 13)
On Tuesday, 6.4., Points 7 and 9 were replaced and are now operated by M23A point machines. Dwarf 6 was relocated 40 metres in the Up direction. Amend Diagram 21/10 (Westall - Yarraman).
- 06.04.2010 **Laverton** (SW 57/10, WN 12)

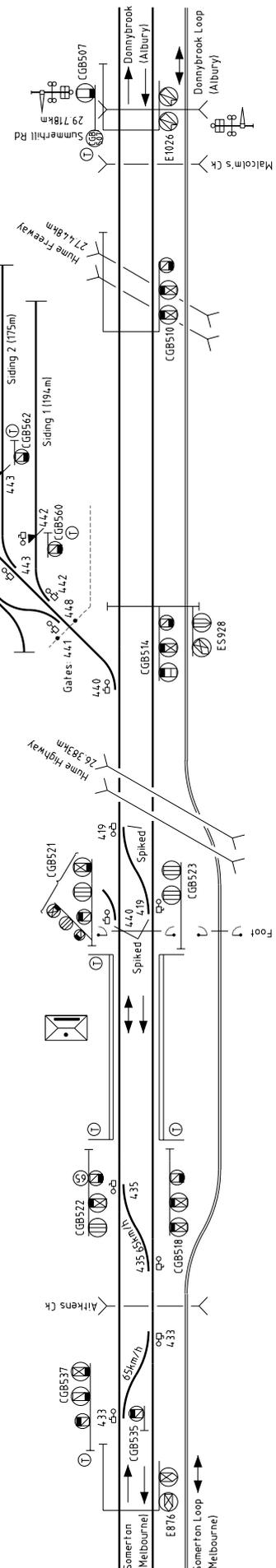
Between Thursday, 1.4., and Tuesday, 6.4., the East Line was slued to run through Platform No 2. Platform No 3 was taken out of use.

Up Home LAV7222 and the co-acting signal were replaced by a new LED post located on a gantry at the Up end of the platform and co-acting signal LAV7222P. Points 620 were provided in the East Line at the Down end of Laverton but not commissioned.

Diagrams 29/10 (Altona Junction - Laverton) and 11/10 (Aircraft - Werribee) replaced 25/10 and 139/06 respectively.

Craigieburn

Based on Diagram 3109 & WN 21/09



CHATSWORTH, CALIFORNIA, 2008

The NTSB has released its report into the head on collision of a Metrolink diesel hauled suburban train and a diesel hauled goods train at Chatsworth, on the outskirts of Los Angeles, California, at 1531 on 22 September 2008. Twenty five people died in the accident, including the driver of the Metrolink train, and 102 people were injured. The two trains collided on a single section of track after the Metrolink suburban train passed the signal protecting the beginning of the single line at danger. It was daylight and the weather was fine and clear, with a visibility of around 4 miles. The board concluded that this was due to the engineer being distracted by receiving and sending text messages while approaching the signal protecting the end of the single line.

The location and signalling

The accident occurred on the Ventura subdivision of the Southern California Regional Rail Authority's (SCRRA) Metrolink about 33 miles west of Los Angeles. This subdivision was formerly the SP's Coast Line which runs between Oakland and Los Angeles. It is now owned by the SCRRA to Moorpark, where the Metrolink service terminates, and the Union Pacific beyond. Between Los Angeles and Control Point (CP) Rayner the line is double track. Beyond CP Rayner it is single track with lengthy sidings (crossing loops) at Chatsworth, Davies, Strathearn, and Moorpark. Approaching the accident site the 11300 foot long Chatsworth siding begins at Control Point (CP) Benson and extends to CP Topanga. Chatsworth station is located about half way along this stretch with platforms provided on both the main track and siding. From Chatsworth station there is a long straight, about one mile long, before the end of the siding at CP Topanga. In this stretch there are two road crossings: Devonshire St and Chatsworth St. Beyond the end of the siding at CP Topanga, the line makes a sharp (6 degree) left hand turn and immediately afterwards passes through three tunnels: Tunnels 28 (547 feet long), 27 (924 feet long), and 26 (7369 feet long). There is a 40 mph speed restriction in this section for all trains. After Tunnel 26 the next siding begins at CP Davies. The accident occurred on the sharp curve just beyond CP Topanga.

All tracks are fully bi-directionally signalled using colour light signalling controlled by despatcher from the Metrolink operations centre. On the subdivision, control points are equipped with Vital Harmon Logic Control processors and the intermediate signals with Electro-Code 4 processors. Safetrans V-20 colourlight and GRS Sentinel signals are used. The line is not equipped with automatic train protection, or any form of trip stops.

The accident

The Metrolink suburban train was Train 111 operating the 1535 westbound Los Angeles Union Station - Moorpark run. It consisted of a diesel locomotive and three bi-level (double deck) carriages. The rear carriage was equipped with a control cabin to allow the train to operate in push-pull mode. The opposing train was UP freight train LOF-65-12 (the Leesdale local) performing local switching while returning to Gemco Yard.

The SCRRA despatcher had set the route for the Leesdale local to arrive into the Chatsworth siding at CP Topanga. It appears that the departure home at CP Davies was clear (green), intermediate signal 4426 was caution (yellow), and the home at CP Topanga was stop (red). The home at Topanga was approach released and would clear to diverg-

ing and intermediate 4426 to approach diverging (yellow over yellow) as the train passed CP Davies. The signals for the Metrolink train were displaying stop (red) at the home at CP Topanga, yellow (approach) at the intermediate signal 4451 approaching Chatsworth, and flashing yellow (advance approach) at the home at CP Benson (446.8 miles). (Actually the, homes at CP Topanga were approach lit to extend lamp life and were not lit until the Metrolink train passed the home at CP Benson.). The recorded audit information at the signal locations showed that the signals were displaying their correct aspects.

The Metrolink train stopped at Northridge station (the station before Chatswood) at 1641:10 and departed 40 seconds later. After departure the conductor began walking through the train. The engineer of the train called the next three intermediate signals as 'green' over the radio. The rulebook required the engineer to announce the indications over the recorded radio at all signals. The conductor was required to acknowledge, over the radio, all calls of signals other than clear. As the train approached the home at CP Benson (showing advance approach, meaning "proceed prepared to stop at second signal"), the engineer correctly called the signal on the radio, but this was not acknowledged by the conductor. The train passed the home at CP Benson at 1647:45 travelling at 68 mph. A few seconds later the engineer of the Leesdale local called the aspect of the home at CP Davies as the local entered the single line section.

At 1618:41 the Metrolink train passed intermediate 4451 which was displaying yellow (approach - "proceed prepared to stop at next signal. Trains exceeding 40 mph must begin their reduction to 40 mph as soon as the head end passes the signal."). The engineer did not call out the aspect of this signal.

The train came to a stand at Chatswood station, a mile south of CP Topanga, at 1619:20 and was stationary for 53 seconds. The conductor stated that as he looked along the train at Chatswood while closing the door, he saw the green signal at CP Topanga, and at a later interview, stated that he radioed "highball 111 on a green signal" to the engineer. The recording of the radio traffic did not contain this message.

At 1620:07 the engineer moved the throttle to notch 2 and began to release the brakes. Subsequently the throttle was advanced to accelerate the train. At 1620:20 he activated the locomotive bell, and at 1620:51 he blew an 11 second blast on the locomotive whistle for the Devonshire Street level crossing. A text message was transmitted to the engineer at 1621:03 (this was the time of transmission by the telephone company - the actual display of the message would be slightly later). The engineer continued to respond to the two level crossings: at 1621:23 sounding the bell for 19 seconds and also making a short (1 second) blast on the horn. A second blast of the horn was made from 1621:34 to 1621:41 for Chatsworth St. At this time the train's speed was 54 mph, and over the next five seconds the engineer adjusted throttle position to Notch 4. Two separate rules limited the speed to 40 mph at this time. The approach aspect at the previous signal required the engineer to reduce speed to 40 mph and to not exceed this speed until the next signal. In addition, Metrolink Operating Rule 9.9 required that when a train had been stopped between signals, for example at a station stop, it was restricted to 40 mph until the next signal.

The train was now around 1200 feet from the home at CP Topanga. At 1621:46 the engineer made a minimum service brake application and the train passed the home at

1621:56 travelling at a speed of 44 mph, presumably in preparation for the 40 mph line speed beyond CP Topanga. The brakes were released at 1622:00. A text message was sent at 1622:01 (this was the time the message was received by the network - the actual transmission time would be slightly earlier). The train ran through and damaged the points at 1622:02.

The crew on the Leesdale local saw the Metrolink train as they exited the third tunnel and entered the curve. They made an immediate emergency brake application, but the trains collided a few seconds later at 1622:23. The engineer of the Metrolink train did not apply the brakes or close the throttle before the collision. The Metrolink train was travelling at 41 mph and the Leesdale local at 43 mph at the time of the collision.

Texting

During the crucial approach to the home signal at CP Topanga the engineer received a text message and sent a response. The General Code of Operating Rules (GCOR) in use prohibited the use of any electronic devices not related to their duties while on duty. Metrolink amplified this in their specific rules to prohibit the use of mobile telephones while operating the controls of moving equipment. Connex (who actually operated the Metrolink services) went even further and prohibited, in most cases, having personal electronic devices switched on and/or in their immediate vicinity when working. Specifically, when the train is moving personal electronic devices had to be switched off and not in reach (e.g. on the control stand). Personal electronic devices could be stowed, switched off, in the employees grip.

About a month before the accident, the conductor of the train saw the engineer using his mobile phone while the train was departing Moorpark station. The conductor spoke to the engineer about this and the engineer agreed that he should put the phone away. The conductor also reported the incident to the Manager of Safety and Operating Procedures who reminded the engineer about the rules regarding mobile phone use. The manager also observed the engineer "a couple of times" over the following two weeks.

The engineer was using a LG Model VX10000 "Voyager" handset. This had a conventional, if small, qwerty keyboard and texting would have been faster than if using a normal phone.

On the day of the accident the engineer sent or received no less than 95 text messages between 0605 and 1622. The engineer received 21 messages and sent 21 messages while he was "responsible for operating the train" and also made four outgoing telephone calls. Records show that the engineer used the mobile telephone whilst he was on duty on the previous three days as well, although not always when operating the train.

The messages exchanged during the previous seven day revealed that the engineer had been co-ordinating with a railfan (the report actually gives a definition of a railfan) to ride in the cab and operate the train. On the Monday prior to the accident the engineer and railfan were exchanging text messages stating that the railfan would operate the train under direction. In addition, they arranged for the railfan and a friend to ride in the cab from Chatsworth to Union Station on the Tuesday. On the Wednesday, the engineer exchanged messages with a third railfan offering a cab ride to Montalvo. A number of text messages on the Friday of the accident, and on the days leading up to the accident, expressed concern that the railfans would be seen entering the cab. A plan was agreed to (emailed, hence not

known) and agreed to by the railfan. The message received by the engineer just before the accident read "I would like that too [referring to a possible meet with other trains, the topic of previous messages]. We already need to meet 796. That would be best." The response was "yea... usually @ north camarillo". The report notes that Connex instructions prohibit anyone apart from the engineer, conductor and authorised employees are permitted in the leading cab of a train.

The text messages exchanged during the morning of the accident were primarily to a co-worker and appeared to be discussing company correspondence.

Aspect of home at CP Topanga

Audit logs in the signalling system showed that the despatcher set the route for the freight to arrive in the siding at Chatsworth and then called the route for the Metrolink train. This was a normal practice and the route would be automatically set when the freight was detected clear in the siding. The audit logs confirm that the commands to clear the westbound home at CP Topanga were not actually sent. Audit logs at the interlocking at CP Topanga show that current was passing through the red lamp in the westbound home, proving that the lamp was intact and the light showing. No current passed through the green lens. Further, the interlocking was set up such that if the green lamp was detected as lit when an opposing route was set, all signals would be force to red and would remain locked out for six minutes. The lead engine of the freight was fitted with a recording forward facing camera and this showed that proceed aspects continued to be displayed as the freight approached CP Topanga. After the accident the signalling system was tested and found to be operating as designed. There does not seem to be any doubt that the westbound home at CP Topanga was displaying stop.

However, the conductor of the Metrolink train, the security guard at Chatsworth, and two railfans on the platform at Chatworth all stated that they saw the home at CP Topanga at clear. The NTSB arranged tests to determine if it was possible see the westbound home from the Chatsworth platform and determine its aspect.

The sighting tests involved a similar locomotive to that in the accident being driven forward from Chatsworth at the same time of day until the experience engineer stated that he could determine the aspect of the home. The cab of a locomotive standing at Chatsworth is around 5288 feet from the home at CP Topanga. The engineer stated that he could see the signal from the platform at Chatsworth, but he knew where to look. The locomotive was then move forward until the engineer could clearly distinguish the red signal. This was at a point 4335 feet from the signal. Not all of the observers in the cab could see the signal at this point, however. The train then backed to Chatsworth and the route was set for the train. As the signal stepped up to clear, the flashing yellow and green aspects were clearly seen by the observers from the train at Chatsworth station. When the signal was restored to stop, however, the red light was only faintly and intermitently visible to some of the observers.

The head of the home consists of three lights 8 3/8" in diameter arranged in a triangular pattern: red at the bottom and yellow and green at the same level above the red. The red light is 20 feet 5" above ground level. Although not mentioned in the report, the lights appear to use conventional incandescent bulbs rather than LEDs.

The NTSB chose to believe the recorded information, post accident tests, and the fact that the switch at CP Topanga had been run through as proving that the home at CP

Topanga was at stop. It noted that the human eye at a distance is better at identifying the intensity of light rather than its colour. When viewed from the platform at Chatsworth, the visual angle of the lights at CP Topanga were equivalent to the width of a single photoreceptor in an eye which puts it at the limit of human visual detection, making it particularly difficult to identify colour from that distance. An observer who was familiar with the location of the signal and its surrounding location might be able to see, and perhaps identify the colour, but would be more likely to not see the signal, or to mis-identify the colour. The report further notes that an experienced engineer who knew the signal and its location had to travel 1000 feet closer to the signal before being confident that he could identify its indication. Finally, it noted that the human eye is less sensitive to red light than green.

Collision behaviour

The impact speed was 84 mph. Both locomotives were derailed to the outside of the curve.

The Metrolink locomotive, which was operating cab leading, suffered severe collision damage to the front of the body, side panels, cab area, and rear of the body. Damage was so severe that the locomotive was compressed from its normal 58 foot length to around 42 feet. The front of the engine was compressed about 15 feet and the cab suffered an almost complete loss of survivable space. The rear of the locomotive badly telescoped the first passenger carriage, with the engine occupying the first 52 feet of the passenger carriage (2/3rds of the length).

The first passenger carriage of the Metrolink train was severely telescoped and almost all of the fatalities occurred in this carriage. As previously mentioned, the carriage was a conventional bi-level (double deck) carriage, with an upper and lower deck between the bogies and two intermediate levels over the bogies at each end of the carriage. The carriage was constructed by Bombardier in 2001-2. The carriage broke in two at the join between the intermediate deck and the bi-level section, and the intermediate level, complete with bogie, was telescoped through the leading carriage by the locomotive. The interior of the leading two thirds of the carriage was completely destroyed (the report used the word 'purged') with only the sidewalls and roof surviving. There was a complete loss of survivable space in this section.

The coaches were a semi-monocoque construction in which some of the strength of the body was taken by the skin of coach. A non-linear structural steel centre sill was provided manufactured from a low alloy high tensile steel married to an aluminium body. The body was designed to resist 800,000 pounds end force applied along the centre line without permanent deformation of the body. In the accident the body was assumed to have achieved its design rating on the basis of tests conducted on each batch of cars

as they were manufactured.

Neither the second or third coaches suffered serious structural damage, although there was considerable damage to internal fittings.

The freight train consisted of two locomotives and 17 cars (7 loaded). It weighed 1523 tons including the locomotives.

Recommendations

The NTSB made the following recommendations:

- * That inwards and outwards video and sound recordings be required in all cabs to allow monitoring of train crew's adherence to rules.
- * Require railroads to periodically review recordings to ensure compliance with safety related operating rules

The NTSB did not recommend the provision of positive train control as the US Government had recently passed the Rail Safety Improvement Act of 2008 which requires all Class I railroads to introduce positive train control by 15 December 2015.

Commentary

Texting has long been recognised as extremely dangerous when operating a road vehicle. This accident re-inforces the message that it is extremely distracting to the texter and can be equally fatal when operating a train. The NTSB report notes that the private nature of a cab means that it is extremely difficult to detect texting (and other rule infractions, such as allowing others to operate the train) and hence recommended videoing of the cab. This has, of course, to be backed up by a monitoring program to be effective and it would be questionable whether railroads would devote the necessary resources to the relatively boring and expensive task of viewing the recordings to detect infractions.

The extremely poor crash performance of the first passenger car is noteworthy - particularly as the maximum line speed on the subdivision is 79 mph - nearly double the speed at the accident site with consequently up to four times the kinetic energy to be dissipated in an accident. The car broke at the join of the intermediate deck and the upper/lower decks and telescoped itself. While this join is always going to be a discontinuity in the strength of a double deck car, Amtrak double deck stock has stood up well to high speed accidents. It is curious that the NTSB confined themselves to stating that the car was designed to meet the US standard of 800,000 pounds end load, and that test cars had achieved this during delivery. The NTSB did not commission independent structural analysis on how the car actually performed in the accident, nor did it question the adequacy of the industry standards.

PARKDALE

Parkdale (15 miles 11 chains) is not one of the original stations on the Caulfield - Mordialloc line; in fact it was not opened as a passenger station until 1919 after pressure from the local residents.

In November 1911 the Traffic Branch requested that on 26 December, and all subsequent busy days, the Mordialloc - Mentone block section be divided in the Up direction, and that the necessary portable offices and signals be provided. Instructions were issued on 12 December for the provision of a temporary block post at Parker's Road at an estimated cost of 182 pounds. The signals were brought into use on 23 December 1911 - this probably marks the date the temporary block post was available for use - and it might have been first used on Boxing Day. The block post was named "Parker's Road Temporary Box" and could be used to divide the block section in both directions. The block post was located at 15 miles 31 which probably indicates that the cabin and non-interlocked quadrants were located just on the Up side of Parker's Road gates. Up and Down Home and Distant signals were provided. The block post was normally switched out with the signals crossed and the levers padlocked normal. It is difficult to get a sense for how often the block post was used, but in late January 1913, the Weekly Notice recorded that, until further notice, the temporary block post will be switched in on Sundays from the arrival of the 1000 Down ex Flinders-street at Mordialloc until the 2024 Up ex Frankston cleared Mentone. The signalman was ride in the rear van on the 1000 Down ex Flinders Street and receive the keys to the signalbox from the SM Mentone. The SM had to instruct the Guard of the 1000 Down to stop the train at Parker's Road to allow the signalman to alight. In contrast to these detailed instructions on how to open the temporary block post, the Weekly Notice was silent on the method of closing. Presumably the signalman was required to walk along the line into Mentone and wait for the next Up train.

The local progress association were pushing for the construction of a station at Parker's Road as early as 1913, but the Department were not enthusiastic.

Parkdale station was opened for passenger traffic on 1 September 1919. Two platforms were provided on the Up side of the level crossing with the middle of the platform located at 15 miles 11 chains 46 links. The signals were retained, but continued to be worked from non-interlocked levers. It is assumed that these levers were relocated to the Up platform. Up and Down Starting signals were provided on 16 September 1919, still worked from non-interlocked levers on the platform.

The overhead between Moorabbin and Mordialloc was energised on 30 May 1922, and the full electric service commenced on 6 June 1922. Electrification meant a more frequent service of quieter trains that accelerated faster than the old steam trains. This, and the increasing number of motor cars, meant an increasing number of level crossing accidents, and the government responded with a program of improving level crossings. Parkdale's turn came on 7 July 1924 when interlocked gates and wickets were provided at Parker's Road. Parkdale became a block post for all trains. The gates and signals were worked from an 11 lever A pattern tappet frame provided in a new combined booking office and signalbay located at the extreme Down end of the Up platform adjacent to the gates. In preparation for this work, the Down Home signal was relocated 98 yards further out on 11 June, and the Down Starting was relocated 88 yards further in on 12 June to a point between the platform and the level crossing. The original toilets and

waiting rooms were retained in the centre of the platforms.

The SM requested a mirror in July 1926 to give signalmen a better view of road traffic approaching northbound along Parker's Road. This was refused as the practice was to normally leave the gates across the road and only open them when a car needed to cross. It was considered that if the gates were normally kept across the line, the signalmen would have a good view of approaching road traffic when opening the gates for trains.

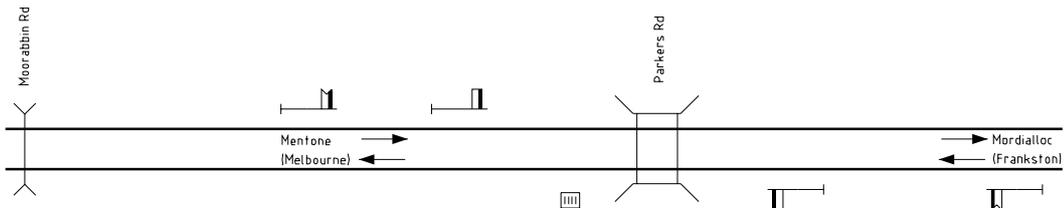
Although originally provided with hand gates, the level crossing at Moorabbin Road (now Warrigal Road) at 14 miles 62 chains between Mentone and Parkdale had been converted to an open crossing by 1910. On 16 March 1932 flashing lights were provided at the level crossing. This was the first installation of flashing light signals in Victoria and they worked automatically for all trains. In November 1932 a bell was provided in the station building at Parkdale to repeat the operation of the flashing lights. The station staff were instructed to notify the electrical fitter if the bell rang continuously when there was no train in the vicinity of the level crossing, or if it did not ring when an Up or Down train was passing over the crossing. A switch was provided to silence the bell in the event of a failure, and this was to be reset by the electrical fitter when the fault had been rectified. In March 1939 the staff complained about the "nerve wracking bell" provided in connection with level crossing. The bell was relocated to the signalbay, but the complaints continued. Matters were recorded as 'resolved' by July 1939, but the complaints were renewed in June 1944. Mr Saunders did not consider that the buzzer made conditions difficult for those engaged in the booking office, but the SM wished it removed. The correspondence was forwarded to the Chief Civil Engineer with no recorded outcome. The buzzer was removed when test switches were provided at the level crossing. Subsequently, correct operation of the flashing lights were checked daily by the patrolmen on his round.

A Down starting signal was provided on the 17 September 1943 on a new Post 15B located 333 yards in advance of the Down Home protecting the gates. This allowed a second train to be accepted from Mentone while the first train waited line clear at the starting signal. On 7 August 1951 this post was replaced by a new post 187 yards further out as the Senior Block and Signal Inspector did not consider the original post gave drivers sufficient view. A telephone was provided adjacent to the new post in order to allow the fireman or driver to carry out the instructions for detention at a Home or Starting signal. The new post was located some 706 yards from the signalbay and in December 1954 the Traffic Branch requested that a ratchet wire adjustor be provided as difficulty had been experienced in keeping the wire in adjustment. This was not provided, but a lever extension was fitted to give more travel to the wire. This, it was considered, would adequately address the issue.

Post 14 was renewed on 21 November 1976.

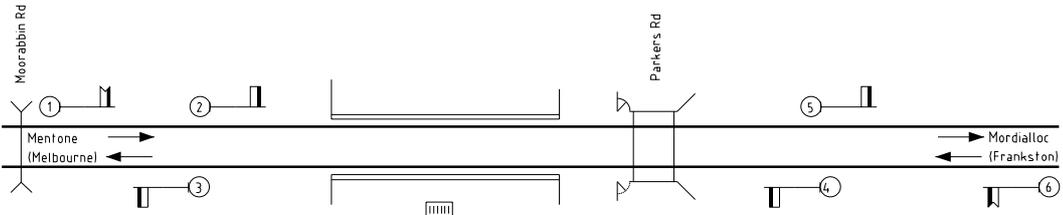
On 27 July 1983 boom barriers and pedestrian wickets replaced the flashing lights at Warrigal Road (the former Moorabbin Rd). A lever lock was provided on lever 5 working the Up starting signal to prevent the signaller from clearing the starting signal until the conditions were correct.

For many years the block sections Cheltenham - Mentone - Parkdale - Mordialloc were the last on the Frankston line, but time finally ran out for the mechanical signalling in the mid 80s. The block sections Cheltenham -



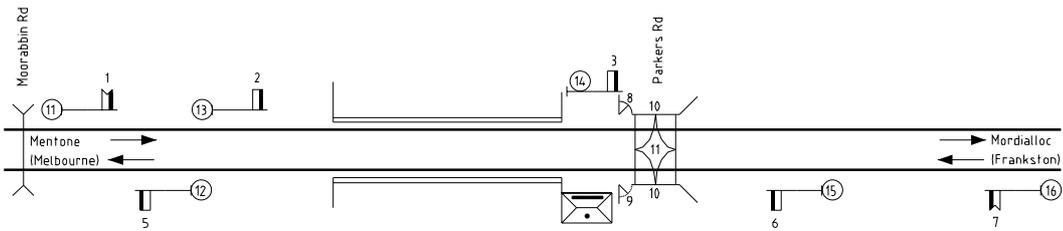
Parker's Road 1911

Probable layout



Parkdale 1919

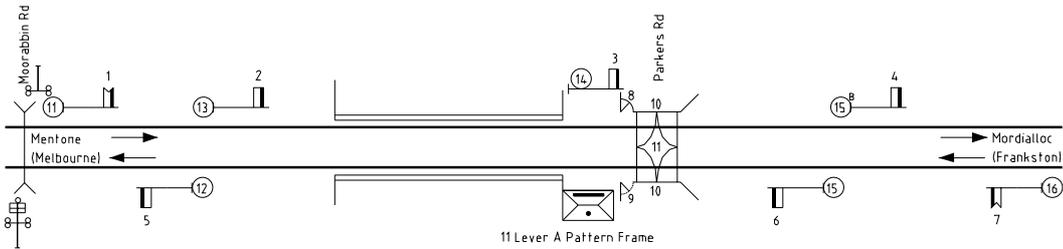
Probable layout



Parkdale 1924

Based on Interlocking Sketch A360 amended to 27.7.83

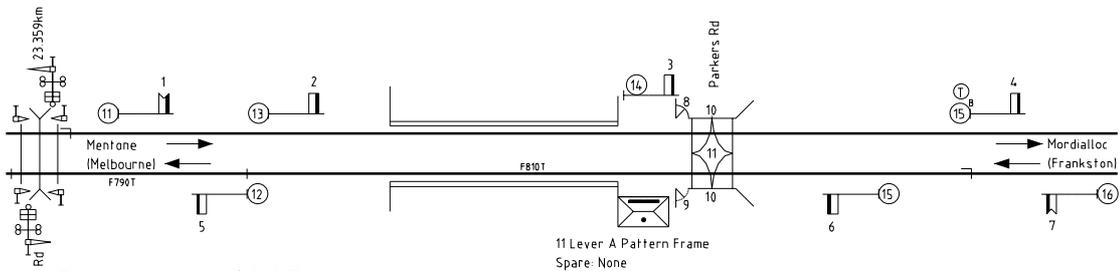
Signalbay 12'10.25"x7'
11 Lever A Pattern Frame
Spare: 4



Parkdale 1943

Based on Interlocking Sketch A360 amended to 27.7.83

11 Lever A Pattern Frame
Spare: None

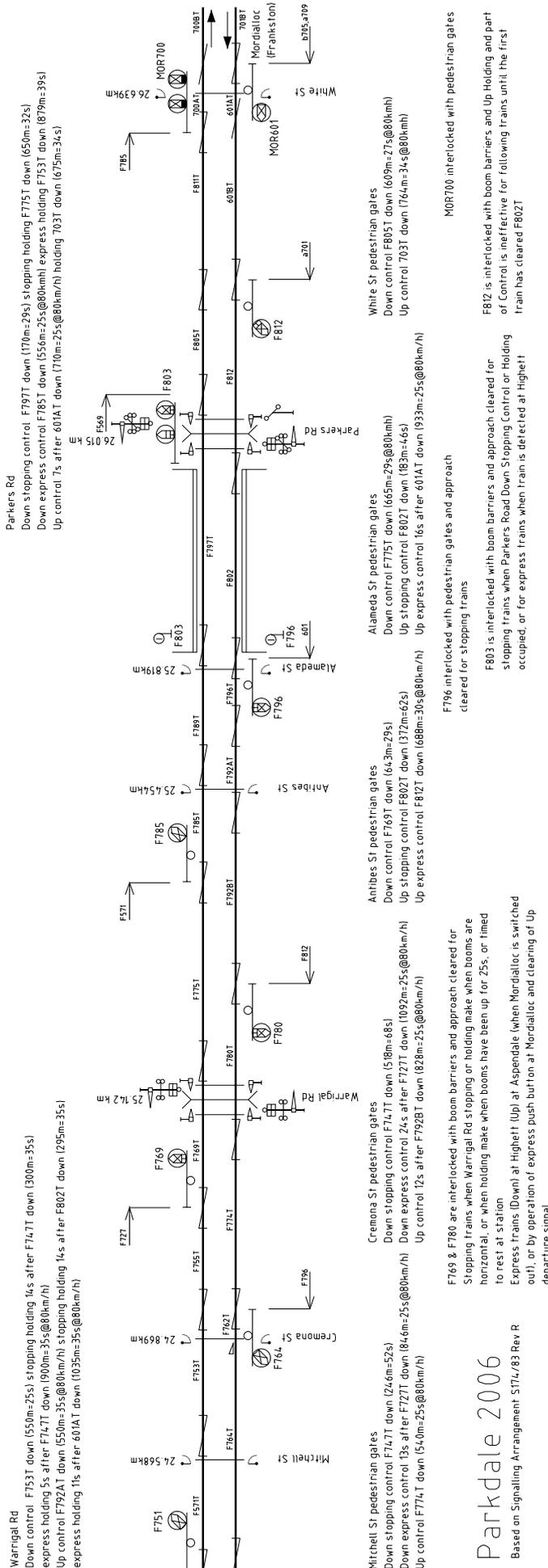


Parkdale 1983

Based on Interlocking Sketch A360 amended to 27.7.83

Warrigal Road

Up Control F790T down (28s, 510m), Up Express Holding F810T down (27s, 600m), Up Stopping Holding 33s after F810T down



Parkdale 2006

Based on Signalling Arrangement S174/83 Rev R

Warrigal Rd
 Down control F753T down (550m=25s) stopping holding 1ks after F747T down (300m=35s)
 express holding 5s after F747T down (900m=35s@80km/h)
 Up control F792AT down (550m=35s@80km/h) stopping holding 1ks after F802T down (295m=35s)
 express holding 1ks after 601AT down (1035m=35s@80km/h)

Parkers Rd
 Down stopping control F797T down (170m=29s) stopping holding F775T down (650m=32s)
 Down express control F785T down (556m=25s@80km/h) express holding F753T down (879m=39s)
 Up control 7s after 601AT down (710m=25s@80km/h) holding 703T down (675m=34s)

White St
 Down control F805T down (609m=27s@80km/h)
 Up control 703T down (764m=34s@80km/h)

Mitchell St pedestrian gates
 Down stopping control F747T down (246m=52s)
 Down express control 13s after F727T down (844m=25s@80km/h)
 Up control F774T down (540m=25s@80km/h)

Cremona St pedestrian gates
 Down stopping control F747T down (518m=68s)
 Down express control 24s after F727T down (1092m=25s@80km/h)
 Up control 12s after F792B down (828m=25s@80km/h)

Antibes St pedestrian gates
 Down control F769T down (643m=29s)
 Up stopping control F802T down (372m=62s)
 Up express control F812T down (688m=30s@80km/h)

Alameda St pedestrian gates
 Down control F775T down (665m=29s@80km/h)
 Up stopping control F802T down (183m=16s)
 Up express control 16s after 601AT down (933m=25s@80km/h)

White St pedestrian gates
 Down control F805T down (609m=27s@80km/h)
 Up control 703T down (764m=34s@80km/h)

Mordialloc (Frankston)
 MOR700 interlocked with pedestrian gates

F812 is interlocked with boom barriers and approach cleared for stopping trains when Parkers Road Down Stopping Control or Holding occupied, or for express trains when train is detected at Hightt

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Mentone - Parkdale were abolished on 7 December 1985. The Down Distant and Home and Up Starting signals at Parkdale were abolished and three position signals were provided. A 5P keyswitch was provided on the Up platform to hold Automatic F780 at stop to prevent unnecessary operation of the boom barriers when a train was delayed in the platform. The Parkdale - Mordialloc block section, the last on the Frankston line, was abolished on 5 April 1986. On this date of the remaining mechanical signals, the interlocked gates, and the interlocking frame were abolished. Boom barriers and pedestrian gates were commissioned at Parkers Road. A 5P keyswitch was provided on the Down platform to hold F802 at stop if a train is unnecessarily delayed in the platform.

On 2 May 2005 automatic pedestrian gates were provided at Antibes St (25.454 km) and Alameda/Bethell Sts (25.815 km) on the Up side of the platforms. On 7 November 2005 further pedestrian gates were provided at White St (26.639 km) on the Down side of Parkdale.