

SOMERSAULT

JANUARY 2006

Vol 29, No 1

SIGNALLING RECORD SOCIETY OF VICTORIA INC



On the 7 December 2005 the new Regional Fast Rail signalling between Sunshine and Ballarat was commissioned. This photo shows the new signalling at Bacchus Marsh from the Fischen Street level crossing at the Up end. Despite the new signalling, the layout of the yard has hardly changed. The main alterations have been the shortening of the platform loop (No 1 Road), the abolition of the Dock Track, and the provision of a new Siding C as a dead end extension of the platform loop. The signals are all new and have LED heads; the brightness of the light causing flare in this picture (recently the editor was interested to note that the LED signals through Sydenham were very clearly visible at night from a plane flying over Sunshine at several hundred metres). Although not apparent in the black and white version of this picture, all of the dwarf signals at Bacchus Marsh show a blue light for Stop. One very interesting feature of the signalling at Bacchus Marsh is that no departure home signals are provided for No 2 Track (the straight road). Any cross at Bacchus Marsh requires the second train to be held at the arrival home signal until the first train has come to a stand in the platform. The signalling on the Ballarat line is controlled from a Sigmaph system at Ballarat. The SSI equipment, however, is located at Bacchus Marsh where three SSI systems control the entire line. At both Bacchus Marsh the signalbox and lever frames are preserved intact, and the frame also remains at Melton. This photograph was taken on 11 December at which time public services on the new line had not yet commenced. Photo: Andrew Waugh.

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Published by the Signalling Record Society Victoria Inc (A0024029F)

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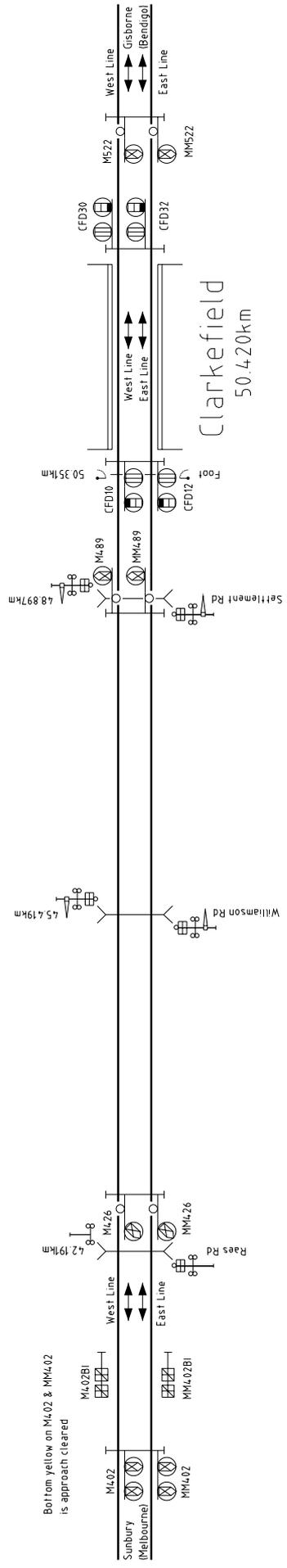
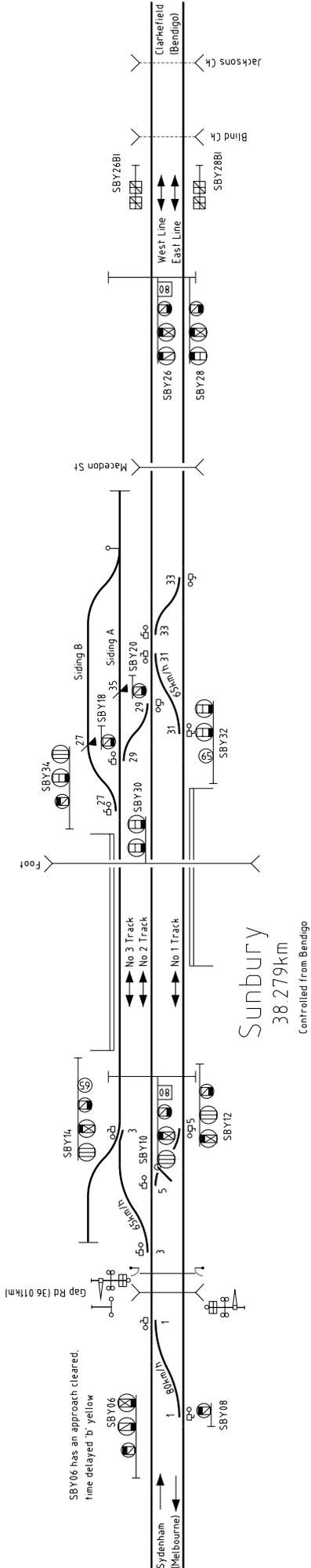
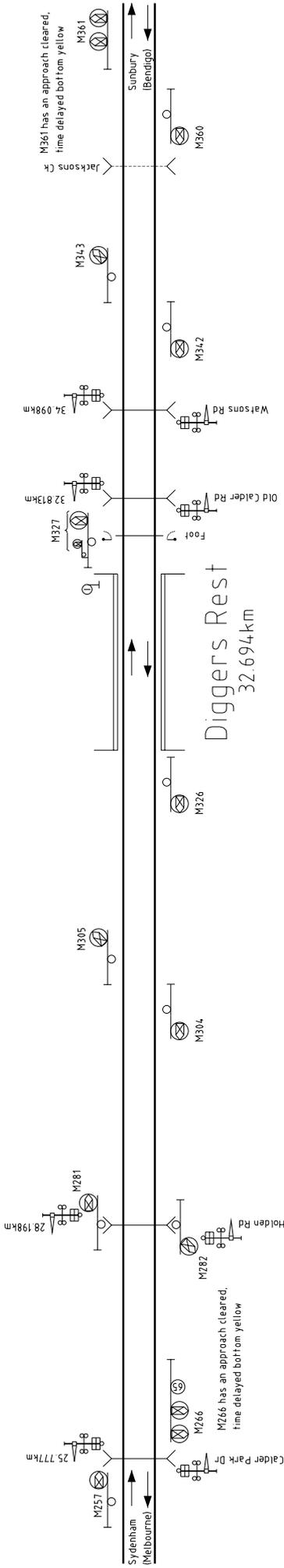
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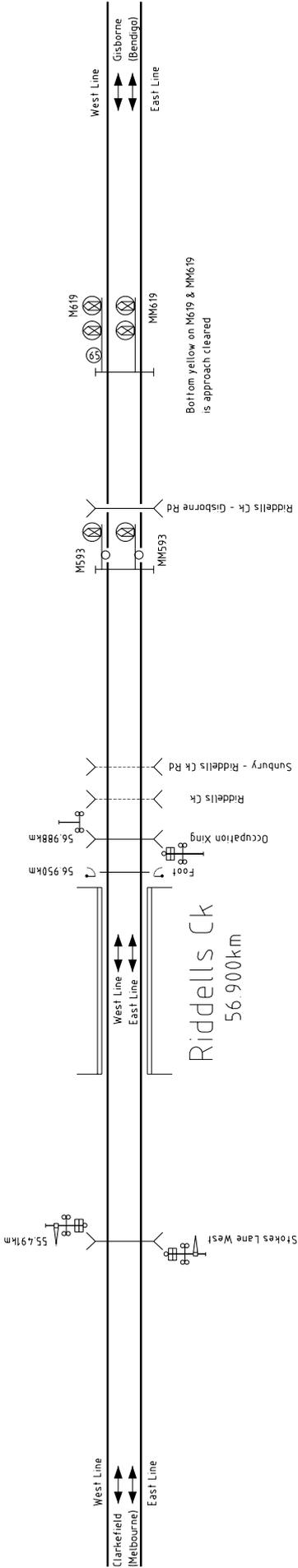
SIGNALLING ALTERATIONS

The following alterations were published in WN 39/05 to WN 50/05 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.

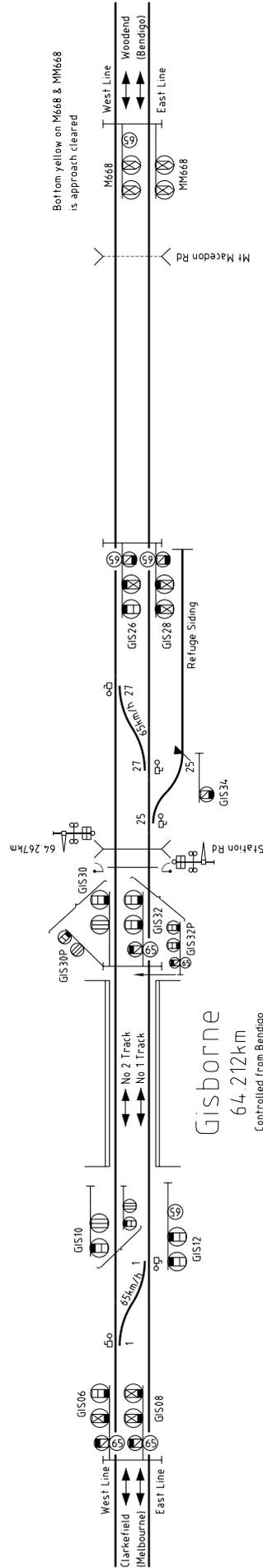
- 25.09.2005 **Sth Geelong - Marshall** (SW186/05, WN 44/05)
 On Sunday, 25.09., the Train Order Working between South Geelong and Marshall was replaced by Train Staff and Ticket Working with the section South Geelong - Marshall. Marshall will be attended by a Signaller for all trains and the panel will remain in 'local' mode.
 South Geelong was disestablished as a Train Order Terminal Station. Marshall was disestablished as an intermediate Train Order Terminal Station and established as an attended Train Order Terminal Station. The 'Commence' and 'End' Train Order Working Boards were relocated from Post 4 at South Geelong to Post 11 at Marshall. Master Key 13 (Marshall - Warrnambool) will remain at South Geelong and will be issued to trains as required. Train Orders for the section Marshall - Winchelsea can be issued at Geelong to avoid delays to passenger trains at Marshall. Similarly, Train Orders can be issued at South Geelong to avoid delays to freight trains.
 If the Driver of a train that will operate between South Geelong and Marshall is not qualified in Train Staff and Ticket Working, a competent employee qualified in Train Staff and Ticket Working will accompany the train.
 The siding at South Geelong Racecourse platform will remain spiked out of use.
- 02.10.2005 **Camberwell - Canterbury** (SW 259/05, WN 39/05)
 On Sunday, 2.10., a speed proving train stop was provided in No 2 Track, 22 metres on the approach side of Up Home CAM317. Up Automatic H334 was converted to a controlled Automatic and was renumbered CAM345. When reversed, this signal will lock Points 211 normal. CAM345 will display Stop, Reduce to Medium Speed, Normal Speed Warning, and Clear Normal Speed. The bottom (b) light on Up Automatic H348 was fixed at red and this signal can now only display Normal speed indications.
- 03.10.2005 **Spencer Street** (SW 258/05, WN 39/05)
 On Monday, 3.10., Home 137 (No 4 Track) was converted to a Westinghouse R4 LED signal. Dwarf U140 (No 4A Track) was converted to a Westinghouse U2L LED signal.
- 08.10.2005 **Heidelberg** (SW 269/05, WN 40/05)
 On Saturday, 8.10., additional track circuits were provided as part of the turnout fouling project.
- 09.10.2005 **Bell** (SW 270/05, WN 40/05)
 On Sunday, 9.10., additional track circuits were provided as part of the turnout fouling project.
- 09.10.2005 **Lalor** (SW 271/05, WN 40/05)
 On Sunday, 9.10., additional track circuits (002A and 007A tracks) were provided as part of the turnout fouling project.
- (11.10.2005) **Footscray** (SW 278/05, WN 40/05)
 The trial period for the banner indicator for M244 has been extended indefinitely.
- (11.10.2005) **Keilor Plains - Sydenham** (SW 274/05, WN 40/05)
 Diagram 35/05 replaced 27/01 as in service.
- (11.10.2005) **East Richmond - East Camberwell** (SW 275/05, WN 40/05)
 Diagrams 21/05 (East Richmond - Auburn) and 23/05 (Camberwell - East Camberwell) replaced 09/05 (East Richmond - East Camberwell) as in service.

- (11.10.2005) **Prahan - Sandringham** (SW 273/05, WN 40/05)
Diagram 37/05 replaced 11/04 as in service.
- (11.10.2005) **Warragul** (SW 196/05, WN 40/05)
The status of the yard roads are as follows:
* Car Dock, Loop Siding, and No 2 Road are all available for use
* Nos 3, 4, and 9 (Shed) Roads are available for track machines only
* Nos 5 - 8 Roads are booked out.
- (11.10.2005) **Morwell Briquette Siding** (SW 197/05, WN 40/05)
This siding has been booked out of use. The baulks at 145.620 km have been relocated to 144.700 km opposite Post 10 at Morwell.
- 16.10.2005 **Hughesdale - Oakleigh** (SW 280/05, WN 41/05)
On Sunday, 16.10., automatic pedestrian gates were provided at the Richardson Rd/Paddington Rd pedestrian crossing (16.213 km).
- 24.10.2005 **Merri** (SW 300/05, WN 42/05)
On Monday, 24.10., the Down platform was shortened 2 metres at the Up end to provide space for the provision of insulated rail joints for a set of pedestrian gates. Amend diagram 03/02 (Jolimont - Merri).
- (25.10.2005) **Flinders Street - North Melbourne** (SW 297/05, WN 41/05)
Diagram 49/05 replaced 29/05 as in service, including Home 244 being suspended from the canopy and Home 250 being relocated to the right hand side of the track and suspended from the canopy..
- 22.10.2005 **Macleod** (SW 292/05, WN 41/05)
On Saturday, 22.10., additional track circuits were provided as part of the turnout fouling project.
- 23.10.2005 **Bayswater** (SW 293/05, WN 41/05)
On Sunday, 23.10., additional track circuits were provided as part of the turnout fouling project.
- 28.10.2005 **Sunbury - Kyneton** (SW 218/05, WN 44/05)
From 0430 hours, Sunday, 28.10., the line between Sunbury and Kyneton was restored to use. The two lines between Sunbury and Kyneton are signalled for bi-directional running. The former Down line is known as the West line, and the former Up line as the East line. The single line sections will be Sunbury - Gisborne - Kyneton. Intermediate Home signals are provided at Clarkefield, Woodend, and Carlsruhe. The section will be operated under the Automatic and Track Control System described in Section 36 of the Book of Rules.
Three position signalling using LED signals, dual control point machines and SSI interlockings are provided at Gisborne and Kyneton. The signalling is controlled from the WestCAD panel at Bendigo. No post phones are provided and all communications will be by radio.
Flashing lights were provided at Raes Rd (42.191 km) and the occupation crossing immediately on the Down side of Riddells Creek (56.988 km). Boom barriers were provided at Williamsons Rd (45.419 km), Settlement Rd (48.897 km), Stokes Lane West Rd (55.491 km), Crows Rd (82.978 km), Thompsons Lane/Carlsruhe Station Rd (84.860 km), Carlsruhe Central Rd (87.733 km), and Mollison St (91.433 km). Pedestrian gates were provided at the Up end of Carlsruhe platforms (50.351 km), the Down end of Riddells Creek platforms (56.961 km), Station Rd (64.267 km), Victoria St (69.584 km), the Down end of Woodend platforms (78.159 km), and Mollison St (91.433 km).
At Sunbury, Homes SBY30, SBY32, and SBY34 were converted to Home Departure signals and the low speed lights removed from Homes SBY30 and SBY32. The low speed aspect on Home SBY34 now only applies to moves to Sidings A and B.
The Refuge Siding at Gisborne has 445 metres clear standing room. Points 25 leading to the Refuge Siding will automatically normalise 45 seconds after the movement clears the points. If it is necessary to hold the points reverse, a blocking command must be applied to the points.
At Kyneton, Points 29 leading to Siding A will automatically normalise 45 seconds after the movement clears the points. If it is necessary to hold the points reverse, a blocking command must be applied to the points. Dwarfs KYN16 and KYN18 can be placed into fleeting mode to facilitate shunting moves between Sidings A and B. A baulk is secured to the line at Home KYN26 to prevent movements into or out of the line to Bendigo. Location and Name boards are provided for Up movements from the Bendigo line.
The areas of Absolute Occupation beyond Kyneton will be altered to three sections: Kyneton - Castlemaine, Castlemaine station, and Castlemaine - Bendigo.
Diagrams 28/05 (Waterngardens - Clarkefield), 34/05 (Clarkefield - Woodend) and 36/05 (Woodend - Kyneton) were issued.
- (02.11.2005) **Spencer Street** (SW 279/05, WN 43/05)
Nos 2B, 3, and 4 Tracks have been returned to service. Homes 137, 244, and 250 have been replaced by Westinghouse R4 LED signals. Home 244 is suspended from the canopy, and Home 250 has been relocated to the right hand side of the track and suspended from the canopy. Dwarf 246 was converted to a Westinghouse U2L LED signal.
- 02.11.2005 **RFR, Section 36, Book of Rules** (SW 219/05, WN 44/05)
From 0001 hours, Wednesday, 2.11., Version 1.7C of the Regional Fast Rail rules, Section 36, Book of Rules will operate between Waterngardens and Kyneton. Version 1.7B is cancelled.

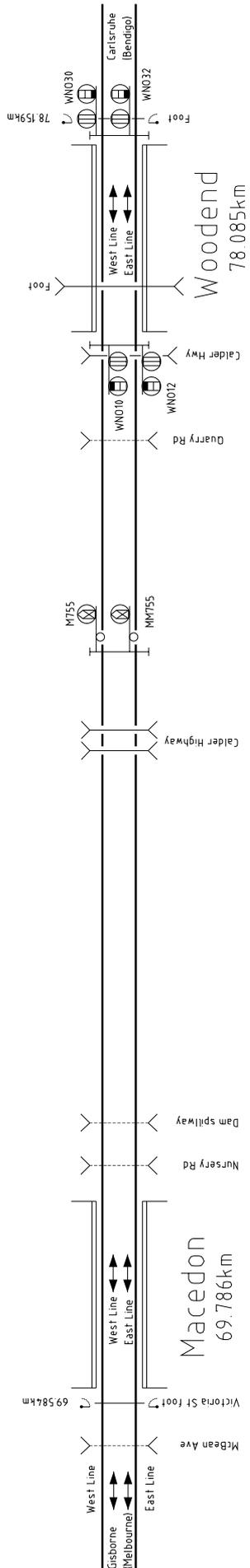




Riddells Ck
56.900km

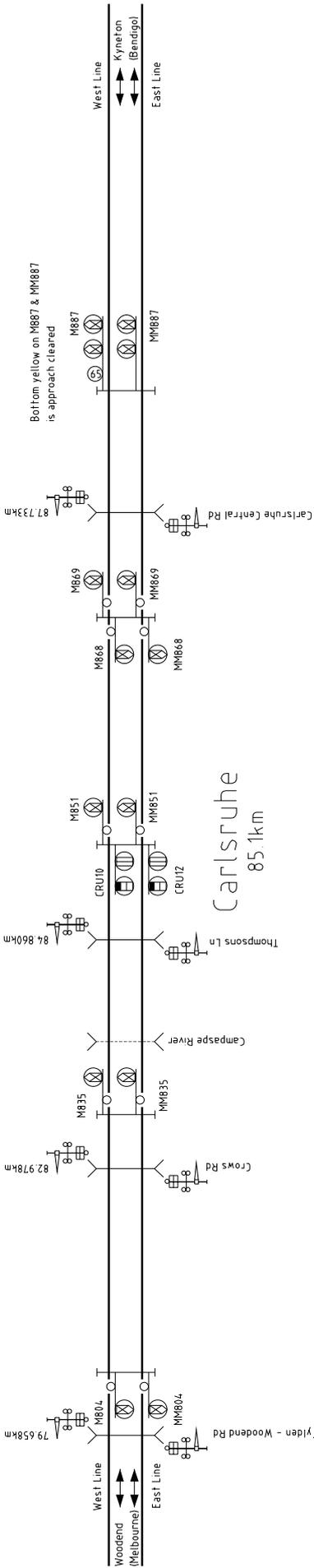


Gisborne
64.212km
Controlled from Bendigo

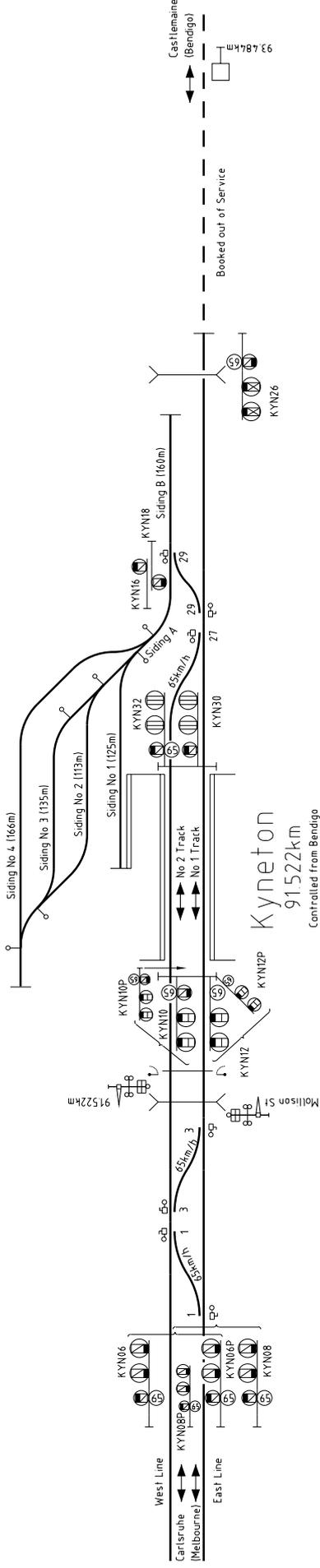


Woodend
78.085km

Macedon
69.786km



Carlsruhe
85.1km



Kyneton
91.522km
Controlled from Bendigo

- 05.11.2005 **Greensborough** (SW 307/05, WN 44/05)
On Saturday, 5.11., an additional track circuit (29T) was provided as part of the turnout fouling project.
- 07.11.2005 **Parkdale - Mordialloc** (SW 309/05, WN 44/05)
On Monday, 7.11., automatic pedestrian gates were provided at the White St pedestrian crossing (26.639 km).
- 13.11.2005 **Frankston** (SW 320/05, WN 45/05)
On Sunday, 13.11., the mechanical signals on the signalbridge at the Down end were converted to light signals with LED heads. Homes 36 (Post 14) & 37 (Post 13) were replaced in situ. Discs 30 & 32 on Post 12 were replaced by two Dwarf signals on a new bracket Post 12. These Dwarf signals will display Purple for Stop and Green for Proceed.
Points 15, 25, 40, and 59 were provided with air assistance.
Amend Diagram 19/04 (Aspendale - Frankston)

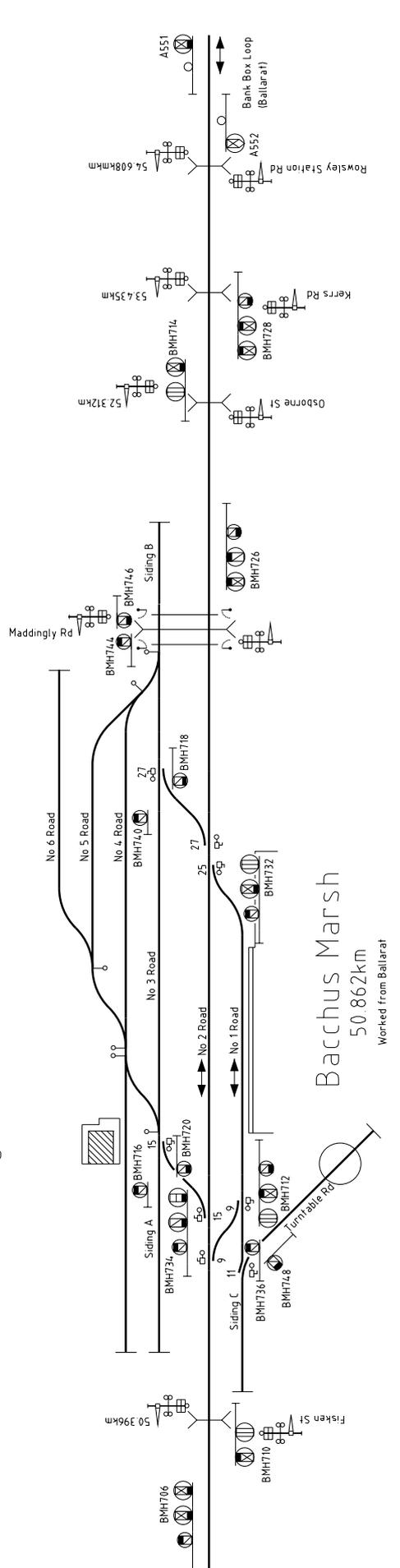
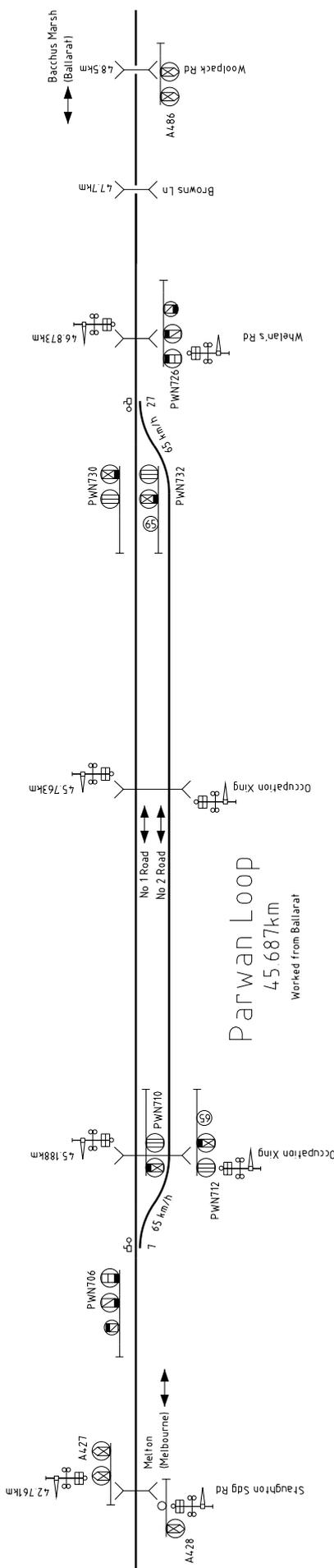
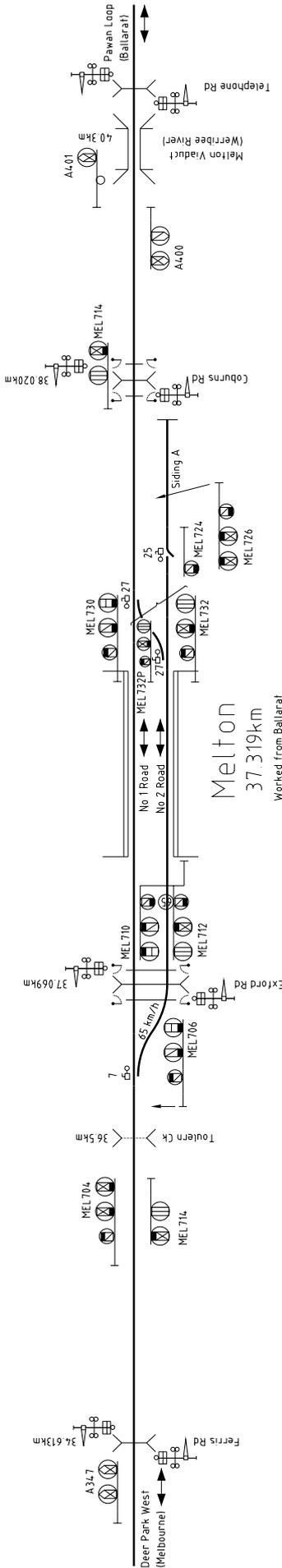


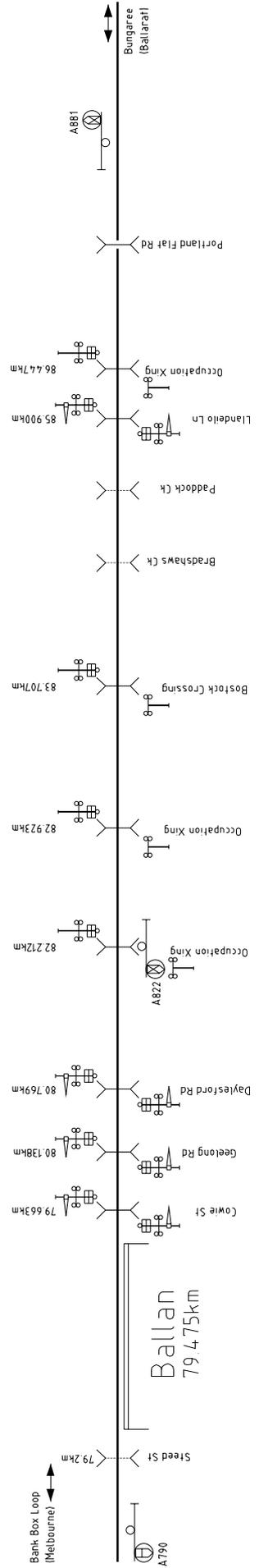
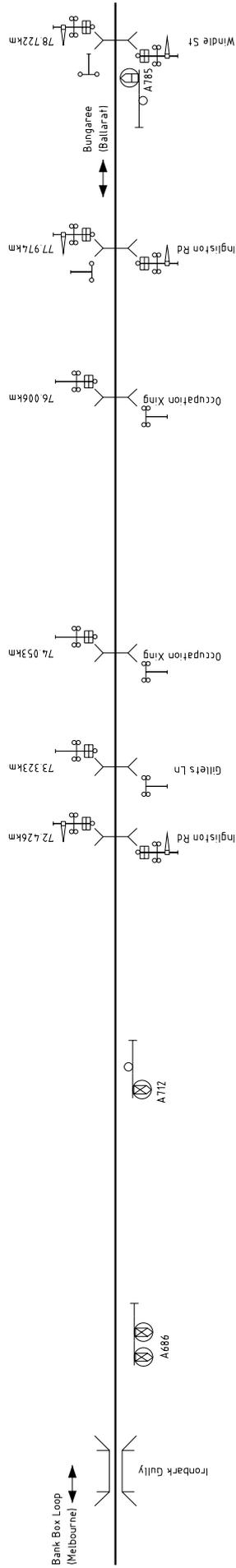
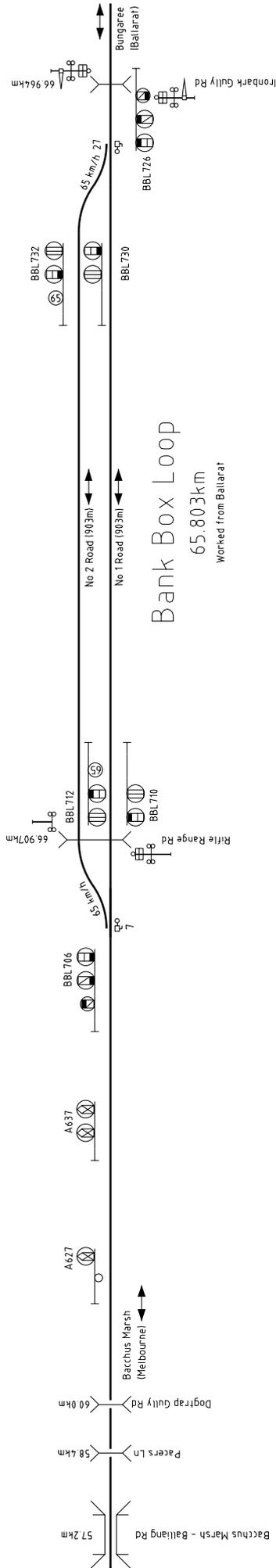
The signalbridge at the Down end of Frankston with the mechanical homes on Posts 13 and 14 replaced by light signals, and the Discs on Post 12 replaced by a 'bracket' post with two Dwarf signals. Photo: Keith Lambert

- 14.11.2005 **Dandenong - Cranbourne** (SW 330/05, WN 45/05)
From Monday, 14.11., Points 670 (Up end of Through Siding) and Points 677 (Down end) were booked into service and the Through Siding was available for normal traffic.
- (15.11.2005) **Spencer Street** (SWP 5/05, WN 45/05)
Amend Operating Procedure 6, Section 34, Book of Rules as follows. In clause b (Shunting Movements) replaced Post 183 with Post 167. In clause c (Cross Movements) replace the text with "When a locomotive is standing beyond Home Departure Signal 167, the Signaller must verbally instruct the Driver not to move the locomotive until instructed.
- (15.11.2005) **Richmond Junction - Richmond** (SW 327/05, WN 45/05)
Diagram 41/05 replaced 33/05 as in service.
- (15.11.2005) **Blackburn - Lilydale** (SW 324/05 & 325/05, WN 45/05)
Diagrams 7/05 (Blackburn - Ringwood) and 5/05 (Ringwood East - Lilydale) replaced 35/04 and 25/03as in service.
- (15.11.2005) **Carnegie - Clayton** (SW 326/05, WN 45/05)
Diagram 39/05 replaced 11/85 as in service.
- 19.11.2005 **Lilydale** (SW 328/05, WN 46/05)
On Saturday, 19.11., additional track circuits were provided as part of the turnout fouling project.
- 20.11.2005 **Belgrave** (SW 329/05, WN 46/05)
On Sunday, 20.11., additional track circuits were provided as part of the turnout fouling project.

- 20.11.2005 **Mentone - Parkdale** (SW 319/05, WN 46/05)
On Sunday, 20.11., automatic pedestrian gates were provided at the Mitchell Street (24.568 km) and Cremona Street (24.869) pedestrian crossings. Down Automatic F751 was converted to be approach cleared for stopping trains.
- 21.11.2005 **Book of Rules** (SW 333/05, WN 46/05)
From Monday, 21.11., Sections 1-33 of the Book of Rules and the clauses in Section 34 applicable to the Connex network will be available electronically. Sections 1-33 will be known as the '1994 Book of Rules'. The former Sections 34 and 35 will be split into six 'Site Specific Operating Procedure Manuals': Volume 1, Inner; Volume 2, Clifton Hill; Volume 3, Burnley; Volume 4: Caulfield (including Sandringham); Volume 5: Northern; and Volume 6, Interface Co-ordination Plans for locations where the track connect with Pacific National/ARTC/Yarra Trams.
A new Section 36 for the Regional Fast Rail Corridor Rules and Operating Procedures was added to the Book of Rules (Version 1.7C of this section was issued on 2.11.2005).
- 23.11.2005 **Bendigo** (TS 171/05, WN 46/05)
On Wednesday, 23.11., the flashing lights at Weeroona Ave were altered to have LED units.
- 25.11.2005 **South Geelong - Marshall** (SW 234/05, WN 46/05)
On Friday, 25.11., the following signalling alterations took effect. Down Distant, Post 1, was converted to a LED head. The Dwarf on Post 14 was converted to a LED head. Post 15 was replaced by a new post located 1 metre in the Up direction with a LED head located on a mast. Up Distant, Post 20, was relocated to the Down side of the line and renumbered Post 1. The Down Distant for Marshall was relocated to this mast. Both Distant on this Post are now LED units and will be fixed at Caution until the Track Block system is brought into use.
- 27.11.2005 **Merri** (SW 334/05, WN 47/05)
On Sunday, 27.11., automatic pedestrian gates were provided at the pedestrian crossing at the Up end of the platforms (7.962 km).
- 28.11.2005 **Bentleigh** (SW 349/05, WN 47/05)
From Monday, 28.11., until the end of January the pedestrian crossings at Centre Road will be upgraded.
- (29.11.2005) **Sunbury** (SW 229/05, WN 47/05)
When a train terminates in No 1 or No 3 Road and the engine requires to run-around, all other movements must be signalled through the opposite platform track. This is to prevent running a train through No 2 Road while the engine crew are on the ground.
- 30.11.2005 **Geelong - South Geelong - Marshall** (SW 234/05 & 238/05, WN 46/05 & 47/05)
Between Saturday, 26.11., until Wednesday, 30.11., the sections Geelong - South Geelong - Marshall were altered to operate under the Track Block System. The Train Staff and Ticket working between South Geelong - Marshall was abolished.
At South Geelong, the existing light signals on Posts 2, 4, 6, 7, & 8 were converted to LED heads. The mechanical Home and Disc on Post 5 were replaced by LED units. The Disc was replaced with a Dwarf signal and a board lettered "Siding" was provided. Stopping/Express push buttons were provided for Posts 5 and 8. A block light for the South Geelong - Marshall section was provided. The Master Key for Marshall - Warrnambool was retained at South Geelong.
At Marshall, the Aspectus control system was extended to include track occupancy indications up to Post 5 at South Geelong. Control screens were provided at Geelong and Marshall to allow Marshall to be operated at either location, but the signalling will normally be operated from Geelong. Stopping/Express 'buttons' were provided for Posts 3 and 10. A block light was provided for the South Geelong - Marshall section.
The Boom Barriers at Wood Street were altered to be operated by level crossing predictors. The siding at South Geelong Racecourse platform remains spiked out of use.
Diagrams 48/05 (South Geelong) and 50/05 (Marshall) replaced 02/93 and 30/05. The instructions for Marshall were reissued.
- 02.12.2005 **Bendigo** (SW 239/05, WN 48/05)
From Friday, 2.12., the existing relay interlocking and panel at Bendigo was abolished to allow commissioning of a Westrace computer interlocking. The signal room was abolished and replaced by a new room at the Up end of the platform. All signals except Homes 10, 34, and 36 were abolished. Homes 10, 34, and 36 were fixed at Stop. All motorised points were secured in the 'Hand' position. The Annett keys at Crosslocks 31 and 35 were removed and are held by the Operational Safeworking Supervisor. The level crossing protection at Powell St, Williamsons St, Mundy St, and Nolan St will not operate automatically and must be manually operated for each train by means of the test switch. Revenue trains may operate through Bendigo and the speed limit between Homes 10, 34 and 36 will be 15 km/h.
Trains to and from the Piangil line will run via Inglewood and must have a locomotive at each end. When the train arrives at Eaglehawk it will reverse and proceed to Raywood (Down train) or Inglewood (Up train). The locomotive at the rear of a Down train will be detached at Raywood. An Up train must attach a locomotive at the rear at Raywood. The text of the Train Order must include the attaching and detaching of the locomotives at Raywood.

- 04.12.2005 **Officer - Pakenham** (SW 359/05, WN 48/05)
 On Sunday, 4.12., the boom barrier on the Up side of the Cardinia Rd crossing was relocated due to road widening.
- 07.12.2005 **Sunshine - Ballarat** (SW 244/05, WN 48/05)
 From 1700 hours, Wednesday, 7.12., the line between Sunshine and Ballarat will be brought back into use. Trains will be operated under the Automatic and Track Control System with the sections Sunshine - Deer Park - Deer Park West - Rockbank Loop - Melton - Parwan Loop - Bacchus Marsh - Bank Box Loop - Bungaree - Ballarat. The two lines between Sunshine and Deer Park West will be bi-directionally signalled and known as the North Line and the South Line. The two lines between the Up and Down ends of Bungaree will be known as the North Line (original line) and the South Line (new line). RFR Territory Boards are provided opposite Posts SUN743 and SUN753 (Sunshine) and 54 (Ballarat).
 A new section of line 8.2 km long will be opened between 93.576 km (adjacent to Sullivan's Rd overbridge) and 101.808 km (Torpy's Rd). This will be known as the South line. The original line (via the original Bungaree Loop) will remain in use as the North line and is approximately 13 km long. The distances on the Down side of Bungaree to Ballarat are now measured by the shorter South line and the kilometre posts have been relocated.
 The line between Sunshine (exc) and Ballarat is worked from a Sigmoid (VDU) panel at Ballarat. Train Description bells were provided between Ballarat and Sunshine panels and the existing bell codes will continue to be used.
 Three position LED signals, dual control point machines, and SSI interlockings were commissioned throughout. Post phones are not provided and the radio will be used for all communications. The existing post phones were removed.
 At Deer Park, Home 1/6 (South Line) was abolished and at Deer Park West the line has been slued so that the straight is along the South Line.
 At Rockbank Loop, the Up end points have been relocated to be 200 metres on the Up side of Leakes Road, and the Down end points 390 metres in advance of the Departure Home signals. The crossing loop will continue to have a clear standing room of 751 m.
 At Melton the Up end points have been relocated to be on the Up side of Exford Road and 206 metres in advance of the Up Departure Homes. At the Down end, No 2 Road (the loop) was extended to a dead end known as Siding A. The facing points in No 2 Road at the Down end are 8 metres from the Down end of the platform. No 1 Road has a standing room of 130 metres, and No 2 Road 125 metres. Siding A has 245 metres clear between the catch points and the baulks.
 At Parwan Loop, the Up end points are 446 metres in advance of the Departure Homes, and the Down end points 398 metres in advance of the Departure Homes. The loop has a standing room of 969 metres. At Bacchus Marsh the platform loop (No 1 Road) was cut back at the Down end and now has a standing room of 170 metres. No Departure Home signals are provided for No 2 Road and when trains are crossed at Bacchus Marsh, one train must be held at the Home Arrival until the other train has come to a stand in No 1 Road. As a consequence of cutting back No 1 Road, the platform was cut back 77 metres at the Down end and extended 75 metres at the Up end. Siding C was replaced by a new Siding C that forms an extension of No 1 Road at the Up end. The Turntable Siding trails into this new Siding C. The local control of the Dwarf signals at Maddingley Road on Siding B was abolished and the signals are now worked from Ballarat.
 Between Bacchus Marsh and Bank Box Loop the existing Automatic signals were removed and replaced by new signals at largely new locations.
 At Bank Box Loop, the Up end points were relocated further out. The existing signals were replaced. The Home Departure signals were relocated further in to give full overlaps. The Up end points are 590 metres in advance of the Home Departure signals, and the Down end points are 373 metres in advance of the Home Departure signals. The loop has a clear length of 903 metres.
 Between Bank Box Loop and Bungaree the existing Automatic signals were abolished. A set of intermediate Automatic signals were provided in each direction near Ballan.
 Boom barriers were provided at the existing flashing lights at Hopkins Rd (24.450 km), Troups Rd (27.626 km), Payne's Rd (31.297 km), Mt Cottrell Rd (32.933 km), Ferris Rd (34.613 km), Telephone Rd (41.967 km), Whelan's Rd (46.873 km), Fischen St (50.396 km), Osborne St (52.312 km), Kerrs Rd (53.435 km), Ingliston Rd (77.964 km), Windle St (78.722 km), Old Geelong Rd (80.130 km), Daylesford Rd (80.769 km), Mt Egerton Rd (90.783 km), Torpys Rd (101.714 km), and Ti Tree Rd (104.156 km).
 Boom barriers were provided at Staughton Siding Rd (42.761 km), Occupation Crossing (45.188 km), Occupation Crossing (45.763 km), Ironbark Gully Rd (66.964 km), Ingliston Rd (72.426 km), Cowie St (79.663 km), Llandeilo Ln (85.900 km), and Boundary Rd (91.908 km).
 Flashing lights were provided at Rowsley Station Rd (54.608 km), Rifle Range Rd (66.907 km), Gillets Ln (73.323 km), Ingliston Rd (72.426 km), Occupation Crossing (74.053 km), Occupation Crossing (76.006 km), Occupation Crossing (82.212 km), Occupation Crossing (82.923 km), Bostock Crossing (83.707 km), Occupation Crossing (86.447 km), Occupation Crossing (92.305 km), Occupation Crossing (102.675 km), and Tierney Rd (104.156 km).
 Pedestrian gates were commissioned at the Up end of Ardeer (15.051 km), opposite West St (15.590 km), Station Street (17.647 km), at the Down end of Deer Park on the North Line (17.938 km), the Down end of





Rockbank platforms (29.876 km), Exford Rd (37.069 km), Coburns Rd (38.007 km), Maddingley Rd (51.214km), and Old Melbourne Rd (103.363 km).

Diagrams 38/05 (Ardeer to Rockbank), 40/05 (Melton to Bacchus Marsh), 42/05 (Bacchus Marsh West - Gordon), 44/05 (Gordon to Warrenheip), and 46/05 (Ballarat) replaced 14/04, 12/04, 46/96, and 08/03.

- 08.12.2005 **Spencer Street** (SW 336/05, WN 49/05)
On Thursday, 8.12., a theatre LED route indicator was provided on Home 123. It will display 'M' when the route is set towards No 9 Track and 'R' when the route is set towards Nos 8 or 8A Tracks.
- 08.12.2005 **Sunshine** (SW 366/05 & 245/05, WN 49/05)
On Thursday, 8.12., two control levers were provided on the panel adjacent to the indications for the North and South lines at Anderson St. The control levers provide a directional control between Homes SUN743 and SUN753 at Sunshine and 1/4 and 1/16 at Deer Park and are necessary because of overlap issues. When the control levers are normal, the direction of traffic will be from Sunshine to Deer Park, and when the levers are reverse, from Deer Park to Sunshine. Whenever a movement is to be signalled from the Sunshine platforms towards Homes SUN743 or SUN753 at Anderson St, the relevant control lever must be placed normal before the move is signalled. The Signaller at Sunshine must operate the control levers under the instructions of the Signaller Ballarat.
- 09.12.2005 **Spencer Street** (SW 336/05, 355/05, & 372/05, WN 49/05)
On Friday, 9.12., theatre LED route indicators were provided on Homes 125 and 567. The route indicator on Home 125 will display 'M' when the route is set towards Nos 9, 10, 10A, or 11 Tracks and 'R' when the route is set towards Nos 8, 8A, or 8 South Tracks. The route indicator on Home 567 will display 'M' when the route is set towards Nos 9, 10, 10A, 11, 12 or 14 Tracks, 'R' when the route is set towards Nos 8 or 8A South Tracks, and 'G' when the route is set for the Main Goods Line. Home 136 was replaced by a Westinghouse R4 LED signal suspended from the canopy. Home 177 was relocated to be suspended from West End Plaza slab. Amend Diagram 49/05.
- 11.12.2005 **Victoria Park - Clifton Hill - Westgarth** (SW 373/05, WN 49/05)
On Sunday, 11.12., a LED co-acting signal was provided for Up Automatic VPK005 at Victoria Park. The co-acting signal was provided on the mast. At Clifton Hill, Up Home 123 from No 1 Track was converted to a three aspect Tri-colour Alstom LED signal. At Westgarth, Up Home CHL131 and its co-acting signal were converted to a three aspect Tri-colour Alstom LED signal.
- 12.12.2005 **Spencer Street** (SW 338/05 & 372/05, WN 49/05)
On Monday, 12.12., Homes V140 and 316 were converted to a Westinghouse R4 LED signal, and Dwarf 503 was converted to a Westinghouse U2L LED signal.
- (13.12.2005) **Kooyong, Riversdale, Gardiner, Glenhuntly** (SWP 2/05, WN 49/05)
The rules concerning the operation of the tramway square at these locations have been removed from Section 9 of the Book of Rules and placed in Section 34.
- 13.12.2005 **Spencer Street** (WN 50/05)
Spencer Street station was officially renamed 'Southern Cross'.
- 14.12.2005 **Spencer Street** (SW 365/05, WN 50/05)
On Wednesday, 14.12., a theatre LED route indicator was provided on Home 305. The route indicator will display 'G' when the route is set towards the Main Goods Line, 'T' when the route is set towards No 14 Track (Down Through Suburban), 'C' when the route is set towards No 12 Track, and 'B' when the route is set towards Post 303. Amend Diagram 49/05 (Flinders Street - North Melbourne Passenger Lines).
- 15.12.2005 **Spencer Street** (SW 365/05, WN 50/05)
On Thursday, 15.12., a theatre LED route indicator was provided on Home 303. The route indicator will display 'M' when the route is set towards Nos 9, or 10 Tracks and 'R' when the route is set towards Nos 8, or 8A Tracks. Amend Diagram 49/05 (Flinders Street - North Melbourne Passenger Lines).
- 16.12.2005 **Spencer Street** (SW 364/05 & 384/05, WN 50/05)
On Friday, 16.12., a theatre LED route indicator was provided on Home 520 and the illuminated 'A' and 'C' light were changed to LEDs. The route indicator will display 'M' when the route is set towards Nos 10, 10A, or 11 Tracks, 'R' when the route is set towards Nos 8 or 8A Tracks, and '7' when the route is set for No 7 Track. Home 140 was converted to a Westinghouse R4 LED signal. Amend Diagram 49/05 (Flinders Street - North Melbourne Passenger Lines).
- 17.12.2005 **Spencer Street** (SW 364/05, WN 50/05)
On Saturday, 17.12., the A and B arms of Home 520 were converted to 8 inch Westinghouse tri-colour LED.
- 18.12.2005 **Bentleigh** (SW 388/05, WN 50/05)
On Sunday, 18.12., an additional pedestrian gate was provided on the Down side of the crossing and a boom barrier mast was relocated.
- (20.12.2005) **Computer Based Interlockings** (SW 388/05, WN 50/05)
Instructions were issued dealing with the failure of computer based (Westrace and SSI) interlockings at Dandenong, Camberwell, Burnley Sidings, Caulfield, Upfield, Newport, Sunshine, Heidelberg, Broadmeadows, Epping, Sydenham, Westall Yard, and Ringwood.

REGIONAL FAST RAIL APPROACH OPERATED SIGNALS AND TPWS APPLICATIONS

Chris Gordon

On the Regional Fast Rail (RFR) project a signalling enforcement solution is provided with approach operated signal aspects and the Train Protection and Warning System (TPWS) on the Geelong, Ballarat, Bendigo and Latrobe corridors.

This has meant that some alterations have been made to the normal aspect sequences used in Victoria.

With RFR work, Medium Speed Warning (R/Y) can only be 40 km/h. Clear Medium Speed (R/G) can be 40 km/h, 65 km/h or 80 km/h, with the last two being provided with illuminated speed numbers. The illuminated speed number has a small round unit for 65 and large square unit for 80. A signal can have either indicator, but not both indicators.

Approach operated signals aspects and TPWS with train stop sensor (TSS) and over speed sensor (OSS) are used to enforce the following restrictions.

Limit of authorities

With a home signal held at stop the following applies:

- * The first signal in the rear will show stop, and the second signal in the rear will show Normal Speed Warning (Y/R) (see figure 1a).
- * After the train passes the second signal in the rear, the speed of the train is proven at less than 100 km/h in mid section (7 seconds over 194m timing track) (see figure 1b).
- * If speed proving is tested satisfactory, the first in the rear signal clears to Medium Speed Warning (R/Y) with the OSS set at 48 km/h (20% overspeed) at that signal (see figure 1c).

Medium Speed signal aspects

The OSS is also used to enforce medium speed aspects, set at 20% overspeed:

- * 40 km/h - OSS set at 48 km/h
- * 65 km/h - OSS set at 73 km/h
- * 80 km/h - OSS set at 89 km/h

Control of train speeds through junctions

When approaching a diverging junction or a trailing movement through a converging junction the current aspect sequence (non RFR) is normally:

- * Clear Normal Speed (G/R)
- * Reduce to Medium Speed (Y/G)
- * Medium Speed Warning (R/Y) or Clear Medium Speed (R/G)

Under RFR this aspect sequence has been modified:

- * When a diverging move is signalled, the junction home and the signal in the rear is held at stop, and the second signal in the rear shows Normal Speed Warning (Y/R) (see figure 2a).
- * After the approaching train passes the second signal in the rear (showing Normal Speed Warning), the next signal will clear to Medium Speed Warning (R/Y), with the junction home still held at stop (see figure 2b).
- * The speed of the approaching train is then tested over a timing track to determine if it is less than 100 km/h in mid section (7 seconds over 194m timing track) (see figure 2c).
- * If the speed is less than 100 km/h, then the junc-

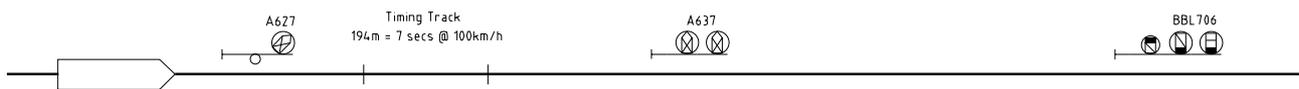


Figure 1a: Train approaching Home at Stop

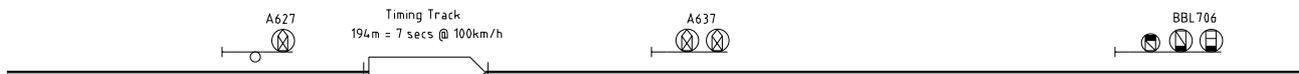


Figure 1b: Speed of train being measured



Figure 1c: Speed of train < 100 km/h, automatic clears to Medium Speed Warning

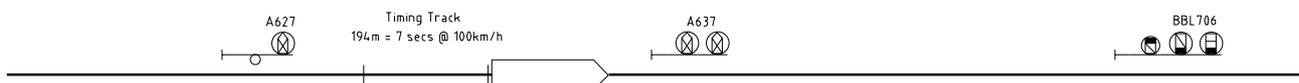


Figure 1d: Speed of train > 100 km/h, train is tripped when passing Automatic at stop

tion home will clear to Clear Medium Speed (R/G) or Medium Speed Warning (R/Y) and the Automatic in the rear (still being approached by the train) will step up to Reduce to Medium Speed (Y/G).

If the speed exceeds 100 km/h, a second further test is carried out from the timing track to the next signal. If the result of this test gives an average speed of 80 km/h or less then the signals will clear as described previously. If the average speed exceeds 80 km/h, the signals will remain at stop causing a TPWS brake application as the train passes the signal at stop.

The signalling of a converging move is arranged in the same way.

The OSS is also used in diverging speed proving to reduce the risk of a train derailing on turnouts due to excessive speed. A series of speed proving sections is set up to cover the braking profiles and the possible acceleration of a train after passing a signal but before reaching the turnout. Without going through many different combinations for the RFR project, the result can be summarised as the TPWS is set up to limit a train to 20% overspeed through a turnout.

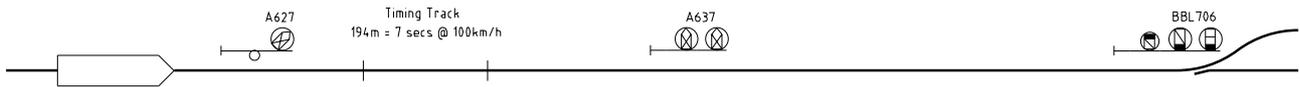


Figure 2a: Train approaching Home at Stop with route set for divergence

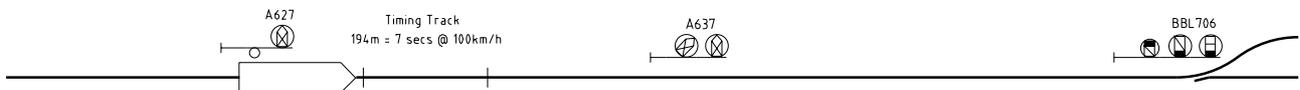


Figure 2b: First Automatic clears to Medium Speed Warning when train passes 2nd Automatic in rear

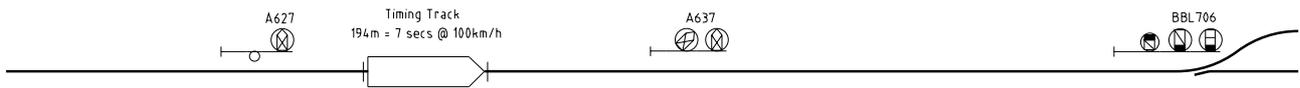


Figure 2c: Speed of train being measured

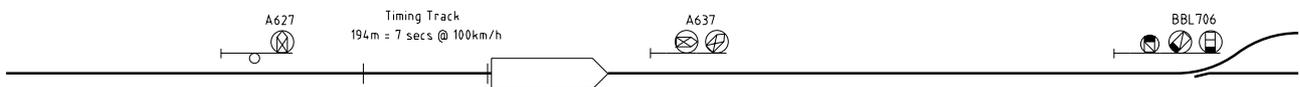


Figure 2d: Speed of train < 100 km/h, signals in advance step up



Points 3 at the Up end of Bungaree Loop. These points are signalled for 65 km/h running and consequently have long point blades and a flat crossing. To prevent flexing in the point blades, the drive from the point motor is applied at two locations along the point blade. The point motor drives the toe of the points (at the right) as normal, and then the drive is transferred down the length of the points by means of the point rodding seen on the near side of the track, to a second drive location. The points are locked using European style claw locks. One set is provided at the toe of the points, and a second set is provided at the second drive location. A point detector is driven off the second drive location to ensure that the point blades have correctly moved.



The new Up Departure Home signals from Bank Box loop are typical of the signals provided on the Ballarat line for the RFR works. The masts are welded galvanised steel, and the heads are LEDs. Unlike the new LED signals on the North Eastern line, large and secure access platforms are provided. The third head on post BBL712 is a '65' indicator, not a low speed light.

LETTERS TO THE EDITOR

Chris Wurr writes...

I know this is probably 4 years too late, but I finally found the reference to the (re-)introduction of the arrow (as against two discs) indication on trailable point switchstands, starting at Jackson's Loop, which I referred to in my switchstand article in the November 2001 issue of Somersault.

It was actually an entry in WN 26/86, published 15 July. This date only post-dates my slides of it by 10 days, so the WN was pretty much on the ball back in those days.

The text of the WN entry read:

Jacksons Loop Trailable Points

The new improved type of switch stand has been installed on the trailable points at both ends of Jacksons Loop. The new switch stand displays the following:-

(i) When the left hand track is the diverging track and

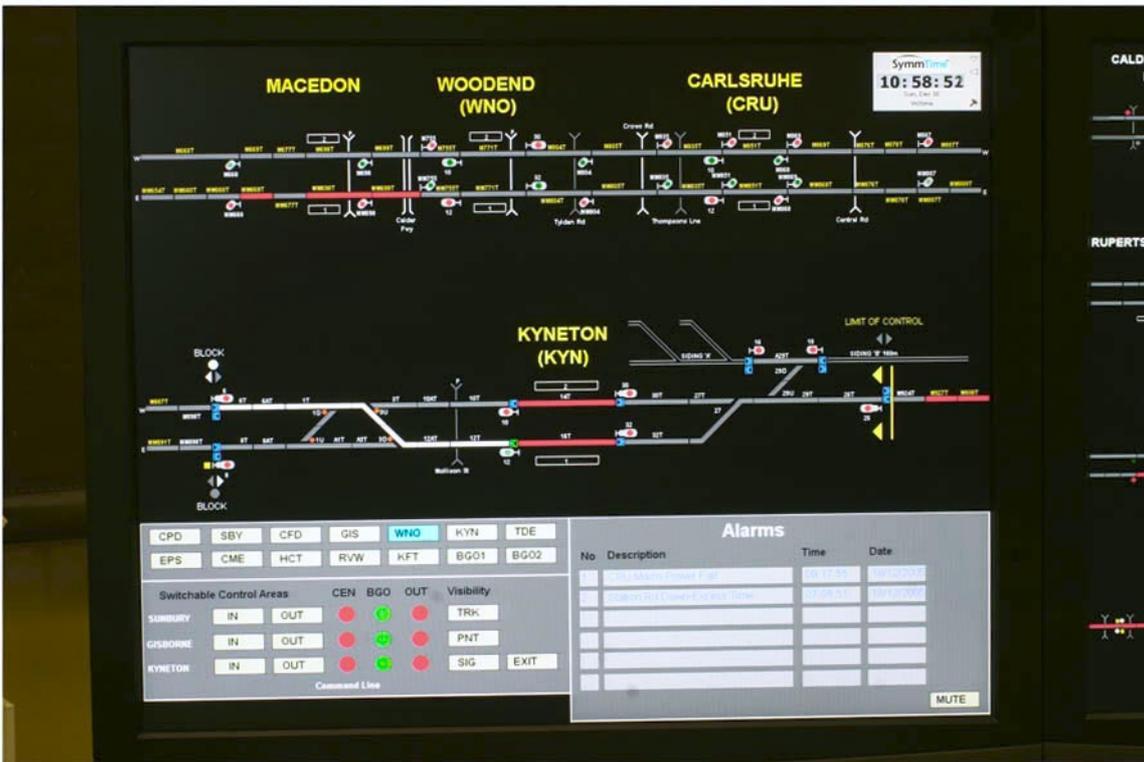
the points are normal and locked, a reflectorised yellow fish-tailed arrow pointing in the direction in which the points are set.

(ii) When the points are not correctly locked, two reflectorised red discs.

If, when approaching the points in the trailing direction, the Driver or Second Person observe two white reflectorised discs with horizontal bar displayed on the switch stand, the Driver may proceed through the trailing points; but must immediately advise the Signal and Communications Supervisor, Ararat.

Note:- Commencing forthwith, the temporary maximum permissible speed of 20 km/h when entering and departing Jacksons Loop has been increased to 40 km/h.

The figures on the curve boards for trains entering and on the speed boards for trains departing Jacksons Loop have been altered accordingly. A. 770/86



(Above) A photo of a detail screen of the Westinghouse WestCAD control system provided to control the Bendigo line and (below) a detail screen of the Alstom Sigmaphone control system for the Ballarat line. The WestCAD screen shows the section of line between Macedon and Kyneton and the Sigmaphone screen shows Bacchus Marsh. The symbols on both screens are based on conventional NX panels. On the WestCAD system, unoccupied tracks are grey, set routes are white, and occupied tracks are red. On the Sigmaphone system, unoccupied tracks are blue, set routes are green, and occupied tracks are red. In both systems, signals are distinguished as Homes, Automatics, and Dwarfs. Both systems can also show additional contextual information, such as signal numbers, point numbers, track circuit numbers, station platforms, level crossings, and overbridges. The Sigmaphone system contains more information, for example, showing the location of level crossings. Both photos: Chris Gordon.

