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Paddington to Reading & Reading to Didcot Parkway Non-Stop Headways

Date: September 2016

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GW103 PADDINGTON TO UFFINGTON			
TIMING POINT	DOWN	UP	NOTES
Paddington to Ladbroke Grove	2½ 2	2½ 2	A second train can follow an EMU after 2 minutes
Ladbroke Grove to Heathrow Airport Jn (incl.)	2½ 2*	2½ 2*	<div> <div> <p>*MAIN LINES</p> <p>DOWN</p> <p>2½ minutes following stopping services</p> <p>4 minutes Following Freight class 4 or 6</p> <p>4½ minutes Following Freight class 7 or slower</p> <p>UP</p> <p>2½ minutes following stopping services</p> <p>3½ minutes Following Freight class 4 or 6</p> <p>4½ minutes Following Freight class 7 or slower</p> </div> <div> <p>*RELIEF LINES</p> <p>DOWN</p> <p>2½ minutes following stopping services</p> <p>3½ minutes Following Freight class 4 or 6</p> <p>5 minutes Following Freight class 7</p> <p>UP</p> <p>2½ minutes following stopping services</p> <p>3½ Following Freight class 7 or slower</p> </div> </div> <p>Note the Heathrow Airport Junction Signalling Restrictions stated in Section 5.3</p>

Proposal 5a-6b

Proposal 7-8b

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Reading High Level Jn to Didcot Parkway (Main Line)	4 2½*	4 2½*	<div><div><div>*UP 4 minutes following stopping services</div><div>*DOWN 3½ minutes following stopping services.</div></div><div>After the two track railway has been given up between Reading and Didcot in the morning the first train in each direction must be block worked between Reading West Junction and Didcot East Junction (AB + 2). Refer to Engineering Access Statement for handback times</div></div>	<div>Proposal 17a-18</div>
Reading West Jn to Didcot Parkway (Relief Line)	3*	3 2½*	<div><div><div>*UP 3½ minutes following stopping services 4 Following Freight class 4 or 6</div><div>*DOWN 3½ minutes following stopping services 4 Following Freight class 4 or 6</div></div><div>After the two track railway has been given up between Reading and Didcot in the morning the first train in each direction must be block worked between Reading West Junction and Didcot East Junction (AB + 2). Refer to Engineering Access Statement for handback times</div></div>	<div>Proposal 19-21b</div>
Didcot Parkway to Uffington	4	4		

Ref No.	Headway change (from – to)	Direction	Supporting commentary
A	GW103 - Reading High Level Junction to Twyford Twyford to Heathrow Airport Junction (excl.)	Up/Down	The modelling shows that reset times for following class 4, 6 or 7 in the up direction between Reading High Level Junction and Twyford greatly exceeds the current planning value, as detailed in proposals 5-16 regarding reset times it is proposed that the current headway locations in both the Up and Down directions within 5.2 be split to include Twyford.

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
1a	GW103 – Paddington to Ladbroke Grove	Down Main	2½ minutes	2 minutes	<p>The modelling shows that the reset times for all main line passenger rolling stock between Paddington station and Reading station ranges from 69-126 seconds. All reset times are greatly below the current planning values of 150 and 180 seconds respectively, due in part to an increasing line speed upon departure from Paddington station to a maximum line speed of 125mph, all rolling stock can achieve 90mph or greater and sufficient signals and signal block lengths across the majority of the route specified. Modelling shows that class 165's will have reset time of 124-126 seconds between signal T501-T519 due to an increased signal block length and running speed of 90mph (all over service reset times fall below 120 seconds), It is therefore proposed that the headway planning values for the four headway locations specified is reduced to 120 seconds to facilitate this.</p> <p>Note: Class 332 uses signals sn11, sn39, sn59, sn83, sn107 upon departure from Paddington station due to Heathrow Express services using platforms 6 and 7, an increased reset time at signal sn285 is due to divergence towards Heathrow Airport.</p>	<p>Report 323 Page 15, 43, 47, 51, 55, 59, 63, 67</p>
1b	Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Main	2½ minutes	2 minutes		
1c	Heathrow Airport Junction (excl.) to Twyford	Down Main	3 minutes	2 minutes		
1d	Twyford to Reading High Level Junction	Down Main	3 minutes	2 minutes		
2a	Reading High Level Junction to Twyford	Up Main	3 minutes	2 minutes	<p>The modelling shows that the reset times for all main line passenger rolling stock between Reading Station and Paddington station range from 70-143 seconds. All reset times are greatly below the current planning value of 180 seconds between Reading station and Heathrow Airport Junction, due in part to a consistent line speed of 125mph upon passing Reading station, all rolling stock can achieve 100mph or greater and sufficient signals and signal block lengths across the majority of the route specified, modelling shows that class 165's will have reset times above 120 seconds due to a maximum running speed of 90mph (all over service reset times fall</p>	<p>Report 323 Page 14, 45, 53, 57, 61, 65, 69</p>
2b	Twyford to Heathrow Airport Junction (excl.)	Up Main	3 minutes	2 minutes		
2c	Heathrow Airport Junction (incl.) to Ladbroke Grove	Up Main	2½ minutes	2 minutes		
2d	Ladbroke Grove to Paddington	Up Main	2½ minutes	2 minutes		

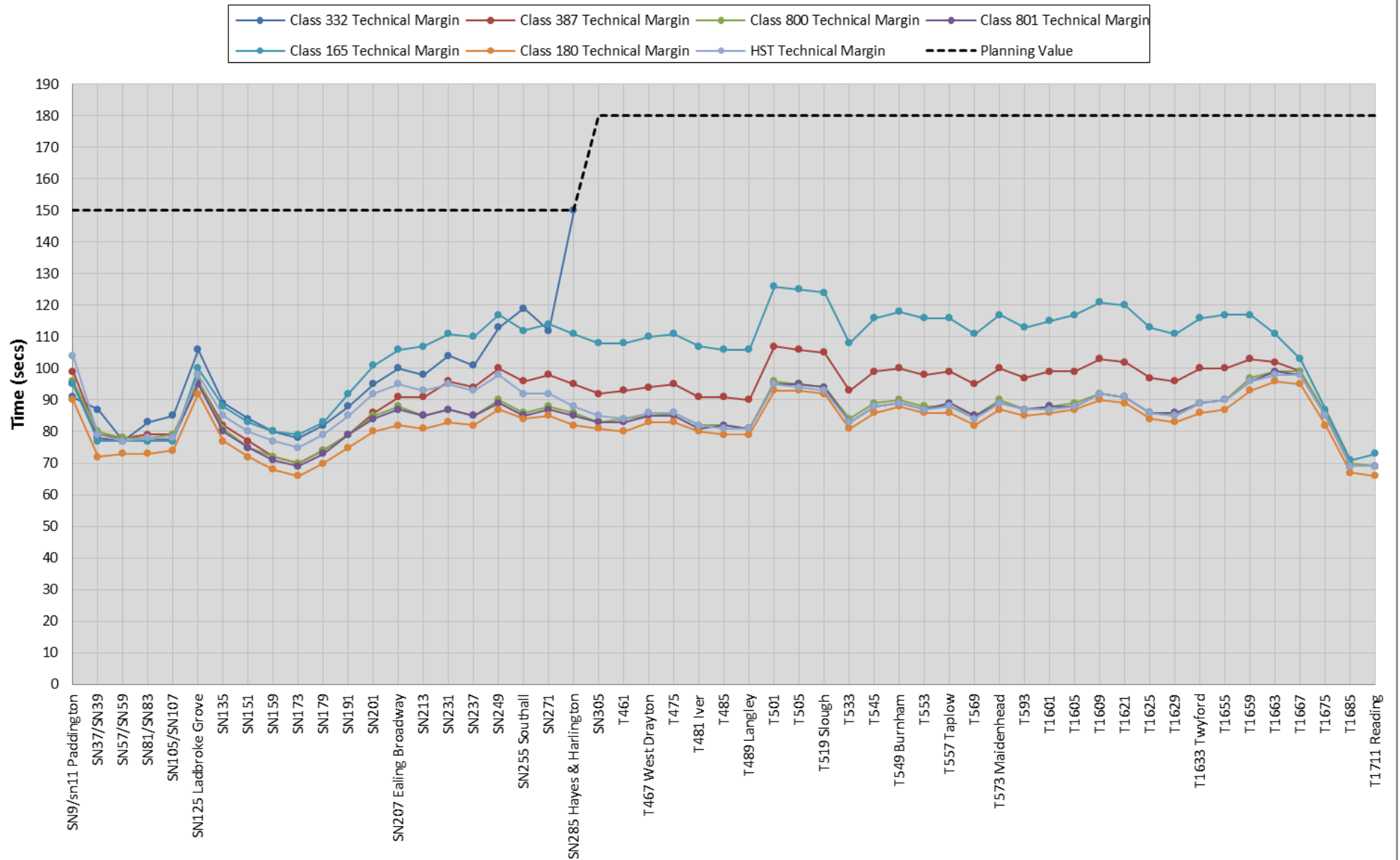
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					<p>below 120 seconds), It is therefore proposed that the headway planning values between Reading High Level Junction and Heathrow Airport Junction is reduced to 120 seconds to facilitate this.</p> <p>The current 150 second headway values between Heathrow Airport Junction and Paddington is sufficient due to reset times between signal SN178-SN120 peaking at 143 seconds due to reduced line speed upon passing Ealing Broadway and further reduced line speed upon approach to Paddington station, it is however noted that as Paddington station is a termini all services will be travelling at the same speed from Ladbroke Grove and therefore reset times for both main line and reliefs would be of a similar time, it is therefore proposed that the current headway value is reduced to 120 seconds so that both main line and relief line services have the same margin.</p> <p>Note: Class 332 enters section via signal sn280 because of originating at Heathrow Airport, they also use signals sn106 and sn86 approaching Paddington station due to Heathrow Express services using platforms 6 and 7.</p> <p>Fig.1.1 and fig.1.2 shows the non-stop technical margins for all passenger classes in both Up and Down directions.</p>	
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Note: Report 456 (Paddington to Reading Stopping Headways) validates that the current headway values within 5.2 would be sufficient for following stopping services between Paddington station and Reading station on main lines in the Up and Down direction.

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Down Main Line - Paddington to Reading



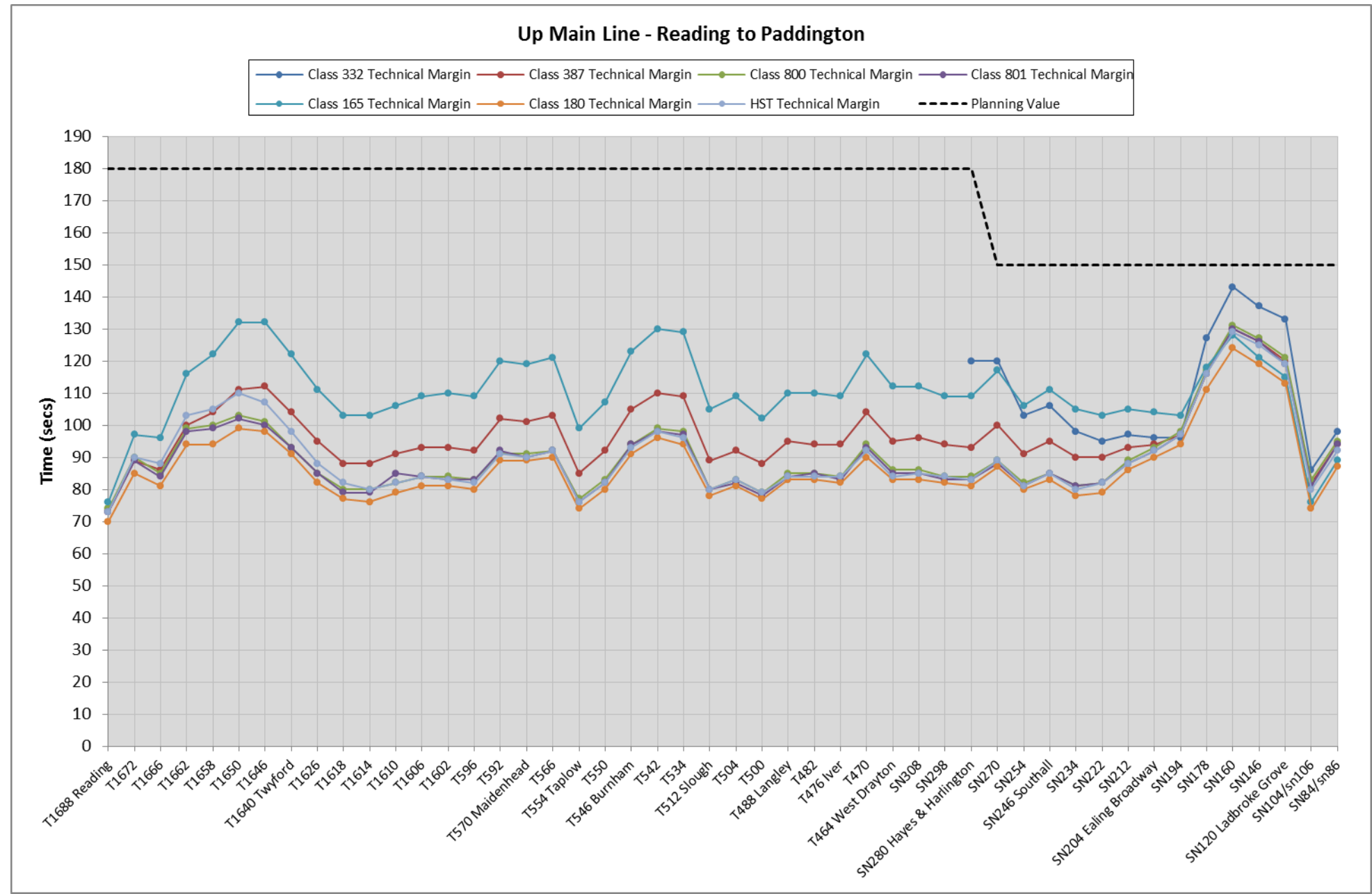
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Down Main Line - Paddington to Reading																										
	SN9/sn11 Paddington	SN37/ SN39	SN57/ SN59	SN81/S N83	SN105/ SN107	SN125 Ladbroke Grove	SN135	SN151	SN159	SN173	SN179	SN191	SN201	SN207 Ealing Broadway	SN213	SN231	SN237	SN249	SN255 Southall	SN271	SN285 Hayes & Harlington	SN305	T461	T467 West Drayton	T475	T481 Iver
Class 332	91	87	77	83	85	106	89	84	80	78	82	88	95	100	98	104	101	113	119	112	150					
Class 387	99	79	78	79	79	96	82	77	72	70	74	79	86	91	91	96	94	100	96	98	95	92	93	94	95	91
Class 800	96	80	78	78	79	96	81	75	72	70	74	79	85	88	85	87	85	90	86	88	86	83	84	85	86	82
Class 801	95	78	77	77	78	95	80	75	71	69	73	79	84	87	85	87	85	89	85	87	85	83	83	85	85	81
Class 165	95	77	77	77	77	100	88	83	80	79	83	92	101	106	107	111	110	117	112	114	111	108	108	110	111	107
Class 180	90	72	73	73	74	92	77	72	68	66	70	75	80	82	81	83	82	87	84	85	82	81	80	83	83	80
HST	104	79	77	78	78	98	85	80	77	75	79	85	92	95	93	95	93	98	92	92	88	85	84	86	86	82

	T489 Langley	T501	T505	T519 Slough	T533	T545	T549 Burnham	T553	T557 Taplow	T569	T573 Maidenhead	T593	T1601	T1605	T1609	T1621	T1625	T1629	T1633 Twyford	T1655	T1659	T1663	T1667	T1675	T1685	T1711 Reading
91	90	107	106	105	93	99	100	98	99	95	100	97	99	99	103	102	97	96	100	100	103	102	99	85	69	69
82	81	96	95	94	84	89	90	88	88	85	90	87	88	89	92	91	86	85	89	90	97	99	99	86	70	69
82	81	95	95	94	83	88	89	87	89	85	89	87	88	88	92	91	86	86	89	90	96	99	98	85	69	69
106	106	126	125	124	108	116	118	116	116	111	117	113	115	117	121	120	113	111	116	117	117	111	103	87	71	73
79	79	93	93	92	81	86	88	86	86	82	87	85	86	87	90	89	84	83	86	87	93	96	95	82	67	66
81	81	95	94	93	83	88	89	87	88	84	89	87	87	88	92	91	86	85	89	90	96	98	98	85	69	69

Fig.1.1

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Up Main Line - Reading to Paddington																								
	T1688 Reading	T1672	T1666	T1662	T1658	T1650	T1646	T1640 Twyford	T1626	T1618	T1614	T1610	T1606	T1602	T596	T592	T570 Maidenhead	T566	T554 Taplow	T550	T546 Burnham	T542	T534	T512 Slough
Class 332																								
Class 387	73	89	86	100	104	111	112	104	95	88	88	91	93	93	92	102	101	103	85	92	105	110	109	89
Class 800	74	90	85	99	100	103	101	93	85	80	80	82	84	84	83	91	91	92	77	83	94	99	98	80
Class 801	73	89	84	98	99	102	100	93	85	79	79	85	84	83	83	92	90	92	76	82	94	98	97	80
Class 165	76	97	96	116	122	132	132	122	111	103	103	106	109	110	109	120	119	121	99	107	123	130	129	105
Class 180	70	85	81	94	94	99	98	91	82	77	76	79	81	81	80	89	89	90	74	80	91	96	94	78
HST	73	90	88	103	105	110	107	98	88	82	80	82	84	83	82	91	90	92	76	82	93	98	96	80

T504	T500	T488 Langley	T482	T476 Iver	T470	T464 West Drayton	SN308	SN298	SN280 Hayes & Harlington	SN270	SN254	SN246 Southall	SN234	SN222	SN212	SN204 Ealing Broadway	SN194	SN178	SN160	SN146	SN120 Ladbroke Grove	SN104/ sn106	SN84/ sn86
									120	120	103	106	98	95	97	96	96	127	143	137	133	86	98
92	88	95	94	94	104	95	96	94	93	100	91	95	90	90	93	94	97	116	130	126	120	82	94
83	79	85	85	84	94	86	86	84	84	89	82	85	81	82	89	93	98	117	131	127	121	83	95
82	78	84	85	83	93	85	85	83	83	88	81	85	81	82	88	92	97	116	130	126	119	81	94
109	102	110	110	109	122	112	112	109	109	117	106	111	105	103	105	104	103	118	128	121	115	76	89
81	77	83	83	82	90	83	83	82	81	87	80	83	78	79	86	90	94	111	124	119	113	74	87
83	79	84	84	84	92	84	85	84	83	89	81	85	80	82	88	92	97	116	129	125	119	80	92

Fig.1.2

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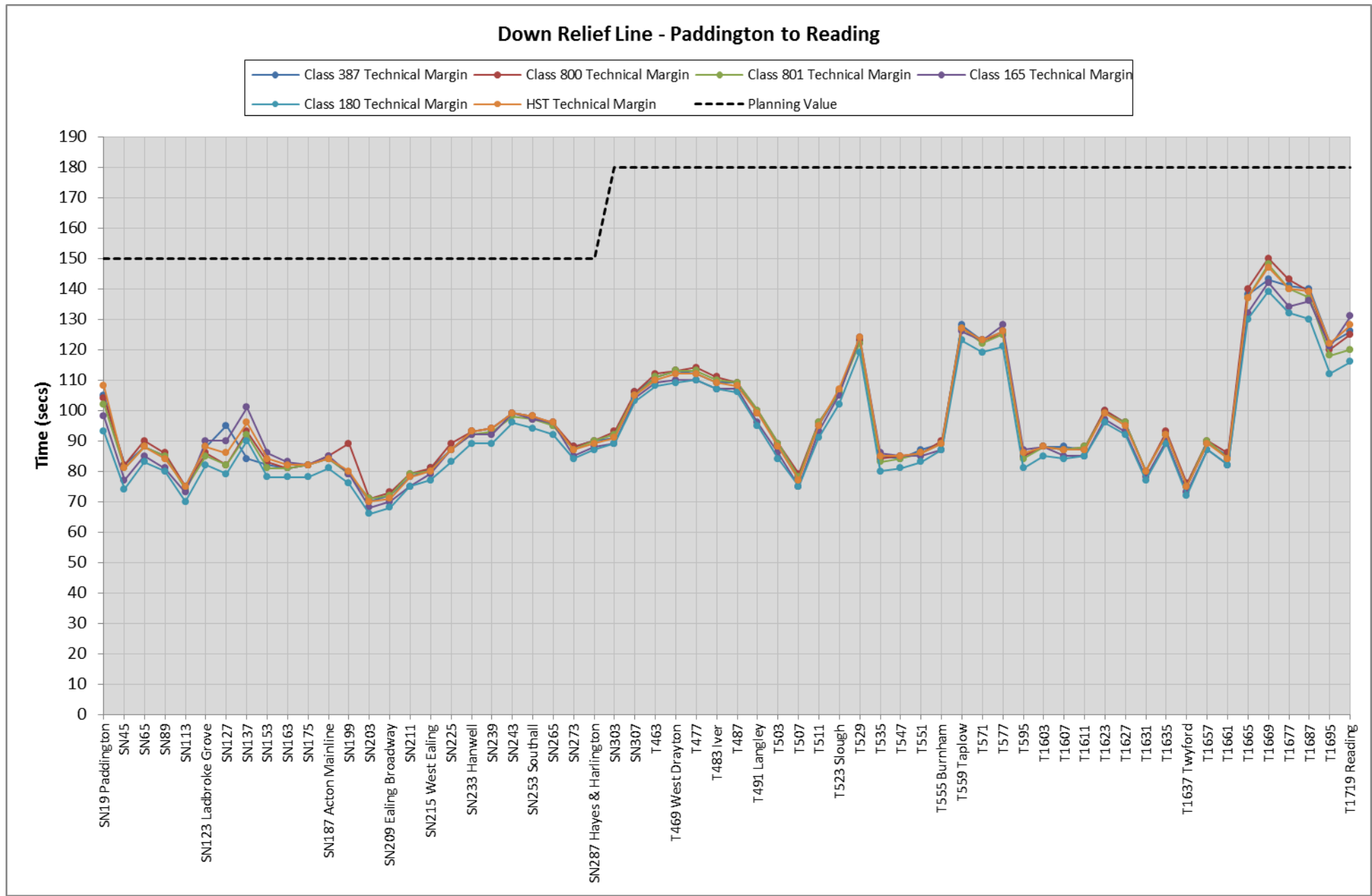
Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
3a	GW103 – Paddington to Ladbroke Grove	Down Relief	2½ minutes	2 minutes	The modelling shows that the reset times for all relief line passenger rolling stock between Paddington station and Reading station ranges from 66-150 seconds. All reset times are at least 30 seconds below the current planning value of 150 seconds between Paddington and Heathrow Airport Junction, due in part to an increasing line speed upon departure from Paddington station to a maximum line speed of 90mph, all rolling stock can achieve this and sufficient signals and signal block lengths across the majority of the route specified. Modelling also shows that the reset times between Heathrow Airport Junction and Twyford are at least 30 seconds below the current planning values of 180 seconds, peaks of 121-128 are due to reduced line speeds of 75mph at Slough and Taplow, however the majority of the section is below 120 seconds, due to 40mph line speed at Reading station reset times peak at 150 seconds upon approach, It is therefore proposed that the headway planning values between Paddington and Twyford are reduced to 120 seconds and between Twyford and Reading West Junction reduced to 150 seconds to facilitate this.	Report 323 Page 44, 52, 56, 60, 64, 68
3b	Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Relief	2½ minutes	2 minutes		
3c	Heathrow Airport Junction (excl.) to Twyford	Down Relief	3 minutes	2 minutes		
3d	Twyford to Reading West Junction	Down Relief	3 minutes	2½ minutes		
4a	Reading West Junction to Twyford	Up Relief	3 minutes	2½minutes	The modelling shows that the reset times for all relief line passenger rolling stock between Reading station and Paddington station ranges from 64-136 seconds. Reset times between Reading station and Twyford peak at 136 seconds due in part to reduced line speed of 40mph upon passing reading station increasing to 90mph and the subsequent acceleration of all rolling stock services to 90mph. Majority of reset times between Twyford and Paddington are all below 120 seconds due to a maximum line speed of 90mph of which all rolling stock types can achieve, a reset time spike of between 123-126 seconds at Taplow is due to a	
4b	Twyford to Heathrow Airport Junction (excl.)	Up Relief	3 minutes	2 minutes		
4c	Heathrow Airport Junction (incl.) to Ladbroke Grove	Up Relief	2½ minutes	2 minutes		
4d	Ladbroke Grove to Paddington	Up Relief	2½ minutes	2 minutes		

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					<p>reduced line speed of 75mph upon approach to Maidenhead, subsequent deceleration and acceleration of services and an increased signal length block between Taplow and signal T556. It is therefore proposed that the current planning value between Reading West Junction and Twyford is reduced to 150 seconds and the planning values between Twyford and Paddington are reduced to 120 seconds to facilitate this.</p> <p>Fig.1.3 and fig.1.4 shows the non-stop technical margins for all passenger classes in both Up and Down directions.</p>	
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Note: Report 456 (Paddington to Reading Stopping Headways) validates that the current headway values within 5.2 would be sufficient for following stopping services between Paddington station and Reading station on relief lines in the Up and Down direction.

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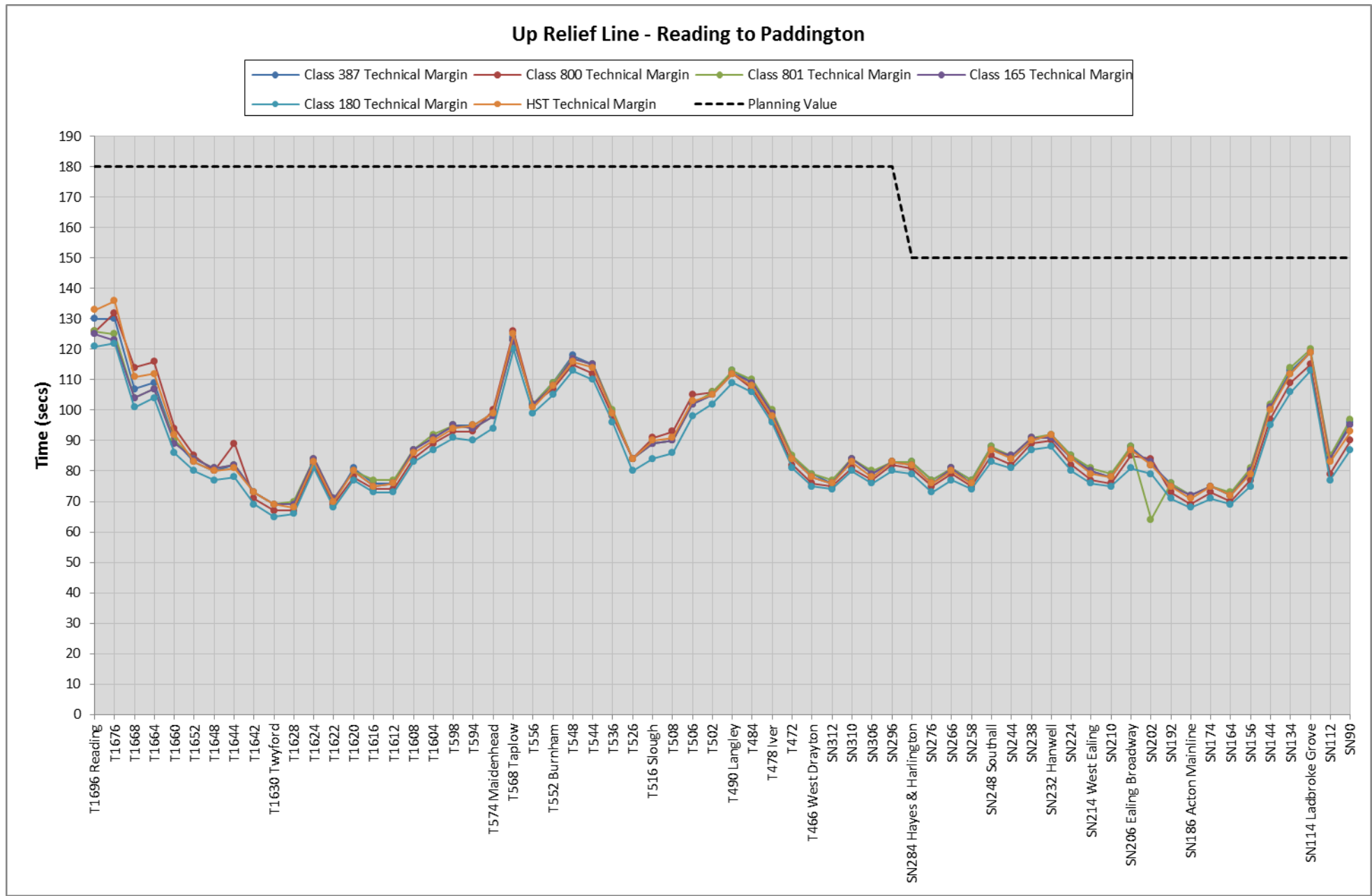
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Down Relief Line - Paddington to Reading																															
	SN19 Paddington	SN45	SN65	SN89	SN113	SN123 Ladbroke Grove	SN127	SN137	SN153	SN163	SN175	SN187 Acton Mainline	SN199	SN203	SN209 Ealing Broadway	SN211	SN215 West Ealing	SN225	SN233 Hanwell	SN239	SN243	SN253 Southall	SN265	SN273	SN287 Hayes & Harlington	SN303	SN307	T463	T469 West Drayton	T477	T483 Iver
Class 387	105	82	88	85	75	88	95	84	82	81	82	84	79	70	72	78	81	87	93	94	99	98	95	88	90	91	106	111	113	112	109
Class 800	104	82	90	86	75	86	82	93	83	81	82	85	89	71	73	79	81	89	93	94	99	98	96	88	90	93	106	112	113	114	111
Class 801	102	81	88	85	74	85	82	92	81	81	82	84	79	71	72	79	80	87	92	93	98	97	95	87	90	92	105	111	113	113	110
Class 165	98	77	85	81	73	90	90	101	86	83	82	85	79	68	70	75	79	87	92	92	99	97	96	85	88	89	104	109	110	110	107
Class 180	93	74	83	80	70	82	79	90	78	78	78	81	76	66	68	75	77	83	89	89	96	94	92	84	87	89	103	108	109	110	107
HST	108	81	88	84	75	88	86	96	84	82	82	84	80	70	71	78	80	87	93	94	99	98	96	87	89	91	105	110	112	112	109

T487	T491 Langley	T503	T507	T511	T523 Slough	T529	T535	T547	T551	T555 Burnham	T559 Taplow	T571	T577	T595	T1603	T1607	T1611	T1623	T1627	T1631	T1635	T1637 Twyford	T1657	T1661	T1665	T1669	T1677	T1687	T1695	T1719 Reading
109	99	89	78	95	106	123	85	84	87	89	128	123	126	85	88	88	87	100	96	80	92	75	89	85	138	143	141	140	122	126
109	100	89	79	96	106	123	84	85	86	90	127	123	125	85	88	87	88	100	96	80	93	76	90	86	140	150	143	139	120	125
109	100	89	78	96	106	122	83	84	86	89	127	122	125	84	88	87	88	99	96	80	92	75	90	84	137	148	140	137	118	120
107	96	86	75	93	105	124	86	85	85	87	126	123	128	87	88	85	85	97	93	78	90	73	87	82	132	142	134	136	121	131
106	95	84	75	91	102	119	80	81	83	87	123	119	121	81	85	84	85	96	92	77	89	72	87	82	130	139	132	130	112	116
108	99	88	77	95	107	124	85	85	86	89	127	123	126	86	88	87	87	99	95	80	92	75	89	84	137	147	140	139	122	128

Fig.1.3

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Down Relief Line - Paddington to Reading																																
	T1696 Reading	T1676	T1668	T1664	T1660	T1652	T1648	T1644	T1642	T1630 Twyford	T1628	T1624	T1622	T1620	T1616	T1612	T1608	T1604	T598	T594	T574 Maidenhead	T568 Taplow	T556	T552 Burnham	T548	T544	T536	T526	T516 Slough	T508	T506	T502
Class 387	130	130	107	109	90	83	80	82	73	69	69	83	70	81	76	76	87	91	95	95	99	124	102	109	118	115	99	84	89	90	102	105
Class 800	126	132	114	116	94	85	80	89	71	67	67	82	69	78	74	74	84	89	93	93	100	126	102	107	115	112	98	84	91	93	105	106
Class 801	126	125	104	107	90	84	81	82	73	69	70	84	71	80	77	77	87	92	95	94	98	123	102	109	117	115	100	84	89	90	102	106
Class 165	125	123	104	107	89	84	81	82	73	69	69	84	71	80	75	76	87	91	95	94	98	123	102	108	117	115	99	84	89	90	102	105
Class 180	121	122	101	104	86	80	77	78	69	65	66	81	68	77	73	73	83	87	91	90	94	120	99	105	113	110	96	80	84	86	98	102
HST	133	136	111	112	92	83	80	81	73	69	68	83	70	80	75	76	86	90	94	95	99	125	101	108	116	114	99	84	90	91	103	105

T490 Langley	T484	T478 Iver	T472	T466 West Drayton	SN312	SN310	SN306	SN296	SN284 Hayes & Harlington	SN276	SN266	SN258	SN248 Southall	SN244	SN238	SN232 Hanwell	SN224	SN214 West Ealing	SN210	SN206 Ealing Broadway	SN202	SN192	SN186 Acton Mainline	SN174	SN164	SN156	SN144	SN134	SN114 Ladbroke Grove	SN112	SN90
113	109	99	84	79	76	84	79	83	83	77	81	77	88	84	90	92	85	80	78	88	82	76	72	75	72	80	101	113	119	84	96
112	107	97	82	76	75	81	77	82	81	75	79	75	85	82	89	90	82	77	76	85	84	73	69	73	70	77	97	109	115	79	90
113	110	100	85	79	77	84	80	83	83	77	81	77	88	85	91	92	85	81	79	88	64	76	72	75	73	81	102	114	120	85	97
112	109	99	84	78	76	84	79	83	82	76	81	76	87	85	91	91	84	80	78	87	83	75	72	75	72	80	101	112	119	84	95
109	106	96	81	75	74	80	76	80	79	73	77	74	83	81	87	88	80	76	75	81	79	71	68	71	69	75	95	106	113	77	87
112	108	98	84	78	76	83	78	83	82	76	80	76	87	84	90	92	84	79	78	87	82	75	71	75	72	79	100	112	119	83	93

Fig.1.4

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
5a	GW103 – Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Main	2½ minutes	4 minutes Following freight class 4 or 6	The modelling shows that the reset times for following freight in the down direction between Ealing Broadway and Heathrow Airport Junction is between 181-221 seconds for Class 4 and 198-240 seconds for Class 6.	Report 323 Page 32, 34
5b	GW103 – Heathrow Airport Junction (incl.) to Ladbroke Grove	Up Main	2½ minutes	3½ minutes Following freight class 4 or 6	<p>The modelling also shows reset times in the up direction ranging from 161-375 seconds for Class 4 and 167-369 seconds for Class 6.</p> <p>Reset times in the down direction are above the current headway planning value in part due to freight services converging on to the down main line using signal SN207 at Ealing Broadway and having to accelerate from 30mph to achieve maximum running speed, reset times in the up direction are above the current planning value due in part to freight services diverging off of the main line towards Acton Yard/Acton Wells Junction at signal SN204 and subsequent decrease in speed to 30mph, class 4 and 6 freight are able to achieve a maximum speed of 60-75mph respectively which is a decrease of 40-52% of the 125mph maximum line speed in both directions. It is therefore proposed that new exceptional headway values following freight services on both Up and Down Main line are introduced in to 5.2 to facilitate this.</p> <p>Note: The increased reset times for up services at signals SN212 & SN204 are due to vision calculations of the following services also travelling towards Acton Yard/Acton Wells Junction.</p>	Report 323 Page 31, 33
6a	GW103 – Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Main	2½ minutes	4½ minutes Following freight class	The modelling shows that the reset times for following freight in the down direction between Ealing Broadway and Heathrow Airport Junction is between 227-243	Report 323 Page 36

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6b	GW103 – Heathrow Airport Junction (incl.) to Ladbroke Grove	Up Main	2½ minutes	<p>7 or slower</p> <p>4½ minutes Following freight class 7 or slower</p>	<p>seconds for Class 7.</p> <p>The modelling also shows reset times in the up direction ranging from 247-397 seconds for Class 7. Reset times in the down direction are above the current headway planning value in part due to freight services converging on to the down main line using signal SN207 at Ealing Broadway and having to accelerate from 30mph to achieve maximum running speed, reset times in the up direction are above the current planning value due in part to freight services diverging off of the main line towards Acton Yard/Acton Wells Junction at signal SN204 and subsequent decrease in speed to 30mph, class 7 freights are able to achieve a maximum speed of 45mph respectively which is a decrease of 64% of the 125mph maximum line speed in both directions. It is therefore proposed that new exceptional headway values following freight services on both Up and Down Main line are introduced in to 5.2 to facilitate this.</p> <p>Note: The increased reset times for up services at signals SN212 & SN204 are due to vision calculations of the following services also travelling towards Acton Yard/Acton Wells Junction.</p> <p>Fig.1.5 and fig.1.6 shows the non-stop technical margins for all freight classes in both Up and Down directions.</p>	<p>Report 323 Page 35</p>
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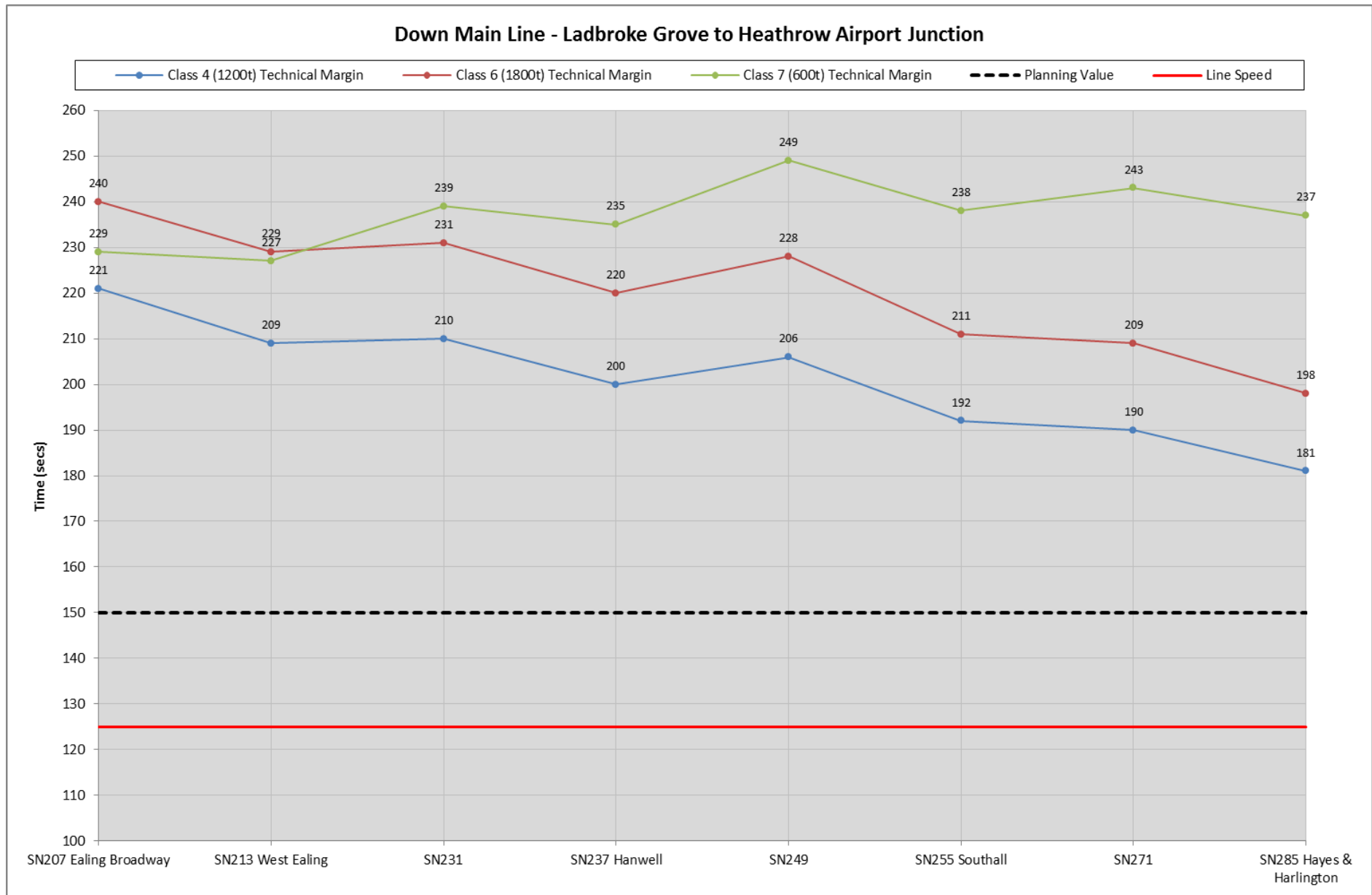


Fig.1.5

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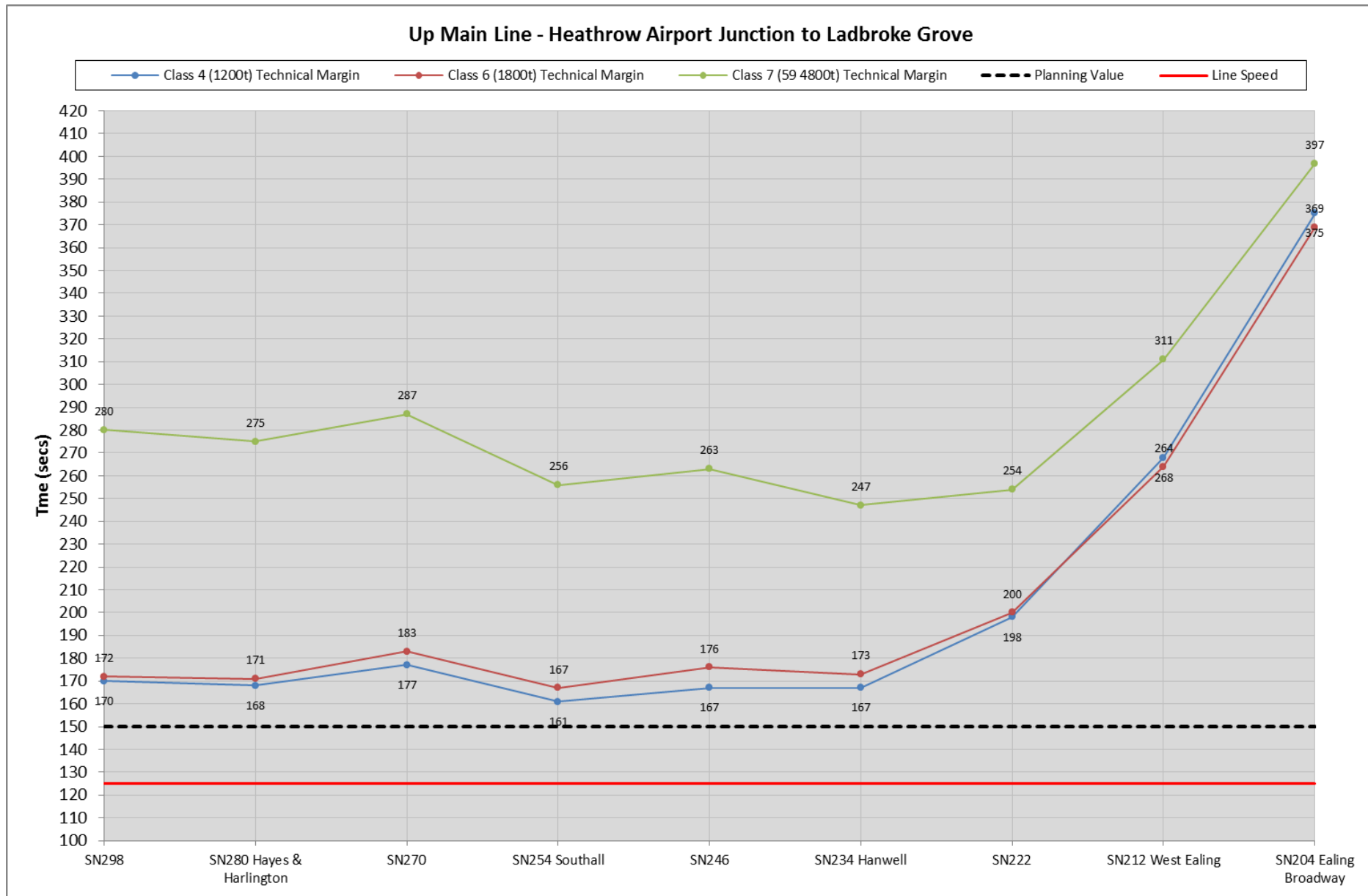


Fig.1.6

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
7	GW103 – Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Relief	2½ minutes	3½ minutes Following freight class 4 or 6	<p>The modelling shows that the reset times for following freight in the down direction between Ealing Broadway and Heathrow Airport Junction is between 147-170 seconds for Class 4 and 160-187 for Class 6. Reset times are above the current headway planning value in part due to freight services converging on to the down relief line using signal SN203 or SN199 at Ealing Broadway and having to accelerate from a maximum 30mph to achieve maximum running speed, class 4 and 6 freights are able to achieve a maximum speed of 60-75mph respectively, both freights would not be able to achieve full speed until passing signal T469 (West Drayton). It is therefore proposed that a new exceptional headway value following freight services on the Down Relief line is introduced in to 5.2 to facilitate this.</p> <p>Note: The modelling shows that the reset times for following class 4 and 6 freight services in the up direction does not exceed the current headway margin.</p>	<p>Report 323 Page 26, 28</p> <p>Report 323 Page 25, 27</p>
8a	GW103 – Ladbroke Grove to Heathrow Airport Junction (incl.)	Down Relief	2½ minutes	5 minutes Following freight class 7	The modelling shows that the reset times for following freight in the down direction between Ealing Broadway and Heathrow Airport Junction is between 245-298 seconds for Class 7.	Report 323 Page 30
8b	GW103 – Heathrow Airport Junction (incl.) to Ladbroke Grove	Up Relief	2½ minutes	3½ minutes Following freight class 7	<p>The modelling also shows reset times in the up direction ranging from 178-205 seconds for Class 7 between Heathrow Airport Junction and Hanwell. Reset times are above the current headway planning value in the down direction in part due to freight services converging on to the down relief line using signal SN203 or SN199 at Ealing Broadway and having to accelerate from a maximum 30mph to achieve maximum running speed, in the up direction reset times exceed the current planning value in part due to freight</p>	Report 323 Page 29

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					<p>weight, length and class 7 freights are able to achieve a maximum speed of 45mph respectively, both up and down direction freight would not be able to achieve full line speed. It is therefore proposed that new exceptional headway values following freight services in both the down and up direction are introduced in to 5.2 to facilitate this.</p> <p>Fig.1.7 and fig.1.8 shows the non-stop technical margins for all freight classes in both Up and Down directions.</p>	
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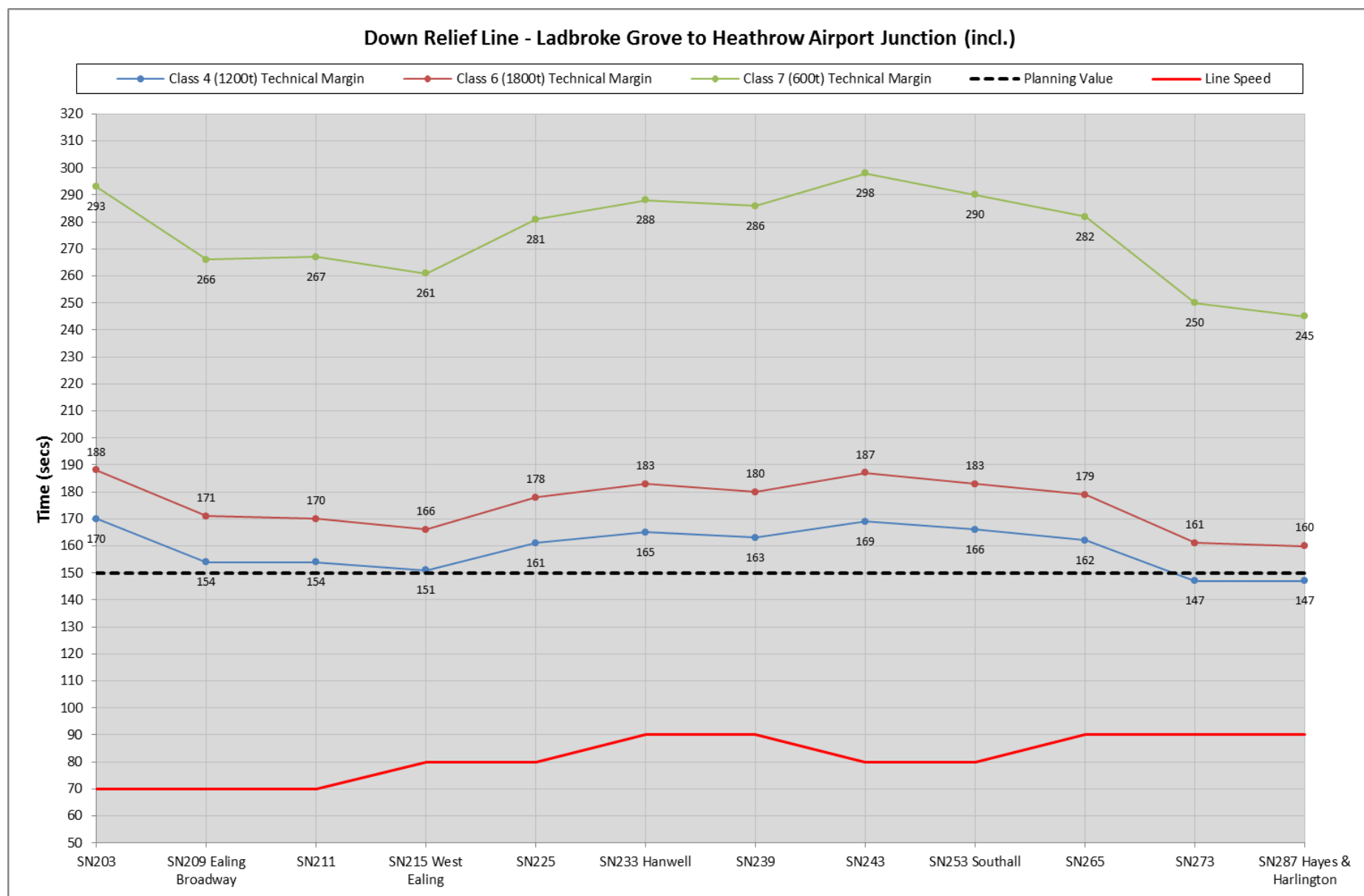


Fig.1.7

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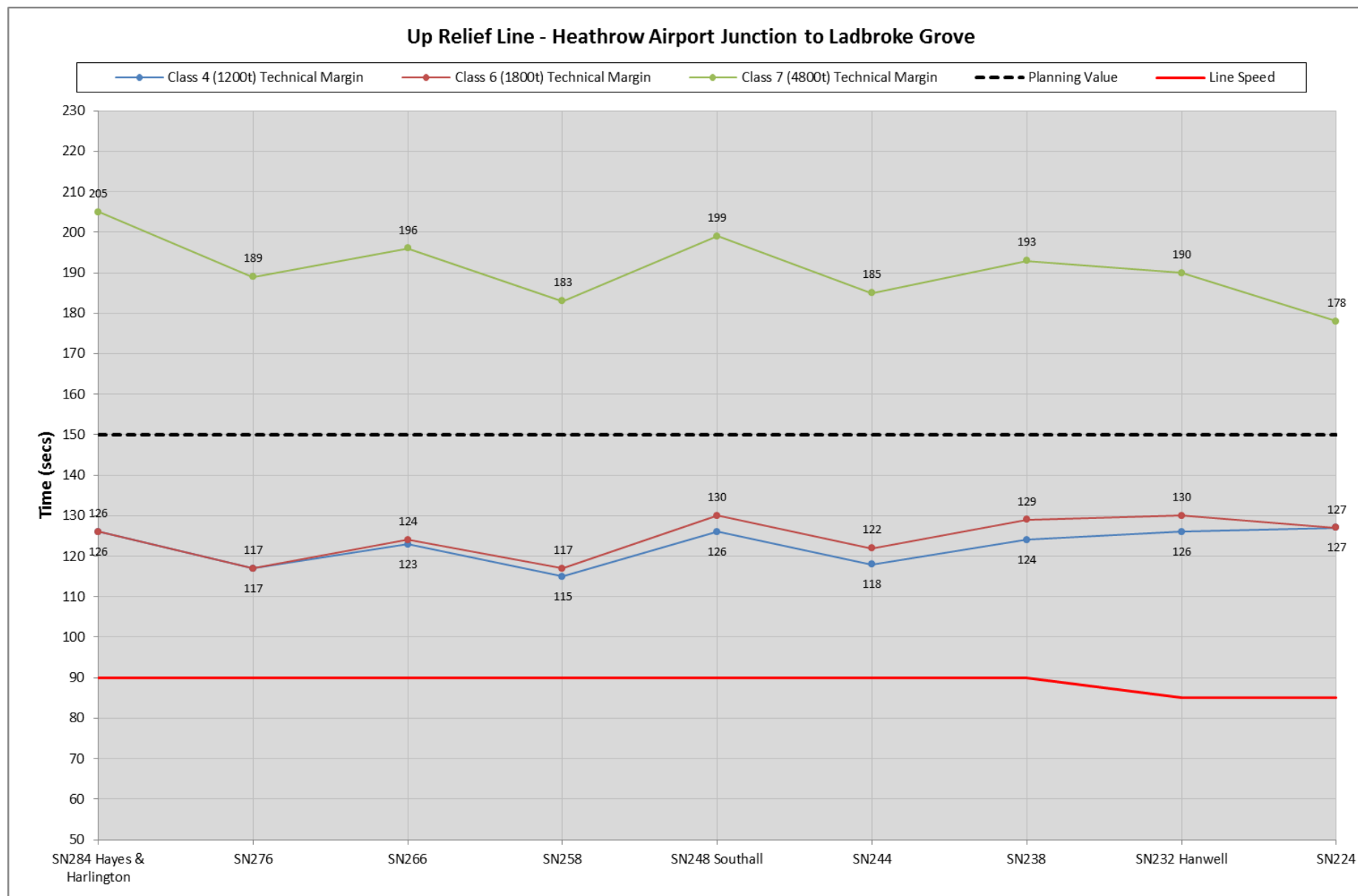


Fig.1.8

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
9a	GW103 - Heathrow Airport Junction (excl.) to Twyford	Down Main	3 minutes	3½ minutes Following Class 4 or 6	The modelling shows that the reset times for following freight between Heathrow Airport Junction and Twyford ranges from 162-192 seconds for Class 4 and 173-208 seconds for Class 6.	Report 323 Page 32, 34
9b	GW103 – Twyford to Heathrow Airport Junction (excl.)	Up Main	3 minutes	3½ minutes Following Class 4 or 6	Modelling also shows that the reset times for following freight between Twyford and Heathrow Airport Junction range from 146-193 seconds for Class 4 and 157-208 seconds for Class 6. All reset times are above the current headway planning values due to class 4 and 6 freight speed being able to achieve a maximum speed of 60-75mph respectively, which is a decrease of 40-52% of the achievable 125mph maximum line speed, it is therefore proposed that new exceptional headway values following freight services on both Up and Down Main line are introduced in to 5.2 to facilitate this.	Report 323 Page 31, 33
10a	GW103 – Heathrow Airport Junction (excl.) to Twyford	Down Main	3 minutes	4½ minutes Following Class 7 or slower	The modelling shows that the reset times for following Class 7 freight between Heathrow Airport Junction and Twyford range from 226-267 seconds.	Report 323 Page 36
10b	GW103 – Twyford to Heathrow Airport Junction (excl.)	Up Main	3 minutes	5 minutes Following Class 7 or slower	Modelling also shows that the reset times for following Class 7 freight between Twyford and Heathrow Airport Junction ranges from 217-288 seconds apart from signal T470 which does however have a reset time of 306 seconds. All reset times are above the current headway planning values due to some increased signal block sections on the up main line and class 7 freight being able to achieve a maximum speed of 45mph respectively, this is however a decrease of 64% of the 125mph maximum line speed along the majority of the specified route in both directions, it is therefore proposed that new exceptional headway values following freight services	Report 323 Page 35

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					<p>on both Up and Down Main line are introduced in to 5.2 to facilitate this.</p> <p>Fig.1.9 and fig.2.0 show the non-stop technical margins for all freight classes in both Up and Down directions.</p>	
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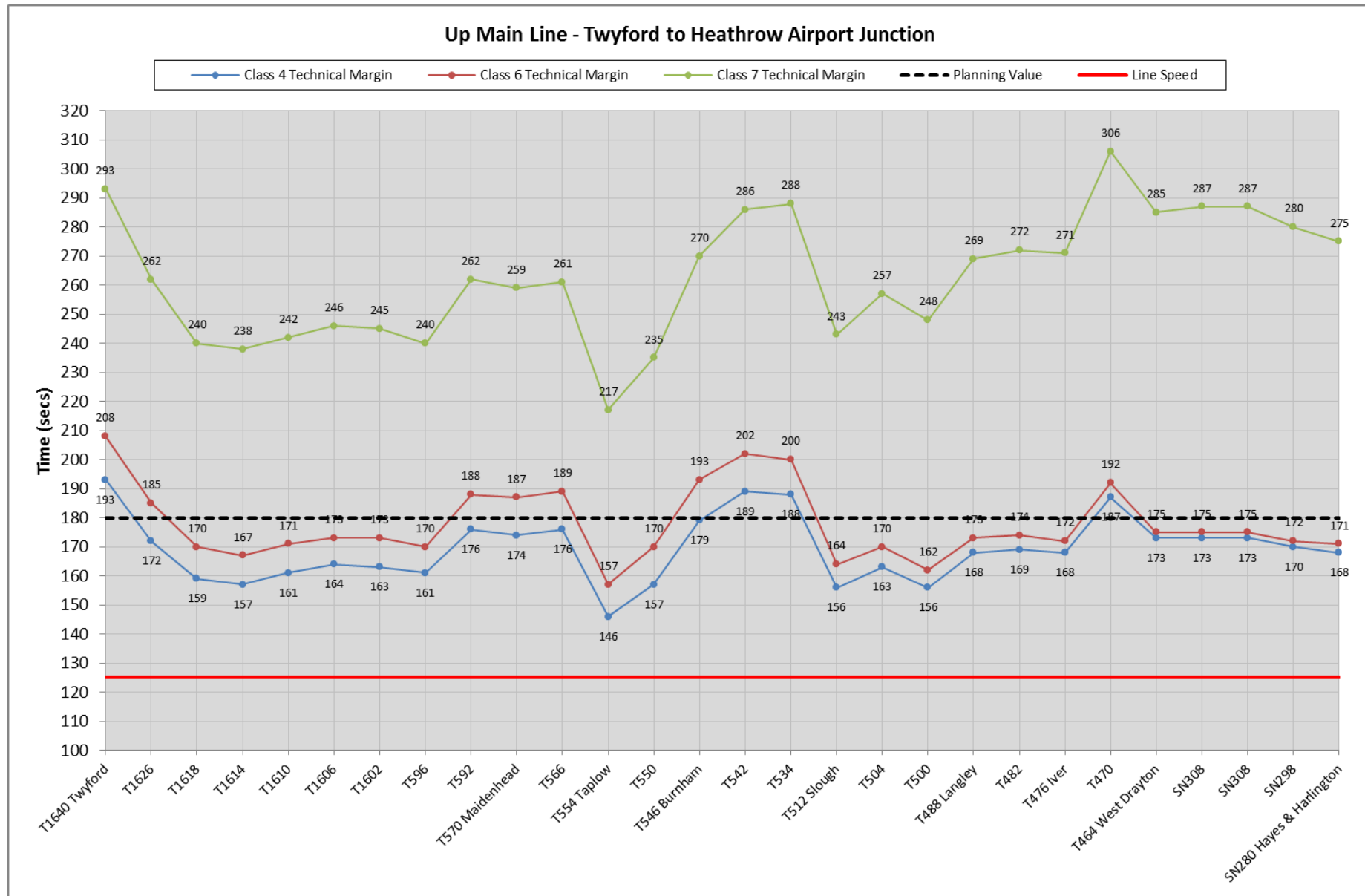


Fig.1.9

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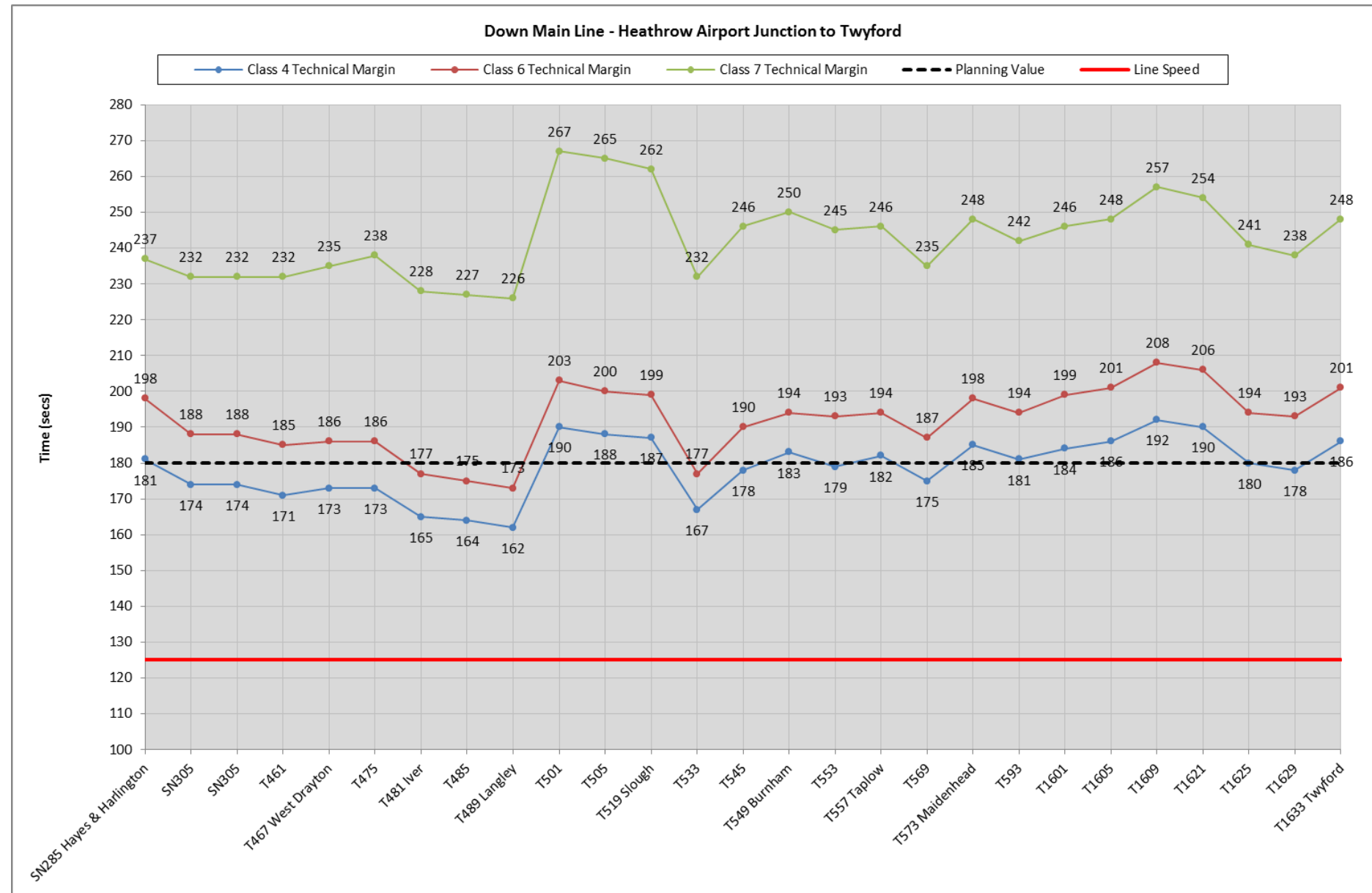


Fig.2.0

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
11	GW103 - Heathrow Airport Junction (excl.) to Twyford	Down Relief	3 minutes	3½ minutes Following freight class 4 or 6	The modelling shows that the reset times for following Class 4 freight between Heathrow Airport Junction and Twyford range from 109-185 seconds and 111-198 seconds for following class 6 freight. Due to freight class 4/6 having to achieve line speed of 60mph and some increased length signal block sections the reset times exceed the current headway planning value, it is therefore proposed that a new exceptional headway value is introduced in to 5.2 to facilitate this. Note: The modelling shows that the current TPR is sufficient for following class 4 and 6 freight on up relief line as only signal T658 fouls the headway value with a reset time of 188/190 seconds respectively.	Report 323 Page 26, 28 Report 323 Page 25, 27
12a	GW103 - Heathrow Airport Junction (excl.) to Twyford	Down Relief	3 minutes	5½ minutes Following freight class 7 or slower	As per proposal 1b Twyford has been introduced in to 5.2 headway locations. The modelling shows that the reset times for following Class 7 freight between Heathrow Airport Junction and Twyford range from 165-320 seconds.	Report 323 Page 30
12b	GW103 – Twyford to Heathrow Airport Junction (excl.)	Up Relief	3 minutes	4½ minutes Following freight class 7 or slower	Modelling also shows that reset times for following class 7 freight between Twyford and Heathrow Airport Junction range between 159-266 seconds. All reset times are above the current headway planning values due to class 7 freight being able to achieve a maximum speed of 45mph respectively, this is however a decrease of 25% of the 60mph maximum line speed along the specified route in both directions, it is therefore proposed that new exceptional headway values following freight services on both Up and Down Relief line are introduced in to 5.2 to facilitate this. Fig.2.1 and fig.2.2 show the non-stop technical margins for all freight classes in both Up and Down directions.	Report 323 Page 29

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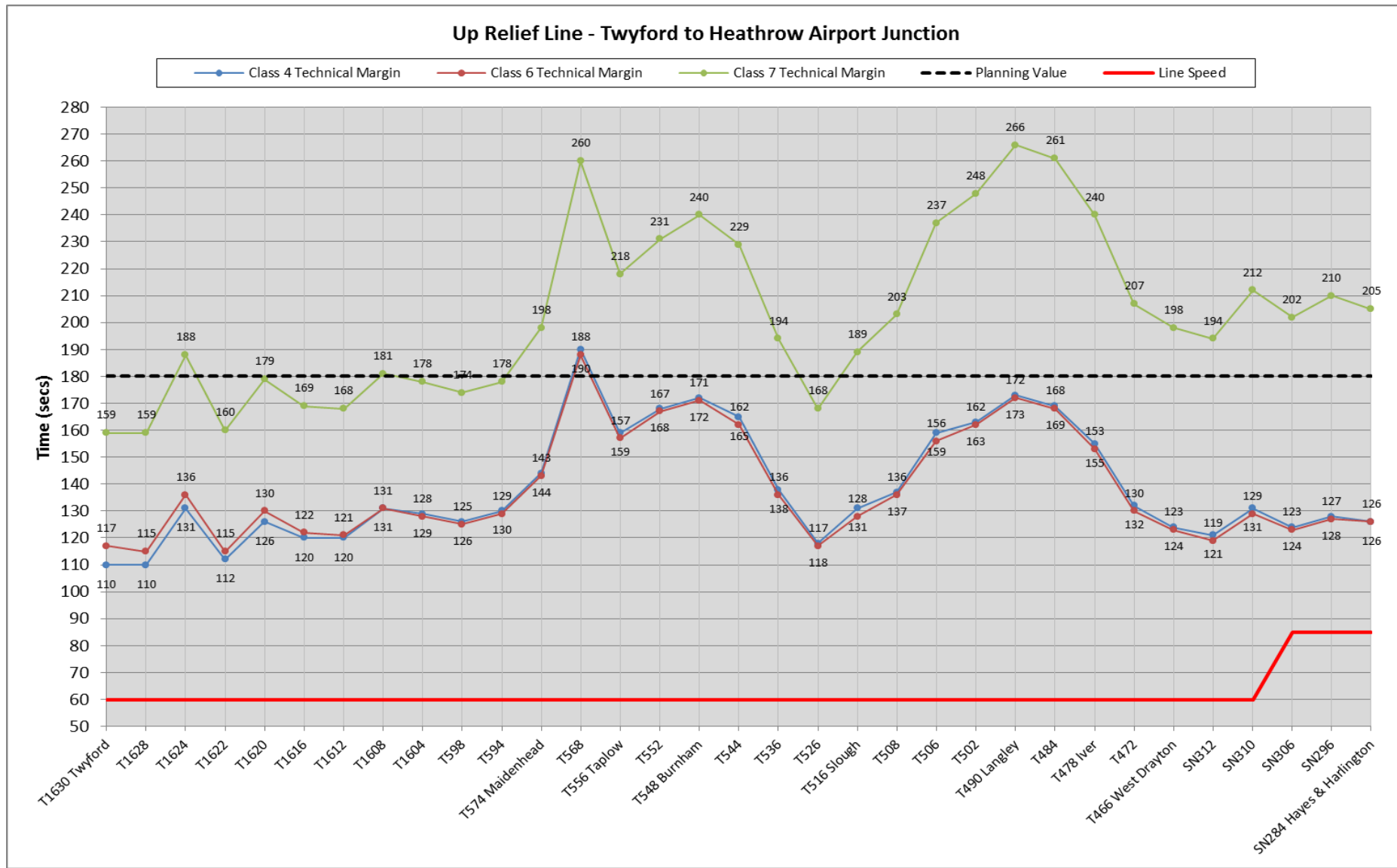


fig.2.1

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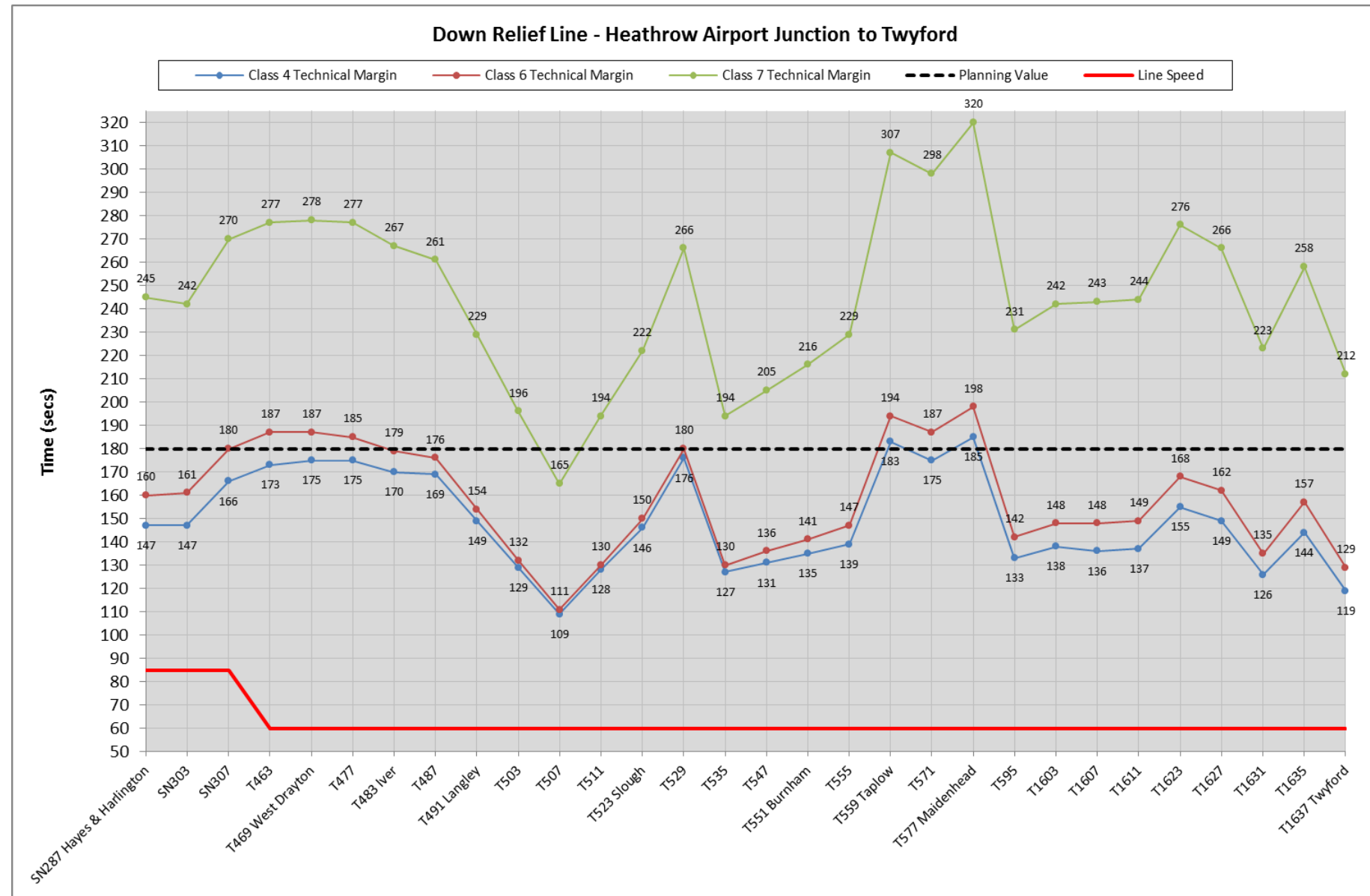


fig.2.2

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
13a	GW103 -Twyford to Reading High Level Junction	Down Main	3 minutes	3½ minutes Following freight class 4 or 6	The modelling shows that the reset times for following freight in the down direction ranging from 146-188seconds for Class 4 and 145-202 seconds for Class 6.	Report 323 Page 32, 34
13b	GW103 - Reading High Level Junction to Twyford	Up Main	3 minutes	4 minutes Following freight class 4 or 6	The modelling also shows reset times in the up direction between Reading High Level Junction and Twyford ranges from 175-218seconds for Class 4 and 186-238 seconds for Class 6. All reset times are above the current headway planning value due to a reduced line speed at Reading station, some increased signal block sections on the up main line and class 4 and 6 freight speed being able to achieve a maximum speed of 60-75mph respectively, this is however a decrease of 40-52% of the 125mph maximum line speed along the majority of the specified route, it is therefore proposed that Twyford be introduced in to the headway locations within 5.2 and new exceptional headway values following freight services on both Up and Down Main line are introduced in to 5.2 to facilitate this.	Report 323 Page 31, 33
14a	GW103 – Twyford to Reading High Level Junction	Down Main	3 minutes	4½ minutes Following freight class 7 or slower	As per proposal 1b Twyford has been introduced in to 5.2 headway locations. The modelling shows that the reset times for following Class 7 freight between Twyford and Reading High Level Junction ranges from 146-248 seconds.	Report 323 Page 36
14b	GW103 - Reading High Level Junction to Twyford	Up Main	3 minutes	6 minutes Following freight class 7 or slower	Modelling also shows that the reset times for following Class 7 freight between Reading High Level Junction and Twyford range from 246-337 seconds. The reset times are above the current headway planning value due to some increased signal block sections on the up main line and class 7 freight being able to achieve a maximum speed of 45mph respectively, this is however	Report 323 Page 35

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					<p>a decrease of 64% of the 125mph maximum line speed along the majority of the specified route in both directions, it is therefore proposed that new exceptional headway values following freight services on both Up and Down Main line are introduced in to 5.2 to facilitate this.</p> <p>Fig.2.3 and fig.2.4 show the non-stop technical margins for all freight classes in both Up and Down directions.</p>	
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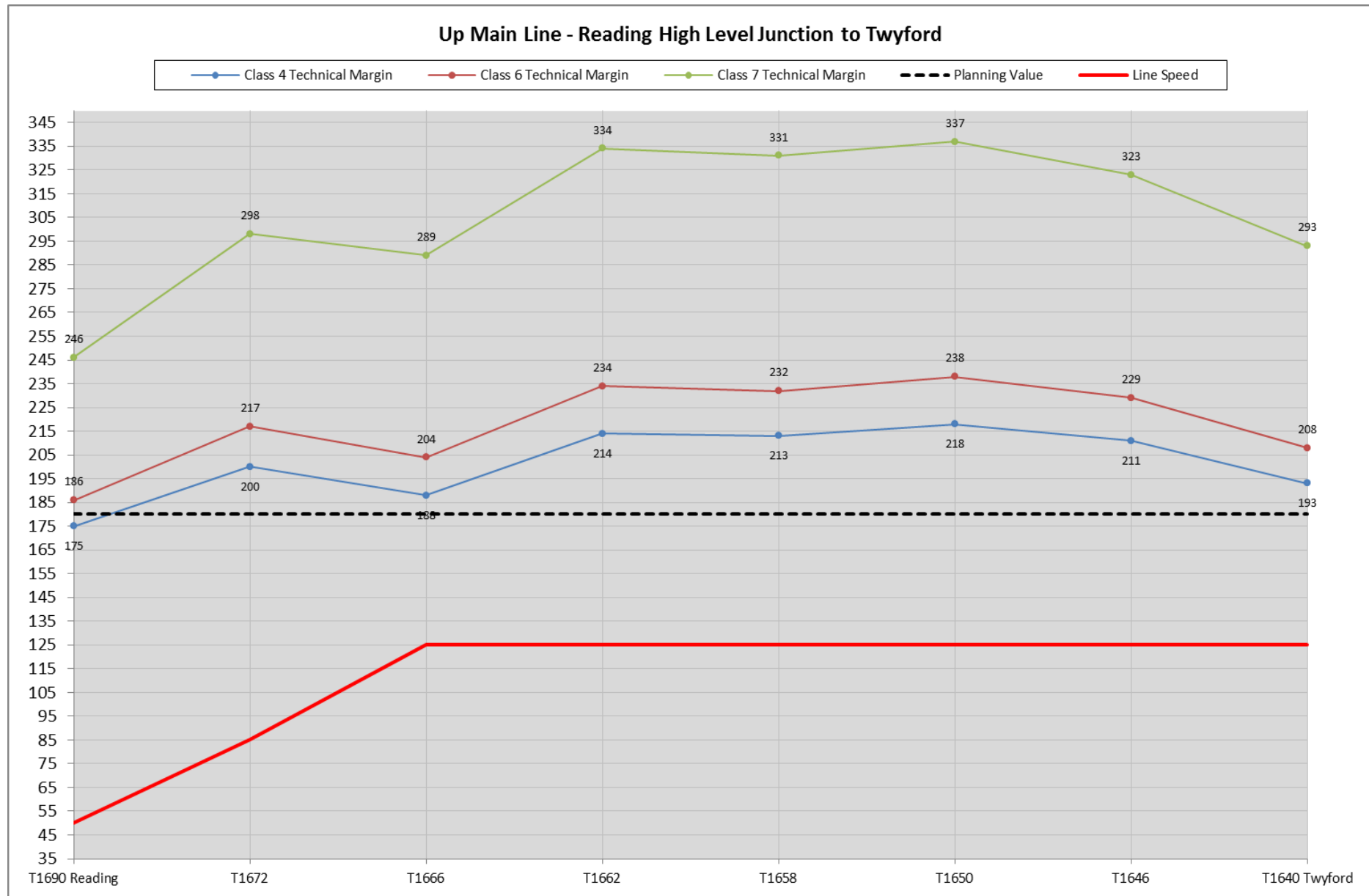


Fig.2.3

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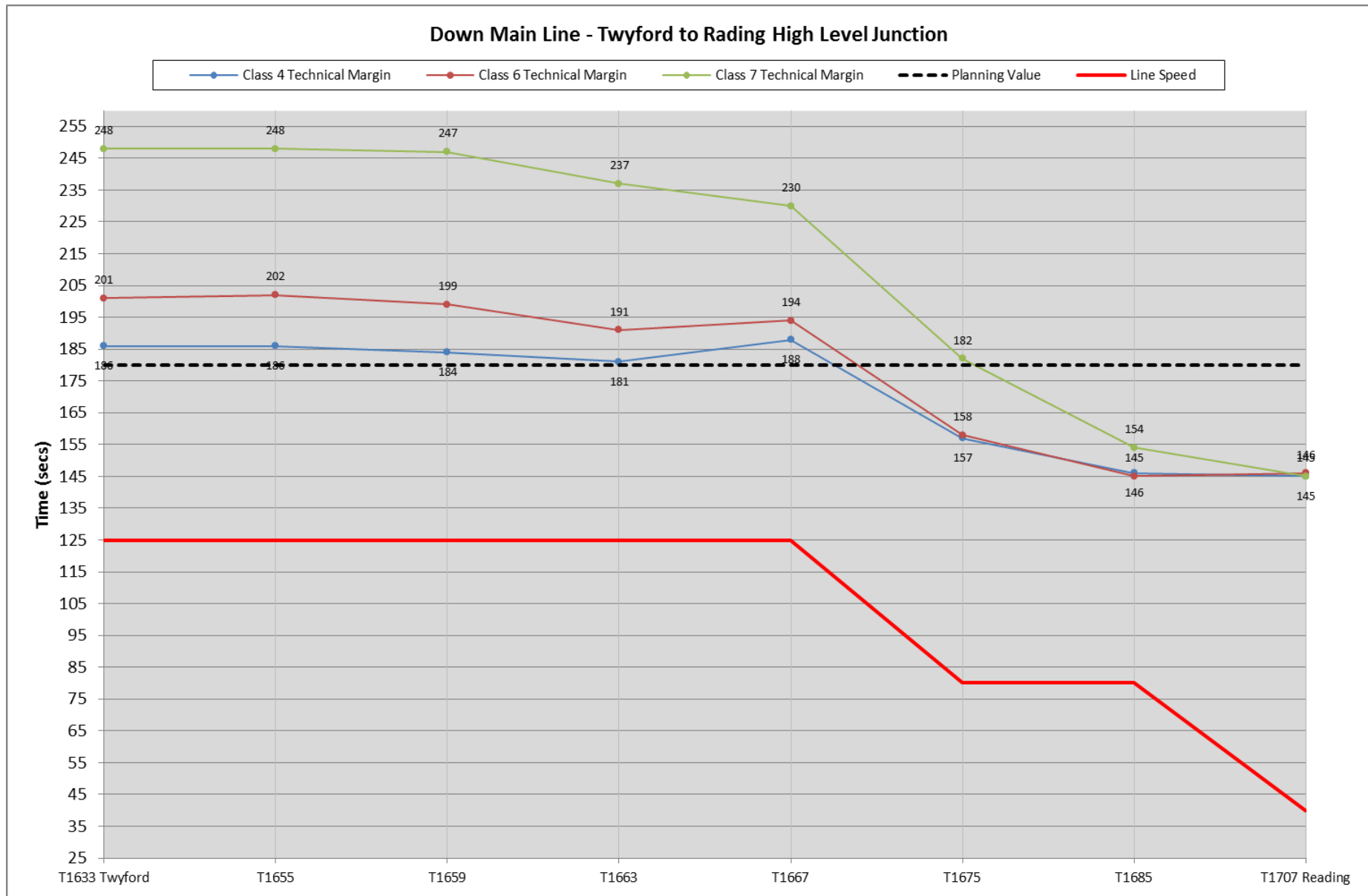


Fig.2.4

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Ref. Number	Headway change (from – to)	Direction and running line	Current value	Proposed value	Supporting commentary	Reference within the SPA report
15a	GW103 - Twyford to Reading West Junction	Down Relief	3 minutes	3½ Following freight class 4 or 6	As per proposal 1b Twyford has been introduced in to 5.2 headway locations. The modelling shows that the reset times for following Class 4 freight between Twyford and Reading West Junction range from 119-196 seconds and 129-205 seconds for class 6 freight.	Report 323 Page 26, 28
15b	GW103 - Reading West Junction to Twyford	Up Relief	3 minutes	4 Following freight class 4 or 6	Modelling also shows that the reset times for following class 4 Freight between Reading West junction and Twyford range between 110-207 seconds and 117-214 for following class 6 Freight. All reset times are above the current headway planning values due to varying signal block lengths in both directions, up direction freight having to accelerate to line speed upon passing Reading Station due to reduced line speed at Reading station and down services having to decelerate to achieve 40mph at Reading station, all services would be able to achieve the maximum line speed of 60mph along the specified route, it is therefore proposed that new exceptional headway values following freight services on both Up and Down Relief line are introduced in to 5.2 to facilitate this.	Report 323 Page 25, 27
16a	GW103 - Twyford to Reading West Junction	Down Relief	3 minutes	5 minutes Following freight class 7 or slower	As per proposal 1b Twyford has been introduced in to 5.2 headway locations. The modelling shows that the reset times for following Class 7 freight between Twyford and Reading West Junction range from 150-302 seconds.	Report 323 Page 30
16b	GW103 - Reading West Junction to Twyford	Up Relief	3 minutes	4½ minutes Following freight class 7 or slower	Modelling also shows that reset times for following class 7 freight between Reading West Junction and Twyford range between 159-253 seconds. All reset times are above the current headway planning values due to class 7 freight being able to achieve a maximum speed of 45mph respectively, this is however	Report 323 Page 29

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					<p>a decrease of 25% of the 60mph maximum line speed along the specified route in both directions, varying signal block lengths in both directions and down services having to decelerate to achieve 40mph at Reading station, it is therefore proposed that new exceptional headway values following freight services on both Up and Down Relief line are introduced in to 5.2 to facilitate this.</p> <p>Fig.2.5 and fig.2.6 show the non-stop technical margins for all freight classes in both Up and Down directions.</p>	
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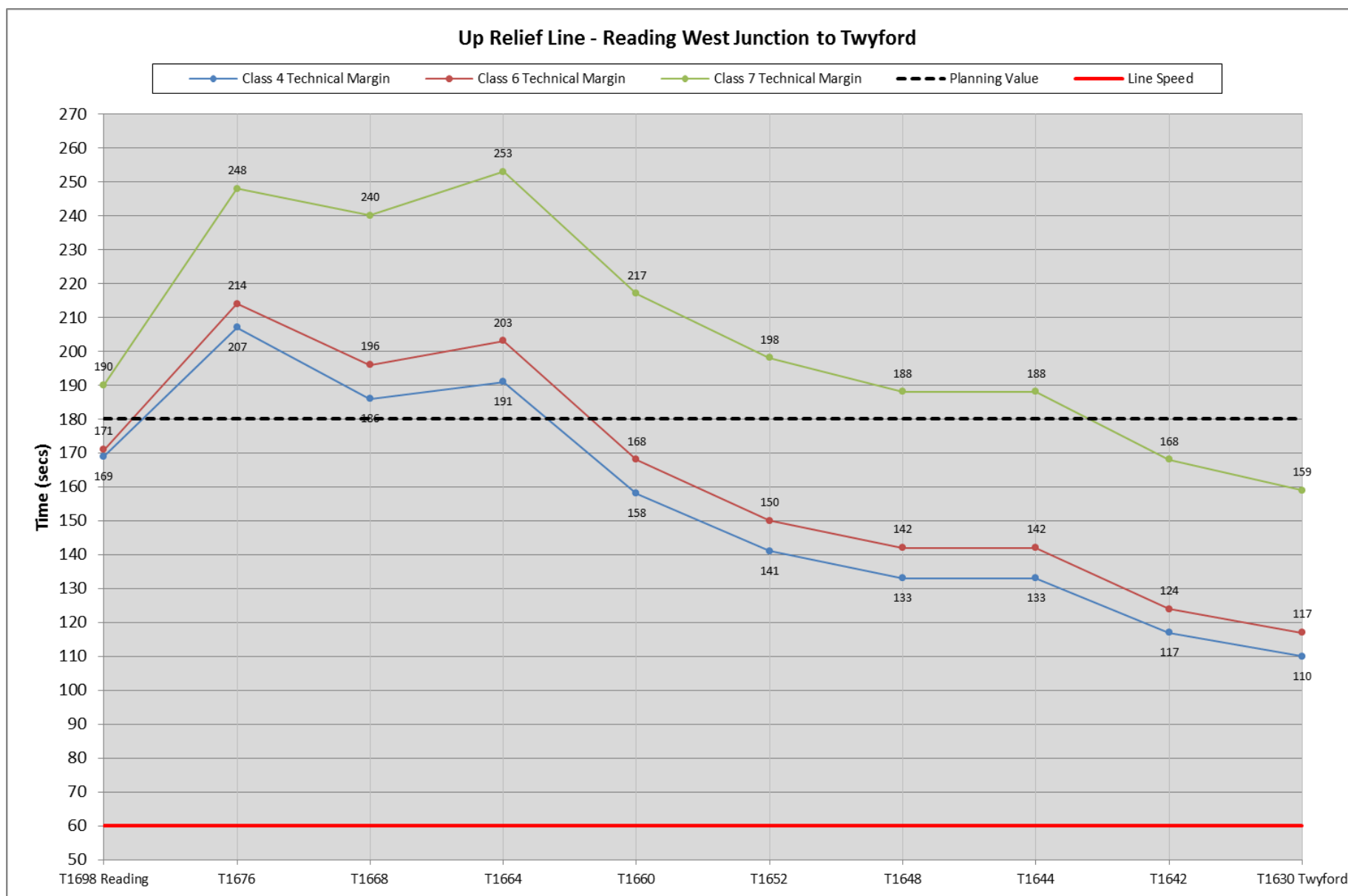


fig.2.5

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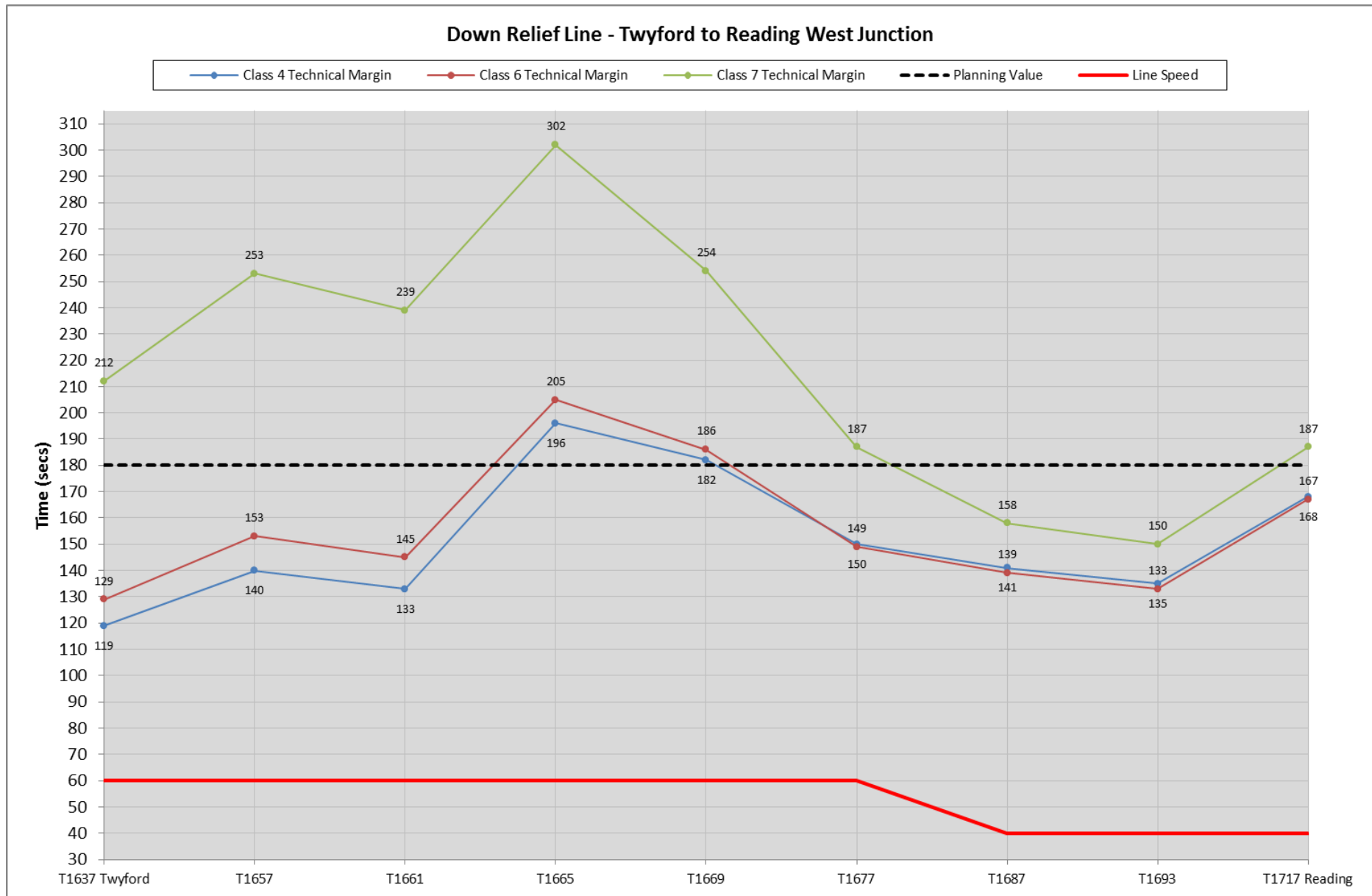


fig.2.6

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Note: Proposals 18, 20a and 20b have already been consulted at forum, proposals are only included in to the document to show complete headway proposals

Ref. Number	Headway Timing Point (from – to)	Direction and running line (where applicable)	Current value	Proposed value	Supporting commentary	Reference within the SPA report (page number)
17a	GW103- Reading High level Junction to Didcot parkway	Down Main	4 minutes	2½ minutes	The modelling shows that the reset times for non-stop services between Reading High Level Junction and Didcot Parkway peak at 151 seconds and 157 seconds between Reading High Level Junction and Didcot East Junction for services towards Didcot North Junction, spike at Didcot East Junction exceeds the proposed value for services via Avoiding lines, therefore a new junction margin would be required for this.	Report 367 page 18-22 Report 419 page 26-27
17b	GW103- Didcot parkway to Reading High level Junction	Up Main	4 minutes	2½ minutes	Modelling also shows that for up direction services between Didcot parkway to Reading High level Junction the reset time's peak at 124 seconds and 123 seconds between Didcot East Junction and Reading High level Junction for services from Didcot North Junction. As all reset times are below the current headway values it is therefore proposed that the values are decreased to facilitate this. Fig.2.7 and fig.2.8 highlights reset performance graph for all non-stopping trains.	Report 367 page 15, 27-30 Report 419 page 12-13
18	GW103- Reading High level Junction to Didcot parkway	Down Main	4 minutes	3 ½ minutes following stopping services	The modelling shows that the reset time for a non-stop train following a stopping passenger train between Reading and Didcot peaks at 188 seconds with line speed ranging from 40mph to 125mph, this is lower than the current planning value but above the proposed headway value in 2a, It is therefore proposed that a new headway be introduced in to 5.2 for following stopping services. Fig.2.9 highlights reset performance graph for stopping trains.	Report 367 Page 306, 308 ,312, 316, 318, 320, 314, 320, 371

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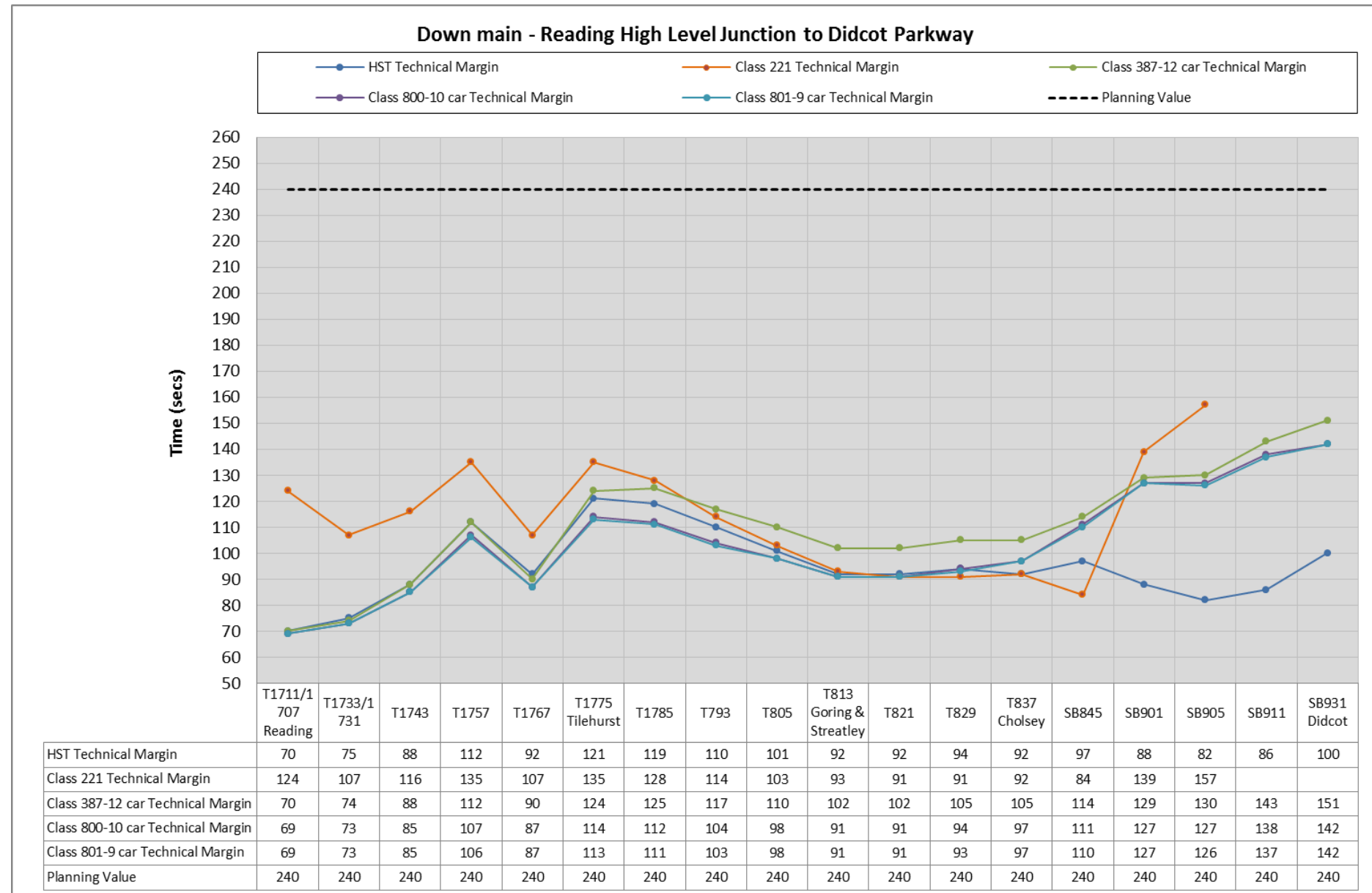


Fig.2.7

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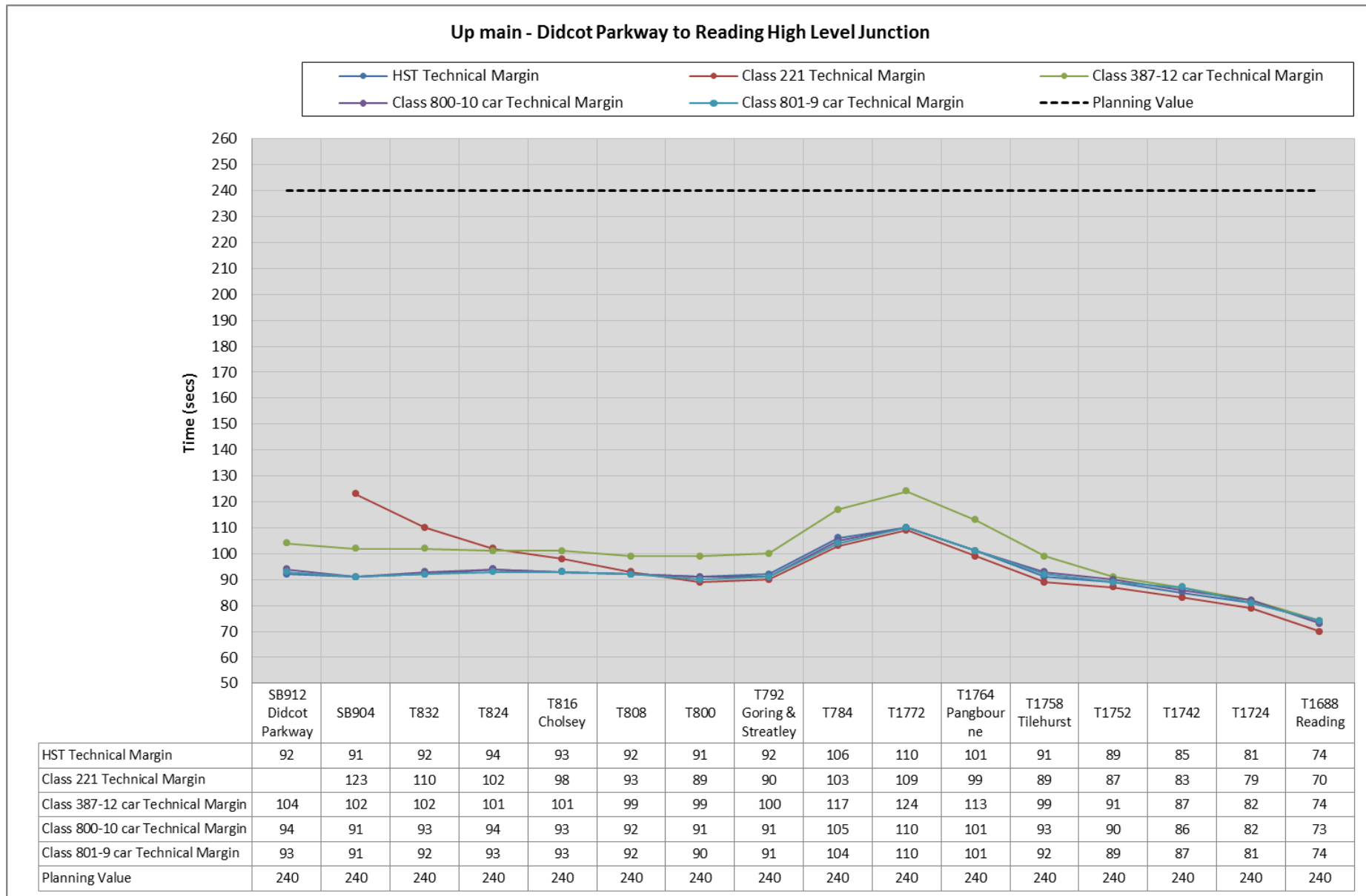


Fig.2.8

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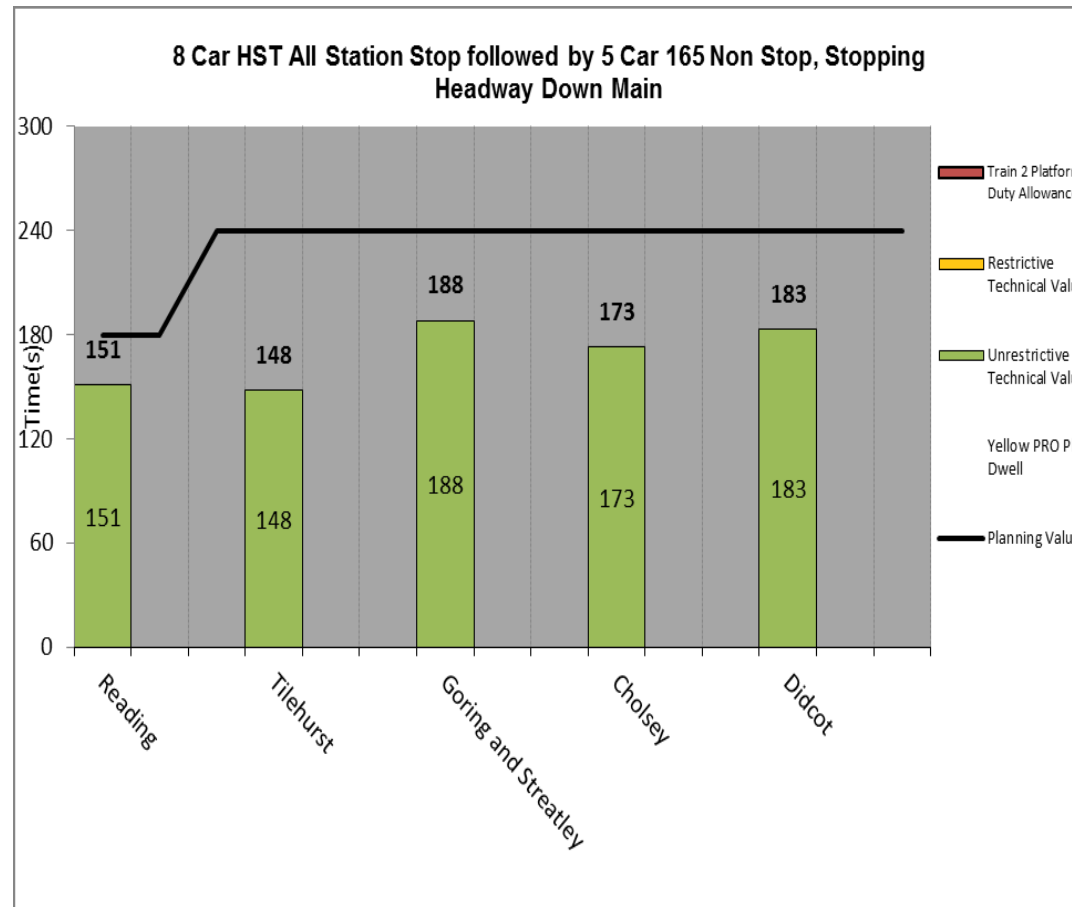


Fig.2.9 –HST 8car Down Direction (stopping passenger service followed by non-stop service).

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Ref. Number	Headway Timing Point (from – to)	Direction and running line (where applicable)	Current value	Proposed value	Supporting commentary	Reference within the SPA report (page number)
19	GW103 – Reading West Junction to Didcot Parkway	Up Relief	3 minutes	2½ minutes	<p>The modelling shows that the reset times for all electric rolling stock on the up relief line ranges from 105-159 seconds.</p> <p>These reset times are all below the current headway planning value as the rolling stock can travel at full line speed of 100mph over the majority of this route. The peak of 159 seconds at Didcot Parkway can be disregarded as this reset time will fall under the previous headway section between Uffington and Didcot Parkway for which this reset time is valid. It is therefore proposed that the headway is reduced to 2½ minutes on the Up Relief Line to improve performance and to facilitate the issues outlined above.</p> <p>Note: The modelling shows that the reset times for electric rolling stock on the Down Relief line cannot be reduced to 2½ minutes as the reset times are too high to facilitate such a reduction.</p> <p>Fig.3.0 highlights reset performance graph for all non-stopping trains.</p>	<p>Report 367 Page 31, 32, 33, 34</p> <p>Report 367 Page 23, 24, 25, 26</p>
20a	GW103- Reading West Junction to Didcot parkway	Down Relief	3 minutes	3½ minutes following stopping services	<p>The modelling shows that the reset time for following stopping between Reading and Didcot ranges between 172-216 seconds, due to signal spacing and location of signals at specific stations these reset times are above the current headway value. As the current 180 second headway is sufficient for following non-stop services as detailed below it is therefore proposed that a new headway value is introduced in to 5.2 for following stopping services, it was agreed at forum with all operators that the proposed value would be 210 seconds as only solitary spike at Pangbourne exceeds proposed margin.</p>	<p>Report 367 Page 307, 309, 311, 313, 315, 317, 319, 321, 323, 333, 335</p> <p>Report 367 Page 14</p>
20b	GW103- Didcot parkway	Up Relief	3 minutes	3½ minutes	<p>The modelling shows that the reset time for following</p>	<p>Report 367 Page 210,</p>

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	to Reading West Junction			following stopping services	stopping between Didcot and Reading ranges between 179-214 seconds, due to signal spacing and location of signals at specific stations these reset times are above the current headway value. As the current 180 second headway is sufficient for following non-stop services as detailed below it is therefore proposed that a new headway value is introduced in to 5.2 for following stopping services, it was agreed at forum with all operators that the proposed value would be 210 seconds as only solitary spike at Pangbourne exceeds proposed margin. Fig.3.1 and fig.3.2 highlights reset performance graph for stopping trains.	212,214,216, 218,220,222, 224, 226,228, 230, 232, 234, 236, 238, 240, 249, 250, 251, 252 Report 367 Page 11
21a	GW103 – Reading West Jn to Didcot Parkway.	Down Relief	3 minutes	4 minutes Following freight class 4 or 6	The modelling shows that the reset times following Class 6 freight in the down direction between Reading West Junction and Didcot Parkway on the relief line is between 140-233 seconds.	Report 419 32, 33, 34
21b	GW103 – Reading West Jn to Didcot Parkway	Up Relief	3 minutes	4 minutes Following freight class 4 or 6	The modelling also shows reset times in the up direction range from 163-319 seconds for Class 4 and 173-233 seconds for Class 6. These reset times are above the current headway planning value due to reduced line speed at Didcot Parkway and Reading Station. Secondly; Reset times also peak at Pangbourne in the Up direction due to signal sequences increasing from 3 to 4-aspect at Sig: T1774. Thirdly; Class 4 and 6 freight are only able to achieve a maximum speed of 60-75mph respectively, this however is a decrease of 25-40% of the 100mph maximum line speed along the majority of the specified route, it is therefore proposed that the headway is increased to 4 minutes in both directions to improve performance and to facilitate the issues outlined above. Fig.3.3 and fig.3.4 show the technical margins for all freight classes in both Up and Down directions.	Report 419 21, 23, 24, 25

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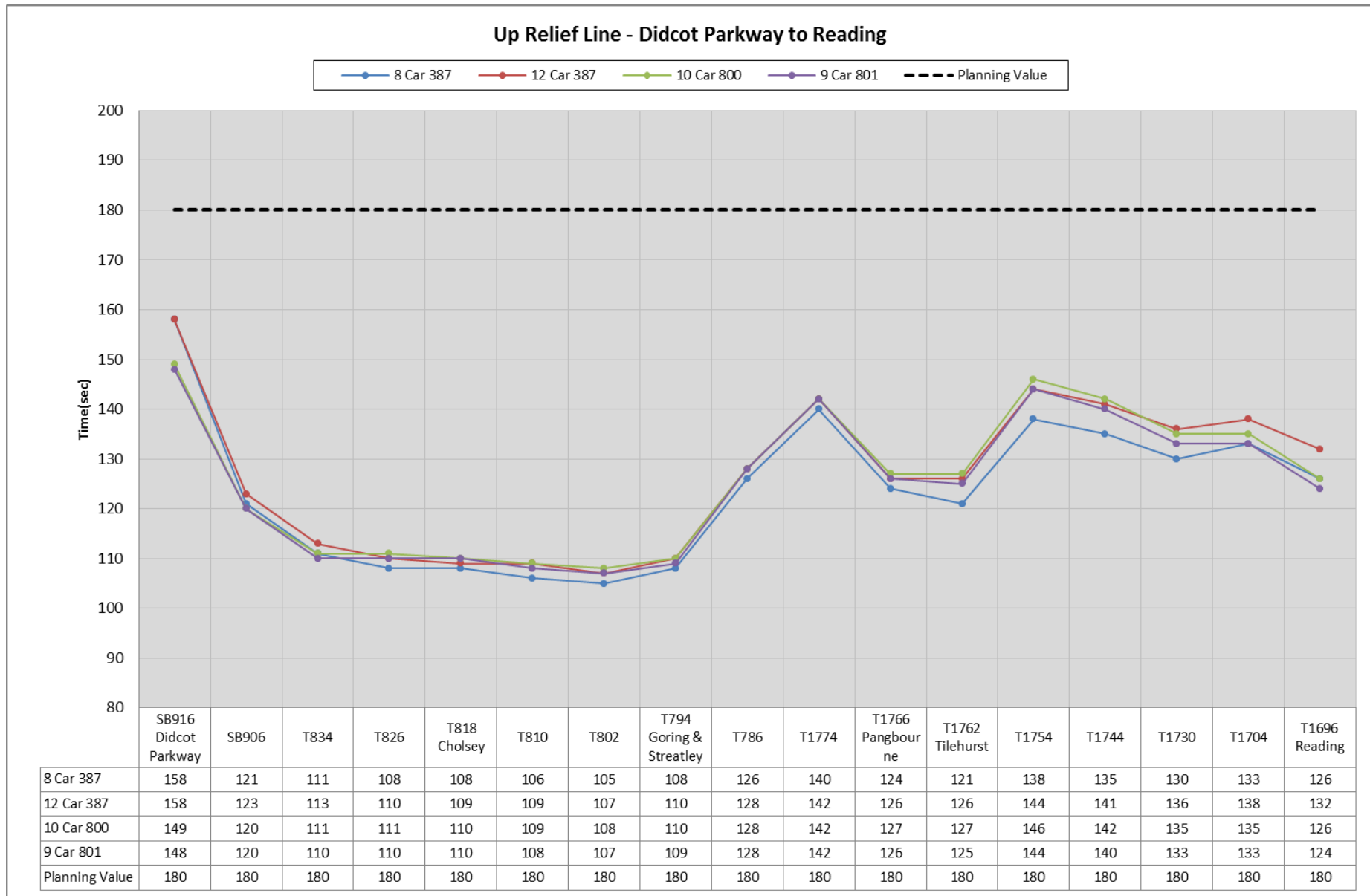


Fig.3.0

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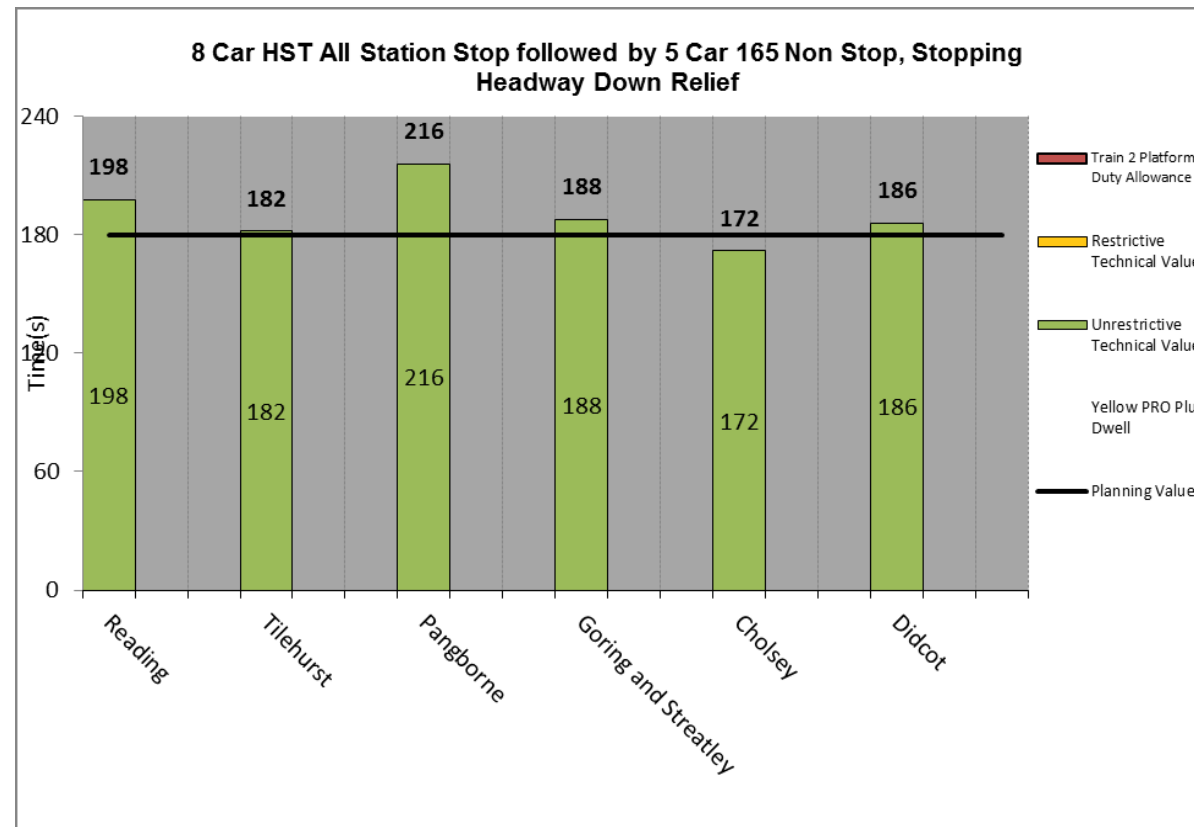


Fig.3.1 –HST 8 car Down Direction (stopping passenger service followed by non-stop service).

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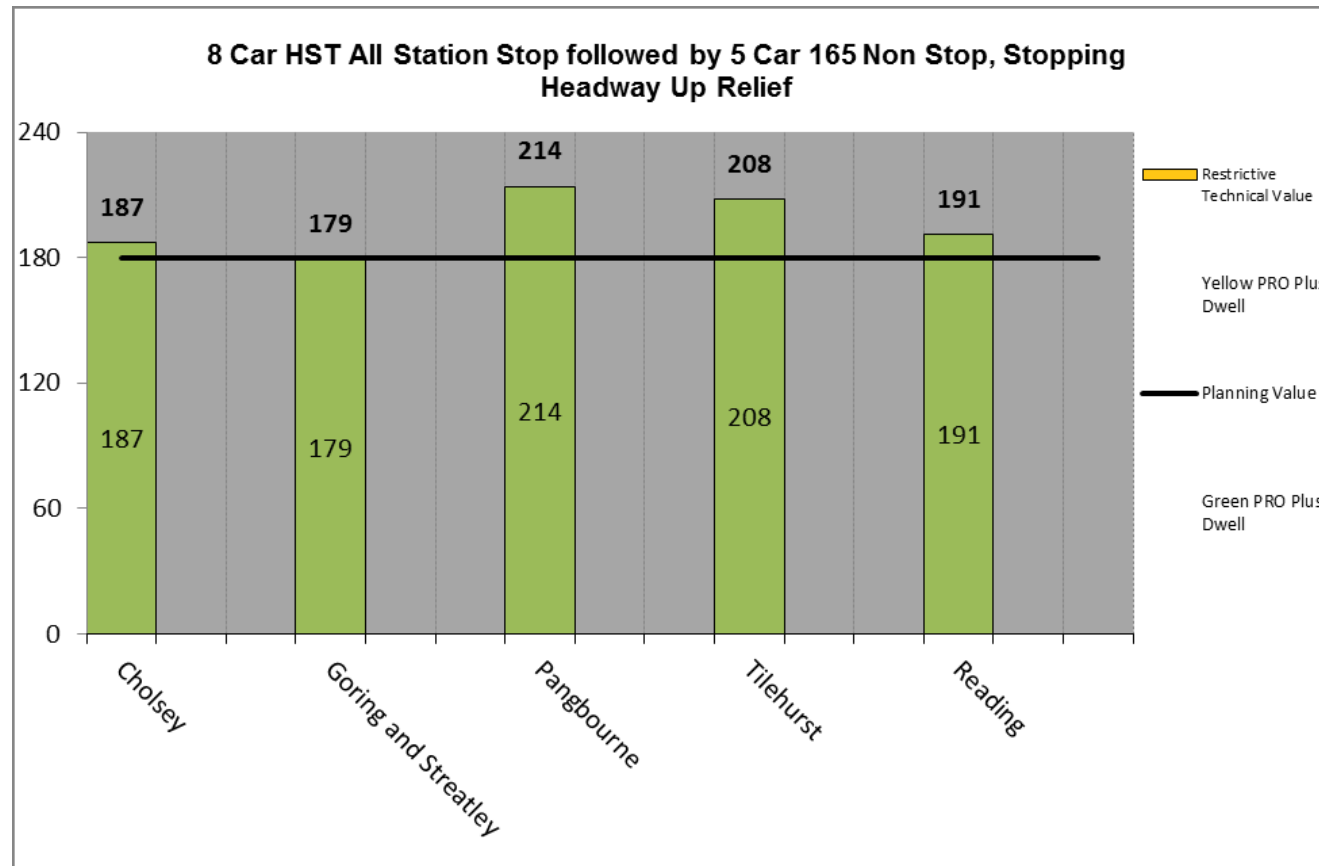


Fig.3.2 – 8 car HST up Direction (stopping passenger service followed by non-stop service)

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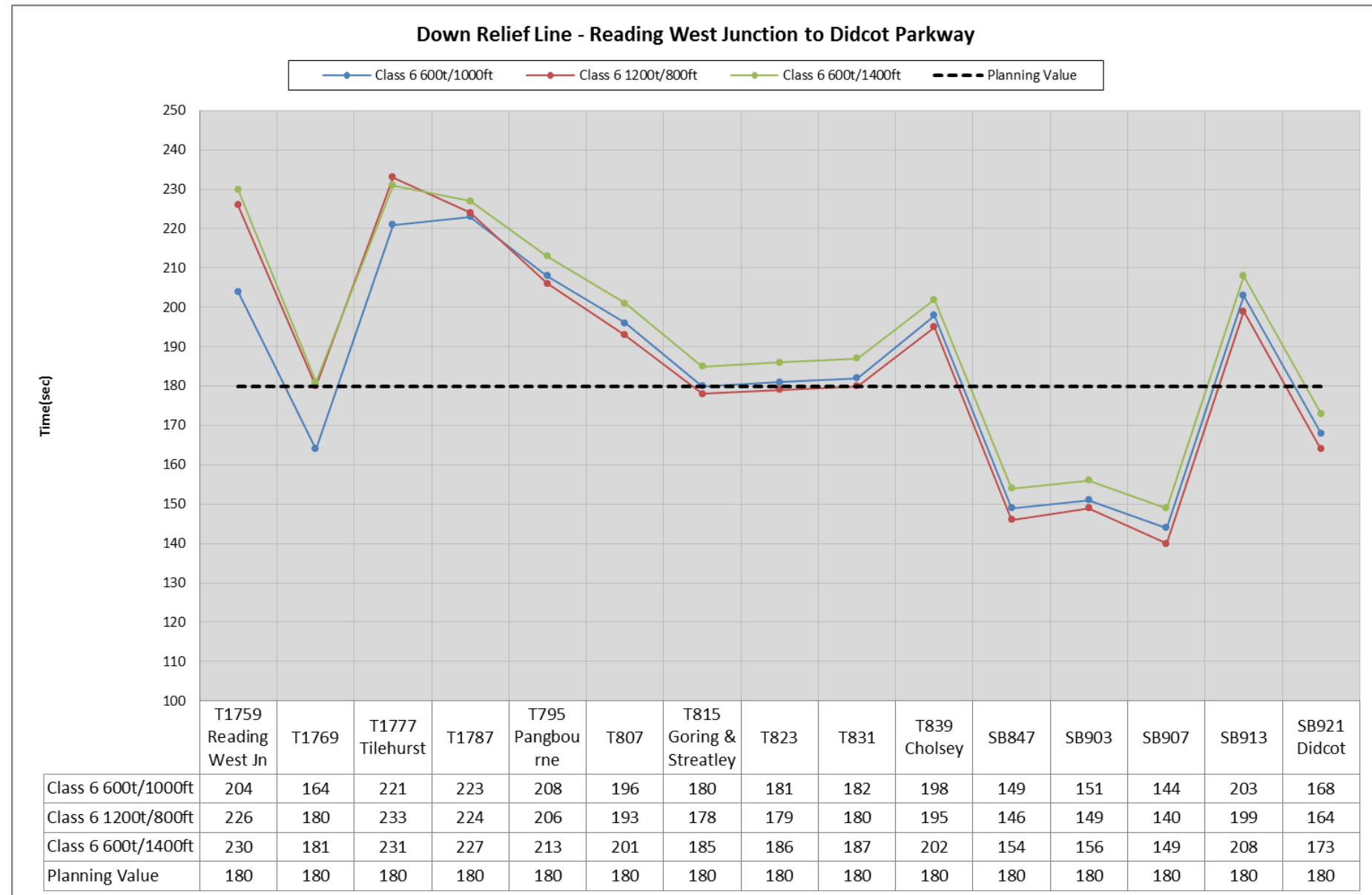


Fig.3.3

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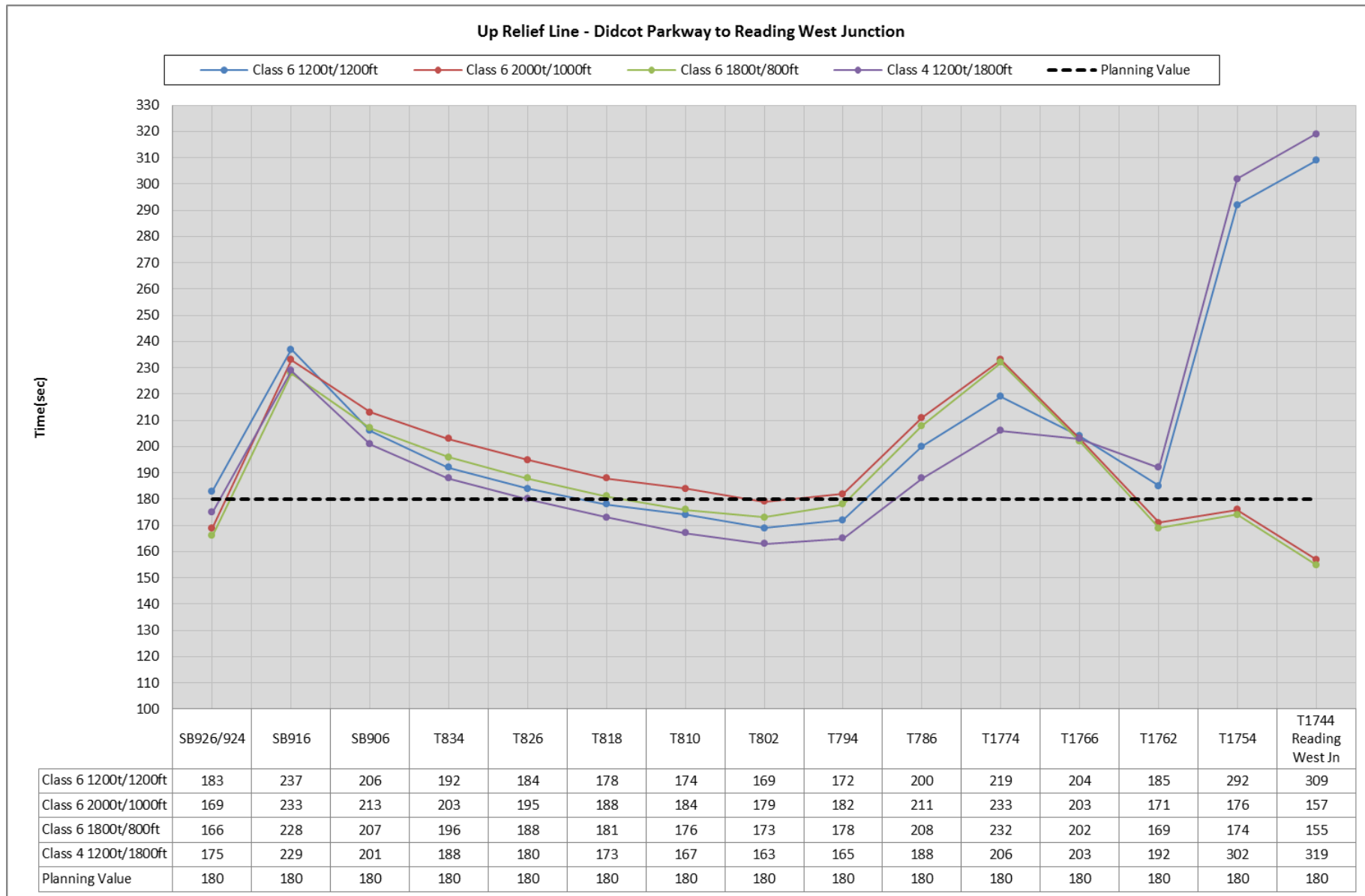


Fig.3.4

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Timetable Planning Rules recommendations in full

Section 5.2 Proposed:

GW103 PADDINGTON TO UFFINGTON			
TIMING POINT	DOWN	UP	NOTES
Paddington to Ladbroke Grove	2½ 2	2½ 2	A second train can follow an EMU after 2 minutes
Ladbroke Grove to Heathrow Airport Jn (incl.)	2½ 2*	2½ 2*	<p>*MAIN LINES DOWN 2½ minutes following stopping services 4 minutes Following Freight class 4 or 6 4½ minutes Following Freight class 7 or slower UP 2½ minutes following stopping services 3½ minutes Following Freight class 4 or 6 4½ minutes Following Freight class 7 or slower</p> <p>*RELIEF LINES DOWN 2½ minutes following stopping services 3½ minutes Following Freight class 4 or 6 5 minutes Following Freight class 7 UP 2½ minutes following stopping services 3½ Following Freight class 7 or slower</p> <p>Note the Heathrow Airport Junction Signalling Restrictions stated in Section 5.3</p>
Heathrow Airport Jn (excl.) to Reading High Level Jn Twyford	3 2*	3 2*	<p>*MAIN LINES DOWN 3 minutes following stopping services 3½ Following Freight class 4 or 6 4½ Following Freight class 7 or slower UP 3 minutes following stopping services 3½ Following Freight class 4 or 6 5 Following Freight class 7 or slower</p> <p>*RELIEF LINES DOWN 3 minutes following stopping services 3½ Following Freight class 4 or 6 5½ Following Freight class 7 or slower UP 3 minutes following stopping services 3 Following Freight class 4 or 6 4½ Following Freight class 7 or slower</p>

Items in green strikethrough font are to be deleted / replaced
Items in red font are amendments or additions

<p>Twyford to Reading High Level Jn (Main Line) or Reading West Junction (Relief Line)</p>	<p>3 2(main)*</p> <p>2½(relief)*</p>	<p>3 2(main)*</p> <p>2½(relief)*</p>	<p>*MAIN LINES DOWN 3 minutes following stopping services 3½ Following Freight class 4 or 6 4½ Following Freight class 7 or slower UP 3 minutes following stopping services 4 Following Freight class 4 or 6 6 Following Freight class 7 or slower</p> <p>*RELIEF LINES DOWN 3 minutes following stopping services 3½ Following Freight class 4 or 6 5 Following Freight class 7 or slower UP 3 minutes following stopping services 4 Following Freight class 4 or 6 4½ Following Freight class 7 or slower</p>
<p>Reading High Level Jn to Didcot Parkway (Main Line)</p>	<p>4 2½*</p>	<p>4 2½*</p>	<p>*UP 4 minutes following stopping services</p> <p>*DOWN 3½ minutes following stopping services.</p> <p>After the two track railway has been given up between Reading and Didcot in the morning the first train in each direction must be block worked between Reading West Junction and Didcot East Junction (AB + 2). Refer to Engineering Access Statement for handback times</p>
<p>Reading West Jn to Didcot Parkway (Relief Line)</p>	<p>3*</p>	<p>3 2½*</p>	<p>*UP 3½ minutes following stopping services 4 Following Freight class 4 or 6</p> <p>*DOWN 3½ minutes following stopping services 4 Following Freight class 4 or 6</p> <p>After the two track railway has been given up between Reading and Didcot in the morning the first train in each direction must be block worked between Reading West Junction and Didcot East Junction (AB + 2). Refer to Engineering Access Statement for handback times</p>
<p>Didcot Parkway to Uffington</p>	<p>4</p>	<p>4</p>	