

**A324 PIRBRIGHT ARCH, PIRBRIGHT**

**PROPOSED MODIFICATION TO TRAFFIC SIGNALS TO  
INCORPORATE CONTROLLED PEDESTRIAN CROSSING  
FACILITIES**

**TECHNICAL AND ENGINEERING APPRAISAL**

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PROPOSED MODIFICATION TO TRAFFIC  
SIGNALS TO INCORPORATE CONTROLLED  
PEDESTRIAN CROSSING FACILITIES

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### 1 PURPOSE

- 1.1 This report considers options for and impacts of proposed improvements at the existing traffic signal controlled junction of A324 Pirbright Arch to provide a safer environment for pedestrians. It focuses on how the signal layout and existing method of control might be enhanced to include a controlled pedestrian stage and how latest Intelligent Transport Systems (ITS) technology might be deployed and integrated to compliment the modified system of control.
- 1.2 Legal constraints and requirements associated with the proposals will be advised along with the estimated implementation costs.
- 1.3 A comparison of the modelled impacts of the proposals on traffic flow and congestion in the area will also be provided.

### 2 LOCATION DETAILS

- 2.1 Pirbright Arch is a narrow “rail over road” brick-arch structure on the A324 Connaught Road just north of its junction with Dawney Hill and Gole Road. The arch provides a vehicular and pedestrian route between the communities of Brookwood and Pirbright which are effectively segregated by the railway.
- 2.2 The carriageway width between the walls of the arch is just 4.5 metres and due to the arch profile (signed headroom of 11ft 6ins) and the need to provide space for pedestrians on one side, the width allocated to vehicles is limited to 3.1 metres broadly in the centre of the arch. The space remaining has been divided to provide an edge margin on the east side of the arch of 0.6 metres and a 0.8 metre margin on the west side that also serves pedestrians.
- 2.3 The arch is just over 30 metres long and segregation of pedestrians and vehicles is only achieved with carriageway marking. Pedestrians therefore feel threatened by the close proximity of vehicular traffic when walking through the arch particularly as to pass another pedestrian requires that one party crosses into the area delineated for vehicles.
- 2.4 Traffic signals control vehicular movements at the junction of the A324 with Gole Road and restrict traffic travelling through the arch to alternate one-way operation. However, the traffic signal control does not include any specific facilities for pedestrians which adds to pedestrians’ feelings of vulnerability when walking through it. It is a matter of debate to what extent this might influence the pedestrian flows measured due to the possibility of suppressed demand due to the poor conditions for pedestrians.

### 3 SOURCE INFORMATION AND METHODOLOGY

- 3.1 The traffic and pedestrian flow information forming the basis of the operational and capacity assessment was collected in a survey on 14 September 2006. This was a 12 hour classified turning count which included pedestrian movements approaching and through the arch. The survey results are included in Appendix 1.
- 3.2 The current method of operation, site layout and current signal timings has been exported from the site layout drawing, controller configuration specification and Mova data set and Mova data log. The site layout drawing is included in Appendix 2.
- 3.3 The assessment of the operation of the current and modified signal arrangements have been assessed using Linsig as the study tool.

### 4 MODIFICATIONS TO LAYOUT AND OPERATION

- 4.1 In order to keep costs within affordable limits schemes requiring significant modification to the arch structure or the provision of a separate pedestrian tunnel have been excluded from this study. The proposals therefore concentrate upon modifying the operation of the traffic signals and the necessary changes to on-street signal equipment in order to provide a separate dedicated signal stage for pedestrians.
- 4.2 The proposed scheme is shown on Drawing No. 536001 01. It provides for:
  - reconfiguration of the existing controller to provide a separate pedestrian stage.
  - relocation of existing posts and erection of additional push-button units and pedestrian indicators.
  - Kerbside call/cancel pedestrian indicators (as per Puffin type operation).
  - Pedestrian on-crossing microwave vehicle detectors.
  - Optionally, the provision of a Variable Message Sign (VMS) activated by the signal controller to advise pedestrian stage operating.
  - Alteration to footways at each end of the arch to accommodate waiting pedestrians.
  - Carriageway markings to improve delineation between pedestrians and vehicles and to encourage pedestrians to keep within their designated space.
  - General upgrading and refurbishment of existing signs and carriageway markings

## 5 IMPACT ASSESSMENT – Option 1 (Modified signals)

### 5.1 Existing operation:

5.1.1 For the purpose of the assessment, the following peak hour stage sequence has been assumed:

- STAGE 1: A324 Connaught Road
- STAGE 2: Clearance (Stage 1 to Stage3)
- STAGE 3: A324 Dawney Hill
- STAGE 4: Gole Road
- STAGE 5: Clearance (Stage 4 to Stage 1)

5.1.2 Due to long “Clearance” stages 2 and 5 above, the existing signals are operated on a cycle time of 120 seconds. The total effective green for the cycle is 80 seconds, which represents just 67% of the total cycle time.

5.1.3 The full Linsig output for the existing case is shown in Appendix 4

### 5.2 Proposed operation:

The additional pedestrian stage has been calculated to require 40 seconds, which for the purposes of the capacity assessment the stage and associated clearance period is additional “lost time” in the signal cycle.

5.2.1 For the purposes of assessing the effects of adding a pedestrian crossing stage to the signal sequence and to provide a sensitivity test, three scenarios have been considered using cycle times of 120 seconds, 140 seconds, and 160 seconds. This is to demonstrate the impact on traffic capacity of:

- i) absorbing the full 40 seconds “lost time” attributable to the pedestrian stage into the existing signal cycle
- ii) increasing the cycle time by 50% of the additional “lost time” attributable to the pedestrian stage
- iii) Increasing the cycle time by 100% of the additional “lost time” attributable to the pedestrian stage

5.2.2 For each of the above scenarios, the total effective green time has been calculated to be 33 seconds, 53 seconds and 73 seconds representing 28%, 38% and 46% for each of the respective signal cycles considered. This illustrates the considerable reduction in the proportion of effective green resulting from the additional pedestrian stage when considered with the value of 67% in 4.1.2 above for the existing layout and operation.

### 5.3 Summary of modelled scenarios

- 5.3.1 There is a presumption in the Linsig assessment that the pedestrian stage would be demanded in each signal cycle. This is likely to be the case in the morning when the pedestrian and vehicle peak periods coincide. This is less likely for the evening peak period, but pedestrian activity is still considered sufficient to have a significant impact on traffic congestion and delay in the area.
- 5.3.2 A summary of queues and delays predicted by the Linsig models for the existing signal operation and each scheme scenario in 5.2.1 above is shown in Appendix 4 Table 1. This demonstrates clearly that providing a separate pedestrian crossing stage severely reduces the “Reserve Capacity below its current operating levels and predicting a considerable increase in peak hour traffic queues and delays.
- 5.3.3 Trend Graphs of “Reserve Capacity” for the existing and modified junction are shown in Appendix 4 Tables 2 and 3. Table 3 in particular shows how the Reserve Capacity for the modified junction continues to improve as the cycle time is increased. Also that it would continue to do so beyond the 160 second cycle time modelled. However in absolute terms the graph is demonstrating that the Reserve Capacity is flattening off at around -90% and that very little improvement could be expected beyond a cycle time of 160 seconds.
- 5.3.4 Clearly in all scenarios, the additional pedestrian stage would have a severe impact on current levels of traffic congestion with large increases in both queues and delays predicted based on current traffic flows during both morning and evening peak periods. Also, that to achieve anything worthwhile by way of mitigation would require the system to operate above a cycle time of 160 seconds.

## 6 APPROVALS AND RELEVANT LEGISLATION

- 6.1 Informal consultation with the Department of Transport (DfT) on Option 1 has been positive and indications are that Option 1 would be acceptable in principle. However the supplementary VMS signing and method of control is not specifically prescribed in current regulations and control equipment specifications.
- 6.2 Further consultation with the DfT will be required during detailed design to agree the details of the control and integration of the VMS. This innovative approach to solving what is an uncommon challenge may require specific Site Approval from the Department for Transport.
- 6.3 Option 2 is compliant with current national guidance, standards and specifications and is unlikely to require any site-specific approvals from the DfT.



## 7 FINANCIAL IMPLICATIONS

### 7.1 Option 1 – Including “controlled” pedestrian crossing.

	£
<b>Works:</b>	
Footway works (inc. dropped kerb, tactile paving and ramps)	30,000
Drainage	5,000
Additional duct infrastructure	15,000
Supply and install traffic signal street furniture	8,000
Supply and install VMS and cable to controller	12,000
Carriageway markings and signing	4,000
Traffic Management	<u>6,000</u>
	<u>80,000</u>
<b>Engineering fees</b>	
Consultation	5,000
Design	10,000
Safety Audit	5,000
Site supervision and commission (Client)	2,000
Site Supervision (Constructor)	<u>4,000</u>
	<u>26,000</u>
Sub Total	106,000
Contingencies (10%)	10,600
<b>Total</b>	<b>116,600</b>

### 7.2 Option 2 – Excluding “controlled” pedestrian crossing.

	£
<b>Works:</b>	
Footway works (inc. dropped kerb, tactile paving and ramps)	30,000
Drainage	5,000
Carriageway markings and signing	4,000
Traffic Management	<u>6,000</u>
	<u>45,000</u>
<b>Engineering fees</b>	
Consultation	5,000
Design	8,000
Safety Audit	5,000
Site supervision and commission (Client)	2,000
Site Supervision (Constructor)	<u>4,000</u>
	<u>24,000</u>
Sub Total	69,000
Contingencies (10%)	6,900
<b>Total</b>	<b>75,900</b>

## 8 CONCLUSION

### 8.1 Pedestrian Environment (See Appendix 1 - Surveys)

- 8.1.1 Pedestrian flow in the area and particularly through the Pirbright Arch are light even at peak periods with maximum values recorded of just 20 and 29 morning and evening respectively. It should however be noted that the afternoon figure occurs at school time, about an hour before the evening traffic peak period. It has been suggested that due to the perceived dangers of walking through the arch, some pedestrians prefer to use alternative routes or travel by car. It is possible therefore that improved facilities could lead to an interest in pedestrian traffic through the arch.
- 8.1.2 Pedestrians walking through the arch are encouraged to use the 0.8 metre edge margin provided on the west side of Connaught Road, but there is insufficient width for construction of a formal footway particularly as it could not accommodate two pedestrians passing. As it is, when this occurs there is no alternative to one party stepping into the designated carriageway as gaps in traffic permit in order to pass by. A kerbed footway would present a significant trip hazard.
- 8.1.3 The route through the arch is clearly unsuited to shared pedestrian and vehicular use and pedestrians feel extremely vulnerable when walking through it. Conditions are largely only sustainable due to the very low pedestrian usage.
- 8.1.4 There is little doubt that pedestrian safety would be improved by the provision of a controlled pedestrian stage through the arch (Option 1) for those prepared to wait for the pedestrian stage to appear. The pedestrian crossing signals associated with a controlled crossing are not mandatory and pedestrians would therefore not be required to wait for the “Green Man” pedestrian stage when all vehicular movements would be stopped. Anyone walking through the arch during a vehicular stage is likely to be at greater risk as motorists would be less likely to expect to encounter a pedestrian in the arch during a vehicle stage.
- 8.1.5 Regrettably, experience suggests that with such high signal cycle times the delay to pedestrians would be so great that many would be likely to walk through the arch during a vehicle stage rather than wait for the pedestrian stage to appear.
- 8.1.6 An anticipated high incidence of non-compliance should be taken into consideration when considering the benefits of the additional pedestrian stage against the disbenefits in terms of additional traffic delay which is predicted by the Linsig model.
- 8.1.7 Option 2 provides the benefits of improved waiting areas for pedestrians at either end of the Arch and a more clearly defined area for vehicles entering and passing through the arch. It would have no adverse impacts on the overall performance and capacity of the existing traffic signals. Whilst not removing the much criticised shared usage through the arch, it is considered to represent a significant improvement for pedestrians over the current conditions.

### 8.2 Traffic Flow and Junction Capacity

- 8.2.1 The existing traffic signals are operating just over capacity during peak periods due mainly to the considerable “Lost time” required to provide the necessary clearance periods through the arch or competing traffic demands. But, peak hour traffic flows are relative light and congestion and delay is just about manageable.
- 8.2.2 The addition of a pedestrian stage severely reduces the %effective green time available for each traffic stream per cycle. The effects on the capacity of the junction are very severe for example during the morning peak period decreasing the Reserve Capacity from its current (-14.5%) to (-167%), (-97%) and (-67%) at 120second, 140 second and 160 second cycle times.
- 8.2.3 It follows as the Linsig assessment has demonstrated, that traffic queues and delays would greatly increase, creating considerable local congestion and “peak spreading”. There is also a risk of deterioration of safety and the environment on local less suitable roads due to traffic diverting to avoid the congestion at Pirbright Arch.
- 8.2.4 It is essential that should Option 1 (which incorporates the controlled pedestrian stage into the traffic signal operation) be implemented, the severe traffic congestion predicted is understood by all stakeholders and full consultation prior to detail design is recommended.
- 8.2.5 As stated in 8.1.7 above, Option 2 would have no detrimental impact on the current method of operation and capacity of the existing traffic signals. This would be a worthwhile proposal to implement should the disadvantages of Option 1 be considered unsustainable.

**APPENDICES**

**APPENDIX 1**  
**Traffic surveys**

# Annexe 1

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Grid Reference: 494400 156810

Date: Thursday 14/09/06

Weather: Overcast, but dry

### Turning movements

TIME	ENTERING JUNCTION FROM										JUNCTION TOTAL
	A324 Dawney Hill			A324 Connaught Rd			B3012 Gole Rd			TOTAL	
	←	↑	TOTAL	↑	→	TOTAL	←	→	TOTAL		
07:00 - 07:30	19	94	113	50	56	106	148	41	189	408	
07:30 - 08:00	25	119	144	69	105	174	210	91	301	619	
08:00 - 08:30	46	121	167	82	124	206	223	59	282	655	
08:30 - 09:00	25	96	121	102	109	211	144	85	229	561	
09:00 - 09:30	18	85	103	71	64	135	98	42	140	378	
09:30 - 10:00	19	62	81	61	50	111	76	11	87	279	
10:00 - 11:00	38	104	142	120	90	210	157	42	199	551	
11:00 - 12:00	39	119	158	89	131	220	111	58	169	547	
12:00 - 13:00	37	109	146	130	130	260	104	39	143	549	
13:00 - 14:00	42	124	166	93	121	214	122	38	160	540	
14:00 - 15:00	42	103	145	112	146	258	152	57	209	612	
15:00 - 16:00	42	133	175	140	212	352	145	50	195	722	
16:00 - 16:30	44	65	109	106	102	208	76	35	111	428	
16:30 - 17:00	45	80	125	86	103	189	94	31	125	439	
17:00 - 17:30	58	91	149	93	144	237	110	35	145	531	
17:30 - 18:00	58	105	163	103	156	259	133	40	173	595	
18:00 - 18:30	43	101	144	66	144	210	92	26	118	472	
18:30 - 19:00	41	52	93	83	122	205	81	27	108	406	
TOTAL	681	1763	2444	1656	2109	3765	2276	807	3083	9292	

CLASSIFICATION	ENTERING JUNCTION FROM							
	A324 Dawney Hill		A324 Connaught Rd			B3012 Gole Rd		
	←	↑	↑	→	←	→	←	→
<b>0800-0900</b>								
Motor Cars	58	190	160	209	306			131
Light Goods	9	17	14	18	47			7
OGV1	2	3	3	1	9			1
OGV2	1	0	2	0	0			0
Motor Cycles, etc	1	3	0	2	4			3
Buses & Coaches	0	4	5	3	1			2
TOTAL	71	217	184	233	367			144
Pedal cycles	0	0	2	2	1			0
<b>1700-1800</b>								
Motor Cars	107	182	179	265	220			64
Light Goods	5	9	11	27	16			10
OGV1	1	3	0	2	2			1
OGV2	0	0	0	0	0			0
Motor Cycles, etc	3	1	5	5	5			0
Buses & Coaches	0	1	1	1	0			0
TOTAL	116	196	196	300	243			75
Pedal cycles	0	5	3	1	3			1

Note  
 OGV1 2 or 3 axle rigid vehicles > 3.5 tonnes  
 OGV2 4 or more axles rigid, 3 or more axles articulated, or other goods vehicles with trailer

# Annexe 1

A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM: A324 Dawney Hill

LEFT TO: B3012 Gole Rd

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	12	3	1	1		2	19		19
07:30 - 08:00	21	4					25		25
08:00 - 08:30	36	7	1	1	1		46		46
08:30 - 09:00	22	2	1				25		25
09:00 - 09:30	12	5	1				18		18
09:30 - 10:00	15	3	1				19		19
10:00 - 11:00	30	3	2	1	2		38		38
11:00 - 12:00	29	9	1				39		39
12:00 - 13:00	29	7	1				37		37
13:00 - 14:00	33	6	2		1		42		42
14:00 - 15:00	36	1	2		2	1	42		42
15:00 - 16:00	31	9	2				42		42
16:00 - 16:30	35	6			1	2	44		44
16:30 - 17:00	38	4			2	1	45		45
17:00 - 17:30	54	3			1		58		58
17:30 - 18:00	53	2	1		2		58		58
18:00 - 18:30	40	3					43		43
18:30 - 19:00	37	3			1		41	1	42
<b>TOTAL</b>	<b>563</b>	<b>80</b>	<b>16</b>	<b>3</b>	<b>13</b>	<b>6</b>	<b>681</b>	<b>1</b>	<b>682</b>

A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM: A324 Dawney Hill

STRAIGHT TO: A324 Connaught Rd

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	75	14	1		2	2	94	1	95
07:30 - 08:00	101	8	2	1	4	3	119	2	121
08:00 - 08:30	108	7			3	3	121		121
08:30 - 09:00	82	10	3			1	96		96
09:00 - 09:30	77	6		1		1	85		85
09:30 - 10:00	48	11	2	1			62	1	63
10:00 - 11:00	79	19	4			2	104		104
11:00 - 12:00	94	19	4	1		1	119	1	120
12:00 - 13:00	98	8	1	1		1	109	2	111
13:00 - 14:00	101	16	4			3	124	1	125
14:00 - 15:00	80	18	2		2	1	103		103
15:00 - 16:00	118	11	2			2	133		133
16:00 - 16:30	57	5				3	65		65
16:30 - 17:00	63	12	2		2	1	80	2	82
17:00 - 17:30	85	4	1			1	91	4	95
17:30 - 18:00	97	5	2		1		105	1	106
18:00 - 18:30	95	4			1	1	101	2	103
18:30 - 19:00	47	5					52	2	54
<b>TOTAL</b>	<b>1505</b>	<b>182</b>	<b>30</b>	<b>5</b>	<b>15</b>	<b>26</b>	<b>1763</b>	<b>19</b>	<b>1782</b>

A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM: A324 Dawney Hill

TOTAL

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	87	17	2	1	2	4	113	1	114
07:30 - 08:00	122	12	2	1	4	3	144	2	146
08:00 - 08:30	144	14	1	1	4	3	167	0	167
08:30 - 09:00	104	12	4	0	0	1	121	0	121
09:00 - 09:30	89	11	1	1	0	1	103	0	103
09:30 - 10:00	63	14	3	1	0	0	81	1	82
10:00 - 11:00	109	22	6	1	2	2	142	0	142
11:00 - 12:00	123	28	5	1	0	1	158	1	159
12:00 - 13:00	127	15	2	1	0	1	146	2	148
13:00 - 14:00	134	22	6	0	1	3	166	1	167
14:00 - 15:00	116	19	4	0	4	2	145	0	145
15:00 - 16:00	149	20	4	0	0	2	175	0	175
16:00 - 16:30	92	11	0	0	1	5	109	0	109
16:30 - 17:00	101	16	2	0	4	2	125	2	127
17:00 - 17:30	139	7	1	0	1	1	149	4	153
17:30 - 18:00	150	7	3	0	3	0	163	1	164
18:00 - 18:30	135	7	0	0	1	1	144	2	146
18:30 - 19:00	84	8	0	0	1	0	93	3	96
<b>TOTAL</b>	<b>2068</b>	<b>262</b>	<b>46</b>	<b>8</b>	<b>28</b>	<b>32</b>	<b>2444</b>	<b>20</b>	<b>2464</b>

# Annexe 1

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM A324 Connaught Rd

STRAIGHT TO A324 Dawney Hill

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	46	3			1		50	1	51
07:30 - 08:00	62	4			2	1	69	2	71
08:00 - 08:30	72	5		1		4	82	1	83
08:30 - 09:00	88	9	3	1		1	102	1	103
09:00 - 09:30	58	11				2	71	1	72
09:30 - 10:00	54	7					61		61
10:00 - 11:00	95	20	2	1	1	1	120		120
11:00 - 12:00	66	17	4	1		1	89	1	90
12:00 - 13:00	100	27	1		1	1	130	1	131
13:00 - 14:00	68	18	1	2	2	2	93	1	94
14:00 - 15:00	91	15	5			1	112		112
15:00 - 16:00	110	19	5		3	3	140	1	141
16:00 - 16:30	87	10	2		3	4	106	2	108
16:30 - 17:00	67	13	3		2	1	86		86
17:00 - 17:30	83	5			4	1	93	1	94
17:30 - 18:00	96	6			1		103	2	105
18:00 - 18:30	61	3			2		66	1	67
18:30 - 19:00	74	4	1		3	1	83	2	85
TOTAL	1378	196	27	6	25	24	1656	18	1674

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM A324 Connaught Rd

RIGHT TO B3012 Gole Rd

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	51	4			1		56		56
07:30 - 08:00	93	9	2		1		105	1	106
08:00 - 08:30	112	9			1	2	124	1	125
08:30 - 09:00	97	9	1		1	1	109	1	110
09:00 - 09:30	56	6	2				64		64
09:30 - 10:00	38	9	2			1	50		50
10:00 - 11:00	71	15	2			2	90		90
11:00 - 12:00	95	26	7		2	1	131		131
12:00 - 13:00	97	26	4	1	1	1	130	5	135
13:00 - 14:00	102	16	1			2	121		121
14:00 - 15:00	111	29	2		2	2	146	1	147
15:00 - 16:00	169	31	6	1	3	2	212		212
16:00 - 16:30	80	15	1		3	3	102		102
16:30 - 17:00	89	11	1		1	1	103		103
17:00 - 17:30	123	16	2		2	1	144		144
17:30 - 18:00	142	11			3		156	1	157
18:00 - 18:30	129	10	1		3	1	144	2	146
18:30 - 19:00	116	6					122	1	123
TOTAL	1771	258	34	2	24	20	2109	13	2122

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM A324 Connaught Rd

TOTAL

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	97	7	0	0	2	0	106	1	107
07:30 - 08:00	165	13	2	0	3	1	174	3	177
08:00 - 08:30	184	14	0	1	1	6	206	2	208
08:30 - 09:00	185	18	4	1	1	2	211	2	213
09:00 - 09:30	114	17	2	0	0	2	135	1	136
09:30 - 10:00	92	16	2	0	0	1	111	0	111
10:00 - 11:00	166	35	4	1	1	3	210	0	210
11:00 - 12:00	161	43	11	1	2	2	220	1	221
12:00 - 13:00	197	53	5	1	2	2	260	6	266
13:00 - 14:00	170	34	2	2	2	4	214	1	215
14:00 - 15:00	202	44	7	0	2	3	258	1	259
15:00 - 16:00	279	50	11	1	6	5	352	1	353
16:00 - 16:30	167	25	3	0	6	7	208	2	210
16:30 - 17:00	156	24	4	0	3	2	189	0	189
17:00 - 17:30	206	21	2	0	6	2	237	1	238
17:30 - 18:00	238	17	0	0	4	0	259	3	262
18:00 - 18:30	190	13	1	0	5	1	210	3	213
18:30 - 19:00	190	10	1	0	3	1	205	3	208
TOTAL	3149	454	61	8	49	44	3765	31	3796



# Annexe 1

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM B3012 Gole Rd

LEFT TO A324 Connaught Rd

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	134	12			2		148		148
07:30 - 08:00	175	26	4		2	3	210		210
08:00 - 08:30	184	27	8		4		223		223
08:30 - 09:00	122	20	1			1	144	1	145
09:00 - 09:30	77	17	2		1	1	98	1	99
09:30 - 10:00	51	22	1		1	1	76		76
10:00 - 11:00	110	38	4		2	3	157		157
11:00 - 12:00	82	20	6		2	1	111		111
12:00 - 13:00	85	15	2		1	1	104		104
13:00 - 14:00	89	26	2		4	1	122		122
14:00 - 15:00	114	29	5	1	2	1	152	3	155
15:00 - 16:00	109	22	7	1	1	5	145		145
16:00 - 16:30	63	12	1				76		76
16:30 - 17:00	76	12	2		2	2	94		94
17:00 - 17:30	100	10					110	2	112
17:30 - 18:00	120	6	2		5		133	1	134
18:00 - 18:30	84	6	1			1	92	1	93
18:30 - 19:00	74	5	1			1	81	1	82
TOTAL	1849	325	49	2	29	22	2276	10	2286

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

FROM B3012 Gole Rd

RIGHT TO A324 Dawney Hill

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	35	6					41	1	42
07:30 - 08:00	79	9	2			1	91	2	93
08:00 - 08:30	53	3			2	1	59		59
08:30 - 09:00	78	4	1		1	1	85		85
09:00 - 09:30	35	4	1	1		1	42		42
09:30 - 10:00	7	4					11		11
10:00 - 11:00	38	3	1				42		42
11:00 - 12:00	43	9	6				58	1	59
12:00 - 13:00	32	3	3		1		39	1	40
13:00 - 14:00	28	6	4				38		38
14:00 - 15:00	45	10	2				57		57
15:00 - 16:00	35	10	2		2	1	50	1	51
16:00 - 16:30	33	1	1				35		35
16:30 - 17:00	26	4			1		31	1	32
17:00 - 17:30	30	4	1				35	1	36
17:30 - 18:00	34	6					40		40
18:00 - 18:30	25	1					26		26
18:30 - 19:00	25	1			1		27		27
TOTAL	681	88	24	1	8	5	807	8	815

## A324 Connaught Rd/Dawney Hill j/w B3012 Gole Rd (Pirbright Arch)

Date: Thursday 14/09/06 07:00 - 19:00

Weather : Overcast, but dry

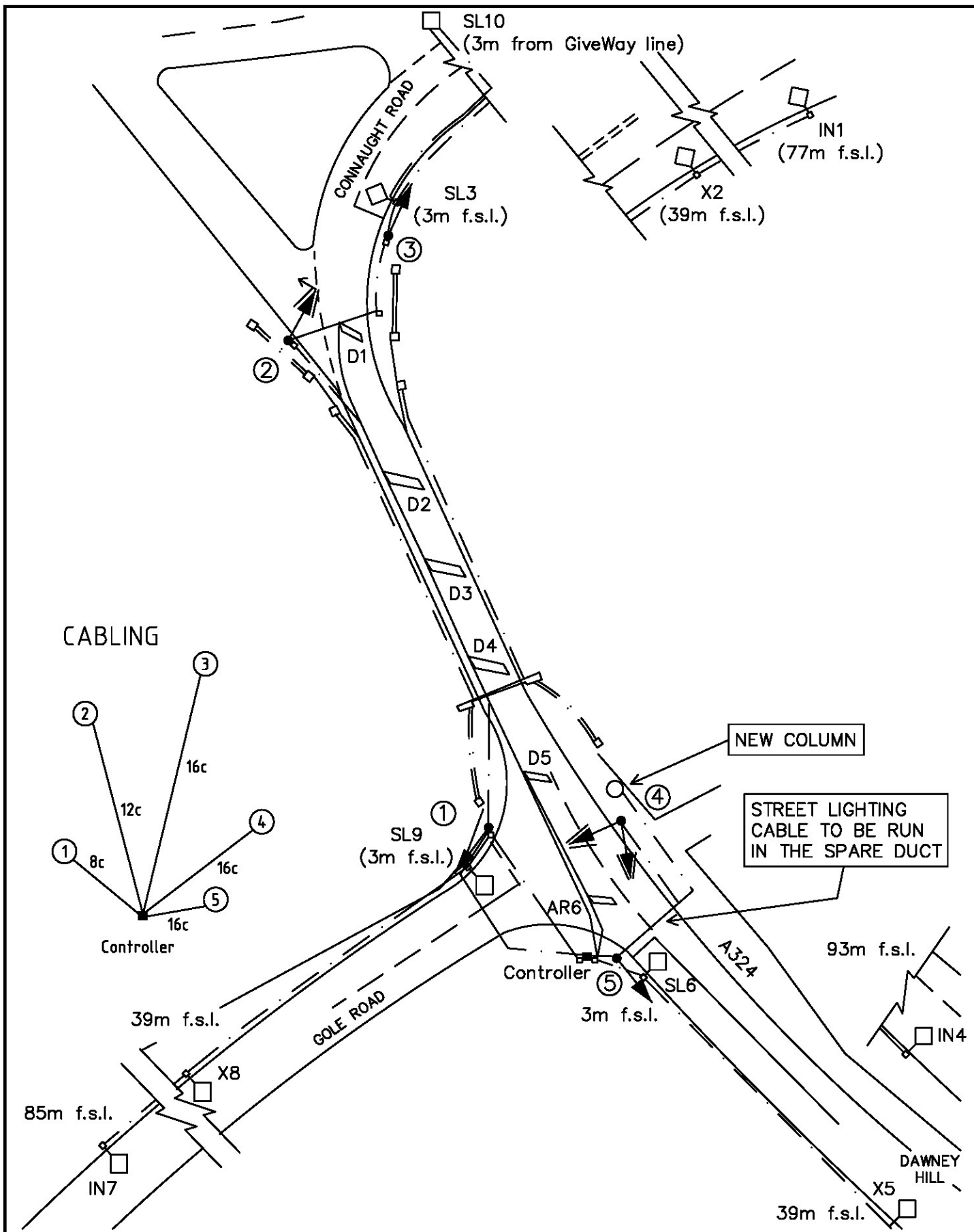
FROM B3012 Gole Rd

TOTAL

TIME	CARS	LIGHT GOODS	OGV1	OGV2	MOTOR CYCLES	BUSES & COACHES	TOTAL VEHICLES	PEDAL CYCLES	TOTAL
07:00 - 07:30	169	18	0	0	2	0	189	1	190
07:30 - 08:00	254	35	6	0	2	4	301	2	303
08:00 - 08:30	237	30	8	0	6	1	282	0	282
08:30 - 09:00	200	24	2	0	1	2	229	1	230
09:00 - 09:30	112	21	3	1	1	2	140	1	141
09:30 - 10:00	58	26	1	0	1	1	87	0	87
10:00 - 11:00	148	41	5	0	2	3	199	0	199
11:00 - 12:00	125	29	12	0	2	1	169	1	170
12:00 - 13:00	117	18	5	0	2	1	143	1	144
13:00 - 14:00	117	32	6	0	4	1	160	0	160
14:00 - 15:00	159	39	7	1	2	1	209	3	212
15:00 - 16:00	144	32	9	1	3	6	195	1	196
16:00 - 16:30	96	13	2	0	0	0	111	0	111
16:30 - 17:00	102	16	2	0	3	2	125	1	126
17:00 - 17:30	130	14	1	0	0	0	145	3	148
17:30 - 18:00	154	12	2	0	5	0	173	1	174
18:00 - 18:30	109	7	1	0	0	1	118	1	119
18:30 - 19:00	99	6	1	0	1	1	108	1	109
TOTAL	2530	413	73	3	37	27	3083	18	3101


## **APPENDIX 2**

**Existing layout and operation (Site Layout Drawing 066/T/750D)**




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Surrey County Council LA 078872 2003.

Drawing  
**A324/ B3012 PIRBRIGHT ARCH  
CONNAUGHT ROAD, DAWNEY HILL**

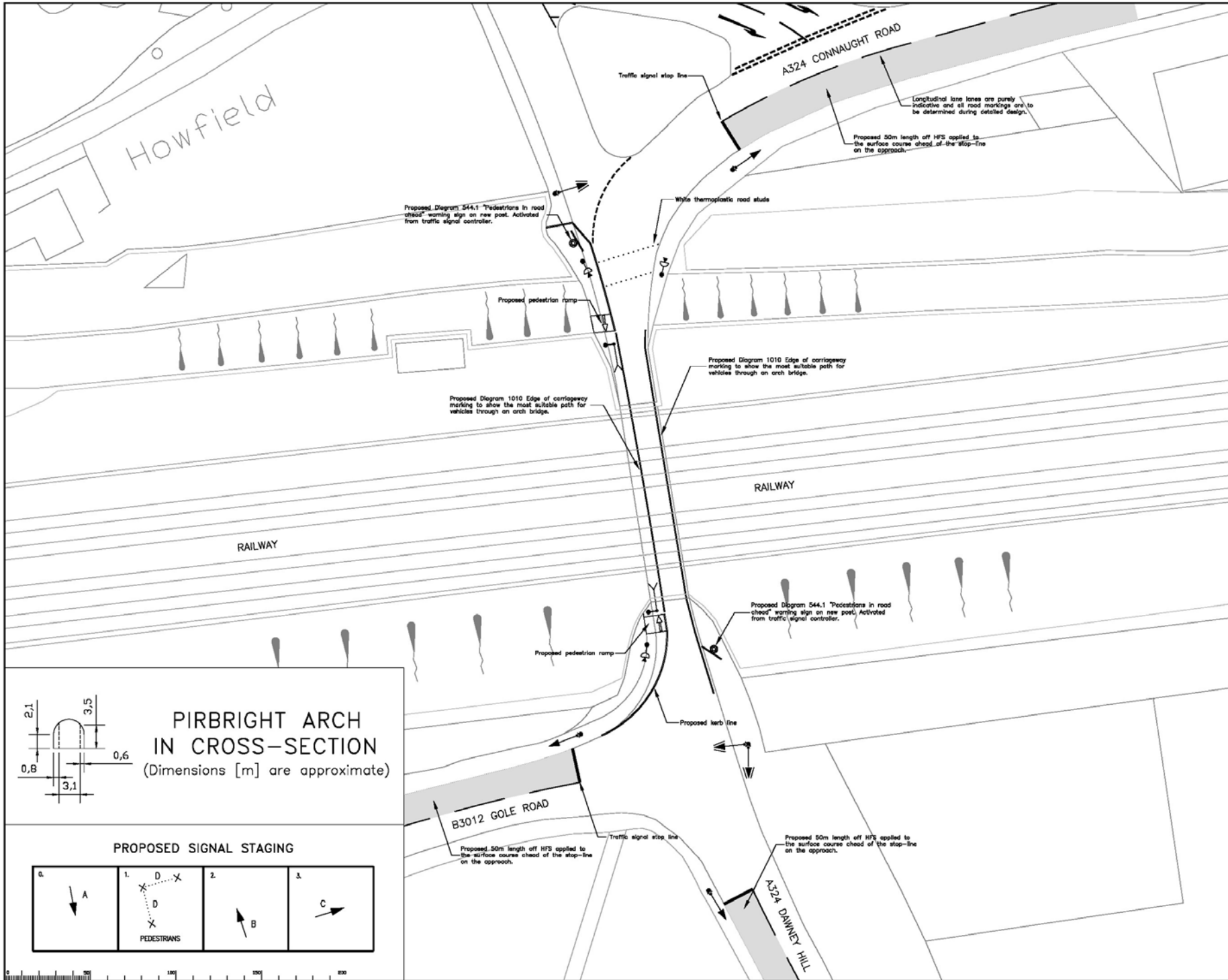


**SURREY  
COUNTY COUNCIL**  
*Sustainable Development*  
Head of Transportation  
G.J.Phipps  
S.M., M.Sc., C.Dip., F.I.C.E.

North Point 	Manufacturer <b>SIEMENS</b>	Drawn <b>M.G.</b>	Sig.	Date	Drawing No. <b>0600/T/J750D</b>	
	Cont'r Type <b>ST800</b>	Checked <b>T.A.S.</b>	Sig.	Date		
	Dimming <b>NONE</b>	Approved <b>G.R.B.</b>	Sig.	Date	Classification <b>RECORD</b>	Scale <b>1:500 APPROX.</b>

## **APPENDIX 3**

**Proposed Layouts and operation**  
**Option 1 (Drg No 53625001 01)**  
**Option 2 (Drg No 53625001 02)**



Notes

**LEGEND**

- ⬆️ Three aspect signal with primary view
- ⬆️ Three aspect signal with secondary view
- ⬆️ Two aspect nearside pedestrian signals with separate push button (p.b)
- ⬆️ On-crossing detector with extension bracket

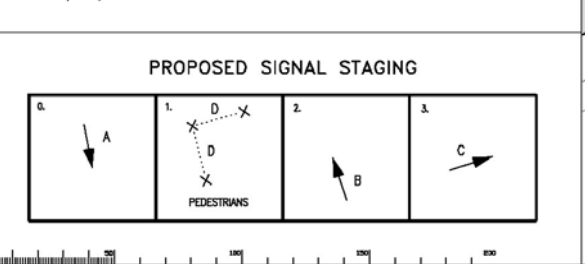
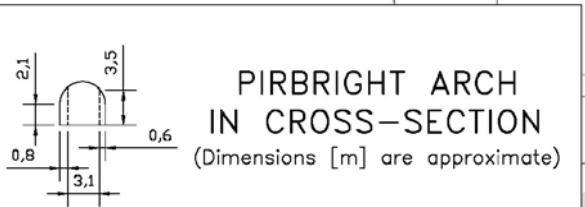
Rev	Drawn	Slp	Date	Check	Slp	Date	Appro	Slp	Date

Amendments

File Name  
 \$Project-current\3625\CAD-Drawings\3625\_01.dwg

Project  
 A324/B3012  
 PIRBRIGHT ARCH  
 CONNAUGHT ROAD  
 DAWNEY HILL

Drawing  
 PROPOSED TRAFFIC SIGNAL  
 MODIFICATION  
 (PEDESTRIAN STAGE)



North point	Scale
	1:200 (APPROX)
Drawn	G.P.B. Slp. Date 23/01/2007
Checked by originator	C.J.F. Slp. Date 24/01/2007
Approved	C.J.F. Slp. Date 24/01/2007

Project No. 53625001

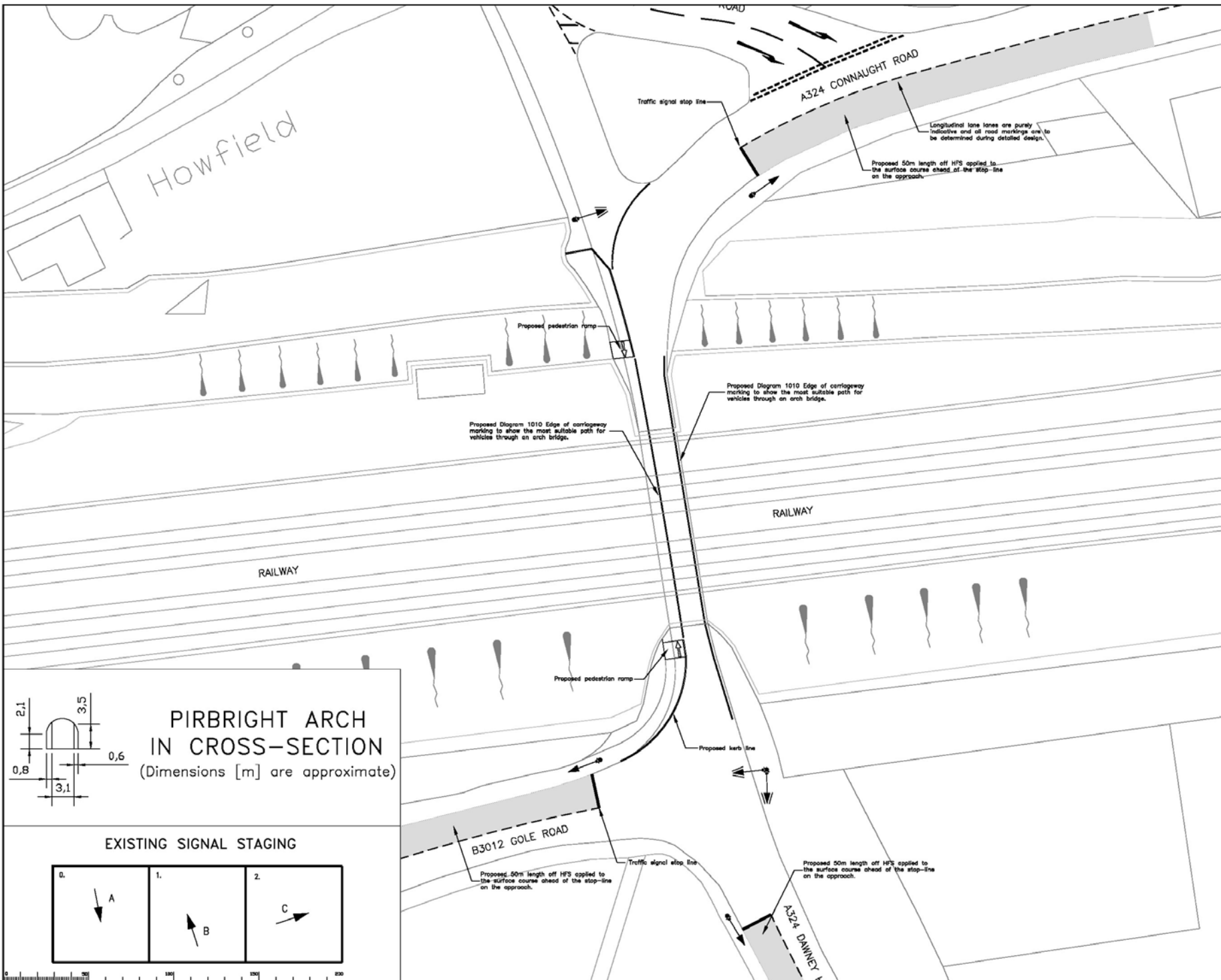
Contract Sheet No. -

**SURREY COUNTY COUNCIL**  
 Sustainable Development

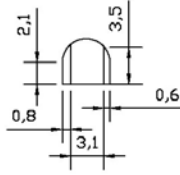
Drawing No. 3625/01

Revision: PRESENTATION

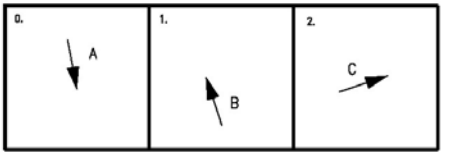
02 Feb.07 - 10:37am



**PIRBRIGHT ARCH IN CROSS-SECTION**  
(Dimensions [m] are approximate)



**EXISTING SIGNAL STAGING**



Notes

Rev									
Drawn + Sgp	Date	Check + Sgp	Date	Appro + Sgp	Date				
Rev									
Drawn + Sgp	Date	Check + Sgp	Date	Appro + Sgp	Date				
Rev									
Drawn + Sgp	Date	Check + Sgp	Date	Appro + Sgp	Date				
Rev									
Drawn + Sgp	Date	Check + Sgp	Date	Appro + Sgp	Date				

Amendments  
File Name  
S:\project-current\3625\CAD-Drawing\3625\_02.dwg

Project  
**A324/B3012  
PIRBRIGHT ARCH  
CONNAUGHT ROAD  
DAWNEY HILL**

Drawing  
**PROPOSED KERB LINE  
MODIFICATION  
(EXISTING SIGNAL LAYOUT)**

North point

Scale  
**1:200 (APPROX)**

Drawn	G.P.B	Sgp	Date	23/01/2007
Checked by originator	C.J.F	Sgp	Date	24/01/2007
Approved	C.J.F	Sgp	Date	24/01/2007

Project No. **53625001**

Contract Sheet No. **-**

Drawing No. **3625/02**

Classification **PRESENTATION**

**SURREY COUNTY COUNCIL**  
Sustainable Development  
Head of Transportation  
Tel: 01483 215100 Fax: 01483 215101

**APPENDIX 4**

**APPENDIX 4**  
**Capacity Assessment – Queues and Delays**

## Annexe 1

### LINSIG results for Pirbright Arch

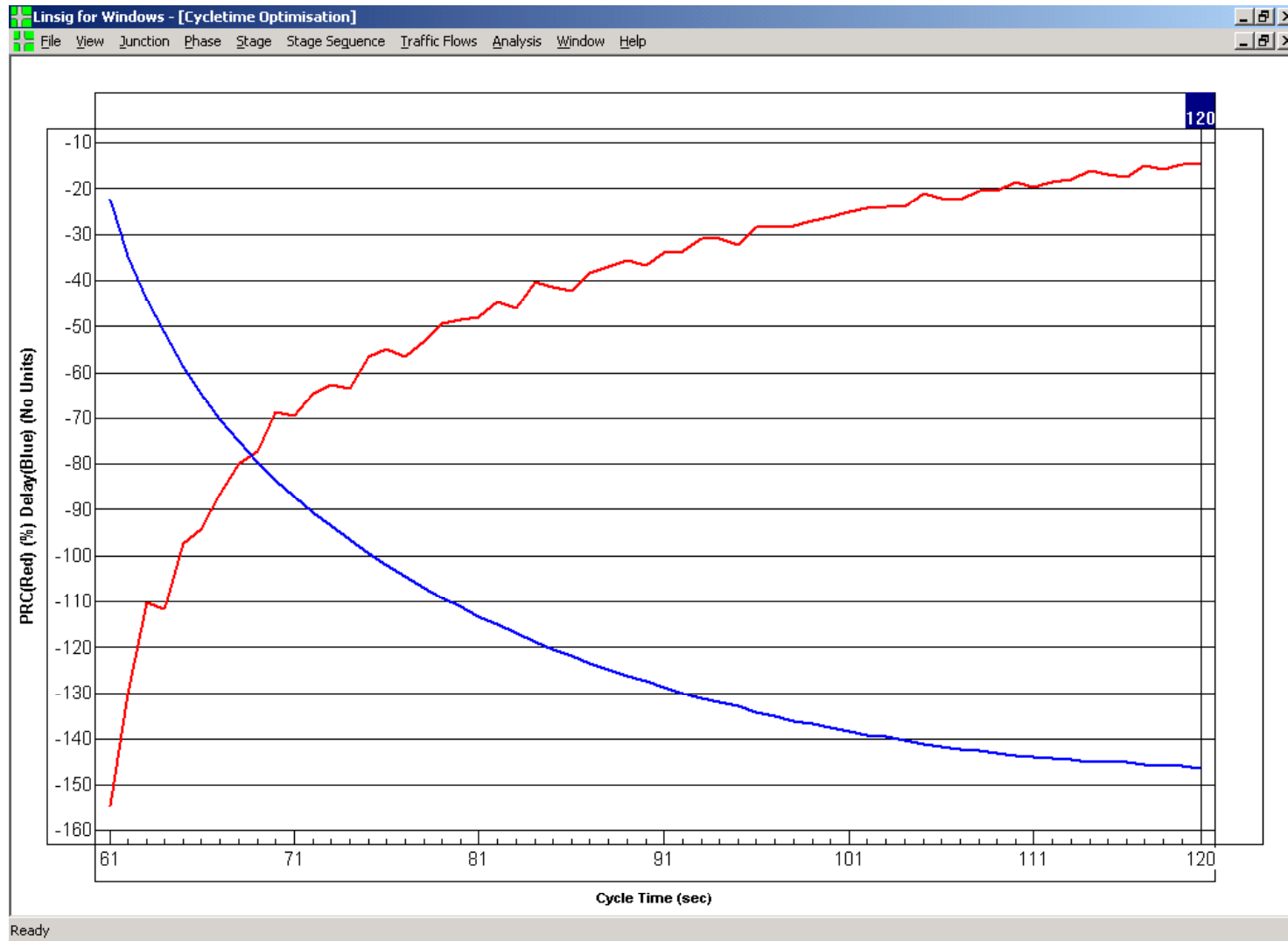
<b>AM Peak</b>									
LINK DESCRIPTION	Flows /hr	Average Queue (veh)				Average Delay (min/veh)			
		Existing at 120 sec Cycle Time (PRC= -14.5%)	Proposed at 120 sec Cycle Time (PRC= -167.2%)	Proposed at 140 sec Cycle Time (PRC= -96.9 %)	Proposed at 160 sec Cycle Time (PRC= -67.0%)	Existing at 120 sec Cycle Time (PRC=-14.5%)	Proposed at 120 sec Cycle Time (PRC= -167.2%)	Proposed at 140 sec Cycle Time (PRC= -96.9%)	Proposed at 160 sec Cycle Time (PRC= -67.0%)
Connaught Road	417	21	159	95	67	2	22	13	8
Dawney Hill	288	16	97	68	47	2	19	13	9
Gole Road	511	25	197	115	85	2	22	12	9

<b>PM Peak</b>									
LINK DESCRIPTION	Flows/hr	Average Queue (veh)				Average Delay (min/veh)			
		Existing at 120 sec Cycle Time (PRC= -5.0%)	Proposed at 120 sec Cycle Time (PRC= -149.4%)	Proposed at 140 sec Cycle Time (PRC= -83.7%)	Proposed at 160 sec Cycle Time (PRC= -52.7%)	Existing at 120 sec Cycle Time (PRC= -5.0%)	Proposed at 120 sec Cycle Time (PRC= -149.4%)	Proposed at 140 sec Cycle Time (PRC= -83.7%)	Proposed at 160 sec Cycle Time (PRC= -52.7%)
Connaught Road	496	17	156	100	67	1.4	18	11	7
Dawney Hill	312	13	101	57	43	1.7	18	10	7
Gole Road	318	13	111	64	44	1.7	20	11	7

**TABLE 1  
LINSIG SUMMARY TABLE  
DELAYS AND QUEUES**

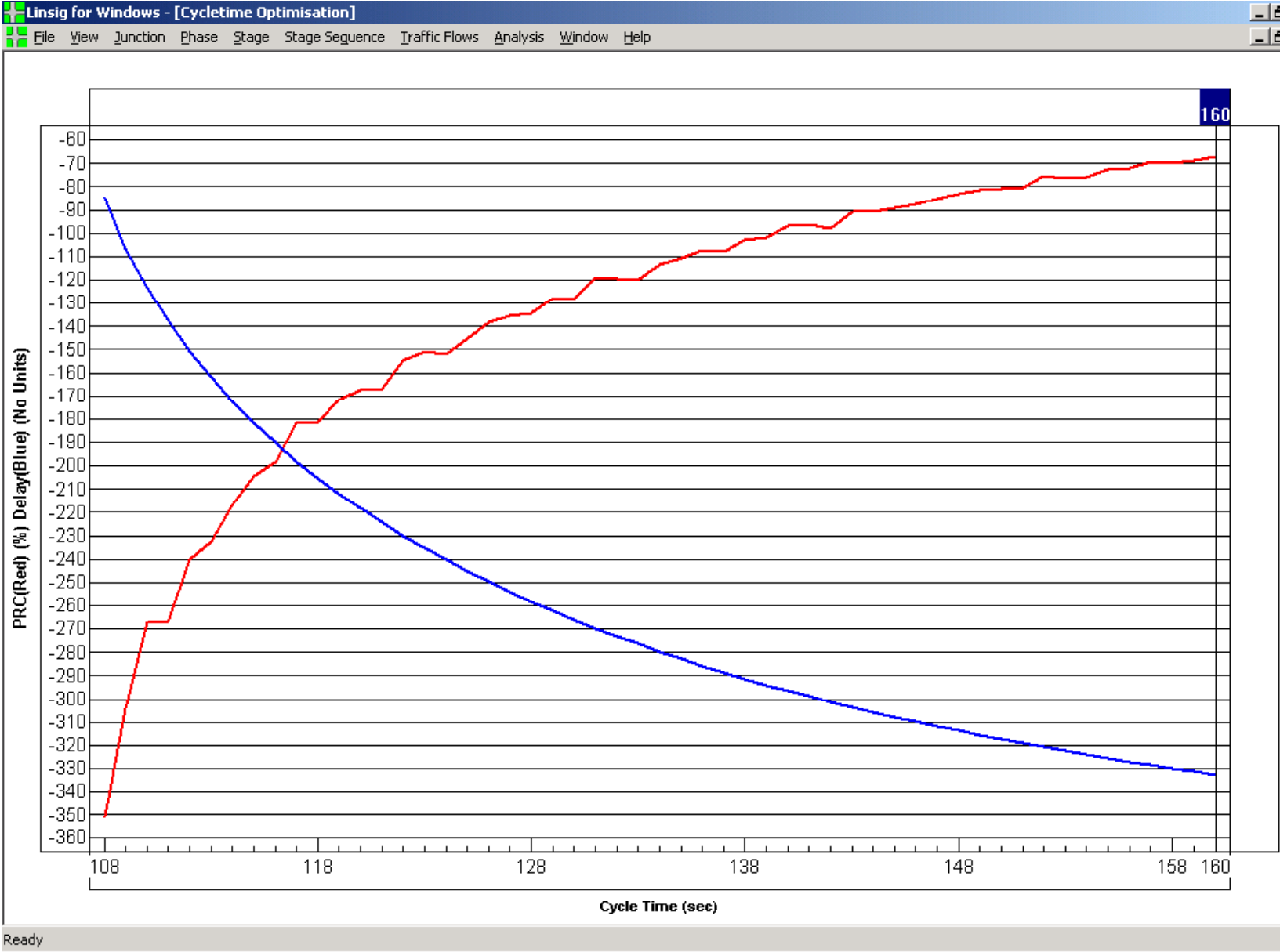


# Annexe 1



**TABLE 2**  
**A324 PIRBRIGHT ARCH**  
**EXISTING LAYOUT AND OPERATION**  
**CYCLE TIME/RESERVE CAPACITY TREND GRAPH**

# Annexe 1



**TABLE 3**  
**A324 PIRBRIGHT ARCH**  
**PROPOSED LAYOUT AND OPERATION**  
**CYCLE TIME/RESERVE CAPACITY TREND GRAPH**

## **Annexe 1**