

	ACTION	DATE
TO	1. SENIOR ENGINEER, CONTROLLER APPLICATIONS 2. STEVE BELZ, PROGRAM DELIVERY	
FROM	NATHAN CORCORAN	DATE 6/07/21
SITE	MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD	SITE NO. 6325
REGION	NORTHERN	MUNICIPALITY CAMPASPE

GENERAL

Works Program Job?	No	Project Number	XX
Classification	STANDARD	Works Order Number	XX

EXISTING CONTROLLER DETAILS

Type	QTC	Software Version & Release	V5 R20	Lanterns	LED
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CONTROLLER APPLICATIONS

Target Date for Draft Opsheet	30/04/2021
Target Date for completion of Program	21/05/2021

PERSONALITY CHECKSUMS

	Hex	Octal
Total	7E	176
Times	A2	242
Pers	DC	334

Prepare Interlocking

Dispatched 6/07/21

Update Graphics, Site Notes Yes

Site ID Revision updated to

Description of changes Fix fault with SG9 operation

PROGRAM DELIVERY - SIGNAL INSTALLATION

<input type="checkbox"/> Changes to signal hardware	<input type="checkbox"/> Changes to interlocking
<input type="checkbox"/> Additional detectors	<input type="checkbox"/> Changes to existing detector numbering
<input type="checkbox"/> Upgrade controller software to	
<input type="checkbox"/> Other changes	
<input checked="" type="checkbox"/> Place new operation specification in controller	

PRIOR NOTICE

A job must be entered into RAI Action database before this PROM change will be allowed.

<input checked="" type="checkbox"/> SCATS data changes - notify	NATHAN CORCORAN	Ext	1210
OR	DARREN VAUGHAN	Ext	1210

before 3:00pm on the day before switch on.

SCATS Data Changes - Slot data, update graphics

TRAFFIC MANAGEMENT CENTRE

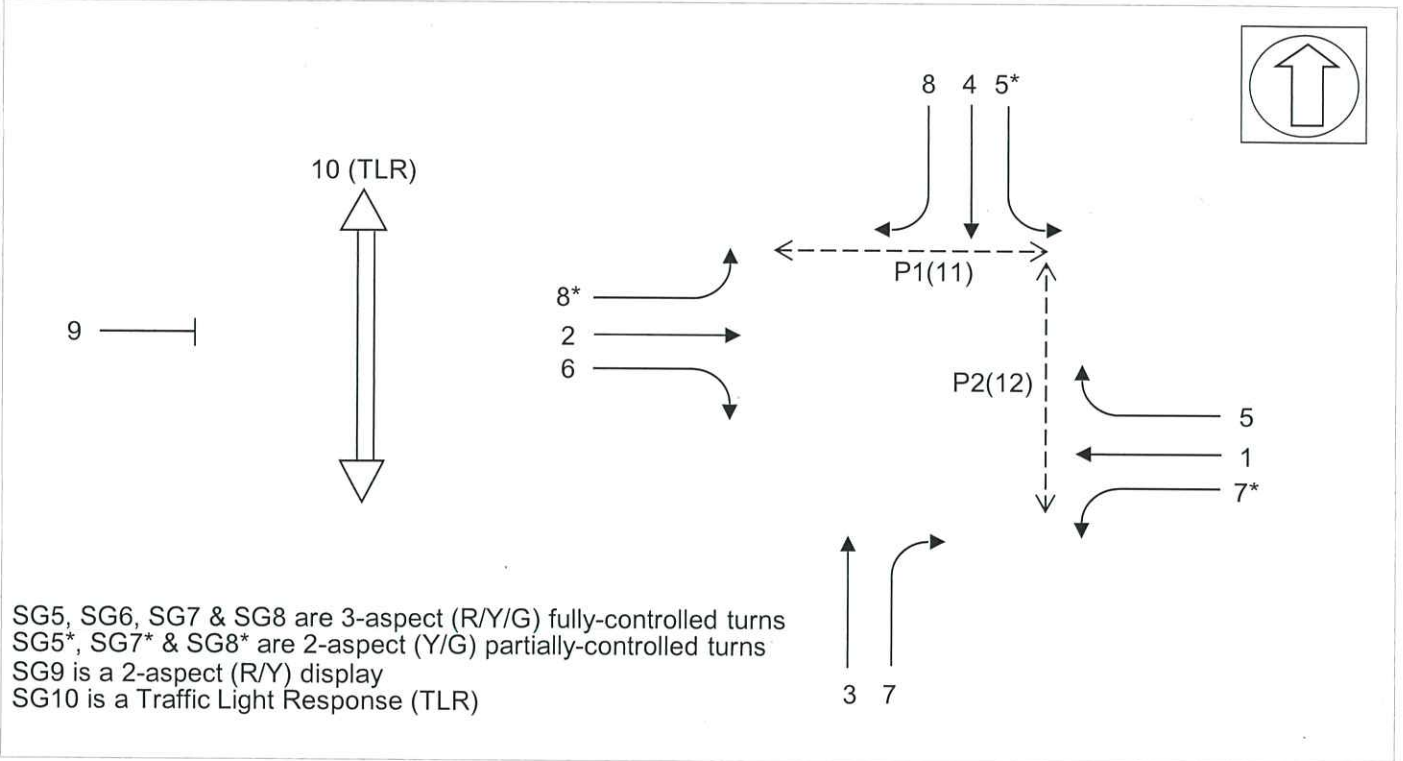
<input checked="" type="checkbox"/> Checksum update only
<input type="checkbox"/> Changes to trim or manual intervention features required
<input checked="" type="checkbox"/> Please notify NATHAN CORCORAN (x1210) on job completion.

DATE PROM INSTALLED

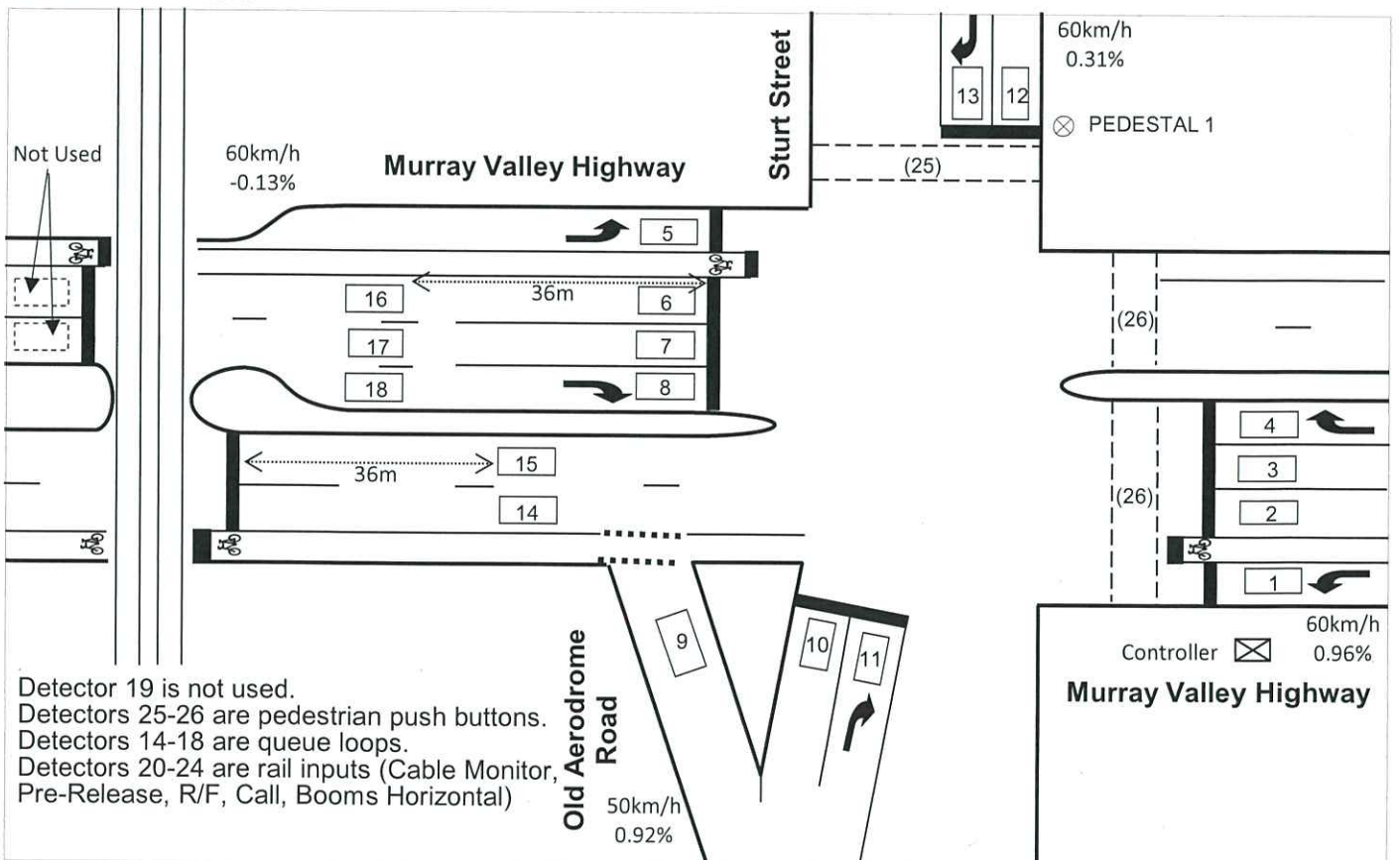
CONTROLLER OPERATION SPECIFICATION

SITE NAME	MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD			SITE NO.	6325
MUNICIPALITY	CAMPASPE	DESIGNED BY	NATHAN CORCORAN	DATE	6/07/21
PLAN NO.	781144C	DESIGN CHECKED		DATE	6/7/21
CONTROLLER TYPE	QTC	PROM CHECKED		DATE	6/7/21

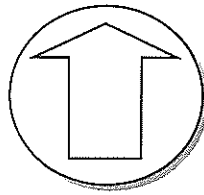
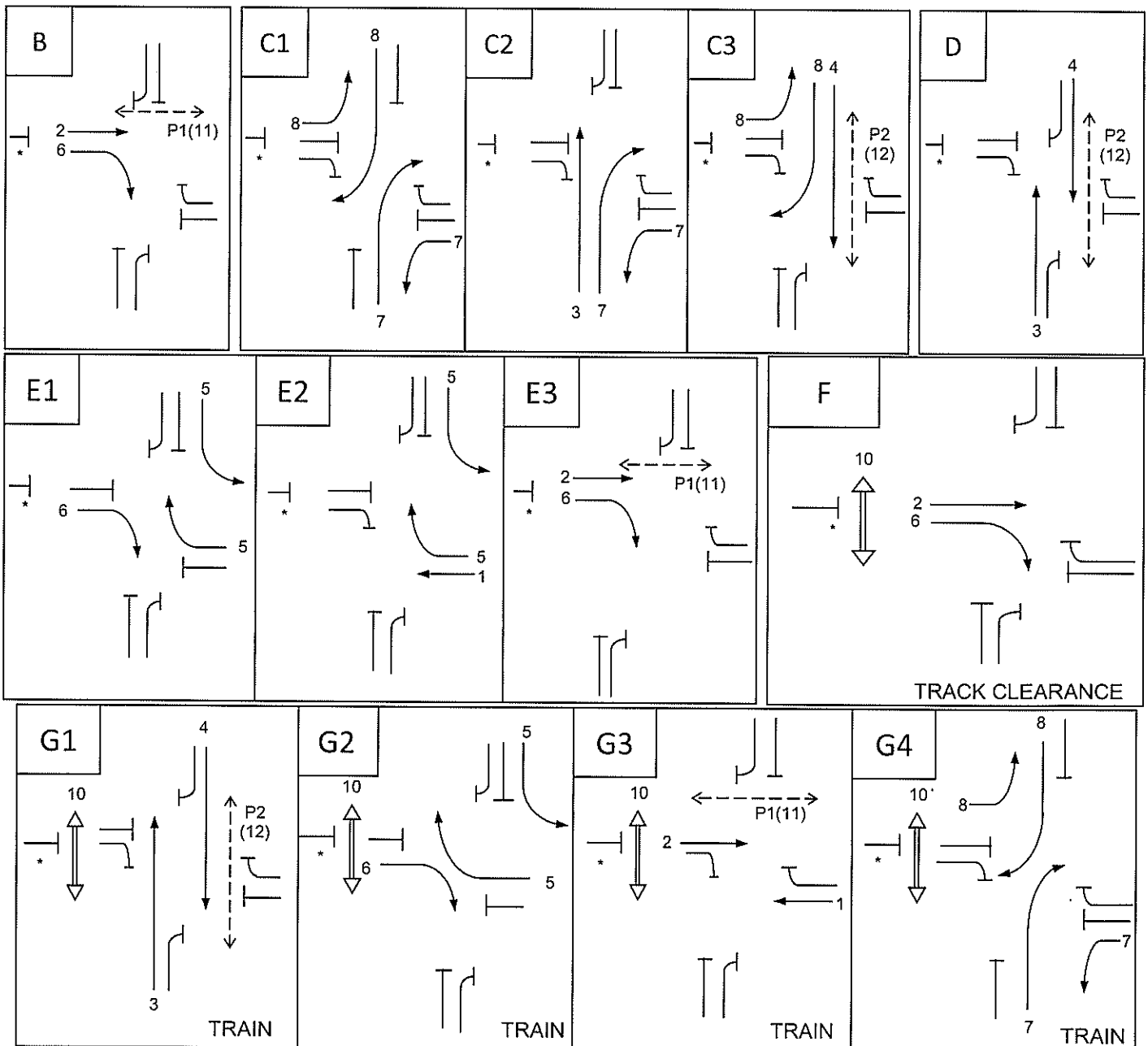
GROUP ALLOCATION



DETECTOR MAP



* Refer SG9 notes

[illegible]

REVn. & V.A. SEQUENCE ACDEFG

DESIGNED BY: NATHAN CORCORAN

DATE 6/07/21

DETECTOR FUNCTIONS

DETECTOR No.	Internal / External	Input Number	CALL PHASE	LOCKING CALL	NON-LOCKING CALL	SET VIG ON PHASE	EXTEND PHASE	SPECIAL FUNCTION			DETECTOR ALARMS						
								Detector Type	Description	Refer Special Notes	DA Category	Disable	DA on S/C only	Fault Simulation			
1	I	1	A	✓			A				0		✓	✓			
2	I	2	A	✓			A				0			✓			
3	I	3	A	✓			A				0			✓			
4	I	4	E	✓			E				0		✓	✓			
5	I	5	A	✓			ABF				0		✓	✓			
6	I	6	A	✓			ABF				0			✓			
7	I	7	A	✓			ABF				0			✓			
8	I	8	BE	✓			BEF			✓	0		✓	✓			
9	I	9	-				-		Counting Loop		0		✓				
10	I	10	D	✓			CD			✓	0		✓	✓			
11	I	11	C	✓			C			✓	0		✓	✓			
12	I	12	D	✓			CD			✓	0		✓	✓			
13	I	13	C	✓			C			✓	0		✓	✓			
14	I	14	-						Queue Loop	✓	0		✓				✓
15	I	15	-						Queue Loop	✓	0		✓				✓
16	I	16	-						Queue Loop	✓	0		✓				✓
17	I	17	-						Queue Loop	✓	0		✓				✓
18	I	18	-						Queue Loop	✓	0		✓				✓
19									NOT USED		1						
20	E	3						RAIL	CABLE MONITOR	✓	1						
21	E	4						RAIL	PRE-RELEASE	✓	1						
22	E	5						RAIL	RELEASE/FORCE (R/F)	✓	1						
23	E	6						RAIL	CALL	✓	1						
24	E	7						RAIL	BOOMS HORIZONTAL	✓	1						
25	E	1	A		✓			P1		✓	0		✓				
26	E	2	D		✓			P2		✓	0		✓				
27																	
28																	
29																	
30																	
31																	
32																	

APPROACH DEFINITIONS

PHASE APPROACHES

Approach No	EXTENDING DETECTORS	APPROACH TIMER AND TIMESETTING DEFINITION*	SIGNAL GROUP	APPROACH EXPIRY (EXPAP)	Refer Special Notes
1	2, 3	A11	1		
2	6, 7	A22, B22, F22	2	AØ↔BØ	
3	1	A33	1	AØ→C1Ø or C2Ø	
4	5	A44, B33, F33	2	AØ↔BØ, AØ→C1Ø or C3Ø, BØ→C1Ø or C3Ø	
5					
6	8	B11, E22, F11	6		
7	11	C11	7		
8	13	C22	8		
9	10	D11, C33	3	C2Ø→DØ	
10	12	D22, C44	4	C3Ø→DØ	
11	4	E11	5		
12					
13					
14					
15					
16					

* There are 8 approach timers and 4 approach timesettings available per phase:

- Where there are 4 or fewer approaches per phase, allocate one timesetting to each timer.

For example: A11, A22, A33, B11, C11.

- Where there are more than 4 approaches per phase, two or more timers must have the same timesetting.

For example: A11, A21, A32, A43, A54, B11.

SPECIAL APPROACHES

Approach No	EXTENDING DETECTORS	APPROACH TIMESETTING	SIGNAL GROUP	DESCRIPTION	Refer Special Notes
1	10, 12	G1	3, 4		✓
2	4	G2	5		✓
3	11	G3	7		✓
4	6, 7	G4	2		✓

GENERAL NOTES

SUMMARY OF XSF FLAGS

(Communications Operation of XSF flags is required)

XSF2 - Used to cancel compensation following the train phase (Online).

XSF10 - Inhibits queue detectors 14 and 15 from setting MSS10 (All modes).

XSF12 - Inhibits queue detectors 16, 17 and 18 from setting MSS12 (All modes).

SUMMARY OF MSS FLAGS

MSS1 - Set on receipt of Call, cleared by termination conditions – used to force the site to isolated.

MSS2 - Set at the start of the train phase, cleared at the start of the intergreen of the train phase.

MSS3 - Set by abnormal condition: Force before TLR.

MSS4 - Set by abnormal condition: Late release.

MSS5 - Set by abnormal condition: Force without Call.

MSS6 - Set by abnormal condition: Break in Cable Monitor.

MSS7 - Set by abnormal condition: Booms not Horizontal.

MSS8 - Set at the start of the train phase until intergreen of AØ (after train phase) or when XSF2 is set.

MSS9 - Set when the Call is received until intergreen of AØ (after train phase).

MSS10- Presence timers for detector 14 and/or 15 expired sets MSS10.

MSS11- Set from establishment of Call, cleared on removal of Call.

MSS12- Presence timers for detector 16 and/or 17 and/or 18 expired sets MSS12.

MSS13- On receipt of the BOOMS HORIZONTAL input MSS13 the flag is set.

MSS14- Set on receipt of Force, cleared on reinstatement of Force.

MSS15- Set on receipt of Pre-Release, cleared on reinstatement of Pre-release

GENERAL OPERATION

1. NOTE – This site has reached the programming capacity of a VC5 controller. Any future remodel requires a controller upgrade to VC6.2.
2. REVn. – First scan after start-up demands CØ, DØ and EØ.

SIGNAL GROUP OPERATION

Signal Group 1

1. SG1 is controlled by Special Movement Timesetting no. 1 in AØ, EØ and GØ.
AØ All Red timesetting is substituted for Special Movement no. 1.
2. SG1 uses GØ minimum green for its minimum green.

Signal Group 2

1. SG2 is controlled by Special Movement Timesetting no. 2 in GØ.
AØ All Red timesetting is substituted for Special Movement no. 2.
2. SG2 uses GØ minimum green for its minimum green.

Signal Group 3

1. SG3 is controlled by Special Movement Timesetting no. 3 in GØ.
DØ All Red timesetting is substituted for Special Movement no. 3.
2. SG3 uses GØ minimum green for its minimum green.

Signal Group 4

1. SG4 is a pseudo special movement in GØ that has been programmed to shadow SG3 due to the lack of special movements.
2. SG4 uses GØ minimum green for its minimum green.

Signal Group 5

1. SG5 is controlled by Special Movement Timesetting no. 5 in EØ and GØ.
EØ All Red timesetting is substituted for Special Movement no. 5.
2. SG5 uses GØ minimum green for its minimum green.

Signal Group 6

1. SG6 closes down in BØ when going BØ → EØ (called by SG5).
SG6 does not introduce in EØ when going BØ → EØ.
2. SG6 is controlled by Special Movement Timesetting no. 6 in EØ and GØ.
BØ All Red timesetting is substituted for Special Movement no. 6.
3. SG6 uses GØ minimum green for its minimum green.

Signal Group 7

1. SG7 is controlled by Special Movement Timesetting no. 7 in CØ and GØ.
CØ All Red timesetting is substituted for Special Movement Timesetting no. 7.
2. SG7 uses GØ minimum green for its minimum green.

Signal Group 8

1. SG8 is controlled by Special Movement Timesetting no. 8 in CØ and GØ.
CØ Special All Red timesetting is substituted for Special Movement Timesetting no. 8.
2. SG8 uses GØ minimum green for its minimum green.

Signal Group 9

1. SG9 is controlled by Special Movement No. 4 in AØ, BØ, CØ, DØ, EØ, FØ and GØ.
AØ Special All Red timesetting is substituted for Special Movement No. 4.
SG9 uses AØ yellow.
2. SG9 closes down when a queue is detected on detectors 16, 17 or 18 (i.e. MSS12 set) AND a CALL DELAY timer (Special Purpose Timesetting No. 21), that starts when the CALL is received has expired.
3. SG9 closes down when the FORCE is received (i.e the wig wags start).
4. SG9 is held red until the R/F is reinstated (i.e. detector 22 to ON).
5. If the R/F is not reinstated before expiry of the RELEASE TIMER (Special Purpose Timesetting No. 26) that commences counting from receipt of the PRE-RELEASE), SG9 red is switched off.

PEDESTRIAN GROUP OPERATION

Pedestrian 1

P1 calls AØ.

P1 is hidden in EØ.

P1 calls G3Ø via detector 24.

P1 can introduce at anytime in E3Ø and at the start of AØ and can overlap E3Ø → AØ and AØ ↔ BØ.
[Recommended walk specifications: W1=8 (ACDEFG), W1=8B*(ABCDE2FG)]

Pedestrian 2

P2 calls DØ.

P2 calls G1Ø via detector 25.

P2 can introduce at any time in C3Ø, at the start of DØ, and can overlap C3Ø → DØ.

PHASE OPERATION

C Phase

1. Use DØ yellow for CØ yellow if C2Ø or C3Ø does not transition to DØ.
2. In CØ intergreen, hold SG3 red or SG4 red (if red) and not going to DØ.

E Phase

1. Use AØ yellow for EØ yellow if E2Ø does not transition to AØ.
2. Use AØ yellow for EØ yellow if E3Ø does not transition to FØ or AØ.
3. In EØ intergreen, hold SG1 and SG2 red (if red) and not going to AØ.

DETECTOR OPERATION

General

1. NOTE – Due to VC5 programming capacity the Detector Alarm Category Table has been removed.
2. Clear vehicle demands during associated phase green and yellow.

Detector 4

Clear demands for EØ from detector 4 during SG5 green and yellow.

Detector 8

Clear demands for BØ and EØ from detector 8 during SG6 green and yellow.

Detector 10

Clear demands for DØ from detector 10 during SG3 green and yellow.

Detector 11

Clear demands for CØ from detector 11 during SG7 green and yellow.

Detector 12

Clear demands for DØ from detector 12 during SG4 green and yellow.

Detector 13

Clear demands for CØ from detector 13 during SG8 green and yellow.

Detector 14 and 15

1. Detectors 14 and 15 are queue loops.
2. If presence timers for detector 14 and/or detector 15 have expired, set MSS10.
3. If detector 14 and/or detector 15 are ON for the time in Special Purpose Timesetting No. 15, ignore the queue function associated with the detectors until the detector changes state from OFF to ON.
4. MSS10 is not set when detectors 14 and 15 are alarmed.
5. When XSF10 is set, the queue function is inhibited (i.e., MSS10 is not set).

Detector 16, 17 and 18

1. Detectors 16, 17 and 18 are queue loops.
2. If presence timers for detector 16 and/or detector 17 and/or detector 18 have expired, set MSS12.
3. If detector 16 and/or detector 17 and/or detector 18 are ON for the time in Special Purpose Timesetting No. 15, ignore the queue function associated with the detector until the detector changes state from OFF to ON.
4. MSS12 is not set when detectors 16, 17 and 18 are alarmed.
5. When XSF12 is set, the queue function is inhibited (i.e., MSS12 is not set).

OPERATION WHEN A WESTBOUND QUEUE IS DETECTED

1. If MSS10 is set prior to the start of E2Ø, hold SG1 red in EØ while MSS10 is set.
2. If MSS10 is set during E2Ø, close down E2Ø after SG1 minimum green has expired.
3. If MSS10 is set during GØ, SG1 does not introduce in GØ.
4. If MSS10 is set during G3Ø, close down SG1 after SG1 minimum green.
5. If MSS10 is set during GØ, SG8 does not introduce in GØ.
6. If MSS10 is set during G4Ø, close down SG8 after SG8 minimum green.
7. If MSS10 is set prior to the start of AØ and SG1 is red, hold SG1 red in AØ while MSS10 is set.
8. If MSS10 is set during AØ, close down SG1 after SG1 minimum green and hold SG1 red in AØ while MSS10 is set. SG1 can only reintroduce in AØ if MSS10 is cleared prior to the start of AØ yellow.

OPERATION WHEN AN EASTBOUND QUEUE IS DETECTED

1. Refer to SG9 & Rail Link Operation notes.

RAIL LINK OPERATION

1.0 GENERAL INTERFACING REQUIREMENTS

Electrical interfacing between the TRAFFIC SIGNAL controller and the LEVEL CROSSING controller is provided by a multi-core telephone-type cable having at least 10 pairs, as detailed in the STANDARD RAIL-LINK CABLE TERMINATION CHART

1.1 STANDARD RAIL LINK INPUTS

CABLE MONITOR	via Detector No. 20	- usually ON
PRE-RELEASE	via Detector No. 21	- usually ON
RELEASE/FORCE (R/F)	via Detector No. 22	- usually ON
CALL	via Detector No. 23	- usually OFF
BOOMS HORIZONTAL	via Detector No. 24	- usually OFF

1.2 STANDARD RAIL LINK OUTPUTS

TRAFFIC LIGHT RESPONSE	via Signal Group 10
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2.0 BASIC OPERATING PROCEDURE

2.1 CALL

On receipt of the CALL input (i.e. detector 23 to ON) the following will occur:

- The controller will clear all phase demands, i.e. the controller will remain in the currently running phase. If a pedestrian is in WALK when the CALL is received, then select Special Purpose Timesetting No. 16 for the pedestrian walk time.
- If the controller is changing phases when the CALL is received then do not service pedestrians in the phase which is about to run.
- A CALL DELAY timer (Special Purpose Timesetting No. 21) is started. When this CALL DELAY timer expires the following occurs:
 - o If MSS12 is set, demands for FØ (Track Clearance Phase) and GØ (Train Phase) are placed and the controller proceeds to FØ immediately (See 2.2.1).
 - o If MSS12 is not set, a demand for GØ (Train Phase) is placed and the controller proceeds to GØ immediately (See 2.2.2).
- MSS1 flag is set at the point when the CALL is first received. The point at which the MSS1 flag is removed is outlined in Section 3.3, which relates to the provision of train compensation operation.
- The controller is forced to isolated mode of operation. When online to the regional computer this is achieved via the MSS1 flag using VR30.
- MSS11 flag is also set from the point when the CALL is first received until the CALL is removed.

2.2 TRAIN PHASE SEQUENCE

2.2.1 TRACK CLEARANCE PHASE

The TRACK CLEARANCE phase is FØ.

The track clearance phase is held until SG2 and SG6 gaps or maximum extension green expires. Proceed to the Train Phase – G1Ø.

2.2.2 TRAIN PHASE

The TRAIN phase is GØ.

Within the TRAIN phase (GØ):

- SG1, SG2, SG3, SG4, SG5, SG6, SG7 and SG8 use GØ minimum green.
- Special approach 1 uses GØ approach 1 timesettings to control SG3 & SG4 extension.
- Special approach 2 uses GØ approach 2 timesettings to control SG5 & SG6 extension.
- Special approach 3 uses GØ approach 3 timesettings to control SG7 (& SG8) extension.
- Special approach 4 uses GØ approach 4 timesettings to control SG2 (& SG1) extension.
- SG3 and SG4 use Special Purpose Timesetting No. 22 for its maximum extension green.
- SG5 and SG6 use Special Purpose Timesetting No. 23 for its maximum extension green.
- SG7 and SG8 use Special Purpose Timesetting No. 24 for its maximum extension green.
- SG1 and SG2 uses Special Purpose Timesetting No. 25 for its maximum extension green.
- P1 calls G3Ø.
- P2 calls G1Ø.
- Rest in G1Ø if no other demands.

2.3 TRAFFIC LIGHT RESPONSE (TLR)

The controller provides phase status information to the Rail Authority in the form of the TLR output (SG10). The TLR output is issued when the CALL DELAY timer expires. It is maintained until the RELEASE input is reinstated.

2.4 FORCE

The receipt of the FORCE (termination of the RELEASE/FORCE (R/F) input) will not cause a flashing yellow response during the period that the TLR output is activated. On receipt of the FORCE input, the MSS14 flag is set. MSS14 remains set until the FORCE input is reinstated. MSS14 is used to monitor the CALL/FORCE interval.

2.5 BOOMS HORIZONTAL

Receipt of this input is an indication that all the booms have reached horizontal. On receipt of the BOOMS HORIZONTAL input MSS13 the flag is set. MSS13 remains set until the BOOMS HORIZONTAL input is removed. MSS13 is used to monitor the duration of the booms closure.

2.6 PRE-RELEASE

The re-activation of the PRE-RELEASE input (ie Detector 23 to ON) is an indication that the train has cleared the control section of track and that the booms are about to lift.

On receipt of the PRE-RELEASE input the MSS15 flag is set. MSS15 remains set until the PRE-RELEASE input is reinstated. MSS15 is used to monitor the PRE-RELEASE/RELEASE interval.

2.7 RELEASE (R/F) INPUT

When the R/F input is reinstated (i.e. Detector 22 to ON), SG9 goes to blank and the controller is RELEASED to resume normal vehicle operation.

3.0 SPECIAL PROCEDURES

3.1 ABNORMAL CONDITIONS

These conditions should not occur in normal operation, however, when they do, appropriate steps should be taken to register the event and to take action as follows.

3.1.1 Abnormal Condition 1 - Force before TLR

Although 27 seconds at least should elapse between receipt of a CALL input and the FORCE (termination of the R/F input), there may be occasions when the FORCE occurs (R/F input is terminated) prior to the controller issuing the TLR output. This will generate ABNORMAL CONDITION message No.1 via MSS3.

3.1.2 Abnormal Condition 2 - Late Release

The RELEASE TIMER (Special Purpose Timesetting No. 26) commences counting from receipt of the PRE-RELEASE. If the R/F is not reinstated before expiry of this timer, then the controller will generate ABNORMAL CONDITION message No.2 via MSS4.

3.1.3 Abnormal Condition 3 - Force without Call

If the R/F input is terminated without a previous CALL input, the controller will generate ABNORMAL CONDITION message No.3 via MSS5.

3.1.4 Abnormal Condition 4 - Break in Cable Monitor

If there is a break in the CABLE MONITOR input, the controller will generate ABNORMAL CONDITION message No.4 via MSS6 and go to flashing yellow, until the CABLE MONITOR is reinstated. When this input is reinstated the controller will go through an all red start-up sequence and resume normal operation.

3.1.5 Abnormal Condition 5 - Booms not Horizontal

If the BOOMS HORIZONTAL input is not received during the train sequence, the controller will generate ABNORMAL CONDITION message No.5 via MSS7. This flag is set at the start of the first phase following release from the train operation.

3.2 CALL TERMINATION TIMER

When a CALL input terminates prior to the FORCE (in the presence of the R/F input), a timer will begin to count down from the timesetting in Special Purpose Timesetting No. 27. Any further CALL inputs will reset the timer. Once the FORCE is received (R/F terminated), the timer is ignored. If the R/F input is not terminated prior to expiry of the timer, then the controller will AUTO-RELEASE from the train operation and resume normal vehicle operation. The purpose of this facility is to prevent the traffic signal controller from being "locked up" indefinitely by spurious inputs (automatic track circuits) or by inadvertent or excessively early calls (manned signal-boxes).

3.3 OPERATING MODES

3.3.1 Isolated Conditions

As discussed in Section 2.1, when the CALL input is received, the MSS1 flag is set and will instruct the regional computer (via VR30) to force the controller into isolated operation. The MSS1 flag will remain on until the termination conditions are met, as dictated by the COMPENSATION sequence requirements. The details of the COMPENSATION sequence are described below:

COMPENSATION SEQUENCE

1. The first phase to run after the train phase is AØ.
2. When the CALL input is received, the MSS1 flag is set and will stay on until the start of AØ intergreen after the train phase, if running Isolated or Flexilink prior to the train phase. If running Masterlink prior to going to the train phase the MSS1 flag will stay on until the intergreen of the train phase (GØ).
3. During the compensation phase sequences as described above adopt:
 - AØ maximum extension green for AØ maximum extension green.

3.3.2 Resumption of Dynamic Mode

At the start of the train phase the MSS2 flag is set and will stay on until the start of the intergreen of the train phase. The termination of the MSS2 flag is used to determine the moment at which the cycle generator is to be set for Masterlink operation.

3.3.3 Flexilink Operation

FLEXILINK is permitted to run.

3.3.4 MSS2

MSS2 is set at the start of the train phase and will stay on until the start of the intergreen of the train phase.

3.3.5 MSS8

MSS8 is set at the start of the train phase and will stay on until the intergreen of AØ (after the train phase), or until XSF2 flag is set regardless of the mode the site was running prior to going to the train phase. XSF2 flag is set via VR45.

3.3.6 MSS9

MSS9 is set when the CALL is received and will stay on until the intergreen of AØ after the train phase.

4.0 VARIATION PARAMETER TABLES

4.1 ABNORMAL CONDITION MESSAGE No. 1

"DNC 6325 RAIL LINK: BREAK IN CABLE MONITOR

VAR10 = 5	- test for MSS flag
VAR11 = 0	- current slot
VAR12 = 6	- MSS6
VAR13 = 36	- read TC file
VAR14 = 203	- if true read TC file No. 203
VAR15 = 0	- no action if false

4.2 ABNORMAL CONDITION MESSAGE No.2

"DCL 6325 RAIL LINK: LATE RELEASE

VAR24 = 5 - test for MSS flag
 VAR25 = 0 - current slot
 VAR26 = 4 - MSS4
 VAR27 = 36 - read TC file
 VAR28 = 201 - if true read TC file No. 201
 VAR29 = 0 - no action if false

4.3 ABNORMAL CONDITION MESSAGE No.3

"DCL 6325 RAIL LINK: FORCE WITHOUT CALL

VAR30 = 5 - test for MSS flag
 VAR31 = 0 - current slot
 VAR32 = 5 - MSS5
 VAR33 = 36 - read TC file
 VAR34 = 202 - if true read TC file No. 202
 VAR35 = 0 - no action if false

4.4 ABNORMAL CONDITION MESSAGE No.4

"DNC 6325 RAIL LINK: BREAK IN CABLE MONITOR

VAR36 = 5 - test for MSS flag
 VAR37 = 0 - current slot
 VAR38 = 6 - MSS6
 VAR39 = 36 - read TC file
 VAR40 = 203 - if true read TC file No. 203
 VAR41 = 0 - no action if false

4.5 ABNORMAL CONDITION MESSAGE No.5

"DCL 6325 RAIL LINK: BOOMS NOT HORIZONTAL

VAR42 = 5 - test for MSS flag
 VAR43 = 17 - current slot
 VAR44 = 7 - MSS7
 VAR45 = 36 - read TC file
 VAR46 = 204 - if true read TC file No. 204
 VAR47 = 0 - no action if false

5.0 MSS FLAGS - SUMMARY OF OPERATIONS

5.1 MSS1, MSS2, MSS8, MSS11

This Flag are set to enable monitoring of the train.

5.2 MSS3 to MSS7

These are described under ABNORMAL CONDITIONS. (See Section 3.1.1 to 3.1.5)

5.3 MSS14 and MSS15

MSS14 and MSS15 are used to monitor the FORCE/RELEASE and PRE-RELEASE, and can be used with MSS1 to monitor the CALL to FORCE interval.

6.0 MONITORING FLAGS

To monitor XSF and MSS flags on the controller, key in:

Controller Type	Flag Type	
	XSF	MSS
QTC/ Eclipse/ ATSC4/ Alpha 16	7 (Diag) > 1 (Mem) > D8	7 (Diag) > 1 (Mem) > DA

APPENDIX 2

**STANDARD RAIL LINK CABLE TERMINATION CHART
FOR CONTROLLERS WITH RELAY OR SOLID-STATE LOAD-SWITCHING**

SITE: MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD NUMBER: 6325

MUNICIPALITY: Campaspe

DESIGNER: Nathan Corcoran

DATE: 20/04/2021

** Delete the inputs and or outputs on this page which are not used.*

RAIL-LINK DESCRIPTOR or FUNCTION	NO-TRAIN CIRCUIT STATUS	PAIR REF. No.	CONDUCTOR INSULATION COLOUR	TERMINATION DETAILS
CABLE MONITOR (CONTINUITY)	CLOSED	1st	WHITE ----- BLUE -----	DET. RETURN DETECTOR NUMBER: 20
PRE-RELEASE (FGR)	CLOSED	2nd	WHITE ----- ORANGE -----	DET. RETURN DETECTOR NUMBER: 21
RELEASE/FORCE (R/F or FCR)	CLOSED	3rd	WHITE ----- GREEN -----	DET. RETURN DETECTOR NUMBER: 22
CALL	OPEN	4th	WHITE ----- BROWN -----	DET. RETURN DETECTOR NUMBER: 23
BOOMS HORIZONTAL	OPEN	5th	WHITE ----- GREY -----	DET. RETURN DETECTOR NUMBER: 24
SPARE	OPEN	6th	RED ----- BLUE -----	NOT TERMINATED NOT TERMINATED
SPARE	OPEN	7th	RED ----- ORANGE -----	NOT TERMINATED NOT TERMINATED
SIGNALS OFF (FY or BO) RLY	OPEN	8th	RED ----- GREEN -----	(NC) "FLASH"
ACKNOWLEDGE CALL (AKN)	OPEN	9th	RED ----- BROWN -----	(NO) "A" RLY (NC) "B" RLY
TRAFFIC LIGHT RESPONSE (TLR)	OPEN	10th	RED ----- GREY -----	(NO) "A" RLY (NO) "B" RLY

For solid-state load-switching, suitable termination is as follows:

ACKNOWLEDGE CALL (AKN)	OPEN	9th	RED ----- BROWN -----	(NC) "RED" RLY (NC) "YEL" RLY (NC) "GRN" RLY
TRAFFIC LIGHT RESPONSE (TLR)	OPEN	10th	RED ----- GREY -----	(NO) "GRN" RLY

- "TLR" (and "AKN" outputs are driven by SIGNAL GROUP NUMBER: 10 using the "RED", "OFF", "GRN" and "YEL" logic states as shown in the TYPICAL SEQUENCE CHART.
- The (AKN) output may be required occasionally (for manual operation at signal-box sites) thus requiring installation of the "RED" and "YEL" 240 V relays in addition to the "GRN" 240 V relay.

SITE NAME **MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD**SITE NO. **6325****DESIGN OF INTERGREEN AND PEDESTRIAN TIMES****INTERGREEN TIMES**

PHASE	CLEARANCE DETAILS			LEGAL SPEED	DESIGN SPEED		INTERGREEN		
	GROUP TRANSITION	DISTANCE	GRADE (%)*		YELLOW	RED	YELLOW	RED	TOTAL
A	2 → P2	42.0	-0.13	60	60	60	4.0	2.5	6.5
B	6 → 3	32.0	-0.13	60	60	45	4.0	3.0	7.0
C	7 → P2	35.0	0.31	50/60	45	45	3.0	3.0	6.0
D	3 → P1	35.0	0.31	50/60	60	50	4.0	2.5	6.5
E	5 → P1	35.0	-0.13	60	45	45	3.0	3.0	6.0
F	6 → 3	32.0	-0.13	60	60	45	4.0	3.0	7.0
G	5 → P2	35.0	-0.13	60	60	45	4.0	3.0	7.0

*Positive grade indicates an uphill approach & negative grade indicates a downhill approach. Specify negative grade values with a "-" prefix

PHASE SPECIAL ALL REDS AND SPECIAL MOVEMENT ALL REDS

FROM PHASE	TO PHASE	CLEARANCE DETAILS		DESIGN SPEED	ALL RED	PHASE or S.M. No**
		GROUP TRANSITION	DISTANCE			
A	B	2 → 5	36.0	60	2.5	A AR
A	E	1 → 6	36.0	60	2.5	A AR
C	D	8 → 3	29	45	2.5	C SAR
		9 → LX	32	60	2.0	A SAR
		→				
		→				

** Specify where the timesetting is stored (the phase special all red or the special movement time setting number)

PEDESTRIAN TIMES

PED	PHASE(S)	WALK			CLEARANCE				MINIMUM SOLID DON'T WALK
		DISTANCE (m)	TIME		DISTANCE (m)	TIME			
			GRAPH	ADOPTED		GRAPH	CL1	CL2	
P1	A	23.0	8	8	23.0	15	15.0		6.5
P2	D	17.0	16	16	14.0	9	9.0		6.5

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SITE NAME **MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD**

SITE NO. **6325**

CONTROLLER TIMESETTINGS - 1

PHASE TIMESETTINGS Front Panel Command: Phase No.Timesetting No (e.g. 3.2 accesses C phase late start)

DESCRIPTION	Timesetting No	PHASE						
		A (1)	B (2)	C (3)	D (4)	E (5)	F (6)	G (7)
RED / YELLOW	1	-	-	-	-	-	-	-
LATE START	2							
MINIMUM GREEN	3	10	8	8	8	8	6	6
INCREMENT	4							
MAXIMUM INITIAL GREEN*	5							
MAXIMUM EXTENSION GREEN	6	40	0	10	20	15	15	0
EARLY CUT OFF	7							
YELLOW	8	4.0	4.0	3.0	4.0	3.0	4.0	4.0
ALL RED	9	2.5	3.0	3.0	2.5	3.0	3.0	3.0
SPECIAL ALL RED	10	2.0		2.5				
GAP 1	11	2.5	2.5	2.5	2.5	2.5	2.5	2.5
GAP 2	12	2.5	2.5	2.5	2.5	2.5	2.5	2.5
GAP 3	13	2.5	2.5	2.5			2.5	2.5
GAP 4	14	2.5	2.5	2.5				2.5
HEADWAY 1	15	0.6	1.2	1.2	1.2	1.2	1.2	1.2
HEADWAY 2	16	0.6	0.6	1.2	1.2	1.2	0.6	1.2
HEADWAY 3	17	1.2	1.2	1.2			1.2	0.6
HEADWAY 4	18	1.2	0.6	1.2				1.2
WASTE 1	19	7	7	7	7	7	7	7
WASTE 2	20	7	7	7	7	7	7	7
WASTE 3	21	7	7	7			7	7
WASTE 4	22	7	7	7				7

* Maximum Initial Green = Minimum Green + V.I.G.

PEDESTRIAN TIMESETTINGS Front Panel Command: Pedestrian No.Timesetting No (e.g. 18.2 accesses P2 walk)

DESCRIPTION	Timesetting No	PEDESTRIAN							
		P1 (17)	P2 (18)	P3 (19)	P4 (20)	P5 (21)	P6 (22)	P7 (23)	P8 (24)
DELAY	1	-	-	-	-	-	-	-	-
WALK*	2	8.0	16.0						
CLEARANCE 1	3	15.0	9.0						
CLEARANCE 2	4								

* Minimum walk time - used in Isolated and Flexilink operation

For walk times in Masterlink operation, refer to slot data.

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CONTROLLER TIMESETTINGS - 2**SPECIAL MOVEMENT TIMESETTINGS** Front Panel Command: B.Timesetting No (e.g. B.5 accesses Special Movement Timesetting No 5)

Timesetting No	Timesetting (Range: 0-5)	FUNCTION
1	2.5	SG1 ALL RED (SUBSTITUTE AØ ALL RED)
2	2.5	SG2 ALL RED (SUBSTITUTE AØ ALL RED)
3	2.5	SG3 ALL RED (SUBSTITUTE DØ ALL RED)
4	2.0	SG9 ALL RED (SUBSTITUTE AØ SPECIAL ALL RED)
5	3.0	SG5 ALL RED (SUBSTITUTE EØ ALL RED)
6	3.0	SG6 ALL RED (SUBSTITUTE BØ ALL RED)
7	3.0	SG7 ALL RED (SUBSTITUTE CØ ALL RED)
8	2.5	SG8 ALL RED (SUBSTITUTE CØ SPECIAL ALL RED)

SPECIAL PURPOSE TIMESETTINGS Front Panel Command: B.Timesetting No (e.g. B.19 accesses Special Movement Timesetting No 19)

Timesetting No	Timesetting (Range: 0-200)	FUNCTION
9		
10		
11		
12		
13		
14		
15	150	Ignore detectors 14-18 if ON for this time
16	4	P1 & P2 timesetting substitution with FØ or GØ demanded
17		
18	0	LIMIT GREEN WATCHDOG TIMER
19	0	SPECIAL FACILITY CONTROLS ALARM TIMER
20	10	ALL RED START UP INTERVAL
21	7	Delay on demand for FØ and GØ following the CALL
22	15	SG3 & SG4 maximum extension green in GØ
23	10	SG5 & SG6 maximum extension green in GØ
24	10	SG7 & SG8 maximum extension green in GØ
25	10	SG1 & SG2 maximum extension green in GØ
26	30	RELEASE TIMER
27	60	MAXIMUM TIME IN TRAIN OPERATION FOLLOWING CALL WITH NO RELEASE/FORCE TERMINATION
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

SITE NAME **MURRAY VALLEY HWY / STURT ST / OLD AERODROME RD**SITE NO. **6325****CONTROLLER TIMESETTINGS - 3****PRESENCE TIMESETTINGS**

Front Panel Command: D.Detector No (e.g. D.7 accesses presence time for detector 7)

DETECTOR No	TIMESETTING (Range: 0-10)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	3.0
15	3.0
16	5.0
17	5.0
18	5.0
19	
20	
21	
22	
23	1.0
24	

NOTE: Set presence time to zero if the detector is not a presence detector

DAILY EVENT TIMESETTINGS

FUNCTION	TIMESETTING
Daily start time (Hours)	
Daily start time (Minutes)	
Daily finish time (Hours)	
Daily finish time (Minutes)	

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FLEXILINK OPERATION**PHASE SEQUENCES**

No	PHASE SEQUENCE
1 (No Y+)	ABCDEFGG
2 (Y+)	

NOTES:

1. All phases must be specified in the phase sequence
2. Only specify phase sequence 2 if it is different from phase sequence 1.

LOOK AHEADS & RELEASES

PHASE SEQUENCE 1		
PHASE	LOOK AHEAD*	RELEASE
A	No	R-
B	No	R+
C	Yes (to D, E, F, G, A)	Auto
D	Yes (to E, F, G, A)	Q-
E	Yes (to F, G, A)	Auto
F	Yes (to G, A)	Auto
G	No	Auto

PHASE SEQUENCE 2		
PHASE	LOOK AHEAD*	RELEASE
A		
B		
C		
D		
E		
F		
G		

* Specify the phases to which look ahead is permitted, e.g. Yes (to E, F, G, A)

INHIBIT PHASES

The following phases can be inhibited in flexilink by setting the call pulse one step before the call pulse of the next phase in sequence

B, F*, G*

* Call pulse for FØ is set 2 steps before the call pulse for GØ

and call pulse for GØ is set 2 steps before the call pulse for AØ

PULSE STEP LENGTH

☐ One Second ☒ Two Second

MASTERLINK & FLEXILINK SPECIAL FLAGS

FLAG	FUNCTION
Y- Flexi	The site will operate in flexilink mode if the signal is continuously sent (C) or is used as an offset (e.g. 25)
Y- Master	
Y+ Flexi	
Z- Flexi	
Z- Master	
Z+ Flexi	
Z+ Master	
R- Flexi	AØ RELEASE PULSE
R+ Flexi	BØ RELEASE PULSE
Q- Flexi	DØ RELEASE PULSE
Q+ Flexi	

SCATS INTERSECTION DATA

The data shown on this page is typical data that can be used for testing controller operations.
This data is not necessarily applicable when the site is switched on in the field.

TYPICAL SLOT DATA

SLOT <i>n</i>	=	7	,	4	,	2
		(phases)		(split plans)		(walks)
INT	=	6325				
VC	=	5				
CS	=					
COM	=	NET				
PK	=	!				
S#	=					
LM	=					
RMN	=	0				
DCL	=	0				
AT	=	7				
BT	=	7				
CT	=	6				
DT	=	7				
ET	=	6				
FT	=	7				
GT	=	7				
W1	=	0B*	W1 T	=	22	
W2	=	16D	W2 T	=	16	
W3	=		W3 T	=		
W4	=		W4 T	=		
W5	=		W5 T	=		
W6	=		W6 T	=		
W7	=		W7 T	=		
W8	=		W8 T	=		
PP1	=	0,0A				
PP2	=	0,0A				
PP3	=	0,0A				
PP4	=	0,0A				

TYPICAL SPLIT PLAN DATA

PHASE SEQUENCE 1		PHASE SEQUENCE 2		PHASE SEQUENCE 3	
A =	0PDFGB	A =	0PDFGB	A =	
B =	1C	B =	15C	B =	
C =	15D	C =	15D	C =	
D =	20TGE	D =	20TGE	D =	
E =	15TGF	E =	15TGF	E =	
F =	1G	F =	1G	F =	
G =	1A	G =	1A	G =	

TYPICAL VARIATION PARAMETERS

VP1 =	5	VP22 =		VP43 =	
VP2 =	0	VP23 =		VP44 =	
VP3 =	1	VP24 =		VP45 =	
VP4 =	30	VP25 =		VP46 =	
VP5 =		VP26 =		VP47 =	
VP6 =		VP27 =		VP48 =	
VP7 =		VP28 =		VP49 =	
VP8 =		VP29 =		VP50 =	
VP9 =		VP30 =		VP51 =	
VP10 =		VP31 =		VP52 =	
VP11 =		VP32 =		VP53 =	
VP12 =		VP33 =		VP54 =	
VP13 =		VP34 =		VP55 =	
VP14 =		VP35 =		VP56 =	
VP15 =		VP36 =		VP57 =	
VP16 =		VP37 =		VP58 =	
VP17 =		VP38 =		VP59 =	
VP18 =		VP39 =		VP60 =	
VP19 =		VP40 =		VP61 =	
VP20 =		VP41 =		VP62 =	
VP21 =		VP42 =			

GROUP CONFLICT TABLE

PED NO	PED NO																								
	GROUP NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	1			X	X		X	X	X				X												
	2			X	X	X		X	X				X												
	3	X	X			X	X		X			X													
	4	X	X			X	X	X				X													
	5		X	X	X			X	X			X	X												
	6	X		X	X			X	X																
	7	X	X		X	X	X						X												
	8	X	X	X		X	X					X													
m	9																								
m	10																								
P1	11			X	X	X			X																
P2	12	X	X			X		X																	
	13																								
	14																								
	15																								
	16																								
	17																								
	18																								
	19																								
	20																								
	21																								
	22																								
	23																								
	24																								

CHECKED: Paul Barugahare DATE: 3/05/21

DESIGNED BY: NATHAN CORCORAN

DATE 6/07/21