



CLIENTS | PEOPLE | PERFORMANCE

# Traffic Signal Software Development

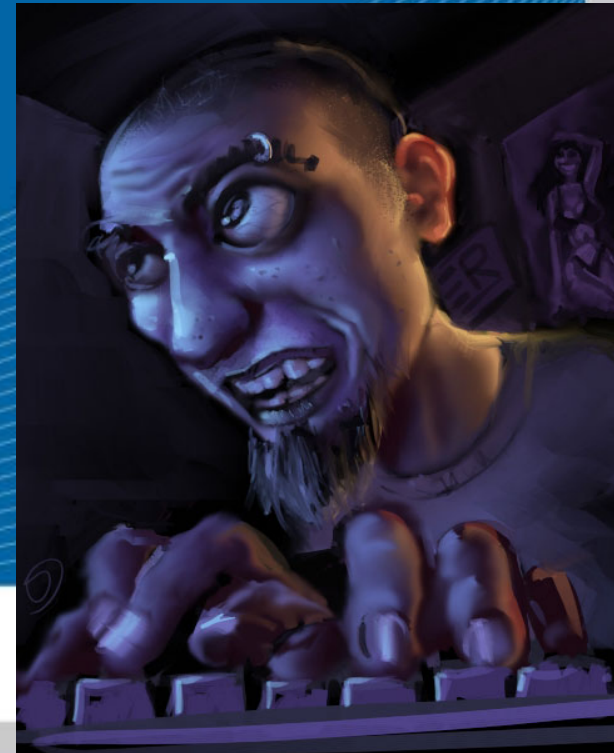
For the Traffic Management Unit

# The Process

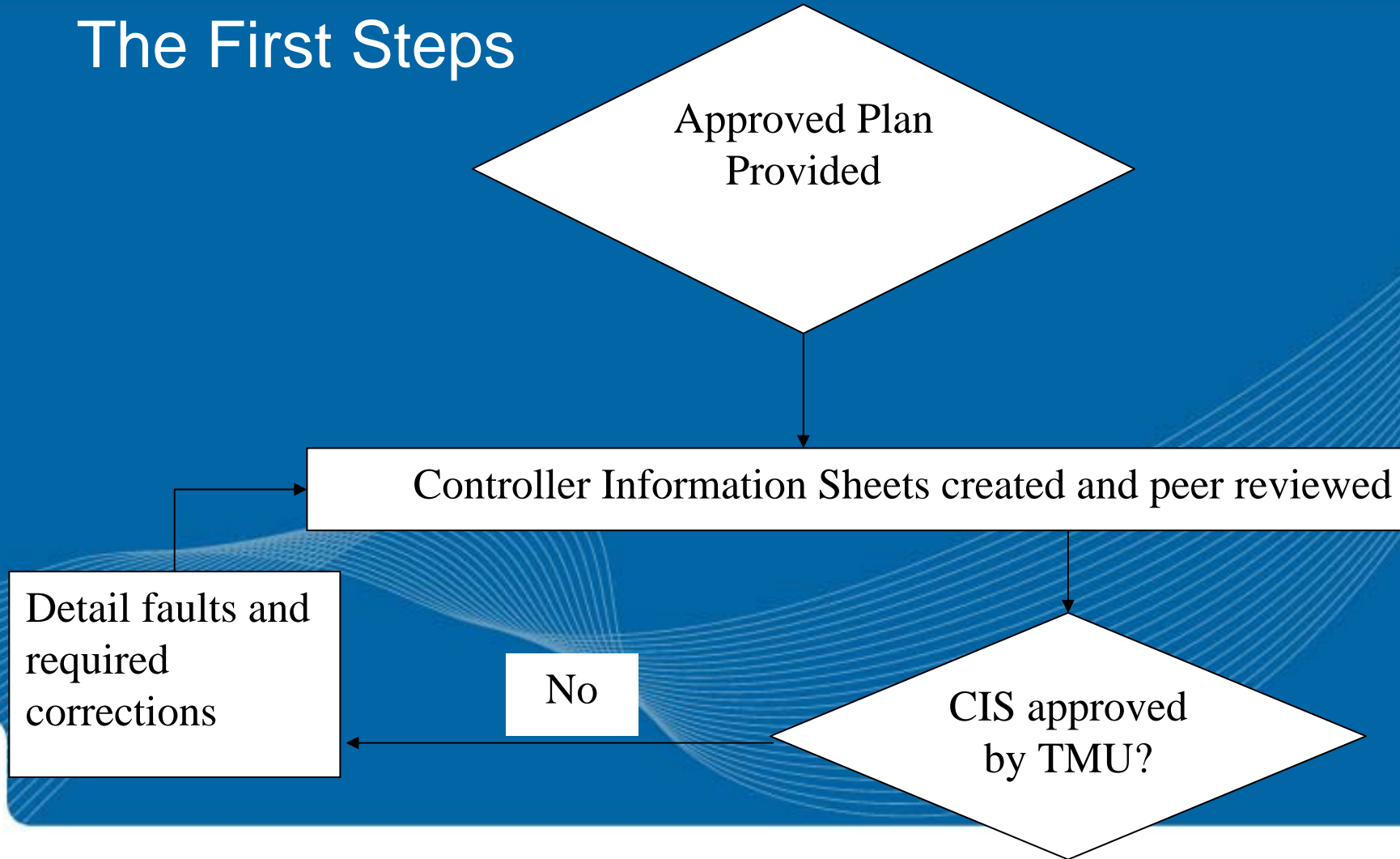
- Similar to that used for Design Guidelines
- Same Group of Traffic Signal Specialist were involved
- The process is in a constant state of evolution (Version 11)
- Software development process requires multiple steps.

# The Focus of the Process:

Transform the design drawings into usable logic that can operate the traffic signals as they were intended.



# The First Steps





CLIENTS | PEOPLE | PERFORMANCE

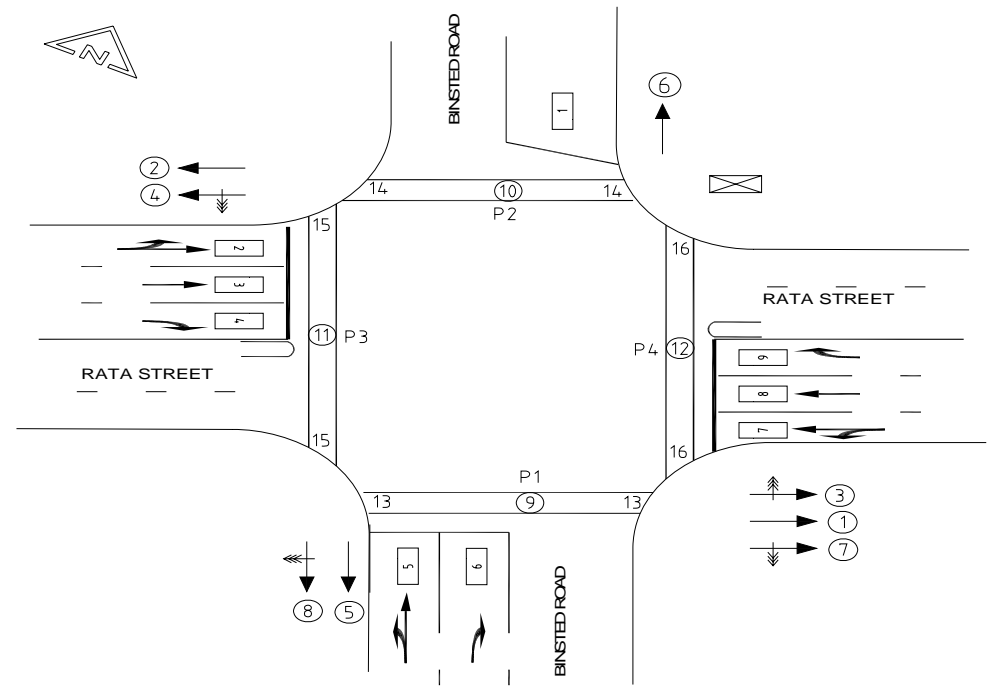
Intersection: Rata Street/Binsted Road

Date: 7/09/2006

Version: 1c

Site ID: 3002

By: Kent McNaughte



<p>A</p>	<p>D</p>	<p>E</p>	<p>F</p>
<p>B</p> <p>Z-</p>			<p>F1</p>
<p>C</p> <p>Z+</p>			<p>F2</p>



## Warning

**This PROM requires hardware changes to the intersection before installation. Do Not install this PROM until the following hardware changes have been completed**

<b>Yes</b>	<input type="checkbox"/>
------------	--------------------------

**This PROM requires SCATS data changes to the intersection before installation.**

<b>Yes</b>	<input type="checkbox"/>
------------	--------------------------

**Controller Type to be installed**

<b>PSC2</b>
-------------

**Lamp Dimming to be used**

<b>Yes</b>	<b>No</b>
------------	-----------

<b>1</b>	Vehicle & pedestrian detector numbers upgraded to TMU standard SG's numbers upgraded to TMU standard
<b>2</b>	Update SCATS data and graphic
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>7</b>	
<b>8</b>	

### SIGNAL GROUP DEFINITIONS - Active phases

Phase Group	A	B(Z-)	C(Z+)	D	E	F	G	Table	Phase Group	A	B(Z-)	C(Z+)	D	E	F	G	Table
1	A	B				F1		DO	(P1)9	W	W				W1		DO
2	A		C			F2		DO	(P2)10	W		W			W2		DO
3		B				F/F1		DO	(P3)11					W			PD1
4			C			F/F2		DO	(P4)12				W				PD1
5					E			1	13								
6				D				1	14								
7					E			DO	15								
8			C		E	F/F2		DO	16								

### Signal Group Modifications

SG	Table	Description

### PHASE INFORMATION

Start Phase :

Phase Sequence:

Alternative Sequence:



### PROHIBITS AND MAXIMUM TRANSFERS

From Phase	Prohibit to	Transfer max	Steal Max
A			
B			
C			
D			
E			
F			
G			

### MAXIMUM CONTROL AND REVERSION

MAXIMUM CONTROL AND REVERSION			
Phase	Arterial Demand	Use VIG on reversion	Reversion
A			
B			
C			
D			
E			
F			
G			

**DETECTORS**

Controller Inputs

VIG DETECTORS			
Det#	Approach SG	Det#	Approach SG

CALLING DETECTORS			
Phase	Ped#	Locking	Nonlocking
A	P1(13) P2(14)	2,3,7,8	
B		9	
C		4	
D	P3(15)	1	
E	P4(16)	5,6	
F		4,9	
Counting Detectors			

**DETECTOR ALARM CATEGORIES**

Det	1	2	3	4	5	6	7	8
Cat	0	0	0	0	0	0	0	0
Det	9	10	11	12	13	14	15	16
Cat	0	1	1	1	7	7	7	7
Det	17	18	19	20	21	22	23	24
Cat	1	1	1	1	1	1	1	1
Det	25	26	27	28	29	30	31	32
Cat	1	1	1	1	1	1	1	1

Alarmed detectors to call and extend	1-9
Alarmed detectors do not call or extend	

**PRESENCE DETECTOR DELAYS**



CLIENTS | PEOPLE | PERFORMANCE

**TIME SETTINGS**

PHASE	LS	LS SG	MG	IN	MV	MAX	ECO	ECO SG	YEL	RED	SRED
A	5	3,4	5			60			4.0	1.0	0.0
B (Z-)	5	3	5			15			4.0	1.0	0.0
C (Z+)	5	4	5			15			4.0	1.0	0.0
D	3	6	5			30			4.0	1.0	2.0
E			5			25			4.0	1.0	2.0
F			5			30			4.0	1.0	0.0

Phase	Dets	Table	SG	Appr No.	Gap	Hwy	Waste	Dets	Table	SG	Appr No.	App Timer Setting (1-4)
A	2,3	DO	2	1	3	1.2	6				5	
	7,8	DO	1	2	3	1.2	6				6	
				3							7	
				4							8	
B	9	DO	3	1	3	0.8	4				5	
	7,8	DO	1	2	3	1.2	4				6	
				3							7	
				4							8	
C	2,3	DO	2	1	3	1.2	4				5	
	4	DO	4	2	3	0.8	4				6	
				3							7	
				4							8	
D	1	1	6	1	3	1	4				5	
				3							6	
				4							7	
				4							8	
E	5	1	5	1	3	1	4				5	
	6	1	5	2	3	0.8	4				6	
				3							7	
				4							8	
F	9	DO	3	1	3	0.8	4				5	
	4	DO	4	2	3	0.8	4				6	
				3							7	
				4							8	
			1							5		
			2							6		
			3							7		
			4							8		

**Detector Table Modifications**

Description



### PEDESTRIAN TIMES

Ped No	Table No	Callaway Phase	Ped Operates in Phases	SG No	Delay Time	Cross	Clear 1	Clear 2	Ped Protection Y/N
1	DO		A,B,F1	9		6	14	3	Y
2	DO		A,C,F2	10		6	13	3	Y
3	PD1		D	11		6	16	3	Y
4	PD1		E	12		6	17	3	Y
5									
6									
7									
8									

Wait Extinguish :	Y
-------------------	---

### PEDESTRIAN PROTECTION TYPE

	Type of Protection		Conflicting Signal Group	Timer	Comments
	Partial Pedestrian	Full Pedestrian			
P1	Y		4,7	S11	
P2	Y		3	S12	
P3	Y		8	S13	
P4	Y			L.S SG 6	
P5					
P6					

Delete these notes on the working copy

Where: **Partial Ped Protection** requires a timer for the Red Arrow protection

**Full Ped Protection** does not require a timer as the SG Table uses the WALK-Clearance + Z5 flag to hold the Red Arrow and introduces the Green at end of the Red Arrow SG at the end of Ped subject to the Z5 flag.

If a Ped does not require **ANY** protection, then answer **N** to both and put note in comment field eg. "**None required.**"



### SPECIAL PURPOSE TIMERS

Timer	Function	Value	Timer	Function	Value	Timer	Function	Value
1			9			17		
2			10			19		
3			11	Partial prot for P1	5	20	All-Red on start up	10
4			12	Partial prot for P2	5	21		
5			13	Partial prot for P3	3	22		
6			14			23		
7			15			24		
8			16			25		

Audio times set for audio tactile
TSH=06 TSM=55 (start 06:55hrs)
TFH=20 TFM=45 (finish 20:45hrs)

Lamp Dimming Voltage	
Lamp Dimming Start Time	
Lamp Dimming End Time	

### NOTES

1	Standard single diamond overlap with split side roads (non filter with filter option)
2	B phase allowed to introduce if Z- flag active under Masterlink or Flexilink
3	C phase allowed to introduce if Z+ flag active under Masterlink or Flexilink
4	SG3 permitted to filter when XSF 1 is active; SG4 permitted to filter when XSF2 is active.
5	5 sec L.S for S.G's 3 & 4 when allowed to filter.

### SPECIAL LOGIC

1	
2	



### FLEXI LINK DATA - Sequence 1

Phase	Look Ahead To	Release (R-, R+, Q-, Q+)
A	Pivot	R-
B		
C		
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

\* No look ahead on Pivot Phase

### FLEXI LINK DATA - Sequence 2

Phase	Look Ahead To	Release (R-, R+, Q-, Q+)
A	Pivot	R-
B		
C		
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

\* No look ahead on Pivot Phase

### MASTERLINK & FLEXILINK SPECIAL FLAGS

Flag	Function
Y- Flexi	C' (Continuous) entry or an offset value will enable Flexilink
Y- Master	Auto recall for pedestrian demands
Y+ Flexi	Run alternative sequence
Z- Flexi	Allows the introduction of B phase
Z- Master	Allows the introduction of B phase
Z+ Flexi	Allows the introduction of C phase
Z+ Master	Allows the introduction of C phase
XSF1 Flexi,Master	SG3 permitted to filter
XSF2 Flexi,Master	SG4 permitted to filter





**corrections**

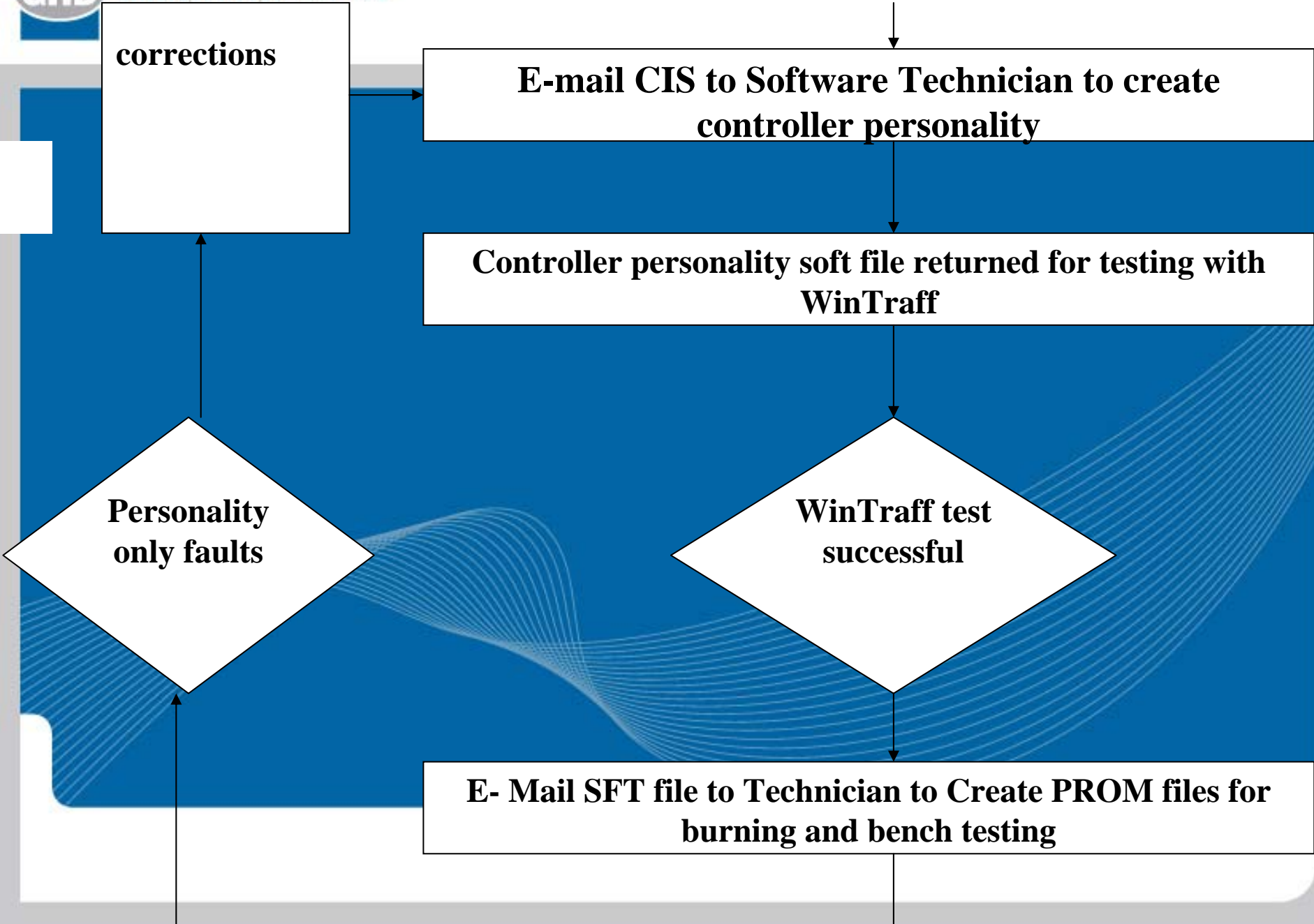
**E-mail CIS to Software Technician to create controller personality**

**Controller personality soft file returned for testing with WinTraff**

**Personality only faults**

**WinTraff test successful**

**E- Mail SFT file to Technician to Create PROM files for burning and bench testing**





**Personality  
only faults**

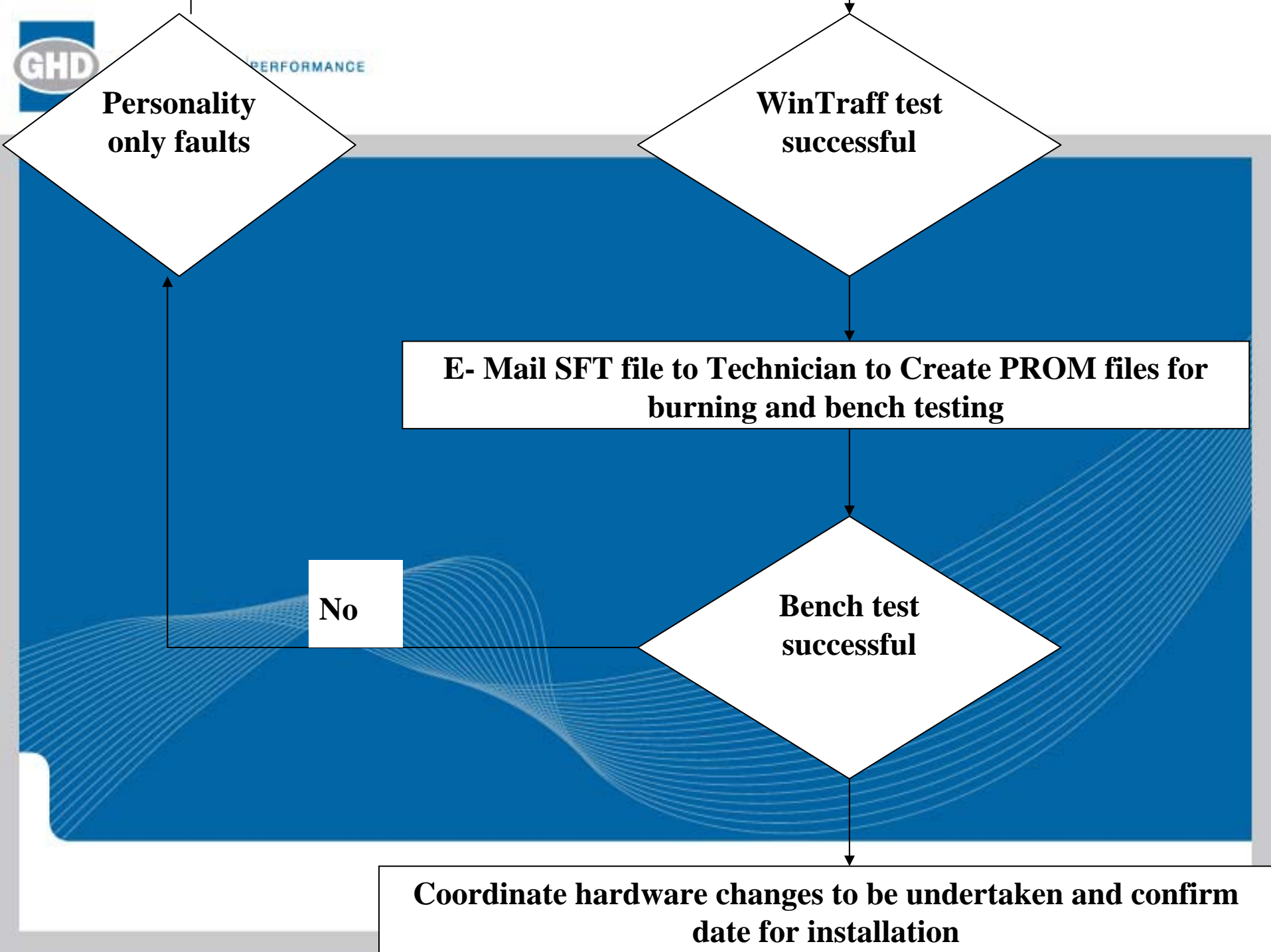
**WinTraff test  
successful**

**E- Mail SFT file to Technician to Create PROM files for  
burning and bench testing**

**No**

**Bench test  
successful**

**Coordinate hardware changes to be undertaken and confirm  
date for installation**





# Where to from here

- The TMU is using this software development process to improve consistency of operation in the field.



# Question

Does the group believe that this software development process should be adopted nationally?



CLIENTS | PEOPLE | PERFORMANCE



**End**  
Thank you

