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#### 1.0 TUJUAN

Menyediakan prosedur terhadap kawalan penyelenggaraan peralatan untuk memastikan kesemua peralatan tol diselengara secara berkala bagi memastikan lorong tol beroperasi dengan optimum selaras dengan *Arahan Operasi Tol LLM-GP/T33-12*.

## **2.0** SKOP

Menjalankan aktiviti Preventive Maintenance untuk peralatan kutipan tol di Lebuhraya KL-Karak (KLK) dan Lebuhraya Pantai Timur Fasa 1 (LPT1) yang merangkumi kesemua peralatan tol, komponen eletronik dan CCTV mengikut garis panduan borang *TCS Routine Maintenance Checklist* (Appendix A).

#### 3.0 PROSEDUR

- 3.1 Berdasarkan manual *Arahan Operasi Tol LLM-GP/T33-12* dan juga target kualiti objektif berkenaan 'lane uptime', IT Admin akan menyediakan jadual perancangan tahunan Preventive Maintenance untuk plaza tol di KLK dan LPT1.
- 3.2 Jadual akan dihantar kepada Ketua Jabatan Alloy Toll Management (ATM) untuk diluluskan dan direkod pada bulan November setiap tahun.
- 3.3 Jadual yang telah diluluskan akan diedarkan kepada Pengurus Operasi, Pegawai Eksekutif Operasi, Juruteknik IT dan kepada semua plaza tol untuk rekod penyimpanan dan rujukan.
- 3.4 Juruteknik IT hendaklah memaklumkan kepada pihak plaza tol terlebih dahulu untuk melakukan Preventive Maintenance dan setelah kebenaran diberi, barulah Preventive Maintenance dilakukan.
- 3.5 Preventive Maintenance hendaklah dilakukan berpandukan garis panduan borang *TCS Routine Maintenance Checklist Toll Plaza*. (*Appendix A*)
- 3.6 Sekiranya Preventive Maintenance tidak dapat dilakukan pada tarikh yang dijadualkan, Juruteknik IT perlu mengisi borang 'Re-Schedule Preventive Maintenance Inspections Form' untuk pindaan tarikh pemeriksaan. (*Appendix B*)
- 3.7 Segala kerja yang dilakukan oleh pihak Juruteknik IT hendaklah dipantau oleh Penyelia Tol.
- Jika terdapat kerosakan pada peralatan tol, kerja pembaikan hendaklah dilakukan dan dimaklumkan kepada Penyelia Tol untuk direkodkan dalam EMIS.

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- 3.9 Penyelia Tol hendaklah memastikan semua lorong beroperasi dengan baik selepas Preventive Maintenance dilakukan, dan juga borang *TCS Routine Maintenance Checklist Toll Plaza* hendaklah disahkan dan ditandatangan.
- 3.10 Salinan borang *TCS Routine Maintenance Checklist Toll Plaza* hendaklah diberikan kepada pihak plaza untuk rujukan dan penyimpanan rekod.
- 3.11 Keberkesanan Preventive Maintenance diukur melalui prestasi pembukaan lorong (lane uptime) seperti yang dinyatakan di kualiti objektif.
- 3.12 Eksekutif Toll Monitoring di ibu pejabat akan membuat kompilasi dan semakan ke atas prestasi pembukaan semua lorong tol. Data yg diperolehi akan diterjemahkan dalam bentuk jadual dan graf. Keputusan prestasi 'lane uptime' sama ada mencapai target kualiti objektif atau tidak, akan dikongsi bersama pihak IT dan plaza tol pada setiap bulan sebagai makluman, rujukan, analisis dan penambahbaikan.
- 3.13 Jadual Preventive Maintenance, borang *TCS Routine Maintenance Checklist Toll Plaza* dan keputusan prestasi 'lane uptime' akan disimpan di dalam fail di setiap tol plaza sebagai rujukan.

### 4.0 KLAUSA BERKAITAN

- 4.4.1 Quality Management System and Its Processes
- 7.4 Communication
- 7.5.3.2 Control Of Documented Information
- 9.1.1 Monitoring, Measurement, Analysis and Evaluation

### 5.0 REKOD KUALITI

No	Tajuk	Tempoh Simpanan
1	TCS Routine Maintenance Checklist Toll Plaza	3 Tahun
2	Re-Schedule Preventive Maintenance Inspections Form	3 Tahun

## Alloy Toll Management Sdn Bhd

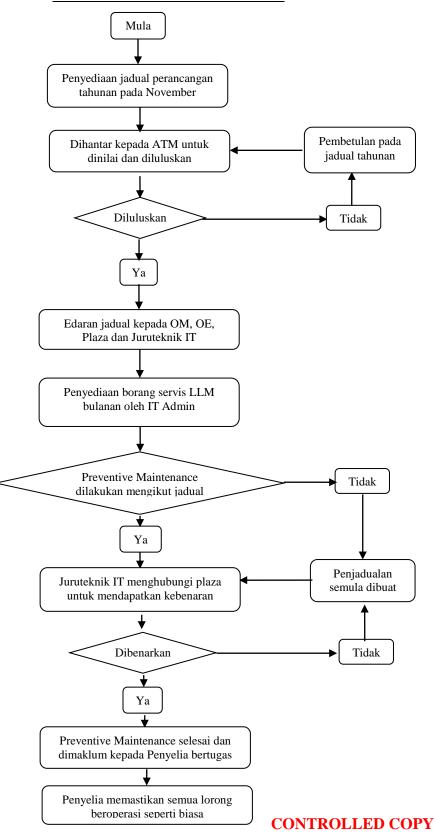
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## Preventive Maintenance Flow Chart



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## APPENDIX A

Borang servis disemak dan disahkan oleh Penyelia Tol

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	No : ctive				Las	t Page Re Page N					
NO. OF MANPOWER  ARRIVAL TIME  DEPARTURE TIME  LOCATION ABB. & BOUND  ROUTINE SCHEDULE DATE  ROUTINE ACTUAL DATE											
TITLE : TCS ROUTINE MAINTENANCE CHECKLIST - TOLL EQUIPMENT ( PLAZA )						PLA	ZA EQU	IPMEN	ITS		
	Minute					Plaz	a Equipm	nents			
EQUIPMENT / WORK DEFINITION	s	Freq	PCS	PCS T	VT	RTDM	T TOD 1/2	СМТ	scw	POS	PC EMAIL
A) Get permission from Plaza Supervisor to close the lane - No(X), Yes(		×/√					$\perp$				
B) Hardware & Software - System Checking	20				_						
1 General cleaning & Visual Inspection		1/M			1		_				
2 Check software version & parameter status		1/M			-						
3 Check registry & .ini files		1/M			-						
4 Check antivirus application and pattern update		1/M			1		_				
5 Check setting & configuration ( Regional / Date / Time setting )		1/M			+		-				
6 Check HDD space housekeeping		1/M			+		-				
7 Remove / delete unused programs / files 8 Run scandisk / Virus cleaning		1/M 1/M					-				
9 Reboot system systematically		1/M			+		_				
Method :		1/1	Remar	·ke ·							l
Oiling / Greasing all moving mechanical parts ( CLE / TTR ) Check TTR / Dispenser ( CLE ) Make sure control card feeder, well function. ( CLE ) Oiling / Greasing all moving mechanical parts. ( CLE )			-								
						Plaz	a Equipm	nents			
C) Others Equipments in the Plaza Control	15	Freq	Porta Read		Printer DVR CCTV CCTV Main Alarm Par					n Panel	
1 General cleaning & Visual Inspection		1/M									
Visual inspection and check/test functionality		1/M		_							
3 Check for loose connection, wire damage and burn marks		1/M		$\dashv$							
4 Check and clean internal parts from accumulated dirt/dust		1/M 1/M		$\dashv$							
5 Visual check of cable, Power & communication.  Method :		1/™	Domar	-les i							
1 Check Alarm Panel Control Board ( Alarm Panel )			Remar	KS :							_
Actual :	40		P-								
PAR	REPLA		т								
Equipment Type	Qty	кераіг				Serial Nu	mber ( if a <sub>l</sub>	pplicable	)		
		80									
Remarks by :											
-											
Reported By C Contractor	hecked I	Зу	Acknowledge By :								
News											
Name :											
Designation :											

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NO. OF MANPOWER ARRIVAL TIME   COCATION ASB. & BOUND   GRK   EAST	В	Ref. No: 101-2008 Last Page Rev:  Effective Date: Page No:													
TITLE : TCS ROUTINE MAINTENANCE CHECKLIST			<u> </u>												r e
TITLE   T. CS ROUTINE MAINTENANCE CHECKLIST   TOLL EQUIPMENT (LANE)   TITLE   TOLL EQUIPMENT (LANE)											GI				
FOUL EQUIPMENT / WORK DEFINITION		-										_	_		
FOUL EQUIPMENT / WORK DEFINITION															
EQUIPMENT / WORK DEFINITION	TITLE		ST .								Tr	ıG			
A) Get permission from Plaza Supervisor to close the lane - No(X), Ves(V)  B) Software - System Checking  1 Lugin maintenance mode then Log Out, Write Job No. 2 Check software version is Parameter status 3 Check registry & Jun files 4 Check antivinas application and pattern update 5 Check setting a configuration (Regional / Date / Time setting) 6 Check viby pagen found-keeping 7 Run scandisk / Vinas cleaning 1 In all Collector Display (TCD) 2 Receipt Printer (RPR) 3 Revolution (TCD) 3 Receipt Printer (RPR) 3 Revolution (TCD) 4 Receipt Printer (RPR) 3 Revolution (TCD) 5 Canabia Repeater / Network 4 Finear / Fool Switch (FSW). 3 Test function of Few from lane to Control Plaza(Check Emg. Alarm ON ) 5 Canabia Repeater / Network 6 Contact Repeater / Network 7 Closed-Circuit Television (CCTV) 8) Check (unclonality of LED, text display & buzzer 9) Check (unclonality of and etabetion on Check (unclonality of LED, text display & buzzer 9) Check (unclonality of and etabetion on Check (unclonality of LED, text display & buzzer 9) Check (unclonality of LED, text display & buzzer 1) Check (or for lose connection, wire damage and burn marks c) Visual check of cable, power & communication. 8 Lane Control System (LCS) 9 System Shutdown (LS / IPC systematically c) Check (LS Gr. p) Check (Lighting Surge Protection & Earthing cable connection b) Check (LS Gr. p) Check (Sor p) Check (S			I						1	ane N	lumbe	r			
Second Septem Checking   15   100 No.   100		EQUIPMENT / WORK DEFINITION		Minutes	Freq	T01	T02	T03	T04	T05	T06	T07	T08	Т09	T10
1 Login maintenance mode then Log Out, Write Job No. 2 Check software version & parameter status 3 Check registry & .ini files 4 Check antivirus application and pattern update 5 Check setting & configuration (Regional / Date / Time setting) 6 Check HDD space housekeeping 7 Run srandisk / Virus cleaning 1 J/M 1	A) Get	t permission from Plaza Supervisor to close the lane - No	o(X), Yes(√)	5	X / √										
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a) Check functionality of LED, text display & buzzer b) Check functionality of card detection 7 Closed-Circuit Television (CCTV) a) General cleaning & Visual Inspection b) Check for loose connection, wire damage and burn marks c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V) e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Visual check of cable, Power & communication. ( All ) TTR Note :- All the tickets and all recorded number of tickets		a) Check cable network connector			1/M										
b) Check functionality of card detection 7 Closed-Circuit Television (CCTV) a) General cleaning & Visual Inspection b) Check for loose connection, wire damage and burn marks c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V) P/Supply 5V DC P/Supply 24V DC e) Visual check of cable, power & communication. 8 Lane Control System (LCS) a) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Supply 24V DC P/Supply 12V DC P/Supply 24V DC P/Supply 12V DC P/Supply 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Supply 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC P/Sup	6	Contactless Smart Card Reader / Controller (CSC	1		1/M										
7 Closed-Circuit Television (CCTV) a) General cleaning & Visual Inspection b) Check for loose connection, wire damage and burn marks c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V)  P/Supply 5V DC P/Supply 24V DC e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All ) TTR Note: - All the tickets and all recorded number of tickets		a) Check functionality of LED, text display & buzzer			1/M										
a) General cleaning & Visual Inspection b) Check for loose connection, wire damage and burn marks c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V)  e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V		b) Check functionality of card detection			1/M										
a) General cleaning & Visual Inspection b) Check for loose connection, wire damage and burn marks c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V)  e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V	7	Closed-Circuit Television (CCTV)			1/M										
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c) Visual inspection and check/test functionality d) Check all voltage levels (5V, 24V)  P/Supply 5V DC P/Supply 24V DC e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V DC P/Supply 12V DC P/Supply 14V DC P/Supply 14V DC P/Supply 15V D			n marks		1/M										
d) Check all voltage levels ( 5V, 24V )  P/Supply 5V DC  P/Supply 24V DC  e) Visual check of cable, power & communication.  8 Lane Control System (LCS)  a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 12V DC  P/Supply 14V DC  P/Supply 14V DC  P/Supply 14V DC  P/Supply 14V DC  P/Supply 15V DC  P/Supply					1/M										
e) Visual check of cable, power & communication.  8 Lane Control System (LCS) a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC P/Supply 24V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 24V DC  P/Supply 12V DC P/Supply 12V DC P/Supply 12V DC P/Supply 24V DC  P/S		d) Check all voltage levels ( 5V, 24V )	Ī	P/Supply	5V DC										
8 Lane Control System (LCS) a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets			ľ	P/Supply	24V DC										
8 Lane Control System (LCS) a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets		e) Visual check of cable, power & communication.	ľ		1/M										
a) Check Lightning Surge Protection & Earthing cable connection b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC P/Supply 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method:  - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets	8	Lane Control System (LCS)			1/M										
b) Check LCS fan, IPC fan & CPU fan. c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC P/Supply 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets			ble connection		1/M										
c) Check DI card, SSR card & RMS Board d) Check and measure voltage, 12V & 24V DC  P/Supply 12V DC P/Supply 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets		b) Check LCS fan, IPC fan & CPU fan.			1/M										
P/Supply 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method: - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All ) TTR Note: - All the tickets and all recorded number of tickets		c) Check DI card, SSR card & RMS Board			1/M										
P/Supply 24V DC  9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method:  - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets		d) Check and measure voltage, 12V & 24V DC	Ī	P/Supply	12V DC										
9 System Shutdown a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method:  - General cleaning all casing internal and external parts from dust ( All ) - Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets				P/Supply	24V DC										
a) Shutdown LCS / IPC systematically b) Off Power ELCB and all MCB in the LCS.  Method:  General cleaning all casing internal and external parts from dust ( All ) Check for loose connection, wire damage and burn marks ( All ) Oiling / Greasing all moving mechanical parts ( TTR, RPR ) Visual check of cable, Power & communication. ( All )  TTR Note:- All the tickets and all recorded number of tickets	9	System Shutdown	<u> -</u>												
b) Off Power ELCB and all MCB in the LCS.    Method :															
Method:  General cleaning all casing internal and external parts from dust ( All )  Check for loose connection, wire damage and burn marks ( All )  Oiling / Greasing all moving mechanical parts ( TTR, RPR )  Visual check of cable, Power & communication. ( All )  TTR Note: All the tickets and all recorded number of tickets															
- Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets	Method				10.4.97										
- Check for loose connection, wire damage and burn marks ( All ) - Oiling / Greasing all moving mechanical parts ( TTR, RPR ) - Visual check of cable, Power & communication. ( All )  TTR Note: - All the tickets and all recorded number of tickets			from dust ( All )			Rema	irks :								
- Visual check of cable, Power & communication. ( All )  TTR Note :- All the tickets and all recorded number of tickets	-		1/50 51												
TTR Note :- All the tickets and all recorded number of tickets	-														•
2002 9000000000000000000000000000000000		Visual check of cable, Power & communication. ( All )													
must be passed to Toll Supervisor at end of	TT	R Note :- All the tickets and all recorded number of tick	kets												<u>1</u>
		must be passed to Toll Supervisor at end of													

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## APPENDIX B

PT 21.00

## RE-SCHEDULE PREVENTIVE MAINTENANCE INSPECTIONS FORM ROUTINE MAINTENANCE SCHEDULE AT ......TOLL PLAZA

LANE	MONTH - Property April 1944 Property Pr						
M01 / T01	Schedule Date	Actual Date	Reason to Re-Schedule	Initialed By			
M02 / T02							
M03 / T03	3						
M04 / T04		0		9			
T05	y.						
T06		2					
T07							
T08		3		59			
T09				100			
T10							
T11							
T12	1						
T13				33			
CO1 / BO1							
C02 / B02							
K03/B03	13						
C04 / B04		3					
05 / B05							
06 / B06		1 2					
B07	3	5.0					
B08		3		0			
B09							
B10							
B11	3	P					
B12		3		50			
B13							
20120	19			000000000000000000000000000000000000000			
pared by:		•	Checked By:	Acknowledged By:			
 Fechnician			T Executive	Supervisor Plaza			

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## DOCUMENT AMENDMENT REGISTER

NO	DATE	REASON	CHAPTER	VERSION
1	15/10/2020	Initial Release	All	1.0