Metrolinx

Reliability, Availability and Maintainability Plan for [contracted project]

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Authorization

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Documents

|  |  |  |
| --- | --- | --- |
| Table 0-1 Supporting Documents | | |
| Document Number | Document Title | Relation |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Acronyms and Abbreviations

| Table 0- Acronyms and Abbreviations | |
| --- | --- |
| **Acronym** | **Full Name** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Definitions

Table 0- Definitions

|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **Source** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

\*This template is intended to be used in compliance with MX-SEA-PD-119 RAM Plan: Product Description standard\*

# Introduction

## Purpose

### Heading 3

#### Heading 4

##### Heading 5

###### Heading 6

## Scope

## RAM Plan Responsibility

# RAM Policy

## 

# System Boundary

## Physical Boundary

## Interfaces with Third Parties

# System Description

## 

# RAM Organization

## Project Organization

## Project Roles and Responsibilities

# RAM Management

## 

Table 0- Phase-Related RAM Tasks

| **Lifecycle Phase** | **Phase-Related RAM Tasks** |
| --- | --- |
| 1. Concept |  |
| 2. System Definition and Operational Context |  |
| 3. Risk Analysis and Evaluation |  |
| 4. Specification of System Requirements |  |
| 5. Architecture and Apportionment of System Requirements |  |
| 6. Design and Implementation |  |
| 7. Manufacture |  |
| 8. Integration |  |
| 9. System Validation |  |
| 10. System Acceptance |  |
| 11. Operation, Maintenance, and Performance Monitoring |  |
| 12. Decommissioning |  |

# Reliability

## Reliability Targets

## Reliability Analysis and Prediction

Table 0- Functional Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Functional Analysis | | | |
| System Title |  | | |
| System Description |  | | |
| Function ID |  | | |
| Primary Function |  | | |
| Secondary Function(s) |  | | |
| Interfaces |  | | |
| Physical Interface |  | | |
| Functional Interface |  | | |
| Functional Failure Ref ID |  | | |
| Elements | Function | No. of Items | Redundancy? |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Miscellaneous Notes | | | |
|  | | | |

Table 0- Sample FMECA Template

|  |  |  |
| --- | --- | --- |
| FMECA | | |
| Functional Failure Ref ID | |  |
| System | |  |
| Subsystem | |  |
| LRU name | |  |
| Failure Mode | |  |
| Failure Mode Apportionment | |  |
| Source of Failure Mode | |  |
| Failure Effects | Local Effect |  |
| System Effect |  |
| Escalation |  |
| System Impact |  |
| Failure Management | Detection |  |
| Diagnostic |  |
| Isolation |  |
| Mitigation |  |
| Operational Response |  |
| Maintainability | Mean Time to Service (MTTS) (hours) |  |
| Mean Down Time (MDT) (hours) |  |
| Reliability Prediction | Item Failure Rate |  |
| Units |  |
| Number of LRUs |  |
| Modal Apport |  |
| Effective Modal Failure Rate (failure per hour (fph)) |  |
| Effective Modal Failure Rate (failure per year (fpy)) |  |
| Data Source |  |
| Reliability Criticality | Frequency Category |  |
| Severity Category |  |
| Reliability Criticality Rating |  |
| Comments/Notes | |  |

## Sensitivity Analysis for Reliability

## Reliability Testing

## Reliability Data Acquisition and Assessment

# Availability

## Availability Targets

## Availability Analysis and Prediction

## Sensitivity Analysis for Availability

## Availability Data Acquisition and Assessment

# Maintainability

## Maintainability Targets

## Maintainability Analysis and Prediction

Table 0- Corrective Maintenance Analysis Field Descriptions

| Field | Description |
| --- | --- |
| Ref. No. |  |
| Item Description |  |
| LRU Function |  |
| LRU Weight (kg) |  |
| LRU Dimension (L, W, H) |  |
| Quantity of LRU (Nj) |  |
| Individual Failure Rate per Hour (λi) |  |
| Nj \* λi |  |
| MTTRi |  |
| Ni \* λi \* MTTRi (Total MCT hours, per unit) |  |
| Qi |  |
| Skill Level Required |  |
| Special Tools Required |  |
| Failure Indication |  |

Table 0- Preventive Maintenance Analysis Field Descriptions

| Field | Description |
| --- | --- |
| Ref No. |  |
| Item Description |  |
| Task Description |  |
| Subsystem Function |  |
| Number of LRU |  |
| Task Interval (per Year) |  |
| Time Required (Hours) |  |
| Personnel Required |  |
| Required Man Hours |  |
| Man Hours per Year |  |
| Skill Level Required |  |
| Special Tools Required |  |
| Remarks |  |

## Logistic Support Evaluation

# Project RAM Delivery Program

## 

<Appendix Title>