**CAPITAL PROJECTS AND**

**FACILITIES MANAGEMENT**

**INFRASTRUCTURE**

**OPERATIONS AND MAINTENANCE MANUAL**

**MAY 2022**

1. **MECHANICAL MANUAL**

**Project Name:** i.e. Aconex project name

*Project Description: Provide a brief description and location*

|  |  |
| --- | --- |
| UoA Project Number: |  |
| UoA Project Building Name(s):  UoA Project Location/Address:  UoA Building Number: |  |
| UoA Project Manager: |  |
| UoA Project Number: |  |
| Consultant: |  |
| Architect: |  |
| Contractor: |  |
| Practical Completion Date: |  |

**Contents**

[i. Document Control Resources](#_Toc49164396)

[ii. Document Approval, Use and Revision History](#_Toc49164397)

[iii. Document Guide](#_Toc49164398)

[1.1 Description of the Installation](#_Toc49164399)

[1.2 Directory of Contacts](#_Toc49164400)

[1.3 Asset Register](#_Toc49164401)

[1.4 Defects Liability Period (DLP) Maintenance Schedule](#_Toc49164402)

[1.5 Care and Maintenance Instructions](#_Toc49164403)

[1.6 Essential Services Provisions](#_Toc49164404)

[1.7 Certificates and Warranties](#_Toc49164405)

[1.8 Installation, Dismantling and Technical (Performance) Data](#_Toc49164406)

[1.9 Operating Instructions](#_Toc49164407)

[1.10 As-Built Drawings](#_Toc49164408)

[1.11 Commissioning and Testing Data](#_Toc49164409)

[1.12 Specialist Tools and Testing Equipment](#_Toc49164410)

[1.13 Spares and Consumables](#_Toc49164411)

[1.14 Imported Equipment](#_Toc49164412)

1. Document Control Resources

Roles and responsibilities

Insert **‘Applicable’** or **‘Not Applicable’** for Stakeholders involved in the consolidation/review process.

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Role** | **Person(s) or Position(s)** | **Applicable/**  **Not Applicable** |
| Document Controller | Document Controller | XXXX  [The same person on each document] |  |
| Document Owner/Approver | Document Owner/Approver | Director Capital Project Delivery and Facilities Management |  |
| [Contractor] | Document Originator | [Title] |  |
| [Consultant] | Document Reviewer | [Title] |  |
| University of Adelaide | Document Reviewer | Project Manager |  |
| University of Adelaide | Document Reviewer | Senior Technical Officer |  |
| University of Adelaide | Document Reviewer | Facility Manager North Terrace  (High Priority) |  |
| University of Adelaide | Document Reviewer | Facility Manager North Terrace (Medium Priority) |  |
| University of Adelaide | Document Reviewer | Facility Manager North Terrace (Low Priority & Support) |  |
| University of Adelaide | Document Reviewer | Facility Manager North Terrace (Soft Services) |  |
| University of Adelaide | Document Reviewer | Facility Manager Roseworthy Campus |  |
| University of Adelaide | Document Reviewer | Facility Manager Waite Campus |  |
| University of Adelaide | Document Reviewer | Senior Space Data Coordinator |  |
| University of Adelaide | Document Reviewer | Maintenance Scheduling Officer |  |

1. Document Approval, Use and Revision History

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Volume** | **Version** | **Date** | **Reason** | **Company** | **Person(s) or Position(s)** | **Comments** |
| [Example:  No. of Volume] | [Example:  Revision Letter or Number] | [Example:  Date of Revision i.e. 2020-02-02] | [Example:  Amendment, Review, Transmitted, etc.] | [Example:  Company Name] | [XXXX [Name]  XXXX [Title]] | [Example:  DRAFT Manual Issued to UoA PM for review] |
| Etc. | Etc. | Etc. | Etc. | Etc. | Etc. | Etc. |

Sample table format as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Volume** | **Version** | **Date** | **Reason** | **Company** | **Issued by**  **(inc. Position)** | **Issued to (inc. Position)** | **Comments** |
| 1 | 1 | 2022-05-18 | 50% review | ABC Builder | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | 50% submission sent to UoA for review |
| 1 | 2 | 2022-05-25 | 50% review | UoA | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | 50% UoA review received with comments |
| 1 | 2 | 2022-06-08 | 90% review | ABC Builder | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | 90% submission sent to UoA for review |
| 1 | 2 | 2022-06-15 | 90% review | UoA | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | 90% UoA review received with comments |
| 1 | 3 | 2022-05-29 | 100% review | ABC Builder | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | 100% submission sent to UoA for review |
| 1 | 3 | 2022-07-06 | 100% review | UoA | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | UoA endorsed 100% documentation package |
| 1 | 4 | 2022-077-07 | Issued for Archiving | ABC Builder | [Name]  XXXX  [Title]  XXXX | [Name]  XXXX  [Title]  XXXX | Sent to UoA for archiving |

Note:

1. This section should only present (3) three review types as per the *“Post-Construction Documentation – O&M Manual Review Matrix”,* i.e.:

* 50% Review;
* 90% Review for PC Endorsement;
* 100% Review; and
* Issued for Archiving.

1. Document Guide

This template is based upon the Natspec guidelines and reference the University of Adelaide’s Design Standards throughout this document.

Refer to ‘National section Matrix’ for further information relating to the Natspec structure.

Should a section not be applicable to this trade discipline, place ‘Not Applicable’ in the respective section.

**Exclude all irrelevant matter within this template.**

## Description of the Installation

Provide a full description of the project including but not limited to the following:

1. Overall scope of works
2. Project Specific Location i.e. UniSpace reference
3. Listing of the trades
4. Project stages
5. Project commencement and completion dates
6. Any work which may have been completed by others (i.e. works completed by others and not the Contractor)

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Project Description’ |

## Directory of Contacts

Provide in table format a combined contact list which includes Contractors, Consultants, UoA Project Manager and this trade discipline.

Contact details to be provided in order as follows:

1. Company Name
2. Contact Name (Representative)
3. Company Position
4. Contact Number (Representative)
5. Company Address
6. Company Email Address
7. After-Hours Contact Name
8. Contact Number

Sample table format as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Trade Discipline** | **Company Name** | **Contact Name (Representative)** | **Contact Number (Representative)** | **Company Address** | **Company Email Address** | **After-Hours Contact Name and Contact Number** |
| Contractor |  |  |  |  |  |  |
| Consultant |  |  |  |  |  |  |
| UoA Project Manager |  |  |  |  |  |  |
| Trade Discipline |  |  |  |  |  |  |
| Etc. |  |  |  |  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Directory of Contacts’ |

## Asset Register

The Contractor (in conjunction with the Consultant) are to provide an asset register reflecting all new, removed/demolished assets during the construction process.

Note:

1. The Contractor must provide item 1.3 (2) two months prior to Practical Completion for review and approval by the University of Adelaide.
2. Provide the asset register in the template provided supplied in an .xls file document.
3. Consultant to identify assets which have been removed/demolished.
4. At start-up phase the UoA representative is to complete responsibility column of asset register to identify Infrastructure or Departmental maintained assets.
5. Asset register to be submitted in conjunction with the Defects Liability Period (DLP) Maintenance Schedule.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Asset/equipment register’  Schedule 4 for ‘asset register’ template |

## Defects Liability Period (DLP) Maintenance Schedule

The Contractor is required to provide a combined maintenance schedule in a spreadsheet, provided by the University. Provide maintenance schedule (2) two months prior to Practical Completion.

Sample table format as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Equipment Code** | **Site** | **PM Procedure** | **Date for First DLP PM** | **Date of Last DLP PM** | **Freq. 1 Interval** | **Interval Type** |
| INF0000001 | NT - DLP | DLP (M) | 2020-07-01 | 2021-07-01 | 1 | m |
| INF0000001 | NT - DLP | DLP (Q) | 2020-10-01 | 2021-07-01 | 3 | m |
| INF0000001 | NT - DLP | DLP (A) | 2020-12-01 | 2021-07-01 | 12 | m |

Note:

1. Refer to DLP Scheduling procedure provided by the University of Adelaide.
2. Schedule to identify all items that have an ESP function (where applicable).
3. Provide completed DLP Maintenance Schedule in conjunction with the Asset Register.
4. Contractor to complete all columns of the DLP maintenance schedule template with exception for column C which will be completed by the University of Adelaide.
5. The Contractor must provide maintenance schedule (2) two months prior to Practical Completion.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Maintenance Schedule’ |
| Refer to the template document PM Schedules.xls |

## Care and Maintenance Instructions

The Contractor is to provide all details for care and maintenance instructions for this trade discipline as recommended by manufacturers/suppliers. These shall include but not limited to the following:

1. Step by step procedures for safe trouble shooting, maintenance and repair
2. Cleaning and maintenance instructions

Note:

1. Contactor contact details are to be recorded in Section 1.2.
2. The Contractor must provide care and maintenance instructions (2) two months prior to Practical Completion.
3. Mark each product data sheet to clearly identify the specific products and components used in the installation and the data applicable.
4. Product information to be inserted in order as listed in table provided below.

Sample table format as follows:

|  |  |  |
| --- | --- | --- |
| **Trade Discipline** | **Contractor** | **Product Brochure Title** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Maintenance Information’ |

## Essential Services Provisions

The Contractor is to provide the following:

1. Evidence that maintenance and testing of all Essential Safety Provisions (ESP) has been carried out in accordance with Ministers Specification SA76
2. A signed statement of compliance (by a suitable company representative)
3. A schedule of maintenance of all ESP’s to be maintained during Defects Liability Period (DLP) including how the program will be managed, details of administration, record keeping and sign-offs
4. Provide a consolidated summary of all fire control functionality and methodology (this information supports the development of the overarching fire matrix)
5. Provide details identifying all ESP interconnection, zoning and functionality

Note:

The Contractor must provide item 1.6 (2) two months prior to Practical Completion for review and approval by the University of Adelaide.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Essential Services Provisions’ |

## Certificates and Warranties

In this section provide:

1. A list of warranties that are included including all contact details of suppliers contractors
2. A combined warranties schedule for this trade discipline in table format similar to the example table provided below
3. Signed documents assigning the warranties to the University of Adelaide. (Commencing upon date of Practical Completion)

Warranty period sample table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trade Discipline** | **Manufactures Warranties** | **Installation Warranties** | **Material Warranties** | **Defects Liability Warranties** |
| Trade Discipline |  |  |  |  |
| Etc. |  |  |  |  |

Note:

1. Copies of warranties for each trade discipline are to be included in this section.
2. Confirmation that warranties have been assigned to the University of Adelaide.
3. Warranties commence from the date of practical completion (identify any departures where warranties do not commence from date of practical completion).
4. Should a warranty not apply insert ‘Not Applicable’.
5. Warranty expiry dates to be included in Asset Register (refer to section 1.3).
6. Mark each product data sheet to clearly identify the specific products and components used in the installation and the data applicable.
7. Product information to be inserted in order as listed in table provided below.

Sample table format as follows:

|  |  |  |
| --- | --- | --- |
| **Trade Discipline** | **Contractor** | **Product Brochure Title** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume B:  ‘Warranties’ |

## Installation, Dismantling and Technical (Performance) Data

The Contractor is to provide full details of installation, dismantling and reassembly instructions including manufacturer’s technical (performance) literature that includes a description of the functionality and mode of operation of each system provided for this trade discipline including but not limited to:

1. Equipment brochures
2. Specifications
3. Data sheets
4. Drawings

Note:

1. All installations must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as not to invalidate any warranties.
2. Mark each product data sheet to clearly identify the specific products and components used in the installation and the data applicable.
3. Product information to be inserted in order as listed in table provided below.

Sample table format as follows:

|  |  |  |
| --- | --- | --- |
| **Trade Discipline** | **Contractor** | **Product Brochure Title** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Equipment Details And Manufacturers Technical Data’ |

## Operating Instructions

The Contractor is to provide operating instruction of each system provided for this trade discipline including but not limited to:

1. Safe starting, operating and shutting-down procedures for the equipment installed
2. Control sequences and flow diagrams for the systems installed (where applicable)
3. Fire mode interconnection and operation
4. Legends for colour-coded services (where applicable)

Note:

1. Mark each product data sheet to clearly identify the specific products and components used in the installation and the data applicable.
2. Product information to be inserted in order as listed in table provided below.

Sample table format as follows:

|  |  |  |
| --- | --- | --- |
| **Trade Discipline** | **Contractor** | **Product Brochure Title** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Equipment Details And Manufacturers Technical Data’ |

## As-Built Drawings

The Contractor (in conjunction with the Consultant) are to provide ‘as built’ drawings reflecting all changes made in the specifications and working drawings during the construction process, showing the exact dimensions, geometry, and location of all elements of the work completed under the contract.

Note:

1. Documents to be submitted separately with the Manual in both pdf and dwg format.
2. Expectation - drawings are transmitted via Aconex. Provide Aconex transmittal reference numbers.
3. Provide other related documents not included in the body of the manual (exception being the asset register).
4. Identify measurement points used to achieve commissioning data.
5. All drawings to include legends/keys/schedules where applicable.

|  |  |
| --- | --- |
| Design Standard references: | Volume K:   * ‘As-built documentation’ * ‘Documentation conventions’ * Schedule 4.12 ‘Post-construction documentation’ * Schedule 4.13 ‘As- built documentation checklist’ |

## Commissioning and Testing Data

The Contractor is to provide commissioning and testing records for each system and component for this trade discipline.

Note:

1. All records must be witnessed and verified by the UoA Project Manager in consultation with the Consultant and/or Designer.
2. Schedules of the parameter settings of each protective device (Including fixed and adjustable circuit breakers, protective relays, adjustable photoelectric switches, pressure switches, and any other control and monitoring device, as established during commissioning and maintenance).
3. Mark each product data sheet to clearly identify the specific products and components used in the installation and the data applicable.
4. Information to be inserted in order as listed in table provided below.

Sample table format as follows:

|  |  |  |
| --- | --- | --- |
| **Trade Discipline** | **Contractor** | **Product Brochure Title** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Commissioning Data’ |

## Specialist Tools and Testing Equipment

This section is expected to contain:

A combined Specialist tools and testing equipment register in table format used for the operation, maintenance and dismantling or assembly of the plant and equipment for each system including the following necessary components as follows:

1. Building Name
2. Level Number
3. Room Number
4. Tool Type
5. Tool Reference
6. Number of Tools

Sample table format as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Trade Discipline** | **Item Number** | **Building Name** | **Level Number** | **Room Number** | **Tool Type** | **Tool Reference** | **Number of Tools** |
| Trade Discipline |  |  |  |  |  |  |  |
| Etc. |  |  |  |  |  |  |  |

Note:

1. This applies to special, non-generic tools and instruments that are not commercially available for the operation, maintenance and dismantling or assembly of the plant and equipment.
2. Provide a register/transmittal of handover of tools including both signatories from Builder and UoA.
3. Should a section not apply insert ‘Not Applicable’.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Schedule of spares and consumables’ |

## Spares and Consumables

The Contractor is to provide a combined spares, special tools register and portable indicating instruments in table format which are used for the operation, maintenance, dismantling or assembly of plant and equipment: Include the following necessary components as follows:

1. Manufacturers Name
2. Manufacturers Address
3. Manufacturers Contact Number
4. Catalogue Number
5. Name of Local Distributor
6. Address of Local Distributer
7. Expected Replacement Frequency
8. Storage of Spares
9. Number of Spares

Sample table format as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Trade Discipline** | **Manufacturers Name** | **Manufacturers Address** | **Manufacturers Contact Number** | **Catalogue Number** | **Name of Local Distributor** | **Etc.** |
| Trade Discipline |  |  |  |  |  |  |
| Etc. |  |  |  |  |  |  |

Note:

1. Provide a register/transmittal of handover of tools including both signatories from Builder and UoA.
2. Should a section not apply insert ‘Not Applicable’.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Schedule of spares and consumables’ |

## Imported Equipment

The Contractor is to provide in table format a combined list of imported equipment including type, cost, and country of origin and importer details.

Sample table format as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trade Discipline** | **Type of Equipment** | **Cost** | **Country of Origin** | **Importer Details** |
| Trade Discipline |  |  |  |  |
| Etc. |  |  |  |  |

Note:

1. Details of any specialized equipment and/or materials which may be subject to procurement risk.
2. Should a section not apply insert ‘Not Applicable’.

|  |  |
| --- | --- |
| Design Standard reference: | Volume K:  ‘Schedule of spares and consumables’ |