

Winnipeg Sewage Treatment Program



Operations Manual Specification

DOCUMENT NUMBER: CD-CP-TO-06

Rev	Description	Prepared by	Reviewed by	Approved by	Approved Date
2015-12-11	Final Rev A	NWA		JV	2016-02-22

Contents

1	PURPOSE	6
2	GENERAL REQUIREMENTS	6
2.1	STANDARDS	6
2.2	READERSHIP AND STYLE	6
2.3	NUMBER OF COPIES AND DELIVERY	7
2.4	COPYRIGHT	8
2.5	PRESENTATION OF MANUALS	9
2.5.1	OPERATIONS MANUAL STRUCTURE	9
2.5.2	GENERAL FORMAT REQUIREMENTS	10
2.5.2.1	Headers and Footers	10
2.5.2.2	Title pages,	10
2.5.2.3	Schematic Diagrams	10
2.5.2.4	Figures – Illustrations	10
2.5.2.5	Photographs	10
2.5.2.6	Colour	11
2.5.2.7	Warnings, Cautions and Notes	11
2.5.2.8	Referencing	11
2.5.3	HARD COPY FORMAT REQUIREMENTS	12
2.5.3.1	Operations Manual Identification and Binders	12
2.5.3.2	Separators for Sections	12
2.5.3.3	Table of Contents Pages for Sections	12
2.5.3.4	Text Pages	13
2.5.4	ELECTRONIC FORMAT REQUIREMENTS	13
3	VOLUME 1 – AREA PROCESS OPERATING MANUAL	15
3.1	INTRODUCTION	15
3.2	SAFETY (COMMON)	15
3.2.1	SAFETY AND HEALTH HAZARDS (FACILITY WIDE)	15
3.2.2	HAZARD CONTROLS	16
3.2.3	CONFINED SPACE	16
3.2.4	FIRE PROTECTION	17
3.2.4.1	Portable fire extinguishers	17
3.2.4.2	Fixed fire protection systems	17
3.2.5	HAZARDOUS LOCATION PLAN DRAWINGS	17
3.2.6	SIGNAGE	17
3.3	SITE SERVICES	17
3.4	PROCESS BY AREA	18
3.4.1	GENERAL DESCRIPTION OF PROCESS AREA (E.G. HEAD WORKS)	18
3.4.2	UNIT PROCESSES 1 – BAR SCREENS AND SCREENINGS CONVEYOR	18
3.4.2.1	Unit Process Description	18
3.4.2.2	Design Criteria	18

3.4.2.3	Operation and Process Control	19
3.4.2.4	Safety and SWPs	19
3.4.2.5	Standard Operating Procedures (SOPs)	19
3.4.3	UNIT PROCESSES 2 – CHANNEL AERATION	20
3.4.3.1	Unit Process Description	20
3.4.3.2	Safety and SWPs	20
3.4.3.3	Design Criteria	20
3.4.3.4	Operation and Process control	20
3.4.3.5	Standard Operating Procedures (SOPs)	20
3.4.4	UNIT PROCESSES 3 – GRIT REMOVAL SYSTEM	20
3.4.4.1	Unit Process Description	20
3.4.4.2	Safety and SWPs	20
3.4.4.3	Design Criteria	20
3.4.4.4	Operation and Process control	20
3.4.4.5	Standard Operating Procedures (SOPs)	20
3.4.5	UNIT PROCESSES 4 – GRIT PUMPING AND DE-WATERING	20
3.4.5.1	Unit Process Description	20
3.4.5.2	Safety and SWPs	20
3.4.5.3	Design Criteria	20
3.4.5.4	Operation and Process control	20
3.4.5.5	Standard Operating Procedures (SOPs)	20
3.5	VOLUME 1 – APPENDICES	21
3.5.1	APPENDIX - SAFE WORK PROCEDURES (SWPs)	21
3.5.2	APPENDIX - STANDARD OPERATING PROCEDURES (SOPs)	21
3.5.3	APPENDIX - MATERIAL SAFETY DATA SHEETS	21
3.5.4	APPENDIX - HAZOP RECORDS	21
4	VOLUME 2 – ASSET DATA MANUAL	22
4.1	PURPOSE OF THE ASSET DATA MANUAL	22
4.2	ASSET DATA SUBMISSION PROCESS AND TIMELINE	22
4.3	GUIDANCE ON COMPLETION OF THE ASSET LOADING TEMPLATE	22
5	VOLUME 3 – EQUIPMENT AND MAINTENANCE TASK MANUAL	27
5.1	PURPOSE OF THE EQUIPMENT AND MAINTENANCE TASK MANUAL	27
5.2	MAINTENANCE BENCHMARK WORK ORDERS	27
5.3	MAINTENANCE TASK INTERVALS	28
5.4	LUBRICANTS SCHEDULE	28
5.5	CRITICAL PARTS LISTS	28
5.6	MANUFACTURERS LITERATURE	28
5.7	EQUIPMENT SUPPLIERS	29
6	VOLUME 4 – TRAINING MANUAL	30
6.1	TRAINING PLANNING AND ADMINISTRATION	31

6.2	TRAINING PROGRAM	31
6.3	GENERAL TRAINING REQUIREMENTS	32
6.3.1	TRAINING DOCUMENTATION REQUIREMENTS	32
6.3.2	TRAINING MANUAL CONTENTS	32
6.3.2.1	Purpose	32
6.3.2.2	Training Program	33
6.3.2.3	Training Records	33
6.3.2.4	Training Material Organized By Discipline Then Process Area	33
7	VOLUME 5 – COMMISSIONING MANUAL	36
7.1	PURPOSE	36
7.2	PART I - PROJECT COMMISSIONING PLAN	36
7.2.1	GENERAL	37
7.2.2	ROLES AND RESPONSIBILITIES	37
7.2.3	SCOPE	37
7.2.4	SEQUENCE / SCHEDULE	37
7.3	COMMISSIONING SPECIFICATION AND OBJECTIVES	37
7.4	COMMISSIONING PROCEDURES	37
7.5	PART II – PROJECT COMMISSIONING RECORDS	37
7.5.1	FACILITY	38
7.5.2	AREA A	38
7.5.2.1	System 1	38
7.5.2.2	System 2	38
7.5.3	AREA B	38
8	VOLUME 6 – DRAWING MANUAL	39
8.1	PURPOSE OF THE DRAWING MANUAL	39
8.2	INDEX OF DRAWINGS	39
8.3	DRAWINGS GENERAL	40
8.4	NUMBER OF COPIES	40
9	APPENDIX	41
9.1	APPENDIX 0-1 - EXAMPLE ELECTRONIC FOLDER AND FILE STRUCTURE	42
9.2	APPENDIX 1-1 TEMPLATE SAFE WORK PROCEDURE (SWP)	45
9.3	APPENDIX 1-2 TEMPLATE STANDARD OPERATING PROCEDURE (SOP)	45
9.4	APPENDIX 2-1 –ASSET LIST LOADING TEMPLATE – EXCEL FILE	45
9.5	APPENDIX 2-2 – BUILDING CODES	46
9.6	APPENDIX 2-3 – ASSET TYPE CODES	48
9.7	APPENDIX 3-1 MAINTENANCE BENCHMARK TEMPLATE	52
9.8	APPENDIX 3-2 LUBRICANT SCHEDULE	52
9.9	APPENDIX 3-3 CRITICAL PARTS SCHEDULE	52
9.10	APPENDIX 4-1 – EXAMPLE ATTENDANCE REGISTERS	52
9.11	APPENDIX 4-2 – EXAMPLE INDIVIDUAL POST TRAINING COURSE EVALUATION FORMS	52

1 Purpose

This document details the requirements for Operating Manuals for the Wastewater Treatment, Wastewater Services (WWS), City of Winnipeg. The purpose of this document is to provide guidance for the production of the Manuals.

The specification ensures information in the operations manuals of the facilities is presented in a consistent way and allows for the content of the manuals to be updated as the facilities develop over time.

The formats of all Operations Manuals delivered to the City of Winnipeg Wastewater Services Division must follow this specification and be based on the templates and examples it contains.

2 General requirements

This document describes a standard approach, across Wastewater Treatment Branch , for the format and presentation for documentation within the scope of the manual.

2.1 Standards

The Operating Manual shall comply with the following standards where appropriate:

IEC 82079-1:2012 Preparation of instructions for use -- Structuring, content and presentation -- Part 1: General principles and detailed requirements

Where information in this ISO conflicts with the City of Winnipeg instruction, the latter shall prevail.

In order to achieve consistent terminology throughout the Operations Manual, descriptions used throughout the manual to describe or define treatment processes must refer to (with the exception of the manufacturers literature provided in the Volume 3 - Equipment and Maintenance Task Manual):

- City of Winnipeg WSTP Paint Colour Standard (this standard is currently under development)
- City of Winnipeg numbering schedule
- Plant and equipment identification used in the Asset Data Manual

2.2 Readership and Style

Readership

The Operating Manuals must be written to provide information for experienced operations and maintenance staff, Engineers or Technicians who would not necessarily know the specific facilities described in the manual.

The manual must provide a comprehensive overview of the facilities for such experienced operators so that they can quickly assimilate and understand the facility, its function, and its operation.

Technical Language

The Manuals are technical documents intended to be used by professionals with an understanding of wastewater treatment. Any acronyms used must be defined. Language and style should be functional rather than imaginative i.e. Plain Statement.

The Manuals will be in the English language.

Level of details

The manuals will provide operations and maintenance staff with sufficient detail to be able to safely operate and maintain the facilities. Information on equipment will have sufficient detail to identify and order spare parts.

2.3 Number of copies and delivery

Requirements for the number of copies are defined in "CD-CP-TO-05 Project Documentation Requirement sheet".

Electronic copies of the manual will be provided on non re-writable DVD.

DVD Label and Presentation

Each DVD will have a centrally applied label as detailed in Figure 1.

Notes for Figure 1: Replace the text in the square brackets, do not include the brackets.

Note 1 – The appropriate plant name will be chosen from the following:

North End Sewage Treatment Plant (NEWPCC)

South End Sewage Treatment Plant (SEWPCC)

West End Sewage Treatment Plant (WEWPCC)

Note 2 – Insert the name of the Project

Note 3 – Where a soft copy manual extends beyond a single DVD, data shall be logically divided and issued in multiple standard depth DVD cases. Each will be numbered "DVD xx of xx", e.g, "DVD 1 of 5"

Note 4 – Insert the document number as per City of Winnipeg document numbering convention.

All DVDs shall be issued in full size jewel cases complete with the following:

- A clearly printed contents label on the spines of the jewel case, this shall typically read: [Facility Name] Operations Manual, [Project name], DVD # of #. The legend shall be read left to right in the horizontal direction with the DVD label side up.
- The rear cover of the jewel case shall include a list detailing the section contents of the DVD.
- The inside of the jewel case front insert shall contain identical data to that printed on the rear cover.
- The outside of the jewel case insert (front cover) shall contain a Repeat of the DVD label.

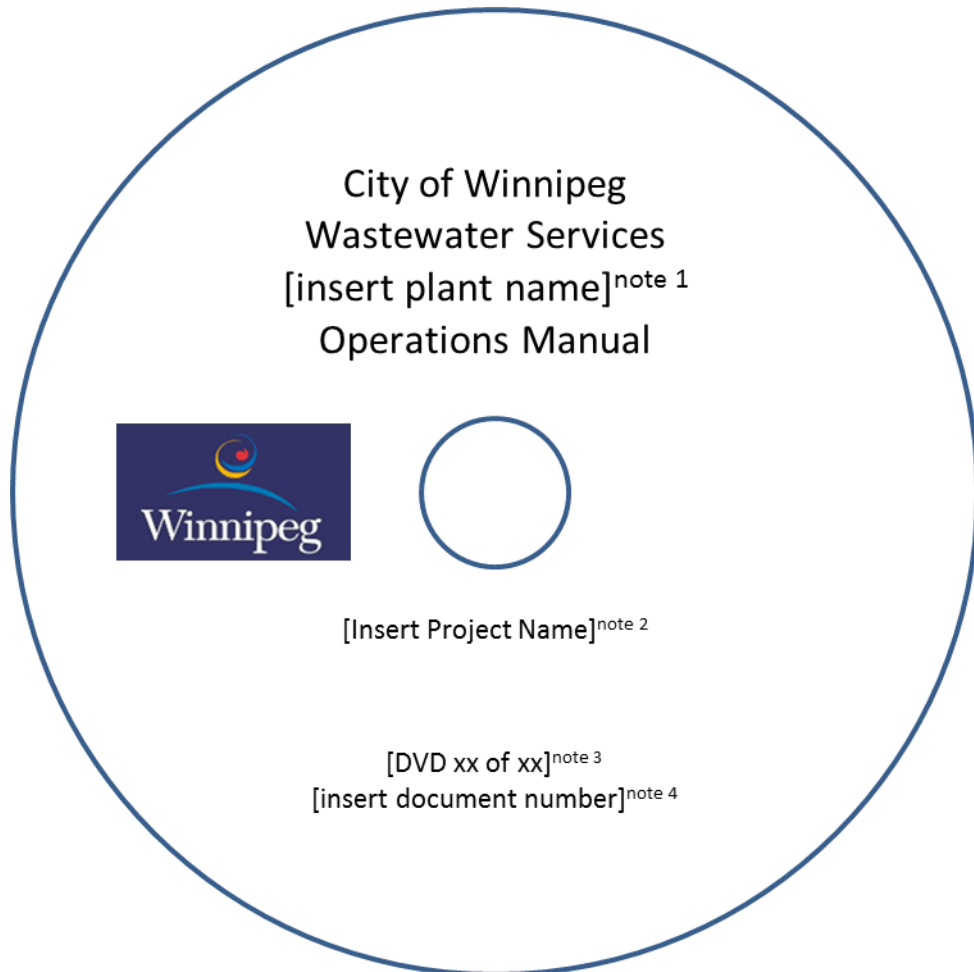


Figure 1 - Operations Manual, Typical DVD Label

2.4 Copyright

Operations Manuals will show copyright protection in favour of City of Winnipeg.

2.5 Presentation of Manuals

2.5.1 Operations Manual Structure

The Operating Manuals will consist of a set of volumes, constituting a complete suite of documents as follows:

Volume 1 – Area Process Operations Manual

Provides information on the operation of the facilities including: Safety and Health hazards and controls; Site services; Description of the Facility Control System; General description of the treatment process; Specific details of each unit process, including process control narratives; Standard Operating Procedures; Safe Work Procedure; Safety and Health records; Materials Safety Data Sheets; HAZOP Records

Volume 2 – Asset Data Manual

Provides data on all assets relating to the facilities, in the form of a data collection template.

Volume 3 – Equipment and Maintenance Task Manual

Provides information required for the maintenance of the facilities including: Technical description of installed equipment; Detailed maintenance tasks and schedule for installed equipment in the form of a data collection template; Lubricants schedule; Critical parts lists; Copies of manufacturers literature for installed equipment; List of suppliers.

Volume 4 – Training Manual

Provides the information used to train operations and maintenance staff for the facilities.

Volume 5 – Commissioning Manual

Provides a record of the plan for commissioning the facilities as carried out; Provides commissioning records and test documentation; Provides guidance on de-commissioning the facilities.

Volume 6 – Drawing Manual

Provides an index of drawings provided for the facilities and provides copies of key drawings required for operation and maintenance of the facilities.

Refer to xxx for an example of a completed Operating Manual.

Each Volume will be constructed of multiple sections. Refer to the specific part of this specification for an explanation of the organization of sections in each volume.

2.5.2 General Format Requirements

2.5.2.1 Headers and Footers

Footer will contain as a minimum: Volume number; page number and revision number

The principle intent is to ensure that if any section of the manual is removed from the hardcopy, staff will have no trouble to replace it.

2.5.2.2 Title pages,

Each volume will have a clear title page. Each section will have a clear section title page. The back of title pages will be left blank.

2.5.2.3 Schematic Diagrams

Whenever possible, schematic diagrams will be incorporated to simplify the description or operating philosophy. These are for illustration purposes only and for more accurate information, the appropriate 'as built' should be referred to.

Schematic diagrams will be provided in native format in the electronic copy to allow for future updates.

2.5.2.4 Figures – Illustrations

Illustrations shall be used for the purpose of increasing or improving communication and should complement or replace text. Unnecessary illustrations should be avoided. Where multiple references are made to the same illustration on different pages, pullout [11x17] illustrations should be used, [11x17] size illustrations should allow the relevant illustration to be seen when using any of the related text pages. If it is inappropriate to use a pullout, the illustration must be relocated.

A list of abbreviations and symbols will be provided when producing process flow schematic illustrations.

On schematic drawings, valves / control gates to be shown in the normal operating position, with open valves / control gates to be in outline and closed valves / control gates to be blocked in.

Illustrations will be provided in native format in the electronic copy to allow for future updates.

2.5.2.5 Photographs

Photographs should be used following the same criteria as for illustrations. When digital photography is used, photographs must be saved using the medium JPEG format.

2.5.2.6 Colour

Grey scale is acceptable. In order to accommodate colour blindness, it is recommended that where colour is used to identify a specific feature on an illustration, a secondary form of identification is used as a back up such as hatching or shading to give different forms of visible patterns.

2.5.2.7 Warnings, Cautions and Notes

Warnings, Cautions and Notes must be used throughout the manual where appropriate to convey the following information: -

WARNING: TO CALL ATTENTION TO INSTRUCTIONS OR INFORMATION WHICH MUST BE ACKNOWLEDGED TO AVOID POSSIBLE DEATH OR INJURY TO PERSONNEL.

Caution: To call attention to instructions, which must be acknowledged to prevent damage to plant and equipment or degradation of plant product quality.

Notes: used to document Items of importance about use of a system, activity etc.... Notes may be non-safety or safety related but not be “Warnings” or “Cautions”.

2.5.2.8 Referencing

Cross referencing out-with each individual Document will not be used. Material referred to within that Document MUST be contained within the Document. With the following exceptions:

Volume 1 (sections on Health and Safety) will contain references to other Volumes to reduce duplication and

Volume 3 Equipment and Maintenance Task Manual, may contain references to Volume 2 – Asset Data Manual.

Volume 6 Drawing manual – Drawings from Volume 6 may be referenced in other volumes and not reproduced in those volumes.

The use of cross referencing to other procedures within a procedure shall only be used if absolutely necessary. Its use leads to complications when amending the manual and introduces increased risk of errors.

Where possible referenced material should be located in the appropriate section. Referenced material can be added in a specific reference section where it is referenced in multiple parts of that document.

2.5.3 Hard Copy Format Requirements

2.5.3.1 Operations Manual Identification and Binders

Operations Manuals will be printed in colour.

Volumes 1 to 5 of the Operating Manuals shall be contained in durable D ring ring-binders with three rings for 8.5" x 11" pages. The binders will have a maximum spine depth of 75 mm, hard backed with white PVC covers of suitable quality to last the expected life duration of the plant.

Volume 6 – Drawings Manual: Drawings shall be provided as 11"x17" pages in D ring durable ring-binders with three rings. The binders will have a maximum spine depth of 75 mm, hard backed with white PVC covers of suitable quality to last the expected life duration of the plant.

The binders for Volumes 1 to 6 will be organized in order of index. The D rings shall allow the manual pages to sit square and horizontal when the binder is opened on a flat surface.

Each Volume of the Operating Manuals Binders must have sufficient capacity for any individual page to be turned without jamming or tearing and allow at least 25% spare capacity for any future additions.

The binders shall have a clear PVC pocket at the front and on the spine for top entry insertion of a white title card headed with the City of Winnipeg logo which shall be printed in black.

Each binder will have a contents page which includes all volumes and binders, which will include: Volume; section; description.

Each binder will be labelled with the volume number, or numbers if more than one volume is included in a single binder.

The following will be in separate binders:

- Volume 4 - Training Manual
- Volume 6 – Drawings Manual

See Manuals Templates and Example Manual for example layout of the manual.

2.5.3.2 Separators for Sections

Divider cards for each Sections Within the individual Volumes shall be multiple part polypropylene coloured dividers, having stepped sides and rounded corners.

2.5.3.3 Table of Contents Pages for Sections

Bright blue paper shall be used at the beginning of each Section for the Table of Contents page.

2.5.3.4 Text Pages

Text pages shall be [letter] sized (portrait) having 3 No. punched holes. Final copy for issue shall be 90grms quality; draft pages may be produced in 80grms quality.

- Each Part shall begin on a new page
- Each Operating Procedure shall begin on a new page.
- [11x17] pullouts shall be 100 grms single sided.

Blank pages, including pull-outs, must have standard headers and footers with page numbers and must have the words – “This page intentionally blank” printed on them.

The first two pages of the manual shall be printed on white 130grm card to prevent tearing at the rings.

2.5.4 Electronic Format Requirements

All electronic data will be provided on labelled DVDs’ and MUST be in a recognizable directory / file structure. An example Operating Manual file structure is shown in Appendix 0-1.

Manuals shall be produced using Microsoft Word 2010, illustrations or Schematics may be provided in AutoCAD 20xx or Microsoft Visio 2010. A native file copy of all Illustrations or Schematics to be provided with a unique reference to associate them with their use in the manual.

The manual to be electronically presented as a searchable pdf complete with in-built Thumbnails and Bookmarks.

Provision of Native Files

All data and documentation to be provided in the NATIVE FORMAT of one the following software packages as appropriate for their creation.

- MS Word in .docx format
- MS Excel in .xlsx format
- MS Visio in .vsd format
- Presentations in MS Powerpoint .pptx format
- Photographic in .jpeg format, medium quality
- Adobe .pdf format
- AutoCAD or AutoCAD LT in .dwg format and saved in the version presently used in the City of Winnipeg Wastewater Department (WWD). Third party fonts, hatch patters, custom linetypes or shapefiles, shall not be used in Drawing Files submitted to the WWD.
- Audio visual in .mp3 format

To aid updating the Operations Manual over time, a single electronic file (Native file format and pdf) will not contain the material for more than one Section of the Operating Manual.

Specific variations to these requirements are specified in specific volumes of the Operations Manual.

Electronic formats related to manufacturers bespoke literature, instruction books etc.. will be acceptable, any bespoke or proprietary software required to read these formats will be provided.

3 Volume 1 – Area Process Operating Manual

The Area Process Operating Manual will be provided prior to substantial completion. The manuals will be structured by process area following the flow of the treatment process from inlet pumping to final effluent discharge and from raw (and WAS) sludge capture to final removal from site. Sub-sections will describe unit processes within each process area.

The Operating Manual will be structured as defined in this specification.

References will be made within the Area Process Operating Manual where necessary to avoid duplication of material. With the exception of the Asset Data Manual, or unless specifically defined in this specification, references will not be made to information outside of this manual.

To simplify updating of the manual, each section identified in this specification (x; x.x; x.x.x; etc...) will begin on a new page.

3.1 Introduction

This section will provide:

- Location and address of the facility;
- General description of the facility including a process flow diagram,
- Plant layout diagram;
- Key data such as dry weather and maximum treatment capacity, licence limits etc..

3.2 Safety (common)

This section will provide information on safety that is common to all process areas, and include the following sections.

3.2.1 Safety and Health Hazards (Facility Wide)

This section is to provide information on safety and health hazards that are common across all process areas in the facility.

Example hazards (area specific hazards will be moved to that specific section(s) of the manual):

- Chemicals Hazards
 - Chemical exposure; list of chemicals used in facility
 - Compressed gasses
 - Asbestos
- Physical Hazards (for example)
 - Temperature
 - Local exhaust ventilation (LEV)
 - Arc flash
 - Confined spaces
 - Electrical safety
 - Hazardous gasses

- Explosive atmospheres
- Pressurized systems
- Noise
- Manual handling
- Traffic
- Hazardous materials
- Buried services
- Overhead cables
- Vibration
- Lighting levels
- Biological Hazards
 - Bacteria and viruses
 - Bacteria

Include identification of all site services and restrictions – For example: Deliveries, Chemicals, gas, electricity, telecom, water, spills, discharges, drainage.

3.2.2 Hazard Controls

This section will describe the design features of the facility that have been used to mitigate each of the identified facility wide safety and health hazards.

The hierarchy of controls applied to mitigate hazard will be explained. For example:

- Engineering Controls;
- Administrative Controls
- and PPE controls.

Reference should be made to the appropriate section in the Area Process Manual where required.

A table of Safe Work Procedures (SWPs) common to all areas will be provided. Note: the SWPs themselves will be provided in the Appendix. The following process will be used for selection or creation of SWPs.

Process for allocation and creation of SWPs

- Review manufacturers or designers requirements as per their literature
- Review existing library of SWPs, provided by the City, and identify closest match.
- If there is an existing SWP with an acceptable match to the requirement, assign the existing SWP in Asset Loading Template (Appendix 2-1).
- If no suitable existing SWP is available, propose a new SWP using the template SWP in Appendix 1-1 and assign it to the asset in Asset Loading Template (Appendix 2-1).
- The Plant Supervisor will review proposed SWP and finalize.

3.2.3 Confined Space

This section will provide warning of the hazards of confined spaces in the facilities and reference the applicable legislation and Safe Work Procedures.

3.2.4 Fire Protection

3.2.4.1 Portable fire extinguishers

Include the following text in the Manual: Refer to the plant Fire Safety Plan for type and location of portable fire extinguishers.

3.2.4.2 Fixed fire protection systems

Include the following text in the Manual: Refer to the plant Fire Safety Plan for type and location of fixed fire protection systems.

Asset data and equipment details for fixed fire protection systems will be provided in Volume 2, Asset Data Manual and Volume 3, Equipment and Maintenance Task Manual respectively.

3.2.5 Hazardous Location Plan Drawings

This section will include a reference to a drawing (or set of drawings) identifying hazardous locations in accordance with the Electrical Design Guide with respect to explosive atmospheres and their classification. A reference will be made to the appropriate volume of the Operations Manual for special equipment installed and operational mitigation procedures.

Other hazardous areas which are not included in the scope of the Electrical Design Guide, will be identified on the Hazard Location Plans.

3.2.6 Signage

This section will include a list of all statutory and safety and health signage included in the design. The specification of the signage will be provided and location installed will be referenced.

3.3 Site services

This section will provide an overview of all site services including and any restrictions or constraints that apply. Reference will be made to the appropriate drawings. Site services scope will include:

- Electricity supply;
- Domestic services;
- Water supply;
- Telecommunications;
- Sewerage;
- Drainage;
- Chemicals;
- Containment of chemical /Fuel /Gas Discharges;
- Delivery of process chemicals. Etc;

3.4 Process By Area

The manual will organize the plant into physical treatment areas and then into unit processes within each process area.

The process areas will be plant specific, however suggested process areas are as follows, this list is not exhaustive:

- Inlet Pumping
- Head works
- Primary Treatment
- Sludge Thickening
- Secondary Treatment (including Return Activated Sludge and Waste Activated Sludge)
- UV Treatment or Disinfection
- Sludge Digestion
- Sludge Dewatering
- HVAC (For all buildings)
- Central effluent flushing water system

A description of applicable plant utilities (including: sump pumps; effluent wash water; compressed air; potable water) will be included in each process area.

To aid updating of the Area Process Manual, the section of the manual for each unit process will begin on the front side of a new page.

An example of the structure of each area is as follows.

3.4.1 General description of process area (E.g. Head works)

A general description of the process area will be provided and refer to the Process Flow Diagram (PFD).

3.4.2 Unit processes 1 – Bar Screens and Screenings Conveyor

3.4.2.1 Unit Process Description

This section will explain the function of each unit process within the process area. An explanation of following will be included: Process objective; process description. Reference will be made to process flow diagrams, P&IDs, SOPs, SWPs and control narratives where applicable. P&IDs will be provided in the Drawings Manual and not reproduced in this manual.

3.4.2.2 Design Criteria

Process design criteria for the specific unit process will be provided.

3.4.2.3 Operation and Process Control

This section will provide, for the specific unit process:

- The process control narratives, including control philosophy in manual and automatic modes;
- Use of manual controls;
- Process control parameters and key control parameters;
- Process trouble shooting guides;
- Description of protection systems installed;
- Emergency shut down and power failure procedures;
- Sampling and analysis requirements;
- Key HMI screen shots will be used to illustrate operation and process control;

Alarm and Warning limits are volatile data. A record of the recommendations of alarm and warning limits for each process parameter as commissioned will be provided in Volume 5 – Commissioning Manual. The values will be transferred to and maintained in the Process Control Management Plan (PCMP) by Operations.

Reference will be made to process flow diagrams, P&IDs, SOPs, SWPs and control narratives where applicable. P&IDs will be provided in the Drawings Manual and not reproduced in this manual.

3.4.2.4 Safety and SWPs

This section will contain safety information specific to the unit process, including safety hazards and safety controls.

Safe Work Procedures (SWPs) will be provided for all activities required for the safe operation of the unit process.

A reference table of all SWPs relevant for each unit process will be provided in the relevant section of the Area Process Manual, by following the process below. A complete list of SWPs will be included as an Appendix to Volume 1- Area Process Operating Manual.

Process for allocation and creation of SWPs

- Review manufacturers or designers requirements as per their literature
- Review existing library of SWPs, provided by the City, and identify closest match.
- If there is an existing SWP with an acceptable match to the requirement, assign the existing SWP in Asset Loading Template (Appendix 2-1).
- If no suitable existing SWP is available, propose a new SWP using the template SWP in Appendix 1-1 and assign it to the asset in Asset Loading Template (Appendix 2-1).

3.4.2.5 Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs) will be provided for all activities required for the proper operation of the unit process.

A reference table of all SOPs relevant for each unit process will be provided in the relevant section of the Area Process Manual by following the process below. A complete list of SOPs will be included as an Appendix to Volume 1-Area Process Operating Manual.

Process for allocation and creation of SWPs

- Review manufacturers or designers requirements as per their literature
- Review existing library of SOPs, provided by the City, and identify closest match.
- If there is an existing SOP with an acceptable match to the requirement, assign the existing SOP in Asset Loading Template (Appendix 2-1).
- If no suitable existing SOP is available, create a new SOP using the template SOP in Appendix 1-2 and assign it to the asset in Asset Loading Template (Appendix 2-1).

3.4.3 Unit processes 2 – Channel Aeration

3.4.3.1 Unit Process Description

3.4.3.2 Safety and SWPs

3.4.3.3 Design Criteria

3.4.3.4 Operation and Process control

3.4.3.5 Standard Operating Procedures (SOPs)

3.4.4 Unit processes 3 – Grit Removal System

3.4.4.1 Unit Process Description

3.4.4.2 Safety and SWPs

3.4.4.3 Design Criteria

3.4.4.4 Operation and Process control

3.4.4.5 Standard Operating Procedures (SOPs)

3.4.5 Unit processes 4 – Grit Pumping and De-watering

3.4.5.1 Unit Process Description

3.4.5.2 Safety and SWPs

3.4.5.3 Design Criteria

3.4.5.4 Operation and Process control

3.4.5.5 Standard Operating Procedures (SOPs)

3.5 Volume 1 – Appendices

The following appendices will be included with the Area Process Operating Manual.

3.5.1 Appendix - Safe Work Procedures (SWPs)

An index of all SWPs will be provided.

SWPs will be provided for all activities identified in the Area Process Manual.

SWPs will be provided as individual files.

SWPs will be provided using the template in Appendix 1-2.

Process for providing Safe Work Procedures (SWP's)

The Wastewater Treatment Division holds standard SWPs for common tasks, which should be referenced to avoid duplication.

- Identify SWPs required
- Review existing SWPs, provided by the CWMS team, and identify closest match.
- Where there is an existing SWP with an acceptable match to the requirement, that SWP should be referenced
- If no suitable SWP is available, create a SWP using the template (Appendix 1-2)

3.5.2 Appendix - Standard Operating Procedures (SOPs)

An index of all SOPs will be provided.

SOPs will be provided for all activities identified in the Area Process Manual.

SOPs will be provided as individual files.

SOPs will be provided using the template in Appendix 1-2.

3.5.3 Appendix - Material Safety Data Sheets

Operations maintain a copy of all materials data sheets on an online application. This appendix will provide an index of materials data sheets applicable to the facility, a “pdf” version of the Material Safety Data Sheet will be provided in the electronic version of the Manual.

3.5.4 Appendix - HAZOP Records

This appendix will include a copy of records from any Hazard and Operability Study (HAZOP) produced by the project, all control measures (engineering and operational) identified in the HAZOP should be included in the hazard control section of this manual.

4 Volume 2 – Asset Data Manual

4.1 Purpose of the Asset Data Manual

This section describes a standard approach, across Wastewater Services (WWS), for the provision of asset data on new or modified assets.

The City of Winnipeg Water and Waste Department use Oracle Work and Asset Management (OWAM) as their Computerized Work Management System

4.2 Asset Data Submission Process and Timeline

This section sets out the process for submitting asset data to the City of Winnipeg resulting from a change in assets through a capital project.

- The City will provide current asset data for the facilities as an Excel file prior to the end of Preliminary Design.
- The Consultant will identify and flag assets, that are to be modified or retired, in the Excel file. The modified file will be submitted to the Project Manager as part of the Detail Design deliverables.
- The Consultant will fully complete asset data for new or modified assets using the Asset Loading Template (Appendix 2-1) no later than two (2) prior to Substantial Completion.

4.3 Guidance on Completion of the Asset Loading Template

The following table provides guidance for the completion of the Asset Template file. Fields marked as Mandatory must be populated for the file to be accepted.

Field	Mandatory	Description	Codes
ASSET_NO	To be left blank	To be left blank. Asset reference number will be generated by OWAM.	Not applicable (n/a)
TAG_ID	Yes	Smart numbered Tag ID using City of Winnipeg standard format.	Refer to TAG specification.
PLANT	Yes	This refers to the OWAM database instance.	01
ASSET_RECORD_TYPE	Yes	Asset Record Type from code list	E = Equipment B = Building A = Virtual (used in Asset Hierarchy Structure)
ASSET_ID	Yes To be completed by the City CWMS	Same as Asset Number - to be left blank.	n/a

Field	Mandatory	Description	Codes
	Specialist		
ASSET_TYPE	Yes	Asset Type from code list	Appendix 2-3 If no appropriate Asset Type is listed provide proposed new Asset Type to City of Winnipeg for consideration.
ASSET_DESC	Yes	<p>The Asset Description is the name by which plant staff would commonly refer to the asset. The description consists of the following separated by spaces:</p> <p>1 - Wastewater Process Area Code = Building Code, excluding name of the plant</p> <p>2 – Type (this is NOT the Asset_Type): this is the sub process of the Wastewater Process Area that is used to group similar assets and components together. See Note 1.</p> <p>3 – TAG ID (smart number)</p> <p>4 – Noun or Common Name: E.g. pump; Switch; Valve; Transmitter etc...</p> <p><u>Examples of “Asset_Desc”:</u></p> <ul style="list-style-type: none"> • Admin motor M681-F81ventilation fan motor • Grit hoist G565-CR 2 ton electric crane c/w monorail trolley hoist • Grit DCS PCU8-SA MMU Cabinet 15 • Grit switch G257-BS barscreen reverse switch • Grit switch G245-TSHblower high temperature switch • Primary valve P212 P213-FV1 transfer control valve 	Appendix 2-2
ASSET_STATUS	Yes	Asset status from code list	ACTIVE
DEPARTMENT	Yes	City department from code list	WWD
AREA	Yes	Water or Waste	Water Waste
PARENT_ASSET_ID	To be left blank	To be left blank. City to define asset hierarchy.	n/a

Field	Mandatory	Description	Codes
	To be completed by the City CWMS Specialist		
ACCOUNT_NO	Yes To be completed by the City CWMS Specialist	City account reference number	n/a
CRITICALITY	Yes	Asset criticality value	Criticality values are defined in the Asset Management Manual.
BUILDING	Yes	Select Building in which asset is located from code list. If no appropriate Building is listed provide proposed new Building to City of Winnipeg for consideration.	Appendix 2-2
LOCATION	Yes	Description of the general physical location within the Building. Examples: Gallery XX, Tunnel XX, Basement, Upper Level, Lower Level, Mezzanine, West Wall etc. Main Level Maximum data length = 30 characters	n/a
PARENT_ASSET_RECO RD_TYPE	To be left blank To be completed by the City CWMS Specialist	Record Type of the Parent Asset.	n/a
ROOM	Yes	Name of room where the Asset is located. Chlorine, Pump, Control, Motor etc. Maximum data length 20 characters	n/a
The following fields are used to capture data from name plates. The data will be completed as fully as possible. Not all data will be applicable to every asset.			
MANUFACTURER	Yes	The manufacturer of the Asset.	n/a

Field	Mandatory	Description	Codes
		Maximum data length 50 characters	
MODEL_NO	Yes	The Make of the Asset Maximum data length 50 characters	n/a
SERIAL_NO	Yes	Serial number from the Asset Maximum data length 50 characters	n/a
TYPE	Where available	Provide relevant information, which is not covered by other fields, which helps define the asset. Maximum data length 50 characters	n/a
SIZE	Where available	Asset size if applicable. E.g: 6 Inch Diameter Maximum data length 50 characters	n/a
CAPACITY	Where available	Asset Capacity if applicable. E.g: 5 MLD. Maximum data length 50 characters	n/a
PUMP_BEARING	Where available	Type of pump bearing if applicable. Format: OD: ABC123 ODE: DEF456 Maximum data length 50 characters	n/a
HEAD_PRESSURE	Where available	Design head pressure of pumps, if applicable Maximum data length 50 characters	n/a
HP	Where available	Motor or engine Horse Power if applicable. Maximum data length 50 characters	n/a
VOLTS	Where available	The design voltage of the asset where applicable. Maximum data length 50 characters	n/a
AMPS	Where available	Full Load Amperage (FLA) as indicated on the motor nameplate. Example: 50 Amps Maximum data length 50 characters	n/a
PHASE	Where available	Electrical Phase from code list.	1 3
OUTPUT	Where available	State the output of instrument assets. Examples: 4-20 mA 3-15 PSI Maximum data length 50 characters	n/a
RANGE	Where available	State the range of instrument assets. Examples: 50MLD 1,500 LPS Maximum data length 50 characters	n/a

Field	Mandatory	Description	Codes
LOOP	Yes for instrumentation or control assets	Relevant loop drawing reference number. Maximum data length 50 characters	n/a
PID	Yes	Relevant P&ID drawing reference number. Maximum data length 50 characters	n/a
MOTOR_BEARING	Where available	Type of motor bearing if applicable. Format: OD: ABC123 ODE: DEF456 Maximum data length 50 characters	n/a
OTHER		Other relevant drawing numbers. Maximum data length 50 characters	n/a
<p>Note 1 – Asset Description: Examples of most common process “Type” description: HVAC, RAS, DCS, Sump, Electrical, Sludge, Centrifuge, Scum, Hoist, Flushing water, WAS, Clarifier, Potable water, Bridge, Bailey, Boiler, Polymer, Storage bin, Overhead, Security, Heat exchanger, Raw sewage, Wet well, Generator, LOX, PSA, SCADA, Safety, Air System, Effluent, Influent. This list is not exhaustive.</p>			

5 Volume 3 – Equipment and Maintenance Task Manual

5.1 Purpose of the Equipment and Maintenance Task Manual

This section describes a standard approach, across Wastewater Services (WWS), for the format, presentation and numbering procedure for documentation within the scope of the manual.

The Equipment and Maintenance Task Manual will be provided at least two (2) weeks prior to substantial completion.

Where a partial treatment works, or item of Plant or Equipment is replaced, an update to the plant Equipment Manual will be provided.

5.2 Maintenance Benchmark Work Orders

Maintenance Benchmark Work Orders are template work orders (with work order task, planned materials, craft, and estimated labour hours, checklists and safe work procedures) which are used to generate a real work order. They are used primarily for setting up reoccurring preventive maintenance type work orders.

Detailed instructions on maintenance requirements of each item of equipment will be provided in the form of a Maintenance Benchmark Work Order using the template in Appendix 3-1, which may require reproduction of information from manufacturers' documentation. To avoid duplication, the maintenance benchmark may refer to Volume 4 - Asset Data Manual.

The benchmarks will contain sufficient information to allow the plant & equipment to be maintained safely. Requirements for regular inspections by all trades, including operations, will be included.

Benchmark work orders are reviewed on regular basis using data from completed work to adjust the estimated labour hours and provided more accurate information for maintenance planning.

Process - Manufacturers Maintenance Requirements

New assets will initially be maintained to manufactures recommendations in order to respect warranties.

- Review manufacturers maintenance requirements as per their literature
- Review existing Maintenance Benchmark Work Orders, provided by the CWMS team, and identify closest match.
- If there is a benchmark Work Order with an acceptable match to the maintenance requirement, assign the benchmark work order to the asset in OWAM Asset List (Appendix 2-1).
- If no suitable benchmark Work Order is available, propose new benchmark Work Order and assign it to the asset in OWAM Asset List (Appendix 2-1).
- Maintenance Engineer will review proposed benchmark Work Orders and finalize.

Safety precautions such as equipment handling requirements including details of specific lifting points will be included in the Benchmark Work Order through referenced Safe Working Procedure attachments (SWPs).

5.3 Maintenance Task Intervals

This section will define the frequency at which maintenance tasks to be carried out on the specific assets in the form of a schedule that is used to build the Planned Maintenance Master (PM Master).

Process - Manufacturers Maintenance Requirements

New assets will initially be maintained to manufactures recommendations in order to respect warranties. The process to be used to define the initial maintenance task intervals is as follows:

- Review manufacturers maintenance requirements as per their literature
- Identify appropriate maintenance benchmark Work Orders
- Assign a frequency for execution of the Benchmark Work Order in the Asset Loading Template (Appendix 2-1). This data will be incorporated to manually build the PM Master.

5.4 Lubricants Schedule

A complete schedule of all lubricants used will be provided in the form of a matrix of lubricants against each asset using the Lubricant schedule template in Appendix 3-2.

5.5 Critical Parts lists

Critical spare parts will be identified using the process in the Wastewater Treatment Asset Management Manual. A list of critical spare parts for each assets identified through this process will be provided using the template schedule in Appendix 3-3.

Appendix 3-3 to include:

- Asset TAG ID;
- Asset description (as Volume 2 – Asset Data Manual);
- Asset location (as Volume 2 – Asset Data Manual);
- Critical spare part description (as per manufacturers manual);
- Equipment manufacturers item number;
- Reference to manufacturers documentation;
- Supplier name, at time of commissioning;

5.6 Manufacturers Literature

All applicable original literature from manufacturers SPECIFIC to the equipment installed will be provided. Where manufacturers' literature contains information on multiple equipment types or variants the SPECIFIC equipment installed will be clearly identified.

Manufacturers' literature will be provided as both hard copy and electronic formats as defined in the General Specification. Where either hard copy or electronic files are not available this will be clearly stated.

Manufacturers' literature will be provided by Process Area following a logical order. An index of manufacturers literature will be provided at the front of the section.

Where electronic versions of Manufacturers documentation are available through either the intranet or within equipment electronic interfaces, an electronic copy will be provided as part of this manual as per the General Specification.

5.7 Equipment Suppliers

A schedule of equipment suppliers, as existing at the time of commissioning, will be provided and will contain:

- Relevant Material Management award reference number (Bid Opp number);
- Supplier contact details (Supplier Name; Address; e-mail address; Telephone numbers etc..)

The schedule will be sorted by supplier name. Supplier names will be those used in the Critical Spare Parts schedule.

6 Volume 4 – Training Manual

This section describes a standard approach, across Wastewater Treatment, Wastewater Services (WWS), for the format, presentation and numbering procedure for documentation within the scope of the manual.

The Training material will be organized first by Discipline (Operations; Electrical; Mechanical; Automation etc.) then by process area.

The Training Manual shall provide the information required to train Operations and Maintenance staff (including control systems staff) in the safe and efficient operation and maintenance of plant and equipment. The Training Manual will be specific to the scope of a project, training material to include where applicable to that project but not be limited to:

- Works operation in fully automatic and manual mode
- Plant and equipment routine and non-routine procedures (operation and maintenance)
- Use of facility Operating & Maintenance Manual
- Facility external layout
- Facility internal layout
- Facility drainage
- Roof drainage
- Facility P&IDs
- Facility process flow
- All installed equipment
- As installed mechanical and electrical drawings
- Individual unit processes.
- Individual chemical process.
- Safety and Health risk assessments.
- Hazardous area classification.
- Electrical classification.
- Works specific emergency procedures
- Training in all specific electronic equipment (PCS, PLC's, HMI's Data Networks and Interfaces, Telemetry, security systems).
- Facility specific commissioning

The Training Manual will be a stand-alone Volume which may be contained in multiple binders.

The content of training courses will be focused on understanding how that subject is impacted / expressed through the project, rather than a tutorial on the subject itself. For example, training on P&IDs and electrical drawings will be make staff familiar with the drawings for the specific project, rather than how to read and interpret P&ID or electrical drawings.

6.1 Training Planning and Administration

This specification applies to all training for Operations and Maintenance staff required under the scope of the project.

Training will be planned in advance. The City sewage treatment plants are full time operations, planning and advance notice is required to ensure the appropriate operations and maintenance staff are able to attend training courses. Where training impacts plant operations and maintenance staff, multiple training sessions will be arranged to minimize the disruption to wastewater service delivery.

A training plan will be produced in advance of any training. A **two week** review period will be allowed for the City to provide comments on the training plan. The training plan will demonstrate arrangements to “mop up” training delegates who may not have been able to attend a planned session due to operational reasons.

The training plan will include: an assessment of training needs; a schedule of training which identifies training delegates, course title, dates, times and locations of individual training courses.

The training plan will include training on all SWPs/SOPs provided by the project.

A minimum of **two weeks'** notice is required to be given to delegates attending a particular training session once the training plan has been agreed, unless otherwise directed by the Project Manager.

Attendance registers will be completed for each training course. Post training evaluation forms will be issued at the end of each training course and the results compiled in a summary.

For certain types of training courses it may be appropriate to use quizzes, learning reviews or other methods to test the understanding of course delegates of the training material. Consideration will be given to these techniques in the training plan. Quizzes (or similar) will be used on safety and health specific training courses.

The following forms will be used, unless agreed otherwise with the Project Manager:

- Attendance registers, Appendix 4-1.
- Individual post training course evaluation forms, Appendix 4-2.

6.2 Training Program

In coordination with the Training Coordinator, the Consultant will identify staff who will be impacted by the Project. The scope and content of the training material will be tailored for the specific audience.

Plant Start-up

The training plan will describe how operations and maintenance staff involved in start-up will be trained prior to their involvement in start-up activities. It can be the case that lessons are

learned during the start-up of a process that will be useful to the long term operator, start-up lessons learned will be documented for communication to staff who may have had training prior to start-up. Start-up lessons learned will be included in the final record of training material.

6.3 General Training Requirements

6.3.1 Training Documentation Requirements

This minimum documentation required for a training session are:

- Training objectives. (May be contained in the course notes)
- Training course program (may be contained in the course notes)
- Training course notes / hand-outs

The Operations Manuals are to be used as part of training courses (where appropriate). The objective is to minimize the amount of bespoke training material required to be created and to allow training delegates to become familiar with where to find relevant information.

The contents of any specific training course will be specific to that course and subject. The training manual will contain copies of all material used during the training sessions.

Where quiz or knowledge assessments are used in the training, copies of the forms and anticipated answers will be provided.

Audio and/or Video Recording of Training

The City may identify particular courses from the training program to be recorded for future use. Where Audio and/or Video material is used in the training a copy will be provided.

6.3.2 Training Manual Contents

This section defines the structure of the Training Manual to be provided at the end of the training program. The manual is to be provided within four weeks of the completion of the training program.

The Training Manual will include the following sections as a minimum:

6.3.2.1 Purpose

Describe the purpose of the Training Manual.

For example

The purpose of the Training Manual is to contain a record of training delivered during the commissioning and handover of new assets to operations and to provide a copy of all training materials used to enable such training to be repeated as required during the operations and maintenance of the facilities.

6.3.2.2 Training Program

Provide a summary of the scope of the training provided and a copy of the final training program as carried out.

6.3.2.3 Training Records

This section will contain copies of the completed training attendance sheets and a summary of post course evaluations for each course in the program. The summary of post course evaluations will not contain information to match comments to specific individuals.

The training records will be organized first by Discipline (Operations; Electrical; Mechanical; Automation etc....) then by process area.

Discipline 1

Process Area 1

Training Course [Title]

- *[insert typical attendance sheets]*
- *[insert typical summary of post course evaluation]*

Training Course [Title]

- *[insert typical attendance sheets]*
- *[insert typical summary of post course evaluation]*

Discipline 2

Process Area 2

Training Course [Title]

- *[insert typical attendance sheets]*
- *[insert typical summary of post course evaluation]*

Training Course [Title]

- *[insert typical attendance sheets]*
- *[insert typical summary of post course evaluation]*

6.3.2.4 Training Material Organized By Discipline Then Process Area

This section to provide a copy of all materials used in each training course within the training program. The Training material will be organized first by Discipline (Operations; Electrical; Mechanical; Automation etc....) then by process area.

Discipline 1

Process Area 1

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Process Area 2

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Discipline 2

Process Area 1

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Process Area 2

Training Course [Title]

- *List of course materials*

- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

Training Course [Title]

- *List of course materials*
- *Training objectives*
- *Training course program*
- *Training course notes / hand-outs*

7 Volume 5 – Commissioning Manual

The WSTP IMS contain a number of Basis Of Design documents and standards which detail certain commissioning requirements depending upon the trade and the type of installation. This manual will document the outcome of those requirements.

Scope of the Commissioning Manual will include commissioning, re-commissioning and eventual de-commissioning considerations.

This Commissioning Manual will consist of two key parts:

Part 1 – Commissioning Plan

The commissioning plan is a set of documents which comprehensively document the procedures required to commission the facility. This includes acceptance criteria for the commissioning tests.

Part II – Commissioning Records

The commissioning records are a set of documents which record and demonstrate the results of the commissioning process and that the acceptance criteria have been met. The records will include test result documentation, checklists, letters of conformity and certificates.

Where sections of the plant are commissioned in phases of one project, or as separate projects, it is acceptable for the Commissioning Manual to be provided in parts aligned to the completion of each project or project phase.

The Commissioning Manual is to be provided within four (4) weeks of the completion of the facility commissioning for each project or project phase.

The Commissioning Manual will include the following sections.

7.1 Purpose

This section will describe the purpose of the Commissioning Manual.

For example:

The purpose of the Commissioning Manual is to contain a record of the commissioning process and handover of new assets to operations. The commissioning manual will enable operations and City personnel to re-commission systems as required.

7.2 Part I - Project Commissioning Plan

The Project Commissioning Plan defines the overall requirements for testing and commissioning the facility. The Commissioning Plan will document the methods and procedures for commissioning the works **as carried out (past tense)**.

The commissioning plan will include information arranged under the following section headings:

7.2.1 General

Provide an overall description of the commissioning approach.

7.2.2 Roles and Responsibilities

Provide an explanation of roles and responsibilities of organizations and personnel involved in the commissioning.

7.2.3 Scope

Provide a description of the scope of the works.

7.2.4 Sequence / Schedule

7.3 Commissioning Specification and Objectives

This section will describe the commissioning tests required to demonstrate the design intent of the project, along with the approved acceptance criteria.

7.4 Commissioning Procedures

The commissioning procedures provide the detailed information to describe the specific field activities necessary to complete the commissioning process and ensure the commissioning specification and objectives are met. Multiple documents will be included for various facility processes.

The commissioning procedures will be organized in a logical fashion most appropriate to the scope of work.

7.5 Part II – Project Commissioning Records

The commissioning records to be included within the Commissioning Manual are a subset of the complete set of Commissioning Records. The records included will be limited to safety, process and system performance verification, and not verification of individual components.

An index of certificates will be provided.

Examples of commissioning records to be included are as follows (but not limited to):

Safety

- Pressure vessel test certificates
- Fixed lifting equipment test certificates
- Portable lifting equipment test certificates
- Certificates of Acceptance, AHJ (Authority Having Jurisdiction).
- Engineers letter of Certification
- Fire alarm test certificates

Other

- Process
- Performance tests certificates.
- Structural
- Mechanical
- Equipment Commissioning Certificates
- Pressure Test Certificates.
- Electrical
- Power distribution system acceptance documentation
- Fire alarm acceptance documentation
- Security system acceptance documentation
- CCTV system acceptance documentation
- Automation
- Process Control System SAT (Site Acceptance Test) acceptance documentation, but not necessarily documentation of all detailed tests.
- Network acceptance documentation
- Equipment control limits as commissioned

The commissioning records section will be organized as follows:

7.5.1 Facility

This section will contain copies of the completed records, tests and certificates that are applicable to the entire facility. For example – Facility effluent quality commissioning record.

7.5.2 Area A

This section to provide a copy of all major completed commissioning records that are applicable to process area A.

7.5.2.1 System 1

This section to provide a copy of all major completed commissioning records that are applicable to the specific system. The records would detail overall system performance, but would not necessarily include detailed test results of components, such as cable testing forms.

7.5.2.2 System 2

Similar to System 1 ... and continued for all systems.

7.5.3 Area B

Similar to Area A and continued for all systems.

8 Volume 6 – Drawing Manual

8.1 Purpose of the Drawing Manual

This section describes a standard approach, across Wastewater Treatment, Wastewater Services (WWS), for the format, presentation and numbering procedure for documentation within the scope of the manual.

“As Built” versions of all drawings will be provided as per the requirements of this specification no later than four weeks after Total Performance.

8.2 Index of Drawings

An index of all as constructed drawings provided as part of the design will be provided, the index will include:

- Drawing Number
- Drawing Title (Title Box Description)
- Version number
- Date of issue
- Type (Process and Instrumentation Drawings (P&ID); Electrical; Mechanical; Civil etc...)
- Process Area
- File name (as per file naming convention)

The index will be provided in an Excel file and in hard copy in this manual. The hard copy index will be arranged by process area then by drawing number.

The index of drawings should include, this list is not exhaustive:

- Civil Drawings
- Cranage points and load bearing capacity drawings for siting of mobile cranes during maintenance lifting operations
- Mechanical Drawings
- Pneumatic control systems
- Hydro electrical supply and gas supply drawings
- Telephone and other communication line drawings
- Telemetry drawings
- Electrical drawings
- Process flow diagrams
- P&IDs
- Works layout
- Works Drainage (Drainage, Chemical and Foul)
- Internal layout plans,
- Hazardous location plans
- Shop drawing
- Any Drawings referred to within any documentation.

Where 3D models have been provided, information will be included on how to navigate the tool.

8.3 Drawings General

The drawings produced to be in conformance with “CD-CP-TO-05 Project Documentation Requirement sheet”

Submit draft drawings for review in both paper and electronic format, use a paper size suitable for a detailed review. Draft drawings will be amended and finalized as requested.

All drawings will be saved with the first layout tab active.

All final files will be fully purged prior to submittal.

8.4 Number of copies

Requirements for the number of copies are defined in “CD-CP-TO-05 Project Documentation Requirement sheet”.

Two (2) hard copies and one (1) electronic of all final shop drawings will be provided.

Electronic and hard copies will be provided in the format as described in the General Specification.

9 Appendix

Drafting note: this appendix contains reference information needed for the completion of the manual, templates, reference lists etc. but will not end up in the final Operations Manuals.

9.1 Appendix 0-1 - Example electronic folder and file structure

The file and folder structure for the Operations Manuals are described here. The file and folder structure has been organized such that once it is applied to a specific wastewater facility the files and folders can be readily transferred to the City server for access by the relevant stakeholders.

The root folder will contain a full index of the complete Operations Manual consisting of six volumes.

The Technical Document Numbering System describes the convention for naming of files assuming the use of a Document Management System. Operations Manuals will finally reside on a City server in a traditional folder hierarchy, this document provides guidance on the required folder structure.

Individual files will be named according to the IMS document PG-RC-PC-03 Technical Document Numbering System.

E.g. Operations Manual files for the WEWPCC Perimeter Road Pumping Station will be in the format:

A-0103-OMAN-Axxx

Each volume will be a separate file or set of files within a folder hierarchy titles with the volume number and title. i.e. files from different Volumes will not be mixed within a folder.

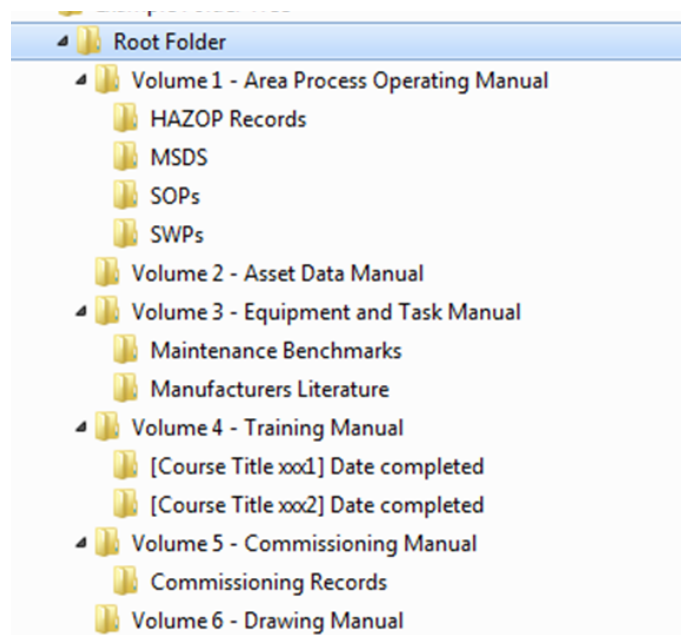


Figure 2 - Typical Operations Manual Electronic Version Folder Structure

The Volume folders will sit under a root Operations Manual Folder which will only contain a complete index of the entire Operations Manual.

Volume 1 – Area Process Operating Manual

- Sections 1 to 3 of the specification may be created as a single file or split into individual files depending on the size and complexity of the specific Manual.
- To aid document change control, sections 4 will be created as separate files for each Process Area. A Process Area may be split into multiple files depending on the size and complexity of the specific Manual. Where a Process area is split into multiple files they will follow a logical order.

Volume 1 Appendices:

- SOPs; SWPs; MSDSs and HAZOP Records will be contained in separate folders as Figure 1
- Each SOP; SWP; MSDS will be a separate file within the relevant folder
- The folder for HAZOP Records will be organized logically appropriate to the specific content
- Further Appendix folders may be included if appropriate to the specific Operations Manual

Volume 2 – Asset Data Manual

This volume consists of an Excel workbook(s) which will be in its own folder. No other files are required within this folder.

Multiple Excel workbooks may be provided depending on the specific Operations Manual if required depending on the complexity.

Volume 3 – Equipment and Maintenance Task Manual

The following sections of the specification will be provided as separate files within the Volume 3 folder:

- Maintenance Task Intervals
- Lubrication schedule (Excel File)
- Critical parts list (Excel File)
- Equipment suppliers

Maintenance Benchmark Work Orders will be provided in a separate folder.

Manufacturers literature will be provided in a separate folder. The folder will contain appropriate sub folders and be organized in a logical manner to suite the specific content. An index will be provided as an Excel file. Files provided by manufacturers and suppliers consisting of their proprietary literature and documentation do not need to be renamed to follow the Technical Document Numbering Standard, however the index must allow the documents to be identified without opening the specific files.

For organization of the DVD copy of the Operations Manual, Manufacturers Literature may be spread across multiple DVDs depending on the size of the specific Manual.

Volume 4 – Training Manual

The training Program will be provided as a separate file.

Training material will be organized into separate folders for specific training courses. Specific folders may contain sub folders as required to suite the material.

Training records will be provided as separate files in a specific folder.

A summary of training feedback forms will be provided as separate file. Copies of completed feedback forms are not to be provided.

Volume 5 – Commissioning Manual

The Commissioning Manual will be provided as a separate file(s).

Commissioning Records will be provided as separate files as appropriate to the content within a sub-folder, which will be organized into further sub folders appropriate to the content.

Volume 6 – Drawing Manual

Drawings files will be provided as pdf and numbered as per the Technical Document Numbering Standard.

An index of all drawings will be provided as an Excel file.

9.2 Appendix 1-1 Template Safe Work Procedure (SWP)

Refer to IMS document:

CD-CP-TO-xx Safe Work Procedure Template.doc.docx

CD-CP-TO-xx - Developing SWP Guideline.pdf

CD-CP-TO-xx - SWP Template Instructions.pdf

9.3 Appendix 1-2 Template Standard Operating Procedure (SOP)

Refer to IMS document: CD-CP-TO-01 Standard Operating Procedure Template.doc.doc

9.4 Appendix 2-1 –Asset List Loading Template – Excel File

Refer to IMS document: CD-CP-TO-xx - Asset Loading Template.

9.5 Appendix 2-2 – Building Codes

BUILDING_CODE	BUILDING_DESCRIPTION
NEWPCC ADMIN	NEWPCC MAIN ADMINISTRATION
NEWPCC BOILER	NEWPCC BOILER
NEWPCC DEWATERING	
NEWPCC DIGESTER	NEWPCC DIGESTER
NEWPCC DRYING BEDS	
NEWPCC GARAGE	NEWPCC MAIN GARAGE
NEWPCC GAS BURNER	
NEWPCC GAS SPHERE	
NEWPCC GRIT	NEWPCC GRIT
NEWPCC HAULED WASTE	
NEWPCC LAB	NEWPCC MAIN LAB
NEWPCC LEACHATE	NEWPCC LEACHATE
NEWPCC MAIN	NEWPCC MAIN PUMPING
NEWPCC N-REMOVAL	
NEWPCC P-REMOVAL	
NEWPCC PRIMARY	NEWPCC PRIMARY
NEWPCC REACTOR	NEWPCC REACTOR
NEWPCC SECONDARY	
NEWPCC UV	NEWPCC ULTRA VIOLET/TERTIARY
SEWPCC ADMIN	SEWPCC ADMINISTRATION
SEWPCC GENERATOR	
SEWPCC GRIT	SEWPCC GRIT
SEWPCC MAINT	SEWPCC MAINTENANCE
SEWPCC OIL STORAGE	
SEWPCC OUTFALL	SEWPCC OUTFALL
SEWPCC PRIMARY	SEWPCC PRIMARY
SEWPCC REACTOR	SEWPCC REACTOR
SEWPCC SECONDARY	
SEWPCC SEPTAGE	SEWPCC SEPTAGE
SEWPCC UV	SEWPCC ULTRA VIOLET/TERTIARY
WEWPCC ADMIN	WEWPCC ADMINISTRATION
WEWPCC DAF	WEWPCC DAF & CHEMICAL FEED
WEWPCC FERMENTER	
WEWPCC HEADWORKS	

BUILDING_CODE	BUILDING_DESCRIPTION
WEWPCC OUTFALL	WEWPCC OUTFALL
WEWPCC PRIMARY	WEWPCC PRIMARY
WEWPCC PRPS	WEWPCC PREIMETER ROAD PUMP STATION
WEWPCC SECONDARY	
WEWPCC UTILITY	WEWPCC UTILITY

9.6 Appendix 2-3 – Asset Type Codes

Asset Type Code	Description
ACTUATOR	VALVE ACTUATOR
ACU	AIR CONDITIONING UNIT
AHU	AIR HANDLING UNIT
ANALYZER	PROCESS ANALYSIS INSTRUMENTS CL2 / DE / DO / NH3 / NO3 / PO4
ARRESTER	FLAME / SPARK ARRESTER
AUGER	AUGER
BACKFLOW	BACKFLOW PREVENTER
BARSCREEN	BARSCREEN
BLOWER	PROCESS BLOWER
BOAT	MOTORBOAT / CANOE
BOILER	BOILER
BRAKE	BRIDGE MOTOR BRAKE
BREAKER	ELECTRICAL BREAKER
BRIDGE	CLARIFIER BRIDGE
BUILDING	BUILDING
BURNER	WASTE GAS BURNER
CATHODIC	CATHODIC PROTECTION
CELL	LOAD CELLS
CENTRIFUGE	CENTRIFUGE
CHANNEL	CHANNEL
CHARGER	BATTERY CHARGER
CHILLER	CHILLER AIR CONDITION UNIT
CHLORINATR	CHLORINE CHLORINATOR
CLASSIFIER	CLASSIFIER
CNTL PANEL	CONTROL PANEL FDP / TC / LCP / MCP COMMUNICATION EQUIPMENT
COMM	RADIOS/PAGERS/TELEPHONE/PAGING SYSTE
COMP-AIR	AIR COMPRESSOR
COMP-GAS	GAS COMPRESSOR
COMPUTER	COMPUTER EQUIPMENT
CONDENSER	CONDENSER
CONVEYOR	GRIT CONVEYOR
CRANE	CRANE
CULVERT	CULVERT
DAMPER	DAMPER
DCS	DISTRIBUTED CONTROL SYSTEM EQUIPMENT
DESTRUCT	OZONE CATALYTIC DESTRUCT
DETECTOR	GAS DETECTOR CL2 / CO / H2S / LEL / O2

Asset Type Code	Description
DIFFUSER	DIFFUSER
DIST PANEL	ELECTRICAL DISTRIBUTION PANEL
DRYER-AIR	AIR DRYER
DUCT HTR	ELECTRIC HEATING COIL
ELECTROLYZ	ELECTROLYZER
ELEVATOR	ELEVATOR
ENGINE	GAS / DIESEL ENGINE
EVAPORATOR	CHLORINE EVAPORATOR
FAN	FANS EXHAUST / CIRCULATION / FUMEHOOD
FEEDERMAIN	DISTRIBUTION FEEDERMAIN
FILTER	FILTER AIR / MOISTURE / OIL
FIRE	FIRE EQUIPMENT
FLEET	Fleet Asset
FLOWTUBE	FLOWTUBE
FLUIDCPLG	FLUID COUPLING
FORCEMAIN	SEWER FORCEMAIN
FOUNTAIN	RETENTION BASIN FOUNTAIN
FURNACE	FURNACE
GATE	GATE
GAUGE	GAUGE
GEARBOX	GEARBOX
GENERATOR	STANDBY GENERATOR
GRATE	GRATE FOR CULVERTS, OUTFALLS, ETC
GROUNDS	GROUNDS
HEAT EXCH	HEAT EXCHANGER
HEAT TRACE	HEAT TRACE
HMI	HUMAN MACHINE INTERFACE
HOIST	CRANE / HOIST UNIT
HOPPER	HOPPER
HYDRANT	HYDRANT
INDICATOR	VERTICAL SCALE INDICATOR
INJECTOR	CHLORINE INJECTOR
INLET	INLET GRATES
INSTRUMENT	INSTRUMENTATION EQUIPMENT
LAWNMOWER	LAWNMOWER
LIGHTING	ELECTRICAL LIGHTS
LOUVER	HVAC LOUVER
LUBRICATOR	AIR LINE LUBRICATOR
MANHOLE	MANHOLE
MCC	MOTOR CONTROL CENTRE
METER-GAS	GAS METER
METER-WTR	WATER METER

Asset Type Code	Description
MIXER	MIXER
MOTOR	MOTOR
MOTOR-PROT	MOTOR PROTECTION EQUIPMENT
OVRHD-DOOR	OVERHEAD DOOR
PGM	PERSONAL GAS MONITOR
PIPE	PIPE PROCESS / SERVICE
PIT	PIT METER / VALVE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PLUMBING	DOMESTIC PLUMBING
POSITIONER	VALVE POSITIONER
PROPERTY	PROPERTY INFORMATION
PUMP	PUMP
PUMP-UNIT	ENTIRE PUMP UNIT
RECIRC	GAS RECIRCULATOR
RECTIFIER	RECTIFIER
REGULATOR	PRESSURE REGULATOR
RESERVOIR	WATER DISTRIBUTION RESERVOIR
RIVER CROS	RIVER CROSSING
ROLLUP	COST ROLLUP ASSET
RTD	RESISTIVE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
SAFETY	SAFETY RELATED EQUIPMENT
SAMPLER	PROCESS SAMPLER
SCADA	SUPERVISORY CONTROL AND DATA AQUISITION
SCALE	WEIGH SCALE
SCBA	SELF CONTAINED BREATHING APPARATUS
SCRUBBER	ODOUR CONTROL SCRUBBER
SECURITY	SECURITY EQUIPMENT
SERVICE	ELECTRICAL SERVICES
SEWERMAIN	SEWERMAIN
SHAFT	PUMP SHAFT
SIGNAL	DCS / SCADA CONTROL SYSTEM SIGNAL
SILENCER	SILENCER
SKID	PSA SYSTEM
SKIMMER	DAF SKIMMER MECHANISM
SLUICE	SLUICE GATE
SOFTSTART	SOLIDSTATE MOTOR STARTER
SRB	STORM RETENTION BASIN
STACK	CHIMNEY OR ODOUR DISPERSION STACK
STRAINER	STRAINER
SWEEP	CLARIFIER & FERMENTER SWEEP MECHANISM
SWITCH	SWITCH LEVEL / PRESSURE / TEMPERATURE / VIBRATION

Asset Type Code	Description
SWITCHGEAR	ELECTRICAL SWITCHGEAR
SYSTEM	SYSTEM RELATING TO COMPUTER OR SOFTWARE
TANK	TANK HOLDING / DIGESTOR / CLARIFIER / AERATION
TEST	TEST EQUIPMENT
TOOL	SHOP EQUIPMENT AND TOOLS
TRACK	RAILWAY TRACK
TRANS-SW	TRANSFER SWITCH
TRANSDUCE	TRANSDUCER
TRANSFORM	TRANSFORMER
TRANSMIT	TRANSMITTER FLOW / LEVEL / PRESSURE / TEMPERATURE
UNIT-HTR	UNIT HEATER
UPS	UNINTERRUPTIBLE POWER SUPPLY
USC	ULTRASONIC CLEANER
UV MOD	ULTRA VIOLET LIGHT MODULAR LAMP ASSEMBLY
UV UNIT	ULTRA VIOLET LIGHT PROCESS UNIT
VALVE	VALVE
VSD	VARIABLE SPEED DRIVE
WATERMAIN	WATERMAIN

9.7 Appendix 3-1 Maintenance Benchmark Template

Format of the maintenance benchmark is under development and will be defined from the maintenance project.

9.8 Appendix 3-2 Lubricant schedule

Refer to IMS document: CD-CP-TO-xx - Lubricant Schedule Template.xlsx

9.9 Appendix 3-3 Critical Parts schedule

Refer to IMS document: CD-CP-TO-xx - Critical Parts Schedule Template.xlsx

9.10 Appendix 4-1 – Example attendance registers

Refer to IMS document: CD-CP-TO-xx - Training attendance register.doc

The attendance record should contain the information in the template as a minimum. Training providers may use their own format.

9.11 Appendix 4-2 – Example individual post training course evaluation forms

Refer to IMS document: CD-CP-TO-xx - Post Course Evaluation Form.docx

The training course evaluation should contain the information in the template as a minimum. Training providers may use their own format.

9.12 Appendix 5 – Example manual (WEWPCP Perimeter Road Pumping Station)

Refer to IMS document: CD-CP-TO-xx-Example Operations Manual