

# National Manual of Assets and Facilities Management

Volume 5, Chapter 1

**Operations Management Introduction Guideline** 

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### **Operations Management Introduction Guideline**

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#### **Table of Contents**

1.0	PURPOSE	5
2.0	SCOPE	5
3.0	DEFINITIONS	б
4.0	REFERENCES	б
5.0	RESPONSIBILITIES	б
6.0	PROCESS	7
6.1	Facility Management	7
6.2	Developing System Operating Procedures	
6.3	HVAC System Operations	
6.4	Building Management Systems (BMS) Operations	8
6.5	Instrumentation Systems Operations	8
6.6	Mechanical Systems Operations	8
6.7	Electrical Systems Operations	9
6.8	Security Systems Operations	10
6.9	Life Safety Systems Operations	10
6.10	Communication Systems Operations	
6.11	Escalators & Elevators Operations	
6.12	Roadway Operations	
6.13	Soft Services Operations Guideline	
6.14	Equipment Calibration	
6.15	System Engineering Program	
6.16	Configuration Management	12
7.0	METHODOLOGY	13
8.0	ATTACHMENTS	13
Attac	hment 1 – National Manual of Assets and Facilities Management Volume 5. Contents List	14



#### 1.0 PURPOSE

The purpose of Volume 5 is to assist in the standardization of Operations Management across all entities and enable smooth and efficient operation of facilities.

The Volume will provide guidance associated with Operating Systems, based upon relevant Standards and best-practice to ensure continued availability and to prolong useful life.

The intention is to provide a robust reference for all levels of the organization to use; in creating their own processes and procedures, and when engaging with external parties for the delivery of services.

The Volume will be updated periodically to reflect changes that are likely to occur (e.g. through: new legislation, revised Standards, innovative practices or user feedback). References have been provided where possible to direct users to the 'specific' requirements of any Decree, Standard, or Regulation as a point of reference, where only a summary is provided within the Volume. Whilst the Volume offers guidance in applying Standards, all Standards referenced herein should be consulted directly to ensure that guidance remains relevant.

#### 2.0 SCOPE

The Entity shall use the Operations Management Volume (Volume 5) as the basis for developing the Entity's own Operating Procedures, templates, and checklists. Volume 5 can also be used to assist in the formulation of external communication, for example, in the compilation of Request for Proposal (RFP) in relation to tendered services.

Volume 5 defines the minimum requirements to be followed in the planning, execution and delivery of the topics covered. An Entity may choose to develop requirements further to reflect unique, specialized Systems or operations, while maintaining the purpose and intent of the Expro National Manual of Assets and Facilities Management (NMA&FM).

The volume contains chapters in order as follows:

- Chapter 1: Introduction
- Chapter 2: Facility Management
- Chapter 3: Developing System Operating Procedures
- Chapter 4: HVAC System Operations
- Chapter 5: Building Management Systems (BMS) Operations
- Chapter 6: Instrumentation Systems Operations
- Chapter 7: Mechanical Systems Operations
- Chapter 8: Electrical Systems Operations
- Chapter 9: Security Systems Operations
- Chapter 10: Life Safety Systems Operations
- Chapter 11: Communication Systems Operations
- Chapter 12: Escalators & Elevators Operations
- Chapter 13: Roadway Operations
- Chapter 14: Soft Services Operations
- Chapter 15: Cleaning Horizontal/Vertical Operations
- Chapter 16: Pest Control Operations
- Chapter 17: Waste Management Operations
- Chapter 18: Grounds & Landscaping Operations
- Chapter 19: Equipment Calibrations
- Chapter 20: System Engineering Program
- Chapter 21: Configuration Management

The table in Section 3 offers definitions for terms and acronyms specifically used within this Introduction Chapter. For a comprehensive list of definitions, the user should consult the "Expro Definitions and Acronyms Guideline Document No. ENT-E00-GL-000001 Rev 001.

#### **Operations Management Introduction Guideline**

#### 3.0 DEFINITIONS

Term	Definition	
Change Control	A formal, or informal process, which can be contractual, which articulates and records the changes from a current activity or process to a new changed status. It provides certainty about the nature of the change and is normally used as part of a quality management procedure	
Facility	Building(s) situated within a single campus in which Entity services, processes and procedures are executed.	
Procedure	Documents that provide information about how to perform interdepartmental activities and processes consistently. Procedures are used to manage and control activities such as tasks performed across different groups or functions such as Engineering, Procurement and Document Control.	
	Acronyms	
BMS	Building Management Systems	
FM	Facility Management	
HVAC	Heating, Ventilation and Air Conditioning	
ISP	Internet Service Provider	
KPI	Key Performance Indicator	
NMA&FM	National Manual of Assets & Facilities Management	
O&M	Operation & Maintenance	
OEM	Original Equipment Manufacturer	
RFP	Request for Proposal	

Table 1: Definitions

#### 4.0 REFERENCES

The Operations Management Volume and chapters have been prepared using relevant Standards, Legislation, and best-practice at the time of production. References are provided within each chapter for further reading. As far as is reasonably practicable, Standards and Legislation referenced within each chapter should be followed, as a minimum. Standards and Legislation may become outdated due to:

- Latest Royal Decree
- Regulatory changes
- Revised Standards
- Innovative practices
- New technologies.

Therefore, Expro should be consulted by each Entity during any change process, to ensure that the most up-to-date and accurate information is used.

#### 5.0 RESPONSIBILITIES

Role	Description	
Entity	A Saudi Government organization that is responsible for the management of government funded facilities management.	

Table 2: Responsibilities



#### 6.0 PROCESS

The Volume contains 21 Chapters. Chapter 1 (this chapter) is the Introduction to the Volume, while all remaining chapters are described within this Section. This Introduction document summarizes the content of the various documents within Volume 5 of the National Manual of Assets and Facilities Management.

#### 6.1 Facility Management

Facility Management (FM) is a professional management discipline focused on the efficient and effective delivery of support services for the organizations that it serves. This chapter covers come key aspects of FM which are not specific to engineering systems, including:

- Facility Safety
- Space Planning and Utilization
- Facility Surveillances
- Natural Phenomena Hazards Mitigation
- Seasonal Planning
- Customer Service

#### 6.2 Developing System Operating Procedures

This chapter comprises 2 components, Procedure Development, and Procedure Writing.

The Procedure Development component of the chapter sets out a framework for identifying whether a System Operating Procedure should be newly established or whether existing System Operating Procedures should be revised. It also highlights the importance of using Policy to drive Operating Procedures and the benefits of using Operating Procedures within each organization. The content is specifically targeted toward the Entity's Management, which is responsible for driving change within the organization. The Procedure is designed to be scalable depending on the size of the Entity and the number of stakeholders involved in developing procedures.

The Procedure Writer's Guide outlines how to write a System Operating Procedure that is fit for purpose, irrespective of the complexity of the system upon which the Operating Procedure is based. Types of System Operating Procedure featured in Volume 5 are as follows:

- Startup
- Shutdown
- System Monitoring/Daily Rounds
- Emergency Response Actions

The steps described within the Guide enable business-specific System Operating Procedures to be produced that can be consistently followed by FM personnel. The content of the Guide is specifically targeted at operational staff and should be used by them, in collaboration with the Entity's Management, to establish new Procedures, and update existing Procedures in line with best-practice and latest Standards. It is supported by an Outline Plan Template, an Operating Procedure Template, and a Procedure Quality Checklist.

Critically, the difference between Policy, Procedure, and Process is defined across both chapter components (Procedure Development, and Procedure Writer's Guide). Both components are interdependent and critical to developing, reviewing, and establishing business-specific System Operating Procedures.

#### 6.3 HVAC System Operations

This chapter features procedural guidelines for the operation of Heating, Ventilation, and Air Conditioning (HVAC) Systems. HVAC Systems are mandatory throughout Government entities within KSA. Standards to which Systems are designed, operated and, maintained within the Kingdom are well-established. Guidance featured in this chapter outlines the minimum requirements that shall be followed by entities



operating buildings within each Sector (Healthcare, Housing, Municipalities, Offices, Parks & Recreation and Schools & Universities,). This offers a common, consistent approach to HVAC System Operating Procedures within KSA based on relevant Standards, and best-practice.

#### 6.4 Building Management Systems (BMS) Operations

BMS are widely used in KSA. The BMS enables cohesion between the Systems under its monitoring and control. As the BMS intelligence increases, so too does building operating efficiency. It is essential, therefore, to operate the BMS according to Entity-specific BMS Operating Procedures based upon Original Equipment Manufacturer (OEM) instructions, the original system design intent and the guidance laid out within the NMA&FM. The chapter covers several topics on the subject matter, including:

- Performance of the BMS and Integrated Building Systems
- Monitoring and control
- Building comfort
- · Safety of assets
- Customized control strategies
- Operational flexibility and ease of change
- · Auto-changeovers of failed equipment
- Improved operational and environmental comfort
- Energy utilization support and operational cost management
- Integration with other building services to improve effectiveness
- Optimization of quality service delivery

Through in-depth commentary on these topics, the chapter provides a holistic approach to the production of BMS Operating Procedures that can be easily followed by the Entity, regardless of the Sector in which they operate.

#### 6.5 Instrumentation Systems Operations

This chapter provides the Entity with guidance based on relevant standards and best-practice to establish enhanced Operating Procedures for instrumentation and associated equipment for buildings.

A key focus of the chapter is the Instrumentation and Control of HVAC Systems. However, the chapter also emphasizes the importance of reliable electromechanical systems within facilities, and the assurance that monitoring and control provides in guaranteeing:

- · Accuracy of results
- Identification of faults
- System safety

An indication of the minimum standard specification of instruments is featured therein, along with the desired engineering parameters to be measured and controlled. Compliant Entities will see increased performance in carrying out Normal Operating Procedures, as well as Emergency Procedures. Other benefits referenced within the chapter are:

- Real time data capturing
- Attaining peak operational efficiencies of the equipment and instrumentation
- Enhanced lifecycle of the instrumentation and equipment considered
- High preparedness in dealing with emergencies

#### 6.6 Mechanical Systems Operations

This chapter features Sector-specific guidance in establishing Operating Procedures for Mechanical Systems within all entities. Mechanical Systems defined within the chapter include:

- Chilled Water Treatment System
- Water Treatment Systems

# Operations M

#### **Operations Management Introduction Guideline**

- Fire Protection Systems
- CSSD Reverse Osmosis Systems
- HVAC Systems
- Reverse Osmosis System
- Plumbing Systems
- Generator Systems/Fuel Systems
- Secondary Chilled Water Systems
- District Cooling Systems
- Boiler Systems
- Medical Gas System
- Chiller Systems

For each Mechanical System, the chapter outlines:

- Roles and responsibilities of operations staff (including third Parties)
- Site-specific considerations
- · How operations may affect other Systems, processes, and people
- Competencies required to establish and deliver Mechanical System Operating Procedures
- The importance of Risk Management (i.e. Pre-work Risk Assessments, Point of Work Risk Assessments, Method Statement, etc.).

Successful implementation of standardized Mechanical System Operating Procedures, using guidance outlined within this chapter will enable:

- Protection of people and the environment
- Maximization of equipment life
- · Efficient operation that meets business needs

The chapter is supported by templates featuring comprehensive guidance and sample checklists to support the tailoring of each template to business-specific needs.

#### 6.7 Electrical Systems Operations

This chapter features guidance which enables each Entity to develop a consistent set of Electrical Systems Operating Procedures, specific to facilities under the Entity's control, based on relevant Standards and best-practice.

The chapter uses visual means to convey guidance associated with Electrical Systems, supported by descriptive text. Roles and responsibilities are also clearly defined. The chapter contains key components that represent minimum requirements to be met by each Entity. The approach presented offers a framework to establish business-specific Operating Procedures while not being prescriptive (i.e. the Entity is required to expand upon the contents of the chapter when applying it to Entity-owned assets).

Safety is the top priority when operating Electrical Systems. Guidance on authorization and reporting is detailed within the chapter, thus ensuring decisions and actions associated with the System are executed by competent, responsible personnel. Guidance contained in the chapter is based on NFPA Standards, acknowledging that Standards adopted by the Entity will influence the approach.

The chapter offers an all-inclusive approach to Electrical Systems at all Voltage Levels (i.e. High Voltage, Medium Voltage, Low Voltage, and Extra Low Voltage), including all sub-Systems and equipment that may be under the Entity's control, regardless of the Sector in which the Entity operates.

For each System highlighted within the chapter, minimum Operating Procedures are described for all conceivable scenarios, including:

- Startup
- Shutdown
- Normal
- Emergency

#### **Operations Management Introduction Guideline**

The chapter also emphasizes the need for continuous review and update of Electrical System Operating Procedures based on changing technology, practices, and Standards.

#### 6.8 Security Systems Operations

This chapter highlights best-practice applicable to each Entity's Security Operations to ensure the suitable protection of facilities, personnel, equipment, and resources. In addition, it outlines essential competencies required of Security Personnel to successfully carry out Security Operations.

Security Control Systems are also described in depth within the chapter, under which a methodology for establishing the Facility Security Level is presented. There are several scenarios describing Security Incidents that may occur within facilities. Therefore, guidance regarding customization of Security Control Systems according to operational requirements is also included.

Responsibilities of Security (and peripheral) Personnel are clearly outlined within the chapter. The measurement and testing of Security System performance is also described. In addition, there is guidance regarding:

- Budgeting
- Security initiatives
- · Assignment of assets
- Management of Security Personnel

#### 6.9 Life Safety Systems Operations

Life Safety Systems are designed to protect assets and people by monitoring the status of the facility during normal operations, and activating mitigation measures during emergencies. Guidance contained within this chapter will enable each Entity to establish its own processes and procedures for effectively managing Life Safety Systems such that they function as designed under all conceivable scenarios.

While the chapter describes an all-inclusive approach to Life Safety Systems, there is a specific focus on three types of Systems:

- Emergency Power Generation Systems
- · Fire Detection Systems
- Firefighting Systems

The chapter contains minimum requirements for: Start-up Procedures, Shutdown Procedures, System Monitoring/Daily Rounds Procedures; and Emergency Response Actions associated with the aforementioned Systems. Roles and responsibilities are also outlined therein.

#### 6.10 Communication Systems Operations

This chapter offers guidance in enabling the safe and effective operation of Communications Systems to ensure that each Entity can develop consistent, facility-specific, Operating Procedures for Communication Systems.

In addition to Life Safety Systems, Communication Systems represent the most important systems in a facility, particularly during an emergency. Setting performance requirements of Communication Systems is critical, both during an Emergency and during Normal Operations. Minimum required Key Performance Indicators (KPIs) associated with Communications Systems are set out in the chapter and include:

- Network availability
- Network resilience
- Network speed

The chapter also highlights the impact that KPIs have on other parameters, such as: minimum level of required spares, and required infrastructure investment. Other statutory requirements of Communications Systems detailed in the chapter include:



- Availability of communication devices that do not rely on a functioning electricity network
- Requirements associated with battery powered devices
- Performance guarantees associated with restoration of communications networks with local telephone/Internet Service Provider (ISP)
- Start-up
- Shutdown
- Normal

Emergency Operating Procedures for primary and back-up Communication Systems are detailed within the chapter for a range of media, including:

- Telephone-based
- Internet-based
- Mains-powered
- Battery-powered devices

Emphasis is placed on the importance of communications protocols, roles and responsibilities associated with such protocols, and the value of traditional methods of communication.

#### 6.11 Escalators & Elevators Operations

This chapter offers guidance in the operation of escalators and elevators associated with the safe and efficient movement of goods and people. Operational methodologies are described that enable each Entity to maximize the availability of equipment during several operating scenarios (i.e. Start-up, Shutdown, System Monitoring/Daily Rounds, and Emergency Response Actions).

#### 6.12 Roadway Operations

Roads within KSA are classified by the Ministry of Transport. The same classification System is followed by Traffic Control Centres and Municipalities to support safe operation and maintenance of road networks (i.e. motorways, branch roads, and rural roads) and their associated systems. This chapter describes in greater detail the relationship between stakeholders in Roadways Operations, and offers guidance that will enable the establishment of Roadways System Operating Procedures based on relevant Standards and best-practice.

The process of collecting Road Network and Traffic data (e.g. network description and location referencing) is also described tin this chapter. In addition, it focuses on the methodology for managing information about the network (e.g. planned roadworks; unplanned events; planned events that will have an impact on traffic conditions, such as major cultural or sporting events and significant weather events). The benefits of Intelligent Transport Systems and toll roads are described along with their impact on data gathering and analytics.

In addition, the chapter describes the significance of response to events (i.e. actions to be taken as a result of outputs of data processing). This includes examples such as: implementation of Variable Message Signs and provision of information to the public via media organizations. Other topics included are: Traffic Monitoring and Surveillance, Traffic Control, and Signaling.

#### 6.13 Soft Services Operations Guideline

Refer to Introduction: Soft Services Operations Guideline EOM-ZO0-GL-000002. This document provides an introduction and overview to Cleaning Horizontal / Vertical Operations, Pest Control Operations, Waste Management Operations, and Grounds and Landscaping Operations.

#### 6.14 Equipment Calibration



This chapter provides specific instructions for the calibration of mechanical and electrical measuring and testing equipment. This is critical in protecting the safety of personnel and to ensure the proper functioning of equipment and its continued accuracy.

#### 6.15 System Engineering Program

This chapter provides information on System Engineering techniques used during Operations. System Engineering uses a host of tools that include: modeling and simulation; requirements analysis; and scheduling; to manage complexity. This chapter covers: program description, System assessments and monitoring, system knowledge requirements, control of maintenance activities, System design descriptions, trending system performance, system engineer qualification, and competency checking processes.

#### 6.16 Configuration Management

Configuration Management is a System Engineering process for establishing and maintaining consistency of System performance as well as assuring the functional and physical attributes throughout its life, in line with user requirements, design, and operational information. The CM Process is widely used to manage changes throughout the System lifecycle of complex Systems in industrial engineering segments such as roads, bridges, canals, dams, and buildings. This chapter addresses the CM Process, and also covers Change Control.

#### **Operations Management Introduction Guideline**

#### 7.0 METHODOLOGY

Each Volume of the National Manual of Assets & Facilities Management has been created by a team of world-class experts in their field, using relevant Standards and best-practice knowledge based on decades of experience.

To ensure that the Entity is compliant with Royal Decrees, Local Standards, and Regulations and to support the Entities decision-making Process associated with the operation and maintenance of facilities, four tiers of linguistic classification have been used within the National Manual of Assets & Facilities Management as follows:



**Shall**. This is a mandated instruction which must be followed or adhered to (e.g., a Royal Decree, in country standards such as the Saudi Building Code).



**Should**. This is an instruction or piece of information which is important and, while it may not be mandated to follow the advice, it is advisable to follow (e.g., international standards which are considered legislation in other countries).



**Consider**. This refers to advice or an instruction which is considered to be important, is worth following, and fits well for the purpose intended.



**Advise**. This generally refers to good practice and entails practical advice intended to raise standards and enhance quality.



#### 8.0 ATTACHMENTS

1. National Manual of Assets and Facility Management, Volume 5, Contents List



# Attachment 1 – National Manual of Assets and Facilities Management Volume 5, Contents

National Manual of Assets and Facilities Management Contents List	Doc. No.
Volume 5: Operations Management	
Chapter 1: Introduction	
Operations Management Introduction Guideline	EOM-ZO0-GL-000001
Chapter 2: Facility Management	
Facility Safety Procedure	EOM-ZO0-PR-000001
Space Planning & Utilization Procedure	EOM-ZO0-PR-000002
Facility Surveillances Procedure	EOM-ZO0-PR-000003
Natural Phenomena Hazards Mitigation Procedure	EOM-ZO0-PR-000004
Seasonal Planning Procedure	EOM-ZO0-PR-000006
Customer Service Procedure	EOM-ZO0-PR-000007
Chapter 3: Developing System Operating Procedures	
Procedure Development	EOM-ZO0-PR-000008
Procedure Writers Guide	EOM-ZO0-PR-000009
Chapter 4: HVAC System Operations	
HVAC Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000010
HVAC Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000011
HVAC Systems Operations - Offices Procedure	EOM-ZO0-PR-000012
HVAC Systems Operations - Municipal Procedure	EOM-ZO0-PR-000013
HVAC Systems Operations - Housing Procedure	EOM-ZO0-PR-000014
HVAC Systems Operations - Parks and Recreation Procedure	EOM-ZO0-PR-000015
Chapter 5: Building Management Systems (BMS) Operations	
Building Management System (BMS) Operations Procedure –	EOM-ZO0-PR-000016
Healthcare BMS Operations - Schools and Universities Procedure	EOM-ZO0-PR-000017
BMS Operations - Schools and Universities Procedure BMS Operations - Offices Procedure	EOM-200-PR-000017
BMS Operations - Municipal Facilities Procedure	EOM-200-PR-000018
BMS Operations - Municipal Facilities Procedure  BMS Operations - Housing Procedure	EOM-200-PR-000019
BMS Operations - Parks and Recreation Procedure	EOM-ZO0-PR-000020
Chapter 6: Instrumentation Systems Operations	EOM-200-PR-000021
Instrumentation Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000022
Instrumentation Systems Operations - reattricare Procedure  Instrumentation Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000022
Instrumentation Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000023
Instrumentation Systems Operations - Municipal Procedure	EOM-ZO0-PR-000025
Instrumentation Systems Operations - Housing Procedure	EOM-ZO0-PR-000026
Instrumentation Systems Operations - Parks & Recreation Procedure	EOM-ZO0-PR-000027
Chapter 7: Mechanical Systems Operations	5014 700 BB 00000
Mechanical Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000028
Mechanical Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000029
Mechanical Systems Operations - Offices Procedure	EOM-ZO0-PR-000030
Mechanical Systems Operations - Municipal Procedure	EOM-ZO0-PR-000031
Mechanical Systems Operations - Housing Procedure	EOM-ZO0-PR-000032
Mechanical Systems Operations - Parks & Recreation Procedure	EOM-ZO0-PR-000033
Chapter 8: Electrical Systems Operations	E011 704 FF 444
Electrical Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000034
Electrical Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000035



Electrical Systems Operations - Offices Procedure	EOM-ZO0-PR-000036
Electrical Systems Operations - Municipal Procedure	EOM-ZO0-PR-000037
Electrical Systems Operations - Housing Procedure	EOM-ZO0-PR-000038
Electrical Systems Operations - Parks & Recreation Procedure	EOM-ZO0-PR-000039
Chapter 9: Security Systems Operations	
Security Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000040
Security Systems Operations - Schools and Universities Procedure	EOM-ZO0-PR-000041
Security Systems Operations - Offices Procedure	EOM-ZO0-PR-000042
Security Systems Operations - Municipal Procedure	EOM-ZO0-PR-000043
Security Systems Operations - Housing Procedure	EOM-ZO0-PR-000044
Security Systems Operations - Parks & Recreation Procedure	EOM-ZO0-PR-000045
Manned Security Procedure	EOM-ZO0-PR-000100
Chapter 10: Life Safety Systems Operations	
Life Safety Systems Operations - Healthcare Procedure	EOM-ZO0-PR-000046
Life Safety Systems Operations - Schools & Universities Procedure	EOM-ZO0-PR-000047
Life Safety Systems Operations - Offices Procedure	EOM-ZO0-PR-000048
Life Safety Systems Operations - Municipal Procedure	EOM-ZO0-PR-000049
Life Safety Systems Operations - Housing Procedure	EOM-ZO0-PR-000050
Life Safety Systems Operations - Parks & Recreation Procedure	EOM-ZO0-PR-000051
Chapter 11: Communication Systems Operations	
Communications Systems Operations – Healthcare	EOM-ZO0-PR-000052
Communications Systems Operations - Schools & Universities	EOM-ZO0-PR-000053
Communications Systems Operations - Offices	EOM-ZO0-PR-000054
Communications Systems Operations – Municipal	EOM-ZO0-PR-000055
Communications Systems Operations – Housing	EOM-ZO0-PR-000056
Communications Systems Operations - Parks & Recreation	EOM-ZO0-PR-000057
Chapter 12: Escalators & Elevators Operations	
Escalators & Elevators Operations Procedure	EOM-ZO0-PR-000058
Chapter 13: Roadway Operations	
Roadway Operations Procedure	EOM-ZO0-PR-000064
Chapter 14: Soft Services Operations	
Soft Services Operations Guideline	EOM-ZO0-GL-000002
Chapter 15: Cleaning Horizontal / Vertical Operations	
Cleaning Horizontal / Vertical Procedure for Healthcare	EOM-ZO0-PR-000065
Cleaning Horizontal / Vertical Procedure for Schools & Universities	EOM-ZO0-PR-000066
Cleaning Horizontal / Vertical Procedure for Offices	EOM-ZO0-PR-000067
Cleaning Horizontal / Vertical Procedure for Municipal	EOM-ZO0-PR-000068
Cleaning Horizontal / Vertical Procedure for Housing	EOM-ZO0-PR-000069
Cleaning Horizontal / Vertical Procedure for Parks & Recreation	EOM-ZO0-PR-000070
Chapter 16: Pest Control Operations	
Pest Control Procedure for Healthcare	EOM-ZO0-PR-000071
Pest Control Procedure for Schools & Universities	EOM-ZO0-PR-000072
Pest Control Procedure for Offices	EOM-ZO0-PR-000073
Pest Control Procedure for Municipal	EOM-ZO0-PR-000074
Pest Control Procedure for Housing	EOM-ZO0-PR-000075
Pest Control Procedure for Parks & Recreation	EOM-ZO0-PR-000076



Chapter 17: Waste Management Operations	
Waste Management Procedure for Healthcare	EOM-ZO0-PR-000077
Waste Management Procedure for Schools and Universities	EOM-ZO0-PR-000078
Waste Management Procedure for Offices	EOM-ZO0-PR-000079
Waste Management Procedure for Municipalities	EOM-ZO0-PR-000080
Waste Management Procedure for Housing	EOM-ZO0-PR-000081
Waste Management Procedure for Parks & Recreation	EOM-ZO0-PR-000082
Chapter 18: Grounds & Landscaping Operations	
Grounds & Landscaping Procedure for Healthcare	EOM-ZO0-PR-000083
Grounds & Landscaping Procedure for Schools & Universities	EOM-ZO0-PR-000084
Grounds & Landscaping Procedure for Offices	EOM-ZO0-PR-000085
Grounds & Landscaping Procedure for Municipal	EOM-ZO0-PR-000086
Grounds & Landscaping Procedure for Housing	EOM-ZO0-PR-000087
Grounds & Landscaping Procedure for Parks & Recreation	EOM-ZO0-PR-000088
Chapter 19: Equipment Calibrations	
Equipment Calibrations Procedure	EOM-ZO0-PR-000089
Chapter 20: System Engineering Program	
Program Description	EOM-ZO0-PR-000090
System Assessments & Monitoring	EOM-ZO0-PR-000091
System Knowledge Requirements Procedure	EOM-ZO0-PR-000092
Control of Maintenance Activities Procedure	EOM-ZO0-PR-000093
System Engineer Qualification Process	EOM-ZO0-PR-000096
Chapter 21: Configuration Management	
Configuration Management Program Procedure	EOM-ZO0-PR-000097
Change Control Process Procedure	EOM-ZO0-PR-000098
Control of Drawings	EOM-ZO0-PR-000099