

# Lawrence Wastewater Management System Manual

**Consistent with:**  
**ISO 14001 Standard**  
**OHSAS 18001 Standard**  
**National Biosolids Partnership EMS**



City of Lawrence – Wastewater Utility  
P.O. Box 708  
Lawrence, Kansas 66044  
Phone: 785-832-7846 Fax: 785-832-7806

## Table of Contents

<b>Section</b>	<b>Description</b>	<b>Page</b>
<b>Section 1.</b>	<b>General Requirements</b>	<b>4</b>
1.1	Purpose	4
1.2	Scope	5
1.3	Overview of Management System (Flowchart)	5
<b>Section 2.</b>	<b>Policy</b>	<b>6</b>
2.1	Lawrence Wastewater Management System (LWWMS) Policy	6
<b>Section 3.</b>	<b>Planning</b>	<b>7</b>
3.1	Environmental Aspects/Hazard ID, Risk Assessment & Risk Control/ Critical Control Points	7
3.2	Legal and Other Requirements	8
3.3	Goals and Targets for Continual Improvement	9
3.4	Public Participation in Planning	10
<b>Section 4.</b>	<b>Implementation &amp; Operation</b>	<b>11</b>
4.1	Roles, Responsibilities, Resources, Authority, & Structure	11
4.2	Competence, Training, and Awareness	12
4.3	Communication and Consultation	13
4.4	Documentation	14
4.5	Document and Data Control	14
4.6	Operational Control	15
4.7	Emergency Preparedness and Response	16
<b>Section 5.</b>	<b>Checking, Measurement, and Corrective Action</b>	<b>17</b>
5.1	Monitoring and Measurement for Performance	17
5.2	Evaluation of Compliance	18
5.3	Nonconformances/Accidents/Incidents: Prevention & Corrective Actions	18
5.4	Control of Records/Records and Records Management	19
5.5	Biosolids Performance Report	20
5.6	Internal Audit	20
<b>Section 6.</b>	<b>Management Review</b>	<b>23</b>
6.1	Periodic Management Review of Performance	23
<b>Glossary</b>		<b>25</b>

The initial copy of this Lawrence Wastewater Management System (LWWMS) Manual has been approved by the Assistant Director of Utilities – Wastewater (see below for signatures). As required by ISO 14001, the Assistant Director of Utilities – Wastewater is defined as top management.

Copies of this document and all revisions shall be sent to the following:

Dave Wagner – Assistant Director of Utilities-Wastewater  
Dave King – Wastewater Maintenance Manager  
Jeanette Klamm – Residuals Coordinator  
Mark Hegeman – Wastewater Treatment Manager  
Jim Stuit – Field Operations Superintendent  
Mike Ellis – Collection Systems Supervisor  
Shari Stamer – Water Quality Manager  
Bob Brower – Collections Systems Supervisor  
Mark Shepherd – I&I Coordinator  
Carolyn Woodhead – Lab Technician

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Dave Wagner  
Assistant Director of Utilities – Wastewater

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Date Approved

## **Section 1. General Requirements**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

### **1.1 Purpose**

The City of Lawrence Wastewater Utility management has chosen to adopt the parameters set forth by three (3) management system standards as follows:

- ◆ ISO 14001 Environmental Management System (ISO 14001)
- ◆ OHSAS 18001 Occupational Health and Safety Management System (OHSAS 18001)
- ◆ National Biosolids Partnership Environmental Management System for Biosolids (NBP EMS)

Collectively, the management system will be referred to as the Lawrence Wastewater Management System (LWWMS) and will apply to all three management systems wherever referenced throughout this manual.

The purpose of implementing these standards is to conduct management activities within a structured management system to support achievement of continuous improvement and demonstrate sound environmental and occupational health and safety performance. The City of Lawrence Wastewater Utility shall establish, implement, maintain, and continually improve an environmental management system in accordance with the requirements of the ISO 14001 Standard, the National Biosolids Partnership Environmental Management System (EMS) for Biosolids standard and an occupational health and safety management system in accordance with the OHSAS 18001 Standard for this purpose.

The purpose of this manual is to compile these three standards into one practical document that addresses and describes the applicable policies, programs, plans, procedures, and management practices of both Environmental Management Systems and the Occupational Health & Safety Management System as they apply to operation, maintenance, and other associated activities of the City's wastewater utility, as defined in the scope below. Given the overlap of scope and criteria between ISO 14001 and NBP EMS, as well as the common structure of all three standards, the wastewater utility will conduct the management requirements as one system with conformance to all three standards wherever possible.

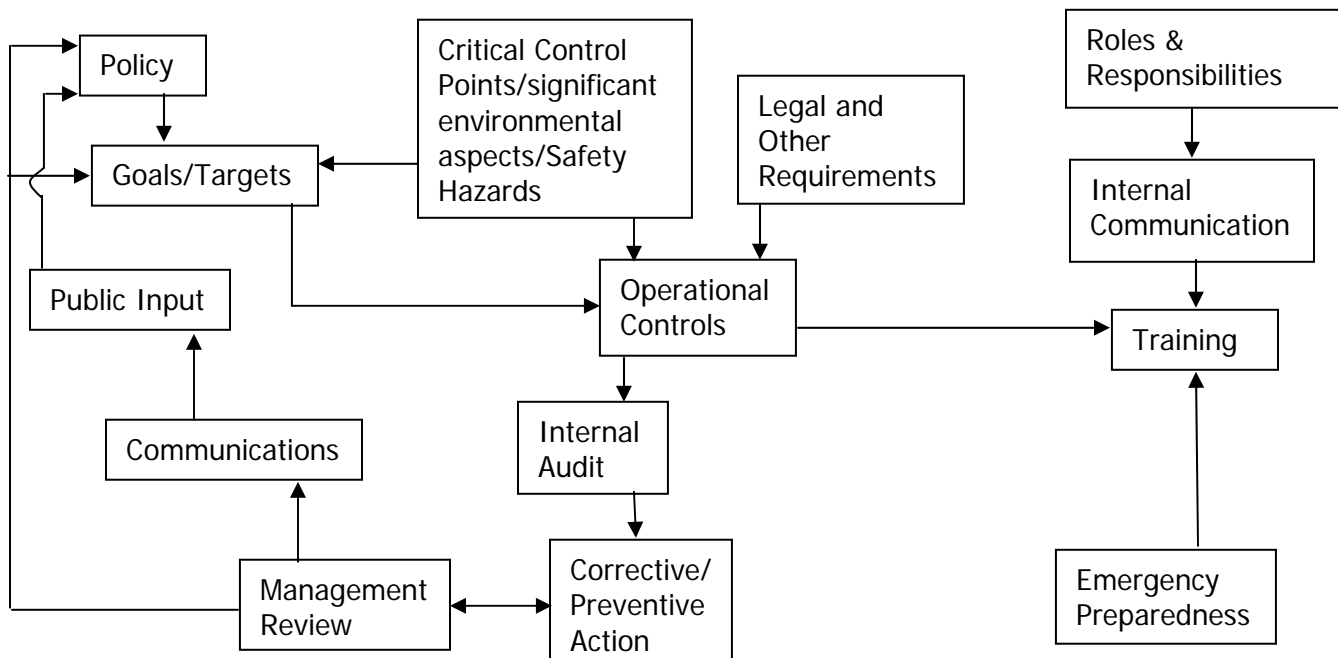
This manual has been approved by a level of management with the authority to commit people and resources to environmental, occupational health and safety, and biosolids management activities. It contains the Wastewater Utility's policy (LWWMS Policy) addressing Environmental, Operational Health & Safety, and Biosolids Management practices and LWWMS procedures as required by all three standards. It contains cross-reference to Public Participation, Communications and Emergency Preparedness Programs or Plans as required by the Standard(s). All operational controls, procedures, processes and other management methods used to achieve and maintain compliance with legal and other requirements are also cross-referenced as required by the standard(s). As required by the NBP EMS standard, the manual includes a description of biosolids management activities assigned to and performed by contractors.

## 1.2 Scope

The scope that each standard encompasses is as follows:

- ♦ ISO 14001 shall include the entire wastewater utility and associated activities, including operations, maintenance, and line maintenance, as well as all water quality and engineering activities as they relate to the wastewater utility. It should be understood that all biosolids management activities as described in the NBP EMS standard are a function of the wastewater operation and all subsequent activities, including those by contractors are included.
- ♦ OHSAS 18001 shall include the entire wastewater utility and associated activities, including operations, maintenance, and line maintenance, as well as all water quality and engineering activities as they relate to the wastewater utility. It should be understood that all biosolids management activities as described in the NBP EMS standard are a function of the wastewater operation and all subsequent activities, including those by contractors are included.
- ♦ NBP EMS shall include biosolids management activities at all critical control points throughout the biosolids value chain as defined by NBP and as applicable to the City of Lawrence Wastewater Utility, including those biosolids management activities performed by contractors.

## 1.3 Overview of the LWWMS (Flowchart)



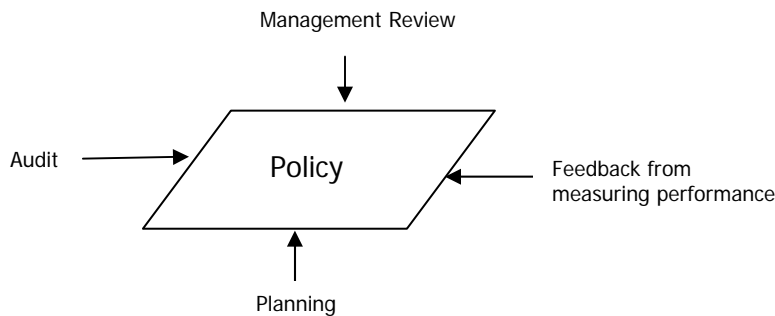
## Reference

ISO 14001: 4.1

OHSAS 18001: 4.1

NBP EMS: Element 1

## Section 2. Policy



### 2.1 Lawrence Wastewater Management System Policy (LWWMS Policy)

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The City of Lawrence Wastewater Utility top management will define and authorize the Wastewater Utility's policy for environmental (including biosolids) and occupational health and safety. The policy will:

- ◆ Be appropriate to the nature, scale of environmental impacts of its activities, including biosolids, products and services, and occupational health and safety risks
- ◆ Make the commitment to continual improvement and prevention of pollution
- ◆ Make the commitment to comply with applicable legal requirements, current applicable OH&S legislation, and with other requirements to which the Utility subscribes which relate to its environmental aspects and impacts, and occupational health and safety
- ◆ Make the commitment to following the principles of conduct set forth in the National Biosolids Code of Good Practice
- ◆ Provide the framework for setting and reviewing environmental goals and targets\*
- ◆ Be documented, implemented, and maintained.
- ◆ Be communicated to all persons working for or on behalf of the organization (including contractors) with the intent that those persons are made aware of their individual environmental and occupational health and safety obligations
- ◆ Be available to and communicated to interested parties
- ◆ Be reviewed periodically to ensure that it remains relevant and appropriate to the Utility
- ◆ Be incorporated into the Utility's biosolids programs, procedures, and practices.

\*("Goals" and "Targets" have been the approved and adopted terminology for this LWWMS. See definitions or Section 3.3 for further description.)

### Reference

ISO 14001: 4.2

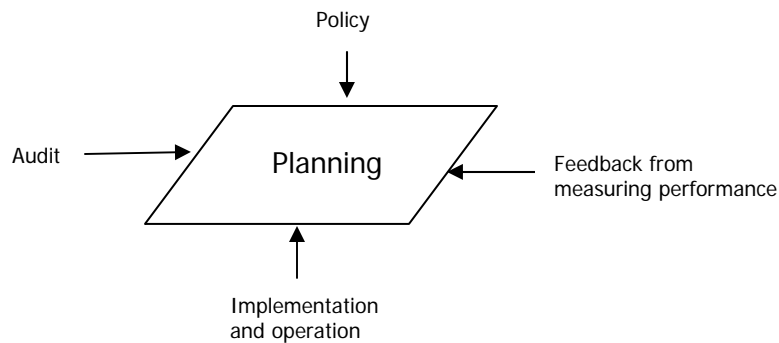
OHSAS 18001: 4.2

NBP EMS: Element 2

### Attachments

2a. Lawrence Wastewater Management System Policy

### Section 3. Planning



#### 3.1 Environmental Aspects/Hazard ID, Risk Assessment & Risk Control/ Critical Control Points

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The City of Lawrence Wastewater Utility will establish, implement, and maintain a procedure(s) to:

- ◆ Identify the environmental aspects of its activities, products & services within the defined scope of the LWWMS that it can control or influence, including planned, new, or modified developments or activities, products & services (ISO14001)
- ◆ Determine those aspects which have or could have significant impact(s) on the environment (ie. significant environmental aspects) (ISO 14001).
- ◆ Ensure that the significant environmental aspects are taken into account in establishing, implementing and maintaining its environmental management system. (ISO 14001)
- ◆ Identify hazards, assess risks, and implement the necessary control measures for routine and non-routine activities, activities of all personnel (including contractors and visitors) having access to the workplace, and facilities at the workplace, provided by the City or others. (OHSAS 18001)
- ◆ Identify and document the critical control points of its biosolids management activities throughout the biosolids value chain and consistent with those identified in the NBP's Manual of Good Practice and other authoritative sources on biosolids management. (NBP EMS)
- ◆ Identify potential or actual environmental impacts at each critical control point. (NBP EMS)
- ◆ Link each critical control point and its potential environmental impacts with corresponding operational control(s)(NBP EMS)
- ◆ Ensure that the results of these assessments and the effects of these controls are considered when setting its goals and targets. (All)

The Utility's procedure for hazard identification and risk assessment (OHSAS 18001) shall:

- ◆ Be defined with respect to its scope, nature and timing to ensure it is proactive rather than reactive.

- ◆ Provide for the classification of risks and identification of those that are to be eliminated or controlled by measures as defined in 4.3.3 and 4.3.4 of the OHSAS18001 Standard or in Section 3.3 of this Manual
- ◆ Be consistent with operating experience and the capabilities of risk control measures employed
- ◆ Provide input into the determination of requirements, identification of training needs and/or development of operational controls.
- ◆ Provide for the monitoring of required actions to ensure both the effectiveness and timeliness of their implementation.

The information for all environmental aspects/hazards, risk assessments, control of risk/critical control points for all standards shall be documented and kept up to date.

The National Biosolids Partnership and assigned third-party verification auditor shall be notified of any operational change that requires a change to the identified critical control points or environmental impacts associated with the critical control points as per the NBP EMS Standard.

#### **Reference**

ISO 14001: 4.3.1

OHSAS 18001: 4.3.1

NBP EMS: Element 3

[Procedure LWWMS-003.1 Identifying and Updating Critical Control Points](#)

[Procedure LWWMS-003.2 Identifying and Updating Environmental & OH&S Aspects](#)

[Procedure LWWMS-004.2 Management of Change](#)

### **3.2 Legal and other requirements**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility will establish, implement and maintain a procedure(s):

- ◆ To identify, have access to, and track the applicable legal requirements and other requirements to which the organization subscribes related to its environmental aspects, occupational health and safety, and biosolids management activities.
- ◆ To determine how these requirements apply to the environmental aspects, occupational health and safety, and biosolids management activities.
- ◆ To ensure that these applicable legal requirements and other requirements are taken into account in establishing, implementing and maintaining the LWWMS.

The information shall be kept up-to-date and the appropriate records of applicable legal and other requirements established and maintained. The relevant information on legal and other requirements shall be communicated to employees and other relevant interested parties.



A procedure shall be established, implemented and maintained for incorporating changes and new requirements into the LWWMS.

#### **Reference**

ISO 14001: 4.3.2

OHSAS 18001: 4.3.2

NBP EMS: Element 4

[Procedure LWWMS-004.1 Tracking Legal and Other Requirements](#)

[Procedure LWWMS-004.2 Management of Change](#)

### **3.3 Goals and Targets for Continual Improvement**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

***Note:*** To maintain consistent use of terminology and definition, the City of Lawrence Utility has adopted the use of "goals", "targets", and "measurements". For definition and comparison to various similar terminology used in ISO14001, OHSAS 18001, and NBP EMS, please refer to the glossary at the end of the manual.

The City of Lawrence Wastewater Utility shall establish, implement, maintain, and periodically review documented and measurable environmental, occupational health and safety, and biosolids management goals and targets at relevant functions and levels within the organization. The goals and targets shall be established using the SMART criteria (i.e. Specific, Measurable, Achievable, Relevant, and Time-Bounded).

The goals and targets shall be measurable, where practicable, and consistent with the LWWMS Policy. When establishing and reviewing, the Utility will take into account the following:

- ◆ Commitments to prevention of pollution
- ◆ Compliance with applicable legal requirements and other requirements to which the organization subscribes
- ◆ Commitment to continual improvement
- ◆ Significant environmental aspects
- ◆ Occupational health and safety hazards and risks
- ◆ Critical control points
- ◆ Identified or potential environmental impacts
- ◆ Technological options
- ◆ Financial, operational, and business requirements
- ◆ Views and input of interested parties
- ◆ Best management practices as defined in the NBP's *National Manual of Good Practice* and various authoritative information sources on biosolids management

The Utility shall establish, implement, and maintain measurement(s) for achieving its goals and targets which includes:

- ◆ Responsibility and authority for achieving goals and targets at relevant functions and levels of the utility

- ◆ Means and time-frame by which they are to be achieved, including milestones and schedules.
- ◆ Resources required.

The measurement(s) shall be integrated with other elements of the LWWMS and subsequent activities. The measurement(s) shall be reviewed and up-dated at regular and planned intervals. Where necessary the measurement(s) shall be modified to address changes to activities, products, services, or operating conditions of the Utility.

### **Reference**

ISO 14001: 4.3.3

OHSAS 18001: 4.3.3 and 4.3.4

NBP EMS: Element 5

[Procedure LWWMS-004.2 Management of Change](#)

[Procedure LWWMS-005.1 Establishing Goals and Targets](#)

[Procedure LWWMS-006.1 Public Participation Plan](#)

[Procedure LWWMS-016.1 Internal Audit](#)

[Procedure LWWMS-017.1 Management Review](#)

### **3.4 Public Participation in Planning**

(Applies to NBP EMS only, however may be used voluntarily in non-biosolids specific activities)

The Utility shall select and implement a proactive public participation approach to involve interested parties in its Biosolids Management Programs and planning process. The approach selected for public participation shall reflect the Utility's commitment to the principles in the NBP's Code of Good Practice, including its plan for independent third-party verification of conformance with EMS Elements. The public participation approach shall be consistent with degree of current public interest, the history of public involvement, the method of biosolids management and related local circumstances.

The approach selected for public participation shall also provide interested parties with meaningful opportunities to express their views and perspectives relative to:

- ◆ organization's biosolids management activities
- ◆ concerns about environmental impacts
- ◆ biosolids program performance
- ◆ potential areas for improvement.

The Utility shall consider input from interested parties in initially developing its biosolids program goals and objectives during its EMS implementation and in updating them as part of its periodic review of biosolids management program performance.

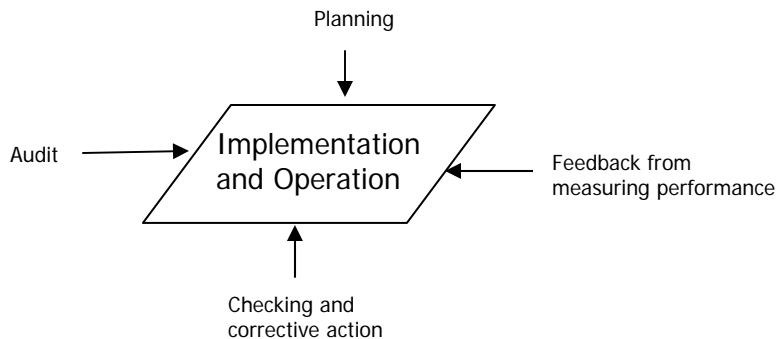
### **Reference**

NBP EMS: Element 6

[Procedure LWWMS-006.1 Public Participation Plan](#)

[Procedure LWWMS-009.1 Communication and Public Outreach](#)

## Section 4. Implementation & Operation



### 4.1 Roles, Responsibilities, Resources, Authority, and Structure

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The roles, responsibilities and authorities for personnel who manage, perform and verify activities having an effect on the significant environmental aspects and impacts, occupational health and safety risks, and biosolids impacts of the utility's activities, facilities and processes, shall be defined and documented and communicated in order to facilitate effective environmental, occupational health and safety, and biosolids management. Records of assigned roles and responsibilities shall be established and maintained. Roles and responsibilities of contractor(s) retained to perform various activities and EMS functions through Service Agreements shall be defined and documented

The Utility's top management shall appoint a specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for:

- ◆ Ensuring that LWWMS is established, implemented, maintained, and performing in accordance with the requirements of the standards in all locations and spheres of operation within the utility.
- ◆ Reporting to top management on the performance of the LWWMS for review, including recommendations for improvement.

Management shall ensure the availability of resources essential to establish, implement, maintain, control, and improve the LWWMS. Resources include:

- ◆ Human
- ◆ Specialized skills
- ◆ Organizational infrastructures
- ◆ Technology (technical)
- ◆ Financial

Those with management responsibility and authority shall demonstrate their commitment to the continual improvement of the environmental, occupational health and safety, and biosolids performance.

### Reference

ISO 14001: 4.4.1

OHSAS 18001: 4.4.1

NBP EMS: Element 7

[Procedure LWWMS-007.1 Defining, Communicating, & Documenting Roles & Responsibilities](#)

## **4.2 Competence, Training and Awareness**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall ensure that any person(s) performing tasks for it or on its behalf that have a potential to cause a significant environmental impact(s), hazard/risk, or who are responsible for specific biosolids management activities and for the implementation of various LWWMS functions is (are) competent on the basis of appropriate education, training or experience in performing their assigned tasks and duties. Associated records of training delivered and completed, experience, and competence shall be retained.

The Utility shall identify training needs associated with its environmental aspects, LWWMS, hazard/risk assessment, and critical control points. It shall provide training or take other action(s) to meet these needs, and shall retain associated records of training delivered and completed.

The Utility shall establish, implement and maintain a procedure(s) to make persons working for it or on its behalf at each relevant function and level aware of:

- ◆ The importance of conformity with the LWWMS Policy and procedures and with the requirements of the LWWMS
- ◆ The significant environmental aspects, related and actual impacts
- ◆ Occupational health and safety actual and potential consequences with their work activities
- ◆ Environmental, occupational health and safety, and biosolids management benefits of improved personal performance
- ◆ Their roles and responsibilities in achieving conformity with the LWWMS Policy and procedures and with the requirements of the LWWMS, including emergency preparedness and response requirements (See 4.7) and the relationship to the entire biosolids value chain.
- ◆ The potential consequences of deviation from specified procedures

Training procedures shall take into account differing levels of responsibility, ability, literacy and risk. It shall address new or reassigned employees as well.

The Utility shall require that their contractors establish their own training programs consistent with their roles and responsibilities in environmental, occupational health and safety, and biosolids management activities as defined through Service Agreements.

## **Reference**

ISO 14001: 4.4.2

OHSAS 18001: 4.4.2

NBP EMS: Element 8

[Procedure LWWMS-008.1 Training](#)

### **4.3 Communication and Consultation**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

With regard to its environmental aspects, hazards/risk, biosolids, and LWWMS, the Utility shall establish, implement and maintain a procedure(s) for

- ◆ Internal communication among the various levels and functions of the Utility
- ◆ Receiving, documenting and responding to relevant communication from external interested parties
- ◆ Ensuring that pertinent environmental, occupational health and safety, and biosolids management activities, its policy, and all elements are communicated to and from employees, other interested parties, and contractors, consistent with their assigned roles and responsibilities.

For OHSAS 18001 management, employees shall be:

- ◆ Involved in the development and review of policies and procedures to manage risks
- ◆ Consulted where there are any changes and affect workplace health and safety
- ◆ Represented on health and safety matters
- ◆ Informed as to who is their employee occupational health and safety representative(s) and specified management appointee (see 4.1)

Employee involvement and consultation arrangements shall be documented and interested parties informed.

The Standards vary in requirements for external communication, which are discussed individually as follows. The ISO14001 Standard allows the Utility to decide whether to communicate externally about its significant environmental aspects and shall document its decision. If the decision is to communicate, the Utility shall establish and implement a method(s) for this external communication.

The OHSAS18001 Standard does not require external communication specifically.

The NBP EMS requires the Utility to establish and maintain a proactive Communication Program that provides on-going information about its Biosolids Management Program and its EMS to interested parties and the public, consistent with local circumstances, the method of biosolids management, its public communications history and degree of current interest in its biosolids management activities. The Utility's Communication Program shall make available a summary of its independent, third party EMS verification audit results to the public. The organization shall define the roles and responsibilities of outside contractors in its Communication Program.

The Communication Program for the NBP EMS shall include a procedure for receiving inquiries and requests for information from interested parties about its biosolids management activities and EMS. The procedure shall define a process for assuring a timely and complete response to inquiries by interested parties. At a minimum, the

Utility's Communication Program shall make the following information about its biosolids management program and activities available to interested parties:

- ◆ The LWWMS Policy (combined environmental, OH&S, and biosolids policy)
- ◆ The applicable legal and other requirements
- ◆ The biosolids program goals and targets and continual improvement
- ◆ The periodic Biosolids Management Program Performance Report
- ◆ A detailed report of its independent, third party EMS & OHS MS verification audit results

#### **Reference**

ISO 14001: 4.4.3

OHSAS 18001: 4.4.3

NBP EMS: Element 9

[Procedure LWWMS-006.1 Public Participation](#)

[Procedure LWWMS-009.1 Communications and Public Outreach](#)

[Procedure LWWMS-015.1 Biosolids Performance Report](#)

#### **4.4 Documentation**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The LWWMS documentation shall include:

- ◆ The LWWMS Policy
- ◆ Goals and targets
- ◆ Description of the scope of the LWWMS
- ◆ Description of the main elements of the LWWMS and their interaction, and reference to related documents
- ◆ Documents, including records, required by the Standard(s)
- ◆ Documents, including records, determined by the Utility to be necessary to ensure the effective planning, operation and control of process that relate to its significant environmental aspects and impacts, occupational health and safety hazards and risks and critical control points
- ◆ Biosolids management activities conducted by its contractors as defined in Service Agreements

#### **Reference**

ISO 14001: 4.4.4

OHSAS 18001: 4.4.4

NBP EMS: Element 12

[Procedure LWWMS-006.1 Public Participation](#)

[Procedure LWWMS-009.1 Communications and Public Outreach](#)

[Procedure LWWMS-015.1 Biosolids Performance Report](#)

#### **4.5 Document and Data Control**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

Documents required by the LWWMS and by the Standard(s) shall be controlled. Records are a special type of document and shall be controlled in accordance with the requirements of Section 5.4 of this manual.

The Utility shall establish, implement and maintain a procedure(s) to:

- ◆ Approve documents for adequacy prior to issue and created following established document creation protocols. Approved by authorized personnel.
- ◆ Periodically review and update as necessary and re-approve documents for adequacy by authorized personnel
- ◆ Ensure that changes and the current revision status of documents are identified
- ◆ Ensure that relevant and current versions of applicable documents and data are available at points of use, essential to the effective functioning of the LWWMS.
- ◆ Ensure that documents remain legible and readily identifiable and locatable
- ◆ Mark with version number, effective date(s), and references to replaced or superseded versions
- ◆ Ensure that documents of external origin determined by the organization to be necessary for the planning and operation of the LWWMS are identified and their distribution controlled
- ◆ Prevent the unintended use of obsolete documents and data and apply suitable identification to them if they are retained for any purpose.
- ◆ Ensure document control requirements are kept for activities conducted by contractors in Service Agreements.

## **Reference**

ISO 14001: 4.4.5

OHSAS 18001: 4.4.5

NBP EMS: Element 12

[Procedure LWWMS-012.1 Document and Records Management](#)

## **4.6 Operational Control**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall identify and plan those operations that are associated with the identified significant environmental aspects and impacts, occupational health and safety hazards/risks, and critical control points, where control measures need to be applied, and consistent with its LWWMS Policy, goals and targets, and activities, in order to ensure that they are carried out under specified conditions, by:

- ◆ Establishing, implementing and maintaining a documented procedure(s) to control situations where their absence could lead to deviation from the LWWMS Policy, and/or goals and targets
- ◆ Stipulating the operating criteria in the procedure(s)
- ◆ Establishing, implementing and maintaining procedures related to the identified significant environmental aspects/impacts, and occupational health and safety risks of goods, equipment and services purchased and used by the Utility and communicating applicable procedures and requirements to suppliers, including contractors.

- ◆ Establishing and maintaining procedures for the design of workplace, process, installations, machinery, operating procedures and work organization, including their adaptation to human capabilities, in order to eliminate or reduce occupational health and safety risks at their source.

#### **Reference**

ISO 14001: 4.4.6

OHSAS 18001: 4.4.6

NBP EMS: Element 10

[Procedure LWWMS-010.1 Identifying Operational and Risk Controls](#)

### **4.7 Emergency Preparedness and Response**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall establish, implement and maintain a plan(s) and procedure(s) to identify potential for, and responses to, incidents and emergency situations and potential accidents that can have an impact(s) on the environment and/or likely health and human safety and a plan for prevention and mitigation. This includes accidents and emergency situations associated with its biosolids management activities.

The Utility shall respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental impacts, and health and human safety.

The Utility shall periodically review and, where necessary, revise its emergency preparedness and response plans and procedures, including communications systems, and in particular, after the occurrence of accidents, incidents, or emergency situations. All emergency response equipment shall be on site or readily available within a minimum response time.

The Utility shall also periodically test such procedures where practicable.

The Utility shall require its contractors to establish and maintain Emergency Preparedness and Response Plans and Procedures to assure effective response to accidents and emergency situations associated with its biosolids management activities, and other activities as necessary.

#### **Reference**

ISO 14001: 4.4.7

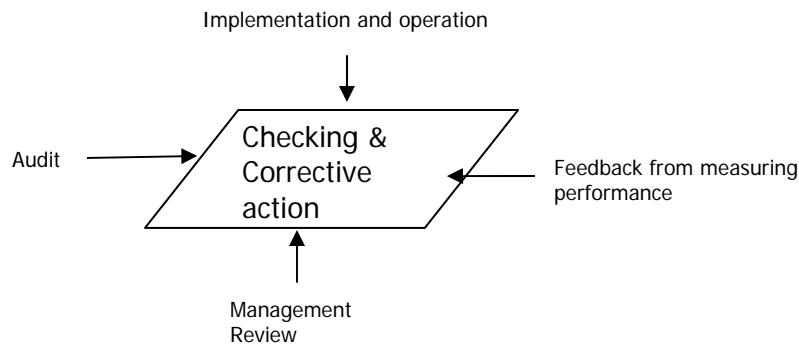
OHSAS 18001: 4.4.7

NBP EMS: Element 11

[Procedure LWWMS-011.1 Emergency Preparedness and Response](#)



## Section 5. Checking, Measurement and Corrective Action



### 5.1 Monitoring and Measurement of Performance

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall establish, implement and maintain a procedure(s) to monitor and measure, on a regular basis, the key characteristics of its operations that can have a significant environmental impact or health and safety risk. The procedure(s) will include the documentation of information to monitor performance, applicable operational controls and conformity with the Utility's LWWMS goals and targets. The procedures will provide for:

- ◆ Both qualitative and quantitative measures, appropriate to Utility needs
- ◆ Monitoring or the extent to which the Utility's LWWMS goals and targets are met and track progress toward achieving them.
- ◆ Proactive measures of performance that monitor compliance with the LWWMS program, operational criteria, and applicable legislation and regulatory requirements
- ◆ Reactive measures of performance to monitor accidents, ill-health, incidents (including near-misses) and other historical evidence of deficient LWWMS performance
- ◆ Recording of data and results of monitoring and measurement sufficient to facilitate subsequent corrective and preventative action analysis
- ◆ Measure biosolids program performance at critical control points

Monitoring and measurement results shall be recorded and the records maintained as established in 5.4 of this manual.

The Utility shall ensure that calibrated or verified monitoring and measurement equipment is used and maintained and shall retain associated records.

For all biosolids management activities, the Utility shall require its contractors to establish and maintain regular monitoring and measurement procedures and practices, as defined in their Service Agreements.

### Reference

ISO 14001: 4.5.1

OHSAS 18001: 4.5.1

## 5.2 Evaluation of Compliance

(Applies to ISO14001 and NBP EMS only, however may be used voluntarily in OH&S activities)

Consistent with its commitment to compliance, the Utility shall establish, implement and maintain a procedure(s) for periodically evaluating and investigating any noncompliance with applicable legal requirements. The procedure(s) shall:

- ◆ Investigate any noncompliance with applicable regulatory requirements and/or nonconformance with internal EMS procedures identified during routine monitoring and measurement or periodic internal EMS audits
- ◆ Identify the cause and take actions to correct the non-conformance
- ◆ Document the necessary corrective actions taken to prevent a recurrence

The Utility shall keep records of the results of the periodic evaluations.

The Utility shall evaluate compliance with other requirements to which it subscribes. The Utility may wish to combine this evaluation with the evaluation of legal compliance previously described or to establish a separate procedure(s).

The Utility shall keep records of the results of the periodic evaluations.

## Reference

ISO 14001: 4.5.2 (4.5.2.1 & 4.5.2.2)

NBP EMS: Element 14

Procedure LWWMS-004.2 Management of Change

Procedure LWWMS-014.1 Nonconformances, Preventive, Corrective Action

Procedure LWWMS-016.1 Internal Audit

Procedure LWWMS-017.1 Management Review

## 5.3 Nonconformances/Accidents/Incidents: Prevention and Corrective Actions

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall establish, implement and maintain a procedure(s) for defining responsibility and authority for dealing with actual and potential nonconformity(ies), accidents, and incidents, including with internal procedures identified during routine monitoring and measurement or periodic internal audits, and for taking corrective action and preventive action. The procedure(s) shall define requirements for:

- ◆ Identifying and correcting nonconformity(ies) and taking action(s) to mitigate their environmental impacts, and occupational health and safety arising from accidents, incidents or nonconformity(ies)
- ◆ Investigating nonconformity(ies), determining their cause(s) and taking actions in order to avoid their recurrence and correct the non-conformance

- ◆ Evaluating the need for action(s) to prevent nonconformity(ies) and implementing and completion of appropriate actions designed to avoid their occurrence
- ◆ Recording and documenting the results of corrective action(s) and preventive action(s) taken to prevent a recurrence
- ◆ Reviewing the effectiveness of corrective action(s) and preventive action(s) taken
- ◆ Assuring that all proposed corrective and preventive actions shall be reviewed through the environmental aspect or risk assessment process prior to implementation

Corrective action plans shall be developed to address non-conformances identified during routine monitoring and measurement. Any corrective or preventive actions plans taken shall be appropriate to the magnitude of the problems and the environmental impacts and occupational health and safety risks encountered, but at a minimum shall identify the nonconformance, the root cause(s) and the corrective action being taken. The corrective action plan shall also identify, implement, and ensure that any necessary changes to policies, program, plans, operational controls, monitoring/measurement procedures to prevent future nonconformances and documentation resulting from corrective and preventive action.

The NBP EMS requires additional procedures for corrective action plans associated with EMS audits. Formal corrective action plans shall be established to address the findings of internal EMS Audits under 5.5 of this manual, and EMS verification audits conducted by third parties. The corrective action plan shall be documented, and describe what actions will be taken to address the audit findings, the individual(s) responsible, the estimated completion date and required resources to develop and implement corrective and preventive action. Progress in completing and corrective actions shall be tracked and periodically updated to reflect completion. The corrective action plan shall include recommended changes to policies, programs, plans, operational controls and monitoring/measurement procedures to prevent future nonconformances. These changes shall be documented in the corrective action plan, and in the LWWMS Manual and other relevant EMS documentation.

## **Reference**

ISO 14001: 4.5.3

OHSAS 18001: 4.5.2

NBP EMS: Element 14

[Procedure LWWMS-004.2 Management of Change](#)

[Procedure LWWMS-014.1 Nonconformances, Preventive, Corrective Action](#)

[Procedure LWWMS-016.1 Internal Audit](#)

[Procedure LWWMS-017.1 Management Review](#)

## **5.4 Control of Records/Records and Records Management**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall establish and maintain records as necessary to demonstrate conformity to the requirements of its LWWMS and of Standard(s), and the results achieved.

The Utility shall establish, implement and maintain a procedure(s) for the identification, maintenance, storage, protection, retrieval, retention and disposal of applicable LWWMS records, as well as the results of audits and reviews.

Records shall be and remain legible, identifiable and traceable. All records shall be stored and maintained in such a way that they are readily retrievable and protected against damage, deterioration or loss. Their retention times shall be established and recorded.

The Utility shall establish records requirements for biosolids management activities conducted by its contractors in Service Agreements, and incorporate these requirements into its LWWMS as it applies to biosolids.

#### **Reference**

ISO 14001: 4.5.4

OHSAS 18001: 4.5.3

NBP EMS: Element 12

[Procedure LWWMS-012.1 Document and Records Management](#)

### **5.5 Biosolids Performance Report**

(Applies to NBP EMS only, however may be used voluntarily in non-biosolids specific activities)

The Utility shall complete a periodic, written Biosolids Management Program Performance Report (at least annually) summarizing the performance of its biosolids management program. The report shall contain appropriate summaries of monitoring, measurements and other results that demonstrate the performance of the biosolids program relative to goals, objectives and legal requirements, including those biosolids management activities conducted by contractors. The report shall also provide summaries of performance relative to other voluntarily adopted requirements, the organization's progress toward achieving its biosolids program goals and targets, and a summary of its independent third party EMS verification audit results.

The periodic Biosolids Management Program Report shall be available to the public. The Utility shall have the flexibility of using other methods, including electronic methods such as a biosolids program web page in addition to or in lieu of a written periodic performance report.

#### **Reference**

NBP EMS: Element 15

[Procedure LWWMS-015.1 Biosolids Performance Report](#)

### **5.6 Internal Audit**

(Applies to ISO14001, OHSAS 18001, NBP EMS)

The Utility shall ensure that internal audits of the LWWMS are conducted at planned intervals to determine whether the LWWMS:

- ◆ Conforms to planned arrangements for environmental and occupational health and safety management including the requirements of the Standard(s)
- ◆ Has been properly implemented and is maintained
- ◆ Is effective in meeting the LWWMS policy, program requirements, and goals and targets and the performance toward meeting these.

The internal audit shall also provide information on the results of the audit to management in a way that they can take action to make necessary modifications to the LWWMS or associated programs.

Audit program(s) shall be planned, established, implemented and maintained by the organization, taking into consideration the environmental and occupational health and safety importance of the operation(s) concerned and the results of previous audits. The audit program, including any schedule, shall be based on the results of risk assessments of the organization's activities, and the results of previous audits. The audit program shall also cover all the organization's biosolids management activities including those performed by a contractor.

Audit procedure(s) shall be established, implemented and maintained that address:

- ◆ The responsibilities and requirements for planning and conducting audits, reporting results and retaining associated records and designate individuals to whom these findings are to be conveyed
- ◆ The determination of audit criteria, scope, frequency and methodologies and competencies

Selection of auditors and conduct of audits shall ensure objectivity and the impartiality of the audit process. Wherever possible, audits shall be conducted by personnel independent of those having direct responsibility for the activity being examined, but not necessarily external to the Utility.

The appropriate responsible person shall develop, or delegate the development of, a comprehensive corrective action plan addressing each nonconformance identified by the internal audit.

At a minimum, the Utility shall maintain the following documents and records, as applicable, relating to its audit program:

- ◆ Description of audit methodology, protocol, scope, and schedule
- ◆ Identification of lead auditor(s), qualifications, and description of roles and responsibilities of auditor(s), management representatives, and others that may participate in, review, or be expected to act upon the audit
- ◆ Corrective and /or preventive action plans prepared resulting from an audit, and any related changes made to policies, plans, procedures, and work practices that occur as a result of an audit's findings, evaluation, or follow-up actions.

**Reference**

ISO 14001: 4.5.5

OHSAS 18001: 4.5.4

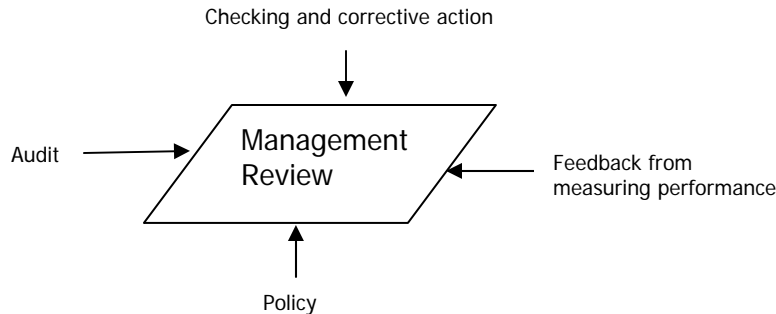
NBP EMS: Element 16

[Procedure LWWMS-004.2 Management of Change](#)

[Procedure LWWMS-016.1 Internal Audit](#)

[Procedure LWWMS-017.1 Management Review](#)

## Section 5. Management Review



### 6.1 Periodic Management Review of Performance

(Applies to ISO14001, OHSAS 18001, NBP EMS)

Top management shall review the Utility's EHS MS, at planned intervals that it determines appropriate, to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. A lead person or persons shall be responsible for organizing and conducting the review. Review shall include assessing opportunities for improvement and the performance of and need for changes to the LWWMS, including the LWWMS Policy, LWWMS goals and targets, program requirements, including the biosolids management program, and other elements of the LWWMS, based on internal EMS audit results, external verification EMS audits by third parties, changing circumstances, and the commitment to continual improvement.

Input to management review shall include:

- ◆ Results of internal audits and evaluations of compliance with legal requirements and with other requirements to which the Utility subscribes
- ◆ Communication(s) from external interested parties, including complaints
- ◆ The environmental and occupational health and safety performance of the Utility
- ◆ The extent to which goals and targets have been met
- ◆ Status of corrective and preventive actions
- ◆ Follow-up actions from previous management reviews
- ◆ Changing circumstances, including developments in legal and other requirements related to its environmental aspects/impacts and hazards/risks
- ◆ Recommendations for improvement

The outputs from management reviews shall include any decisions and actions related to possible changes to LWWMS Policy, goals, targets, and other elements of the LWWMS, consistent with the commitment to continual improvement.

Records and documentation of the management reviews shall be retained:

- ◆ Schedule and scope of review(s)
- ◆ Documentation of findings, evaluation, and follow-up actions

- ◆ Documentation of changes to policies, plans, procedures, work practices and other EMS elements that are made as a result of the management review findings, evaluation, or follow-up actions.

**Reference**

ISO 14001: 4.6

OHSAS 18001: 4.6

NBP EMS: Element 17

[Procedure LWWMS-016.1 Internal Audit](#)

[Procedure LWWMS-017.1 Management Review](#)



<b>LWWMS GLOSSARY</b>
<b><i>Accident</i></b> - undesired event giving rise to death, ill health, injury, damage or other loss
<b><i>Audit</i></b> – systematic investigation of a program or process to identify deficiencies to be corrected or resolved.
<b><i>Audit Criteria</i></b> – policies, practices, procedures, or requirements against which the auditor compares collected audit evidence about the subject matter.
<b><i>Audit Finding</i></b> – documented deficiency (straying from the agreed audit criteria) uncovered during the course of an audit.
<b><i>Audit (Internal)</i></b> – a systematic internal audit process for objectively evaluating whether an organization's environmental and occupational health and safety management system for biosolids conforms with the requirements of the Code of Good Practice.
<b><i>Auditor</i></b> – person with the competence to conduct an audit
<b><i>Audit (Third Party Verification)</i></b> – a systematic, structured audit of the organization's management system performed by a qualified independent third party auditor using a standardized protocol for verification.
<b><i>Awareness</i></b> – mindful and conscious of the implication of each action or activity.
<b><i>Biosolids</i></b> – solid organic matter recovered from a wastewater treatment process and used especially as fertilizer, usually used in plural.
<b><i>Biosolids Management Activities</i></b> – a wide range of activities that impact the quality of wastewater solids and biosolids, including pretreatment activities, wastewater treatment processes, solids stabilization processes, conditioning and dewatering process, transportation, storage, and beneficial use or disposal.
<b><i>Biosolids Program Performance Report</i></b> - includes the biosolids program/EMS performance with respect to compliance, budget conformance, actions on input from interested parties, progress toward goals and objectives, and the results of the third part EMS audit.
<b><i>Biosolids Value Chain</i></b> – sequence of activities from wastewater pretreatment, discharge and collection through wastewater treatment, solids treatment and handling, storage, transportation, and final use that impact the quality and stability of biosolids and their suitability for the selected management method.
<b><i>CFR</i></b> - "Code of Federal Regulations" – the codification of the general and permanent rules published in the Federal Register.
<b><i>Code of Good Practice</i></b> - Broad framework of goals and commitments to guide the production, management, transportation, storage, and use or disposal of biosolids.
<b><i>Continual Improvement</i></b> – EMS process for systematically improving the overall management of biosolids to achieve the organization's goals and objectives set forth in the organization's policy.
<b><i>Contractors</i></b> – companies that hold contracts for services, goods, and other activities not directly completed by the organization
<b><i>Critical Control Points</i></b> – those locations, unit processes, events, and activities throughout the biosolids value chain under the organization's direct control or influence that require effective policies, programs, procedures, practices, monitoring and measurements to ensure the biosolids activities meet legal, quality and public acceptance requirements and do not have undesirable environmental impacts. Critical control points include all biosolids management activities that are covered under applicable legal and other requirements.
<b><i>Corrective Actions</i></b> – specific actions and steps taken to correct the City's noncompliance with legal and other requirements or nonconformance with procedures and to mitigate any resultant impacts to the environment, health and safety, or to public perception.

<b>Cross Training</b> – training individuals in areas that are not normally part of their regular work routine.
<b>Documents</b> – information and its supporting medium (paper, magnetic, electronic, computer disc, photograph, or combination thereof). For the purpose of the LWWMS it is the various documents that collectively comprise the management system documentation, including the LWWMS policy, program, procedures, practices, operating instruction, and other supporting documents required by the LWWMS and applicable laws and regulations.
<b>Emergency Preparedness</b> – an emergency planning process to ensure that emergency situations affecting biosolids have been identified, response plans and procedures have been developed, and training emergency response personnel and equipment are ready and available.
<b>Emergency Response</b> – specific emergency plans and activities that are initiated to contain an emergency situation and bring it under control in order to minimize environmental impacts.
<b>EMS</b> – Environmental Management System, which is comprised of 17 Elements that describe and document the way the organization manages environmental aspects and critical control points, by identifying the parts critical to compliance, by setting clear and attainable goals, by setting a mechanism for periodic checking of the parts of the system, and by involving the public and stakeholders in the process.
<b>Environment</b> – surrounding in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and other interrelation.
<b>Environmental aspect</b> – element of an organization's activities or products or services that can interact with the environment. NOTE: A significant environmental aspect has or can have a significant environmental impact.
<b>Environmental Impacts</b> – any change to the environment (positive or negative) including public health, public nuisance and odor problems, that wholly or partially result directly or indirectly from the organization's environmental aspects (activities, products or services, including those activities associated with biosolids management, and those activities that alter (positively or negatively) the acceptable disposal/use method or create public nuisance and public health risks).
<b>ERP</b> – stands for Emergency Response Plan and is a set of standard emergency instructions and practices for employees describing the “how to” steps in managing emergency situations that may affect biosolids quality and compliance with legal and self-imposed requirements.
<b>External Stakeholder</b> – includes interested parties, such as the general public, regulators, academia, farmers, city and county officials, environmental groups, community associations, and other generators. Those individuals who are not directly affiliated with the City's program.
<b>Goal(s)</b> – environmental and occupational health and safety performance improvement goals that are consistent with an organization's policy to ensure activities comply with applicable laws and regulations, meet quality and public acceptance requirements and prevent other unregulated adverse environmental and public health impacts by effectively managing all environmental aspects, hazards/risks, and critical control points. Goals may include but are not limited to compliance with specific regulatory requirements, improving quality, improving public acceptance and reducing or eliminating direct/indirect negative environmental impacts NOTE: The LWWMS has adopted the term “goals”. This term is used in the same manner as “objectives” is used in ISO14001 and OHSAS18001 Standards.
<b>Hazard</b> – source of situation with a potential for harm in terms of human injury or ill health, damage to property, damage to the workplace environment, or a combination of these
<b>Hazard Identification</b> – process of recognizing that a <b>hazard</b> exists and defining its characteristics
<b>Incident</b> – event that gave rise to an accident or had the potential to lead to an accident. (An incident where no ill health, injury, damage, or other loss occurs is also referred to as a “near-miss”. The term “incident” includes “near-misses”.

<b>Interested Parties</b> — individuals directly affiliated with the City's program and projects. Includes individuals, groups, or other public/private organizations interested in, involved with, or otherwise affected by the City's activities. This includes customers, farmers, regulators, local/state government officials, community residents, the media, environmental and public interest groups, university professors, City staff, and the general public. Staff responsible for the communication and public outreach for the EMS and OH&S MS maintains a current list of internal and external stakeholders, their affiliation, and the details on how to contact them. Staff, vendors, regulatory agencies, neighbors, contractors, general public.
<b>Knowledge</b> – to recognize, be familiar with, or understand information, activities, and actions based on experience or association; acquaintance with a science, art, or technique.
<b>LEOMM</b> – Stands for the Lawrence Electronic Operations and Maintenance Manual.
<b>LWWMS</b> – acronym for Lawrence Wastewater Management System. The system includes the requirements for ISO 14001, OHSAS 1800, and the National Biosolids Partnership EMS Standards.
<b>LWWMS Policy</b> – the organization's policy, which in this case includes the requirements for ISO 14001, OHSAS 1800, and the National Biosolids Partnership EMS Standards
<b>Legal Requirements</b> – the environmental federal, state and local laws and regulations that are applicable to an organization's activities.
<b>Process and Maintenance Database</b> – the computerized process and maintenance tracking system through which the operations staff receives and enters data, develop reports, and analyze process operations and other applications. The maintenance staff work activity is requested, preventive maintenance scheduled, mechanical and electrical asset, location, and maintenance information obtained, and reported, and through which staff can query and review progress of maintenance work.
<b>Management of Change</b> – a systematic, standardized process for updating documents, training, procedures and practices to the current requirements.
<b>Management Review</b> – addresses the possible need for changes to policy, to goals and objectives, to the LWWMS, and to any EMS element based on internal audit results, external third-party verification, changing circumstances, and the City's commitment to continual improvement.
<b>Measurement</b> – the systematic method of estimating, testing, or otherwise evaluating the same key parameters being monitored.
<b>Measurements</b> – is the process by which the organization shall achieve its goals and targets including identifying resources, deadlines, responsible parties, and other pertinent details. NOTE: The LWWMS has adopted the term "measurements". This term is used in the same manner as "action plan" is used in NBP EMS Standards and "programme" in the ISO 14001 and OHASA 18001. This term is consistent with the overall City terminology for completing goals and targets.
<b>Monitoring</b> – the systematic process of watching, checking, observing, inspecting, keeping track of, regulating, or otherwise controlling key parameters and characteristics of the City's activities to determine compliance with a specific standard, regulatory or other performance requirement, or to measure progress toward goals and targets.
<b>NBP</b> – National Biosolids Partnership, which is a not-for-profit alliance between the Water Environment Federation (WEF), the Association of Metropolitan Sewerage Agencies (AMSA), and the U.S. Environmental Protection Agency (EPA) whose purpose is to promote safe and environmentally sound biosolids management.
<b>National Manual of Good Practice</b> – detailed set of documents that provides guidance on the identification of critical control points and the selection of appropriate management practices.
<b>Noncompliance</b> – a deviation from federal, state and local laws, regulations and other compliance requirements applicable to the organization's activities.
<b>Nonconformance</b> – a deviation from the established program and EMS or OH&S requirements that has the potential to create a noncompliance situation, significant environmental impact,

public perception issue, or hazard/risk.
<b>Objective Evidence</b> – Ordinances, policies, procedures, manuals, inspection checklists, operating logs, annual reports, various other documents, and various records – monitoring, inspection, enforcement, training, etc., that objectively document conformance with the EMS Elements requirements.
<b>Occupational Health and Safety</b> – conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person in the workplace.
<b>OH&amp;S Management System</b> – part of the overall management system that facilitates the management of the OH&S risks associated with the business of the organization. This includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization's policy. The LWWMS includes the requirements for the OH&S management system.
<b>Operational Controls</b> – ordinances, regulations, standard operating procedures, practices, technology, instrumentation and process controls, monitoring and other criteria developed, implemented, and maintained by an organization to ensure effective management of all critical control points associated with its activities; including conformance with policy requirements; and achievement of goals and targets.
<b>Other Requirements</b> – other binding practices and environmental requirements to which an organization voluntarily subscribes as part of its EMS or OH&S MS. Examples include binding agreements with customers, suppliers, and public organizations and commitments to “beyond compliance” performance.
<b>Other Management Controls</b> – Management methods used by the City to ensure that other requirements as well as goals and targets are met.
<b>Performance</b> – measurable results of the LWWMS, related to the organization's control of environmental, health and safety risks, and biosolids activities, based on its policy and goals/targets.
<b>Pollutants</b> – Materials, such as heavy metals, cyanides, solvents, and others that make wastewater (and biosolids) physically impure if present at certain concentrations.
<b>POTW</b> – acronym for Publicly Owned Treatment Works which is a sewage or municipal wastewater treatment facility.
<b>Prevention of Pollution</b> – use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts
<b>Preventive Action</b> – specific actions and steps taken to identify, analyze, and eliminate the root causes of noncompliance and/or nonconformance and to put into place permanent solutions that prevent a recurrence.
<b>Public (Interested Parties)</b> - same as the definition of interested parties.
<b>Public Education</b> – systematic public communications program for educating interested parties and other stakeholders on its biosolids management activities.
<b>Public Outreach</b> – communicating current and future biosolids plans and operations. Detailed information on this plan is included in Element 9.
<b>Records</b> – Various records/reports of activities required by the EMS and OH&S MS and applicable laws and regulations, including but not limited to records/reports of, equipment calibration, monitoring, measurement, laboratory testing, inspections, operating logs, emergency response incident, outside party inquiries, public participation meetings, audits, corrective actions, management reviews and periodic performance reports. Records describe the results of specific activities for a prescribed event, activity and/or period of time.
<b>Responsibilities</b> – specific tasks that an individual performs in either a lead or supporting role that accomplishes and/or supports goals and targets.

<b>Risk</b> – combination of the likelihood and consequence(s) of a specified hazardous event occurring.
<b>Risk Assessment</b> – overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable.
<b>Role</b> – the purpose for the activity that an individual performs as a part of the LWWMS.
<b>Safety</b> – freedom from unacceptable risk of harm
<b>Service Agreement</b> – is the contract between the City and other person(s) to perform specific acts.
<b>Skills</b> – the ability to use knowledge effectively and readily in execution or performance of tasks and activities; a developed aptitude or ability; the ability to do tasks competently.
<b>Spill</b> – an accidental discharge of material.
<b>Standard Operating Procedure (SOP)</b> – standard work instructions and practices for employees describing the “how to” steps in managing the aspects, risks, and critical control points of a specific management activity affecting biosolids quality and compliance with legal and other requirements and health and safety risks.
<b>Target(s)</b> – a detailed performance improvement requirement, applicable to the organization or parts thereof, that arises from the goals and that needs to be set and met in order to achieve those goals. NOTE: The LWWMS has adopted the term “targets”. This term is used in the same manner as “objectives” is used in NBP EMS Standards.
<b>Tolerable risk</b> – risk that has been reduced to a level that can be endured by the organization having regard to its legal obligations and its own policy
<b>Training</b> – teaching to make fit, qualified, or proficient; preparation for a test of skill or knowledge; instruction in disciplines and techniques.
<b>Utility</b> - refers to the entire wastewater utility and associated activities, including operations, maintenance, and line maintenance, as well as all water quality and engineering activities as they relate to the wastewater utility. It should be understood that all biosolids management activities as described in the NBP EMS standard are a function of the wastewater operation and all subsequent activities, including those by contractors are included.
<b>Value Chain</b> – sequence of activities from wastewater pretreatment, discharge and collection through wastewater treatment, solids treatment and handling, storage, transportation, and final disposition of biosolids that impact the quality and stability of biosolids and their suitability for the selected management method.