Life Safety and Maintenance Access Design Standards

I. Background and Overview

A. The City's Program Standards and Procedures (PSP) are intended to be used in conjunction with the data contained in related standards and procedures. They are not intended to be used as stand alone documents. It is the responsibility of the Designer to become familiar with all the PSP documents and comply with the criteria set forth as a whole.

B. Willow Lake Water Pollution Control Facility (WLWPCF) staff have developed standards for a variety of preferred products and their installation with the durability, function, training requirements, operation, maintenance, consistency of materials, and methods of the components in mind.

C. The Designer must consider the safety of operations and maintenance staff during the design of facilities at WLWPCF. The Designer shall provide for layout and design of proposed facilities that considers staff access for operations and maintenance and places staff safety as highest priority.

II. General Requirements

A. The design team shall apply the following design standards in the preparation of the project documents:

1. Apply the more restrictive requirements of the applicable National Fire Protection Association (NFPA) codes and standards, and other applicable codes or these design standards.

2. Provide National Electrical Code (NEC) working clearance requirements as a minimum to provide access to accommodate assembly, disassembly, and routine maintenance of equipment. In no case shall clearance be less than three feet of working area around equipment.

3. Design shall ensure compliance with Seismic Zone 4.

4. Fire alarm and life safety equipment shall be placed to allow maintenance activities to be performed in areas protected from rain and wind. This requirement does not apply to outdoor beacons, horns, or acknowledge buttons.

5. Equipment required to be labeled, shall be labeled by a listing agency recognized by the State of Oregon Building Codes Division.

6. Alarm circuits shall be shown in the de-energized (power off) position.

7. Reference Master Guide Specifications, Section 13420 - Instruments and Section 13851 - Fire Detection and Alarm, for technical specifications on many of the products required by this design standard.

8. Equipment shall be shown to scale on floor plans.

9. Elevation drawings shall be provided for areas containing fire alarm and life safety equipment and the equipment shall be drawn to scale. The equipment size shall be based on the largest currently identified in the specifications as an approved product.

10. Design of the fire alarm system shall be in accordance with NFPA 72 - National Fire Alarm Code. The system shall utilize local control panels and local alarming devices located within or adjacent to the facilities. The WLWPCF Distributed Control System (DCS) will monitor the status of each system including supervisory, trouble, and alarm conditions at a minimum.

11. Design of the facility shall incorporate applicable portions of NFPA 70E - Standard for Electrical Safety Requirements for Employee Workplaces, NFPA 101- Life Safety Code, and NFPA 780 - Standard for Installation of Lightning Protection Systems.

B. NFPA 820 - Standard For Fire Protection In Wastewater Treatment And Collection Facilities:

1. This standard shall be the basis for new facilities to determine minimum requirements for protection against fire and explosion hazards in the wastewater treatment plant processes and associated collection systems processes.

2. Fire risk evaluation shall be initiated early in the design of a new facility or the alteration of an existing facility to allow integration of the appropriate fire prevention and fire protection required by this standard.

3. Designer is responsible to incorporate ventilation practices and material of construction to maximize the fire prevention and fire protection system for critical unit processes, essential unit processes, and other unit processes as described in this standard.

4. It is understood that much can be done during the design of a facility to minimize the risk of fire and explosion hazards. The Designer is responsible to design facilities that minimize these risks through separation of classified areas, ventilation, positive air pressure, enclosing or not enclosing a process,

and location of electrical utilization equipment beyond the classified areas when possible.

5. Automatic extinguishing systems, when required, shall be installed according to the appropriate NFPA Standards.

6. Portable fire extinguishers shall be installed and located in accordance with NFPA 10 - Standards for Portable Fire Extinguishers.

7. Fire detection and alarm systems shall be installed in accordance with NFPA 72 - National Fire Alarm Code.

8. Combustible gas detectors shall be listed for the environment in which they are installed. They shall be installed in accordance with their listing requirements and the manufacturers' recommended installation instructions. For further information, reference NFPA 328 - Recommended Practice for the Control of Flammable and Combustible Liquids and Gases in Manholes, Sewers, and Similar Underground Structures.

9. Combustible gas (i.e. methane) detectors located in hazardous location as defined by the NEC, shall initially have a warning issued locally and to the DCS at five percent of the Lower Explosive Limit (LEL) and an alarm set at 10 percent of the LEL. If experience indicates ambient levels are too high and frequent false alarms are probable, the limits shall be adjusted.

10. Environmental gas (i.e. hydrogen sulfide) monitoring systems shall generate warning, and danger alarms locally and on the WLWPCF DCS system. Alarm levels for warning and danger will be factory default levels or levels determined by the Owner.

11. Oxygen level monitoring systems shall generate warning, and danger alarms locally and on the WLWPCF DCS system. Alarm levels for warning and danger will be factory default levels or levels determined by the Owner.

12. All continuous ventilation systems required shall be equipped with a flow detection device connected to a local and DCS alarm system to indicate ventilation system failure. This requirement applies to required purged and pressurized enclosures for electrical equipment as well.

13. Local alarming for ventilation system failure and combustible gas detection shall be visual and audible. The visual shall be a red strobe light with a sign that clearly states the alarm condition. The local alarm shall be located at the entrances to the facility and immediately adjacent to the affected area. Egress instructions (diagram) shall be posted where necessary.

14. Ventilation systems designed to reduce the classification of a hazardous area shall be designed in accordance with NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems.

13. Ventilation systems installed to reduce the hazard classification of any given area shall be connected to a power source which is, itself, supplied by an alternate electrical power source. The switch to alternate power shall be automatic. In addition, the plant may designate areas that require positive ventilation in the event of total power failure. In this case, the ventilation system shall be equipped to accept power from a portable generator.

14. Ventilation systems installed to reduce the hazardous classification as defined in NFPA 70 - National Electrical Code, Class 1, Division 1 and Division 2 shall NOT be permitted to be a two-speed or high–low flow rate system.

15. The Owner shall establish and maintain formal procedures and controls necessary for the execution of the fire prevention and fire protection activities and practices for wastewater treatment and collection facilities as defined in NFPA 820 - Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

16. The Owner shall assist the Designer in determining when or if existing facilities that do not meet the current standard for fire protection shall be brought into compliance to the extent that is feasible.

—End of Section—