Exhibit B: Safety by Design: Safety Design Requirements for Renovations and New Construction

Section 1 – Introduction and Standards

1.1 The project will be designed using current City of Columbus specifications and standards as specified in the project scope of services.

1.2 The following requirements are written in an effort to ensure the safety and health of the City of Columbus employees and the public both during the construction stage and following completion of the project (final use by occupants and while performing maintenance).

1.3 The following regulations and guidance documents will be referenced in this document

- 1.3.1 29 CFR 1910 Subpart D, Walking and Working Surfaces
- 1.3.2 29 CFR 1910 1926.501-503, Fall Protection
- 1.3.3 29 CFR 1910.147, Control of Hazardous Energy
- 1.3.4 NFPA 70E, Standard for Electrical Safety in the Workplace
- 1.3.5 NEC 110.26, Requirements for Electrical Installations
- 1.3.6 NEC, Article 250, Grounding and Bonding
- 1.3.7 29 CFR 1926.403, Electrical General Requirements
- 1.3.8 29 CFR 1910.146, Confined Spaces
- 1.3.9 29 CFR 1926.1053, Ladders
- 1.3.10 29 CFR 1910.25-26, Portable wood and metal ladders
- 1.3.11 29 CFR 1910.36, Means of Egress
- 1.3.12 Ohio Building Code, OAC 4101:1-10, Means of Egress
- 1.3.13 29 CFR 1910.151, Medical Services and First Aid
- 1.3.14 ANSI Z358.1, Plumbed and Portable Eyewashes
- 1.3.15 NFPA 70 Section 210.8, Ground fault circuit interrupter protection for personnel
- 1.3.16 29 CFR 1910.145, Specifications for accident prevention signs and tags
- 1.3.17 ANSI Z535 – Safety Signage
- 1.3.18 2010 ADA Standards for Accessible Design
- 1.3.19 Mayor's Executive Order #2012-02 (Nursing Mother's Room)
- 1.3.20 29 CFR 1910.179, Overhead and Gantry Cranes
- 1.3.21 29 CFR 1910.28, Scaffolding
- 1.3.22 29 CFR 1910.95, Hazardous Noise

1.4 The design development of this project shall be performed in accordance with but not limited to the Specifications, Standards, and Guidance cited within this document. The Consultant shall perform all work required by this document unless a written exemption is provided by the City's Design Project Manager (DPM). Absence of a specific reference to complete any required design element of work contained within the Scope of Services shall not relieve the Consultant

of responsibility to perform the work. The development of drawings adhering to these requirements shall be based on the most current version of each document at the date of the Design Kick-off Meeting.

This document shall be updated from time to time. If, after the design kick off meeting, the document is updated, the DPM will review the changes. If minor changes can be incorporated without significant design changes, the DPM shall inform the Consultant of the changes and the Consultant shall incorporate them without additional cost to the City. If there are significant changes and the DPM would like the change(s) incorporated into the design, the DPM and the Consultant shall review the changes and negotiate a fee for the additional work.

Section 2 – Design considerations to safely conduct maintenance activities

2.1 Safe Access to HVAC Equipment. To prevent injuries from falls, electricity, awkward and tight positions, and heavy lifting and also to allow maintenance staff safe clearance to access equipment, the below measures shall be implemented during the design phase of the project.

2.1.1 Compliance with the Occupational Safety and Health Administration (OSHA) Regulations: 29 CFR 1910 Subpart D Walking and Working Surfaces; and 29 CFR 1926.501-503 Fall Protection.

2.1.2 Place HVAC and other traditional roof units on the ground whenever feasible.

2.1.3 Provide sufficient space to safely install, operate, and maintain HVAC equipment. Units should not be placed above hallways or too close to fresh air/open ventilation.

2.1.4 When applicable, consider installing hoist to safely move equipment to catwalks or 2nd floor areas as needed.

2.1.5 Include manufacturer recommended catwalks, work platforms, and accessories for maintenance equipment when work will be performed at elevation from walking surface and a fall could occur (>4 ft above walking surface).

2.1.6 In accordance with 29 CFR 1926.403, Electrical General Requirements:

- Location of mechanical rooms should be able to be locked.
- Whenever possible, location should allow safe access for trucks to mechanical rooms to remove or install equipment.

2.1 Lockout/Tagout. To prevent injuries from machines or equipment becoming energized.

2.2.1 Whenever applicable, Lockout/Tagout plans are required to be provided by the contractor whenever new equipment is being installed or upgraded.

2.2.2 New equipment shall be able to be safely locked out in accordance with 29 CFR 1910.147 and NFPA 70E.

2.2 Confined Spaces. To prevent injuries from entering into confined spaces during construction and in completed structure.

2.3.1 To meet compliance with 29 CFR 1910.146, Confined Spaces.
2.3.2 Confined spaces shall be protected by grate, door, or cover and shall be properly labeled.

2.3 Safe access to lighting fixtures. To prevent injuries from falls when servicing lighting fixtures.
2.4.1 To meet compliance with 29 CFR 1910 501-503, Fall Protection and 29 CFR 1910.147, Control of Hazardous Energy, there shall be safe access to lighting fixtures being installed as part of the project.
2.4.2 Avoid installing over stairway voids or in high ceilings or roofs, roof tops, whenever possible.
2.4.3 Lighting fixtures shall be protected from breakage with cage or cover.
2.4.4 Lighting fixtures shall be easily accessed or provisions to access them shall be provided if not readily accessible.

2.4 Generator safety. To prevent electrical injuries from improperly stored or grounded generators, generators that will be installed or positioned at a City owned facility shall comply with the following.
2.5.1 Generators will be grounded and stored properly in accordance with NEC Article 250.

2.5 Window cleaning methods. As a best practice to prevent fall hazards, safe access to windows for window cleaning activities shall be considered during design.

2.6 Gutter cleaning methods. As a best practice to prevent fall hazards, safe access to gutters for cleaning activities shall be considered during design. Additionally, tie off locations for ladders shall be included whenever applicable.

2.7 Slips, trips, and falls; wet surfaces. To prevent falls and injuries resulting from wet, slippery, or otherwise hazardous walking surfaces and to ensure compliance with 29 CFR 1910.22, Walking and Working Surfaces General Requirements and 29 CFR 1910.141, Sanitation.
2.8.1 The use of slip resistant surfaces in walking or working areas exposed to weather, frequent spills, or dedicated wet areas shall be implemented.
2.8.2 Where wet processes are used, maintain sloped drainage and provide false floors, platforms, mats, or other dry standing places where practicable.

2.8 Refuse collection points. As a best practice to prevent injuries from lifting or moving refuse, refuse collection points shall be accessible. Additionally, loading bays and ramps shall be designed for easy loading and unloading.

2.9 Roof access and fall protection – prevention of falls by design. For the prevention of falls as a result of accessing a roof or equipment on a roof, new roof design should reduce or eliminate

the risk of falls from height. The below requirements assist in compliance with 29 CFR 1910 Subpart D, Walking and Working Surfaces and 29 CFR 1926.501-503, Fall Protection.

2.10.1 Low slope (≤4:12) or flat roof is most desirable for fall prevention and shall always be considered when designing new roof.

2.10.2 If maintenance equipment must be placed on a roof because it is not feasible to place on the ground, the equipment shall be at least 10 feet from the leading edge.

2.10.3 Installation of parapet walls at least 42" high is the preferred method of fall protection and shall be installed where there is maintenance equipment placed on a roof, whenever feasible.

2.10.3 (a) When parapet walls are not feasible, alternate fall protection shall be provided when there is equipment that will be serviced on the roof. The alternate fall protection shall be compliant with 29 CFR 1910 Subpart D, Walking and Working Surfaces and 29 CFR 1926.501-503, Fall Protection where applicable.

2.10.4 Safe permanent ladders or permanent stairs to access roof or catwalk shall be installed when the roof will be accessed for maintenance activities. Permanent ladders shall extend 42" beyond the access level or roof line and shall have a pass through opening with a self-closing gate.

2.10.5 Fixed ladders above 20 feet shall have a fall restraint system or cage to prevent falls. For areas where the public can access the ladder, the bottom shall be gated or otherwise restricted/blocked to prevent access.

2.10.6 Walkways and stairways shall be properly guarded with handrails in accordance with 29 CFR 1910.23.

2.10.7 Roof hatches shall be properly guarded and shall have safety grab bar for entering and exiting the hatch.

2.10.8 Non-slip surface material shall be added to the walking surfaces in the roof areas that will be accessed by personnel when the roof presents a slip hazard.

2.10.9 Sky lights shall be protected with 200 lbs cover or guard rail.

2.10.10 Mezzanines shall be protected from fall hazards with proper guardrails in accordance with 29 CFR 1910 Subpart D, Walking and Working Surfaces.

2.10.11 If a fall arrest system will be used to access the roof, the system shall be designed by a Professional Engineer and shall provide the employee with 100% tie off while accessing and moving around the roof to complete maintenance activities. Lifelines shall not be installed in a manner that creates a tripping hazard or any other additional safety hazard.

Section 3 – Design considerations for safe use by occupants

3.1 General Access and Egress. To maintain compliance with 29 CFR 1910. 36, Means of Egress, and OAC 4101:1-10, corridors shall be widened where applicable (heavy traffic areas/emergency egress).

3.2 Snow guards on roof. As a best practice to prevent snow/ice from falling to ground from roof, snow guards shall be considered when designing roof.

3.3 Emergency eye washes and showers. To comply with 29 CFR 1910.151, Medical Services and First Aid and ANSI Z358.1 – where the eyes or body of any person may be exposed to injurious corrosive materials, a plumbed eye wash (and shower where applicable) shall be installed within the work area for immediate emergency use. The installation shall be in accordance with 29 CFR 1910.151, Medical Services and First Aid and ANSI Z358.1.

3.4 Adequate drinking water availability. As a best practice to prevent heat related illness – adequate drinking water sources shall be provided for employees who are exposed to heat stress while performing their duties.

3.5 GFCI Receptacles. Where wet or damp areas exist with electrical receptacles or panels, appropriate fixtures shall be provided to prevent an electrical shock hazard. GFCI receptacles and protected electrical panels shall be installed in areas where there is a potential for moisture (including all outdoor receptacles) in accordance with NFPA 701, National Electric code, Section 210.8.

3.6 Safe chemical storage. To maintain compliance with 29 CFR 1910.106, Flammable Liquids and chemical safety data sheets, chemical storage areas shall be designed to allow for safe storage, chemical separation where applicable, and with dedicated venting when necessary.

3.7 Stairs. For the prevention of falls by design and to comply with 29 CFR 1910 Subpart D the following shall be implemented during the design of a structure:

3.7.1 Walkways and stairways shall be properly guarded with handrails in accordance with 29 CFR 1910.23.
3.7.2 Slip resistant stair nosing shall be used for new or replacement stairs.
3.7.3 Handrails shall be installed for any change in elevation that is ≥30” or > 4 risers.
3.7.4 Permanent stairs shall be provided to access transition points >19”.

3.8 Shelving heights. As a best practice to prevent falls and poor ergonomic conditions that can lead to injuries, shelving heights shall be optimized to minimize over reaching and risks of falls from heights during access.

3.9 Wall paints. As a best practice to prevent exposure to VOC’s by sensitive individuals, low VOC wall paints and associated products shall be considered for internal use.

3.10 Low emission carpets. As a best practice to prevent exposures to VOC's by sensitive individuals, low emission carpets shall be considered for internal use.

3.11 Safety signage. For compliance with 29 CFR 1910.145, specifications for accident prevention signs and tags and ANSI Z535 guidance, appropriate safety signs shall be included where applicable (i.e., high voltage overhead, floor load, chemical storage area, eyewash area, do not pass this point without fall protection, etc.)

3.12 Photocopier rooms. As a best practice to prevent build-up of off-gassing chemicals from photocopier areas (ozone primarily), resource areas containing photocopiers, printers, etc. shall be separated from workstations and/or are appropriately ventilated.

3.13 CNG vehicle parking. New parking structures that will house CNG vehicles or parking structures that are being retrofitted to house CNG vehicles must be complaint with Ohio Building Code and National Electric Code for CNG vehicle storage.

3.14 Landscaping. As a best practice to prevent water intrusion into remodeled, renovated, or new structure, landscaping and trees shall be kept at an adequate distance from the building to allow proper drainage. Weep holes in masonry buildings shall allow space to allow moisture out of the masonry.

3.15 ADA Compliance. In accordance with 2010 ADA Standard for Accessible Design, new buildings and restrooms shall be designed to meet ADA compliance. Additionally, consideration shall be given for the installation of unisex and family restrooms. Contact EEO office in the Department of Human Resources for more information.

3.16 Nursing mother's room. As a best management practice and to comply with Mayor's Executive Order #2012-02, a nursing mother's room shall be included in the design of a new building and shall be considered during renovation of an existing structure.