1.1 **GENERAL**

1.2 **Co-ordination Requirements**

.1 Coordinate requirements with SFU Facilities and SFU Project Manager.

.2 All proposed systems must be reviewed and signed off by Technical Services prior to any tendering.

1.3 **Description**

.1 The design, supply and installation of fall protection systems for maintenance personnel (particularly when parapets are less in height than required for guards), and for window washing equipment and personnel.

.2 Meet all requirements of the Province of British Columbia Industrial Health and Safety Regulations pursuant to WorkSafe BC.

.3 Be responsible for determining the location and types of anchorages required to provide a complete system.

1.4 **Performance Standards**

.1 Province of British Columbia Industrial Health and Safety Regulations pursuant to WorkSafe BC.


.3 Engineer to design a complete fall protection system to prevent a worker from falling according to WorkSafe BC requirements.

1.5 **Quality Control and Assurance**

.1 **Submittals**

.1 **Shop Drawings**

.1 The Design Engineer’s seal, signature and a statement assuring code compliance must appear on each shop drawing.

.2 At completion, submit as-built drawings and 2 copies of a reduced plastic laminated as-built shop drawing showing anchor locations and detailed fall protection plan clearly depicting the intent and usage of each component and overall system, to be supplied to the SFU Facilities for posting near roof entrances.

.2 **Quality Assurance**

.1 Work to be carried out by a company specializing in the type of safety equipment required.

.2 All components to be designed and certified by a professional engineer registered in the Province of British Columbia.

.3 Roofing penetrations to conform to roofing membrane.
.4 Manufacturers and roofing inspector’s recommendations.

.3 Quality Control

.1 Design Engineer to carry out site reviews and submit a Letters of Assurance certifying that the anchors meet the performance requirements of CSA Z91M.

2.1 MATERIAL and DESIGN REQUIREMENTS

2.2 Prescriptive Requirements

.1 All facility fall protection should be reviewed and approved by SFU Facilities and SFU EHS.

.2 All miscellaneous metal work shall have the minimum standards described in Section 05 50 00 Metal Fabrications.

.3 All roofing work and roof repair work shall be in accordance with Section 07 50 00 Membrane Roofing.

.4 Public access to roofs should be prevented and deterred through strategic building design, coordinated with design consultants.

.5 Components

.1 Cast-in-place material: stainless steel type 304.

.2 Exposed anchor surfaces and exposed structural components: stainless steel type 304.

.3 Rotating heads are not allowed on campus, as they make safety inspections more difficult.

.4 Anchors must be certified that they meet the performance requirements of CSA Z91M.

.5 No adhesive or expansion shield anchoring of anchors.

2.3. SFU Guidelines for Rooftop “Fall Protection System” Design

.1 Overview

.1 SFU requires that all new buildings, major renovations, and roof replacement projects be reviewed with Facilities Services to determine if required to incorporate the design of a permanent, engineered, fall protection system. The system shall incorporate the use of rust resistant (e.g. galvanized metal), railing anchors, horizontal life lines, signage, etc.

.2 The lead design consultant is responsible for the functional requirements of the system design. The “Fall Protection System” design is more than a rooftop anchor installation design.

.2 Buildings or Rooftop Surfaces less than 10 feet above Grade

.1 Fall protection design is not typically required unless the hazard of falling is greater than the hazard of impacting a flat surface. Consideration must be given to what periodic maintenance is required to be performed while on these surfaces to ensure
that safe access is achievable using ladders, et.al.

.3 **Buildings or Surfaces greater than 10 feet but less than 25 feet above Grade**

.1 A fall protection system design is required for use by employees for the purpose of fall restraint and fall arrest. Design for window cleaning is only required on buildings where access is not practical from the ground via extension poles or a mobile lift.

.4 **Buildings or Surfaces greater than 25 feet above Grade**

.1 A fall protection system design is required for use by employees for the purpose of fall restraint, fall arrest, and window cleaning via a bosun’s chair. Attachment mechanisms for swing stage or other roof supported maintenance equipment should only be designed if specifically required for the project; like a high-rise building. A wall stabilization anchoring system is to be provided to prevent the working platform from dangerously swaying in the wind while suspended, where required by code or deemed necessary due to the combination of building accessibility, building height and wind speeds.

.5 **Fall Protection System Designs Shall Include:**

.1 Adherence to WorkSafe BC guidelines and regulations required.

.2 Adherence to applicable latest building codes required.

.3 Signed and sealed by a Professional Engineer

.4 Window cleaning anchor design must allow for separate anchors for the person (safety line) and the suspension equipment (bosun’s chairs, swing stages etc.) (suspension line).

.5 Drawing(s) indicating the anchoring locations and instructions for use regarding angles and tie off locations. Indicate ground areas requiring pedestrian protection while suspension equipment (bosun’s chairs, swing stages etc.) is being used for maintenance; over doorways, etc. The drawing shall be printed on a durable medium and mounted at each rooftop access location and fall protection access location inside of buildings.

.6 The drawings shall include instructions on any protection requirements for the building parapet walls and / or flashings to ensure that the ropes do not damage the building components and so that the building components do not damage the ropes.

.7 Imposed loads on the parapet walls shall be identified on the drawings and the information provided to the project lead designer, normally the Architect, to ensure that parapets are designed accordingly.

.8 The designer must ensure that rooftop mounted equipment, ducting, skylights, piping, vent stacks, etc. are accounted for and do not impact the operation of the system. Modify the design as required to ensure that the system is fully functional once the building is occupied.

.9 Areas of the roof that are accessible to the general public shall use guardrails to ensure protection against falls because they will not have the training and equipment required for using the anchoring system.

.10 Where interior fall protection systems such as in atriums are required, allowance must be made for the use of manlifts to access all interior surfaces and fixtures for
maintenance. Further allowance must be included in the building design for access of this equipment into the space required and floor/slabs must be capable of supporting the loading required by such equipment.

.11 An annual inspection checklist indicating each anchor shall be developed. Every anchor on the roof shall be uniquely identified, and the checklist will correspond to these identifiers. The checklist shall be prepared on 8.5” x 11” sheets. A copy of the checklist will be left in a mounted pouch at the entrance of the fall protection area for review by personnel accessing the fall protection area.

.12 Anchor design and load rating drawings shall be provided for each type of anchor in the system.

.13 Anchor fastening details must be provided for each type of fastening. The fastener load ratings must be indicated.

.14 Avoid adhesive and expansion shield anchors due to load testing inspection requirements.

.15 Anchor manufacturer’s shop drawings, installation instructions, and inspection / testing requirements.

.16 Anchor inspection detailed descriptions to be comprehensive enough to allow anchors and fastening mechanisms to be inspected by third party personnel.

.17 A copy of all components of the anchor system design shall be bound in a three-ring binder complete with a stamped and sealed cover letter from the Professional Engineer describing the system. The binder shall include all drawings, shop drawings, anchor detail drawings, fastener detail drawings and specifications, inspection checklists, instructions on the proper use and limitations of the system, instructions for inspections, testing requirements and frequency, letter of initial system certification stamped and sealed by a Professional Engineer. The contents of this manual will be scanned into SFU Facilities – Building & Infrastructure Records system for permanent record and future reference.

.6 Commissioning

.1 Roof anchor designer/manufacturer to provide a comprehensive seminar to SFU Facilities staff and Contractor personnel, on the purpose and nature of the tie-back and lifeline anchoring system.

***END OF SECTION***