1.1 **GENERAL**

1.2 **Related SFU Technical Requirements**

1.2.1 *Section 12 35 53 Laboratory Casework*

1.2.2 *Section 23 38 16 Fume Hood Exhaust Systems*

1.2.3 *Section 20 00 08 Mechanical Identification* for the details for fume hood labelling requirements.

1.3 **Co-ordination Requirements**

1.3.1 Design development guidance will be provided by SFU Facilities and SFU EHS to the Consultant defining in detail the laboratory function, requirements, and systems to be provided.

1.3.2 Review design intent and additional requirements with SFU Safety & Risk Services.

1.3.3 The selection of fume hoods and biological safety cabinets is to be made in consultation with SFU Facilities and principal researcher to ensure that the scientific, safety and engineering concerns are properly addressed.

1.3.4 Operable windows are not to be installed in labs in order to allow negative pressures to be maintained relative to adjacent spaces and to prevent draft conditions.

1.4 **Description**

1.4.1 Factory-manufactured fume hoods and biological safety cabinets designated for biohazard containment levels:

1.4.1.1 Containment Level 1

1.4.1.2 Containment Level 2

1.4.1.3 Containment Level 3

1.4.1.4 Containment Level 4

1.4.2 All equipment must be CSA and/or ULC certified for use in Canada.

2.1 **MATERIAL AND DESIGN REQUIREMENTS**

2.2 **Design Requirements**

2.2.1 All fume hoods and exhaust systems shall conform to Part 30 Laboratories, of the Occupational Health and Safety (OHS) Regulation under the inspection jurisdiction of WorkSafeBC, and the latest edition for CSA-Z-316.5 Fume Hoods, and Associated Exhaust Systems, and show evidence of being performance tested in accordance with ASHRAE 110, Method of Testing Performance of Laboratory Fume Hoods.

2.3 **Certification and Commissioning Requirements**

2.3.1 Fume hood installations must be certified by a professional engineer. To certify the installation of a laboratory fume hood, a professional engineer is required to conduct an assessment of OHS Regulation requirements related to the installation of the fume hood, duct work, exhaust system, lab requirements, make-up and air balance requirements.
.2 Following installation of the fume hood and before it is used, the installation must be fully tested to confirm all air flow requirements are met, including face velocity, containment, balancing and makeup air. Face velocity requirements are as per current WorkSafeBC / OHS requirements.

.3 It must be demonstrated to the SFU Project Manager, and SFU Safety and Risk Management Services that the fume hoods have been designed and installed to meet all requirements of the SFU Technical Requirements.

2.4 Performance Standards

.1 Fume hoods shall conform to the following function-specific requirements, including as applicable:

.1 Laboratory Bio-Safety Guidelines, (latest revision), published Public Health Agency of Canada.

.2 Containment Standards for Veterinary Facilities, Canadian Food Inspection Agency, Publication 1921/E.

.3 Canadian Nuclear Safety Commission Standard R-52, Design Guidelines for Basic and Intermediate Level Radioisotope Laboratories.

.4 NSF (National Science Facilities) standards: for all biosafety cabinets; fully reticulating HEPA filters typical.

.5 CSA: including requirement for flow sensors.

.6 WCB: including requirement for outside controls.

.7 SFU Safety and Risk Services to determine additional regulatory and construction standards.

.8 Biological Safety Cabinets to conform to CSA Z 316.3 Biological Containment Cabinets (Class I and II). Installation and Field Testing shall meet the requirements of NSF 49.

.9 Performance.

.1 Life Cycle Costing is to be calculated based on a 15 year life.

2.5 General Requirements

.1 Set the fume hood sash at 15" (375 mm).

.2 The correct operating height of the sash must be clearly marked on the cabinet frame.

.3 A fume hood must be connected to a local exhaust ventilation system which will provide air velocities over the operational face area of the hood that meet the current Work Safe BC / OHS Requirements.

.4 New fume hoods shall have flow sensors as per CSA standards.

.5 Design of building structure to accommodate the provision of shielded radio isotope hoods (SFU to establish which hoods).

.6 Whenever a project permits, conform to the most stringent Containment Level requirements to allow flexibility of use.
.7 Hoods intended for use with Perchloric acid shall be specifically designed for that use and shall be reviewed with SFU Safety & Risk Services and SFU Facilities. Material that is resistant to Perchloric Acid must be used for the fume hood, duct work, fans and stacks. Stainless steel is not an acceptable material for this service.

.8 If hoods are to be relocated, it is preferred to use new hoods rather than re-using existing hoods.

2.6 Seismic Restraint Requirements

.1 A professional engineer registered in BC, shall be engaged by manufacturer, and shall seal shop drawings, confirmed by Letters of Assurance, for seismic restraints including anchorage.

.2 Means for attachment for seismic restraint to be incorporated in the manufacture of fume hoods and bio-safety cabinets. Restraints and anchorage shall be designed to the BC Building Code.

2.7 Components

.1 Fume hoods to be either stainless steel lined or epoxy lined. All fume hood materials must be non-flammable. Radioisotope hoods to be of stainless steel construction.

.2 Hoods intended for use with radioisotopes to have a reinforced work surface capable of supporting 500 kg.

.3 Window sash to be equipped with a tempered safety glass.

.4 Majority of bio-safety cabinets will be Class II Type A2. SFU Safety & Risk Services EHS department to determine if Class II Type B1 or B2 cabinets are required at a meeting between with consultants.

.5 Fume Hoods to be variable volume type.

.6 Fume Hoods to be equipped with occupancy sensor to allow reduce air flow when equipment is unoccupied.

.7 As per BCOHS regulation 30.21; an exhaust duct wash down system shall be part of the design in Perchloric Acid fume hoods.

2.8 Finishes

.1 All fittings or trim in fume hoods to be non-corrosive. Chrome-plated or similar types of ‘non-corrosive’ finishes are not acceptable.

2.9 Fabrication

.1 The fume hood must be double walled construction permitting mechanical and electrical service fittings to be mounted on the vertical front stiles.

.2 Heavy duty galvanized steel framework as well as the service fixture valves and boxes must be housed and concealed within the service chase on both sides of the hood.

.3 Exterior or interior panels must be independently mounted and easily removable, complete with panels required completing service connections. Exterior service panels are preferred where the installation permits.
4. The exterior panels and front stiles must be minimum 1.2 mm powder coated epoxy steel. Air foil must be Type 316L 1.5 mm gauge stainless steel, number 4 finish.

2.10 Materials

1. Consult with SFU Facilities for SFU Mandatory, approved, or not approved products and materials.

2. Type 316L 16 gauge stainless steel number #4 finish and be of seamless one piece construction with all corners coved and radii.

3. All welds ground smooth and polished. A liner must be bolted and cemented to the steel framework forming a rigid and completely sealed chamber.

4. The duct stub must be 316L stainless steel.

5. Hood baffles are required with top and bottom ventilation slots. These must be fully adjustable and of the same material as the hood liner.

6. The vertical sliding sash must be full view type with 6 mm thick tempered safety glass panel and stainless steel pull, and be counter balanced for smooth operation. Sash shall latch when fully open and when released shall automatically close by gravity.

7. Fume hoods and biological safety cabinets shall be equipped with a positive lockable latching system. The locking system must allow for the addition of a tradesman’s lock that complies with lockout procedures.

8. For a stainless steel liner, hood work surface must be type 316L 16 gauge stainless steel, seamless welded and integral with liner. The work surface must have 6 mm high marine type edge. The underside of the work surface must have a 20 mm thick plywood sheet bonded to it for rigidity and sound deadening.

9. For an epoxy lined hood, the hood work surface must be 20 mm solid black epoxy sealed to the hood liner with a 6 mm high marine type edge sealed to the hood liner.

10. A recess mounted electronic air monitor shall be mounted on the front face of the hood, indicating high, normal and low air flows, complete with audio and visual alarms.

11. Where provided, the hood accessories must conform to the following specifications:

1. Provide outside controls for all fume hoods as per OHS requirements.

2. Sinks must be integrally welded to the work top or, if epoxy, sealed and recessed into the counter with 38 mm tail pieces.

3. Flush type electrical receptacle consisting of a box 120 volt 15 amp U ground duplex stainless steel face plate must be located on the exterior of the fume hood preferably on the vertical stile.

4. A flush mounted stop/start blower switch must be located in the fume hood front stile. The switch must be suitable for the specified horsepower characteristics of the fan and be labeled as to its function and status.

5. The fume hood must be prewired and CSA approved.
The hood must be equipped with a vapor proof lamp and light switch and all wired to a junction box on top of the hood.

2.11 Service Connection to Biological Safety Cabinets

.1 Natural Gas

.1 Natural gas connections to Biological Safety Cabinets are no longer permitted by the Public Health Agency of Canada (PHAC).

.2 Water, Drain and Vacuum Services

.1 Water, drain, air and vacuum are normally not recommended. In instances where users request any of these services, the Consultant to discuss and obtain approval from the SFU Facilities.

.3 Electrical

.1 A duplex outlet is required adjacent to each cabinet supplied from two separate circuits.

2.12 Labelling

.1 Fume Hoods and Biological Safety Cabinets to be labeled in accordance with the requirements of Technical Services, and this labeling must be coordinated with the similar identification number of the related fan located on the roof.

.2 Commissioning

.1 It must be demonstrated to the SFU Project Manager, and SFU Facilities that the fume hoods have been designed and installed to meet all requirements of the SFU Technical Requirements.

***END OF SECTION***