SCHEDULE 3

DESIGN AND CONSTRUCTION SPECIFICATIONS

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SCHEDULE 3

DESIGN AND CONSTRUCTION SPECIFICATIONS

PART 1. INTERPRETATION

1.1 Definitions

In this Schedule, in addition to the definitions set out in Schedule 1 of this Agreement:

"**Authority End Use Equipment**" has the meaning set out in Section 7.8.9.2(1);

"**BC Building Code**" means the British Columbia Building Code;

"**BMS**" has the meaning set out in Section 7.6.1.1(1) of this Schedule;

"**Buildings"** means the buildings to be constructed on the Sites by Project Co pursuant to this Agreement, and includes all additions and improvements thereto over the term of this Agreement;

"**Category A IMIT**" has the meaning set out in Section 7.8.3.1(1) of this Schedule;

"**Category B IMIT**" has the meaning set out in Section 7.8.3.1(2) of this Schedule;

"**Category C IMIT**" has the meaning set out in Section 7.8.3.1(3) of this Schedule;

"**Category D IMIT**" has the meaning set out in Section 7.8.3.1(4) of this Schedule;

"**Category E IMIT**" has the meaning set out in Section 7.8.3.1(5) of this Schedule;

"**Clinical Specifications**" has the meaning set out in Section 2.3 of this Schedule;

"**Communications Tower**" has the meaning set out in Section 5.3.10;

"**dBA**" is a weighted sound pressure level within a space adjusted based on human hearing systems (e.g. less sensitive to low frequencies);

"**Elevated Flooring**" has the meaning set out in Section 6.11.11.1 of this Schedule;

"**End User Administration**" has the meaning set out in Section 7.8.3.1(6) of this Schedule;

"**Energy Centre**" has the meaning set out in Section 2.8.1 of this Schedule;

"**EOC**" means the Emergency Operations Centre described in Section 5.3.10 of this Schedule;

"**Evidence Based Design**" has the meaning set out in Section 3.4.1 of this Schedule;

"**Heliport**" has the meaning set out in Section 4.5.1.1 of this Schedule;

"**IMIT Systems and Equipment**" has the meaning set out in Section 7.8.3.1(7) of this Schedule;

"**Indicative Design**" has the meaning set out in Section 2.11.1 of this Schedule;

"**Infrastructure**" has the meaning set out in Section 7.8.3.1(8) of this Schedule;

"**Integrate/Integration**" has the meaning set out in Section 7.8.3.1(9) of this Schedule;

"**Interface**" has the meaning set out in Section 7.8.3.1(10) of this Schedule;

"**LEAN**" means to a structured way of continuously exposing and solving problems to eliminate waste in systems that deliver value to customers;

"**Mass Casualty Tent Area**" has the meaning set out in Section 5.3.9 of this Schedule;

"**Master Site Plan**" has the meaning set out in Section 4.1 of this Schedule;

"**Patient Centred Care**" has the meaning set out in Section 3.6.1.2 of this Schedule;

"**Project Co End Use Equipment**" has the meaning set out in Section 7.8.9.1(1);

"**Project Design Principles**" has the meaning set out in Section 3.2.1 of this Schedule;

"**RJH**" means the Royal Jubilee Hospital in Victoria, British Columbia;

"**Server**" has the meaning set out in Section7.8.3.1(11) of this Schedule;

"**Service Level**" has the meaning set out in Section 7.8.3.1(12) of this Schedule;

"**Software**" has the meaning set out in Section 7.8.3.1(13) of this Schedule;

"**System Lifecycle**" has the meaning set out in Section 7.8.3.1(14) of this Schedule;

"**UBC**" means the University of British Columbia;

"**UBC Clinical Skills Room**" has the meaning set out in Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications];

"**UBC TEL Rooms**" has the meaning set out in Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications]; and

"**UBC Small Seminar Room**" has the meaning set out in Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications].

1.2 Interpretation

1.2.1 This Schedule is written as an output specification and defines what Project Co must achieve in the Design and Construction. Except as expressly stated otherwise, Project Co will carry out the Design and Construction as required and contemplated by each provision of this Schedule and its Appendices whether or not the provision is written as an obligation of Project Co or is stated in the imperative form.

1.2.2 Where “cost effective”, “appropriate”, “sufficient”, “minimize” and related and similar terms are used, they are to be construed and interpreted in terms of whether they are cost effective, appropriate, sufficient, minimizing, etc. from the perspective of a prudent public owner of a major public hospital facility who balances capital costs against maintenance, operations, clinical efficiency and other non capital costs over the life of the Facility.

1.2.3 Unless expressly stated otherwise, each reference to a standard in this document will be deemed to mean the latest version of that standard as of the Financial Submission Date.

1.3 Acronym List

1.3.1 AAS – Aluminum Association Standards

1.3.2 AAMA – American Architectural Manufacturers Association

1.3.3 AECB – Atomic Energy Control Board

1.3.4 ARCAL – Aircraft Radio Control of Aerodrome Lighting

1.3.5 AFUE - Annual Fuel Utilization Efficiency

1.3.6 ANSI - American National Standards Institute

1.3.7 ASHRAE - American Society of Heating, Refrigerating and Air-conditioning Engineers

1.3.8 ASME - American Society of Mechanical Engineers

1.3.9 ASPE - American Society of Plumbing Engineers

1.3.10 ASTM - American Society for Testing and Materials

1.3.11 AV / IT – Audio Visual / Information Technology

1.3.12 AWCC – Association of Wall and Ceiling Contractors

1.3.13 AWMA – Architectural Woodwork Manufacturers Association

1.3.14 AWWA – American Water works Association

1.3.15 BCERMS - British Columbia Emergency Response Management System

1.3.16 BCICA - British Columbia Insulation Contractors Association

1.3.17 BCLNA - British Columbia Landscape & Nursery Association

1.3.18 BCSLA - British Columbia Society of Landscape Architects

1.3.19 BICSI - Building Industry Consulting Service International

1.3.20 BMS - Building Management System

1.3.21 CAR – Canadian Aviation Regulations

1.3.22 CATV – Community Access Television

1.3.23 CCD – Charge Couple Device

1.3.24 CCI/CRI – Canadian Carpet Institute/Canadian Rug Institute Program

1.3.25 CCTV – Closed Circuit Television

1.3.26 CEC – Canadian Electrical Code

1.3.27 CFL – Compact Fluorescent Lamp

1.3.28 CGA - Compressed Gas Association

1.3.29 CIF – Common Intermediate Format

1.3.30 CISCA - Ceiling Interior Systems Construction Association

1.3.31 CGBC – Canada Green Building Council

1.3.32 CMCA – Canadian Masonry Contractors Association

1.3.33 CNSC – Canadian Nuclear Safety Commission

1.3.34 CODEC – Coder/Decoder

1.3.35 CPTED - Crime Prevention Through Environmental Design

1.3.36 CPU – Central Processing Unit

1.3.37 CRI/IAQ – Canadian Rug Institute/Indoor Air Quality Program

1.3.38 CRT – Cathode Ray Tube

1.3.39 CRTC – Canadian Radio-television and Telecommunications Commission

1.3.40 CSA - Canadian Standards Association

1.3.41 CSDFMA – Canadian Steel Door and Frame Manufacturers Association

1.3.42 CSSBI – Canadian Sheet Steel Building Institute

1.3.43 DDC - Direct Digital Controls

1.3.44 DFO - Department of Fisheries and Oceans

1.3.45 DHI – Door and Hardware Institute

1.3.46 DID – Direct Inward Dialling

1.3.47 DISS - Diameter Index Safety System

1.3.48 DSSS – Direct Sequence Spread Spectrum

1.3.49 EF – Entrance Facility Room

1.3.50 EHR – Electronic Health Record

1.3.51 EIA/TIA – Electronics Industry Association/Telecommunications Industry Association

1.3.52 EMT – Electric Metallic Tubing

1.3.53 EPA – Environmental Protection Agency

1.3.54 ePDU - electronic power distribution unit

1.3.55 FACP – Fire Alarm Control Panel

1.3.56 FATO – Final Approach and Take-off Area

1.3.57 FM – Factory Mutual

1.3.58 GCA – Glazing Contractors Association of British Columbia

1.3.59 GPS – Global Positioning Satellite

1.3.60 HAZMAT - Hazardous Materials

1.3.61 HEPA - High Efficiency Particulate Air

1.3.62 HOA – Hand/Off/Auto

1.3.63 HP – Horsepower

1.3.64 HRC – High Rupting Capacity (fuse type)

1.3.65 HVAC - Heating, Ventilating and Air-Conditioning

1.3.66 ICU – Intensive Care Unit

1.3.67 IDS / IPS – Intrusion Detection System / Intrusion Prevention System

1.3.68 IEEE - Institute of Electrical and Electronic Engineers

1.3.69 IGMAC – International Glazing Manufacturers Association of Canada

1.3.70 IP – Internet Protocol

1.3.71 IMIT – Information Management Information Technology

1.3.72 ITIL – Information Technology / Telecommunication

1.3.73 KW – Kilowatt

1.3.74 KWH – Kilowatt hours

1.3.75 KV – Kilovolt

1.3.76 KVA – Kilovolt Ampere

1.3.77 LAN – Local Area Network

1.3.78 LCD – Liquid Crystal Display

1.3.79 LDRP – Labour Delivery Recovery and Post-Partum

1.3.80 LED – Light Emitting Diode

1.3.81 LEED – Leadership in Energy Efficient Design

1.3.82 Mb - Megabit

1.3.83 MCP – Motor Circuit Protector

1.3.84 MPI – Master Painters Institute

1.3.85 MSE – Mobility Service Engines

1.3.86 NCRP – National council on Radiation Protection and Measurement

1.3.87 NEMA - National Electrical Standards Association

1.3.88 NFCA – National Floor Covering Association

1.3.89 NFPA - National Fire Protection Association

1.3.90 NTSC – National Television Standards Committee

1.3.91 NWNA – National Woodworkers Manufacturers Association

1.3.92 OFDM – Orthogonal Frequency Division Multiplexing

1.3.93 OS&Y - Open Stem and Yoke

1.3.94 PACS - Picture Archiving and Communication System

1.3.95 PBX – Private Branch Exchange

1.3.96 PC – Personal Computer

1.3.97 PDA – Personal Digital Assistant

1.3.98 PDU - power distribution unit

1.3.99 PER – Primary (Communications) Equipment Room

1.3.100 PoE – Power Over Ethernet

1.3.101 PTZ – Pan Tilt Zoom

1.3.102 PVC – Polyvinyl Chloride

1.3.103 RFID – Radio Frequency Identification

1.3.104 RCDD – Registered Communications Distribution Designer

1.3.105 RTLS – Real Time Location System

1.3.106 SAGA - System of Approach Azimuthal Guidance

1.3.107 SER – Secondary (Communications) Equipment Room

1.3.108 SES – Safety Engineering Society

1.3.109 SIP – Session Initiated Protocol

1.3.110 SMACNA – Sheet Metal and Air Conditioning Contractors National Association

1.3.111 SMDR – Station Message Detail Recording

1.3.112 SNR – Signal to Noise Ratio

1.3.113 SQL – Structured Query Language

1.3.114 STC – Sound Transmission Coefficient

1.3.115 TCO – Total Cost of Ownership

1.3.116 TCP – Transmission Control Protocol

1.3.117 TDM – Time Division Multiplexing

1.3.118 THD -Total Harmonic Distortion

1.3.119 TLOF – Touchdown and Lift-off Area

1.3.120 TR – Telecommunications Room

1.3.121 TTMAC – Terrazzo and Tile Manufacturers Association of Canada

1.3.122 TVOC – Total Volatile Organic Compounds

1.3.123 TVSS Transient Voltage Surge Suppressor

1.3.124 UBC, FOM, - University of British Columbia, Faculty of Medicine

1.3.125 ULC - Underwriters' Laboratories of Canada

1.3.126 UPS – Uninterruptible Power Supply

1.3.127 USGBC – U.S. Green Building Council

1.3.128 V - Volt

1.3.129 VAR – Volt Ampere Reactive power

1.3.130 VFD - Variable Frequency Drive

1.3.131 VLAN – Virtual Local Area Network

1.3.132 VOC – Volatile Organic Compounds

1.3.133 VoIP – Voice Over Internet Protocol

1.3.134 WAN – Wide Area Network

1.3.135 WAP2 – Wireless Application Protocol 2

1.3.136 WLC – Wireless LAN Controllers

1.3.137 WMM – WiFi Multimedia

PART 2. GENERAL

2.1 Applicability of Specifications to the Facilities

This Schedule 3 and the Appendices attached to this Schedule 3 set out specifications for the Design and Construction of two facilities: the Campbell River Facility and the Comox Valley Facility. This Schedule is written as a single specification applicable to both Facilities. Each provision of this Schedule will be applicable to both the Campbell River Facility and the Comox Valley Facility, unless the provision expressly states that it applies only to the Campbell River Facility or to the Comox Valley Facility.

2.2 Project Overview

A brief overview of the two Facilities is set out below:

2.2.1 **Campbell River Facility**: The Campbell River Facility, which will be located on the site of the Existing Campbell River Hospital, will include:

2.2.1.1 an Acute Care Facility;

2.2.1.2 a separate or integrated Clinical Support Building;

2.2.1.3 a separate or integrated Energy Centre;

2.2.1.4 a Heliport;

2.2.1.5 surface and structured parking; and

2.2.1.6 associated works.

2.2.2 **Comox Valley Facility**: The Comox Valley Facility will be located on the Comox Valley Site which is a greenfield site next to the existing North Island College in Courtenay, B.C.. The Comox Valley Facility will include:

2.2.2.1 an Acute Care Facility;

2.2.2.2 a separate or integrated Clinical Support Building;

2.2.2.3 a separate or integrated Energy Centre;

2.2.2.4 a Heliport;

2.2.2.5 surface and structured parking; and

2.2.2.6 associated works.

2.3 Clinical Specifications

2.3.1 Clinical Specifications for each of the two Facilities are set out in Appendix 3A [Clinical Specifications] (the "**Clinical Specifications**"). Appendix 3A is written as a single specification applicable to both Facilities. Each provision of Appendix 3A will be applicable to both the Campbell River Facility and the Comox Valley Facility, unless the provision expressly states that it applies only to the Campbell River Facility or to the Comox Valley Facility.

2.3.2 Project Co will design and construct each Facility:

2.3.2.1 so that it accommodates all of the spaces, activities, functions, design features and adjacencies described in the applicable Clinical Specifications; and

2.3.2.2 in accordance with the requirements of the applicable Clinical Specifications, subject to any adjustments or refinements made in accordance with the Schedule 2B [User Consultation and Design Review].

2.4 Acute Care Facility

2.4.1 The Acute Care Facility will include the functional components identified in the Clinical Specifications.

2.5 Clinical Support Building

2.5.1 The functional components of the Clinical Support Building may be designed as a stand-alone building or integrated as part of the Acute Care Facility. If a stand-alone building, the Clinical Support Building must be physically attached to the Acute Care Facility, by corridor

links or otherwise, to facilitate staff and patient access. The Clinical Support Building will include the functional components and adjacencies identified in the Clinical Specifications.

2.6 Additional Rooms and Spaces

2.6.1 Notwithstanding anything in the Clinical Specifications, Project Co will design and construct each Facility to include all rooms and spaces as required to comply with the terms of this Agreement, including sufficient rooms and spaces as necessary for the operation and maintenance of the Facility and for Project Co to perform the Services in accordance with this Agreement.

2.7 UBC Faculty of Medicine Technology Enabled Learning Rooms

2.7.1 In addition to the requirements of this Schedule, Project Co will design and construct the UBC Small Seminar Room and the UBC Clinical Skills Room included in each Facility to meet the requirements of Appendix 3C [UBC Faculty of Medicine Technology Enabled Learning Room Specifications]. Refer also to the Clinical Specifications for additional information regarding UBC FOM spaces to be included in the Facilities. If there is a conflict between a provision of Appendix 3C [UBC Faculty of Medicine Technology Enabled Learning Room Specifications] and a provision of this Schedule (with respect to the UBC Clinical Skills Room or the UBC Small Seminar Room only), the provisions of Appendix 3C [UBC Faculty of Medicine Technology Enabled Learning Room Specifications] will govern.

2.8 Energy Centre

2.8.1 "**Energy Centre**" means the collection of rooms and exterior spaces housing the mechanical and electrical plant required for each Facility. The Energy Centre:

2.8.1.1 will be the location where all energy required by the Facility is either generated or distributed from a utility to the Facility;

2.8.1.2 may be designed as a stand-alone building or integrated into one of the Buildings on the Site; and

2.8.1.3 will provide energy capacity for the Facility, as well as provision to easily service the expansion of the Site as described in Section 4.1.3 without disruption to ongoing operations.

2.9 Heliport

2.9.1 Refer to Section 4.5.

2.10 Standards

2.10.1 Project Co will undertake the Design and Construction:

2.10.1.1 in accordance with the standards set out in this Schedule;

2.10.1.2 in accordance with the BC Building Code and all applicable Laws;

2.10.1.3 having regard for the concerns, needs and interests of:

2.10.1.3(1) all persons who will be Facility Users;

2.10.1.3(2) all Governmental Authorities; and

2.10.1.3(3) the community;

2.10.1.4 in accordance with Good Industry Practice; and

2.10.1.5 to the same standard that an experienced, prudent and knowledgeable long term owner of a high quality health care facility in North America operated publicly would employ.

2.10.2 If more than one of the above standards is applicable then the highest such standard will apply.

2.10.3 If Project Co wishes to make reference to a code or standard from a jurisdiction outside of Canada, then Project Co will demonstrate to the Authority's satisfaction that such code or standard meets or exceeds the requirements of this Schedule.

2.10.4 Without limiting Section 2.10.1 of this Schedule, Project Co will undertake the Design and Construction in compliance with all applicable standards, including:

2.10.4.1 ANSI / EIA

2.10.4.1(1) 568-B.1 & 568-B.2 (CSA-0T529-M95) Commercial Building Telecommunications Cabling Standard – Parts 1 & 2;

2.10.4.1(2) 568-B3 (CSA-T529-M95) Commercial Building Telecommunications Cabling Standard – Part 3;

2.10.4.1(3) 569-B (CSA-T530) Commercial Building Standard for Telecommunications Pathways and Spaces;

2.10.4.1(4) 606A (CSA-T528) Administration Standard for Telecommunications Infrastructure of Commercial Buildings; and

2.10.4.1(5) 607A (CSA-527) Commercial Grounding and Bonding Requirements for Telecommunications;

2.10.4.1(6) TIA/EIA 526-7 and TIA/EIA 526-14 standards for Optical Power Loss measurement of single mode and multimode fibre cable plant;

2.10.4.1(7) TIA/EIA – 606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings;

2.10.4.1(8) ANSIA/TIA/EIA – 607A (J-STD-607-A-2002) Commercial Building Grounding and Bonding Requirements for Telecommunications;

2.10.4.1(9) ANSI/TIA/EIA-758-A Customer Owned Outside Plant Telecommunications Cabling Standard;

2.10.4.1(10) ANSI/TIA-1179 Healthcare Facility Telecommunications Cabling Standard and all referenced documents;

2.10.4.1(11) BICSI TDM, TCIM, NTS, OSP and WD manuals.

2.10.4.2 ANSI/TIA

2.10.4.2(1) ANSI/TIA-942-2 Telecommunications Infrastructure Standard for Data Centers;

2.10.4.2(2) ANSI/TIA TSB-162 Telecommunications Cabling Guidelines for Wireless Access Points.

2.10.4.3 ANSI / ESNA American National Standard Practice for Lighting.

2.10.4.3(1) IESNA RP 29-06;

2.10.4.4 ASHRAE (American Society of Heating, Refrigeration and Air-Conditioning Engineers)

2.10.4.4(1) Handbooks: Fundamentals, Refrigeration, HVAC Systems and Equipment;

2.10.4.4(2) Design of Smoke Control Systems;

2.10.4.4(3) ASHRAE Guideline 12-2000 – Minimizing the Risk of Legionaellosis Associated with Building Water Systems;

2.10.4.4(4) 52.2: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size;

2.10.4.4(5) 55: Thermal Environmental Conditions for Human Occupancy;

2.10.4.4(6) 62.1: Ventilation for Acceptable Air Quality;

2.10.4.4(7) 90.1: Energy Efficient Design for New Buildings;

2.10.4.4(8) 111: Practices for Measurement, Testing, Adjusting and Balancing of Building HVAC systems;

2.10.4.4(9) 129: Measuring Air Change Effectiveness; and

2.10.4.4(10) 135: Data Communication Protocol for Building Automation and Control Network;

2.10.4.5 ANSI / ASME (American National Standards Institute / American Society of Mechanical Engineers)

2.10.4.5(1) A13.1 Visibility Standard (Pipe Labeling);

2.10.4.5(2) B16 Piping Component Standards;

2.10.4.5(3) B31 Pressure Piping Code;

2.10.4.5(4) B36 Piping Standards;

2.10.4.5(5) X358.1: Emergency Eyewash and Shower Equipment;

2.10.4.5(6) Section IX: Welding Qualifications; and

2.10.4.5(7) Unfired Pressure Vessels;

2.10.4.6 ASPE (American Society of Plumbing Engineers)

2.10.4.6(1) Plumbing Engineering Design Handbook, Volumes 1 – 4;

2.10.4.7 ASTM (American Society for Testing and Materials)

2.10.4.7(1) A185-06 - Standard Specification for Steel Welded Wire Fabric;

2.10.4.7(2) A82/A82M-05 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement;

2.10.4.7(3) ASTM C568-03 - Standard Specification for Limestone Dimension Stone;

2.10.4.7(4) ASTM C615-03 - Standard Specification for Granite Dimension Stone;

2.10.4.7(5) ASTM C503-05 - Standard Specification for Marble Dimension Stone;

2.10.4.7(6) ASTM C616-03 - Standard Specification for Quartz-Based Dimension Stone;

2.10.4.7(7) BCLS - BCSLA and BCLNA - BC Landscape Standard;

2.10.4.7(8) ASTM E917.24401-1 Life Cycle Cost Assessment Methodology; and

2.10.4.7(9) B88: Copper Piping;

2.10.4.8 CGA (Compressed Gas Association)

2.10.4.8(1) P-2.1: Recommendations for Medical / Surgical Vacuum Systems in Hospitals;

2.10.4.9 CAN ULC

2.10.4.9(1) S524 Standards for the Installation of Fire Alarm Systems; and

2.10.4.9(2) S537 Standards for Verification of Fire Alarm Systems;

2.10.4.10 CSA (Canadian Standards Association)

2.10.4.10(1) A23.3-04 (R2010) – Design of Concrete Structures;

2.10.4.10(2) B651-95: Barrier Free Design;

2.10.4.10(3) C9-02 Dry Type Transformers;

2.10.4.10(4) C22.1 & C22.2 Canadian Electrical Code as adopted in British Columbia;

2.10.4.10(5) C282 Emergency Electrical Power Supply for Buildings;

2.10.4.10(6) Z32.09 Electrical Safety and Essential Electrical System in Health Care Facilities;

2.10.4.10(7) Z317.5 Illumination Systems in Health Care Facilities;

2.10.4.10(8) Z318.5 Commissioning of Electrical Equipment and Systems in Health Care Facilities;

2.10.4.10(9) Z318.0-93: Commissioning of Health Care Facilities;

2.10.4.10(10) Z462-12 - Workplace Electrical Safety;

2.10.4.10(11) A23.4-09-Precast Concrete – Materials and Construction;

2.10.4.10(12) W186-M1990 (R2002) - Welding of Reinforcing Bars in Reinforced Concrete Construction;

2.10.4.10(13) A370-04 (R2009) - Connectors for Masonry;

2.10.4.10(14) A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete;

2.10.4.10(15) S832-06 (R2011) – Seismic Risk Reduction of Operational and Functional Components (OFCS of buildings);

2.10.4.10(16) S478-95 (R2007) Guideline on Durability of Buildings;

2.10.4.10(17) S413-07 - Parking Structures;

2.10.4.10(18) S16-09 - Design of Steel Structures;

2.10.4.10(19) S136-07 - Design of Cold Formed Steel Members;

2.10.4.10(20) S157-05 (R2010) – Strength Design in Aluminum;

2.10.4.10(21) S304.1-04 (R2010) - Masonry Design for Buildings;

2.10.4.10(22) Z317.1-09 Special requirements for plumbing installations in Health Care facilities;

2.10.4.10(23) Z314.7-03 Steam sterilizers for Health Care Facilities;

2.10.4.10(24) Z317.11-02 Area requirements for Health Care Facilities;

2.10.4.10(25) Z317-10.09 Handling of waste materials in Health Care Facilities and Veterinary Health Care Facilities

2.10.4.10(26) Z317.13-07 “Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities”;

2.10.4.10(27) CSA S832-06 Guidelines for Seismic Risk Reduction of Operational and Functional Components of Buildings;

2.10.4.10(28) B45 Series – 94: Plumbing Fixtures;

2.10.4.10(29) B64 Series 94: Backflow Preventers and Vacuum Breakers;

2.10.4.10(30) B52HB: Mechanical Refrigeration Code;

2.10.4.10(31) B125: Plumbing Fittings;

2.10.4.10(32) B139: Installation Code for Oil-Burning Equipment;

2.10.4.10(33) B149.1: Natural Gas and Propane Installation Code;

2.10.4.10(34) B651: Barrier Free Design;

2.10.4.10(35) Z317.1: Special Requirements for Plumbing Installations in Health Care Facilities;

2.10.4.10(36) Without limiting Section 2.10.1 of this Schedule, Project Co will undertake the Design and Construction in compliance with all applicable standards, including CSA Z317.2: Special Requirements for HVAC systems in Health Care Facilities, except as noted in Section 7.4.4.1(9);

2.10.4.10(37) Z318.0: Commissioning of Health Care Facilities; and

2.10.4.10(38) Z318.1: Commissioning of HVAC Systems in Health Care Facilities;

2.10.4.11 NFPA (National Fire Protection Association)

2.10.4.11(1) 10: Standard for Portable Fire Extinguishers;

2.10.4.11(2) 13: Standard for Installation of Sprinkler Systems;

2.10.4.11(3) 14: Standard for Installation of Standpipe and Hose Systems;

2.10.4.11(4) 17: Standard for Dry-Chemical Extinguishing Systems;

2.10.4.11(5) 20: Standard for the Installation of Stationary Pumps for Fire Protection;

2.10.4.11(6) 55: Compressed Gases and Cryogenic Fluids Code;

2.10.4.11(7) 90A: Standard for Installation of Air Conditioning and Ventilation Systems;

2.10.4.11(8) 92A: Standard for Smoke Control Systems Utilizing Barriers and Pressure Differences;

2.10.4.11(9) 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; and

2.10.4.11(10) 101: Life Safety Code;

2.10.4.12 USP <797> Guidebook to Pharmaceutical Compounding – Sterile Preparations;

2.10.4.13 Canadian Society of Hospital Pharmacists Guidelines for the preparation of sterile products in Pharmacies;

2.10.4.14 British Columbia Insulation Contractors Association (BCICA) Quality Standards Manual for Mechanical Insulation;

2.10.4.15 City of Vancouver District Energy Connectivity Standards;

2.10.4.16 IEEE

2.10.4.16(1) 802.1 series for Interworking, Security, Audio/Video Bridging and Data Centre Bridging;

2.10.4.16(2) 802.3 series of Ethernet Standards;

2.10.4.16(3) 802.11 series of Wireless Standards;

2.10.4.16(4) 802.15 series of Wireless Standards; and

2.10.4.16(5) IEEE 519-1992 Harmonic Limits;

2.10.4.17 NETA

2.10.4.17(1) ATS International Electrical Testing Association (Acceptance Testing Specifications); and

2.10.4.17(2) MTS Standards for Maintenance Testing;

2.10.4.18 NETA

2.10.4.18(1) UL 1069 Hospital Signaling and Nurse Call Equipment;

2.10.4.19 ECABC Seismic Restraint Standards Manual;

2.10.4.20 BICSI Telecommunications Distribution Methods Manual (TDMM);

2.10.4.21 Master Municipal Construction Document (MMCD) and MMCD supplemental specifications, as authored or adopted by the applicable municipal authorities having jurisdiction;

2.10.4.22 Ministry of Transportation and Infrastructure (MoTI) Standard Specifications for Highway Construction (latest edition);

2.10.4.23 BC Supplement to TAC Geometric Design Guide;

2.10.4.24 Guidelines for Design and Construction of Health Care Facilities;

2.10.4.25 TP-312 – Transport Canada Aerodrome Standards and Recommended Practices;

2.10.4.26 ICAO / Annex 14, Volume II;

2.10.4.27 NFPA 70B Recommended Practice for Electrical Equipment Maintenance;

2.10.4.28 Canadian Aviation Regulations Standard 325 – Heliports;

2.10.4.29 British Columbia Ministry of Health and Ministry of Seniors Standards and Hospital Based Psychiatric Emergency Services.

2.10.5 CSA Z8000-11: Canadian Health Care Facilities

2.10.5.1 CSA Z8000-11 complements the standards and codes specified in Schedule 3 by providing overarching design principles and referencing specific standards and codes that are appropriate for healthcare facility design.

2.10.5.2 Project Co will:

2.10.5.2(1) refer to CSA Z8000-11 for design guidance to resolve issues not otherwise addressed in Schedule 3; and

2.10.5.2(2) comply with:

2.10.5.2(2)(a) any minimum standards and codes referenced in CSA Z8000-11 (except for any minimum space requirements that may be required by those standards and codes); and

2.10.5.2(2)(b) all infection control provisions set out in CSA Z8000-11; and

2.10.5.2(2)(c) section 7.8.8 (Accommodation of Bariatric Persons) of CSA Z8000-11.

2.11 Indicative Design

2.11.1 The Authority's architectural and engineering consultants undertook an indicative design for each Facility (the "**Indicative Design**"). The Indicative Design was based on a preliminary draft of the Clinical Specifications and also reflects preliminary consultations with potential Facility Users. Drawings describing the Indicative Design for each Facility have been made available to Project Co.

2.11.2 Project Co may use the Indicative Design as a basis for its design, but the Authority makes no representation as to the accuracy or completeness of any aspect of the Indicative Design.

2.11.3 Project Co will be completely responsible for all aspects of the Design and Construction whether or not it uses all or any part of the Indicative Design, and Project Co will independently verify the accuracy of any information contained in or inferred from the Indicative Design if Project Co uses any of such information in its design.

PART 3. DESIGN GUIDELINES AND PRINCIPLES

3.1 Design Guidelines

3.1.1 Attached as Appendix 3I [Design Guidelines] are the "North Island Hospitals Design Guidelines" that the Authority has agreed to with the City of Courtenay and the City of Campbell River. Project Co will design the Facilities in compliance with Appendix 3I [Design Guidelines].

3.2 Project Design Principles

3.2.1 Project Co will apply the design principles described in Sections 3.3 to 3.12 of this Schedule (collectively, the "**Project Design Principles**") in undertaking the Design.

3.2.2 In addition to the descriptions of these principles in this Part 3, specific requirements related to these principles are included in Parts 4 – 6 of this Schedule.

3.2.3 The Project Design Principles are integrated principles and Project Co will apply them on an integrated basis throughout the Design and Construction.

3.3 Master Planning

3.3.1 Project Co will design the Facilities to:

3.3.1.1 have a strong urban presence and a distinctive architectural character, reflecting the Authority's values and role as the major centre for health in the community;

3.3.1.2 support community access and include a visible main entry and lobby for the Facility and a direct access route to the Emergency Department main entry; and

3.3.1.3 reflect logical planning and clarity of circulation.

3.3.2 Project Co will consider all design decisions within the context of enhancing each Site.

3.4 Evidence Based Design

3.4.1 Project Co will apply Evidence Based Design methodologies in undertaking the Design.

3.4.2 "**Evidence Based Design**" means that decisions about the design of the Facility will be based on credible research, information derived from comparable projects, and information about Authority operations, in order to achieve the best possible outcomes. The goal of Evidence Based Design is to deliver measurable improvements (for example in the Authority's patient and workflow outcomes, productivity, economic performance, and customer satisfaction).

3.5 LEAN Design

3.5.1 Project Co will design the Facilities:

3.5.1.1 to facilitate the delivery of efficient and effective workflow and processes;

3.5.1.2 to eliminate waste, within both clinical and non-clinical service delivery processes;

3.5.1.3 to recognize the value to the Authority of LEAN healthcare (or equivalent methodologies) in supporting the delivery of Authority activities, and accordingly allow the findings from such methodologies to play a key role in influencing design decisions;

3.5.1.4 to include ergonomic design features throughout all spaces that specifically facilitate the physical activities of staff and patients, including, for example, appropriate millwork, lighting, lift devices, and patient assist or equipment manoeuvring space; and

3.5.1.5 to support innovative and collaborative methods of working, to help incorporate the Authority's new and emerging technologies, to respond to diverse work styles (such as hoteling and job-sharing), and to optimize flexibility and space utilization. A key element to the development of an integrated workplace is the

provision of physical environments that support varied workplace strategies. Accordingly, Project Co will design workplaces to:

3.5.1.5(1) include standardized spaces, systems furniture and casework where appropriate;

3.5.1.5(2) provide floor lay-outs that accommodate teams as well as individuals, and that support mobile employees who require flexibility and use portable technology; and

3.5.1.5(3) consider co-location options, space saving strategies, and lay-outs and furniture that facilitate change.

3.6 Healing Environment

3.6.1 Project Co will design the Facilities:

3.6.1.1 to promote a healing and wellness environment for patients and their families. The environment will be welcoming for the community of users and provide non-clinical spaces to relax and de-stress;

3.6.1.2 to promote and enhance Patient Centred Care. "**Patient Centred Care**" is a standard of care that emphasizes the individual needs of each patient and treats them with respect and dignity, enabling them to participate integrally in their own care process within an environment that recognizes and respects the essential role of the patient's family or supporters;

3.6.1.3 to provide an environment that supports excellence and innovation in the delivery of safe, high quality healthcare and where employees, physicians and others can work together collaboratively in promoting health and wellness;

3.6.1.4 to include elements that have been proven to create a therapeutic and low stress environment;

3.6.1.5 to create a comfortable, functional environment for employees, physicians, patients, patients' families and others, by including, as tools for creating an environment that will support and distract patients of all ages and their families:

3.6.1.5(1) design elements that minimize noise, maximize natural light while providing light control, and use natural materials;

3.6.1.5(2) design elements that maximize connection to the outdoors, views of the exterior environment in all inpatient rooms, meeting rooms, staff lounges and similar locations;

3.6.1.5(3) design elements that allow for maximum family interaction;

3.6.1.5(4) design features such as sound and music, color, pattern, air quality, nature;

3.6.1.5(5) design features such as art and aesthetic forms that reflect Aboriginal cultures of northern Vancouver Island, community history and values, and incorporate the work of local artists.

3.6.1.5(6) design features that are sensitive to regional population diversity including local Aboriginal cultures;

3.6.1.6 to utilize views to create an visually pleasing environment, including:

3.6.1.6(1) maintaining existing views and encouraging new views where possible through the use of view corridors , the terracing of Building forms and the creation of appropriate public spaces;

3.6.1.6(2) situating Buildings to utilize “near views” of public spaces, natural and landscaped areas on-Site and off-Site as well as Site specific views such as the Discovery Passage at the Campbell River Site and nature views at the Comox Valley Site;

3.6.1.6(3) considering on-Site views as well off-Site views at all stages of the design process; and

3.6.1.6(4) minimizing negative visuals such as blocking views and creating unwanted sun shadows.

3.7 Elderly Friendly

3.7.1 Project Co will design the Facilities to create an elderly friendly environment. Project Co will comply with “Code Plus: Physical Design Components for an Elder Friendly Hospital, 2009”, which identifies components that are known to contribute adverse effects on functional ability and safety in older adults, and additional physical design elements that go beyond industrial building codes and standards together with corresponding recommendations for elderly friendliness.

3.7.2 Project Co will design the medical surgical inpatient units included in the Facilities so that they are appropriate for patients with dementia.

3.8 Standardization

3.8.1 Project Co will design the Facilities:

3.8.1.1 using a standardized approach for the overall design of both Facilities so that both Facilities are as similar as is possible in the planning and design of building form and mass, systems, services, functional relationships, and Site layout, provided that certain differences will be necessary due to the differences between the Sites and the Clinical Specifications;

3.8.1.2 to, wherever appropriate, apply standardization to reduce errors and improve quality of service delivery (for example to assist caregivers in quickly accessing rooms and equipment, patient treatment modules should contain a number of

standard room types and room details, including controls and control locations); and

3.8.1.3 so that rooms in the two Facilities that have the same function (for example operating rooms) will be designed and constructed to be as similar as possible, subject to any different requirements set out in the Clinical Specifications.

3.9 Sustainability

3.9.1 In addition to the requirement to achieve LEED Gold Certification in accordance with the provisions in Schedule 2 [Design and Construction Protocols], Project Co will:

3.9.1.1 design the Facilities using design methods, building materials, operational practices, energy and life cycle considerations that promote environmental quality, social benefits and economic vitality throughout the Construction and Operating Periods, including by minimizing the Authority's operating costs (for example in relation to utilities and carbon taxes);

3.9.1.2 design the Facilities:

3.9.1.2(1) to give priority to efficient use of resources, protection of health and indoor environmental quality;

3.9.1.2(2) to take advantage of efficiencies and innovations that may be possible through integration of systems to minimize operational costs for the Authority (for example in relation to utilities and carbon taxes); and

3.9.1.2(3) considering alternative sources of energy, explore opportunities for recovering waste heat, and consider the development of biomass cogeneration;

3.9.1.2(4) to apply a total systems approach to minimize energy consumption and incorporate energy consumption management techniques that are targeted to stabilize and optimize energy flows.

3.10 Technology

3.10.1 Project Co will design the Facilities so that they utilize technology to improve cost effectiveness, integrate services and achieve better health outcomes.

3.11 Adaptability, Flexibility and Expansion

3.11.1 Project Co will design the Facilities:

3.11.1.1 to meet the needs of patients, visitors, employees, physicians, volunteers, learners, researchers and teachers now and into the future;

3.11.1.2 to accommodate the rapid cycle of innovation and change to support development and implementation of new clinical and non-clinical work processes and technology change;

3.11.1.3 to accommodate program, service, work and equipment change with minimized utility infrastructure and Facility impact, including down time, and so that clinical areas are acuity adaptable;

3.11.1.4 to support future expansion of components, and capacity as a whole, including planning zones for growth, loose fit design to optimize functionality within a given floor area, and multi-use adaptable space; and

3.11.1.5 with an infrastructure that incorporates excess systems capacity and includes systems and components that support future expansion with minimized disruption and allows for upgrades in Authority technology or technological progression; and

3.11.1.6 utilizing open planning to create soft zones responsive to rapid change and growth by use of modular fit out.

3.11.2 In addition to the general specifications of Section 3.11.1, Project Co will design the Campbell River Facility:

3.11.2.1 such that one of the Diagnostic Imaging General Interventional rooms meets the structural loading requirements for its current use and has the potential to be converted to an MRI area in the future, including:

3.11.2.1(1) clear routing for the installation of a quench vent;

3.11.2.1(2) appropriately designed clear access, plus structural capacity, for convenient delivery and installation of an MRI unit; and

3.11.2.1(3) adequate mechanical and electrical capacity to accommodate the MRI unit.

3.12 Accessible Design

3.12.1 Project Co will incorporate the following philosophies in the Design to address barriers to equitable access to healthcare such as cultural diversity, physical capability and gender:

3.12.1.1 Equitable use – the Design will be easy to use by people with diverse abilities;

3.12.1.2 Flexibility in use – the Design will accommodate a wide range of individual preferences and abilities;

3.12.1.3 Simple and intuitive – the Design will be easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level;

3.12.1.4 Perceptible information – the Design will communicate necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities;

3.12.1.5 Tolerance for error – the Design will minimize hazards and the adverse consequences of accidental or unintended actions;

3.12.1.6 Low physical effort – the Design is capable of being used efficiently and comfortably and with a minimum of fatigue; and

3.12.1.7 Size and space for approach and use – the Design will use provide appropriate size and space for approach, reach, manipulation, and use regardless of user's body size, posture or mobility.

3.12.2 Respect for Aboriginal Cultural Values

3.12.2.1 Project Co will demonstrate respect for Aboriginal cultural values represented by Aboriginal groups of northern Vancouver Island throughout the development and design of the Facilities.

3.12.2.2 Project Co will incorporate visible representation of Aboriginal culture into the design of the Facilities and Sites.

3.12.2.3 Site landscaping will incorporate cultural elements such as wood sculptures, wood poles, and indigenous plants used for traditional healing.

3.12.2.4 Interior programmatic spaces will be sized and placed appropriately to allow for cultural activities such as: an all nations healing room to facilitate small group (i.e. 10 – 15 people) cultural ceremonies, access to the exterior from patient rooms, extended family involvement in care, preparation of food and multigenerational involvement, adequate office space for an Aboriginal liaison nurse to meet with a patient and their family.

3.12.2.5 Language and names on major exterior and interior signage will reflect the local culture and be translated into local languages as appropriate.

3.12.2.6 At the Campbell River Facility, provide Aboriginal design features reflecting and representing the Aboriginal groups of northern Vancouver Island and the surrounding area in the following functional component areas:

3.12.2.6(1) Maternal Newborn Pediatric Unit;

3.12.2.6(2) Emergency Department;

3.12.2.6(3) Ambulatory Care/Day Programs;

3.12.2.6(4) Surgical Services;

3.12.2.6(5) Central Patient Registration;

3.12.2.6(6) Diagnostic Intake;

3.12.2.6(7) Specimen Collection Services; and

3.12.2.6(8) two Labor, Delivery, Recovery and Postpartum Rooms, which will be designated as Aboriginal Labor, Delivery, Recovery and Postpartum Rooms.

Consult with the Aboriginal Working Group to identify and articulate the specific design and requirements.

3.12.3 Reference to Local History and Heritage

3.12.3.1 Project Co will design the Facilities:

3.12.3.1(1) in a manner that demonstrates respect for the local history and heritage of the Comox Valley or Campbell River, as applicable; and

3.12.3.1(2) to include design elements and display opportunities that will identify, reinforce and educate visitors to the Facilities of the unique history and heritage of the Comox Valley or Campbell River community, as applicable;

PART 4. SITE DEVELOPMENT REQUIREMENTS

4.1 Master Site Plan

4.1.1 Project Co will develop and submit to the Authority a master site plan ("**Master Site Plan**") for each Site, based on the master planning principles described in Section 3.3 and the Site development requirements described in this Section 4.1.

4.1.2 The Master Site Plans will illustrate the Site context and development opportunities to validate the Facility siting.

4.1.3 The Master Site Plans will contemplate future expansion at the Sites. Project Co will locate the Facilities and design the Master Site Plans to allow for:

4.1.3.1 a 6,000 m^2 footprint for acute care space expansion at the Comox Valley Site (including all required parking for the expansion);

4.1.3.2 a 4,000 m^2 footprint for acute care space expansion at the Campbell River Site (including the required parking for the expansion); and

4.1.3.3 a 100% area and volume expansion of the Energy Centre at both Sites. This expansion space will be contiguous to the Energy Centre.

4.1.4 Each Master Site Plan will:

4.1.4.1 describe in detail the implementation of all phased development at the Site, including describing the demolition at the Campbell River Site;

4.1.4.2 ensure that each component of the Facilities is an integrated part of its Site, facilitating the delivery of clinical and non-clinical support services (for example though efficient physical links and service connections between Buildings), enhancing the ability of these to function in a cohesive manner;

4.1.4.3 indicate the access needed for replacing major components required for the Facility, as well as for adding major components at a future date;

4.1.4.4 provide a Site servicing, parking and traffic master plan to accommodate the expansion capacity described in Section 4.1.2;

4.1.4.5 illustrate the expansion areas described in Section 4.1.3; and

4.1.4.6 illustrate the area capable for use in a mass casualty event as described in Section 5.3.9.

4.1.5 The Master Site Plan for the Campbell River Facility will reflect the redevelopment of a site currently in use, including the demolition of the Existing Campbell River Hospital.

4.1.6 The Master Site Plan for the Comox Valley Facility will:

4.1.6.1 reflect the development of a greenfield site;

4.1.6.2 define expansion areas on the greenfield site;

4.1.6.3 integrate the pedestrian pathways and emergency access routes developed in the Interface Zone;

4.1.6.4 include direct and logical pedestrian connections between the interface pathways and the main Buildings' entries; and

4.1.6.5 meet and match the grades along the edge of the Interface Zone.

4.2 Urban Design and Site Development

4.2.1 General

4.2.1.1 Minimize the impact of Site development and Facility placement on adjacent neighbours and land uses. Preserve visual privacy and sunlight for adjacent properties and buildings, and include features that will give the Facility an appropriate identity in the overall urban context.

4.2.1.2 Retain as many existing trees on the Sites as possible to reduce the impact of the Facility on its neighbourhood context and to contribute to the natural healing environment for patients, visitors and staff.

4.2.1.3 Minimize the adverse micro-climatic effects arising from the location and configuration of parking, walkways and Buildings, including effects of Building entrance orientation on patient, staff and visitor comfort and safety. Provide smooth transitions between Building green space and public sidewalks.

4.2.1.4 Reinforce the physical relation of the structures with the major streets and create a legible site layout and pattern to foster a strong sense of place and identity and to ease increased vehicular and pedestrian penetration of the Sites.

4.2.1.5 Design for maximum access to the Facility. Provide separate and distinct passenger-side drop-off areas at each of the main entrances to the Buildings and the Emergency Department walk-in entrance.

4.2.1.6 Cover passenger-side drop-off areas at each of the main entrances to the Buildings and the Emergency Department walk-in entrance.

4.2.1.7 Mitigate the nearby noise from adjacent roadways and the Heliport through the use of exterior glazing and other acoustic screening.

4.2.1.8 Create meaningful open spaces both urban and natural for the benefit of patients, visitors and staff which provide opportunities for recreation and contribute to a cohesive, healthy community; capitalize on opportunities for outdoor areas of respite and repose to aid in providing a healing environment.

4.2.1.9 Design landscape and circulation routes to have clear unobstructed views of surrounding areas for safety surveillance.

4.2.1.10 Common facilities and/or areas must be grouped so that each facility or area be automatically monitored by the constant presence of users of facilities or areas.

4.2.1.11 Screen from view from the street, as much as possible, all refuse/recycling areas, shipping, loading or utility areas, satellite dishes, outdoor vents, mechanical equipment, transformers and other similar structures. Located these visual screening items so that they also serve as noise screens for components that generate outdoor noise including transformers, mechanical equipment and shipping / loading areas. Design the enclosure of the outdoor refuse/recycling areas to coordinate with the overall design of the Site.

4.2.1.12 Provide easy access to garbage and recycling bins, and contained such bins within roofed/walled enclosures, or screen them from public view.

4.2.1.13 For the Comox Valley Site, retain and integrate the design of the Interface Zone with the rest of the landscape design.

4.2.2 Pedestrian and Vehicular

4.2.2.1 Create a high-quality, vibrant, pedestrian-friendly environment, including by tying the sidewalks and pathways to existing sidewalks and pathways adjacent to the Site, including the City's and, at the Comox Valley Site, the Interface Zone's.

4.2.2.2 Design for the functional separation of traffic for emergency vehicles, visitors, staff and service vehicles, and to minimize public and service vehicle traffic interference with ambulance and other emergency vehicle access to the Site.

4.2.2.3 Integrate vehicular circulation with layout of pedestrian and bicycle zones throughout the Site to provide visible connections, promote safe travel, and to minimize conflict between vehicles and other modes of travel. Design the driveways to provide connections between the surrounding roads and the main entrances to the Buildings. Design vehicular service entrances so that they are integrated into the Building design with minimal visual impact.

4.2.2.4 Provide safe pedestrian crossings that are clearly designated using pavement markings and signage. In areas where a high volume of pedestrian crossings is expected, provide for changes in surface material (such as from asphalt to Portland cement, for example).

4.2.2.5 Create access for the mobility impaired (including people with baby strollers) by providing paths of travel with a minimum clear width of 1.5 m connecting all open space areas.

4.2.2.6 Provide pedestrian routes that are fully accessible by the disabled community. The primary pedestrian systems, public open space, walkways and entrances to the Facility must be universally accessible to the physically challenged and be elderly friendly. Design features which segregate circulation / areas / uses for people with disabilities from typical public usage are discouraged, except where required due to reasons of safety or due to space limitations.

4.2.2.7 Provide curb-cuts or curb let-downs in appropriate locations to facilitate convenient and direct access from the parking space(s) to the Building(s) for people with disabilities.

4.2.2.8 Provide clear, direct pedestrian routes that are unimpeded by parked or moving vehicles.

4.2.2.9 Provide walking trails around the perimeter of the Site and pedestrian access throughout the interior of the Site. Surface of walking trails must be wheelchair accessible (e.g. compacted gravel, 'Fibar' type playground surfacing (engineered wood fiber), asphalt).

4.2.2.10 Use traffic calming measures (e.g. curb bulges) to minimize roadway pavement width at pedestrian crosswalks.

4.2.2.11 Pedestrian routes within and to/from parking facilities must be clearly delineated and logical in terms of directness.

4.2.2.12 Provide paving and landscape treatments to further identify and enhance the pedestrian movement.

4.2.2.13 The pathway system will incorporate landscape treatments with trees and benches, lighting, and distinct paving where appropriate. The pathway system must also be wide enough for wheelchairs / scooters and will include a tactile strip for the visually impaired wherever possible.

4.2.2.14 Minimize grade changes for drop curbs and raised crossings. Drop curbs aligned to pedestrian crossings.

4.2.2.15 All walkways and other paved areas must have positive drainage to shed rain water quickly with minimum side slope gradients of 2%.

4.2.2.16 Minor walkways must be at least 1.5 m (5ft.) wide.

4.2.2.17 Major walkways must be wide enough to allow for two people walking side by side and someone passing (i.e. minimum 2.5 m (8.2ft.) wide).

4.2.2.18 Provide lighting on all pathways, including pedestrian-scale lighting at the Interface Zone pathway. The Authority will provide two light pole bases and conduit for lighting within the Interface Zone (refer to Interface Zone drawings made available by the Authority). Light poles, fixtures and electrical service will be provided by Project Co.

4.2.3 Public Realm and Open Space

4.2.3.1 Design and construct the Facility with consideration for the legibility, quality and consistency of the overall treatment of the public realm, including public open space, pedestrian corridors and streets, to achieve the urban design objective for a unified and attractive built environment.

4.2.3.2 Provide a hierarchy of open spaces as follows:

4.2.3.2(1) public open spaces;

4.2.3.2(2) private open spaces; and

4.2.3.2(3) for the Comox Valley Facility, private and secure open space for the Mental Health Unit /Psychiatry Unit).

4.2.3.3 Achieve segregation between different open spaces through landscape barriers such as fencing, walls, hedges and planting.

4.2.3.4 Situate Buildings so that they maximize the availability of sunlight in exterior and open spaces and areas of high pedestrian use. Maximize sunlight exposure for private and secure open spaces.

4.2.4 Community Noise Protection

4.2.4.1 Orientate the Facility on the Site so that the noise impact of emergency and service vehicles, helicopter activity and new traffic routes will be minimized on the existing residential areas.

4.2.4.2 Strategically locate and / or silence mechanical and electrical equipment, outside air intake and discharge openings and emergency generators' engine exhausts.

4.2.4.3 Design and construct the Facility so that noise levels from mechanical and electrical equipment at the nearest residential property lines do not exceed:

4.2.4.3(1) 50 dBA at night; and

4.2.4.3(2) 60 dBA during the day.

4.2.4.4 Ensure that electrical and mechanical noise levels in outdoor patient lounge areas and public sidewalks do not exceed 50 dBA.

4.2.5 Site Wayfinding and Exterior Signage

4.2.5.1 Provide Site wayfinding and exterior signage in accordance with Appendix 3I [Wayfinding and Signage]

4.2.5.2 Provide a signage master-plan for approval by the Authority.

4.2.5.3 Arrange pedestrian pathways to ease wayfinding and create an amenable environment for pedestrians through the use of coordinated methods of wayfinding which inform people of routes through the Sites to specific Buildings and entries or to the major street and transit nodes. Encourage pedestrians to avoid unsafe vehicle roads by providing well-signed alternative pedestrian routes. Utilize paving patterns which can easily be differentiated from vehicular paving by pedestrians where they cross vehicular traffic to access the emergency department and main entrance.

4.2.5.4 Provide visually connected pathways and integrated plazas to facilitate wayfinding.

4.2.5.5 Provide external directional signage that:

4.2.5.5(1) clearly identifies the Facility and its components including the emergency department, main entry drop off area, and public and staff parking;

4.2.5.5(2) clearly indicates points of access for the public, parking areas and restrictions for various vehicle types and restrictions to 'after-hours' access; is well illuminated, backlit, reflective or high contrast and easily visible at night; and

4.2.5.5(3) minimizes light spillage.

4.2.5.6 Wayfinding must start at the Site property line with freestanding illuminated exterior signage located at each prominent Site entry location. Supplement these entry signs with free standing signage structures located to give overall direction within the Site. These illuminated exterior signs must have an overall Site plan and have some weather protection for standing viewers.

4.2.5.7 Locate site banner signs at strategic landscaped locations to advertise hospital events and fundraising campaigns.

4.2.5.8 Overall Site parking signage is required to follow consistent design intent for the Site.

4.2.5.9 Provide all necessary exterior illuminated signage to direct traffic from the access streets. Design and construct such signage so that it is visible for drivers of vehicles to identify at a far enough distance so that they can safely slow down and follow the signage to enter the Facility and the parking areas.

4.2.6 Site Lighting

4.2.6.1 Provide lighting for public outdoor spaces and the adjacent private property to create an unobtrusive, human scale lighting concept, with a hierarchy of fixture types designed according to functional and security needs (including CPTED), and reflecting the hierarchy of pedestrian corridors.

4.2.6.2 Luminaires within 5 metres of grade will be vandal resistant.

4.2.6.3 Lighting on pedestrian paths will illuminate not just the path but also the surrounding area adjacent to the path particularly en route to transit connections.

4.2.6.4 Provide lighting to facilitate ease and safety of pedestrian access to public transit.

4.2.7 Landscape

4.2.7.1 Provide landscape for the complete Site that contributes to a liveable, healthy and responsive community.

4.2.7.2 Provide elements including therapeutic gardens, exterior rehabilitation areas, areas of refuge including covered seating, handrails along pathways and landscape features for the enjoyment of staff and visitors.

4.2.7.3 Minimize grade changes for drop curbs and raised crossings. Drop curbs aligned to pedestrian crossings.

4.2.7.4 Provide streetscape treatments (e.g. street trees, boulevards and sidewalks) to City guidelines and standards (as a minimum). Verify streetscape requirements with the local municipalities. Reinforce and enhance an image of the cities of Campbell River and Courtenay, as applicable, through the preservation of mature vegetation.

4.2.7.5 Provide landscape site plans for the complete Site. Landscape plans to be prepared by a BCSLA (British Columbia Society of Landscape Architects) registered landscape architect.

4.2.7.6 Installation of the landscape to be supervised and approved by a BCSLA registered landscape architect.

4.2.7.7 If a landscape irrigation system is provided:

4.2.7.7(1) the system must be designed by a certified IIABC (Irrigation Industry Association of British Columbia) irrigation designer; and

4.2.7.7(2) the installation of the system must be supervised and approved by a certified IIABC irrigation designer.

4.2.7.8 Maximize the amount of landscape areas on the Site and minimize the amount of impervious surfaces to increase the natural absorption rate of storm water, targeting a goal of 25% of the Site to have soft landscape, including trees, shrubs, groundcover and grass.

4.2.7.9 See 8.1.8 and 8.2 for detailed descriptions of planting and street furniture suggestions and requirements.

4.2.8 Site Safety Through Design

4.2.8.1 Public spaces will be distinguishable from private spaces. Design and locate symbolic barriers throughout the Site. Symbolic barriers will include landscaping (such as changes in paving, vegetation or grade) and/or architectural features (such as low walls, bollards and raised planters) rather than continuous solid fences or walls.

4.2.8.2 Design the exteriors of the Sites so that there are opportunities for people to easily view what is happening around them during the course of their everyday activities.

4.2.8.3 Eliminate entrapment spots. Incorporate barriers that permit visual access without loss of privacy such as glazing in lobby doors and stairwells.

4.2.8.4 Promote the “eyes on the street” concept by using windows, doors, and activity generators such as seating or fountains. Windows will be visible from the street and not hidden by vegetation or other items.

4.2.8.5 Incorporate CPTED principles in the design of all exterior areas of the Sites.

4.3 Parking

4.3.1 General

4.3.1.1 Project Co will provide parking for both Facilities in accordance with the requirements of this Schedule and all applicable standards.

4.3.2 Facility Specific Requirements

4.3.2.1 For the Campbell River Facility

4.3.2.1(1) provide 408 vehicle parking stalls as follows:

4.3.2.1(1)(a) 265 stalls for physicians and staff;

4.3.2.1(1)(b) 143 stalls for patients and visitors, including at least 13 parking stalls for disabled persons;

4.3.2.1(1)(c) included in the 408 vehicle parking stalls, provide the following:

(c).1 40 stalls adjacent to the Emergency Department entrance; and

(c).2 70 stalls adjacent to the Ambulatory Care entrance,

provided that these numbers and the stall locations are subject to adjustment under the user consultation and design review process;

4.3.2.1(2) in addition to the 408 parking stalls required above, provide:

4.3.2.1(2)(a) 2 handyDART bus transit stops on Site, 4 main door drop off spaces and 1 taxi stand;

4.3.2.1(2)(b) 3 dedicated parking stalls for ambulances (covered) and 1 dedicated stall for police, adjacent to the emergency department;

4.3.2.1(2)(c) 2 emergency department patient drop off spaces;

4.3.2.1(2)(d) 30 motorcycle parking stalls and any additional motorcycle parking stalls as may be required by the City;

4.3.2.1(2)(e) secured, long-term bicycle parking for 50 employee bicycles as described in Section 4.3.8; and

4.3.2.1(2)(f) unsecured, short-term bicycle parking for 30 bicycles as described in Section 4.3.8.

4.3.2.2 For the Comox Valley Hospital

4.3.2.2(1) provide 655 vehicle parking stalls as follows:

4.3.2.2(1)(a) 425 stalls for physicians and staff;

4.3.2.2(1)(b) 230 stalls for patients and visitors, including at least 24 stalls for disabled persons;

4.3.2.2(1)(c) included in the 655 vehicle parking stalls, provide the following:

(c).1 50 stalls adjacent to the Emergency Department entrance;

(c).2 85 stalls adjacent to the Ambulatory Care entrance,

provided that these numbers and the stall locations are subject to adjustment under the user consultation and design review process;

4.3.2.2(2) in addition to the 655 parking stalls required above, provide:

4.3.2.2(2)(a) 2 handyDART bus transit stops on site, 10 main door drop-off spaces (10 min limit) and 2 taxi stands;

4.3.2.2(2)(b) 3 dedicated parking stalls for ambulances (covered) and 1 dedicated stall for police, adjacent to the emergency department;

4.3.2.2(2)(c) 3 emergency department drop off spaces;

4.3.2.2(2)(d) 50 motorcycle stalls and any additional motorcycle parking stalls as may be required by the City;

4.3.2.2(2)(e) secured, long-term bicycle parking for 50 employee bicycles as described in Section 4.3.8; and

4.3.2.2(2)(f) unsecured, short-term bicycle parking for 30 bicycles as described in Section 4.3.8.

4.3.3 Parking Stall Sizes

4.3.3.1 Parking stalls will comply with the following:

4.3.3.1(1) minimum parking stall dimensions will be 6.0 m x 2.8 m, provided that:

4.3.3.1(1)(a) a maximum 10% of the total stalls may be for small cars and have minimum dimensions of 5.0 m x 2.4 m;

4.3.3.1(1)(b) pick up and drop off areas, minimum stall dimensions will be 6.0 m x 3.5 m; and

4.3.3.1(1)(c) minimum dimensions for handicap stalls will be per the respective municipal authorities; and

4.3.3.1(2) minimum drive aisle widths will be 7.0 m.

4.3.4 Structured Parking

4.3.4.1 Project Co will provide structured parking (which may be either underground parking or a parkade) for each Site as follows:

4.3.4.1(1) provide structured parking for a minimum of 178 stalls on the Campbell River Site; and

4.3.4.1(2) provide structured parking for a minimum of 357 stalls on the Comox Valley Site.

4.3.4.4 If a parkade is provided, the parkade's lowest level will be approximately 2.4 m below grade to minimise the parkade's height.

4.3.4.5 Structured parking must not front public streets (including the North Island College east access road) at grade.

4.3.4.6 Where possible, structured parking will be located at the rear of the Site or beneath Buildings.

4.3.4.7 The entry of structured parking must be located a sufficient distance from the public street to prevent parking queues from extending onto the street. At the exit of structured parking, a minimum distance of two car lengths must be provided between the exit and the street edge to accommodate cars waiting to enter the traffic stream.

4.3.4.8 At the Comox Valley Site, an above grade parking structure may be located in the small site adjacent to the school, and front Lerwick Road. If located here, the structure will be designed to not have large expanses of blank concrete walls. The design will provide opportunities to introduce relevant treatment, such as art reliefs, to create texture and visual interest in the pedestrian realm.

4.3.4.9 Unfinished ceilings, lights, pipes and related items must not be visible from a public street or public street sidewalk.

4.3.5 Parking Payment System

4.3.5.1 Project Co will design and construct structured and surface parking so as to accommodate a 'pay by space' parking system with payment machines ("pay devices") located both within parking areas and within the Buildings so as to allow users to 'pay by space' and pay for time extensions without leaving the Facility.

4.3.5.2 The pay devices are Category E Equipment (refer to Appendix2D [Equipment and Furniture] and the Equipment List). The Authority intends to engage a 3rd party parking operator who will operate and maintain the pay devices. Minimum requirements for the pay devices are set out in this Section. Pay devices will:

4.3.5.2(1) be payment card industry compliant (refer to http://www.pcicomplianceguide.org/);

4.3.5.2(2) include built in wireless communications for credit card processing;

4.3.5.2(3) have solar and hardwire capability for power (hardwire is the preferred option);

4.3.5.2(4) have a built-in or supplied heater for each machine;

4.3.5.2(5) use spitter ticket stock (the receipt that is printed) that is be multi-sourced and not exclusive to vendor only spitter ticket stock;

4.3.5.2(6) where exposed to the elements, be contained within a fully covered kiosk with lighting; and

4.3.5.2(7) include a bill acceptor with additional change holding capacity.

4.3.5.3 One example of a pay device that meets the Authority's requirements is the Digital Luke Parking Machine.

4.3.5.4 Project Co will coordinate with the Authority and provide all infrastructure necessary to support pay devices in the following areas:

4.3.5.4(1) the Acute Care Facility main lobby;

4.3.5.4(2) the main entrance to the Emergency Department;

4.3.5.4(3) the main entrance to the Clinical Support Building, if applicable;

4.3.5.4(4) at 6 locations in the structured parking, which will be confirmed through the user consultation process described in Appendix 2B [User Consultation and Design Review]; and

4.3.5.4(5) at 6 locations in the surface parking, which will be confirmed through the user consultation process described in Appendix 2B [User Consultation and Design Review].

4.3.6 Parkade Stall Counting/Tracking System

4.3.6.1 Project Co will provide for any structured parking:

4.3.6.1(1) a stall counting/tracking system which:

4.3.6.1(1)(a) will clearly indicate to Facility visitors and staff whether the structured parking has parking stalls available, or is full;

4.3.6.1(1)(b) will indicate availability in real-time; and

4.3.6.1(1)(c) will have the capability to record data to track the utilization of the structured parking;

4.3.6.1(2) a suitable quantity of illuminated signage such that visitors can avoid entering the structured parking if no stalls are available; and

4.3.6.1(3) all necessary electrical and communication infrastructure for system.

4.3.6.2 The Authority intends to engage a 3rd party structured parking operator who will be responsible for maintenance and, where required, daily calibration of the stall counting/tracking system.

4.3.7 Parking Design Principles

4.3.7.1 Noise attenuation must be provided on parking structure walls within 200 meters from residential developments.

4.3.7.2 Walls and ceilings of parking structures must be painted to enhance or reflect light. The design and operation of parking facilities, both surface and multi-level, will create convenient and safe usage, including panic duress systems. Refer to Section 7.9.

4.3.7.3 Design and construct a surface parking, parkade and/or underground parking in accordance with the following:

4.3.7.3(1) provide structured parking that is capable of being secured and locked when not in use;

4.3.7.3(2) provide adequate provision for ingress and egress to all parking spaces to ensure ease of mobility, ample manoeuvring clearances, and safety of vehicles and pedestrians;

4.3.7.3(3) apply CPTED principles and the following principles:

4.3.7.3(3)(a) reduce opportunities for graffiti through the use anti-graffiti coatings;

4.3.7.3(3)(b) ensure the interior is well-lit while minimizing light spillage into adjacent properties; and

4.3.7.3(3)(c) where surface parking is situated between a Building and an adjacent public street, provide trees between the Building setback line and the adjacent public street.

4.3.7.3(4) clearly mark all parking spaces as directed by the Authority;

4.3.7.3(5) use wayfinding strategies, including signage, to allow each floor to be identifiable and to assist in orientation and ease of finding/identifying parking stalls;

4.3.7.3(6) set parking lot layouts in an orderly and logical design to minimize confusion and excessive internal circulation;

4.3.7.3(7) employee parking must not be located in visually remote areas of parking lots, behind blank walls, or within service or loading areas; and

4.3.7.3(8) in situations with little or no surface parking, the ground level parking areas in a parking structure must have sufficient height clearance to accommodate most light trucks and passenger vans.

4.3.7.4 Provide all parking lots with the following landscape requirements:

4.3.7.4(1) screen surface parking by plant material, and where surface parking is behind Buildings, screen such surface parking from adjacent properties with landscape planting or trellis strips;

4.3.7.4(2) incorporate safety and security measures into the landscape design;

4.3.7.4(3) surface parking must contribute to the continuity of the street landscaping edge without compromising the safety and security of the public inside the lot and on the public street;

4.3.7.4(4) reduce the visual impacts of large surface parking lot areas by dividing the parking area into smaller 0.6 ha parking lots defined at the boundaries by drive aisles, sidewalks, trees and landscape planting; plant shrubs and small trees to define circulation routes for pedestrians and vehicles; and

4.3.7.4(5) multiple surface parking lots must provide a direct pedestrian pathway system through the parking area to provide convenient and safe pedestrian access between Building entrances, parked cars, and sidewalks of adjoining streets.

4.3.8 Bicycle Parking

4.3.8.1 Provide bicycle parking facilities that are at-grade, have uniform lighting and are safe and secure.

4.3.8.2 Provide secured, long term bicycle parking for employees. Such bicycle parking may be integrated into parking structures located close to Building access points.

4.3.8.3 Provide unsecured, short-term bicycle parking in the form of bicycle racks located within 15 m of a principal building entry. Such bicycle parking must be situated in well-lit locations, clearly visible from principal building entries and/or public roads.

4.3.8.4 Bicycle racks must be made of sturdy, theft-resistant material and be secured to the floor or ground. Design the bicycle racks so that they secure the bicycle frame, not the wheels, and allow both the frame and front wheel to be locked to the rack with a U-style lock.

4.4 Site Infrastructure

Project Co will provide, as necessary, adequate and reliable infrastructure and necessary municipal services to the Facilities.

4.4.1 Municipal Off-Site Services Infrastructure

4.4.1.1 General

4.4.1.1(1) Design and construct all municipal off-Site services, connections or upgrading of municipal systems as needed or as required by the City such that the off-Site municipal infrastructure is adequate to support the Facility, to the satisfaction of the City and other Governmental Authorities. Refer to the applicable City documents for land development and municipal servicing engineering standards.

4.4.1.1(2) All works required for excavation, exposing, backfill and surface restoration of all proposed water, sanitary sewer and storm service connections, as well as the connection of each service to the municipal system, will be the responsibility of Project Co.

4.4.1.2 Potable Water – Off-Site

4.4.1.2(1) Both Facilities require two separate water system connections, including metering and backflow prevention.

4.4.1.2(2) Both Sites require connection to the adjoining municipal water storage reservoirs, for emergency supply purposes. At the Comox Valley Site, the emergency connection will be to the large diameter, ductile iron, +/- 120 metre pressure zone, reservoir supply line on Lerwick Road, south of Waters Place.

4.4.1.2(3) The primary connection point at the Comox Valley Site will be the City-controlled water main routed within the Lerwick Road corridor.

4.4.1.2(4) At the Comox Valley Site, the secondary supply routing will be extended in from Lerwick Road, per Section 4.4.1.2(2) above. The details pertaining to this connection to the Comox Valley Regional District-owned reservoir supply main must be acceptable to the Comox Valley Regional District engineering department. This will include, at a minimum, backflow prevention, and possibly separate metering. The extent to which provision for on-site pumping from this secondary connection will be required (to suit either domestic demand or fire-fighting demand, or both) will be determined, in part, by the final building floor area and building height.

4.4.1.2(5) At the Campbell River Site, the primary connection point will be from the adjacent Evergreen Road Reservoir (Pump Pressure Zone). Watermain connections from Evergreen Road north on Birch Street may be allowed by the City for the servicing of the Hospital, and are subject to City approval.

4.4.1.2(6) The secondary connection point at the Campbell River Site will be from 2nd Avenue (107m Pressure Zone). Location of the secondary connection is subject to approval from the City.

4.4.1.2(7) Project Co will ensure that City access to municipal fire hydrants is not encumbered at any time. All existing hydrants must remain active during the Construction. Temporary construction water will be provided by a new connection to the City's water system.

4.4.1.3 Sanitary Sewer – Off- Site

4.4.1.3(1) At the Comox Valley Site, the connection point for the sanitary sewer will be to the existing municipal sewer, which is routed through the adjoining North Island College site access road, to the immediate south of the Site.

4.4.1.3(2) At the Campbell River Site, the connection point for the sanitary sewer will be approved by the City of Campbell River. There are existing connection points at 2nd Avenue and Birch Street, as well as 1st Avenue and Birch Street. Project Co will be responsible to ensure adequate sewer capacity exists in the downstream system for the new connection in accordance with City standards. If Project Co is required to upgrade the City's downstream system to meet City standards related to the new connection, the Authority will reimburse Project Co for all costs reasonably incurred by Project Co to complete such upgrades.

4.4.1.3(3) Capacity of the City of Courtenay's downstream conveyance system is limited. Project Co will ensure that that the peak wet

weather flow (P.W.W.F.) from the Comox Valley Facility will be limited to the extent required by the City of Courtney.

4.4.1.4 Storm Drainage – Off- Site

4.4.1.4(1) The off-Site storm drainage systems available at connection points to the Comox Valley Site area are already operating at full capacity. Project Co must employ on-Site storm water management strategies which result in no net increase in peak storm water discharge rates up to the 100 year recurrence interval event. Project Co will design the Site so that expected drainage flow capacity and direction meet City requirements.

4.4.1.4(2) Off-Site storm drainage system connection at the Campbell River Site will be at the intersection of 1st Avenue and Birch Street.

4.4.1.4(3) At the Campbell River site, municipal storm main removal and replacement, for the purpose of deepening and flattening of the longitudinal gradient, is required by Project Co on 1st Avenue, from Birch Street toward Alder Street, in order to ensure the Site drains by gravity in its entirety. The existing off-Site storm main is not sufficiently deep to achieve the requirement that 100% of the new works are drained by gravity to the municipally owned, off-Site conveyance system.

4.4.1.5 Road Work – Off- Site

4.4.1.5(1) Project Co is responsible for the following off-Site roadwork:

4.4.1.5(1)(a) Site access upgrading; and

4.4.1.5(1)(b) pedestrian pathway/sidewalk reconstruction.

4.4.1.5(2) The following is required at the Comox Valley Site:

4.4.1.5(2)(a) a new signalized four-way intersection at ‘Waters Place’ and Lerwick Road complete with electrical power supply and signal controls, all ducting and wiring as required;

4.4.1.5(2)(b) a right turn lane, southbound on Lerwick Road, approaching the proposed Waters Place intersection;

4.4.1.5(2)(c) a secondary Site access off Lerwick Road, to the south of the Waters Place intersection;

4.4.1.5(2)(d) pavement marking eradication and replacement to suit the new intersections and access points. Signage relocations and replacements/additions to suit same;

4.4.1.5(2)(e) removal and replacement of existing concrete sidewalks along the full Lerwick Road frontage of the project site and replacement with 1.8 metre wide concrete sidewalk;

4.4.1.5(2)(f) construction of a 1.4 metre wide irrigated boulevard strip along the Lerwick Road frontage, between the existing back of barrier curb and new/proposed sidewalk edge, complete with street trees to suit City of Courtenay requirements;

4.4.1.5(2)(g) relocation of underground utilities in conflict with the proposed Waters Place intersection improvements;

4.4.1.5(2)(h) relocation and extension of storm drainage infrastructure (catch basins and leads)] within the Lerwick Road corridor; and

4.4.1.5(2)(i) street lighting relocations and street lighting additions along Lerwick Road as described in Section 4.4.1.6.

4.4.1.5(3) The following is required at the Campbell River Site:

4.4.1.5(3)(a) construction of three new driveway access letdowns on Birch Street and one on 2nd Avenue; and

4.4.1.5(3)(b) the infill of any of the four existing driveway letdowns on Birch Avenue with new curb and sidewalk, if one or more of such driveway let downs is not required.

4.4.1.5(4) Project Co will incorporate surface texture elements that allow for delineation of cyclist, motorist, pedestrian and larger truck traffic routing at accesses and intersections (for example, green cyclist conflict zone surface treatments).

4.4.1.5(5) See Section 4.2.5 regarding way finding and exterior signage requirements.

4.4.1.6 Street lighting – Off- Site

4.4.1.6(1) Off- Site street lighting illumination levels and other related operations characteristics will conform to the respective municipal standards. In order to achieve this, relocation of existing lighting and additional off-Site lighting are both expected to be required.

4.4.1.6(2) For the Comox Valley Site, off-Site street lighting along the Lerwick Road corridor will be positioned within the grassed boulevard, between the barrier curb and the proposed sidewalk alignment.

4.4.1.7 Traffic signals – Off-Site

4.4.1.7(1) At the Comox Valley Site, traffic signals will be required, per MMCD standard, at the proposed intersection of Waters Place and Lerwick Road. Provision of these signals, inclusive of electrical and traffic engineering (i.e. the determination of appropriate signal phase timing, connections for hydro power, etc.) is the responsibility of Project Co.

4.4.2 On-Site Services Infrastructure

4.4.2.1 General

4.4.2.1(1) Design and construct all on-Site servicing to meet or exceed the design and quality requirements for the corresponding municipal off-Site services, and to meet the needs of the Facilities.

4.4.2.2 Sanitary Sewers – On-Site

4.4.2.2(1) Provide sanitary sewers of a diameter, grade and depth to safely convey all effluent from the Facilities. The sanitary sewer system will include the pipes, manholes and all other required appurtenances to comply with applicable municipal and provincial standards.

4.4.2.3 Storm Sewers and Drainage – On-Site

4.4.2.3(1) Provide storm sewers, storm sewer management strategies and drainage network:

4.4.2.3(1)(a) of a size, grade and depth to safely manage and convey all storm water on-Site to the receiving system;

4.4.2.3(1)(b) which, at minimum, maintains the pre-Construction discharge rates after Facility Completion;

4.4.2.3(1)(c) which includes storm water/oil and grit separation devices or other water quality treatment devices as required, capturing and treating runoff from all road and parking area surfaces; and

4.4.2.3(1)(d) where roof water run-off will receive grit separation treatment before entering the piped on-Site conveyance network. Oil/water separation is not required for roof water.

4.4.2.3(2) Provide an on-site storm water management system designed to meet each municipality's requirements for storm water attenuation and runoff / recharge water quality.

4.4.2.3(3) Storm water quality: Comply with the federal/provincial land-development guidelines and Stormwater Planning: A Guidebook for British Columbia (2011).

4.4.2.3(4) Project Co will ensure that neighbouring properties are protected from flooding and nuisance runoff issues and existing municipal system capacities are not exceeded.

4.4.2.3(5) Provide adequately sized water quality/sediment control components for both the surface parking and underground parking lots, before discharging to the on-Site retention systems, groundwater recharge facilities or the off-Site drainage system.

4.4.2.4 It is expected that permanent pumping of storm water will be required at the Comox Valley Site to ensure that the lower floor level and loading bay areas are adequately drained.

4.4.2.5 Watermain and Appurtenances – On-Site

4.4.2.5(1) Provide two separate watermain systems at each Site (watermain and ancillary components) from the municipal/regional systems, each system capable of providing all required commercial/institutional demands and firefighting capacity and redundancy for the Facilities. The extent to which provision for on-site pumping, from both primary and secondary offsite connection points, will be required (to suit either domestic demand or fire-fighting demand, or both) will be determined, in part, by the available system pressures, the final building floor area and building height.

4.4.2.5(2) Firefighting volumetric demands are to be calculated using the Fire Underwriters Survey (FUS) method, unless alternates are otherwise approved by the municipal authorities.

4.4.2.5(3) If required to meet the Fire Underwriters Survey fire flow demands, Project Co will provide back-up, permanent fire-fighting equipment.

4.4.2.5(4) The watermain systems will include approved backflow preventers necessary to protect the municipal system and on-Site facilities from contaminants based on the hazard level of the Facilities.

4.4.2.5(5) For the purposes of redundancy, one of the water services to the Facilities will operate as a secondary connection to the municipal system. A looped on-Site connection for the main is desired by the Authority.

4.4.2.5(6) Both watermain services, from separate off-Site connection points, are to converge into a common mechanical room, wherein metering and splitting off of fire suppression flows will occur.

4.4.2.6 Road Works – On-Site

4.4.2.6(1) Design and construct on-Site roadways, including the pavement, curbs and gutters, sidewalks, walkways, signage, pavement markings, and traffic calming devices, that are handicapped accessible and wheel-chair friendly, and provide safe passage between parking areas, loading areas, emergency vehicle areas and drop off areas without requiring the driver to enter the municipal roadway. The minimum roadway surface width will be 9.0 metres.

4.4.2.6(2) All roadways will accommodate fire truck access in accordance with the requirements of the respective municipality‘s fire department or by municipal bylaw requirements.

4.4.2.6(3) Design vehicle for loading access to be WB20. All other internal roadways must safely accommodate the typical fire truck in use by the respective municipal authorities.

4.4.2.6(4) Internal site truck movements will be designed such that loading bays are easily accessible, limiting the requirement for truck manoeuvring into and out of loading bay areas.

4.4.2.6(5) Use site surfacing materials which will meet intended use and minimize the ‘heat island’ effect, where possible.

4.4.2.7 Street Lighting – On-Site

4.4.2.7(1) Provide lighting for on-Site roadways, walkways and parking areas to ensure safe vehicle and pedestrian traffic with respect to collisions, personal safety, and Building access/egress. Lighting will be sympathetic to any existing or future buildings at each Site, as well as all neighbouring properties. Wherever possible, all Site lighting to be ‘dark skies’ compliant, per municipal definitions.

4.4.2.7(2) Detailed on-Site lighting specifications are carried elsewhere, under electrical specifications section.

4.4.2.8 Electrical, Telecommunications, Gas Services

4.4.2.8(1) Provide adequate and redundant electrical, telecommunication and natural gas services to the Facilities.

4.4.2.8(2) An existing gas main at the Comox Valley Site, along the existing North Island College access road [immediately abutting the southerly Comox Valley Site boundary], may require relocation. Project Co will coordinate with the gas company and North Island College to determine the need for relocation and, if required, will relocate the gas existing gas main.

4.5 Heliport

4.5.1 General

4.5.1.1 Project Co will provide a heliport (the "**Heliport**") at each Facility that complies with the requirements of this Schedule.

4.5.2 Heliport Classification

4.5.2.1(1) The Heliport must meet H2 classification.

4.5.3 Heliport Dimensions and Loading

4.5.3.1(1) The Heliport will be designed to accommodate a helicopter with a total length of 17.5 m.

4.5.3.1(2) The Heliport will accommodate helicopters with a total static load of 17,000 lbs.

4.5.3.1(3) Design the Heliport for a point load for a Bell 212 skid undercarriage and an Agusta Westland 139 wheeled gear helicopter.

4.5.4 Aviation Criteria

4.5.4.1(1) The Heliport design will be in accordance with CAR 305 regulations and 325 standards and 621 marking requirements.

4.5.4.1(2) Consider the direction of the prevailing wind in determining the flight path orientation.

4.5.4.1(3) Two flight paths will be provided at greater than 135 degrees apart.

4.5.4.1(4) At least one of the flight paths will be H2.

4.5.4.1(5) Additional flight path(s) may be H1 providing that the configuration in terms of flight path slope and the presence of obstructions will permit use by a Sikorsky 76C+ helicopter under specific operational conditions.

4.5.4.1(6) Suitable emergency landing areas for the H2 classification must be identified and confirmed by Transport Canada as being accepted.

4.5.4.1(7) The Heliport must be certified for night use. Flight path divergence will be 15%.

4.5.4.1(8) Identify and address all off-Site obstructions that require day markings and night lighting markings in accordance with CAR 621.

4.5.5 Mechanical

4.5.5.1(1) The location and operation of air intakes and ventilation systems must not be compromised by the Helicopter exhaust. Helicopter exhaust cannot be permitted to enter buildings.

4.5.6 Technical Proposal Requirements

4.5.6.1(1) Project Co is responsible to plan the Heliport and flight path to take into account all on-Site and off-Site obstructions.

4.5.7 Electrical

4.5.7.1(1) Obstruction light LED fixture type will be Farlight single bulb product number NVL810ED and for duel bulb Farlight product number NV-L810LED or Crouse Hinds VAW style incandescent, single bulb 43958-116-GR or duel bulb 43961-116-GR.

4.5.7.1(2) FATO or TLOF lighting will be Crouse Hinds P1032U-LP with green lenses, 69 watt bulbs.

4.5.7.1(3) Heliport lighting connectors, wiring and bases will be appropriate to the design and in accordance with fixture manufactures recommendations.

4.5.7.1(4) Walkway will be Crouse Hinds P1032U-LP with white lenses or approved equivalent.

4.5.7.1(5) Auxiliary white lighting to illuminate the Heliport for patient transport or maintenance will be top and side shielded to protect a pilots night vision. Fixture type will be Cooper floodlight GPF25MP262, accessory number OA1179 or OA1180 pending the application or approved equivalent.

4.5.7.1(6) The lighting system will include a control panel complete with circuit activation indicator lights. Lighting switch control will be located inside the hospital adjacent the doorway.

4.5.7.1(7) The Heliport FATO or TLOF lighting will be supplied by two electrical circuits with alternating fixtures on the same circuit and controlled by a single switch.

4.5.7.1(8) Auxiliary white light will be controlled by a separate switch.

4.5.7.1(9) Walkway lighting will be controlled by a separate switch.

4.5.7.1(10) The windsock will be Aviation Visual Aids product, Nisku Alberta or equivalent in accordance with CAR 325.31 (1). Mounting base pending installation application.

4.5.7.1(11) All lighting systems will be designed to allow local and remote control from the Authority's Royal Jubilee Hospital in Victoria. Refer to Section 7.9.4.1(8).

4.5.7.1(12) Project Co is responsible for all required off-Site obstruction lighting, markings, and installations.

4.5.7.1(13) All off-Site obstruction lights to be in accordance with CAR 621.

4.5.8 Elevated Heliport Design Requirements

4.5.8.1(1) A roof top elevated Heliport design will include a glycol under pad heating system for the TLOF and walkway.

4.5.8.1(2) An elevated Heliport will have a concrete surface.

4.5.8.1(3) Traditional trowel joints will not be installed on all concrete surfaces including TLOF, FATO and walkway/ramp. Concrete curing cracking will be controlled using surface saw cuts.

4.5.8.1(4) The walkway width for an elevated Heliport will be minimum 2.6 meters wide.

4.5.8.1(5) Safety net mesh and fuel containment materials will be galvanized.

4.5.8.1(6) Drainage openings will not be installed in the TLOF surface.

4.5.8.1(7) The surface slope of the TLOF will be continuous in one direction, not crowned or coned.

4.5.8.1(8) Foam suppression system will be of fixed type all in accordance with CAR 325.47 (1) and (2).

4.5.9 Ground Heliport Design Requirements

4.5.9.1(1) A ground Heliport design will include landscape rehabilitation using sod rather than seed within an area of 5 meters outside

boundary of the Heliport safety area unless the seeded area has been well established prior to the opening of the Heliport.

4.5.9.1(2) The Heliport walkway width for a ground pad will be a minimum of 3.0 meters wide.

4.5.9.1(3) Traditional trowel joints will not be installed on all concrete surfaces including TLOF, FATO and walkway/ramp. Concrete curing cracking will be controlled using surface saw cuts.

4.5.9.1(4) A perimeter fence for a ground Heliport will be a minimum 1.0 meter high and located clear of the Heliport OLS.

4.5.9.1(5) The perimeter fence will include at least one 2 meter maintenance gate and one 2 meter patient/crew access gate.

4.5.9.1(6) The maximum downward ground slope outside the FATO area of a raised mound heliport is 3:1.

4.5.9.1(7) Drainage openings will not be installed in the TLOF/FATO surface of either a ground or elevated Heliport.

4.5.9.1(8) The surface slope of the FATO will be continuous in one direction, not crowned or coned in accordance with the permissible slopes in CAR 325 and 305.

4.5.10 Planning Criteria

4.5.10.1 The maximum travel distance from the Heliport to the nearest hospital entry will be 100 m from the edge of the Heliport FATO.

4.5.10.2 The hospital entrance doors for Heliport use will be automatic opening double or sliding doors with a clear opening of 1800 mm.

4.5.10.3 Patient travel route from the hospital entry will be as direct as possible through a corridor designed to accommodate transport of stretcher patients.

4.5.10.4 The Heliport site will be secured from public access including pedestrians and vehicles.

4.5.10.5 The Authority has obtained a letter of non-opposition to the Heliport from both the City of Campbell River and the City of Courtenay, copies of which have been made available to Project Co for reference.

4.5.11 Work Area B of the Campbell River Site

4.5.11.1 As required by Section 6.12 of Schedule 2 [Design and Construction Protocols], Project Co will, after Facility Completion of the Campbell River Facility, demolish and remove from the Site all buildings and structures in Work Area B of the

Campbell River Site in accordance with the reviewed Demolition Plan. After the demolition work is complete, Project Co will construct surface parking and related landscaping on Work Area B of the Campbell River Site in accordance with the standards set out in this Agreement.

PART 5. BUILDING DESIGN REQUIREMENTS

5.1 Adaptability and Flexibility

5.1.1 Project Co will:

5.1.1.1 locate permanent Building elements, such as stairs, elevators and duct shafts, to minimize constraints on changes to the Facility;

5.1.1.2 minimize interior columns for ease of planning and re-planning of care areas;

5.1.1.3 avoid interior shear walls if possible;

5.1.1.4 provide additional capacity in vertical (and horizontal) distribution shafts and plenums to accommodate 10% additional service system improvement;

5.1.1.5 accommodate the vertical and horizontal distribution of electrical and mechanical services to allow maintenance and changes to occur with the least disruption to clinical service delivery;

5.1.1.6 provide access points to Building service systems in critical locations so that service disruption is minimised; and

5.1.1.7 In general, avoid cabling in the concrete slab. Provide a system or strategy to support equipment where cabling is imbedded into the slab, to allow for easy servicing to control rooms and medical equipment. Do not provide raised access flooring.

5.2 Expandability

5.2.1 Project Co will:

5.2.1.1 locate primary circulation corridors to allow expansion without increasing the complexity of the circulation system as a whole; and

5.2.1.2 provide floor zoning that allows for expansion of programs or services, for example by locating administrative and other non-clinical ‘soft’ functions adjacent to clinical areas that are likely to need to expand.

5.3 Post Disaster Requirements

5.3.1 In undertaking the Design, Project Co will consider the need to protect the life and safety of all Facility occupants and the need for continuing services following catastrophic events such as earthquakes, severe weather, epidemics, chemical spill, disruption to service utilities and

internal events such as fire. Particular attention should be paid to the Acute Care Facilities, generators, transformers and service connections.

5.3.2 For the Acute Care Facilities (and Energy Centres, if independent buildings), design and construct the Buildings, their generators, transformers and service connection structures, structural components, non-structural components, anchorages, and equipment to post disaster standards in accordance with the BC Building Code.

5.3.3 If the Clinical Support Building is designed as a stand-alone building, Project Co will design and construct the structural components of the Clinical Support Building to post disaster standards in conformance with the BC Building Code. Other aspects of the Clinical Support Building design must meet the requirements for Normal Importance Category.

If structured parking is designed as a stand-alone building, Project Co will design and construct the structured parking to meet the design requirements for a Normal Importance Category building as defined in the BC Building Code. This applies to all aspects of the design including structure as noted in Section 5.9.10.2.

5.3.4 Design and construct essential services servicing the Campbell River and Comox Valley Acute Care Facilities, and their Energy Centre (if designed as a separate building) including the electrical system, steam, domestic water and medical gases, to post disaster standards as defined in the BC Building Code. Locate these services in utilities enclosures that meet post disaster standards as defined in the BC Building Code.

5.3.5 Design and construct the Campbell River and Comox Valley Acute Care Facilities, and their Energy Centre (if designed as a separate building) so that each is capable of meeting its functional requirements (lights, power and water) for a minimum period of 72 hours following a natural disaster or other incident (except that additional storage tanks are not required for potable water – assume water will be pumped in and for sewage Project Co will provide a 3785L (1000USGAL) sewage waste storage tank).

5.3.6 Provide operable windows for the Facilities to allow for natural ventilation in the event of mechanical ventilation failure during a post disaster event.

5.3.7 See Section 5.10.10 for mechanical post disaster requirements.

5.3.8 See Sections 5.11.1.1(2), 5.11.1.2(13) and 5.11.1.2(16) for electrical post disaster requirements.

5.3.9 Design and construct each Facility so that it includes an exterior area that is of a size capable of accommodating temporary tents in case of a mass casualty event requiring the decontamination and treatment of up to 150 patients (the “Mass Casualty Tent Area”). “Design and construct the MCTA to convey surface water away from tent area. Surface grading must cause no ponding, and adequate drainage must be provided to avoid wet and/or muddy ground conditions during and after storm events.” This area must be adjacent to the emergency department and the exterior water, gas, power, and communication hookups. Refer to Section 5.10.10.

5.3.9.1 Provide a dedicated electrical and communications kiosk in the Mass Casualty Tent Area that contains the following infrastructure:

5.3.9.1(1) 400A Vital power feeder supplying a 400A, 120/208V, 3P, 4W panelboard complete with 4 x 100A, 3P circuit breakers and 20 x 15A, 1P circuit breakers. The distribution board will be suitable for connecting cab-tyre type cable connections;

5.3.9.1(2) six 15A, 120V split-duplex receptacles in the kiosk, each supplied with dedicated circuits from the kiosk panelboard. Provide Styrofoam liner inside top of kiosk;

5.3.9.1(3) one 50 pair Cat 5 analog telephone trunk lines (terminated on BIX) from each of the PER and SER for connection to Telus 1B lines;

5.3.9.1(4) 4pr SM fibre and 4 pr MM fibre from each of the PER and SER.

5.3.9.1(5) fibre patch panel;

5.3.9.1(6) twenty four Cat 6 data drops from the nearest Telecommunications Room. Maximum cable distance for Cat 6 will be 70 metres. Terminate on kiosk patch panel;

5.3.9.1(7) 48 port Cat 6 patch panel with 48 Cat 6 harness cables punched down to BIX for easy connection of field data cabling;

5.3.9.1(8) space for provision (by others) of a 48 port 19" CISCO network switch and a 1.5kVA UPS; and

5.3.9.1(9) CATV trunk cable (terminated at an 8-port splitter) from each of the PER and SER. CATV will be connected to provide cable TV to the kiosk.

5.3.9.2 Design and locate the kiosk to be weatherproof, bug and rodent proof, vandal-proof, naturally ventilated and thermostatically heated. Mount the kiosk on a housekeeping pad. Provide switched robust strip lighting inside the kiosk.

5.3.10 Design and construct each Facility to support a Project Co supplied and installed roof-top emergency communications antennae tower (the "**Communications Tower**") including all structural supports and fasteners, all electrical, lighting, and lightning grounding requirements, and all enclosures, entrances, ducting, pathways, and cabling between the communications tower antennae locations and the Emergency Operations Centre (the "**EOC**") communication equipment room. The Communications Tower will be sized to support all Authority emergency communications antennae plus capacity for an additional antennae of each type as required by the Authority.

5.3.11 Project Co will design and construct each Facility so that it includes space that is capable of being used as an EOC during an emergency. The EOC will be located in the Campbell

River Acute Care Facility and the Comox Valley Acute Care Facility, as applicable. Each EOC will:

5.3.11.1 be located in a post-disaster structure;

5.3.11.2 be located so that it is accessible directly from the exterior;

5.3.11.3 include a communication centre with a minimum of 30 seats, a locked supply storage area (complete with power and network capability), a communication equipment room capable of supporting the Communications Tower systems and equipment, a food preparation/storage area and at least two bathrooms, each with a shower;

5.3.11.4 be connected to vital power, with 30% of EOC lighting and power outlets connected to UPS power, have telecommunication outlets supplied from two separate network rooms and have two separate Telus 1B feeds that will support at least 12 Telus 1B phone and satellite communications, as described below. These requirements also apply to any rooms adjacent to the EOC that may be used in the event of an emergency or disaster;

5.3.11.5 be designed so that the communications centre has the potential to be segregated from the main EOC operational area to minimize noise;

5.3.11.6 be capable of supporting the emergency communication systems described in Section 5.3.11, including all required cabling, conduit paths and other infrastructure;

5.3.11.7 have six operator station areas, and each station will have:

5.3.11.7(1) 2 telecommunication outlets;

5.3.11.7(2) 2 Telus 1B phone lines;

5.3.11.7(3) satellite phone capability for each of the Telus 1B phone lines, including the infrastructure for specialized antennae to the Communications Tower and a switching box/device that allows automatic switching from Telus 1B phone line to satellite phone communications for all phones; and

5.3.11.7(4) 2 power outlets;

5.3.11.8 include in the communications centre a suitable area and infrastructure for amateur radio operations that meet the following specifications:

5.3.11.8(1)(a) supplied with UPS power;

5.3.11.8(1)(b) minimum 32 channel programming capability;

5.3.11.8(1)(c) 5 specialized satellite antennae on the Communications Tower for satellite communications (specific locations for these antennae will require consultation with communication specialists);

5.3.11.8(1)(d) storage room for amateur radio equipment;

5.3.11.8(1)(e) 2 power outlets and a telecommunications outlet in the radio room;

5.3.11.8(1)(f) in addition to the 5 specialized satellite antennae, the following antennae are required (specific locations for these antennae will require consultation with communication specialists):

(f).1 1 commercial antenna;

(f).2 2 VHF antennae, consisting of 1 digital antenna and 1 voice antenna; and

(f).3 2 HF antennae, consisting of 1 digital antenna and 1 voice antenna;

5.3.11.9 have commercial radio capability for interoperability with Protection Services Radio system;

5.3.11.10 have a multifunction printer/scanner/fax that has:

5.3.11.10(1) a telecommunication outlet, with electrical outlet on vital power; and

5.3.11.10(2) 2 fax lines (one for outgoing messages and one for incoming messages) that are both Telus 1B lines (which are in addition to the Telus 1B lines described in Section 5.3.11.7)

5.3.11.11 throughout the EOC, provide an additional 24 telecommunication outlets, 16 power outlets on vital power and 8 power outlets on UPS power (all of which are in addition to the telecommunication and power outlets described in Section 5.3.11.7);

5.3.11.12 have 5 display/whiteboards and capability to support an electronic whiteboard on vital power;

5.3.11.13 be capable of supporting teleconferencing and videoconferencing; and

5.3.11.14 have 4 wall-mounted screens with cabling to support viewing and monitoring of local, regional, provincial and national news.

5.4 Architecture

5.4.1 Building Form and Character

5.4.1.1 General

5.4.1.1(1) The Buildings will be articulated, yet be detailed to ensure the Buildings' envelopes are robust.

5.4.1.1(2) Utilize glazing to optimize views and daylight penetration, and to reduce energy consumption.

5.4.1.1(3) Roof top mechanical / electrical equipment to be either enclosed within a mechanical penthouse, or screened and incorporated in architectural elements, and consistent in form, material, and detail with the rest of the Building. The use of a penthouse for such equipment is encouraged. Roof top mechanical / electrical equipment will be provided with noise attenuation.

5.4.1.1(4) Where a Building exceeds 15.2 m in height, the Building facade projecting above the lower level street must be recessed a minimum of 2 m.

5.4.1.1(5) As contemplated by the *Wood First Act* (British Columbia), Project Co will incorporate wood products into the Design as required by Appendix 3G [Wood First Matrix].

5.4.1.2 Exterior Building Materials and Colour

5.4.1.2(1) Exterior materials will include high quality finish materials and robust detailing. Cladding materials to be durable, and applied in a rainscreen fashion. Cladding materials may be architectural concrete, brick or stone masonry, glass, phenolic panels, metal cladding and wood.

5.4.1.2(2) Stucco will not be a principal building material and its use is discouraged.

5.4.1.2(3) Project Co will minimize the number of exterior cladding materials to reduce the number of envelope joints.

5.4.1.2(4) Wood used on the exterior is to be selected, located and treated to minimize maintenance and optimize its life span.

5.4.1.2(5) Provide a sample board indicating exterior material finishes for review by the Authority.

5.4.1.3 Roofs

5.4.1.3(1) Landscaping and other “green” treatments of roof areas are encouraged, including provision of useable outdoor open spaces.

5.4.1.3(2) Where not landscaped, roof areas will be designed to be attractive when in view.

5.4.1.3(3) Provide stair access to all major roof areas larger than 100 m^2 with ladder access to smaller roof areas only.

5.4.1.3(4) Use of roof hatch accesses will be minimized.

5.4.1.3(5) Provide elevator access to the mechanical penthouse.

5.4.1.3(6) Project Co will provide high parapets or guardrails to minimize the need for fall arrest anchors for operational staff. Locate at main roofs and other roof areas needing regular access for maintenance.

5.4.2 Building Configuration and Internal Circulation

5.4.2.1 Building Entrances

5.4.2.1(1) All direct entries into the Buildings from the exterior will be protected from snow and rain by canopies or building overhangs. Weather protection must be implemented where Building entrances front a sidewalk or open space. Weather protection must not extend into public street rights-of-way.

5.4.2.1(2) Ensure that areas protected from weather still receive daylight using appropriate measures such as high to depth proportions and the use of glass roof panels.

5.4.2.1(3) Orient Building entrances away from direct prevailing winds. Provide wind protection at Building entrances exposed to prevailing winds. Orient Buildings generally to minimize wind induced by Buildings. Provide wind mitigating measures and areas that are protected from the wind so as to extend the seasonal duration of outdoor activities such as convalescing or socializing.

5.4.2.1(4) Entrance vestibules will provide complete transparency from the exterior, from the interior immediately in front of the vestibule, and from habited spaces adjacent to at least one long side of the vestibule.

5.4.2.1(5) Entrance vestibules will be configured and sized in order to preserve the airlock effect for climate control. Ensure a minimum 5 metre distance between the sets of doors to allow stretchers and

wheelchairs to fit lengthwise into the vestibule. Provide a heated air curtain system over the exterior doors to control the temperature loss during winter months.

5.4.2.1(6) Use sliding doors at all public entrances, except that where sliding doors are not feasible, use swinging doors. Use doors that can be activated by handicapped accessible push-button controls located on the inside and outside of both sets of doors or revolving doors with a swing door. Doors will be configured for push-pull manual operation in addition to automatic operation.

5.4.2.1(7) Entrance doors to the emergency department and doors to patient care areas will be sufficiently wide to allow access for stretchers surrounded by medical staff.

5.4.2.1(8) Pedestrian interest and comfort at entries will be provided through specifically designed seating, signage, lighting and features that signal the Facility's use.

5.4.2.1(9) Provide wheelchair alcoves visible and accessible to the main entry vestibules. Provide easy access to wheelchairs/stretchers close to the entrance of the Building.

5.4.2.1(10) If the Facility has a large open entrance or atrium, the space must be acoustically treated to control excessive noise or sound reverberation that can prevent effective space communication, facilitate the spread of noise from the atrium to adjacent noise sensitive interior spaces and / or make spending time in the atrium uncomfortable.

5.4.2.1(11) Entryways and doors must be illuminated using light levels that are comfortable when entering and exiting.

5.4.2.2 Access

5.4.2.2(1) Project Co will design and construct the Facility to ensure that all patient-occupied spaces are designed for disabled access and assistance by nursing staff.

5.4.2.3 Exit Stairs

5.4.2.3(1) Locate exit stairs strategically for the convenience of staff moving between related clinical departments.

5.4.2.3(2) Locate exit stairs conveniently accessible from circulation routes.

5.4.2.3(3) Avoid stair locations that negatively impact future planning flexibility or constrain desirable views from patient care and staff work areas.

5.4.2.3(4) Provide day lighting and views from stairwells for orientation and amenity, and provide adequate lighting into stairwells for staff security at night.

5.4.2.4 Convenience Stairs

5.4.2.4(1) Include convenience stairs where appropriate, located strategically to reduce dependence on elevator use.

5.4.2.4(2) Provide metal convenience stairs to mezzanines in the Equipment Depot and in Equipment Maintenance.

5.4.2.5 Corridors

5.4.2.5(1) Corridor widths will be a minimum of 2400 mm wide clear, except in:

5.4.2.5(1)(a) office areas, where corridors will be a minimum of 1500 mm wide; and

5.4.2.5(1)(b) major service supply corridors, which will be a minimum of 3000 mm wide.

5.4.2.5(2) Provide convenient service access to the ceiling mechanical and electrical plenum above corridors. If ceiling tiles are used, provide the ceiling tile layout such that access to the plenum requiring a hoarded area in the corridor below will not reduce the clear corridor to less than half its original width.

5.4.2.5(3) Corridors in patient care areas will have alcoves for storage of equipment. The alcoves will be dispersed between patient rooms allowing corridors to be kept clear of equipment and supplies. Provide the alcoves with power outlets for charging electronics and data ports, each at waist height for ease of access. Corridors will have recessed rest areas for patients to promote mobility and activity. Project Co will identify, for the approval of the Authority, alcoves for portable diagnostic imaging equipment, and install power and data outlets sufficient for such equipment.

5.4.3 Building Envelope

5.4.3.1 Utilize a building envelope professional (whose credentials as a building envelope professional are recognized by the Architectural Institute of British

Columbia or the Association of Professional Engineers and Geoscientists of British Columbia) to advise on building envelope design and construction.

5.4.3.2 Complete the Design and Construction so as to prevent the accumulation and stagnation of rain, snow, ice and dirt on the horizontal and vertical surfaces of the Building envelope(s) appropriate for the climate the Facility is situated in.

5.4.3.3 Complete the Design and Construction so as to prevent both the ingress of exterior moisture and the trapping of condensation from infiltrating humid air within the envelope.

5.4.3.4 Design exterior walls in accordance with the ‘rain-screen principle’.

5.4.3.5 Ensure that materials and systems of the wall and roof assemblies contribute to reducing heat gains and losses with minimal decline in performance over their expected lifespan.

5.4.3.6 Ensure continuity of the air barrier, vapour barrier, thermal barrier and rain barrier across the entire envelope.

5.4.3.7 Design Building envelope details to avoid thermal bridging.

5.4.3.8 Design Building envelope so that the inside of patient rooms exposed to noise from hospital related equipment, delivery / loading bays, emergency intake areas, and busy road traffic areas are exposed to noise levels less than:

5.4.3.8(1) NC 35-40 from steady sources of noise such as HVAC equipment and transformers; and

5.4.3.8(2) NC 45 for noises associated with brief intermittent events such as road traffic events.

Extreme intermittent noise such as helicopter landings and sirens will be excluded from the determination of noise levels.

5.4.4 Interior Walls and Partitions

5.4.4.1 Use interior walls and partition systems that provide acoustic separations as required for the specific functions to be carried out in the spaces affected, and in accordance with the requirements of Appendix 3D [Sound Transmission Ratings].

5.4.4.2 Design and select interior walls and partitions, partition systems and interior finishes to comply with the following criteria as may be relevant for the particular or specific functions enclosed:

5.4.4.2(1) cleaning, maintenance and infection prevention and control;

5.4.4.2(2) permanence and durability including impact resistance; and

5.4.4.2(3) low VOC emissions so as to minimize adverse impact on indoor air quality and indoor environmental quality.

5.4.4.3 Provide fittings, attachments and internal bracing/backup as required to accommodate and support wall mounted equipment.

5.4.4.4 All interior partition walls to go from floor to underside of slab.

5.4.4.5 In special areas such as Mental Health or Psychiatry departments, construct the wall to suit the purposes unique to those areas in compliance with the British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observations Units.

5.4.4.6 Interior partition in airborne isolations rooms, ante rooms and pressurized rooms must be designed and constructed to meet the specific pressure requirements for such rooms. Refer to CSA Z8000-11.

5.4.5 Ceilings

5.4.5.1 Ceiling systems will comprise a major component of the acoustic or sound attenuation function as required in the spaces in which they are installed and will comply with the requirements of Appendix 3D [Sound Transmission Ratings]

5.4.5.2 See Section 6.10.2.6.

5.4.5.3 Ceiling height will not be less than 2700 mm above the finished floor in all areas except for the following:

5.4.5.3(1) operating suites, x-ray rooms, and rooms with overhead patient gantry lifts (except inpatient rooms) to have a minimum ceiling height of 3000 mmm;

5.4.5.3(2) ceilings in rooms with equipment requiring specific clear heights will be based on specific equipment requirements; and

5.4.5.3(3) provide open ceilings in material management and facilities management with open work benches, machine shops, high utility shelving storage areas, and overhead hoists.

5.4.5.4 Patient lift gantry and tracks will be flush with ceiling.

5.4.5.5 Suspended structure located for overhead equipment will be located above finished ceiling.

5.4.5.6 In special areas such as Mental Health or Psychiatry departments, construct the ceiling to suit the purposes unique to those areas in compliance with the British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observations Units.

5.4.5.7 Infection Control for Ceilings:

5.4.5.7(1) Ceilings in the Facilities will comply with CSA Z8000-11: Canadian Health Care Facilities.

5.4.5.7(2) Ceilings in airborne isolation rooms and procedure rooms will be smooth, solid surface, non-perforated and scrubable.

5.4.5.7(3) Penetrations must be properly sealed in airborne isolation rooms, procedure rooms and pressurised rooms to ensure the ceiling provides an effective air seal.

5.4.5.7(4) Ceilings in airborne isolations rooms, ante rooms and pressurized rooms must be designed and constructed to meet the specific pressure requirements for such rooms.

5.4.5.6(4) In psychiatric secure rooms and psychiatric intensive care units, provide smooth, solid surface, non-perforated and scrub-able ceiling.

5.4.5.8 Virtual Skylight Ceiling Systems

5.4.5.8(1) Provide virtual skylight ceiling systems in internal rooms that would provide a positive distraction for patients undergoing treatment; including Diagnostic Imaging patient imaging rooms for CT, MRI and Fluoroscopy Rooms.

5.4.5.8(2) See Section 6.10.2.4(4) for additional information.

5.4.6 Floor Finishes

5.4.6.1 Project Co will provide flooring that is complementary and integral to the functional and aesthetic requirements of the interior space.

5.4.6.2 Project Co will select floor finishes to suit types and concentration of pedestrian and/or vehicular/wheel traffic to be anticipated.

5.4.6.3 Continuous cove base is required with all sheet flooring in all patient areas. Base height is minimum 150 mm.

5.4.6.4 Project Co will design and select floor finishes to comply with the following criteria:

5.4.6.4(1) ergonomic comfort, cleaning, maintenance and infection prevention and control including the frequency and quality of joints and also including ease of replacement if and when required;

5.4.6.4(2) imperviousness to concentrations of moisture anticipated to be existing on the floors and for the duration of that moisture;

5.4.6.4(3) permanence and durability and resistance to concentrated service traffic both pedestrian and vehicular;

5.4.6.4(4) low VOC emissions so as to minimize adverse impact on indoor air quality and indoor environmental quality; and

5.4.6.4(5) compatibility of patterns and textures with the requirements for pedestrian safety and elderly friendly design.

5.4.6.5 Non-slip flooring will be used in all wet areas including: food service areas, central cleaning and sterilizing, wash and change rooms, bathing areas, patient washrooms, laundry, soiled utility and housekeeping rooms.

5.4.6.6 Patient shower floors will slope to drain and be flush-walk-in without ridges for water retention.

5.4.6.7 Infection Control for Floors:

5.4.6.7(1) Floors in patient care areas must be washable and able to withstand routine low level hospital disinfection

5.4.6.7(2) Penetrations must be properly sealed.

5.4.6.7(3) Floors in clinical areas must be seamless, have homogeneous heat welded seams, and integral bases.

5.4.7 Public Washrooms

5.4.7.1 Provide public washrooms on each floor level of the Facility that is accessible to the public. Allow for one woman's, one men's, and one family style (accessible by either sex) washroom at a minimum on each floor level.

5.5 The Energy Centre

5.5.1 If the Energy Centre is designed as a stand-alone structure on the Site:

5.5.1.1 locate it away from existing residential areas surrounding the Site;

5.5.1.2 design and construct it to BC Building Code post disaster standards as described in Section 5.3;

5.5.1.3 blend it into the Site landscaping;

5.5.1.4 use non-combustible, robust cladding materials including concrete or concrete masonry unit; and

5.5.1.5 secure it against unauthorized access and design it to prevent acts of vandalism and theft.

5.5.2 The Energy Centre will be located and configured to optimize operational continuity and avoid threats resulting from fire, flood, snow, windfall, seismic events and traffic.

5.5.3 Provide vehicular access for maintenance and delivery of alternative fuel source as required.

5.5.4 Configure the Energy Centre to enable a quick removal and replacement of critical equipment.

5.5.5 Minimize the exhaust from the Energy Centre so that it is not a nuisance to users of other buildings on the Site or to residents of off-Site properties.

5.5.6 Orient the intake louvers of the Energy Centre to face away from residential areas and other noise sensitive locations.

5.5.7 The exhaust noise from the diesel generators will have silencers and be directed upwards through an acoustically lined plenum space for discharge at roof level. The noise level immediately outside of the intake louver will not exceed 92 dBA.

5.6 Clinical Support Building

5.6.1 If the Clinical Support Building is designed as a stand-alone structure on the Site, Project Co will locate the Clinical Support Building so that there is convenient pedestrian access between the Clinical Support Building and the Acute Care Facility.

5.6.2 The Clinical Support Building must be constructed to meet the structural requirements for a post-disaster building, regardless if it is constructed as a stand-alone structure or integral with the Acute Care Facility. A stand-alone Clinical Support Building does not have to meet the post-disaster standards for mechanical and electrical systems but rather these systems can be built to conventional standards (Normal Importance).

5.6.3 Provide vehicular access.

5.6.4 Design the Clinical Support Building to be compatible with the form and character of the Acute Care Facility, while integrating it with the rest of the Site.

5.7 Commercial Opportunity

5.7.1 Project Co will provide, per the Clinical Specifications, a designated area for commercial opportunity in the Acute Care Facility, to the approval of the Authority.

5.7.2 Provide this commercial opportunity at a convenient location by the main public entry area, to optimize staff and public access.

5.7.3 The Authority, at its choosing, may put out a separate tender, for the fit out and / or operations of this commercial opportunity.

5.7.4 Provide services that are appropriate for a typical commercial retail food opportunity space of the size specified, including electrical and power, natural gas, low voltage

communications, fire alarm, paging, phone, hot and cold water, sanitary drainage and grease trap and mechanical HVAC for the fit out to conveniently connect to.

5.7.5 Provide for separate metering of electrical, natural gas and hot and cold water services.

5.7.6 Provide for appropriately sized ventilation, make-up air and exhausting that will include exhaust hoods for two deep style fryers for convenient venting from this commercial space to the roof.

5.7.7 Any commercial space provided must compliment healthcare objectives.

5.8 Interior Environment

5.8.1 Infection Control

5.8.1.1 General

5.8.1.1(1) Design the Facility in compliance with all applicable infection control standards, including CSA Z8000.

5.8.1.1(2) Design the Facility to mitigate and prevent, where possible, the spread of infection including via contaminated surfaces and airborne pathogens.

5.8.1.1(3) Select appropriate materials and use simple detailing leading to quality workmanship and ease of accessibility for routine cleaning and maintenance.

5.8.1.1(4) Design the Facility to consider ease of infection prevention and control in future alterations, modifications and additions.

5.8.1.1(5) In addition to meeting the requirements of CSA Z317.2, design and construct the Facility to mitigate the spread of airborne infections during an outbreak by creating outbreak control zones as follows:

5.8.1.1(5)(a) provide outbreak control zones in each neighbourhood located within the following components: IP.01 (Medical/Surgical Inpatient Units), IP.02 (Intensive Care/Telemetry Unit) and IP.03 (Maternity and Newborn Inpatient Unit); each neighbourhood within these components will be equipped with an infection control vestibule that will accommodate pressurization differences between the vestibule and adjacent zones, controlled entry and exit, and provide for hand-washing and personal protection equipment. Although IP.02 (Intensive Care/Telemetry Unit) includes two neighbourhoods, they will operate as a single

contiguous outbreak zone served by a common infection control vestibule. Although IP.03 (Maternity/Newborn Inpatient Unit) includes two neighbourhoods, they will operate as a single contiguous outbreak zone served by a common infection control vestibule;

5.8.1.1(5)(b) design and construct outbreak control zones so that the mechanical ventilation systems will achieve negative pressure within the outbreak control zone relative to adjacent floor areas;

5.8.1.1(5)(c) provide differential pressure sensors at each of the outbreak control zone vestibules to monitor whether the required pressurization is achieved to adjacent areas; and

5.8.1.1(5)(d) coordinate outbreak control zones with the mechanical requirements described in Section 7.4 of this Schedule.

5.8.1.2 Sinks and Hand Hygiene Stations

5.8.1.2(1) Design the Facility in compliance with all applicable infection control standards, including CSA Z8000.

5.8.1.2(2) Prepare a workflow pattern and risk assessment in collaboration with the Authority to address placement of hand wash sinks and alcohol-based hand rub dispensers.

5.8.1.2(3) Provide specialized scrub sinks in the following rooms or areas:

5.8.1.2(3)(a) the surgical suite, procedure rooms and all areas where invasive sterile procedures occur; and

5.8.1.2(3)(b) other rooms or areas as indicated in the Clinical Specifications.

5.8.1.2(4) Provide hand hygiene stations:

5.8.1.2(4)(a) at all entrances to the Facility so that visitors stop, take notice, and access them (stations will have at least four antiseptic hand rub dispensers mounted for convenient access for visitors); and

5.8.1.2(4)(b) other rooms or areas as indicated in the Clinical Specifications.

5.8.1.3 Equipment & Storage

5.8.1.3(1) Provide storage shelves that are:

5.8.1.3(1)(a) cleanable with Authority approved detergents and disinfectants;

5.8.1.3(1)(b) not located under sinks; and

5.8.1.3(1)(c) minimum 200 mm above the floor to permit routine cleaning;

5.8.1.3(2) If open shelving is provided for storage, the bottom shelf of such shelving will be a solid surface to prevent contamination from the floor.

5.8.1.4 See Section 5.4.5.7 for infection control for ceilings.

5.8.1.5 See Section 5.4.6.7 for infection control for floors.

5.8.1.6 Psychiatric Areas

5.8.1.6(1) Design the Psychiatric Intensive Care Unit, Psychiatric Inpatient Unit and Emergency Seclusion Rooms to the requirements of British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

5.8.1.6(2) Design all mental health units to have a non-institutional feel and the ability to put a unit in lock-down mode as necessary.

5.8.1.6(3) Provide direct access to an exterior courtyard that meets the requirements of Section 8.2.1 and is secure.

5.8.1.7 Pharmacy Areas

5.8.1.7(1) Design the Pharmacy areas in accordance with the requirements of USP 797 Guidebooks to Pharmaceutical Compounding – Sterile Preparations and the Canadian Society of Hospital Pharmacists Guidelines for the preparation of sterile products in pharmacies.

5.8.1.7(2) Refer to the Equipment List for the requirements of the BioSafety Cabinet, Laminar Flow Hoods and other equipment in the Pharmacy department.

5.8.2 Ergonomic Design

5.8.2.1 Project Co will provide:

5.8.2.1(1) detailed design features, which expressly facilitate the physical activities of the staff and patients to increase their safety,

efficiency and general well-being, and assist in eliminating ergonomic risk factors;

5.8.2.1(2) for all inpatient care rooms (including washrooms) to accommodate lifting and transfer devices;

5.8.2.1(3) ergonomic design, consistent with good industry practice, of all work spaces including millwork, furniture, lighting, and finishes to eliminate strain and injury to health care workers; and

5.8.2.1(4) adjustable work surfaces and shelves to allow for flexibility of use in nursing stations.

5.8.3 Colour

5.8.3.1 Project Co will:

5.8.3.1(1) provide departmental color palettes appropriate for the emotional and psychological needs of patients;

5.8.3.1(2) provide color palettes that contribute to the creation of a healing environment;

5.8.3.1(3) provide distribution of ambient full-spectral color within typical staff and patient environments;

5.8.3.1(4) avoid glare-creating finishes; and

5.8.3.1(5) provide a master colour sample palette and sample board of interior finishes for approval by the Authority.

5.8.4 Art Works

5.8.4.1 The Authority intends to procure various art works for display within the Facility. The Design will allow for the display of art work as follows:

5.8.4.1(1) in the interior allow for wall surfaces to display art;

5.8.4.1(2) in the exterior allow for sculpture to be placed at grade;

5.8.4.1(3) at the Campbell River Site allow for the removal and replacement of the existing wood carvings located in the existing sculpture garden;

5.8.4.1(4) allow for the development of local community art projects to be included as part of project design; and

5.8.4.1(5) provide specific corridors and display spaces for art for approval by the Authority.

5.8.4.2 Project Co will:

5.8.4.2(1) design the Facility to support the Authority's art program by providing and identifying for the Authority effective and appropriate locations for major and minor art works throughout the Facility;

5.8.4.2(2) coordinate the procurement and delivery (including timing of delivery), of art works with the Authority and install all art works procured by the Authority;

5.8.4.2(3) provide lighting to enhance the display of all art works; and

5.8.4.2(4) provide all necessary structural support, seismic restraint, vandal-proof mounting and other protective measures required for particular art works.

5.8.5 Interior Signage and Wayfinding

5.8.5.1 Project Co will:

5.8.5.1(1) provide a simple configuration of the Facility circulation systems and functions so that wayfinding is inherently easy;

5.8.5.1(2) locate major destinations, such as department entrances, directly off of entry spaces and/or along primary circulation paths for easy access, make waiting areas as open as possible to circulation routes without requiring wayfinders to pass through waiting areas;

5.8.5.1(3) provide significant recognizable, easily named and identified elements in key and easily found locations that can become 'meeting points' for patients and visitors;

5.8.5.1(4) design public elevator and stair lobbies and public circulation routes to be distinct from service routes and other non-public routes; and

5.8.5.1(5) orient all building plan directories to reflect the direction from which they are viewed.

5.8.5.2 Project Co will provide all signage required for the Facility in accordance with the following:

5.8.5.2(1) design signage in consultation with the Authority such that the materials, colours, letter fonts, sizes and other aesthetic and functional considerations, such as Braille, conform to the overall wayfinding design system and are coordinated and consistent with those used for the Authority's Royal Jubilee Hospital Patient Care Centre. Refer to Appendix 3I [Wayfinding and Signage]. Materials

for signs include: aluminum, acrylic, vinyl and stainless steel materials;

5.8.5.2(2) signage will be highly visible (day and night), clear, concise, and well-differentiated from surrounding information, notices, advertising, etc.;

5.8.5.2(3) signage will be resistant to graffiti and physical damage;

5.8.5.2(4) use international symbols where and as applicable;

5.8.5.2(5) provide signage that directs visitors to all patient destinations and all other departments and rooms within. Prioritize patient destinations over non-patient destinations;

5.8.5.2(6) orient all important signs, including all patient destination signs, to be perpendicular to the line of patient travel on approach; and

5.8.5.2(7) avoid multi-layered naming hierarchies and complex numbering systems.

5.8.5.3 Project Co will provide the following interior signage at the Facility:

5.8.5.3(1) building directories at all entrances, major corridor junctions and at elevator lobbies. They will include a Site plan highlighting the Buildings as well as floor level listings of departments;

5.8.5.3(2) a digital interactive kiosk signage system in lobby of the Acute Care Facility;

5.8.5.3(3) elevator floor directories at all elevator lobbies. They will include floor level listing of departments;

5.8.5.3(4) room signage for all rooms. Room signage is to be of several types distinguishing room functions. Administrative space signage requires a pocket to insert specific information such as name of occupant. Room signage for utility rooms will be designed to be less evident than general room signage. Blade signs may be used to identify vending areas and waiting areas;

5.8.5.3(5) Infrastructure required to support the “Care Aware Room Link” electronic signage by Cerner in areas selected by the Authority, as indicated in Appendix 2D Attachment 4A [Campbell River Facility Smart Hospital Requirements] and 4B [Comox Valley Facility Smart Hospital Requirements] for locations. Project Co will confirm all locations of such signage with the Authority. Where “Care Aware Room Link” electronic signage is used, typical room

identification signage is not required. The Authority will provide all "Care Aware Room Link" electronic signage devices.

5.8.5.3(6) small door tags for all door frames;

5.8.5.3(7) patient room signage and patient care department directories. Signs will incorporate art imagery, such as local scenery, to designate different departments and patient rooms;

5.8.5.3(8) overhead directional signage, which must either be suspended from a ceiling or bulkhead or be mounted directly over doors. No directional signage will be incorporated into flooring; and

5.8.5.3(9) feature signs and information panels at various locations throughout the hospital (for example signs to locate information desk).

5.8.5.4 Design internal directional signs to include:

5.8.5.4(1) a main directory, installed at or near the main public entrance to the Building that indicates the Building in relation to the overall Site and the location of every area and department within the Building that is accessible to the public;

5.8.5.4(2) a continuous 'trail' of signage from the entrances to each of the reception/information points listed on the directories;

5.8.5.4(3) installation of signage at each point at which a directional decision is required;

5.8.5.4(4) consistent terminology;

5.8.5.4(5) door signage to identify every space (e.g. rooms, alcoves, corridors and stairwells) in the Facility. Door signage will:

5.8.5.4(5)(a) be developed in consultation with the Authority;

5.8.5.4(5)(b) be located in a consistent location for every space in the Facility;

5.8.5.4(5)(c) indicate restrictions on entry and warn of hazards, including "Laser in use" and "Radiology in use" signage; and

5.8.5.4(5)(d) not be obscured by the emergency systems and code blue system call.

5.8.5.5 Provide a room numbering system that is consistent with the following protocol:

5.8.5.5(1) each room and any space with walls and a door require a unique identifier number. In addition any space such as a patient cubicle, alcove or recess of significant size must be numbered as a room. This identifies spaces for labelling of fire alarm, electrical and data outlets and for ongoing maintenance purposes;

5.8.5.5(2) rooms are numbered in a manner that reflects normal movement through the Facility;

5.8.5.5(3) labelling anticipates a person attempting to follow numbering along corridors in sequence;

5.8.5.5(4) blocks of numbers are periodically skipped to allow for future expansion of the numbering system if rooms are added through renovations;

5.8.5.5(5) each room and space requires a unique number for service reasons. It is important that room numbers be determined early in design and maintained following occupancy. Follow the same numbering system on design and construction documentation for all disciplines (architectural, mechanical, electrical, etc.);

5.8.5.5(6) numbering will be according to an Authority standard. Building identification letters are first. Use “CRH” for the Campbell River Facility and “CVH” for the Comox Valley Facility;

5.8.5.5(7) the Building identification letters are followed by three or four digits, beginning with the first digit: 0 for basement rooms, 1 for ground floor, 2 for second floor, etc. on up the Building floors. Four digits may be required in a large Building due to the number of rooms on the floor, and if this is the case, the four digits will extend to all floors;

5.8.5.5(8) the second digit identifies the department. The third and / or fourth digit identifies the room. For example, CRH1234 is Room 34 in the Diagnostic Imaging Department identified as Department 2, on the first floor in the Campbell River Hospital. CRH1334 is Room 34 in the emergency department, identified as Department 3, on the first floor of the Campbell River Facility;

5.8.5.5(9) if a room is only accessed from within another room, for example a large closet, the closet room number will be the room number in which it is located followed by a small letter a, b, c, etc. depending on the number of additional rooms that exist within the room;

5.8.5.5(10) stair numbering will follow the sequence: Building name first, then 1, 2, 3, 4 depending on the number of stairs (for example CRH1, CRH2, and CRH3);

5.8.5.5(11) corridor numbering will follow the sequence: Building name first, then two numbers. The first number identifies the floor, the second number identifies the corridor. For example, CRH 02, CRH 12, CRH 22 and CRH 32; and

5.8.5.5(12) elevators will follow the sequence: Elevator 1, Elevator 2 and Elevator 3.

5.8.5.6 See Section 4.2.5 for exterior signage and wayfinding.

5.8.5.7 Donor Walls

5.8.5.7(1) Project Co will provide a space located in proximity to the main visitor entrance(s) of the Acute Care Facility where the Authority may construct a feature to recognize donors, and other supporters of the Facility.

5.8.5.7(2) Donor Wall signage must be incorporated in the Acute Care Facility lobby. The design will allow for changes to donors and additional donors to be added in an economical and convenient way

5.9 Structural Design

5.9.1 Structural Design Principles

5.9.1.1 The structural design, including minimum design loads and general provisions and material specifications, will satisfy the more stringent requirements of the BC Building Code, other applicable or referenced design standards, loading criteria required by equipment suppliers or construction technique and the principles detailed in this Section.

5.9.1.2 Carry out the Construction so that Construction-caused settlement of existing buildings and structures does not exceed 6 mm at any location.

5.9.1.3 The long term differential settlement in any structural bay will not exceed 20 mm. Foundations will be designed by Project Co's structural engineer together with Project Co's geotechnical engineer. Project Co will cause its structural and geotechnical engineers to be jointly responsible for foundation design (including causing both to sign the appropriate sections of Schedules B & C of Project Co's building permit submission).

5.9.1.4 Refer to Schedule 2 [Design and Construction Protocols] for requirements regarding vibration from Construction activities.

5.9.1.5 During site preparation and construction, Project Co will cause its structural and geotechnical engineers to provide site reviews and oversee appropriate testing

(by Project Co) to confirm that the general intent of the foundation and site preparation design recommendations are carried out.

5.9.2 Design loads

5.9.2.1 Performance criteria

5.9.2.1(1) Use the following minimum floor design specified live loads except where the specific use and occupancy of a space requires a higher live load:

5.9.2.1(1)(a) Parking Structures: 2.4 kPa (50psf);

5.9.2.1(1)(b) Main (ground) floor and Assembly Areas: 4.8 kPa (100 psf);

5.9.2.1(1)(c) Upper Floors 3.60 KPa (75 psf); and

5.9.2.1(1)(d) Mechanical/electrical service rooms: 6.0 kPa (125 psf).

5.9.2.1(2) Design upper floors to accommodate concentrated loads from equipment, fixtures, and machinery, whether floor, wall, or ceiling-mounted, including medical equipment and patient lifting devices.

5.9.2.1(3) Design floors for a minimum superimposed specified dead load allowance of 1.0 kPa to allow for partitions, and 0.5 kPa to allow for ceilings and mechanical equipment (other than medical equipment).

5.9.2.1(4) Design roofs for a minimum net uplift wind load of 1.5kPa and for the minimum snow and rain loads required by the British Columbia Building Code and referenced standards. Notwithstanding other requirements, the minimum specified live load for design of roofs will be 2.4 kPa (50 psf) and roofs will be designed to accommodate concentrated loads from equipment, machinery and features, whether roof or ceiling-mounted, including medical equipment and patient lifting devices.

5.9.2.1(5) Design roofs for the superimposed specified dead load of roofing materials, green roofs (if applicable), ceilings, mechanical equipment, but not less than 1.5 kPa (30 psf) to allow for future re-roofing alternatives.

5.9.2.1(6) Design floors and roofs above mechanical and electrical service rooms for a superimposed suspended equipment specified dead load of 2.0 kPa (40 psf) in addition to the minimum dead load allowances specified above.

5.9.2.1(7) Design floors for rooms designated for medical records storage or compact mobile shelving for a minimum 12.0 kPa (250 psf) specified live load.

5.9.3 Flexibility for Future Change

5.9.3.1 Design the floor structure to be able to accommodate one 130 mm diameter cored hole per structural bay at almost any location in the floor plate and the design for the concrete floors will assume at least one reinforcing bar in each direction at each core location is cut.

5.9.3.2 Design the floor structure with a minimum of one 150 mm diameter knock-out opening on two sides of each column for future use and the knock-out openings will be in addition to any openings required for current services; additionally the floor structure will be capable of having a minimum of six additional core holes (100 mm diameter) per bay without additional reinforcing.

5.9.3.3 See Section 3.11.2 for additional flexibility requirements.

5.9.4 Deflection limitations

5.9.4.1 Design the structure to meet the deflection limits of the BC Building Code, and in accordance with the applicable materials design standards listed in Section 2.7.1 as a minimum and as appropriate for the non-structural components of the Facility. Notwithstanding the above, the deflection limit will not exceed the levels specified in this Section.

5.9.4.1(1) For concrete floor or roof construction, the maximum deflection occurring after the installation of non-structural elements, including long-term creep deflection and live load deflection, will not exceed span/480 and total short and long-term deflection will not exceed span/360;

5.9.4.1(2) for steel floor construction, the maximum live load deflection will not exceed span/480 with the total load deflection not exceeding span/360. The total load deflection is to include effects of shrinkage of concrete topping slabs; and

5.9.4.1(3) for steel roof construction, the maximum live load deflection will not exceed span/360 and the total load deflection will not exceed span/240.

5.9.5 Vibration limitations

5.9.5.1 Design the structural system to minimize the effects of floor vibration due to use, occupancy and equipment. Vibration is to be limited to acceptable levels for the use and occupancy of the floors.

5.9.5.2 Floor system vibration characteristics are to be in accordance with Commentary D of the NBCC 2010 Edition.

5.9.5.3 Performance criteria

5.9.5.3(1) Select and design floor structural systems to have a vibration acceleration maximum limit of 0.5%g with a damping ratio of 0.02 when an excitation force of 0.29 kN is applied.

5.9.5.3(2) Machinery that could be a source of vibration is to be mounted using vibration isolation techniques; this includes the potential dynamic loads associated with the use of the Heliport.

5.9.5.3(3) In areas supporting sensitive equipment and occupancies, design the structure for the vibration limitations specified by the manufacturer of the specified equipment or required by the planned use and occupancy of the floor space and in-situ measurement verification of floor vibration characteristics is to be carried out where specified by the equipment manufacturer.

5.9.5.3(4) Consult with users about the locations of sensitive equipment, and design the structure to support the equipment per the equipment specifications.

5.9.5.3(5) To verify compliance with the vibration requirements, an independent testing firm may be retained by the Authority. The testing firm will measure the vibration using instrumentation which may include transducers, accelerometers, signal-conditioning equipment, data recorders, and analysis systems. Measured vibration performance characteristics for the structure must meet the requirements set out in these specifications. The following table indicates acceptable vibration levels for various typical medical and non medical Facility spaces:

Occupancy or Equipment Requirements	Vibrational Velocity (1)		Floor Stiffness KFn[(2)]
	µin/s	µm/s	Kips/in-sec
Mechanical rooms on an unoccupied floor above or below an occupied floor	4000	100	Not Applicable
Office areas, waiting rooms and corridors	8000	200	250-1500
Mechanical Rooms on the same floor as an occupied area	1200	30	Not Applicable
Computer areas; patient care areas (daytime) – threshold of human perception	8000	200	500-3000
Operating rooms and critical work areas; bench microscopes up to 100 x magnification	4000	100	1000-6000
Bench microscopes up to 400 x magnification; optical and other precision balances; optical comparators	2000	50	2000-12000
Microsurgery, eye surgery; Bench microscopes at magnification greater than 400x; optical equipment on isolation tables	1000	25	4000-25000
Magnetic resonance imagers	500	12	8000-50000
Mass spectrometers	250	6	16000-100000
(1) Value of constant velocity regions measured in one-third octave bands of frequency range 8 to 100 Hz. Based on ASHRAE, AISC and ISO Criteria. (2) KFn depends on walker weight and gait. Ranges indicated reflect average to conservative designs. Average walker (150 lbs, 75 steps/min). Conservative walker (185lbs, 100 steps/min)			

5.9.6 Durability

5.9.6.1 Design the structure and structural components of the Facility for a minimum 50-year life span.

5.9.6.2 Design the structure and structural components of the Facility to minimize the effects of corrosion and deterioration due to the environment and use in accordance with the following:

5.9.6.2(1) adequate concrete crack control joints and expansion / contraction joints. Caulk exposed joints;

5.9.6.2(2) high strength concrete mixes proportioned to CSA A23.1/A23.2 durability requirements for exposure class;

5.9.6.2(3) hot-dip galvanize or powder-coat exterior exposed steel; and

5.9.6.2(4) hot-dip galvanize embedded steel protection angles and skid plates for loading docks and garbage compactors.

5.9.7 Medical equipment supports

5.9.7.1 Design and provide for support/anchorage of all supplied equipment. Medical equipment will be supported, anchored, and braced to resist gravity, operational, and seismic loads in a manner appropriate for the functional and service requirements for the specific equipment.

5.9.7.2 The design for medical equipment supports, anchorage, and bracing will be carried out by a qualified professional engineer registered in the Province of British Columbia. Installations will be field reviewed by the design engineer.

5.9.7.3 Provide overhead monorail lifting beams (of a length suitable for the purpose of the space) that are attached to the ceiling, complete with trolley and hoists, each rated for a safe working load of 1000 lbs or 454 kg in the following areas:

5.9.7.3(1) Biomedical Engineering Tech Workroom;

5.9.7.3(2) Equipment Maintenance; and

5.9.7.3(3) the Equipment Depot.

5.9.7.4 Performance criteria

5.9.7.4(1) Design floor and roof assemblies to support the gravity and seismic loads for floor, wall, or ceiling-mounted medical equipment. Ensure that steel content of structural members is compatible with equipment which is sensitive to steel content of the surrounding structure.

5.9.7.4(2) Design the structure for the vibration limitations specified by the manufacturer of the specified equipment or required by the planned use and occupancy of the floor space and carry out in-situ vibration testing when specified by the equipment manufacturer.

5.9.7.4(3) Where practical, design the supports for ceiling-mounted equipment, such as radiology gantries, to be universal so that the supports may be used for various types of equipment.

5.9.7.4(4) Drilled insert-type anchors for medical equipment supports and anchorage are to be rated by the insert manufacturer for seismic and cyclic loading applications.

5.9.8 Mezzanines

5.9.8.1 Provide a mezzanine in each of the following areas:

5.9.8.1(1) Equipment Depot;

5.9.8.1(2) Equipment Maintenance; and

5.9.8.1(3) Materials Management,

or an equivalent floor area as described in Section 5.9.8.4.

5.9.8.2 Mezzanines will have a minimum area of half the area of the departments listed above, in accordance with Appendix 3A [Clinical Specifications].

5.9.8.3 For all mezzanines:

5.9.8.3(1) The mezzanine will be designed to store equipment with a live load of up to 4.8 kPa (100 psf).

5.9.8.3(2) Provide a convenience stair to access the mezzanine.

5.9.8.3(3) The mezzanine floor surface will be a smooth concrete.

5.9.8.3(4) Provide a detachable guardrail section for the edge of the mezzanine where the hoist beam needs to access the mezzanine.

5.9.8.3(5) Provide equipment access to the mezzanine by means of a scissor lift (see Section 6.12.7 for scissor lift requirements).

5.9.8.3(6) Provide mezzanines with minimum headroom of 2.4m above and below.

5.9.8.4 As an alternative to the requirement to provide a mezzanine in one or more of the areas specified in Section 5.9.8.1, Project Co may provide the total floor area equal to that required by the mezzanine under Section 5.9.8.2 on the same floor level as the applicable area(s) specified in Section 5.9.8.1.

5.9.9 Member Design Criteria

5.9.9.1 Design all floor and roof structural framing members to have sufficient strength and stability so that the factored member resistance is equal to or greater than the effects of the factored loads.

5.9.9.2 Design all floor and roof structural framing members to have sufficient stiffness so as to remain serviceable under the specified gravity loads.

5.9.10 Parking Structure

5.9.10.1 Parking structures will be designed and constructed to meet the requirements of CSA S413-07, “Parking Structures”.

5.9.10.2 Parking structure can be classified as Normal Importance Category provided the structure is totally independent of post-disaster category Buildings.

5.9.10.3 Structural Loads

5.9.10.3(1) Live load due to occupancy: minimum 2.4kPa (50 psf).

5.9.10.3(2) Snow load: as per requirements of BC Building Code.

5.9.10.3(3) Superimposed dead load (electrical & mechanical): minimum 0.50 kPa (10 psf).

5.9.10.4 Parking structure members will not exceed the deflection limitations specified in Section 5.9.4.

5.9.10.5 All floors and roofs of parking structures will be protected by a membrane meeting the requirements of CSA S413-07.

5.9.10.6 Project Co will provide all quality control procedures as specified in Annex D of CSA S413.07.

5.9.10.7 Project Co will undertake all maintenance procedures outlined in Annex E of CSA S413-07 at the minimum recommended frequency.

5.9.10.8 Project Co will provide documentation confirming all responsibilities given in Annex F of CSA S413-07 have been met.

5.9.10.9 The structural design will take into consideration all issues presented in Annex G of CSA S413-07.

5.10 Mechanical Systems Design

5.10.1 General - Project Co will provide mechanical systems that:

5.10.1.1 are designed to provide a healing, comfortable and productive environment for the Facility Users and meet the required environmental conditions for all equipment;

5.10.1.2 are located and designed to meet the requirements set out in Appendix 3E [Sound Transmission Ratings] from outdoor spaces / places of respite intended for staff / patient use; and from adjacent properties surrounding the hospital site;

5.10.1.3 minimize impact on the natural and physical environment, through energy efficiency, optimization of resource use, and simplification of the systems;

5.10.1.4 are configured and located in such a way to minimize disruption to clinical areas to perform maintenance and repairs;

5.10.1.5 are developed to provide reliability of continual operation. Adequate standby capacity and redundancy will be included in system design;

5.10.1.6 are vibration isolated to minimize noise and vibration through the structure or other components of the Facility;

5.10.1.7 incorporate flexibility and adaptability for future expansion without major disruption or alteration to the Facility operations or infrastructure. All systems will be designed and sized to suit the consumption and discharge needs of the Facility at peak operational requirements (including all retail occupancies filled), plus:

5.10.1.7(1) the ability to increase the flow or capacity as follows:

5.10.1.7(1)(a) piping and ducting systems in main service distribution lines (mechanical rooms, shafts and corridors) serving Type I areas, Type II areas and Type III areas not listed below will accommodate an increase of at least 30% for future demand. Refer to CSA Z317.2(Table 1) for area classifications; and

5.10.1.7(1)(b) piping and ducting systems in main service lines (mechanical rooms, shafts and corridors) serving general storage rooms, conference rooms, locker rooms, offices, corridors, admission and lobbies will accommodate an increase of at least 10% for future demand;

5.10.1.7(2) branch piping and ducting will be sized to meet the requirements of current demand.

5.10.1.7(3) air handling equipment, exhaust fans, and pumps will be sized for 10% additional capacity;

5.10.1.7(4) provide space within the mechanical rooms for 30% additional future equipment;

5.10.1.7(5) designing the mechanical plant to allow for expansions of the heating plant, chilled water plant, and associated plumbing, piping, and equipment, for convenient expansion of the Facility per Section 4.1.3;

5.10.1.7(6) the design of piping, ductwork, heating/cooling coils, and air filters will meet the following minimum parameters:

5.10.1.7(6)(a) hydronic pressure drop – maximum piping friction loss: 4 m/100m;

5.10.1.7(6)(b) hydronic velocity – maximum velocity based on pipe manufacturer's recommendations;

5.10.1.7(6)(c) supply and return ductwork will be sized within the ASHRAE Fundamentals (latest edition) upper and lower limits for duct air velocities and pressure drop. Duct velocity will be limited to achieve and acoustical design criteria of RC(N) 35;

5.10.1.7(6)(d) Heating/ cooling coil face velocity – maximum velocity 2.5 m/s; and

5.10.1.7(6)(e) Air filter face velocity – maximum velocity 2.5 m/s.

5.10.1.8 are as similar as possible across both Facilities (refer to Section 3.8).

5.10.1.9 such that steam, water, glycol and other fluids used within mechanical systems are treated to prevent corrosion, algae growth, build-up of deposits, disease, bacteria and will prolong the equipment life.

5.10.2 All mechanical services installed within electrical, communication and UPS rooms will maintain a minimum clear height of 2000 mm above finished floor. Do not install any equipment requiring a water connection in the ceiling of these spaces. Do not route plumbing or hydronics distribution piping in the ceiling of these spaces. Avoid running plumbing drain pipes in the ceilings of these spaces wherever possible, and provide drain pans under all drainage piping that is located in the ceiling space.

5.10.3 Pipes, ducts and fittings will be insulated to conserve energy, prevent condensation, attenuate noise and prevent accidental burns.

5.10.4 Refer to Appendix 2C [Energy and Carbon Emissions] regarding energy BC Hydro Power Smart New Construction Program (Whole Building Design). Integrate requirements of this program and any other applicable incentive programs into the mechanical systems. Coordinate incentive program applications with other disciplines and with the Authority. Provide all receipts, invoices, and other documentation required for the incentive program submissions.

5.10.5 Refer to Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications] for additional requirements related to the UBC TEL Rooms.

5.10.6 Coordinate with the electrical specification for all mechanical systems that must maintain operation during an expected or unexpected shut down of the Building electrical service. Where mechanical equipment and devices are required to be served by emergency power, provide UPS, vital, delayed vital, or conditional power as per standards in Section 7.7.5.1.

5.10.7 Coordinate all mechanical systems with requirements of all equipment, whether supplied by Project Co or the Authority and provide all connections required from mechanical systems. Make allowances within the mechanical systems' designs so all equipment can be removed or replaced without disrupting the operation of other equipment connected to the mechanical systems.

5.10.8 For all spaces designated for tenants, design all mechanical systems so the work required to modify the systems for the tenant fit-out will not affect the operation of the main Building's systems. See Section 5.7.

5.10.9 All computer based systems required to operate or supervise mechanical systems will comply with the Authority's IMIT standards and policies identified in this Schedule including Appendix 3F(vi) [VIHA IMIT Technologies Standards].

5.10.10 Post-Disaster Design

5.10.10.1 Design all mechanical piping, equipment, and systems seismically in accordance with the requirements for post disaster buildings, except that systems serving a standalone Clinical Support Building need only meet BC Building Code Seismic standards as a minimum requirement.

5.10.10.2 The following is a list of additional requirements that Project Co will comply with beyond the BC Building Code minimum:

5.10.10.2(1) The heating plant will have two sources of energy each designed for post disaster. If fuel is stored on site the tank will be designed to operate for a minimum of 72 hours.

5.10.10.2(2) The fuel storage system will also have sufficient capacity to supply fuel to the emergency generators (per Division 26) for a minimum period of 72 hours. If the heating plant and generators use the same fuel, the supplies will be stored in separate tanks per applicable regulations, including CSA Z32.

5.10.10.2(3) Each fuel storage system will be complete with a fuel polishing system to ensure the stored fuel remains clean and available for its intended use at any time.

5.10.10.2(4) Boilers and pumping equipment will have sufficient redundancy to ensure the Facility continues to be operational after an event.

5.10.10.2(5) Refer to Section 7.4.4.1(9) regarding heating, ventilation and air conditioning systems.

5.10.10.2(6) See Section 5.3.11 for additional information on the EOC.

5.10.10.2(7) Provide a sewage waste storage system with 3785L (1000 USGAL) retention capacity at each Site. Manual diverting valves will divert the sewage to the tank based on a sewage main break.

5.10.10.2(8) Provide connections on the exterior face of the Facility as follows:

5.10.10.2(8)(a) a water inlet connection on the exterior of the Facility to allow for supply of water from a tanker truck. This water would serve the Building's domestic needs as well as all utility water requirements. This includes all process loads and make-up water for heating and cooling systems. This excludes landscaping irrigation systems;

5.10.10.2(8)(b) mechanical service connections (domestic hot water, domestic cold water, medical gases) that support the Mass Casualty Tent Area to be enclosed in a vandal-resistant kiosk;

5.10.10.2(8)(c) a separate holding tank for hazardous materials with separate connections for receiving hazardous materials from the decontamination shower in the emergency department and the Mass Casualty Tent Area. Locate the drain serving the Mass Casualty Tent Area in a concrete pad complete with cap and lock when not in use. Design drain line so that sewage fumes do not discharge to outdoors when not connected.

5.10.10.2(8)(d) inlet connections for fire water system as required;

5.10.10.2(8)(e) a sanitary sewer pump-out for connection to a sewage pump truck. The connection will connect to the sewage storage system;

5.10.10.2(8)(f) electrical and communication services connections that support the Mass Casualty Tent Area will be enclosed in a vandal-resistant kiosk;

5.10.10.2(8)(g) except as otherwise set out in this Section 5.10.10, all connections will be secure terminations (valved, capped and locked) to protect from tampering and vandalism; and

5.10.10.2(8)(h) all connections will be located in service areas away from general circulation routes, and where they can be readily accessible by service vehicles.

5.11 Electrical Systems Design

5.11.1.1 Project Co will comply with the following design principles for electrical, communications and security systems.

5.11.1.1(1) All electrical systems, materials and equipment will be of a type and quality intended for use in a health care facility. Configure electrical systems to meet requirements of the identified program and patient care needs in an efficient manner, with optimal utilization of space, staff and equipment resources.

5.11.1.1(2) Provide electrical systems that: allow the Authority to deliver the program described in the Clinical Specifications; and provide redundancy, protection, continuity of service, serviceability of equipment; and a comfortable and safe working environment for patients, visitors, and staff.

5.11.1.1(3) Implement the latest proven technologies in the design of the electrical systems and equipment.

5.11.1.1(4) Integrate systems where integration provides efficiency, operational and cost advantage.

5.11.1.1(5) All electrical, communication, security, medical and life safety systems will be fully compatible with existing Authority regional based systems. Provide all infrastructure, interfaces, modifications, programming, testing and commissioning to local and off-Site systems to ensure that there is seamless integration with remote facilities.

5.11.1.1(6) Coordinate the design of network architectures and communication, security, clinical and Building systems functionality with the Authority's representatives. Obtain approval from the Authority prior to implementation. Refer to Appendix 3F(i) [Cable Infrastructure Standard], Appendix 3F(ii) [Wireless Infrastructure Standard], Appendix 3F(iii)[Wireless Data Communications Policy], Appendix 3F(iv) [VIHA A/V and Video Conferencing Standard], Appendix 3F(v) [NIHP Systems Responsibility Matrix] and Appendix 3F(vi) [VIHA IMIT Technology Standards]. All computer based systems required to operate or supervise electrical, communications, security and buildings systems will comply with the Authority's IMIT standards and policies identified in this Schedule including Appendix 3F(vi) [VIHA IMIT Technology Standards].

5.11.1.1(7) All head-end/server equipment and applications will reside on the Authority's network equipment which resides in the PER and SER,

or as directed by the Authority. Workstations will be located as required for system operator use.

5.11.1.1(8) Incorporate into the design and construction the principle that change will be a constant and inevitable fact within the Facility. Completed electrical systems will permit change while minimizing the cost of change and the amount of interruption to the regular Facility activities. Utilize a combination of natural light, luminaries and controls to optimize daylight.

5.11.1.1(9) Provide lighting schemes that support staff activities and provide enhance safety for staff, patients and visitors.

5.11.1.1(10) Design lighting with the objective of creating a comfortable working environment and an environment conducive to healing and recovery.

5.11.1.1(11) Include systems and equipment coordinated to provide synergy and reliable electrical performance for the various Facility functions.

5.11.1.2 Provide devices and systems to minimize the noise and vibrations of electrical equipment/ components (transformers, luminaries, cables etc.) to below an acceptable level as required in a health care facility.

5.11.1.2(1) Locate electrical rooms and power distribution equipment in order to minimize the distances for feeder runs, to provide easy access for equipment moves and to avoid interference with other services and equipment. Where electrical equipment is located below grade, provide adequate protection against the risk of flooding.

5.11.1.2(2) Install electrical systems and equipment in a fixed and permanent manner, seismically restrained to meet post-disaster building standards in accordance with the latest version of the BC Building code.

5.11.1.2(3) Locate electrical equipment and feeder routes to minimise the risk to service continuity resulting from fire, flood, adverse weather, seismic events, construction activities and vandalism.

5.11.1.2(4) Incorporate energy management systems to minimize demand pressures on the Building systems and minimize the anticipated increase to energy costs.

5.11.1.2(5) Refer to Appendix 2C [Energy] regarding energy incentive programs. Integrate any requirements of those programs into the electrical systems.

5.11.1.2(6) Refer to Appendix 3C [UBC Faculty of Medicine Technology Enabled Learning Room Specifications] for additional requirements applicable to the UBC TEL Rooms.

5.11.1.2(7) Design and construct the 25kV system to with adequate capacity to accommodate a 100% increase in electrical demand.

5.11.1.2(8) Project Co will:

5.11.1.2(8)(a) design and construct the entire electrical system with adequate spare capacity to accommodate an increase in electrical demand by 25%. Size the emergency power generators, main normal power transformers, feeders and 600V and 208V switchgear accordingly;

5.11.1.2(8)(b) Provide adequate spare physical space in the main electrical room and configure the equipment provided to facilitate all electrical equipment in the main electrical room to be easily expanded by an additional 25% without replacement, relocation or major shutdown of the existing equipment. A major shutdown is defined as a switchboard or transfer switch power outage extending beyond 4 hours, or a main transformer outage exceeding 12 hours;

5.11.1.2(8)(c) provide one complete set of spare power and controls ducts extending from the main electrical room generator bus / controls locations to a future generator pad adjacent to the proposed generators. Cap off these ducts. Ducts will be sized to accommodate a similar sized generator; and

5.11.1.2(8)(d) provide 25% spare capacity for switchgear and panelboards by means of spare adjustable trip circuit breakers. Exact sizing of these spare circuit breakers will be confirmed by the Authority during design.

5.11.1.2(9) Provide adequate physical space to facilitate the installation of new feeders which will utilise the spare electrical capacity. Installation of new feeders will have minimal impact on the Facility.

5.11.1.2(10) Plan installation of equipment to facilitate easy access to equipment which may require inspection or maintenance.

5.11.1.2(11) Provide a complete essential electrical system which meets or exceeds the requirements of CSA Z32-09 and CSA C282-09.

5.11.1.2(12) Provide electrical distribution schemes which are sized and configured to achieve service continuity in the event of equipment failure. Failure of any electrical equipment or feeder will not impair Facility operation or leave any patient treatment room or area of the Facility without at least one active light and one active receptacle.

5.11.1.2(13) Install electrical systems and equipment in a fixed and permanent manner, seismically restrained to meet post-disaster building standards in accordance with the latest version of the BC Building Code.

5.11.1.2(14) The following equipment will be designed, certified and installed in accordance with the International Building Code (IBC) chapters 16 and 17 and tested in accordance with the shake table testing standard ICC-ES AC-156:

5.11.1.2(14)(a) emergency power generator;

5.11.1.2(14)(b) automatic transfer switch;

5.11.1.2(14)(c) UPS system;

5.11.1.2(14)(d) main distribution boards;

5.11.1.2(14)(e) utility transformers; and

5.11.1.2(14)(f) distribution transformers 112.5kVA and larger.

5.11.1.2(15) Size and configure equipment to permit routine testing and servicing of power generation and distribution equipment with minimal loss of service continuity.

5.11.1.2(16) Coordinate the electrical and systems design with other disciplines to support the service continuity and redundancy requirements for mechanical and building systems.

5.11.1.2(17) Design and construct all systems with protection, grounding, isolation and control to address the functional requirements where they are located.

5.11.1.2(18) Power throughout the Building will comprise of a combination of 347/600V and 120/208V for all power, lighting and equipment loads.

5.11.1.2(19) Provide capacity in distribution equipment to serve any shelled spaces in the Facility. Allow 40watts/sq.m for lights and receptacles in shelled space with 50% of load on emergency power. Indicate on floor plans all assumed locations of future Vital

and Conditional 120/208 volt panelboards that will serve the shelled spaces. Indicate future panelboards such that no point in the shelled space is more than 15 metres away either Vital or Conditional panelboard. Provide independently metered electrical services with sufficient panelboard and breaker capacity to serve the shelled space. Indicate on drawings all provisions allowed for shelled spaces, including the transformers from which panels will be fed.

5.11.1.2(20) Provide services to the parkade including power, lighting, wired and wireless data, cellular coverage, CCTV, duress, fire alarm, public address and a parkade stall counting system.

5.11.1.2(21) Provide new services to existing buildings at the Campbell River Site as identified in this Schedule.

5.12 Food Services

5.12.1 Project Co will design and construct the Facility, including with sufficient space, equipment and infrastructure to accommodate the food services described in the Clinical Specifications and in compliance with Appendix 3J [Food Services Specifications].

PART 6. FACILITIES CONSTRUCTION SUBGROUP SPECIFICATIONS

6.1 Procurement and Contracting Requirements (Division 1) – NOT USED

6.2 Existing Conditions (Division 2)

6.2.1 Refer to Schedule 2 [Design and Construction Protocols] regarding available Site reports.

6.3 Concrete (Division 3)

6.3.1 Overriding Principles

6.3.1.1 Design and construct cast in place or precast concrete of appropriate properties for the intended use in accordance with the requirements of all applicable codes and specifications.

6.3.1.2 Design for the applicable concrete exposure class and provide high sulphate resistant performance where applicable.

6.3.1.3 Maximize the fly ash content of the mix.

6.3.1.4 Use wood formwork for cast in place concrete.

6.3.2 Quality Requirements

6.3.2.1 Cause cast in place concrete and concrete materials to be inspected and tested by a CSA certified testing laboratory.

6.3.2.2 Cause precast concrete materials and workmanship to be inspected and tested by the precast concrete contractor as part of its quality control program in accordance with all applicable standards.

6.3.3 Performance Criteria

6.3.3.1 Finish concrete floors with a smooth, dense, steel trowel finish with a Class F2 Flatness Classification in accordance with CAN/CSA A23.1/A23.2-09, except where more strict requirements are needed to suit the proposed occupancy or equipment that will be located in the space. Overlay toppings to level floors will not be used.

6.3.3.2 Repair cracks in concrete floors and walls to suit the floor finish and long-term serviceability requirements of the floor.

6.3.3.3 Water proof all foundation walls for below-grade occupied spaces and crawl spaces to prevent groundwater ingress, including any below-grade structured parking. Construction joints will have purpose-made water stops. A perimeter draining system will be installed around the exterior of earth-retained foundations.

6.3.3.4 Exposed architectural concrete will comply with CAN/CSA A23.1/A23.2-09 to minimize honey combing or patching.

6.3.3.5 All concrete exposed in areas used by staff, patients or public will be architectural concrete.

6.3.3.6 Provide vapour barrier under slabs-on-grade in the form of continuous, cross-linked, minimum 10 mil polyethylene sheet.

6.3.3.7 See Section 6.5.2.4 for concrete topping on metal deck requirements.

6.3.3.8 Provide weeping tile as required to ensure proper drainage of the sub surface foundations and walls.

6.4 Masonry (Division 4)

6.4.1 Basic Requirements

6.4.1.1 Masonry construction may be considered for exterior walls and walls systems where permanence of finishes, both visually and functionally, and ease of maintenance are primary considerations in the exterior fabric of the Facility.

6.4.1.2 Masonry construction may be considered for interior walls and wall systems when priorities include permanence and maintenance, sound transmission control, fire resistance and separation requirements and security.

6.4.2 Concrete Masonry Units

6.4.2.1 Concrete unit masonry may be considered for both independent exterior walls and in exterior wall systems as a structural backing to other finish materials or systems.

6.4.2.2 Concrete unit masonry for interior applications may be considered as an integrally finished material, as a base for applied finish and as a structural backing to other finish systems.

6.4.2.3 Unpainted concrete unit masonry will not be used as an exposed finish in clinical or public areas.

6.4.2.4 Where concrete unit masonry is used as the exposed finish, all exposed corners will have rounded or chamfered corners.

6.4.2.5 In special areas such as Mental Health /Psychiatry, construct the wall as required by British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

6.4.2.6 Masonry design and construction will comply with Canadian Masonry Contractors Association (CMCA) Masonry Practices Manual and all applicable standards.

6.4.3 Brick Masonry

6.4.3.1 Exterior wall systems comprising brick masonry as a finish veneer to concrete, concrete masonry or metal framing will be a rain-screen or cavity wall system.

6.4.3.2 Brick masonry below grade for exterior applications is not permitted.

6.4.3.3 Brick masonry in interior applications is to have integral finish and construction compatible with the Authority's infection prevention and control requirements.

6.4.4 Stone Masonry

6.4.4.1 Stone masonry may be considered as a finish veneer to concrete walls or concrete masonry walls. Exterior wall systems in such applications will be a rain screen or cavity wall system.

6.4.4.2 Stone will be sound, hard and durable, well-seasoned and of uniform strength, colour and texture, and free of quarry sap, flaws, seams, sand holes, iron pyrites or other mineral or organic defects.

6.5 Metals (Division 5)

6.5.1 Basic Requirements

6.5.1.1 Structural steel, steel deck, and cold-formed steel stud design and construction may be considered for building elements and systems, where appropriate.

6.5.2 Performance Criteria

6.5.2.1 Design structural steel, steel deck, and cold-formed steel stud systems to comply with the deflection and vibration criteria outlined in Section 5.1 (Structural Design).

6.5.2.2 Erection tolerances for steel construction will be in accordance with all applicable CAN/CSA standards.

6.5.2.3 For steel floor and roof construction, the deflection of steel beams, joists, and girders due to the wet weight of concrete topping slabs is to be considered. Topping slab thickness may have to vary to maintain floor levelness tolerances. The additional concrete ponding weight is to be considered in the design of the structure.

6.5.2.4 Concrete topping slabs will be finished with a smooth, dense, steel trowel finish in accordance with Section 6.3.3.1. Design and construct concrete topping slabs on steel deck to control cracking and avoid random surface shrinkage cracking and radial cracking around re-entrant corners. Implement concrete construction and curing procedures to minimize cracking for concrete topping slabs on metal deck.

6.5.2.5 Steel floor/roof decking is to be wide rib profile for ease of attachment of current and future services, equipment, and fixtures using drilled insert expansion anchors into the bottom of the deck ribs.

6.5.2.6 Steel floor/roof decking plus the concrete topping slab thickness is to satisfy the requirements of a ULC-rated assembly meeting the BC Building Code fire rating requirements. Spray on or applied fireproofing material is not to be used to achieve required floor deck fire rating.

6.5.2.7 Fire proof structural steel floor/roof framing and supporting members to meet the fire rating requirement.

6.5.3 Structural Steel and Steel Joists

6.5.3.1 Quality Requirements

6.5.3.1(1) Quality assurance testing and monitoring of workmanship to be carried out by an approved testing laboratory using testing procedures as specified in the CAN/CSA standards listed in Section 2.1 of this Schedule to verify soundness of representative shop and field welds.

6.5.3.1(2) Material quality including sourcing and welding quality will be monitored by an independent testing agency.

6.5.3.1(3) The specification for preparation and painting of Structural Steel components will conform to the Master Painters Institute (MPI) Standards.

6.5.4 Load Bearing Steel Studs

6.5.4.1 Overriding Principles

6.5.4.1(1) Load bearing steel studs may be considered as a component of the exterior wall systems to support exterior wall finishes and form an integral part of the perimeter envelope.

6.5.4.1(2) Load bearing steel studs may be part of the structural framing or may be independent of the principal structural system.

6.5.4.2 Quality Requirements

6.5.4.2(1) Design, detail and construct load bearing steel stud design and construction to comply with all applicable CAN/CSA standards.

6.5.4.2(2) The steel stud manufacturer will be certified in accordance with CSSBI Standard 30M-06 and all applicable CAN/CSA standards.

6.5.4.2(3) The steel stud fabricator and erector will be experienced in the type of work undertaken.

6.5.4.2(4) Conform to the Association of Wall and Ceiling Contractor's Specification Standards Manual (AWCC).

6.5.4.3 Performance Requirements

6.5.4.3(1) Limit maximum deflection under specified wind loads to L/360 (L/720 for masonry veneers), unless a smaller maximum deflection is specifically required due to wall finishes.

6.5.4.3(2) Design components to accommodate erection tolerances of the structure.

6.5.4.3(3) Design wind bearing stud end connections to accommodate floor/roof deflections and to ensure that studs are not loaded axially.

6.5.4.3(4) Design steel studs to take into account the anchorage of other materials being supported including but not limited to: sub-girts supporting metal cladding and composite panels, soffit finishes and the provision of lateral support at window heads.

6.5.4.4 Corner Guards and Bumper Rails

6.5.4.4(1) Provide stainless steel corner guards and bumper rails in infection control sensitive areas, including:

6.5.4.4(1)(a) the Medical Device Reprocessing Department;

6.5.4.4(1)(b) surgical suite corridors;

6.5.4.4(1)(c) sterile storage areas; and

6.5.4.4(1)(d) other areas with high risk of impact from utility cart traffic.

6.5.4.4(2) Provide heavy duty steel corner guards and bumper rails in utility areas, including:

6.5.4.4(2)(a) the Material Management Storage, Loading Dock and Marwilling areas;

6.5.4.4(2)(b) utility corridors with heavy utility cart and pallet jack traffic; and

6.5.4.4(2)(c) utility shop areas.

6.5.4.5 Guardrails & Handrails

6.5.4.5(1) Provide guardrails and handrails of minimum diameter 42 mm, required to resist design loads.

6.5.4.5(2) All guardrails to be designed to their usage classification and per applicable codes.

6.5.4.5(3) Provide a durable painted finish for steel guardrails.

6.5.4.5(4) Provide a manufactured pre-finish for stainless steel or aluminum guardrails.

6.5.4.5(5) Provide safety glass for glazed decorative railings.

6.5.4.5(6) In exterior applications of guardrails, where a hazard exists, provide guardrails to conform to the requirements of the BC Building Code.

6.6 Wood, Plastics and Composites (including Millwork) (Division 6)

6.6.1 Basic Requirements

6.6.1.1 The use of wood and plastic products is to be within the limitations of combustible content restrictions of the BC Building Code for the specific occupancy classification of each Building.

6.6.1.2 Timber may be considered as acceptable product for Building structure (e.g. Clinical Services Building).

6.6.1.3 Do not use urea formaldehyde containing materials in the Facility.

6.6.1.4 Provide rough carpentry, wood backing materials, backing boards for mechanical rooms and electrical/communication rooms, roof sheathing, copings, cant strips, finish carpentry and architectural woodwork, including but not limited to exterior fascia's, cabinets, casework (excluding laboratory casework, which is included in Division 12), frames, panelling, ceiling battens, trim, installation of doors and hardware, and other wood-related products and applications as required:

6.6.1.4(1) to support functionality as defined in the Clinical Specifications or as required for operation of the Facility; and

6.6.1.4(2) as required for wood products exposed to view in finished interior and exterior installations.

6.6.1.5 Use wood studs for non-load bearing framing in non patient care areas, subject to approval from the authority having jurisdiction under the BC Building Code. Wood studs will comply with applicable CSA standards for lumber. Wood framing design will be certified by a professional engineer registered in the province of British Columbia.

6.6.1.6 Provide solid polymer fabricated or stainless steel surfacing for:

6.6.1.6(1) all counters that incorporate integral sinks; and

6.6.1.6(2) other areas as required to create surfaces that provide antiseptic or clean characteristics, special or regular maintenance, and resistance to caustic action of chemicals or agents used by the Authority.

6.6.1.7 Provide acrylic plastic products (or other products as approved by the Authority) as required for wall cladding, wall protection, corner protection, casework finishing, trims, ornamental elements, and other applications to achieve a quality of interior finish suitable for use by patients and staff.

6.6.1.8 Prepare and propose to the Authority locations and types of all handrails, bumper guards, wall protection, and consult with the Authority to determine locations and types in accordance with Appendix 2B [User Consultation and Design Review].

6.6.1.9 Use pressure treated wood for any exterior exposed wood.

6.6.2 Wall Guards and Corner Guards, Handrails, Wall Protection, Door Edge and Door Frame Protection

6.6.2.1 Wall and corner guards

6.6.2.1(1) Provide protection of walls and exposed wall corners at patient care areas, service areas, and other areas as required, to prevent damage due to impact from traffic such as stretchers, equipment and service vehicles.

6.6.2.1(2) Select materials appropriate to the amount and degree of impact anticipated.

6.6.2.2 Handrails

6.6.2.2(1) Provide handrails in all corridors and patient care areas of an appropriate type for patient support.

6.6.2.2(2) Select materials and shapes appropriate for the use, provide continuous uninterrupted supports.

6.6.2.3 Wall protection

6.6.2.3(1) Apply sheet wall protection to wall areas where the impact damage anticipated is of a larger area of wall than would be protected by bumper guards.

6.6.2.3(2) Provide wood wall bumper guards in high traffic pedestrian areas.

6.6.2.3(3) Provide wall splash back protection behind and surrounding hand sinks, scrub sinks and housekeeping sinks.

6.6.2.3(4) Apply sheet wall protection to faces of doors where impact damage is anticipated. Use sheet wall protection that complements the installation of door edge and frame protection.

6.6.2.3(5) Secure wall and corner guards to reinforcing and backing in the walls, such backing sufficient to withstand expected impact loads. Wall protection will be high impact and stain-resistant.

6.6.2.3(6) Use wall protection handrails and corner guard products that are stain-resistant to pen marks, paint, and graffiti, and able to withstand commercial cleaners without fading or staining. Use products containing anti-microbial additives to retard mildew and bacterial growth.

6.6.2.4 Door Edge and Door Frame Protection

6.6.2.4(1) Protect door edges and door frames in patient care areas from damage such as impact caused by the regular movement of stretchers and other wheeled vehicles.

6.6.2.4(2) Protect door edges and door frames in clinical and service areas from damage such as impact caused by regular and non-regular service vehicles.

6.6.2.4(3) Use bumper guards, crash rails, handrails, and corner guards that are high impact-resistant extrusion conforming to ASTM D4226 and with anti-microbial additive.

6.6.3 Finish Carpentry, Millwork and Architectural Woodwork

6.6.3.1(1) Conform to Architectural Woodwork Manufacturer's Association of Canada (AWMAC) Quality Standards Manual for minimum "Custom Grade," and Door and Hardware Institute (DHI) standards for the design, fabrication, materials, installation, and workmanship of finish carpentry and architectural woodwork.

6.6.3.1(2) For millwork and cabinets, seal all wood surfaces and edges with plastic laminate for infection control.

6.6.3.1(3) Adhesives will be non-toxic, non-solvent glue to comply with AWMAC Quality Standards Manual, Canadian 'Eco-Logo' program, and CaGBC (Canada Green Building Council).

6.6.3.1(4) Use marine-grade plywood substrate for countertops. Do not use fibreboard or particleboard.

6.7 Thermal and Moisture Protection (Division 7)

6.7.1 Basic Requirements

6.7.1.1 Design construction assemblies according to sound building envelope principles.

6.7.1.2 Design construction assemblies to prevent the ingress of moisture or water vapour from the exterior through the building envelope and the passage of air through the building envelope from the interior spaces to the exterior and vice versa.

6.7.1.3 Design construction assemblies to prevent the ingress of moisture through foundation walls below grade, both subject and not subject to hydrostatic pressure.

6.7.1.4 Provide protection (such as insulation) to resist the transfer of heat through exterior walls and roofs to create comfortable, liveable interior environments.

6.7.1.5 Provide resistance to the propagation and spread of fire for exterior walls and interior walls designated as fire-resistance rated separations where appropriate.

6.7.2 Performance Criteria

6.7.2.1 Dampproofing

6.7.2.1(1) Dampproofing is not to be used as a means of prevention of moisture ingress.

6.7.2.2 Waterproofing

6.7.2.2(1) Provide waterproofing to prevent moisture ingress to basement and crawlspaces below grade. This applies to structured parking, as well as other Buildings.

6.7.2.2(2) Use membrane waterproofing to prevent water ingress over suspended slabs and decks and associated walls over habitable spaces where water collection is anticipated.

6.7.2.2(3) Use fluid-applied waterproofing for mechanical room floors.

6.7.2.2(4) Provide waterproof membranes in exterior walls as part of the building envelope and integral with rain screen or cavity wall assemblies.

6.7.2.2(5) Dam the floor under key mechanical equipment in the mechanical penthouse, mechanical rooms and mechanical shafts with a continuous curb and waterproofing to contain the water. Provide floor drains.

6.7.2.3 Vapour Barriers

6.7.2.3(1) Prevent water vapour transmission and condensation in wall assemblies, roofing assemblies, and under concrete slabs-on-grade within the Building perimeter by means of a continuous vapour barrier membrane.

6.7.2.4 Air Barriers

6.7.2.4(1) Prevent air leakage caused by air pressure across the wall and roof assembly by means of air barrier assemblies.

6.7.2.4(2) Provide air barrier assemblies that:

6.7.2.4(2)(a) limit air exfiltration and infiltration through materials of the assembly, joints in the assembly, joints in components of the wall assembly, and junctions with other building elements including the roof; and

6.7.2.4(2)(b) prevent air leakage caused by air pressure across the wall and roof assembly, including interruptions to the integrity of wall and roof systems such as junctions with dissimilar constructions.

6.7.2.5 Thermal Protection

6.7.2.5(1) Provide rigid and semi-rigid thermal insulation as part of the building envelope to prevent the transfer of heat both from the interior to the exterior and vice versa, depending on seasonal conditions, and to resist the absorption of water.

6.7.2.5(2) Use thermal protection materials of a type and quality that will provide consistent environmental quality to enclosed spaces.

6.7.2.5(3) Use foamed plastic insulation that is CFC and HCFC free.

6.7.2.5(4) Minimum insulation values will be R20 (U-Value 0.05) for exterior walls and R30 (U-Value 0.033) for roof areas or higher as necessary to achieve targeted energy performance.

6.7.2.6 Roofing

6.7.2.6(1) Comply with the Roofing Contractors Association of British Columbia Guarantee Roof Star latest standards and requirements for a five (5) year Guarantee, as published in the Roof Star Roofing Practices Manual. Perform roofing quality inspections as required by the RCABC to obtain the RCABC warranty.

6.7.2.6(2) Provide roofing assemblies that will withstand air pressures due to helicopter approaches and landings.

6.7.2.6(3) Comply with Roof Star Roofing Practices Manual “Acceptable Materials List,” including:

6.7.2.6(3)(a) Membrane for vegetated green roofs – SBS modified (two-ply system); and

6.7.2.6(3)(b) Flexible membrane for reflective roofs – Elastomeric or Thermoplastic (single-ply system), Energy Star compliant (highly reflective) and high emissivity (of at least 0.9 when tested in accordance with ASTM 408).

6.7.2.6(4) Use foamed plastic insulation that is CFC- and HCFC-free and complies with the province of British Columbia Ozone Depletion Substances Regulations.

6.7.2.6(5) Provide a complete horizontal barrier to weather and climate using one of the aforementioned roofing systems.

6.7.2.6(6) If a vegetated green roof is used, design the assembly so that the system dead load, measured according to ASTM D2397, when added to the weight of the roofing membrane system, do not exceed the maximum allowable dead load for the roof.

6.7.2.6(7) Roofing systems will include:

6.7.2.6(7)(a) flashings and sheet metal;

6.7.2.6(7)(b) thermal insulation;

6.7.2.6(7)(c) assembly components for green roofs if used;

6.7.2.6(7)(d) roofing specialties and accessories required for completion;

6.7.2.6(7)(e) interior access systems to roof areas;

6.7.2.6(7)(f) protection from pedestrian traffic and solar radiation; and

6.7.2.6(7)(g) roof drainage, including overflow scuppers.

6.7.2.6(8) Provide sheet metal flashings that divert water away from membrane flashing termination and protect the membrane from deterioration due to the exterior elements and mechanical damage. Provide flexible membrane subflashing continuously under the metal.

6.7.2.6(9) Metal roofing systems, if used, will be complete with continuous waterproof membrane as part of the assembly and provide clear internal paths of drainage to allow any trapped moisture to drain to the exterior and avoid the staining of architectural finishes, forming of puddles, forming of icicles, and dripping on pedestrians.

6.7.2.6(10) In designing the Facility, including any roof systems, ensure that entrance ways are protected from sliding snow and ice and that there are no accumulations of snow and ice in roof valleys.

6.7.2.7 Fire and Smoke Protection

6.7.2.7(1) Use spray-applied cementitious fireproofing if required to achieve a fire resistance rating.

6.7.2.7(2) Integrate barriers into vertical and horizontal space separations to protect against the spread of fire and smoke. Apply protection to exposed building elements (structural and non-structural) susceptible to fire and subsequent damage.

6.7.2.7(3) Apply protection around penetrations through vertical and horizontal fire-resistance rated separations.

6.7.2.7(4) Use firestopping and smoke seal systems that consist of asbestos-free materials and systems, capable of maintaining an effective barrier against flame, smoke, and gases.

6.7.2.7(5) Use firestopping that:

6.7.2.7(5)(a) is compatible with substrates;

6.7.2.7(5)(b) allows for movement caused by thermal cycles; and

6.7.2.7(5)(c) prevents the transmission of vibrations from pipe, conduit or duct to structure and structure to pipe, conduit or duct.

6.7.2.7(6) When more than one product is required for an assembly, use products that are compatible with one another and from the same manufacturer.

6.7.2.7(7) Use fire stopping sealants and coatings that are silicone-based and guaranteed not to re-emulsify if subject to wetting or standing water. Do not use acrylic-based coatings and sealants.

6.7.2.8 Sealants

6.7.2.8(1) All sealants and sealant primers used on the interior of the Facility will comply with the requirements of LEED - low VOC.

6.7.2.8(2) Apply sealant materials to achieve:

6.7.2.8(2)(a) Seals to the building envelope systems and around openings in the building envelope systems as required to prevent water ingress;

6.7.2.8(2)(b) seals around and over cavities in or behind surface elements to allow effective infection prevention and control (note that sealant around door frames must include joints at bottom of door frames (between floor finish and frames);

6.7.2.8(2)(c) sealed joints between dissimilar or similar materials to allow a smooth or even transitions; and

6.7.2.8(2)(d) sealed expansion or controls joints in the building envelope systems or structural systems to allow movement.

6.7.2.8(3) Do not use unsealed joints in clinical areas.

6.7.2.8(4) For the exterior; use sealants to completely and continuously fill joints between dissimilar and/or similar materials.

6.7.2.8(5) For the interior; use sealants (at frames such as those at doors, windows and skylights), to completely fill joints between dissimilar materials using one component, acrylic emulsion, paintable type.

6.7.2.8(6) Use silicone caulking that is mildew-resistant and impervious to water for caulking washroom plumbing fixtures.

6.7.2.8(7) Use sealants with self-levelling properties for expansion and control joints in concrete floors using two-component epoxy urethane sealants.

6.7.2.8(8) Use non-sag sealants for exterior vertical expansion and control joints in masonry or wall cladding.

6.7.2.8(9) Use sealants that allow for minimum 25% movement in joint width.

6.7.2.8(10) In corridors and other traffic areas used by laundry carts, supply carts, material handling equipment etc., use traffic bearing type sealants suitable to support imposed load without deformation or failure.

6.7.2.9 Traffic Coatings

6.7.2.9(1) Protect the structural concrete floor slabs of parkade structures with a traffic coating to prevent the ingress of moisture into the slab.

6.7.2.9(2) Use traffic coating that complies with the following:

6.7.2.9(2)(a) Primer: Multi-component, 100% solids, low VOC, low viscosity polyurethane primer or as recommended by manufacturer to suit substrate and site conditions.

6.7.2.9(2)(b) Base and Intermediate Coats: Multi-component low VOC liquid urethane or epoxy elastomeric membrane forming part of manufacturer’s vehicular traffic coating system.

6.7.2.9(2)(c) Topcoat: Multi-component low VOC liquid urethane elastomeric membrane top coat forming part of manufacturer’s vehicular traffic coating system; colour as selected by Authority from manufacturer's full range, and meeting or exceeding the following specifications:

Property	ASTM Test	Result
Tensile Strength	D-638	9.1 MPa
Elongation at Break	D-638	435%
Tear Strength	D-624	38.2 KN/mm
Hardness	D-2240	80 Shore A
Abrasion Resistance wear course (CS-17 wheel, 1000g)	D-4068	Maximum Weight loss of 22 mg/1000 cycles
Fire Rating	CAN/ULC S102.2	Class A
Water vapour Permeability	ASTM E-96	0.0013 ng/Pa•s•m, 0

6.7.2.10 Provide fluid applied integral flashings at all locations where a horizontal surface butts a vertical surface and at all deck projections. Apply the membrane over the prepared surfaces at a minimum thickness of 500 microns thick and extend the membrane a minimum of 10 cm on vertical and horizontal surfaces.

6.8 Cladding (Division 7)

6.8.1 Acceptable cladding materials include

6.8.1.1 Section 6.3 Concrete & Precast Concrete

6.8.1.2 Sections 6.4.2 and 6.4.3 Concrete Masonry Unit, Brick & Stone Masonry

6.8.1.3 Section 6.9.2.11 Glass & Glazing

6.8.1.4 Section 6.8.2 Phenolic Panels

6.8.1.5 Section 6.8.3 Metal or Composite Aluminum Cladding

6.8.1.6 Section 6.8.3 Aluminum Curtain Wall

6.8.1.7 Section 6.8.4 Wood Cladding

6.8.2 Phenolic Panels

6.8.2.1 Panels to be high density phenolic resin with acrylic resin finish.

6.8.2.2 Acceptable Phenolic Panels include Trespa, Prodema, Fundermax or similar.

6.8.2.3 Phenolic Panels to comply with all applicable CSA standards per BC Building Code.

6.8.3 Metal Cladding

6.8.3.1 Metal Panel cladding can be integrated into aluminum curtain wall system or be stand-alone system.

6.8.3.2 Metal Panel to be baked enamel finish. Aluminum to be prefinished aluminum or baked enamel finish

6.8.3.3 Maximum panel deviation (flatness) to be 3 mm in 1530 mm in any direction for assembled units (non-accumulative – no oil canning).

6.8.4 Wood Cladding

6.8.4.1 Wood cladding to comply with Appendix 3G [Wood First Matrix] and all applicable CSA standards per BC Building Code.

6.9 Openings (Division 8)

6.9.1 Basic Requirements

6.9.1.1 Except where wire glass is required in accordance with the BC Building Code, construct interior windows, sidelights and glazing forming part of doors of tempered glass. For exterior glazing at doors and sidelights, use laminated glass.

6.9.1.2 Installation methods and locations for doors, frames and hardware to conform with the standards of the Door and Hardware Institute (DHI).

6.9.1.3 Doors

6.9.1.3(1) Doors are to be sized, fabricated and installed to suit the intended function of spaces or rooms requiring acoustic or visual privacy, security, special HVAC requirements, fire-resistance rated separations or other closures.

6.9.1.3(2) Size Requirements for Doors

6.9.1.3(2)(a) Provide door openings of adequate width to suit the intended purpose of rooms on either side of the doors and allow the movement of people and equipment associated with those rooms.

6.9.1.3(2)(b) No single door will have a width of less than 750mm.

6.9.1.3(2)(c) Provide double doors into rooms where large pieces of equipment will be moved in or out during the lifetime of the Facility and where such equipment cannot pass through a single 1200 mm wide opening.

6.9.1.3(2)(d) HDCU, ICU and Emergency Department room doors will be 3 panels wide sliding glass doors.

6.9.1.3(2)(e) Size door openings to accommodate movement of equipment.

6.9.1.3(2)(f) Size door openings to suit bariatric patient requirements for all patient rooms of medical / surgical units, ICU and other rooms identified in the Clinical Specifications for bariatric use. The minimum door opening size will be 1500 mm clear. Doors must have a large leaf and a small leaf. Provide a viewing window in the large door leaf, with an integral blind in the window unit, operable from both sides.

6.9.1.3(2)(g) Provide double doors into corridors and major rooms to ease access where patients in beds or stretchers will be attended to or accompanied by a large number of medical staff and medical equipment.

6.9.1.3(2)(h) Unless required otherwise, provide doors to patient care areas, including doors to water closets and change room cubicles with a minimum width of 900 mm.

6.9.1.3(2)(i) Provide a minimum of 2150 mm high door or door leaf, unless specifically required for access to services or other purposes where height is restricted.

6.9.1.3(3) Acoustic Requirements for Doors: refer to Appendix 3D [Sound Transmission Ratings]. STC ratings of doors are to match that of the walls they are located within.

6.9.1.3(4) Provide patient rooms with hardware that allows the doors to stay in an open position and facilitates casual observance of patients by the nursing staff.

6.9.1.3(5) For doors into or between major departments or activity areas through which cart, stretcher, or bed traffic is anticipated on a routine basis, provide automatic activation by an electronic device or manual push button, located to allow emergency access without the necessity to stop movement. For all other doors through which cart, stretcher, bed, or frequent patient or staff traffic is anticipated on a routine basis, provide appropriate hardware or automatic activation that allows the doors to stay in an open position.

6.9.1.3(6) Apply door sizes and designs consistently to rooms of similar use, location, and configuration.

6.9.1.3(7) Avoid doors swinging into corridors in a manner that may obstruct traffic flow or reduce the corridor width, except doors to psychiatric

holding rooms or to spaces that are used infrequently and are not subject to occupancy such as small closets.

6.9.1.3(8) Doors may swing into patient bathrooms, provided they allow for ease of patient use, both on their own and assisted by staff. Equip such doors with appropriate hardware to allow the door to be opened out into the room in an emergency situation. Alternatively "barn type" sliding doors may be used for patient bathrooms.

6.9.1.3(9) Provide all doors with appropriate hinges, edge protection, and face protection to minimize damage and resultant disruptive maintenance.

6.9.1.3(10) Finish doors and frames with a suitable finish that prevents dirt and fingerprint accumulation, and can be easily cleaned and disinfected.

6.9.1.3(11) Be consistent with the extent of glazing in a door, or the size and quantity of sidelights, and balance these between the nature of observation required and the privacy requirements of the occupants of the room. Where possible and appropriate, provide glazing in an adjacent sidelight rather than within the door itself.

6.9.1.3(12) Provide glazing in doors and sidelights in such a way that they allow patient observation and operational safety of the spaces they serve. Provide tempered glass in aluminum frame sliding doors. Sliding doors to be without floor tracks, and be provided with emergency swing breakout. Provide blinds or coverings suitable and appropriate for the level of privacy intended and required.

6.9.1.3(13) Provide doors and door frames with the capability to withstand the varying and high levels of humidity and impact that occur typically within a hospital and in specific rooms within a hospital, and maintain their inherent aesthetic and functional capacities.

6.9.1.3(14) Frames and anchors for door, sidelights, interior and exterior windows in Mental Health / Psychiatry departments, and other areas as requested by the Authority, will be designed to withstand a heavy degree of impact while maintaining their aesthetic and functional capacities. Glazing of such components will be non-breakable and use hospital-type cut-away jambs.

6.9.1.3(15) In areas where security is considered paramount, including Mental Health / Psychiatry departments and secure entrances, achieve safety and security with the appropriate location, configuration, materials, construction and detailing of doors and hardware as required by British Columbia Ministry of Health Standards for

Hospital-Based Psychiatric Emergency Services: Observation Units.

6.9.1.4 Exterior Windows

6.9.1.4(1) Size, configure, and adequately construct windows to suit rooms that require daylight, views and/or natural ventilation.

6.9.1.4(2) Window framing systems to be thermally-broken, designed based on principles of pressure equalized rain screen.

6.9.1.4(3) Provide operable windows (windows that may be opened and closed) in all rooms and spaces where acceptable for the functionality of the room or space, as described in the Clinical Specifications.

6.9.1.4(4) Provide exterior windows in the Mental Health / Psychiatry areas that meet the requirements of the British Columbia Ministry of Health Hospital-Based Psychiatric Emergency Services Standards.

6.9.1.5 Interior Windows

6.9.1.5(1) Provide ‘borrowed light’ through interior windows to occupied rooms that do not have exterior windows. The intent is to borrow light from areas that have windows and consequently create a more comfortable and less closed-in atmosphere.

6.9.1.5(2) Provide 1000 mm wide interior windows in the following rooms:

6.9.1.5(2)(a) Intensive Care Unit/Telemetry Unit: provide a window in between adjacent inpatient rooms, and from the charting counters at corridor outside patient bedrooms;

6.9.1.5(2)(b) medical/surgical inpatient rooms, maternity, newborn and pediatric inpatient rooms, psychiatric inpatient rooms: provide a viewing window from the corridor or nursing station;

6.9.1.5(2)(c) isolation patient rooms: provide a viewing window from the corridor or nursing station;

6.9.1.5(2)(d) provide viewing windows between the Ante Room into the Isolation Patient Rooms; and

6.9.1.5(2)(e) in the Emergency Department from the Ante Room into the Decontamination Room.

6.9.1.5(3) Coordinate glazing heights with adjacent wall protection, handrails, and other accessories to achieve functional and aesthetic cohesiveness.

6.9.2 Performance Criteria

6.9.2.1 Hollow Metal Doors and Frames

6.9.2.1(1) Materials and manufacture of metal doors and will comply with the requirements of the Canadian Steel Door and Frame Manufacturer's Association (CSDFMA).

6.9.2.1(2) Provide interior metal doors with flush face construction.

6.9.2.1(3) Provide exterior metal doors with:

6.9.2.1(3)(a) flush face construction;

6.9.2.1(3)(b) edge seams to correspond with door function and minimize maintenance needed; and

6.9.2.1(3)(c) prepared surfaces to receive finishes that resist corrosion from exposure to weather.

6.9.2.1(4) Provide pressed metal frames with:

6.9.2.1(4)(a) fully welded construction;

6.9.2.1(4)(b) thermally-broken door frames for exterior door; and

6.9.2.1(4)(c) anchors to each jamb to suit wall type and receive the frame.

6.9.2.1(5) Door Glazing

6.9.2.1(5)(a) For exterior hollow metal door glazing, use sealed units with warm edge, in thermally-broken frames to prevent heat loss.

6.9.2.1(5)(b) For interior hollow metal door glazing use tempered glass.

6.9.2.2 Wood Doors

6.9.2.2(1) All wood doors will comply with all applicable standards, including the Quality Standards for Architectural Woodwork published by the Architectural Woodwork Manufacturer's Association of Canada (AWMAC).

6.9.2.2(2) Wood doors will have hardware and finishes that suit the intended function and aesthetics of the Facility.

6.9.2.2(3) Construct, finish, and install wood doors to minimize the requirement for maintenance and resulting disruption to Facility operations.

6.9.2.2(4) Provide wood doors in flush design, Architectural Grade quality (as defined in the AWMAC standards referred to above), solid particleboard core.

6.9.2.2(5) Provide fire-resistance rated doors with a homogeneous incombustible mineral core and AWMAC Quality Standards Option 5 blocking.

6.9.2.2(6) Install finish hardware securely to resist loosening over time. Fasten to solid wood backing, except where hardware is designed to be through-bolted.

6.9.2.2(7) Glue stiles, rails and faces to the core with Type II water-resistant adhesive to minimize de-lamination or disassembly as a result of moisture ingress.

6.9.2.2(8) Use B-Grade hardwood veneer with AWMAC No. 3 edge, finish to suit the intended use.

6.9.2.2(9) Do not use wood veneer-faced doors in critical care areas for reasons of cleanliness and infection prevention and control, unless suitably finished to mitigate such concerns.

6.9.2.2(10) In locations requiring radiation protection, line doors with lead and label such doors with lead thickness.

6.9.2.3 Aluminum Entrances and Storefronts

6.9.2.3(1) Aluminum entrances and storefront framing and doors may form part of the exterior envelope of the Building.

6.9.2.3(2) Provide glazed interior partitions as appropriate to comply with the functions of the spaces as defined by the Clinical Specifications.

6.9.2.3(3) Use aluminum doors within aluminum entrances and storefront.

6.9.2.3(4) Use frames that are thermally-broken, flush glazed, aluminum sections, to accept insulating glass units.

6.9.2.3(5) Incorporate in the frames drained and vented system (rain screen) with a complete air and vapour seal, allowing any moisture

entering the frame to drain to the exterior and allowing air into the pressuring chamber.

6.9.2.3(6) Use aluminum swing entrance doors that are heavy-duty commercial or institutional grade that may be automatically operated, motion-detector controlled.

6.9.2.3(7) Apply aluminum finish for exposed aluminum surfaces. Finish to be permanent and resistant to corrosion caused by weather exposure and climate.

6.9.2.4 Specialty Doors

6.9.2.4(1) Overhead Rolling Service Doors

6.9.2.4(1)(a) Restrain lateral movement of door curtain slats. Provide windlocks as required by door size or wind load requirements.

6.9.2.4(1)(b) Provide interlocking flat slats, complete with bottom bar and contact type bottom astragal.

6.9.2.4(1)(c) For manually operated doors, provide inside lift handle and locking bar or chain hoist. Motor operation may be provided on doors requiring constant usage. Chain operation will be by means of reduction gears and galvanized hand chain.

6.9.2.4(1)(d) For fire doors, provide automatic closing device operated by fire door release device connected to fire alarm system.

6.9.2.4(2) Overhead Rolling Grilles

6.9.2.4(2)(a) Provide grilles that allow visual access to secure areas.

6.9.2.4(2)(b) Provide aluminum or steel guides that are: fabricated to withstand vertical and lateral loads; counterbalanced by helical torsion springs; and sound-deadened.

6.9.2.4(2)(c) For manually operated closures, provide inside lift handle and locking bar or chain hoist. Motor operation may be provided on grilles requiring constant usage. Chain operation will be by means of reduction gears and heavy chrome plated hand chain.

6.9.2.4(3) Overhead Rolling Counter Shutters / horizontal sliding grilles

6.9.2.4(3)(a) Provide shutter curtains fabricated with extruded aluminum, galvanized steel, or stainless steel interlocking flat slats, complete with guides of similar materials.

6.9.2.4(3)(b) Provide closures that are manually operated and with locking capability.

6.9.2.4(4) Interior Aluminum Sliding Doors and Sidelights

6.9.2.4(4)(a) Provide interior glass sliding doors and sidelights without floor track, sliding and fixed panel(s) single glazed with 6 mm clear fully tempered float glass.

6.9.2.4(4)(b) Interior sliding doors to have break-out capability to facilitate staff access to patient rooms.

6.9.2.4(4)(c) Provide visual cues/glazing film in transparent glass panels as appropriate to prevent collisions.

6.9.2.4(4)(d) Provide manual break-out capable 3 panel style interior glass sliding doors in the following patient rooms:

(d).1 intensive care unit/telemetry unit;
(d).2 post-anaesthesia recovery enclosed patient bays; and
(d).3 enclosed exam rooms.

6.9.2.4(4)(e) Provide automatic break-out capable interior glass sliding doors, with card access and locking capability, in the following areas:

(e).1 patient isolation rooms, including vestibules, examination rooms and inpatient rooms;
(e).2 Emergency Trauma / Resuscitation rooms;
(e).3 Laboratory BioSafety Cabinet Room and Vestibule; and
(e).4 Laboratory Laminar Flow Room and Vestibule.

6.9.2.4(4)(f) Provide automatic break-out capable interior glass sliding doors with frosted glazing in the IPU Medication Rooms.

6.9.2.4(5) Automatic Sliding Doors

6.9.2.4(5)(a) Automatic sliding doors complete with break-away capability for exiting may be installed at main entrance, provided that the size and configuration of the entrance vestibule is designed such that both sets of doors will not be open at the same time.

6.9.2.4(5)(b) Door equipment will accommodate medium to heavy pedestrian traffic and up to the following weights for active leaf doors: 100 kg for bi-part doors and 200 kg for single slide doors.

6.9.2.4(5)(c) Provide door operators, including the motion and presence detection system, that are: capable of operating within the temperature ranges existing at the Facility; and unaffected by ambient light or ultrasonic interference.

6.9.2.4(5)(d) Provide energy-saving devices to reduce conditioned air loss.

6.9.2.4(6) Automatic Swing Doors

6.9.2.4(6)(a) Use automatic swing doors for interior and exterior locations where appropriate, including the entrance vestibule, cross-corridor double-egress doors, entrances to departments and areas where stretchers and equipment are frequently wheeled, and doors to exterior spaces that are required to be handicapped accessible.

6.9.2.4(6)(b) If used, provide directional motion sensor control device that are unaffected by ambient light or ultrasonic frequencies.

6.9.2.4(6)(c) Equip all in-swing doors that are required exits with an emergency breakaway switch that internally cuts power to the operator. No external power switch allowed.

6.9.2.4(6)(d) Implement longer hold-open times to accommodate the elderly and frail.

6.9.2.4(7) Aluminum Curtain Walls

6.9.2.4(7)(a) Aluminum curtain walls will comply all applicable standards, including the Aluminum Association Standards (AAS) and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.9.2.4(7)(b) Incorporate in the curtain wall framing a drained and vented system complete with air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allow air into the pressuring chamber.

6.9.2.4(7)(c) Provide curtain wall framing that incorporates a thermal-break.

6.9.2.4(7)(d) For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure and climate.

6.9.2.4(7)(e) Provide assemblies that resist local seismic conditions and 1-in-100 year climatic events (with a safety factor).

6.9.2.4(7)(f) Window wall framing relying on primary face seals is not allowed.

6.9.2.5 Aluminum Windows

6.9.2.5(1) Aluminum windows will comply with all applicable standards, including the Aluminum Association Standards (AAS) and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.9.2.5(2) Incorporate in windows a drained and vented system complete with air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allow air into the pressuring chamber.

6.9.2.5(3) Provide windows that incorporate a thermal-break.

6.9.2.5(4) For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure and climate.

6.9.2.5(5) Provide assemblies that resist local seismic conditions and 1-in-100 year climatic events (with a safety factor).

6.9.2.6 Skylights

6.9.2.6(1) Skylights will comply with all applicable standards, including the Aluminum Association Standards (AAS), and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.9.2.6(2) Roof or skylight glazing may be provided where natural light is required in interior spaces to augment or complement interior ambient lighting.

6.9.2.6(3) All skylights to be sealed double glazed in thermally-broken, internally drained rain screen type extruded aluminum frames. Plastic skylights are not to be used.

6.9.2.6(4) For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure and climate.

6.9.2.7 Light Tubes

6.9.2.7(1) If light tubes are required for providing natural light to internal areas, provide a reflective light tube system that that will transmit the full range of natural light, ensuring a bright, clean and white light source.

6.9.2.7(2) Provide a daylight dimmer to control the level of light.

6.9.2.7(3) Coordinate the light tube solution with the other components of the ceiling design, including the artificial lighting, to provide an integrated design solution.

6.9.2.8 Roof Hatches

6.9.2.8(1) Minimize use of roof hatch accesses per Section 5.4.1.3(4). If roof hatches are used to provide access to the roof for maintenance:

6.9.2.8(1)(a) provide access ladders and ships ladders; and

6.9.2.8(1)(b) the minimum hatch size will be 762 mm x 762 mm.

6.9.2.9 Entrance Mat Wells

6.9.2.9(1) Provide a recessed, integrated mat well at major entrances with built in drainage.

6.9.2.10 Revolving Doors

6.9.2.10(1) Provide a motorized revolving door as appropriate in lieu of vestibules to deal with the climatic elements.

6.9.2.10(2) If used, revolving doors to be integrated with entrance mat well system.

6.9.2.10(3) Provide a two leaf revolving door system to allow for breakaway stretcher access as required.

6.9.2.10(4) Provide an adjacent small vestibule beside revolving door to allow for revolving door maintenance without impacting entry.

6.9.2.11 Glass and Glazing

6.9.2.11(1) Glass and glazing will comply with all applicable standards, including the Insulating Glass Manufacturers Association of

Canada (IGMAC) Guidelines and the Glazing Contractors Association of B.C. (GCA) Glazing Systems Specifications Manual.

6.9.2.11(2) Exterior and/or interior glass and glazing may be provided as integral components of the exterior envelope, interior partitions and screens, exterior and interior doors, handrail balustrades, skylights and decorative and ornamental glazing.

6.9.2.11(3) Provide assemblies that resist local seismic conditions as a post-disaster building as defined in the BC Building Code.

6.9.2.11(4) Provide assemblies that resist 1-in-100 year climatic events (with a safety factor).

6.9.2.11(5) Use laminated safety glass in single-glazed skylights, entry doors and sidelights, or as the inboard light of a double-glazed skylight. Single-glazed skylights are not to be used when separating interior and exterior environments.

6.9.2.11(6) For the Mental Health / Psychiatric Unit and Psychiatric Intensive Care Unit inpatient rooms, provide glass and glazing that meets the requirements of the British Columbia Ministry of Health Hospital-Based Psychiatric Emergency Services Standards.

6.9.2.11(7) Mirrors

6.9.2.11(7)(a) For full wall unframed mirrors, use 6 mm thick minimum float glass backed with electrolytically-applied copper plating. Grind smooth and polish all edges.

6.9.2.11(7)(b) For wall mounted posture mirrors, use framed type; one piece, stainless steel channel frame with a No. 1 quality, 6 mm thick float glass mirror backed with electrolytically applied copper plating. Back with galvanized steel.

6.9.2.12 Finish Hardware

6.9.2.12(1) Finish hardware will comply with all applicable standards, including the quality standards of the Door and Hardware Institute (DHI).

6.9.2.12(2) Provide all finish hardware from one supplier that is a member in good standing of the Door and Hardware Institute (DHI) and has in its employ one or more AHC (Architectural Hardware Consultant).

6.9.2.12(3) Hardware will be integrated with the security requirements and coordinated with electrical wiring and power requirements.

6.9.2.12(4) See Appendix 3F(vii) [Door Operations Matrix] for additional requirements.

6.9.2.12(5) Select finishes to provide maximum longevity and preservation of the finish.

6.9.2.12(6) Provide, where applicable, ULC-listed hardware for the required fire rating.

6.9.2.12(7) Use heavy-duty commercial quality hardware; locksets and latchsets fully mortised type and lever handles of solid material.

6.9.2.12(8) All doors with maglocks must have a key override on both sides of the door.

6.9.2.12(9) For special areas provide hardware to suit the purposes unique to those areas, as identified in the user consultation process as described in Appendix 2B [User Consultation and Design Review]. Hardware in the Mental Health / Psychiatry department will comply with the British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

6.9.2.12(10) All hardware, including door strikes, in special areas such as Mental Health/Psychiatry, will be ligature resistant.

6.9.2.12(11) In areas such as Maternity, Newborn, and Pediatric Inpatient Unit, where infant and child abduction is a possibility, provide hardware that can interface with an electronic child abduction system. This system is to be confirmed with the Authority.

6.9.2.12(12) Keying

6.9.2.12(12)(a) Supply and install ASSA key cylinders, or pre-approved cylinders of equivalent quality, 6 pin (factory pinned).

6.9.2.12(12)(b) Implement a 4-level system.

6.9.2.12(12)(c) Keying groups will be assigned by the Authority.

6.9.2.12(12)(d) New key fittings will be given to and controlled by the Authority.

6.9.2.12(12)(e) Develop a keying schedule in consultation with the Authority

6.9.2.12(12)(f) Turn over keys from factory to the Authority.

6.9.2.12(12)(g) Supply four (4) keys for each lock cylinder.

6.10 Finishes (Division 9)

6.10.1 Basic Requirements

6.10.1.1 Provide interior finishes that are capable of being maintained throughout the Operating Period to the B.C. Health Authorities Cleaning Outcome Standards (Version 7 – Revision A, issue date: October 24, 2007).

6.10.1.2 In areas where finishes and systems of installation will occur and water is anticipated to be present as part of cleaning or other procedures, allow water to collect and exit without causing damage to the finishes or substrate.

6.10.1.3 For areas in which wear is a concern, such as areas with anticipated pedestrian or wheeled traffic, use durable finish materials able to withstand damage and easily replaceable in sections if damage does occur.

6.10.1.4 Give priority to infection prevention and control in the selection of finishes for all patient care areas. Acoustic characteristics of finish materials will also be a priority consideration.

6.10.1.5 Select the appearance of finishes and colours to create and promote a natural healing environment, prevent glare, and minimize artificial lighting requirements.

6.10.1.6 Select materials to promote sustainability by, for instance, having low-emissivity or comprising of renewable resources.

6.10.1.7 Select finish materials that do not use known carcinogenic material or chemicals in their manufacture or disposal. Consult the Green Guide for Healthcare Version 2.2.

6.10.2 Performance Criteria

6.10.2.1 Interior Wall Framing

6.10.2.1(1) Interior wall framing will comply with all applicable standards, including the Canadian Sheet Steel Building Institute Standards (CSSB1) and the Association of Wall and Ceiling Contractors of B.C. (AWCC) Wall & Ceiling Specification Standards Manual for materials and workmanship for interior walls, including steel studs and furring and gypsum board ceiling suspension systems.

6.10.2.1(2) System design and components will meet seismic restraint requirements for a post-disaster building where applicable.

6.10.2.1(3) Use prefabricated non-load bearing steel studs for interior partitions and furring with no axial load other than its own weight, the weight of attached finishes, and lateral loads of interior pressure differences and seismic loads.

6.10.2.1(4) Construct steel stud framing to accommodate electrical, plumbing and other services in the partition cavity, and to support fixtures, wall cabinets, medical equipment and other such wall-mounted items. Provide reinforcement and backing throughout.

6.10.2.1(5) Consider in design, the differences in air pressure that may result on opposite sides of the wall or partition due to factors such as wind and other lateral pressures, stack effects, or mechanically-induced air pressurization.

6.10.2.1(6) Coordinate with all supplied equipment to confirm location of wall mounts for equipment and furnishings. Provide backing for handrails, grab-bars, wall protection and other similar items. Identify areas for mounting artwork and other display items that would require backing and confirm with the Authority.

6.10.2.2 Gypsum Board

6.10.2.2(1) Gypsum board will comply with all applicable standards, including the Association of Wall and Ceiling Contractors of B.C. (AWCC) Wall & Ceiling Specification Standards Manual.

6.10.2.2(2) Gypsum board will be no less than 16 mm in thickness.

6.10.2.2(3) Use cementitious backer board (tile backer board) behind ceramic wall tile in showers or other wet areas. Use glass mat water-resistant gypsum backing panels behind sinks.

6.10.2.2(4) Provide abuse-resistant gypsum board in corridors with heavy patient, cart or equipment traffic, to be located on the bottom 1200mm of the corridor wall, in order to increase resistance to abrasion, indentation and penetration of interior walls.

6.10.2.2(5) Use glass mat surfaced gypsum sheathing board wherever exterior gypsum sheathing is required at exterior walls.

6.10.2.2(6) Provide airborne sound insulation for gypsum board/steel stud assembly to close off air leaks and flanking paths by which noise can go around the assembly. Make assemblies airtight. Do not locate back to back recessed wall fixtures such as cabinets or electrical, telephone and television outlets and medical gas outlets, which perforate the gypsum board surface. In addition, carefully cut any opening for fixtures to the proper size and appropriately seal piping penetration. Seal conduit/duct/piping penetrations with tape and fill at the plenum barrier. Make the entire perimeter of a sound insulating assembly airtight to prevent sound flanking. Use an acoustic caulking compound or acoustical sealant to seal between the assembly and all dissimilar surfaces

(including at window mullions) in accordance with the recommendations of an acoustic consultant.

6.10.2.3 Ceramic Tilework

6.10.2.3(1) Ceramic tilework will comply with all applicable standards, including the Terrazzo Tile and Marble Association of Canada (TTMAC) Specification Guide 09300 Tile Installation Manual.

6.10.2.3(2) In order to reduce opportunities for the spread of infection, avoid use of ceramic tile in interior applications at patient and other clinical areas, and if used limit to no more than 10% of such applications.

6.10.2.3(3) For installations on wet and exterior surfaces, use floor tiles that have the following static coefficients of friction as per the American Society for Testing and Materials International (ASTM):

6.10.2.3(3)(a) Level Surfaces: Not less than 0.50 for wet and dry conditions.

6.10.2.3(3)(b) Stair Treads: Not less than 0.60 for wet and dry conditions.

6.10.2.3(3)(c) Ramp Surfaces: Not less than 0.60 for wet and dry conditions.

6.10.2.3(4) For exterior installations, provide frost-resistant exterior tiles with a moisture absorption rating of 3.0% or less.

6.10.2.3(5) Provide control joints and expansion joints in conformance with the recommendations of the TTMAC Tile Installation Manual.

6.10.2.3(6) Provide a waterproof membrane under ceramic floor and wall tile in showers and other wet areas. The membrane will be trowel-applied, built-up, liquid-applied or sheet-applied.

6.10.2.3(7) Provide crack isolation membranes to resist crack transmission from the substrate due to lateral movement; design for use in thin-set applications of tile over a cracked substrate. Use elastomeric sheets or trowel-applied materials suitable for subsequent bonding of ceramic tile.

6.10.2.3(8) Set ceramic tile with latex modified mortar and grout with epoxy grout.

6.10.2.4 Ceilings

6.10.2.4(1) Acoustic Tile Ceilings

6.10.2.4(1)(a) Acoustic ceiling tiles in metal suspension system will be used in at least the following locations:

(a).1 Hallways;
(a).2 Offices, meeting rooms;
(a).3 Common lobby, admitting areas;
(a).4 Waiting areas;
(a).5 Quiet rooms;
(a).6 Staff sleep rooms;
(a).7 Medication rooms;
(a).8 Coffee/gift shops;
(a).9 Patient Rooms
(a).10 Examination rooms;
(a).11 Soiled, clean and storage rooms
(a).12 Patient and staff lounges; and
(a).13 Other areas requiring a non-institutional finish.

6.10.2.4(1)(b) Acoustic Panel: Non-directional, fissured pattern, Imperial dimension white ceiling panel, trim edge detail (square) to fit a standard 15/16” T-bar grid panel size.

6.10.2.4(1)(c) Install acoustic ceiling tiles in the suspension system that comply with the requirements of Appendix 2E [Sound Transmission Ratings] and provide the levels of sound attenuation required to suit the intended function of the room.

6.10.2.4(1)(d) All acoustic tile ceilings used in spaces which do not have special cleaning, maintenance or environmental needs (as in food preparation areas or high temperature / humidity areas) to have a Noise Reduction Co-efficient of 0.80 or greater.

6.10.2.4(1)(e) Provide accessibility to the ceiling spaces where access is required to mechanical, electrical or other service systems.

6.10.2.4(1)(f) Special surface-treated ceiling tiles, such as mylar, vinyl-faced or metal-faced tiles, may be used where maintenance and ease of cleaning are priorities as well as the accessibility and acoustic requirements.

6.10.2.4(1)(g) Provide acoustical panels that are appropriate for the normal occupancy condition range of 15°C - 29°C and maximum 70% relative humidity. When the service use temperature and relative humidity are expected to exceed these ranges, consider use of acoustical units specifically designed for such applications.

6.10.2.4(1)(h) Use tiles with scratch-resistant surfaces in any area where lay-in ceiling panels frequently need to be removed for plenum access.

6.10.2.4(1)(i) For ceilings installed in food preparation areas, use acoustic panels capable of being cleaned without undue wear on the panel.

6.10.2.4(1)(j) In the operating rooms, provide a gasketted, smooth, prefinished, metal panel t-bar ceiling system for easy access to the plenum, with an integrated ceiling solution for mechanical, electrical, overhead boom and surgical lighting systems. Provide this ceiling solution in high humidity areas of the Medical Device Reprocessing department.

6.10.2.4(1)(k) Install LED ceiling panel mural in the ceiling of the following rooms:

(k).1 CT Imaging Rooms
(k).2 MRI Imaging Rooms,
(k).3 General Xray Imaging Rooms
(k).4 IV Chemotherapy Room, if it lacks an exterior window
(k).5 Paediatric Procedure Room, if it lacks an exterior window

6.10.2.4(2) Hard Ceilings

6.10.2.4(2)(a) Construct hard ceilings of 16 mm gypsum board where fire rating is not required. In fire rated rooms the gypsum board must be fire rated and the thickness of the gypsum board is to be determined by the rating required by the BC Building Code. Finish hard ceilings as per the paint specifications outlined in Section 6.10.2.7. Provide hard ceilings for the following rooms:

(a).1 housekeeping and utility rooms;
(a).2 washrooms and shower rooms;
(a).3 procedure rooms and any other rooms where invasive procedures may be performed;
(a).4 sterile supply rooms;
(a).5 other areas where infection prevention and control may be an issue;
(a).6 air borne isolation and protective islolation rooms and anterooms; and
(a).7 other areas where infection prevention and control may be an issue.

6.10.2.4(2)(b) In special areas such as Mental Health/Psychiatry, construct the ceiling in accordance with British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

6.10.2.4(3) Access Panels

6.10.2.4(3)(a) Where hard ceilings are used, provide access panels to allow for mechanical and electrical servicing in the ceiling.

6.10.2.4(3)(b) Access panel to be prefinished.

6.10.2.4(4) Ceiling Virtual Skylights

6.10.2.4(4)(a) Create photographic views of the natural landscape or sky view in the ceiling mounted in a rectilinear luminous sky ceiling type system.

6.10.2.4(4)(b) Provide the luminous panels in a suspended ceiling grid system, with back lighting.

6.10.2.4(4)(c) Integrate the ceiling virtual skylight system with the adjacent ceiling areas to create a calming distraction for patients lying on treatment tables.

6.10.2.4(4)(d) Luminous panel surface to be smooth to facilitate cleaning.

6.10.2.5 Flooring

6.10.2.5(1) All Rooms Except Wet Rooms

6.10.2.5(1)(a) Use solid homogeneous sheet flooring (or an equivalent product approved in advance by the Authority) unless specified otherwise.

6.10.2.5(1)(b) Hot weld all joint seams.

6.10.2.5(1)(c) Provide continuous coved bases 150 mm high, straight cut. Where the cove base does not abut to the wall protection or millwork, the top edge will be finished with a clear silicone caulking.

6.10.2.5(1)(d) Use water soluble, low odour flooring adhesive.

6.10.2.5(1)(e) Where there is no existing product to butt against, finish edging finish with vinyl finishing strip as per manufacturers' specifications.

6.10.2.5(1)(f) Finish flooring with high speed buffing as per manufacturers' specification. Do not apply sealer or wax.

6.10.2.5(1)(g) A rubber cove base may be applied in lieu of a continuous cove base in non-clinical administrative areas, except:

(g).1 in any enclosed room that contains a plumbing fixture; or

(g).2 within 3 meters of a plumbing fixture located in a corridor or open area.

6.10.2.5(2) Wet Rooms

6.10.2.5(2)(a) Use slip-resistant solid sheet flooring (or an equivalent product approved in advance by the Authority) for all wet rooms.

6.10.2.5(2)(b) Hot weld all joint seams.

6.10.2.5(2)(c) Form coved bases 150 mm high, straight cut, finished with clear silicone caulking. Do not cap.

6.10.2.5(2)(d) Use solvent based, low odour flooring adhesive.

6.10.2.5(2)(e) Hot weld new flooring to existing floor product.

6.10.2.5(2)(f) Finish flooring as per manufacturer's specification. Do not apply sealer or wax.

6.10.2.5(3) Stair Covering

6.10.2.5(3)(a) Use one piece treads and sheet risers with carborundum strip or an alternate designed for the visually impaired (product approved in advance by the Authority).

6.10.2.5(3)(b) Use water soluble, low odour adhesive.

6.10.2.5(4) Comply with all applicable standards, including the National Floor Covering Association (NFCA) Specification Standards Manual. US Federal Specification RR-T-650d.

6.10.2.5(5) In selecting flooring materials, consider cleaning and maintenance, pedestrian and rolling traffic, acoustics, infection prevention and control, and aesthetics.

6.10.2.5(6) Where epoxy flooring is used in wet areas, use water and slip-resistant grade and prevent water or moisture transmission to the substrate. Terminate flooring at the walls in the form of 150 mm high flash coves.

6.10.2.5(7) Use heavy-duty materials for flooring on which wheeled or service vehicle traffic is anticipated and to which wear and damage may result.

6.10.2.5(8) Use permanent, heavy-duty integral materials such as seamless epoxy quartz flooring for flooring in areas subject to moisture and heat over extended periods of time.

6.10.2.5(9) Use suitable flooring in patient and staff areas where cart or stretcher traffic is expected or where cleaning on a regular or emergency basis is necessary.

6.10.2.5(10) Use water resistant and slip-resistant flooring in public, staff, and patient washrooms.

6.10.2.5(11) Consider resilient tile products for flooring in service corridors and service areas.

6.10.2.5(12) Use anti static flooring material for telecommunication rooms.

6.10.2.5(13) Resilient Flooring

6.10.2.5(13)(a) Choose products with exposed surface having anti-bacterial properties to prevent entry of gram-positive and gram-negative micro-organisms. Weld all seams. Provide integral cove bases.

6.10.2.5(13)(b) If used, provide slip-resistant sheet vinyl with a static coefficient of friction of 0.6 on level surfaces and 0.8 on ramps.

6.10.2.5(13)(c) Avoid the use of linoleum sheet flooring.

6.10.2.5(13)(d) Hot weld all seam joints.

6.10.2.5(13)(e) Form cove bases 150 mm high, straight cut, except for wet rooms. Where the cove base does not abut to the wall protection or millwork, the top edge will be finished with a clear silicone caulking.

6.10.2.5(13)(f) Use solvent based low odour flooring adhesive.

6.10.2.5(13)(g) Finish flooring with high speed buffing as per manufacturers specification.

6.10.2.5(13)(h) Provide tactile warning strips and stair nosings to assist the visually impaired.

6.10.2.5(13)(i) Use adhesive for resilient flooring that meets or exceeds the United States Environmental Protection Agency (EPA) Standards for acceptable VOC concentration and emission rates.

6.10.2.5(14) Gymnasium Flooring

6.10.2.5(14)(a) Provide a resilient vinyl surface multipurpose sport flooring surface.

6.10.2.5(14)(b) Vinyl to be 5 mm thick minimum for shock absorption.

6.10.2.5(14)(c) Choose products with exposed surface having anti-bacterial properties to prevent entry of gram-positive and gram-negative micro-organisms. Weld all seams. Provide integral cove bases.

6.10.2.5(14)(d) Static coefficient of friction of 0.6 on level surfaces.

6.10.2.5(14)(e) Hot weld all seam joints.

6.10.2.5(14)(f) Provide continuous coved bases 150 mm high, straight cut. Where the cove base does not abut to the wall protection or millwork, the top edge will be finished with a clear silicone caulking.

6.10.2.5(14)(g) Use solvent based low odour flooring adhesive.

6.10.2.5(14)(h) Finish flooring with high speed buffing as per manufacturers specification.

6.10.2.5(15) Seamless Quartz Epoxy Flooring

6.10.2.5(15)(a) If used, provide seamless epoxy flooring with 100% solids, zero VOC, solvent-free comprised of a two-component epoxy primer, a two-component epoxy resin and curing agent, coloured quartz aggregate broadcast into both primer and undercoat, and a high performance, UV-resistant two-component, clear epoxy sealer. Provide integral cove bases.

6.10.2.5(16) Carpets and Carpet Tiles

6.10.2.5(16)(a) The use of carpets and carpet tile is allowed only in non-clinical, non-wet areas, such as:

(a).1 single and multi occupancy offices;

(a).2 open office and administrative areas;

(a).3 conference and meeting rooms; and

(a).4 other similar administrative areas.

6.10.2.6 Acoustic Treatment

6.10.2.6(1) Design and construct the Facility to comply with the minimum sound transmission ratings between spaces described in Appendix 3E [Sound Transmission Ratings].

6.10.2.6(2) In addition, provide acoustic treatment where sound attenuation, soundproofing or other sound control measures are necessary to create a healing environment for patients and a safe and comfortable environment for staff and where confidentiality is required.

6.10.2.6(3) Sound control will include:

6.10.2.6(3)(a) attenuation of sound within public, patient and staff environments;

6.10.2.6(3)(b) sound isolation between the exterior and interior spaces;

6.10.2.6(3)(c) sound isolation between interior spaces within the building at both horizontal and vertical separations;

6.10.2.6(3)(d) sound and vibration isolation of building service noises and sound isolation of building service rooms; and

6.10.2.6(3)(e) sound isolation as required for specialty rooms such as video-conferencing. Refer to Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications] and Appendix 3F(vi) [VIHA A/V and Video Conferencing Standards].

6.10.2.6(4) Design partition and ceiling construction to provide approximately the same degree of sound control through each assembly. When a partition is used for sound isolation, extend the sound control construction from slab to slab.

6.10.2.6(5) Optimum sound isolation requires that the integrity of gypsum board partitions and ceilings (mass) never be violated by vent or grille cut-outs or by recessed cabinets, light fixtures, etc.

6.10.2.6(6) Where penetrations are necessary, minimize placing them back-to-back and next to each other. Stagger electrical boxes and medical gas outlets, preferably by at least one stud space. Use mineral fibre insulation to seal joints around all cut-outs such as electrical, TV and telephone outlets, plumbing escutcheons, recessed cabinets, and bathtubs. Use non setting acoustical caulking to seal where the gaps are too small to insert mineral fibre insulation.

6.10.2.6(7) Minimize constructions such as ducts, rigid conduits, or corridors that act as speaking tubes to transmit sound from one area to another. At common supply and return ducts, provide sound attenuation liners at the diffuser and/or grill to maintain assemblies' STC. Seal around conduit.

6.10.2.6(8) Isolate structure-borne vibrations and sound with resilient mountings on vibrating equipment to minimize sound transfer to structural materials. Provide ducts, pipes, and conduits with resilient, non-rigid boots or flexible couplings where they leave vibrating equipment; isolate from the structure with resilient gaskets and sealant where they pass through walls, floors, or other building surfaces.

6.10.2.6(9) Use acoustic screens, vibration isolators, and carefully selected exterior equipment to prevent exterior noise that neighbours may find offensive. See Section 4.2.4.2, Community Noise Protection guidelines / criteria.

6.10.2.7 Painting and Protective Coatings

6.10.2.7(1) Comply with LEED requirements for Low Emitting Materials Paints and Coatings. In particular:

6.10.2.7(1)(a) architectural paints, coatings and primers: low voc.

6.10.2.7(1)(b) anti-corrosive and anti-rust: low voc.

6.10.2.7(1)(c) clear wood finishes, floor coatings, stains and shellacs: low VOC.

6.10.2.7(2) Walls, doors and shelving

6.10.2.7(2)(a) Use eggshell or semi gloss for all walls, doors and painted shelving.

6.10.2.7(3) Door frames and metal doors

6.10.2.7(3)(a) Use semi gloss for all door frames and metal doors.

6.10.2.7(4) Wood finish doors

6.10.2.7(4)(a) Use clear coat interior rub varnish for all wood finish doors.

6.10.2.7(5) Paint Grade Doors

6.10.2.7(5)(a) Use semi gloss for all paint grade doors.

6.10.2.7(6) Ceilings

6.10.2.7(6)(a) Use eggshell paint for all ceilings.

6.10.2.7(7) Floors, concrete

6.10.2.7(7)(a) Use a 2-component (base component A, curing agent B).

6.10.2.7(7)(b) Use a primer if part of coating system.

6.10.2.7(8) Paint painted patient care areas with a semi-gloss finish.

6.10.2.7(9) Conform to all applicable standards, including the material and workmanship requirements of Master Painters Institute (MPI) Architectural Painting Specification Manual.

6.10.2.7(10) Use exterior paints of a quality designed to protect substrate materials from weather and climate conditions.

6.10.2.7(11) Use exterior and interior finish materials with surface finishes either as integral to the finish material or field-applied separately to the surface of the finish material.

6.10.2.7(12) Treat exterior masonry materials such as brick and concrete block with water-repellent coatings to prevent water ingress into or through the material.

6.10.2.7(13) Provide a special protective coating on exterior and interior materials that are subject to corrosion from exposure to moisture or other corrosive agents, and where painting is deemed to be insufficient protection. Materials requiring a special protective coating include exterior and interior structural, galvanized, and miscellaneous steel.

6.10.2.7(14) Use paints with a minimal VOC level in patient, staff, and public interior areas.

6.10.2.7(15) Use interior paint materials of a quality to withstand regular or repeated cleaning as the function of the area dictates.

6.10.2.7(16) Paint handrails, doors, and frames with a contrasting colour from walls in consideration of the visually impaired.

6.10.2.7(17) Do not use materials containing lead and mercury.

6.10.2.7(18) If seamless epoxy wall coatings are used, provide a two-component, high solids, zero or low VOC, solvent-free, epoxy glaze wall coating that is seamless and abrasion, chemical, and UV-resistant.

6.10.2.8 Vinyl Acrylic Wall Covering

6.10.2.8(1) If vinyl/acrylic wall covering is used, provide vinyl/acrylic high impact rigid sheet, nominal 0.40” thickness with colour-matched vinyl/acrylic trim for joint/transitions.

6.10.2.8(2) Furnish complete packaged system containing all primers and adhesive. Use non water-based and non-hazardous primer and adhesive materials.

6.10.2.9 Dry Erase Wall Covering

6.10.2.9(1) Provide as required throughout the Facilities pigmented gloss vinyl wall covering presentation surfaces for dry erase markers, 0.61 kg/sq.m, non-woven backing.

6.10.2.9(2) Provide trim and other accessories including but not limited to wall covering trim of anodized aluminum, low profile trim, plastic marker dispensers, dry erase markers (set of 4 colours), low odour, and eraser, magnets, clearer, towels.

6.11 Specialties (Division 10)

6.11.1 Basic Requirements

6.11.1.1 Provide specialty products manufactured for the specific purposes intended, and installed in strict accordance with the manufacturer’s directions.

6.11.2 Tackboards and Whiteboards

6.11.2.1 Provide, as required in the Equipment List:

6.11.2.1(1) tackboard surfaces that allow pin penetration of the surface materials and have reasonable resistance to deterioration; and

6.11.2.1(2) whiteboard surfaces that allow use of felt-type writing instruments and allow erasing and cleaning with minimal effort. Use porcelain ceramic on steel surface, magnetic, scratch and abrasion-resistant and have maximum contrast, glare control, and reflectivity.

6.11.2.2 Provide tackboards and whiteboards with extruded aluminum frames, accessory trays, map rails and map hooks.

6.11.2.3 Use non-toxic, water based lamination adhesive for tackboards and whiteboards.

6.11.3 Projection Screens

6.11.3.1 Provide, as required in the Equipment List:

6.11.3.1(1) projection Screens mounted from recesses in ceilings or wall mounted; and

6.11.3.1(2) where appropriate, provide for motorized screens.

6.11.3.2 Provide supports and power as required to coordinate with mobile or fixed projector units, including ceiling mounted projectors.

6.11.3.3 Provide for trims and finishes compatible with the design of the rooms.

6.11.4 Compartments and Cubicles

6.11.4.1 Provide compartments and cubicles including toilet partitions, change cubicles, shower partitions, and other compartments and cubicles requiring privacy and security.

6.11.4.2 Provide exposed surfaces that are permanent, water-resistant, corrosion-proof, and readily cleaned and maintained.

6.11.4.3 Secure partitions and standards to the floor or ceiling structure, and in a manner to resist lateral loading and impact.

6.11.4.4 For compartment/cubicle doors, use material matching the partitions and include permanent, purpose-made hardware. Design doors and hardware to provide barrier-free access.

6.11.4.5 Where appropriate and approved by the Authority, curtain tracks and curtains may be used in lieu of doors.

6.11.4.6 Provide a mirror in all change compartments.

6.11.5 Toilet Partitions

6.11.5.1(1) Galvannealed sheet metal will conform to ASTM A653 with minimum ZF001 (A01) zinc coating. Finish in polyester, baked enamel or powder coating.

6.11.5.1(2) For stainless steel, use Type 304 conforming to ASTM A240 with No. 4 finish.

6.11.5.1(3) For plastic laminate, use Grade 10/HGS GP50 scuff-resistant, high pressure laminate, conforming to NEMA LD-3.

6.11.5.1(4) Avoid use of particleboard core partitions.

6.11.5.1(5) For fibre-reinforced plastic (fibreglass), use a moisture resistant grade.

6.11.6 Change Cubicle Partitions

6.11.6.1(1) Where not adjacent to showers, change cubicle partitions will comply with the above requirements for toilet partitions.

6.11.7 Shower Partitions

6.11.7.1(1) Use solid phenolic laminated thick stock, factory-laminated with decorative finish both faces of core and conforming to CAN3-A172 or NEMA LD3.

6.11.8 Metal Lockers

6.11.8.1 Provide individual and shared storage facilities in designated staff and patient areas in the Facility based on expected staffing requirements as described in the Clinical Specifications and as appropriate for operation of the Facility. Such storage facilities may be metal lockers and metal locker systems of sizes, numbers, and groupings as determined in consultation with the Authority. Lockers will include a mix of full height, half size and purse lockers.

6.11.8.2 For sheet metal, use galvannealed steel conforming to ASTM A653 with ZF001 (A01) zinc coating.

6.11.8.3 Lockers will be placed on minimum 150 mm high masonry bases finished with cove bases integral with the floor finish.

6.11.8.4 Lockers will fit tightly below gypsum board bulkheads or be complete with sloped metal tops.

6.11.8.5 Finish steel surfaces with polyester baked enamel or powder coating.

6.11.8.6 All single, double, or multiple-tier metal lockers for staff use will have digital electronic locks, number plates and hanging hooks.

6.11.9 Storage Shelving Systems

6.11.9.1 Provide storage systems for materials in designated storage areas.

6.11.9.2 Adjustable shelving systems may be specifically manufactured for storage purposes, such as plywood or steel-slotted angle industrial shelving for bulk materials of plastic laminate-faced plywood for clean storage.

6.11.9.3 For mobile storage systems, provide a high-density system designed to make maximum use of available space by eliminating need for access aisle for each run of shelving. Install and brace systems to resist seismic loads. The mobile storage system to be either power assisted or to be easily operable without undue required strength by any person.

6.11.10 Washroom Accessories

6.11.10.1 Provide washroom accessories as specified in the Equipment List and this Schedule in all public, patient, and staff washrooms as required in accordance with the applicable high quality hospital standards. Determine the type, size, and number of accessories and placement on walls with regard for the numbers and categories of users, in consultation with the Authority.

6.11.10.2 Install washroom accessories to allow cleaning and maintenance of the accessory and surrounding wall area.

6.11.10.3 Accessories with appropriate safety features will be selected for Mental Health / Psychiatry and other areas where there is increased risk of patient injury and in accordance with British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

6.11.10.4 Recessed dispensers (such as those for paper towels, soap and waste receptacle) will not be used.

6.11.10.5 Use commercial grade accessories free from imperfections in manufacture and finish.

6.11.10.6 Use fittings with concealed fastening for security and discouragement of tampering.

6.11.10.7 Staff and public washroom accessories will include the following:

6.11.10.7(1) soap dispensers;

6.11.10.7(2) toilet paper dispensers;

6.11.10.7(3) paper towel dispensers – “hands free” type;

6.11.10.7(4) paper towel disposals;

6.11.10.7(5) mirrors;

6.11.10.7(6) barrier-free grab bars (with integral tactile grip finish);

6.11.10.7(7) coat hooks;

6.11.10.7(8) sanitary napkin dispensers;

6.11.10.7(9) sanitary napkin disposals;

6.11.10.7(10) baby change table; and

6.11.10.7(11) utility shelf.

6.11.10.8 Patient washroom accessories will include the following:

6.11.10.8(1) soap dispensers;

6.11.10.8(2) toilet paper dispensers;

6.11.10.8(3) paper towel dispensers;

6.11.10.8(4) paper towel disposals;

6.11.10.8(5) mirrors;

6.11.10.8(6) handicap grab bars (with integral tactile grip finish);

6.11.10.8(7) coat hooks; and

6.11.10.8(8) utility shelf.

6.11.10.9 Shower rooms or showers in washrooms will include the following accessories:

6.11.10.9(1) shower curtain and track or rod as appropriate;

6.11.10.9(2) handicap grab bars; and

6.11.10.9(3) fold-down shower seat.

6.11.11 Elevated Access Flooring

6.11.11.1 Provide an elevated access flooring system ("**Elevated Flooring**") where appropriate, including in all server rooms and control rooms, and other rooms as appropriate and approved by the Authority.

6.11.11.2 The Elevated Flooring assembly will consist of modular floor panels laid out on a grid system, supported by and secured to the under-structure. Panels will be supported by an adjustable pedestal base that positively located, engages and secures panels and that accommodates horizontal grid members as required.

6.11.11.3 The Elevated Flooring is to facilitate electrical, communication and computer service lines and mechanical ducting, and may service various areas as air supply or return plenums in the cavity portion below, provided that it fully accommodates the functional uses it serves above. The area below the Elevated Flooring may be a pressurized area.

6.11.11.4 Panels will be easily removable by one person with standard tools and a lifting device and will be interchangeable, except for cut-out panels. Cut-out panels will be interchangeable with solid panels.

6.11.12 Cubicle Curtains

6.11.12.1 Provide and install hospital cubicle privacy curtain panels, curtain hooks, ceiling mounted tracks, wall flanges, angle brackets, ceiling flanges, end stops, T plates, 4-way plates and all other accessories as required, in consultation with the Authority.

6.11.12.2 Provide the number of cubicle curtains required to fully enclose the opening, with a minimum of three sets of curtain panels for each location.

6.11.12.3 Curtains will comply with CAN/ULC S109-03 Flame Tests of Flames Resistant Fabrics and Films.

6.11.12.4 For cubicle tracks, use extruded, anodized aluminum, entirely enclosed except for the track guide.

6.11.12.5 Use cubicle carriers composed of a non-binding, abrasion-resistant, nylon block supported from self-lubricating bearings by two nylon wheels with a free-moving plated swivel-hook assembly. Fit one end of each track with a removable end stop to permit simple carrier replacement. Use anodized aluminum splicing clamps. Use factory-curve tracks.

6.11.12.6 Curtain and curtain track will be structurally supported.

6.11.12.7 Provide cubicle curtains in the following locations:

6.11.12.7(1) inpatient bedrooms and treatments bays in the General Medical and Surgical inpatient units, ICU/Telemetry unit and Maternity Newborn and Pediatric units;

6.11.12.7(2) the emergency department at stretcher, bed and chair bays, treatment areas, holding spaces, examination rooms, procedure rooms and trauma rooms;

6.11.12.7(3) the Cast Clinic at stretcher treatment bays;

6.11.12.7(4) Diagnostic Imaging at change cubicles;

6.11.12.7(5) Ambulatory Clinics / Outpatient Procedural Care at change cubicles, treatment bays, procedure bays and examination rooms;

6.11.12.7(6) Surgery Day Care at stretcher bays;

6.11.12.7(7) Surgical Suite PARR bays and Pre-Operating holding bays;

6.11.12.7(8) Cardio Pulmonary Diagnostics at change cubicles and holter monitoring and stress test areas;

6.11.12.7(9) Therapy Services at change cubicles; and

6.11.12.7(10) any other location identified in the Clinical Specifications.

6.11.13 Shower Curtains

6.11.13.1 Provide shower curtains and track in the following locations:

6.11.13.1(1) General medical and surgical unit at inpatient washrooms;

6.11.13.1(2) ICU/Telemetry unit at inpatient washrooms; and

6.11.13.1(3) Maternity Newborn and Pediatric Unit inpatient washrooms.

6.11.14 Privacy Glazed Partitions

6.11.14.1 Provide fixed glazed partitions in open bed bays in accordance with the Clinical Specifications.

6.11.14.2 Fixed glazed partitions to allow for enhanced patient acoustic privacy while allowing for visual supervisions by staff.

6.11.15 Folding Panel Partitions

6.11.15.1 Provide folding panel partitions with acoustic seal for subdividing the EOC into 3 separate meeting rooms in accordance with the Clinical Specifications.

6.11.15.2 Provide an access door in each folding panel partition to allow access from meeting room to meeting room.

6.11.16 Inpatient Bed Headwalls

6.11.16.1 Design the headwalls in consultation with the Authority.

6.11.16.2 In private inpatient rooms, design the head wall adjacent to the inpatient bed:

6.11.16.2(1) to allow for one oxygen connection, one medical air connection and one vacuum connection on each side of the bed, for a total of 6 medical gas outlets; and

6.11.16.2(2) to meet or exceed all relevant CSA and ULC codes and regulations for the full range of requirements for an Acuity Adaptable Direct Patient Care Area and environment;

6.11.16.2(3) to provide all rails, accessories and backing required for mounting monitors, baskets, and other equipment as required,

6.11.16.2(4) to provide bed dock locators behind the bed,

6.11.16.2(5) to allow for data, communication and electrical power outlets on both sides of the bed (refer to Attachment 4A and Attachment 4B of Appendix 2D [Equipment and Furniture] for the required number of outlets);

6.11.16.2(6) to provide one nurse call station button and one code blue button; and

6.11.16.2(7) so that medical gases, service outlets, rails, equipment and accessories are provided in a horizontally configured modular system, which may be either a horizontal modular headwall strip or a complete wall unit.

6.11.16.3 In semi-private inpatient rooms provide two headwalls, each of which must comply with the requirements of section 6.11.16.2.

6.11.16.4 In bariatric rooms provide two headwalls that comply with the requirements of section 6.11.16.2, one behind the bariatric bed and the other on the opposite wall, in order to support a second inpatient bed during over capacity.

6.11.17 Electric Fireplace

6.11.17.1 Provide manufactured electric fireplaces in the located identified in the Clinical Specifications.

6.11.17.2 Fireplaces will have all components and accessories for a complete, functional unit listed to UL or WHI and will be front view, opening-sealed unit and non-venting, with a fire on/off switch, log set and log grates.

6.11.18 Mail Slots

6.11.18.1 Provide mail slots that are a minimum of 25mm wide, 350mm high and 400mm deep, in locations identified in the Clinical Specifications.

6.11.19 Light Tubes

6.11.19.1 Provide 5 light tubes in each Facility as directed by the Authority during design development. The total length of each individual light tube will be as determined by Project Co.

6.12 Equipment (Division 11)

6.12.1 Refer to Section 7 of Schedule 2 [Design and Construction Protocols] and Appendix 2D [Equipment and Furniture].

6.12.2 Equipment Supports

6.12.2.1 Provide equipment supports for equipment outlined in Appendix 2D [Equipment and Furniture], with proper backing and structural reinforcing as described in Section 5.3 Post Disaster Requirements.

6.12.3 Patient Lifts

6.12.3.1 General. Project Co will design and construct the Facility to include patient lifts at the room locations specified in Appendix 3L [Patient Lift Matrix] of the type, weight requirement and quantity specified in Appendix 3L [Patient Lift Matrix]. Refer to Appendix 2D and the Equipment List for responsibilities related to patient lift motors, carry bars and chargers. Project Co will provide all equipment and components not specifically listed in the Equipment List as required to integrate the patient lift Equipment into the Facility, including tracks and docking stations for all patient lifts.

6.12.3.2 Bariatric Patient Lifts. Project Co will design and construct the Facility to include patient lifts that have a patient load bearing capacity of 454 kg at the room locations indicated in Appendix 3L [Patient Lift Matrix] with a quantity shown in the column titled “bariatric”. Project Co will design and construct all bariatric patient lift systems so that any traverse will accommodate safe transfer of a bariatric patient by two Authority staff members.

6.12.3.3 Non-Bariatric/Standard Patient Lifts. Project Co will design and construct the Facility to include non-bariatric patient lifts that have a patient load bearing capacity of 284 kg at the room locations indicated in Appendix 3L [Patient Lift Matrix] with a quantity shown in the column titled “standard”. Project Co will design and construct all non-bariatric patient lift systems so that any traverses will be manual and will accommodate safe transfer of a patient by one Authority staff member.

6.12.3.4 Patient Lifts in Inpatient Bedrooms. Project Co will design and construct all rooms identified in Appendix 3L [Patient Lift Matrix] as requiring type “A” patient lifts, to include a patient lift system that:

6.12.3.4(1) is a ceiling-mounted X-Y gantry track lift system in the inpatient bedroom; and

6.12.3.4(2) allows for patient pick up and care functions (turning, boosting, re-positioning, supporting/holding limbs) from all areas of the inpatient bedroom designed for patient use or access. The patient bedroom boom and gantry is to transfer to a single lift track to the

en-suite washroom so as to enable patient use of the toilet, sink, shower and/or tub.

6.12.3.5 Project Co will design and construct an innovative lift system design for the Facility that provides for effective transition points between the X-Y gantry tracks and any other associated tracks including if applicable the en-suite washroom.

6.12.3.6 Patient Lifts in Procedure Rooms. Project Co will design and construct all rooms identified in Appendix 3L [Patient Lift Matrix] as requiring type "B" patient lifts to include a patient lift system that:

6.12.3.6(1) is either a ceiling-mounted X-Y gantry track lift system or a ceiling-mounted boom lift system; and

6.12.3.6(2) allows for patient pick up and care functions (turning, boosting, re-positioning, supporting/holding limbs) from all procedural areas and areas designed for patient use or access.

6.12.3.7 Project Co will design and construct the Facility so that ceiling heights in all rooms containing patient lifts will accommodate patient mobility on lifts when using specialized ambulatory slings and carry bars; and so that a patient's lower limbs will clear the edge of bed/stretcher/tub during seated transfers.

6.12.3.8 Project Co will undertake final design of all patient lift systems in consultation with the Authority and patient lift equipment suppliers.

6.12.4 Window Washing Systems

6.12.4.1 Provide equipment or appropriate anchors to facilitate window washing.

6.12.5 Loading Dock Equipment

6.12.5.1 Provide a loading dock with the following:

6.12.5.1(1) 3 docking bays for trucks, each with built in dock leveller;

6.12.5.1(2) 2 waste compactor bays;

6.12.5.1(3) 2 recycling bays; and

6.12.5.1(4) access stair and ramp access.

6.12.5.2 The loading dock will be an external covered area, with a 14' high overhead clearance.

6.12.5.3 Provide lighting over the loading dock to allow night time functionality.

6.12.5.4 The loading dock platform will be 1200mm higher than the truck bay.

6.12.5.5 Dock Bumpers

6.12.5.5(1) Provide a dock bumper at each truck bay equipped with a built in dock leveller.

6.12.5.6 Dock Leveller

6.12.5.6(1) Provide 3 pit style dock levellers in each Facility, one per truck bay, in the loading dock area to facilitate deliveries as outlined in the Clinical Specifications in the material management section.

6.12.5.6(2) The dock leveller is to be a hydraulic style lift system, equipped with a push button remote control.

6.12.5.6(3) Assume an operational maximum tilt of 10 degrees for the dock leveller, based on a 52” – 55” high truck bed.

6.12.5.6(4) Provide each dock leveller with a minimum lifting capacity of 22,727 kg.

6.12.6 Additional Truck Delivery Bay

6.12.6.1 Provide a truck delivery area that is additional to the loading dock, for the transport of cadavers to and from the Morgue.

6.12.7 Scissor Lifts

6.12.7.1 Provide a permanent, hydraulic style scissor lift in the following locations:

6.12.7.1(1) Equipment Depot mezzanine;

6.12.7.1(2) Equipment Maintenance mezzanine;

6.12.7.1(3) Materials Management; and

6.12.7.1(4) Truck Delivery Bay.

6.12.7.2 The scissor lift will have the height extension required to reach to the mezzanines (refer to Section 5.9.8).

6.12.7.3 Design the scissor lift to fit in the floor slab recess to ensure its platform is flush with the finished floor level.

6.12.7.4 Each scissor lift will have the following features:

6.12.7.4(1) a push button remote control;

6.12.7.4(2) warning lights and sirens for use when the unit is in operation; and

6.12.7.4(3) a swing gate to allow easy access to the platform.

6.12.7.5 The scissor lift platform for the Truck Delivery Bay will be 1200mm x 2400mm with minimum lift capacity of 1000kg.

6.12.7.6 The scissor lift platforms for the Equipment Depot mezzanine and Equipment Maintenance mezzanine will be 900mm x 1200mm with a lift capacity of 400kg.

6.12.8 Biohazardous Waste Refrigerated Storage Room

6.12.8.1 Provide biohazardous waste storage, as set out in the Clinical Specifications, that:

6.12.8.1(1) has a floor drain and interceptor for spill containment;

6.12.8.1(2) provides temperature containment in the room with prefabricated refrigeration panels, sized to suit;

6.12.8.1(3) is an integrated packaged unit, complete with lighting, doors and hardware; and

6.12.8.1(4) meets the hardware requirements set out in Appendix 3F(vii) [Door Operation Matrix].

6.12.9 Refrigerated Body Holding Room

6.12.9.1 Provide Body Holding storage, as set out in the Clinical Specifications, that:

6.12.9.1(1) has a floor drain and interceptor for spill containment;

6.12.9.1(2) has flush finished floor access to the body holding room, with recessed floor slab for floor insulation as required;

6.12.9.1(3) accommodates the equipment designated for this room as set out in the Equipment List;

6.12.9.1(4) provides temperature containment in the room with prefabricated refrigeration panels, sized to suit;

6.12.9.1(5) is an integrated packaged unit, complete with lighting, doors and hardware; and

6.12.9.1(6) meets the hardware requirements set out in Appendix 3F(vii) [Door Operation Matrix].

6.12.10 Overhead Service Columns

6.12.10.1 Provide, in consultation with the Authority, in the locations specified in the Clinical Specifications, overhead service columns as follows:

6.12.10.1(1) coordinate the overhead service column placement in the room with other ceiling elements, including patient lift tracks, lights and diffusers;

6.12.10.1(2) provide articulated service columns as required by Authority to ensure an adequate range of coverage and flexibility for the care of the patient; and

6.12.10.1(3) determine the electrical services, medical gas outlets, accessories and equipment supports to be accommodated by the service column based on the information provided in this Schedule and its Appendices and the user consultation process.

6.13 Furnishings (Division 12)

6.13.1 Millwork, Casework, Clinical Systems Furniture and Systems Furniture

6.13.1.1 In addition to Project Co's obligation to provide Category B and E Equipment, Project Co will provide and install all millwork, casework, clinical systems furniture, systems furniture and accessories as required to support the programs and functions described in the Clinical Specifications or as required to support the operation of the Facility.

6.13.1.2 Appendix 3K [Millwork, Casework and Systems Furniture] lists the locations in which millwork, casework, clinical systems furniture or systems furniture are required. Subject to Sections 6.13.1.5(1) and 6.13.1.6(1), Project Co may use millwork, casework, clinical systems or systems furniture interchangeably to satisfy the requirements of Appendix 3K [Millwork, Casework and Systems Furniture]. Project Co will submit an initial layout and configuration for review by the Authority.

6.13.1.3 Project Co, in consultation with the Authority and during the user consultation process described in Appendix 2B [User Consultation and Design Review], will establish which option (millwork, casework, clinical systems or systems furniture) best meets the Authority's functional needs for each space and will achieve the most appropriate level of flexibility, re-configurability, serviceability, and reusability between all areas of the Facilities.

6.13.1.4 Millwork means custom fabricated wood or metal cabinetry and counter components and accessories that are installed with little or no modification. Millwork or casework may require mechanical, electrical power and data service connections.

6.13.1.5 Millwork or casework components can include but are not limited to work surfaces (such as counters and work benches) and storage (such as cabinetry, files, drawers, wardrobes and cabinets).

6.13.1.5(1) Project Co will provide the following as millwork:

6.13.1.5(1)(a) kitchen and pantry counters, upper and lower cabinets, drawers and shelving;

6.13.1.5(1)(b) utility room counters, storage cabinetry and shelving;

6.13.1.5(1)(c) patient room lockable wardrobes, including shelving, drawers, coat rods, counters and cabinets; locks will be digital electronic;

6.13.1.5(1)(d) workroom counters and storage;

6.13.1.5(1)(e) security kiosks; and

6.13.1.5(1)(f) vanity counters containing sinks.

6.13.1.6 Modular Casework means a composition of factory produced, quickly installed parts that are easily replaceable, reconfigurable and interchangeable. Casework can be rearranged to change configuration or to include additional modules as needed.

6.13.1.6(1) Project Co will provide the following as modular casework:

6.13.1.6(1)(a) lab casework;

6.13.1.6(1)(b) pharmacy casework;

6.13.1.6(1)(c) medication room work surfaces, upper and lower cabinetry, shelving and storage components; and

6.13.1.6(1)(d) clinical, exam and treatment room counters, upper and lower cabinets, shelving and storage.

6.13.1.7 Clinical systems furniture means a factory produced, component system designed to be replaceable, reconfigurable, and interchangeable, and designed for specific use in health care facilities. Clinical furniture systems can be rearranged to change the configuration or to include additional modules and accessories as necessary. Clinical systems furniture requires electrical power and data service connections.

6.13.1.7(1) Without limitation, Project Co may use clinical systems furniture for the following:

6.13.1.7(1)(a) nursing workstations;

6.13.1.7(1)(b) charting alcoves;

6.13.1.7(1)(c) triage desk;

6.13.1.7(1)(d) unit clerk stations;

6.13.1.7(1)(e) team care stations;

6.13.1.7(1)(f) registration cubicles;

6.13.1.7(1)(g) adjustable height workstations;

6.13.1.7(1)(h) reception desks;

6.13.1.7(1)(i) information desks; and

6.13.1.7(1)(j) triage desks.

6.13.1.8 Project Co will provide all accessories, storage, cabinetry, upper and lower shelving, keyboard trays and counters necessary to facilitate efficient clinical operations.

6.13.1.9 Systems furniture means a composition of factory-produced wall mounted or partition components that are easily reconfigurable and interchangeable. Systems furniture is designed for office or commercial use and includes accessories and attachments which complete its functionality. Systems furniture requires electrical power and data service connections.

6.13.1.9(1) Without limitation, Project Co may use systems furniture for the following:

6.13.1.9(1)(a) office workstations including desks, shelving, cabinets, keyboards and accessories;

6.13.1.9(1)(b) cubicle partitions;

6.13.1.9(1)(c) reception desks;

6.13.1.9(1)(d) information desks; and

6.13.1.9(1)(e) work/study carrels.

6.13.2 Furniture

6.13.2.1 Furniture means loose or unattached items that can be rearranged to suit various activities and includes:

6.13.2.1(1) coffee tables and side tables;

6.13.2.1(2) unattached seating (such as chairs and stools); and

6.13.2.1(3) office desks.

6.13.2.2 All furniture and millwork supplied by Project Co will meet the following requirements:

6.13.2.2(1) Flexibility

6.13.2.2(1)(a) Products must offer modular solutions that will enable flexibility and LEAN principles to be practiced. Furniture pieces will:

(a).1 allow for individualization;

(a).2 possess the ability to be used in different applications or flex easily for future use;

(a).3 use non-handed solutions that work in multiple configurations, when possible.

6.13.2.2(2) Durability

6.13.2.2(2)(a) Activity, waiting, and dining room furniture will be engineered for high traffic use.

6.13.2.2(2)(b) Patient room furniture will be designed in conjunction with healthcare professionals and facility residents and be tested to ensure durability and function.

6.13.2.2(2)(c) Furniture will conform to Upholstery Section under “Cleaning and Ease of Maintenance” for additional criteria related to durability.

6.13.2.2(3) Construction

6.13.2.2(3)(a) The quality and make of the product (its construction, finish materials, and maintenance requirements) will be suitable for long term use and be designed for intense performance.

6.13.2.2(3)(b) Products with replaceable components are preferred.

6.13.2.2(3)(c) Wood furniture should be avoided, particularly in clinical areas (such as patient rooms, waiting rooms, unit offices, nurses’ stations, staff rooms and conference rooms). Where utilized, wood pieces will be constructed of:

(c).1 Solid wood frames of kiln dried wood for added strength and long term durability.

(c).2 A frame capable of supporting varying weights and body types and offering ease and reassurance to both patients and care providers.

(c).3 Plastic laminates can be used in place of real wood when a wood-look is desired.

6.13.2.2(4) Seating

6.13.2.2(4)(a) In waiting room and patient seating, steel tube construction and spring-seat construction are preferred.

6.13.2.2(4)(b) Seating with wall-saver legs or a wall-saver back design is preferred.

6.13.2.2(4)(c) Seating products with arms will include polyurethane arm caps rather than upholstered arm caps.

6.13.2.2(4)(d) See upholstered notes referenced throughout this document for information on upholstered seating products.

6.13.2.2(4)(e) See Section 6.13.2.2(8) and 6.13.2.2(11) for additional requirements.

6.13.2.2(5) Tables

6.13.2.2(5)(a) For durability in waiting rooms and high traffic areas, horizontal table surfaces of solid surface material tops or plastic laminate are preferred.

6.13.2.2(5)(b) Low VOC polyurethane sealed woods can be used on vertical surfaces if plastic laminate is not available.

6.13.2.2(5)(c) Edges will feature an ergonomic profile for user comfort and be of durable material composition and construction.

6.13.2.2(6) Workstations/Desks

6.13.2.2(6)(a) Refer to individual specifications for material composition and finish information.

6.13.2.2(6)(b) When installed, two adjoining end panels of work surfaces will be leveled so work surfaces sit at the same height.

6.13.2.2(6)(c) Tackboard, if specified with desk and/or workstation, between hutch and worktop, will span from work surface top to underside of overhead cabinetry leaving no visible gaps, while, at the same time, managing task light wires, if specified with assembly.

6.13.2.2(6)(d) Front edge of keyboard platform will be set back from front edge of work surface and/or table.

6.13.2.2(6)(e) Any “smart” or “hardwired” furniture will be fully coordinated for proper circuitry and any other building requirements.

6.13.2.2(7) Filing / Storage

6.13.2.2(7)(a) Filing is for letter filing, unless specified otherwise. In order to maximize filing capacity, files will be set up for side-to-side filing.

6.13.2.2(7)(b) During installation, the conversion parts of the files will be left in the file to allow for front-to-back / side-to-side conversion at a later time.

6.13.2.2(7)(c) Filing will be equipped with hanging frames at the time of installation.

6.13.2.2(7)(d) At a minimum, two-drawer files will include a counter-balance package as recommended by the product manufacturer.

6.13.2.2(7)(e) Lockable storage will be keyed as per the building keying system. Keying schedule to be determined with the Authority.

6.13.2.2(8) Cleaning and Ease of Maintenance

6.13.2.2(8)(a) The size, shape, and design of the furniture will allow easy access for cleaning.

6.13.2.2(8)(b) Materials, upholstery, and finishes will be capable of withstanding institutional grade detergents, cleaners, and disinfectants with no effect on the appearance, integrity, or life of the product. Selection will be based on the understanding of the principles of decontamination and maintenance requirements (able to withstand multiple applications of diluted disinfectants over time).

6.13.2.2(8)(c) Project Co will request that manufacturers provide detailed cleaning and disinfection guidelines prior to Project Co’s purchase along with a thorough listing of which cleaning products can be used on their products. Project Co will review instructions to ensure they are clear and cleanable with Authority approved detergents and disinfectants.

6.13.2.2(8)(d) Other upholstered soft furnishings will have the following characteristics:

(d).1 Be seamless where possible or have double stitched seams located on the non-contact areas of the furniture or sealed.

(d).2 Limited pleating.

(d).3 Upholstered furniture in care areas will be covered with fabrics that are fluid-resistant, non-porous and can withstand cleaning with hospital grade disinfectants.

(d).4 Seating will have removable seat cushions for cleanability and/or “clean-out” spaces between the seat and back for lounge seating applications.

(d).5 Seating will have removable upholstery covers for both the seat and back, if applicable. Attic stock of the removable upholstery covers will be ordered with the original purchase, in the amount of 5% of the total waiting room and patient room seating.

(d).6 Have high-destiny foam cores with a moisture barrier and resistance to mold.

6.13.2.2(8)(e) Upholstery will:

(e).1 be impermeable to water and quick-drying;

(e).2 be anti-microbial, and/or have anti-microbial inhibitor technology;

(e).3 have a good abrasion rating for high-use areas (with a minimum of 100,000 DR (ASTM D4157-02 Wyzenbeek Test Method);

(e).4 have a high-rating for color-fastness, exceeding 40 hours (AATCC Method 16A);

(e).5 be stain-resistant;

(e).6 be latex-free;

(e).7 have low volatile organic compounds;

(e).8 contain no heavy metals;

(e).9 have no halogenated flame retardant materials or perfluorinated chemicals;

(e).10 have limited use of polyvinyl choride, avoiding use of polyvinyl choride where possible, subject to 6.13.5.(9)(c)

6.13.2.2(9) Infection Prevention and Control

6.13.2.2(9)(a) Organic finish substances (e.g. wood), which can be exposed to a liquid, and upholstered furnishings, will be

avoided, or at least minimized, in areas where immunocompromised patients are present.

6.13.2.2(9)(b) The use of impermeable upholstery (such as vinyl) is permitted in high-risk areas (high-risk applies to any areas specifically used by patients/residents/clients, including patient rooms and waiting rooms) and any area where a healthcare worker goes after providing direct patient care (including nursing station, staff lounge, report area, conference rooms and office within patient care areas). Polyurethane fabrics are preferred, if they meet the requirements of the application.

6.13.2.2(9)(c) Durable, cleanable fabrics are appropriate in low risk areas. A low level of risk applies to any office areas where staff members are not providing direct patient care, or return to after providing direct patient care.

6.13.2.2(10) Environmentally Sensitive

6.13.2.2(10)(a) Products will be GREENGUARD certified, and be designed to achieve reduced environment impact.

6.13.2.2(10)(b) If wood products are used, lumber will come from responsibly managed forests, with each piece utilized to its full capacity. Wood will have low formaldehyde emissions with little to no CFC's used in the production of the materials.

6.13.2.2(10)(c) Furnishings will follow the LEAN principles outlined in Section 3.5 of this Schedule and the LEED Gold Certification Requirements of Schedule 2 [Design and Construction Protocols].

6.13.2.2(11) Comfort, Ergonomics, and Safety

6.13.2.2(11)(a) Waiting room furniture will be designed to promote comfort and long term durability.

6.13.2.2(11)(b) The product construction and design should avoid stress and fatigue to the patient.

6.13.2.2(11)(c) Seating will have the stability to assist the patient or visitor in entering and exiting the chair.

6.13.2.2(11)(d) All items of furniture (including tables) will be stable and will not move or tip over when touched by a person requiring support.

6.13.2.2(11)(e) Furniture will not constitute a hazard for persons who have visual limitations and will be usable by persons with varying abilities and disabilities.

6.13.2.2(11)(f) Products will accommodate and facilitate comfort and well-being.

6.13.2.2(11)(g) Back support will be provided on seating pieces, through the use of a high or mid back, to provide adequate back support to various populations.

6.13.2.2(11)(h) A minimum of 20% of seating will be designed to meet bariatric requirements of 600 lbs.

6.13.2.2(11)(i) Task seating will be ergonomically correct with respect to the seat height and pan depth. Seating will be height adjustable, with height adjustable lumbar support to maintain correct body alignment, adjustable back rest tilt, adjustable seat pan depth, height, width, and swivel adjustable armrests. The seat pan will have a waterfall edge on the seat pan or a radius front seat cushion to avoid restriction of circulation to the lower legs. The overall dimensions will be appropriate for the vast majority of users.

6.13.2.2(11)(j) General meeting room seating will have a backrest recline function, be stackable, mobile, cleanable and durable.

6.13.2.2(11)(k) Boardroom seating will be height adjustable, feature a backrest recline function, be stackable, mobile, cleanable and durable.

6.13.2.2(11)(l) Waiting room seating will include armrests to aid sitting and standing and have a raised seat pan for hip and knee considerations.

6.13.2.2(11)(m) All Behavioural Areas will receive furniture that are not harmful or will not allow patients to injure themselves or others. Security and safety are the main concern.

6.13.2.2(12) Office and Workstation Allocation Guidelines

6.13.2.2(12)(a) Single-user or Multi-user workstations for computer, reading, and writing:

(a).1 Height: Allow leg clearance and movement under the work surface and keyboard to be

placed at elbow height for most users (27- 1/4 inches, 692mm).

(a).2 Depth: Allow room for keyboard, document holder between the keyboard and monitor and monitor positioned for comfortable viewing (30 inches, 760 mm). Additional depth may be required depending on the tasks completed at the workstation.

(a).3 Width: Accommodate keyboard and mouse, telephone, writing and reading areas (min. 27.6 inches, 700mm). Additional width depending on tasks completed at the workstation.

6.13.2.2(12)(b) Project Co will be responsible for verifying field measurements to ensure proper clearance for fitting items per the specifications and drawings.

6.13.2.2(13) Supplemental Standards and/or Guidelines:

6.13.2.2(13)(a) In addition to the above listed features, furnishings will be designed and specified in accordance with all appropriate ergonomic design principles and best design practices of the Authority. Products will also meet minimum criteria set out in BC Building Code and in accordance with the Occupational Health and Safety Regulations and the Ergonomics (MSI) Requirements of WorkSafe B.C.

6.13.2.2(13)(b) The Facility and its components must be accessible by people with different functional capacitates including, children, the elderly, handicapped, and the disabled as defined in the BC Building Code. Project Co will apply “Universal Design” principles in the design and planning to ensure the furnishings are usable by all people without the need for specialized design or adaptation. Counters, desks, and work surfaces in non-office areas will include wheelchair access for both patients and the public.

6.13.2.2(13)(c) Products, including foam and upholstery, will be fire retardant to meet applicable building code requirements.

6.13.2.2(13)(d) In undertaking the design and construction of work stations, incorporate the recommendations set out in the Authority document entitled “Sitting and Standing

Workstations: Recommended Heights, Widths, Depths and Clearances" dated October 2009.

6.13.2.2(14) Furniture List and Specifications

6.13.2.2(14)(a) The furniture is described in the Equipment List in generic terms and by a furniture identification number. The quantity column demonstrates the number of identical items in a room. All room numbers, room names, and department names are the same or are derivatives of the Functional Program.

6.13.2.2(14)(b) Furniture pieces and layouts will follow the accessibility principles of the Facilities as a whole. Refer to Accessible Design Section 3.12.

6.13.3 Laboratory Casework

6.13.3.1 General Approach

6.13.3.1(1) Provide laboratory casework:

6.13.3.1(1)(a) for the specific and particular functions to be performed by the casework;

6.13.3.1(1)(b) to give the end users a good working ergonomic environment that is suited to their specific needs; and

6.13.3.1(1)(c) with structural rigidity and chemical resistivity to withstand the service conditions for which they are exposed.

6.13.3.1(2) All casework will be modular and consistent throughout the Facility.

6.13.3.1(3) All casework will be lockable.

6.13.3.1(4) Casework will be wood, metal and/or epoxy resin, selected to minimize cleaning and maintenance operations and maximize infection control capabilities. Refer to Section 5.4.1.1(5) regarding use of wood.

6.13.3.1(5) All epoxy resin material bench tops will be acid resistant.

6.13.3.1(6) Provide all lab benches with cabinets for approximately 50% of the length of the benches.

6.13.3.1(7) Lab bench systems will hide and organize instrument tubing, electrical and/or data cables.

6.13.3.1(8) Casework will comply with all applicable standards, including:

6.13.3.1(8)(a) at a minimum, the quality standards of the Architectural Woodwork Manufacturer's Association of Canada (AWMAC) for Premium Grade; and

6.13.3.1(8)(b) the BC Building Code "Building Requirements for Persons with Disabilities".

6.13.3.1(9) Use non-toxic, non-solvent adhesive glue complying with AWMAC Quality Standards Manual, and that of Canadian "Eco-Logo" program or equivalent, with a Total Volatile Organic Carbon (TVOC) emissive content of 20 gr/litre.

6.13.3.1(10) Provide casework anchorage that complies with the seismic restraint requirements of BC Building Code.

6.13.3.1(11) Steel for cabinet construction for laboratory casework will be levelled prime quality furniture grade cold rolled steel.

6.13.3.2 Cabinets

6.13.3.2(1) Cabinet parts and sub-assemblies (doors, drawers, tracks and back panels) will be interchangeable in the field without requiring special tools. Doors and drawers will be interchangeable with like-sized cabinets. Cabinets will be constructed so that a standard height drawer can be removed and two ½ height drawers installed in its place. Likewise, a cupboard door or doors can be removed and replaced by a like-sized combination of drawers or vice versa. This interchangeability will permit rearrangement in the field of all components in addition to being able to relocate the entire cabinet, should changing needs dictate a revision in the layout of cabinets. All cabinets are to be enclosed with lockable doors; hardware will be stainless steel. Provide modesty panels where the back of the benches are exposed.

6.13.3.3 Wood Laboratory Casework

6.13.3.3(1) Cabinetwork and framing system will be constructed of prime grade selected materials to conform to AWMAC Premium Grade; Flush Overlay Cabinet construction.

6.13.3.3(2) Fabricate cabinets and cases as self-contained modules and in accordance with the best practices of the wood laboratory furniture industry. Finish exterior and interior surfaces to allow for relocation without the need of additional finishing.

6.13.3.3(3) Assemble units with concealed fasteners, or glued and screwed construction, making each unit rigid and self-supporting for use interchangeably in an assembly or for single unit use.

6.13.3.3(4) Use epoxy resin counter/bench tops and splash backs, to be provided in minimum two different colours, black in microbiology and different for the remaining use.

6.13.3.3(5) Finish exposed wood surfaces with a polymerizing two-component catalytic conversion varnish system specially formulated for chemical reagent resistance. The individual components will be chemically compatible to assure perfect adhesion and a top quality, durable finish.

6.13.3.4 Stainless Steel Casework

6.13.3.4(1) Fabricate from Type 316L, No. 4 finish stainless steel.

6.13.3.4(2) Corners will be welded, ground, polished and crevice-free. Joints and welds will be polished to a uniform No. 4 satin finish. No filler or solders will be used. Straight lengths will be one-piece with all seams, including field joints, welded.

6.13.3.4(3) Sound-deaden tops and reinforce with waterproof plywood core, bonded to tops with waterproof contact cement. Seal underside of top (plywood core) with a waterproof finish. The front edges of the tops will be marine edge. Form splashback as an integral part of the tops, radiused where the splashback occurs in the top. Bond all splashbacks to plywood core, bonded the same as specified for the tops. Fabricate countertops, splashbacks, and front aprons out of one piece of stainless steel. Weld counter and sink assemblies into single units without seams or joints. Drill splashbacks, tops and sinks to receive plumbing and electrical fittings.

6.13.3.4(4) Form integral sinks with all-welded rounded corners, seamless construction with all traces of welding removed. Weld stainless steel sinks integrally into tops without seams or joints. Slope tops for sinks and adjacent drain boards to sinks. Provide sinks with drain outlets with removable stainless steel strainer. Stainless steel bench and or counter tops are required where staining or similar procedures are performed.

6.13.3.5 Leg Frame Laboratory Casework System

6.13.3.5(1) The leg frame system will provide complete independent rigid support for all overhead shelving, undercounter suspended cabinets, service cover panels, countertops, sinks and fittings

including all mechanical and electrical line work, as necessary to make the assembly operational.

6.13.3.5(2) The concept will permit the addition, relocation or removal of suspended base cabinets, the removal of the entire leg frame module including base cabinet and countertop, leaving intact the separate service strip with all its service fittings, service lines and cover panels as a finished operational component. The countertop height will be designed to be from desk to counter height adjustable without the addition of framing components.

6.13.3.5(3) Base framing modules on basic standard cabinet modules.

6.13.3.5(4) Steel frame will comprise vertical wall channels and independent self-contained pipe chase and leg sets which will allow for the removal and/or interchange of work surfaces, and suspended under-counter mounted cabinets and upper shelving. Determine pipe chase location in consultation with the Authority.

6.13.3.5(5) Fabricate system from prime quality furniture grade cold rolled steel. Form all components to create a rigid interlocking structure. All services will be fully accessible through removable cover panels, no special assembly tools are required. Bench legs to be fully adjustable. All legs will have leveller bolt. Suspended cabinets will be interchangeable and easily moved from workstation to workstation. Adjustable leg frame modules will be capable of adjusting countertop heights in 25 mm increments from 750 mm height up to 1100 mm height.

6.13.3.5(6) Finish for steel surfaces will be as specified above.

6.13.3.6 Miscellaneous Accessories

6.13.3.6(1) Laboratory casework will include the following accessory items:

6.13.3.6(1)(a) countertops and splashbacks;

6.13.3.6(1)(b) service fittings;

6.13.3.6(1)(c) drying racks;

6.13.3.6(1)(d) pegboards;

6.13.3.6(1)(e) acid storage cabinets;

6.13.3.6(1)(f) solvent storage cabinets;

6.13.3.6(1)(g) glassware drying cabinets;

6.13.3.6(1)(h) framed sliding glass doors;

6.13.3.6(1)(i) sliding glass doors;

6.13.3.6(1)(j) open storage units;

6.13.3.6(1)(k) emergency eye wash;

6.13.3.6(1)(l) emergency shower head;

6.13.3.6(1)(m) safety shower station;

6.13.3.6(1)(n) bin cabinets;

6.13.3.6(1)(o) file drawer cabinets; and

6.13.3.6(1)(p) mobile cabinets.

6.13.4 Window Coverings

6.13.4.1 Provide window coverings as follows:

6.13.4.1(1) all exterior windows are to receive shading devices providing privacy, sun and heat control, that are easy to clean and do not support or provide a surface that encourages spread of infectious disease (i.e. do not become electrostatically charged);

6.13.4.1(2) roller shades are preferred for use on exterior windows;

6.13.4.1(3) all interior windows to receive blinds where privacy may be a concern, as identified by the Authority; and

6.13.4.1(4) provide motorized blinds in all inpatient rooms.

6.13.4.2 Provide motorized blind controls at the patients beds.

6.13.4.3 Blinds will be selected to provide optimum privacy, sun and heat control, are easy to clean, are not prone to become electrostatically charged and their surface does not encourage the spread of infectious disease.

6.13.4.4 Window coverings will allow control of exterior light entering the room during daylight hours and provide privacy during daylight and non-daylight hours.

6.13.4.5 Provide black-out window coverings for all patient rooms in the ICU and HDCU, and provide motorized black-out window coverings in the operating rooms.

6.13.4.6 Where window coverings are required for black-out functions, provide materials, tracks, seals, and operation suited to that purpose.

6.13.4.7 Use window coverings manufactured from materials and mechanisms that minimize cleaning and maintenance operations and maximize infection prevention and control.

6.13.4.8 Horizontal venetian blinds are also discouraged other than for between-glass installation. Roller shades and vertical blinds are preferable.

6.13.5 Window Shade Systems

6.13.5.1 Use manual and motorized roller shades with one piece extruded aluminum roller tube, extruded vinyl fabric spline, aluminum profile hem bars.

6.13.5.2 Install recessed in ceiling pockets, facilitating easy removal and replacement. Use galvanized or zinc-plated steel mounting brackets and non-corrosive fasteners.

6.13.5.3 Use shading fabric of non PVC coated fibreglass yarn and that:

6.13.5.3(1) is waterproof, washable, rot-proof, flame-resistant, fungal and bacteria-resistant, colourfast to light, glare-reducing, and able to control heat gain and provide external visibility;

6.13.5.3(2) conforms to CAN/CBSB-4.162-M, “Hospital Textiles - Flammability Performance Requirements”; and

6.13.5.3(3) is tested in accordance with ASHRAE Standard 74073 for shading coefficient, fungal resistance in accordance with ASTM G21, and bacterial resistance.

6.13.5.4 Audiovisual Light Blocking Shades: Fabricated from black-out shade panel material, designed to eliminate all visible light gaps when shades are fully closed.

6.13.5.5 Manual shade operation with continuous loop bead chain, clutch, cord tensioner and bracket lift operator.

6.13.5.6 Motorized operation utilizing in-tube motor dive, externally located control wheels and manual switch control.

6.13.6 Venetian-Type Blinds between Glazing

6.13.6.1 Provide integral blinds, with controls on both sides, in interior glazing windows in the following rooms:

6.13.6.1(1) intensive care unit/telemetry unit: in between adjacent patient rooms, and from the charting counters at corridor outside;

6.13.6.1(2) medical/surgical inpatient rooms, maternity, newborn and pediatric inpatient rooms, psychiatric inpatient rooms: viewing window from corridor or nursing station outside;

6.13.6.1(3) isolation patient rooms: viewing window from corridor or nursing station outside;

6.13.6.1(4) viewing windows between Ante Room into the Isolation Patient Rooms; and

6.13.6.1(5) Emergency Department Ante Room into the Decontamination Room.

6.13.6.2 In special areas such as the Mental Health / Psychiatry department, construct windows with blinds suited to the purposes unique to those areas and in accordance with the British Columbia Ministry of Health Standards for Hospital-Based Psychiatric Emergency Services: Observation Units.

6.13.6.3 Provide black-out capable blinds for viewing windows between the scrub sinks and Operating Room in Opthamic Surgery.

6.13.6.4 Blinds for the viewing windows between scrub sinks and Procedure Rooms will be motorized and remote operable.

6.13.6.5 Blinds will consist of tempered aluminum alloy slats uniformly spaced and 100% interlaced between cross-ladders on at least one tape. Use tapes with no special end rails required to attach the suspension members from the window opening to the blind.

6.13.6.6 Use a hardware/window design that does not allow air movement from a room to adjacent rooms. Openings in the glazing plane are not allowed.

6.13.6.7 The operator will be a specially constructed, permanent magnet capable of moving the blind assembly from a closed position in one direction to a closed position in the opposite direction.

6.14 Special Construction (Division 13)

6.14.1 Radiation Protection

6.14.1.1 Comply with all applicable requirements of the National Council on Radiation Protection and Measurement (NCRP); and Radiation Protection Service, B.C., Centre for Disease Control, Government of B.C., 655 – 12 Ave West, Vancouver, B.C. V5Z 4R4.

6.14.1.2 Provide radiation protection in walls, doors, floors, ceilings and windows as required and appropriate to protect staff and patients from x-ray, imaging digitizing, CT scanner, radiology, nuclear medicine radioactive storage decay and other rooms in the radiation protection shield.

6.14.1.3 Provide radiation protection by incorporating lead sheet of appropriate weight and thickness into wall and door assemblies and leaded glass manufactured for radiation shielding purposes into window assemblies.

6.14.1.4 Radiation shielding will be 9.75 kq/m^2, not less than 0.9 mm lead to 2.1 m above the floor level as a minimum.

6.14.1.5 For sheet lead, comply with ASTM B749 Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate and meet or exceed Federal Specification QQL-201F Grade C.

6.14.1.6 For lead-lined gypsum board, comply with ASTM C36 or and ASTM C1396/1396M, Type X.

6.14.1.7 For lead glass, meet or exceed Federal Specification DD-G-451.

6.14.1.8 For cassette transfer cabinets, meet or exceed MIL-C-3673 (DM) Radiation shielded.

6.14.1.9 For radiation shielded doors, meet or exceed American National Standards Institute/ National Woodworkers Manufacturers Association (ANSI/NWMA) Industry Standard for wood doors and NCRP Report #49.

6.14.1.10 Fabricate radiation-shielded doors using a single layer of sheet lead with wood core laminated on each side of the lead. Bond cores using poured lead dowels at edges.

6.14.1.11 Fabricate radiation-shielded door frames with lead-lining.

6.14.1.12 Lead glass or lead louvers occurring in radiation shielded doors will be equivalent rated to sheet lead in doors.

6.14.1.13 For lead-laminated gypsum wallboard, use a single unpierced sheet of lead.

6.14.1.14 For sheet lead applied directly to partition steel studs, provide a continuous and complete protective shield.

6.14.1.15 Provide radiation shielding barriers, mobile or fixed, modular and transparent barriers to protect medical personnel by providing a full body shield. Provide units with distortion-free, lead-plastic windows.

6.14.2 Magnetic Resonance Protection

6.14.2.1 Comply with all applicable requirements for Magnetic Resonance Imaging (MRI) equipment room shielding per manufacturer’s specifications.

6.14.2.2 Provide quench venting per equipment specifications.

6.14.2.3 Provide slab recess to allow for level flooring finish to MRI room.

6.14.3 Cooler and Freezer Rooms

6.14.3.1 Provide walk-in cooler and freezer rooms, with freezer room floors recessed into the slab for “flush” walk-in.

6.14.3.2 Design room enclosure elements to accommodate movement in wall and structural movements without permanent distortion, damage to infills, racking of joints, breakage of seals, water penetration or glass breakage.

6.14.3.3 Design temperatures for cooler and freezer rooms will be as follows:

6.14.3.3(1) for cooler rooms: + 2^{o}C to + 10^{o}C;

6.14.3.3(2) for freezer rooms: -10^{o}C to -25^{o}C, with normal operation at + 4^{o}C +/- ½^{o}C;

6.14.3.4 Design floor, wall and ceiling panels to comply with ULC/ORD-C376 “Fire Growth of Foamed Plastic Insulated Building Panels in a Full-Scale Room Configuration”.

6.14.3.5 Design floor, wall and ceiling panels with tongue and groove joints to achieve a maximum air leakage rate of 75 Pa^{o}F 0.00 m^{3}/h-m^{2} and a water vapour permeance rate of 0.00 perms in accordance with ASTM E283 “Air Leakage Rate Testing” and ASTM E96” Water Vapour Permeance Rate Testing”.

6.14.3.6 Design ceiling panels with internal reinforcing to provide a maximum deflection of 1/240 of span under uniform loading of 20 psf and to support refrigeration systems.

6.14.3.7 Design room assembly to permit replacement of components.

6.14.3.8 Allow for ceiling, piping, conduit and other interior dead loads imposed on the structure.

6.14.3.9 Provide components and accessories as follows:

6.14.3.9(1) Floor, Wall and Ceiling Panels: fabricated from commercial grade galvanized steel conforming to ASTM A526M with zinc coating to ASTM A525M, designation Z275, and finished on exposed surfaces with manufacturer’s standard baked white enamel.

6.14.3.9(2) Panel Insulation: foamed-in-place polyurethane.

6.14.3.9(3) Doors: 915 mm x 2115 mm of same panel construction as panels, with soft perimeter gaskets, manufacturer’s standard pre-wired light switch, dial thermometer, heavy duty door closer, spring loaded and self-closing hinges, latch, pull handles, kickplate and threshold plate. Furnish freezer doors with anti-condensate heater, heated vent and pre-wired sill.

6.14.3.9(4) Provide self supporting steel shelving racks in cooler rooms.

6.14.3.9(5) Refrigeration System: self-contained air cooled condensing units mounted on walk-in units, and forced-air evaporators mounted on interior of units. Capacities, air delivery and dimensions to manufacturer's design. The cooling units are to consist of minimum two separate units per room to provide full cooling capacity redundancy for servicing and maintenance.

6.14.3.9(6) Lighting: CSA approved vapourproof box with standard incandescent light fixture pre-wired to switch on door frame.

6.14.3.9(7) Alarms: Modulam MT, 1 local and remote to the BMS for each room.

6.15 Conveying Equipment (Division 14)

6.15.1 Basic Requirements

6.15.1.1 Project Co will provide an elevator study to demonstrate the number, type and distribution of elevators required to service the Facility. At a minimum, provide 2 separate public elevators, 2 service elevators, a dedicated clean and soiled elevator from the MDRD to the surgical suite and 2 patient transfer elevators, with redundancy, to allow smooth transport of the public to public visiting zones, patient transport between relevant departments, and back of house delivery of goods and services. If the Clinical Services Building is a stand alone building, it will contain at least one service elevator. Use good design practice taking into consideration infection prevention and efficient flow.

6.15.1.2 The elevator and systems will be designed to accommodate the requirements / needs the Facility in a manner which contributes to the overall efficiency and effectiveness of the hospital operations.

6.15.1.3 Elevator systems will be designed to ensure there is sufficient capacity to accommodate the wide range of user and functionality requirements, in a manner which satisfies expectations for safety, reliability, responsiveness, accessibility and operational efficiency.

6.15.1.4 Provisions will be considered for persons with special mobility needs and other forms of disabilities, such as learning difficulties or mental disorders.

6.15.1.5 Elevators will support access provisions, for people and materials, to all functional areas. Elevator access to all Building levels, including mechanical levels, will be provided by at least one elevator.

6.15.1.6 Equipment provided will have a proven track record of at least five years field operation in Canada in similar environments and of similar configuration.

6.15.1.7 Durable elevator cab finishes (including stainless steel fronts as well as hand and bumper rails) will be provided.

6.15.1.8 Emergency power operation of elevators will be provided such that all elevators are fed with emergency power and they are all capable of operating simultaneously. Coordinate with electrical design & requirements.

6.15.1.9 Elevators used for support services will be configured with platforms to accommodate easy movement of material carts. Requirements for transport of heavy equipment will be considered and accommodated by at least one elevator.

6.15.1.10 In the Comox Valley Facility, provide the structural requirements, including the pit and shaft, to facilitate future installation of a passenger elevator. This will not include the cab, rails, hoisting equipment and doors. The top of the elevator shaft must remain clear for future installation of a passenger elevator. The elevator lobby finishes will be continuous where the doors have been deleted.

6.15.2 Performance Criteria for Elevators

6.15.2.1 Provide passenger and service elevators as required to meet the following performance requirements:

6.15.2.1(1) Population: Provide elevators to serve the number of beds and total population expected in each Facility/Building.

6.15.2.1(2) For parking applications population will be based on 2 persons per vehicle and the assumption that the parking garage can completely turn over in a one (1) hour period. (i.e. total population = 2 persons x # of parking stalls x 2 (for in & out traffic)).

6.15.2.1(3) Handling Capacity: Passenger elevators will have a handling capacity of at least 12% of the total population for a peak 5 minute period. (Handling capacity refers to the number of passengers that are transported by the elevator for a certain period of time). Service elevators will be capable of transporting 4 full size ambulance stretcher per 100 beds, plus 12% of the staff population, in a peak 5 minute period.

6.15.2.1(4) Interval: For adequate elevator service, an interval of 30 to 50 seconds is required for both passenger and service elevators. The interval is defined as the average time between an elevator leaving the main floor and the next elevator returning to the main floor.

6.15.2.1(5) Waiting Time: Average waiting time will not exceed 35 seconds. Maximum waiting time will not exceed 125 seconds. Waiting time will be measured from the moment elevator call is registered until an elevator arrives at the designated level.

6.15.2.1(6) Load Factor: All elevators will provide adequate service with a load factor of 46% or below. Load factor refers to the number of

passengers transported by each elevator during one trip expressed as a percentage of the maximum number of passengers permitted by the Safety Code for Elevators and Escalators (CSA B44).

6.15.2.1(7) Service Elevator Cabs: Non-public elevators used to transport patients will be able to accommodate a bariatric bed, up to four staff, four IV pumps, portable ventilator, oxygen tanks and monitors and have enough space to allow for staff to carry out emergency procedures within the elevator.

6.15.2.2 Arrange the equipment such that there are no timers, dates, trip counters, or other counters that would shut down the equipment or change its operation

6.15.3 Scope of Work

6.15.3.1 Supply and install elevators as required to meet the needs of the Facilities. Provide all necessary components to make elevator systems fully operational and functional, whether or not specifically referenced in this outline specification.

6.15.3.2 Provide at least one (1) service elevators to serve Heliport levels that provide direct access to levels containing the Emergency Department, Operating Rooms and Diagnostic Imaging.

6.15.3.3 Provide all permits, labour, materials, products, equipment, services and all else necessary for the design, manufacture, delivery, installation and services required for a complete and fully functioning elevator system.

6.15.3.4 Obtain and pay for design submission, registration, inspection and permit, as required (except for ownership and operating license), and make such tests as required by the British Columbia Safety Authority prior to licensing.

6.15.3.5 Codes, By-Laws, and Regulations

6.15.3.5(1) Provide equipment and perform work in accordance with the latest edition of the B44 Safety Code for Elevators and any other code which may govern the installation.

6.15.3.6 Training

6.15.3.6(1) At the completion of the job, provide a training session for the Authority consisting of a review of the documentation.

6.15.3.7 Programming

6.15.3.7(1) Refer to Sections 7.7, 7.8 and 7.9 for requirements related to programming elevators to integrate with communication, networks, fire alarms and other systems in the Facility, to the approval of the Authority.

6.15.3.8 Barrier-Free Access

6.15.3.8(1) Arrange the controls and fixtures to meet barrier-free access requirements of the B44 Safety Code for Elevators Appendix E (latest edition) and any other code which may govern the installation.

6.15.3.9 Fixtures

6.15.3.9(1) Unless indicated otherwise in the Specifications or Drawings, provide a choice of fixtures from a third party supplier and the manufacturer's standard products.

6.15.3.9(2) Provide buttons with LED illumination and stainless steel targets.

6.15.3.10 Operating Conditions

6.15.3.10(1) Provide equipment that will operate normally when the machine room and hoistway temperature is between 5 and 35 degrees Celsius.

6.15.3.10(2) Provide equipment that will operate normally when the power supply is within 10 percent of its rated voltage.

6.15.3.11 Seismic requirements

6.15.3.11(1) Comply with Section 8.4 (Elevator Safety Requirements For local Seismic Risk Zone) of the B44 Safety Code for Elevators and any other code which may govern the installation.

6.15.3.12 Maintainability

6.15.3.12(1) Arrange the equipment such that there are no timers, dates, trip counters, or other counters that would shut down the equipment or change its operation.

6.15.3.13 Equipment Summary

6.15.3.13(1) Passenger elevators will, at a minimum, meet the requirements set out in the table below:

Passenger Elevators	
Number	Two (2) or more to suit the needs of the facility
Type	Passenger Elevators
Type of Machine	Gearless Overhead Traction or Machine Room Less (MRL)
Machine Room Location	Overhead
Alternative Control Room Location	Adjacent to top landing or hoistway overhead
Drive	AC VVVF
Load (Capacity)	Min. 4000 lb. (1820 kg) to suit the performance requirements
Class of Loading	Passenger Classification and Class A General Freight Loading
Car Speed	To satisfy the performance requirements
Operation	Group Supervisory System; Full Selective Collective
Control	Microprocessor
Number of Stops	Provide Service to all floors to suit the facility
Openings	Front openings only (DO NOT provide both front and rear openings)
Hoistway Size	To suit the equipment
Cab Inside Dimensions	Min. 7’-6” (2281) w x 5’-6” (1681) d
Hoistway Overhead Clearance	To suit the equipment
Pit Depth	To suit the equipment
Cab Height	9’-0” (2745)
Door Type	Centre Opening
Door Size	Min. 4’-0” (1220) wide x 7’-0” (2134) high
Car Operating Panel	Two (2) per car
Car Position Indicator	Two (2) per car
In-Car Riding Lanterns	None
Hall Buttons	Min one (1) riser for up to three (3) cars, if greater then three (3) cars then provide a min. of two (2) risers
Hall Lanterns	At all Landings
Hall Position Indicators	at Main floor levels only

6.15.3.13(2) Service Elevators will at a minimum, meet the requirements set out in the table below:

Patient Transfer/Service Elevators	
Number	Groups of Two (2) or more to suit the needs of the facility
Type	Passenger / Service Elevator
Type of Machine	Geared or Gearless Overhead Traction
Machine Room Location	Directly Overhead the Hoistway
Drive	AC VVVF
Load (Capacity)	Min. 8000 lb. (3630 kg)
Class of Loading	Passenger Classification and Class A General Freight Loading
Car Speed	To satisfy the performance requirements
Operation	Group Supervisory System; Full Selective Collective
Control	Microprocessor
Number of Stops	Provide Service to all floors to suit the facility. At least one (1) car will also service any interstitial or mechanical floor levels.
Openings	Front only or Front and Rear Openings to suit the facility
Hoistway Size	To suit the equipment
Cab Inside Dimensions	Min. 7’-0” (2135) w x 10’-0” (3050) d
Hoistway Overhead Clearance	To suit the equipment
Pit Depth	To suit the equipment
Cab Height	9’-0” (2745)
Door Type	Two Speed Centre Opening
Door Size	6’-0” (1830) wide x 7’-0” (2135) high
Car Operating Panel	One (1) per car if front openings only or Two (2) per car if front and rear openings are used.
Car Position Indicator	One (1) per car if front openings only or Two (2) per car if front and rear openings are used.
In-Car Riding Lanterns	None
Hall Buttons	Min one (1) riser for up to three (3) cars, if greater then three (3) cars then provide a min. of two (2) risers
Hall Lanterns	At all Landings
Hall Position Indicators	at Main floor levels only

6.15.3.13(3) Dedicated MDRD Elevators (if provided) will at a minimum, meet the requirements set out in the table below:

Dedicated Surgical Processing Elevators (if provided)	
Number	Clean (Sterile) and Dirty (Soiled) Elevators as applicable to suit the needs of the facility
Type	Passenger/Service Elevator
Type of Machine	Machine Room Less (MRL)
Control Room Location	Adjacent to top landing or hoistway overhead (located remotely if necessary to be outside of Sterile areas)
Drive	AC VVVF
Load (Capacity)	Min. 4500 lb. (2045 kg)
Class of Loading	Passenger Classification and Class A General Freight Loading
Car Speed	To satisfy the performance requirements
Operation	Simplex; Full Selective Collective
Control	Microprocessor
Number of Stops	Surgical Processing and Operating Room levels only
Openings	Front only or Front and Rear Openings to suit the facility
Hoistway Size	To suit the equipment
Cab Inside Dimensions	Min. 5’-6” (1681) w x 8’-1” (2473) d
Hoistway Overhead Clearance	To suit the equipment
Pit Depth	To suit the equipment
Cab Height	8’-0” (2440)
Door Type	Two Speed Side Opening
Door Size	4’-0” (1220) wide x 7’-0” (2135) high
Car Operating Panel	One (1) per car if front openings only or Two (2) per car if front and rear openings are used.
Car Position Indicator	One (1) per car if front openings only or Two (2) per car if front and rear openings are used.
In-Car Riding Lanterns	None
Hall Buttons	One (1) riser
Hall Lanterns	At All Floors
Hall Position Indicators	At All Floors

6.15.3.14 Machine Room Less (MRL) Elevator Equipment

6.15.3.14(1) Provide a gearless traction hoisting machine located within the hoistway.

6.15.3.14(2) Provide an automatic reset governor located in the hoistway that can be maintained from the car top. When the governor has tripped, arrange that it will be reset when the car is moved in the up direction and provide means to remotely activate the governor for testing purposes.

6.15.3.14(3) Provide an electronically released and monitored brake system, to permit momentary nudging of elevator within the hoistway under test or emergency conditions.

6.15.3.14(4) Provide a control room that allows full body access and permits maintenance and other work to be done with the control room door in the closed position.

6.15.3.14(5) Locate control room adjacent to the top of the elevator hoistway or remotely at roof level, immediately above, or in near proximity to elevator core if necessary.

6.15.3.15 Elevator Machine and/or Control Room Equipment — All Elevators

6.15.3.15(1) Provide a non-proprietary elevator control system that is microprocessor-based with sophisticated group dispatching capability.

6.15.3.15(2) Provide a spring applied electric brake, held open by an electro-magnet actuated by the controller. Design the brake to automatically apply in event of interruption of power supply from any cause.

6.15.3.15(3) Provide sound and vibration isolation pads such that there is no direct contact between the machine and the building structure.

6.15.3.15(4) Provide an emergency brake to stop the elevator if it overspeeds or if it moves more than 500 mm (20") away from the floor with the doors open.

6.15.3.15(5) Provide a solid state drive complete with isolation transformers, filters (to meet IEEE Standard 519-1992 for Special Applications), and isolation pads.

6.15.3.15(6) Provide a digital velocity encoder on the motor, giving feedback to the controller on motor speed and position.

6.15.3.15(7) Provide a microprocessor based controller consisting of relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static drive units, wiring terminal strips, and related components all enclosed in a cabinet with hinged door panels.

6.15.3.16 Hoistway Equipment – All Elevators

6.15.3.16(1) Provide entrances consisting of doors, frames, sills, sight guards, door hangers, tracks, interlocks, door closers, gibs, and all other equipment required for a complete installation. Provide entrance doors and frames finished in brushed stainless steel.

6.15.3.16(2) Provide standard 'T' section steel guide rails for the car (and counterweight). Install guide rails using brackets fastened to the building structure. Clamp the guide rails to the bracket with clips arranged to prevent any horizontal movement of the rail. Join the rail sections using steel backing plates.

6.15.3.16(3) Provide hoist ropes/belts of sufficient size and number to lift the load and ensure proper wearing qualities. Provide either steel ropes consisting of at least six strands wound around a hemp core centre or Polyurethane coated belts with high-tensile-grade zinc-plated steel cords. Ensure that all the ropes for a particular elevator are from the same manufacturing run.

6.15.3.16(4) Provide a counterweight to counterbalance the elevator for smooth and economical operation with cast iron or steel plate weights contained in a structural steel frame. Provide a counterweight equal to the weight of the elevator car plus between 40 and 50 percent of the rated capacity.

6.15.3.16(5) Provide for the car (and counterweight) spring mounted roller guides located at the top and the bottom of the car (and counterweight frame).

6.15.3.16(6) Provide fascias from each hall sill to the entrance header below. Include express zones. Extend the fascias into the pit and the overhead.

6.15.3.16(7) Provide a car frame constructed of steel channels and a platform constructed of steel channels with a wood or metal sub-floor. Isolate the frame and platform from one another so that there is no metal to metal contact in order to prevent the transmission of noise and vibration. Mount the elevator cab shell on the platform in alignment with the hoistway entrances. Isolate the cab from the car frame and platform.

6.15.3.17 Cab Equipment – All Elevators

6.15.3.17(1) For Public/Passenger Elevators provide factory Standard Cab Interior Finishes, Raised Plastic Laminate cab wall panels, Sectional Suspended Ceiling with LED Lighting, cab front & car door panels of Stainless Steel #4 Brushed Finish. 50 mm diameter stainless steel cylindrical handrails.

6.15.3.17(2) For Service and dedicated surgical processing elevators (if required) provide Factory Standard Cab Interior Finishes, Rigidized Stainless Steel 5WL Cab Wall Panels, Sectional Suspended Ceiling with Fluorescent Lighting and Translucent Panel Diffusers, cab front & car door panels of Stainless Steel #4 Brushed Finish. 100 mm flat bar stainless steel handrails and 200 mm flat bar stainless steel bumper rails.

6.15.3.17(3) Provide three dimensional type Infrared light beam type door detector edges that reliably detect carts, wheelchairs, etc. of varying heights and finishes, including chrome. The depth of the infrared zone will be field adjustable.

6.15.3.17(4) Provide car doors, jambs, headers, hangers. tracks, door closers, gibs. electrical contacts. and all other equipment required for a complete installation.

6.15.3.17(5) Provide swing return or applied faceplate car stations incorporating floor push buttons, door open and close buttons, an alarm button, and other fixtures required for normal operation. Provide for each floor button a call registered light and momentary audible tone. Provide a Firefighters' Emergency Operation panel. Provide below the car station a locked service cabinet containing devices other than those used for normal operation. Engrave the car station with the elevator capacity, identification number, government installation number, and other markings required by code.

6.15.3.17(6) For Patient Transfer/Service Elevators and dedicated surgical processing elevators (if required) provide Door Hold Open Push Button in Car Operating Panels.

6.15.3.17(7) Provide a 110 V power outlet in each car in one of the Car Panels in a locked service cabinet

6.15.3.17(8) Provide a digital (dot matrix or segmented) car position indicator located above each car station with a minimum 50 mm (2") high display.

6.15.3.17(9) Do not install any certificates or licences in the cab.

6.15.3.17(10) Provide a voice announcer for each elevator with automatic verbal announcement of each floor at which the elevator stops. Provide a system that will handle a variety of other messages and indications as may be required by the Authority at a later date.

6.15.3.17(11) Provide a two speed exhaust fan mounted in the cab top.

6.15.3.17(12) Provide one set of cab protective pads for each group of elevators that cover all walls and the cab front return panel along with pad hooks. Provide pad hooks in each elevator.

6.15.3.17(13) Provide a heavy duty closed loop door operator to open and close the car and hoistway doors simultaneously.

6.15.3.17(14) Provide a hands-free two-way voice intercommunication / telephone system with a lobby rescue station and remote handset. Provide communication from each car enclosure to designated security station located in Hospital.

6.15.3.18 Hall Equipment – All Elevators

6.15.3.18(1) Provide hoistway access switches located in the entrance frame or in the hall door sight guard at the top and bottom landing for each elevator regardless of the elevator speed or floor to floor heights for the elevator.

6.15.3.18(2) Provide in each hall station illuminating up and down push buttons (at terminal floors, provide only one button) located with their centreline 1070 mm ± 25 mm (42" ± 1") above the floor.

6.15.3.18(3) Provide an elevator monitoring & command interface (PC monitor) for monitoring and control of the elevators. Locate in each control or machine room or provide a centrally located system connected to all elevators as approved by the Authority.

6.15.3.19 Electric Wiring – All Elevators

6.15.3.19(1) Provide copper wiring to connect the equipment.

6.15.3.19(2) Run the wire in metal conduit, duct or electrical metallic tubing.

6.15.3.19(3) Provide travelling cable between car stations and the controller in the machine and/or control room.

6.15.3.19(4) Provide at least eight (8) pair spare shielded wires and two (2) RG6 spare coaxial conductors in the travelling cable. This is in addition to the wiring required for the basic operation of the elevators.

6.15.3.19(5) Provide at least ten percent spare wires in each travelling cable.

6.15.3.20 Operational Features and General Requirements – All Elevators

6.15.3.20(1) All Public Passenger and Service Elevators will serve all floors except interstitial floors or mechanical levels that are accessed infrequently.

6.15.3.20(2) Provide Firefighter's Emergency Operations Phase I & II, including remote/duplicate keyed switches at building CACF.

6.15.3.20(3) Provide cab loadweighing device & operation for hall call bypass, anti-nuisance & overload

6.15.3.20(4) Provide Barrier Free Access in Accordance with Appendix "E" of latest B44 Elevator Safety Code including Voice Announcers.

6.15.3.20(5) Provide restricted access via electronic card access for any elevators which provide access to mechanical levels including the roof, Heliport and other secure access that should not be accessible to the general public.

6.15.3.20(6) Provide for installation of security cameras in the elevators. Install and wire the security cameras provided by another trade. Provide the required wiring in the travelling cable run between the car top and the controller as well as power to the car top for the camera.

6.15.3.20(7) Provide equipment and labour for installation of a card reader security system on the inside of each cab. Provide card readers in every elevator lobby at the hall call location of all staff and service elevators. Each staff or service elevator requires authentication by card reader prior to calling a cab at the hall call station. Provide the required wiring between the card reader and the elevator security box in the machine room along elevator controller connections and circuits for the security system (including floor tracking).

6.15.3.20(8) Provide independent service.

6.15.3.20(9) Provide emergency power operation of the elevators such that all elevators are fed with emergency power and are capable of operating simultaneously.

6.15.3.20(10) Provide means to call elevators that provide access to interstitial, mechanical levels, etc. that may not be served by all elevators in a group. This will be by a separate call button, keyed switch or electronic access card reader as approved by the authority.

6.15.3.20(11) For all Elevators provide Medical Emergency Service Operation (Code Blue) and Priority Service Operation with activation means at all floors served and provisions for remote activation of these features. Provide code blue keyswitches in each cab and at each hall call location for elevator code-blue override.

6.15.3.20(12) For all elevators providing access to patient care areas, the elevator shall not operate when an Infant Abduction tag or Patient Tracking / Wandering system tag is present in the elevator cab.

6.15.3.20(13) Each elevator cab shall be provided with a 802.11 wireless network access point to ensure full coverage of the Authority's wireless network. Provide all necessary wiring.

6.15.3.20(14) Each elevator cab shall be provided with a RTLS wireless network access point to ensure full coverage of the RTLS wireless network. Provide all necessary wiring.

6.15.3.21 Operating Performance

6.15.3.21(1) Levelling - Arrange that the car stops within 3 mm (1/8") of the floor level.

6.15.3.21(2) Operating time - Adjust the equipment so that the operating time is 17.0 seconds or less (based on 4'0" wide two speed side opening doors and a speed of 150 fpm and travel of 4.5 m (14'-9")). Measure the operating time from the time that the doors begin to close until they are 3/4 open at the next floor.

6.15.3.21(3) Ride quality - Arrange that the lateral acceleration (front to rear and side to side) measured during express runs is less than 150 mm/s/s (0.5 f/s/s) peak to peak.

6.15.3.21(4) Adjust the door equipment so that the noise level is less than 62 decibels during a full door open and door close operation. Measure the noise levels using a sound level meter set to the "A" scale for a fast response.

6.15.3.21(5) Arrange the machine room equipment so that the noise level with the elevator running is less than 80 decibels. Measure the noise levels using a sound level meter set to the "A" scale for a fast response.

6.16 Pneumatic Tube System (Division 14)

6.16.1 Overall System Description

6.16.1.1 Provide a fast and secure on-demand light material transport system for the Facility through a pneumatic tube system or air tube system.

6.16.1.2 The system is to be comprised of user stations, carriers to contain and transport light weight unit-load materials, and a strategically designed network of piping and traffic control devices to ensure optimal performance.

6.16.1.3 Provide pneumatic tube user stations as outlined in the Clinical Specifications. Each station is to be equipped with a control panel with a touch-screen display.

6.16.1.4 The system is to be a 6inch pneumatic tube system.

6.16.1.5 Provide leak resistant carriers that are double lined, with a secure, lockable integral seal to transport fluid containers, including, but not limited to, IV bags, blood products, bodily fluid samples and other pharmaceutical products.

6.16.2 Design of System

6.16.2.1 Provide a pneumatic tube study that outlines the capacity, anticipated wait times, and anticipated trip times of the pneumatic tube system. Maximum allowable trip time is 40 seconds. Outline the number of carriers proposed based on the clinical demands outlined in in the Clinical Specifications, for the Authority's approval. Outline the proposed training for users to ensure optimal performance of the system.

6.16.2.2 The noise of the blowers and transfer stations will be contained from patient care areas.

6.16.2.3 Ensure that the Clinical Support Building is equipped with a user station integral with the rest of the Facility if it is a separate physical structure.

6.16.2.4 Provide the ability to monitor the system from the management offices of each Facility.

PART 7. FACILITIES SERVICES SUBGROUP SPECIFICATIONS

7.1 Mechanical Systems Design Principles

7.1.1 See Section 5.10.

7.2 Fire Suppression (Division 21)

7.2.1 Fire Protection

7.2.1.1 Basic Requirements

7.2.1.1(1) Provide all required fire protection for the Facility, including the Heliport.

7.2.1.1(2) Provide a sprinkler system and equipment that is designed for the applicable occupancy classification.

7.2.1.1(3) Provide a double check valve assembly on the sprinkler system take-off connection from the water supply. The assembly will be complete with OS&Y gate valves on both sides and tamper proof switches.

7.2.1.1(3)(a) Installation will incorporate redundancy to maintain uninterrupted building operation while cleaning, repairing, or replacing devices.

7.2.1.1(4) Provide a fire pump system if required to meet the fire pressure and flow requirements. Base the design on the lowest incoming pressure of the two water mains during peak summer operation.

7.2.1.1(5) Provide a fire pump, if required, with a transfer switch that is part of the fire pump controller. Mount the switch package in a separate mechanically attached enclosure that is approved by UL, ULC, FM and CSA and built to NFPA 20 standards for this application.

7.2.1.1(6) Provide a dry type sprinkler heads and / or a dry type sprinkler system in areas that may be subject to freezing temperatures.

7.2.1.1(7) Sprinkler heads in areas subject to vandalism will be vandal proof. This includes areas where psychiatric patients may be present and unsupervised.

7.2.1.1(8) Provide fire extinguishers complete with recessed or fully recessed cabinets. Each fire extinguisher will be located within the space it serves, and will be of appropriate size and hazard classification for that space. Do not use water extinguishers or other limited types. Coordinate fire extinguisher locations with the local authority having jurisdiction during design.

7.2.1.1(9) Provide zone shut-off valves that are readily identifiable and accessible from the floor level, but not located in patient rooms. Zone valves will be located within the zone served.

7.2.1.1(10) Provide fire department connections at a location that is approved by applicable authority having jurisdiction.

7.2.1.1(11) Provide a foam suppression fire protection system for any elevated heliports. The system will be of fixed type in accordance with the applicable Canadian Aviation Regulations. Refer to Section 4.5.

7.2.1.1(12) All equipment located in the PER and SER must be protected by a clean agent fire suppression system as recommended for industry standard Tier 2 data centers.

7.2.1.1(13) The PER and SER will be enclosed in a 2hr fire rated room that meets NFPA 13 requirements, such that additional, water-based fire protection systems are not required.

7.2.1.1(14) All equipment located in the CT Scanner Room, Digital Imaging, and Auto-line in the Lab Services Area must be protected by a pre-action type fire suppression system.

7.2.1.2 Performance Criteria

7.2.1.2(1) All equipment will be CSA or ULC approved.

7.2.1.2(2) Equipment installation will comply with manufacturers' requirements.

7.2.1.2(3) Fire protection systems and equipment will be installed, tested and certified by a qualified and licensed contractor, who is regularly engaged in such installations.

7.3 Plumbing (Division 22)

7.3.1 Site Services

7.3.1.1 Basic Requirements

7.3.1.1(1) Provide water, fire protection, natural gas, medical gas sanitary, and storm services as required and sized to suit the usage needs of the Facility, plus the required additional capacity as per Section 4.1.3. Coordinate locations of these services with the requirements of 7.7.

7.3.1.1(2) Water supply to the Building will be by a combined domestic water / fire protection service. Provide two separate services for redundancy, complete with a separate water meter on each service. Calculate and submit to the authority having jurisdiction the estimated maximum flow requirement for the domestic water supply. Refer also to requirements listed in 7.7.

7.3.1.1(3) Provide water and medical gas inlet connections on the exterior of the Facility as per Section 5.3. Provide a sanitary pump-out connection on the exterior of the Facility as per Section 5.3.

7.3.1.1(4) Provide a sanitary pump-out connection on the exterior of the Facility as per Section 5.3.

7.3.1.1(5) Provide a strainer, water meter, reduced pressure backflow preventer, filter, and independent shut-off valve on the main water supply to the Facility.

7.3.1.1(5)(a) Installation will incorporate redundancy to maintain uninterrupted building operation while cleaning, repairing, or replacing devices.

7.3.1.1(6) Provide subsurface drainage as required to alleviate water pressure exerted onto the bottom of foundations and/or floor slabs. Subsurface drainage will be sized and designed in accordance to the geotechnical conditions.

7.3.1.2 Performance Criteria

7.3.1.2(1) Water delivered to the Facility will meet the water quality requirements of all applicable standards and laws, including CSA-A317.1 and the Drinking Water Protection Regulation (British Columbia). Filter systems must be capable of operating at high turbidity levels.

7.3.1.2(2) Any point of use filtration implemented will use stainless steel filter casings to minimize the occurrence of equipment failure and leaks.

7.3.1.2(3) Provide utilities-commission approved meters for domestic water and natural gas. The meters will be used to accurately measure water flow and natural gas consumption in all flow conditions.

7.3.1.2(4) Water and gas meter will have remote access capability for connection to the Building Automation System.

7.3.1.2(5) All piping will be accessible. No in slab piping is permitted. No under slab piping is permitted except drains.

7.3.2 Domestic Hot Water Systems

7.3.2.1 Basic Requirements

7.3.2.1(1) Provide a domestic hot water system with sufficient capacity and recovery rate for the hot water requirements of the Facility, plus the required additional capacity as per Section 4.1.3.

7.3.2.1(2) Domestic hot water supply will be of adequate temperature to serve the needs of the Facility. Provide automatic mixing valves where the supply temperature at the fixture is required to be less than the system temperature.

7.3.2.1(3) Locate thermostatic mixing valves serving plumbing fixtures as close as possible to the fixture it serves to minimize dead legs.

Thermostatic mixing valves serving public washrooms may be located in the ceiling space above the fixture.

7.3.2.1(4) Design the domestic hot water system to prevent growth and spread of Legionella bacteria within the hot water generation plant, piping, fixtures, or any other component. Design methods may include heat-based control and/or active treatment systems; eliminating dead-leg piping; and minimizing uncirculated piping by connecting the circulation system as close as possible to fixtures.

7.3.2.2 Performance Criteria

7.3.2.2(1) Provide a hot water generating plant and hot water storage equipment to meet the requirements of CSA Z317.1.

7.3.2.2(2) Recirculate domestic hot water from the distribution system(s) back to the generating equipment.

7.3.2.2(3) Monitor hot water supply temperatures via the BMS and provide alarm outputs when the temperature exceeds or drops below the design setpoint range.

7.3.3 Plumbing Distribution Systems

7.3.3.1 Basic Requirements

7.3.3.1(1) Provide the plumbing systems to avoid disruption to the operation of the Facility during maintenance or repairs. Design the systems so that, as much as possible, Type I and Type II rooms do not need to be entered when performing these functions. All isolation, maintenance, balancing, and other service valves will be located in the corridor ceiling spaces and will be accessible. Refer to CSA Z317.2 for space Type definitions.

7.3.3.1(2) Distribute plumbing by means of risers to each floor area to a maximum of 25% of the total floor area. Provide isolation valves to each area.

7.3.3.1(3) Incorporate flexibility in the system designs to accommodate future alterations and allow for future expansion in accordance with Section 4.1.3.

7.3.3.1(4) Label all systems clearly, including painting and labelling of all pipes, ceiling identification dots, valve tagging, and emergency valve identification signage.

7.3.3.1(5) Provide the water systems to ensure that water is supplied at the required pressures to all water outlets.

7.3.3.1(6) Provide a domestic water booster pumping system if required to meet water supply requirements. Base the design on the lowest incoming pressure of the two water mains during peak summer operation.

7.3.3.1(7) Provide durable materials to allow for 24 hour a day operation with minimal downtime. All ferrous, non-ferrous, CPVC and polypropylene pipe materials acceptable by the BC Plumbing Code for above ground potable water distribution systems are acceptable. Where copper pipe is used for potable water distribution systems, Type-K will be used.

7.3.3.1(8) Provide all systems to meet the infection control requirements of the Facility.

7.3.3.1(9) Provide a central reverse osmosis filtered water system for use where required by non-dialysis functions, such as laboratory equipment, as follows:

7.3.3.1(9)(a) include a single central water filtration package with continuously circulating distribution loop(s);

7.3.3.1(9)(b) install distribution piping in accessible locations to allow replacement with minimal disruption of patient care areas; and

7.3.3.1(9)(c) provide piping and outlets that are suitable for use with both of the following systems: automated heat sterilization method; and a chemical sterilization method.

7.3.3.1(10) Provide appropriate domestic water supply connections for portable reverse osmosis machines and hemodialysis units as follows:

7.3.3.1(10)(a) include all accessories needed to make the connection suitable for the intended use; to meet relevant codes and standards; and to meet the manufacturer's requirements for any connected equipment. This includes electrical outlets, point-of-use micron filtration, thermostatic mixing valves, and backflow preventers;

7.3.3.1(10)(b) provide water, sanitary sewer, and electrical connections, located at the headwall suitable for inpatient hemodialysis using portable reverse osmosis units in one med/surg unit inpatient pod and all ICU beds.

7.3.3.1(11) Provide natural gas and fuel gas piping as needed for all uses within the Facility.

7.3.3.1(12) Provide plumbing connections to all medical and food services equipment provided by Project Co.

7.3.3.1(13) Ensure the plumbing systems are designed to accommodate the requirements of commercial spaces. Make allowance within the base building systems for any future plumbing systems needed for future tenant fit-outs of the commercial spaces.

7.3.3.1(14) Ensure the domestic cold water, domestic hot water, and pure (reverse osmosis) water quality is within the required conditions of the applicable codes, standards, and manufacturer's recommendations for all equipment including medical device reprocessing.

7.3.3.1(15) Ensure the instrument air quality is within the required conditions of the applicable codes, standards, and manufacturer's recommendations for all equipment including medical device reprocessing.

7.3.3.2 Performance Criteria

7.3.3.2(1) Insulate storm drainage, domestic water piping, cooling water and exposed p-traps throughout. Where piping and/or piping components are subject to freezing, provide insulation and thermostatically-controlled heat tracing. Ensure life-safety systems are not installed in locations subject to freezing.

7.3.3.2(2) Provide flushing and disinfection of domestic water systems. Provide independent testing of piping systems once flushing and cleaning has been completed. Supply the testing reports to the Authority.

7.3.3.2(3) All piping will be accessible. No in slab piping is permitted. No under slab piping is permitted except drains.

7.3.3.2(4) Provide isolation valves for all plumbing services and clearly identify the location of all valves. Valves will be located at a minimum at each set of piping branches from the main distribution line, and at all locations where the branches serve group of rooms with similar uses. In Mental Health / Psychiatry Inpatient Units provide isolation valves within the public area in an easily accessible area to allow access without the need for a ladder.

7.3.4 Plumbing Fixtures

7.3.4.1 Basic Requirements

7.3.4.1(1) Provide fixtures as described in the Clinical Specifications and as needed to comply with all applicable codes and regulations.

7.3.4.1(2) All plumbing fixtures will be made of impervious, durable materials suitable for a hospital facility. Fixtures selected must have proven acceptable hospital performance from previous installations.

7.3.4.1(3) Consult with the Authority on the selection of fixtures, and give particular attention to performance relative to infection prevention and control**.**

7.3.4.1(4) Select all sink basin and faucet combinations to minimize the potential for splatter and contamination. Ensure the faucet does not discharge directly into the drain.

7.3.4.1(5) Provide anti-splash, anti-aerosolizing, faucet fittings (i.e. laminar flow) that do not retain air. Provide gooseneck faucet fittings. Avoid low profile gooseneck faucet fittings.

7.3.4.1(6) Sinks will be stand alone wall hung type or have bowls integrally formed into countertops. Drop in or under mount style countertop sinks will not be used.

7.3.4.1(7) Provide double or triple basin sinks where required.

7.3.4.1(8) Sinks will meet the requirements of CSA Z8000 including materials, size, construction, location, controls, backsplash, soap and lotion dispensers, and accessibility.

7.3.4.1(9) Provide stainless steel combination lavatory / toilet security fixtures where psychiatric patients may be present and unsupervised.

7.3.4.1(10) Barrier-free plumbing fixtures, fittings, and carriers to be provided where required will be suitable for use by bariatric users. Toilets not designated specifically for bariatric use will be wall mounted.

7.3.4.1(11) Select toilets that will reduce the spread of infection. The bowl must be designed to accommodate the flow of the flush valve. Toilet bowls will not splash or spray water onto the toilet rim or anywhere outside the toilet bowl and will be designed to minimize the aerosolization of the toilet contents.

7.3.4.1(12) Provide lids for all toilets. Ensure all flush valve operators extend above the height of the open lid.

7.3.4.1(13) Public toilets will consist of wall hung elongated bowls with an open front seat and electronic hands free flush valves with manual override.

7.3.4.1(14) Patient toilets will consist of wall hung elongated bowls, an open front seat and manual high/low dual flow flush valves.

7.3.4.1(15) Intensive Care Unit and isolation room washroom will have a wall mounted cleaning and disinfecting appliance with water closet (Mieko Topline 30WC or an equal or better appliance). Appliance installation with be flush to the wall with a mounting frame. The appliance must have hot and cold water connections for a concealed disinfection drain pan washer with wall hung toilet mounted below. Water, drainage and sanitary vent piping to be installed in accordance with building codes and the manufacturer's recommendations.

7.3.4.1(16) Urinals will be wall-hung and low-consumption with electronic hands-free flush valve operation.

7.3.4.1(17) Washroom lavatory fixtures will be have electronic hands-free type faucets with single temperature discharge that can be adjusted and set to the desired temperature, except as follows:

7.3.4.1(17)(a) patient washroom lavatory fixtures will have a manual faucet with hot and cold supplies.

7.3.4.1(18) Handwashing sinks or hand hygiene stations for nursing stations, patient care areas, examination rooms, food services, emergency room, soiled utility rooms and other similar function rooms will have electronic hands-free type faucets with gooseneck spouts and single temperature supply that can be adjusted and set to the desired temperature. Basins will be adequately sized for proper washing and scrubbing of hands.

7.3.4.1(19) Scrub sinks will be dual basin stainless steel with integral backsplash and hands-free faucet and soap dispenser for hand hygiene, suitable for a user conducting surgery or other sterile procedures, and supplied as a proprietary equipment item by a medical equipment manufacturer.

7.3.4.1(20) For Labour, Delivery, Recovery and Postpartum rooms with a birthing tub, the rub will be a free standing acrylic or high density fiberglass tub with quick connection hoses for filling and draining. Provide a thermostatically controlled valve, fill spout and handles, hand held shower and grab bars.

7.3.4.1(21) For Labour, Delivery, Recovery and Postpartum rooms without birthing tubs, provide a baby wash sink with integrated bowl and counter. Faucet to be a hot/cold thermostatically controlled mixing faucet with blade type handles and a spray hose. The room will include a free standing acrylic or high density fiberglass tub with quick connection hoses for filling and draining. Provide thermostatically control valve, fill spout and handles, hand held shower and grab bars.

7.3.4.1(22) Equipment cleaning sinks and other utility sinks will be made of stainless steel with blade handle faucets and gooseneck spout. Sinks will be large and deep to accommodate proper washing of equipment. Materials and piping will be suitable for the intended application of the sink.

7.3.4.1(23) Soiled utility rooms to have minimum of two wall mounted, cleaning and disinfecting appliance for bedpan washing (Meiko Topline 20 or an equal or better appliance). Provide required plumbing services per manufacturer's recommendations.

7.3.4.1(24) For pharmacy sinks in all areas including modular clean rooms, scrub rooms and ante rooms, and dispensary areas, provide a stainless steel sink with blade handle faucets and gooseneck spout. Stainless steel will be of an alloy suitable for the intended use.

7.3.4.1(25) For Laboratory sinks, including but not limited to nuclear medicine and bio-hazardous waste sinks, provide alloy material suitable for the intended use. Faucets will have blade handle with gooseneck spout. Sinks will be large and deep enough to accommodate the intended application.

7.3.4.1(26) For adjustable shampoo sinks in Ear, Eye, Nose and Throat exam room and emergency room, the sink will have a 300mm vertical adjustable height controlled by a stainless steel foot pump mechanism. The sink bowl design will minimize splashing on surrounding floor. The faucet will have a spray hose with thermostatic mixing valve for hot – cold adjustment. Provide a stainless steel shroud and hair interceptor.

7.3.4.1(27) The Assistance with Daily Living kitchen sink will have an adjustable height counter to American Disabilities Act standard height levels. Faucet to be ADA blade handles hot – cold with gooseneck swivel faucet. Drainage and water to meet adjustable heights.

7.3.4.1(28) In the Morgue, provide the following plumbing fixtures: a wall mounted autopsy station with a built in sink at one end, dual work stations with sloped drain boards, perforated drain trays, thermoplastic cutting boards, instrument drawers, gooseneck faucet, hydro aspirator with suction and sensing features, drain board rinse nozzles and control valves.

7.3.4.1(29) For the Scope Processing/Decontamination room:

7.3.4.1(29)(a) Provide endoscope reprocessor equipment connected to a potable water system and drain connection per the manufacturer's recommendations. The water supply will have a thermostatic mixing valve with temperature display and bypass valve piped to the drain. Provide a wall mounted pre-filter assembly with isolation valves. Filter assembly will be sized based on the source water and final treatment requirements.

7.3.4.1(29)(b) Provide two height adjustable double-bowl sink with clean up counter (Steris Amsco or equal). Unit to come with sink dimensions: 24" W X 17" L X 10" D (610 X 432 X 254); one water saving faucet with hot and cold water; one pure water faucet; one air gun for cleaning tubes; and three, 3-foot (76.2) flexible hoses to connect to water supplies.

7.3.4.1(30) Showers and bathtubs will be provided with pressure balanced and high temperature limit shower valves, metal shower heads will be utilized. Shower bases will ensure that the water is contained within the shower area. Patient showers must be free of barriers with with no lip between the washroom floor and shower.

7.3.4.1(31) Exterior and interior emergency decontamination showers will be designed with a pull down type valve to supply tempered water from an overhead drench shower. Provide hot and cold isolation valves with freeze protection drainage for the exterior shower.

7.3.4.1(32) Provide suitable quantities of janitors' sinks, hose bibs, eye wash stations, drinking fountains with bottle fillers to provide sufficient service to the Facility.

7.3.4.1(32)(a) Eye wash stations will be complete with a water receptor and drain piping.

7.3.4.1(32)(b) Emergency showers will be designed to supply tempered water within an acceptable timeframe in accordance with the OHS legislation.

7.3.4.1(32)(c) Locate drinking fountains with bottle fillers in or near staff rooms, staff gyms and as outlined in the Clinical Specifications.

7.3.4.1(33) Provide all appropriate services and connections to all equipment for patient care, laboratory and all other areas. Provide all accessories as needed.

7.3.4.2 Performance Criteria

7.3.4.2(1) Provide accessible clean-outs for all sinks and lavatories above the flood-level rim of the sink.

7.3.4.2(2) The following applies for all electronic sensor activated fixtures:

7.3.4.2(2)(a) all sensors will be hardwired and served by the emergency power system so water is available during a power outage;

7.3.4.2(2)(b) the duration of sensor faucet flow will be adjustable. All sensors will be able to operate for a minimum of 30 seconds without interruption of flow, to facilitate proper hand washing. Sensors will turn off automatically when hands are no longer in the sensor range; and

7.3.4.2(2)(c) the domestic hot water recirculation system will be connected to the fixture's hot water supply immediately next to the fixture shut-off at the wall.

7.3.4.2(3) Provide water hammer arresters at the cold water and hot water supply to each fixture or bank of fixtures served by a single branch.

7.3.4.2(4) Flush valves will also have a manual flush operator.

7.3.4.2(5) If system pressure exceeds the acceptable delivery pressure, then provide pressure reducing valves with 100% redundancy. Place the valves in accessible locations.

7.3.5 Plumbing Drainage and Venting Systems

7.3.5.1 Basic Requirements

7.3.5.1(1) Provide sanitary, storm, specialty drainage, and venting systems to avoid disruption to the operation of the Facility or interference with other services during operation and maintenance activities. Design the systems so that, as much as possible, Type I and Type II rooms do not need to be entered when performing these functions. Refer to CSA Z317.2 for space Type definitions.

7.3.5.1(2) Provide all drainage systems such that the system connects to the site drainage services, utilizing gravity drainage wherever possible.

7.3.5.1(3) If pile foundations are used to support the structure, all underslab piping will be supported (hung) from the concrete slab above. Hangers and rods will be of sufficient strength and be installed at intervals to carry the pipe and load and maintain the required slope. Hangers and rods will be corrosion resistant. Install light-weight fill above all piping that is supported (hung) from the concrete slab above.

7.3.5.1(4) Pumping systems for subsurface, storm, or sanitary drainage will include 100% redundancy (one redundant unit for each active unit) and related equipment will be supplied with emergency power. The sump will have twin compartments (separate chambers for settling and pumping) and will be sized to prevent short cycling of the pump. Provide engineered packaged system(s) complete with controls and alarms including but not limited to high water level and pumps failure alarms. Provide local alarms annunciation with audible and visible alarms indication and remotely via the BMS.

7.3.5.1(5) All drainage and venting piping and fittings will be of a material suitable for the expected effluent. This includes but is not limited to dialysis systems and other specialty systems with acidic, high-temperature, or radioactive discharges. Drainage piping material will only be changed downstream a point where the hazardous property of the effluent is reduced so a different piping material is suitable:

7.3.5.1(5)(a) where the branch connects into a main drain line, such that the additional effluent flow dilutes the discharge; and

7.3.5.1(5)(b) where a device is placed in-stream to reduce the hazard of the discharge, such as an acid neutralizer.

7.3.5.1(6) Provide drains suitable for discharge from dialysis machines at all locations where reverse osmosis water connections are provided, plus any locations designated for connection of portable dialysis machines.

7.3.5.1(7) Provide floor drains in all mechanical rooms and other rooms where water spillage from equipment or operations can be reasonably expected.

7.3.5.1(7)(a) Provide drains for all devices that may discharge water, including but not limited to emergency showers, reverse osmosis systems, and backflow prevention devices.

7.3.5.1(7)(b) Floor drains in patient care areas will be installed only as needed for the specific use of the room and as per CSA-Z317.1 and CSA-Z8000.

7.3.5.1(7)(c) Ensure all equipment drain piping is terminated in floor drains.

7.3.5.1(7)(d) Floor drains serving backflow preventers, sprinkler test points, or other devices will be sized to accommodate the discharge flow rate of the device.

7.3.5.1(8) Provide neutralizers, interceptors, and sediment buckets to intercept oil, grease, dirt, solids, and fuel where necessary.

7.3.5.1(8)(a) Interceptors will be provided in accordance with the manufacturer's specifications.

7.3.5.1(8)(b) Install plaster traps for casting sinks in well-ventilated closets or other service areas, so odours released during trap cleaning do not migrate beyond the immediate service area to other parts of the Building.

7.3.5.1(8)(c) Provide acid neutralizers at either the point of acid discharge to the drainage system or at the acid waste drainage system termination.

7.3.5.1(8)(d) Provide a bio-hazard storage tank or tanks to contain radio-active waste from nuclear medicine sinks, bio-hazardous sinks and decontamination showers.

7.3.5.1(8)(e) Provide appropriate systems at all fuel storage tanks and filling stations to prevent fuel leakage beyond the designated containment area, in accordance with all applicable standards.

7.3.5.1(8)(f) Provide grease interceptors to serve all sinks and floor drains in Food Services and Ware Washing areas. Run an independent drainage system sloped at a minimum 2%. Interceptors to be located outside of building for servicing.

7.3.5.1(9) Provide automatic trap primers at drains that are subject to losing the trap seal, including infrequently used fixtures and p-traps in

negatively pressurized rooms. Locate trap primers in a location where they can easily be accessed, inspected, and repaired.

7.3.5.1(10) Provide adequate drainage for all Heliports. Drainage openings will not be installed in the Touchdown and Lift-Off Area, in accordance with the applicable Canadian Aviation Regulations. Refer to Section 4.5.

7.3.5.1(11) Ensure the plumbing systems are designed to accommodate the requirements of commercial spaces. Make allowance within the base building systems for any future plumbing systems needed for future tenant fit-outs of the commercial spaces.

7.3.5.1(12) Provide liquid medical waste disposal system for Soiled Utility Rooms in Surgical Services. Units will be powered by tap water and safely empty canisters containing infectious liquid medical waste directly into the sanitary sewer with no pouring required. The units will be equal to or better than Cardinal Health Medi-Vac Saf-T Pump.

7.3.5.1(13) Provide flushing rim type floor drains in all Mental Health / Psychiatry Secure Rooms.

7.3.6 Medical Gas Systems

7.3.6.1 Basic Requirements

7.3.6.1(1) Provide medical gases for the Facility as required by Appendix 3D [Medical Gas Requirements].

7.3.6.1(2) Provide connections for medical gases on the exterior of the Facility. There will be one connection for supplying oxygen into the Facility from external bulk storage tanks; and one connection for supplying oxygen out of the Facility to serve the Mass Casualty Tent Area (refer to Section 5.3.9).

7.3.6.1(3) Provide a compound suitable for installation of a new central bulk oxygen plant by the Authority's bulk oxygen supplier. Coordinate the compound requirements with the supplier, including dimensions, fencing, piping connections, electrical connections, alarm wiring, and safety measures. Locate the compound exterior to the Facility in a location that can be accessed by a standard oxygen refueling truck.

7.3.6.1(4) Provide centralized manifold supply systems for the following medical gases: nitrogen, nitrous oxide, Design the centralized duplex bottle manifold supply systems so that they will, when

required, automatically switch to the spare bank of bottles (and that switching to the spare bank is alarmed at the master alarm).

7.3.6.1(5) Include in the Facility an enclosed room with adequate space for the storage of medical gas bottles, including bottles of gases supplied by the centralized supply systems described above, all gases required for laboratory use, and bottles of the additional medical gases required.

7.3.6.1(5)(a) Only medical gas valving and piping that is necessary for the installation of new bottles will be included in the bottle room. All piping and components associated with distribution of medical gases throughout the Building will be located in a separate room or enclosure, adjacent to the bottle room that has a separate access door.

7.3.6.1(5)(b) Provide sufficient space for storage of enough medical gases so the Facility can maintain operational for the full post-disaster timeframe as per Section 5.10.10.

7.3.6.1(6) Provide new central medical air and medical vacuum systems with redundancy so that if 50% of the units in either system were to fail or be shut down, there will be no degradation of the system's ability to meet the capacity requirements of the Facility. Provide 'fail-safe' controls: all units will continue to run and maintain service in the event of failure of the electronic controls, without human intervention.

7.3.6.1(7) Connect new central medical air and medical vacuum systems to emergency power.

7.3.6.1(8) If the laboratories or any other non-clinical use requires a vacuum system, this system will be independent from vacuum intended for patient use. Refer to the Clinical Specifications for laboratory requirements.

7.3.6.1(9) Provide independent dental air and dental vacuum systems for all Operating Rooms with the exception of the Orthopedic Operating Rooms.

7.3.6.1(10) Each inpatient bed will have an oxygen connections, a medical air connection and a vacuum connection on each side of the bed.

7.3.6.1(11) Locate all medical gas outlets in a head wall system that incorporates medical gases, electrical and data outlets. Provide two headwalls per bed within patient rooms, one on either side of the bed.

7.3.6.1(12) Provide medical gas service outlets as follows:

7.3.6.1(12)(a) Provide recessed service outlet boxes designed for concealed piping and fabricated for straight insertion of secondary equipment.

7.3.6.1(12)(b) Each recessed wall outlet will have a permanently marked, colour-coded non-interchangeable index system to prevent connection to the wrong gases. Provide a secondary check valve to maintain the line pressure if the primary valve is removed for maintenance.

7.3.6.1(12)(c) Provide 2-part DISS type outlet connections for each medical gas. Each oxygen outlet will be complete with dial style integrated flow meter, adjustable knob for flow control, visual flow indicator, extra auxiliary port, and color coded labelling.

7.3.6.1(13) Provide a dedicated active waste anaesthetic gas scavenging system for all points of anaesthetic gas use. Gas scavenging systems will be designed to applicable standards including CSA-Z7396.1.

7.3.6.1(14) All pipe and pipe fittings will be in accordance to ASTM 88, de-greased copper Type ‘L’.

7.3.6.1(15) Ball type shut off valves will be U.L. labelled showing the appropriate gas service & pressure rating. Valves will swing out during installation and have a quarter turn from full open to close.

7.3.6.1(16) Area zone shut off valves will be housed in a single box comprised of multiple shut off valves with tube extensions, lexan glass door with hinges and pull out opening ring. Provide pressure / vacuum gauges for each service.

7.3.6.1(17) Provide medical gases to the LDRP washrooms as per Appendix 3D.

7.3.6.1(18) Provide a central stationary plume scavenging system serving all operating rooms. Plume scavenging systems will be designed to applicable codes including CSA Z305.13-09. The central stationary plume scavenging system will include a boom mounted capture device, a filtration mechanism, controls, piping to points of use from a central source, a centrally located suction source, and an exhaust system.

7.3.6.2 Performance Criteria

7.3.6.2(1) Provide the medical gas system so that there is a minimum of one zone shut off valve per programmed area.

7.3.6.2(2) All medical gas piping in normally inaccessible areas (e.g. behind walls and boarded ceilings) will be clearly identified.

7.3.6.2(3) All piping, valves and filters will be factory cleaned and capped or sealed to prevent contamination.

7.3.6.2(4) Provide a local alarm panel for each zone. Alarm panels will be connected to emergency power. Provide a master medical gas alarm panel to monitor all medical gas functions. Remote alarm annunciation will be provided at a location with 24 hour continuous monitoring by personnel. Provide an inter-connected status and alarm point and signal to the BMS.

7.3.6.2(5) Individually connect all master alarm panels to the BMS. Provide an alarm interface signal to the BMS for critical alarms such as low or high pressure.

7.3.6.2(6) All medical gas systems will be certified in accordance with CSA standards by an independent and qualified testing agency. Supply the testing reports to the Authority.

7.3.6.2(7) All systems components requiring electrical power will be on emergency power.

7.3.6.2(8) The medical gas supply system will be for patient consumption only. If equipment and/or procedure(s) require instrument air, then provide separate dedicated source equipment, piping, valving and monitoring to accommodate that application.

7.4 Heating, Ventilating and Air Conditioning (Division 23)

7.4.1 Heating Plant:

7.4.1.1 Provide a heating plant to provide all necessary heating for the Buildings and to meet the heating plant requirements of CSA Z317.2 for a Type A-2 HCF. Determine the design load and redundancy per the requirements of CSA Z317.2 and to ensure the heating plant has sufficient heating capacity to continue operations in Surgical Services (component DT.04 of the Clinical Specifications) at all times of the year, except as noted in Section 7.4.4.1(9).

7.4.1.2 Apply energy recovery systems to offset plant heating requirements. Provide analysis of energy savings, life-cycle costing, and maintenance concerns

7.4.1.3 Design the heating plant to sufficiently meet the maximum simultaneous facility demand for all systems served by the heating plant, as well as being capable of controlling and responding to periods of low usage.

7.4.1.4 Provide heat for all spaces to meet their full functional requirements following any disruption of the primary energy source. Refer to Section 5.10.10.

7.4.1.5 Design the heating plant and all heating systems within the Buildings to be 'District Energy Ready,' as defined within the City of Vancouver District Energy Connectivity Standards.

7.4.1.6 Provide separate standalone steam generators for all steam uses within the Building. Provide separate steam generation systems for humidification and process loads.

7.4.1.6(1) Ensure the feed water quality to steam generators is within the required conditions of the applicable codes, standards, and manufacturer's recommendations for both the generator and the downstream equipment. Steam quality must be condensate free and minimum 97% saturated vapour.

7.4.1.6(2) Provide connections in the steam system near the point-of-use, which can be used to access the steam for quality measurement.

7.4.2 Cooling Plant:

7.4.2.1 Design the cooling plant to meet the maximum simultaneous facility demand for all systems served by the cooling plant, as well as being capable of controlling and responding to periods of low usage.

7.4.2.1(1) Provide equipment for all necessary cooling, including the required redundancy in the cooling systems and cooling required by building systems in a post disaster event.

7.4.2.1(2) Provide 100% outdoor air for free cooling as the first means of space cooling

7.4.2.1(3) Apply energy recovery systems to offset plant heating requirements.

7.4.2.2 Chillers will be rated in accordance with ARI 550/590-98. No absorption chillers may be used.

7.4.2.3 Chillers will have multiple individual refrigerant circuits. Prime mover nameplate ratings for each circuit will not exceed 200 KW for groups Al, A2 or B1 refrigerants.

7.4.2.4 Cooling towers performance will be certified in accordance with CTI (Cooling Tower Institute) Standard STD-201. No open-type cooling towers are allowed

except spray coil (closed circuit evaporative fluid cooler) type cooling towers, if such towers:

7.4.2.4(1) are located away from fresh air intakes; and

7.4.2.4(2) do not emit water vapours that interfere or could interfere with helicopter operations.

7.4.2.5 Chillers and cooling towers will be designed and located so as not to have an adverse effect on mechanical systems or the Heliport flight path.

7.4.2.6 Provide chillers and cooling towers for ease of operation, accessibility for maintenance, safety and appearance.

7.4.2.7 Installation will comply with ASHRAE Guideline 12-2000 for Minimizing the Risk of Legionellosis Associated with Building Water Systems.

7.4.3 Space Heating and Cooling

7.4.3.1 Basic Requirements

7.4.3.1(1) Provide all necessary space, ventilation and process heating for all Buildings on the Site.

7.4.3.1(2) Space heating capacity must be sufficient to meet the required indoor design temperature per CSA Z317.2-10, except as noted in Section 7.4.4.1(9).

7.4.3.1(3) Sources of heating and cooling that serve Type I and Type II spaces will be connected to the emergency power supply. Refer to CSA Z317.2 for space Type definitions.

7.4.3.1(4) Provide air curtains to all vestibules adjacent to the exterior to prevent cold drafts from entering the adjacent occupied space.

7.4.3.1(5) Design pumps to operate at the system fluid temperature without vapour binding and cavitation. Pumps, will be non- overloading in parallel or individual operation, and will operate within 25% of the midpoint of published maximum efficiency curve.

7.4.3.1(6) Pump construction and installation will permit complete pump servicing without disrupting piping or motor connections.

7.4.3.1(7) Insulate all piping, equipment and accessories in accordance with all applicable standards.

7.4.3.1(8) Provide seismic mitigation and building separation devices for all piping that crosses buildings and/or utility corridors.

7.4.3.1(9) Provide adequate expansion compensation for heating piping. Location of anchors and guides, design of expansion compensation loops and selection of expansion compensation devices will be based on a thorough review of piping layout, and piping stress analysis.

7.4.3.1(10) Ensure that no air within the air conditioning system, outside of the central air handling equipment, drops below its dewpoint temperature.

7.4.3.1(11) Once through cooling is not permitted for any process or service within the Facility.

7.4.3.1(12) Provide continuously available chilled water or condenser water systems for all areas containing specialized medical equipment, walk in coolers, server rooms and electrical rooms for managing continuous internal heat gains. Cooling and heat rejection for these critical loads may be served by the central cooling plant provided the system incorporates redundancy per CSA Z317.2 requirements and is connected to the delayed vital electrical system. Design HVAC terminal components in conjunction with equipment location in order to mitigate unnecessary heat gain into the space.

7.4.3.1(13) Provide a glycol underpad heating system under the Touchdown and Lift-Off Area and walkway for any elevated Heliport. Refer to Section 4.5.

7.4.3.2 Performance Criteria

7.4.3.2(1) Install piping in an orderly manner (aligned with structural elements and at right angles). Slope piping to permit complete drainage of the system. Make allowances in all pipe sizing to provide flexibility for future renovations, in accordance with Section 4.1.3.

7.4.3.2(2) Equipment and piping will be installed with adequate service space, access panels, and the ability to remove equipment for servicing or replacement. Locate services that require access for regular maintenance above non-critical spaces such as corridors to minimize or eliminate disruptions to the delivery of health care services.

7.4.3.2(3) All high points in piping will be equipped with air removal devices such as air collection chambers and air vents.

7.4.3.2(4) Provide isolation valves, unions, and bypass piping to allow for equipment isolation and removal without unduly affecting the system operation or major drain down.

7.4.3.2(5) Provide balancing valves, flow-measuring devices, temperature and pressure sensors throughout the system to facilitate system balancing.

7.4.3.2(6) All piping will be accessible. No under-slab piping is permitted. No in-slab piping is permitted except as follows:

7.4.3.2(6)(a) Piping embedded in concrete for radiant heating and/or cooling systems are permitted in areas that are not expected to change in layout over the life span of the building.

7.4.4 Ventilation

7.4.4.1 Basic Requirements

7.4.4.1(1) Provide all necessary ventilation for the Facility.

7.4.4.1(2) The air handling equipment for the Facility will be designed to provide 100% outdoor air capability at all times of the year, except as noted in Section 7.4.4.1(9).

7.4.4.1(3) The clinical support spaces, administration spaces, meeting spaces, UBC learning spaces and energy centre ventilation systems may be designed to ASHRAE standard for Health Care facilities provided these spaces are not served from a common ventilation system serving the Acute Care Facility.

7.4.4.1(4) Design all surgical and ICU rooms to support invasive procedures and airborne isolation requirements as per applicable CSA Z317.02 guidelines

7.4.4.1(5) In addition to the requirements of CSA Z317.2, design the ventilation systems so that all areas designated as outbreak control zones can operate to mitigate the spread of infections during an outbreak. The ventilation system will be capable of being:

7.4.4.1(5)(a) easily converted into a negative pressure condition with respect to adjacent floor areas by proportionally changing the supply, return, and exhaust air ratio for all rooms with the zone; and.

7.4.4.1(5)(b) easily configured to ensure that no airborne infection can be re-circulated into any ventilation system from any outbreak control zone.

Refer to Section 5.8.1.1(5) for outbreak control zone requirements.

7.4.4.1(6) Provide an HVAC system that maintains appropriate pressure relationships between various areas of the Facilities and provides necessary outdoor air quantity, air filtration, cleansing and exhaust to control the transmission of infection. Refer to applicable infection control standards and CSA Z317.2 for the relative pressurization and other minimum indoor air quality requirements for the Facilities, except as noted in Section 7.4.4.1(9).

7.4.4.1(7) Provide HVAC systems with adequate backup capacity and equipment redundancy to ensure continuous Facility operations at all times.

7.4.4.1(8) Provide air handling units with sectional heating and cooling coils and manual isolation valves that will enable isolation and repairs to the damaged sections of coils without stoppage of the system.

7.4.4.1(9) Design and construct the Facility to comply with the requirements of CSA Z317.2 for a Class A-2 HCF except as follows:

7.4.4.1(9)(a) Surgical Services (component DT.04 of the Clinical Specifications) will have 100% redundant air handling unit systems, and will meet CSA Z317.02 for air change rates and will operate with continuous 100% outside air;

7.4.4.1(9)(b) at least one 18-bed sub-unit within Medical/Surgical Inpatient Units (component IP.01 of the Clinical Specifications) will have interconnected air handling equipment to provide adequate redundancy. The redundancy for critical spaces being served will provide sufficient fresh air and filtration as outlined in CSA Z317.02;

7.4.4.1(9)(c) all air handling equipment serving inpatient areas will implement multiple fans or a fan wall within a single air handling unit cabinet; and

7.4.4.1(9)(d) humidification is not required for air handling systems, except for the air handling system serving Surgical Services (component DT.04 of the Clinical Specifications).

7.4.4.1(10) Not used.

7.4.4.1(11) For clusters of isolation bedrooms, inpatient units and floors for infection control, provide dampers of sufficient quality to ensure minimal leakage of airflow. Provide airflow sensor at damper to ensure isolation has been achieved.

7.4.4.1(12) Provide air filtration in accordance with all applicable standards, All HVAC systems will perform such that any indoor contaminants are maintained at less than 50% of their occupational exposure limits (OELs).

7.4.4.1(13) Not used.

7.4.4.1(14) Provide dedicated supply air with HEPA filters for spaces as required by applicable standards.

7.4.4.1(15) Design operating rooms as Type 1 – specialized rooms as described in CSA-Z317.2-10.

7.4.4.1(16) Provide fans with Variable Frequency Drives (VFDs) for energy savings under part-load conditions. Motor starters will be selected in accordance with Section 7.7.7.2.

7.4.4.1(17) Air handling equipment will be factory-fabricated to ensure the highest construction standard.

7.4.4.1(18) Not used.

7.4.4.1(19) Provide vandal-proof HVAC fixtures in safe and seclusion rooms, and other areas where psychiatric patients may be present and unsupervised.

7.4.4.1(20) Ensure the ventilation systems are designed to accommodate any additional ventilation supply needed for commercial spaces, to maintain proper pressurization throughout the Building. Provide sufficient make up air for all NFPA-96 commercial exhaust hood systems. Make allowance within the base building systems for any future make-up air systems needed for future tenant fit-outs of the commercial spaces.

7.4.4.1(21) Ensure the ventilation of residential dryers and range hoods exhaust air is ducted to the exterior. If the ducting exceeds the dryer's maximum allowable distance, provide a booster fan.

7.4.4.1(22) Apply CSA-Z317.2-10 and ASHRAE standard 170-2008 for space pressurization and minimum air change rates. If the standards differ apply the most stringent requirement.

7.4.4.1(23) Procedure Rooms that fall under CSA Z317.2 – Table 1 as Minor Surgical Procedure and Trauma Rooms, along with CSA Z8000 – Table 9.5 Items 20-22 will have a minimum of 20 air changes per hour notwithstanding that 15 air changes per hour is stipulated in these standards.

7.4.4.2 Performance Criteria

7.4.4.2(1) Provide Indoor Air Quality (IAQ) plans to meet the project's IAQ requirements.

7.4.4.2(2) Incorporate a strategy to allow the installation and removal of major Building equipment such as fans without disrupting hospital operations.

7.4.4.2(3) Locate fans, common filters (e.g. HEPA), and other equipment in the central mechanical rooms. Allow for adequate clearance for service access.

7.4.4.2(4) Provide exhaust systems with bag in – bag out filters and 100% redundancy for isolation room exhaust systems.

7.4.4.2(5) All equipment for supply air, return air and general exhaust systems that will be located exterior to the Building and will be designed and constructed to with-stand the exposure to outdoor conditions.

7.4.4.2(6) Make allowances in duct sizing and equipment selections to provide flexibility for future changes in spaces. Refer to Section 4.1.3.

7.4.4.2(7) Provide fresh air intakes, cooling coil drain pans, air handling units, duct mounted humidifiers, ductwork, and all other interconnected components to prevent moisture or contaminants from collecting within the system. Provide sufficient access panels to allow for inspection and cleaning.

7.4.4.2(8) Fresh air intakes will be located to not entrain contaminants from outdoor sources including existing exhaust points of adjacent buildings. All intakes will be located in areas that are not accessible by the public and will not be located near exhaust air outlets.

7.4.4.2(8)(a) Take into account the location of the Heliport and ensure that fumes from the Heliport are not introduced into the Building or adjacent buildings' fresh air intakes. Provide extra filtration on any intakes that may entrain contaminants from the Heliport and demonstrate the

filtration is sufficient for this purpose. Switchable outdoor air intakes may be utilized if necessary to achieve this requirement.

7.4.4.2(9) All supply, return, and exhaust air will be fully ducted to the space being served. Ceiling area may not be used as return air plenums.

7.4.4.2(10) Insulate all ductwork to all applicable standards

7.4.4.2(11) Provide seismic mitigation and building separation devices for all ductwork that crossings buildings and/or utility corridors.

7.4.4.2(12) No in-slab or under slab ductwork is permitted.

7.4.5 Exhaust Systems

7.4.5.1 Basic Requirements

7.4.5.1(1) Design exhaust air discharges to ensure that there is no cross contamination with outdoor air intakes for any new or existing buildings on the Site.

7.4.5.1(2) Design exhaust air discharges to ensure they do not interfere with Heliport operation, including discharges for Building smoke exhaust under fire alarm. Refer to Section 4.5.

7.4.5.1(3) Provide exhaust fans and locate them at the end of the exhaust ductwork systems. Ensure that the fans will be readily serviceable and are separated from spaces that house other mechanical equipment.

7.4.5.1(4) Provide exhaust systems for enclosed parking areas controlled by carbon monoxide-monitors tied to BMS.

7.4.5.1(5) Integrate the control of the exhaust systems with the ventilation supply air systems for spaces with differential pressure requirements from adjacent spaces.

7.4.5.1(6) Provide an exhaust air system suitable for the laboratory requirements, surgery rooms, morgue wall mounted autopsy station and any other special venting requirements as per CSA standards. These systems will be interlocked with the supply air systems.

7.4.5.1(7) Provide commercial-grade NFPA-96 exhaust hood systems where commercial cooking operations will occur within a commercial space. Make allowance within the base building design for the installation of future commercial exhaust hood systems at all other commercial spaces. Interlock the hood(s) with a make-up air

system to ensure proper pressurization within the Facility is maintained.

7.4.5.1(8) Provide exhaust systems at the emergency generators for radiator cooling and engine exhaust. Ensure exhaust termination points are located so flue gases are not entrained in air intakes, operable windows, or any other building opening for the Facility or adjacent buildings.

7.4.5.1(9) Make provisions in the Building exterior for connections of portable negative pressurization ventilation units that are used during future Building renovations. These connection points will be available for use without adversely affecting the building envelope. Provide sufficient connection points at the building exterior so all internal areas can be served by negative pressurization ventilation units.

7.4.5.2 Performance Criteria

7.4.5.2(1) Isolation rooms and their associated washrooms will be provided with dedicated exhaust systems with 100% redundancy. HEPA filters will be provided in the exhaust ductwork in readily accessible locations for servicing.

7.4.5.2(2) Biosafety cabinets will be provided with dedicated exhaust systems that are appropriate for their class and type. Where multiple cabinets are tied into a common system, a 100% redundant central exhaust system will be provided.

7.4.5.2(3) Fume hoods and other smoke/fume generating process booths/space will be provided with dedicated exhaust systems that are corrosion/ chemical resistant to the exhaust media.

7.4.5.2(3)(a) Ensure all exhaust systems serving modular clean rooms, or the equipment within, are designed to comply with the most current version of USP 797.

7.4.5.2(4) Provide dedicated exhaust systems as required for medical equipment. Provide central or built in systems for smoke evacuation in operations or procedures rooms. Do not use portable systems.

7.4.5.2(5) All ductwork that exhausts humid air at or near saturation will be constructed of welded stainless steel of a suitable alloy, or of a material equally resilient to corrosion. All duct sections will be sloped to drain points and will be accessible for inspection and cleaning.

7.4.6 Metering Requirements for Energy Measurement and Verification

7.4.6.1(1) Provide meters on all services connecting to the Building from an external infrastructure including but not limited to district heating water supply and return, natural gas service, domestic water and electrical service.

7.4.6.1(2) Provide all required meters, sensors, and trend logging equipment at end uses within the Building to meet the energy monitoring requirements outlined in Appendix 2C [Energy]. For additional funding consider the BC Hydro New Construction Program and other incentive programs.

7.4.6.1(3) All meters will be connected to an integrated energy management system to monitor, record, report, and analyze energy consumption. Coordinate electrical metering and the energy management system with the requirements of Section 7.7.

7.4.6.1(4) Metering intervals will be fifteen minutes or less.

7.4.7 Sound Attenuation and Vibration Isolation

7.4.7.1(1) Provide all mechanical systems to prevent sound and vibration transmission between spaces, to prevent transmission from mechanical equipment to the spaces, and to minimize sound and vibration transmission to the outside of the Facility. Provide sound attenuation to limit sound levels in accordance with Appendix 3E [Sound Transmission Ratings].

7.4.7.1(2) Systems will be provided with noise attenuation screening if the equipment or their exterior openings are located facing and within 200 meters of residential areas.

7.4.7.1(3) Provide vibration isolation devices on all equipment with rotating components.

7.4.7.1(4) All hung equipment will utilize spring isolators designed for the weight and vibration characteristics of the equipment.

7.4.7.1(5) Provide flexible connections where needed to isolate mechanical equipment sound and vibration from ducting, piping and electrical wiring systems.

7.4.7.1(6) Ensure duct silencers meet or exceed the requirements of the ductwork for cleanliness and inspection.

7.4.7.1(7) Utilize fibre free internal insulation.

7.4.8 Testing, Adjusting, Balancing (TAB) and Commissioning (Cx)

7.4.8.1(1) Without limiting Project Co's commissioning obligations under Section 12 (Commissioning) of Schedule 2 [Design and Construction Protocols], Project Co will:

7.4.8.1(1)(a) perform Testing, Adjusting and Balancing and Commissioning (TAB & Cx) of all mechanical equipment;

7.4.8.1(1)(b) integrate the TAB & Cx into the project construction and start-up schedules. Configure the TAB & Cx plan so it will support a phased occupancy of the Building, if required by construction conditions and approved by the Authority;

7.4.8.1(1)(c) utilize a quality assurance system throughout the TAB & Cx process to ensure that TAB & Cx has been performed to all equipment and systems requiring TAB & Cx. Demonstrate the quality assurance system to the Authority prior to beginning TAB & Cx;

7.4.8.1(1)(d) ensure any construction or installation errors are identified and remedied prior to the start of Cx functional testing;

7.4.8.1(1)(e) perform follow-up TAB & Cx services during each season over the first year of the Building's operation;

7.4.8.1(1)(f) make all TAB & Cx reports available to the Authority. The reports will identify how much additional capacity is available for in all systems, as required by Section 4.1.3; and

7.4.8.1(1)(g) retain complete records of all TAB and Cx data.

7.5 Reserved for Future Expansion (Division 24) – NOT USED

7.6 Integrated Automation (Division 25)

7.6.1 Controls

7.6.1.1 Basic Requirements

7.6.1.1(1) Provide a building management system ("**BMS**") for the Facility that performs the following functions:

7.6.1.1(1)(a) automatically operates, monitors and manages the Facility's mechanical systems to provide a high level of occupant comfort and maintains a healthy and

productive environment without disruption to the delivery of clinical and patient treatment services;

7.6.1.1(1)(b) provides an internet based means of external monitoring by the Authority, including all associated hardware and software;

7.6.1.1(1)(c) interfaces with the Building mechanical, electrical and communication systems and controls;

7.6.1.1(1)(d) meters, trends and archives all data related to the flow of services into and out of the Facility, including domestic water, steam, condensate, medical oxygen, and electricity and takes into account seasonal variations in flow rate;

7.6.1.1(1)(e) annunciates Building and equipment alarms, including fire alarm, security alarms, freezer alarms, lab alarms, medical equipment alarms, lighting, UPS, emergency power systems. switchgear alarms, temperature and humidity setpoint deviation alarm;

7.6.1.1(1)(f) monitors the status, temperature, humidity and alarms for equipment identified in consultation with the Authority, including freezers, coolers, labs and medical equipment; and

7.6.1.1(1)(g) acquires and collates all data associated with energy measurement and verification as required by Section 7.4.6.

7.6.1.1(2) Design the controls systems to allow monitoring and operation of the Facility from a BMS location in the Facility, or from any location with appropriate security controls in place via an integrated Building Automation System over IP (BAS/IP).

7.6.1.1(3) The BMS will be a completely integrated (front-end and back-end) Native BacNET DDC system.

7.6.1.1(4) The BMS will be non-proprietary and designed with open protocol.

7.6.1.1(5) The BMS will be provided as a complete package from one manufacturer, not a composite system from several. Proprietary systems may be integrated into the BMS provided there are sufficient control points between the two systems to monitor and operate the system as required by these specifications, and to diagnose problems.

7.6.1.1(6) The BMS will optimize the system performance under all operating conditions to minimize Facility energy usage.

7.6.1.1(7) The BMS will accommodate future technological changes and the architecture of the BMS will permit expansion of the system for future renovations.

7.6.1.1(8) The BMS will be an independent system separate from the fire alarm and other control systems.

7.6.1.1(9) Provide airflow sensors at infectious control isolation dampers in ductwork to ensure isolation has been achieved.

7.6.1.1(10) Provide sensors to monitor outdoor air volumes, space CO2 levels, and other levels is required.

7.6.1.1(11) Provide continuously-operating sensors between all spaces requiring differential pressurization to monitor that the required pressure differential is in place. In addition to BMS alarms, provide local audio and visual alarms at the room entrance and also at the local monitoring station if applicable.

7.6.1.1(12) Provide BMS complete with Automated Fault Detection, Diagnosis and Reporting (AFDDR) software. Configure and operate the AFDDR software to ensure building systems remain continuously optimized, and the need for fault diagnosis by the building operator is minimized. AFDDR software will provide customizable web-accessible reports available to the Authority.

7.6.1.1(13) Provide a separate physical network and any required network equipment for the BMS.

7.6.1.1(14) All system critical server/head-end applications which the BMS relies upon will reside on the Authority's server equipment. All software systems, platforms and equipment will comply with the Authority's standards and policies as described in this Schedule including Appendix 3F(vi) [VIHA IMIT Technology Standards].

7.6.2 Performance Criteria

7.6.2.1 Provide an independent control zone for each patient care room. For type 3 spaces as defined in CSA Z317.2, zoning for HVAC systems will be based on occupancy, room location, room orientation and room heating and cooling loads.

7.6.2.2 Zone floor areas to provide control of smoke in a fire situation. Zone floor areas to ensure infection control for each of the care team stations.

7.6.2.3 Provide thermostats throughout the Facility as required. Mercury-containing components will not be permitted.

7.6.2.3(1) Provide adjustable type thermostats in all patient rooms with temperature read out. The temperature range will be controlled by the BMS.

7.6.2.4 Provide local pressure control for each isolation room and anteroom. Provide a local annunciator panel located in the corridor outside each of these rooms.

7.6.2.5 All components will be designed to default to a safe position upon failure, and will be installed to ensure reliable operation at any failure situation.

7.6.2.6 The BMS will monitor, control, indicate alarms, and provide trending where applicable for all connected sensors and control points.

7.6.2.7 The BMS will be connected to emergency power and UPS to ensure continued availability during utility power disruptions.

7.6.2.8 The BMS will monitor critical alarms for essential Building and life safety systems. Critical alarms include:

7.6.2.8(1) fire alarm system for alarm, supervisory and trouble;

7.6.2.8(2) all temperature alarms resulting from setpoint deviations;

7.6.2.8(3) failure of any major HVAC or plumbing equipment;

7.6.2.8(4) medical gas system high and low pressure alarms;

7.6.2.8(5) all alarms relating to the fire protection system; and

7.6.2.8(6) all alarms related to the emergency power generators and transfer switch control system.

7.6.2.9 The BMS documentation will include a detailed narrative description of the sequence of operation of each system.

7.6.2.10 User interface will be graphical in nature with animated graphics to indicate equipment operation. Graphics will be grouped in systems and in departments.

7.6.2.11 The energy management system will be connected to the BMS.

7.7 Electrical (Division 26)

7.7.1 Wiring Methods, Materials and Devices

7.7.1.1 Basic Requirements

7.7.1.1(1) Use wiring methods, materials and devices that result in a safe, reliable and flexible electrical power, lighting control, communication, data and life safety system.

7.7.1.1(2) Install all wiring in a neat and secure manner so that it is protected from damage, is not in conflict with mechanical or architectural components and allows for future changes and additions.

7.7.1.1(3) Do not install conduit or wiring in floor slabs, except where it is impossible to supply the device from the ceiling, or specific approval has been granted by the Authority.

7.7.1.1(4) Feeders to panelboards will be routed to the panelboard from the ceiling space above. Panelboards will not be fed via the slab below, nor will they be 'daisy-chained' through floors.

7.7.1.1(5) Branch circuits from panelboards will be routed to a large pullbox located in the ceiling space immediately above the panelboard for distribution through the above-ceiling service space.

7.7.1.1(6) Colour of power receptacles will be as follows:
Normal power – WHITE
Essential power – RED
UPS power – GREY
Housekeeping – BLACK

7.7.1.1(7) All power receptacles will be identified with panel and circuit number. Colour of labelling will be in accordance with Authority colour coding standards as follows:
Vital power - RED with WHITE text
Delayed vital power - BLUE with WHITE text
Conditional power - YELLOW with BLACK text
UPS - GREY with BLACK text
Normal power - BLACK with WHITE

7.7.1.1(8) Project Co will obtain approval from the Authority of the proposed classification of all patient care areas in the Facility per CSA Z32-09. The Authority will review these classifications and confirm the areas as basic, intermediate or critical care. Provide as a minimum the circuit and receptacle requirements identified in CSA Z32-09. Where this Schedule 3 identifies requirements beyond CSA Z32-09, comply with the requirements of this Schedule 3.

7.7.1.2 Performance Criteria

7.7.1.2(1) Utilize non-alloyed copper for all conductors and all conducting components of electrical equipment, which form part of the Facility's wiring systems. Minimum conductor size will be

#12AWG. Aluminum conductors installed in conduits may be used for feeders larger than #6AWG.

7.7.1.2(2) All conductors #12 AWG and larger will be stranded.

7.7.1.2(3) Project Co may use Teck cable in mechanical plant rooms and service rooms for connection to mechanical equipment. Teck cable will be installed in perpendicular runs and will be neatly strapped to dedicated cable support systems or tray. Do not support armoured cabling from mechanical ducts, pipes or equipment. Where possible, Teck cable runs will be consolidated into common routes.

7.7.1.2(4) Each branch circuit will be provided with a dedicated neutral conductor.

7.7.1.2(5) Provide panel boards, feeders and branch circuiting with double neutral(s) capacity where significant non-linear load(s) are anticipated. This includes open office and other areas with a medium to high density of personal computers.

7.7.1.2(6) Conceal all wiring and wiring support systems from public view except where approved by the Authority.

7.7.1.2(7) Separate all wiring for systems of different voltages and from different sources and do not run in common raceways. Maintain adequate shielding and separation between wiring for power and communication systems to prevent interference.

7.7.1.2(8) Provide hospital grade receptacles for all patient care areas. Receptacles in all other areas will be specification grade. Receptacles will be colour coded.

7.7.1.2(9) Utilize smooth nylon cover plates for receptacles and switches. Grouped receptacles and switches will have a single cover plate for the whole group.

7.7.1.2(10) Design each room in the Facility such that receptacles and data outlets are distributed throughout the room as required to support functionality and convenient use of equipment by Facility Users and in accordance with Good Industry Practice and as required by other provisions of the Agreement. Provide sufficient quantities of receptacles and data outlets as required:

7.7.1.2(10)(a) to meet or exceed the requirements of CSA Z32-09;

7.7.1.2(10)(b) for the “Smart” hospital environment as described in Appendix 4A to Schedule 2D [Campbell River Facility

Smart Hospital Requirements] and Appendix 4B to Schedule 2D [Comox Valley Facility Smart Hospital Requirements]; and

7.7.1.2(10)(c) to support all of the systems and equipment to be installed or used in the Facility, including any additional power outlets required by other provisions of this Agreement; and as required by Good Industry Practice to provide convenience, flexibility of use and operational support throughout the Facility.

7.7.1.2(11) Unless otherwise requested by the Authority or elsewhere in this specification, provide emergency power per CSA Z32 requirements and for 75% of the receptacles within the emergency department. The remainder of the receptacles in the emergency department will be provided with conditional emergency power.

7.7.1.2(12) Allow a maximum connection of six general use receptacles to one 15 amp circuit.

7.7.1.2(13) Provide one duplex convenience receptacle rated at 15A, 125V in all rooms.

7.7.1.2(14) Utilize NEMA 5-20R 15/20Amp style receptacles for printers and copiers. Provide 20A rated dedicated circuits for each printer and copier.

7.7.1.2(15) Utilize NEMA 5-20R 15/20Amp style receptacles for housekeeping staggered on alternate sides of the hallways spaced a maximum of 10 meters apart. Provide 20A rated dedicated circuits for each area, to a maximum of 6 receptacles per circuit.

7.7.1.2(16) Provide a minimum of one spare power outlet in all offices. In single occupancy offices, two outlets will be quadplexes located to serve the location of possible workstations, the other one will be a convenience duplex.

7.7.1.2(17) Provide a minimum of one 15Amp circuit per four open office workstations.

7.7.1.2(18) Provide a minimum of one 15Amp circuit per two single person enclosed offices.

7.7.1.2(19) In each multi-occupancy office provide a minimum of one quadplex receptacles for each desk or workstation and a minimum of one duplex receptacle spaced every 5 meters of open wall space.

7.7.1.2(20) Each administration workstation will have a minimum of two duplex receptacles.

7.7.1.2(21) Provide a minimum of four duplex receptacles in each exam treatment room, two of which will be fed from vital power.

7.7.1.2(22) Provide a minimum of four duplex receptacles at each clean utility room, 50% of which will be fed from vital power and the remainder connected to conditional power.

7.7.1.2(23) In each care team station, provide one quadplex receptacle spaced 1.5 m on centre below work counters in knee space or above counter if no knee space is provided. 50% of these receptacles will be fed from vital power and the remainder connected to conditional power.

7.7.1.2(24) In each conference or meeting room provide a minimum of one duplex receptacle spaced every 3 meters of wall space and one duplex receptacle spaced a maximum every 2 meters above work counters. In addition, provide receptacles for all dedicated equipment such as microwaves, coffee makers, refrigerators, etc. At all locations with overhead projectors provide 15Amp 120 volt receptacle located at ceiling and provide one 27 mm conduit and pullstring to floor and/or wall outlet for the video signal to the projector.

7.7.1.2(25) Provide two duplex receptacles at each patient treatment bed or care location in patient care areas defined by CSA Z32-09 as “Basic Care Area”, and connect one of the receptacles to vital power.

7.7.1.2(26) Provide five duplex receptacles per patient care location in patient care areas defined by CSA Z32-09 as “Intermediate Care Area”, and connect three of the receptacles to vital power.

7.7.1.2(27) Provide ten duplex receptacles per patient care locations defined by CSA Z32-09 as “Critical Care Area”, and connect 75% of these receptacles to vital power. Remainder of receptacles will be connected to conditional power.

7.7.1.2(28) Provide one duplex receptacle for each electric bed where applicable in all patient care areas and connect to vital power.

7.7.1.2(29) Provide a minimum of four duplex receptacles at each medication room, connect 50% of these receptacles to vital power.

7.7.1.2(30) Provide one duplex receptacle for every 50 square meters, or portion thereof, of service, housekeeping and storage space. A minimum of one duplex receptacle will be provided per room.

7.7.1.2(31) Provide special receptacles for fixed and moveable equipment as defined in the Equipment List.

7.7.1.2(32) Provide each workbench in the Biomedical technical work area with one 50A, 208V outlet, plus two dedicated 15A, 120V circuits each of which serves a six outlet power bar. One of the 15A circuits will be delayed vital power.

7.7.1.2(33) Install approved fire stopping to maintain all fire separations and as required by local Governmental Authorities.

7.7.2 Raceways

7.7.2.1 Basic Requirements

7.7.2.1(1) Provide raceways for all wiring and cabling to support, protect and organize all wiring and cabling systems.

7.7.2.1(2) Design raceways to provide ease of access and install with capacity for expansion and change, consistent with the requirements of the equipment and systems that they serve.

7.7.2.1(3) Install all raceways in a neat and secure manner in such a way that they are protected from damage, are not in conflict with mechanical or architectural components and allow for future changes and additions.

7.7.2.1(4) Except as noted otherwise, install power wiring in EMT with steel couplings and connectors.

7.7.2.1(5) Install telecommunication outlet and building system wiring (unless otherwise required by applicable codes and standards) in EMT with steel couplings in the wall up to the ceiling space. Install individual steel backboxes for all communication system devices. J-hooks may be used from the ceiling space above backboxes to cable tray installed in major corridors and/or J-hooks installed in minor corridors. ("major" and "minor" corridors will be shown on the drawings included in Part 3 of the Proposal Extracts (Design and Construction)). J-hooks will be installed parallel and/or perpendicular from backbox locations to major or minor corridors J-hooks shall be routed within minor corridors where possible. Cabling will be consolidated to minimize the quantity of J-hooks in non-corridor spaces, and these J-hook runs will be located to maximize accessibility from below. Where more than 2 parallel

runs of J-hooks are required to serve an area, Project Co will provide cable tray. The Authority will review and approve the location of all J-hook runs.

7.7.2.1(6) EMT is to be surface mounted in service rooms and concealed in ceiling spaces and partition walls. Do not encase EMT in concrete, unless such installation is permitted by code and is:

7.7.2.1(6)(a) for power wiring to lighting fixtures and receptacles located in the parkade; or

7.7.2.1(6)(b) approved by the Authority as being necessary to achieve a concealed installation in finished spaces such as exposed concrete stairwells.

7.7.2.1(7) If EMT conduit is encased in concrete, such conduit runs will:

7.7.2.1(7)(a) be as short as possible; and

7.7.2.1(7)(b) emerge from the concrete in the closest adjacent space above suspended ceilings.

7.7.2.1(8) Minimum EMT conduit size is 21 mm (3/4”), except that minimum EMT conduit size for each communication or data outlet is 27 mm (1”) – see Div. 27 for minimum cabling requirements for a telecommunication or data outlet.

7.7.2.1(9) Use flexible conduit for all final connections to vibrating equipment, such as transformers and motors.

7.7.2.1(10) Minimum flexible conduit size is 21 mm (3/4”) and maximum length of any flexible conduit run is 1.5 metres.

7.7.2.1(11) Except as noted below, armoured cable (BX) may be used only for final connections from concealed junction boxes to lighting fixtures on suspended ceilings. The maximum length of any individual piece of armoured cable is 3.0 metres.

7.7.2.1(12) Use rigid PVC conduits for the underground portion of services to lighting and power outlets located outside of a Building.

7.7.2.1(13) Install individual bonding conductor in each conduit and/or raceway.

7.7.2.1(14) Raceways shall typically be concealed, however, surface raceways may be installed where required and approved by the Authority. Typical areas will include laboratory spaces, workbenches, nurse stations, and other areas where frequent changes in power and telecommunication outlets are likely.

7.7.2.1(15) Armoured cable (BX) may be provided for modular pre-fabrication of non-clinical electrical systems. Modular wiring will consist of pre-cut flexible wiring which will terminate at an easily located and accessible junction box above the ceiling. The junction box will be located in an adjacent room within 3m (horizontally) of the prefabricated unit. Excess lengths of armoured cable will be neatly coiled up in the ceiling space to accommodate future changes. All wiring installed in walls will be vertical from device to ceiling space.

7.7.2.1(16) Armoured cable (BX) may be provided for receptacles and light switches for non-clinical administrative areas. All installation of armoured cabling will be concealed and will originate from an easily located and accessible junction box mounted above the ceiling of the room it serves. This junction box will only serve one room, and will utilise conduit to home run its circuits back to a panelboard. Armoured cable may be daisy-chained within a single wall, but will not extend (i) around a corner, or (ii) horizontally beyond 10 metres of its vertical drop from the junction box. There will be no excess armoured cabling in the ceiling space and all wiring will be neatly strapped to the underside of slab, or onto dedicated wire management supports. Do not support armoured cabling from mechanical ducts, pipes or equipment, or suspended ceiling systems.

7.7.2.2 All power outlet and telecommunication outlet back boxes will be a minimum 4” square welded steel type, equivalent to a Iberville 5200 series.

7.7.2.2(1) Provide cable trays for installation of all communication system wiring for data, telephone, public address and other such systems. Install cable trays from communication rooms and above all major corridors. J-Hooks may be used in minor corridors, except that cable tray will be used in minor corridors where more than 2 runs of J-hooks would be required to serve the area ("major" and "minor" corridors" will be as shown on the drawings included in Part 3 of the Proposal Extracts (Design and Construction)). If cable trays pass through walls with fire resistance ratings, provide a non-removable ULC approved firestopping system similar to ‘EZPath’ raceway or ‘Hilti Speedsleeve’ of a quantity capable of accommodating the entire capacity of the cable tray

7.7.2.2(2) Cable tray will be aluminum or steel wire mesh or ladder type with manufactured fittings. Provide continuous #6AWG minimum bare copper bonding wire which is connected by split bolt to each length of the cable tray. Provide bare copper bonding jumper between the cable tray and every associated conduit to ensure continuous bond between tray and low tension raceways.

7.7.2.2(3) Identify all conduits, raceways, pull boxes, and junction boxes using painted colour bands. Colouring scheme will be determined by the Authority at a later date. Provide all power and communication systems with unique colours in accordance with the colouring scheme. Major colour to be 100 mm wide and minor colour to be 50 mm wide. Identify raceways with coloured bands (using either spray paint or coloured duct tape) at intervals of 6 m, plus at the point where the raceway enters a wall or floor (i.e. raceway is identified on both sides of a penetration to facilitate tracing of raceway). Colour-code all junction boxes using spray paint on the cover. Neatly identify the relevant system and circuit ID using permanent marker pen. Identify parallel conduit runs at common locations.

7.7.2.2(4) Indicate the location of conductors encased or embedded in concrete or masonry by conspicuous permanent markers set in the walls, floors, or ceilings. Markers will indicate each point at which buried conductors penetrate a wall. Markers will indicate encased or buried conductors every 10 meters and at each change in direction.

7.7.2.3 Performance Criteria

7.7.2.3(1) Construct separate raceways or barriered raceways to isolate systems of different voltages and prevent magnetic interference to low voltage system conductors.

7.7.2.3(2) Design and install raceways without sharp edges or tight bends so that cables can be pulled in or laid in and removed without damage to the cables.

7.7.2.3(3) Provide all cable trays with minimum 70% spare capacity for the installation of future cables. If multiple raceways are required in a group, such as a duct bank or tray system interconnecting two or more major areas, provide matching empty raceway equal to a minimum of 50% of the capacity of the total installed group.

7.7.2.3(4) Provide a minimum of two spare 103 mm conduits with pullstrings from the main electrical room to each sub-distribution room.

7.7.2.3(5) Provide all duct banks with a minimum quantity of 50% spare conduits of the largest conduit size.

7.7.2.3(6) Install all conduits in finished areas within finished walls and above finished ceilings.

7.7.3 Electrical Utilities

7.7.3.1 Basic Requirements

7.7.3.1(1) Coordinate with BC Hydro to service the site with two independent 25kV Utility services. These services will be redundant and will be supplied from separate circuits. For added redundancy, the BC Hydro services will not share common physical routes into the primary service switchgear.

7.7.3.1(2) Coordinate with Telus and Shaw Cable and provide fibre and cable TV services to site. Consult with the Authority and provide redundant fibre and copper services. Provide service demarcation rooms and redundant service connections to each of the PERs and SERs.

7.7.3.1(3) The main electrical room will be designed and constructed to facilitate future expansion with minimal disruption to Facility operation and continuity. The Facility will be constructed with all necessary infrastructure including spare capacity, spare circuit breakers, physical expansion space, ducts stubbed out from the building footprint and capped off for easy future extension, pull-pits, sleeves, housekeeping pads, wiring, controls, distribution routes, and ventilation as necessary to accommodate the future system expansion.

7.7.3.2 Performance Criteria

7.7.3.2(1) Design the electrical systems and equipment to comply with the BC Building Code requirements for a post-disaster facility.

7.7.3.2(2) Design the electrical and communication rooms to be accessible to authorized personnel only. Provide security measures as required by the Authority including access controls and CCTV.

7.7.3.2(3) Incorporate design features and practices to reduce arc flash hazards on electrical systems such that routine operations such as transfer switch operation, opening and closing distribution breakers, and inspection and maintenance activities will require (as defined in NFPA 70E) PPE Level 2. No activities will expose personnel to arc flash hazards which exceed the protection afforded by PPE Level 4.

7.7.3.2(4) Utilise technologies such as zone selective interlocking protection, limiting available fault current from transformers, maintenance mode settings of circuit breakers or providing remote control of switching and motorised racking devices.

7.7.3.2(5) Prepare and submit to the Authority a detailed arc flash study signed and sealed by a professional engineer registered in British

Columbia and provide equipment labelling indicating available energy levels and level of PPE required when servicing the equipment.

7.7.3.2(6) Provide a fully selective protection scheme for all of the circuit breakers on all essential system distribution equipment immediately downstream of the transfer switches, for both hydro and generator available fault currents. Additionally, all essential system circuit breakers will be fully selective for circuit breaker sizes 150A and larger.

7.7.3.2(7) Prepare and submit to the Authority a detailed distribution coordination study signed and sealed by a professional engineer registered in British Columbia.

7.7.4 Service Switchgear – Over 600 Volts

7.7.4.1 Basic Requirements

7.7.4.1(1) Provide metal clad electrical equipment for the primary service switchgear system for the Facility.

7.7.4.1(2) Utilize transmission and distribution equipment that are robust, reliable, easily operated and maintained.

7.7.4.1(3) Provide two high voltage circuit breakers and load break switches for the two utility (normal) power transformers.

7.7.4.1(4) Provide one spare 25kV distribution circuit breaker adjacent to the two main service transformer circuit breakers.

7.7.4.1(5) Provide a spare section in which a circuit breaker can be added for future high voltage distribution of normal power. Provide a capped off duct bank stubbed out of the Facility to facilitate future extension of 25kV power to a new building on the Site. Coordinate the location of the spare duct bank with the Authority.

7.7.4.1(6) Provide an indoor load break switch and motorized high voltage circuit breaker for each of the two incoming 25kV utility services. The circuit breakers will be configured as an open transition automatic transfer switch and will provide the capability of local manual and automatic transferring between services. The open transition service configuration will be subject to a BC Hydro operating order. The operating order will define switching operations during planned and unplanned outages, key contacts, authorized personnel and specific nomenclature / sequences to support the switching orders. Provide all necessary arrangements to conform to BC Hydro requirements.

7.7.4.2 Performance Criteria

7.7.4.2(1) Provide main load break switches utilising HRC current limiting fuses.

7.7.4.2(2) Provide rackable 500 MVA rated metal-clad switchgear with vacuum circuit breakers, potential transformers, current transformers and metering sections.

7.7.5 Emergency Power

7.7.5.1 Basic Requirements

7.7.5.1(1) Provide a Tier 2 emergency power generating plant comprising a minimum of two diesel powered generators. Generators will be located at grade level, preferably inside the Energy Centre. Generators will be capable of being installed and withdrawn from the Building through the air discharge louvers with minimal deconstruction work being required.

7.7.5.1(2) Should exterior generators be provided, they will be located at grade housed in secure, walk-in, illuminated and heated enclosures. Enclosures will be supervised for unauthorised intrusion.

7.7.5.1(3) Locate the generators to enable routine and emergency maintenance activities to be performed quickly and efficiently. Removal of the generators from the Site will be simple and will not require disassembly of the Buildings or systems, nor special lifting equipment.

7.7.5.1(4) Generators will not be located where they are subject to damage from vandalism, falling objects or debris, road traffic, fire, flood or adverse weather conditions.

7.7.5.1(5) Generator sizing will include the electrical system spare capacity per Section 5.11.1.2(8). Upon loss of one generator, the remaining generator(s) will be capable of supplying the total future vital and delayed vital power systems peak load. The “future vital and delayed vital power system peak load” means peak demand load when the Facility has been constructed to include the future expansion capacity in Section 5.11.1.2(8). The electrical system expansion criteria identified in Section 5.11.1.2(8) pertains to load growth within the Facility only.

Additionally, a spare physical space requirement within the Energy Centre is identified in Section 4.1.3.3. This space is required to accommodate future additional electrical distribution equipment

necessary to serve the future site expansion identified in Section 4.1.3. Project Co will provide suitable physical space, ducts etc. required to accommodate the future additional electrical distribution equipment, but no additional electrical capacity is required to be provided for this expansion.

7.7.5.2 Performance Criteria

7.7.5.2(1) Generators will be supplied by an established supplier of generators to healthcare facilities in British Columbia. The generator supplier will have a full service repair facility within 8 hours travel time (by road and sea) to the Site. Generator spares will be routinely stocked within the British Columbia Lower Mainland and will be available on Site within 24 hours.

7.7.5.2(2) The generators will normally operate in parallel and provide features including bumpless (closed transition) transfer operation, load sharing and base loading. It will be possible to use the Facility load as a base load for annual load testing of the generators.

7.7.5.2(3) The generator plant will be designed to minimise noise emissions. Provide high grade exhaust mufflers and other sound attenuation means, as necessary, to achieve a maximum sound level of 72 dBA measured at 7 m from the Energy Centre in any horizontal plane.

7.7.5.2(4) Provide a generator exhaust system to discharge exhaust fumes in a manner that does not create an objectionable odour or noise issue to the Facility or neighbouring properties.

7.7.5.2(5) Provide a fuel system capable of supplying the maximum capacity of the emergency power plant at 100% load (including spare capacity) for a minimum of 72 hours.

7.7.5.2(6) Provide a dedicated load bank connection point for each generator which does not require the disconnection of existing cabling. The circuit breaker will automatically shunt trip the load bank upon loss of utility power to the Facility.

7.7.5.2(7) The essential electrical systems will include tie breakers from the main conditional distribution to each of the main vital and delayed vital distributions. Conditional power will be derived at 600V by means of manually operated automatic transfer switch connected between the generator bus and normal power distributions.

7.7.5.2(8) For redundancy, the conditional power distribution throughout the Facility will include tie-breakers and be sized to provide power

simultaneously to both the conditional load plus the larger of the vital or delayed vital loads in that locality.

7.7.5.2(9) Implement redundancy such that if an automatic transfer switch system fails, there is a manual means to restore power to the essential loads in the Facility. All transfer switches will have double sided bypass capability. Transfer switch mechanism will be capable of being withdrawn for servicing while the switch is in bypass mode.

7.7.5.2(10) Transfer switches will be contactor or power circuit breaker type and will be listed to UL1066 (30 cycle withstand rating at maximum available short circuit current) and will not require upstream circuit breakers for protection of the transfer switch.

7.7.5.2(11) Essential power branches will serve essential loads as defined by CSA Z32-09 and as required to meet the Clinical Specifications, including:

7.7.5.2(11)(a) Vital branch loads:

(a).1 Path of egress lighting.
(a).2 Exit signs.
(a).3 Stair and ramp lights.
(a).4 Receptacles and lights in service rooms.
(a).5 Medical gas alarm panels.
(a).6 Elevator cab and machine room lighting.
(a).7 Fire alarm and medical gas alarm systems.
(a).8 Telecommunications systems.
(a).9 Public address systems.
(a).10 50% of receptacles and lights in all patient care rooms.
(a).11 50% of lights and outlets in care team stations.
(a).12 Nurse call system power supplies.
(a).13 Medical vacuum pumping systems.
(a).14 50% of receptacles and lights in laboratories.
(a).15 Pharmacy dispensing areas.
(a).16 Equipment indicated on Equipment List.
(a).17 Emergency Department, 75% vital.
(a).18 ICU department, 75% vital.
(a).19 HDCU and NICU department, 75% vital.
(a).20 Lab analyzers.
(a).21 Operating rooms and trauma rooms.
(a).22 Security systems.
(a).23 Medical fridges.
(a).24 Smoke fans.

7.7.5.2(11)(b) Delayed vital branch loads:

(b).1 Ventilation systems serving patient care rooms.
(b).2 Sump pumps and sewage ejector pumps.
(b).3 Medical air pumping systems.
(b).4 Fire pump and jockey pump if provided. (via integral transfer switch).
(b).5 Fume hoods.
(b).6 Essential heating, ventilation and plumbing systems.
(b).7 Radiology, ultrasound and CT scan equipment as per Equipment List and Clinical Specifications.
(b).8 Alarmed freezers and refrigerators.
(b).9 Pneumatic Tube System
(b).10 Automated dispensing cabinets for medication
(b).11 Food services freezers and refrigerators
(b).12 Retail services freezers and refrigerators.

7.7.5.2(11)(c) Conditional branch loads:
(c).1 Per CSA Z32-09 Table 7
(c).2 Food service equipment required to maintain food service during Hydro power outages
(c).3 As required by other provisions of this Agreement.

7.7.5.2(12) The BMS will monitor and record emergency loads.

7.7.5.2(13) All elevators within the Facility will operate on emergency power.

7.7.6 Uninterruptible Power Supply (UPS) Systems

7.7.6.1 Basic Requirements

7.7.6.1(1) Provide UPS power for all areas, equipment and systems that require a continuous and uninterrupted source of power as per the requirements of this Schedule, Appendix 3F(i) [Cabling Infrastructure Standard], the Appendix 3A [Clinical Specifications], the Appendix 2D [Equipment List], and for the following additional rooms, equipment and systems:

7.7.6.1(1)(a) Operating rooms – select lighting and receptacles;

7.7.6.1(1)(b) Care Hubs, Care Team, Collaboration Centres - select lighting and receptacles;

7.7.6.1(1)(c) Switchboard;

7.7.6.1(1)(d) EOC – select lighting and receptacles;

7.7.6.1(1)(e) Energy Centre – select lighting and receptacles;

7.7.6.1(1)(f) all equipment and systems located in communications rooms (PER, SER, TRs) including Equipment Racks as defined in 7.8.7.1(16);

7.7.6.1(1)(g) network equipment for the wired and wireless networks;

7.7.6.1(1)(h) wireless access points;

7.7.6.1(1)(i) wireless communications system;

7.7.6.1(1)(j) nurse call system;

7.7.6.1(1)(k) public address system;

7.7.6.1(1)(l) RTLS system;

7.7.6.1(1)(m) CCTV system;

7.7.6.1(1)(n) Radio system;

7.7.6.1(1)(o) Infant abduction system;

7.7.6.1(1)(p) Patient Tracking / Wandering system;

7.7.6.1(1)(q) Equipment and Asset Tracking system;

7.7.6.1(1)(r) Fire alarm system;

7.7.6.1(1)(s) Physiological monitoring system;

7.7.6.1(1)(t) Staff Communication System;

7.7.6.1(1)(u) Building Management System (BMS);

7.7.6.1(1)(v) Fixed panic system;

7.7.6.1(1)(w) Staff duress system;

7.7.6.1(1)(x) access control systems;

7.7.6.1(1)(y) intrusion detection system;

7.7.6.1(1)(z) emergency power plant control system.

7.7.6.1(2) Provide two centralised UPS systems, each configured as an N+1 arrangement. One UPS system will be located in the PER and the other in the SER.

7.7.6.1(3) Do not provide small distributed, stand alone UPS systems. All equipment shall be supplied from the centralised UPS systems.

7.7.6.1(4) Provide a UPS power sub-distribution system throughout the Facility. At a minimum provide one 42 circuit, 100 A, 120/208V UPS panelboard on each floor of the Facility. Provide additional panelboards as required to meet the requirements within this section. Each UPS panelboard shall serve an area no greater than 1600m2.

7.7.6.1(5) Provide an additional UPS system dedicated to the Operating Rooms, ICU beds and Emergency Department Trauma Rooms. The UPS will have a dedicated capacity of 50kVA for the Operating Rooms and 20kVA for the ICU and Trauma Rooms. This UPS will be capable of running on batteries at full load for a minimum of 30 minutes. Coordinate with the Authority to determine which equipment is to be supplied with UPS power. Provide this UPS to meet the requirements of Section 7.7.6.2. Locate this UPS within the same fire compartment and within 25m of the OR suite.

7.7.6.2 Performance Criteria

7.7.6.2(1) The UPS system will be certified as suitable for post-disaster facility.

7.7.6.2(2) Connect UPS units to vital power.

7.7.6.2(3) Each UPS system will have:

7.7.6.2(3)(a) external maintenance bypass switch for servicing;

7.7.6.2(3)(b) fully rated internal static bypass switch to bypass UPS in the event of UPS failure;

7.7.6.2(3)(c) fully redundant UPS bypass breaker arrangement; and

7.7.6.2(3)(d) two battery strings (fully redundant batteries), each with an individual battery monitoring system.

7.7.6.2(4) Provide adequate batteries rated for a minimum of 15 minutes at full UPS capacity.

7.7.6.2(5) Provide an audible warning in the OR Care Team Station, Energy Centre, Protection Services, Switchboard, EOC, SER, and PER to indicate that the UPS battery supply has less than ten minutes of power remaining. Provide adequate labelling.

7.7.6.2(6) Provide monitoring of all alarm and trouble conditions of the UPS systems by the BMS.

7.7.6.2(7) The UPS will be capable of providing adequate fault clearing current for a 100A circuit breaker without operation of the static bypass switch.

7.7.6.2(8) The UPS utilisation voltage will be 120V, however the UPS system may operate at 208V, 480V or 600V.

7.7.7 Distribution Equipment – 600 Volts and below

7.7.7.1 Basic Requirements

7.7.7.1(1) Provide electrical power transmission and distribution from the main sources of supply to meet all requirements of the Facility and the Clinical Specifications. Provide electrical equipment to establish a building distribution voltage of 600V.

7.7.7.1(2) Provide two normal power main service transformers complete with a switching arrangement so that if one transformer fails, the other transformer (by manual switching) will continue servicing all loads connected to the failed transformer. Size the main transformers and distribution system such that each transformer is capable of carrying the entire Facility load plus 50% spare capacity

7.7.7.1(3) Provide rackable power circuit breakers for all circuit breakers upstream of the transfer switches. Provide motorized operators on these circuit breakers to reduce the arc flash exposure hazard.

7.7.7.1(4) Provide three independent sets of spare ducts, each capable of extending a 600V, 800A service to remote buildings outside of the facility. Each set of ducts will comprise a normal, vital and delayed vital feeder. Conditional power will be derived at the remote building by means of a tie-switch arrangement between normal and delayed vital power. Ducts will extend from the 600V switchgear pullpits to locations determined by the Authority upon review of the proposed Master Site Plan. Each set of ducts will extend beyond the Facility footprint in a concrete encased ductbank to a suitably sized power manhole for future connection by others. Each ductbank will also contain six spare 53 mm ducts for communication cables serving future buildings. These communication ducts will be installed between the PER and exterior communications manholes.

7.7.7.1(5) In accordance with Appendix 2C [Energy], separate the Facility electrical loads into ‘metered electrical components’ and ‘non-metered electrical components’. Provide dedicated panelboards, motor control centres, distribution centres, feeders and circuit

breakers as necessary to segregate the electrical loads and facilitate the metering requirements.

7.7.7.1(6) The CRGH NI Admin Building is presently fed from CRGH #2 Electrical Room. Replace this existing 120/208V 3P, 4W 150A service with a new delayed vital power feeder from the new Facility.

7.7.7.2 Performance Criteria

7.7.7.2(1) Protect the main electrical room from ground water infiltration and separate it from plumbing and mechanical equipment. Provide raised housekeeping pads, drainage and sump pumps (on vital power) as required in electrical service areas to mitigate the risk of flooding. Design the electrical room to be readily accessible, secure, well ventilated and free of corrosive or explosive fumes, gases or any flammable material. Establish routes clear of obstruction to and from the electrical room which facilitate the addition and removal of the largest current and future components located within the room.

7.7.7.2(2) Locate major electrical equipment to minimize run length of feeders and branch circuits, and locate within the Facility so as to provide a clean, dry, safe, accessible installation protected from unauthorized access.

7.7.7.2(3) Locate and design electrical equipment for ease of maintenance and with due regard for future expansion and renovation.

7.7.7.2(4) Provide all circuit breakers 150A and larger with electronic trips and LSI field adjustable settings.

7.7.7.2(5) Provide a ground fault protection scheme such that ground faults are selective between the transformer and generator main circuit breakers and the downstream breakers sized 200A and larger.

7.7.7.2(6) Install 120/208V dry type transformers for small equipment loads in electrical rooms on concrete pads or suspend from structure. Install transformers so that removal can be facilitated without removal of any other equipment or conduit serving the room, except for luminaires.

7.7.7.2(7) All transformers will have copper windings and be rated minimum K-13. Provide areas with significant non-linear loads with transformers with a higher K-rating.

7.7.7.2(8) Rate all distribution devices to handle available fault duty at line terminals. Perform a computer generated fault study to ensure

that all devices are properly rated. All circuit breakers 150A and larger will be fully selective.

7.7.7.2(9) Design and install protection equipment so that the initial electrical installation, future additions and modifications will be fully coordinated to isolate only the faulty portion of the system.

7.7.7.2(10) Select, configure, locate and install all components of transmission and distribution systems to minimize the transmission of noise, vibration or unwanted heat into other parts of the Facility.

7.7.7.2(11) Provide a networked digital metering system to monitor and record electrical loads and quality of power in the Facility.

7.7.7.2(12) Provide power factor correction equipment within the Building to ensure the Building power factor does not fall below the threshold established for BC Hydro surcharge. Coordinate capacitors with adjustable frequency drives and other harmonic generating equipment to avoid resonance conditions.

7.7.7.2(13) Provide dedicated transformation equipment for diagnostic imaging equipment as required by the imaging equipment vendors.

7.7.7.2(14) Provide circuit breaker type panelboards fully rated to handle calculated fault current level. Series rating of breakers and panel boards is not acceptable.

7.7.7.2(15) Provide oversize neutral(s) for panel boards, feeders and branch circuiting where significant non-linear load(s) are anticipated, such as in open office and other areas with a high density of personal computers.

7.7.7.2(16) Construct flush mounted panel boards with two spare 53 mm conduits stubbed into an accessible location above the panel. Do not feed panelboard from below. All feeders must be routed down from the ceiling for top entry into the panelboard.

7.7.7.2(17) Provide electronic grade panel boards to serve electronic equipment susceptible to electrical transients.

7.7.7.2(18) Install panelboards on the same floor as the loads they serve. Per CSA Z8000-11, all panelboards will be located in electrical service rooms.

7.7.7.2(19) Do not daisy-chain the feeders to panelboard. All panelboard feeders must be dedicated.

7.7.7.2(20) Components of the electrical distribution systems in any public, clinical, administrative or staff area will have long life expectancy without perceptible deterioration and a good appearance. Design and install so as to permit easy and complete cleaning.

7.7.7.2(21) Provide individual enclosed motor starters for individual motors. Utilize motor control centers for groups of four or more motors that require individual motor starters.

7.7.7.2(22) Motor starters will be combination of magnetic MCP (Motor Circuit Protector) type with integral control power transformers, Hand-Off-Auto (HOA) or start/stop control and at least two auxiliary contacts in addition to seal-in contacts. Provide “power on” and “running” LED type indicators on each motor starter.

7.7.7.2(23) Provide combination starters for all motors 1/2 HP and larger that are not already controlled by adjustable frequency drive or include an integral control package. All motors of ½ HP or more will be 600 volt 3 phase.

7.7.7.2(24) Provide voltage transient / surge protection for the main 600V and 120/208V switchgear loads and all other panels serving sensitive electrical loads including diagnostic equipment, lab equipment and adjustable frequency drives.

7.7.7.2(25) Locations of receptacles will comply with the requirements for each program area as described in the Clinical Specifications.

7.7.8 Metering

7.7.8.1 Basic Requirements

7.7.8.1(1) Supply networked digital metering to provide detailed information about power quality and power consumption at key points throughout the Facility. Key points include: motor control centres, panelboards feeding mechanical equipment and power consumed by elevators and dedicated plug-load panelboards. Integrate information from all meters on a common software platform residing on a dedicated electrical metering server.

7.7.8.1(2) In addition to the above, provide metering as necessary to support the energy calculations required by Appendix 2C [Energy]. Integrate this metering to the Site metering system and provide custom energy consumption reports as required by the Authority.

7.7.8.1(3) Implement a networked metering system with terminals for maintenance and plant administration, and data transfer to the BMS.

7.7.8.1(4) Connect electrical demand and consumption meters to the BMS.

7.7.8.1(5) Design the digital metering system to be accessible from any Authority networked computer using appropriate software.

7.7.8.1(6) Provide to the Authority five software licenses to enable access to the Facility metering system from remote Authority sites. These licences will enable the Authority to access real time data, peak demand data, and to produce custom reports on energy consumption at the facility.

7.7.8.1(7) Provide metering which complies with Section 7.7.7.1(5). Provide monthly reports which summarise total electrical energy consumed by the regulated and non-regulated loads.

7.7.8.1(8) Include trend logging equipment sensors to comply with and fulfill energy measurement and verification requirements. Logged information will not be overwritten and will be archived.

7.7.8.1(9) Metering intervals will be 15 minutes or less.

7.7.8.1(10) All metering information and records will be accessible to Authority personnel upon request.

7.7.8.2 Performance Criteria

7.7.8.2(1) Include metering displays at all distribution switchboards at primary voltage and for each secondary distribution switchboard.

7.7.8.2(2) Design the metering system network to store historical data and with the capability to generate user configurable electronic and printed reports on demand.

7.7.8.2(3) Support the metering system by a backup power source(s), which ensures operation when the metered circuit is de-energized. The metering system will not be dependent on power from the metered circuit for its operation.

7.7.8.2(4) The metering system will, at a minimum, provide the following information about each metered circuit: Phase-to-Phase Voltage (all phases), Line-to-Neutral Voltage (all phases), Phase Current (all phases and neutral), KW, KVA, Power Factor, KWH, VAR hours.

7.7.8.2(5) Utilize power quality type meters for monitoring harmonics and surges / sags. Provide power quality meters capable of monitoring harmonics on the normal, vital, delayed vital, conditional and UPS switchboards.

7.7.9 Grounding and Bonding

7.7.9.1 Basic Requirements

7.7.9.1(1) Provide grounding and bonding for all electrical equipment and systems in the Facility for the safety of people and for protection against damage to equipment or property in the case of a fault occurring in any of the equipment or systems. Install grounding and boding as required by all applicable standards.

7.7.9.1(2) Provide supplementary grounding per CSA Z32 in areas identified by the Authority as patient care areas.

7.7.9.2 Performance Criteria

7.7.9.2(1) Utilize non-alloyed copper for all conductors and all conducting components of electrical equipment which form part of the grounding and bonding systems in the Facility.

7.7.9.2(2) Provide solid system grounding including conductors and bussing.

7.7.9.2(3) Provide a minimum #12 copper bonding conductor in each and every conduit or raceway. Provide a #6 copper bonding conductor on each communications tray and ensure each section of the tray is securely bonded.

7.7.9.2(4) Provide equipotential grounding systems and equipment for all patient care areas. Provide a #6 AWG copper bond from the panelboard to each room reference ground bus RRGB in each patient care area. RRGB will be located in a flush mounted enclosure, installed below the ceiling on the left hand side of the door upon entering the room. All branch circuits serving the patient care area will be routed through the RRGB enclosure. Provide a stainless steel cover over the enclosure with an identification label on it.

7.7.9.2(5) Bond all exposed non-current carrying components of communication, radio or television equipment in patient care areas to ground using a properly sized equipment bonding conductor. Uniquely identify each bonding conductor at each end.

7.7.9.2(6) Complete a lightning protection study for the Facility, such study to be done by a specialist in lightning protection work and to be signed and sealed by a professional engineer registered in British Columbia. Implement a lightning protection study on any risk value of 4 or higher, as defined by CAN/CSA B72. Provide lightning protection if required by study.

7.7.10 Seismic Requirements for Electrical Systems

7.7.10.1 Basic Requirements

7.7.10.1(1) Provide seismic restraint for all electrical equipment and components of electrical systems. Design the electrical systems and its associated equipment to comply with the BC Building Code for a post-disaster facility.

7.7.10.1(2) Provide seismic restraint systems and methods that facilitate ease of maintenance and ease of replacement and reconfiguration of electrical equipment and systems and other equipment and building components.

7.7.10.1(3) Provide seismic restraint systems and methods that coordinate with the Facility's architecture and finishes. Wherever practicable, conceal components of seismic restraints from public view. Where concealment is not practicable, provide systems that complement the Facility's architecture and finishes.

7.7.10.2 Performance Criteria

7.7.10.2(1) Provide seismic support for all electrical equipment and components of electrical systems that have the potential to cause injury or damage during or following a seismic event.

7.7.10.2(2) Use seismic restraint systems that are designed by a professional engineer, registered in British Columbia, or, where an identified pre-designed standard restraint device or system exists for a particular item, that equipment may be used provided that written confirmation of its acceptability for the installation is provided by a professional engineer registered in British Columbia. Provide signed and sealed drawings as well as typewritten field reports from a professional seismic engineer, registered in British Columbia. Obtain certification of the main electrical distribution equipment for "seismic withstand capability" and, to maintain the certification, anchor such equipment according to the manufacturer's instructions.

7.7.11 Power Quality

7.7.11.1 Basic Requirements

7.7.11.1(1) Establish and maintain an overall power quality which assures suitable conditions for operation of all electrical and electronic equipment throughout the Facility.

7.7.11.1(2) Provide equipment and systems which assure that electrical equipment and systems will not be harmed or impaired either by external events or conditions, such as lightning and disturbances on the utility service, or by internal events or conditions generated within the Facility.

7.7.11.1(3) Meet or exceed relevant standards for power quality where deemed necessary by the Authority and IEEE.

7.7.11.1(4) Provide harmonic mitigation equipment, as necessary, to ensure that power quality meets or exceeds recommendations in IEEE, including standard 519. For the purposes of measuring the harmonic distortion, the “Point of Common Coupling” will be any of the three main transformers. As part of commissioning, confirm compliance to tables 10-2 and 10-3 of IEEE 519 by field measurements after building occupancy and under normal operating conditions.

7.7.11.1(5) Provide individual harmonic filters ahead of and coordinated with variable speed drive for every motor greater than 7.5 HP.

7.7.11.2 Performance Criteria

7.7.11.2(1) Provide equipment, such as filters, TVSS (Transient Voltage Surge Suppression), etc, specifically designed to control and remove all adverse power quality conditions that could damage or impair function of sensitive electronic equipment used in the Facility. Adverse power quality conditions include voltage spikes, dips and droops, transients, harmonics, power factor and radio frequency interference.

7.7.11.2(2) Provide the ability to demonstrate to the Authority at any time that there are no potentially harmful power conditions present and that equipment intended to guard against such conditions is in proper working order.

7.7.12 Lighting

7.7.12.1 Basic Requirements

7.7.12.1(1) The lighting installed will meet the requirements of the Clinical Specifications.

7.7.12.1(2) Lighting systems will accommodate the needs of Facility staff, patients and visitors, and will support the visual tasks being performed and the desired appearance of the space.

7.7.12.1(3) Provide complete lighting solutions which align with the requirements and recommendations of section 4 of IESNA-RP29-06. Illuminance levels and design criteria will be consistent with IESNA RP-29-06 tables 3A and 3B

7.7.12.1(4) Provide lighting controls with flexibility to adjust lighting to suit functions and activities and permit simple and integrated control of lighting. Design controls to be easily operated and conveniently and appropriately located for each area and function.

7.7.12.1(5) Lighting controls will comprise a significant part both of the energy management of the Facility and of the flexibility required to adjust lighting to suit functions and activities.

7.7.12.1(6) Provide luminaires which are easily maintainable (accessible components, quick change capability).

7.7.12.1(7) In patient treatment areas, related patient care support spaces and anywhere the Authority would use chemical cleaning for infection control purposes, provide luminaires which minimise accumulation of dust and debris and support Authority's infection control policies and procedures. Provide and locate luminaires such that they are easily cleaned and of suitable construction to withstand chemical cleaning. The Authority Policies related to infection control will not apply to luminaries in administrative areas, non-patient care support spaces (stores, technical/service spaces, lobbies, cafeterias, stairwells etc.), public spaces, non-sterile corridors and the Facility exterior.

7.7.12.1(8) An electrically powered "Laser In Use" sign will be located outside the procedure room in the NICU. The sign will be connected to an internally illuminated switch inside the room label "Laser". The switch will be interlocked with the laser equipment such that the equipment will not operate with the switch in the "off" position. Internal illumination of the switch will be on only when the "Laser in Use" sign is illuminated.

7.7.12.1(9) An electrically powered "X-ray In Use" sign will be located outside any room in which fixed x-ray equipment is anticipated to be used. The sign will be connected to an internally illuminated switch inside the room label "X-ray". The switch will be interlocked with the x-ray equipment such that the equipment will not operate with the switch in the "off" position. Internal illumination of the switch will be on only when the "X-ray in Use" sign is illuminated.

7.7.12.1(10) Provide all required lighting for the Heliport. This includes general lighting and all aviation/navigation lighting. Refer to Section 4.5.

7.7.12.2 Performance Criteria

7.7.12.2(1) Provide luminaires that require minimal cleaning and permit practical and easy access and disassembly. All lighting components will be hospital grade.

7.7.12.2(2) The use of LED lighting is encouraged. Where LED is not used, utilize fluorescent lighting. The use of compact fluorescent lighting for decorative purposes will be kept to a minimum. Use high efficiency electronic fluorescent linear T8 and T5 lamps when possible. Do not use incandescent lighting unless otherwise indicated in this Schedule.

7.7.12.2(3) Utilize premium grade quality luminaires with emphasis on energy efficiency (69 lumens/watt minimum) and high color rendition (.80 color rendering index minimum for fluorescent fixtures and .70 for metal halide lamps). Where achieving the energy efficiency specified in this Section is not feasible due to functional constraints imposed by the task being performed by the luminaire, the luminaire will be exempt from the energy efficiency requirement. Examples of luminaires that are exempt from the energy efficiency requirement include:

7.7.12.2(3)(a) wall sconces (used for night-time illumination);

7.7.12.2(3)(b) medical procedure luminaires;

7.7.12.2(3)(c) vandal resistant luminaires; and

7.7.12.2(3)(d) task lighting.

7.7.12.2(4) Lamps will have a colour temperature of 3500K.

7.7.12.2(5) All exterior lighting will have a colour temperature of 4100K.

7.7.12.2(6) Exterior lighting including street lighting, pathway, building perimeter and parkade will be low glare LED type with full cut off photometrics.

7.7.12.2(7) Utilize program start electronic ballasts for fluorescent lamps with a THD of 10% and no more than 8% for third harmonic. Power factor will be .98 or greater and efficiency will be 90% or higher. Ballasts will be supplied by an established vendor with minimum 10 years history of serving the healthcare sector in North America, and manufactured in a facility certified to ISO9002.

7.7.12.2(8) Minimize use of battery-operated unit emergency lighting. Battery-operated emergency lighting may be an acceptable alternative as

a second level of emergency lighting in areas including inpatient areas, emergency power distribution rooms, and mechanical areas.

7.7.12.2(9) Connect lighting in critical care rooms to the UPS system.

7.7.12.2(10) Utilize low glare, recessed indirect LED or fluorescent luminaries specifically design to eliminate indirect glare in treatment rooms, offices, reception areas, care team stations and other areas where computer terminals and similar screens are available.

7.7.12.2(11) Design lighting in corridors to limit glare to patients being transported on stretchers.

7.7.12.2(12) Provide sconce lighting in inpatient area corridors for glare-free, low level, night time illumination.

7.7.12.2(13) Provide recessed, adjustable overbed patient exam lights, with a remote or a wand, located in the ceiling at the foot of the bed with the light direction toward the head of the bed. For a representative example, refer to http://www.healthcare-lighting.com/assets/brochures/2012-cut-sheets/ceiling/ldr-led.pdf. Refer to the Clinical Specifications for the required locations of such recessed, adjustable overbed patient exam lights;

7.7.12.2(14) Provide separate lighting control for each of the following areas within each patient room:

7.7.12.2(14)(a) Entry (locate control at entry);

7.7.12.2(14)(b) Handwash sink (locate control at handwash sink);

7.7.12.2(14)(c) Recessed overbed patient exam lights and recessed adjustable patient exam lights (locate control at headwall);

7.7.12.2(14)(d) Patient Reading Light (locate control at headwall and via Smartbed);

7.7.12.2(14)(e) Patient Area (locate 3-way lighting control at entry/headwall);

7.7.12.2(14)(f) Family Area (locate 3-way lighting control at entry/family zone);

7.7.12.2(14)(g) Washroom (locate control at washroom); and

7.7.12.2(14)(h) Night Lights (locate one switch at entry).

7.7.12.2(15) Provide two nightlights in patient rooms, one above toilet and the other along the walkway between the patient bed and washroom.

7.7.12.2(16) Design lighting in technology conference rooms and video conferencing facilities to maximize viewing of monitors and screens and provide suitable illumination of people being viewed.

7.7.12.2(17) Provide special task lighting designed for the types of procedures conducted for rooms and areas where treatment is provided and rooms and areas where specialized analytical or diagnostic work is carried out.

7.7.12.2(18) Provide dimmable lighting in Medical Imaging Rooms and Radiology Reading Rooms.

7.7.12.2(19) Provide ceiling mounted articulated lighting with dimmable controls in all procedure, exam and treatment rooms. Confirm lighting requirements with the Authority.

7.7.12.2(20) Provide ceiling mounted double headed articulated surgical lighting with integrated controls in the surgical suite and autopsy suite. Confirm lighting requirements with the Authority.

7.7.12.2(21) As architectural features, design lighting in main lobbies, waiting areas and the main entrance with high quality products aesthetically pleasing to the public and staff.

7.7.12.2(22) Utilize vandal resistant and dark sky compliant exterior luminaires. All luminaires will be either ceramic metal halide or LED type.

7.7.12.2(23) Utilize LED type exit signs.

7.7.12.2(24) Utilize lighting controls that comprise of a networked low voltage relay switching system with programmed ON/OFF operation and local manual override capabilities for corridor lighting levels. Provide local control from care team stations and reception desks where applicable.

7.7.12.2(25) Protect lighting controls from unauthorized operation when required to be located in areas accessible to the public.

7.7.12.2(26) Design all lighting in public and administration areas to be capable of being switched from a central location.

7.7.12.2(27) In open areas and common areas, zone and subdivide lighting to permit energy management and appropriate control and variation of light levels.

7.7.12.2(28) Provide local lighting control for each treatment room. Each room will have 2 or more levels of illumination in addition to the off position unless specified otherwise. Lighting will support the clinical functions being performed.

7.7.12.2(29) Integrate controls in technology conference rooms, videoconference rooms and meeting rooms with equipment controls and control stations in the room so as to permit the conference manager to vary the lighting as required for different activities. Provide a minimum of 2 levels of lighting control.

7.7.12.2(30) Provide manually operated lighting controls of a type, which can be completely cleaned and disinfected without requiring any disassembly, and which will not deteriorate or be otherwise adversely affected by frequent cleaning and disinfection.

7.7.12.2(31) Install specifically rated lighting controls for the application/condition in locations where they may be subjected to excessive moisture or to chemicals that might cause deterioration.

7.7.12.2(32) Utilize occupancy sensors and daylight control systems to maintain light levels at appropriate levels based upon the occupancy of the room and the quantity of daylight. This will include dual technology occupancy sensors in offices, meeting rooms, restrooms, support spaces, and storage rooms and daylight control systems at perimeter rooms where daylight contribution is significant. Occupancy sensors will have manual override capability to enable full control by occupant.

7.7.12.2(33) Provide a time clock, photocell and contactors with HOA switch for control of site lighting. Submit a control plan to the Authority for approval.

7.7.12.2(34) Interface the lighting control system with the BMS for the purpose of implementing energy management schemes.

7.7.13 Mechanical Equipment Connections

7.7.13.1 Basic Requirements

7.7.13.1(1) Provide electrical power control and monitoring connections to all mechanical equipment as required for proper operation, protection and maintenance of the equipment. Materials and installation methods will result in safe, reliable and serviceable mechanical equipment and systems in the Facility.

7.7.13.2 Performance Criteria

7.7.13.2(1) Utilize institutional or industrial quality cables, connectors, conduit systems, fittings and hardware used to make connection to mechanical equipment so as to provide for high levels of reliability, durability and ease of maintenance of the equipment.

7.7.13.2(2) Design connections made to motors and/or motor driven equipment or equipment with noticeable levels of vibration to accommodate the vibration.

7.7.13.2(3) Design connections to mechanical equipment to easily permit removal and replacement of the equipment.

7.7.13.2(4) Size motor control centres, main feeders to motor control centres, and mechanical distribution centres to accommodate the current mechanical equipment with an additional 50% spare capacity.

7.7.13.2(5) Utilize motor control centres when four 3-phase motors that require a starter are located within 50 m of each other.

7.7.14 Specialty Systems

7.7.14.1 Basic Requirements

7.7.14.1(1) Special electrical and communications systems are required in the Facility (as described in this Schedule) and form essential parts of the Facility. Provide power supply, specially conditioned power and communication conduits and other electrical operational support equipment to meet all requirements of these special electrical and electronic systems.

7.7.14.2 Performance Criteria

7.7.14.2(1) Utilize institutional or industrial quality cables, connectors, conduit systems, fittings and hardware to make connection to special equipment and to provide for high levels of reliability, durability and ease of maintenance of the equipment.

7.7.14.2(2) Provide connections to special equipment that easily permit removal and replacement of the equipment.

7.7.15 Clock System

7.7.15.1 Basic Requirements

7.7.15.1(1) Provide a synchronized wireless clock system to assure accurate consistent time is available at key control and clinical spaces in the Facility.

7.7.15.1(2) Supply master time controllers and all clocks by a recognized industry leader with all components by the same manufacturer.

7.7.15.2 Performance Criteria

7.7.15.2(1) Install battery-operated analog type synchronized clocks that will receive correction signals from the master clock. Use batteries rated to last a minimum of 5 years.

7.7.15.2(2) Provide synchronized clocks minimum 300 mm in diameter with sweeping second hand and 24 hour numbering. Numbering will include hours 1-12 in large numbers on outer ring and hours 13-24 in smaller numbers on inner ring.

7.7.15.2(3) Locate synchronized analog clocks in areas including:

7.7.15.2(3)(a) each patient care area including treatment rooms, patient rooms, care stations, patient therapy rooms, interview/consult rooms, medication rooms, locker rooms, imaging rooms and corridors; and

7.7.15.2(3)(b) conference rooms, meeting rooms, care team stations, staff lounges, family rooms, reception desks and staff work rooms.

7.7.15.2(4) Locate synchronized digital clocks in areas including operating rooms, trauma rooms and procedure rooms.

7.7.15.2(5) Provide digital clocks that can be synchronized that will receive correction signals from the master clock. Provide UPS power to these clocks.

7.7.15.2(6) Digital clocks will display numerical values for hours, minutes and seconds, and will have the capability of displaying 12 or 24 hour time format. Displays will be highly visible and legible from a minimum 10 metres away.

7.7.15.2(7) Provide local satellite transmitters to provide signals to all clocks in the Facility where required.

7.8 Communications (Division 27)

7.8.1 Principles, Guidelines and Assumptions

7.8.1.1 Achieving the “Next Generation” electronic health record (EHR) is the ultimate goal of the Authority when it comes to gathering, storing and transmitting patient information. The intent of the EHR is to allow health care providers the ability to make more accurate, faster decisions on courses of action for patients, provide

efficiencies for staff and patients to reduce costs, and provide better privacy and security of the patient record by controlling where it is stored.

7.8.1.2 It is envisioned that all components of the next generation electronic health record will be developed and will be ready for deployment within the Facilities. This goal has implications for the degree of automation of workflow, integration of systems and devices and overall reliance on the information system infrastructure that need to be supported.

7.8.1.3 The Authority's primary health care information system software application package is Cerner. The Cerner system is the primary integration point for several categories of integrated systems/devices including communication/alerting systems, RTLS (asset, patient and staff tracking) life safety systems and others. Cerner defines specific interface specifications that Project Co will be responsible to provide.

7.8.1.4 Most applications will be hosted on servers located at a remote data centre. Some applications may be hosted locally within the Facility. The local data centre, any applications/systems installed therein and the processes for maintenance of said systems are all subject to the Authority's defined standards/requirements outlined in this Schedule and the appendices.

7.8.1.5 The management of all the Authority's employees' and patients' information is the responsibility of the Authority.

7.8.1.6 Except as expressly stated otherwise Project Co will be responsible for designing and constructing all required infrastructure, servers and software required to support the communication systems to be included within the facility.

7.8.2 Basic Requirements

7.8.2.1 The communications systems in the Facility will be an extension of the Authority's communications systems, and must meet all of the Authority's standards at the time of procurement. Project Co will ensure that all new technology, systems, and equipment are fully compatible and seamlessly interfaced with the existing systems and equipment used at the Authority.

7.8.2.2 All applications used in the Facility for clinical purposes will be provided by the Authority. ProjectCo will provide all communication infrastructure necessary to support, interface, and integrate these systems.

7.8.2.3 The communications systems will be proven technology for use in facilities similar to the Facility.

7.8.2.4 All communications systems infrastructure and equipment provided by Project Co and not covered by existing Authority standards will be the latest proven version of the equipment at the time of procurement.

7.8.2.5 Communication systems utilized in the Facility consist of multiple tiers of technical infrastructure and services applied in support of both clinical and non-clinical Authority services.

7.8.3 IMIT Systems and Equipment Categorization and Responsibilities

7.8.3.1 This Schedule sets out requirements for information technology and information management systems on a system by system basis. For each system, Construction Period and Operating Period responsibilities for Software and Server, Infrastructure and Interface with Authority systems are set out by category. The following definitions are used:

7.8.3.1(1) "**Category A IMIT**" means the items described in this Schedule as IMIT Category A;

7.8.3.1(2) "**Category B IMIT**" means the items described in this Schedule as IMIT Category B;

7.8.3.1(3) "**Category C IMIT**" means the items described in this Schedule as IMIT Category C;

7.8.3.1(4) "**Category D IMIT**" means the items described in this Schedule as IMIT Category D;

7.8.3.1(5) "**Category E IMIT**" means the items described in this Schedule as IMIT Category E".

7.8.3.1(6) "**End User Administration**" means the day to day end-user configuration required to effectively use an application, including set up of end-user devices, but does not limit the obligations of the party responsible for Software and Server Installation, Interfacing, Commissioning, Maintenance, Renewal or Replacement.

7.8.3.1(7) "**IMIT Systems and Equipment**" means collectively the Category A IMIT, Category B IMIT, Category C IMIT, Category D IMIT and Category E IMIT;

7.8.3.1(8) "**Infrastructure**" means everything required to support an IMIT System except for the required Software and Server(s);

7.8.3.1(9) "**Integrate**" and "**Integration**" mean the combining of software or hardware components or both into an overall system that must be able to physically connect via a standards based Interface to Authority systems if required to pass information, status, or extend system functionality.

7.8.3.1(10) "**Interface**" means the physical infrastructure, system components, software application development, configuration, messaging

standards, commissioning and testing necessary to perform data interchange between separate systems. Interfacing of systems will be provided to achieve the integration of systems which supports the overall clinical, operational and technical functional requirements. For each IMIT system required for the Facility, this Schedule sets out a non-exhaustive list of other systems with which the system must interface with in order to achieve the technical, performance and functional requirements specified within this Schedule for the purposes of integrating into a complete system.

7.8.3.1(11) "**Server**": a server is a computer that provides hosting services for one or more applications including also acting as a data repository. Servers typically have additional processing capacity, memory, and data storage availability than basic or home computers. These requests between clients and servers are usually transported via standard TCP/IP network connectivity. Examples of server roles within the Authority include: authentication servers, application hosting, data repository servers, web servers, utility servers, building operation and life safety servers.

7.8.3.1(12) "**Service Level**" means the service level requirements set out in Appendix 3F(vi) [VIHA IMIT Technologies Standards];

7.8.3.1(13) "**Software**": also known as applications, software's role is to execute computer based instructions resulting in defined outputs supporting the Authority's end user's business and clinical workflow requirements including building control and life safety systems, Software is grouped into two general categories: application based software and operating system software (including operating and related utilities). Samples of application based software within the Authority include: Cerner, Meditech, Oracle Databases and Microsoft Office suites. Samples of operating systems and related software utilities include HP Unix, Redhat Linux, Microsoft Server 2008, SCCM, SCOM and Symantec Backups and Antivirus systems.

7.8.3.1(14) "**System Lifecycle**" means the time periods from Facility Completion following which Project Co is required to renew or replace the applicable IMIT System and Equipment as set out in this Schedule and Section 3.8 of Appendix 4C [FM Services].

7.8.3.2 A summary of responsibilities for IMIT Systems and Equipment, including categorization of responsibility for Software and Server, Infrastructure and Interface, and including Operating Period responsibilities is included in Appendix 3F(v) [Information System Responsibilities Summary].

7.8.3.3 Project Co will be responsible for integrating all IMIT Systems and Equipment in accordance with Good Industry Practice with the overall design of the Facility and will include such IMIT Systems and Equipment as part of the design development process described in Section 5.3 of Schedule 2 [Design and Construction Protocols].

7.8.3.4 Responsibilities for IMIT Categories A, B, C, D and E are as follows:

7.8.3.4(1) Category A IMIT

7.8.3.4(1)(a) Project Co will be responsible for Procurement, Delivery, Storage, Setup, Installation, Interfacing, Commissioning, Maintenance, renewal and replacement;

7.8.3.4(2) Category B IMIT

7.8.3.4(2)(a) Project Co will be responsible for Procurement, Delivery, Storage, Setup, Installation, Interfacing, Commissioning and Maintenance;

7.8.3.4(2)(b) the Authority will be responsible for renewal and replacement;

7.8.3.4(3) Category C IMIT Equipment

7.8.3.4(3)(a) the Authority will be responsible for Procurement, Delivery, Storage, Setup, Installation, Interfacing, Commissioning, Maintenance, renewal and replacement;

7.8.3.4(4) Category D IMIT Equipment

7.8.3.4(4)(a) Project Co will be responsible for Storage, Setup, Installation, Interfacing and Commissioning; and

7.8.3.4(4)(b) the Authority will be responsible for Procurement, Delivery, Maintenance, renewal and replacement;

7.8.3.4(5) Category E IMIT Equipment

7.8.3.4(5)(a) Project Co will be responsible for Procurement, Delivery, Storage, Setup, Installation, Interfacing, Commissioning;

7.8.3.4(5)(b) the Authority will be responsible for Maintenance, renewal and replacement.

7.8.3.5 Application of Appendix 2D [Equipment and Furniture]

7.8.3.5(1) Section 3 (other than Sections 3.5 to 3.22) of Appendix 2D [Equipment and Furniture] will apply to all Category A IMIT, Category B IMIT and Category E IMIT to the same extent such sections apply to Project Co Procured Equipment, provided that Project Co will be responsible for all costs associated with performance of all obligations related to such categories of IMIT Systems and Equipment (including payment of the purchase price) without payment or reimbursement from the Authority.

7.8.3.5(2) Systems described in this Schedule may also have components and equipment that are listed on the Equipment List, to which Appendix 2D [Equipment and Furniture] applies.

7.8.4 IMIT Design and Construction Responsibility

7.8.4.1 System Design and Architectural Review Board

7.8.4.1(1) Project Co will design all IMIT Systems and Equipment in conformance with the applicable industry telecommunications standards plus the Authority technical standards and integration, interfacing, performance and quality requirements as described in this Schedule and the Appendices to this Schedule. In the event of any conflict between standards, the more stringent requirement will apply.

7.8.4.1(2) All systems that will be Integrated with, or that Interface with the Authority's systems must be reviewed and approval by ARB under the terms of Appendix 3F(viii) [Architectural Review Board] prior to development/implementation of the systems.

7.8.4.2 System Procurement

7.8.4.2(1) If a system procured for use in the Facility represents a net new addition to the overall Authority systems inventory, Project Co will ensure that any contract it enters into for that system includes provisions:

7.8.4.2(1)(a) permitting assignment of the contract to the Authority on the same terms and conditions as included in the contract between Project Co and the system vendor; and

7.8.4.2(1)(b) allowing use of the system to be expanded beyond the Facility to other Authority sites provided the associated increase of scope charges are paid;

7.8.4.2(2) Project Co will ensure that all of its contracts for supply of IMIT Systems and Equipment:

7.8.4.2(2)(a) have a defined service level commitment that supports the Authority service level expectation as detailed in this Schedule; and

7.8.4.2(2)(b) have a privacy and security schedule that aligns with the British Columbia Freedom of Information and Protection of Privacy Act / Personal Information Protection and Electronic Documents Act legislation as applicable;

7.8.4.2(3) Applications, software modules and any related software installed, operated or used by Project Co must not interfere with the operation or performance of, or reduce the security or privacy of, any Authority applications or equipment.

7.8.4.3 System Development/Implementation

7.8.4.3(1) For development and implementation of all systems that will be Integrated with, or that Interface with the Authority's systems, Project Co will comply with Appendix 3F(ix) [Change Management Procedure].

7.8.5 Telecommunications Infrastructure

7.8.5.1 Basic Requirements

7.8.5.1(1) Physical network design and installation by Project Co will have high availability and security that meets or exceeds the industry standard for use in and support of acute care hospital applications.

7.8.5.1(2) The following network separation will be provided in the Facility:

7.8.5.1(2)(a) the Authority's network (data, voice, video);

7.8.5.1(2)(b) patient monitoring systems;

7.8.5.1(2)(c) the BMS;

7.8.5.1(2)(d) nurse call system;

7.8.5.1(2)(e) patient entertainment; and

7.8.5.1(2)(f) RTLS system.

7.8.5.1(3) Project Co will consult with the Authority and meet all of the Authority's policies and standards for all connections to the Authority's data, voice or video networks. The above list is indicative only and does not limit Project Co's obligation to provide all physical networks required for the Facility.

7.8.5.1(4) Provide systems which promote operational efficiency and integrate systems where this integration provides efficiency and operational and cost advantages.

7.8.5.1(5) The communications systems will accommodate all media types, including data, voice, video and public address.

7.8.5.1(6) Train the Authority's IM/IT specialist(s) on configuration/setup and testing of the communication systems equipment in the Facility.

7.8.5.1(7) Design and install equipment and infrastructure to remain operational during and after disasters.

7.8.5.1(8) Provide all necessary infrastructure, including power, pathways, conduits, spaces and structured cabling, to support UBC's clinical academic program as outlined in Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications].

7.8.5.2 Performance Criteria

7.8.5.2(1) Provide infrastructure for the communications network as detailed in Appendix 3F(i) [Cable Infrastructure Standard].

7.8.5.2(2) IP Protocol will be used for data, voice, and video network based equipment. Telecom equipment will be a mix of VoIP, and analog equipment.

7.8.5.2(3) All network protocols will be IPV4 compatible.

7.8.5.2(4) Project Co will maintain the manufacturer's warranties on all communications systems equipment and ensure that the warranties are assignable to the Authority.

7.8.5.2(5) All communications systems equipment provided by Project Co will support all applications run generally by the Authority, which include Cerner, PACS and Microsoft Office.

7.8.5.2(6) All networked equipment provided by Project Co intended for integration with Authority networks/systems will include any adapters necessary to integrate with the Authority's IP based network.

7.8.5.2(7) All technology systems must be approved through regular Authority processes, including but not limited to Change Management and the IM/IT architecture review board.

7.8.5.2(8) Per Appendix 3F(i) [Cable Infrastructure Standard], provide outside plant cable infrastructure to connect the Campbell River Facility's communications rooms to Yucalta Lodge (Coastal

electrical room) via physically diverse and redundant pathways. Outside plant cable infrastructure will be continuous and terminate in the existing electrical room in the Coastal Building. Project Co will perform all work (including providing all necessary parts and components) required to connect to the Authority's IMIT infrastructure in Yucalta Lodge. Project Co will terminate all fibre and copper cables as directed by the Authority. The Authority will provide the fibre patch cables for actual network connectivity and will cross connected any copper cabling.

7.8.5.2(9) Per Appendix 3F(i) [Cable Infrastructure Standard] provide outside plant cable infrastructure to connect the Campbell River Facility's communications rooms to North Island Administration Building via physically diverse and redundant pathways. Outside plant cable infrastructure will be continuous and terminate in the existing network closet in the North Island Administration Building. Project Co will perform all work (including providing all necessary parts and components) required to connect to the Authority's IMIT infrastructure in North Island Administration Building. Project Co will terminate all fibre and copper cables as directed by the Authority. The Authority will provide the fibre patch cables for actual network connectivity and will cross connect any copper cabling.

7.8.5.3 Quality Requirements

7.8.5.3(1) Project Co will:

7.8.5.3(1)(a) use the latest technology for transferring, securing, and storing information available at the date of procurement of the communications system for the Facility;

7.8.5.3(1)(b) use equipment and materials that are certified and clearly sealed by CSA or ULC or other testing agency approved and accepted by the Local Inspection Authorities;

7.8.5.3(1)(c) comply with all Appendices of this Schedule.

7.8.5.3(2) In the event of a conflict between applicable industry standards, Authority standards or this Schedule, the more stringent standard will apply.

7.8.5.4 IMIT Categorisation

7.8.5.4(1) Software and Server – IMIT Category A

7.8.5.4(2) Infrastructure – IMIT Category A

7.8.5.4(3) Interface - IMIT Category A

7.8.5.5 Interface Requirements

7.8.5.5(1) see system specific requirements

7.8.5.6 Service Level – Platinum

7.8.5.7 Systems Operation – Operating Period

7.8.5.7(1) End user administration – see system specific requirements

7.8.5.7(2) Systems Lifecycle – see system specific requirements

7.8.6 Site Utilities / Access Provider

7.8.6.1 Project Co will coordinate the design of the Facility with the Authority's access providers to achieve two physically diverse, redundant telecommunications services to the Facility. The redundant services will not share a common ductbank or fire compartment before entry into two separate entrance facilities.

7.8.6.2 For additional redundancy, the telecommunications services will originate from separate central offices.

7.8.6.3 The communications systems that will be integrated or interoperate with Authority systems will be compatible with the systems of the Authority's service providers as of the date of installation of the systems and be designed to integrate with the service providers' equipment and, as appropriate, to utilize the Authority's existing service agreements by extending them to the Facility.

7.8.7 Telecommunication Equipment Rooms

7.8.7.1 Basic Requirements

7.8.7.1(1) Project Co will provide telecommunication equipment rooms to accommodate the telecommunications infrastructure and equipment in accordance with Schedule 3, Appendix 3F(i) [Cable Infrastructure Standard] and EIA/TIA standards.

7.8.7.1(2) "Telecommunication equipment room" includes the following room types: Entrance Facility Room (EF), Primary Equipment Room (PER), Secondary Equipment Room (SER) and Telecommunication Room (TR).

7.8.7.1(3) Locate PER and SER to minimise the possibility of both rooms being adversely impacted simultaneously (including impact resulting from flood, fire, vandalism, mechanical or structural failure).

7.8.7.1(4) Minimum design requirements for the telecommunication equipment rooms will comply with EIA/TIA-1179. Provide and size telecommunication equipment rooms to accommodate the telecommunications requirements of the Facility, including all required equipment racks, cabling systems and all active and passive network equipment, devices and infrastructure.

7.8.7.1(5) Provide all structured cabling between all telecommunication equipment rooms as detailed in Appendix 3F(i) [Cable Infrastructure Standard].

7.8.7.1(6) Entrance Facility Room (EF) – an entrance to a building for both public and private service cables including the entrance point of the building and continuing to the entrance room. The Entrance Facility Room accommodates the joining of inter and intra building telecommunications backbone facilities.

7.8.7.1(7) Provide two EFs (EF-A and EF-B) to accommodate the two physically diverse, redundant telecommunications services to the Facility.

7.8.7.1(8) Locate EF-A and EF-B to minimise the possibility of both rooms being adversely impacted simultaneously (including impact resulting from flood, fire, vandalism, mechanical or structural failure).

7.8.7.1(9) All telecommunication equipment rooms must provide sufficient redundant cooling capacity to permit all racks to be fully populated with a total load of 6KW of conditioned power per rack.

7.8.7.1(10) All telecommunication equipment rooms must provide a minimum of 6kw of fully redundant power from both the UPS and conditional power systems to each rack.

7.8.7.1(11) Primary Equipment Room (PER)

7.8.7.1(11)(a) Primary Equipment Room (PER) will host Authority network equipment and Authority servers. The PER will be designated as a ANSI/TIA-942 Tier Level 2 Data Center.

7.8.7.1(11)(b) No horizontal cabling to telecommunication outlets located outside of the PER will terminate in the PER.

7.8.7.1(11)(c) The PER will be equipped with a minimum of 10 server racks and 2 network racks at 50 sq ft per rack or 600 sq ft of floor space.

7.8.7.1(12) Secondary Equipment Room (SER)

7.8.7.1(12)(a) Secondary Equipment Rooms (SER) will host Authority and Project Co network equipment, and Project Co and third party servers. The SER will be designated as a ANSI/TIA-942 Tier Level 2 Data Center.

7.8.7.1(12)(b) No horizontal cabling to telecommunication outlets located outside of the SER will terminate in the SER

7.8.7.1(12)(c) The SER will be equipped with a minimum of 5 server racks and 2 network racks at 50 sq ft per rack or 350 sq ft of floor space.

7.8.7.1(13) Telecommunications Room (TR)

7.8.7.1(13)(a) TRs will comprise enclosed architectural spaces throughout the facility to house telecommunications equipment, provide horizontal cross connects and cable terminations. Refer to Appendix 3F(i) [Cable Infrastructure Standard].

7.8.7.1(13)(b) All horizontal and riser data/voice cabling for a given floor terminates at a TR. A TR includes the relay racks and network hubs for that floor.

7.8.7.1(13)(c) TRs will only serve the floor they are located on and will minimize the distances for cable runs. TRs will provide easy access for equipment modifications and working space, and will avoid interference with other services and systems.

7.8.7.1(13)(d) The TR rooms will also support the Cisco 802.11a/b/g/n/ac wireless access points and telephones, both of which require PoE functionality and standards based QoS (Quality of Service) traffic prioritization.

7.8.7.1(13)(e) Subject to compliance with the cable distance requirements of TIA 568-B, the maximum quantity of data drops per TR is 2,400. This quantity will be logically and physically separated into two distinct groups of up to 1,200 data drops in order to accommodate the Authority's labelling and cable management requirements. The Authority will review and approve the layout and configuration of each TR.

7.8.7.1(14) End-use equipment will be connected to the TR layer 3 switch and a 10/100/1000 base T Ethernet 802.3 protocols run on Category 6 twisted pair.

7.8.7.1(15) All network ports with network devices attached will be activated. A small percentage of ports, to be used for portable equipment or on an as required basis, will be designated as active. These ports will be designated by the Authority.

7.8.7.1(16) Equipment Racks

7.8.7.1(16)(a) Multiple types of equipment rack will be installed in telecommunication rooms. These will include network racks, voice gateway, fibre termination, TR equipment racks and server racks.

7.8.7.1(16)(b) Except as noted otherwise, all racks will be provided with floor space per TIA standards.

7.8.7.1(16)(c) The voice gateway, fibre termination and TR equipment racks will be two-post types.

7.8.7.1(16)(d) The network rack and server racks will be four-post types.

7.8.7.1(16)(e) Provide one network rack in each of the PER and SER. These racks will be extra-wide to accommodate a Cisco 6500 chassis and cable management. These racks will be directly seismically anchored to the PER or SER floor.

7.8.7.1(16)(f) Each server rack requires approx 50 sq ft of floor space with a min distance of 4.5 ft from any electrical panel or outlet.

7.8.7.1(16)(g) All server racks must meet or exceed industry standard specifications with front and rear door locks, 42U in size, width=19”, Depth=39.7 “, Height=78.7”.

7.8.7.1(16)(h) All server racks, unless otherwise specified, will be mounted on seismic isolation bases. The platforms will be bolted together and seismically anchored.

7.8.7.1(16)(i) Provide each voice gateway rack and TR rack with sufficient quantity of rack mounted electronic power distribution units (ePDU) to accommodate all rack mounted equipment. ePDU’s will be designed for switching non phase synchronized AC power sources.

The ePDU will monitor both power inputs and providing a fast switch transfer from 120Vac UPS power to 120Vac Conditional power source without interruption.

7.8.7.1(16)(j) Each server rack will include redundant PDU's (Power Distribution Units) connected to separate L15-30R-208V (3 phase) circuits, one on UPS, the other on Conditional power. Each PDU will be capable of supporting C13, C14 and C19 power connections.

7.8.7.1(16)(k) Each network rack will include one ePDU and redundant PDUs, each connected to separate L21-20R 208V (3 phase) circuits, one on UPS, the other on Conditional power. The ePDU will monitor both power inputs and providing a fast switch transfer from 120Vac UPS power to 120Vac Conditional power source without interruption. Each PDU will be capable of supporting C13, C14 and C19 power connections.

7.8.7.2 IMIT Categorisation

7.8.7.2(1) Software and Server – IMIT Category A

7.8.7.2(2) Infrastructure – IMIT Category A

7.8.7.2(3) Interface - IMIT Category A

7.8.7.3 Interface Requirements

7.8.7.3(1) see system specific requirements

7.8.7.4 Service Level – Platinum

7.8.7.5 Systems Operation – Operating Period

7.8.7.5(1) End user administration – see system specific requirements

7.8.7.5(2) Systems Lifecycle – see system specific requirements

7.8.8 Structured Cabling

7.8.8.1 Basic requirements

7.8.8.1(1) All structured cabling will be designed, installed and tested in accordance with Appendix 3F(i) [Cable Infrastructure Standard].

7.8.8.1(2) The cabling infrastructure will be universal and support the networks and systems required in the Facility, including voice (VOIP and analog), data, video, RTLS, CCTV and security

systems and to allow all forms of end-use equipment, including computers, telephones, video conferencing equipment and other digital end-use equipment. access to the various IT, telecommunication, and digital video networks.

7.8.8.1(3) Appendix 3F(i) [Cable Infrastructure Standard] identifies the structured cabling required by the Authority for its own networks. Any cabling required by Project co to support its own networks will be provided in addition to that identified in Appendix 3F(i) [Cable Infrastructure Standard].

7.8.8.1(4) Project Co will cause:

7.8.8.1(4)(a) the cabling infrastructure to be designed by an RCDD;

7.8.8.1(4)(b) the RCDD to work with the Authority to complete the physical network design; and

7.8.8.1(4)(c) the RCDD to provide, as necessary, a network plan which would include the following: all active network devices, non-Authority applications, all connecting End-Use Equipment and each separate network. Project Co will assist the Authority in the network plan by supplying all necessary information to the Authority about their building network. The building network equipment is to match the network equipment specified by the Authority.

7.8.8.1(5) Project Co will provide preliminary conceptual drawings of proposed telecommunications outlet locations in advance of the first detailed room review meetings with the Authority.

7.8.8.1(6) As part of the design process described in Section 5.3 of Schedule 2 [Design and Construction Protocols], provide detailed plans including risers, rack layouts, telecommunication equipment layout, infrastructure, raceways, expansion space, elevations of telecommunication equipment room walls including IDT layouts in each of the PER, SER and TRs.

7.8.8.1(7) Create, in consultation with the Authority, an operational plan for the cable infrastructure, including a management strategy and resource requirements for maintenance.

7.8.8.1(8) Project Co will test all cable infrastructure in consultation with the Authority.

7.8.8.1(9) Provide and install a complete structured cabling solution for the Facility in accordance with Appendix 3F(i) [Cable Infrastructure Standard] and all applicable standards as detailed in Section 2.10.

7.8.8.1(10) Provide separate physical networks, in accordance with Good Industry Practice or equipment vendor specifications and in consultation with the Authority, as required for the telecommunications systems and equipment installed or used in the Facility. At a minimum, provide a separate physical network for each of the networks identified in Section 7.8.5.1(2).

7.8.8.1(11) In consultation with the Authority, design and provide physically diverse and redundant pathways between the PER, SER and TRs.

7.8.8.1(12) Telecommunication Outlets and Data Drops

7.8.8.1(12)(a) In this Schedule and the Appendices to this Schedule, the terms “telecommunication outlet”, “data outlet” and “communications outlet” are used interchangeably. Notwithstanding any standard referenced in this Schedule, all such outlets included in the Facility will:

(a).1 include a minimum of two data drops, with each “data drop” comprising a complete Category 6 structured cabling connection between the RJ45 outlet jack and the port on a network switch;

(a).2 comply with all requirements set out in Appendix 3F(i) [Cable Infrastructure Standards];

(a).3 have a minimum conduit size as defined in Section 7.7.2.1(8) serving an outlet box as defined in Section 7.7.2.3;

(a).4 include a 4 port coverplate with RJ45 jacks as required to terminate the supplied cabling, plus blank filler plates on unused outlets;

(a).5 use Category 6 termination technique. No differentiation will be made between data and voice cables.

7.8.8.1(12)(b) All horizontal cables will be terminated on GigaBIX termination hardware located in a TR. Provide harness cabling for each horizontal cable and connect through to the corresponding switch port.

7.8.8.1(12)(c) Provide a minimum of one unused data drop at each telecommunication outlet, except as noted in Section 7.8.8.1(12)(e).4.

7.8.8.1(12)(d) Project Co will, in consultation with the Authority, assign each room and space in the Facility a work area data drop density ("High", "Medium" or "Low") in accordance with the ANSI/TIA-1179 Healthcare Facility Telecommunications Cabling Standard Table 1.

Notwithstanding the quantities defined in ANSI/TIA-1179, Project Co will provide a minimum quantity of data drops as defined below:

(d).1 Low Density Work Area - provide 2-6 data drops (depending on the type of work area as defined in TIA 1179);

(d).2 Medium Density Work Area - provide 9 data drops (depending on the type of work area as defined in TIA 1179);

(d).3 High Density Work Area - provide 15 data drops;

(d).4 No Data Area - 0 data drops are required for the following TIA 1179 defined work area types: 'Janitor Closet', 'General Storage', 'Circulation Space', Alcove' and Locker Rooms / Showers' except as may be required by Section 7.7.1.2(10).

7.8.8.1(12)(e) Project Co will provide additional data drops in excess of the minimum quantity required by Section 7.8.8.1(12)(d) as required:

(e).1 to support all of the networks, systems and equipment (including the Equipment) to be installed or used in the Facility;

(e).2 to comply with Appendix 4A to Schedule 2D [Campbell River Facility Smart Hospital Requirements] and Appendix 4B to Schedule 2D [Comox Valley Facility Smart Hospital Requirements] and any other provisions of this Agreement that require data drops;

(e).3 by Good Industry Practice to provide convenience, flexibility or use and operational support throughout the Facility; and

(e).4 to ensure there is one unused data drop for each telecommunications outlet, except for wireless access points, RoomLink terminals and wall mounted telephones which do not require an unused data drop .

7.8.8.1(12)(f) Project Co will design each room in the Facility such that data drops are distributed throughout the room as required to support clinical functionality and convenient use of equipment by Facility Users and in accordance with Good Industry Practice.

7.8.8.1(13) Project Co will co-locate, at each telecommunications outlet location, an appropriate number of power outlets.

7.8.8.1(14) Terminate all cables in TRs in accordance with Section 7.8 of this Schedule and Appendix 3F(i) [Cable Infrastructure Standard].

7.8.8.1(15) The Authority will provide the analog gateways, for which Project Co will provide appropriate racks, UPS, power, cooling and connectivity in each of the PER and SER.

7.8.8.1(16) All conduit pathways will have spare capacity at least as per TIA/EIA standards and Appendix 3F(i) [Cable Infrastructure Standard]. All communications rooms will have physical floor and wall space to accommodate such expansion. For each GigaBIX cross-connect wall, provide adequate space to accommodate 50% expansion on the same and adjacent wall. Provide adequate floor space to facilitate at least 2 expansion racks to be located adjacent to required racks.

7.8.8.1(17) All ceiling spaces will have telecommunication outlets for wireless network access points, information display systems, and other ceiling mounted digital devices.

7.8.8.1(18) Follow the equipment and cabling labelling standards per 3F(i). Confirm details with the Authority prior to labelling.

7.8.8.1(19) Provide floor telecommunications outlets and floor power to connect floor mounted self-registration systems, electronic directional systems and patient education kiosks, as approved by the Authority.

7.8.8.1(20) Provide a data outlet for all public phones, minimum 1 per lobby area per department in the Facility.

7.8.8.1(21) Run category 6 network cables in a ring topology (qty 4) between each communication room (PER to SER to each TR) to accommodate the patient monitoring infrastructure required.

7.8.8.2 IMIT Categorisation

7.8.8.2(1) Software and Server – N/A

7.8.8.2(2) Infrastructure – IMIT Category A

7.8.8.2(3) Interface - IMIT Category A

7.8.8.3 Interface Requirements

7.8.8.3(1) N/A

7.8.8.4 Service Level – Gold

7.8.8.5 Systems Operation – Operating Period

7.8.8.5(1) End user administration – N/A

7.8.8.5(2) Systems Lifecycle - Not specified.

7.8.9 Equipment

7.8.9.1 Project Co's Equipment

7.8.9.1(1) Provide end-use equipment and communications equipment to provide a fully operational Facility and that Project Co may require for its own use for the performance of its obligations under this Agreement ("**Project Co's End-Use Equipment**").

7.8.9.1(2) Do not connect any of Project Co's End-Use Equipment to the Authority's network, both wired and wireless, without prior approval from the Authority. Project Co is responsible for paying any additional cost incurred by the Authority for Project Co's use of Project Co's End-Use Equipment on the Authority's network.

7.8.9.1(3) The Authority will accommodate any of Project Co's End-Use Equipment that has been approved for connection to the Authority's network.

7.8.9.1(4) Servers and related equipment for Project Co's End-Use Equipment will be located in the SER. They will not be located in TR's.

7.8.9.1(5) Any wireless devices used by Project Co will not interfere with the Authority's wireless infrastructure or devices.

7.8.9.1(6) The Authority wishes to have a single communications infrastructure but where required this infrastructure may be physically separated with approval of the Authority.

7.8.9.1(7) If Project Co elects to reside on the Authority's network, Project Co will conform to all Authority network, end-use standards and will be subject to the Authority's Total Cost of Ownership (TCO) model.

7.8.9.2 Authority's End-Use Equipment

7.8.9.2(1) The Authority will provide its own end-use equipment including:

7.8.9.2(1)(a) computer, desktop;

7.8.9.2(1)(b) computer, laptop;

7.8.9.2(1)(c) tablet PCs;

7.8.9.2(1)(d)	printer laser, multifunction;
7.8.9.2(1)(e)	photocopiers;
7.8.9.2(1)(f)	facsimile machines, general: facsimile, multifunction;
7.8.9.2(1)(g)	healthcare card readers;
7.8.9.2(1)(h)	dictation microphones;
7.8.9.2(1)(i)	scanner, barcode;
7.8.9.2(1)(j)	registration kiosks;
7.8.9.2(1)(k)	PDAs;
7.8.9.2(1)(l)	telephone, desktop, digital, multiline;
7.8.9.2(1)(m)	cart, medication with computer;
7.8.9.2(1)(n)	dispenser, medication (host) and dispenser, medication, lock module and dispenser, medication, mobile;
7.8.9.2(1)(o)	computer, barebone and computer, desktop;
7.8.9.2(1)(p)	printers, label;
7.8.9.2(1)(q)	scanner, barcode;
7.8.9.2(1)(r)	handheld computer devices;
7.8.9.2(1)(s)	monitor, blood glucose;
7.8.9.2(1)(t)	television, xxxx, flat panel;
7.8.9.2(1)(u)	bed, residential, single; bed birthing; bed, electric; bed, electric, bariatric;
7.8.9.2(1)(v)	pump, infusion, single; pump, infusion, controller, modular; pump, enteral; pump infusion, PCA;
7.8.9.2(1)(w)	device integration for real –time clinical assessment and physiological data documentation;
7.8.9.2(1)(x)	digital room signage and way-finding;
7.8.9.2(1)(y)	interactive patient station;
7.8.9.2(1)(z)	cerner connectivity engine;
7.8.9.2(1)(aa)	multifunction communication devices; and

7.8.9.2(1)(bb) telehealth clinical devices;

(collectively, the "**Authority Supplied End-Use Equipment**").

7.8.9.2(2) Project Co will:

7.8.9.2(2)(a) include the installation of the Authority Supplied End-Use Equipment as part of the Move-in Schedule;

7.8.9.2(2)(b) assist the Authority to define locations for the Authority Supplied End-Use Equipment;

7.8.9.2(2)(c) provide adequate space, infrastructure, power, and wired network data outlets for the Authority Supplied End-Use Equipment; and

7.8.9.2(2)(d) provide jack number information (on the Authority's cable information Excel spreadsheet) to the Authority to facilitate placement of the Authority Supplied End-Use Equipment.

7.8.10 Authority Network

7.8.10.1 Basic Requirements

7.8.10.1(1) For the Authority's network and patient monitoring network, the Authority will:

7.8.10.1(1)(a) provide to Project Co network switches for installation by Project Co;

7.8.10.1(1)(b) complete all logical network design (excluding structured cabling) and network equipment programming and configuration; and

7.8.10.1(1)(c) be responsible for all network management licensing.

7.8.10.1(2) For the Authority's network and patient monitoring network, Project Co will:

7.8.10.1(2)(a) install all network switches and connect harness cabling; and

7.8.10.1(2)(b) complete all physical network design and provide all structured cabling.

7.8.10.1(3) For all other networks required in the Facility, Project Co will:

7.8.10.1(3)(a) provide all required network equipment, including network switches;

7.8.10.1(3)(b) in consultation with the Authority, complete the logical network design and program and configure all network equipment;

7.8.10.1(3)(c) be responsible for all network management licensing; and

7.8.10.1(3)(d) locate network and other equipment in the SER or TRs.

7.8.10.1(4) For all of the networks described above, Project Co will mount and connect all network switches, harness cables, and cross connect and test all network equipment and cable infrastructure per Appendix 3F(i) [Cable Infrastructure Standard] in consultation with the Authority.

7.8.10.1(5) Project Co will provide and install harness cables for all network switches for all networks plus spare capacity, per Appendix 3F(i) [Cable Infrastructure Standard].

7.8.10.1(6) Project Co will provide patch cords for all network switches for all networks, per Appendix 3F(i) [Cable Infrastructure Standard].

7.8.10.1(7) Install all network equipment in accordance with all applicable IEEE and EIA/TIA standards, including the 802.1 and 802.3 standards.

7.8.10.1(8) The Authority will provide and manage all firewalls, security and IDS/IPS systems for connections to the Authority's networks.

7.8.10.1(9) Project Co is responsible to provide and manage all firewalls, security and IDS/IPS systems for connections to all networks in the Facility other than the Authority's network and patient monitoring network.

7.8.10.1(10) Retain a vendor certified network engineer trained on Project Co's network equipment.

7.8.10.1(11) Redundancy and security will be incorporated in all network designs.

7.8.10.2 IMIT Categorisation

7.8.10.2(1) Software and Server – IMIT Category D

7.8.10.2(2) Infrastructure – IMIT Category A

7.8.10.2(3) Interface - IMIT Category E

7.8.10.3 Interface Requirements

7.8.10.3(1) Per individual system requirements

7.8.10.4 Service Level – Gold

7.8.10.5 Systems Operation – Operating Period

7.8.10.5(1) End user administration – Authority

7.8.10.5(2) Systems Lifecycle – 5 years

7.8.11 Authority Servers

7.8.11.1 Basic Requirements

7.8.11.1(1) Authority servers will installed in the PER by the Authority.

7.8.11.1(2) All Servers will align with Authority policies and operational procedures with regards to security and operations.

7.8.11.1(3) Servers will meet minimum "*Lights out*" requirements where all servers will have remote access cards and data outlets for remote management and support.

7.8.11.2 Performance Criteria

7.8.11.2(1) Project Co will provide infrastructure (including structured wiring per Appendix 3F(i) [Cable Infrastructure Standard] to support each server with the required network and power redundancy by means of dual power supplies and dual NIC cards installed in each server. Each power supply will be connected to separate redundant rack PDU`S and each network card would be connected to separate core routers in the PER and SER communication rooms.

7.8.11.2(2) Project Co will provide the cable infrastructure to support each server per Appendix 3F(i) [Cable Infrastructure Standard].

7.8.11.3 IMIT Categorisation

7.8.11.3(1) Software and Server – IMIT Category C

7.8.11.3(2) Infrastructure – IMIT Category A

7.8.11.3(3) Interface - N/A

7.8.11.4 Interface Requirements

7.8.11.4(1) None

7.8.11.5 Service Level – Gold

7.8.11.6 Systems Operation – Operating Period

7.8.11.6(1) End user administration – Authority

7.8.11.6(2) Systems Lifecycle – 5 years

7.8.12 Project Co Servers

7.8.12.1 Basic Requirements

7.8.12.1(1) All Servers must align with Authority policies and operational procedures with regards to security and operations in accordance with this Schedule and its Appendices. This includes aligning to the Authority operating system and hardware patching processes.

7.8.12.1(2) Servers must meet minimum "*Lights out*" requirements where all servers must have remote access cards and data outlets for remote management and support.

7.8.12.1(3) Servers will be the latest technology, as of the date of installation (Intel processor latest model or similar acceptable to the Authority) and will interface to the Ethernet network via a 1000Mb network interface card.

7.8.12.1(4) All Servers deployed must align with the Authority's standards for procuring equipment including hardware models, operating systems, software licenses, maintenance and contract agreements. All agreements must be maintained for the life cycle of the hardware and or application.

7.8.12.1(5) All Servers as well as the applications hosted on those servers must be entered into the Authority's change management database system as configuration items and dependencies identified and linked. All changes, incidents, and problems relating to said servers and applications must be managed, monitored, and tracked using the Authority's change, incident, and problem management processes as defined within this Schedule and its Appendices.

7.8.12.2 Performance Criteria

7.8.12.2(1) Each server will require network and power redundancy by means of dual power supplies and dual NIC cards installed in each server. Each power supply will be connected to separate

redundant rack PDU`S and each network card would be connected in consultation with the Authority.

7.8.12.2(2) All network attached Servers will include the installation and management of Antivirus software that aligns with the Authorities antivirus policies.

7.8.12.2(3) All network attached servers will include the installation and management of enterprise data backup and retention software that aligns with the Authorities Backup and Retention policies and procedures.

7.8.12.2(4) Hardware and software configuration of servers provided by Project Co must be reviewed and approved by aRB under Appendix 3F(viii) [Architectural Review Board].

7.8.12.2(5) Servers for the technology and communication systems will be Microsoft compliant (version acceptable to the Authority) and will be from a common manufacturer.

7.8.12.3 IMIT Categorisation

7.8.12.3(1) Software and Server – IMIT Category A

7.8.12.3(2) Infrastructure – IMIT Category A

7.8.12.3(3) Interface - IMIT Category A

7.8.12.4 Interface Requirements

7.8.12.4(1) As determined by Project Co

7.8.12.5 Service Level – Highest service level of any system dependant on the server

7.8.12.6 Systems Operation – Operating Period

7.8.12.6(1) End user administration – Project Co

7.8.12.6(2) Systems Lifecycle – 5 years

7.8.13 Telephone Equipment

7.8.13.1 Basic Requirements

7.8.13.1(1) Design and construct the Facility including infrastructure per Appendix 3F(i) [Cable Infrastructure Standard] to support the Authority's VoIP, EOC Satellite telephone, patient telephone, and public telephone systems.

7.8.13.1(2) Have a public telephone company provide and install pay phones in consultation with the Authority.

7.8.13.1(3) For the patient telephone system the Authority will utilize a third party provider. It is contemplated that Hospitality Networks will provide this service.

7.8.13.1(4) Project Co may at it's cost use the Authority phone system for its telecommunications needs. If Project Co intends to use the Authority phone system, Project Co will provide and, in consultation with the Authority, install additional capacity and functionality as required.

7.8.13.2 Performance Criteria

7.8.13.2(1) See Appendix 3F(i) [Cable Infrastructure Standard].

7.8.13.3 IMIT Categorisation

7.8.13.3(1) Software and Server – IMIT Category C

7.8.13.3(2) Infrastructure – IMIT Category A

7.8.13.3(3) Interface - IMIT Category C

7.8.13.4 Interface Requirements

7.8.13.4(1) Per individual system requirements.

7.8.13.5 Service Level – Gold

7.8.13.6 Systems Operation – Operating Period

7.8.13.6(1) End user administration – Authority

7.8.13.6(2) Systems Lifecycle – 5 years

7.8.14 Cellular Services

7.8.14.1 Basic Requirements

7.8.14.1(1) Project Co will provide all infrastructure and equipment required to support a singular distributed antennae system that will universally support the following cellular service providers: Telus, Bell, and Rogers.

7.8.14.1(2) Ensure that the system installed supports both cellular voice and data requirements. The system will function effectively in all areas of the Facility, including underground parking.

7.8.14.1(3) Project Co will work with the Authority and the cellular service providers to coordinate a transfer of the contract to the Authority upon Service Commencement.

7.8.14.2 IMIT Categorisation

7.8.14.2(1) Software and Server – IMIT Category A

7.8.14.2(2) Infrastructure – IMIT Category A

7.8.14.2(3) Interface - IMIT Category A

7.8.14.3 Interface Requirements – NA

7.8.14.4 Service Level – Gold

7.8.14.5 Systems Operation – Operating Period

7.8.14.5(1) End user administration – Project Co

7.8.14.5(2) Systems Lifecycle – 14 years

7.8.15 Wireless Networks

7.8.15.1 Basic Requirements

7.8.15.1(1) In consultation with the Authority design and install a complete 802.11 wireless network solution for the Facility in accordance with Appendix 3F(ii) [Wireless Infrastructure Standard] to support the extension of the Authority wireless network into the Facility. The Authority currently utilizes a single wireless network that extends across all its facilities. Project Co will not install any other 802.11 wireless network in the Facility.

7.8.15.1(2) The wireless network in the Facility will have sufficient wireless access points to support the Wireless Staff Communication system in accordance with Appendix 3F(i) [Cable Infrastructure Standard].

7.8.15.1(3) Refer to Section 7.8.20.1(9) regarding use of the Authority's 802.11 wireless network by the RTLS system in the Facility.

7.8.15.1(4) The Authority will:

7.8.15.1(4)(a) procure, configure, maintain and refresh Wireless Lan Controllers (WLC) and Mobility Service Engines (MSE) or latest equivalent to support the Authority's wireless network within the facilities.

7.8.15.1(4)(b) procure, program and configure wireless access points and provide to Project Co for installation.

7.8.15.1(5) Project Co will install all structured wiring, wireless access points, Wireless Lan Controllers (WLC), Mobility Service Engines (MSE), and test all cable infrastructure and wireless system devices for the wireless network in consultation with the Authority. Install all network equipment in accordance with all applicable standards.

7.8.15.1(6) The wireless infrastructure will service 802.11b (2.4Ghz DSSS), 802.11g (2.4Ghz OFDM), 802.11a (5Ghz OFDM), 802.11n Draft 2.0, or newer (5Ghz and 2.4Ghz MIMO), and 802.11ac wireless communications and data transfer requirements for access by wireless devices to data and voice services within the Facility and across the Authority, via the Authority WAN.

7.8.15.1(7) Provide a complete structured cabling infrastructure that will allow the installation of the complete wireless network, including PoE wireless access points. Project Co will install telecommunication outlets and access points in consultation with the Authority. Note that the patient monitoring wireless access points will be installed independently from the Authority wireless network.

7.8.15.1(8) Test all aspects of the wireless network and provide heat maps for the Facility indicating the channel coverage, signal level, data rate and noise floor for 802.11 standard including 802.11b, 802.11g, 802.11a and 5GHz 802.11n wireless networks.

7.8.15.1(9) Project Co will update the Authority's wireless management applications to include the Facility floor plans including wireless access point locations mapped to a floor plan with RF characteristics defined for structural composition which will include glass, concrete, wood, drywall, metal, and permanently mounted RF obstacles.

7.8.15.1(10) The wireless network will provide 100% coverage that meets the performance requirements, as described in Appendix 3F(ii) [Wireless Infrastructure Standard], throughout the Facility including elevator cabs, mechanical spaces, service areas, parkade, facility exterior, stairwells, and parking lots.

7.8.15.2 Performance Criteria

7.8.15.2(1) Work with the Authority in creating an operational plan for the wireless network complete with management strategy alerts notification and resource requirements for maintenance.

7.8.15.2(2) Retain a RCDD certified network engineer with expertise and experience in working with the Authority approved equipment to design the wireless network.

7.8.15.2(3) Each wireless access point will have a singular data drop terminated at a telecommunication outlet installed in accordance with Appendix 3F(ii) [Wireless Infrastructure Standard].

7.8.15.2(4) Design the facility including equipment locations (e.g., microwave ovens) that does not interfere beyond the noise floor and signal strength requirements (SNR) of the wireless network. The resulting RF environment in the Facility must be consistent with the strictest specifications of the wireless end-use equipment.

7.8.15.2(5) Provide a adequate signal strength to the boundaries of the Facility/Site.

7.8.15.3 IMIT Categorisation

7.8.15.3(1) Software and Server – IMIT Category D

7.8.15.3(2) Infrastructure – IMIT Category A (except Authority will procure WAP's, see Section 7.8.15.1(4))

7.8.15.3(3) Interface - IMIT Category A

7.8.15.4 Interface Requirements

7.8.15.4(1) Staff Communication System, Authority Networks, Telephone System, Wireless Management System, Project Co End User Devices.

7.8.15.5 Service Level – Gold

7.8.15.6 Systems Operation – Operating Period

7.8.15.6(1) End user administration – See system specific requirements.

7.8.15.6(2) Systems Lifecycle – Not specified.

7.8.16 Staff Communication System

7.8.16.1 Basic Requirements

7.8.16.1(1) The Authority's wireless network will support a complete wireless staff to staff communication system.

7.8.16.1(2) The staff communication system will allow staff to initiate 2-way voice conversations from their staff communication system device to:

7.8.16.1(2)(a) other staff communication system devices; and

7.8.16.1(2)(b) VoIP telephone.

7.8.16.1(3) The staff communication system will allow staff to receive 2-way voice conversations into their staff communication system device from:

7.8.16.1(3)(a) other staff communication system devices;

7.8.16.1(3)(b) VoIP telephone;

7.8.16.1(3)(c) nurse call consoles;

7.8.16.1(3)(d) patient stations;

7.8.16.1(3)(e) staff/duty station; and

7.8.16.1(3)(f) external telephone.

7.8.16.1(4) The system will align with the region's current standard Vocera staff communication system and allow for the central management of devices and users via the existing Vocera administrative modules.

7.8.16.1(5) The Authority will provide all wireless end-use devices and centralised staff communication services

7.8.16.1(6) Project Co will ensure that all required systems integrate with the staff communication system. At the Authority's discretion, some of the system integration may be performed through the Authority's phone system.

7.8.16.1(7) Project Co may use a different system for its own communication such as portable radios. Any such devices or system must not interfere with the Authority's wireless communication devices or systems or other devices or systems.

7.8.16.1(8) The wireless system will function throughout 100% of the Facility, including elevator cabs, mechanical spaces, service areas, parkade, facility exterior, stairwells, and parking lots.

7.8.16.2 Quality Requirements

7.8.16.2(1) Comply with the requirements of Appendix 3F(ii) [Wireless Infrastructure Standard].

7.8.16.3 Performance Requirements

7.8.16.3(1) Provide adequate space and power outlets for wireless device charging stations inside each department, taking in to account that charging units with multiple devices may cause signal concentrations that impact active unit performance. Sufficient spread of units must be maintained for both charging and storage areas so as not to impact operational performance of active units.

7.8.16.4 IMIT Categorisation

7.8.16.4(1) Software and Server – IMIT Category C

7.8.16.4(2) Infrastructure – IMIT Category A

7.8.16.4(3) Interface - IMIT Category A

7.8.16.5 Interface Requirements

7.8.16.5(1) Authority Network, Wireless Network, Nurse Call, Intercommunication System, Fire Alarm System, Telephone System

7.8.16.6 Service Level – Bronze

7.8.16.7 Systems Operation – Operating Period

7.8.16.7(1) End user administration – Authority

7.8.16.7(2) Systems Lifecycle – 5 years

7.8.17 Public Address System

7.8.17.1 Basic Requirements

7.8.17.1(1) Provide cable infrastructure and equipment for a public address system in the Facility, including any parkade. This public address system is intended to be used for general and emergency voice paging. Other communications systems will be also used for routine communications between staff and patients.

7.8.17.1(2) The public address system will be separate from and act independently of the fire alarm system paging system. Provide interconnects between the systems as required by all applicable regulatory standards or codes.

7.8.17.1(3) Provide, in consultation with the Authority interface to the public address system from the telephone system. The public address system integration will facilitate single-step dialling from a telephone handset directly to a paging zone. This will accommodate speed-dial functionality.

7.8.17.1(4) Voice paging will typically be performed via a telephone located at the switchboard. In addition, provide a hard-wired backup microphone in a location to be advised by the Authority in the event the phone system fails. This backup microphone must be able to page the entire Facility.

7.8.17.1(5) Generally, voice paging will be on an ‘all-page’ basis. Provide physical zoning of the public address system by department to enable each department to page itself, if so desired.

7.8.17.2 Operational Requirements

7.8.17.2(1) Provide complete speaker coverage throughout 100% of the Facility so that emergency voice pages can be heard everywhere in the Facility, including specifically situated speakers within each meeting room, on-call sleep areas, a remote parkade, and Energy Centre, with high intelligibility and low loss of articulation of consonants (%ALCONS).

7.8.17.2(2) Provide sound levels as follows throughout the Facility:

7.8.17.2(2)(a) Normal voice paging: 60 dB minimum.

7.8.17.2(2)(b) Fire alarm messages: 75 dB minimum.

7.8.17.2(2)(c) Voice paging sound levels will be at least 10 dB above ambient noise levels in mechanical rooms and similar locations.

7.8.17.2(3) Provide all equipment necessary for a fully operational public address system, including:

7.8.17.2(3)(a) paging amplifiers;

7.8.17.2(3)(b) flush ceiling speakers in finished areas, with adjustable volume levels;

7.8.17.2(3)(c) trumpet type speakers in mechanical and other high ambient locations;

7.8.17.2(3)(d) microphone(s);

7.8.17.2(3)(e) mixers; and

7.8.17.2(3)(f) telephone/network system interfaces.

7.8.17.2(4) Size amplifiers to handle total load plus 20% spare capacity.

7.8.17.2(5) Provide telephone access for public address with a maximum delay of 1 second between accessing system and ability to transmit page.

7.8.17.3 IMIT Categorisation

7.8.17.3(1) Software and Server – IMIT Category A

7.8.17.3(2) Infrastructure – IMIT Category A

7.8.17.3(3) Interface - IMIT Category A

7.8.17.4 Interface Requirements

7.8.17.4(1) Telephone, Fire Alarm

7.8.17.5 Service Level – Gold

7.8.17.6 Systems Operation – Operating Period

7.8.17.6(1) End user administration – Project Co

7.8.17.6(2) Systems Lifecycle – 14 years

7.8.18 Intercommunication System

7.8.18.1 Basic Requirements

7.8.18.1(1) Local Intercom systems are required at locked entrance doors that delivery personnel or the public will need access through, and at doors provided with Access Controls as identified in Appendix 3F(iii) [Door Operations Matrix].

7.8.18.2 Quality Requirements

7.8.18.2(1) The intercom systems will be manufactured by recognized industry leaders in the intercom business.

7.8.18.3 Performance Criteria

7.8.18.3(1) Provide a video intercom system at all entrance locations as identified in Appendix 3F(iii) [Door Operations Matrix], in consultation with the Authority, and based on the Facility Threat and Risk Assessment.

7.8.18.3(2) Provide a video intercom door-station at the entrance to each inpatient department. Each inpatient department will have master stations at each collaboration station and care hub. Calls from the door-station will be broadcast to each master station simultaneously, and may be answered from any of these locations. Any master station will be capable of releasing the inpatient entrance door.

7.8.18.3(3) Coordinate the provision of video intercom systems for all other areas with the authority.

7.8.18.3(4) Door stations will be provided as follows:

7.8.18.3(4)(a) full colour surveillance camera with ability to pan and tilt;

7.8.18.3(4)(b) hands-free full duplex audio capability;

7.8.18.3(4)(c) push-to-talk/call buttons; and

7.8.18.3(4)(d) vandal resistant and weatherproof where required.

7.8.18.3(5) Master stations will be provided as follows:

7.8.18.3(5)(a) capable of being desk and wall mounted;

7.8.18.3(5)(b) full colour display screen with ability to control pan and tilt of door station;

7.8.18.3(5)(c) hands-free full duplex audio capability; and

7.8.18.3(5)(d) capability to release to the secure entry door

7.8.18.3(6) Provide desk loud-speaking master station with handset at locations as determined in consultation with the Authority, including:

7.8.18.3(6)(a) each imaging control room; and

7.8.18.3(6)(b) pharmacy dispensing area.

7.8.18.3(7) Provide flush wall loud-speaking master station without handset at locations including:

7.8.18.3(7)(a) radiography rooms;

7.8.18.3(7)(b) CT major imaging rooms;

7.8.18.3(7)(c) ultrasound rooms;

7.8.18.3(7)(d) physician offices/reading rooms; and

7.8.18.3(7)(e) IV mixture area.

7.8.18.3(8) Provide dedicated duplex voice intercom system between each Seclusion room and the local nurse station. Nurse station will have the capability of turning the volume off, or up, as required. Intercom will be hands free in the Seclusion room and will be ceiling mounted behind a guard.

7.8.18.4 IMIT Categorisation

7.8.18.4(1) Software and Server – IMIT Category A

7.8.18.4(2) Infrastructure – IMIT Category A

7.8.18.4(3) Interface - IMIT Category A

7.8.18.5 Interface Requirements

7.8.18.5(1) Access controls, staff communication system

7.8.18.6 Service Level – Bronze

7.8.18.7 Systems Operation – Operating Period

7.8.18.7(1) End user administration – Project Co

7.8.18.7(2) Systems Lifecycle – 14 years

7.8.19 Video Conferencing and Telehealth

7.8.19.1 Basic Requirements

7.8.19.1(1) All videoconferencing systems will interface with Authority's videoconferencing infrastructure and systems as identified in the section.

7.8.19.1(2) Provide the supporting infrastructure including power, telecommunication outlets, audio-video wiring, raceways, outlet boxes, structural requirements necessary to deliver the Telehealth requirements identified in Appendix 3A [Clinical Specifications] for options A to H.

7.8.19.1(3) As identified in the Appendix 3A [Clinical Specifications], design and construct video conference capable rooms and locations within rooms in accordance with Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications] and Appendix 3F(iv) [VIHA A/V and Video Conferencing Standard].

7.8.19.1(4) Retain audio visual professionals with expertise and experience in the application, use and integration of audio/video conferencing systems for the design, configuration and integration of the required videoconference rooms and systems.

7.8.19.2 Quality Requirements

7.8.19.2(1) Comply with all applicable standards and codes, including the latest IP based video conferencing standards or the latest high speed common standard.

7.8.19.2(2) Audio quality will be comparable to voice quality found in typical PSTN voice networks. Video quality will be high definition (1080p) and synchronized with the audio content. Video conference systems will allow for adjustments of compression and audio and video quality to accommodate for bandwidth management.

7.8.19.3 Performance Criteria

7.8.19.3(1) Design and construct videoconference rooms and locate microphones, video cameras, video monitors, lighting systems and sound attenuation structures/materials to optimize the performance of the video conferencing systems.

7.8.19.3(2) Coordinate with the Authority for network access. Video conferencing systems will be configured in consultation with the Authority and adhere to the Authority security and quality of service requirements so not to negatively impact the Authority's network performance in any way.

7.8.19.4 IMIT Categorisation

7.8.19.4(1) Software and Server – IMIT Category C

7.8.19.4(2) Infrastructure – IMIT Category A

7.8.19.4(3) Interface - IMIT Category A

7.8.19.5 Interface Requirements

7.8.19.5(1) Lighting, Authority Network, Telephone Equipment, BAS, Window Blinds

7.8.19.6 Service Level – Gold

7.8.19.7 Systems Operation – Operating Period

7.8.19.7(1) End user administration – Authority

7.8.19.7(2) Systems Lifecycle – 5 years

7.8.20 Real Time Location System (RTLS)

7.8.20.1 Basic Requirements

7.8.20.1(1) In consultation with the Authority, design and install a complete RTLS solution for the Facility that includes the following applications and systems:

7.8.20.1(1)(a) equipment and asset tracking;

7.8.20.1(1)(b) patient tracking;

7.8.20.1(1)(c) staff location;

7.8.20.1(1)(d) staff to patient interactions with automatic association to the HER;

7.8.20.1(1)(e) patient to medical device interactions with automatic associations to the HER;

7.8.20.1(1)(f) room utilization;

7.8.20.1(1)(g) staff duress;

7.8.20.1(1)(h) patient wandering;

7.8.20.1(1)(i) staff presence within an inpatient room with automatic association to the nurse call system; and

7.8.20.1(1)(j) staff workflow analysis and reporting.

7.8.20.1(2) RTLS will utilise a server and allow multiple work stations to access the system for supervision, control and reporting purposes. Each of the above applications and systems will have a dedicated customised monitoring and reporting interface for each of the following departments:

7.8.20.1(2)(a) protection services;

7.8.20.1(2)(b) biomedical department;

7.8.20.1(2)(c) logistics department (equipment depot);

7.8.20.1(2)(d) portering;

7.8.20.1(2)(e) medical imaging;

7.8.20.1(2)(f) emergency department;

7.8.20.1(2)(g) infection control; and

7.8.20.1(2)(h) all clinical departments.

7.8.20.1(3) Project Co will coordinate with the Authority to ensure that departmental tracking/dashboard displays in each department listed above are capable of displaying real-time location mapping of RTLS-tagged staff, patient and equipment.

7.8.20.1(4) Provide for staff work flow analysis to enable time-in-room tracking for staff.

7.8.20.1(5) The RTLS system will have the capability to allow Cerner to report from the RTLS system and pull data from the RTLS system for the purposes of reporting and analytics for items such as workflow optimization and time-in-use tracking. All data points within the RTLS system will be available for Cerner access.

7.8.20.1(6) All data points within the RTLS system will be capable of being retained for the purposes of reporting for a minimum two weeks.

7.8.20.1(7) The RTLS equipment and asset location system will provide for PAR level management, asset utilisation, shrink control, preventative maintenance and provide custom reports for such.

7.8.20.1(8) Provide the following quantities of RTLS tags. These quantities represent the total number of tags to be supplied to serve both Facilities:

7.8.20.1(8)(a) 2000 Patient tags (this does not include infant tags, but does include patient wander tags);

7.8.20.1(8)(b) 2500 Staff tags;

7.8.20.1(8)(c) 500 Duress Tags; and

7.8.20.1(8)(d) 3500 Equipment tags.

7.8.20.1(9) The Authority's existing 802.11 wireless network is designed to maximize use for voice and data (with emphasis on the staff to staff communication system). Project Co may use the Authority's wireless network for the RTLS system in the Facility, subject to the following conditions:

7.8.20.1(9)(a) Project Co will not be permitted to add to, modify, reconfigure or tune the Authority's wireless network to facilitate use by the RTLS system; and

7.8.20.1(9)(b) use of the wireless network by the RTLS system must not negatively impact the Authority's wireless network.

7.8.20.1(10) The RTLS solution must integrate with and be approved by Cerner.

7.8.20.1(11) Provide a complete structured cabling infrastructure that will allow the installation of the complete RTLS network, including access points, exciters, and/or ultrasonic receivers if applicable. Project Co will install telecommunication outlets and access points in consultation with the Authority.

7.8.20.1(12) Test all aspects of the RTLS network and provide heat maps for the Facility indicating the channel coverage, signal level, data rate and noise floor for the wireless network.

7.8.20.1(13) The RTLS system will provide 100% coverage throughout the Facility including elevator cabs, mechanical spaces, service areas, parkade, facility exterior, stairwells, and parking lots.

7.8.20.2 Quality Requirements

7.8.20.2(1) Provide an RTLS manufactured by a recognized industry leader in the RTLS business.

7.8.20.2(2) Tags must have a minimum of 12 months of battery life in a typical usage scenario.

7.8.20.3 Performance Criteria

7.8.20.3(1) The RTLS must provide the following functionality:

7.8.20.3(1)(a) tracking of patient, staff and equipment locations in all areas within the Facility to floor and room level;

7.8.20.3(1)(b) all entry/exit locations to the Facility and each Department must have an RTLS array capable of determining direction of travel and be interfaced with the corresponding access control system such that a 'lock-down' of a door based on 'tag' credentials can be initiated automatically;

7.8.20.3(1)(c) patient tags must be non-line of sight and must work when covered with bed sheets and shirt sleeves;

7.8.20.3(1)(d) the RTLS system will provide absolute detection of tags within elevator cabs. Provide additional exciters in each elevator cab to ensure adequate accuracy;

7.8.20.3(1)(e)	alerting and reporting based on patient location, patient proximity to location, patient duration in location and patient proximity to other tagged items or persons;
7.8.20.3(1)(f)	each treatment/procedural area and inpatient room will be capable of associating a RTLS tagged medical device with a patient via Cerner when the device is brought to within 1.5m of an inpatient bed location;
7.8.20.3(1)(g)	each treatment/procedural area and inpatient room will be capable of associating a RTLS tagged staff member with a patient via Cerner when the staff member is within 1.5m of an inpatient bed location;
7.8.20.3(1)(h)	each treatment/procedural area and inpatient room will be capable of signalling to Cerner that a RTLS tagged staff member is present within a treatment/procedural area or inpatient room;
7.8.20.3(1)(i)	the RTLS will interface with Cerner and the nurse call system, and this interface will support the ‘staff presence’ functionality of the nurse call system and will provide automatic call acknowledgement when a RTLS tagged staff member is within 2 meters of the patient in treatment/procedural area or inpatient room;
7.8.20.3(1)(j)	identifying equipment and asset location, patient location, staff location, and staff duress location within the Facility by floor, within a 3 m x 3 m or smaller area;
7.8.20.3(1)(k)	reporting on tag and RTLS infrastructure health and availability;
7.8.20.3(1)(l)	reporting on tag movement and tag location relative to other tag locations;
7.8.20.3(1)(m)	reporting on tag button press and alerting based on button press;
7.8.20.3(1)(n)	tags must be submersible and cleanable within the Authority’s infection control standards;
7.8.20.3(1)(o)	tags must support configuration in “always on” mode;
7.8.20.3(1)(p)	tags must be resistant to tampering and will immediately alarm if the tag is cut, damaged or modified for unauthorised removal from the patient or equipment.

7.8.20.3(1)(q) tags must have a visual alerting option (LED or light on tag);

7.8.20.3(1)(r) tags must have multiple attachment options, including integration with patient wrist bands and staff ID badge lanyards; and

7.8.20.3(1)(s) integrate with Cerner systems, using Cerner iBus interfacing to import/export patient information and location information.

7.8.20.3(1)(t) integrate with the patient entertainment/education system for the purposes of displaying clinician information on the display based upon staff presence within an inpatient room.

7.8.20.3(2) Design the RTLS to include features that assist the Authority to achieve the highest possible tag recovery rate.

7.8.20.3(3) For the Emergency Department only, the RTLS must:

7.8.20.3(3)(a) provide tracking of patients within specific care areas identified by the Authority within a 3 m x 3 m or smaller area (areas may not be separated by walls); tracking of patients must be 100% accurate and the patient tracking system must update every 3 seconds or better; and

7.8.20.4 be flexible and allow for reconfiguration to respond to Emergency Department care space changes.IMIT Categorisation

7.8.20.4(1) Software and Server – IMIT Category A

7.8.20.4(2) Infrastructure – IMIT Category A

7.8.20.4(3) Interface - IMIT Category A

7.8.20.5 Interface Requirements

7.8.20.5(1) Wireless Network, Nurse Call, Patient Education, Patient Entertainment system, Cerner, Access Control, CCTV, Elevators, Radio, Staff Communication system, Authority's Network, Fixed Panic system.

7.8.20.6 Service Level – Gold

7.8.20.7 Systems Operation – Operating Period

7.8.20.7(1) End user administration – Authority

7.8.20.7(2) Systems Lifecycle – 14 years

7.8.21 Equipment and Asset Tracking

7.8.21.1 Basic Requirements

7.8.21.1(1) Provide an RTLS based equipment and asset tracking system, in accordance with Section 7.8.20 (Real Time Location System).

7.8.21.1(2) The Equipment and Asset Tracking system will be capable of interfacing with a Computerised Maintenance Management System (CMMS), such as Maintenance Connection. The CMMS will be capable of interfacing with VFA Canada Corporations (VFA) capital asset facility assessment system as mandated by the Ministry of Health.

7.8.21.1(3) Provide a quantity of tags as follows:

7.8.21.1(3)(a) 3500 Equipment and Asset tags

7.8.21.1(4) The system must be capable of being extended into the existing buildings on the Campbell River Site.

7.8.21.2 Performance Criteria

7.8.21.2(1) The Equipment and Asset Tracking system will be capable of locating and tracking a particular piece of equipment anywhere within the Facility.

7.8.21.2(2) Project Co will coordinate with the Authority to ensure that departmental tracking/dashboard displays in each Equipment Depot, Biomedical, FMO, and Protection Services are capable of displaying real-time location mapping of RTLS-tagged staff and equipment.

7.8.21.2(3) Project Co will provide a PC based application that will provide a presentation of equipment and assets by superimposing positional data on a facility floor plan and providing asset tag based information.

7.8.21.2(4) Provide an RTLS based equipment and asset tracking system that:

7.8.21.2(4)(a) facilitates each treatment/procedural area and inpatient room to be capable of associating a RTLS tagged medical device with a patient via Cerner when the device is brought to within 1.5m of an inpatient bed location.

7.8.21.2(4)(b) has the capacity to send an alarm signal if a particular piece of equipment or a patient pass through a door that leads to the exterior of the Facility.

7.8.21.2(4)(c) provides alerting for RTLS tagged equipment and asset location based on:

(c).1 location within the Facility;
(c).2 movement within the Facility;
(c).3 quantity of devices or lack thereof within a given location/area in the Facility (for example a low number of wheelchairs or a large number of infusion pumps requiring cleaning);
(c).4 status of a tag (low battery, tag removal, tamper, failure);
(c).5 activation of a tag push button.

7.8.21.2(4)(d) upon the initiation of an alert the system will identify the location of the event and the particular piece of equipment.

7.8.21.2(4)(e) includes at all entry/exit locations to the Facility and at each Department, an RTLS array that is capable of determining direction of travel and will be interfaced with the corresponding access control system such that a 'lock-down' of a door based on 'tag' credentials can be initiated automatically.

7.8.21.2(4)(f) annunciates on the local protection services workstation; and

7.8.21.2(4)(g) interfaces with the CCTV system such that when RTLS-tagged equipment exits through a department or Facility perimeter door, all local CCTV cameras associated with the door are displayed at the local Protection Services workstation and the RJH Dispatch Centre. Equipment and Asset Tracking tags will have a push button for request for service functionality.

7.8.21.2(5) Equipment and Asset Tracking tags will have a barcode label affixed for the purpose of interfacing the tag, and related equipment information, into the CMMS.

7.8.21.3 IMIT Categorisation

7.8.21.3(1) Software and Server – IMIT Category A

7.8.21.3(2) Infrastructure – IMIT Category A

7.8.21.3(3) Interface - IMIT Category A

7.8.21.4 Interface Requirements

7.8.21.4(1) RTLS, Cerner, Access Control, CCTV, CMMS, VFA

7.8.21.5 Service Level – Gold

7.8.21.6 Systems Operation – Operating Period

7.8.21.6(1) End user administration – Authority

7.8.21.6(2) Systems Lifecycle – 14 years

7.8.22 Patient Tracking / Wandering

7.8.22.1 Basic Requirements

7.8.22.1(1) Provide an RTLS based patient tracking / wandering system, in accordance with Section 7.8.20 (Real Time Location System).

7.8.22.1(2) Patients may be provided with RTLS tags/bracelets, ID bands, badges, or bracelets.

7.8.22.1(3) Provide a quantity of tags as follows:

7.8.22.1(3)(a) 2000 Patient Tracking tags.

7.8.22.1(4) The system must be capable of being extended into the existing buildings on the Campbell River Site.

7.8.22.2 Performance Criteria

7.8.22.2(1) The Patient Tracking / Wandering system will be capable of locating and tracking a patient anywhere within the Facility.

7.8.22.2(2) The system will incorporate latest encryption techniques to secure patient ID and location.

7.8.22.2(3) Project Co will coordinate with the Authority to ensure that departmental tracking/dashboard displays in each Clinical and Mental Health Department, and Protection Services are capable of displaying real-time location mapping of RTLS-tagged staff and patients.

7.8.22.2(4) Project Co will provide a PC based application that will provide a presentation of patient locations by superimposing positional data on a facility floor plan and providing patient tag based information.

7.8.22.2(5) Provide an RTLS based Patient Tracking / Wandering system that:

7.8.22.2(5)(a) performs alerting and reporting based on patient location, patient proximity to location, patient duration in location and patient proximity to other tagged items or persons;

7.8.22.2(5)(b) provides association of an RTLS tagged medical device with a tagged patient via Cerner when the device is brought to within 1.5m of an inpatient bed location;

7.8.22.2(5)(c) has the capacity to send an alarm signal if a particular piece of equipment or a patient pass through a door that leads to the exterior of the Facility;

7.8.22.2(5)(d) provides alerting for RTLS tagged patients based on:

(d).1 location within the Facility;

(d).2 movement within the Facility;

(d).3 status of a tag (low battery, tag removal, tamper, failure).

7.8.22.2(5)(e) upon the initiation of an alert the system will identify the location of the event and the particular patient and annunciate on the local clinical department and protection services workstation and status boards.

7.8.22.2(6) Each department utilizing the Patient Tracking system will be provided with a wireless Patient Tracking tag test device that audibly and visually indicates on a pass / fail basis the functionality and battery life of the Patient Tracking tag. The testing device will be a closed loop device/station that allows for full functional testing without activating the Facility's Patient Tracking alarm system and will provide audit function as required.

7.8.22.2(7) At all entry/exit locations to the Facility and at each Department provide an RTLS array that is capable of determining direction of travel and proximity to a secure door. This functionality will be interfaced with the corresponding access control system such that a 'lock-down' of a door can be initiated automatically.

7.8.22.2(8) The patient tracking / wandering system will interface with the CCTV system such that when an RTLS-tagged patient exits through a Department or Facility perimeter door, all local CCTV cameras associated with the door are displayed at the local Protection Services workstation, the RJH Dispatch Centre, and a local audible/visual alarm is activated at the point of exit. The event will also be transmitted to the Staff Communication system.

7.8.22.2(9) The patient tracking / wandering system will interface with all elevators such that these elevators will not operate when an

unaccompanied tagged patient is present in the elevator cab. The elevator inhibit feature will not operate when the patient is accompanied by an authorised companion or staff tag.

7.8.22.2(10) Patient Tracking / Wandering system tags will have a barcode label affixed for the purpose of positive patient identification and integration to the Authority's clinical systems.

7.8.22.3 IMIT Categorisation

7.8.22.3(1) Software and Server – IMIT Category A

7.8.22.3(2) Infrastructure – IMIT Category A

7.8.22.3(3) Interface - IMIT Category A

7.8.22.4 Interface Requirements

7.8.22.4(1) RTLS, Cerner, Access Control, CCTV, Staff Communication System, Dementia System, Elevator

7.8.22.5 Service Level – Gold

7.8.22.6 Systems Operation – Operating Period

7.8.22.6(1) End user administration – Authority

7.8.22.6(2) Systems Lifecycle – 14 years

7.8.23 Dementia System

7.8.23.1 Basic requirements

7.8.23.1(1) Project Co will provide a dementia monitoring system for 20% of inpatient rooms within each General Medical/Surgical Inpatient Unit within the Facility rooms to be determined in consultation with the Authority.

7.8.23.2 Quality Requirements

7.8.23.2(1) Provide a dementia system manufactured by a recognized industry leader in the dementia monitoring business.

7.8.23.3 Performance Criteria

7.8.23.3(1) Provide a dementia system which includes monitoring and analysis hardware and software to monitor resident activity when in their rooms and alert staff when the resident's activities are outside of their predetermined safe or usual parameters

7.8.23.3(2) Monitoring of patients will include bed exit, incontinence, patient fall, patient room movement, bathroom entry, exit and duration, and patient room entry/exit.

7.8.23.3(3) Patient elopement risk will be managed separately by the patient tracking / wandering system.

7.8.23.3(4) Individual patient room profiles will be administered at the local care

7.8.23.3(5) The dementia monitoring system will provide monitoring of patients in patient rooms and their associated bathrooms.

7.8.23.3(6) The dementia system will not utilise the Authority's 802.11 wireless network.

7.8.23.3(7) Provide integration between the dementia system and the nurse call system, the smartbed and the staff communication system.

7.8.23.4 IMIT Categorisation

7.8.23.4(1) Software and Server – IMIT Category A

7.8.23.4(2) Infrastructure – IMIT Category A

7.8.23.4(3) Interface - IMIT Category A

7.8.23.5 Interface Requirements

7.8.23.5(1) Cerner, Staff Communication System, Nurse Call, Patient Tracking / Wandering

7.8.23.6 Service Level – Gold

7.8.23.7 Systems Operation – Operating Period

7.8.23.7(1) End user administration – Authority

7.8.23.7(2) Systems Lifecycle – 14 years

7.8.24 Radio system

7.8.24.1 Basic Requirements

7.8.24.1(1) Provide a complete 2-way, multi-channel radio system including all required infrastructure and equipment to support the requirements of the following Authority departments: protection services, portering, facilities maintenance & operations, materials management, and transport. Each department will require a dedicated channel on the radio system.

7.8.24.1(2) The 2-way radio system will integrate with the Authority's existing security communication system located at the RJH Dispatch Centre.

7.8.24.1(3) Provide 20 portable 2-way radios with all required equipment to complete a fully working system.

7.8.24.1(4) The 2-way radio system will be multi-channel and will meet or exceed the capabilities of the Authorities existing system at the Nanaimo Regional General Hospital (NRGH).

7.8.24.1(5) The radio system will not be reliant upon the Authority network for continued operation.

7.8.24.1(6) Provide 100% coverage of the Facility site such that radios will work in all interior and exterior spaces/areas.

7.8.24.2 Performance Criteria

7.8.24.2(1) The 2-way radio system must allow interconnection between on-site radios and be connected to the RJH dispatch centre to allow for telephone based dispatching of site security personnel from the RJH dispatch centre or any designated Authority telephone handset. Integration of the radio system with the RJH dispatch centre equipment will include redundant communication means. Provide physically diverse connections that utilise the Authority's network and Telus 1B lines.

7.8.24.2(2) The radio system will work independently of the RJH system. If the RJH Dispatch Centre is not be available, the on-site radio system will continue to be fully operational.

7.8.24.2(3) The 2-way radio system will integrate with the Authority's telecommunication systems including the security communication system located at the Royal Jubilee Hospital (RJH) Dispatch Centre.

7.8.24.2(4) The radio system will facilitate communication between any Authority telephone and any radio channel.

7.8.24.2(5) The radio system will be capable of sending text messages from the RJH Dispatch Centre to individual radios and to groups of radios.

7.8.24.2(6) The radio system will automatically broadcast pre-recorded voice messages from each of the fixed duress locations to all radios.

7.8.24.2(7) The radio system will integrate with the RTLS, wireless staff duress system, and fixed panic system to automatically broadcast voice messages to all radios. The voice message will indicate individual room location from which the staff duress call was initiated. Provide all middleware and converters required to interface the radio system with the RTLS, wireless staff duress system, and fixed panic system.

7.8.24.2(8) The radio system will integrate with the fire alarm system to automatically broadcast voice messages to all radios. The voice message will relay the specific alarm message produced by the addressable fire alarm system. Provide all middleware and converters required to interface the radio system with the fire alarm system.

7.8.24.2(9) Infrastructure as per Section 7.8.24.3(2) for this system includes antennae, gateway, transmitters, and receivers.

7.8.24.3 IMIT Categorisation

7.8.24.3(1) Software and Server – IMIT Category E

7.8.24.3(2) Infrastructure – IMIT Category A

7.8.24.3(3) Interface - IMIT Category A

7.8.24.4 Interface Requirements

7.8.24.4(1) Telephone Equipment, Authority Network, RTLS, Staff Duress, Fixed Panic, Fire Alarm

7.8.24.5 Service Level – Gold

7.8.24.6 Systems Operation – Operating Period

7.8.24.6(1) End user administration – Authority

7.8.24.6(2) Systems Lifecycle – 7 Years (except the Authority will replace the portable 2-way radios)

7.8.25 Paging System

7.8.25.1 Basic Requirements

7.8.25.1(1) Provide a complete Facility-based radio frequency voice and alphanumeric capable paging system including all required infrastructure, equipment and interfaces.

7.8.25.1(2) The paging system will not be reliant upon the Authority Network for continued operation.

7.8.25.2 Performance Criteria

7.8.25.2(1) Provide 100% coverage of the Facility site such that paging system will work in all interior and exterior spaces/areas.

7.8.25.2(2) Provide an interface between the paging system and the regional Authority telephone system to enable local voice paging.

7.8.25.2(3) Infrastructure as per Section 7.8.25.3(2)for this system includes antennae, transmitters, and receivers.

7.8.25.3 IMIT Categorisation

7.8.25.3(1) Software and Server – IMIT Category E

7.8.25.3(2) Infrastructure – IMIT Category A

7.8.25.3(3) Interface - IMIT Category A

7.8.25.4 Interface Requirements

7.8.25.4(1) Telephone Equipment, Authority Network

7.8.25.5 Service Level – Gold

7.8.25.6 Systems Operation – Operating Period

7.8.25.6(1) End user administration – Authority

7.8.25.6(2) Systems Lifecycle – 7 Years

7.8.26 Patient Entertainment System

7.8.26.1 Basic Requirements

7.8.26.1(1) The patient entertainment system will provide patient, visitor, and staff television and pay per view content. The system will be administered after Facility Completion by a third party provider under the direction of the Authority. It is anticipated that Hospitality Networks will be the third party provider.

7.8.26.1(2) Project Co will be responsible for design and provision of the complete infrastructure, system, and interfaces necessary to support the system. Project Co will direct and procure services from the third party provider to supply a complete patient entertainment system other than associated equipment as categorized in Appendix 2D [Equipment and Furniture].

7.8.26.1(3) The Authority will procure and deliver the IP TV's and wall mount brackets for the TV's to Project Co. See Appendix 2D [Equipment and Furniture]for equipment categorization.

7.8.26.1(4) The patient entertainment system will consist of internet protocol based display units (Television). Refer to the Appendix 2D [Equipment and Furniture] for information regarding televisions.

7.8.26.1(5) The patient entertainment and education system will both utilize the same display and audio. User controls for these systems will not necessarily be the same.

7.8.26.1(6) The patient entertainment system will operate over physical networks other than the Authority's network.

7.8.26.1(7) Project Co will be responsible for the complete system design and installation including off-site connections, entrance services, demarcation, and distribution. The Authority will be responsible for the ongoing cost of the TV (cable) service after service commencement.

7.8.26.1(8) The patient entertainment system in a smart hospital environment is a hub for interfacing technologies and systems. Incorporate in the planning, design and installation the multiple virtual and physical interfaces, and pathways that are required to support an integrated patient centric system. In addition to the interfacing of systems as detailed in 7.8.26.5 (Interface Requirements) physical pathways, interconnections, and interfacing are also required to support control of the patient entertainment/education system from the smart bed, and transmission of audio signals to the smart bed speakers.

7.8.26.1(9) Patient entertainment outlets will be installed at:

7.8.26.1(9)(a) each patient bed location, patient care area, and each patient use area in all patient use and patient care areas/rooms/units of the facility including: General Medical/Surgical Inpatient, Intensive Care/Telemetry, Maternity, Psychiatric, Emergency, Ambulatory/Daycare, Clinics, Surgical Daycare, Outpatient Procedural Care, Cardio-Pulmonary, and Medical Imaging; and

7.8.26.1(9)(b) each care team station, care hub, nurse station, staff lounge, waiting room, sunroom, main entrance/lobby area (3 outlets), cafeteria (two outlets), and emergency operation centre (three outlets), on call room, doctor

sleeping room, physician lounge, and UBC teaching facility lounge and sleeping rooms.

7.8.26.1(10) At patient entertainment locations other than inpatient bed location Authority staff will control the channels/programming via remote control and will be able to change program channels or television inputs for access to patient entertainment programming.

7.8.26.1(11) At patient bed locations patients will control content including channels, programming, volume via pillow speakers connected to the nurse call system.

7.8.26.1(12) At each patient location in all clinical areas:

7.8.26.1(12)(a) provide an patient entertainment outlet capable of receiving television programming, patient education resources, clinical applications, and internet access.

7.8.26.2 Quality Requirements

7.8.26.2(1) The patient entertainment system will be manufactured by an industry leader and all components will be of that manufacturer.

7.8.26.3 Performance Criteria

7.8.26.3(1) A patient entertainment outlet consists of a quad-plex receptacle, one data outlet, and one coaxial cable. A patient entertainment outlet will serve a patient entertainment display, a patient education display, or a combined patient entertainment/education display. All cabling will be connected in the closest TR.

7.8.26.3(2) At each patient entertainment outlet location provide sufficient structural support and backing for a 55” display (TV) unit.

7.8.26.3(3) Arrange for the installation and connection of TV service including the complete backbone, horizontal, and distribution connections throughout the Facility.

7.8.26.4 IMIT Categorisation

7.8.26.4(1) Software and Server – IMIT Category E

7.8.26.4(2) Infrastructure – IMIT Category A

7.8.26.4(3) Interface - IMIT Category A

7.8.26.5 Interface Requirements

7.8.26.5(1) Cerner, RTLS, Patient Education, Smartbeds, Nurse Call, Telehealth, Patient/Staff Assignments, Telephone Equipment.

7.8.26.6 Service Level - Bronze

7.8.26.7 Systems Operation – Operating Period

7.8.26.7(1) End user administration – Authority

7.8.26.7(2) Systems Lifecycle – Not specified.

7.8.27 Patient Education System

7.8.27.1 Basic Requirements

7.8.27.1(1) The Authority intends to provide the application services, programs and electronic educational material that will be displayed via the Authority's network on televisions, patient entertainment displays, video conferencing equipment, information kiosks, tracking dashboards, and personal computers.

7.8.27.1(2) Project Co will be responsible for design and provision of the complete infrastructure, system, and interfaces necessary to support the education system.

7.8.27.1(3) The patient entertainment and education system will both utilize the same display, audio, and control features.

7.8.27.1(4) The Authority will procure and utilize Cerner – MyStation as the patient education platform

7.8.27.1(5) The Authority will provide the head-end components for Cerner - myStation on the Authority's servers.

7.8.27.2 Performance Criteria

7.8.27.2(1) At each inpatient bed location the patient education system will utilize a webcam for Telehealth and other applications.

7.8.27.2(2) At each inpatient bed location provide infrastructure and interface to accommodate an over-bed microphone which will connect to the patient education system.

7.8.27.2(3) At patient education locations other than inpatient bed locations Authority staff will control the channels/programming via remote control and will be able to change program channels or television inputs for access to patient education programming.

7.8.27.2(4) At inpatient bed locations patients will control content and volume via pillow speakers connected to the nurse call system.

7.8.27.3 IMIT Categorisation

7.8.27.3(1) Software and Server – IMIT Category D

7.8.27.3(2) Infrastructure – IMIT Category A

7.8.27.3(3) Interface - IMIT Category A

7.8.27.4 Interface Requirements

7.8.27.4(1) Cerner, RTLS, Patient Entertainment, Smartbeds, Nurse Call, Telehealth, Patient/Staff Assignments, Telephone Equipment

7.8.27.5 Service Level - Gold

7.8.27.6 Systems Operation – Operating Period

7.8.27.6(1) End user administration – Authority

7.8.27.6(2) Systems Lifecycle – Not specified.

7.8.28 Nurse Call Systems

7.8.28.1 Basic Requirements

7.8.28.1(1) The nurse call system will utilize the latest proven technology used in facilities similar to the Facility.

7.8.28.1(2) The nurse call system in a smart hospital environment is a hub for interfacing technologies and systems. Incorporate in the planning, design and installation the multiple virtual and physical interfaces, and pathways that are required to support an integrated patient centric system. In addition to the interfacing of systems as detailed in 7.8.28.5 *(*Interface Requirements) physical pathways, interconnections, and interfacing are also required to support lighting and blind control from the smart bed, and control of the patient entertainment/education system from the smart bed.

7.8.28.1(3) Prior to designing and installing the nurse call system and as required by the Authority, coordinate the technical capabilities of the nurse call system, hardware interface and integration requirements, system layout, and functionality with the Authority and the Authority's clinical staff.

7.8.28.1(4) Installation of the nurse call system will be to the satisfaction of the Authority including programming, configuration, interfacing , testing and commissioning of the system.

7.8.28.1(5) Train Authority staff on the nurse call system, training schedule to be determined in consultation with the Authority.

7.8.28.1(6) Provide a full feature audio and visual nurse call system with full duplex communications in any and all patient use and patient care areas/rooms/units of the facility including: General Medical/Surgical Inpatient, Intensive Care/Telemetry, Maternity, Psychiatric, Emergency, Ambulatory/Daycare, Clinics, Surgical Daycare, Outpatient Procedural Care, Cardio-Pulmonary, and Medical Imaging.

7.8.28.1(7) The nurse call system will be:

7.8.28.1(7)(a) the primary communication device for patients to contact staff in each clinical use and patient care area; and

7.8.28.1(7)(b) the primary communication device for Authority staff to alert other staff that they need assistance in a clinical use or patient care area.

7.8.28.2 Quality Requirements

7.8.28.2(1) Comply with all applicable standards, including UL1069, CSA C22.2 and CSA Z32-09.

7.8.28.3 Performance Criteria

7.8.28.3(1) In consultation with the Authority Interface and Integrate the nurse call system with other systems as defined in 7.8.28.5 *(*Interface Requirements).

7.8.28.3(2) Interface the nurse call system with other systems in a seamless manner to achieve the integrated functional requirements as determined in consultation with the Authority.

7.8.28.3(3) The nurse call system will fully interface with Cerner to enable bi-directional communications and transfer of all required data.

7.8.28.3(4) Integrate the nurse call system with the network and provide sufficient audio channels, in consultation with the Authority, for the requirements of the Facility.

7.8.28.3(5) Interface the nurse call system with the RTLS and Cerner such that the system is capable of signalling the presence of an

individual staff member in a particular room via the dome light, staff console, or status board. Interface the RTLS to the nurse call system to enable automatic nurse call cancellation based on the staff presence within or entering a room.

7.8.28.3(6) The nurse call system will provide a full range of software applications as offered by the nurse call vendors most current systems intended for use in large acute care facilities. The applications will include system administration and supervision, staff assignment and messaging, staff tracking and presence, workload and workflow management, and statistical reporting.

7.8.28.3(7) The nurse call system will have the capability to allow Cerner to report from the nurse call system and pull data from the nurse call system for the purposes of reporting and analytics for items such as workflow optimization. All data points within the nurse call system will be available for Cerner access.

7.8.28.3(8) All data points within the nurse call system will be capable of being retained for the purposes of reporting for a minimum two weeks.

7.8.28.3(9) Provide network separation of the nurse call system as per Section 7.8.5.1(2). Provide all network equipment for the nurse call system and integrate this network, in consultation with the Authority, with other Facility networks.

7.8.28.3(10) Utilize standard Category 6 (or greater based on standard in place at the time of procurement) cabling and connectors for nurse call cabling as applicable.

7.8.28.3(11) Install nurse call terminal cabinets in telecommunication rooms as approved by the Authority. All nurse call network horizontal runs to telecommunications rooms (TR) will be terminated in accordance with Appendix 3F(i) [Cable Infrastructure Standard].

7.8.28.3(12) The nurse call system will annunciate on the wireless staff communication system (staff communication device, wireless phone devices, PDA’s or phones) for near instant alarm response as a secondary alerting system. The nurse call system will operate seamlessly with the wireless staff communication devices and allow two-way VoIP communication into all patient locations.

7.8.28.3(13) The nurse call system will utilize VoIP communications between all major components including staff consoles, patient stations, staff stations and all telephones and staff communication devices.

7.8.28.3(14) At a minimum, provide a staff console in each clinical nursing area including care team stations, care hubs, nurse stations, reception, and administrative.

7.8.28.3(15) Staff consoles will be colour, touch screen, user configurable, allow multiple screens, soft key enabled, hands-free full duplex capability with handset for private conversations.

7.8.28.3(16) Staff consoles will have the capability to redirect all calls to other staff consoles on a manual, automatically scheduled basis, call escalation, or console failure.

7.8.28.3(17) Patient stations will be installed at each patient bed location, patient care area, and each patient use area as identified in Section 7.8.28.1(6).

7.8.28.3(18) In each General Medical/Surgical inpatient room provide the following:

7.8.28.3(18)(a) one patient station for each bed location;

7.8.28.3(18)(b) one bath station with audio and pull cord capability; and

7.8.28.3(18)(c) one pull/call cord station for each patient chair location.

7.8.28.3(19) Patient stations will be individually programmable to allow multiple call classification and priority levels. Patient stations will be capable of connecting two nurse call cords or auxiliary alarm inputs. Provide the ability to disable any nurse call system input from any staff console.

7.8.28.3(20) Patient stations located in psychiatric areas will have a suitable physical barrier, or enclosure that enables staff to prohibit access to the patient station by the patient.

7.8.28.3(21) Where smart beds are planned the nurse call patient station will fully interface with the full range of smart bed call and audio functions.

7.8.28.3(22) The nurse call system will provide an interface such that the audio from the patient entertainment/education system will be connected and audible through the smart bed speakers.

7.8.28.3(23) The nurse call system will also provide an interface such that the smart bed is capable of controlling patient headwall lighting, and up/down control of the patient room electric blind,

7.8.28.3(24) Provide nurse call cords for each patient station plus 10% spare. 25% of the call cords will be pillow speaker type, with the remainder being standard call cords.

7.8.28.3(25) Provide emergency pull cord stations at all patient bath rooms, shower rooms, and change room locations complete with audio and staff emergency alarms.

7.8.28.3(26) Pull cords will be washable and compliant with the Authority's infection control policies.

7.8.28.3(27) Psychiatric facilities will not have cords permanently attached to input devices.

7.8.28.3(28) Provide multi-call classification dome light (minimum 4 LEDs) to annunciate staff presence, or calls in all rooms with nurse call devices. Locate dome lights in a manner that allow Authority staff the best possible view from the outside of the room where the nurse call device is located. Provide zone lights at all corridor intersections to direct and lead staff from anywhere within or outside the unit to the origin of the call.

7.8.28.3(29) Provide a code blue system with code blue buttons at locations determined in consultation with the Authority including: each area as identified in Section 7.8.28.1(6) including all clinical use area, patient care area, care team stations, care hubs, nurse stations, reception, administrative, and all patient therapy rooms, patient lounges, procedure rooms, exam rooms and inpatient rooms. Provide a code blue system that is interfaced with the following systems: access control, Authority network, staff communication system, radio system, elevator controls, public address system.

7.8.28.3(30) Provide a code blue system that achieves the following sequence of operation:

7.8.28.3(30)(a) Upon a Code Blue button activation a priority call signal will be annunciated at the staff console, a pop-up message will also be displayed on all switchboard workstations that will indicate the precise origin of the code blue call.

7.8.28.3(30)(b) Provide dome/zone lights at all corridor intersections elevator lobbies to direct and lead the code blue team from anywhere within or outside the unit to the origin of the code blue call

7.8.28.3(30)(c) A message will be automatically sent to all unit based staff communication and paging devices as directed and determined by the Authority.

7.8.28.3(30)(d) Upon authentication of the code blue event by the unit clinical staff to the switchboard, a code blue signal will be manually initiated by the switchboard staff. The code blue signal will comprise a coded message on the public address system, and a text message which is sent to the code blue teams staff communication devices, and a pre-recorded message to be sent to the radio system.

7.8.28.3(30)(e) Switchboard staff will also activate an elevator homing command by way of keyswitch at the switchboard location.

7.8.28.3(30)(f) Switchboard will also activate a pushbutton which confirms to the access control system that the code blue event is genuine. The access control system determines the origin of the code blue call from the nurse call system. The access control system provides the code blue response team with an unrestricted route to the origin of the code blue call.

7.8.28.3(30)(g) Each code blue team member will have the ability to recall any elevator from any elevator lobby by means of a elevator recall keyswitch, The code blue team will assume control of the elevator by means of a code blue keyswitch located inside each elevator cab.

7.8.28.3(30)(h) Upon cancellation of the code blue call at the patient station all systems will reset and resume normal operation.

7.8.28.3(31) Provide adequate staff/duty stations for each nurse call system to ensure that tones are heard throughout each department. Provide the capability to mute each staff/duty station.

7.8.28.4 IMIT Categorisation

7.8.28.4(1) Software and Server – IMIT Category A

7.8.28.4(2) Infrastructure – IMIT Category A

7.8.28.4(3) Interface - IMIT Category A

7.8.28.5 Interface Requirements

7.8.28.5(1) Cerner, RTLS, Patient Education, Patient Entertainment, Physiological/Patient Monitoring, Smartbeds, Infant Abduction, Staff Communication System, Code Blue System, Fire alarm, TeleTracking, Nurse Call Reporting Database, ADT Integration, Electronic Clinical Status Board, Patient/Staff Assignments, Paging System, Help Desk, VoIP/Telephone System, Radio System, Access Controls, Public Address System, Elevator Controls.

7.8.28.6 Service Level - Gold

7.8.28.7 Systems Operation – Operating Period

7.8.28.7(1) End user administration – Project Co

7.8.28.7(2) Systems Lifecycle – 14 years

7.9 Electronic Safety and Security (Division 28)

7.9.1 General

7.9.1.1 Project Co will:

7.9.1.1(1) utilize CPTED (Crime Prevention Through Environmental Design) principles along with workplace safety and security considerations;

7.9.1.1(2) minimize the visibility of security devices in patient care areas to reinforce the therapeutic nature and residential qualities of treatment spaces. In interior and exterior public spaces such as lobbies, reception and waiting areas, rest areas, access and egress points, security devices may be visible; design the Facility and all outdoor areas with Facility Users safety and security in mind; and

7.9.1.1(3) ensure a safe environment for staff, patients and visitors by proper utilization of electronic access control, duress, video monitoring and intrusion detection systems.

7.9.1.2 Refer to Section 7.8.3 regarding categorization of IMIT Systems and Equipment. Refer also to the summary included in Appendix 3F(v) [Information System Responsibilities Summary].

7.9.2 Fire Alarm System

7.9.2.1 Basic Requirements

7.9.2.1(1) Provide a fire alarm system for the Facility and ensure that that system meets or exceeds the requirements in this Section.

7.9.2.1(2) Fire alarm system must be of a type that failed devices can be rapidly replaced and programmed by building operations and not require on site presence of a manufacturer's representative.

7.9.2.1(3) Provide a complete two-stage, supervised, 24 VDC fire detection and alarm system that includes addressable, intelligent, automatic and manual initiation devices and audio/visual alarm devices with voice evacuation capabilities. Alarm activation will be initiated by manual pull stations, smoke / heat detection, and fire sprinkler water flow devices. Alarm indication will consist of visual and combination visual/audible devices.

7.9.2.2 Performance Criteria

7.9.2.2(1) Install all fire alarm wiring in conduit. Provide fire rated cable where required by the BC Building Code.

7.9.2.2(2) Provide addressable smoke detectors as required, self correcting type to maintain consistent sensitivity.

7.9.2.2(3) All Facility addressable fire alarm devices, fire alarms and fire troubles will be incorporated on the Authority's network computers. Ensure that the Facility's fire alarm panel devices and internal trouble condition details print out on the Authority's network printers.

7.9.2.2(4) Provide two-stage manual pull stations at all exit doors and entrances to exit stairs as required.

7.9.2.2(5) Provide visual notification devices at all corridors, public spaces, staff and patient and toilets and common use spaces.

7.9.2.2(6) Provide fire alarm speakers throughout the Facility as required. Speaker system will be available to announce alarm conditions and for use as emergency public address announcements. Provide a telephone interface to the fire alarm voice paging system from the main switchboard. Pre-programmed messages will be transmitted over the public address system to annunciate origin of alarm. Any program sources on the public address system will be muted while alarm messages are transmitted.

7.9.2.2(7) Use combination audible alarm and visual notification devices where applicable.

7.9.2.2(8) Include control devices and connection to close fire and smoke doors on activation of alarm condition.

7.9.2.2(9) Incorporate smoke control systems with control fans and dampers.

7.9.2.2(10) Provide a class A addressable loop for all detection circuits. Provide isolation modules at each penetration of a fire wall within the fire alarm zone.

7.9.2.2(11) Fully integrate the fire alarm system with the sprinkler system, BMS, HVAC system, elevator controls, access control system, nurse call, emergency generator plant, and public address systems.

7.9.2.2(12) The fire alarm system will integrate with the radio system to automatically broadcast voice messages to all protection services radios. The voice message will relay the specific alarm message produced by the addressable fire alarm system. Provide all middleware and converters required to interface the radio system with the fire alarm system.

7.9.2.2(13) Provide a graphic annunciator complete with LCD display at the main reception area for the Facility, as required and approved by the local fire department. The annunciator will have an LED matrix and vellum floorplan overlays to provide for simple future revisions to floorplans.

7.9.2.2(14) Provide LED type indicators for remote indication that a heat and/or smoke detector has been activated in a lockable room (located outside room adjacent to door), in an elevator shaft (located at elevator lobby ceiling) or duct sensors that are not readily visible (located on ceiling or at visible location nearest to sensor installation).

7.9.2.2(15) In consultation with the Authority, provide remote annunciators at key locations throughout the Facility. At a minimum, these will include nurse stations, maintenance workshops, boiler house and security offices.

7.9.2.2(16) Provide a central monitoring system located at the Facility security centre. This computer workstation will display a graphical representation of the Facility and will indicate the general origin of the fire alarm, trouble, supervisory condition or system event. Supplemental ‘drill-down’ detailed maps of each building and fire compartment will allow staff to identify the exact location.

7.9.2.2(17) Provide a fireman’s handset from the fire alarm system to a location of the Authority’s choosing, such that the fire alarm voice paging system is capable of performing as a redundant public address system.

7.9.2.2(18) Coordinate with the Authority to establish a secure backup of the fire alarm system event log.

7.9.2.2(19) Provide a fully functional supervisory fire alarm computer workstation in maintenance department.

7.9.2.2(20) Provide a printer with each fire alarm workstation to generate a hard copy of the system's event log.

7.9.2.2(21) Provide gel electrolyte type batteries with overcharge protection for FACP and all transponders. Provide solid state battery charger(s) with capacity to recharge entire battery system in 4 hours. Batteries will have enough capacity (with 25 percent spare time) to operate entire system (except magnetic door holders) in accordance with the BC Building Code.

7.9.2.2(22) Include transmission of alarm signal to remote emergency response centre approved by the Authority.

7.9.2.3 IMIT Categorisation

7.9.2.3(1) Software and Server – IMIT Category A

7.9.2.3(2) Infrastructure – IMIT Category A

7.9.2.3(3) Interface - IMIT Category A

7.9.2.4 Interface Requirements

7.9.2.4(1) Public Address system, Elevator system, Building Management System, Nurse Call system, Staff Communication System, Paging system, Access Controls, Telephone System, Radio.

7.9.2.5 Service Level – Platinum

7.9.2.6 Systems Operation – Operating Period

7.9.2.6(1) End user administration – Project Co

7.9.2.6(2) Systems Lifecycle – 25 years

7.9.3 Electronic Security Systems

7.9.3.1 General

7.9.3.1(1) Design, provide and install a security system to meet the Authority's security programs within a healthcare facility environment.

7.9.3.1(2) Provide fully networked integrated security systems to protect staff, patients, visitors and property. As part of this security management program, at a minimum, provide a closed circuit

television system to view and record events, an access control system to restrict access to secure areas to authorized personnel only and to support the safe operation of psychiatric facilities, an infant abduction system, an intrusion alarm detection systems to detect and report unauthorized entry into protected spaces, a Facility wide panic duress system (wired and wireless) to protect staff and a 2-way voice-based radio system to support the operation of protection services personnel.

7.9.3.1(3) Develop the security design based on the Facility Threat and Risk Assessment (refer to Sections 4.10 and 5.3 of Schedule 2 [Design and Construction Protocols]).

7.9.3.1(4) Project Co will be responsible for the initial programming of proximity cards. Project Co will locate all security devices and provide monitoring and alarm annunciation requirements to the satisfaction of the Authority.

7.9.3.1(5) The Authority's security personnel will monitor the security system from their present security office location in the Authority's RJH dispatch centre. Project Co will be responsible for modifying the existing RJH dispatch centre to accommodate new monitors, PCs, hardware and software infrastructure and all electrical requirements.

7.9.3.1(6) All electronic security systems will reside on a dedicated security systems VLAN as part of the Authority's information technology infrastructure connected via the structured cabling system and network devices to allow the Authority the opportunity to review events and monitor the status of security systems from off-Site locations. The system will be fully accessible through the Authority's network.

7.9.3.1(7) Electronic security systems will be scalable to allow for future additions and interconnections of many devices and subsystems from different manufacturers.

7.9.3.1(8) The security system will incorporate commercial off-the–shelf equipment and proven designs from manufacturers regularly engaged in the production of models and types of equipment used in the security industry. Products will be quality control tested and verified for the intended operation prior to installation at site.

7.9.3.1(9) All materials, including hardware and software provided will be fully compatible with the Authority's head-end systems located at RJH in Victoria and will be new and the most current version or production model.

7.9.3.1(10) Electronic security systems will maintain dependability and reliability under all operational environmental conditions, capable of 24 hours per day, seven days per week continuous operation.

7.9.3.1(11) Interconnect security systems to the fire alarm system and other systems as required by applicable codes and standards.

7.9.3.1(12) Arrange meetings with the Authority to coordinate system design, interconnections and programming requirements to integrate with the Authority's security systems.

7.9.3.1(13) Train Authority staff on the use and operation of security systems and location of all security devices. Coordinate and schedule training with the Authority.

7.9.3.1(14) Security systems infrastructure must comply with the manufacturer's technical specifications and configuration requirements.

7.9.3.1(15) All electronic security systems will meet all Authority privacy standards pertaining to storage and operation of devices. Provide all necessary documentation and completed privacy impact assessment (PIA) required to meet Authority privacy/confidentiality standards.

7.9.3.1(16) Provide an independent electronic signage system for parkade availability indication. Integrate the parkade control system with the access control system.

7.9.3.1(17) Provide duress stations that are highly visible, illuminated, and accessible. Duress stations upon activation will annunciate locally by means of a minimum 90dBA siren, a xenon strobe, and will be supervised by protection services monitoring , and be integrated with the CCTV system and radio system.

7.9.3.1(18) Provide all areas of parking including the parkade with duress stations such that no location in the parkade is further than 30m from a duress station.

7.9.3.1(19) Ensure that all areas of parking and the parkade, including stairwells are capable of being viewed with either PTZ or fixed CCTV. Coverage will be to a level that will allow facial identification. The term "facial identification" or "facial recognition" means capturing a target's face with CCTV cameras and providing images of 80 pixels per foot.

7.9.4 Access Control

7.9.4.1 Basic Requirements

7.9.4.1(1) The Authority intends to maintain and manage a central Facility Commander (FC NWX) access control head-end server and database for administration and programming of card access at RJH in Victoria, BC. This head-end system also provides administration of access control systems at various healthcare facilities under the Authority's jurisdiction throughout the region.

7.9.4.1(2) Provide an access control system that is compatible with the Authority's existing system. If the access control system is not identical to the Authority's existing system then it will fully integrate with and utilize the existing database of users, groups and schedules. Integration will be such that any change to one system will effect and cause the same change on the other system with no additional input or action.

7.9.4.1(3) The access control system will lock and unlock doors via time schedule and card readers utilizing proximity field effect technology to grant or restrict access to employees via a programmable classification system with sufficient capacity to handle at minimum 65,000 regional employees down to the field panel level, and operate over a standard TCP / IP Ethernet network.

7.9.4.1(4) Refer to Appendix 3F(vii)[Door Operation Matrix] for a schedule of doors required by the Authority, at a minimum, to be equipped with card access control.

7.9.4.1(5) All doors that require card access control will be equipped with:

7.9.4.1(5)(a) door position contacts/monitors,

7.9.4.1(5)(b) request to exit sensors, hardware, or pushbuttons,

7.9.4.1(5)(c) electric strikes or magnetic locks,

7.9.4.1(5)(d) proximity card readers,

7.9.4.1(5)(e) interface relays, and

7.9.4.1(5)(f) power supplies.

7.9.4.1(6) Locking systems will be fail secure as a preference, or as required by code. The access control and monitoring system will be integrated with the alarm interface unit and event recorder providing graphic display of door position status and operating interface for central locking/unlocking of doors.

7.9.4.1(7) The access control system will permit full control functionality from off-site and on-site workstations.

7.9.4.1(8) The access control system will integrate with the Heliport lighting system to permit local and remote control of the lighting from the RJH dispatch centre and from local security workstations.

7.9.4.1(9) Provide a dedicated parkade access control system.

7.9.4.1(10) The access control system will interface with the CCTV system such that when an alarm is initiated at an access controlled door all local CCTV cameras associated with the door are displayed at the local Protection Services workstation and the RJH Dispatch Centre.

7.9.4.1(11) The access control system will integrate with the infant abduction and patient wandering system to prevent unauthorized egress.

7.9.4.1(12) Interface requirements between the access control system and other systems are described in this section and in other sections identified in 7.9.4.4 (Interface Requirements).

7.9.4.2 Performance Criteria

7.9.4.2(1) Refer to Appendix 3F(vii) [Door Operation Matrix] for the high level description of functional intent for doors required to be provided with access control.

7.9.4.2(2) All access controlled doors will be provided with keyed hardware, on both sides of the door if required, to override all access controls and allow passage through the door in either direction.

7.9.4.2(3) All mag lock controlled doors will be able to be manually unsecured by means of a keyswitch which directly interrupts power to the doormag(s). A key override will be provided on each side of the door(s).

7.9.4.2(4) All doors from the stairwells leading into the Facility will be equipped with proximity card access control.

7.9.4.2(5) All seclusion rooms will require simultaneous operation of a local pushbutton and proximity card to enter the room. A single card reader inside the room will enable egress. Each seclusion room will have a remote release toggle switch and door locked/unlocked indicators at the local nurse station. All switches and indicators will be clearly labeled to indicate their function.

7.9.4.2(6) All access control panels / field controllers will reside in TRs.

7.9.4.2(7) All access control panels will either have integral battery backup for 2 hour continual operation and be connected to vital power, or be connected to UPS power. Access controls and door hardware components required in Mental Health and Addiction Services (MHAS) and other secure doors in the Facility which do not fail secure, will be provided battery backup for 60 minutes and UPS power. Determination of these battery backed secure doors will be made by the Authority during the design phase.

7.9.4.2(8) All remote power supplies serving access control components and door hardware will have battery backup for 2 hour continual operation, and these will be connected to Vital power.

7.9.4.2(9) Each access controlled door and its associated electrical door hardware components including door strikes, door mags and hold open devices will be supplied with individually fused, battery-backed circuits. Individual power supply units will not serve more than 8 doors, or more than 1 department, or multiple floors of the building, or an area greater than 2000m2.

7.9.4.2(10) All doors will have their hardware keyed to provide fail-safe mechanical override of the access control;

7.9.4.2(11) Card access system will utilize a file server and allow multiple workstations to access this file server for control and annunciation purposes. All alarms will be annunciated locally and at the RJH Dispatch Centre (located off-Site), and will allow concurrent remote monitoring capability both on and off-Site.

7.9.4.2(12) Project Co will provide a user interface at both the RJH Dispatch Centre and local monitoring station that will provide the following functionality:

7.9.4.2(12)(a) presentation of access control system alarm locations superimposed on a facility floor plan,

7.9.4.2(12)(b) ability to configure and control each door, or monitored point,

7.9.4.2(12)(c) alarm handling, and

7.9.4.2(12)(d) real-time indication of door/device status.

7.9.4.2(13) The access control system will be integrated with code blue emergency response procedures to provide unrestricted access through designated code blue travel routes. Code blue carts within two metres of a secure door will cause the secure door to

automatically open. Secure doors will then close and secure once the code blue team is two metres or more beyond the secure door.

7.9.4.2(14) Each access controlled door will have the capability to emit an audible tone/alarm signal to annunciate door held open and door forced open alarms. This tone will be adjustable in volume and will have a programmable option allowing the tone to be silenced or removed for door functionality as required on access or egress.

7.9.4.2(15) The access control system will function at the field controller level without connection to the PC Host or gateway. All field controllers will be connected by TCP/IP using the structured cabling.

7.9.4.2(16) The access control system will have the capability to lock down departments or other areas identified by the Authority in the event of an emergency or per an established schedule on a door by door basis or global command. Determine and program final access control system configuration in consultation with the Authority.

7.9.4.2(17) The access control system will use dual technology (proximity and microchip) type readers and will be capable of reusing all existing cards presently distributed across the Authority. Volume level of the tones emitted by the card reader will be adjustable and will be suitable for quiet environments. Card readers will also have will have a silent operation capability.

7.9.4.2(18) The access control system will be compatible with the Authority's existing systems to allow existing Authority cards to work on the system and allow new cards for the Facility to work on systems in the rest of the Authority's region. Provide base programming and coordination with the Authority.

7.9.4.2(19) Provide all necessary equipment, hardware, network infrastructure and programming as required to establish interconnectivity and seamless interface with the FC WNX system and head-end equipment.

7.9.4.2(20) Provide five thousand five hundred (5500) blank HID Corporate 1000 35-bit proximity cards with smart technology for Authority staff. Consult with the Authority on card numbering sequence and format before ordering cards to ensure compatibility with existing cards and equipment.

7.9.4.2(21) Provide delayed egress operation and alarms at emergency exit doors; alarms to annunciate audibly locally and via the integrated access system. See Appendix 3F(vii) [Door Operation Matrix]

7.9.4.2(22) Interconnect and interface all electronically controlled doors for remote “lock & unlock” capability through the access control system on a door-by-door or global command basis.

7.9.4.2(23) Provide clear signage indicating entry procedures. Consult with the Authority for appropriate and acceptable wording.

7.9.4.2(24) All security alarms will be logged and archived. Logging system will be capable of external archiving/backup in order to extend the event info storage duration.

7.9.4.2(25) Access control system will provide canned reports and custom reporting capability as defined during consultation with the Authority.

7.9.4.2(26) Provide interconnection access to the applicable control and reporting platform to security workstations located in the security offices.

7.9.4.2(27) Provide an maintenance/administration workstation (MAW) PC complete with operating & application software, monitor, keyboard, mouse and interconnection to the security system. Locate MAW in SER data room, accessible to authorized personnel and Authority staff.

7.9.4.2(28) Determine, in consultation with the Authority and per Appendix 3F(vii) [Door Operation Matrix], the location of access control doors and door alarms within the Facility. Provide card readers, locking hardware, request-to-exit devices, door closers, door position/alarm contacts with all associated mechanical and electric hardware and field devices, including power supplies for a fully operational system.

7.9.4.2(29) In addition to Appendix 3F(vii) [Door Operation Matrix] provide access control doors and door alarms for the following:

7.9.4.2(29)(a) administration and cash offices;

7.9.4.2(29)(b) IPU main entrances;

7.9.4.2(29)(c) medical records;

7.9.4.2(29)(d) stairwells;

7.9.4.2(29)(e) care hubs which contain medication storage;

7.9.4.2(29)(f) staff / locker rooms, staff lounges, staff washrooms;

7.9.4.2(29)(g) EOC;

7.9.4.2(29)(h) video conference rooms;

7.9.4.2(29)(i) teaching rooms;

7.9.4.2(29)(j) service rooms;

7.9.4.2(29)(k) computer rooms, PER, SER, TRs and equipment rooms;

7.9.4.2(29)(l) perimeter entrances;

7.9.4.2(29)(m) pharmacy, drug storage & medication rooms;

7.9.4.2(29)(n) support spaces (FMO, Stores, Logistics, Clean rooms/storage; OT splinting room etc) where not contained within a secure/non-public access perimeter;

7.9.4.2(29)(o) staff only corridors;

7.9.4.2(29)(p) entrances to locker rooms;

7.9.4.2(29)(q) morgue;

7.9.4.2(29)(r) Heliport;

7.9.4.2(29)(s) operating department entrances;

7.9.4.2(29)(t) all elevators (both hall call and inside the cab), with floor by floor control;

7.9.4.2(29)(u) roof access;

7.9.4.2(29)(v) stairwells (mhas, perinatal and roof access);

7.9.4.2(29)(w) neuroscience;

7.9.4.2(29)(x) all seclusion rooms;

7.9.4.2(29)(y) mental health and addiction services (MHAS);

7.9.4.2(29)(z) UBC TEL Rooms (refer to Appendix 3C [UBC Faculty Medicine Technology Enabled Room Specifications]); and

7.9.4.2(29)(aa) areas designated as high risk by the Authority.

7.9.4.2(30) Following consultation with the Authority, provide combination pin code/proximity card readers at all access/egress locations to/from all strictly controlled areas identified by the Authority, such as:

7.9.4.2(30)(a) ambulance entrance(s); and

7.9.4.2(30)(b) ambulance patient transport locations;

7.9.4.2(31) combination pin code/proximity card readers will be fully integrated into the Facility's access control platform (stand-alone, non-integrated pin pads are not acceptable). Combination pin code/proximity card readers will facilitate access by the following methods:

7.9.4.2(31)(a) pin code only;

7.9.4.2(31)(b) card read only; and

7.9.4.2(31)(c) pin code and card read.

7.9.4.2(32) Provide pan/tilt colour video intercom communications between the secure side of main entry doors and reception/care stations in departments and areas that are strictly controlled. Provide momentary remote pushbutton operation to release main entry doors when activated by staff or security personnel. Integrate the video intercom system with the access control system as required.

7.9.4.2(33) All delayed-egress doors intended for emergency use only will be alarmed locally at the carehub and collaboration desk, and at the protection services monitoring stations via the access control system. Alarms will be silenced through use of a keyswitch that will be integral to the panic hardware.

7.9.4.2(34) In MHAS inpatient units provide two access controlled doors between interior patient accessible areas and exterior unsecured space;

7.9.4.2(35) Provide interconnection access to the applicable control and reporting capabilities included with the Continuum platform to security workstations located in:

7.9.4.2(35)(a) the Facility's main entrance lobby; and

7.9.4.2(35)(b) the Emergency Department.

7.9.4.3 IMIT Categorisation

7.9.4.3(1) Software and Server – IMIT Category E

7.9.4.3(2) Infrastructure – IMIT Category A

7.9.4.3(3) Interface - IMIT Category A

7.9.4.4 Interface Requirements

7.9.4.4(1) Fire alarm system, Nurse Call/Code Blue, Building Management system, Elevator, RTLS, Patient Tracking / Wandering, Infant Abduction, Staff Duress, Fixed Panic system, Intercommunication System, Intrusion Alarm, CCTV, HR Systems.

7.9.4.5 Service Level – Gold

7.9.4.6 Systems Operation – Operating Period

7.9.4.6(1) End user administration – Authority

7.9.4.6(2) Systems Lifecycle – 14 years

7.9.5 Fixed Panic System

7.9.5.1 Basic Requirements

7.9.5.1(1) The fixed panic system will provide staff with the ability to either discreetly or overtly initiate a call for assistance.

7.9.5.1(2) The fixed panic system will indicate the exact location of the call on a local protection services office workstation, the RJH Dispatch Centre, and transmit a message to the staff communication system.

7.9.5.1(3) The fixed panic system will interface and integrate with the RTLS based wireless staff duress system such that the system annunciates an alarm from either system in a similar fashion. See Section 7.8.20 (Real Time Location System (RTLS)).

7.9.5.1(4) The access control system will not be utilised for integrating the fixed panic system.

7.9.5.2 Performance Criteria

7.9.5.2(1) Fixed panic system buttons will be strategically located, suitably sized, clearly identified, suitable for application, and require key to reset.

7.9.5.2(2) Provide fixed panic system buttons for staff to initiate emergency assistance calls in areas of the Facility as determined in consultation with the Authority, including but not limited to:

7.9.5.2(2)(a) main lobby reception/security kiosk;

7.9.5.2(2)(b) each department nurse station and sub station;

7.9.5.2(2)(c) care/sub-care station reception desks;

7.9.5.2(2)(d) medication rooms;

7.9.5.2(2)(e) pharmacy;

7.9.5.2(2)(f) each interview room;

7.9.5.2(2)(g) imaging exam rooms (including but not limited to general radiology, CT and ultrasound;

7.9.5.2(2)(h) decontamination room;

7.9.5.2(2)(i) all triage desks;

7.9.5.2(2)(j) trauma rooms;

7.9.5.2(2)(k) parkade, parking lots and parkade booth (locate so that a button is within 30 meters of a person anywhere in the parking lot /parkade; parking lot duress alarms may be located on light poles);

7.9.5.2(2)(l) gift shop;

7.9.5.2(2)(m) patient information desk;

7.9.5.2(2)(n) patient admitting;

7.9.5.2(2)(o) in and out patient clinics;

7.9.5.2(2)(p) cash offices;

7.9.5.2(2)(q) health records; and

7.9.5.2(2)(r) secure rooms.

7.9.5.2(3) Upon activation of a fixed panic button a signal will identify the exact location of the event while providing the name of the device that initiated the alarm on mapping software located at the RJH Dispatch Centre, specified care stations and Facility protection services offices, while simultaneously annunciating a voice message on security radios. A local audible and visual alarm will be annunciated so that it may be seen and heard by staff throughout certain areas as determined by the Authority during the duress system design.

7.9.5.2(4) The fixed panic system will integrate with the radio system to automatically broadcast voice messages to all protection services radios. The voice message will indicate the specific location from

which the fixed panic call was initiated. Provide all middleware and converters required to interface the radio system with the fixed panic system.

7.9.5.2(5) The fixed panic system will be hard-wired and supervised such that a trouble/error message will reported to both Project Co and protection services.

7.9.5.2(6) The entire fixed panic system will be supervised for the following:

7.9.5.2(6)(a) power loss;

7.9.5.2(6)(b) system trouble;

7.9.5.2(6)(c) communication loss; and

7.9.5.2(6)(d) wiring and button (including short, ground fault, open circuit).

7.9.5.3 IMIT Categorisation

7.9.5.3(1) Software and Server – IMIT Category A

7.9.5.3(2) Infrastructure – IMIT Category A

7.9.5.3(3) Interface - IMIT Category A

7.9.5.4 Interface Requirements

7.9.5.4(1) RTLS, Access Controls, Nurse Call, Radio system, Switchboard, Telephone system, Staff Communication System, Authority's Network

7.9.5.5 Service Level – Gold

7.9.5.6 Systems Operation – Operating Period

7.9.5.6(1) End user administration – Authority

7.9.5.6(2) Systems Lifecycle – 14 years

7.9.6 Staff Duress system

7.9.6.1 Basic Requirements

7.9.6.1(1) Provide an RTLS based staff duress system, in accordance with Section 7.8.20 (Real Time Location System).

7.9.6.1(2) Staff will be provided with staff duress system pendants.

7.9.6.1(3) Provide a quantity of tags as follows:

7.9.6.1(3)(a) 500 staff duress system tags.

7.9.6.1(4) The staff duress system will provide 100% coverage throughout the Facility including elevator cabs, mechanical spaces, service areas, parkade, facility exterior, stairwells, and parking lots.

7.9.6.1(5) The system must be capable of being extended into the existing buildings on the Campbell River Site.

7.9.6.2 Performance Criteria

7.9.6.2(1) The staff duress system will be capable of locating and tracking a staff member anywhere within the Facility.

7.9.6.2(2) Project Co will coordinate with the Authority to ensure that departmental tracking/dashboard displays in each clinical and mental health department, and protection services are capable of displaying real-time location mapping of RTLS-tagged staff.

7.9.6.2(3) Project Co will provide a PC based application that will provide a presentation of staff locations by superimposing positional data on a facility floor plan and providing patient tag based information.

7.9.6.2(4) Provide an RTLS based staff duress system that provides the following functionality:

7.9.6.2(4)(a) the system will be capable of identifying the staff duress tag location within the Facility by floor, within a 3 m x 3 m or smaller area;

7.9.6.2(4)(b) the system will alert a duress system tag based on:

(b).1 operation of the staff duress pendant pushbutton;

(b).2 status of a tag (low battery, pendant failure);

7.9.6.2(4)(c) staff duress location tracking must update continuously when activated;

7.9.6.2(4)(d) the system will interface and integrate with the fixed panic system such that the system annunciates an alarm from either system in a similar fashion. See Section 7.9.5 (Fixed Panic System);

7.9.6.2(4)(e) the system will integrate with the radio system to automatically broadcast voice messages to all protection services radios. The voice message will indicate individual room location from which the staff

duress call was initiated. Provide all middleware and converters required to interface the radio system with the RTLS wireless staff duress system.

7.9.6.2(4)(f) upon the initiation of an alert the system will identify the location of the event and the particular staff member on the local clinical department and protection services workstation and status boards.

7.9.6.2(4)(g) the system will interface with the CCTV system such that when an RTLS-tagged staff member activates a staff duress system pendant, all local CCTV cameras associated with the event are displayed at the local Protection Services workstation and at the RJH Dispatch Centre. The event will also be transmitted to the staff communication system.

7.9.6.2(4)(h) Each department utilizing wireless duress will be provided with a wireless duress pendent test device that audibly and visually indicates on a pass / fail basis the functionality and battery life of the duress pendent. The testing device will be a closed loop device/station that allows for full functional testing without activating the Facility's staff duress system and will provide audit function as required.

7.9.6.3 IMIT Categorisation

7.9.6.3(1) Software and Server – IMIT Category A

7.9.6.3(2) Infrastructure – IMIT Category A

7.9.6.3(3) Interface - IMIT Category A

7.9.6.4 Interface Requirements

7.9.6.4(1) RTLS, Cerner, CCTV, Staff Communication system, Radio,

7.9.6.5 Service Level – Gold

7.9.6.6 Systems Operation – Operating Period

7.9.6.6(1) End user administration – Authority

7.9.6.6(2) Systems Lifecycle – 14 years

7.9.7 Infant Abduction

7.9.7.1 Basic Requirements

7.9.7.1(1) Provide an infant abduction system that does not utilise the Authority's 802.11 wireless network.

7.9.7.1(2) The system will be provided for the following departments:

7.9.7.1(2)(a) Maternity Newborn Child; and

7.9.7.1(2)(b) Paediatrics

7.9.7.1(3) Newborn, infant and paediatric patients will be provided with infant abduction tags.

7.9.7.1(4) Provide a quantity of tags as follows:

7.9.7.1(4)(a) 200 infant abduction system tags.

7.9.7.2 Performance Criteria

7.9.7.2(1) The infant abduction system will be capable of identifying and tracking an infant, paediatric patient or companion tag anywhere within the Maternity Newborn Child and Paediatric departments within 3m of its actual location.

7.9.7.2(2) Project Co will coordinate with the Authority to ensure that departmental tracking/dashboard displays located within the Maternity Newborn Child and Paediatric departments are capable of displaying real-time location mapping of tags.

7.9.7.2(3) All entry/exit locations to the specified departments must have an array capable of determining direction of travel and be interfaced with the corresponding access control system such that a 'lock-down' of a door based on 'tag' credentials can be initiated automatically.

7.9.7.2(4) The infant abduction system will interface with all elevators such that these elevators will not operate when an unaccompanied tagged infant is present in the elevator cab. The elevator inhibit feature will not operate when the infant is accompanied by an authorised companion tag.

7.9.7.2(5) Project Co will provide a PC based application that will provide a presentation of infant abduction tag locations by superimposing positional data on a facility floor plan and providing Infant Abduction tag based information.

7.9.7.2(6) Provide an infant abduction system that:

7.9.7.2(6)(a) provides alerting for tagged infant or paediatric patients based on:

(a).1 proximity to the department perimeter for infant abduction tags which are unaccompanied by a companion tag;

(a).2 status of a tag (low battery, tag removed, tag tamper, tag failure).

7.9.7.2(6)(b) upon the initiation of an alert, the system will identify the location of the event and the particular Infant on the local clinical department and protection services workstation and status boards.

7.9.7.2(6)(c) When an infant abduction system tag is in close proximity to a department perimeter:

(c).1 all local CCTV cameras associated with the perimeter door are displayed at the local protection services workstation and at the RJH Dispatch Centre;

(c).2 the event will also be transmitted to the staff communication system;

(c).3 a local siren and strobe is activated;

(c).4 the perimeter secure doors are secured via the access control system;

(c).5 message automatically sent to protection services radio system; and

(c).6 displayed on status boards

7.9.7.2(7) The infant abduction system will integrate with the radio system to automatically broadcast voice messages to all protection services radios. The voice message will indicate the specific department exit door from which the call was initiated. Provide all middleware and converters required to interface the radio system with the infant abduction system.

7.9.7.2(8) Infant abduction tags must have a minimum of 12 months of battery life in a typical usage scenario.

7.9.7.2(9) Patient tags must be non-line of sight and must work when covered with bed sheets and shirt sleeves.

7.9.7.2(10) Each department utilizing the infant abduction system will be provided with a wireless tag test device that audibly and visually indicates on a pass / fail basis the functionality and battery life of the pendant. The testing device will be a closed loop device/station that allows for full functional testing without activating the Facility's infant abduction system and will provide audit function as required.

7.9.7.3 IMIT Categorisation

7.9.7.3(1) Software and Server – IMIT Category A

7.9.7.3(2) Infrastructure – IMIT Category A

7.9.7.3(3) Interface - IMIT Category A

7.9.7.4 Interface Requirements

7.9.7.4(1) CCTV, Access Controls, Radio System, Status Boards, Staff Communication system, Elevators

7.9.7.5 Service Level – Gold

7.9.7.6 Systems Operation – Operating Period

7.9.7.6(1) End user administration – Authority

7.9.7.6(2) Systems Lifecycle – 14 years

7.9.8 Intrusion Detection

7.9.8.1(1) Basic Requirements

7.9.8.1(1)(a) Intrusion detection systems will be installed in all areas where protection of physical assets is deemed critical by the Authority.

7.9.8.1(2) Performance Criteria

7.9.8.1(2)(a) The intrusion detection system(s) will utilize industry proven devices for intrusion alarm detection and reporting capable of 24 hours per day, seven days per week continuous operation, with a minimum of 8 hours battery backup operation in the event of power outages.

7.9.8.1(2)(b) Provide intrusion detection system(s) including alarm controllers, local keypads, motion sensors, shock sensors, glass break sensors, door contacts, strobes, sirens and other alarm initiating devices as needed for a reliable and fully operational system(s).

7.9.8.1(2)(c) Control each system with keypad(s) located inside the department or area being protected.

7.9.8.1(2)(d) Local alarm controllers will be integrated with the Authority's existing intrusion monitoring system which resides in the RJH Dispatch Centre. The intrusion alarms will report to Sureguard digital receivers via its own phone line through a dedicated Telus 1B telephone line and be backed up over the LAN/WAN.

7.9.8.1(2)(e) Install intrusion detection systems in all areas where protection of physical assets is critical including:

(e).1 pharmacy and narcotics rooms;
(e).2 office suites (human resources administration, etc);
(e).3 health records storage;
(e).4 stores (shipping/receiving);
(e).5 hazmat storage;
(e).6 videoconference rooms;
(e).7 data centers (server, telecom equipment & computer rooms);
(e).8 cash offices; and
(e).9 areas designated as high risk by the Authority.

7.9.8.1(2)(f) Intrusion alarm system and all associated alarm panels must be compatible and remotely programmable from existing Authority system equipment.

7.9.8.1(2)(g) The intrusion alarm system will integrate with the radio system to automatically broadcast voice messages to all protection services radios. The voice message will indicate the specific department area from which the call was initiated. Provide all middleware and converters required to interface the radio system with the intrusion alarm system.

7.9.8.2 IMIT Categorisation

7.9.8.2(1) Software and Server – IMIT Category A

7.9.8.2(2) Infrastructure – IMIT Category A

7.9.8.2(3) Interface - IMIT Category A

7.9.8.3 Interface Requirements

7.9.8.3(1) Telephone System, Access Controls, Radio System, Authority's Network

7.9.8.4 Service Level – Bronze

7.9.8.5 Systems Operation – Operating Period

7.9.8.5(1) 7.9.8.5(2) End user administration – Authority

7.9.8.6 Systems Lifecycle – 14 years

7.9.9 CCTV

7.9.9.1 Basic Requirements

7.9.9.1(1) Provide all necessary infrastructure required to support the following systems:

7.9.9.1(1)(a) CCTV;

7.9.9.1(1)(b) clinical cameras;

7.9.9.1(1)(c) NextGen webcams;

7.9.9.1(1)(d) OR cameras; and

7.9.9.1(1)(e) videoconferencing cameras.

7.9.9.1(2) Provide the supporting infrastructure including power, telecommunication outlets, audio-video wiring, raceways, outlet boxes, structural requirements necessary to deliver the Telehealth requirements identified in Appendix 3A [Clinical Specifications] for options A to H.

7.9.9.1(3) Provide CCTV throughout the Facility, parkade and exterior areas for the purpose of viewing and recording video to enhance the level of security and assist Authority staff in providing a safe environment for patients, staff, and visitors and the general public while protecting the physical assets. In consultation with the Authority, the locations of CCTV cameras will be strategically placed to provide coverage of doors, entrances and corridors according to the intent of Appendix 3F(vii) [Door Operation Matrix] in lieu of each door individually.

7.9.9.1(4) Project Co will post signage at the main entrances to the Building. The signage as per Authority standards will notify the public that this area is under video surveillance. CCTV processes will be governed by the Public Surveillance System Privacy Guidelines for the Province of BC as well as the Freedom of Information and Protection of Privacy Act (British Columbia).

7.9.9.1(5) The system must be able to record clear images of individuals, which would allow distinction of gender, ethnicity and age category. System will provide recorded images of sufficient quality to be used as court evidence in Canada.

7.9.9.1(6) The Authority is implementing a project to integrate all Authority CCTV cameras onto a single open architecture type platform. Provide a CCTV system which is compatible with an open architecture system specified by the Authority.

7.9.9.1(7) The CCTV system will allow web based access to all live recording images and all system programming from remote Authority sites.

7.9.9.1(8) Interface requirements between the CCTV system and other systems are described in this Section and in other Sections identified in Section 7.9.4.4 (Interface Requirements).

7.9.9.2 Performance Criteria

7.9.9.2(1) System(s) will be a dedicated software-based virtual matrix that integrates to the existing Authority CCTV system using the structured cable plant for transmission and recording of images.

7.9.9.2(2) Provide the appropriate encoding/decoding capability to support 2 way (video and control) communications with any and all CCTV camera, individually and/or in predetermined clusters via the Authority network.

7.9.9.2(3) Provide video storage capacity for minimum of 30 days at 15 frames per second, minimum HD (1920 x 1080p) resolution. The CCTV system will have the option of recording each camera at various resolution levels and FPS depending on use and location, as well as by schedule or event. Provide file servers, workstations, and optical storage devices and connect to network. The system will have activity detection and incorporate smart search capabilities. Playback speed will be capable at 5x normal rate. During alarm conditions, allow for higher recording rates..

7.9.9.2(4) CCTV system will integrate with other systems identified in Section 7.9.4.4 (Interface Requirements).

7.9.9.2(5) CCTV display and review system will be network-based client application allowing for authorized users to remotely view, control and manage all aspects of the CCTV system across the network. System will have network and web access for remote monitoring, using predefined user authentication.

7.9.9.2(6) Display and review for all the cameras will be accessible through dual screen workstations located in the security office/ and RJH dispatch centre. Provide CCTV workstations with all required operating and application software, monitors, keyboard, mouse, joystick control with interconnection to security system network.

7.9.9.2(6)(a) Indoor cameras will be fixed type, capable of facial recognition, colour, high-resolution, high sensitivity (day/night), smoke dome type with an auto iris and zoom capability. Mounting will be appropriate for the environment, unobtrusive, matching colour with hidden cabling. Fixed cameras will be vandal resistant wall mounted and / or mounted at protective locations and heights.

7.9.9.2(6)(b) Outdoor cameras will be pan-tilt-zoom (PTZ) colour dome cameras, high resolution, capable of minimum 35x optical zoom, high-speed with low light day/night operation capability with 360 degrees rotation in less than 3 seconds. Domes will mount on poles, parapets and walls located to provide optimum unobstructed viewing of the area under surveillance. PTZ cameras will have the ability to mask portions of view through software and remote programming.

7.9.9.2(6)(c) Outdoor cameras will be complete with weatherproof housing and internal heater/ defroster/blower/wiper as required for suitable operation under varying environmental conditions.

7.9.9.2(6)(d) Cameras will not be set up in private areas such as patient rooms, treatment rooms or clinical areas (unless specifically identified for use by clinical department staff), locker rooms or washrooms. Cameras will not be placed or reviewed for the purpose of observing work performance of employees.

7.9.9.2(6)(e) CCTV clinical activity monitors will be located out of public view as required to protect privacy.

7.9.9.2(6)(f) Provide controller at security office to view and control all PTZ CCTV cameras.

7.9.9.2(6)(g) Provide minimum 24” LED CCTV monitors on site.

7.9.9.2(6)(h) Provide 2 workstations located at the RJH dispatch centre complete with virtual matrix controller and 4x42” 1080p monitors. Integrate these monitors with the existing system to permit remote supervision of the Facilities.

7.9.9.2(6)(i) Provide megapixel cameras in consultation with authority to capture appropriate identification footage.

7.9.9.2(6)(j) All entry and exit points to departments and associated areas require recorded video surveillance integrated to the CCTV security system as identified in Appendix Appendix 3F(vii) [Door Operation Matrix]. Where required by the Authority, provide video monitors for department staff to monitor local CCTV cameras associated with the department.

7.9.9.2(7) Provide CCTV equipment to monitor and record the identity of all persons entering and exiting the Facility’s main entrances, corridor/links and utilizing elevators in strictly controlled high risk departments and associated areas, as identified in consultation with the Authority.

7.9.9.2(8) Provide CCTV cameras at locations determined in consultation with the Authority, including:

7.9.9.2(8)(a) main entrances & exits to the Facility;

7.9.9.2(8)(b) entrance and exit corridors to all departments;

7.9.9.2(8)(c) public lobbies and waiting areas;

7.9.9.2(8)(d) pharmacy and associated entry doors;

7.9.9.2(8)(e) narcotic vaults;

7.9.9.2(8)(f) perinatal;

7.9.9.2(8)(g) loading docks;

7.9.9.2(8)(h) inside all elevators and elevator lobbies;

7.9.9.2(8)(i) parkade entrances and exits, including stairwells, exterior locations and parkade levels for viewing parking areas;

7.9.9.2(8)(j) perimeter walkways and walkways connecting to other buildings on Site;

7.9.9.2(8)(k) public thoroughfares and walkways;

7.9.9.2(8)(l) Heliport;

7.9.9.2(8)(m) gift shops;

7.9.9.2(8)(n) cafeterias;

7.9.9.2(8)(o) cash offices or areas where cash is exchanged;

7.9.9.2(8)(p) all mental health and addiction services areas, which will have 100% CCTV coverage;

7.9.9.2(9) MHAS departments will include recorded and non-recorded (clinical) CCTV coverage.

7.9.9.2(10) MHAS non-recorded CCTV coverage will be monitored locally at the care hub. The non-recorded areas will include:

(a).1 any patient accessible common areas,
(a).2 rooms not directly observable form the care team station,
(a).3 interview/consultation rooms,
(a).4 secure rooms provide clinical activity camera coverage,
(a).5 all of the bedrooms in the secure complex dementia and PICU units;

7.9.9.2(10)(b) Emergency Department will include recorded and non-recorded (clinical) CCTV coverage. Areas in which CCTV is employed will have 100% CCTV coverage;

7.9.9.2(10)(c) Emergency Department non-recorded CCTV coverage will be monitored locally at the Care Hub. The non-recorded areas will include:

(c).1 Seclusion Rooms

7.9.9.2(11) Provide an interface between the CCTV system and the fire alarm system such that when a fire alert or fire alarm is activated, the CCTV cameras in the vicinity of the fire alarm or alert will automatically be displayed in the Facility security office and also at the RJH Dispatch Centre.

7.9.9.3 IMIT Categorisation

7.9.9.3(1) Software and Server – IMIT Category A

7.9.9.3(2) Infrastructure – IMIT Category A (this includes cameras)

7.9.9.3(3) Interface - IMIT Category A

7.9.9.4 Interface Requirements

7.9.9.4(1) Authority's Network, RTLS, Infant Abduction, Patient Tracking / Wandering, Staff Duress, Fixed Panic, Access Controls, Fire Alarm, Intrusion Alarm, Elevators.

7.9.9.5 Service Level – Gold

7.9.9.6 Systems Operation – Operating Period

7.9.9.6(1) End user administration – Authority

7.9.9.6(2) Systems Lifecycle – 5 years

7.10 Clinical Systems (Division 29)

7.10.1 Enterprise Clinical Information Systems

7.10.1.1 General

7.10.1.1(1) The Authority's clinical information system platform is the Cerner Millennium platform. The system is the repository for the Authority electronic patient chart and offers a wide breadth of features designed to support clinical workflow, ensure safe practice and realize operational efficiencies through automation. As such the system has a very wide breadth of implementation that touches all Authority employees and most other information systems in use in the region. This Section details the common integration and interface points of the system and the specific requirements for doing so.

7.10.1.1(2) Refer to Section 7.8.3 regarding categorization of IMIT Systems and Equipment. Refer also to the summary included in Appendix 3F(v) [Information System Responsibilities Summary].

7.10.1.2 Interfaces

7.10.1.2(1) HL7. Health Level Seven (HL7) is an international standards development organization that has set several standards for clinical system to system messaging. Cerner supports most standard message types including ADT, Orders, Results,

Scheduling and FT1. Foreign systems looking to contribute or receive information from Cerner will utilize an HL7 V 2.4.X interface to do so.

7.10.1.2(2) iBus. iBus is Cerner's proprietary interfacing platform for device integration and alert management. Cerner maintains a device certification program for the iBus platform and list of certified equipment. Foreign systems looking to send information from a device or alert information from a system (e.g. BMS, NurseCall) will use iBus. The Cerner certified device list is available from the Cerner web site at www.cerner.com. The iBus module AlertLink is used as a standardized framework for collection and distribution of alerting information from foreign systems.

7.10.1.2(3) Note – foreign system alert information in Cerner PowerChart is considered redundant information and not for the purposes of primary alerting. Rationale for interfacing with Cerner is that the system has a very high usage rate and many staff spend considerable time in the system making it an excellent target for secondary alerting to maximize chances of alerts being received.

7.10.1.2(4) iAware. iAware is Cerner's framework for pulling data from foreign systems directly in to the Cerner screens. The framework utilizes common API's like web services to pull data and Cerner maintains their own API to support the integration of pulled data in to the Cerner screens via custom "gadgets" which can be positioned in line with the Cerner user interface.

7.10.1.2(5) URL linking. For systems that do not need to incorporate data in the millennium database but do need to be incorporated in the clinicians Cerner based workflow – there is a capability in PowerChart to launch other applications via a fully formed URL link. The target application must be a web based application for this type of integration to work. With a small amount of customization the URL link can be formatted to pass a limited amount of Cerner session information (username, patient context) to streamline integration. Bi-directional context management is not available.

7.10.1.2(6) CareAware Multimedia (CAMM). CAMM is Cerner's framework for interfacing image information. Foreign systems looking to contribute multi-media or image information to the Cerner system will utilize the CareAware interfaces.

7.10.1.2(7) Cerner Capacity Management. Capacity Management is Cerner's framework for integrating RTLS system information in to the

system for the purpose of enabling patient, staff, equipment status tracking and flow through the health care facilities.

7.10.2 Patient Physiological Monitoring System

7.10.2.1 Basic Requirements

7.10.2.1(1) The Authority has standardized on the Philips patient physiological monitoring system and Welch Allyn Vital Signs Monitors.

7.10.2.1(2) The patient physiological monitoring system comprises the following:

7.10.2.1(2)(a) fixed patient locations for physiological monitoring and vital signs monitoring; and

7.10.2.1(2)(b) telemetry (wireless) system for physiological monitoring.

7.10.2.1(3) Project Co will provide all infrastructure required to support the patient physiological monitoring system.

7.10.2.1(4) The Authority will provide the patient physiological monitoring system equipment, including physiological monitoring system wireless access points.

7.10.2.1(5) Project Co will coordinate with the Authority to determine locations of access points required to support the dedicated, independent wireless infrastructure associated with the patient physiological monitoring system. Project Co will install infrastructure and wireless access points.

7.10.2.1(6) Project Co will design the Facility including equipment locations (e.g., microwave ovens) so that it does not interfere beyond the noise floor and signal strength requirements (SNR) of the patient physiological monitoring system's wireless network. The resulting RF environment in the Facility must be consistent with the strictest specifications of the wireless end-use equipment.

7.10.2.1(7) Telemetry (wireless) systems for Physiological monitoring systems will be installed in each of the following departments: ICU/Telemetry Unit, Emergency Department, Cardio-Pulmonary, PAR, and Medical Imaging, plus all connecting corridors and elevators between these Departments.

7.10.2.1(8) Alarms will annunciate at bedside monitors and at the central stations unless the patient is monitored only on a telemetry monitor. A patient on a telemetry monitor will have his/her alarms annunciate only at the central station.

7.10.2.2 Performance Criteria

7.10.2.2(1) Patient physiological monitoring system servers will be located in the PER.

7.10.2.2(2) TR's will contain the patient physiological monitoring system equipment including PoE switches, synchronisation units and network switches. Provide dedicated rack space and complete structured cabling connections between the RJ45 outlet jack serving both the fixed patient locations and the wireless access point, and the port on the network switch. Provide sufficient equipment rack space complete with power supplies and wire management per Section 7.8.7.1(16)(a) Equipment Racks.

7.10.2.2(3) Provide a telecommunications outlet at each headwall in each department identified in Section 7.10.2.1(7).

7.10.2.2(4) Provide 2 telecommunications outlets at each care hub in each department identified in Section 7.10.2.1(7).

7.10.2.2(5) Provide a telecommunication outlet with a single data drop for each patient physiological monitoring system wireless access point.

7.10.2.2(6) Project Co will coordinate with the Authority and provide the mounting hardware for the patient physiological monitors and vital signs monitors in the care hubs and patient rooms, surgical, and procedure rooms.

7.10.2.2(7) Project Co will coordinate with the Authority and provide a complete speaker system at locations required to meet audibility requirements for the patient physiological monitoring system. Infrastructure will include provision of communications and power. The Authority will procure the patient physiological monitoring speakers.

7.10.2.3 IMIT Categorisation

7.10.2.3(1) Software and Server – IMIT Category C

7.10.2.3(2) Infrastructure – IMIT Category A (except for wireless access points)

7.10.2.3(3) Interface - IMIT Category C

7.10.2.4 Interface Requirements

7.10.2.4(1) Cerner, staff communication system

7.10.2.5 Service Level – Gold

7.10.2.6 Systems Operation – Operating Period

7.10.2.6(1) End user administration – Authority

7.10.2.6(2) Systems Lifecycle – 10 years

7.10.3 Clinical Camera System

7.10.3.1 Basic Requirements

7.10.3.1(1) Refer also to Section 7.9.9 (CCTV).

7.10.3.1(2) Provide point-to-point cameras and viewing monitors for clinical purposes (these are not security cameras) at locations described in the Clinical Specifications.

7.10.3.1(3) Recording is not required unless otherwise stated in the Clinical Specifications.

7.10.3.1(4) Clinical cameras are not to be viewable by site security staff or recorded on the building security system.

7.10.3.1(5) Coordinate viewing monitors with the millwork design to ensure ergonomic viewing and usage in conjunction with other systems.

7.10.3.1(6) In order to ensure patient safety, cameras required for specialized environments (e.g. seclusion rooms) must be approved by the manufacturer for that specific use.

7.10.3.2 Performance Criteria

7.10.3.2(1) Provide color high-resolution, high sensitivity cameras with auto-iris lens operation. Mounting will be appropriate for the environment, unobtrusive, matching colour with hidden cabling. Camera will be CCD image capture technology and will have at least 540 lines of resolution.

7.10.3.2(2) Infrared illuminated cameras are required for patient observation in low or no light (sleeping) environments.

7.10.3.2(3) Viewing monitors will be LCD type with CFL or LED backlit (LED is preferred) with a minimum of 17” diagonal viewing surface.

7.10.3.2(4) System will be IP based or NTSC base band. IP based systems will utilize the cabling infrastructure. Consult with the Authority for any required network access.

7.10.3.2(5) System will be real time viewing with extremely low to no latency or delay.

7.10.3.3 IMIT Categorisation

7.10.3.3(1) Software and Server – IMIT Category A

7.10.3.3(2) Infrastructure – IMIT Category A (includes cameras)

7.10.3.3(3) Interface - IMIT Category A

7.10.3.4 Interface Requirements

7.10.3.4(1) None

7.10.3.5 Service Level – Gold

7.10.3.6 Systems Operation – Operating Period

7.10.3.6(1) End user administration – Authority

PART 8. SITE, INFRASTRUCTURE AND LANDSCAPE SUBGROUP SPECIFICATIONS

8.1 Exterior Improvements

8.1.1 Aggregate Base Courses

8.1.1.1 Basic Requirements

8.1.1.1(1) Utilize granular sub-base for stability of surface treatment through freeze thaw cycles and for its ability to store rainwater. Sub-base material to meet MMCD 31 05 17, Clause 2.8 – Select Granular Sub Base, or approved equal.

8.1.1.2 Performance Criteria

8.1.1.2(1) Exceed limits defined by regional average freeze thaw cycles averaged over a twenty year period.

8.1.2 Asphalt Paving

8.1.2.1 Basic Requirements

8.1.2.1(1) Utilize asphalt paving in areas where vehicle traffic and snow clearing equipment require a smooth surface for travel.

8.1.2.2 Performance Criteria

8.1.2.2(1) Asphalt mix is to be suitable for use in climatic conditions found at the Site. Asphalt will meet or exceed MMCD requirements.

Pavement structure thicknesses will be as required by Project Co's geotechnical engineers, based on assessment of specific Site conditions, but in no case will be less than as specified under Section 4.4.

8.1.3 Unit Paving on Sand Bed

8.1.3.1 Basic Requirements

8.1.3.1(1) Utilize unit pavers in areas where a high level of finish is desired and/or a requirement for removal and replacement of paved surface in the future.

8.1.4 Concrete Paving

8.1.4.1 Basic Requirements

8.1.4.1(1) Utilize concrete paving in areas that require firm, long lasting hard surfaces for activities such as pedestrian pathways, loading docks and Building entrances.

8.1.5 Prevailing Winds

8.1.5.1 Basic Requirements

8.1.5.1(1) Protect pedestrians at Building entrances and high activity pedestrian areas from the negative effects of the prevailing winds.

8.1.5.2 Performance Criteria

8.1.5.2(1) Design and install the landscape with trees, shrubs, hedges, fencing, walls or other elements to protect pedestrians from the prevailing south easterly wind.

8.1.6 Tree Retention and Protection

8.1.6.1 Basic Requirements

8.1.6.1(1) Existing trees and mature vegetation are to be retained where they do not conflict with Site development or Site grading. Trees and mature vegetation that will be retained must be protected during construction.

8.1.6.1(2) To reinforce the image of a well-established landscape, retention and incorporation of mature trees and landscaping into the development Site is encouraged.

8.1.6.2 Performance Criteria

8.1.6.2(1) Engage a certified arborist (licensed with the International Society of Arboriculture – ISA) to evaluate the existing trees to remain.

8.1.6.2(2) Treat the retained trees as directed by the arborist and under the direct guidance of the arborist (e.g. root pruning, spiral pruning, watering, fertilizing).

8.1.6.2(3) Trees and mature vegetation that will be retained must be protected during construction with fencing to the Critical Protection Zone as defined in the BC Landscape Standard (BCLS) latest edition.

8.1.6.2(4) Trees and vegetation that will be retained must be surrounded by Protective Fencing as defined in the BCLS.

8.1.6.2(5) No excavation, storage of materials, parking, vehicular driving, preloading, or filling will occur within the Critical Protection Zone of the trees being preserved.

8.1.6.2(6) Comply with applicable tree protection bylaws (such as City of Courtenay Bylaw No. 2462) including with regard to tree replacement ratios and sizes.

8.1.6.2(7) For the Comox Valley Site, comply with the applicable tree protection bylaw. For the Campbell River Site (where there is no applicable tree protection bylaw), comply with the following tree replacement requirements: a) whenever a tree over 300 mm diameter at breast height is removed, Project Co will replace the tree at a 1:1 ratio; and b) replacement trees will be specimen trees and must have a minimum calliper of 7 cm (2.9 in.) in diameter at breast height for deciduous trees, or 2.0 - 2.5m ht. for coniferous trees.

8.1.6.2(8) Provide tree wells and/or creative grading of the ground away from existing vegetation to remain. Where tree wells are to be constructed, the wells must be a minimum distance of 1.5 times the distance from the trunk of the tree to the drip line.

8.1.6.2(9) Do not disturb any existing planting in the Interface Zone at the Comox Valley Site. If these areas are disturbed by Project Co, Project Co will replace all plants, growing medium, mulch and irrigation per the “VIHA Comox Valley Hospital Tree Clearing and Interface Zone Landscape Plans”.

8.1.7 Outdoor Art

8.1.7.1 Basic Requirements

8.1.7.1(1) The Master Site Plan will include areas for outdoor art/sculptures.

8.1.7.2 Performance Criteria

8.1.7.2(1) Provide areas for outdoor art.

8.1.7.2(2) For the Campbell River Site, existing wood sculptures must be incorporated into one well-defined area of the Site's landscape plan. Protect the sculptures during construction. Install them carefully into their new location without damaging them.

8.1.8 Trees, Shrubs and Groundcover

8.1.8.1 Basic Requirements

8.1.8.1(1) Provide plantings to support the landscape design by reinforcing spatial relationships and way-finding. The plant selection and placement will address micro-climates surrounding the Facility and mitigation of heating and cooling loads. Planting will shade and screen parking lots. Planting will provide habitat for birds and other animals.

8.1.8.1(2) Provide landscape treatments for the complete Site that contributes to the creation of a liveable, healthy and responsive community.

8.1.8.1(3) Use large calliper deciduous trees and evergreen trees that provide seasonal interest in association with ground covering shrub plantings. Use a variety of plant material to reflect seasonal change. Avoid tree species which would have difficulty surviving or be difficult to maintain in urban areas.

8.1.8.1(4) Use similar plant species to help unify the urban character, create recognizable spaces, contribute to site orientation and create a strong sense of place, recognizing that a diversity of tree specifies may increase the survival ratio of new landscaping.

8.1.8.1(5) Use of indigenous flora will be considered a priority, in terms of minimizing maintenance and expressing an attitude about the Pacific Northwest context.

8.1.8.1(6) Landscape open space and setbacks to include existing trees that are of high quality, desirable species and appropriately situated.

8.1.8.2 Performance Criteria

8.1.8.2(1) All planting is to be per BCLS.

8.1.8.2(2) Trees must be planted at a minimum ratio of one tree for every two parking stalls (surface parking plus parking structure parking). (Notes: The Authority intends to supply 50 Garry Oak trees for each Site, which trees will count towards the number of new trees required. Newly planted trees that are replacing existing trees (per Section 8.1.6 Tree Retention and Protection) will not count towards this total.)

8.1.8.2(3) Shrubs must be planted at a minimum ratio of three shrubs for every parking stall (surface parking plus parking structure parking).

8.1.8.2(4) Trees to be no smaller than 7 cm cal for deciduous shade trees, 2 m ht. for ornamental/understory trees and 2.0 - 2.5 m ht. for coniferous trees upon installation.

8.1.8.2(5) Shrubs will be no smaller than #3 pot size upon installation.

8.1.8.2(6) Landscape treatment and circulation routes must be in accordance with Section 4.2.1.9.

8.1.8.2(7) To ensure safety and security, sightlines must be provided through any cluster of tall growing vegetation by keeping all under storey plants to a maximum of 1.2 m (3.9 ft.) in height.

8.1.8.2(8) At least 50% of the total number of plants on the Site are to be native to Coastal British Columbia as defined in “Plants of Coastal British Columbia” by Pojar and MacKinnon.

8.1.8.2(9) Use some flowering and fruiting trees and shrubs to promote natural avian habitat.

8.1.8.2(10) The trees on Site will be a combination of small trees, medium-sized trees and large trees (in terms of ultimate size) with no less than 50% of the total number of trees being large trees.

8.1.8.2(11) Do not install any plants listed as poisonous to humans by the Canadian Government’s ‘Canadian Poisonous Plants Information System’.

8.1.8.2(12) Group plants to minimize the use of water, chemicals and fossil fuel use for routine maintenance and to promote a healthy local ecosystem using sustainable measures.

8.1.8.2(13) Provide elements of healing gardens in the courtyards and close to Building entries to stimulate senses of sight, smell and touch.

8.1.8.2(14) Shrubbery within 2 m of walkways will not exceed 50 cm in height.

8.1.8.2(15) Trees planted in narrow planting areas (e.g. ‘Street Trees’) between hard surfaces (e.g. curbs, sidewalks, roads, buildings) will have a continuous volume growing medium available to their roots along the length of the planting area (i.e. no tree pits). Minimum widths of planting areas to be 1.5 m, but wider planting areas are encouraged.

8.1.8.2(16) Trees will be planted in areas that will provide root zone access to a volume of growing medium sufficient to support proper growth. This may include linear tree trenches, structural soil beneath pavement or other means necessary to provide ample growing medium. Provide soil volume per tree as follows:

8.1.8.2(16)(a) 5 cubic metres for small trees;

8.1.8.2(16)(b) 10 cubic metres for a medium-sized tree; and

8.1.8.2(16)(c) 20 cubic metres for a large tree.

8.1.9 Utility Visibility

8.1.9.1 Basic Requirements

8.1.9.1(1) Locate refuse/recycling areas, shipping, loading or utility areas, satellite dishes, and other similar structures, such as outdoor vents, mechanical equipment, or transformers out of view from streets and from adjacent properties.

8.1.9.1(2) In cases where the above items cannot be located out of view, they must be screened out of view from streets and from adjacent properties.

8.1.9.1(3) Garbage and recycling bins must be easily accessible, and contained within roofed/walled enclosures or screened from public view and from adjacent properties.

8.1.9.2 Performance Criteria

8.1.9.2(1) Refuse/recycling areas, shipping, loading or utility areas, satellite dishes, and other similar structures, such as outdoor vents, mechanical equipment, or transformers must be screened out of view from streets and from adjacent properties using hedging, shrubs, trees, fencing or walls.

8.1.9.2(2) Garbage and recycling bins must be easily accessible, and contained within roofed/walled enclosures, or screened from public view and from adjacent properties using hedging, shrubs, trees, fencing or walls.

8.1.9.2(3) Bury electrical wires.

8.2 Landscape

8.2.1 Outdoor Open Space

8.2.1.1 Basic Requirements

8.2.1.1(1) Provide outdoor spaces in the design of the Facility to accommodate activities.

8.2.1.2 Performance Criteria

8.2.1.2(1) Provide outdoor spaces in the design of the Facility to accommodate activities, including:

8.2.1.2(1)(a) space and hard landscape elements conducive to healing and recovery that may be used as a component of physical and occupational therapy;

8.2.1.2(1)(b) space which acts as the “front garden” of the Facility which will be fully accessible to the public with strong connections to the site and the neighbourhood;

8.2.1.2(1)(c) space to accommodate semi-public/private activities; and

8.2.1.2(1)(d) spaces for activities including patient/family visiting, staff breaks/retreats.

8.2.1.2(2) Provide access to the outdoor spaces from the public areas of the hospital.

8.2.2 Therapeutic Gardens

8.2.2.1 Basic Requirements

8.2.2.1(1) In addition to general outdoor spaces, provide distinct, separate therapeutic gardens to accommodate programmed and unprogrammed activities as follows:

8.2.2.1(1)(a) at the Comox Valley Site, provide a minimum of five therapeutic gardens: the Psychiatric Inpatient Unit therapeutic garden, the Psychiatric Intensive Care Unit therapeutic garden, the ICU/Telemetry Unit therapeutic garden, the staff therapeutic garden and a general therapeutic garden; and

8.2.2.1(1)(b) at the Campbell River Site, provide a minimum of three therapeutic gardens: the ICU/Telemetry Unit therapeutic garden, the staff therapeutic garden and a general therapeutic garden.

8.2.2.2 Performance Criteria

8.2.2.2(1) The general specifications in this Section 8.2.2.2 will apply to all the therapeutic gardens.

8.2.2.2(2) Project Co will design the therapeutic gardens:

8.2.2.2(2)(a) to provide a sense of control:

(a).1 provide a variety of spaces from which to choose;

(a).2 provide fixed furniture; and

(a).3 promote a sense of security and safety;

8.2.2.2(2)(b) to provide for social support:

(b).1 provide areas with seating to encourage conversation;

(b).2 provide areas of refuge; and

(b).3 provide areas for meditation, contemplation and reflection;

8.2.2.2(2)(c) to provide for physical movement and exercise:

(c).1 provide a variety of different activities;

(c).2 provide easy wayfinding;

(c).3 provide a variety of longer and shorter pathway loops for strolling and exercise;

(c).4 no pathway is to have dead ends;

(c).5 utilize walkway edging to prevent those using wheelchairs from rolling into planting beds;

(c).6 walkways will be a minimum 1.5m in width and will have a surface that accommodates patients with intravenous equipment, gurneys and wheelchairs or walkers;

(c).7 provide a minimum of one handrail between the entrance to any garden (from the interior of the Facility) and a seat for patients experiencing difficulties with strength or balance;

(c).8 pavement expansion joints to be no more than 1/8” in width to prevent the wheels of IV poles getting caught and stuck;

8.2.2.2(2)(d) to provide access to nature and positive distractions:

(d).1 gardens are to be incorporated as an integral extension of the hospital interiors, linking its internal spaces to view vistas of the exterior greenspace;
(d).2 gardens are to be visible from at least one well-used interior area (unless otherwise noted below);
(d).3 incorporate visibility and visual interest both into and out of the garden;
(d).4 provide adequate signage within the building to alert people of the gardens;
(d).5 gardens are to be fully accessible with automatic doors and low entry lips to facilitate wheelchair access;
(d).6 gardens are to be unlocked during daylight hours (unless otherwise noted below);
(d).7 provide artwork including 'found elements' of art that provide visual distraction;
(d).8 provide plant material that attracts birds and provides seasonal interest;
(d).9 design elements that stimulate the senses and create an atmosphere of peace, such as reflecting pools;
(d).10 provide visual relief and interest in vertical and horizontal dimensions;
(d).11 provide bright colours; and
(d).12 provide visual vistas of nature/landscape elements viewable to patients who are confined to their rooms.

8.2.2.2(2)(e) to minimize intrusive stimuli:
(e).1 gardens must be sheltered from the wind;
(e).2 provide some gathering/seating areas that are sheltered from the sun and rain;
(e).3 surfaces must reduce glare (e.g. tinted concrete);
(e).4 seating material to be constructed of warm, comfortable material that does not get excessively hot or cold (e.g. wood) and facilitates the shedding of water. Avoid the use of concrete, aluminum & steel seats;
(e).5 seating must include back rests;
(e).6 take measures to reduce or cover up loud or repetitive man-made sounds (e.g. by providing running water);

(e).7 locate gardens to avoid unpleasant odours and smoke;
(e).8 design gardens to avoid bright lights; and
(e).9 all plant material selection will consider potential allergic reactions and avoid any potential allergic reaction causing species;

8.2.2.2(2)(f) as gardens and not paved courtyards:
(f).1 gardens are to be lush and green with a minimum ratio of planted areas to hard surface areas of 7:3. Higher ratio of plants is acceptable;
(f).2 stimulate the senses of sight, sound, smell and touch;
(f).3 provide natural lighting and sounds;
(f).4 design with an emphasis on natural features such as plants, rocks, wood and water; and
(f).5 provide at least one hose bib in each therapeutic garden regardless of whether an automatic irrigation system is supplied as part of the design;

8.2.2.2(2)(g) to minimize ambiguity:
(g).1 provide a well-defined and inviting garden entrance;
(g).2 provide a design that is easy to interpret by the majority of people; and
(g).3 avoid the use of abstract art.

8.2.2.2(3) To supplement the general specifications identified above, the following Sections 8.2.2.2(4) to 8.2.2.2(8) set out specific requirements for each of the outdoor therapeutic gardens at each Facility.

8.2.2.2(4) Design the Comox Valley Psychiatric Inpatient Unit therapeutic garden so that it:

8.2.2.2(4)(a) is a private and secure space, enclosed by either fencing or walls that are sturdy and non-scalable;

8.2.2.2(4)(b) is not visible from any well-used areas of the hospital;

8.2.2.2(4)(c) is observable from a nursing station with PA access for staff to call back patients;

8.2.2.2(4)(d) has direct access from the PIU;

8.2.2.2(4)(e) cannot have items dropped into the garden from the floors above or from outside the garden;

8.2.2.2(4)(f) allows space for outdoor therapy;

8.2.2.2(4)(g) allows patients to have scheduled visits outdoors under supervision from staff;

8.2.2.2(4)(h) allows basic activities like picnics, outdoor gardening, reading, resting, contemplation and walking;

8.2.2.2(4)(i) is at least 150 m^2; and

8.2.2.2(4)(j) includes tables and chairs, with seating for at least 10 people.

8.2.2.2(5) Design the Comox Valley Psychiatric Intensive Care Unit therapeutic garden so that it:

8.2.2.2(5)(a) is a private and secure space, enclosed by either fencing or walls that are sturdy, vandal-proof and non-scalable;

8.2.2.2(5)(b) is designed to limit the potential for vandalism and injury to users;

8.2.2.2(5)(c) is not visible from any well-used areas of the hospital;

8.2.2.2(5)(d) is observable from a nursing station with PA access for staff to call back patients;

8.2.2.2(5)(e) has direct access from the PICU;

8.2.2.2(5)(f) cannot have items dropped into the garden from the floors above or from outside the garden;

8.2.2.2(5)(g) allows space for outdoor therapy;

8.2.2.2(5)(h) allows patients to have scheduled visits outdoors under supervision from staff;

8.2.2.2(5)(i) allows basic activities like picnics, outdoor gardening, reading, resting, contemplation and walking;

8.2.2.2(5)(j) is at least 60 m^2; and

8.2.2.2(5)(k) includes tables and chairs, with seating for at least 4 people.

8.2.2.2(6) Design the ICU/Telemetry Unit therapeutic garden at each Facility so that it:

8.2.2.2(6)(a) is a private space;

8.2.2.2(6)(b) is not visible from any well-used areas of the hospital;

8.2.2.2(6)(c) is quiet and immediately accessible off the ICU;

8.2.2.2(6)(d) provides an area of respite for palliative care patients and their families;

8.2.2.2(6)(e) provides an area for use by palliative care patients and their families;

8.2.2.2(6)(f) provides an area for families to grieve in private;

8.2.2.2(6)(g) is adjacent to or accessible by Emergency Trauma Resuscitation;

8.2.2.2(6)(h) at least 60 m^2;and

8.2.2.2(6)(i) includes tables and chairs, with seating for at least 8 people.

8.2.2.2(7) Design the staff therapeutic garden at each Facility so that it:

8.2.2.2(7)(a) provides staff outdoor resting areas in close proximity to the Central Staff Facilities (OS-GP-03);

8.2.2.2(7)(b) provides visual privacy from public and patient care areas so staff does not have to mingle with patients on their breaks;

8.2.2.2(7)(c) is at least 500 m^2;

8.2.2.2(7)(d) has moveable furniture; and

8.2.2.2(7)(e) includes tables and chairs, with seating for at least 30 people.

8.2.2.2(8) Design the general therapeutic garden / exterior social space at each Facility to be accessible to the general population of the hospital including patients, staff and visitors. This general therapeutic garden will:

8.2.2.2(8)(a) be highly visible from well-populated areas of the Facility;

8.2.2.2(8)(b) have continuous glazing to provide daylight to all spaces or circulation zones adjacent to the garden;

8.2.2.2(8)(c) be at least 1000 m^2;

8.2.2.2(8)(d) include tables and chairs, with seating for at least 40 people;

8.2.2.2(8)(e) include fully-accessible play areas and play features for at least 10 children and their families;

8.2.2.2(8)(f) include an integrated interpretive signage system;

8.2.2.2(8)(g) respect Aboriginal culture as follows:

(g).1 consult with the Aboriginal Working Group during the design phase, the installation phase and the maintenance phase of the general therapeutic garden;

(g).2 incorporate cultural elements such as wood sculpture and wood poles and indigenous plants used for traditional healing;

(g).3 provide some edible indigenous plants;

(g).4 provide a plaque acknowledging traditional aboriginal territory;

(g).5 provide resting places that promote enjoyment and education of Aboriginal culture; and

8.2.2.2(8)(h) reference Local History and Heritage by incorporating cultural and historical references to the local history and heritage of the local community (unique to each hospital).

8.2.3 Site Slopes and Retaining Walls

8.2.3.1 Basic Requirements

8.2.3.1(1) Site grading is to provide positive drainage throughout (except where required for storm water detention/retention).

8.2.3.1(2) Site grading is to avoid over-steepened slopes that cannot hold growing medium and plants.

8.2.3.1(3) Retaining walls to architecturally finished.

8.2.3.1(4) Provide ‘green’ retaining walls.

8.2.3.2 Performance Criteria

8.2.3.2(1) Minimum gradients (e.g. 2%) are required to avoid ponding throughout the site except where required for storm water detention/retention.

8.2.3.2(2) Steep slopes are to be no steeper than 2:1 and finished with growing medium and plant material. Prohibit riprap on slopes.

8.2.3.2(3) Slopes steeper than 2:1 are to be retained using architecturally-finished retaining walls (e.g. cast-in-place C.I.P concrete, precast concrete). Prohibit gabion baskets and lockblock walls on site.

8.2.3.2(4) Retaining walls within 5 m of roadways and building faces are to be 'green' retaining walls (e.g. planters) planted with vegetation to cover 80% of the face of the retaining walls one year following installation.

8.2.4 Street Furniture

8.2.4.1 Basic Requirements

8.2.4.1(1) Unify the exterior ground plane treatment through the use of common paving materials, tree grates, lighting and other landscape furniture items.

8.2.4.1(2) Provide and coordinate design for street furniture, including benches provided at regular intervals for ease of use particularly for the infirm.

8.2.4.1(3) Where possible use exterior steps and landscape features for the enjoyment of staff and visitors.

8.2.4.1(4) Seating in public areas must: be ergonomically designed for a variety of people; be designed to allow a wheelchair to sit alongside fixed seating or, where tables are provided, to allow a wheelchair to pull up to each table; have a minimum of 5% with backrests; and shed rain water.

8.2.4.2 Performance Criteria

8.2.4.2(1) Unify the ground plane treatment through the use of common paving materials, tree grates, lighting and other landscape furniture items.

8.2.4.2(2) Seating areas with benches will be located throughout the site no more than 70 m apart from each other. Select products on the basis of safety, comfort, design and materials that relate to the Facility architecture and landscape design, durability and required maintenance.

8.2.4.2(3) Select products for their suitability and durability in the climatic conditions found at the Site.

8.2.4.2(4) Utilize a variety of scales, locations and orientations of seating areas and site furnishings to cater to varied outdoor activities and varied experiences of the staff and visitors.

8.2.5 The Interface Zone

8.2.5.1 The Authority has undertaken site preparation work in the Interface Zone, including landscape planting, berms, growing medium, irrigation, grass, concrete sidewalks, a gravel pathway, an emergency access road, bollards, light pole bases and electrical conduit, temporary tree protection fencing, and temporary construction fencing.

8.2.5.2 Project Co will perform the Design and Construction so that:

8.2.5.2(1) grading of Work Area A of the Comox Valley Site meets and matches the grades along the Interface Zone;

8.2.5.2(2) Work Area A of the Comox Valley Site does not drain towards the Interface Zone; and

8.2.5.2(3) all drainage from the Interface Zone is collected in Work Area A of the Comox Valley Site and managed together with drainage for Work Area A of the Comox Valley Site.

8.2.5.3 For additional requirements related to the Interface Zone, refer to Section 6.10 of Schedule 2 [Design and Construction Protocols] and the requirements included in Part 4 of this Schedule.

8.3 Utilities (Division 33) – Not used

APPENDIX 3A

CLINICAL SPECIFICATIONS

APPENDIX 3B

NOT USED

APPENDIX 3C

UBC FACULTY OF MEDICINE TECHNOLOGY ENABLED ROOM SPECIFICATIONS

APPENDIX 3D

MEDICAL GAS REQUIREMENTS

APPENDIX 3E

SOUND TRANSMISSION RATINGS

APPENDIX 3F(I)

CABLE INFRASTRUCTURE STANDARD

APPENDIX 3F(II)

WIRELESS INFRASTRUCTURE STANDARD

APPENDIX 3F(III)

WIRELESS DATA COMMUNICATIONS POLICY

APPENDIX 3F(IV)

VIHA A/V AND VIDEO CONFERENCING STANDARD

APPENDIX 3F(V)

NIHP SYSTEMS RESPONSIBILITY MATRIX

APPENDIX 3F(VI)

VIHA IMIT TECHNOLOGIES STANDARDS

APPENDIX 3F(VII)

DOOR OPERATIONS MATRIX

APPENDIX 3F(VIII)

ARCHITECTURAL REVIEW BOARD

APPENDIX 3F(IX)

CHANGE MANAGEMENT PROCEDURE

APPENDIX 3G

WOOD FIRST MATRIX

APPENDIX 3H

WAYFINDING AND SIGNAGE

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