

**THE NEW SURREY HOSPITAL
AND
BC CANCER CENTRE PROJECT**

Schedule 1 – Statement of Requirements

Appendix 1V – Asset Management Requirements

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

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1. DEFINITIONS

In this Appendix, in addition to the definitions set out in Schedule 1 – Statement of Requirements to this Agreement:

“**Asset Description**” means a descriptive name used in the Authority’s Computerized Maintenance Management System (CMMS) to describe each asset.

“**Asset Number**” means an identification number that uniquely identifies the asset/equipment in the Authority’s CMMS system. These numbers are provided by the Authority.

“**Asset Name**” means a structured, short form alpha-numeric identifier that typically includes an acronym for the specific equipment type and sequential numbering. These names are to be in accordance with standards provided by the Authority.

“**Asset Tag**” means a physical nameplate attached to the equipment with specified information on it to identify the asset.

“**Asset Label**” means a stick-on label with a designated number and affixed to the equipment.

“**Facilities Manual**” means the collective documents including content as described in Attachment 1 of this Appendix.

“**Facilities Maintenance Lead**” has the meaning set out in Section 3 of this Appendix.

“**Maximo**” means the name of the Computer Maintenance Management System (CMMS) software used by the Authority’s Facilities Maintenance and Operations (FMO) team.

“**Tracked Asset**” means an asset that has received an identification as indicated by the requirements outlined in Appendix 1U [BIM Requirements]

2. GOALS

2.1 Intent

These Asset Management requirements are intended to ensure that:

- (a) at the completion of the Design-Build phase, the Authority has the necessary training and information to manage, maintain, and operate the Facility effectively and efficiently; and
- (b) assets can be tracked and managed over their lifetime to minimize risk and costs while maximizing reliability, efficiency, utility, and value to the Authority.

2.2 Purpose

These requirements outline the Asset Management related deliverables and requirements in a consolidated, structured basis and work in conjunction with requirements outlined in other Schedules and Appendices.

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These requirements ensure the Design-Builder leads, manages, coordinates, and organizes in a consistent manner all requirements in support of the management of the facility and related assets.

Refer to the Asset Management specific deliverables which are listed herein, and cross referenced to Schedule 1 – Statement of Requirements which outline the processes to be followed to ensure a robust transition to FM services following completion of construction and commissioning.

3. FACILITIES MAINTENANCE LEAD

3.1 Qualifications

The Facilities Maintenance Lead will have the following qualifications:

- (a) Minimum ten (10) years in an operations and maintenance role, preferably in the health care sector.
- (b) Experience and knowledge in implementing and using computerized maintenance management systems (CMMS), preferably Maximo.
- (c) Experience of developing documentation for complex healthcare facilities such as systems manuals, standard operating procedures, operations, and maintenance manuals, etc. similar to the contents of the Facilities Manual.
- (d) Experience of developing and managing facilities lifecycle replacement plans and fiscal management of facilities operations budgeting.

3.2 Responsibilities

The Facilities Maintenance Lead's responsibilities will include:

- (a) Acting as a single point of contact for the Authority for discussion and coordination for the fulfilment of all requirements set out in this Appendix.
- (b) Coordinating the Submittals as set out in this Appendix.
- (c) Maintaining a digital log of issues related to the Submittals and providing regular updates on the progress and close-out of issues.
- (d) Facilitating and attendance at the inspections by the Authority specified in Section 4.4. and the recording and tracking of the issues raised following those inspections.

3.3 Communication

The Facilities Maintenance Lead will communicate with the Authority's appointed FMO representative:

- (a) Using phone, email or in-person discussions as agreed by both parties. Any issues, decisions and resolutions will be documented in the issues log as defined in Section 5.2.
- (b) According to the schedule set out in Section 4.3(c) of this appendix

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4. GENERAL REQUIREMENTS

4.1 Submittals

- (a) In all cases, where a Submittal or deliverable is identified, provide in accordance with the Submittal schedule identified in Section 4 – Submittal Procedures of this Appendix.
- (b) In addition to these requirements, separately follow the requirements of Schedule 1 – Statement of Requirements and related appendices for all design and construction Submittals required as part of the design and construction activities.

4.2 Other Standards

When complying with these requirements, ensure the Submittals comply with the following standards and guidelines. Where there are conflicting requirements, identify these to the Authority for discussion and resolution.

- (a) CSA Z8001 – Commissioning of Health Care Facilities
- (b) ASHRAE Guideline 4 Preparation of Operating and Maintenance Documentation for Building Systems
- (c) LEED v4 Systems Manual requirements

Submittals will also comply with the following standard to the extent they influence Design and Construction. The Design-Builder will identify any conflicts and identify them to the Authority for resolution at no cost to the Authority.

- (a) CSA Z8002 – Operation and Maintenance of Health Care Facilities

4.3 Coordination of Requirements

- (a) The Facilities Maintenance Lead is to work with the Authority's for all requirements outlined in this Appendix as a subject matter expert and coordinator on behalf of the Design-Builder.
- (b) The Facilities Maintenance Lead will be appointed within one month after the Effective Date of the Design-Build Agreement.
- (c) The Facilities Maintenance Lead will regularly meet with the Authority's FMO representative as required by the Authority, on at least a bi-weekly basis during the term of the Agreement. The meetings are intended to facilitate the Authority's understanding through the exchange of information, ensure coordination of alignment to the Asset Management Requirements as set out in this Appendix. Any unresolved issues will be raised according to the process set out in:
 - (1) Schedule 2 [Review Procedure] during Design, or
 - (2) Schedule 1 Section 5.5.8 the Commissioning issue resolution process during Construction

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- (d) All Submittals within Schedule 1 – Statement of Requirements and its Appendices are to be coordinated with the requirements contained in this Appendix. Where there are conflicting requirements, identify these to the Authority for resolution.
- (e) For the purposes of LEED certification Submittal of a 'Systems Manual', the Submittals identified in this Appendix are also to be structured and named in accordance with and to meet the requirements for LEED certification. Any supplementary material and content or reworking of Submittals as required to meet the LEED certification Submittal requirements will be added as necessary.

4.4 Inspection of installed assets

- (a) The Design-Builder will allow the Authority to inspect the installation of any Tracked Assets for compliance to the 100% Design Submittal.
- (b) The Facilities Maintenance Lead will ensure that the Design-Builder is fully prepared and in attendance along with the relevant subcontractor/supply chain presence to ensure all such Authority inspections are efficient and effective from the Authority's perspective.

5. SUBMITTALS

All Submittals required in this Appendix and related Submittals within Schedule 1 – Statement of Requirements are to be submitted in accordance with the following requirements. Where there are conflicting requirements, identify these to the Authority for discussion and resolution.

5.1 Submittal Procedures

- (a) All Submittals are to be submitted through the Submittals Process outlined in Schedule 2 [Review Procedure].
- (b) Submittals required in this Appendix are to be separately submitted from the Design and Construction Submittals and are to be managed by the Design-Builder's Facilities Maintenance Lead working with designated personnel from the Authority's Facilities Management and Operations (FMO) team.

5.2 Submittal Coordination plan

- (a) Provide a coordination plan for delivery of all Asset Management requirements taking into account overall project timing, dependency and integration with all other requirements such as related design and construction milestones, the commissioning plan, LEED certification, the Submittal phases, and related deadlines.

5.3 Submittal Formats

The following applies to all Asset Management Submittals outlined within this Appendix and Related Submittals outlined in Schedule 1 – Statement of Requirements.

In many cases, both a Hardcopy and Electronic format of Submittals is required with formats as set out below.

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In all cases, a Submittal list is required in electronic format listing all documents, file names and contents of each Submittal.

(a) Electronic Formats

- (1) Every Submittal provided by the Design-Builder to the Authority which is developed or created by the Design-Builder is to be provided in the original standard editable formats and in digitally created 'True' PDF files. These files will not be secured or locked and will be editable, searchable and printable by the Authority as well as have all items in the Table of Contents with "hypertext links" within the document.
- (2) Every Submittal provided by a third party and not developed or created specifically for this project (such as original equipment manuals from the manufacturer) are to be provided in editable format where available and in PDF files.
- (3) All digital Submittals are to be organized within logical folder structures with folder names that reflect the contents of the folder. All digital files are to be named such that the contents are readily identified from the file name. The Design-Builder will provide the Authority with a naming convention plan for review and approval prior to Submittal.
- (4) All digital files are to be provided as a digital download with at minimum 30-day availability of the data after providing the download URL, or, with the Authority's prior approval, on an external hard drive or USB drive.
- (5) No document will exceed 100MB. If necessary, split documents into smaller files with suitable file naming convention to identify the related parts.

(b) Hard copy Formats

A sample of the binding and the format (i.e., organization, numbering, sections, etc.) will be provided in advance as a sample for Authority approval prior to the final Submittal.

- (1) Submittals that are primarily data information (excel lists such as listing of spare parts or consumables), or are entered into BIM databases, do not require a hardcopy format unless explicitly identified in the related requirement specified in this Appendix.
- (2) Submittals that are primarily standard document size such as operating manuals, system manuals, reports, etc. require the following:
 - (A) Included Drawings will be minimum 11" x 17" format (fold out) to ensure usability and readability while all other content will be standard 8 1/2" x 11" Letter size paper in portrait orientation. Supplemental Drawings are to be provided separately as required for readability and usability.
 - (B) Draft and initial Submittals: 2 or more hard copies in draft format based on request from the Authority to enable review and comment. These do not

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need to be bound in final format however will be in a format that is convenient and readily reviewable.

(C) Final Submittals: 3 hard copies in final bound format within heavy duty expandable hinge lock type binders (similar to those available at Ringbinder.com) with embossed lettering on the front and spine with the document name and related information identified. A table of content page(s) is required, and tabbed pages will separate sections within the document.

(3) Submittals that are primarily drawings in nature such as CAD drawings, floor plans, site plans, equipment plans, line diagrams, etc. require the following:

(A) All Submittals: 3 hard copies in full size large format organized and bound. Architectural and design drawings are to be provided in ARCH D format (24” x 36”)

5.4 Submittals Schedule

- (a) All Submittals are to be submitted in accordance with the following table.
- (b) Actual dates may be adjusted based on Project schedule changes.
- (c) Submittal deadlines for the Draft versions may be adjusted by the Authority based on workload. Adjustments sooner than the stated deadline are with agreement of the Design-Builder; adjustment later than the stated deadline are at the discretion of the Authority.

Section Reference	Submittal Document	Submittal Deadlines	Requirements
5.2	Submittal Coordination Plan	Draft: as part of the 30% Design Submittal	Outline level plan with all topics and issues listed along with estimated timelines
		Final: as part of the 50% Design Submittal	Detailed plan with topics and issues fully completed with final, agreed timelines.
Error! Reference source not found.	Asset Renewal Expenditure Forecast	Draft: as part of the 50% Design Submittal	Template with several sample entries in UNIFORMAT II breakdown with example assets. Include Vendor and /or Manufacturer Sign-off form (Attachment 2) for asset system / components.

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Section Reference	Submittal Document	Submittal Deadlines	Requirements
		Updated Draft: As part of 70%, 90% and 100% Design Submittal	Updated information in the agreed template and breakdown aligned with the submitted Design
		Final: 90 days prior to Substantial Completion	Completed plan based on approved template.
8	Operating Cost Estimate	Draft: As part of 50% Design Submittal	Sample of costing estimate using template or other recommended structure.
		Updated draft: As part of 70% and 90% Design Submittals	Updated operating cost estimate aligned with the updated design using the approved template
		Final: As part of the 100% Design Submittal	Completed estimate based on approved template.
10	Spare Parts & Materials Inventory	Draft: As part of the 70% Design Submittal	Sample template with sample information.
		Updated Draft: 100% Design Submittal	Completed inventory based on design requirements.
		Final: At Substantial Completion	Completed inventory based on as-built requirements.
11	Special Tools Inventory	Draft: As part of the 70% Design Submittal	Sample template with sample information.
		Updated Draft: 100% Design Submittal	Completed inventory based on design requirements.
		Final: At Substantial Completion	Completed inventory based on as built.
12	Warranty Information	Draft: As part of 90% Design Submittal	Sample listing template
		Updated Draft: As part of 100% Design Submittal	Warranty information based on selected equipment and aligned with warranty requirements
		Final: At Substantial Completion	Completed information based on final warranty information in approved format.
9	Services Procurement Information	Draft: At 100% Design Submittal	Sample of Submittals (draft information from this project or a sample from another project.
		Final: 90 days prior to Substantial Completion	Completed information based on the most current information and the approved format.

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Section Reference	Submittal Document	Submittal Deadlines	Requirements
14	Asset Identification and Labelling	Draft: At 100% Design Submittal	Sample of the Asset Tag and Asset Label provided for approval along with recommended placement examples on a variety of equipment types.
		Final: At Substantial Completion	All assets to be labelled based on requirements and approved samples.
15	360 Photos	Samples and Plan: At final Design Submittal	Sample 360 photos from another project along with a plan for conducting the 360 photos.
		Examples: After first photos in this project	Provide examples of the first 360 Photos from this project for review.
		Updated photos as per the requirements set out in Schedule 1 2.5.3.3(6)	
		Final: At Substantial Completion	Completed 360 Photos based on approved sample and plan including a digital copy of all data
13	Facilities Manual	Draft: 180 days prior to demonstration of operational Energy Centre	A sample template with table of contents, sample content and details about format and structure of each separate item in the Energy Centre
		Draft: 90 days prior to the start of the demonstration of operational Energy Centre	Updated information related to the Energy Centre in approved template based on current as built state.
		Draft: 180 days prior to Substantial Completion	A sample template with table of contents, sample content and details about format and structure of each separate item
		Draft: 90 days prior to Substantial Completion	Updated information in approved template based on current as built state.
		Updated Draft: 60 days prior to Substantial Completion	Complete information in approved format based on final as built

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Section Reference	Submittal Document	Submittal Deadlines	Requirements
		Final: At Total Completion or after Seasonal Testing, whichever is later	Complete and updated information in approved format based on final as built
6	Handover Plan	Draft: 180 days prior to Substantial Completion.	Outline level plan with all topics and issues listed along with estimated timelines.
		Draft: 90 days prior to Substantial Completion	Detailed plan with topics and issues fully completed with final, agreed timelines.

6. HANDOVER PLAN

- (a) Provide a plan for transition of maintenance and operations to the Authority including final coordination meetings to be held prior to the start of the Stabilization Period and Substantial Completion. Include the following:
- (1) Ongoing Coordination Meetings, structure, timing, participants, etc.
 - (2) Utilities & Interim services
 - (3) Keys, access controls, system usernames, passwords, etc
 - (4) Receipt and review of final Submittals
 - (5) Final handover meeting

7. ASSET RENEWAL EXPENDITURE FORECAST

The asset renewal expenditure forecast, also referred to as a life cycle plan in the industry, is intended to help the Authority in their long-range planning and budgeting processes for refurbishment and replacement requirements. This plan from the Design-Builder based on the constructed elements will be updated and managed by the Authority after Substantial Completion.

- (a) Provide an asset renewal expenditure forecast that identifies the timeline and anticipated cost for replacement or refurbishment of relevant building elements and systems, covering a 30-year period starting at Substantial Completion using Uniformat II level 1 and 2 at a minimum, expanding to level 3 where applicable.
- (b) Provide the plan in Excel format using the template **NSHBCCC – Lifecycle Plan Template.xlsx**. An alternative format that serves the same purpose may be proposed to the Authority, who may accept or reject the alternative.

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NSHCC Template - Life Cycle Replacement Plan (Facilities Assets)

							Year of Refurb / Replacement Cost (\$)				
							1	2	3	4	5
Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Individual elements	Equipment or System	Initial Installed Cost Estimate	Estimated Typical Life (years)	Comment about assumptions / cycles as appropriate					
Add lines above this line as				\$0							
Annual Total							\$0	\$0	\$0	\$0	\$0

Notes:
 Use ASTM Uniformat II building elements classifications
 Use separate line for each major asset. Do not group
 Include all maintained equipment, systems and elements
 Refurb/replacement cost are to be provided in current dollars

- (c) Initially provide a draft plan based on the Design at every design Submittal from 50% Design onwards with subsequent updates based on installed equipment and as-built records. The final plan will reflect the final as-builts.
- (d) The costs used in the asset renewal expenditure forecast will reflect current year un-inflated costs.

8. OPERATING COST ESTIMATE

The operating cost estimate is intended to help the Authority in their budgeting processes for typical facility related operating costs. This initial estimate from the Design-Builder based on the constructed elements will be used as a basis for establishing budgeting estimates by the Authority.

- (a) Provide cost estimates for Maintenance and Operation of the Facility based on the design, installed equipment, systems and the manufacturer recommended preventive maintenance tasks and frequencies.
- (b) Calculate the cost estimate for all major categories using benchmark comparisons for similar hospital facilities and the characteristics of this project. Base the cost estimates on a typical fully operational year following stabilization in current dollars. Include estimates of the required FTEs for each category as driven by design choices and level of automation to be installed.
- (c) The Authority will provide their service contracting out strategy to enable the Design-Builder to complete the operating cost estimates.
- (d) Provide the Operating Cost Estimate in Excel format using the template **NSHH – OPEX Estimates.xlsx** available in the data room. An alternative format that serves the same purpose may be proposed to the Authority, who may accept or reject the alternative.

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NSHCC Template - O&M Costs

Main Category	Units (Description)	Units (#)	\$/Unit	Annual Cost	Assumptions / Sources
Grounds - Landscaping				\$ -	
Grounds - Snow				\$ -	
Waste Removal				\$ -	
Security				\$ -	
Cleaning				\$ -	
Window Cleaning (exterior)				\$ -	
Maintenance & Repair (All Facilities related)				\$ -	
Maintenance & Repair (All Clinical related)				\$ -	

9. SERVICES PROCUREMENT INFORMATION

To enable the Authority to initiate staffing and/or procurement of the following services prior to Substantial Completion, the Design-Builder will provide the following information:

- (a) Grounds (Landscaping and Snow)
 - (1) Provide a simplified site plan with all planted elements and hard surfaces clearly identified. Include a summary of the planted and hard surface area.
 - (2) Include clearly marked delineation of the Authority's responsible area separated from Municipal responsible areas as applicable.
 - (3) Include clearly marked areas designated for snow storage.
 - (4) Provide a landscaping maintenance summary with landscape recommendations from the Landscaping consultant.
 - (5) Provide an outline maintenance plan and approximate quantities.
- (b) Cleaning
 - (1) Provide simplified floor plans identifying all flooring surface types, washroom fixtures and janitorial closets. Include a summary of total cleaning area by cleaning treatment.
 - (2) Provide a summary of any special cleaning procedures or chemicals required or recommended by the manufacturers.
- (c) Waste
 - (1) Provide simplified floor plans with all central waste and recycling receptacles and loading dock waste and recycling bins/compactors identified.
 - (2) Provide a summary of recycling / waste bin and compactor capacity and expected collection schedule as well as load percentages per collection.
- (d) Maintenance

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- (1) Provide a listing in electronic format of all contractors, suppliers and manufacturers used for supply and/or installation of systems, equipment, fixtures, and architectural elements such as roofing, doors, windows, flooring, ceiling, etc.

10. SPARE PARTS AND MATERIALS INVENTORY

In addition to and collectively with any requirements for spare parts outlined in Schedule 1 – Statement of Requirements, the Design-Builder will also deliver these requirements.

10.1 Recommended Spare Parts Listing

In addition to the spare parts requirements for Elevators outlined in Appendix 1Y [Spare Parts and Extra Stock Materials], identify spare parts for all other systems that should be kept on site by a reasonable operator:

- (a) Based on a risk assessment, provide a prioritized listing of recommended spare parts in an Excel file that should be retained on-site. The risk assessment should consider at a minimum the impact to operations and ability to provide healthcare service at the Facility in areas serviced by the equipment, back-up systems, typical failure modes, and lead-times for replacement parts. All spare parts will be linked to the Asset Number of the related equipment.
- (b) Include specifications for the spare parts and include vendors in the list or on an attachment with reference to the list.
- (c) Identify on the list where spare parts have been provided by the Design-Builder in accordance with spare parts that a knowledgeable and experienced hospital operator would expect to have on site, along with the quantity provided and the location where they are stored.
- (d) Provide a draft / template for review and acceptance by the Authority and then subsequently a final version based on a final risk assessment and the final installed equipment.

10.2 Recommended Consumables Listing

- (a) Based on the normal and typical consumables required for all installed systems and equipment, provide a consumable listing in an excel file with all consumables linked to the Asset number of the related equipment where relevant as well as a reference to the related Safety Data Sheets, which are to be provided in the Facilities Manual.
- (b) Include specifications for the consumables and include the vendors in the list or on an attachment with reference to the list.
- (c) Provide a draft / template for review and acceptance by the Authority and then subsequently a final version based on a final risk assessment and the final installed equipment.

11. SPECIAL TOOLS OR MAINTENANCE EQUIPMENT

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In relation to any special tools as required by Schedule 1, also provide information according to the following requirements:

- (a) Where special tools require calibration, provide the calibration certificate.
- (b) Provide a listing of the special tools, where they are located on site, what they are used for and the instructions for use or alternately, point to a maintenance or service manual that contains the instructions.
- (c) Provide training on the use, care, maintenance, and calibration of any special tools as part of the commissioning training.
- (d) Provide a list of special equipment, along with specifications and vendors, that is required for providing maintenance services along with what they are used for.
- (e) Provide a draft / template for review and acceptance by the Authority and then subsequently a final version based on a final installed equipment.

12. WARRANTY INFORMATION

The warranty information requirements specified in this Section relates to equipment specific information in alignment with the requirements set out in Appendix 1X [Warranty Requirements].

12.1 Warranty Certificates

- (a) Provide all warranty certificates and related documentation required to validate warranty applicability.
- (b) Submit PDF versions electronically and provide hard copies in a binder with tabs separating warranties by system type (HVAC, electrical, plumbing, architectural, etc.).

12.2 Warranty list

- (a) Provide an electronic list (in excel) of all equipment and the related warranty certification numbers, warranty period and the warranty vendor name, address and contact information and brief description of warranty service (parts, service, both, etc.)

13. FACILITIES MANUAL

Provide a Facilities Manual comprising of a set of documents as outlined in Attachment 1 of this document.

13.1 Purpose

- (a) The Facilities Manual ensures users and operators have the information necessary to properly operate and maintain the Facility in a safe, efficient manner based on the design intent.

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- (b) The Facilities Manual also provides all necessary requirements to satisfy LEED v4 requirements for the Systems Manual.

13.2 Coordination

- (a) The Facilities Manual requirements in this Appendix will be coordinated with and be in addition to requirements from Schedule 1 – Statement of Requirements and all its Appendices. Where there are conflicting requirements, address them with the Authority for resolution.
- (b) The Design-Builder will coordinate with the Authority to confirm the desired structure and organization by providing drafts through the submittal review process for Asset Management requirements.
- (c) Some content will require Authority input and the Design-Builder will work with the Authority to incorporate the Authority's material where required.

13.3 Format & Structure

- (a) The Facilities Manual is a set of documentation. Some parts of the Facilities Manual, e.g., OEM manuals, are separately provided and separately bound however will be referenced, indexed, and introduced within the Facilities Manual.
- (b) Organize the Facilities Manual by major system category and sub-system where relevant.

14. ASSET IDENTIFICATION AND LABELLING

Each Tracked Asset that has received an identification as indicated by Appendix 1U [BIM Requirements], is to have an Asset Number, Asset Name and Asset Description assigned to it.

The Design-Builder will use the asset naming structure provided in Section 6.4 of Appendix 1U [BIM Requirements] to ensure consistency in naming conventions for maintained assets.

Provide identification and warning signs for complete electrical systems as outlined in Attachment 3 of this Appendix.

14.1 Asset Number

- (a) Each Tracked Asset will have an Asset Number, which will be entered into the BIM database for that asset.
- (b) The Authority will provide a series of asset numbers to the Design-Builder to be used for asset numbering. This ensures they do not conflict with any existing asset numbers and follow the asset numbering system used within the Authority's Maximo system.

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14.2 Asset Name

- (a) Each asset will have an Asset Name which is a short form alpha-numeric identifier that typically includes an acronym for the specific equipment type and sequential numbering in accordance with standards as provided by the Authority.

14.3 Asset Description

- (a) Each asset will have a description which helps identify the asset as per the requirements of the BIM database for that asset.

14.4 Asset Tag

- (a) Each Tracked Asset will have a physical plate affixed to it which contains information about the equipment as defined in requirement 14.5.
- (b) The Asset Tag will be affixed in an accessible and visible location. The location should be standardized for each type of asset as much as possible to make it easy to find the Asset Tag.

The Asset Tag will have the information engraved on it in accordance with the requirements provided by the Authority. This includes the Asset Name number as a minimum with other pertinent information (e.g., source of power, equipment controlled, voltage, primary and secondary voltages, etc.) as applicable and where space permits.

- (c) The Asset Tag will meet the following characteristics for durability and readability:
 - (1) 3 mm ($\frac{1}{8}$ ") thick laminated plastic plates with white, engraved lettering and mechanically attached with high bond adhesive. Plates will be UV resistant.
 - (2) Colour scheme for electrical equipment can be found in the “Electrical Labelling Schema”; colours for other asset types to be determined by the Authority prior to the Design-Builder creating the Asset Tags.
 - (3) Where space permits, Asset Tags are to include a blank space of appropriate size below the Nameplate information where the Asset Label will be affixed.
- (d) A sample Asset Tag is shown below (yellow).



APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

14.5 Asset Label

- (a) Each Tracked Asset will have an Asset Label affixed in an accessible and visible location, preferably in a blank space on or adjacent to the Asset Tag where space permits.
- (b) The Asset Label will be affixed in an accessible and visible location. The location will be standardized for each type of asset as much as possible in a location where the label can be scanned with a handheld device.
- (c) The label will meet the following characteristics for durability and readability:
 - (1) Size: 2.0 in x 1.0 in or larger as needed to accommodate the QR code
 - (2) Substrate: 3-mil Flexible Anodized Aluminum Foil
 - (3) UV resistant
 - (4) Text Color: Black
 - (5) Adhesive strength suitable to ensure adherence to all equipment surfaces.
- (d) The label will contain the following information:
 - (1) Line #1: Property of
 - (2) Line #2: Fraser Health
 - (3) Line #3: Return if Found
 - (4) QR code in the appropriate version to include the Asset Number and related data as directed by the Authority
 - (5) Asset Number
 - (6) Logo: placed in top left corner
- (e) A sample Asset will be provided to the Authority for approval before producing and applying the Asset Labels.

15. 360 PHOTOS

The Design-Builder will utilize 360 camera technology and provide progressive 360 photo documentation as set out in Schedule 1 Section 2.5.3.3(6). In addition, the following requirements apply:

- (a) Provide a draft schedule of 360 photo shooting timeline by Building Systems, equipment and areas for review and acceptance by the Authority and then subsequently a final version.

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- (b) The Design-Builder will provide cloud software licencing to store and organize 360 photos for sharing with the Authority. The Design-Builder will provide a digital copy of all data contained in this platform (photos and all their metadata including location and timestamps) as part of the Record Documentation through a hard drive or download, whichever is practical and acceptable to the Authority at that time. The Design-Builder will give at least 30 days notice before the Authority's access to the cloud software terminates.
- (c) The Design-Builder will provide high-resolution photos (Matterport or approved equal) of the as-built environment at Substantial Completion. For clarity, this requirement refers to a higher quality of photos than set out in Schedule 1 Section 2.5.3.3(6)

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

Attachment 1 – Facility Manual Content Requirements

This attachment outlines the required contents for the Facilities Manual to be developed and submitted by the Design-Builder

Refer to the Submittal requirements and the formatting requirements within this Appendix for additional information.

1. INTRODUCTION AND EXECUTIVE SUMMARY

2. FACILITY OPERATIONS

2.1 Basis of Design

- (a) Updated as needed to reflect as-built conditions
- (b) List design considerations that are incorporated in the Final Design. This includes at a minimum any changes relative to the original design Intent.

2.2 Systems Descriptions

- (a) Provide general description of the type of system, how it operates and how it interacts with other systems.
- (b) Provide details of system type, composition, areas served, location in building, design criteria and function of major components. All equipment arranged to operate together as one system will be considered part of that system description. Organized system by system rather than by contract. Descriptions will include requirements for those systems in accordance with Schedule 1 – Statement of Requirements.

2.3 Sequences of Operation

- (a) For all systems, providing information on how the systems are designed to operate in detail based on requirements as outlined in Schedule 1 – Statement of Requirements.
- (b) Provide in a context, language, and nature suitable for ongoing operational use by facility personnel.
- (c) Include Standard Operating Procedures (SOP's) for start-up, shutdown, and seasonal change over of each system component. Include following:
 - (1) Exact type and specific location of each switch and device to be used in system operation.
 - (2) Identify safety devices and interlocks that will be satisfied for equipment to start.
 - (3) List conditions to be fulfilled before attempting equipment start up, i.e.

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

- (4) Valves positions correct, glycol mixture concentration proper, piping filled with fluid, filters/strainers in place, etc.

2.4 Building Occupancy and Equipment Runtime Schedules

2.5 HVAC Setpoints

- (a) Include Design conditions, Requirements for Minimum Outside Air, Seasonal changes in Operational Schedules or Setpoints

3. CONTROLS SOFTWARE

- (a) Provide system introductions for all controls software, including:
 - (1) A brief description of overall control philosophy.
 - (2) Hardware interlocks with other equipment that may affect or override
 - (3) Action of software control modules.
- (b) Provide procedure for operating staff to interface with software control modules.
 - (1) How to override system or component operation, to adjust system or building control set points, etc. Name virtual points provided in software for this purpose and recommend adjustment increments and limits where applicable.
- (c) Provide a System Schematic indicating locations, point mnemonics.
- (d) Provide proper names of physical control points in system. Include RCU panel wiring diagrams with field point termination addresses.
- (e) Software Modules:
 - (1) For each module provide a description of purpose and logic of module.
 - (2) Provide a description of each software Input and Output Variable.
 - (3) Provide a hard copy listing of software module.

4. FACILITY DOCUMENTATION

4.1 As-Built Drawings and Specifications

4.2 Single Line Diagrams and Schematics

4.3 Commissioning and TAB (testing, adjusting, balancing) Reports

4.4 Maintenance Contractor Reports

4.5 Reports and Studies

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

- (a) Authority inspection reports, balancing reports, acoustic reports, calibration, certifications, pressure tests, performance tests, etc.

4.6 **Warranty List**

4.7 **List of Equipment Suppliers and Contractors**

4.8 **O&M / Site Events Log**

4.9 **Safety Data Sheets**

5. **OPERATION AND MAINTENANCE**

5.1 **Original Equipment Manufacturer (OEM) Maintenance Manuals**

- (a) Where standard manuals are provided by manufacturers and vendors, the format will be in accordance with their standard documents.
- (b) Where modified or custom maintenance manuals are developed for this project, these are to be provided in accordance with the Submittal Format identified in this document.
- (c) Provide all equipment datasheets, including performance curves and optimum ranges. Generic catalog will be marked-up to specifically indicate the selected product, size, specification, operating point on the curve, and options.

5.2 **Preventive Maintenance (PM) Plan**

- (a) PM plans and schedules, using manufacturer's recommendations for major pieces of equipment including:
 - (1) Check sheets detailing tasks and associated frequencies;
 - (2) Schedules indicating the recommended frequency of maintenance tasks (e.g. weekly, monthly, quarterly, semi-annually, annually, or as recommended by the manufacturer); and
 - (3) Summary of warranty items that must be fulfilled for the Authority to obtain maximum value during the warranty period.
- (b) Detailed PM procedures for each individual maintenance task identified on PM plans and schedules, including:
 - (1) Safety instructions and precautions, including lock out/tag out precautions;
 - (2) Required skill level of operators/maintenance staff;
 - (3) Number of personnel required;
 - (4) Special tools required;

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- (5) Parts required;
- (6) Estimated time to complete task;
- (7) Lubrication schedule indicating types, grades, and capacities of lubricants for specific temperature ranges and applications; and
- (8) Schedule of maintenance materials specified including tools, spare parts, and extra materials.

6. COMMISSIONING DURING OPERATIONAL PERIOD

- (a) Ongoing Commissioning Plan.
- (b) Periodic Cx Requirements.
- (c) Recommended Schedule for Recommissioning.
- (d) Recommended Schedule for Recalibration of Sensors and Actuators.

7. TRAINING

- (a) Training Plan delivered.
- (b) Training material (those in addition to the standard documentation outlined elsewhere in this attachment).
- (c) Plan for Ongoing Training.

8. REVISIONS

- (a) Plan for Updates to Manuals.

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

Attachment 2 – Vendor and /or Manufacturer Sign-off Form

Project: _____ Schedule 1 Reference: _____

Asset System / Component : _____

(Make / Model / Size): _____

Vendor and/or Manufacturer: _____

Expected Service Life of Asset / System (years): _____

Standard Warranty Period (years): _____

Optional Warranty Extensions (years) _____

Service Contract Options Description including typical service levels agreement, as applicable:

Preventative Maintenance

Option 1: Number of Visits _____ Unit Price _____ Annual Price _____

Option 2: Number of Visits _____ Unit Price _____ Annual Price _____

Option 3: Number of Visits _____ Unit Price _____ Annual Price _____

Demand Maintenance

Description _____ Unit of Measure _____ Unit Price _____

Maintenance Activity	Weekly	Monthly	Quarterly	Annually

Component Repair / Replacement Activity	Frequency (years)

Propose Equipment Install Location	Mark Applicable
Acceptable Clearances	
Non-Hazardous Area	
Requires Safe Work / Confined Space Provisions	
Other:	

Comments: _____

Licensing costs (if applicable)	Frequency (years)

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The undersigned vendor and/or manufacturer of the equipment item described above hereby certifies that the above information is accurate under typical operating conditions and with consideration of acceptable maintenance practices.

Date

Vendor and/or Manufacturer

Signature of Authorized Representative

Date

Design-Builder

Signature of Authorized Representative

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

Attachment 3 – Identification for Electrical Systems

1. GENERAL REQUIREMENTS

1.1 Scope

- (a) Provide identification and warning signs for complete electrical systems as shown, as specified, as intended, and as otherwise required

2. PRODUCTS

2.1 Warning Signs

- (a) As required to meet requirements of Technical Safety BC
- (b) Outdoor signs:
 - (1) fibreglass,
 - (2) minimum size 250 mm x 360 mm (10" x 14").
- (c) Indoor signs:
 - (1) aluminum,
 - (2) baked enamel finish,
 - (3) minimum size 180 mm x 250 mm (7" x 10"),
 - (4) standard of acceptance
 - (A) Brady
 - (B) Seton

2.2 Equipment Identification

- (a) Nameplates for panels and equipment:
 - (1) to be in accordance with Fraser Health Equipment Labelling Scheme.
 - (2) 3 mm (1/8") thick laminated plastic plates,
 - (3) engraved lettering,
 - (A) first line: 11mm (7/16") high lettering
 - (B) second line: 7 mm (1/4") high lettering
 - (C) third line: 5mm (3/16") high lettering,

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- (4) colour coded as per Fraser Health Equipment Labelling Scheme:

Power Source	Label Colour	Label Text Colour
Vital Red White	Vital Red White	Vital Red White
Delayed Vital Blue White	Delayed Vital Blue White	Delayed Vital Blue White
Conditional Yellow Black	Conditional Yellow Black	Conditional Yellow Black
Normal Black White	Normal Black White	Normal Black White
Uninterruptible Power Gray Black	Uninterruptible Power Gray Black	Uninterruptible Power Gray Black

- (5) with bevelled edges,
- (6) mechanically attached with self-tapping stainless-steel screws.
- (b) Labels for warnings, instructions etc. on panels and equipment:
- (1) printed on white polyester background,
 - (2) 7 mm (¼") high letters unless specified otherwise,
 - (3) UV resistant inks,
 - (4) clear polyester over lamination,
 - (5) pressure sensitive adhesive.
 - (6) standard of acceptance
 - (A) Brady
 - (B) Ideal Industries
 - (C) Safety Sign
 - (7) Do not commence manufacture of nameplates and labels until wording has been reviewed by the Authority.

2.3 Wiring Identification

- (a) Colour coded phasing tapes:
- (1) 7 mil poly vinyl chloride,
 - (2) pressure sensitive adhesive,
 - (3) compatible with wire insulation,
 - (4) permanent colour,

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

- (5) electrically insulating,
- (6) UV and moisture resistant,
- (7) to CSA C22.2 No. 197
- (8) standard of acceptance
 - (A) 3M Scotch 35
 - (B) Electro Tape Specialties 103/103C Series
- (b) Wire markers:
 - (1) heat shrink, military grade polyolefin sleeves, permanent printed wire identification.
Or
 - (2) adhesive self-laminating, white vinyl print area, permanent thermal transfer printing.
 - (3) standard of acceptance
 - (A) Brady
 - (B) Panduit

3. EXECUTION

3.1 Equipment Identification

- (a) Identify electrical equipment with nameplates, directories, and labels.
- (b) Nameplates:
 - (1) secure to top exterior of equipment except where indicated otherwise,
 - (2) switchboards: indicate name, voltage, and ampacity,
 - (3) rear of switchboard cubicles or cells: indicate name of cell or cubicle,
 - (4) panel boards: indicate name, voltage, and source of power,
 - (5) terminal cabinets: indicate name, system, and voltage,
 - (6) disconnects, starters and contactors: indicate equipment being controlled and voltage,
 - (7) transformers: indicate name, capacity, primary and secondary voltages,
 - (8) pull boxes and junction boxes: indicate system, circuit numbers and voltage,

APPENDIX 1V – ASSET MANAGEMENT REQUIREMENTS

- (9) cabinets for low voltage systems, such as signals and communications: indicate name and system,
- (10) equipment not listed above, such as, instruments, fire alarm, clock and program equipment and control panels: identify in a similar manner showing name and number of the equipment, voltage, and load information.
- (11) Typical identification standard:
 - (A) Lighting, Receptacle and Power Panels: each identified with an engraved lamicoïd nameplate secured to top interior trim as follows:

0834-03V01	11 mm (7/16") high lettering
FED FROM	7 mm (1/4") high lettering
0833-01-2V01	5 mm (3/16") high lettering

(c) Directories:

- (1) Supply each panel board with a directory card holder welded to inside of door, complete with a neatly typewritten list showing information as follows:

Panel board Name 0834-03V01	
Panel Voltage	120/208 Volts
Circuit Number	Description
1	Lighting Room #34
2	Receptacles Room #34
3	Ice Machine Room #17

- (2) Cabinets for low voltage systems, such as signals and communications: as for panel boards with a directory showing circuit numbers and room locations plus a blank column for "Remarks".
- (3) Cover directory list with a 0.8mm (1/32") minimum thick clear plastic sheet to protect it.

(d) Pull Boxes and Junction Boxes

- (1) Label all feeder pull boxes and junction boxes with an appropriate label on the box cover plate.
- (2) All labels will be of a plasticized material and self-adhesive with industrial adhesives specifically selected to be compatible with the materials labels will be applied to.
 - (A) Abrasion and chemical resistant,

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- (B) Appropriate for indoor and outdoor use,
 - (C) Weatherproof,
 - (D) UV resistant.
- (3) Labels to provide the following information:
- (A) Colour labelling with system identification matching the label on the incoming and outgoing conduit as required by section 3.4.
 - (B) Additional label to provide the following box information:
 - i. Box Number,
 - ii. Source: Panel name, low voltage switch/controller name, etc. as appropriate,
 - iii. Terminations: Branch circuit numbers, feeder load panel, control circuits, etc. as appropriate.

3.2 Service Rough-in Identification

- (a) Provide colour code identification inside of each outlet box, pull box and panel as it is installed. Provide colour code in accordance with Fraser Health Electrical Pipe Colours standard.
- (b) Junction boxes in furred ceilings to have colour identification on both inside and outside.

3.3 Wiring Identification

- (a) Identify feeders and branch circuit wiring with wire markers;
 - (1) at each end of run,
 - (2) in each junction box,
 - (3) wherever they are introduced into ducts or equipment.
- (b) Identify incoming utility service lines by Red - Phase "A", Black - Phase "B", Blue - Phase "C", with colour coded phasing tape.
- (c) Band buswork in each;
 - (1) switchboard,
 - (2) unit substation cubicle,
 - (3) power panel,
 - (4) lighting and receptacle panel, with colour coded phasing tape as follows:

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Red Phase A	Red Phase A
Black Phase B	Black Phase B
Blue Phase C	Blue Phase C
White Neutral	White Neutral
Green Ground	Green Ground

- (d) Band feeder and sub-feeder bus and conductors as above.
- (e) Maintain phase sequence and colour coding throughout.
- (f) Connections in equipment to be Phase A, B, C from left to right when viewing from front or accessible direction.
- (g) For control conductors for motors and equipment, schedule and chart marker numbers with corresponding machine numbers and locations and include with Record Drawings and Operation and Maintenance Data.
- (h) Use colour coded wires in communication cables, matched throughout system. Schedule and chart, marker numbers and wire colours with corresponding equipment and include with Record Drawings and Operation and Maintenance Data.

3.4 Conduit and Cable Identification

- (a) Conduit containing low voltage data and control cabling will be identified with green labels with white lettering with the exception of Fire Alarm.
- (b) Fire Alarm systems will utilize red labels with white lettering.
- (c) The following table will be utilized for system grouping and identification:

Label Abbreviation	Description	Sub System
DDC	Direct Digital Controls	BAS, BMS
COM	Communication	Intercom
DAS	Distributed Antenna System	2-Way Radio, Paging, ECOMM Radio, Cellular
PA	Public Address	
AV	Audio Visual	AV, CATV, Digital Signage
SEC	Security	CCTV, Access Control, Intrusion, Intercom, Panic Duress, Patient Wandering, Infant Protection
NC	Nurse Call	

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Label Abbreviation	Description	Sub System
CLN	Clinical	Standalone clinical systems e.g. Physiological Monitoring, Telemetry
PTS	Pneumatic Tube System	
LTG	Network Lighting	
PME	Power Management	Metering, Power Management, Power Control
FA	Equipment	Fire Detection, Annunciated, Telephone
LAN	Fire Alarm	Any device or system connected to the FHA LAN

- (d) Conduit containing AC power circuits will be identified with orange labels with black lettering indicating the source voltage e.g. "120/208 VOLTS AC", followed by a coloured band indicating the source system. Bands should match the switchboard panel service colours as closely as possible:

Source	Colour	Switchboard Paint Colour Code
Vital	Red	Traffic Red RAL 3020
Delayed Vital	Blue	Traffic Blue RAL 5017
Conditional	Yellow	Traffic Yellow RAL 1023
UPS	Grey	Manufactures standard Grey

- (e) Conduit containing DC power circuits will be identified with orange labels with black lettering indicating source voltage e.g. "120 VOLTS DC"
- (f) Label sizing will be determined by conduit diameter:

Pipe Diameter	Min. Label Size	Min. Text Height
3/8" – 1 1/4" (12 -35 mm)	1" x 8" (25 x 203 mm)	0.5" (13 mm)
1 1/2" – 2" (41 -53 mm)	1" x 8" (25 x 203 mm)	0.7" (19 mm)
2 1/2" – 6" (63 – 155 mm)	2" x 12" (51 x 305 mm)	1.3" (32 mm)
>6" (>155 mm)	3" x 24" (102 x 610 mm)	2.5" (64 mm)

- (g) Labels will be placed:

- (1) Every 6 meters along straight runs,
- (2) At all changes in direction (on both sides of the turn),

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- (3) At both sides of penetrations through floors and walls
 - (4) At all transitions between conduit and cable tray at conduit end
 - (5) At all entry and exit points on electrical panels, controllers, junction boxes, equipment panels etc.
- (h) Where a conduit contains more than one system, a label for each system contained within will be applied at all the previously specified locations.
- (i) All labels will be of a plasticized material and self-adhesive with industrial adhesives specifically selected to be compatible with the materials labels will be applied to (e.g. plastic and steel conduit, armoured cable, fire rated pathways, direct to cable etc.). All labels will be certified to withstand use in harsh environments and at a minimum be:
- (1) abrasion and chemical resistant,
 - (2) appropriate for indoor and outdoor use,
 - (3) weatherproof,
 - (4) UV resistant,
- (j) Physical label sample boards will be provided during the shop drawing stage laying out an example of each size of label and each system label to be utilized during the project for example:
- (1) one DDC label in each size,
 - (2) one 12,400 VOLTS AC label in each size and each colour band (red, blue, yellow, grey),
 - (3) one 12 VOLTS DC label I each size,
 - (4) labels to be adhered to a variety of the different materials to be adhered to (conduit, cable, rated enclosures etc.)

3.5 Fire Stopping Identification

- (a) Provide a warning card adjacent to each opening exceeding 25mm (1") in diameter, indicating the following;
- (1) a warning that the opening is protected by a fire stopping material,
 - (2) the fire stop system used, ULC or cUL,
 - (3) F rating or FT rating,
 - (4) specific fire stop product(s) used,

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- (5) name and telephone number of the contact person should any changes to the fire stopping be required.
- (b) Provide warning labels for each fire stopped penetration as follows;
 - (1) permanently attached to walls, floors, underside of slabs, adjacent to the penetration,
 - (2) on each side of the penetration,
 - (3) vinyl panel, white and red background with black lettering,
 - (4) self adhesive with permanent pressure sensitive adhesive,
 - (5) stating:

WARNING
THROUGH PENETRATION FIRESTOP SYSTEM - DO NOT DISTURB
NOTIFY BUILDING MANAGEMENT OF ANY DAMAGE

3.6 Single Line Electrical Diagrams

- (a) Provide a single line schematic diagram in each Electrical room.
- (b) Diagram:
 - (1) not less than 600 mm x 600 mm (2' x 2'),
 - (2) in a wood frame,
 - (3) Plexiglas covered.

3.7 Fire Alarm Diagrams

- (a) Provide at the fire alarm control panel and annunciator;
 - (1) a fire alarm riser diagram,
- (b) Diagrams:
 - (1) print of an AutoCAD drawing using the latest version of AutoCAD,
 - (2) not less than 600 mm x 600 mm (2' x 2'),
 - (3) in a wood frame,
 - (4) Plexiglas covered.

NSHBCCC Template - O&M Costs

Main Category	# FTE's	\$/FTE	Annual Cost	Assumptions / Sources
Grounds - Landscaping			\$ -	
Grounds - Snow			\$ -	
Waste Removal			\$ -	
Security			\$ -	
Cleaning			\$ -	
Window Cleaning (exterior)			\$ -	
Maintenance & Repair (All Facilities related)	0		\$ -	
Electrical				
Mechanical				
Elevators				
Other				
Maintenance & Repair (All Clinical related)			\$ -	

APPENDIX 1V - ASSET MANAGEMENT REQUIREMENTS

NSHBCCC Template - Life Cycle Replacement Plan (Facilities Assets)

							Year of Refurb / Replacement Cost (\$)																																
Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Individual elements	Equipment or System	Initial Installed Cost Estimate	Estimated Typical Life (years)	Comment about assumptions / cycles as appropriate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	30 Year Total		
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				\$0		Annual Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		

Notes:
 Use ASTM Uniformat II building elements classifications
 Use separate line for each major asset. Do not group
 Include all maintained equipment, systems and elements
 Refurb/replacement cost are to be provided in current dollars