

ADDENDUM

No. 04 **Date:** 9/18/2024
Project No. 0020711.01 **Attention:** Leonard D'Souza
Project Name: Princess Margaret Cancer Centre
Stem Cell Transplant 2, MHC, MHDU, DSC
Address: University Health Network
610 University Avenue
Toronto ON

Issued By: Linda Vela

Distribution: Refer to the UHN Cover Letter

This Addendum forms a part of the Bidding and Contract Documents and modifies the original issued Bidding Documents (dated August 13, 2024) for the above titled project, as indicated below, and is hereby incorporated into the Contract Documents as part thereof.

Bidders are required to acknowledge receipt of this Addendum in the space provided on the Proposal/Bid Form.

The following architectural questions have been received by the Bidder(s) and the following answers are being provided to all Bidder(s).

1. (61) Tabletop Integrated Audio-Video Systems & Equipment (InteGret Table Box c/w Cable Grommet, SJT Cord, Cable Retractors & Cable Management System) – Please confirm since this get mounted on furniture tabletop, will be supplied by furniture supplier.

Response: This will be provided by the UHN A/V contractor under a separate contract.

2. (118) We are assuming we are just performing the cut/cap/make safe work and that dropping/removal of all piping/ductwork/fixtures/equipment will be by others (including work in the mechanical room. Please confirm

Response: Scope delineation is stipulated in the drawings and specifications, and is to be further coordinated amongst trades as required.

3. (197) I cannot locate the leg size required for the corner guards. Please advise.

Response: Refer to CG-1 on A1200 Interior Finish Legend. Leg size is 2".

4. (200) There's a few details on A0801 that show insulation above the ceilings, but I don't see any indication on where these details are required. Are these just default details?

Response: These details are typical.

5. (211) Please clarify what are colour and configuration of existing windows to much as directed on det. 5/A0504 and det.1/A0504

Response: Refer to revised Spec Section 08 51 13 and 07 92 00 issued herewith.

6. (212) For interior aluminum entrance doors, specified dimensions for aluminum entrance framing: 38mmx152mm top and 38mmx228mm bottom frames (spec section 08 41 00 - 2.4) do not exist. Also, for specified Narrowstile type doors (specified in 08 41 00 - 2.5) top rail -

57.2mm and bottom rail - 98.4mm. Sections 2.4 and 2.5 of specs 08 41 00 also do not match frame FG3 listed in Door Schedules for these doors (drawings A1002 and A1005A)

Response: Refer to revised Spec Section 08 41 00 issued herewith.

7. (213) Please provide specification for exterior glass type and framing

Response: Refer to revised Spec Section 08 80 00 issued herewith.

8. (214) Please confirm that windows sc5-402A, sc5-402B at L5 entrance to waiting area and reception are to be B2 type sliding windows

Response: B2 sliding windows are only in MHDU Treatment bays. sc5-402A, sc5-402B are B1.

9. (216) Specification 12 24 13 - Roller Window Shades and drawing number A1200 - Interior Finish Schedule notes roller shades are in-contract. However, no roller window shades are shown on the architectural drawings. Please confirm if window roller shades are in-contract. If so, please provide locations.

Response: Refer to Reflected Ceiling Plan drawings, Tags WS-01 and WS-02.

10. (240) In the interior partition types, page A0004, in the general notes item 16, it referred to page A1011 for the head of wall termination condition, which is not in the drawing set. Can you please send us this page?

Response: Correct reference for A1010 is A0811. Delete reference to A1011.

11. (247) All the area except mentioned for Phase 2 will be vacant and can be done altogether as Phase 1. Is this correct?

Response: Yes. Refer to Construction Control Plan and Phasing Plan Drawings.

12. (248) In regards to the response to 5 (85) of Addendum#3, we are requesting the pictures of those occupied areas (levels below the actual work) where we were not either granted access or allowed photos to be taken due to presence of patients/staff etc. Also, during the Site walkthrough it was informed that a folder will be issued via an addendum with all the photographs of the existing areas of the levels below. There is significant amount of Re&Re works on these floors and getting these photos will help greatly.

Response: Photographs are provided via www.multivista.com (Username: pmsct2outpatient@UniversityHealthNetwork.onmicrosoft.com, Password: [uhntender2024sct2](#)). An additional site visit is scheduled.

13. (249) Sheet flooring wall base as per finish schedule for RS-1 there's a note/comment indicating a 9" prefabricated base in the corridor, waiting area & millwork area and all other places will have a 9" integral cove base. Please confirm if this integral cove means site-fabricated cove wall base. Also, please clarify if the integral cove base should be without the aluminum backer as aluminum backer-only comes with prefabricated wall base.

Response: All RS-1 cove base are 9" site fabricated with an integral "butterfly" corner.

14. (250) Could you please confirm if all the corridors and waiting areas will receive prefabricated wall bases regardless of wall base sheet flooring type? Because on the Floor finish plan, - e.g level 2 waiting and corridor area has RS-1 as the main flooring however there's RS-2 flooring at the borders, so the wall base will be RS-2 and RS-2 notes only indicate a 9" integral cove base, so in this case, it is contradicting with wall base note indicated with RS-1 which shows 9" prefabricated wall base in corridors, waiting area and adjacent millwork because it RS-2 flooring wall base in corridors and waiting area. Please clarify.

The live load allowance that the scissor lift must fall within is summarized below based on location:

610 University: Level 2, 5, 10 – 7.2kPa (150psf)
620 University: Level 5 (at ramp) – 6kPa (125psf)
620 University: Level 10 – 2.4kPa (50psf)

Note: The new ramp falls within an area of Level 5 that was designed to 125psf (6kPa). The rest of Level 5, 620 University, is 75psf (3.6kPa), see enclosed existing drawing. From the existing drawings 620 University Level 10 have a design live load of 50psf (2.4kPa)

Note, that no other materials, hoarding, equipment etc. is to be stored in the bay and adjacent bays of where the scissor lift is to be used. Contractor to submit to structural consultant a proposed scissor lift and travel path for review and confirmation prior to use on site.

17. (253) Is there any elevation as a reference showing Whiterock heights, especially for custom heights Whiterock? Please advise on the dimensions what is custom height is it 4', or 5' or what is the height number which is required for each Whiterock type? For full-height Whiterock, is it 10' high? Please confirm

Response: Refer to Interior Wall Protection Plans A1300.

WP2 CUSTOM-HEIGHT (Refer Millwork Assemblies and Interior Elevations) Wall protection at locations where we have millwork

WP3 HALF-HEIGHT (Refer to A1301 for typicals)

WP4 CEILING-HEIGHT (To U/S of ceiling, refer to RCP for ceiling types)

WP5 CEILING-HEIGHT (ACCENT) (To U/S of ceiling, refer to RCP for ceiling types)

18. (254) Drawing A0504 shows two sections 13 and 14, mentioning Typical expansion joint on columns and at doors.

Response: Refer to 255 response.

19. (255) Please indicate the locations on floor plans so that we can properly price this item.

Response: Refer to Arch Addendum 1 for response on location of the existing expansion joints. The expansion joint covers are continuous and are located on the floor, wall and ceiling assemblies that are crossing the expansion joint.

20. (256) Drawing A0705 A mentions to apply spray fire proofing to U/S of Level 6 slab. This is representing some portion of slab, which is hatched.

Response: Refer to 257 response.

21. (257) Fire proofing for Level 6 slab is altogether a new work or this is a rectification work resulting from impact of our work?

Response: All new work. Refer to A0705A and A0705B area shown in diagonal dash. The whole area is to be fireproofed.

22. (258) Hatched area shown is a portion of Level 6 slab, whereas impacted area will be for entire slab. Please confirm the exact area where we have to do spray fire proofing.

Response: All new work. Refer to A0705A and A0705B area shown in diagonal dash. The whole area is to be fireproofed.

23. (259) Spray Fire proofing has been shown on Level 6 slab (Drawing #A0705A) and Level 11 slab (Drawing # A0710A), but not shown on any other slabs. Please confirm the exact scope of work and locations.

Response: That is correct. The slabs in the area of construction will be made accessible due to extensive demolition and will require fireproofing as noted in the documents. Refer to A0705A and A0705B area shown in diagonal dash. Fireproofing of remaining slabs will be addressed when renovations, in areas not part of this project, are planned.

24. (278) Spec. section 10 11 00 -Signage and Wayfinding is listed the table of contents but the spec. is not provided. Only the cut sheets are available. Please provide the spec.

Response: Refer to Arch Addendum 1 for response.

25. (279) Cubicle Curtain track is provided in the tender document, but not shown in the table of contents. Is it required? Please advise.

Response: Refer to Arch Addendum 1 and 2 for response. Curtain tracks have been removed from the project with exception of Staff Coat Room on Level 10.

26. (280) Patient Lift & Track System. Arjo Canada is requesting for an approve alternative substitution. Please find attached Arjo's part 1 and Part 1 document for substitution request.

Response: Refer to Arch Addendum 1 for response.

27. (312) Please advise estimated date when we are allowed to mobilize on site. This is pertinent to our schedule.

Response: Refer to UHN Addendum #3.

28. (313) Please advise owner's anticipated duration when each level can be closed off for construction. This is pertinent to our schedule.

Response: Refer to UHN Addendum #3.

29. (320) What are the milestone dates for this project. Ie, award date, Substantial completion dates etc.

Response: Construction expected to start immediately after the award notification, which is based on the required timeline for MOH approval to award the project. Proponents to present their schedule along with the bid based on criteria provided in the bid documents.

30. (321) Is any of the work on floors 2, 5, & 10 that is to be done after hours?

Response: Refer to Arch Addendum 2 for response.

31. (322) Is all of the sanitary drainage work on the floors below (1, 4, and 9) to be done after hours? or are there areas in which we can work during the day?

Response: Refer to Arch Addendum 2 for response.

32. (323) For the hoisting of the temporary AHU, will be allowed to hoist off of University Ave? Are there time restrictions as to when we can hoist?

Response: Refer to Arch Addendum 3 for response.

33. (334) Upon checking the drawings you've provided, there are enlarged floor plans and elevations of some areas of MHU, MHDU, and DSC shown on Drawings A0602A to A0610D where we can check the elevations of windows. However, there are other locations where window elevations are not visible. In order to provide you quotes for window shades, could you please provide us with elevations and window schedules?

Response: Refer to Arch Addendum 2 for response.

34. (337) Is any of the work on floors 2, 5, & 10 that is to be done after hours

Response: Refer to Arch Addendum 2 for response.

35. (338) Is all of the sanitary drainage work on the floors below (1, 4, and 9) to be done after hours? or are there areas in which we can work during the day?

Response: Refer to Arch Addendum 2 for response.

36. (339) For the hoisting of the temporary AHU, will be allowed to hoist off of University Ave? Are there time restrictions as to when we can hoist?

Response: Refer to Arch Addendum 2 for response.

37. (340) I have a few questions for clarification. I am reviewing the Appendix E Specs Document for reference.

Regarding the Amico Solution Specs (Page 1787 – 1789), I noticed that the Oxygen, Med gas, and Vacuum outlets are located on the headwalls. Could you please clarify if these devices will be provided by the headwall supplier or if another company will be supplying and installing these outlets?

Unfortunately, DIRTT does not yet have approval in Canada for their Flex Gas Solution, as it is only approved in the USA. We can provide a cutout in our wall system for the medical devices to be installed on.

We would need to know the manufacture and the latch style that is specified for medical outlets.

On pages 1775 – 1784, Ohio Medical is mentioned for the Flowmeter Oxygen and Flowmeter Air, manufactured by Western a Scott Fetzer Company. However, I did not see a Medical Vacuum supplier mentioned. From my research these flowmeters need to be attached to an outlet. Will Western a Scott Fetzer Company be supplying and installing these outlets?
(Attachment has been emailed separately)

Response: Refer to Arch Addendum 3 for response.

38. (356) Wall Protection:

• INFO:

o A1200, WP2, WP3 & WP4

• QUESTIONS:

o Is millwork supplying the Wall Protection or do you have this covered by others?

Response: Refer to Arch Addendum 3 for response.

39. (357) Glass Glazing:

• INFO:

o A0921 Reception Desk, A0924 Reception, A0925 Reception

• QUESTIONS:

o Is millwork supplying the Laminated Glass Glazing?

Response: Refer to Arch Addendum 3 for response.

40. (358) Metal Frame Work:
- INFO:
 - o A0921, MW001 Bench
 - QUESTIONS:
 - o Is millwork supplying the Metal Frame Work or do have this covered by Misc. Metal?

Response: Refer to Arch Addendum 3 for response.

41. (359) Metal for Washroom Counters:
- INFO:
 - o A0920, MW101 & MW101A
 - QUESTIONS:
 - o Is millwork supplying the Metal Posts and Brackets for Countertops or do have this covered by Misc. Metal?

Response: General contractor to coordinate trades.

42. (408) Interior Partition types (A-P) are shown on dwg A004, but the floor plan dwg A0102.1, A0105.1, A0105.2, A0110.1 do not have any table to identify the partitions. Please clarify.

Response: Wall partition tags are on A0102.1_D, A0105.1_D, A0105.2_D, A0110.1_D.

43. (409) (03 53 00) The specification has spec section -03 53 00 -Cementitious Underlayment. We could not be able to find the location for floor levelling on the drawings. Where does this apply? Please indicate the location and area of floor levelling required on the drawings. Also, please advise the average thickness of required floor levelling.

Response: Refer to response for 252 issued herewith.

44. (410) (Dwg D0102A, D0105B, D0105B & D0110A) As per W1, Remove and dispose existing partition walls, Is it drywall/block wall? If it's a mix? Please Indicate on dwg or specify the existing wall type clearly."

Response: All partitions noted W1 are drywall except where indicated with cross hatch which denote concrete walls (ie. MHDU electrical room 5-508A and existing wall between the 2 buildings in work areas 5-803A)

45. (411) (Dwg D0102A, D0105B, D0105B & D0110A) As per F1, Remove and dispose existing flooring and base. Is it tile, terrazzo? . Please Indicate on dwg or specify the existing wall type clearly.

Response: Refer to enclosed flooring sketches.

46. (412) (Dwg D0102A, D0105B, D0105B & D0110A) Is there a laydown area for a 40 Yard bin available all through the project on regular shifts?

Response: Refer to Construction Control Plan Drawings for construction bin placement.

47. (413) (Dwg A0504, A0501, S0002.) Dwg A0504 detail 1 & 5 show Steel Channel (by Misc. Metal trade) sitting on Structural stud support (by drywall trade) to support Mega board Sub floor. The structural dwg S0002 details A, B, C & D do not show any Misc. Metal support. Please confirm the provided detail is correct. Ramps & deck framing plan, detail 1 on dwg A0501 shows, rows of steel stud wall attached together. If the Miscellaneous metal framing required above the stud wall, please provide a detailed layout and the steel member size.

Response: Megaboard floor is supported by CFMF studs. Details 1&5/A0504 have been updated accordingly.

48. (414) (Dwg A0504, S0002) Dwg A0504 detail 1 & 5 show Steel Channel (by Misc. Metal trade) attached to Structural stud framing (by drywall trade). The structural dwg S0002 details A, B, C &D do not show any Misc. Metal support. Please confirm the provided details are correct and if steel channel are required, please provide the size and detail.

Response: Glass guardrails at floor and ramp edges are supported HSS10x2x1/4 (51x254mm) as shown in the detail 2/A0504 and the HSS tube locations have been specified in the detail 1/A0501. Engineered shop drawings submittal to include glass guard rails.

49. (417) There is a spec. section 07 21 29, Sprayed applied Insulation is in the document. We are unable to locate on the drawings. Please advise.

Response: Refer to A0822A section details. Spray insulation is required where perimeter FCU are being removed. Detail 3. Refer to mechanical drawings for full extent of work.

50. (418) There is a spec. section 07 95 13, S Expansion Joint Cover assemblies is in the document. Is it for floors, walls, ceiling or Roof? Please advise which floor needs the expansion joint assemblies. We are unable to locate on the drawings. Please clarify.

Response: Refer to Arch Addendum 1 for response on location of the existing expansion joints. The expansion joint covers are continuous and are located on the floor, wall and ceiling assemblies that are crossing the expansion joint.

51. (419) The tender document has spec. section 08 56 19 - sliding pass through Windows. But the Doors and Borrowed Lights schedule on dwg A1005A does not show any sliding pass through windows.

Response: Refer to Borrowed Light Schedule on A1005A (Mark B2)

52. (420) The Equipment Plans - Dwgs A1102 A, A1105A, A1105 B, A1105C, A1105D, A1105E, A1110 A, A1110 B has FFE schedules. Are these all equipment will be supplied and installed by the Owner (UHN)? Or any equipment Owner supply Contractor installed? Or Contractor supply and Contractor install? Please clarify.

Response: FFE list is included in the Architectural Specification. Refer to Table of Contents Appendix. The FFE list notes Owner Provided/ Contractor Installed and Contractor Provided/ Contractor Installed items that need to be included.

53. (421) The Notes on Equipment Plans - Dwgs A1102 A, A1105A, A1105 B, A1105C, A1105D, A1105E, A1110 A, A1110 B says the following. We are unable to locate the list for these items. Please clarify. Refer to FFE List for diagnostic set accessories. Refer to FFE List for Head wall accessories. Refer to FFE List for cubicle Track. Refer to FFE List for computer to be mounted on the wall bracket. Refer to FFE List for Pharmaceutical waste

Response: FFE list is included in the Architectural Specification. Refer to Table of Contents Appendix.

54. (422) Table of contents 00 01 10 page 4 - document identification says furniture Fixtures & equipment list for DSC, MHC & MHDU. We find cut sheets only in the tender document. Please advise. Do we have to include any of this in our bid or this is for information only? please clarify.

Response: FFE list is included in the Architectural Specification. Refer to Table of Contents Appendix. The FFE list notes Owner Provided/ Contractor Installed and Contractor Provided/ Contractor Installed items that need to be included.

55. (423) Spec. section 09 62 90. We are unable to see tactile Attention indicators on dwgs 1205.1 & A1205.2. Please indicate.

Response: Refer to Detail 2 on A0501

56. (426) Some structural channels are shown below the megaboard floor attached to structural studs posts. Is it under the scope of the miscellaneous? Refer detail 7/A0503. Even though the channel refers to structural drawings nothing is shown in the structural drawings. Can you please provide some inputs? Also the Guardrails in 2/A0504 shown as sitting on Misc. Channels Question is if by Misc. Metals, whether these channels need to be spread on the entire floor as shown in 1/A0501 and what type of connection?

Response: Refer to response for 413 and 414 issued herewith.

57. (428) Level 10 Floor plan A0110.1 show the following doors have door side lights.1008, 1010, 1011,1013,1016,1018,1020,1022,1024,1026,1028,1031,1037,1039,1054,1056,1058. But the Doors & Borrow sidelights (DSC) schedule A1010 shows these doors are type F or FG-3. As per elevation shown on dwg A1000. The door type F and FG-3 are single doors and does not show side lights. Which one to follow? please clarify.

Response: Frame / Type column in the Door schedule notes the door frames (00, 01, 00-DA, etc). Door types are noted in the Door/ Panel column in the Door schedule (F, FG-3, etc)

58. (429) Dwg A1302.1, room 2-434 and Dwg A1305.1 room 5-870 show WP7 at the corner of House keeping Closet . Please advise the spec for WP7.

Response: WP7 is stainless steel wall protection (splash guard) that comes as an add on accessory with the mop sink. Refer to Mechanical spec.

59. (430) Since the partition type indicated on dwg A004, is not labelled in any of the floor plans, we find difficult to price the drywall partitions. Please provide revised floor plan with the partition type indicated on the drawings.

Response: Refer to response for 408 issued herewith.

60. (431) Addendum 2- Consultant Addendum 1 Q/A 8. refer Signage Spec. section 10 11 00. The table of contents page 3 has spec. section 10 11 00 for Visual display surfaces. There is a spec. section 10 14 00 is listed on the table of contents, but the spec. is not issued. Please issue the listed signage specification section 10 14 00.

Response: The Signage specification is issued in the Project Manual. The document is titled Signage & Wayfinding, UHN - Signage specification (page 396 of the PDF).

61. (432) Dwg A1102 A, A1105A, A1105B, A11058C show Folding partition in several Treatment rooms. There is no Folding partition spec. provided or listed in the table of contents issued with the tender document. Are these Folding partition in FFE items? We could not be able to locate Folding Partition in FFER list. Please advise.

Response: Refer to Addendum 2 - Silentia folding screens cutsheet.

62. (433) Upholstery UP-8 to UP 26 are listed pm on Interior Finish Legend A1200. But these are not shown on Millwork drawings. Is it in a part of FFE item O/O, or O/V? Please confirm.

Response: Upholstery is for furniture which is owner provided/ owner installed.

63. (434) Addendum 2- Consultant Addendum 1 Q/A 23. deletes Cubicle Curtain and Track. But, Room by Room detail (We take the room 2-425 MHC - Lvl 2 as typical to ask this question). MHC 2 2-425, Atta ID C-452572 shows Track , Ceiling , Cubicle Curtain as C/C item. Since this item is deleted by addendum, we assume not to include in our pricing. Also., please advise what is cubicle curtain Atta, ID C-461266? Please clarify.

Response: Refer to response for 279 issued herewith. Refer to FFE list dated 08/14/2024 included in the architectural spec. Curtains in MHC were replaced with Silentia panels. Cut sheet was issued in Arch Addendum 2.

ATTACHMENTS: The following is a list of the modified documents and a brief description of what has been modified.

SPECIFICATIONS:

A. Incorporate the following new Specification Sections attached to this Addendum:

SECTION 07 92 00 - JOINT SEALANTS

Added exterior joint sealant requirements.

SECTION 08 41 00 - ALUMINUM ENTRANCES

Updated requirements for interior aluminum entrance doors.

SECTION 08 51 13 - ALUMINUM WINDOWS

Added exterior window requirements.

SECTION 08 56 19 - SLIDING PASS THROUGH WINDOWS

Revised to include alternate supplier for sliding pass-through windows.

SECTION 08 80 00 - GLASS AND GLAZING

Updated to include the IGU glazing

SECTION 09 91 00 – PAINTING

Updated paint for door and frames.

SECTION 09 77 33 - HYGIENIC PANEL WALL SYSTEM

Revised to include installation of existing panels in DSC.

IMAGE SCHEDULE

Revised to include existing panels to be reinstalled in DSC.

TICKNER REPORT

Report regarding existing kitchen exhaust system that will be removed from the 12th to the 6th floors.

347979.000 REVISED LEAD BULK SAMPLE RESULTS LETTER

Pinchin Ltd. (Pinchin) was retained by University Health Network to collect bulk samples for lead analysis of materials associated with ductwork in a fresh air airshaft within Princess Margaret Hospital located at 620 University Avenue, Toronto, Ontario.

PINCHIN REPORT

Pinchin Report dated January 17, 2024 for Hygiene and Air Quality Considerations and for consideration for the entire shaft from L6 and above.

ARCHITECTURAL:

B. Incorporate the following revised Drawing(s) reissued as attachment(s) to this Addendum:

DRAWING G0502 – CONSTRUCTION CONTROL PLANS

Revised Level 6 floor plan.

DRAWING A0501 - VERTICAL CIRCULATION

Revised notes for structural support and subfloor framing.

DRAWING A0502 - BUILDING SECTIONS

Revised notes for structural support and subfloor framing.

DRAWING A0503 - RAMP & STAIR SECTIONS

Revised notes for structural support and subfloor framing.

DRAWING A0504 - RAMP & STAIR DETAILS

Revised details and notes for structural support and subfloor framing.

DRAWING A1000 - DOORS & BORROWED LIGHTS

Revised FG-3 dimensions. Deleted red text.

DRAWING A1200 - INTERIOR FINISH LEGEND

Revised APC-1 and APC-2 to align with new UHN guideline.

DRAWING A1310.1 – INTERIOR WALL PROTECTION PLAN – LEVEL 10 (DSC)

Added note for installation of the existing art panels in DSC.

REFERENCES:

EXISTING FLOOR TYPES

Colour coded existing flooring types for areas affected by new work.

SHAFT EXHAUST PHOTOS

<https://fileshare.uhn.ca/download/f6d27478-c884-484c-9080-0281f7ffd92c>

ADMINISTRATIVE BUILDING 5TH FLOOR FRAMING

Reference for load capacity of existing slab.

S4 - TENTH FLOOR FRAMING

Reference for load capacity of existing slab.

MECHANICAL:

C. Incorporate the following Mechanical Addendum 3, prepared by Quasar Consulting Group, dated September 18, 2024 attached to this Addendum 04.

ELECTRICAL:

D. Incorporate the following Electrical Addendum 3, prepared by Quasar Consulting Group, dated September 18, 2024 attached to this Addendum 04.

Total number of pages: 11

This Addendum consists of 279 pages (including ALL attachments, excluding UHN cover).

Joint Sealants

Section revised and reissued by Addendum No. 4

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Joint sealants – interior locations.
 - .2 Joint sealants – exterior building envelope locations.
- .2 Section excludes:
 - .1 Glazing system assembly sealants.
 - .2 Fluid-applied flooring sealants.
 - .3 Mechanical and electrical sealants.
 - .4 Acoustic sealants.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - .1 The following items shall be addressed at the pre-installation meeting:
 - .1 Analysis of the work and weather conditions.
 - .2 Shape factor of the joint.
 - .3 Recommendations for priming joints.
 - .4 Inspection of surfaces and joints.
 - .5 Compatibility of materials.
 - .6 Backing materials.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section including primers.
 - .2 Submit manufacturer's and *Product* name for each sealant which will be used in the *Work* prior to commencing the *Work*.
 - .3 For *Products* specified to comply with SWR Institute Sealant Validation Program, provide written confirmation from SWRI of *Product* compliance.
- .3 Samples:
 - .1 Submit duplicate "wet sample" sealant colour samples for each sealant *Product* and colour.
- .4 Test and evaluation reports:
 - .1 Test sealant in contact with samples of materials to be sealed to verify adhesion will be achieved, and no staining of the material will result. Prepare sample joints at the *Place of the Work* of each type of sealant for each joint condition.

Joint Sealants

Section revised and reissued by Addendum No. 4

- .1 Submit test results to *Consultant* prior to application of sealants.
- .2 Test sealant in contact with samples of porous materials to be sealed to ensure that no staining of the material will result in accordance with ASTM C1248-18.
 - .1 Submit test results to *Consultant* prior to application of sealants.
- .5 Certificates: Provide information indicating product acceptability if used in air plenum spaces.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
 - .1 Include manufacturer's warranties.
- .2 Maintenance instructions:
 - .1 Submit maintenance instructions for all items for incorporation into the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*.
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified.
 - .2 Shall be a member in good standing of the Sealant and Waterproofing Association (SWA).
 - .2 Installer to comply with quality assurance articles referenced in ASTM C1193-16 for installation of joint sealants.
- .2 Mock-up:
 - .1 Submit 2440 mm (96") long sealant joint mock-up. Mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.
 - .2 Locate where directed by *Consultant*.

1.6 Field Conditions

- .1 Conform to sealant manufacturer's specifications and recommendations.
- .2 Do not proceed with installation of joint sealants under the following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer, or are below 4° C (40° F).
 - .2 When joint substrates are wet.
 - .3 Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - .4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

Joint Sealants

Section revised and reissued by Addendum No. 4

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranties:
 - .1 For exterior exposed silicone sealants, provide 20 year Product material warranty.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Interior sealants shall have a VOC limit of 50 g/L maximum, unless otherwise specified, and comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications.
- .2 Joint sealants:
 - .1 Shall perform as air tight and water-tight joints.
 - .2 Defects shall include, but are not limited to:
 - .1 Staining from abutting materials or filler.
 - .2 Migrating, bleeding into, or staining abutting materials.
 - .3 Unsightly surface deformation.
 - .4 Excessive colour change, chalking, or dust pick-up.
 - .5 Failing adhesively or cohesively where maximum elongation is less than 25% of designed width of exposed joints.
 - .6 Hardening to more than 25% over specified hardness.

2.2 Acceptable Manufacturers

- .1 Tremco.
- .2 Sika Canada Inc.
- .3 Pecora
- .4 Momentive/GE Silicone.

2.3 Sealants

- .1 General:
 - .1 Single source responsibility: Obtain joint sealant from a single manufacturer for each joint sealant type.
 - .2 Colours: Sealant colours shall match colours of adjacent materials, as selected and approved by *Consultant*.
 - .1 Colours: shall be selected from manufacturer's full range of colours.
 - .3 In accordance with ASTM C920-14 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C920-14 classifications for type, grade, class, and uses.
 - .4 For sealants to be applied to porous substrates:

Joint Sealants

Section revised and reissued by Addendum No. 4

- .1 Provide products that have undergone testing in accordance with ASTM C1248-18 and have not stained porous joint substrates indicated for *Work*.
- .5 Sealant supplied shall not exude any material(s) which travel into adjacent materials, or travel onto surfaces of adjacent materials; causing damage, or attracting soiling, which becomes apparent during the service life of the building.
- .2 Exterior sealants; joints in vertical and overhead surfaces:
 - .1 Silicone sealant; high performance; 100% inorganic type:
 - .1 Single-component, non-sag, low to medium modulus non-bleed, high-performance silicone joint sealant, in accordance with the following: ASTM C920-11, Type S, Grade NS, Class 50 or greater. SWR Institute Sealant Validation Program.
 - .2 Provide low or medium modulus sealants as recommended by exterior wall cladding manufacturer.
 - .3 Acceptable Products:
 - .1 Low modulus:
 - .1 DOWSIL '790'.
 - .2 Momentive 'SCS2700 Silpruf LM.
 - .3 Sika 'Sikasil WS-290'.
 - .4 Tremco, Inc. 'Spectrem 1'.
 - .2 Medium modulus:
 - .1 DOWSIL '795'.
 - .2 Momentive 'SCS 2000 Silpruf'.
 - .3 Sika 'Sikasil WS-295'.
 - .4 Tremco, Inc 'Spectrem 2'.
 - .2.3 Interior general sealants:
 - .1 VOC limit: Maximum 50 g/L, unless otherwise indicated.
 - .2 Interior sealant; at joints with painted gypsum board: one-component paintable acrylic or polyurethane sealant, in accordance with ASTM C834-10; Type OP, Grade -18° C, zero VOC.
 - .3 Interior sealant; gap filler: at movement paintable joints in vertical surfaces: One-component polyurethane sealant in accordance with the following: ASTM C920-14, Type M or S, Grade NS, Class 25.
 - .1 Acceptable Products:
 - .1 Sika 'Sikaflex 15LM'.
 - .2 Substitutions: in accordance with Section 01 25 00.
 - .4 Interior sealant; at movement joints in vertical surfaces: one-component polyurethane sealant in accordance with the following: ASTM C920-14, Type M or S, Grade NS, Class 25.

Joint Sealants

Section revised and reissued by Addendum No. 4

- .1 Acceptable *Products*:
 - .1 Sika 'Sikaflex 15LM'.
 - .2 Tremco, Inc. 'Dymonic 100'.
 - .3 Substitutions: in accordance with Section 01 25 00.
- .5 Interior sealant; at vertical and trafficable movement joints: one-component low modulus silicone sealant in accordance with the following: ASTM C920-14, Type S, Grade NS, Class 100/50. SWR Institute Sealant Validation Program.
 - .1 Acceptable *Products*:
 - .1 Momentive 'Silpruf LM SCS2700'.
 - .2 Sika 'Sikasil WS-290'.
 - .3 Tremco, Inc. 'Spectrem 1'.
- .6 Interior sealant; mildew resistant one part silicone sealant; healthcare facilities: in accordance with FDA Regulation No. 21 CFR 177.2600, ASTM C920-14, Type S, Grade NS, Class 25, CAN/CGSB 19.22-M89.
 - .1 Acceptable *Products*:
 - .1 DOWSIL '786'.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .7 Pick resistant; two part high solids, high modulus epoxy resin security sealant for non-moving joints:
 - .1 Acceptable *Products*:
 - .1 Pecora 'DynaPoxy EP-1200'.
 - .2 Sika 'Sikadur 31 High -Mod Gel'.

2.4 Accessories

- .1 General: Provide joint sealants, primers, backings, and fillers that are compatible with one another and with joint substrates and other sealants or joint fillers specified and approved for applications indicated under joint sealant scheduled and under conditions of service and application as demonstrated by joint sealant manufacturer based on proven test results and field experience. When incompatible, inform *Consultant* and change to compatible type acceptable to *Consultant*.
- .2 Cylindrical sealant backings: Provide joint backings that meet ASTM C1330-02, Type O (open-cell polyurethane), or Type B (non-absorbent bi-cellular backing materials with surface skin), sized 25 percent or greater than joint opening with proper density to control sealant depth and profile. Follow joint sealant manufacturer's recommendations with backing selections for optimum joint sealant performance, in accordance with the following schedule:
 - .1 Use open cell foam with non-absorbing closed cell skin (Sof-Rod) for vertical joints; round shape for open joints and triangular shape for angular joints.
 - .2 Use closed cell foam for horizontal joints.

Joint Sealants

Section revised and reissued by Addendum No. 4

- .3 Bond-breaker tape: Polyethylene tape or other approved plastic tape as recommended by joint sealant manufacturer to prevent 3-sided joint adhesion to rigid, inflexible joint fillers or joint surfaces at back of joint where such adhesion would restrict proper sealant movement or result in sealant failure.
- .4 Masking tape: Non-staining, non-absorbent and compatible with joint sealants and adjacent surfaces.
- .5 Sealant primers: Use primers only as recommended by sealant manufacturer where required to enhance adhesion of sealant to specific joint substrates indicated and as determined for use from pre-construction mock-up testing. Select primers in consultation with sealant manufacturer and manufacturer of substrate material which do not have a detrimental effect on sealant adhesion or in-service performance.
- .6 Cleaners for nonporous surfaces:
 - .1 Provide non-staining, chemical cleaners of type which are acceptable to manufacturer of sealant and sealant backing material, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
 - .2 Provide cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 Manufacturer's Recommendations

- .1 Unless specified otherwise herein, comply with the recommendations and directions of the manufacturer whose materials are being used in the work of this section.

3.2 Preparation

- .1 Protect adjacent work areas and finished surfaces from damage during joint sealant installation.
- .2 Clean and prepare joint surfaces and substrates of substance that could impair the bond of joint sealants immediately before installing joint sealants.
- .3 Provide a dry, dust-free and cleaned substrate for optimum results.
- .4 Clean porous joint surfaces by using heavy-duty brushing, light abrasive, mechanical abrading or combination of these methods to produce a clean, sound surface for optimum bond with joint sealants per manufacturer's recommendations.
- .5 Clean non-porous surfaces using the two-cloth wipe method as referenced in ASTM C1193-16 and outlined by joint sealant manufacturer's written requirements.
- .6 Prepare rusting or scaling surfaces using abrasive cleaning methods as recommended by joint sealant manufacturer prior to joint sealant installation. Remove and neutralize efflorescence, mould, mildew and algae prior to joint sealant installation.
- .7 Prepare finish-coated surfaces per joint sealant manufacturer's specific recommendations.
- .8 Test materials for indications of staining or poor adhesion before any sealing is commenced. Submit reports in writing to *Consultant* of results.

Joint Sealants

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3.3 Masking

- .1 Where necessary to prevent contamination or marring surfaces of adjacent materials, mask areas adjacent to joints with masking tape prior to priming or sealing application. Remove tape immediately after joint has been completed and an initial set achieved.

3.4 Installation

- .1 Install in accordance with joint sealant manufacturer's installation written requirements for products, primers and applications indicated unless more stringent project-specific instructions or requirements apply.
- .2 Apply joint sealants for continuous waterproof sealant joint protection. Lap vertical joints over horizontal joints as recommended by sealant manufacturer. Comply with installation recommendations in ASTM C1193-16 for use of joint sealants as applicable to each specific sealant installation.
- .3 Install sealant primers only when recommended by sealant manufacturer and demonstrated at pre-construction tests after joint surface preparation has been completed and when surfaces are verified as clean and dry. Allow any primer installation to completely dry or cure prior to installation of backing or joint sealants. Primer is mandatory for gun applied sealants.
- .4 Install joint sealants using proven techniques that comply with the following and in proper sequence with installation of primers and backings.
 - .1 Using proper joint sealant dispensing equipment, place sealants by pushing sealant beads into opening to fully wet-out joint sealant substrates. Fill sealant joint opening to full and proper configuration.
 - .2 Provide uniform cross-sectional shapes and depths in relation to joint width for optimum sealant movement capability per joint sealant manufacturer's written requirements.
- .5 Joint sealant tooling is required for non-sag joint sealant installations. Immediately after placing fresh sealants and before skinning or curing begins, tool sealants using metal spatulas designed for this purpose in accordance with manufacturer's recommendations. Provide a smooth, uniform sealant finish, eliminating air pockets and ensuring good contact for optimum sealant adhesion within each side of the joint opening.
 - .1 Provide concave joint configuration as indicated per figure 5-A in ASTM C1193-16 unless otherwise indicated.
 - .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.
 - .3 Remove excess sealant from surfaces adjacent to joint openings using metal spatula, promptly cleaning any sealant residue from adjacent finished surfaces. Remove masking after joint sealant is installed.
- .6 Allow single-component sealants to fully cure before adhesion testing is performed as recommended by joint sealant manufacturer.
- .7 Match approved sealant mock-up for colour, finish and overall aesthetics. Remove, refinish or re-install work not in compliance with the *Contract Documents*.
- .8 When surfaces of adjacent materials are to be painted, perform sealant work before these surfaces are painted.

Joint Sealants

Section revised and reissued by Addendum No. 4

- .9 Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform *Consultant* and change primer and sealant to compatible type, or clean concrete to sealant manufacturer's acceptance.
- .10 Install joint backing material, filler strips, gaskets, bond breakers and similar type material of comparable performance characteristics. Install bond breaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.
- .11 Where joints are 12.7 mm (1/2") or deeper, insert backing material in continuous uniform compression with setback from finished face of adjoining materials equal to required depth of sealant (width/depth ratio) as specified herein.
- .12 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .13 Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.
- .14 Maintain correct sealant depth. Sealant depth shall be 1/2 the width of the joint, maximum depth shall be 12.7 mm (1/2"), minimum depth shall be 6 mm (1/4"). Comply with manufacturer's written recommendations.
- .15 Fillet bead sealant joints to be sized to provide proper contact area with substrates, in accordance with manufacturer's written recommendations.
- .16 Apply sealants using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply sealants in such manner as to ensure good adhesion to sides of joints and to completely fill voids in joints.
- .17 Apply sealants so that surfaces of joints are smooth, full bead, free from ridges, wrinkles, sags, air pockets and embedded impurities. Tool sealant surfaces to produce a smooth surface.
- .18 Install sealant with exterior face of sealant set back 10 mm (3/8") from face of adjacent materials at building movement joints, unless otherwise indicated.
- .19 Do not apply sealants to areas where installation of paints, coatings or flooring is in progress. Apply sealants after such work is complete and fully cured.

3.5 Exterior Sealant Schedule

- .1 Include in work of this section joint sealants in exterior assemblies to seal open joints in surfaces exposed to view, and to make building weather-tight, as indicated, and as otherwise specified, except where specified under the work of other sections.
- .2 Exterior sealant work is part of the work of this section. Install sealant to:
 - .1 Perimeters of exterior openings.

3.5.3.6 Interior Sealant Schedule

- .1 Include in work of this section sealants to seal open joints in surfaces exposed to view, and to make building weather-tight and air-tight, as applicable, as indicated, and as otherwise specified, except where specified under the work of other sections.
- .2 Install sealant to:
 - .1 Perimeters of exterior and interior door and window frames.

Joint Sealants

Section revised and reissued by Addendum No. 4

- .2 Exposed interior control joints in gypsum board.
- .3 Millwork junctions with walls.
- .3 Mildew resistant sealant at wet areas:
 - .1 Perimeter joints of wet fixtures such as:
 - .1 Urinals.
 - .2 Water closets.
 - .3 Janitor sinks.
 - .4 Showers.
 - .2 Wall tile joints, tile to tile at bathtub or shower corners. Gap between tile backer board and edge of bathtub or shower base.
 - .3 Counter/wall junctions at countertops.

3.63.7 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
 - .1 Manufacturer's field review to be in accordance with Section 01 45 00.
 - .2 Provide manufacturer's field service consisting of periodic site visits by manufacturer or their distributor representative for observation of joint sealant application.

3.73.8 Adjusting and Cleaning

- .1 Remove droppings and clean off excess sealant or sealant residue adjacent to sealant joint installations as the work progresses by methods approved by joint sealant manufacturer before material achieves initial set.
- .2 Do not damage adjacent surfaces with harmful removal techniques and protect finished surfaces beyond those that have been masked.
- .3 Remove and replace damaged joint sealants.
- .4 Remove temporary coverings and masking protection from adjacent work areas upon completion.

3.83.9 Protection

- .1 Protect installed sealants during and after final curing from damage resulting during construction.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Aluminum punched windows.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Clearly indicate each type of frame and screen, extrusion profiles, method of assembly, section and hardware reinforcement and mounting plates, locations of exposed fasteners, finishes, glazing systems, glass type, accessories, line of air barrier and drainage path, and as required to completely represent the proposed window system.
 - .3 Indicate fastening system for anchorage of windows to opening, and structural window design for each window type and size, structural designed under seal of qualified professional engineer registered in the *Place of the Work*.
- .4 Samples:
 - .1 Submit samples of frame, sill and mullion sections, sill flashing and accessories, fasteners for connection of frame to opening, glazing tape, glass retainers, glazing gaskets, screening and frame, spandrel panels and each finish material and any other material, as requested.
 - .2 Samples of colour and finish prepared as specified on respective metal components for both extrusion and sheet.
 - .3 Identify samples as to treatment, thickness, alloy, framing composition, colour, manufacturer, performance standard and portion of the work to which they apply.
 - .4 Fabrication shall not proceed without written acceptance of samples from *Consultant*.
- .5 Test and evaluation reports: Submit relevant test report prepared by accredited independent testing laboratory, showing compliance with the design criteria of this section.

1.4 Closeout Submittals

- .1 Operation and maintenance data:

Aluminum Windows

Section issued by Addendum No. 4

- .1 Submit manufacturer's operation and maintenance instructions for incorporation into the operation and maintenance manuals in accordance with Section 01 78 00.

1.5 Quality Assurance

.1 Qualifications:

- .1 Installers / applicators / erectors:
 - .1 *Subcontractors*: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
 - .2 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .3 Typical glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.
 - .4 Welding: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA Welding qualification codes; CSA W47.1-19 for welding of steel, and CSA W47.2-11(R2020) for welding of aluminum.

1.6 Delivery, Storage, and Handling

- .1 Comply with AAMA CW-10 – Care and Handling of Architectural Aluminum from Shop to Site.
- .2 Brace and protect frame units to prevent distortion and damage in shipment and handling.
- .3 Provide methods for lifting or hoisting units into place without causing damage.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 System:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 The warranty is a total system warranty, and includes hardware, sealants, hanging and fitting, and finishing.
 - .3 Duration: 2 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Reinforce units to withstand handling stresses, temperature changes, the effect of shrinkage forces, wind loads, dead and live loads, and related loads.
- .2 Design, fabricate, and install work of this section in compliance with building code.

Aluminum Windows

Section issued by Addendum No. 4

- .3 Design components to achieve sufficient freedom of movement of members to allow for thermal expansion and contraction within the range of air and surface temperatures as applicable to the location of the components without causing harmful buckling, opening of joints, distortion, undue stress on fasteners, breakage of sealants, or other detrimental effects.
- .4 Make provision at fixed glazing units and at spandrel panels for drainage to the exterior. Design system to comply with building code requirements.
- .5 Design and fabricate windows to AAMA/WDMA/CSA 101/I.S.2/A440-11 – Windows.
- .6 Design and anchor work so that there will be no objectionable distortion or seriously stressed fastenings as metal expands and contracts. Design and fabricate expansion joints to ensure that they will be, and remain, permanently watertight. Locate joints as shown on reviewed shop drawings. Incorporate necessary wind bracing as required.
- .7 Design mullions for maximum deflection of 1/175 or 19 mm (3/4") maximum, under design wind load.
- .8 Design horizontal mullions for maximum reduction of glass bite by 3 mm (1/8"), under greatest glass dead load condition. Design location of setting blocks to suit glass loads.
- .9 Design total system to specified performance and ensure that proper and recommended use of materials forming part of the work.
- .10 Design to drain to exterior face of the wall or window assembly, any water entering at joints and any condensation occurring within the wall or window assembly.
- .11 Design structural support framing components to CSA A157 under direct supervision of a professional structural engineer experienced in design of work in this section and licensed at the *Place of the Work*.
- .12 Edges of glass shall be secured in place using aluminum glazing retainers.
- .13 Vision glazing shall be replaceable from the interior with finished aluminum stops; spandrel glazing shall be replaceable from the exterior.
- .14 Edges of glass shall be secured in place using aluminum glazing retainers.
- .15 Vision glazing shall be replaceable from the interior with finished aluminum stops; spandrel glazing shall be replaceable from the exterior.

2.2 Materials

- .1 Aluminum extrusions for framing sections: Aluminum Association alloy AA6063-T5 or T6 temper for framing.
- .2 Aluminum extrusions for glazing retainers: Aluminum Association alloy AA6063-T5 or T6 temper for framing.
- .3 Sheet aluminum:
 - .1 Thickness to be 1.29 mm (0.051")(16 gauge) for panels less than 610 mm (24") wide and 2.05 mm (0.081")(12 gauge) for panels of a greater dimension, minimum unless otherwise specified.
 - .2 Aluminum alloy:
 - .1 AA3003-H14 Painting Quality.

Aluminum Windows

Section issued by Addendum No. 4

- .4 Aluminum panels:
 - .1 System type: concealed fastener with dry joints.
 - .2 Aluminum panels: 3.18 mm (0.125") aluminum.
 - .1 Aluminum alloy:
 - .1 AA3003-H14 Painting Quality.
 - .3 Support brackets: Steel brackets to be hot dipped galvanized with zinc coating 0.09 g/m² (3.4 mil) in accordance with CAN/CSA G164-M92.
 - .4 Fasteners: Self-tapping, purpose made stainless steel screws.
 - .5 Sub-girts: 1.2 mm (0.05")(18 gauge) zinc-coated steel to ASTM A653/A653M-13 with Grade A coating Z275.
 - .6 Isolation coating: Bituminous paint.
 - .5 Insulation at spandrels, closures and flashings: ASTM C612-10, Type IVB, non-combustible to CAN/ULC-S114-05
 - .1 Acceptable *Products*:
 - .1 Johns Manville 'MinWool Curtainwall'.
 - .2 Rockwool 'CurtainRock'.
 - .6 Steel anchors; non-exposed: to CSA G40.21-13, Grade 300W. Steel anchors in contact with aluminum, exterior to line of air barrier, shall be hot dipped galvanized, 380 g/m² (13.4 oz/ft²) zinc coating to CAN/CSA G164-M92.
 - .7 Fasteners; aluminum framing: Commercial Quality steel screws, zinc plated and case hardened.
 - .8 Fasteners; concrete/masonry: Commercial Quality zinc plated steel concrete screws or bolts.
 - .9 Isolation coating: alkali resistant bituminous paint or epoxy solution.
 - .10 Glass and glazing materials: Refer to requirements specified in Section 08 80 00.
 - .11 Thermal separator for aluminum framing: semi-solid, multi-cavity extruded PVC sections.
 - .12 Weather-stripping: durable, non-absorbing material resistant to deterioration by aging and weathering.
 - .13 Sealant tape; frame to frame connections seals: butyl sealant tape, black.
 - .14 Heal bead sealant; between glazing and framing: One component elastomeric chemical curing, to ASTM C920-14.
 - .15 Frame sealant: One component elastomeric chemical curing, compatible with insulated glass unit sealants, to ASTM C920-14.
 - .16 PVC extrusions: to CAN/CGSB 82.1-M89.
 - .17 Glazing gaskets: fully resilient, shim type butyl glazing tape or EPDM glazing gasket.

Aluminum Windows

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- .18 Air barrier membrane: Self-adhering type, composite preformed 1.1 mm (43 mil) thick modified membrane system consisting of SBS modified asphalt for low temperature flexibility and polyethylene scrim reinforcing, complete with manufacturer's recommended primer.
 - .1 Bakor 'Blueskin SA'
 - .2 Sopraseal Stick 1100 by Soprema Inc.
 - .3 Air Shield by W.R. Meadows:
- .19 Sealants: in accordance with Section 07 92 00.
- .20 Glass and glazing: in accordance with Section 08 80 00.

2.3 Finishes.

- .1 Exposed aluminum surfaces: 70% Kynar 500 or Hylar 5000 fluoropolymer resin systems, ceramic pigments and other select inorganic pigments to AAMA 2605-17a.
 - .1 Acceptable *Products*:
 - .1 PPG 'Duranar XL'.
 - .2 Sherwin-Williams 'Fluropon Classic'.
 - .2 Colour:
 - .1 Colour to match existing panels and adjacent framing system.
- .2 Finish exposed metal fasteners, if applicable, to related aluminum surfaces.
- .3 Finish steel clips and reinforcing steel with 380 g/m² (13.4 oz/ft²) zinc coating to CAN/CSA G164-M92.
- .4 PVC extrusions: Colour to match adjacent aluminum finish.

2.4 Fabrication

- .1 Sill flashing: extruded aluminum, finished to match window frames, 20 mm (3/4") minimum drip projection beyond wall surface. Fabricate preformed drip deflectors for sill ends at jambs. Fabricate with preformed butt joint and corner sill splice connectors and applied sealant to prevent water penetration. Locate splice connectors (joint covers) at center line of mullions when required. Trim and detail corners to remove hazardous projections at entry doors.
- .2 Fabricate with continuous condensation track to retain and evaporate condensation from interior exposed window surfaces.
- .3 Anchors shall be factory prefabricated, bent and formed.
- .4 Utilize concealed internal drainage design (holes in glazing stop not permitted) to drain moisture from glazing rebate space to exterior of building envelope. Cover exterior exposed drainage ports with insect and weather proof covers.
- .5 Make allowances for deflection of structure and temperature movement. Ensure structural loads are not transmitted to aluminum work.
- .6 Incorporate structural steel reinforcement for strength, stiffness and connections, as required.

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- .7 Fit intersecting members to flush, hairline, and weather tight joints and mechanically fasten together.
- .8 Conceal fastenings from view, unless otherwise indicated.
- .9 Reinforce aluminum to suit hardware requirements.
- .10 Fabricate items fitting to building from as-built measurements taken at the *Place of the Work*. Full responsibility for proper coordination of different components of cladding and windows rests with this section.
- .11 Fabricate glazed framing to provide uniform rough opening dimension:
 - .1 Maximum tolerance will be +/- 3 mm (1/8") for rough opening joint width.
- .12 Fabricate and assemble work by skilled glazing installers. Do forming operations prior to finishing.
- .13 Insofar as practical, jig assemble components in the shop and partially disassemble where necessary before moving to the *Place of the Work* and re-assemble just prior to installation. Fabricate windows to shape, profiles, spacing, sections and arrangements. Do fitting and assembling in the shop accurately square and true. Carefully fit and screw joints and reinforce with corners permanently sealed to prevent infiltration of air or moisture. Fabricate and erect units to ensure a windproof and watertight installation.
- .14 Utilize aluminum condensate collection channels at bottom of windows at interior face, and aluminum closure strips between windows and underside of concrete slabs, where applicable.
- .15 Incorporate continuous aluminum cover strip at interior window heads to cover anchors.
- .16 Spandrel panels: removable glazing stops, spandrel glass or aluminum as indicated, airspace, semi-rigid insulation and corrosion resistant metal back-up panel.
- .17 Fabricate spandrels with cut-outs at mechanical exhaust vents. Wrap opening and seal to prevent moisture access to spandrel core.

PART 3- EXECUTION

3.1 Examination

- .1 Take dimensions at the *Place of the Work* to ensure that adjustments in fabrication or installation are incorporated, that allowance is made for possible deflection of structure at heads and that clearance to other constructions have been maintained.
- .2 Ensure that anchors and inserts, installed by others are adequate to meet specified requirements.

3.2 Installation

- .1 Install work plumb, square, level, free from warp, twist and superimposed loads.
- .2 Secure work in required position. Do not restrict thermal movement.
- .3 Install hardware in accordance with templates.
- .4 Adjust operable parts for correct function.
- .5 Install in accordance with CAN/CSA A440.4-07 and requirements of building code.

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- .6 Insulate hollow corner window sections where enclosed within this section's work.
- .7 Fasten window jambs at 450 mm (18") on centre maximum spacing with corrosion resistant anchors, and aluminum anchor plates as required.
- .8 Install slab edge firestopping in accordance with Section 07 84 00, if applicable.
- .9 Explosive actuated or powder actuated fasteners will not be permitted.

3.3 Glazing

- .1 Glaze aluminum windows with specified glazing tapes, blocks, and spacer shims in accordance with Section 08 80 00.

3.4 Air Barrier Continuity with Building Envelope

- .1 Provide continuous air barrier transition between work of this section where work interfaces with building envelope air barrier materials. Provide EPDM or PVC glazing pocket filler or joint plug to seal glazing rebate where applicable; sealed airtight with silicone sealant.
- .2 Install in accordance with manufacturer's installation instructions. Seal lap joints and seal perimeter to adjacent building envelope air barrier material with silicone sealant.
- .3 Coordinate with adjacent materials for continuity and compatibility.

3.5 Sealant

- .1 Apply sealant between frame members, sills and adjacent construction as part of the work of this section and in accordance with Section 07 92 00.

3.6 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

END OF SECTION

Sliding Pass Through Windows

Section revised and reissued by Addendum 05

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Interior glass sliding pass through (transaction) windows.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Shop drawings shall include, but not be limited to complete details illustrating construction of the various parts of the work of this section, metal and glass thicknesses, methods of joining, details of field connections and anchorage, interfacing with other work, fastening and sealing materials and methods.
 - .2 Submit catalogue cuts of manufactured items.
- .4 Samples:
 - .1 Unless otherwise indicated, submit 3 samples for each of the following:
 - .1 305 mm x 305 mm (12" x 12") sample of each glass type and finish.
 - .2 305 mm (12") long sample of top ~~and bottom door~~window rails in specified finish.
 - .3 1 sample of each hardware type in specified finish.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance instructions:
 - .1 Submit operation and maintenance data for cleaning and maintenance of glass sliding windows.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with training of *Product* manufacturers.

Sliding Pass Through Windows

Section revised and reissued by Addendum 05

1.6 Delivery, Storage, and Handling

- .1 Package or crate, and brace products to prevent damage during shipment and handling. Label packages and crates, and protect finish surfaces from environmental conditions where required.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Chemical resistance:
 - .1 Window materials shall be resistant to and compatible with the following list of chemicals:
 - .1 Diversey Oxivir Plus (Canada) Disinfectant Cleaner Concentrate, containing:
 - .1 Propylene glycol n-propylether; 5 – 10%.
 - .2 Hydrogen peroxide; 5 – 10%.
 - .3 Dodecylbenzene sulfonic acid; 1 – 5%.
 - .4 Sodium xylene sulfonate; 1 – 5%.
 - .2 Diversey PERdiem General Purpose Cleaner with Hydrogen Peroxide, containing:
 - .1 Alcohol C9-C11 ethoxylated; 7 – 13%.
 - .2 Hydrogen Peroxide; 1 – 5%.
 - .3 Sodium Xylene Sulfonate; 1 – 5%.
 - .3 Chlorox Performance Disinfecting Bleach.
 - .1 Sodium Hypochlorite; 1 – 5%.
 - .2 Window materials shall not deteriorate or discolour when exposed to the above specified chemicals.

2.2 Materials

- .1 Extruded aluminum shapes: Aluminum Association alloy AA6063-T5.
 - .1 Finish: satin anodized.
- .2 Glass and other glazing materials: Tempered glass in accordance with Section 08 80 00.
- .3 Top and bottom channels: Aluminum.

2.3 Sliding Pass Through Windows

- .1 Frameless Rolling track assembly consisting of top header and top-hung ball bearing rollers, one fixed and one sliding panel with a lock~~lower rail, bottom sash with roller assembly and lock, and upper channel.~~

Sliding Pass Through Windows

Section revised and reissued by Addendum 05

.2 Acceptable *Products*:

.1 C.R. Laurence 'Sharyn Custom Size XO Frameless Pass-Thru'.

~~.1 Creative Mirrors & Showers 'Ambiance Sliding systems Pass Through Windows'.~~

.2 Substitutions: in accordance with Section 01 25 00.

2.4 Finish Hardware

.1 Furnish hardware necessary for complete and trouble free operation of windows.

2.5 Fabrication

- .1 Fabricate sections to accommodate and interface with work of other sections by means of rabbets, interlocks, miscellaneous angles, trim and filler sections, as required.
- .2 Jointing and intersections of metals shall be accurately cut, fitted to a tolerance of 0.076 mm (0.003") in true planes with adequate concealed fastenings.
- .3 Perform fitting and assembly of component parts in shop, insofar as practicable. Work of this section that cannot be permanently shop assembled shall be fitted, assembled, marked and dismantled to assure proper fitting in field. Identify shop assembled components on shop drawings for location and erection at *Place of the Work*.
- .4 Cleanly and smoothly finish exposed edges of materials including holes.
- .5 Polish glass edges prior to tempering.

PART 3 - EXECUTION

3.1 Examination

- .1 Make thorough examination of *Contract Documents*, check interfacing with work of other sections and other factors influencing design and performance and be fully cognizant of requirements.
- .2 Notify *Contractor* if preparations are required to be made in the work of other sections for proper attachment, securing or executing of the work of this section.

3.2 Installation

- .1 Allow for dimensional tolerances and deviation from true plane permissible in structural support frame. Erect plumb and true, and in correct relationship to the work of other sections.
- .2 Install components in accordance with reviewed shop drawings.
- .3 Upon completion of glazing, check units for squareness, alignment and smooth operation, adjust as required. Clean and polish glass and remove soiling from exposed metal.
- .4 Finish Hardware: Adjust, test and make operational without binding or other interference likely to affect movement of panels.

3.3 Installation Tolerances

- .1 Maximum variations from plumb and level: 3 mm (1/8") deviation in 3000 mm (10'-0").

Sliding Pass Through Windows

Section revised and reissued by Addendum 05

3.4 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

3.5 Cleaning

- .1 At completion of the work of this section, remove labels from glass and clean inner and outer faces of glass and exposed finished metal surfaces. Replace scratched or broken glass and make good any damaged materials.

END OF SECTION

Glass and Glazing

Section revised and reissued by Addendum No. 4

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Glass and glazing.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Show details of each type of glazing system in conjunction with the framing system indicating type of glass, sizes, shapes, glazing material and quantity. Show details indicating glazing material, glazing thickness, bite on the glass and glass edge clearance.
 - .2 Indicate analysis of glass including maximum deflection and allowable stresses from imposed dead/live loads and thermal loads.
- .4 Samples:
 - .1 Submit 305 mm (12") square samples of each type of glass indicated except for clear monolithic glass products, and 305 mm (12") long samples of each color required, except black, for each type of sealant or gasket exposed to view.
 - .1 For glass scheduled or indicated as engineered and glass to serve as guard in accordance with building code, shop drawings to be engineered shop drawings.
 - .1 Refer also to Section 08 88 00 for glass guard requirements.
 - .2 Submit samples of glass showing each type of shape and finish of glass edge for exposed glass edges.
 - .5 For glass scheduled or indicated as engineered and glass to serve as guards in accordance with building code, shop drawings to be engineered.
 - .1 Refer also to Section 08 88 00 for requirements of glass guards.
- .6 Test and evaluation reports:
 - .1 Obtain compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealant as well as other glazing materials including insulating units.
- .7 Manufacturer reports:

Glass and Glazing

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- .1 Submit glass fabricator's product information and structural calculations indicating compliance with glazing standards established by the Glass Association of North America (GANA). Submittal to include thermal stress and structural load analysis of the proposed glass types, configuration and sizes.
- .8 Submit sample glazing warranty.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for glass and glazing for incorporation into the operating and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers: Fabrication processes, including insulating, laminated, and tempering shall be manufactured by a single manufacturer with a minimum of ten (10) years of fabrication experience and meet ANSI / ASQC 9002 1994.
 - .2 Installers / applicators / erectors: Provide the work of this section executed by specialist *Subcontractor* who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of the work of this section, and personally direct installation performed under this section.
 - .1 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .2 Glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.

1.6 Delivery, Storage, and Handling

- .1 Protect glass from edge damage, dust, and contaminants during handling and storage.
- .2 Storage and protection: Protect glazing materials according to manufacturer's written requirements and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun or other causes.

1.7 Field Conditions

- .1 Ambient Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by the glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation or other causes.
- .2 Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 4.4°C.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:

Glass and Glazing

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- .1 General extended warranty:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 Duration: 5 years.
- .2 Special product warranty for laminated glass products:
 - .1 Warranty shall cover deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to the glass manufacturer's published instructions. Warranty shall be manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units.
 - .2 Duration: 5 years from date of manufacture for laminated glass.
- .3 Special product warranty for tempered glass products:
 - .1 Warrant that tempered glass will not break spontaneously as a result of Nickel Sulfide (NiS) inclusions at a rate exceeding 0.8% (8/1000) for a period of five years from the date of manufacture. Warranty shall be manufacturer's standard form in which tempered-glass manufacturer agrees to replace tempered-glass units.
 - .2 Duration: 5 years from date of manufacture for fully tempered glass.
 - .3 Warrant that heat soaked tempered glass will not break spontaneously as a result of Nickel Sulfide (NiS) inclusions at a rate exceeding 0.5% (5/1000) for a period of five years from the date of manufacture. Warranty shall be manufacturer's standard form in which heat soaked-glass manufacturer agrees to replace heat soaked-glass units.
 - .4 Duration: 5 years from date of manufacture for fully tempered glass that has been Heat Soaked.
- .4 Special product warranty for insulating glass unit products:
 - .1 Provide a written warranty from date of manufacture for sealed insulating glass units. Warranty shall cover the following:
 - .1 Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - .2 Duration: 10 years.
- .4.5 Special product warranty for spandrel glass products:
 - .1 Provide a written warranty from date of manufacture of spandrel glass product. Warranty shall cover the following:
 - .1 Deterioration due to normal conditions of use and not to handling, installing, protecting and maintaining practices contrary to the glass manufacturer's published instructions.
 - .2 Spandrel glass coating will not flake, peel, chip, blister, or develop any colour change.

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- .3 Replacement of spandrel glass units.
- .4 Duration: 10 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

.1 General:

- .1 Publications: Comply with recommendations in the publications below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section.

- .1 GANA Glazing Manual.
- .2 GANA Engineering Standards Manual.
- .3 GANA Laminated Glazing Reference Manual.
- .4 GANA Sealant Manual.

.2 Glass strength:

- .1 Design glass in conformance with the building code and the following requirements:

- .1 Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:

- .1 8 breaks per 1000 for glass installed vertically less than 15 degrees from the vertical plane and under wind action.

.2 Maximum lateral deflection; insulating glass units:

- .1 For insulating glass units supported on four edges, limit centre-of-glass deflection at design wind pressure to not more than 1/175 times the long-side length or 19 mm (3/4") maximum.

- .2 Glass at guards, balustrades, and where glass is likely to be subjected to human impact shall comply with safety glass requirements of CAN/CGSB 12.20-M89 and CAN/CGSB 12.1-M90, CSA A500-16(R2021), DIN EN 14179-1:2005, where applicable, and building code.

- .3 Provide annealed, heat strengthened, and tempered lights where required by the building code.

- .4 Glass thicknesses and glass types specified, indicated, or scheduled in the *Contract Documents* are minimums required. Modify glass thickness as required to satisfy design and building code requirements, and requirements of authorities having jurisdiction, and any such modifications shall be clearly indicated on shop drawings.

.3 Thermal and optical performance: Provide glass products with performance properties specified or published by glass manufacturer where not specified. Performance properties to be manufacturer's published data as determined according to the following procedures:

- .1 Centre of glass U-Value: National Fenestration Rating Council (NFRC) 100 methodology using Flixo Pro (version 8.0 or later) or LBNL WINDOW 7 computer program.

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.2 Centre of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 5.2 computer program.

.3 Visible light transmittance: NFRC 200 methodology.

.4 Solar optical properties: NFRC 300 or LBNL Optics.

.3.4 Protect laminated glass interlayer from damage or discolouration resulting from contact with deleterious and incompatible sealants, substances, and materials. Comply with manufacturer's recommended installation requirements.

2.2 Glass Manufacturers

.1 Subject to compliance with the requirements of the *Contract Documents*, provide primary glass by one of the following float glass manufacturers:

- .1 AGC Glass Company.
- .2 Cardinal Glass Industries.
- .3 Dow Corning.
- .4 Guardian Industries, LLC.
- .5 Momentive Performance Materials.
- .6 Pilkington North America.
- .7 Tremco Canada.
- .8 Vitro Architectural Glass.

2.3 Glass Materials

.1 General:

.1 Single source responsibility: Provide materials from a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source and manufacturing plant for each type and class required.

.2 Insulating glass units:

.1 Warm edge, hermetically sealed, in accordance with CAN/CGSB 12.8-97 or ASTM E2190-10, minimum 12 mm (1/2") cavity, 90% argon/10% air filled, double sealed edges (primary to be polyisobutylene, secondary to be polysulphide, desiccant filled warm edge spacer (splice connectors at corner of each glass unit)).

.2 Warm edge spacer: insulated glass unit manufacturer's standard warm edge space to meet specified or scheduled thermal requirements.

.3 Grey coloured polyisobutylene shall not be acceptable.

.4 Edge delete low 'E' coating down to bare glass in accordance with manufacturer's written requirements. Deletion shall be continuous around the entire periphery of glass edges to minimum deletion width from edge of glass to at least 50% through the primary sealant bead width.

.5 IGMAC or IGCC/IGMA certified, permanently marked either on spacers or on at least one component lite of units with appropriate certification label.

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.6 Low 'E' coating (triple silver):

.1 Acceptable Products:

.1 Cardinal 'LoE 366'.

.2 Guardian 'SNX 62/27'.

.3 Vitro 'Solarban 70'.

.4 Viracon 'VNE1-63'.

.7 Glass thickness: 6 mm (1/4") minimum, and as required to suit design requirements.

.8 Glass colour: clear, unless otherwise indicated.

2.3 Annealed (float) glass:

.1 Clear, annealed glass, 6 mm (1/4") thick minimum, in accordance with CAN/CGSB 12.3-M91, Glazing Quality.

.1 Acceptable products:

.1 Cardinal.

.2 Guardian Industries.

.3 Pilkington.

.4 Vitro Architectural Glass.

3.4 Heat treated (tempered or heat strengthened) float glass:

.1 In accordance with CAN/CGSB 12.1-M90.

.2 Minimum thickness: 6 mm (1/4").

.3 Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

.4 For uncoated glass, comply with requirements for Condition A in accordance with ASTM C1048-18.

.5 For coated vision glass, comply with requirements for Condition C (other coated glass) in accordance with ASTM C1048-18.

.6 Heat strengthened glass shall have surface compression of 24-52 MPa (3,500-7,500 psi).

4.5 Laminated glass (GL):

.1 In accordance with CAN/CGSB 12.1-M90.

.2 Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations. Use materials that have a proven record of no tendency to bubble, discolour, or lose physical and mechanical properties after fabrication and installation.

.3 Glass layers minimum 5 mm (0.197") thick unless otherwise indicated.

.4 Interlayer thickness: Provide thickness as needed to comply with requirements and not less than the following:

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- .1 Vertical glazing: not less than 0.76 mm (0.030") unless otherwise indicated.
- .5 Interlayer colour: Clear unless otherwise indicated.
- .6 Glass type: annealed or heat strengthened or tempered, as required to suit design requirements.
- .7 Laminated glass products to be fabricated free of foreign substances and air or glass pockets in autoclave with heat plus pressure.

5.6 Ceramic-coated spandrel glass:

- .1 Glass treatment:
 - .1 Heat strengthened float glass.
 - .2 Tempered float glass.
- .2 Thickness: 6 mm (1/4") minimum thickness.
- .3 Coating Location: Second surface.
- .4 Fallout Resistance: Passes fallout-resistance test in ASTM C1048-12e1 for an assembly of glass and adhered reinforcing material.
- .5 Ceramic enamel coating, baked on.
 - .1 Colour: Custom colour to later selection by the *Consultant*, to match existing window in colour and configuration.
- .6 Acceptable ceramic coating manufacturers:
 - .1 Viracon
 - .2 Prelco.

2.4 Fire-Rated Glass (FRGL)

- .1 Non-film faced glazing:
 - .1 Fire-protective-rated and impact safety-rated, transparent glazing material with no exposed film facing, and listed for use in doors, sidelites, transoms, and borrowed lites in both interior and exterior applications, not functioning as a barrier to heat.
 - .2 Surface finish:
 - .1 Premium Grade: transparent glass, polished for superior optical clarity.
 - .3 Acceptable *Product*:
 - .1 Safti First 'SuperLite II-XL'.
 - .2 Saint Gobain 'Keralite Select L'.
 - .3 Schott 'Pyran Platinum L'.
 - .4 Technical Glass Products 'FireLite Plus'.

2.5 Glazing Materials

- .1 Glazing materials; general: Select glazing sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

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- .2 Glazing gaskets: Moulded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2015).
 - .2 Preformed silicone to ASTM C1115-17(2022).
- .3 Setting blocks: Moulded or extruded material with Shore, Type A Durometer hardness of 85, plus or minus 5, made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2015).
 - .2 Preformed silicone to ASTM C1115-17(2022).
- .4 Spacers: Moulded or extruded blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2015).
 - .2 Preformed silicone to ASTM C1115-17(2022).
- .5 Edge blocks: Moulded or extruded material of hardness needed to limit glass lateral movement (side walking) made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2015).
 - .2 Preformed silicone to ASTM C1115-17(2022).
- .6 Cleaners, primers and sealers: Type recommended by sealant or gasket manufacturer.
- .7 Polyurethane foam glazing tape:
 - .1 High density, closed-cell, flexible, non-extruding tape, adhesive backed one side only; recommended by manufacturer for exterior applications with nominal pressure in glazing channel.
 - .2 Acceptable *Products*: As recommended by manufacturer suitable for conditions of application and use.
- .8 Butt glazing joint sealant:
 - .1 Medium-modulus, neutral-curing silicone sealant; complying with ASTM C920-11, Type S, Grade NS, Application G, Class 25.
 - .2 Colour: as selected by *Consultant* from full colour range.
 - .3 Acceptable *Products*:
 - .1 DOWSIL '999-A'.
 - .2 Momentive 'SCS1200'.
 - .3 Pecora '860'.
 - .4 Tremco 'Proglaze'.

2.6 Fire Rated Glazing Accessories

- .1 Glazing tape; fire-rated glass (non-wired):

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- .1 Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air and vapour seal.
- .2 Silicone sealant: One-part neutral curing silicone, medium modulus sealant, to ASTM C920-11, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.
 - .1 Acceptable *Products*:
 - .1 DOWSIL '795'.
 - .2 Momentive 'Silglaze-II 2800'.
 - .3 Tremco 'Spectrem 2'.
 - .3 Setting blocks: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
 - .4 Cleaners, primers, and sealers: Type recommended by manufacturer of glass and gaskets.

2.7 Fabrication of Glazing Units

- .1 Fabricate glazing units in sizes required to fit openings, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - .1 Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - .2 Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
 - .3 Grind smooth and chamfer, and polish exposed glass edges and corners, unless otherwise indicated.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine framing, glazing channels, and stops, with glazing installer present, for compliance with the following:
 - .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - .2 Inspect butt and mitre joints in framing. Seal joints found to be open with a compatible sealant prior to glazing.
 - .3 Glazing pockets and surfaces are free of dust, construction debris, and contaminants.
 - .4 Presence and functioning of weep systems.
 - .5 Minimum required face and edge clearances as per FGIA and GANA standards.

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.6 Effective sealing between joints of glass-framing members.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

.1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

.2 Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

.3 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the manufacturer's requirements. Ensure surfaces are free of moisture and frost.

3.3 Glazing - General

.1 Comply with combined written requirements of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

.2 Adjust glazing channel dimensions as required by conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

.3 Protect glass edges from damage during handling and installation. Remove damaged glass from *Project* site and legally dispose of off *Project* site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

.4 Clean glazing rebate surfaces of traces of dirt, dust, or other contaminants.

.5 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

.6 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

.7 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

.8 Provide spacers for glass lites where length plus width is greater than 1270 mm (50").

.1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

.2 Provide 3.2 mm (1/8") minimum bite of spacers on glass and use thickness equal to sealant width.

.9 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel.

.10 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

.11 Set glass lites with proper orientation so that coatings face exterior or interior as specified.

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- .12 Glaze hollow metal doors and frames specified under work of Section 08 11 13 using tape glazing installation.
- .13 Install fire rated glazing in accordance with fire rated glazing *Product* manufacturer's written requirements and with current fire-resistance listing for each *Product*. Field cutting or tampering is not permissible.

3.4 Tape Glazing

- .1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- .2 Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- .3 Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- .4 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- .5 Do not remove release paper from tape until right before each glazing unit is installed.
- .6 Centre glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centres of openings.

3.5 Gasket Glazing (Dry)

- .1 Allow gaskets to relax and cut compression gaskets to lengths recommended by gasket manufacturer to fit openings to suit frame dimensions.
- .2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- .3 Installation with drive-in wedge gaskets: Centre glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centres of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .4 Installation with Pressure-Glazing Stops: Centre glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .5 Install gaskets so they protrude past face of glazing stops.

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3.6 Sealant Glazing (Wet)

- .1 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- .2 Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- .3 Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 Adjusting and Cleaning

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.
- .2 Final cleaning of glass in accordance with Section 01 78 00.

END OF SECTION

Painting

Section revised and reissued by Addendum No. 4

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Painting of interior paintable surfaces.
- .2 Section excludes:
 - .1 HPC-1 by Section 09 67 00.
- .3 Paintable and non-paintable surfaces:
 - .1 Paint and finish paintable surfaces included in the *Work*, except where excluded by the *Contract Documents*.
 - .2 The following surfaces are considered non-paintable, except as otherwise indicated or scheduled:
 - .1 Material and equipment furnished prime and finish painted.
 - .2 Internal surfaces of steel tanks and stacks.
 - .3 Sprayed fire-resistive materials.
 - .4 Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered or mill finished aluminum, Monel metal.
 - .5 Metallic and mastic insulation finishes.
 - .6 Abrasive material finishes on floors, stair treads, stair nosing and landings.
 - .7 Insulated electric cables.
 - .8 Machined parts of machinery and equipment.
 - .9 Concealed surfaces.
 - .10 Manufactured finish materials.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.
- .2 Agenda for the meeting shall include the following:
 - .1 Review Drawings, details and Schedules, determine intent, extent, materials, types of surfaces, locations and be fully cognizant of intent of Work. Review Product literature, MSDS, related safety data, proper disposal requirements and inform those involved in work of this Section.
 - .2 Review Specifications and Drawings for work of other Sections regarding provisions for prime and finish coats and ensure compatibility with each other and substrate prior to application.
- .3 Prior to start of work, arrange for Project site meeting of parties associated with *Work* of this Section. Presided over by *Contractor*, include *Consultant*, Subcontractor, manufacturer's representative, any sub-trades whose work will be painted (including Mechanical and Electrical trades) or whose work is adjacent to, or whose work or schedule may be affected by work of this Section.

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1.3 Definitions

- .1 Exposed: Visible in completed work. In case of closets, cabinets and drawers, it includes their interiors.
- .2 Gloss or Sheen: Capacity of a finish on a surface to reflect light at specific angles as tested in accordance with ASTM D523.
- .3 Hazardous Waste: Construction and demolition materials that are regulated for disposal by local, city, county, province or federal authorities having jurisdiction.
- .4 Painting: In this Section refers to application of various types of paint, stain, varnishes and lacquers, etc.
- .5 Surface Preparation: Cleaning or treating of surface to be painted to ensure best possible bond between surface and painting to be applied to surface; remove surface contaminants that will affect performance of painting, without limitations such as oil, grease, salts, dust, dirt, rust, rust scale, mill scale and old coatings where applicable; remove surface imperfections without limitation including but not limited to such as weld spatter, sharp edges, burrs, slivers, laminations, pits, porosities and crevices; prepare surfaces to provide anchor profile or surface profile which improve mechanical bonding of coating to prepared surface by increasing surface area

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets and list of *Products* proposed for use in the work of this section as identified in 'Approved Product List' section of the MPI Architectural Painting Specification Manual. Correlate *Products* to Schedule furnished by *Consultant*.
 - .1 Submit *Product* data and submit a Schedule of Finishes listing manufacturer's Product name, colour, textures, MSDS and test reports requested for each paint system. Submit test reports for odourless, low or zero VOC Products when specified.
 - .2 Painting Subcontractor to receive written confirmation of specific surface preparation procedures and primers used for fabricated steel items from fabricator/supplier to ensure appropriate and manufacturer compatible finish coat materials prior to commencement of painting.
 - .1 Submit manufacturer's representative's written approval of surface preparation methods and any specific recommendations for alternative methods, with *Product*
- .3 Samples:
 - .1 Samples for initial paint colour and finish selection:
 - .1 Submit manufacturer's colour charts showing full range of colours available, including light and deep dark tones, for each type of finish material indicated for colour selection by *Consultant*.

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- .2 *Consultant* shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer of *Products* specified.
- .3 Submit 3 drawdowns of each selected colour for review by *Consultant* and resubmit to *Consultant* as required to obtain approval. Drawdown to be of specified colour, sheen, and paint formula for applicable surface.
- .2 Samples for verification:
 - .1 Submit 3 samples on 600 mm x 600 mm (24"x 24") material of same type as that on which coating is to be applied, for *Consultant's* approval, at least 30 days before materials are required in the following format:
 - .1 Masonry: face of typical unit.
 - .2 Gypsum board: face of typical unit.
 - .3 Metal: Steel plate.
 - .2 Identify each sample as to *Project*, finish, formula, colour name, number, gloss name and number, date and name of *Contractor* and painting *Subcontractor*.
 - .3 Resubmit as required until colours and gloss value are approved.
- .4 MPI Manual:
 - .1 Submit 1 copy of MPI Manual – latest edition, and maintain at site office for reference.
- .5 Quality Control Submittals:
 - .1 Submit site instruction reports containing information required by this Section
 - .2 Submit copies of paint manufacturer's weekly Job Progress Reports.

1.5 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
 - .1 Include the following information:
 - .1 'Area Summary' with finish schedule.
 - .2 'Area Detail' designating where each Product/colour/finish was used.
 - .3 Product Data Pages.
 - .4 MSDS Pages.
 - .5 Care and cleaning instructions.
 - .6 Touch-up procedures.
 - .7 Colour samples of each colour and finish used.
- .3 Maintenance materials:

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- .1 Provide minimum 3% but not less than 1 sealed container, of 4 litres (1 gallon) capacity of each paint product in each type and colour and degree of gloss used (batch mix) in the *Work* for *Owner's* maintenance use. Containers shall be boxed and in new, clearly labelled cans with manufacturer's name, type of paint, colour and colour number. Give to *Consultant* at time of final inspection. Store at *Place of the Work* where directed by *Owner*.

1.6 Quality Assurance

.1 Qualifications

.1 Manufacturers:

- .1 Paint manufacturers and *Products* used shall be as listed under the Approved Product List section of the MPI Painting Manual.

.2 Installers / applicators / erectors:

- .1 Execute work of this Section by a firm which has adequate plant, equipment and skilled workers to perform work expeditiously and which is known to have been responsible, during immediate past 5 years, for installations similar to work contained herein subject to *Consultant's* approval, and be fully conversant with applicable laws, bylaws, codes, fire, health and safety regulations and other regulations which govern.
- .2 Provide work of this Section executed by competent applicators with membership in good standing in the Ontario Painting Contractors Association (OPCA) and have a minimum of 5 years' experience in application of *Products*, systems, coatings and assemblies specified and with approval and training of *Product* manufacturers
 - .1 Only qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices shall work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.2 Mock-ups:

- .1 Provide mock-ups of each paint system for indicated surfaces of each colour and finish selected to verify preliminary paint selections made under Sample submittals.
- .2 Mock-ups shall be located to areas as directed by *Consultant* under lighting conditions matching final area lighting, for acceptance by *Consultant*.
- .3 Mock-ups shall demonstrate aesthetic effects of paint colour and sheen and shall set quality standards for material and execution of the *Work*. Final approval of colour and finish selections shall be based on mock-ups. If colour selections are not approved, apply additional mock-ups of additional colours selected by *Consultant* at no added cost to the *Owner*.
- .4 Do not proceed with work, including ordering of paint *Products*, until mock-ups of each paint colour and finish and paint system for indicated surfaces have been reviewed and accepted by *Consultant*.

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- .5 Apply minimum 600 mm x 600 mm (24" x 24") size, or as indicated below, in-situ mock-up of each finish on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required.
- .6 Provide the following in-situ mock-ups:
 - .1 Concrete block, concrete and gypsum board: 9.3 m² (100 ft²) of vertical surfaces and 9.3 m² (100 ft²) of horizontal surfaces.
 - .2 Accent colour walls: 914 mm x 914 mm (36" x 36") vertical area.
 - .1 Provide a mock-up for each accent paint colour.
 - .3 Hollow metal doors and frames: 1 door and frame for each finish specified.
- .7 Upon completion and approval, mock-ups shall serve as a standard for the balance of the work of this section. Subsequent work carried out and not in the *Consultant's* opinion equal to standard shall be repainted without charge.

1.7 Delivery, Storage, and Handling

- .1 Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- .2 Store paint *Products* and materials in original labelled containers in secure (lockable), dry, heated and well ventilated single designated area meeting minimum requirements of both paint manufacturer and authorities having jurisdiction, and at a minimum ambient temperature of 7°C.
- .3 Protect floor and wall surfaces of storage area. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out.

1.8 Field Conditions

- .1 Ambient conditions:
 - .1 Comply with environmental requirements of MPI Manual.
 - .2 Perform no painting work when ambient air and substrate temperatures are below 10°C for both interior and exterior work, unless suitable weatherproof covering and sufficient heating and ventilation facilities are in place in accordance with MPI Manual.
 - .3 Perform no painting work when relative humidity is above 85% or when dew point is less than 3°C (5°F) variance between air/surface temperature.

1.9 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
 - .1 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to material and workmanship defects such as: improper cleaning and preparation of surfaces, entrapped dust and dirt, material shrinkage, cracking, splitting and defective workmanship including but are not limited to failure in bubbling, drips, runs, blistering, uneven coverage, misses, poor cutting in and delamination.

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PART 2- PRODUCTS

2.1 Performance/Design Requirements

- .1 Except where more stringent requirements are specified, the following reference standard shall govern the work of this section:
 - .1 Master Painters Institute (MPI) Architectural Painting Specification Manual (MPI Manual), including Identifiers, Evaluation, Systems, Preparation and Approved Product List, latest edition, and referenced herein as the MPI Manual, as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
 - .2 Materials, preparation and workmanship shall conform to requirements of latest edition of Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
 - .3 Painting systems:
 - .1 Shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
 - .2 Presence of any of following shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.
 - .4 Chemical resistance:
 - .1 Painting system materials shall be resistant to and compatible with the following list of chemicals:
 - .1 Diversey Oxivir Plus (Canada) Disinfectant Cleaner Concentrate, containing:
 - .1 Propylene glycol n-propylether; 5 – 10%.
 - .2 Hydrogen peroxide; 5 – 10%.
 - .3 Dodecylbenzene sulfonic acid; 1 – 5%.
 - .4 Sodium xylene sulfonate; 1 – 5%.
 - .2 Diversey PERdiem General Purpose Cleaner with Hydrogen Peroxide, containing:
 - .1 Alcohol C9-C11 ethoxylated; 7 – 13%.
 - .2 Hydrogen Peroxide; 1 – 5%.
 - .3 Sodium Xylene Sulfonate; 1 – 5%.
 - .3 Chlorox Performance Disinfecting Bleach.
 - .1 Sodium Hypochlorite; 1 – 5%.
 - .2 Painting system materials shall not deteriorate or discolour when exposed to the above specified chemicals.

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2.2 Materials

- .1 *Products* listed in MPI Manual shall be used in the *Work*, from the manufacturers listed as follows, unless specified otherwise.
 - .1 Acceptable Manufacturers:
 - .1 Benjamin-Moore & Co., Limited.
 - .2 Dulux Paints.
 - .3 Para Paints.
 - .4 Pittsburgh Paints.
 - .5 The Sherwin-Williams Company.
 - .6 Substitutions in accordance with Section 01 25 00.
 - .2 Paint and materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and the like) shall be in accordance with the MPI Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
 - .3 Other paint materials, such as linseed oil, shellac, and the like, shall be highest quality *Products* of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials as required.
 - .4 Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.
 - .5 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by building code requirements and/or authorities having jurisdiction.
 - .6 Paints and coatings materials used within the weatherproofing system shall not exceed the VOC content limits of the following criteria.
 - .1 Interior paints and coatings: to following Green Seal GS-11 VOC limits:
 - .1 Flat coating type: 50 gm/L.
 - .2 Non-flat coating type: 150 gm/L.
 - .2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive Paints, maximum 250 gm/L.
 - .3 Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings.

2.3 Equipment

- .1 Painting and coating equipment in accordance with written requirements of MPI Manual.

2.4 Mixing and Tinting

- .1 Unless otherwise specified, paints shall be ready-mixed. Re-mix prior to application to ensure colour and gloss uniformity.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in accordance with manufacturer's written requirements.
- .3 Perform colour tinting operations prior to delivery of paint to *Place of the Work*.

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- .4 Where thinner is used, addition shall not exceed paint manufacturer's recommendations.

2.5 Colours and Gloss Levels

- .1 Paint colours and gloss levels shall be as selected by the *Consultant*. Locations as indicated or scheduled.
- .2 Colour schedule: in accordance with Interior Finish Legend.
- .3 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 maximum
G2	Velvet finish	0 to 10	10 to 35
G3	Eggshell finish	10 to 25	10 to 35
G4	Satin finish	20 to 35	35 minimum
G5	Semi-gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

- .4 Gloss values for this project:
- .1 Walls: Satin (G4) or Semi-gloss (G5).
- .2 Floors: Semi-gloss (G5) or Gloss (G6).
- .3 Ceilings: Flat or Matte (G1).
- .4 Trim and Doors: Semi-gloss (G5 or Gloss (G6).
- .5 Signage: Flat or Matte (G10>

PART 3- EXECUTION

3.1 Examination

- .1 Prior to commencement of work of this section, thoroughly examine surfaces scheduled to be painted.
- .2 Check moisture content and alkalinity of surfaces to be painted in accordance with paragraph above titled Field Conditions.
- .3 Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
- .4 Report in writing any condition adversely affecting work of this section.
- .5 Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from surfaces which could be detrimental to a satisfactory and acceptable finish.

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3.2 Preparation

- .1 Comply with manufacturer's written requirements and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- .2 Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - .1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- .3 Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, mildew, grease, and incompatible paints, encapsulants, and other deleterious materials.
- .4 Paint surfaces when moisture content or alkalinity of surfaces to be painted comply with paragraph 3.5 Field Quality Control / Standard of Acceptance.
- .5 Concrete substrates: Remove release agents, curing compounds, efflorescence, and chalk.
- .6 Shop-primed steel substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- .7 ZF75 and ZF120 galvanized-metal substrates: Remove grease and oil residue from galvanized sheet metal by methods to produce clean surfaces that promote adhesion of subsequently applied paints.
- .8 Z275 galvanized-metal substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- .9 Existing painted substrates:
 - .1 Clean substrates as indicated above.
 - .2 Sound existing paint surfaces and remove paint surfaces that are not sound, loose or are otherwise stained, cracked, wrinkled, peeling, or defective.
 - .3 Dull hard or glossy surfaces by sanding or other abrasive methods prior to finishing.
 - .4 Apply tie-coat primer product that compatible with substrate as recommended by paint coatings manufacturer.
 - .5 Follow with paint finish coats as specified for like substrate materials specified herein.

3.3 Installation

- .1 Do not paint unless substrates are acceptable and/or until Field Conditions (heating, ventilation, lighting and completion of work of other sections) are acceptable for applications of *Products*.
- .2 Apply primer, paint or stain in accordance with MPI Manual Premium Grade finish requirements.

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- .3 Apply paint and coatings within an appropriate time frame after cleaning when Field Conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications.
- .4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .5 Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- .6 Unless otherwise approved by *Consultant*, apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
- .7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").
- .8 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .9 Prime coat of stain or varnish finishes may be reduced in accordance with manufacturer's directions.
- .10 Paint finish shall continue through behind wall-mounted items (i.e. chalk and tack boards) and exposed/ visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
- .11 *Consultant* shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to *Owner*.
- .12 Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.

3.4 Mechanical and Electrical Items

- .1 Finish paint primed mechanical and electrical items with 2 coats of paint. Include for the following list unless otherwise indicated:
 - .1 Air handling units.
 - .2 Convectors.
 - .3 Conduit.
 - .4 Diffusers.
 - .5 Ductwork.
 - .6 Grilles.
 - .7 Hangers.
 - .8 Heaters.
 - .9 Fire hose cabinets.
 - .10 Fire extinguisher cabinets.
 - .11 Louvres.
 - .12 Radiators.

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- .13 Stacks.
- .14 Vents.
- .2 Prime and paint exposed insulated and bare pipes. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65°C.
- .3 Coordinate the painting of pipes, and coverings with mechanical contractor applying colour banding, flow arrows and pipe identification after the painting of pipes and coverings.
- .4 Paint work to match adjacent walls and ceilings unless directed otherwise.
- .5 Paint interior surfaces of air ducts and pipe trenches including heating pipes and elements that are visible through grilles and louvres with one coat of flat metal paint to limit of sight-line. Paint to be black or white as directed by *Consultant*.
- .6 Gas pipes, whether concealed or exposed, shall be painted in accordance with gas code.
- .7 Paint and finish wall surfaces behind convectors. Walls to be finished prior to installation of convector covers. Touch up walls after covers are installed as necessary to make good installation damage.
- .8 Air diffusers shall be primed and finished with 2 coats of paint of same colour and sheen as ducts and/or ceiling.

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
 - .1 Field tests and inspections:
 - .1 Paint and Coating Quality Assurance Inspections:
 - .1 Field quality control shall be in accordance with Section 01 45 00.
 - .2 Arrange for paint manufacturer's representative to inspect work of this Section on a regular basis and prepare weekly Job Progress Reports.
 - .2 Moisture and alkalinity testing:
 - .1 Check moisture content of surfaces to be painted using properly calibrated electronic moisture meter approved by paint manufacturer, and *Consultant*, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
 - .1 Concrete and concrete masonry (clay and concrete brick/block): Maximum 12%.
 - .2 Gypsum board and plaster: Maximum 12%.
 - .3 Wood: Maximum 15%.
 - .2 Conduct moisture tests on concrete floors using cover patch test method.
 - .3 Test concrete, masonry and plaster surfaces for alkalinity.
 - .3 Painted interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the *Consultant*.

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- .1 Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from weather.
 - .5 Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- .4 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces to the *Consultant*:
- .1 Visible defects are evident on vertical and horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 - .2 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - .3 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.
- .5 Painted surfaces rejected by the *Consultant* shall be made good at the expense of the *Subcontractor*. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.
- .6 Painting *Subcontractor* shall obtain from *Contractor* written confirmation of specific surface preparation procedures and primers used for fabricated steel items from the fabricator/*Supplier* to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

3.6 Adjusting and Cleaning

- .1 Promptly as work proceeds and on completion of *Work*, remove paint where spilled, splashed or spattered during the progress of the *Work*. Keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

3.7 Interior Paint Systems

- .1 System references listed are based on MPI Manual and are Premium Grade, Low VOC (Green Seal GS-11), High Performance Architectural, unless otherwise indicated:
 - .1 Concrete vertical surfaces: (including ceilings)
 - .1 INT 3.1C High performance architectural latex.
 - .2 Concrete horizontal surfaces: (floors and stairs)
 - .1 INT 3.2A Latex floor enamel finish.

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- .3 Concrete masonry unit assemblies:
 - .1 Latex block filler and primer/sealer: as recommended by paint manufacturer.
 - .2 Finish coats: Benjamin Moore 'Ultra Spec Scuff X Flat Base 1 K484-1X, Matte Finish'.
- .4 Primed ferrous metal; touch-up and finish coats required under this section:
 - .1 Ferrous metal fabrications: Prepared and primed in accordance with Section 05 50 00.
 - .2 INT 5.1R High Performance Architectural Latex.
- .5 Galvanized metal: (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.)
 - .1 Primer/sealer as recommended by paint manufacturer.
 - .2 Finish coats: ~~Sherwin-Williams Interior 'Emerald, semi-gloss'~~ Benjamin Moore 'Ultra Spec Scuff X K4871x2, Semi-gloss Finish'.
- .6 Plaster and gypsum board: (gypsum wallboard, drywall and textured finishes)
 - .1 Latex block filler and primer/sealer: as recommended by paint manufacturer.
 - .2 Finish coats: Benjamin Moore 'Ultra Spec Scuff X Flat Base 1 K484-1X, Matte Finish'.

END OF SECTION

Hygienic Wall Panel System

Section revised and reissued by Addendum 05

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Hygienic wall panel system (WP2, WP3, WP4, WP#, WP#3, WP#6, WP#7, WP#8, WP5-XXX, IM-XXX, WP-WB).
 - .2 Installation of existing glass panels (GPX).

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordination of work: coordinate layout, penetrations and installation of work of this section with work of other sections.
- .2 Conduct a pre-installation meeting in accordance with Section 01 31 19.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product data*:
 - .1 Submit *Product data* sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit shop drawings to show layout, treatment at walls, and other objects. Indicated details of proposed treatment where materials meet other materials.
- .4 Samples:
 - .1 Submit sample panels in triplicate on 305 mm x 305 mm (12"x 12") showing each finish and colour.
 - .2 Submit samples of each accessory type product specified.
 - .3 Identify each sample as to project, finish, colour name, number.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Mock-ups:

Hygienic Wall Panel System

Section revised and reissued by Addendum 05

- .1 Provide full size panel system mock-up of each panel system, for review and acceptance by *Consultant*. Locate at the *Place of the Work* where directed by the *Consultant*.

1.6 Field Conditions

- .1 Install hygienic wall system only when surfaces and air temperatures have been maintained between 18°C and 26°C for twenty four (24) hours preceding installation, and will be so maintained during installation and for forty eight (48) hours thereafter.
- .2 Commence installation after building has been enclosed and dust generating activities have been completed.
- .3 Ensure that adequate ventilation is provided during installation and curing of adhesive.

1.7 Delivery, Storage and Handling

- .1 Package materials and identify contents of each package.
- .2 Store materials for a minimum of 8 hours before installation on a solid flat surface and preconditioned for approximating the operating environment of the finished room.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 Manufacturer's warranty.
 - .1 Duration: 10 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 10.
 - .2 Smoke Developed Value (SDV): 300.
- .2 Chemical resistance:
 - .1 Hygienic wall panel materials shall be resistant to and compatible with the following list of chemicals:
 - .1 Diversey Oxivir Plus (Canada) Disinfectant Cleaner Concentrate, containing:
 - .1 Propylene glycol n-propylether; 5 – 10%.
 - .2 Hydrogen peroxide; 5 – 10%.
 - .3 Dodecylbenzene sulfonic acid; 1 – 5%.
 - .4 Sodium xylene sulfonate; 1 – 5%.
 - .2 Diversey PERdiem General Purpose Cleaner with Hydrogen Peroxide, containing:

Hygienic Wall Panel System

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- .1 Alcohol C9-C11 ethoxylated; 7 – 13%.
- .2 Hydrogen Peroxide; 1 – 5%.
- .3 Sodium Xylene Sulfonate; 1 – 5%.
- .3 Chlorox Performance Disinfecting Bleach.
 - .1 Sodium Hypochlorite; 1 – 5%.
- .2 Hygienic wall panel system materials shall not deteriorate or discolour when exposed to the above specified chemicals.

2.2 Hygienic Panel Wall System

- .1 Description:
 - .1 Hygienic, impact resistant, water-resistant, low VOC, antimicrobial, PVC wall system.
 - .2 Surface: smooth.
 - .3 Antimicrobial: HACCP certified.
 - .4 Impact resistance: in accordance with ASTM D5420-21, up to 198 inch lbs in force.
 - .5 Fungi resistance: zero, in accordance with ASTM G21-15(2021)e1.
 - .6 Mold resistance: 10, in accordance with ASTM D3273-16.
- .2 WP2, WP3, WP4, WP#, WP#3, and WP#6, WP#7, WP#8:
 - .1 Colours and patterns: In accordance with Interior Finish Legend.
 - .2 Acceptable *Products*: In accordance with Interior Finish Legend.
- .3 WP5-(XXX) and IM-(XXX):
 - .1 Provide high-quality stock images to the manufacturer to be printed directly to the wall panels.
 - .2 Stock images: to later selection by the *Consultant*.
 - .3 Acceptable *Products*: In accordance with Interior Finish Legend.
- .4 WP-WB:
 - .1 Colours and patterns: In accordance with Interior Finish Legend.
 - .2 Trim: Writeable wall protection; Refer to Interior Finish Legend.
 - .3 Acceptable *Products*: In accordance with Interior Finish Legend.
- .5 Panel fixing method: Adhesive, type as recommended by panel manufacturer.
- .6 Accessories:
 - .1 Resilient trim: Start and edge strip: #A807 Strip.
 - .2 Metal trim: Schluter 'Schiene E30 Stainless Steel Trim'.
 - .3 Welding rod: as recommended by panel manufacturer.
 - .4 Sealant: as recommended by panel manufacturer.
 - .5 Panel cleaning materials: as recommended by panel manufacturer.

Hygienic Wall Panel System

Section revised and reissued by Addendum 05

2.3 Glass Wall Panels

.1 GPX:

- .1 Install existing glass panels as indicated on the Graphics Locations schedule.**
- .2 Include top and bottom metal trims as required.**

PART 3 - EXECUTION

3.1 Examination

- .1 Examine surfaces to receive wall panel system. Report unsatisfactory conditions immediately to *Consultant*. The work of this section shall not proceed until unsatisfactory conditions have been corrected.
- .2 Substrate surface shall be straight to tolerance of ± 3 mm (± 0.12 ") over 3000 mm (118").
- .3 Ensure that environmental conditions have been provided as requested and specified.
- .4 Defective *Work* resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the *Work* of this section.

3.2 Installation - General

- .1 Install in accordance with wall panel manufacturer's written recommendations.

3.3 Installation - Adhesive Method Application

- .1 Cut and fit sheet as required. Clean back of panel using safe solvent cleaner. Avoid the use of ketones, acetones or any solvents that may cause damage to panel.
- .2 Clean adhesive from existing panels and prepare for wall application.**
- ~~.3~~ .3 Apply double sided adhesive tape to top and bottom of sheet.
- ~~.3.4~~ .4 Apply adhesive tape to window and door openings where sheet has a tendency to pull away from substrate prior to adhesive cure.
- ~~.4.5~~ .5 Prime wall on area directly corresponding to tape position using a non-flammable contact adhesive.
- ~~.5.6~~ .6 Apply adhesive to back of sheet using trowel as recommended by panel manufacturer.
- ~~.6.7~~ .7 Apply sheet to wall and line up any reference marks before pressing into place.
- ~~.7.8~~ .8 Use a white rubber mallet for initial contact with adhesive tape.
- ~~.8.9~~ .9 Ensure adequate adhesive transfer by thoroughly rolling entire panel surface using a wall roller.
- ~~.9.10~~ .10 Allow 3 mm (1/8") gap at ceiling, door and window frames, pipes, and projections to accommodate panel expansion. Seal gaps with sealant.
- ~~.10.11~~ .11 Seal transition strip to flash-coved sheet vinyl with silicone sealant. Allow required gap between top of flash-coved flooring and panels to accommodate expansion.
- ~~.11.12~~ .12 Maintain at least 80% coverage of direct transfer of adhesive between panels and wall substrate.

Hygienic Wall Panel System

Section revised and reissued by Addendum 05

3.4 Sheet to Sheet Jointing

- .1 Heat welding:
 - .1 Apply double-sided adhesive tape flush to panel edges.
 - .2 Remove burrs from panel edges.
 - .3 Place each successive panel allowing for a 1.5 mm (1/16") gap between each panel.
 - .4 Clean both the seam area and the weld rod with safe solvent cleaner - one that will not attach the vinyl or leave a film.
 - .5 Test weld on a scrap piece of panelling before proceeding.
 - .6 Proceed only when temperature and speed have been satisfied.
 - .7 The weld may be trimmed flush when semi-cooled using the round part of the trimming spatula.

3.5 Jointing Sheet to Coved Vinyl Flooring

- .1 Overlapping:
 - .1 Extend the panel down a minimum of 50 mm (2") past the top of the flooring material.
 - .2 Use extra adhesive to fill the gap.
 - .3 Apply a bead of recommended sealant along the bottom edge of the panel.

3.6 Field Quality Control

- .1 Manufacturer's field review to be in accordance with Section 01 45 00.

3.7 Adjusting and Cleaning

- .1 Remove the protective film from the panels, clean panels with an anti-static solution.
- .2 Wash with water or a diluted neutral soap/detergent solution. Do not use materials containing abrasives or solvents.

3.8 Protection

- .1 After materials have set, and until completion, co-ordinate *Work* to ensure that panels are not damaged by traffic or adjacent work.
- .2 At completion of panel installation, install protection in areas where finishing *Work*, repairs and installation of equipment will occur.

END OF SECTION

Aluminum Entrances

Section revised and reissued by Addendum No. 4

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Aluminum entrances and storefronts.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - .1 Independent inspection and testing company shall attend the pre-installation meeting.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings.
 - .2 Further to requirements of Section 01 33 00, indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, field welding, coordination with hardware and electrical requirements.
 - .3 Identify and describe material types being supplied, wall thicknesses of extrusions, and shapes including connections and grades, dimensions and tolerances (minimum and maximum), attachments, reinforcing, anchorage and locations of fastenings, and provisions for thermal and structural movement between components of this section and adjacent materials.
 - .4 Include description of materials, metal finishing specifications, and other pertinent information.
 - .5 Design loads, typical reactions and support movement allowances, both vertical and horizontal, shall be placed on the shop drawings.
 - .6 Shop drawings shall clearly indicate the specification of materials and, where applicable, indicate installation methods and coordination with other sections.
 - .7 Submit framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.
- .4 Samples:
 - .1 Submit samples of frame, sill and mullion sections, sill flashing and accessories, fasteners for connection of frame to opening, glazing tape, glass retainers, glazing gaskets, screening and frame, spandrel panels and each finish material and any other material, as requested.

Aluminum Entrances

Section revised and reissued by Addendum No. 4

- .2 Samples of colour and finish prepared as specified on respective metal components for both extrusion and sheet.
- .3 Identify samples as to treatment, thickness, alloy, framing composition, colour, manufacture, performance standard and portion of the work to which they apply.
- .4 Fabrication shall not proceed without written acceptance of samples from *Consultant*.
- .5 Test reports:
 - .1 Submit valid laboratory test reports, prepared by an independent laboratory, verifying that proposed system has been tested by an independent laboratory and achieved performance values that meet the specified performance criteria.

1.4 Closeout Submittals

- .1 Closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for incorporation into the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 Company:
 - .1 Has adequate plant, equipment, and skilled workers to perform the work expeditiously.
 - .2 Has successfully completed installations similar to that specified during a period of at least the immediate past 5 years.
 - .2 Provide at least one trade specialist who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of this work, and personally direct installation performed under this section.
 - .1 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .2 Typical glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.
 - .3 Welding: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA Welding qualification codes; CSA W47.1-19 for welding of steel, and CSA W47.2-11(R2020) for welding of aluminum.

1.6 Delivery, Storage, and Handling

- .1 Store parts in a dry place and permit natural ventilation over their finished surfaces.
- .2 Store materials in locations protected from damage of other trades.

Aluminum Entrances

Section revised and reissued by Addendum No. 4

- .3 Under conditions of high humidity or cold temperatures, supply heating or forced air ventilation to prevent accumulation of surface moisture.
- .4 Mark components to show location on building and on drawings.
- .5 Protect finishes with strippable coating that will not mar, nor deface finish on removal, or a similar method designed to afford an equivalent amount of protection. Leave protected coating intact until damage risk is past or immediately prior to final cleaning.
- .6 Stacking should be done to prevent bending pressure or abrasion of finished surfaces.
- .7 Brace and protect frame units to prevent distortion and damage in shipment and handling.
- .8 *Provide* methods for lifting or hoisting units into place without causing damage.

1.7 Field Conditions

- .1 Comply with requirements of *Product* manufacturers.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 System:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 The warranty is a total system warranty, and includes hardware, operators, finishing, delivery, hanging, fitting, and refinishing of doors, framing, and hardware.
 - .3 Duration: 2 years.
 - .2 Glass and glazing: in accordance with Section 08 80 00.

PART 2 - PRODUCTS

2.1 Manufacturer

- .1 Work of this section shall be provided by one of the following acceptable manufacturers:
 - .1 Alumicor Limited.
 - .2 Commdoor Aluminum.
 - .3 Kawneer.
 - .4 Windspec Inc.
- .2 Substitutions: in accordance with Section 01 25 00.

2.2 Performance/Design Requirements

- .1 Air Leakage; except entrance doors: Air leakage through the work shall not exceed 0.3 L/s/m² (0.06 cfm/ft²) of glazing area when tested in accordance with ASTM E283-04 at test pressure of 300 Pa (6.24 psf).
- .2 Water Penetration (other than entrance doors): No water penetration shall occur when the work is tested in accordance with ASTM E331-00, amended to prohibit water from passing through interior glazing seals or frame joints, at a test pressure of 300 Pa (6.24 psf).

Aluminum Entrances

Section revised and reissued by Addendum No. 4

- .3 Fabricate mullions to ensure under specified loads a maximum deflection of $1/175$ of mullion span or 19 mm (3/4"), whichever is less.
- .4 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with building code.
- .5 Design and size components to withstand sway displacement as calculated in accordance with building code.
- .6 *Provide* system to accommodate, without damage to components or deterioration of seals:
 - .1 Movement within system,
 - .2 Movement between system and perimeter framing components,
 - .3 Dynamic loading and release of loads,
 - .4 Deflection of structural support framing,
 - .5 Shortening of building concrete structural columns,
 - .6 Creep of concrete structural members,
 - .7 Mid-span slab edge deflection.
- .7 Maintain continuous air barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- .8 Position thermal insulation to exterior of air barrier.
- .9 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

2.3 Materials

- .1 Aluminum extrusions: Aluminum Association alloy AA6063-T5 or T6 temper for framing.
- .2 Sheet aluminum: aluminum sheet, 0.92 mm (0.04") minimum thickness.
 - .1 Aluminum alloy:
 - .1 AA5005H14 Anodizing Quality.
- .3 Concealed sheet metal air barriers: 1 mm (0.04") (22 gauge) Z275 galvanized steel sheet.
- .4 Fasteners: aluminum or Type 304 stainless steel, finished to match adjacent material.
- .5 Isolation coating: alkali resistant bituminous paint or epoxy solution.
- .6 Glazing gaskets: fully resilient, shim type butyl glazing tape or EPDM glazing gasket.
- .7 Glass and other glazing materials: Refer to Section 08 80 00.
- .8 Silicone Sealant: One component, chemical curing; capable of water immersion without loss of properties: cured Shore A Durometer hardness of 15 to 25 to ASTM D2240-15(2021), colour as selected by *Consultant*, where exposed, to ASTM C920-14.
- .9 Sheet metal work air barrier sealant: One component elastomeric chemical curing, to ASTM C920-14.

Aluminum Entrances

Section revised and reissued by Addendum No. 4

- .10 Insulation at spandrels, closures and flashings: ASTM C612-14, Type IVB, non-combustible to CAN/ULC-S114-05
 - .1 Acceptable *Products*:
 - .1 Johns Manville 'MinWool Curtainwall'.
 - .2 Rockwool 'CurtainRock'.
- .11 Air barrier membrane:
 - .1 Self-Adhesive membrane: Composite preformed modified membrane system consisting of SBS modified asphalt for low temperature flexibility and polyethylene scrim reinforcing. Acceptable *Products*:
 - .1 Bakor 'Blueskin SA' Self-Adhesive Grade Air Barrier Membrane.
 - .2 Soprema 'Soprasedal Stick 1100'.
 - .3 W.R. Meadows 'Air Shield'.
 - .2 Primer: as recommended by manufacturer.
 - .3 Membrane Properties:
 - .1 Thickness: 1.0 mm (40 mils).
 - .2 Application temperature: minimum +5°C.
 - .3 Service temperature: -40°C to +70°C.
 - .4 Elongation: 200% minimum in accordance with ASTM D412-16-modified.
 - .5 Low temperature flexibility: to -30°C to CGSB 37-GP-56M-1985.
 - .6 Air leakage: 0.005 L/m².s under a pressure differential of 75 Pa (0.01 PSI) in accordance with ASTM E283-04.

2.4 Door Framing

- .1 Aluminum entrance framing:
 - .1 ~~50.8 mm x 114.3 mm (2" x 4.5") 38 mm x 152 mm (1-1/2" x 6")~~ top frame and jambs, ~~and 38 mm x 228 mm (1-1/2" x 9")~~ at bottom, thermally broken extruded aluminum assembly with flush sight lines.
- .2 All section shall be designed for shear block joinery.

2.5 Entrance Doors

- .1 Narrowstile type factory fabricated from purpose made extruded aluminum framing, thermally broken.
- .2 Reinforce mechanically-joined corners of doors by welding, spigotting, welding and spigotting or by one piece cast aluminum angle to produce sturdy door unit.
- .3 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.
 - .1 Glass: 6 mm (1/4") clear fully tempered safety glass.
 - .2 Use double glazed double sealed units at exterior doors as per Section 08 80 00.
- .4 Door stiles shall be weathered with metal backed polypropylene pile weather-stripping. Provide weather-stripping sweeps at door bottoms.

Aluminum Entrances

Section revised and reissued by Addendum No. 4

2.6 Manual Door Hardware

- .1 Door hardware; hinges, closers, thresholds, push/pulls, locks, exit hardware, and as indicated: supplied by Section 08 71 00 for installation by this section.
- .2 Door jambs and head shall be weatherstripped with metal backed pile weather-stripping.
- .3 Door sills shall be weatherstripped with door sweeps.
- .4 Finish hardware to match door finish unless otherwise indicated.
- .5 Threshold: continuous type, 100 mm (4") wide, extruded aluminum.

2.7 Finishes

- .1 Exposed aluminum surfaces; where indicated: Mill finished aluminum.
- .2 Exposed aluminum surfaces; anodized to AAMA 611-20:
 - .1 Clear anodized to AA Designation AA-M12C21A31 or AA-M12C22A31 (Class II).

2.8 Fabrication

- .1 Make allowances for deflection of structure. Ensure that structural loads are not transmitted to aluminum work.
- .2 *Provide* structural steel reinforcement for strength, stiffness and connections.
- .3 Fit intersecting members to flush hairline weathertight joints and mechanically fasten together, except where indicated otherwise.
- .4 Conceal fastenings from view. Exposed fastenings where indicated.
- .5 Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.
- .6 Field apply isolation coating to aluminum in contact with dissimilar metals and/or cementitious materials.
- .7 Fabricated assemblies shall make required clearances other assemblies and for deflection of structure.

PART 3 - EXECUTION

3.1 Installation

- .1 Install work of this section plumb, square, level, free from warp, twist and superimposed loads.
- .2 Secure work in required position. Do not restrict thermal movement.
- .3 Install hardware in accordance with templates.
- .4 Adjust operable parts for correct function.
- .5 Isolate from cementitious materials.

3.2 Glazing

- .1 Glaze aluminum windows at exterior using insulating glazing units in accordance with Section 08 80 00. Glaze interior windows using 6 mm (1/4") clear float glass typically, tempered at entry sidelites unless otherwise indicated.

Aluminum Entrances

Section revised and reissued by Addendum No. 4

3.3 Sealants

- .1 Seal between frame members, sills and adjacent construction as a part of the work of this section and in accordance with Section 07 92 00.

3.4 Hardware

- .1 Install in accordance with manufacturer's installation requirements.
- .2 Accurately locate and adjust hardware to meet manufacturer's requirements. Use special tools and jigs as recommended.
- .3 Set, fit and adjust hardware according to manufacturer's directions, at heights later directed by *Consultant*. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
- .4 Powered hardware:
 - .1 Power wiring will be supplied and installed by electrical work installer including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that wiring work is done in accordance with the *Suppliers* wiring diagrams and directions.
 - .2 Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the *Consultant*.

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review shall be in accordance with Section 01 45 00.

3.6 Adjusting and Cleaning

- .1 Cleaning on completion of installation:
 - .1 Remove deposits which affect appearance or operation of units.
 - .2 Remove protective materials.
 - .3 Clean interior and exterior surfaces by washing with clear water; or with water, and soap or detergent; followed by a clear water rinse.
 - .4 Clean and restore stained metal surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.
 - .5 Final cleaning is specified in Section 01 77 00.

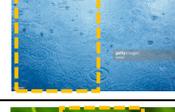
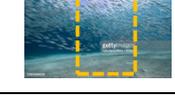
END OF SECTION

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
Level 02, Malignant Haematology Clinic (MHC)					
02	h Willow Branches And Furry Catkin At Bo	4424 x 6599 px (14.75 x 22 in) 300 dpi 29.2 MP		1220 x 2200	201
02	https://www.gettyimages.com/detail/photo/macro-nature-beautiful-dew-drops-on-dandelion-seed-royalty-free-image/1424658011	7508 x 5012 px (25.03 x 16.71 in) 300 dpi 37.6 MP		1220 x 2200	202
02	https://www.gettyimages.com/detail/photo/frosted-rosemary-royalty-free-image/1450338376	4160 x 6240 px (13.87 x 20.8 in) 300 dpi 26 MP		1220 x 2200	203
02	photo/virginia-juniper-and-blue-berries-of-s	7952 x 5304 px (26.51 x 17.68 in) 300 dpi 42.2 MP		1220 x 2200	204
02	https://www.gettyimages.com/detail/photo/eucalyptus-leaves-royalty-free-image/1098418404	8216 x 5477 px (27.39 x 18.26 in) 300 dpi 45 MP		1220 x 2200	205
02	https://www.gettyimages.com/detail/photo/sunlight-and-fresh-green-leaf-royalty-free-image/1328205708	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	206
02	https://www.gettyimages.com/detail/photo/magnolias-in-bloom-royalty-free-image/1387364546	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	207
02	https://www.gettyimages.com/detail/photo/close-up-of-flowering-plant-richmond-hill-ontario-royalty-free-image/1402711737	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	208
02	https://www.gettyimages.com/detail/photo/close-up-image-of-a-frosted-hydrangea-paniculata-royalty-free-image/1048799642	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		3660 x 2200	209
02	https://www.gettyimages.com/detail/photo/greenery-dew-and-green-grass-royalty-free-image/1220353018	7952 x 5304 px (26.51 x 17.68 in) 300 dpi 42.2 MP		2440 x 2200	210
02	https://www.gettyimages.com/detail/photo/ladybird-on-a-blade-of-grass-royalty-free-image/1252754463	8256 x 5256 px (27.52 x 17.52 in) 300 dpi 43.4 MP		610 x 910	211
02	https://www.gettyimages.com/detail/photo/delicate-flowers-of-spring-fothergilla-royalty-free-image/1389158428	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	212

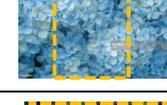
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
02	https://www.gettyimages.com/detail/photo/low-angle-view-of-palm-tree-against-clear-sky-royalty-free-image/1343571699?adppopup=true	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	213
02	In A Field Below A Blue Sky High-Res Stock	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		610 x 910	214
02	https://www.gettyimages.com/detail/photo/close-up-of-blue-leaves-of-a-succulent-echeveria-royalty-free-image/1341766547	5000 x 4519 px (16.67 x 15.06 in) 300 dpi 22.6 MP		610 x 910	215
02	https://www.gettyimages.com/detail/photo/beautiful-abstract-close-up-of-water-splashing-in-royalty-free-image/1366443887	7526 x 5017 px (25.09 x 16.72 in) 300 dpi 37.8 MP		610 x 910	216
02	https://www.gettyimages.com/detail/photo/flower-head-royalty-free-image/1327380302	6016 x 4010 px (20.05 x 13.37 in) 300 dpi 24.1 MP		610 x 910	217
02	https://www.gettyimages.com/detail/photo/fresh-green-blue-leaves-of-an-evergreen-tree-royalty-free-image/1408917735	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		610 x 910	218
02	https://www.gettyimages.com/detail/photo/close-up-of-wet-plant-during-rainy-season-richmond-royalty-free-image/1425268829?adppopup=true	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	219

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
Level 05, Malignant Haematology Day Unit (MHDU)					
05	https://www.gettyimages.com/detail/photo/rain-drops-on-leaves-royalty-free-image/1494569194	5827 x 4000 px (19.42 x 13.33 in) 300 dpi 23.3 MP		610 x 910 - 2 Posters	501
05	https://www.gettyimages.com/detail/photo/floral-photo-royalty-free-image/1141859520	6034 x 4012 px (20.11 x 13.37 in) 300 dpi 24.2 MP		1220 x 2200	502
05	https://www.gettyimages.com/detail/photo/group-of-pink-water-lily-royalty-free-image/84972762	7932 x 5456 px (26.44 x 18.19 in) 300 dpi 43.3 MP		1220 x 2200	503
05	https://www.gettyimages.com/detail/photo/full-frame-shot-of-wet-pink-flowering-plants-royalty-free-image/1355355381	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	504
05	https://www.gettyimages.com/detail/photo/red-mountains-panorama-royalty-free-image/1299170102	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	505
05	https://www.gettyimages.com/detail/photo/beautiful-background-with-a-dew-drop-on-the-rose-royalty-free-image/1345130977	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		1220 x 2200	506
05	https://www.gettyimages.com/detail/photo/row-of-red-apple-trees-royalty-free-image/1178837944	6240 x 4160 px (20.8 x 13.87 in) 300 dpi 26 MP		1220 x 2200	507
05	https://www.gettyimages.com/detail/photo/close-up-of-red-flower-western-australia-royalty-free-image/1287321700	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	508
05	https://www.gettyimages.com/detail/photo/guava-fruit-royalty-free-image/1216349849	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	509
05	https://www.gettyimages.com/detail/photo/sweet-oleander-rose-bay-nerium-oleander-name-pink-royalty-free-image/1481573327	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	510
05	https://www.gettyimages.com/detail/photo/tranquil-landscape-banff-national-park-alberta-royalty-free-image/1279195631	6480 x 4320 px (21.6 x 14.4 in) 300 dpi 28 MP		1660 x 2200	511
05	https://www.gettyimages.com/detail/photo/scenic-view-of-pink-flowering-plants-on-field-royalty-free-image/1287664417	6191 x 4127 px (20.64 x 13.76 in) 300 dpi 25.6 MP		3483 x 2200	512

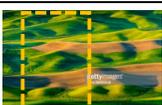
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/drops-on-dandelion-royalty-free-image/113241195	8660 x 5773 px (28.87 x 19.24 in) 300 dpi 50 MP		610 x 910	513
05	https://www.gettyimages.com/detail/photo/olive-backed-sunbird-enjoy-eating-sweet-on-red-royalty-free-image/1058365352	5863 x 3890 px (19.54 x 12.97 in) 300 dpi 22.8 MP		610 x 910	514
05	https://www.gettyimages.com/detail/photo/pink-frangipani-royalty-free-image/1184930065	5773 x 8660 px (19.24 x 28.87 in) 300 dpi 50 MP		610 x 910	515
05	https://www.gettyimages.com/detail/photo/typical-soft-coral-reef-with-anthias-fish-in-the-royalty-free-image/1073063444	4165 x 6240 px (13.88 x 20.8 in) 300 dpi 26 MP		1220 x 2200	516
05	https://www.gettyimages.com/detail/photo/crabapples-on-a-tree-ready-for-picking-royalty-free-image/1422297265?adppopup=true	5000 x 4870 px (16.67 x 16.23 in) 300 dpi 24.4 MP		1220 x 2200	517
05	https://www.gettyimages.com/detail/photo/beautiful-dogwood-trees-blooming-in-spring-garden-royalty-free-image/1393053224	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		1220 x 2200	518
05	https://www.gettyimages.com/detail/photo/persian-shield-leaves-strobilanthes-royalty-free-image/1060689548?adppopup=true	5872 x 3916 px (19.57 x 13.05 in) 300 dpi 23 MP		1220 x 2200	519
05	https://www.gettyimages.com/detail/photo/cherries-royalty-free-image/1288812994	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	520
05	https://www.gettyimages.com/detail/photo/antelope-canyon-wave-shaped-colorful-sandstone-and-royalty-free-image/910027328	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		1220 x 2200	521
05	https://www.gettyimages.com/detail/photo/close-up-of-flowering-plants-on-field-royalty-free-image/1343622655	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		1220 x 2200	522
05	https://www.gettyimages.com/detail/photo/gorgeous-lenten-roses-of-spring-royalty-free-image/1223075397	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	523
05	https://www.gettyimages.com/detail/photo/close-up-of-pink-flowering-plants-on-field-royalty-free-image/1496674458	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 2200	524

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/close-up-of-red-tulips-royalty-free-image/1331318734	7360 x 4912 px (62.37 x 41.63 in) 118 dpi 36.2 MP		600 x 2200	525
05	https://www.gettyimages.com/detail/photo/sea-and-sky-abstract-at-dusk-royalty-free-image/1289543187	5957 x 3977 px (19.86 x 13.26 in) 300 dpi 23.7 MP		1220 x 2200	526
05	https://www.gettyimages.com/detail/photo/colorful-vibrant-peacock-with-feathers-fanned-out-royalty-free-image/1075651658	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		610 x 910 - 3 Posters	527
05	https://www.gettyimages.com/detail/photo/fresh-blueberries-with-water-drops-royalty-free-image/1423683319	7071 x 7071 px (23.57 x 23.57 in) 300 dpi 50 MP		1070 x 2200	528
05	https://www.gettyimages.com/detail/photo/santa-cruz-water-lily-at-a-water-botanic-garden-royalty-free-image/1385632618	4016 x 6016 px (13.39 x 20.05 in) 300 dpi 24.2 MP		610 x 910	529
05	https://www.gettyimages.com/detail/photo/idyllic-lake-and-clear-sky-the-blue-sky-is-royalty-free-image/1385632618	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		3660 x 2200	530
05	https://www.gettyimages.com/detail/photo/close-up-of-blueberries-growing-on-a-plant-malartic-royalty-free-image/1423683319	6250 x 4168 px (20.83 x 13.89 in) 300 dpi 26.1 MP		610 x 910	531
05	https://www.gettyimages.com/detail/photo/rain-drops-background-royalty-free-image/891663762	6048 x 4032 px (20.16 x 13.44 in) 300 dpi 24.4 MP		610 x 910	532
05	https://www.gettyimages.com/detail/photo/hydrangea-blue-hydrangea-royalty-free-image/1440209317	7238 x 4949 px (24.13 x 16.5 in) 300 dpi 35.8 MP		610 x 910	533
05	https://www.gettyimages.com/detail/photo/agave-and-echeveria-royalty-free-image/1215627594?adppopup=true	7070 x 7071 px (23.57 x 23.57 in) 300 dpi 50 MP		610 x 910	534
05	https://www.gettyimages.com/detail/photo/low-angle-view-of-tropical-shark-swimming-in-sea-royalty-free-image/1384346528	8640 x 5760 px (28.8 x 19.2 in) 300 dpi 49.8 MP		1220 x 2200	535
05	https://www.gettyimages.com/detail/photo/bunches-of-ripe-grapes-before-harvest-in-a-chilean-royalty-free-image/1378364221	6720 x 4480 px (22.4 x 14.93 in) 300 dpi 30.1 MP		1220 x 2200	536

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/at-longwood-gardens-conservatory-pennsylvania-royalty-free-image/1142037603	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	537
05	https://www.gettyimages.com/detail/photo/idyllic-lake-and-landscape-in-summer-blue-sky-is-royalty-free-image/1333576982	3840 x 5760 px (12.8 x 19.2 in) 300 dpi 22.1 MP		1220 x 2200	538
05	https://www.gettyimages.com/detail/photo/branch-with-green-leaves-and-turquoise-berries-royalty-free-image/1404062027	4480 x 6720 px (14.93 x 22.4 in) 300 dpi 30.1 MP		1220 x 2200	539
05	https://www.gettyimages.com/detail/photo/oceania-palau-oxeye-scads-selar-boops-shoal-of-fish-royalty-free-image/525468395	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	540
05	https://www.gettyimages.com/detail/photo/lake-louise-banff-national-park-alberta-royalty-free-image/614153315	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		1220 x 2200	541
05	https://www.gettyimages.com/detail/photo/lake-pukaki-and-the-southern-alps-royalty-free-image/543472055	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		3482 x 2200	542
05	https://www.gettyimages.com/detail/photo/mount-kirkjufell-reflecting-in-lake-iceland-royalty-free-image/1176594619?adppopup=true	8144 x 5429 px (27.15 x 18.1 in) 300 dpi 44.2 MP		1220 x 2200	543
05	https://www.gettyimages.com/detail/photo/gosauseen-austria-royalty-free-image/1331492551?adppopup=true	10536 x 4745 px (35.12 x 15.82 in) 300 dpi 50 MP		1220 x 2200	544
05	https://www.gettyimages.com/detail/photo/famous-spirit-island-jasper-national-park-canada-royalty-free-image/908179110?adppopup=true	8632 x 5755 px (28.77 x 19.18 in) 300 dpi 49.7 MP		1220 x 2200	545
05	https://www.gettyimages.com/detail/photo/canadian-rockies-banff-national-park-dramatic-royalty-free-image/1342152935?adppopup=true	6480 x 4320 px (21.6 x 14.4 in) 300 dpi 28 MP		1220 x 2200	546
05	https://www.gettyimages.com/detail/photo/group-of-jackfish-underwater-royalty-free-image/1319669772?adppopup=true	8660 x 5773 px (28.87 x 19.24 in) 300 dpi 50 MP		1220 x 2200	547
05	https://www.gettyimages.ca/detail/photo/lettuce-growing-in-a-hydroponic-farm-royalty-free-image/672697804?adppopup=true	7952 x 5304 px (26.51 x 17.68 in) 300 dpi 42.2 MP		610 x 910	548

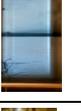
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/close-up-of-ripe-blackthorn-berry-fruits-growing-in-royalty-free-image/1291922741	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	549
05	https://www.gettyimages.com/detail/photo/forget-me-not-flowers-royalty-free-image/1143981780?adppopup=true	8688 x 5552 px (28.96 x 18.51 in) 300 dpi 48.2 MP		1220 x 2200	550
05	https://www.gettyimages.com/detail/photo/aerial-view-of-fish-swimming-in-sea-royalty-free-image/1384346531?adppopup=true	8640 x 5760 px (28.8 x 19.2 in) 300 dpi 49.8 MP		1220 x 2200	551
05	https://www.gettyimages.com/detail/photo/green-forest-reflection-royalty-free-image/173300501?adppopup=true	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		1220 x 2200	552
05	https://www.gettyimages.com/detail/photo/reflection-of-mountains-on-tranquil-lake-surface-royalty-free-image/176946497?adppopup=true	8660 x 4077 px (28.87 x 13.59 in) 300 dpi 35.3 MP		1220 x 2200	553
05	https://www.gettyimages.com/detail/photo/branches-of-blue-thuja-in-the-evening-twilight-royalty-free-image/1485199751?adppopup=true	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	554
05	https://www.gettyimages.com/detail/photo/close-up-of-tiny-blue-flowers-royalty-free-image/1394485179	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		610 x 910	555
05	https://www.gettyimages.com/detail/photo/ripples-on-water-surface-royalty-free-image/1342706471?adppopup=true	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		610 x 910	556
05	https://www.gettyimages.com/detail/photo/pale-blue-hydrangeas-royalty-free-image/1387958306	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	557
05	https://www.gettyimages.com/detail/photo/amazing-nature-of-tirino-river-in-gran-sasso-royalty-free-image/1299328949	7047 x 4703 px (23.49 x 15.68 in) 300 dpi 33.1 MP		610 x 910 - 2 Posters	558
05	https://www.gettyimages.com/detail/photo/coniferous-forest-in-evening-light-with-fog-in-royalty-free-image/1200124422	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	559
05	https://www.gettyimages.com/detail/photo/green-forest-reflected-in-the-pond-royalty-free-image/1150482604	5742 x 3828 px (48.66 x 32.44 in) 118 dpi 22 MP		1220 x 2200	560

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/high-angle-view-of-pine-trees-in-forest-xinjiang-royalty-free-image/1339294764	8209 x 5473 px (27.36 x 18.24 in) 300 dpi 44.9 MP		1220 x 2200	561
05	https://www.gettyimages.com/detail/photo/redwood-forest-royalty-free-image/897664578	9159 x 5459 px (30.53 x 18.2 in) 300 dpi 50 MP		1220 x 2200	562
05	https://www.gettyimages.com/detail/photo/aerial-view-of-winding-road-amidst-trees-in-forest-royalty-free-image/1473755013	4141 x 6212 px (13.8 x 20.71 in) 300 dpi 25.7 MP		1220 x 2200	563
05	https://www.gettyimages.com/detail/photo/tree-in-a-green-field-at-sunrise-stripes-royalty-free-image/1394471430	8008 x 5000 px (26.69 x 16.67 in) 300 dpi 40 MP		610 x 910 - 4 Posters	564
05	https://www.gettyimages.com/detail/photo/close-up-of-red-flowering-plant-israel-royalty-free-image/1468291367	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	565
05	https://www.gettyimages.com/detail/photo/branches-of-blue-thuja-in-the-evening-royalty-free-image/1468291367	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	566
05	https://www.gettyimages.com/detail/photo/water-drops-on-grass-royalty-free-image/1468291367	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	567
05	https://www.gettyimages.com/detail/photo/aerial-view-of-nature-forest-royalty-free-image/1171920212	5337 x 4000 px (17.79 x 13.33 in) 300 dpi 21.3 MP		1220 x 2200	568
05	https://www.gettyimages.com/detail/photo/green-mangrove-tree-background-royalty-free-image/1437509713	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	569
05	https://www.gettyimages.com/detail/photo/gorgeous-floral-clusters-of-reeves-spirea-bush-royalty-free-image/1398313920	6240 x 4160 px (20.8 x 13.87 in) 300 dpi 26 MP		600 x 2200	570
05	https://www.gettyimages.com/detail/photo/close-up-of-crops-growing-on-field-salmon-arm-royalty-free-image/1399608575	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		730 x 2200	571
05	https://www.gettyimages.com/detail/photo/view-from-rocks-to-dam-flaje-royalty-free-image/1165252635	5987 x 3734 px (19.96 x 12.45 in) 300 dpi 22.4 MP		1220 x 2200	572

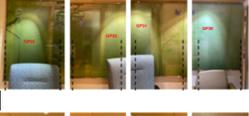
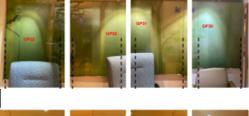
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/trees-with-moss-on-the-bark-riverbank-area-royalty-free-image/1392392371?adppopup=true	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	573
05	https://www.gettyimages.com/detail/photo/water-dripping-off-of-leaf-royalty-free-image/1264374352	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	574
05	https://www.gettyimages.com/detail/photo/dreamy-dandelion-royalty-free-image/987986178	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910	575
05	https://www.gettyimages.com/detail/photo/teucrium-pyrenaicum-royalty-free-image/1418838639?adppopup=true	5827 x 6336 px (19.42 x 21.12 in) 300 dpi 36.9 MP		610 x 910	576
05	https://www.gettyimages.com/detail/illustration/meadow-of-chamomiles-and-grass-royalty-free-illustration/1234984446	6376 x 4251 px (21.25 x 14.17 in) 300 dpi 27.1 MP		1220 x 2200	577
05	https://www.gettyimages.com/detail/photo/canary-island-pine-pinus-canariensis-royalty-free-image/138800574?adppopup=true	5464 x 8192 px (18.21 x 27.31 in) 300 dpi 44.8 MP		1220 x 2200	578
05	https://www.gettyimages.com/detail/photo/close-up-of-water-droplets-on-leaves-royalty-free-image/1406828385	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		1220 x 2200	579
05	https://www.gettyimages.com/detail/photo/mangrove-and-swamp-forest-ecosystem-royalty-free-image/514070562	7360 x 4912 px (62.37 x 41.63 in) 118 dpi 36.2 MP		1220 x 2200	580
05	https://www.gettyimages.com/detail/photo/karajun-grassland-scenery-xinjiang-china-royalty-free-image/1396657193	7952 x 5304 px (26.51 x 17.68 in) 300 dpi 42.2 MP		1220 x 2200	581
05	https://www.gettyimages.com/detail/photo/fichtensch%C3%86ssling-royalty-free-image/1333584536	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		1220 x 2200	582
05	https://www.gettyimages.com/detail/photo/green-fields-royalty-free-image/1294119152	4877 x 5684 px (16.26 x 18.95 in) 300 dpi 27.7 MP		1220 x 2200	583
05	https://www.gettyimages.com/detail/photo/palouse-from-steptoe-royalty-free-image/498941503	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		1220 x 2200	584

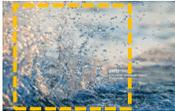
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/fichtensch%C3%86ssling-royalty-free-image/1333269866	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		610 x 910	585
05	https://www.gettyimages.com/detail/photo/eastern-wood-pewee-royalty-free-image/1393708347	6365 x 4243 px (21.22 x 14.14 in) 300 dpi 27 MP		610 x 910 - 2 Posters	586
05	https://www.gettyimages.com/detail/photo/water-droplets-on-lush-green-leaves-royalty-free-image/126980253	3811 x 5717 px (12.7 x 19.06 in) 300 dpi 21.8 MP		610 x 910	587
05	https://www.gettyimages.com/detail/photo/aerial-view-of-agricultural-landscape-collax-united-royalty-free-image/126980253	6946 x 4636 px (23.15 x 15.45 in) 300 dpi 32.2 MP		2440 x 2200	588
05	https://www.gettyimages.com/detail/photo/close-up-of-tiny-blue-flowers-royalty-free-image/1394485268	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		1220 x 2200	589
05	https://www.gettyimages.com/detail/photo/view-of-forest-reflected-on-lake-royalty-free-image/1129989058	5906 x 3937 px (19.69 x 13.12 in) 300 dpi 23.3 MP		610 x 910 - 2 posters	590
05	https://www.gettyimages.com/detail/photo/pine-siskin-spinus-pinus-on-a-branch-with-red-royalty-free-image/1135520612	4797 x 4480 px (15.99 x 14.93 in) 300 dpi 21.5 MP		610 x 910 - 2 posters	591
05	https://www.gettyimages.com/detail/photo/close-up-of-red-leaves-royalty-free-image/1443500521	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		610 x 910 - 2 posters	592
05	https://www.gettyimages.com/detail/photo/leaves-royalty-free-image/486678533	9000 x 4500 px (30 x 15 in) 300 dpi 40.5 MP		610 x 910 - 2 posters	593

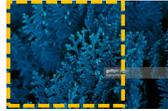
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
Level 10, Department of Supportive Care (DSC)					
10	beautiful-summer-flowering-pink-echinacea	4016 x 6016 px (13.39 x 20.05 in) 300 dpi 24.2 MP		1220 x 2200	1001
10	https://www.gettyimages.ca/detail/photo/orange-duo-royalty-free-image/979349082	3840 x 5760 px (12.8 x 19.2 in) 300 dpi 22.1 MP		1220 x 2200	1002
10	https://www.gettyimages.ca/detail/photo/low-angle-shot-of-siberian-chrysanthemum-yeongwol-royalty-free-image/1184097814	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	1003
10	https://www.gettyimages.ca/detail/photo/red-poppies-flowers-with-blue-sky-background-royalty-free-image/1159625972	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	1004
10	https://www.gettyimages.ca/detail/photo/close-up-of-flowering-plant-on-field-royalty-free-image/1388790365	4000 x 6000 px (13.33 x 20 in) 300 dpi 24 MP		1220 x 2200	1005
10	https://www.gettyimages.ca/detail/photo/pink-salvia-plants-with-soft-bokeh-in-summer-royalty-free-image/1171151220	5773 x 8660 px (19.24 x 28.87 in) 300 dpi 50 MP		1220 x 2200	1006
10	https://www.gettyimages.ca/detail/photo/gold-poppies-super-bloom-in-the-joshua-tree-royalty-free-image/1141020937	3840 x 5760 px (12.8 x 19.2 in) 300 dpi 22.1 MP		1220 x 2200	1007
10	ail/photo/vibrant-flowers-in-warm-sunlight	4912 x 7360 px (16.37 x 24.53 in) 300 dpi 36.2 MP		1220 x 2200	1008
10	https://www.gettyimages.ca/detail/photo/purple-wildflowers-royalty-free-image/1151984565	4800 x 7200 px (16 x 24 in) 300 dpi 34.6 MP		1220 x 2200	1009
10	https://www.gettyimages.ca/detail/photo/purple-wildflowers-serene-background-small-purple-royalty-free-image/1290007226	3840 x 5760 px (12.8 x 19.2 in) 300 dpi 22.1 MP		1220 x 2200	1010
Level 10, Department of Supportive Care (DSC) EXISTING GLASS PANELS					
10	EXISTING GLASS PANELS			109 x 152	GP1
10	EXISTING GLASS PANELS			102 x 152	GP2

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
10	EXISTING GLASS PANELS			114 x 152	GP3
10	EXISTING GLASS PANELS			114 x 152	GP4
10	EXISTING GLASS PANELS			107 x 152	GP5
10	EXISTING GLASS PANELS			107 x 152	GP6
10	EXISTING GLASS PANELS			111 x 152	GP7
10	EXISTING GLASS PANELS			100 x 152	GP8
10	EXISTING GLASS PANELS			109 x 152	GP9
10	EXISTING GLASS PANELS			109 x 152	GP10
10	EXISTING GLASS PANELS			109 x 152	GP11
10	EXISTING GLASS PANELS			109 x 152	GP12
10	EXISTING GLASS PANELS			77 x 152	GP13
10	EXISTING GLASS PANELS			79 x 152	GP14

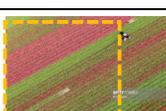
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
10	EXISTING GLASS PANELS			79 x 152	GP15
10	EXISTING GLASS PANELS			79 x 152	GP16
10	EXISTING GLASS PANELS			79 x 152	GP17
10	EXISTING GLASS PANELS			123 x 152	GP18
10	EXISTING GLASS PANELS			123 x 152	GP19
10	EXISTING GLASS PANELS			108 x 152	GP20
10	EXISTING GLASS PANELS			108 x 152	GP21
10	EXISTING GLASS PANELS			98 x 152	GP22
10	EXISTING GLASS PANELS			98 x 152	GP23
10	EXISTING GLASS PANELS			74 x 152	GP24
10	EXISTING GLASS PANELS			102 x 152	GP25
10	EXISTING GLASS PANELS			84 x 152	GP26

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
10	EXISTING GLASS PANELS			84 x 152	GP27
10	EXISTING GLASS PANELS			109 x 152	GP28
10	EXISTING GLASS PANELS			109 x 152	GP29
10	EXISTING GLASS PANELS			94 x 152	GP30
10	EXISTING GLASS PANELS			94 x 152	GP31
10	EXISTING GLASS PANELS			94 x 152	GP32
10	EXISTING GLASS PANELS			94 x 152	GP33
10	EXISTING GLASS PANELS			78 x 152	GP34

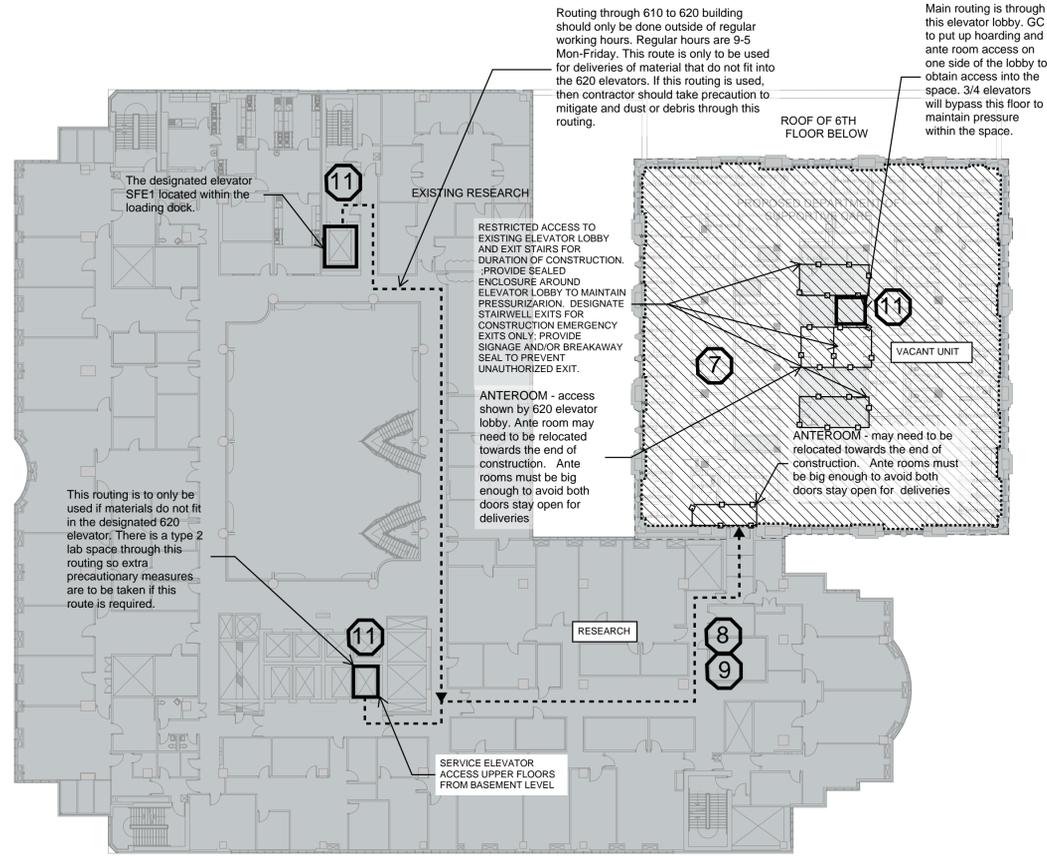
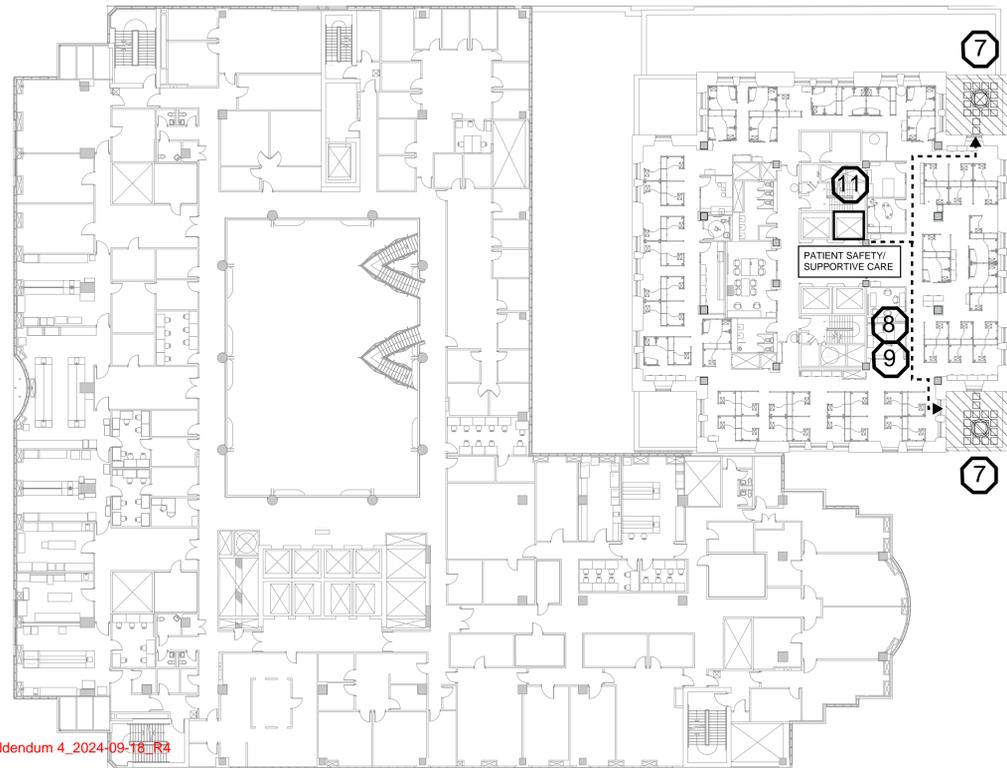
Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
RAMP					
05	https://www.gettyimages.com/detail/photo/grassland-landscape-with-meadows-and-mountains-royalty-free-image/1055577186	7952 x 5304 px (26.51 x 17.68 in) 300 dpi 42.2 MP		600 x 600	5001
05	https://www.gettyimages.com/detail/photo/natural-background-of-frozen-leaves-covered-with-royalty-free-image/1372755915?adppopup=true	3673 x 4898 px (12.24 x 16.33 in) 300 dpi 18 MP		600 x 600	5002
05	https://www.gettyimages.com/detail/photo/vortex-split-view-of-blue-ocean-waters-surface-royalty-free-image/1368265555	8660 x 5773 px (28.87 x 19.24 in) 300 dpi 50 MP		600 x 600	5003
05	https://www.gettyimages.com/detail/photo/japanese-hydrangeas-royalty-free-image/1252196583	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5004
05	https://www.gettyimages.com/detail/photo/aerial-view-of-deep-blue-sea-at-great-barrier-reef-royalty-free-image/1175109485	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5005
05	https://www.gettyimages.com/detail/photo/beautiful-abstract-close-up-of-water-splashes-royalty-free-image/1366813755	7526 x 5017 px (25.09 x 16.72 in) 300 dpi 37.8 MP		600 x 600	5006
05	https://www.gettyimages.com/detail/photo/freshly-picked-blueberries-in-coconut-bowl-on-dark-royalty-free-image/1366813755	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5007
05	https://www.gettyimages.com/detail/photo/purple-blue-peacock-feather-background-royalty-free-image/1332891647	6048 x 3679 px (20.16 x 12.26 in) 300 dpi 22.3 MP		600 x 600	5008
05	https://www.gettyimages.com/detail/photo/hard-coral-reef-system-in-the-pacific-ocean-royalty-free-image/1298853498	6720 x 4480 px (22.4 x 14.93 in) 300 dpi 30.1 MP		600 x 600	5009
05	https://www.gettyimages.com/detail/photo/bush-leaves-top-view-abstract-natural-blue-tone-royalty-free-image/1217208197	6048 x 4024 px (20.16 x 13.41 in) 300 dpi 24.3 MP		600 x 600	5010
05	https://www.gettyimages.com/detail/photo/close-up-view-of-the-water-drop-on-the-leaf-stem-royalty-free-image/1411663027	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5011

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/at-longwood-gardens-conservatory-pennsylvania-royalty-free-image/1142037603	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5012
05	https://www.gettyimages.com/detail/photo/succulents-funchal-botanical-garden-jardim-botanico-royalty-free-image/1465346551	5504 x 8256 px (18.35 x 27.52 in) 300 dpi 45.4 MP		600 x 600	5013
05	https://www.gettyimages.com/detail/photo/oceania-palau-oxeye-scads-selar-boops-shoal-of-fish-royalty-free-image/525468395	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5014
05	https://www.gettyimages.com/detail/photo/branches-of-blue-thuja-in-the-evening-twilight-royalty-free-image/1485199751	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5015
05	https://www.gettyimages.com/detail/photo/garden-macro-royalty-free-image/988276546	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		600 x 600	5016
05	https://www.gettyimages.com/detail/photo/full-frame-shot-of-tobacco-leaves-royalty-free-image/1249204501?adppopup=true	8064 x 6048 px (26.88 x 20.16 in) 300 dpi 48.8 MP		600 x 600	5017
05	https://www.gettyimages.com/detail/photo/elevated-view-of-forest-royalty-free-image/1456074875?adppopup=true	5272 x 3521 px (17.57 x 11.74 in) 300 dpi 18.6 MP		600 x 600	5018
05	https://www.gettyimages.com/detail/photo/leaves-of-a-succulent-plant-macro-shot-bavaria-royalty-free-image/1168258658?adppopup=true	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5019
05	https://www.gettyimages.com/detail/photo/lily-of-the-valley-royalty-free-image/520120622?adppopup=true	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		600 x 600	5020
05	https://www.gettyimages.com/detail/photo/close-up-of-dandelion-on-plant-royalty-free-image/143454244	6330 x 4346 px (21.1 x 14.49 in) 300 dpi 27.5 MP		600 x 600	5021
05	https://www.gettyimages.com/detail/photo/fichtensch%C3%86ssling-royalty-free-image/1386740587	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5022

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/virginia-marshes-of-the-chickahominy-river-near-the-royalty-free-image/681896947?adppopup=true	7360 x 4267 px (24.53 x 14.22 in) 300 dpi 31.4 MP		600 x 600	5023
05	https://www.gettyimages.ca/detail/photo/ladys-mantle-leaf-royalty-free-image/1199485273	6272 x 4181 px (20.91 x 13.94 in) 300 dpi 26.2 MP		600 x 600	5024
05	https://www.gettyimages.com/detail/photo/close-up-green-blade-of-grass-and-rice-food-with-royalty-free-image/1175804164	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5025
05	https://www.gettyimages.com/detail/photo/wiesenschaumkraut-royalty-free-image/1419692181	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		600 x 600	5026
05	https://www.gettyimages.com/detail/photo/red-beetroot-close-up-royalty-free-image/1281739376?adppopup=true	8256 x 5504 px (27.52 x 18.35 in) 300 dpi 45.4 MP		600 x 600	5030
05	https://www.gettyimages.com/detail/photo/royal-poinciana-flower-showing-mainly-sepal-on-royalty-free-image/1411144437	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5031
05	https://www.gettyimages.com/detail/photo/butterfly-goby-goby-protects-nest-built-in-the-royalty-free-image/949690660	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5032
05	https://www.gettyimages.com/detail/photo/leaf-or-interrupted-fern-royalty-free-image/1409172176	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5033
05	https://www.gettyimages.com/detail/photo/beautiful-red-flowers-at-sunset-light-pentas-royalty-free-image/1409176814?adppopup=true	6240 x 4160 px (20.8 x 13.87 in) 300 dpi 26 MP		600 x 600	5034
05	https://www.gettyimages.com/detail/photo/monarda-gardenview-scarlet-royalty-free-image/1409265016?adppopup=true	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5035
05	https://www.gettyimages.com/detail/photo/close-up-image-of-vibrant-red-winter-berries-royalty-free-image/1066525766	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5036

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/jacobs-well-near-austin-texas-usa-royalty-free-image/1354082608	6480 x 4320 px (21.6 x 14.4 in) 300 dpi 28 MP		600 x 600	5037
05	https://www.gettyimages.com/detail/photo/close-up-of-green-corn-stalk-leaves-in-an-royalty-free-image/1417055191	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5038
05	https://www.gettyimages.com/detail/photo/green-leaves-pattern-background-natural-lush-royalty-free-image/1279903532	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5039
05	https://www.gettyimages.com/detail/photo/close-up-of-purple-flowering-plants-on-field-royalty-free-image/1498718149	6459 x 4311 px (21.53 x 14.37 in) 300 dpi 27.8 MP		600 x 600	5040
05	https://www.gettyimages.com/detail/photo/rhubarb-on-sale-at-vegetables-market-royalty-free-image/1146268182?adppopup=true	4912 x 7360 px (16.37 x 24.53 in) 300 dpi 36.2 MP		600 x 600	5041
05	https://www.gettyimages.com/detail/photo/close-up-of-shapes-of-a-tulip-royalty-free-image/1460827358	6240 x 4160 px (20.8 x 13.87 in) 300 dpi 26 MP		600 x 600	5042
05	https://www.gettyimages.com/detail/photo/close-up-of-strawberry-on-table-bristol-tennessee-royalty-free-image/1408741110?adppopup=true	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5043
05	https://www.gettyimages.com/detail/photo/spring-branch-of-a-lime-tree-royalty-free-image/1216785774	6000 x 4000 px (20 x 13.33 in) 300 dpi 24 MP		600 x 600	5044
05	https://www.gettyimages.com/detail/photo/close-up-of-the-spring-flower-trillium-erectum-also-royalty-free-image/696192730	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5045
05	https://www.gettyimages.com/detail/photo/red-foilage-of-the-coleus-plant-close-up-top-view-royalty-free-image/1485807538?adppopup=true	6016 x 4016 px (20.05 x 13.39 in) 300 dpi 24.2 MP		600 x 600	5046
05	https://www.gettyimages.com/detail/photo/aerial-view-tractor-driving-across-red-green-and-royalty-free-image/904627278?adppopup=true	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		600 x 600	5047

Princess Margaret Cancer Centre (Stem Cell Transplant 2, Part B)					
Graphics Locations					
Level	Link	Original Image Size/Quality (W x H)	Image Intent	Printing Size (W x H)	Image numbers below are shown in on 1300 series drawings to indicate graphic to be shown on Wall Protection (WP5[#]) and Graphics indicated on other substrates.
05	https://www.gettyimages.com/detail/photo/closeup-butterfly-on-grass-royalty-free-image/532893386	5760 x 3840 px (19.2 x 12.8 in) 300 dpi 22.1 MP		600 x 600	5048
05	https://www.gettyimages.com/detail/photo/volterra-pisa-tuscany-italy-royalty-free-image/1262250970	6240 x 4160 px (20.8 x 13.87 in) 300 dpi 26 MP		600 x 600	5049
05	https://www.gettyimages.com/detail/photo/maple-seedling-royalty-free-image/129099547?adppopup=true	5700 x 3800 px (19 x 12.67 in) 300 dpi 21.7 MP		600 x 600	5050
05	https://www.gettyimages.com/detail/photo/vibrant-deep-pink-petals-at-centre-of-peony-flower-royalty-free-image/963730206?adppopup=true	5764 x 3843 px (19.21 x 12.81 in) 300 dpi 22.2 MP		600 x 600	5051
05	https://www.gettyimages.com/detail/photo/water-lettuce-royalty-free-image/1124933792	7360 x 4912 px (24.53 x 16.37 in) 300 dpi 36.2 MP		600 x 600	5052
05	https://www.gettyimages.com/detail/photo/macro-shot-black-forest-germany-royalty-free-image/1456614970	7008 x 4672 px (23.36 x 15.57 in) 300 dpi 32.7 MP		600 x 600	5053
05	https://www.gettyimages.com/detail/photo/summer-landscape-in-karelia-summer-grass-in-the-royalty-free-image/1436207982	6062 x 4041 px (20.21 x 13.47 in) 300 dpi 24.5 MP		600 x 600	5054

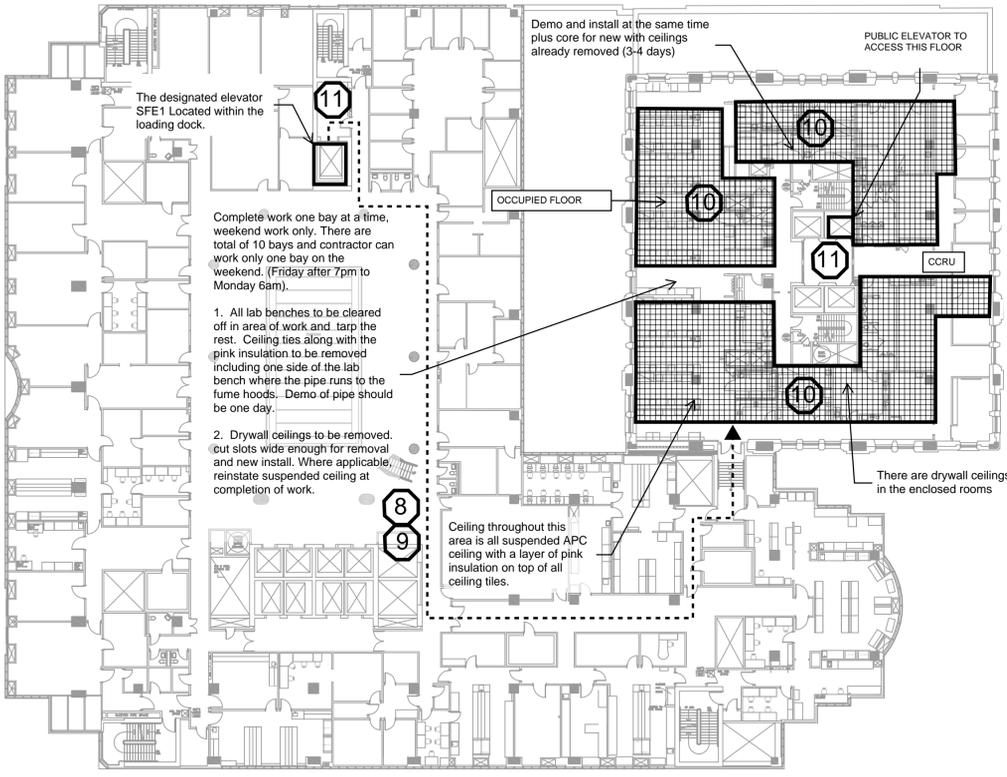
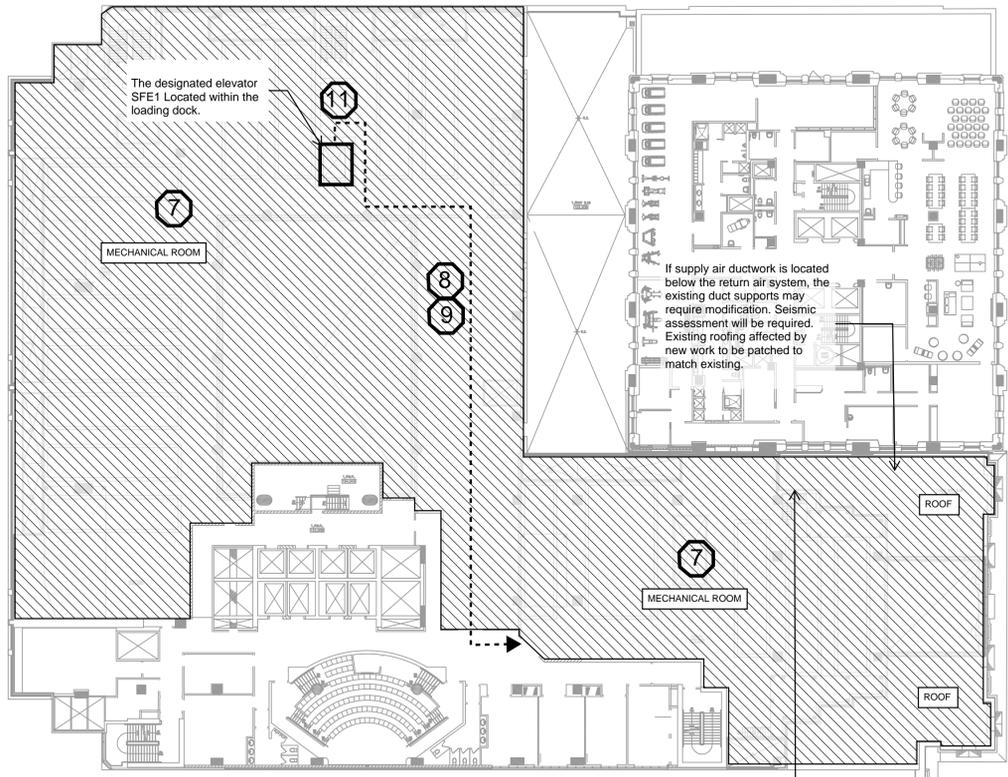


- CONSTRUCTION CONTROL LEGEND**
- 1 EQUIPMENT AND MATERIAL DROP OFF
LOADING DOCK DESIGNATED FOR DELIVERY OF EQUIPMENT, MATERIALS AND DEBRIS REMOVAL. COORDINATE ALL DELIVERIES WITH UHN. THERE WILL BE NO STORAGE OF MATERIALS IN THIS AREA AND MUST BE IMMEDIATELY TAKEN TO AREA OF WORK ONCE UNLOADED. UHN IS NOT RESPONSIBLE FOR DAMAGE OR THEFT OF EQUIPMENT AND MATERIALS.
 - 2 DELIVERY ROUTE BY VEHICLES
ALL DELIVERY VEHICLES MUST FOLLOW THIS ROUTE. EMERGENCY ROUTE MUST REMAIN UNOBSTRUCTED AND CLEAR AT ALL TIMES. CONTRACTOR TO COORDINATE ALL DELIVERIES WITH UHN AND PROVIDE STRICT INSTRUCTIONS TO DELIVERY VEHICLES PRIOR TO ARRIVAL.
 - 3 CONTRACTOR DISPOSAL BIN AND REMOVAL OF DEBRIS
DESIGNATED LOCATION OF CONTRACTOR'S DISPOSAL BINS WILL BE DETERMINED BY UHN AT ONSET OF WORK. AT COMPLETION OF WORK, CONTRACTOR TO MAKE GOOD THE AREA OCCUPIED BY CONTRACTOR DISPOSAL BINS TO REINSTATE THE ORIGINAL CONDITION. START TIME OF 5:00PM TO BE CONFIRMED ON SITE. WORK TO BE COORDINATED WITH OTHER CONTRACTORS ON SITE AND UHN FOR LOADING DOCK ACCESS. THE LOADING DOCK AND ELEVATORS ARE REQUIRED TO BE BOOKED IN ADVANCE FOR MATERIAL DELIVERY OR REMOVAL. ELEVATOR AND LOADING DOCK ACCESS TO BE COORDINATED WITH UHN.
 - 4 PARKING FOR CONTRACTOR FORCES
PARKING IS NOT PROVIDED ON THE SITE. PUBLIC PARKING IS AVAILABLE ON MURRAY STREET. CONTRACTOR TO INCLUDE ALL PROVISIONS FOR PARKING WHEN PLANNING AND BIDDING THE WORK.
 - 5 ACCESS FOR HOSPITAL EMERGENCY VEHICLES
AMBULANCE ROUTE MUST BE CLEAR OF OBSTRUCTIONS AND BE OPEN TO TRAFFIC AT ALL TIMES.
 - 6 ACCESS TO EXTERIOR ENVELOPE
ACCESS TO EXTERIOR ENVELOPE FOR NEW WORK WILL BE REQUIRED.
 - 7 AREA OF WORK
LIMIT OF DESIGNATE WORK AREA. EXTENT OF ALL OPERATIONS TO BE LIMITED TO THIS AREA. HOARDING TO BE INSTALLED ACCORDING TO CURRENT CSA Z317 STANDARD AND UHN INFECTION PREVENTION STANDARDS AND UHN CONSTRUCTORS HEALTH AND SAFETY RULES TO PROTECT THE ADJACENT TENANTS AND PUBLIC FROM CONSTRUCTION RELATED CONTAMINANTS. MAINTAIN CLEAR AND SAFE CIRCULATION AND ACCESS TO EMERGENCY EXITS FOR THE DURATION OF CONSTRUCTION AND PROVIDE SAFETY SIGNAGE WHERE REQUIRED. SCHEDULE AND COORDINATE ALL WORK WITH UHN PRIOR TO COMMENCEMENT OF WORK. FINAL CONFIGURATION OF CONSTRUCTION HOARDING TO BE REVIEWED UPON PRIOR TO INSTALLATION AND SIGNED OFF BY UHN ONCE INSTALLATION HAS BEEN COMPLETED.
 - 8 MATERIAL AND EQUIPMENT ACCESS TO SITE
NOTED ROUTE SHALL BE FOR DELIVERY OF MATERIALS AND EQUIPMENT BY THE CONTRACTOR AND THEIR FORCES. ALL DAMAGES TO EXISTING FINISHES DUE TO WORK BEING DONE TO BE MADE GOOD IN A TIMELY MANNER AND TO A COMPLETE SATISFACTION OF UHN. DO NOT STORE MATERIALS OR DEBRIS IN PATH OF TRAVEL AND MAINTAIN CLEAR AND SAFE ACCESS TO EMERGENCY EXITS FOR THE DURATION OF CONSTRUCTION. DELIVERY OF EQUIPMENT AND REMOVAL OF DEBRIS TO BE COORDINATED WITH UHN PRIOR TO COMMENCEMENT OF WORK.
 - 9 ACCESS TO SITE BY CONTRACTOR AND THEIR FORCES
NOTED ROUTE SHALL BE FOR ACCESS TO CONSTRUCTION AREA BY CONTRACTOR AND THEIR FORCES. ALL DAMAGES TO EXISTING FINISHES DUE TO WORK BEING DONE TO BE MADE GOOD IN A TIMELY MANNER AND TO A COMPLETE SATISFACTION OF UHN. DO NOT STORE MATERIALS OR DEBRIS IN PATH OF TRAVEL AND MAINTAIN CLEAR AND SAFE ACCESS TO EMERGENCY EXITS FOR THE DURATION OF CONSTRUCTION.
 - 10 AREA OF CEILING WORK
EXTENT OF CEILING WORK OUTSIDE OF DESIGNATED WORK AREA. EXISTING CEILINGS TO BE REMOVED AS REQUIRED TO COMPLETE MECHANICAL AND ELECTRICAL WORK. REINSTALL CEILING AND/OR MAKE GOOD AREAS AFFECTED IMMEDIATELY AFTER COMPLETION OF NEW WORK. OPENINGS IN EXISTING WALLS FOR CONNECTION TO EXISTING SERVICES TO BE MADE GOOD IMMEDIATELY AFTER COMPLETION OF NEW WORK AND REINSTATE TO MATCH EXISTING FIRE RATING AND CONSTRUCTION PROPERTIES. NEW FINISHES TO MATCH EXISTING. CONTRACTOR TO VISIT THE PLACE OF WORK TO MAKE THOROUGH REVIEW OF EXISTING CONDITIONS PRIOR TO SUBMITTING THE TENDER BID TO HAVE A FULL UNDERSTANDING OF WORK REQUIRED. REMOVE AND REINSTALL EXISTING MECHANICAL AND ELECTRICAL FIXTURES AS REQUIRED TO ACCOMMODATE NEW WORK. COORDINATE ALL WORK WITH UHN PRIOR TO COMMENCEMENT TO REVIEW SCOPE, IMPACT, ACCESS AND INFECTION CONTROL MEASURES REQUIRED. ALL WORK TO COMPLY WITH UHN CONSTRUCTORS HEALTH AND SAFETY RULES. ALL WORK OUTSIDE CONSTRUCTION AREAS TO BE DONE AFTER HOURS AND WEEKENDS.
 - 11 DESIGNATED SERVICE ELEVATOR
ALL DAMAGES TO EXISTING FINISHES DUE TO WORK BEING DONE TO BE MADE GOOD IN A TIMELY MANNER AND TO A COMPLETE SATISFACTION OF UHN.

UHN_PMCC_Addendum 4_2024-09-18_R4

4 LEVEL 11 - CONSTRUCTION CONTROL PLAN
1:300

2 LEVEL 10 - CONSTRUCTION CONTROL PLAN
1:300



- 11 ISSUED FOR ADDENDUM #4 2024-09-18
 - 10 ISSUED FOR ADDENDUM #3 2024-09-10
 - 9 ISSUED FOR TENDER 2024-08-13
 - 8 ISSUED FOR BUILDING PERMIT 2023-12-19
 - 7 ISSUED FOR MOH 4.1 SUBMISSION 2023-09-25
 - 6 ISSUED FOR 95% CD SUBMISSION 2023-09-06
 - 5 ISSUED FOR 90% CD SUBMISSION 2023-07-31
 - 4 ISSUED FOR 50% CD SUBMISSION 2023-05-08
 - 3 ISSUED FOR MOH 3.2 SUBMISSION 2023-03-13
 - 2 ISSUED FOR DD SIGN-OFF 2022-12-16
 - 1 ISSUED FOR DD SIGN-OFF 2022-12-02
- | Rev. | Description | Date |
|------|-------------|------|
| | | |

3 LEVEL 06 - CONSTRUCTION CONTROL PLAN
1:300

1 LEVEL 09 - CONSTRUCTION CONTROL PLAN
1:300

REFER TO UHN CONSTRUCTORS HEALTH AND SAFETY RULES FOR CONSTRUCTION CONTROL PROCEDURES AND COMPLIANCE REQUIREMENTS.



Princess Margaret
Cancer Centre Stem Cell
Transplant 2
Part B
(MHC, MHDU, DSC)

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CONSTRUCTION CONTROL PLANS

Project No.: 0020711.00 Checked by: Checker

G0502

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HEALTH & SAFETY SERVICES REPORT

PREPARED FOR:	UNIVERSITY HEALTH NETWORK	ATTENTION:	KATHERINE ELEDAM
LOCATION:	PMH-610 UNIVERSITY	INSPECTOR:	GEORGE PAPADAKOS
DATE:	SEPT 10, 2024	REPORT NO.	UNIHN_09_10_2024_GP
PAGE:	2 Pages	TIME IN SERVICE:	2.0 HRS

SERVICES DESCRIPTION

Traveled to the site as requested by Katherine Eledam. I met with Katherine and travelled to the 12th and 6th floors to have a look at the existing kitchen exhaust system that will be removed from the 12th to the 6th floors (second phase).

OUTCOME

Workers will be removing the kitchen exhaust system and replacing it with a new one. The exhaust system goes all the way to the bottom of the shaft on the 6th floor. The existing system insulation that will need to be removed along with the duct work. Each floor has a landing/platform and guardrails around the landing. A ship's/fixed ladder is available to access each floor platform.

The following Health and Safety observations were noted:

-The insulation will be removed. Katherine noted that the insulation has been tested and is free of any hazardous contaminants.

-Workers will need to ensure that they are using a proper work platform (secured in place, at least 460mm wide, designed and constructed to withstand all expected loads).

-Additional fall protection measures are required if the workers need to work above the landing level of each floor (above the existing guardrails). Fall protection systems and scaffolds (if used) shall meet all the requirements as set out in the construction regulations (Ont. Reg 213/91). The scaffold erected shall have a proper means of access.

-Additional lighting will be required as the work area is dark. Workers to ensure existing lights have working/functional bulbs in place before commencing.



E-MAIL: george@ticknersafety.com – CELL (416) 458-5413
Please visit us at www.ticknersafety.com

HEALTH & SAFETY SERVICES REPORT

PREPARED FOR:	UNIVERSITY HEALTH NETWORK	ATTENTION:	KATHERINE ELEDAM
LOCATION:	PMH-610 UNIVERSITY	INSPECTOR:	GEORGE PAPADAKOS
DATE:	SEPT 10, 2024	REPORT NO.	UNIHN_09_10_2024_GP
PAGE:	2 Pages	TIME IN SERVICE:	2.0 HRS

-Air quality and ventilation measures will need to be accounted for. Natural ventilation appears to only be available on the 19th floor. Workers may require specialized PPE and or additional mechanical ventilation equipment.

-Access to the shaft is via the mechanical rooms on the 6th, 12th and 19th floors. There are catwalk platforms and ship ladders between the 7th and 19th floors which provides access to the intermediate floors (e.g., 7th, 8th, 9th, 10th, etc.). There is no ladder access between the 6th and 7th floors within the shaft.

-Trades to perform pre-and-post job inspections to ensure work areas are clean, access/egress routes are clear and free of obstructions, and that all tools, equipment and materials are properly stored and secured in a safe and controlled manner.

FOLLOW UP

I wanted to thank Katherine for her time on site and for her assistance in showing me the work area and for providing information for the tasks involved on this project.

PLEASE NOTE: This report is not to be used for means and method and points are noted as observations only.

GEORGE PAPADAKOS
TICKNER AND ASSOCIATES



September 24, 2024

University Health Network
67 College Street, 2nd Floor
Toronto, Ontario M5G 2M1

Re: REVISION Lead Bulk Sample Results Letter
Princess Margaret Hospital, 620 University Avenue, Toronto, Ontario
Pinchin File: 347979.000

Pinchin Ltd. (Pinchin) was retained by University Health Network to collect bulk samples for lead analysis of materials associated with ductwork in a fresh air airshaft within Princess Margaret Hospital located at 620 University Avenue, Toronto, Ontario. Sample collection was performed by Pinchin on September 18, 2024.

The purpose of this sample collection was to facilitate renovations to the building. Sample collection was limited to a coating present on non-asbestos sprayed insulation around one exhaust duct within the air shaft.

Pinchin previously assessed the duct insulation for asbestos content. The spray foam insulation present on the duct work does not contain asbestos. The results of the asbestos bulk sampling are detailed in the report prepared by Pinchin entitled “Asbestos Bulk Sampling Letter Report – Princess Margaret Hospital, 19th Floor Mechanical Shaft, 620 University Avenue, Toronto, Ontario”, Pinchin File 335943.000, dated December 21, 2023.

1.0 METHODOLOGY

1.1 Lead Paint

Samples of paint finishes were collected by scraping the painted finish to include base and covering applications. Analysis was performed in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption.

2.0 RESULTS AND FINDINGS

2.1 Lead Bulk Sampling

Sample No.	Location	Description	Result (%)
L0014	19 th Floor Fresh Air Mechanical Shaft	Black coating on non-asbestos sprayed insulation	0.027



Sample No.	Location	Description	Result (%)
L0015	12 th Floor Fresh Air Mechanical Shaft	Black coating on non-asbestos sprayed insulation	0.0031
L0016	6 th Floor Fresh Air Mechanical Shaft	Black coating on non-asbestos sprayed insulation	0.019

Results less than or equal to 0.1% (1,000 mg/kg), but equal to or greater than 0.009% (90 mg/kg), are considered low-level lead paints or surface coatings in accordance with the EACC guideline.

Based on the results above, the black coating is considered to have low-level lead throughout the shaft.

3.0 RECOMMENDATIONS

3.1 General

Provide this report to the contractor prior to bidding or commencing work.

If suspected hazardous building materials are discovered during the planned work, which are not identified in this report, do not disturb, and arrange for further testing and evaluation.

3.2 Lead

For paints identified as having low levels of lead (i.e., equal to or above 0.009% (90 mg/kg) but less than or equal to the EACC guideline of 0.1% (1,000 mg/kg) for lead-containing paints) special precautions are not recommended unless aggressive disturbance (grinding, blasting, torching) is planned.

4.0 TERMS AND LIMITATIONS

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.



5.0 CLOSURE

Should you have any questions or concerns regarding the contents of this letter, please contact the Project Manager at 416.274.3093 or mcake@pinchin.com.

Yours truly,

Pinchin Ltd.

Prepared by:

Meredith Cake, EPT
Senior Project Manager

Reviewed by:

Alex Brett, B.Sc., CRSP
Operations Manager

Encl.: Appendix I - Laboratory Certificate of Analysis
Appendix II - Photographs

\\pinchin.com\miss\Job\347000s\0347979.000 UHN,PMH,610University,HAZ,BULK\Deliverables\347979.000 REVISED Lead Bulk Sample Results Letter, 620 University Ave Toronto, UHN Sep 24 2024.docx

Template: Master Asbestos Bulk Sample Results Letter, HAZ, July 2, 2024

APPENDIX I
Laboratory Report



Your Project #: 347979
Your C.O.C. #: N/A

Attention: Meredith Cake

Pinchin Ltd
2360 Meadowpine Blvd
Unit # 2
Mississauga, ON
CANADA L5N 6S2

Report Date: 2024/09/23
Report #: R8331422
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4T2904
Received: 2024/09/19, 08:35

Sample Matrix: Solid
Samples Received: 3

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Metals in Paint	3	2024/09/20	2024/09/20	CAM SOP-00408	EPA 6010D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your Project #: 347979
Your C.O.C. #: N/A

Attention: Meredith Cake

Pinchin Ltd
2360 Meadowpine Blvd
Unit # 2
Mississauga, ON
CANADA L5N 6S2

Report Date: 2024/09/23
Report #: R8331422
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4T2904
Received: 2024/09/19, 08:35

Encryption Key

Nilushi Mahathantila
Project Manager
23 Sep 2024 11:09:59

Please direct all questions regarding this Certificate of Analysis to:
Nilushi Mahathantila, Project Manager
Email: Nilushi.Mahathantila@bureauveritas.com
Phone# (905) 817-5700

=====

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU VERITAS

Bureau Veritas Job #: C4T2904
Report Date: 2024/09/23

Pinchin Ltd
Client Project #: 347979
Sampler Initials: BD

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

Bureau Veritas ID		ADHD65		ADHD66		ADHD67		
Sampling Date		2024/09/18 10:00		2024/09/18 10:00		2024/09/18 10:15		
COC Number		N/A		N/A		N/A		
	UNITS	L0014, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 19TH FLOOR	RDL	L0015, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 12TH FLOOR	RDL	L0016, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 6TH FLOOR	RDL	QC Batch

Metals								
Lead (Pb)	%	0.027	0.00039	0.0031	0.00013	0.019	0.00024	9651357
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



BUREAU
VERITAS

Bureau Veritas Job #: C4T2904
Report Date: 2024/09/23

Pinchin Ltd
Client Project #: 347979
Sampler Initials: BD

TEST SUMMARY

Bureau Veritas ID: ADHD65
Sample ID: L0014, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 19TH FLOOR
Matrix: Solid
Collected: 2024/09/18
Shipped:
Received: 2024/09/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals in Paint	ICP	9651357	2024/09/20	2024/09/20	Japneet Gill

Bureau Veritas ID: ADHD66
Sample ID: L0015, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 12TH FLOOR
Matrix: Solid
Collected: 2024/09/18
Shipped:
Received: 2024/09/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals in Paint	ICP	9651357	2024/09/20	2024/09/20	Japneet Gill

Bureau Veritas ID: ADHD67
Sample ID: L0016, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 6TH FLOOR
Matrix: Solid
Collected: 2024/09/18
Shipped:
Received: 2024/09/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals in Paint	ICP	9651357	2024/09/20	2024/09/20	Japneet Gill



GENERAL COMMENTS

Revised Report (2024/09/23): Client sample IDs have been amended.

Sample ADHD65 [L0014, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 19TH FLOOR] : Metal Analysis: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Sample ADHD66 [L0015, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 12TH FLOOR] : Metal Analysis: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Sample ADHD67 [L0016, BLACK COATING ON SPRAY INSULATION, FRESH AIR MECHANICAL SHAFT, 6TH FLOOR] : Metal Analysis: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Results relate only to the items tested.



BUREAU
VERITAS
1875

Bureau Veritas Job #: C4T2904
Report Date: 2024/09/23

Pinchin Ltd
Client Project #: 347979
Sampler Initials: BD

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9651357	Lead (Pb)	2024/09/20	NC	75 - 125	<0.00010	%	3.1	35	102	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)



BUREAU
VERITAS

Bureau Veritas Job #: C4T2904
Report Date: 2024/09/23

Pinchin Ltd
Client Project #: 347979
Sampler Initials: BD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Louise Harding, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RUSH!



NONT-2024-09-3875



6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAN FCD-01191/6

CHAIN OF CUSTODY RECORD

Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required														
Company Name: Pinchin Ltd.		Company Name:		Quotation #:		<input type="checkbox"/> Regular TAT (5-7 days) Most analyses														
Contact Name: Meredith Cake		Contact Name: Meredith Cake		P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS														
Address:		Address:		Project #: 347979		Rush TAT (Surcharges will be applied)														
Phone: Fax:		Phone: Fax:		Site Location:		<input checked="" type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input checked="" type="checkbox"/> 3-4 Days														
Email: mcake@pinchin.com		Email: mcake@pinchin.com		Site #:		Date Required:														
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY				Site Location Province: ON		Rush Confirmation #:														
Regulation 153		Other Regulations		Analysis Requested		LABORATORY USE ONLY														
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/ Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/ Other <input type="checkbox"/> Table _____ FOR RSC (PLEASE CIRCLE) Y / N		<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> PWQO <input type="checkbox"/> Region _____ <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> REG 558 (MIN. 3 DAY TAT REQUIRED) <input type="checkbox"/> REG 405 Table _____		# OF CONTAINERS SUBMITTED: _____ FIELD FILTERED (CIRCLE) Metals/ Hg/ Cr/ Ni BTX/ PHC F1 PHCS F2 - F4 VOCs REG 153 METALS & INORGANICS REG 153 ICP/MS METALS REG 153 METALS (Hg, Cr, Ni, ICP/MS Metals, HWS - B) Lead (Pb) in Paints PCBs HOLD-DO NOT ANALYZE		CUSTODY SEAL Y / N <input checked="" type="checkbox"/> Present Intact COOLER TEMPERATURES COOLING MEDIA PRESENT: Y / N <input checked="" type="checkbox"/> COMMENTS: <i>nvt</i>														
Include Criteria on Certificate of Analysis: Y / N																				
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																				
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals/ Hg/ Cr/ Ni	BTX/ PHC F1	PHCS F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICP/MS METALS	REG 153 METALS (Hg, Cr, Ni, ICP/MS Metals, HWS - B)	Lead (Pb) in Paints	PCBs	HOLD-DO NOT ANALYZE	CUSTODY SEAL Y / N	Present Intact	COOLER TEMPERATURES	COOLING MEDIA PRESENT: Y / N	COMMENTS	
L0014, Black Coating on Spray Insulation, 6th Floor Fresh Air Mechanical Shaft, 19th Floor	2024-09-18	10:00	BULK																	
L0015, Black Coating on Spray Insulation, 6th Floor Fresh Air Mechanical Shaft, 12th Floor	2024-09-18	10:00	BULK																	
L0016, Black Coating on Spray Insulation, 6th Floor Fresh Air Mechanical Shaft, 6th Floor	2024-09-28	10:15	BULK																	
RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV JOB #														
Meredith Cake	2024-09-18		<i>Meredith Cake</i>	2024/09/19	08:35															

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at <https://www.bvna.com/coc-terms-and-conditions>

APPENDIX II
Photographs



Photo 1 - Black coating on sprayed insulation, 19th Floor



Photo 2 - Black coating on sprayed insulation, 12th Floor



Photo 3 - Black coating on sprayed insulation, 6th Floor

**REMOVAL OF DUCTING IN AN AIR SHAFT –
HYGIENE AND AIR QUALITY CONSIDERATIONS**

Revision	Date (mm/dd/yyyy)	Revision Description	Created/Revised By:	Reviewed By:
0	January 17/24	New Edition	Pinchin Ltd.	

**University Health Network
Princess Margaret Cancer Centre
610 University Avenue, Toronto, ON
Mechanical Penthouse to 12th Floor**

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2. SCOPE AND LIMITATIONS.....	1
3. REGULATORY REFERENCES AND RELATED DOCUMENTS.....	1
4. BACKGROUND.....	1
5. GENERAL PROCEDURES	3

1. OBJECTIVE

- 1.1 To provide guidance to workers conducting the task of removing/demolishing a vertical duct from an air shaft to be adequately protected from potential chemical/biological agents in the shaft or any residual material in the duct.

2. SCOPE AND LIMITATIONS

- 2.1 These safe work considerations apply to contractors of University Health Network (UHN) involved in the removal/demolition of a vertical duct from an air shaft spanning the 19th floor penthouse, down to the 12 floor (first phase) at Princess Margaret Cancer Centre located at 610 University Avenue, Toronto.
- 2.2 This SWP considers only the health and occupational hygiene aspects of workers conducting work in the air shaft. Other safety hazards related to the physical work of the project, such as welding/cutting, mechanical, falling, slip and trips, etc., are considered under a different scope.

3. REGULATORY REFERENCES AND RELATED DOCUMENTS

- 3.1 Canadian Standards Association (CSA) standard Z94.4-18, “Selection, Use, and Care of Respirators”
- 3.2 Ontario Occupational Health and Safety Act
- 3.3 Ontario Regulation 1101/90 – First Aid Requirements

4. BACKGROUND

- 4.1 The ducting to be removed is located vertically within a mechanical shaft starting at the 19th floor penthouse and spanning down to the 5th floor. The work will be conducted in two stages, with the first stage starting at the 19th floor penthouse, down to the 12th floor. The shaft is accessed through a full-size door (Photo 1) in the penthouse mechanical room, and has a mezzanine/platform with guardrails, and fixed ladder access to the floors/levels below (Photos 2 and 3).

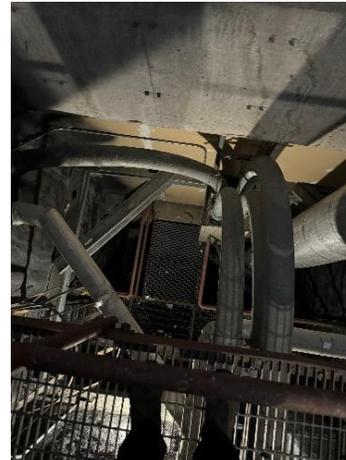
Photo 1



Photo 2



Photo 3



- 4.2 The existing duct is approximately 1.2 by 2.1 metres (plus the height/length of the penthouse to 5th floor) and is currently covered with a hard foam (non-asbestos) insulation (Photos 4 and 5), and capped/closed at the 5th floor.

Photo 4

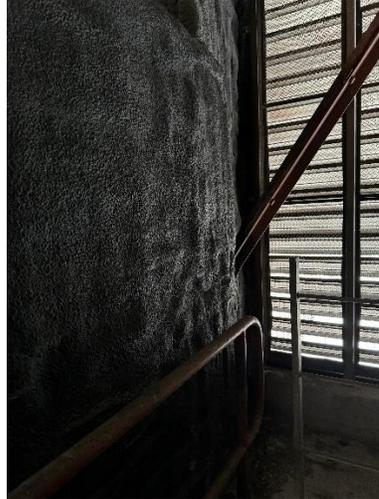


Photo 5



- 4.3 As noted in the Scope and Limitations section, above, the scope of these safe work considerations is not with the physical work involved with removing the ducting material, but rather, any potential hazards associated with the occupational hygiene aspects and air quality within the shaft during the work. While the shaft is technically an “air shaft”, and louvres to the outdoors are present at the penthouse level (Photo 6), there is likely less airflow/movement as the floors descend towards the 12th floor. In addition, there are potential air quality issues with mustiness, and/or odours (e.g., potentially associated with animal research/housing, etc.) in the shaft. It should be noted that any air quality “issues” related to adjacent activities are considered to be at “irritant” levels (i.e., not related to an overexposure). Air quality aspects may be related to sulfur oxides and other organic decomposition products. However, the only potential overexposure risks relate to the activities themselves (e.g. welding, cutting, etc.).

Photo 6



5. GENERAL CONSIDERATIONS/PROCEDURES

5.1 Prevention and Preparation

- 5.1.1 Evaluate and understand the risks, particularly the hazards and risks associated with the actual work.
- 5.1.2 A holder of a valid St. John Ambulance Emergency First Aid Certificate or its equivalent must be on site and provided with an adequate supply of first-aid equipment as required by the First Aid Requirements regulation, including clean water, sterile towelettes and adhesive dressings.
- 5.1.3 Thoroughly cleanse all exposed injuries and keep them covered with a bandage while working.
- 5.1.4 Seek a physician's advice as soon as possible if cuts or penetrating injuries occur during work.
- 5.1.5 Report all injuries and/or work-related symptoms to your supervisor immediately.

5.2 Personal Hygiene

- 5.2.1 Avoid direct contact with contents/settled material in the shaft, and in the ducting (if any) with unprotected skin.
- 5.2.2 Wash (using potable water and soap) and/or sanitize (using antiseptic towelettes) your hands/face each time after exiting the work area, prior to eating, drinking, or smoking.
- 5.2.3 Do not eat, drink, or smoke in work area(s).
- 5.2.4 Avoid touching the face, mouth, hands, eyes or nose with soiled hands or other items and avoid nail-biting.

5.3 Personal Protective Equipment

5.3.1 Eye and Face Protection

- 5.3.1.1 It should not be necessary to wear a full-facepiece respirator; however, if this is worn, additional eye and face protection is not required.
- 5.3.1.2 If a full-facepiece respirator is not worn, then CSA/ANSI approved safety eyeglasses/goggles with permanent side shields must be worn (or alternative a CSA/ANSI approved face shield).

5.3.2 Skin Protection

- 5.3.2.1 Protective / cut resistant gloves (e.g., Durarmor™, Ansell®, Dyneema®, Kevlar®) should be worn.
- 5.3.2.2 Coveralls or a full, disposable dust tight (e.g. Tyvek® or equivalent) suit should be worn over every day work wear.

5.3.3 Respiratory Protection

- 5.3.3.1 Depending on the stage at which the ducting is being removed, there may be potential for dust and debris, so a properly fitted disposable (N95) filtering face piece, a re-usable half face or full-face piece respirator with P100 cartridges should be worn. As noted, these considerations do not account for specific contractor work related tasks associated with removing the ducting, such as welding and cutting, and thus appropriate control measures for these tasks must be addressed in the contractor's procedures.
- 5.3.3.2 If there is a desire for irritation odour control, switching to an N95 with organic vapour irritant control, or moving to P100/multi-gas cartridges could be considered, but again, this would be for irritation purposes only.

5.4 Ventilation

- 5.4.1 As noted previously, there should already be adequate airflow in the shaft due to the nature of the air shaft, including the large outdoor louvres at the penthouse level; however, consideration

should be given to providing additional air movement, especially within the mid sections between the 19th floor penthouse and the 12th floor, via portable blowers/fans.

5.5 Air Testing

- 5.5.1 Although the shaft is not considered a “confined space” by Regulatory definition (i.e., no potential for “atmospheric hazards”), using a direct reading instrument (e.g., multigas or oxygen meter) to test for oxygen levels could be considered as additional information regarding the airflow during the work.
- 5.5.2 Normal atmosphere contains 20.9% of oxygen, so levels should not fluctuate more than a few tenths of this percentage during the work, otherwise, it may indicate an issue with the general airflow. The lower threshold in the Regulatory confined space provisions is 19.5%; however, as a best practice, and since this is not a confined space, it is recommended that this level not drop below 20.5% without further investigation needed.

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MHC, MHDU, DSC)**

CANNONDESIGN

20 Victoria Street 5th floor
Toronto, ON Canada M5C 2N8
P: 416.915.0121
F: 416.955.0122

www.cannondesign.com

7	ISSUED FOR ADDENDUM #4	2024-09-18
6	ISSUED FOR TENDER	2024-08-13
5	ISSUED FOR BUILDING PERMIT SUBMISSION	2023-12-19
4	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
3	ISSUED FOR 95% CD SUBMISSION	2023-09-06
2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

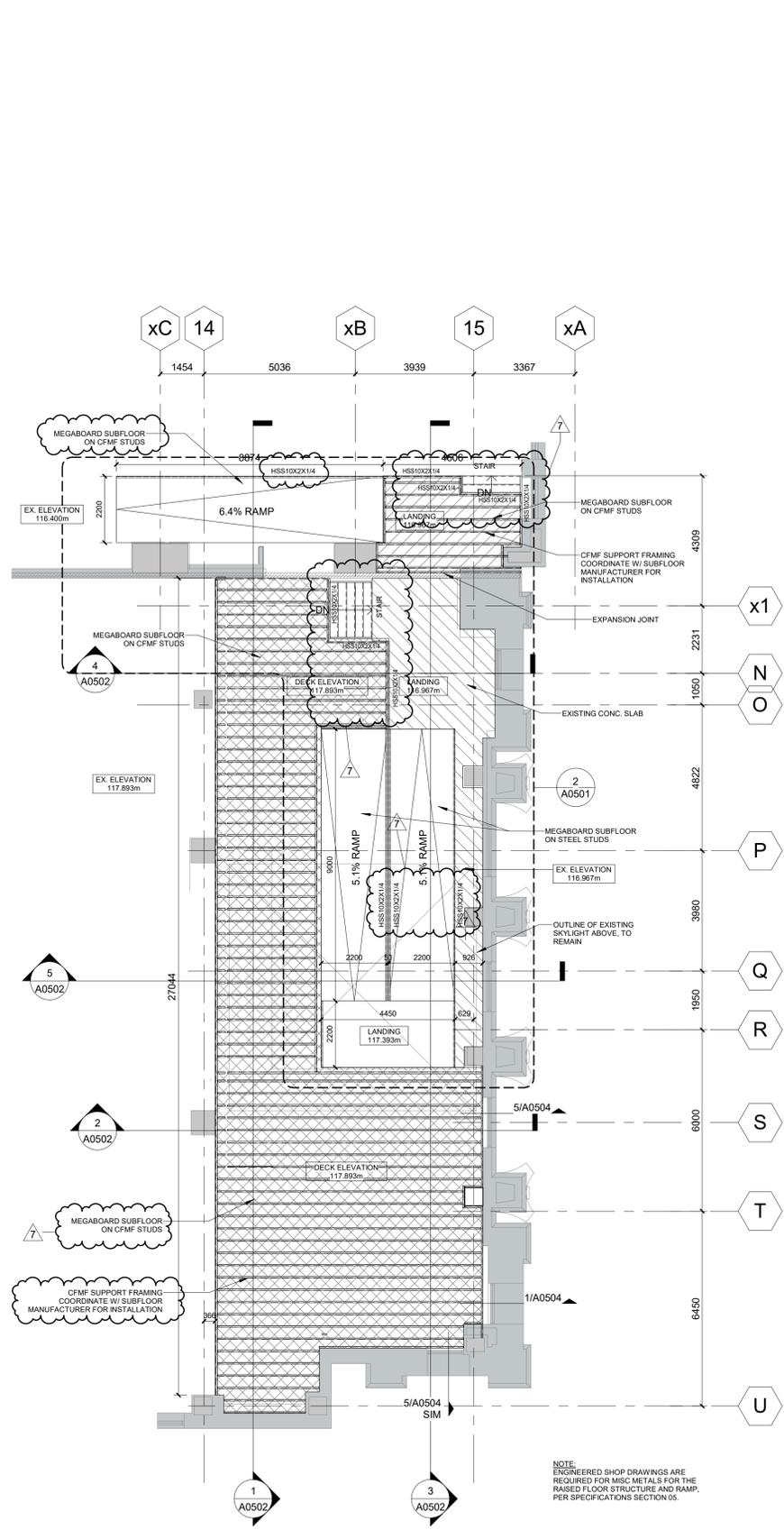
Rev.	Description	Date
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Drawing Title:

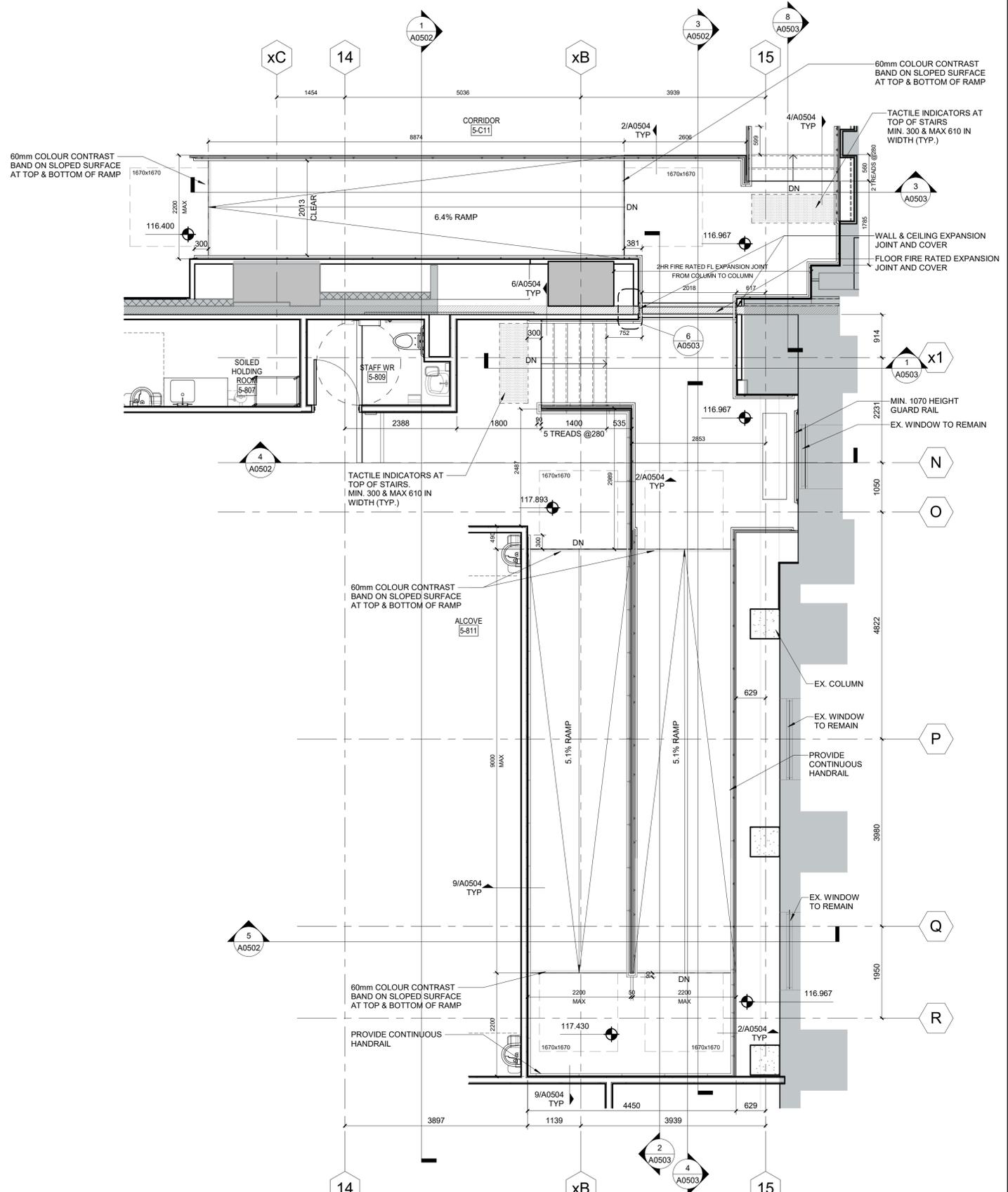
VERTICAL CIRCULATION

Project No.: 0020711.00 Checked by: LV

A0501



1 LEVEL 05 - RAMPS & DECKS FRAMING PLAN
1:100



2 LEVEL 05 - RAMP & STAIR FLOOR PLAN
1:50

UHN_PMCC_Addendum 4_2024-09-18_R4

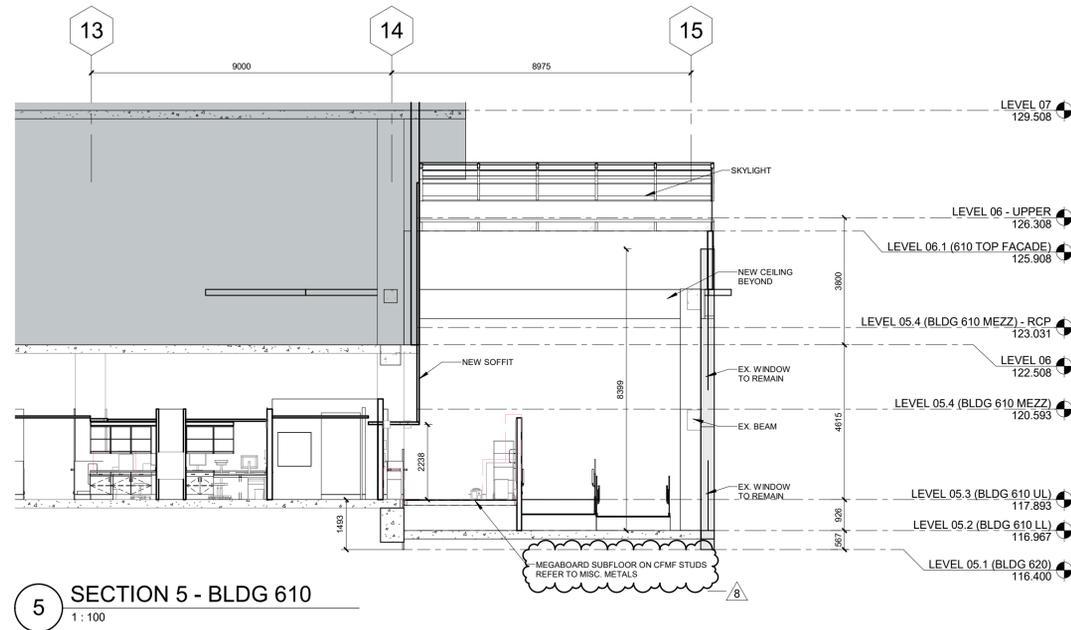
Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MHC, MHDU, DSC)

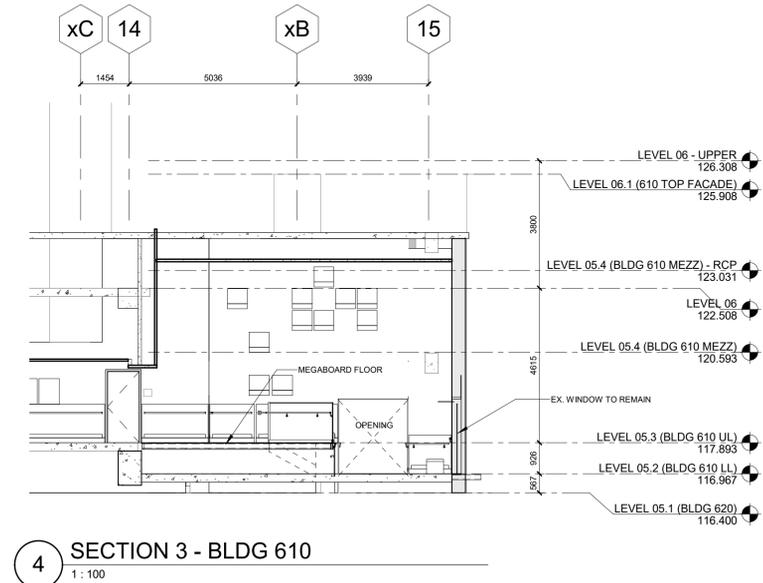
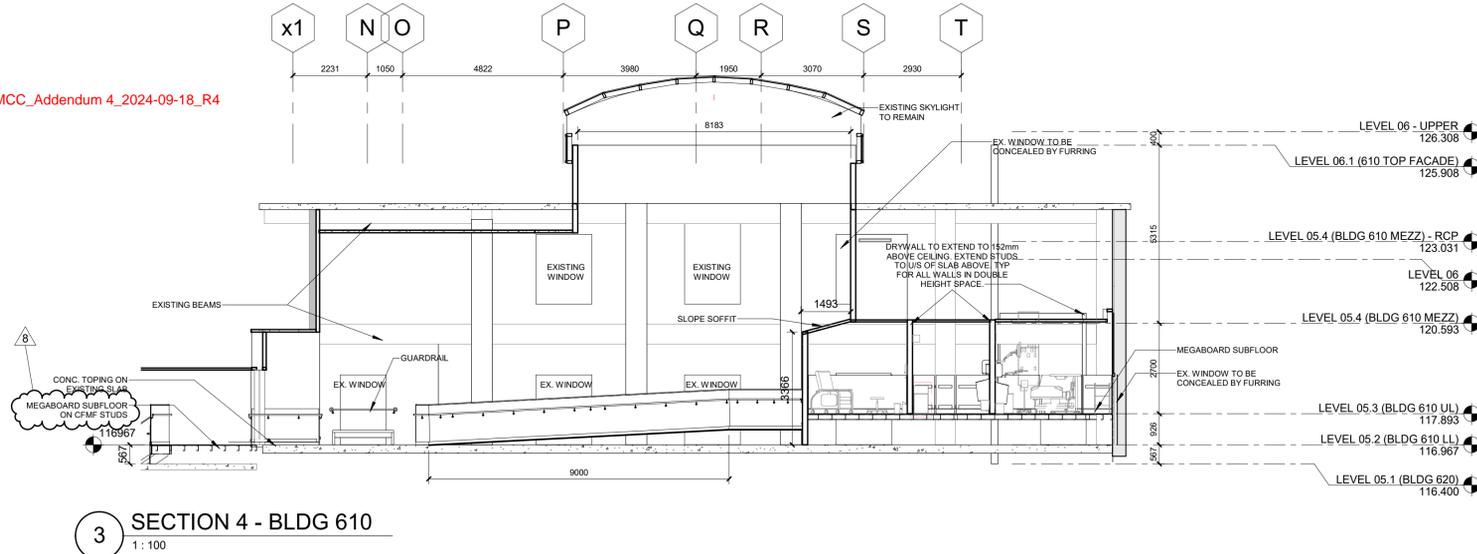
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8	ISSUED FOR ADDENDUM #4	2024-09-18
7	ISSUED FOR ADDENDUM #1	2024-08-29
6	ISSUED FOR TENDER	2024-08-13
5	ISSUED FOR BUILDING PERMIT SUBMISSION	2023-12-19
4	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
3	ISSUED FOR 95% CD SUBMISSION	2023-09-06
2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

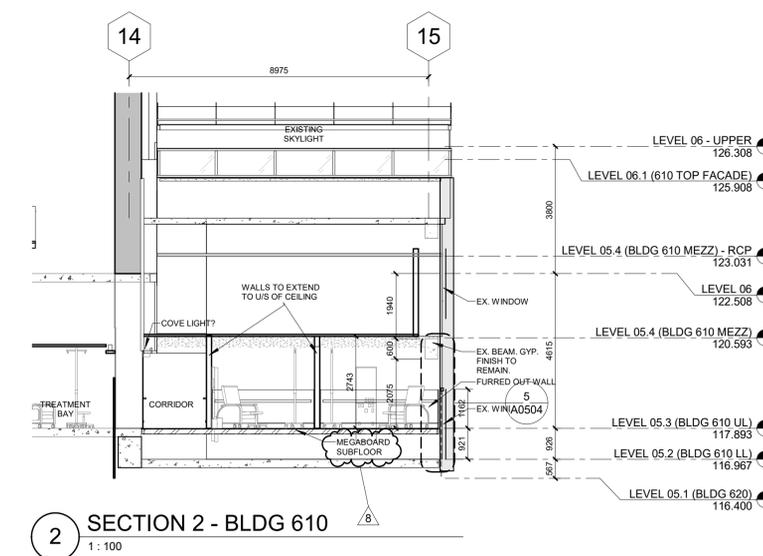
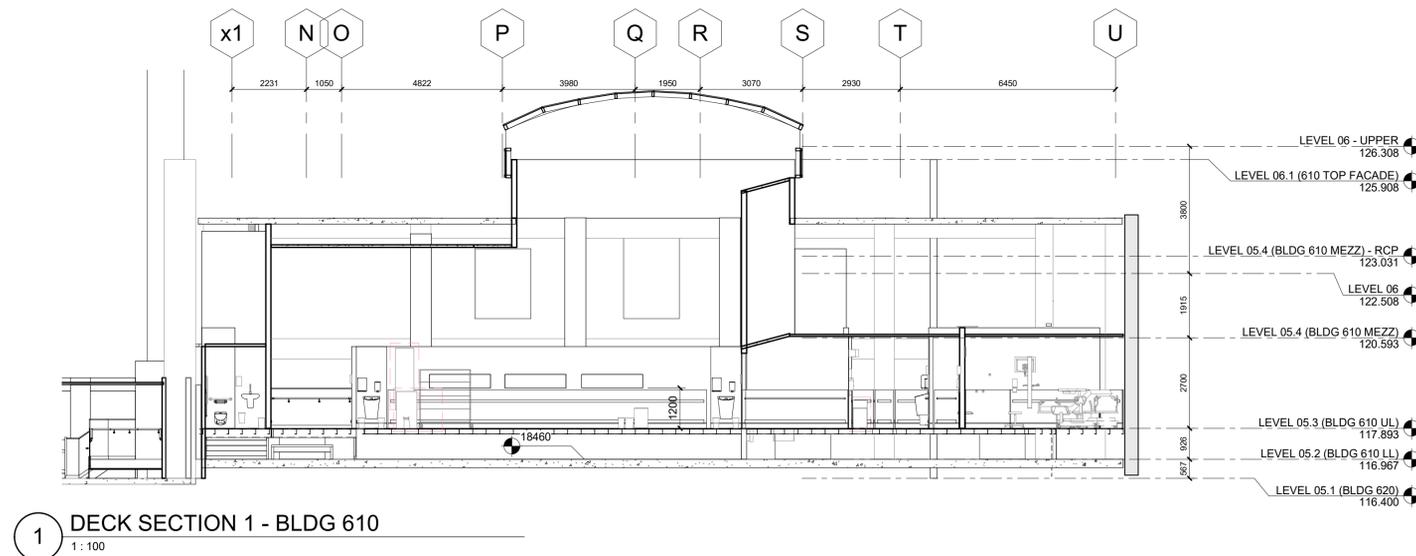
Rev. Description Date

Drawing Title:

BUILDING SECTIONS

Project No.: 0020711.00 Checked by: LV

A0502



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Part B
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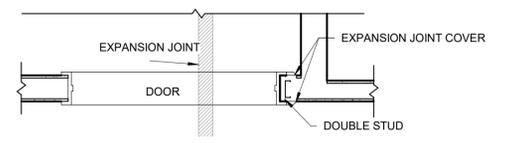
Rev.	Description	Date
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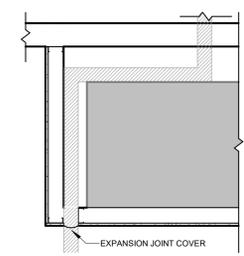
RAMP & STAIR DETAILS

Project No.: 0020711.00 Checked by: Checker

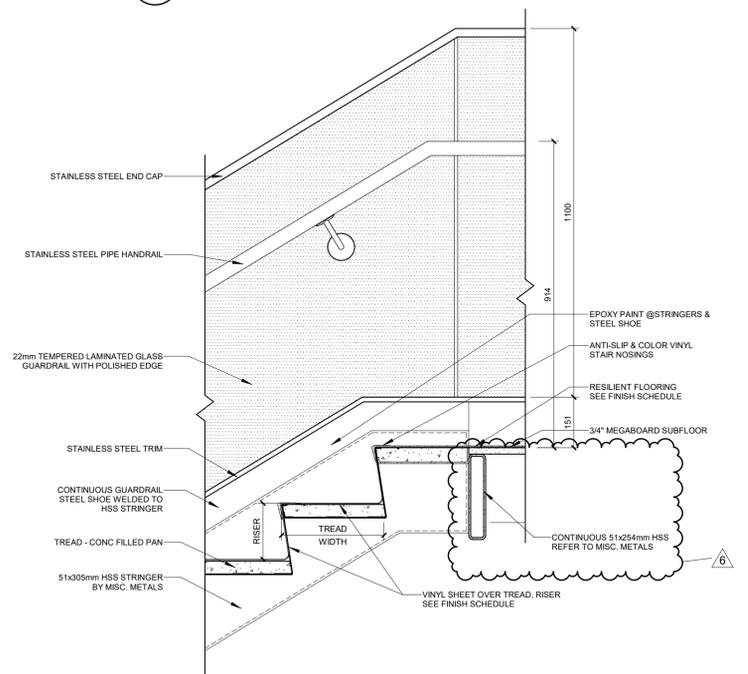
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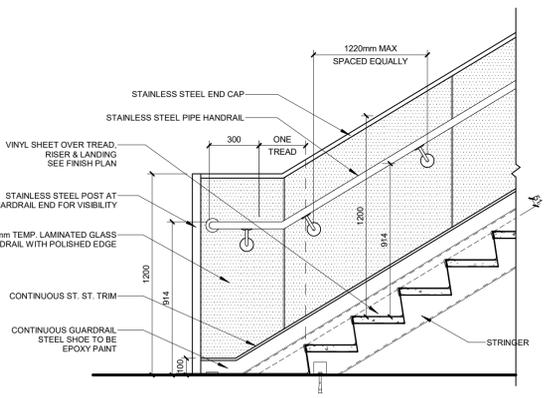
14 TYPICAL EXPANSION JOINT DETAIL AT DOOR
1: 20



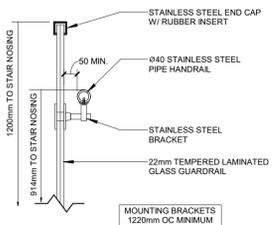
13 TYPICAL EXPANSION JOINT AT COLUMN
1: 20



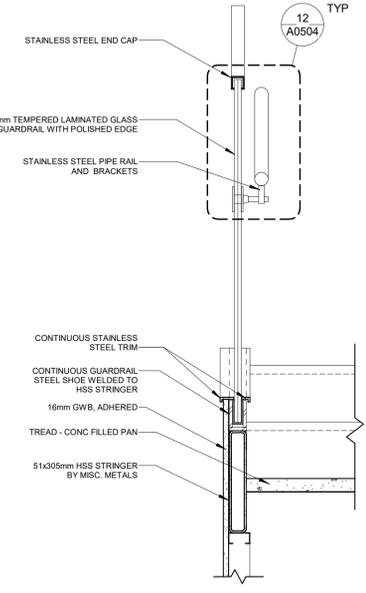
8 STAIR DETAIL - FLOOR LANDING
1: 10



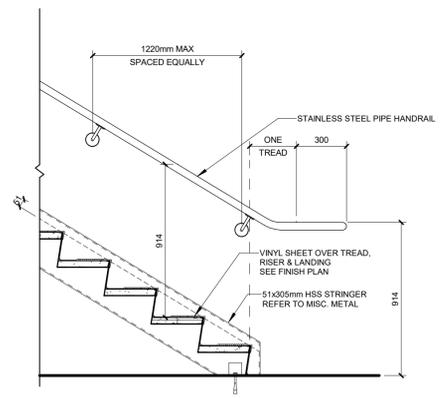
4 STAIR SECTION AT BOTTOM LANDING 1
1: 20



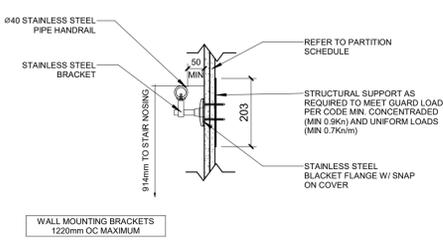
HANDRAIL SECTION DETAIL AT GLASS GUARDRAIL
1: 10



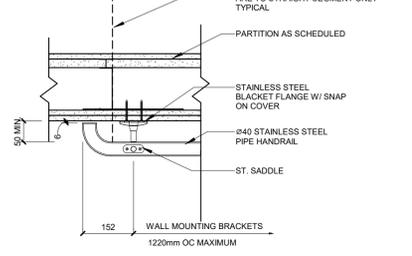
7 GLASS GUARDRAIL AT STAIR MID POINT
1: 10



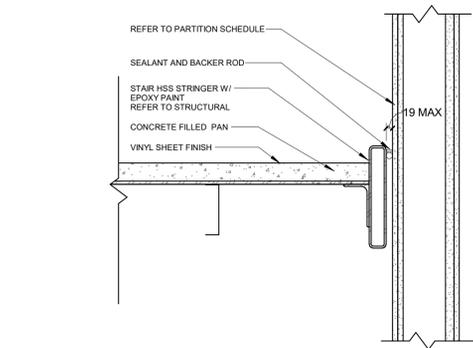
3 STAIR SECTION AT BOTTOM LANDING 2
1: 20



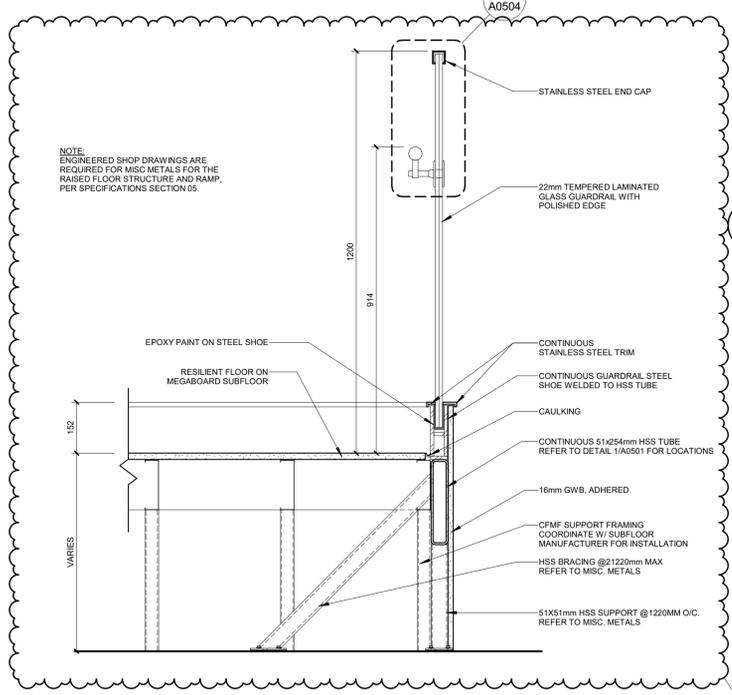
HANDRAIL SECTION DETAIL AT PARTITION
1: 10



10 HANDRAIL PLAN AT PARTITION
1: 10

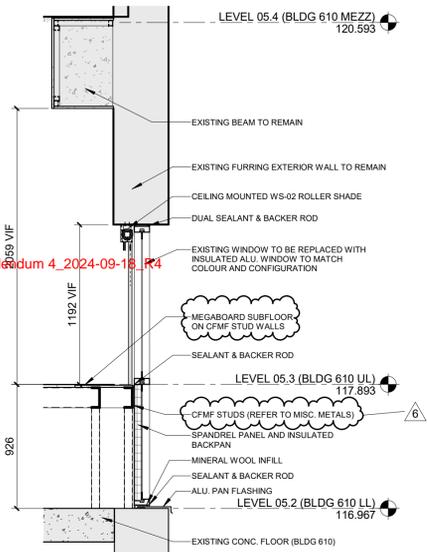
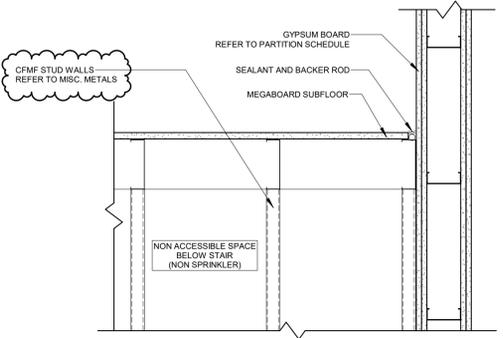


6 DETAIL AT STAIR TREAD AND WALL
1: 10

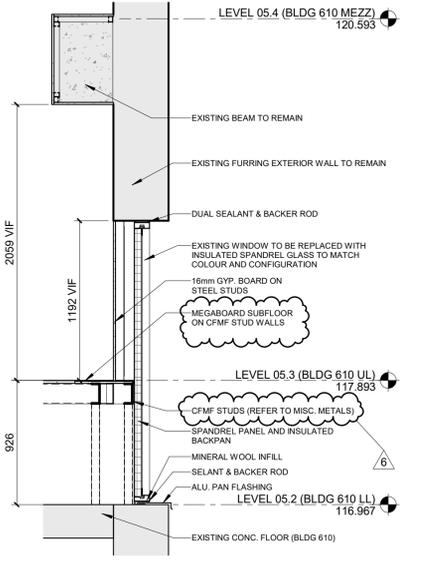


2 GUARDRAIL DETAIL AT MEGABOARD DECK
1: 10

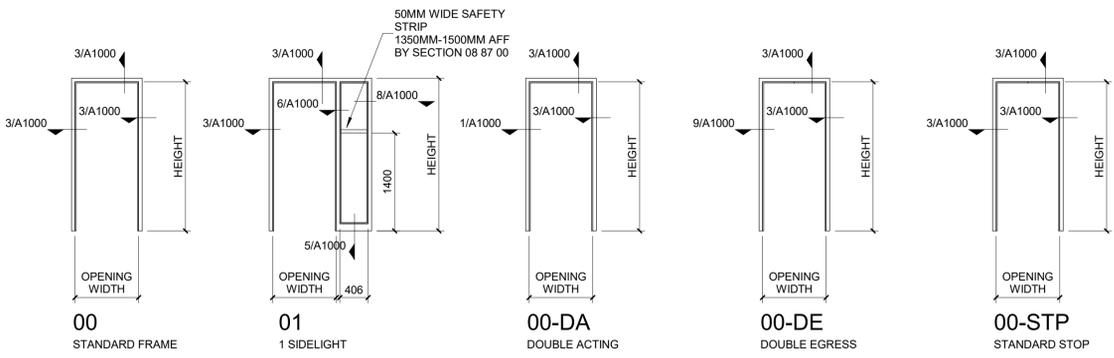
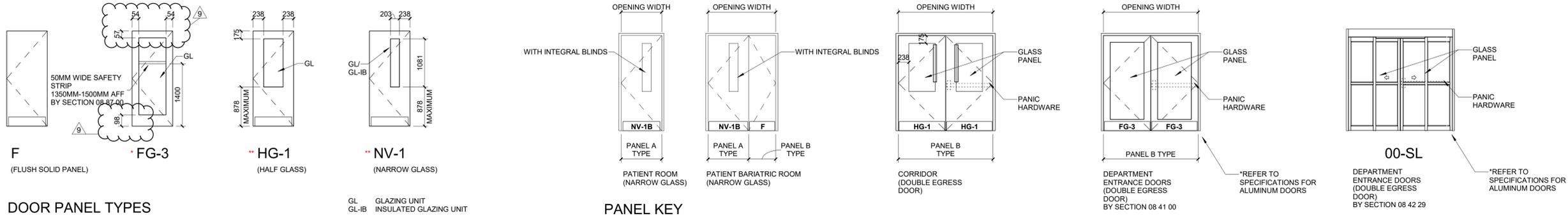
9 DETAIL AT STAIR & RAMP LANDING AND WALL
1: 10



5 HALF WINDOW DETAIL
1: 25

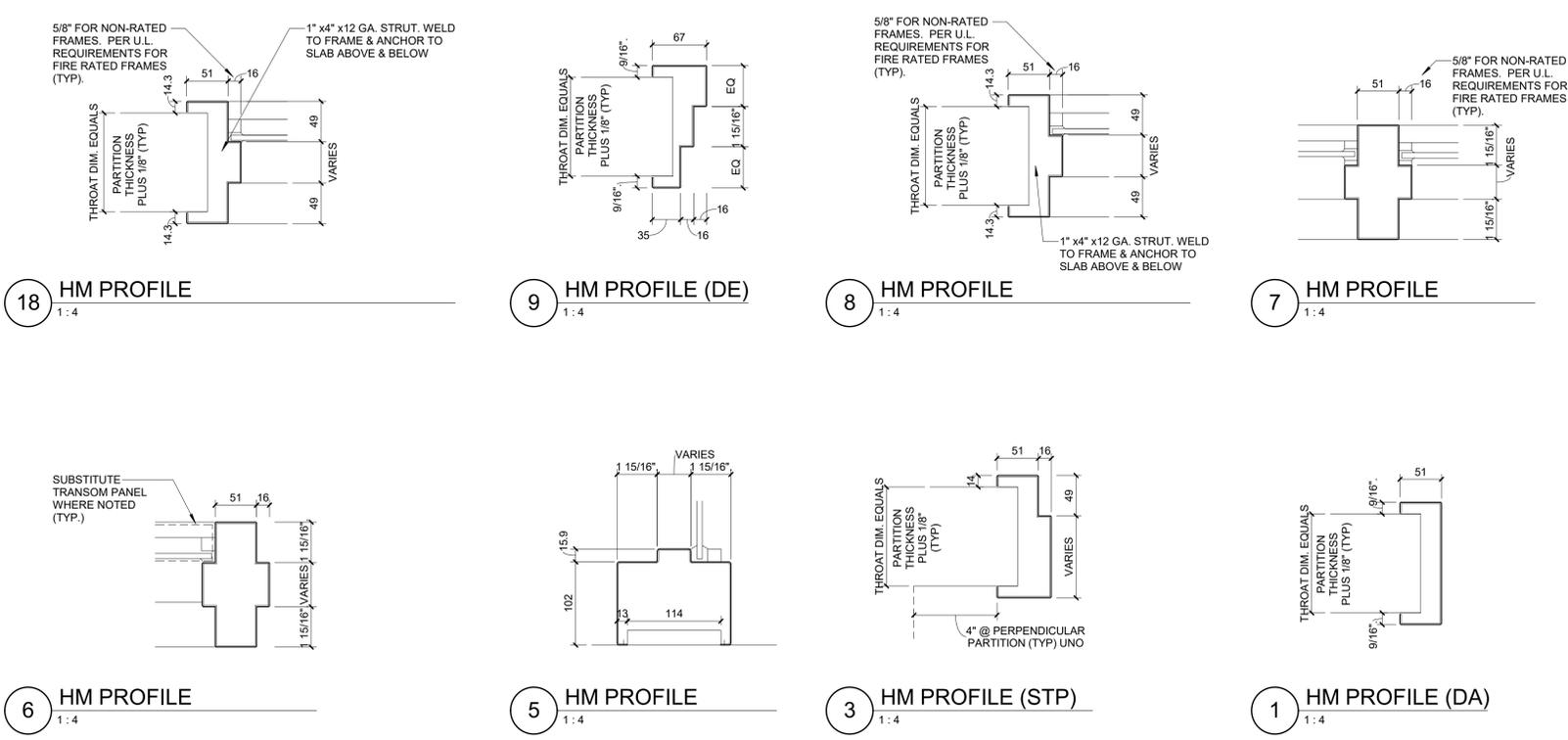
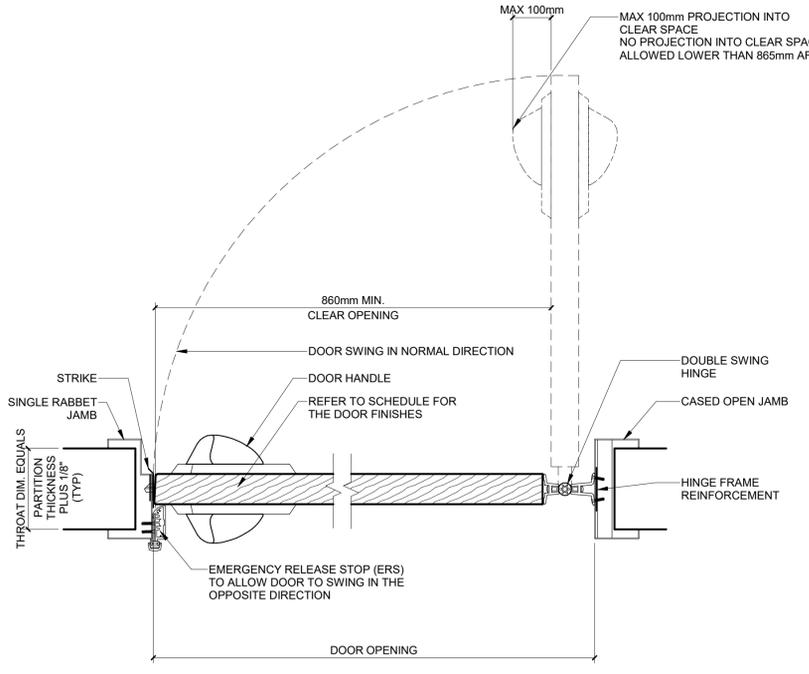
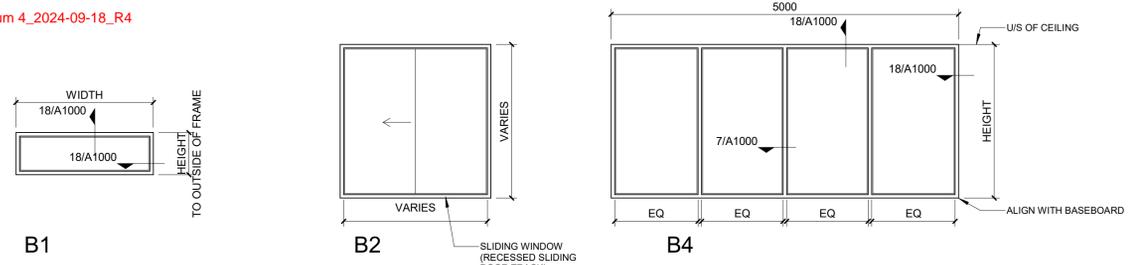


1 SPANDREL WINDOW DETAIL
1: 25



UHN_PMCC_Addendum 4_2024-09-18_R4

BORROWED LIGHT FRAME TYPES



9	ISSUED FOR ADDENDUM #4	2024-09-18
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4	ISSUED FOR 90% CD SUBMISSION	2023-07-31
3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR DD SIGN-OFF	2022-12-16
1	ISSUED FOR DD SIGN-OFF	2022-12-02

Rev.	Description	Date
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Drawing Title:

DOORS & BORROWED LIGHTS

Project No.: 0020711.00 Checked by: Checker

A1000

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MHC, MHDU, DSC)

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INTERIOR FINISH LEGEND				PRODUCT INFORMATION INDICATED IS A REFERENCE FOR BASIS OF DESIGN ONLY. REFER TO SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS				
SYMBOL	SPEC SECTION	DEPARTMENT	LOCATION	MANUFACTURER	STYLE	PRODUCT NUMBER	COLOUR	COMMENTS
WALLS								
GWB-1	092900	MHDU MH CLINIC DSC	WAITING, ANTE ROOM, TREATMENT,		GYPSUM BOARD CEILING			Finished with Wall Protection or Paint.
GWB-2	092900	MHDU MH CLINIC DSC	WET AREAS - WASHROOMS, SOILED, STAFF/PUBLIC WASHROOM, HOUSEKEEPING		GYPSUM BOARD CEILING (MOISTURE RESISTANT)			Finished with Wall Protection or Paint.
GWB-3	092900	MHDU MH CLINIC DSC	CLEAN ROOM, EQUIPMENT,		GYPSUM BOARD CEILING (IMPACT RESISTANT)			Finished with Wall Protection or Paint.
WALL WALL PROTECTION (SEE ALSO WALL PROTECTION PLANS)								
A2	102613	MHDU MH CLINIC DSC	BUMPER RAIL, REFER TO WALL PROTECTION PLANS	Construction Specialties	SCR-F Series	SCR-48M	253 Parchment	
B2	102613	MHDU MH CLINIC DSC	CHAIR RAIL, REFER TO WALL PROTECTION PLANS	Construction Specialties	SCR-F Series	BL-100	253 Parchment	
C2	102613	MHDU MH CLINIC DSC	CRASH RAIL, REFER TO WALL PROTECTION PLANS	Construction Specialties	SCR-F Series	SCR-40	253 Parchment	
CG-1	102613	MHDU MH CLINIC DSC	CORNER GUARDS	Construction Specialties	CD-8	CD-8	Silver	Stainless-steel, Nonporous corner guards
H1	102613	MHDU MH CLINIC DSC	RAMP AREA HAND RAIL, REFER TO WALL PROTECTION PLANS	Construction Specialties	HRS-5C		Brushed Stainless Steel	
H2	102613	MHDU MH CLINIC DSC	HAND RAIL, REFER TO WALL PROTECTION PLANS	Construction Specialties	Activon Finish with Brushed Stainless Steel Supports	HR-6CRBN	253 Parchment	253 Parchment
WP2, WP3, WP4	102600	MHDU MH CLINIC DSC	ALL OTHER AREAS EXCEPT THE ONES INDICATED ELSEWHERE. REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock - Satin	32	Oyster	Matches PNT-1
WP#	102600	MHDU MH CLINIC DSC	BEHIND HHS SINKS REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock	W103-W104	White	Extruded semi-rigid PVC sheet - LRV 89
WP#3	102600	DSC ANTI-GLAURE WASHROOMS	COLOURED WALL PROTECTION IN PUBLIC ANTI-GLAURE WASHROOMS. REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock	FLINT 201		Extruded semi-rigid PVC sheet - LRV 32
WP#4	Not Used							
WP#5	Not Used							
WP#6	102600	MHDU	COLOURED WALL PROTECTION IN MHDU. REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock - Chameleon	6622	Nightfall	
WP#7	102600	MHDU	COLOURED WALL PROTECTION IN MHDU. REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock - Chameleon	6638	Hawaiian Palm	
WP#8	102600	MHDU	COLOURED WALL PROTECTION IN MHDU. REFER TO WALL PROTECTION PLANS.	Atro	Atro Whiterock - Chameleon	6618	Moulin Rouge	
WP5 [XXX]	102600	MHDU MH CLINIC DSC	PRINTED WALL PROTECTION, REFER TO WALL PROTECTION PLANS	Atro	Atro Whiterock - PopArt Gloss*		Custom Printed	CONTRACTOR TO PURCHASE HIGH RESOLUTION STOCK IMAGES. IMAGES WILL BE SELECTED BY THE ARCHITECT.
IM [XXX]	102600	MHDU MH CLINIC	PRINTED WALL PROTECTION, REFER TO WALL PROTECTION PLANS	Atro	Atro Whiterock - PopArt Gloss*		Custom Printed	CONTRACTOR TO PURCHASE HIGH RESOLUTION STOCK IMAGES. IMAGES WILL BE SELECTED BY THE ARCHITECT.
WP-WB		MH CLINIC	POD TEAM WORK AREA, REFER TO WALL PROTECTION PLANS	Atro	Atro Whiterock - Whiteboard			Glass finish, white dry-erase, overlaminated scratch and ghost resistant, anti-graffiti coating.
WINDOW SHADES								
WS-1	122413	MH CLINIC		Alex	Moduline 85/105 Ektra Sunproject Line			Cordless, Motor Operated, Bottom-up Roller Shades 120V
WS-2	122413	MHDU DSC		Alex	Newton High-Speed Lite- Lift with Fascia	SHEERWEAVE 4800	701 Alabaster	Cordless, Vinyl on Polyester 1%
CURTAIN (PRIVACY)								
CT-1	102113	MHDU MH CLINIC DSC	TREATMENT BAYS	CS-group	Oxford		Gull	
FLOOR WAYFINDING								
FM-1		MHDU	FLOOR WAYFINDING MARKING	3M	3M™ Evison™ Print Film	48C - 20R	Custom/printed	Pre-marking and Pre-spacing tape required; Apply 3M Scotchlac Luster Overlaminant M45 for slip-resistance

INTERIOR FINISH LEGEND				PRODUCT INFORMATION INDICATED IS A REFERENCE FOR BASIS OF DESIGN ONLY. REFER TO SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS				
SYMBOL	SPEC SECTION	DEPARTMENT	LOCATION	MANUFACTURER	STYLE	PRODUCT NUMBER	COLOUR	COMMENTS
CEILING (ALSO SEE REFLECTED CEILING PLANS)								
APC-1	095126	MHDU MH CLINIC DSC	CORRIDOR, WAITING, TREATMENT, SATELLITE NURSING, ALCOVE, CLEAN SUPPLIES, BODS FRIDGE, STORAGE, EQUIPMENT ROOM	Armstrong	Grid - Armstrong Pheobe XL 1510" Exposed Tee System Tile - Armstrong Clean Rooms VL 870, 810mm (24" x 1220mm (48")		White	
APC-2	095126	MHDU MH CLINIC DSC	PRIVATE ROOM, BARIATRIC ROOM, INTERVIEW/CONS, GROUP ROOM, WORKSTATIONS, OFFICES, MEETING ROOM, PHONE ROOM	Armstrong	Grid - Armstrong Pheobe XL 1510" Exposed Tee System Tile - Armstrong Clean Rooms VL 870, 810mm (24" x 1220mm (48")		White	
GWB-1	092900	MHDU MH CLINIC DSC	RECEPTION/REGISTRATION, SOILED, CONTACT LINES, PRIVATE ROOM, REG PRESS ROOM, ANTEROOM, ELEVATOR LOBBY, HOUSE KEEPING, KITCHENETTE				PNT-1	
GWB-2	092900	MHDU MH CLINIC DSC	WET AREAS - WASHROOMS, STAFF WASHROOM, PATIENT WASHROOM				PNT-1	
DOORS AND SCREENS								
FDL		MHDU MH CLINIC DSC	SCW DOOR FINISHES	Nevamar			Pattern: UN6001	Frappe
GLAZING FILM								
		MHDU	GLASS DOORS TREATMENT BAY SLIDING GLAZING RECEPTION DIVISOR, DSC OFFICE GLASS DOORS	3M	FASARA Glass Finishes Fabric / Wash SHZFGSE, Sensar Linen			
EXPANSION JOINT COVER								
EJC	079500	MHDU MH CLINIC	ONTOP OF EXISTING EXPANSION JOINT IN VARIOUS LOCATIONS - FLOOR	CS Construction Specialties			SIFPR Series	Clear Anodized w/ Adjacent Flooring to be incorporated into expansion joint cover
EJC2	079500	MHDU MH CLINIC	ONTOP OF EXISTING EXPANSION JOINT IN VARIOUS LOCATIONS - WALL AND CEILING	Balco			CM - Low Profile Surface Mount	to match EJC
FLUID APPLIED FLOORING								
FAF-1	096700	MHDU MH CLINIC DSC	CLEAN SUPPLY, SOILED, HOUSEKEEPING, PATIENT WASHROOM	Sika Canada	Sika ComfortFloor	RAL 7038		Agate grey
MILLWORK								
MM-2	064023	MHDU MH CLINIC DSC	NURSE STATIONS/ REGISTRATION/RECEPTION/	Weston Premium Woods	CLEAR-Melamine Faced Thermo Structured Surfaces, with matching edge banding	FA42		Sereno Penelope
SS-1	064023	MHDU MH CLINIC DSC	NURSE STATIONS/ REGISTRATION/RECEPTION	Corian	Solid Surfacing 20mm	Whisper		Whisper
PAINT (ALSO SEE INTERIOR FINISHES PLANS)								
PNT-1	099123	MHDU MH CLINIC DSC	FIELD PAINT (WALLS)	Sherwin Williams	Eggshell	SW9502		Arrowroote
PNT-2	099123	MH CLINIC DSC	ACCENT WALLS	Sherwin Williams	Eggshell	SW6801		Regale Blue
PNT-3	099123	MHDU MH CLINIC DSC	AT ALL GYPSUM BOARD CEILING	Sherwin Williams	Eggshell	SW7005		Pure White
PNT-4	099123	MH CLINIC DSC	ACCENT WALLS	Sherwin Williams	Eggshell	SW6422		Shagreen
PNT-5	099123	MH CLINIC	ACCENT WALLS	Sherwin Williams	Eggshell	SW6458		Restful
PNT-6a	099123	MHDU MH CLINIC	ACCENT WALLS	Sherwin Williams	Eggshell	SW6803		Danube
PNT-6b	099123	MHDU	ACCENT WALLS (Secondary Colour)	Sherwin Williams	Eggshell	SW6802		Jacaranda
PNT-7a	099123	MHDU	ACCENT WALLS	Sherwin Williams	Eggshell	SW6740		Kilenny
PNT-7b	099123	MHDU	ACCENT WALLS (Secondary Colour)	Sherwin Williams	Eggshell	SW6444		Lounge Green
PNT-8a	099123	MHDU	ACCENT WALLS	Sherwin Williams	Eggshell	SW6851		Radish
PNT-8b	099123	MHDU	ACCENT WALLS (Secondary Colour)	Sherwin Williams	Eggshell	SW6311		Memorable Rose
HPC-1	099656	MHDU MH CLINIC DSC	WET AREAS - PATIENT ROOM WASHROOM, SOILED, STAFF/PUBLIC WASHROOM, EXISTING HOUSEKEEPING, ANTI-GLAURE WASHROOMS (DSC) SEE COMMENTS.	Sherwin Williams	Renewall Aqua GR1			To match PNT-1 epoxy base coat with fiberglass mesh reinforcement, Use Pick resistant, two part high solids, high modulus epoxy resin security system for non-moving joints in Anti-glare washrooms DSC.
FLOORING (ALSO SEE INTERIOR FINISHES PLANS)								
RS-1	096615	MHDU MH CLINIC DSC	NURSE STATION, CORRIDOR, ANTEROOM, CLEAN ROOM, MED ROOM, EQUIPMENT, STORAGE, CLEAN SUPPLY, EQUIPMENT, KITCHENETTE	POLYFLOR	Paletone PUR - Heavy- duty homogeneous vinyl flooring	8641		9" PRE-FABRICATED BASE IN CORRIDORS AND WAITING AREAS, AS WELL AS ADJACENT TO MILLWORK 9" HIGH INTEGRAL COVE BASE IN ALL OTHER LOCATIONS
RS-2	096615	MHDU MH CLINIC DSC	CORRIDOR, WAITING, RAMP	POLYFLOR	Expos Flow PUR - Heterogeneous vinyl sheet flooring	9869		9" HIGH INTEGRAL COVE RS-1 BASE
WIN-1	096617	MHDU	MHDU RAMP AND STAIRS	POLYFLOR	Polysafe Verona PUR - Safety vinyl flooring			STAIR NOSING TO BE JOHNSONOTE VOL XX SQ SQUARE VINYL STAIR NOSING (COLOUR: BE FRAM)
UPHOLSTERY								
UP-8		MHDU	REGISTRATION / RECEPTION	MOMENTUM	EPU	SKU: 09554730		TWILL EPU DOLOMITE
UP-9		MHDU	WAITING ROOM	CFSTINSON	Clean Vinyl	TWT52		SAND DOLLAR
UP-10		MHDU	RED POD STAFF CHAIRS	CFSTINSON	Clean Vinyl	ARD 25		SEQUOIA
UP-11		MHDU	RED POD GUEST CHAIRS	CFSTINSON	Clean Vinyl	TWT51		ROSEWOOD
UP-12		MHDU	RED POD RECLINERS	MOMENTUM	EPU	SKU: 09554598		TWILL EPU BLUFF
UP-13		MHDU	BLUE POD STAFF CHAIRS	CFSTINSON	Clean Vinyl	ALM30		WAVE
UP-14		MHDU	BLUE POD GUEST CHAIRS, ONE CHAIR WAITING ROOM	CFSTINSON	Clean Vinyl	TWT56		OCEANSIDE
UP-15		MHDU	BLUE POD RECLINERS, WAITING ROOM	MOMENTUM	EPU	SKU: 09554631		TWILL EPU FOUNTAIN
UP-16		MHDU	GREEN POD STAFF CHAIRS	CFSTINSON	Clean Vinyl	CRE214		GREY
UP-17		MHDU	GREEN POD GUEST CHAIRS, TWO CHAIRS WAITING ROOM	CFSTINSON	Clean Vinyl	TWT55		SPRING
UP-18		MHDU	GREEN POD RECLINERS, ONE CHAIR WAITING ROOM	MOMENTUM	EPU	SKU: 09554576		TWILL EPU BLUE SAGE
UP-19		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09517550		Anthology CV Albe
UP-20		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09517539		Anthology CV Jade
UP-21		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09517506		Anthology CV Pacific
UP-22		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09532257		Keeper CV Lake
UP-23		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09532356		Keeper CV Palm
UP-24		MH CLINIC DSC	REGISTRATION / RECEPTION STAFF CHAIRS	MOMENTUM	Clean Vinyl	SKU: 09532268		Keeper CV Pool
UP-25		MH CLINIC DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09538560		Fidget CV aquamarine
UP-26		DSC	REGISTRATION / RECEPTION	MOMENTUM	Clean Vinyl	SKU: 09517571		Anthology CV Surf

UHN_PMCC_Addendum 4_2024-09-18_R4

- 5 ISSUED FOR ADDENDUM #4 2024-09-18
- 4 ISSUED FOR TENDER 2024-08-13
- 3 ISSUED FOR BUILDING PERMIT 2023-12-19
- 2 ISSUED FOR MOH 4.1 2023-09-25
- 1 SUBMISSION
- 1 ISSUED FOR 95% CD 2023-09-06
- 1 SUBMISSION

Rev. Description Date

Drawing Title:

INTERIOR FINISH LEGEND

Project No.: 0020711.00 Checked by: Checker

A1200

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MHC, MHDU, DSC)**

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2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

Rev.	Description	Date
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Drawing Title:

**INTERIOR WALL
PROTECTION PLAN -
LEVEL 10 (DSC)**

Project No.: 0020711.00 Checked by: Checker

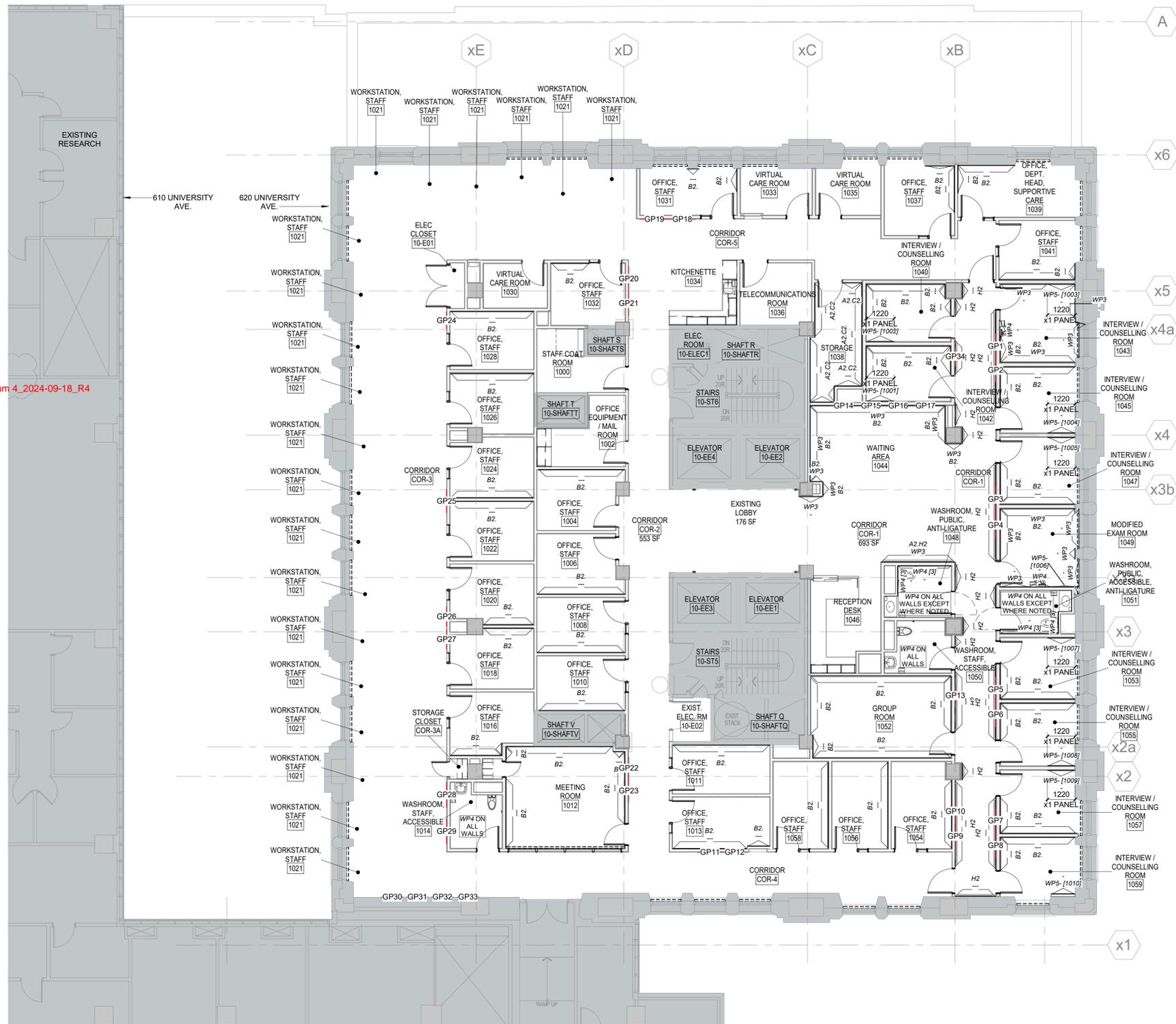
A1310.1

GP# EXISTING ART PANELS (REUSED FROM UNIT 16A)
PANELS TO BE PROVIDED BY UHN AND INSTALLED IN DSC AS NOTED ON THE DRAWINGS. REFER TO IMAGES SCHEDULE FOR SPECIFIC PANELS THAT CORRESPOND TO THE LOCATIONS NOTED ON THE DRAWINGS. PROVIDE NEW ALUMINUM TRIM BY SECTION 09 77 33 ON TOP AND BOTTOM OF THE EXISTING PANELS. PREP AND CLEAN THE PANELS. SILICONE SEAL ALL EDGES.

WALL PROTECTION LEGEND

—	NO SHEET WALL PROTECTION
WP2	CUSTOM HEIGHT
WP3	HALF-HEIGHT
WP4	CEILING-HEIGHT
WP5	CEILING-HEIGHT (ACCENT)
WP5-[x]	WALL PROTECTION WITH WITH ACCENT COLOUR. [x] REFERS TO COLOUR CODE. REFER TO FINISH LEGEND FOR COLOURS.
WP5-[xxx]	WALL PROTECTION WITH DIGITAL PRINT IMAGE. [xxx] REFERS TO IMAGE IDENTITY # FOUND ON IMAGE SCHEDULE.
IM [xxx]	910H x 610W DIGITAL PRINT. [xxx] REFERS TO IMAGE IDENTITY # FOUND ON IMAGE SCHEDULE.
IM2 [xxx]	600H x 600W DIGITAL PRINT. [xxx] REFERS TO IMAGE IDENTITY # FOUND ON IMAGE SCHEDULE.
A	BUMPER
B	CHAIR RAIL
C	CRASH RAIL
H	HANDRAIL
1	STAINLESS STEEL
2	PLASTIC

- GENERAL NOTES - WALL FINISHES:**
- HALF HEIGHT WALL PROTECTION (U.N.O ON CONFLICT WITH SILL HEIGHT OF EXTERIOR WINDOWS)
 - FULL HEIGHT STAINLESS STEEL CORNER GUARD AT ALL OUTSIDE CORNERS
 - CEILING HEIGHT WALL PROTECTION = TO US OF CEILING
 - PROVIDE CONCEALED BLOCKING AT ALL BUMPER GUARDS, CHAIR RAILS, CRASH RAILS AND HANDRAIL LOCATIONS.
 - TERMINATE HANDRAILS AT DOORS AS PER TYPICAL DETAIL ON A1202, UNLESS NOTED OTHERWISE. ALL HANDRAILS TO CONTINUOUSLY WRAP AROUND INSIDE AND OUTSIDE CORNERS.
 - SHEET WALL PROTECTION TO CONTINUOUS ALONG ALL WALLS UNLESS OTHERWISE NOTED, AND TERMINATES AT CORNER GUARDS PER DETAIL ON A1202.
 - WHERE CORNER GUARDS SEPARATE TWO DIFFERENT BASE TYPES, CORNER GUARDS SHALL EXTEND TO FINISHED FLOOR AND SERVE AS TRANSITIONAL BETWEEN MATERIALS.
 - WHERE MATERIALS WITH WOOD GRAIN ARE LOCATED ON WALLS, WOOD GRAIN TO RUN UP/DOWN. WHERE WOOD GRAIN IS LOCATED ON FASCIAS OF CEILING BULKHEADS, GRAIN TO MATCH DIRECTION OF CEILING OR WALL PATTERN.



1 LEVEL 10 FLOOR PLAN - WALL PROTECTION

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8/9/2024 9:35:05 AM

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MHC, MHDU, DSC)**

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DEMOLITION KEYED NOTES: XX

No.	DESCRIPTION
D1	REMOVE AND DISPOSE EXISTING FRIDGE ROOM ASSEMBLY INCLUDING ALL HANGERS AND SUPPORTS, LIGHTS, GRILLES, SPEAKERS, SMOKE DETECTORS, SPRINKLERS, CURTAIN TRACKS, CONTROL JOINTS ETC. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR FULL EXTENT OF WORK.
D2	REMOVE AND DISPOSE EXISTING EXHIBITING SHELVES AND BOOKS AND STUDY CAROLS
E1	EXISTING AREA TO REMAIN. PREP EXISTING SURFACES WHERE IMPACTED BY NEW WORK TO RECEIVE NEW FINISH.
E3	EXISTING EXPANSION JOINT TO REMAIN.
F1	REMOVE AND DISPOSE ALL EXISTING FLOORING AND BASE INCLUDING, ADHESIVES, ETC. TO EXPOSED CONCRETE. PREPARE SURFACE TO RECEIVE NEW FLOORING AS INDICATED IN THE ROOM FINISH SCHEDULE.
F2	REMOVE AND DISPOSE EXISTING HIGH DENSITY FILE STORAGE TRACKS AND ASSOCIATED SUPPORTS AND CONTROLS. PREPARE SURFACE TO RECEIVE NEW FLOORING AS INDICATED IN THE ROOM FINISH SCHEDULE.
G1	REMOVE AND DISPOSE EXISTING GLAZING INCLUDING, ADHESIVES, SUPPORTS ETC. PREPARE ALL SURFACES TO RECEIVE NEW FINISHES AS INDICATED IN THE ROOM FINISH SCHEDULE.
H1	REMOVE AND DISPOSE EXISTING HEADWALL OUTLETS AS NOTED IN MECHANICAL AND ELECTRICAL DRAWINGS. PATCH ALL DISTURBED CONSTRUCTION TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE. MAINTAIN FIRE SEPARATIONS.
M1	REMOVE AND DISPOSE EXISTING MILLWORK / CASEWORK. PATCH ALL EXISTING SURFACES TO REMAIN TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE. MAINTAIN FIRE SEPARATIONS (WHERE APPLICABLE). COORDINATE WITH MECHANICAL & ELECTRICAL FOR FULL SCOPE OF WORK
O1	REMOVE AND DISPOSE EXISTING DOOR(S), SCREEN(S) AND/OR FRAME(S) AS INDICATED ON DEMOLITION PLANS. PATCH ALL EXISTING SURFACES TO REMAIN TO MATCH ADJACENT EXISTING OR NEW SURFACES AS INDICATED ON FINISHES PLANS. IF A PARTITION IS CMU FILL VOIDS ABOVE EXISTING DOORS WITH CMU AND PROVIDE ALL SUPPORT FRAMING AND LINTELS AS REQUIRED (SEE STRUCTURAL DOCUMENTS FOR LINTEL SCHEDULE).
O2	REMOVE AND DISPOSE EXISTING DOOR(S), SCREEN(S) AND/OR FRAME(S) TO RECEIVE NEW FINISH
P1	REMOVE AND DISPOSE EXISTING PLUMBING FIXTURES (TOILETS, SINKS, MOP SINKS AND CARRIERS), AS INDICATED ON DEMOLITION PLANS. REFER TO MECHANICAL AND ELECTRICAL DOCUMENTATION FOR ANY OTHER REQUIREMENTS.
P2	REMOVE AND DISPOSE EXISTING MEDICAL GASES. COORDINATE WITH MECHANICAL AND ELECTRICAL FOR FULL EXTENT OF WORK.
P3	REMOVE AND DISPOSE EXISTING PARTITION AND SILL BELOW EXISTING WINDOW TO ACCOMMODATE REMOVAL OF MECHANICAL UNITS. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR FULL EXTENT TO WORK.
S1	COMPLETELY REMOVE EXISTING AND DISPOSE STAIR, RAILING, LANDING AND ANY ASSOCIATED SUPPORT STRUCTURE AND/OR WALL LEDGER
S2	EXISTING STAIRS TO REMAIN.
S3	EXISTING MEZZANINE TO BE DEMOLISHED. COORDINATE WITH STRUCTURAL FOR FULL EXTENT OF WORK. MEZZANINE FLOOR, WALLS, AND FINISHES TO BE DEMOLISHED AND REMOVED.
S4	EXISTING STRUCTURAL BRACING FOR ADJACENT WALLS TO REMAIN.
S5	EXISTING STRUCTURAL ELEMENTS ABOVE CEILING TO REMAIN.
T1	REMOVE AND DISPOSE EXISTING TILE AND PREPARE EXISTING SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE.
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- DEMOLITION GENERAL NOTES**
- 1) AREAS SHOWN IN GRAY HALF-TONE ARE NOT IN SCOPE. ITEMS SHOWN IN DASHED LINES ARE TO BE DEMOLISHED OR REMOVED.
 - 2) CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS BEFORE PROCEEDING WITH THE WORK.
 - 3) DEMOLITION DRAWINGS SHALL BE READ IN CONJUNCTION WITH NEW CONSTRUCTION DOCUMENTATION. ALSO REFER TO MECHANICAL AND ELECTRICAL DEMOLITION AND NEW CONSTRUCTION DRAWINGS.
 - 4) CONTRACTOR SHALL LIMIT THE EXTENT OF ALL OPERATIONS OUTSIDE OF THE WORK AREA AND LIMIT AS MUCH AS POSSIBLE THE WORK AREA TO THE UNIT/ ROOMS ASSOCIATED WITH THE CONTRACT FOR THIS SCOPE OF WORK. PROVIDE SOUND AND DUST PROTECTION OUTSIDE OF WORK AREAS.
 - 5) INFILL AND SEAL ACCORDINGLY TO ACHIEVE REQUIRED FIRE PROTECTION OF SLAB FOR ALL SLAB PENETRATIONS RESULTING FROM REMOVAL OF BUILDING SERVICES AS PART OF THE DEMOLITION.
 - 6) SCAN SLAB FOR STRUCTURAL INTEGRITY PRIOR TO ANY CUTTING, CORING OF EXISTING CONCRETE SLABS. REFER TO UHN CUTTING AND CORING PROCEDURES PRIOR TO THE WORK.
 - 7) CONTRACTOR SHALL BE RESPONSIBLE FOR SAFE DISPOSAL OF ALL EXISTING BUILDING ELEMENTS NOTED TO BE REMOVED OR DEMOLISHED.
 - 8) MAINTAIN SAFE AND CLEAR ACCESS TO EXISTING EXITS AT ALL TIMES, AS REQUIRED BY APPLICABLE CODES AND STANDARDS.
 - 9) PATCH AND MAKE GOOD EXISTING CONDITIONS AFFECTED BY DEMOLITION. WHERE EXISTING BUILDING ELEMENTS ARE REMOVED, MAKE GOOD SUBSTRATE TO RECEIVE NEW SPECIFIED FINISHES/MATERIALS. WHERE EXISTING SURFACES ARE DISTURBED DUE TO DEMOLITION OR ALTERATIONS, PATCH AND MAKE GOOD TO MATCH EXISTING.
 - 10) WHERE EXISTING BUILDING SERVICES THAT PENETRATE FIRE SEPARATIONS ARE BEING REMOVED, MAKE GOOD SUBSTRATE AND APPLY FIRESTOPPING AND SMOKE SEALS TO MAINTAIN REQUIRED FIRE SEPARATION.
 - 10A) WHERE EXISTING BUILDING MATERIALS AND CONSTRUCTION IS IDENTIFIED AS BEING FIRE SEPARATION OR SMOKE SEAL AS PART OF NEW DESIGN, MAKE GOOD SUBSTRATE AND APPLY FIRESTOPPING AND SMOKE SEAL TO MAINTAIN REQUIRED FIRE SEPARATION.
 - 11) REVIEW WORK DEFINED WITHIN THE HAZARDOUS MATERIALS - GENERAL CONDITIONS DOCUMENTATION. COORDINATE AND SCHEDULE WORK ACCORDINGLY. REFER TO HAZARDOUS MATERIALS - GENERAL CONDITIONS SPECIFICATION.
 - 12) SAFELY DISCONNECT AND CAP ALL MECHANICAL (HVAC, PLUMBING, FIRE PROTECTION) AND ELECTRICAL (POWER, DATA, TELEPHONE AND FIRE ALARM DEVICES AND SERVICES) FROM WALLS, FLOOR AND CEILING. REFER TO MECHANICAL AND ELECTRICAL DOCUMENTS FOR REQUIREMENTS.
 - 13) FOR HAZARDOUS MATERIAL INCLUDING ASBESTOS AND MOLD ABATEMENT, REFER TO SPECIFICATIONS.
 - 14) CONTRACTOR TO REMOVE EXISTING FURNITURE AND EQUIPMENT IN ALL AREAS AFFECTED BY NEW WORK. COORDINATE WITH HOSPITAL PRIOR TO REMOVAL AND STORE AS DIRECTED BY HOSPITAL.
 - 15) CONTRACTOR TO PROTECT ALL EXISTING FLOORING THROUGHOUT AREAS OF CONSTRUCTION WITH HARDBOARD MATERIAL SUCH AS MASONITE OR EQUIVALENT.
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 - 17) CONTRACTOR TO REMOVE AND DISPOSE OF ALL EXISTING WALL-HUNG ACCESSORIES (INCLUDES WALL MOUNT CHAIR RAILS, CORNER GUARDS, WHITEBOARDS, ETC.) WITHIN SCOPE UNLESS OTHERWISE NOTED.
 - 18) CONTRACTOR TO REMOVE AND DISPOSE OF ALL EXISTING FURNITURE WITHIN SCOPE UNLESS OTHERWISE NOTED.
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Rev.	Description	Date
8	ISSUED FOR TENDER	2024-08-13
7	ISSUED FOR BUILDING PERMIT	2023-12-19
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1	ISSUED FOR SD SIGN-OFF	2022-09-01

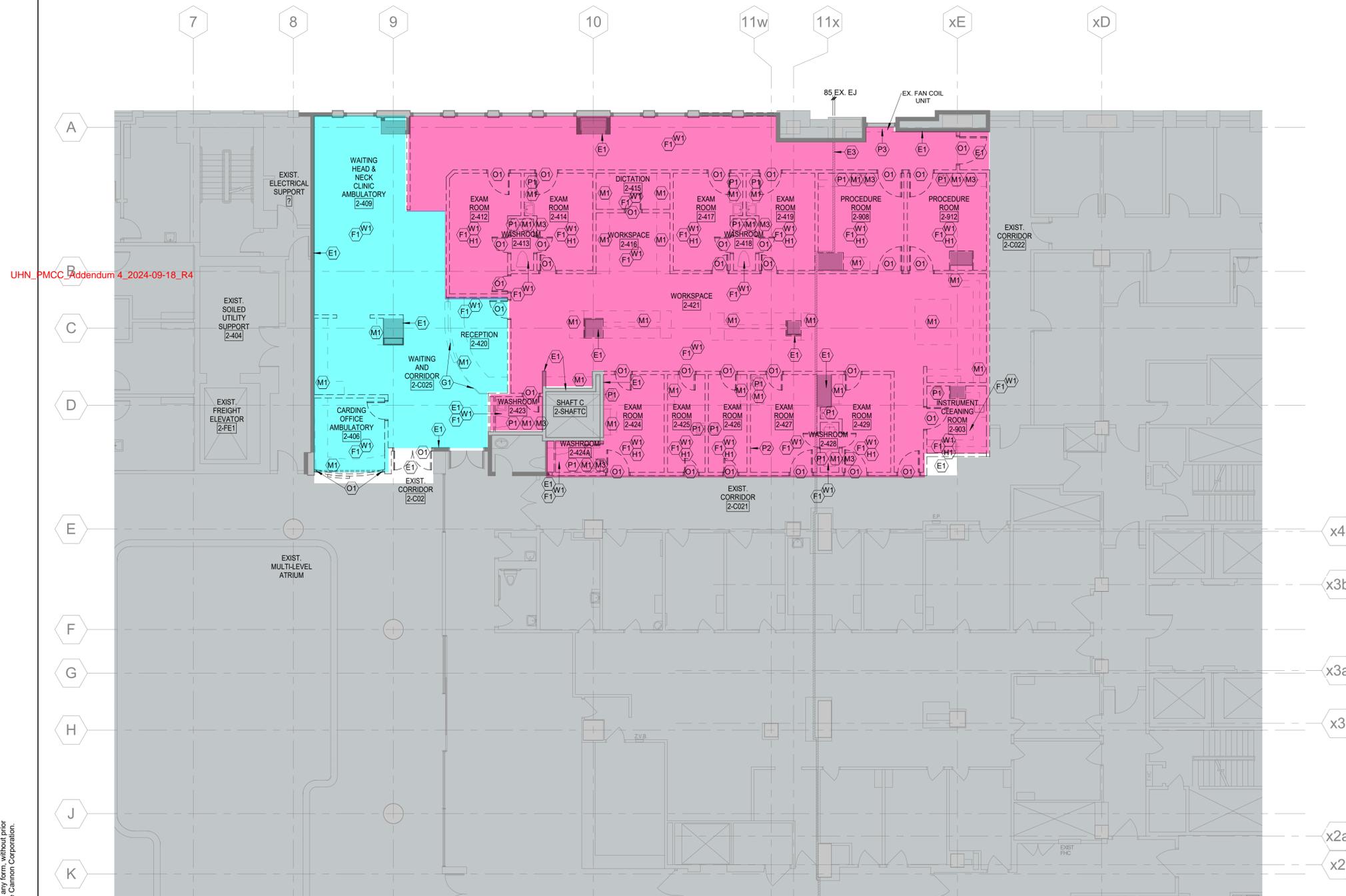
Drawing Title:

**DEMOLITION PLAN -
LEVEL 02 (MHC)**

Project No.: 0020711.00 Checked by: Checker

D0102A

- FRIDGE ROOM
- LAMINATE
- TILE
- CARPET TILE
- MARBLE
- EPOXY
- WOOD LAMINATE PLANK
- RUBBER STAIR TREADS



1 LEVEL 02 - DEMOLITION PLAN
1: 100

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MHC, MHDU, DSC)

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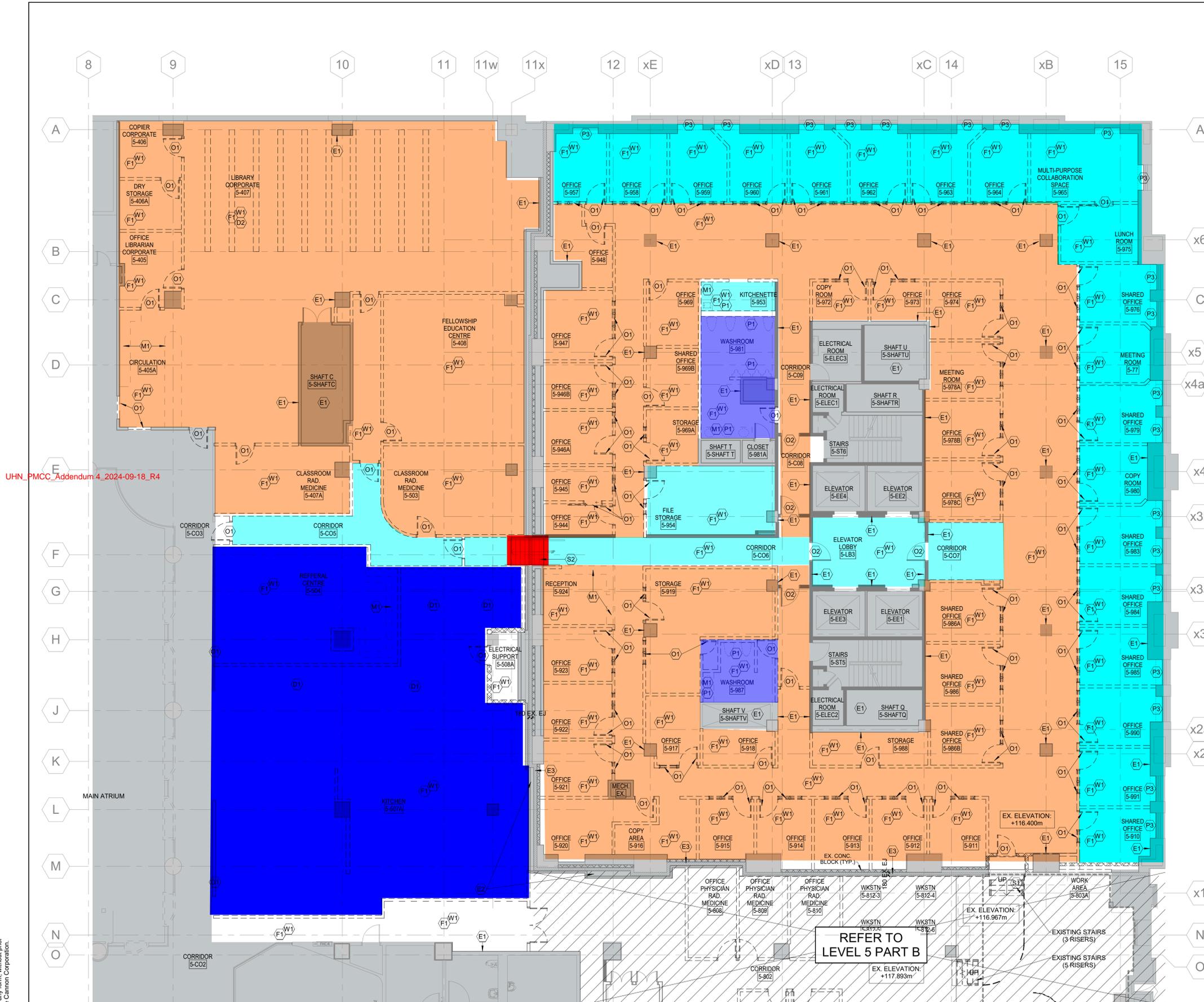
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3	ISSUED FOR DD SIGN-OFF	2022-12-16
2	ISSUED FOR DD SIGN-OFF	2022-12-02
1	ISSUED FOR SD SIGN-OFF	2022-09-01

Drawing Title:

DEMOLITION PLAN -
LEVEL 05A (MHDU)

Project No.: 0020711.00 Checked by: Checker

D0105A



UHN_PMCC_Addendum 4_2024-09-18_R4

REFER TO
LEVEL 5 PART B

1 LEVEL 05 - DEMOLITION PLAN - 05A

1: 100

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Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MHC, MHDU, DSC)

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W1	REMOVE AND DISPOSE EXISTING PARTITION WALLS OR PORTIONS OF WALLS AS INDICATED DASHED ON DEMOLITION PLANS. PATCH ALL DISTURBED CONSTRUCTION TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE.

DEMOLITION GENERAL NOTES

- 1) AREAS SHOWN IN GRAY HALF-TONE ARE NOT IN SCOPE. ITEMS SHOWN IN DASHED LINES ARE TO BE DEMOLISHED OR REMOVED.
- 2) CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS BEFORE PROCEEDING WITH THE WORK.
- 3) DEMOLITION DRAWINGS SHALL BE READ IN CONJUNCTION WITH NEW CONSTRUCTION DOCUMENTATION. ALSO REFER TO MECHANICAL AND ELECTRICAL DEMOLITION AND NEW CONSTRUCTION DRAWINGS.
- 4) CONTRACTOR SHALL LIMIT THE EXTENT OF ALL OPERATIONS OUTSIDE OF THE WORK AREA AND LIMIT AS MUCH AS POSSIBLE THE WORK AREA TO THE UNIT/ ROOMS ASSOCIATED WITH THE CONTRACT FOR THIS SCOPE OF WORK. PROVIDE SOUND AND DUST PROTECTION OUTSIDE OF WORK AREAS.
- 5) INFILL AND SEAL ACCORDINGLY TO ACHIEVE REQUIRED FIRE PROTECTION OF SLAB FOR ALL SLAB PENETRATIONS RESULTING FROM REMOVAL OF BUILDING SERVICES AS PART OF THE DEMOLITION.
- 6) SCAN SLAB FOR STRUCTURAL INTEGRITY PRIOR TO ANY CUTTING, CORING OF EXISTING CONCRETE SLABS. REFER TO UHN CUTTING AND CORING PROCEDURES PRIOR TO THE WORK.
- 7) CONTRACTOR SHALL BE RESPONSIBLE FOR SAFE DISPOSAL OF ALL EXISTING BUILDING ELEMENTS NOTED TO BE REMOVED OR DEMOLISHED.
- 8) MAINTAIN SAFE AND CLEAR ACCESS TO EXISTING EXITS AT ALL TIMES, AS REQUIRED BY APPLICABLE CODES AND STANDARDS.
- 9) PATCH AND MAKE GOOD EXISTING CONDITIONS AFFECTED BY DEMOLITION, WHERE EXISTING BUILDING ELEMENTS ARE REMOVED, MAKE GOOD SUBSTRATE TO RECEIVE NEW SPECIFIED FINISHES/MATERIALS. WHERE EXISTING SURFACES ARE DISTURBED DUE TO DEMOLITION OR ALTERATIONS, PATCH AND MAKE GOOD TO MATCH EXISTING.
- 10) WHERE EXISTING BUILDING SERVICES THAT PENETRATE FIRE SEPARATIONS ARE BEING REMOVED, MAKE GOOD SUBSTRATE AND APPLY FIRESTOPPING AND SMOKE SEALS TO MAINTAIN REQUIRED FIRE SEPARATION.
- 10A) WHERE EXISTING BUILDING MATERIALS AND CONSTRUCTION IS IDENTIFIED AS REQUIRING FIRE SEPARATION OR SMOKE SEAL AS PART OF NEW DESIGN, MAKE GOOD SUBSTRATE AND APPLY FIRESTOPPING AND SMOKE SEAL TO MAINTAIN REQUIRED FIRE SEPARATION.
- 11) REVIEW WORK DEFINED WITHIN THE HAZARDOUS MATERIALS - GENERAL CONDITIONS DOCUMENTATION. COORDINATE AND SCHEDULE WORK ACCORDINGLY. REFER TO HAZARDOUS MATERIALS - GENERAL CONDITIONS SPECIFICATION.
- 12) SAFELY DISCONNECT AND CAP ALL MECHANICAL (HVAC, PLUMBING, FIRE PROTECTION) AND ELECTRICAL (POWER, DATA, TELEPHONE AND FIRE ALARM DEVICES AND SERVICES) FROM WALLS, FLOOR AND CEILING. REFER TO MECHANICAL AND ELECTRICAL DOCUMENTS FOR REQUIREMENTS.
- 13) FOR HAZARDOUS MATERIAL INCLUDING ASBESTOS AND MOLD ABATEMENT, REFER TO SPECIFICATIONS.
- 14) CONTRACTOR TO REMOVE EXISTING FURNITURE AND EQUIPMENT IN ALL AREAS AFFECTED BY NEW WORK. COORDINATE WITH HOSPITAL PRIOR TO REMOVAL AND STORE AS DIRECTED BY HOSPITAL.
- 15) CONTRACTOR TO PROTECT ALL EXISTING FLOORING THROUGHOUT AREAS OF CONSTRUCTION WITH HARDBOARD MATERIAL SUCH AS MASONITE OR EQUIVALENT.
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- 17) CONTRACTOR TO REMOVE AND DISPOSE OF ALL EXISTING WALL-HUNG ACCESSORIES (INCLUDES WALL MOUNT CHAIR RAILS, CORNER GUARDS, WHITEBOARDS, ETC.) WITHIN SCOPE UNLESS OTHERWISE NOTED.
- 18) CONTRACTOR TO REMOVE AND DISPOSE OF ALL EXISTING FURNITURE WITHIN SCOPE UNLESS OTHERWISE NOTED.

REFER TO SPEC SECTION 02 81 00 AND 02.81.00.01 FOR HAZARDOUS MATERIALS ABATEMENT

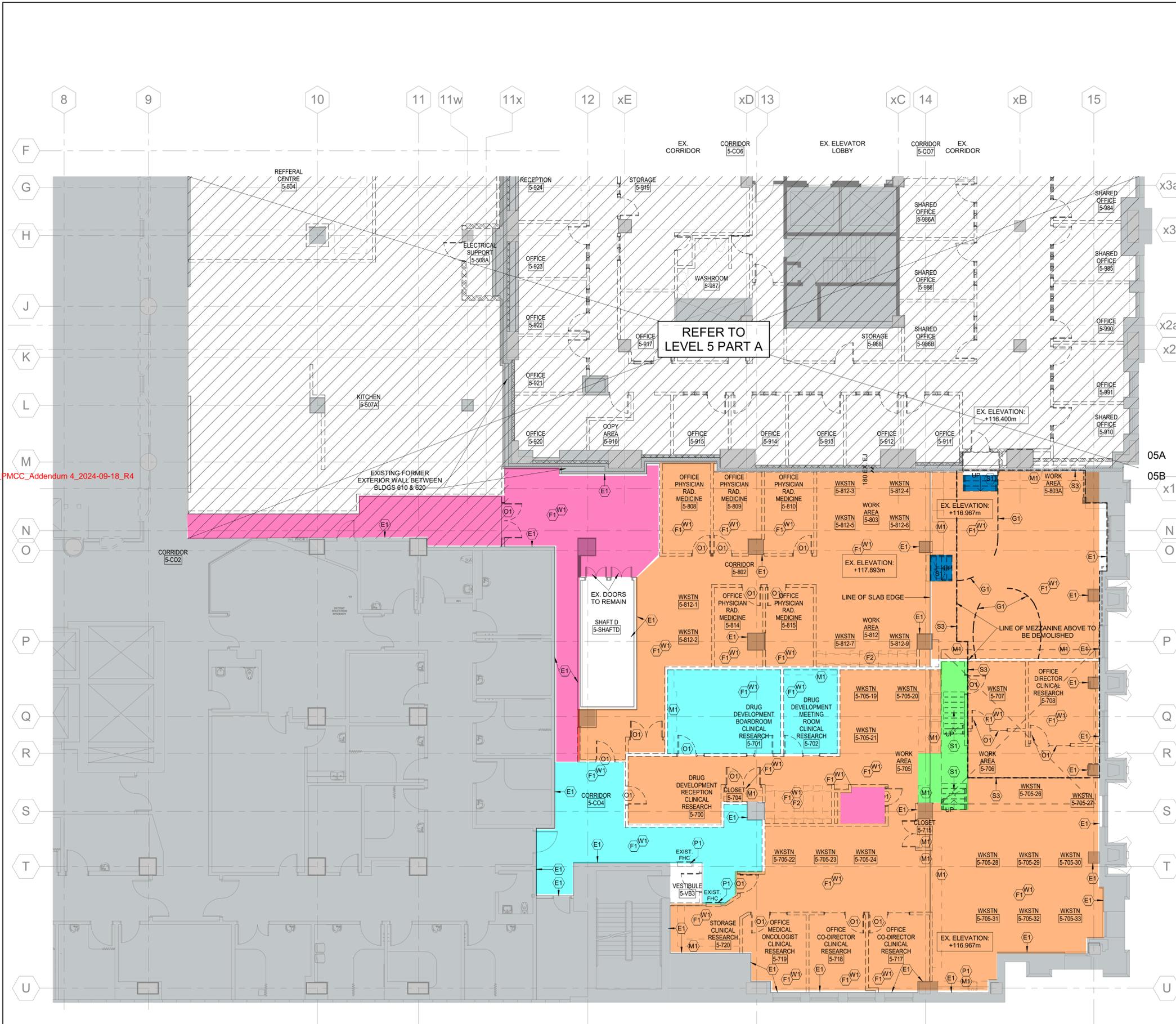
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2	ISSUED FOR DD SIGN-OFF	2022-12-02
1	ISSUED FOR SD SIGN-OFF	2022-09-01

Drawing Title:

DEMOLITION PLAN - LEVEL 05B (MHDU)

Project No.: 0020711.00 Checked by: Checker

D0105B



1 LEVEL 05 - DEMOLITION PLAN - 05B
1:100

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Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MHC, MHDU, DSC)

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Toronto, ON Canada M5C 2N8
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DEMOLITION KEYED NOTES: (XX)	
No.	DESCRIPTION
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D2	REMOVE AND DISPOSE EXISTING SHELVES AND BOOKS AND STUDY CAROLS
E1	EXISTING AREA TO REMAIN. PREP EXISTING SURFACES WHERE IMPACTED BY NEW WORK TO RECEIVE NEW FINISH.
E2	EXISTING EXTERIOR WALL BETWEEN BUILDINGS 610 & 620 TO REMAIN. PATCH AND MAKE GOOD EXISTING PARTITION AFFECTED BY DEMOLITION TO RECEIVE NEW FINISH.
E3	EXISTING EXPANSION JOINT TO REMAIN.
F1	REMOVE AND DISPOSE ALL EXISTING FLOORING AND BASE INCLUDING, ADHESIVES, ETC. TO EXPOSED CONCRETE. PREPARE SURFACE TO RECEIVE NEW FLOORING AS INDICATED IN THE ROOM FINISH SCHEDULE.
F2	REMOVE AND DISPOSE EXISTING HIGH DENSITY FILE STORAGE TRACKS AND ASSOCIATED SUPPORTS AND CONTROLS. PREPARE SURFACE TO RECEIVE NEW FLOORING AS INDICATED IN THE ROOM FINISH SCHEDULE.
G1	REMOVE AND DISPOSE EXISTING GLAZING INCLUDING, ADHESIVES, SUPPORTS ETC. PREPARE ALL SURFACES TO RECEIVE NEW FINISHES AS INDICATED IN THE ROOM FINISH SCHEDULE.
H1	REMOVE AND DISPOSE EXISTING HEADWALL OUTLETS AS NOTED IN MECHANICAL AND ELECTRICAL DRAWINGS, PATCH ALL DISTURBED CONSTRUCTION TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE. MAINTAIN FIRE SEPARATIONS.
M1	REMOVE AND DISPOSE EXISTING MILLWORK / CASEWORK, PATCH ALL EXISTING SURFACES TO REMAIN TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE. MAINTAIN FIRE SEPARATIONS (WHERE APPLICABLE). COORDINATE WITH MECHANICAL & ELECTRICAL FOR FULL SCOPE OF WORK
O1	REMOVE AND DISPOSE EXISTING DOOR(S), SCREEN(S) AND/OR FRAME(S) AS INDICATED ON DEMOLITION PLANS. PATCH ALL EXISTING SURFACES TO REMAIN TO MATCH ADJACENT EXISTING OR NEW SURFACES AS INDICATED ON FINISHES PLANS. IF A PARTITION IS CMU FILL VOIDS ABOVE EXISTING DOORS WITH CMU AND PROVIDE ALL SUPPORT FRAMING AND LINTELS AS REQUIRED (SEE STRUCTURAL DOCUMENTS FOR LINTEL SCHEDULE).
O2	REMOVE AND DISPOSE EXISTING DOOR(S), SCREEN(S) AND/OR FRAME(S) TO RECEIVE NEW FINISH
P1	REMOVE AND DISPOSE EXISTING PLUMBING FIXTURES (TOILETS, SINKS, MOP SINKS AND CARRIERS.) AS INDICATED ON DEMOLITION PLANS. REFER TO MECHANICAL AND ELECTRICAL DOCUMENTATION FOR ANY OTHER REQUIREMENTS.
P2	REMOVE AND DISPOSE EXISTING MEDICAL GASES. COORDINATE WITH MECHANICAL AND ELECTRICAL FOR FULL EXTENT OF WORK.
P3	REMOVE AND DISPOSE EXISTING PARTITION AND SILL BELOW EXISTING WINDOW TO ACCOMMODATE REMOVAL OF MECHANICAL UNITS. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR FULL EXTENT TO WORK.
S1	COMPLETELY REMOVE EXISTING AND DISPOSE STAIR, RAILING, LANDING AND ANY ASSOCIATED SUPPORT STRUCTURE AND/OR WALL LEDGER CONSTRUCTION
S2	EXISTING STAIRS TO REMAIN.
S3	EXISTING MEZZANINE TO BE DEMOLISHED. COORDINATE WITH STRUCTURAL FOR FULL EXTENT OF WORK. MEZZANINE FLOOR, WALLS, AND FINISHES TO BE DEMOLISHED AND REMOVED.
S4	EXISTING STRUCTURAL BRACING FOR ADJACENT WALLS TO REMAIN.
S5	EXISTING STRUCTURAL ELEMENTS ABOVE CEILING TO REMAIN.
T1	REMOVE AND DISPOSE EXISTING TILE AND PREPARE EXISTING SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE.
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REFER TO SPEC SECTION 02 81 00 AND 02.81 00.01 FOR HAZARDOUS MATERIALS ABATEMENT

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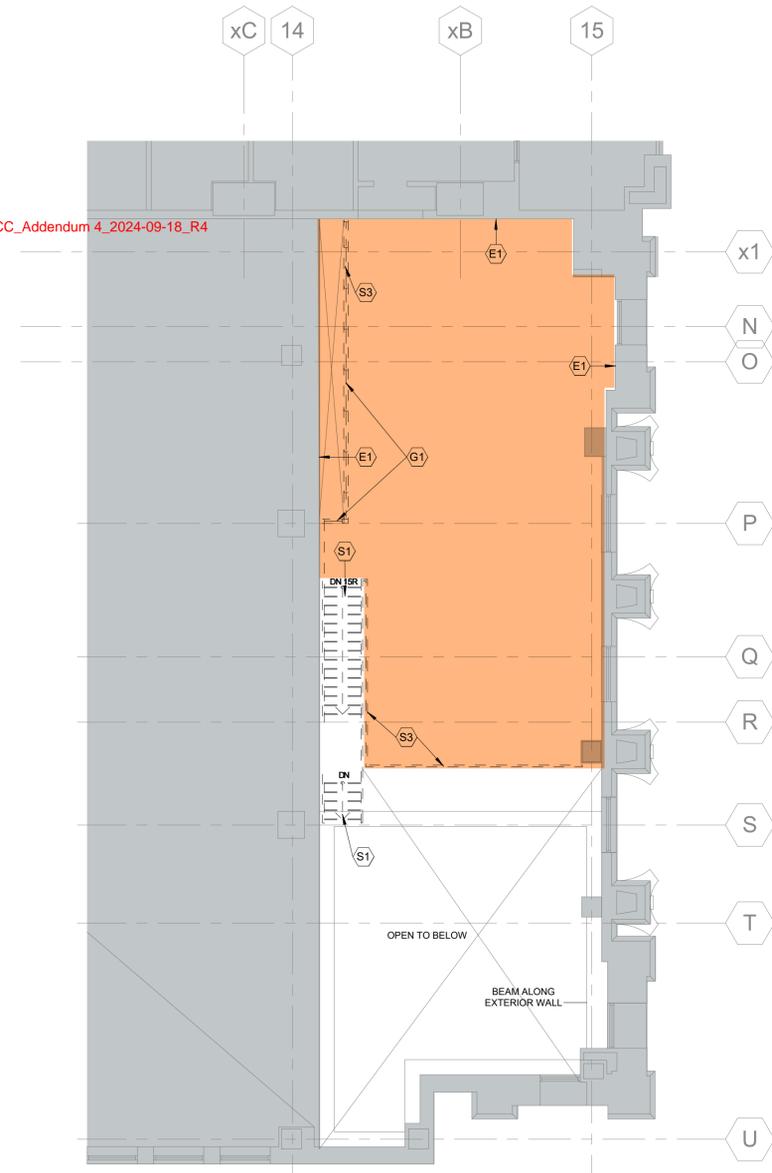
Drawing Title:

**DEMOLITION PLAN -
LEVEL 05M (MHDU)**

Project No.: 0020711.00 Checked by: Checker

D0105M

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1 LEVEL 05 MEZZANINE - DEMOLITION PLAN (MHDU)

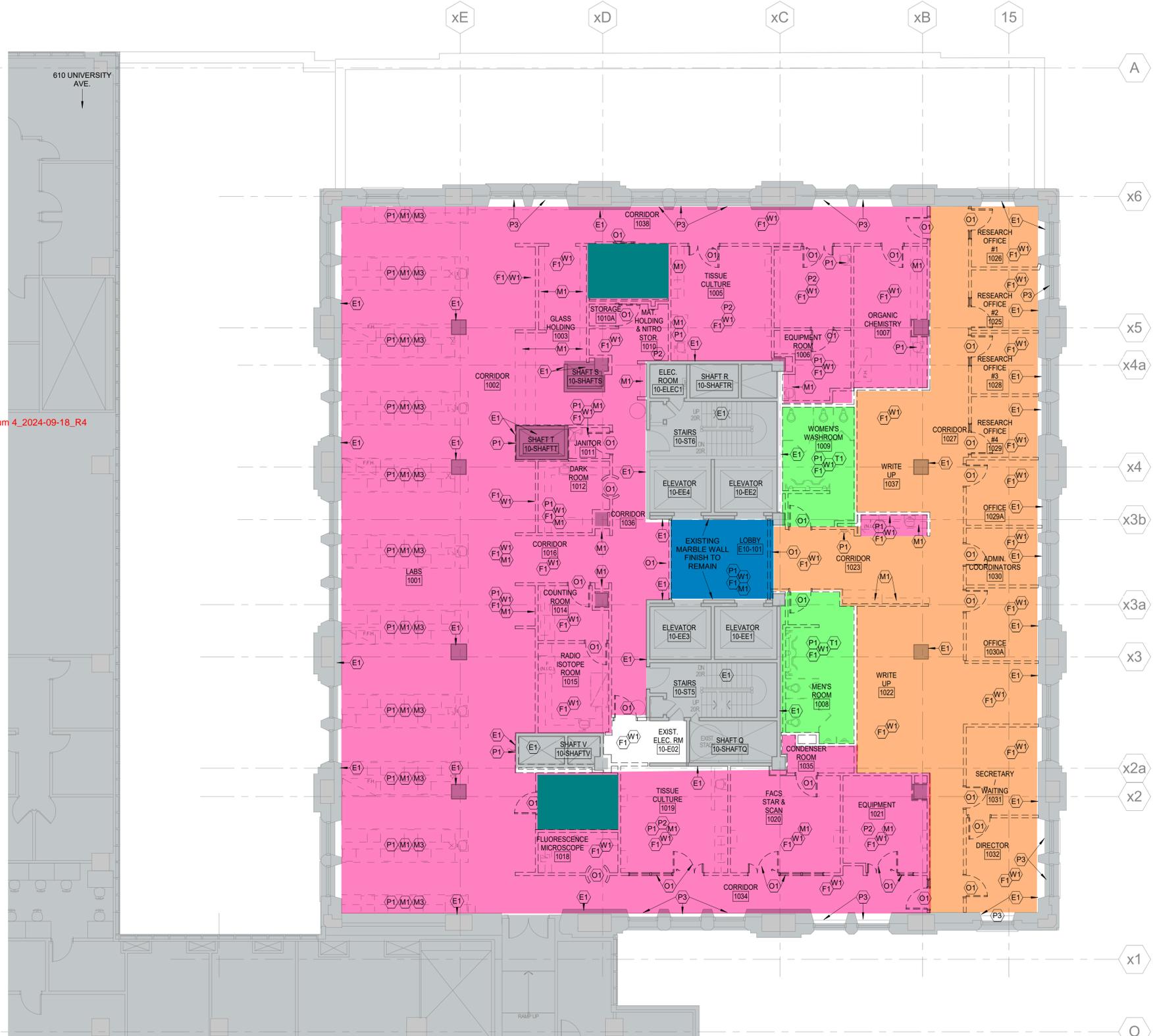
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1 LEVEL 10 - DEMOLITION PLAN

1 : 100



DEMOLITION KEYED NOTES: XX

No.	DESCRIPTION
D1	REMOVE AND DISPOSE EXISTING FRIDGE ROOM ASSEMBLY INCLUDING ALL HANGERS AND SUPPORTS, LIGHTS, GRILLES, SPEAKERS, SMOKE DETECTORS, SPRINKLERS, CURTAIN TRACKS, CONTROL JOINTS ETC. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR FULL EXTENT OF WORK.
D2	REMOVE AND DISPOSE EXISTING EXISTING SHELVES AND BOOKS AND STUDY CAROLS
E1	EXISTING AREA TO REMAIN. PREP EXISTING SURFACES WHERE IMPACTED BY NEW WORK TO RECEIVE NEW FINISH.
E3	EXISTING EXPANSION JOINT TO REMAIN.
F1	REMOVE AND DISPOSE ALL EXISTING FLOORING AND BASE INCLUDING, ADHESIVES, ETC. TO EXPOSED CONCRETE. PREPARE SURFACE TO RECEIVE NEW FLOORING AS INDICATED IN THE ROOM FINISH SCHEDULE.
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M1	REMOVE AND DISPOSE EXISTING MILLWORK / CASEWORK. PATCH ALL EXISTING SURFACES TO REMAIN TO MATCH ADJACENT EXISTING OR PREPARE SURFACE TO RECEIVE NEW FINISH AS INDICATED IN THE ROOM FINISH SCHEDULE. MAINTAIN FIRE SEPARATIONS (WHERE APPLICABLE). COORDINATE WITH MECHANICAL & ELECTRICAL FOR FULL SCOPE OF WORK
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Princess Margaret Cancer Centre Stem Cell Transplant 2

Part B (MHC, MHDU, DSC)

CANNONDESIGN

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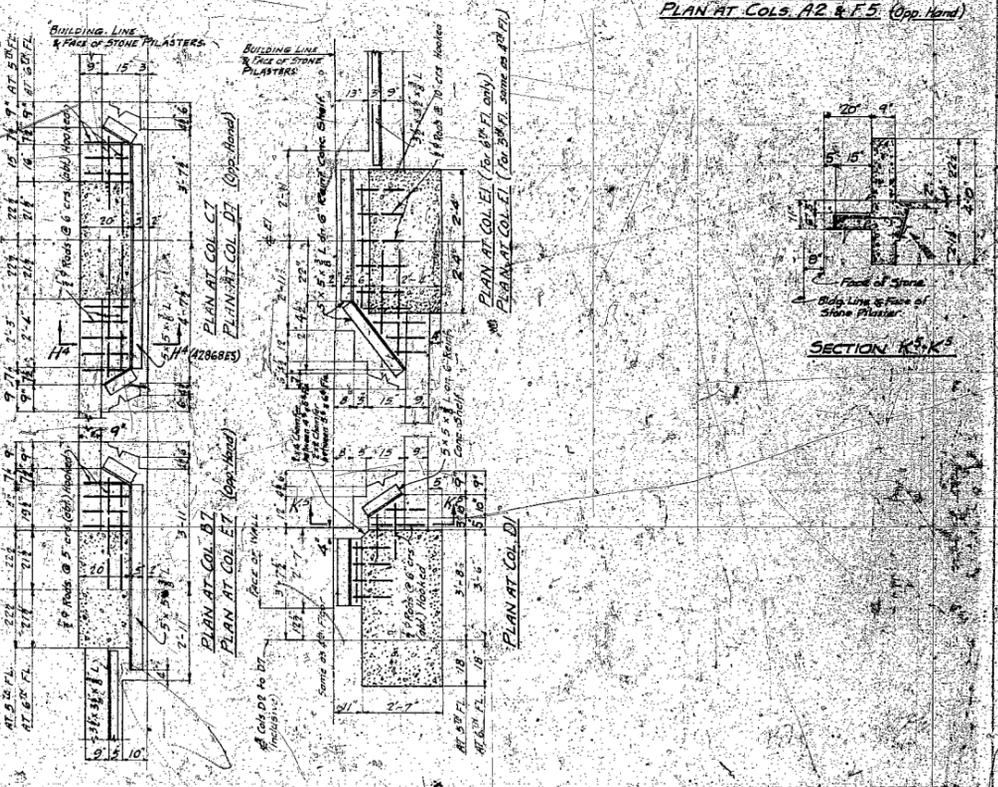
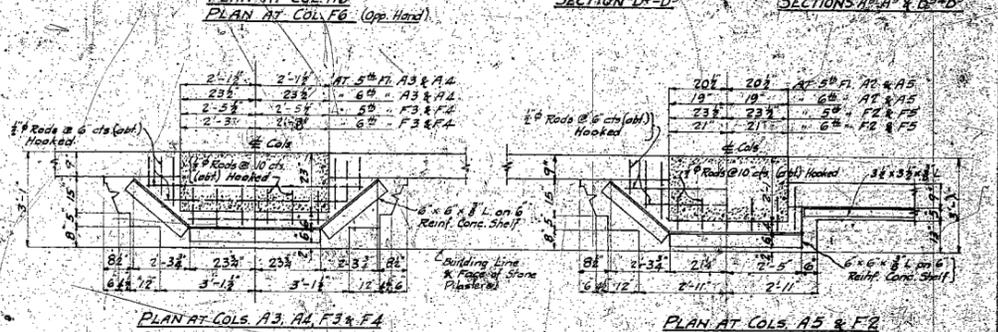
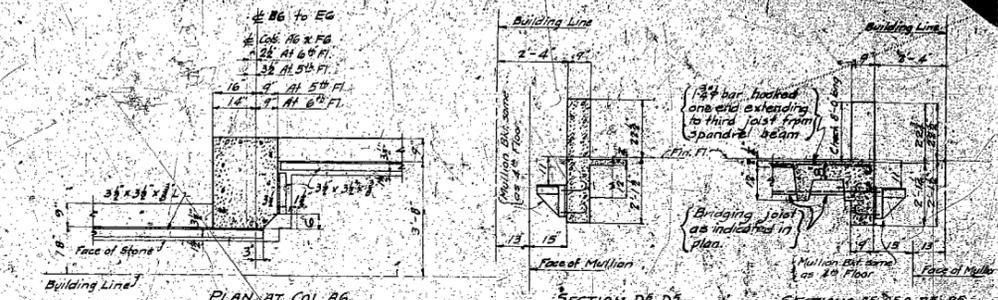
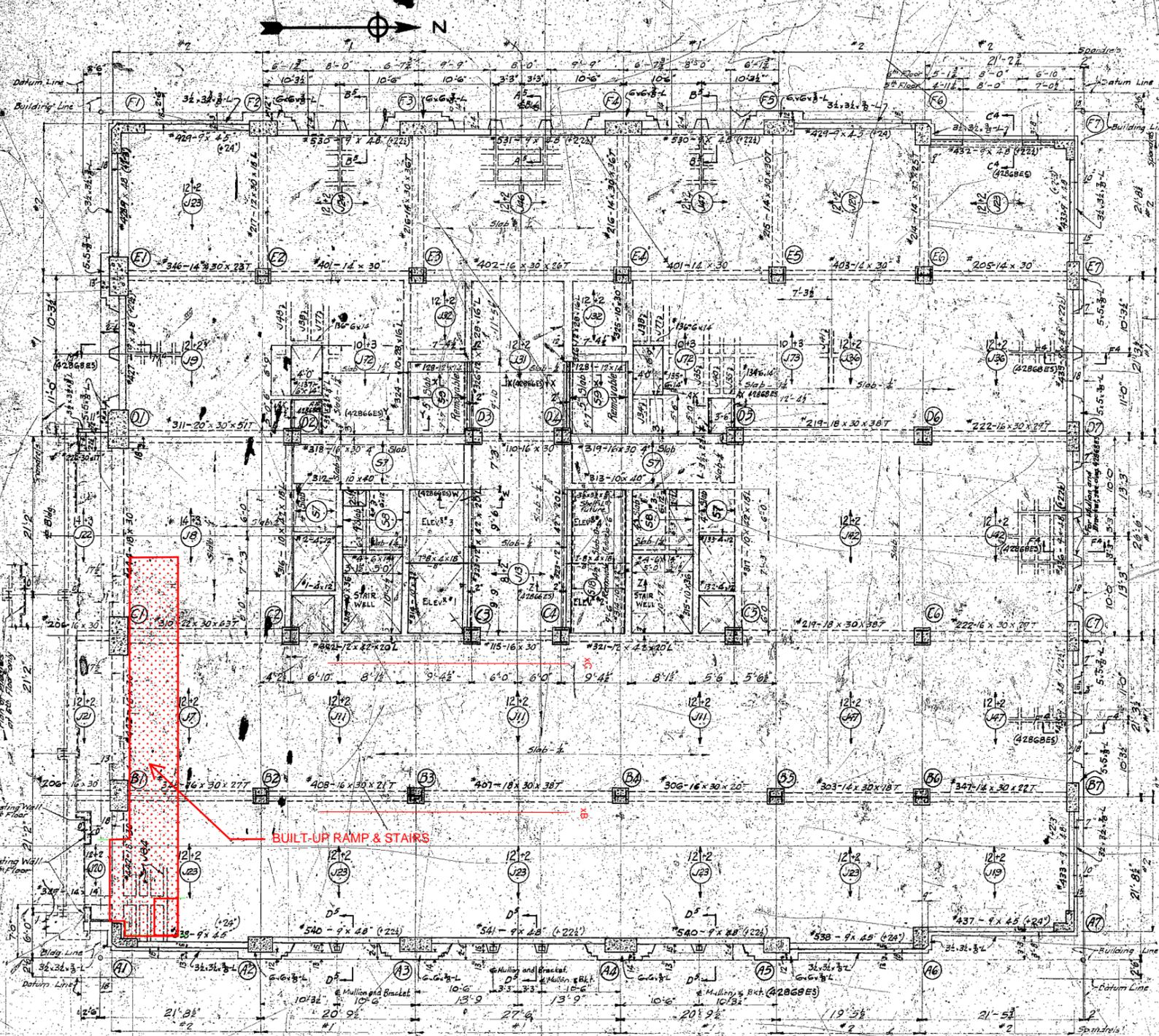
Drawing Title:

DEMOLITION PLAN - LEVEL 10 (DSC)

Project No.: 0020711.00 Checked by: Checker

D0110A

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REFERENCE DRAWINGS:-
 Beam Reinforcing Schedule 40873ES & 43023ES
 Joist Reinforcing Schedule 40830ES

Elevation of Finished Fifth Floor - 382'-6"
 Elevation of Finished Sixth Floor - 394'-6"
 Live Load on Panels (A1)-(A16) and 7'-2 1/2' strip South of these Panels - 125 lbs. per sq. ft.
 Live Load on Balance of Floor - 75 lbs. per sq. ft.
 Shelf Angles to be supported by 3/4" Anchors, 12" long, hooked, spaced at obt. 12" ctrs.
 For General Notes and Reference Drawings, see dwg. 42865ES
 Change in size of Wall Columns occurs at top of highest spandrel beam flashing into Column. Dimensions and details of Columns shown on plan apply to tier below Floor on which this information is given.

HARRISS AND HERTZBERG
 CONSULTING STRUCTURAL ENGINEERS
 TORONTO, ONT.

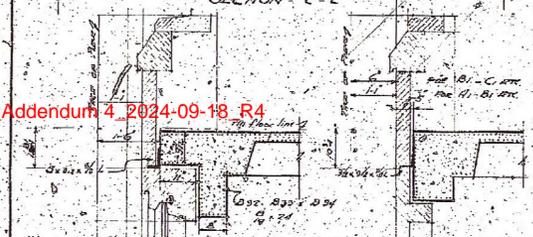
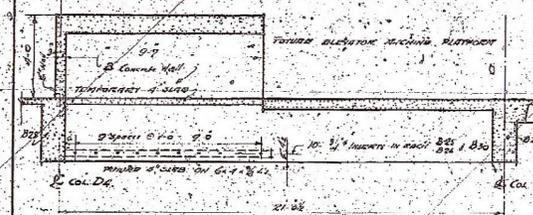
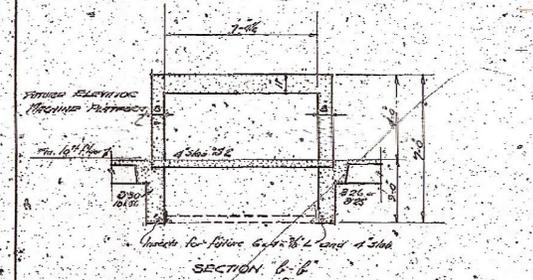
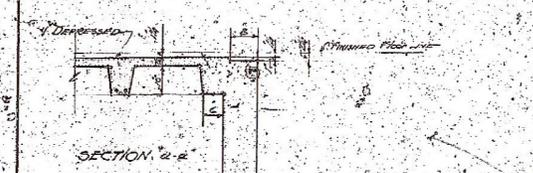
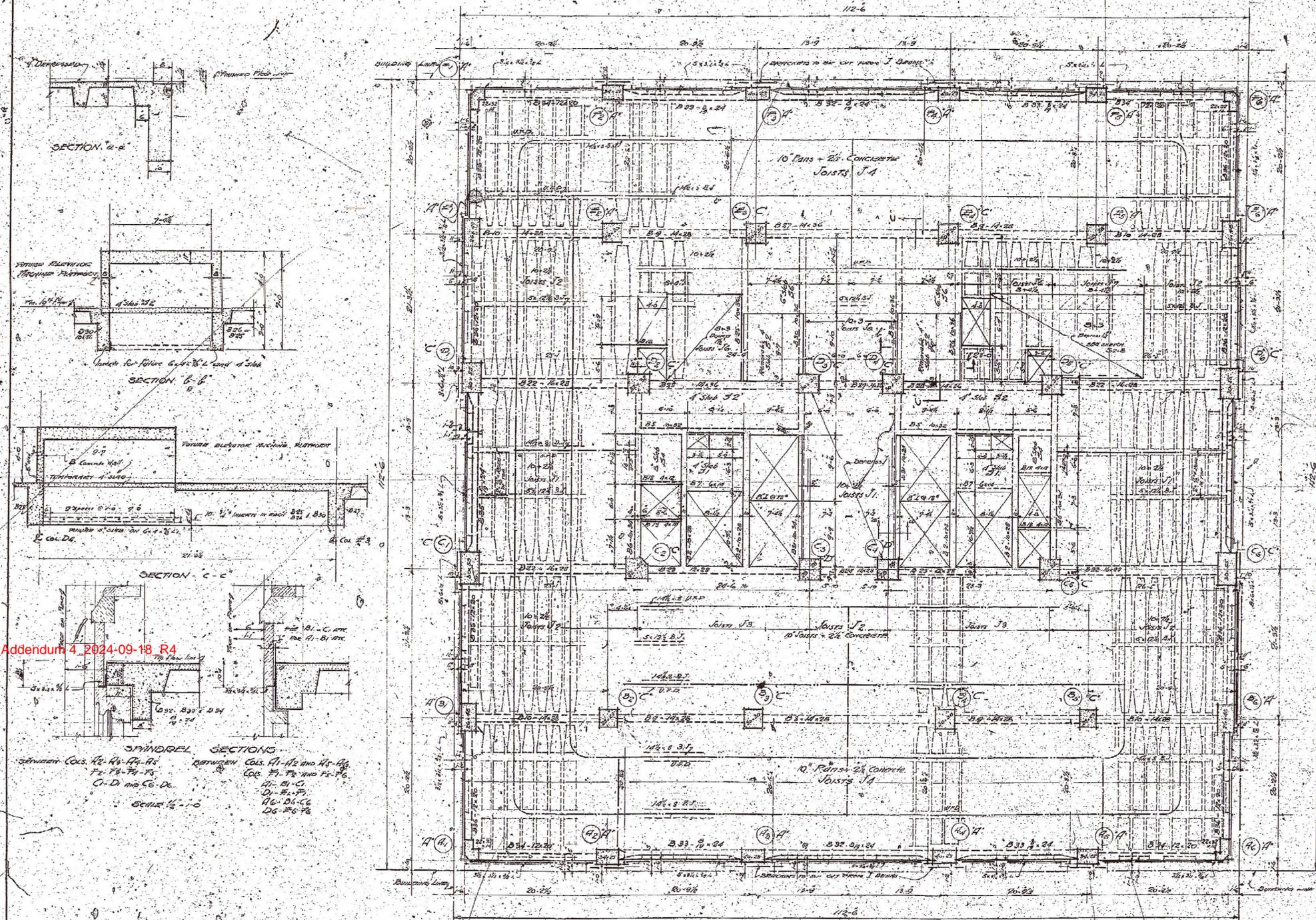
REVISIONS	DATE	REMARKS	CHECKED	BY

HYDRO-ELECTRIC POWER COMMISSION
 OF ONTARIO

ADMINISTRATION BUILDING
 5TH & 6TH FLOORS
 CONCRETE

DRAWN BY: [Name]
 CHECKED BY: [Name]
 DWG. NO. 42869ES
 DATE: KI-23

NOTES:-
 ALL BEAMS AND SLABS SHALL BE CONCRETE
 COLUMNS SPACED AT 2000' ON CENTER
 CEILING HEIGHTS 10' 0" ON CENTER
 DIMENSIONS SHOWN IN 3000' ON CENTER
 DIMENSIONS SHOWN IN 3750' ON CENTER
 MAKE 100% FOR DOUBLE END
 USE 100% RIBBED SLAB
 INCLUDE ALL CURBS, DIMENSIONS TO
 CEILING FINISHES
 160 IN.
 INDICATES SINGLE CURB
 INDICATES DOUBLE CURB
 ANY CURBING SHALL BE WITHIN 2' OF THE FINISHED FLOOR IS TO BE
 COMPLETED WITH A 1/4" MIN. DEPRESSION TO AN EXPOSED REBAR AND
 CONDUIT
 FOR SPACING OF JOISTS AND THE SPACING OF DISTRIBUTION BEAMS SEE
 SECTION DRAWINGS BY THE DESIGNER'S OFFICE
 USE APPROPRIATE JOIST AND BEAM NUMBERS
 ALL CURBING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE
 CONTRACTOR
 DESIGN CONTRACTOR NOTES THE CONTRACTOR IS TO PROVIDE THE
 DEPTH OF DEPRESSIONS AND SHALL BE RESPONSIBLE FOR THE
 PROTECTION OF ALL CURBING, WITH PROTECTIVE CURBING SHALL
 BE PROVIDED AND SHALL BE MAINTAINED
 ALL STEEL ANGLES AND BRACKETS TO HAVE 3/4" HOLES IN PATTERN
 1/4" GAPS, INCLUDING ALL CURBING CONNECTIONS



SPINDREL SECTIONS
 BETWEEN COLS. A6-A7-A8-A9
 F7-F8-F9-F5
 C-D AND C6-D6
 SECTION 1/2-1-2
 BETWEEN COLS. A1-A2 AND A3-A4
 COLS. F7-F8 AND F5-F6
 A1-A2-C1
 D1-E1-F1
 A6-A7-C6
 D6-E6-F6

UHN_PMCC Addendum 4 2024-09-18_R4

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HYDRO. ELECTRIC POWER COMMISSION
 OF ONTARIO
 ADMINISTRATION BUILDING
 DRAWING No. 54 SCALE 1/8"=1'-0"
 DRAWN BY Z.M.H.
 A.E.C. APRIL 27/40
 SPROATT & YOUTH ARCHITECTS
 HARRISBURG
 PENNSYLVANIA

Project Name: UHN PM Stem Cell Transplant Phase II Part A **Date Issued:** September 25, 2024
Quasar Project #: HC-21-058

Distribution

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Addendum #: M-3
Revision #: 0

This Addendum forms part of the Contract Specifications and Drawings, and modifies the Bidding Documents, with Amendments and Additions noted below. This Addendum shall be added to the front of the specifications as issued. Bidders shall acknowledge receipt of this Addendum in the space provided in the Bid Form and include in bid amount.

This addendum includes modifications to the drawings and specifications as summarized below. Unless otherwise noted, all drawings listed below are attached herewith. Changes to drawings are highlighted with a revision bubble; include for all changes highlighted in the revision bubbles including, but not limited to, those items described below. Answers to Requests for Information below shall form part of the project specifications and are identified in bold following QCG (Quasar Consulting Group).

Requests for Information:

1. (98) According to keynote #5, control valves of AH-001 and AH-002 need to be replaced. Please provide existing pipe size or coil flow rate.

QCG M: (98) This has been clarified as part of Addendum M-3.

2. (100) According to detail 2 on drawing M7504, medical gas pressure needs to be monitored by BAS through analog inputs. Based on 22 60 00.02 on drawing, dry contacts are available for remote monitoring. Can BAS contractor just monitor medical gas pressure through dry contacts in medical gas alarm panel instead of analog input?

QCG M: (100) Analog inputs are to be provided as shown. Additionally, medical gas alarm panel low and high level alarms shall be monitored at the BAS.

3. (132) The heating water schematic on mechanical drawing M7013 shows a glycol fill tank however the pipes are tagged heating water not glycol heating. Please confirm if this system is filled with water or glycol?

QCG M: (132) This has been clarified as part of Addendum M-3.

4. (133) The heating water schematic on mechanical drawing M7013 shows a pipe size of 4" however the corresponding plan view drawings M2406C & M2405B show a pipe size of 3". Please confirm the correct pipe size.

QCG M: (133) This has been clarified as part of Addendum M-3.

5. (218) Princess Margaret BAS requirement Rev 2 is included in mechanical specifications. Please confirm this is the latest version.

QCG M: (218) The updated Princess Margaret BAS Requirement Specification Rev 2.3 was provided as part of Addendum M-2 to replace Rev 2.

6. (219) For FCU and reheat coil control, there are 2 options, wall mount BACnet thermostat or BACnet controller with separate wall mount space temperature sensor. Which one does UHN prefer? If using BACnet controller with separate wall mount space temperature sensor, does BAS contractor have to mount BACnet controller on the wall within a NEMA 1 enclosure?

QCG M: (219) There will be no wall mount BACnet thermostats. The controllers shall be installed in control cabinets with a backplate and a door that can be fully opened. The location(s) of the cabinets shall be confirmed with the Facilities team.

7. (238) For transferring the custom air handling unit to the mechanical room, Is there any freight elevator? If yes, what are the dimensions (Width x Height) ?

QCG M: (238) The elevator dimensions and weight capacity are as follows for the service elevator SFE: wxdxh – 77”x106”x120”, weight capacity – 2700 kg, door openings are 5’x 8’.

8. (239) What is the opening size for mechanical room that the custom air handling unit is fit into? Single door or doubled?

QCG M: (239) Air handling unit is to be fully field assembled on site in accordance with the added Air Handling Unit specification section provided as part of Addendum M-2. Prior to delivery, the AHU must also be factory assembled, tested and inspected in accordance with the specifications. Refer to RFI response 238 for elevator opening size. Equipment path shall be delivered from loading bay through freight elevator SFE1, and through double doors via the Electrical Substation room 6-502. Refer to Arch Addendum 4 for updated Construction Control Plan.

9. (260) Please provide FanCoil Unit Specification.

QCG M: (260) This has been provided as part of Addendum M-3.

10. (261) Please provide UV light Specification and requirements (intensity on the coil).

QCG M: (261) The AHU UV light specification has been added as part of Addendum M-3.

11. (262) For AH-033A/B please confirm if the unit is to be shipped as a single pc as shown in M7009

- a) Mechanical New Work / Demolition drawings M2306A does not show an opening where and how the unit is to enter the Building/Mechanical room
- b) Please provide Opening location and Opening Dimensions the unit is to go though
 - i. There is very little space to maneuver the entire AH-033A/B unit between AH-022 and the Column next to 1000x800 duct (M2306A Detail 3).
 - c) If it is to be split, please provide Max unit section dimensions.

QCG M: (262) a) Air handling unit is to be fully field assembled on site in accordance with the added Air Handling Unit specification section provided as part of Addendum M-2. Prior to delivery, the AHU must also be factory assembled, tested and inspected in accordance with the specifications.

- b) Refer to RFI responses 238 & 239 for delivery path and opening size.
 - i. Refer to 262a response.
 - c) Refer to 262a response.

12. (263) AHU Drawing M7009, shows VFD, and they appear to be mounted on the unit.

- a) Please confirm who is responsible for providing VFDs (AHU manufacturer, or Installing Mechanical or Electrical contractor)
 - i. Electrical Drawing E6001 notes STARTER BY PACKAGE DIV.20
 - ii. AHU Specs 23 75 00 2.12 .5 references the VFD and the Sec 20 as well.
- b) Wiring Diagram, Detail 2 on the Same drawing notes VFD part # ACH580-VDR-017A-6+F267, which is different than what it noted in the Sec 20 05 13.13 VFDs
 - i. Nama1 vs Nema12, does not show the Input Harmonic Filter & dv/dt Output Filter
- c) Section 3.8: Building Automation Systems also notes additional requires (Page 3.8.2), contrary to 237500.2.13.4 combination motor starter for each fan motor, secured to exterior of fan section casing and pre-wired to fan motor
 - i. VFD operational parameters must be maintained within 30%-100%
 - ii. VFD'S to installed on a uni-strut (even when wall mounted).
 - iii. VFD's must never be installed onto the Air Handling Units.
- d) Please confirm what is the AHU manufacturer 's scope as it relates to the Motor / VFD

- i. To provide a conduit / flex at motor & a junction box outside, for the Installing contractor / electrician to run conduit to the VFD from J-box outside of the unit, and pull and connect wires to the VFD and motor
- ii. Please note that this will also entail a Field Electrical Evaluation for the AHU.

QCG M: (263) (a) Air Handling Unit VFDs are to be provided by AHU manufacturer in accordance with specification section 20 05 13.13 Article 3.01.9.
(b) Refer to specifications for VFD requirements.
(c) Follow BAS guidelines specifications. VFDs are not to be installed onto the Air Handling Units, and are to be mounted on Unistrut outside of AHU on site.
(d) Provide conduit at motor and junction box outside for wiring to be completed by Mechanical Contractor as described in (i).

13. (264) AH-33A/B fan schedule SF-033A/SF-033B notes 498Pa ESP & 1120 TSP, on Drawing M6000
- a) Please confirm what Pre and Final filter Loading was considered
 - b) Noting also, 13.95 BHP motor, this selection is at 93% of the Motor 15HP,
 - i. there might not be room to increase the speed, filter loading, duct leakage, AHU plenum losses, etc.

QCG M: (264) The motor sizing accounts for pre and final filter loading.

14. (265) For Tagging purposes of AH-33A/B, please confirm which is Upper Section and Which is lower section unit.

QCG M: (265) AH-033A is the upper section of the air handling unit, AH-033B is the lower section of the air handling unit.

15. (266) Drawing M2306A Detail 3, shows a 1000x800 duct to lower Section unit, while AHU drawing on M7009 shows a 1300x675 damper.
- a) There is a column at end of unit shown in M2306A Detail 3, it ends approx. 700mm away from the AHU front while the Duct shown at the AHU is 681mm, there is potential interference and there is no room for duct insulation.

QCG M: (266) The supply air opening to the AHU is to be coordinated to match duct size as shown. All dimensions and air handling unit openings are to be verified and coordinated by the mechanical contractor prior to shop drawing submission.
a) The column referenced is within the outdoor air plenum at high level and not behind the unit.

16. (267) Any provisions to assist in SA Fan Motor removal / replacement from inside the unit (motor removal rail)
- a) Notting a 15HP TEFC motor weight is ~ 260LBs (118kg).

QCG M: (267) An I-Beam rail is required within each fan section to facilitate fan replacement as noted in the mechanical schedule. This was further clarified as part of the added Air Handling Unit specification section provided in Addendum M-2.

17. (268) Int the AHU drawing on M7009 show a connection to humidifier at the back of the AHU
- a) Mech Drawing M2306A Detail 3, AH-033A/B are back -to-back with AH-022, and Columns at S14 and P14 appear to touch both units. There does not appear to be access.
 - b) Electrical Drawing E2106A Detail 2, shows Disc Switch in the same location, is there enough Clearance as noted in Electrical code
 - i. Note 4 does provide a provision for: EXACT LOCATION TO COORDIANTE WITH MECH. ON SITE.

QCG M: (268) a) the humidifier connection is intended to be at the front of the AHU. This can be further updated via shop drawing submittal.
b) The disconnect is to be located on the serviceable side of unit. Final connection of feeder and disconnect is to be coordinated on site as to comply with OESC clearance requirement for local disconnect.
l) Revsed note 4: "Exact location to be coordinated with mechanical contractor on site."

18. (270) Please clearly define AH-033A/B Control Scope of work, to avoid misunderstanding and either Pricing overlap or worse gaps.

- a) Section 23 75 00. 2.11 .1 refers to Control system components required for within air handling unit enclosures are to be in accordance with and compatible with product requirements specified in Section 25 05 02 – Building Automation System, and factory installed at air handling unit manufacturer's plant.
- b) Is the BAS Contractor responsible for the AH-033 Control panel
- c) Can the BAS Contractor carry the cost and coordination of the Control items, including damper actuators for the AHU Unit Mounted and other duct mounted Dampers, Valves ect. to have consistency throughout the project.
 - i. AHU manufacturer to install said Control devices, run conduit and wire them to and common junction box, with enough cable rolled in around the junction box to connect to the AHU control panel
 - BAS controls contractor / their electrician to run conduit between the Junction box and Control panel, pull the cable and terminate at the controller
 - If the AHU is to be split,
 - a. Junction boxes and Flex connections to be provided at each split
 - i. Enough wire to be provided & coiled at the split, and the Controls Contractor/Electrician to reconnect all AHU splits and pull the cables to the Control panel.
 - b. Or each section control devices to be pulled to a common junction box on top of the AHU
 - i. Enough wire to be provided & coiled at the split, and the Controls Contractor/Electrician to reconnect all splits and pull the cables to the Control panel.
 - ii. Conduit diameters on top of the AHU will need to be coordinated.

QCG M: (270) The AHU manufacturer is to provide all components identified in the air handling unit specification and schedules including, but not limited to, dampers. Controls/BAS Contractor is to provide all control components, including but not limited to damper actuators, for field installation to be completed on site. Control wiring is to be completed by the Controls/BAS Contractor. Refer to revised Specification Section 23 75 00 included as part of Addendum M-3 for scope clarification.

19. (271) M7009 drawing shows K & M, Humidifiers after the Heating coil in AH-033A and in AH-033B, while M7502 Control Schematic shows only One and after unit Isolation Dampers. Please confirm, update the control drawing if needed.

QCG-M: (271) Humidifiers serving AH-033A/B are to be located within the AHU as per drawing M7009. The control sequence has been clarified by Addendum M-3.

20. (272) M7009 drawing shows K & M, Humidifiers after the Heating coil, without a Dip pan underneath with drain or SS construction in that section, please confirm if this is acceptable. There is no reference to the humidifier section contraction in the AHU spec.

QCG-M: (272) A drain pan is required for the humidifier section. Refer to added specification section as part of Addendum M-3.

21. (273) Who is responsible to provide the Humidifier Control valve(s).

QCG-M: (273) The controls contractor is responsible for all control valves.

22. (275) Would we recommend to have a High-Pressure switch in each SA fan section, before the Isolation damper, in addition to the common Duct pressure switch.

QCG-M: (275) Facilities does not wish to have an additional switch added.

23. (276) Sec 23 xx xx – FanCoil Units, please consider Total Comfort Solutions as Equal.

QCG-M: (276) The list of acceptable manufacturers within the fan coil unit specification are to be used. Fan coil unit specification has been issued as part of Addendum M-3.

24. (277) Sec 23 75 00 – AHUs, please consider MAFNA as Equal, Mafna has provided AHUs to many UHN locations.

QCG-M: (277) The list of acceptable manufacturers within specification section 23 75 00 are to be used for Custom Air Handling Units.

25. (298) Please confirm VFD's will be supplied & Installed by others.

QCG-M: (298) VFDs are to be supplied and installed by the Mechanical Contractor. Refer to Addendum M-3 specification revisions for clarification.

26. (318) 1) Request from HVAC equipment supplier to be added to spec
Section 23 75 00 - Custom Air Handling Units

- Specification section 2.01 – 1

Can we use Modular Systems custom AHUs

<https://modular-systems.ca/>

- Specification section 2.01 – 3

Please confirm maximum dimensions for each section (W x H x L)

- Specification section 2.03 – 1 – 9

Can we use 2" Foam Insulation meeting 25/50 flame spread/smoke developed ratings?

- Specification section 2.10 – 4

Is the Belimo damper actuator provided by the AHU manufacturer or the Control Contractor?

QCG-M: (318) Refer to Addendum M-2 for response.

27. (315) Please clarify whether steam HX-1,2 are supposed to be complete pre-piped package s or loose heat exchanger with loose control valve and trap? If needs to be a complete package, please provide a complete specification on the design.

QCG-M: (315) Refer to Addendum M-1 for response.

28. (326) The heating water schematic on mechanical drawing M7013 shows a glycol fill tank however the pipes are tagged heating water not glycol heating. Please confirm if this system is filled with water or glycol?

QCG-M: (326) This has been clarified as part of Addendum M-3.

29. (327) The heating water schematic on mechanical drawing M7013 shows a pipe size of 4" however the corresponding plan view drawings M2406C & M2405B show a pipe size of 3". Please confirm the correct pipe size.

QCG-M: (327) This has been clarified as part of Addendum M-3.

30. (335) For this project (UHN PMCC), the client has specified Antec Controls as the basis of design for Lab Air Valves

I have attached a extract of the specification marking the comparison between Antec & Accutrol.

Our valves are much easier to commission and provide a 5-year warranty for manufacturing defects. ESC will provide any commissioning assistance necessary to complete the project along with your controls contractor.

We also have Environmental Monitoring & Control System (Section 25 05 01, Point 2.05 & 2.06), again the engineer has specified Setra as basis of design and equivalent models as acceptable - Accutrol ISO-Tek Room Pressure Monitor & Iso-Tek Central Monitor. We can price for both these items as a package and commission them at site.

QCG-M: (335) Air valves meeting the performance requirements of the air valve specification will be accepted provided that the valves are actuated by Belimo and directly controlled by Distech, and the environmental monitoring is equal to Setra.

31. (336) Request from HVAC equipment supplier to be added to spec requesting addition of Ingenia to list of acceptable manufacturers in Section 23 75 00 – Custom Air Handling Units please? We have supplied Ingenia air handlers on previous Quasar projects.

QCG-M: (336) Refer to Addendum M-2 for response.

32. (360) Is there only one new AHU fir 5th Floor?

QCG-M: (360) Refer to Addendum M-2 for response.

33. (376) Princess Margaret BAS requirement Rev 2 is included in mechanical specifications. Please confirm this is the latest version.

QCG-M: (360) Refer to response to RFI-218.

34. (377) For FCU and reheat coil control, there are 2 options, wall mount BACnet thermostat or BACnet controller with separate wall mount space temperature sensor. Which one does UHN prefer? If using BACnet controller with separate wall mount space temperature sensor, does BAS contractor have to mount BACnet controller on the wall within a NEMA 1 enclosure?

QCG-M: (377) Refer to response to RFI-219.

Changes to Drawings:

1. **Drawing M0002 – MECHANICAL LEGEND**
 - Revision to laboratory gas symbol description, as indicated.
2. **Drawing M1410 - HVAC PIPING - DEMO WORK - LEVEL 10**
 - Addition of keynote 4, as indicated.
3. **Drawing M2406A – HVAC PIPING – MECH ROOM - LEVEL 6 - I**
 - Revisions to steam and condensate piping, and keynotes, as indicated.
4. **Drawing M2406B – HVAC PIPING – MECH ROOM - LEVEL 6 - II**
 - Revision to keynote 5, as indicated.
5. **Drawing M2406C – HVAC PIPING – MECH ROOM - LEVEL 6 - III**
 - Revisions to steam piping and addition of condensate piping, and additional notes, as indicated.
6. **Drawing M6000 – MECHANICAL SCHEDULES**
 - Addition of AIR HANDLING UNIT - HUMIDIFIER schedule, as indicated.
 - Revisions to DUCT MOUNTED STEAM HUMIDIFIER schedule, as indicated.
 - Revisions to electrical data for EF-1 and EF-2, as indicated.
7. **Drawing M7010 – VENTILATION SCHEMATIC I**
 - Revision to drawing notes and addition of keynote 7, as indicated.
8. **Drawing M7011 – VENTILATION SCHEMATIC II**
 - Revision to drawing notes, as indicated.
9. **Drawing M7012 – VENTILATION SCHEMATIC III**
 - Revision to general notes, as indicated.
10. **Drawing M7013 – HEATING WATER SCHEMATIC**
 - Removal of glycol fill system and revisions to pipe sizes, as indicated.
11. **Drawing M7502 – MECHANICAL CONTROL SEQUENCE III**
 - Revisions to AHU control sequence and additional general notes, as indicated.

- 12. Drawing M7503 – MECHANICAL CONTROL SEQUENCE IV**
- Revisions to AHU control sequence and additional general notes, as indicated.
- 13. Drawing M7504 – MECHANICAL CONTROL SEQUENCE V**
- Revision to 23 00 00.01 control sequence and revision of glycol reference to heating water, as indicated.
- 14. Drawing M7506 – MECHANICAL CONTROL SEQUENCE VII**
- Revision to motorized damper connection and addition of drawing notes, as indicated.

Changes to Specifications:

- 1. Refer to added Specification Section 23 82 19 titled “Fan Coil Units”, attached herewith, and include for all requirements as indicated.**
- 2. Refer to Specification Section 23 75 00 titled “Custom Air Handling Units”, attached herewith, and include for all blackline revisions as indicated.**
- 3. Refer to Specification Section 20 05 13.13 titled “Variable Frequency Drives for Mechanical Equipment”**
 - a. Remove Article 1.04 titled “Coordination with Mechanical Divisions”
 - b. Refer to Article 2.03.2 and revise to read as follows:
“.2 VFDs serving motors sized 7.5 kw (10 HP) or more to be provided with harmonic filters to limit harmonics distortion produced by each drive to following maximum levels as measured on input side of drive:
 - .1 Total harmonic distortion (voltage) – 5%;
 - .2 Total harmonic distortion (current) – 10%.”
 - c. Refer to Article 3.01.9 and revise to read as follows:
“.9 Where VFDs are required for custom made air handling units VFDs to be supplied, and "load" side connected to fan motors by air handling unit manufacturer. "Line" side power wiring to these VFDs to be provided as part of Electrical Divisions work.”
 - d. Remove Article 3.02 titled “Installation of Variable Frequency Drives”
- 4. Refer to Specification Section 22 13 00 titled “Facility Sanitary Sewerage”**
 - a. Add Articles 3.05.4 to 3.05.8 to read as follows:
 - “.4 Drain cleanouts shall be installed in places that provide 100% access to any drain piping point for cleaning.
 - .5 Where possible, cleanouts should be mounted on walls as a priority. The ceiling and floor should be considered exceptional installment locations, and the necessity of it should be proven.
 - .6 All cleanouts should be designated in the “as-built” drawings, listed in the relevant valve charts and provided to UHN.
 - .7 At the site, all cleanouts should be marked with lamacoids/labels:
 - .1 The labels should be made of plastic base, with a dark blue background and white text of plain readable font such as calibri or similar.
 - .2 The labels should contain the words “DRAIN CLEAN OUT” (of 16mm high font) and information about areas this cleanout serves (of 6mm high font).
 - .3 The label should be 75mm wide, the height may vary depending on the additional text quantity.
 - .4 Design label example:



- .5 If a cleanout is installed on the floor or ceiling, the appropriate label should be mounted on the wall nearby and contain an additional arrow pointing in the cleanout direction:



- .8 Rooms containing cleanouts should have the corresponding label above the entrance door at the door frame (w75xh25mm, 8mm high font):



5. Refer to Specification Section 23 21 00 titled "Hydronic Piping and Pumps"

- a. Add Article 2.03.3 to read as follows:

"3 All shut-off valves which isolate Air Handling Unit heating and cooling control valves, heat exchanger heating water control valves, and hydronic pumps shall be stainless steel valves by Bray. No alternate. Valve body, stem, and paddle shall be stainless steel."

- b. Refer to Article 2.21.1.3 and revise to read as follows:

"3 TEFC vertical mount motor by Baldor."

- c. Remove Article 2.22 titled "Split Coupled, Dual, Vertical In-Line Pump"

- d. Remove Article 2.23 titled "Split Coupled, Dual, VFD Drive Vertical In-Line Pump"

6. Refer to Specification Section 23 30 05 titled "Inspection and Cleaning of Ductwork"

- a. Refer to Articles 1.01.2, and revise to read as follows:

"2 The ventilation inspection must include a written report and a colour video of the system after cleaning. Cleaning is to be performed by robots to ensure maximum access to the ductwork while the Air Handling Unit (AHU) is under a vacuum pressure and exhausted through a HEPA Filter System."

7. Refer to Specification Section 25 05 01 titled "Automatic Control Systems"

- a. Add Article 1.04 as follows:

"1.04 WARRANTY

- .1 The Building Automation System and associated equipment shall be warranted for a period of not less than 2 years from the date of commissioning against defects in materials and workmanship.
- .2 The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc."

- b. Refer to Article 2.01.2 and revise to read as follows:

".2 Control systems are to follow Section 25 05 02.01 Princess Margaret BAS Guidelines and Princess Margaret BAS Requirements Rev. 2.3 and Section 25 05 02.02 UHN Design & Construction Guidelines Section 3.8 Building Automation System. Where conflicts arise between this specification section and the above referenced Guidelines, the more expensive option shall govern and successful bidder shall submit a summary of conflicts for review within 4 weeks of contract award."

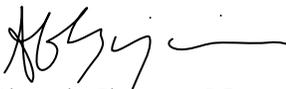
- c. Refer to Article 2.02 titled "Automatic Control Valves and Operators" and add Article 2.02.11 to read as follows:

".11 Heating and cooling control valves and associated valve actuators shall be by Belimo, no alternate."

- d. Refer to Article 2.03.5 and revise to read as follows:

".5 Electric damper operators to be Belimo EF Series 24 volt or 120 volt AC spring return, direct coupled electric motor operators for either modulating or 2 position control as required. Each operator is to be overload protected and complete with an enclosure to suit the mounting location."

Quasar Consulting Group



Alexandra Blagojevic, P.Eng.
Sector Lead

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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9	ISSUED FOR ADDENDUM M-3	2024-09-18
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
5	ISSUED FOR 95% CD SUBMISSION	2023-09-06
4	ISSUED FOR 90% CD SUBMISSION	2023-07-31
3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

Rev.	Description	Date
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Drawing Title:

MECHANICAL LEGEND

1 : 1

Project No.: 0020711.00 Checked by: Checker

M0002

GENERAL	
SYMBOL	DESCRIPTION
	EXISTING TO REMAIN
	EXISTING TO BE DEMOLISHED
	EXISTING TO BE REMOVED FOR RELOCATION
	EXISTING RELOCATED IN NEW WORK
	NEW WORK
	CONNECT TO EXISTING
	AIRFLOW / PIPE FLOW DIRECTION
	PIPE TURNING DOWN
	PIPE TURNING UP
	PRESSURE REDUCING VALVE
	ROOM THERMOSTAT
	ROOM HUMIDISTAT
	PUMP
	CONTROL VALVE - TWO WAY
	CONTROL VALVE - THREE WAY
	ISOLATION VALVE
	BALANCING VALVE
	CHECK VALVE
	STRAINER - OVER 50MM WITH VALVED FLUSHING DRAIN
	PIPE BRANCH OFF TOP
	PIPE BRANCH OFF BOTTOM
	RELIEF VALVE
	PRESSURE GAUGE
	TEMPERATURE GAUGE
	CAP
	HEAT TRACING

MEDICAL GAS	
SYMBOL	DESCRIPTION
	MEDICAL AIR OUTLET
	VACUUM OUTLET
	OXYGEN OUTLET
	MEDICAL AIR
	MEDICAL VACUUM
	OXYGEN
	ALARM POINT
	ZONE VALVE BOX
	ZONE VALVE BOX/LOCAL EMERGENCY ALARM PANEL
	ALARM SENSOR WITH D.I.S.S. CONNECTION
	LOCAL EMERGENCY ALARM PANEL

LABORATORY GAS	
SYMBOL	DESCRIPTION
	LAB AIR OUTLET
	LAB VACUUM OUTLET
	NATURAL GAS OUTLET
	COMPRESSED AIR OUTLET
	LAB AIR
	LAB VACUUM
	COMPRESSED AIR
	CARBON DIOXIDE

HEATING & COOLING PIPING	
SYMBOL	DESCRIPTION
	HEATING WATER RETURN
	HEATING WATER SUPPLY
	HEATING GLYCOL RETURN
	HEATING GLYCOL SUPPLY
	HIGH TEMPERATURE HEATING WATER RETURN
	HIGH TEMPERATURE HEATING WATER SUPPLY
	CHILLED WATER RETURN
	CHILLED WATER SUPPLY
	CONDENSATE DRAIN
	PUMPED CONDENSATE
	LOW PRESSURE STEAM
	LOW PRESSURE CONDENSATE
	HIGH PRESSURE STEAM
	HIGH PRESSURE CONDENSATE
	VENT
	STEAM VENT
	UNION
	MANUAL AIR VENT
	AUTOMATIC AIR VENT
	EXPANSION COMPENSATOR
	EXPANSION LOOP
	PIPE ANCHOR
	PIPE GUIDE
	STEAM CONDENSATE TRAP
	BASEBOARD HEATER
	RADIANT PANEL TYPE - HEAT OUTPUT
	CABINET UNIT HEATER
	UNIT HEATER

PLUMBING	
SYMBOL	DESCRIPTION
	SANITARY DRAINAGE - ABOVE GROUND
	SANITARY DRAINAGE (ACID RESISTANT) - ABOVE GROUND
	DOMESTIC COLD WATER SUPPLY
	DOMESTIC HOT WATER SUPPLY
	DOMESTIC HOT WATER RECIRC.
	COLD WATER SUPPLY
	HOT WATER SUPPLY
	HOT WATER RECIRC.
	TEMPERED WATER
	ACID RESISTANT VENT
	VENT
	NATURAL GAS
	REVERSE OSMOSIS PIPING
	RADIO ISOTOPE DRAIN
	PURE WATER
	RUNNING TRAP
	P-TRAP
	EMERGENCY SHOWER
	EYE WASH
	CLEANOUT IN FLOOR/BELOW GRADE
	CLEANOUT IN CEILING
	HOSE BIBB
	NON FREEZE HOSE BIBB
	ROOF HYDRANT
	GROUND HYDRANT
	ROOF DRAIN
	CONTROL FLOW ROOF DRAIN
	VENT THROUGH ROOF
	RAIN WATER LEADER
	TRAP SEAL PRIMER
	SCUPPER DRAIN
	MANHOLE
	CATCH BASIN
	TRENCH GRATE & FRAME
	AREA DRAIN
	FUNNEL FLOOR DRAIN
	FLOOR DRAIN
	HUB DRAIN
	FLOOR SINK
	FLOOR DRAIN - FLUSHING RIM
	WATER METER ASSEMBLY
	GAS METER
	BACK WATER VALVE
	BACKFLOW PREVENTER
	WC-1

VENTILATION	
SYMBOL	DESCRIPTION
	FUSIBLE LINK FIRE DAMPER (DOUBLE LINE)
	FUSIBLE LINK FIRE DAMPER (SINGLE LINE)
	SMOKE DAMPER (DOUBLE LINE)
	SMOKE DAMPER (SINGLE LINE)
	COMBINATION SMOKE/FIRE DAMPER (DOUBLE LINE)
	COMBINATION SMOKE/FIRE DAMPER (SINGLE LINE)
	BACK DRAFT DAMPER (DOUBLE LINE)
	BACK DRAFT DAMPER (SINGLE LINE)
	BALANCING DAMPER (DOUBLE LINE)
	BALANCING DAMPER (SINGLE LINE)
	MOTORIZED DAMPER (DOUBLE LINE)
	MOTORIZED DAMPER (SINGLE LINE)
	RECTANGULAR DUCTWORK - DIMENSIONS AS SHOWN
	ROUND DUCTWORK - DIMENSION AS SHOWN
	DUCTWORK (SINGLE LINE) - DIMENSION AS SHOWN
	RECTANGULAR SUPPLY/OUTDOOR AIR DUCT UP
	RECTANGULAR EXHAUST/RETURN AIR DUCT UP
	CIRCULAR SUPPLY/OUTDOOR AIR DUCT UP
	CIRCULAR EXHAUST/RETURN AIR DUCT UP
	RECTANGULAR SUPPLY/OUTDOOR AIR DUCT DOWN
	RECTANGULAR EXHAUST/RETURN AIR DUCT DOWN
	CIRCULAR SUPPLY/OUTDOOR AIR DUCT DOWN
	CIRCULAR EXHAUST/RETURN AIR DUCT DOWN
	MITRED ELBOW WITH TURNING VANES
	DUCT RISE (DOUBLE LINE)
	DUCT RISE (SINGLE LINE)
	SUPPLY GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	EXHAUST/RETURN GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	CEILING SUPPLY AIR DIFFUSER - DIMENSIONS AS SHOWN ON SCHEDULE
	LINEAR SLOT DIFFUSER - DIMENSIONS AS SHOWN ON SCHEDULE
	CEILING EXHAUST/RETURN GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	SUPPLY AIR ROUND DIFFUSER
	BRANCH TAKE-OFF WITH ADJUSTABLE SPLITTER DAMPER IN SUPPLY DUCT (DOUBLE LINE)
	BRANCH TAKE-OFF WITH ADJUSTABLE SPLITTER DAMPER IN SUPPLY DUCT (SINGLE LINE)
	OPEN ENDED DUCT WITH BALANCING DAMPER AND BELLMOUTH, DIRECTION AS SHOWN (DOUBLE LINE)
	OPEN ENDED DUCT WITH BALANCING DAMPER AND BELLMOUTH, DIRECTION AS SHOWN (SINGLE LINE)
	FLEXIBLE DUCT CONNECTION
	ACOUSTICALLY LINED DUCTWORK (DOUBLE LINE)
	DUCT SILENCER
	FLEXIBLE DUCT (DOUBLE LINE)
	FLEXIBLE DUCT (SINGLE LINE)
	FLEXIBLE DUCT CONNECTION WITH BALANCING DAMPER ON TAKE-OFF
	DUCT MOUNTED HEATING COIL (DOUBLE LINE)
	DUCT MOUNTED HEAT RECOVERY COIL (DOUBLE LINE)
	SUPPLY AIR TERMINAL BOX C/W ATTENUATOR.
	SUPPLY AIR TERMINAL BOX C/W REHEAT COIL AND ATTENUATOR.
	RETURN / EXHAUST AIR TERMINAL BOX ATTENUATOR.

CONTROLS	
SYMBOL	DESCRIPTION
	SUPPLY FAN
	RETURN FAN
	EXHAUST FAN
	HEATING COIL
	COOLING COIL
	PRE-HEAT COIL
	FILTERS
	HUMIDIFIER
	AIRFLOW / FLUID DIRECTION
	MOTORIZED DAMPER
	MANUAL ISOLATION DAMPER
	MOTOR CONTROL CENTRE
	LOCAL DISPLAY UNIT
	MANUFACTURER SUPPLIED EQUIPMENT CONTROLLER
	MOTOR STARTER
	VARIABLE FREQUENCY DRIVE
	NORMALLY OPEN
	NORMALLY CLOSED
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	FLOW SWITCH
	LEVEL SWITCH
	TEMPERATURE SWITCH
	PRESSURE SWITCH
	DIFFERENTIAL PRESSURE SWITCH
	DOOR SWITCH
	ACTUATOR NORMALLY CLOSED DE-ENERGIZED POSITION
	ACTUATOR NORMALLY OPEN DE-ENERGIZED POSITION
	ACTUATOR FAIL OPEN POSITION
	ACTUATOR FAIL CLOSED POSITION
	ACTUATOR FAIL LAST POSITION
	TWO-POSITION ACTUATOR
	MODULATING ACTUATOR
	PRESSURE SENSOR
	DIFFERENTIAL PRESSURE SENSOR
	HUMIDITY SENSOR
	TEMPERATURE SENSOR
	OCCUPANCY SENSOR
	CARBON DIOXIDE SENSOR
	AIRFLOW STATION
	ZONE VALVE BOX & ALARM PANEL
	BUILDING AUTOMATION SYSTEM
	ANALOG INPUT
	ANALOG OUTPUT
	DIGITAL INPUT
	DIGITAL OUTPUT
	BAS ADJUSTABLE SET POINT
	BACNET VARIABLE
	CONTROL WIRING
	AIR PRESSURE MONITOR

FIRE PROTECTION	
SYMBOL	DESCRIPTION
	SPRINKLER LINE
	FIRE MAIN
	STANDPIPE
	DRAIN RISER
	SUPERVISED VALVE
	FIRE EXTINGUISHER CABINET
	FIRE HOSE CABINET
	FIRE EXTINGUISHER C/W WALL BRACKET
	PENDENT SPRINKLER HEAD
	SPRINKLER ZONE FLOOR CONTROL VALVE ASSEMBLY IN CABINET
	UPRIGHT SPRINKLER HEAD
	CONCEALED SPRINKLER HEAD
	INSTITUTIONAL (HIGH SECURITY AND ANTI-LIGATURE) SPRINKLER HEAD

VENTILATION	
SYMBOL	DESCRIPTION
	FIRE RATED DUCTWORK (DOUBLE LINE)
	DUCT TRANSITION FROM RECTANGULAR TO ROUND
	RECTANGULAR DUCT BREAK
	ROUND DUCT BREAK
	SINGLE LINE DUCT BREAK
	TRANSFER AIR DUCT
	75mm (3/4") DOOR UNDERCUT
	SUPPLY AIR
	EXHAUST AIR
	OUTDOOR AIR
	RETURN AIR

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9	ISSUED FOR ADDENDUM M-3	2024-09-18
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
5	ISSUED FOR 95% CD SUBMISSION	2023-09-06
4	ISSUED FOR 90% CD SUBMISSION	2023-07-31
3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

Rev.	Description	Date
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Drawing Title:

HVAC PIPING - DEMO WORK - LEVEL 10

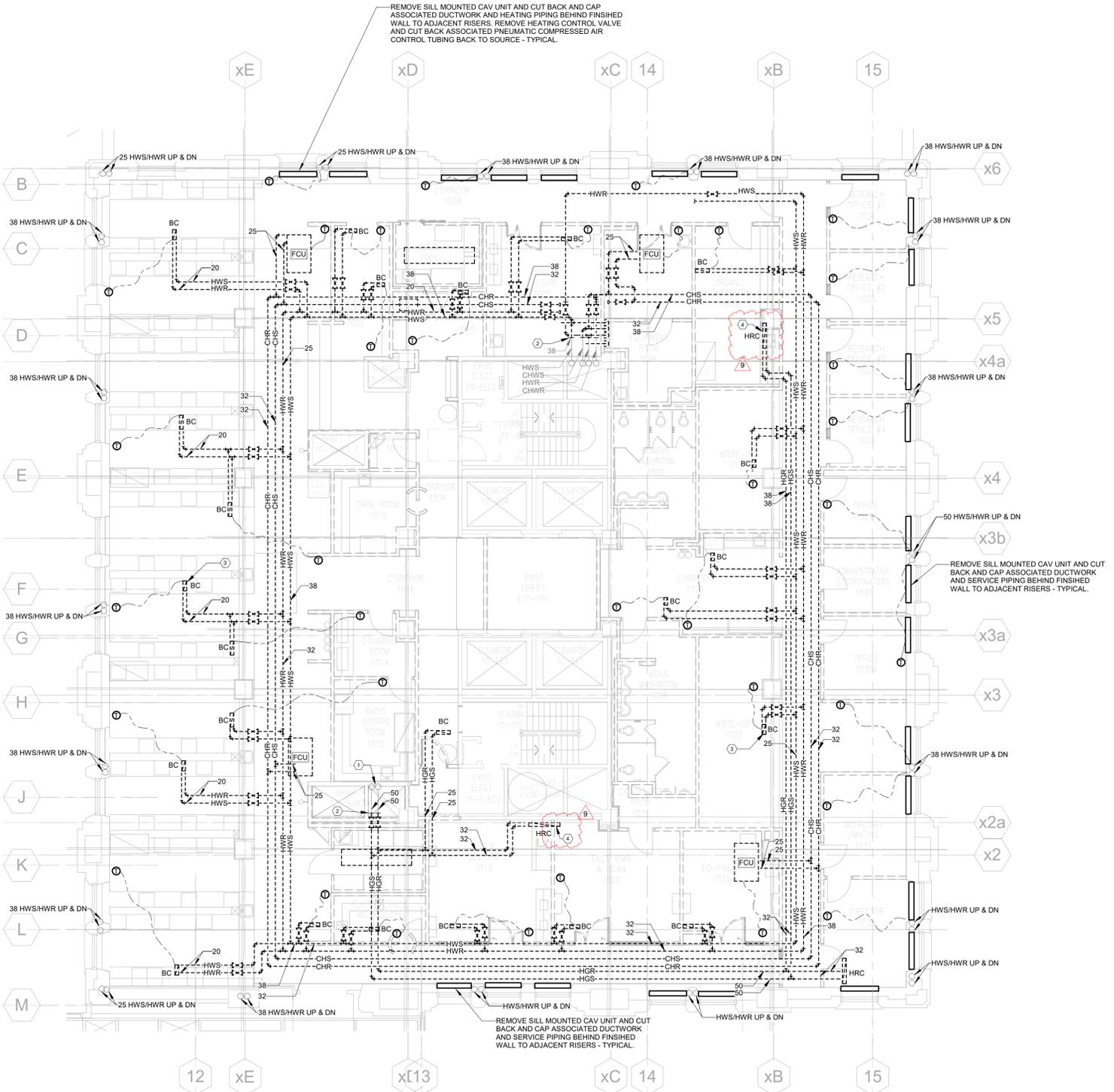
1 : 100

Project No.: 0020711.00 Checked by: Checker

M1410

GENERAL NOTES	
1.	ALL EXISTING PNEUMATIC COMPRESSED AIR CONTROL PIPING WITHIN AREA OF WORK IS TO BE CUT BACK. ASSOCIATED CONTROLLERS ARE TO BE REMOVED AND REPLACED WITH NEW DIGITAL CONTROLLERS AND WIRING.
2.	CONTRACTOR IS TO INCLUDE FOR PIPE FREEZING IN ALL LOCATIONS WHERE CONNECTING TO EXISTING PIPING.

SHEET KEYNOTES	
1	EXISTING 75 GLYCOL SUPPLY AND RETURN PIPES UP.
2	CUT BACK HVAC PIPING TO EXTENT SHOWN AND PREPARE FOR NEW WORK CONNECTION - TYPICAL
3	REMOVE EXISTING BOOSTER COILS CAV VALVES, PNEUMATIC COMPRESSED AIR CONTROL PIPING, THERMOSTATS, AND ACCESSORIES - TYPICAL
4	RETAIN EXISTING AEROFIN GLYCOL HEAT RECOVERY COILS FOR REVIEW BY EXISTING MANUFACTURER TO DETERMINE EXISTING PERFORMANCE CRITERIA. SUBMIT TO CONSULTANT FOR REVIEW TO DETERMINE PERFORMANCE CRITERIA OF NEW GLYCOL HEAT RECOVERY COILS.



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5	ISSUED FOR ADDENDUM M-3	2024-09-18
4	ISSUED FOR TENDER	2024-08-14
3	ISSUED FOR BUILDING PERMIT	2023-12-19
2	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
1	ISSUED FOR 95% CD SUBMISSION	2023-09-06

Rev. Description Date

Drawing Title:

**HVAC PIPING - MECH
ROOM - LEVEL 6 - I**

1 : 50

Project No.: 0020711.00 Checked by: Checker

M2406A

GENERAL NOTES

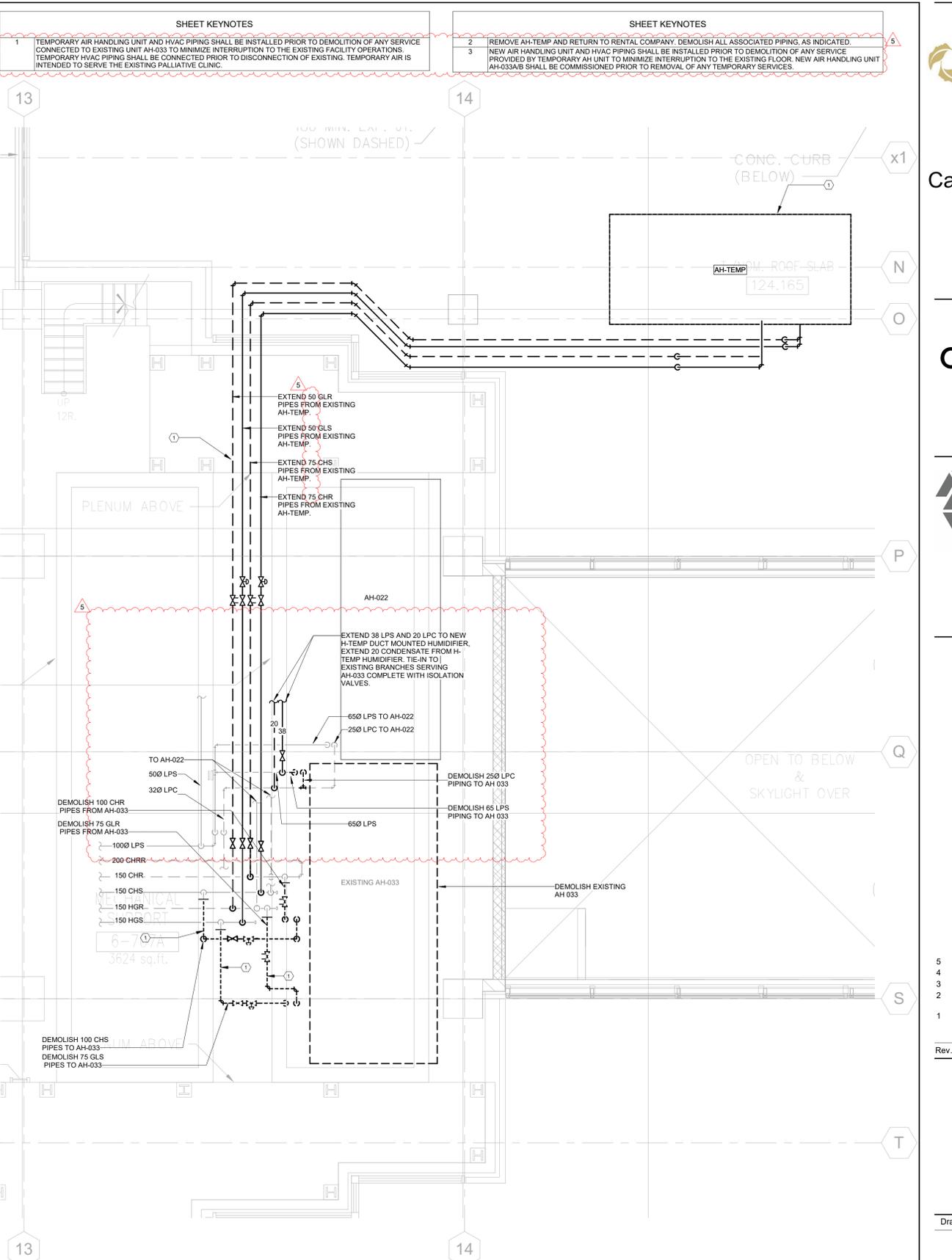
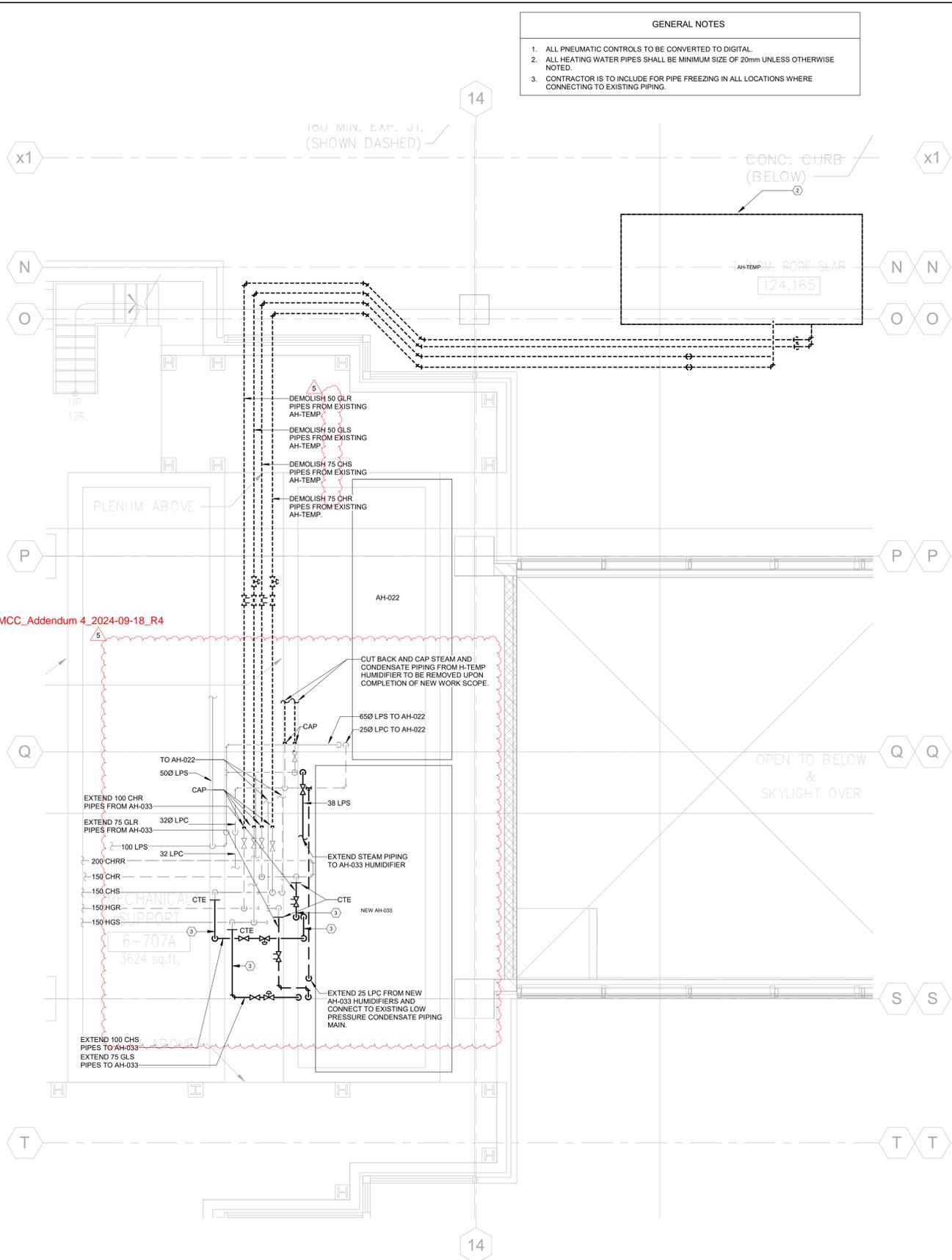
1. ALL PNEUMATIC CONTROLS TO BE CONVERTED TO DIGITAL.
2. ALL HEATING WATER PIPES SHALL BE MINIMUM SIZE OF 20mm UNLESS OTHERWISE NOTED.
3. CONTRACTOR IS TO INCLUDE FOR PIPE FREEZING IN ALL LOCATIONS WHERE CONNECTING TO EXISTING PIPING.

SHEET KEYNOTES

1. TEMPORARY AIR HANDLING UNIT AND HVAC PIPING SHALL BE INSTALLED PRIOR TO DEMOLITION OF ANY SERVICE CONNECTED TO EXISTING UNIT AH-033 TO MINIMIZE INTERRUPTION TO THE EXISTING FACILITY OPERATIONS. TEMPORARY HVAC PIPING SHALL BE CONNECTED PRIOR TO DISCONNECTION OF EXISTING. TEMPORARY AIR IS INTENDED TO SERVE THE EXISTING PALLIATIVE CLINIC.

SHEET KEYNOTES

2. REMOVE AH-TEMP AND RETURN TO RENTAL COMPANY. DEMOLISH ALL ASSOCIATED PIPING, AS INDICATED.
3. NEW AIR HANDLING UNIT AND HVAC PIPING SHALL BE INSTALLED PRIOR TO DEMOLITION OF ANY SERVICE PROVIDED BY TEMPORARY AH UNIT TO MINIMIZE INTERRUPTION TO THE EXISTING FLOOR. NEW AIR HANDLING UNIT AH-033A/B SHALL BE COMMISSIONED PRIOR TO REMOVAL OF ANY TEMPORARY SERVICES.



2 L6 MECHANICAL ROOM - HVAC PIPING - NEW WORK - PHASE 3
SCALE: 1 : 50

1 L6 MECHANICAL ROOM - HVAC PIPING - TEMPORARY AND DEMOLITION WORK - PHASES 1 & 2
SCALE: 1 : 50

UHN_PMCC_Addendum 4_2024-09-18_R4

GENERAL NOTES	SHEET KEYNOTES
1. ALL PNEUMATIC CONTROLS TO BE CONVERTED TO DIGITAL.	1. REPLACE EXISTING 50% E.G. GLYCOL HEATING WATER CONTROL VALVE SIZED FOR 7.8 L/S FLUID FLOW, LOCATED ON 75ø PIPE BRANCH, COMPLETE WITH ISOLATION VALVES UPSTREAM AND DOWNSTREAM OF CONTROL VALVE. ASSUME PIPE FREEZING AND PIPING REWORK SHALL BE REQUIRED. NEW CONTROL VALVE SHALL BE DIGITAL. EXISTING PNEUMATIC CONTROL PIPING IS TO BE REMOVED AND REPLACED WITH DIGITAL. EXTEND NEW CONTROL WIRING AND REINSTATE EXISTING CONTROL VALVE SEQUENCE FOR AH-01B.
2. ALL HEATING WATER PIPES SHALL BE MINIMUM SIZE OF 20mm UNLESS OTHERWISE NOTED.	2. REPLACE EXISTING CHILLED WATER CONTROL VALVE SIZED FOR 14.2 L/S FLUID FLOW, LOCATED ON 100ø PIPE BRANCH, COMPLETE WITH ISOLATION VALVES UPSTREAM AND DOWNSTREAM OF CONTROL VALVE. ASSUME PIPE FREEZING SHALL BE REQUIRED. NEW CONTROL VALVE SHALL BE DIGITAL. EXISTING PNEUMATIC CONTROL PIPING IS TO BE REMOVED AND REPLACED WITH DIGITAL. EXTEND NEW CONTROL WIRING AND REINSTATE EXISTING CONTROL VALVE SEQUENCE FOR AH-01B.
3. CONTRACTOR IS TO INCLUDE FOR PIPE FREEZING IN ALL LOCATIONS WHERE CONNECTING TO EXISTING PIPING.	3. REPLACE EXISTING 50% E.G. GLYCOL HEATING WATER CONTROL VALVE SIZED FOR 5.9 L/S FLUID FLOW, LOCATED ON 75ø PIPE BRANCH, COMPLETE WITH ISOLATION VALVES UPSTREAM AND DOWNSTREAM OF CONTROL VALVE. ASSUME PIPE FREEZING AND PIPING REWORK SHALL BE REQUIRED. NEW CONTROL VALVE SHALL BE DIGITAL. EXISTING PNEUMATIC CONTROL PIPING IS TO BE REMOVED AND REPLACED WITH DIGITAL. EXTEND NEW CONTROL WIRING AND REINSTATE EXISTING CONTROL VALVE SEQUENCE FOR AH-021.
	4. REPLACE EXISTING CHILLED WATER CONTROL VALVE SIZED FOR 10.9 L/S FLUID FLOW, LOCATED ON 100ø PIPE BRANCH, COMPLETE WITH ISOLATION VALVES UPSTREAM AND DOWNSTREAM OF CONTROL VALVE. ASSUME PIPE FREEZING SHALL BE REQUIRED. NEW CONTROL VALVE SHALL BE DIGITAL. EXISTING PNEUMATIC CONTROL PIPING IS TO BE REMOVED AND REPLACED WITH DIGITAL. EXTEND NEW CONTROL WIRING AND REINSTATE EXISTING CONTROL VALVE SEQUENCE FOR AH-021.
	5. REPLACE ALL EXISTING PNEUMATIC CONTROL DAMPERS, VALVES, AND SENSORS ASSOCIATED WITH AH-001 & AH-002. ASSUME PIPE FREEZING SHALL BE REQUIRED. ALL NEW COMPONENTS ARE TO BE DIGITAL. CUT BACK ALL PNEUMATIC PIPING AND REPLACE WITH DIGITAL WIRING TO BAS REFER TO CONTROL SEQUENCES IN DRAWING M7603 FOR ALL COMPONENTS TO BE REPLACED. HEATING COIL CONTROL VALVE IS TO BE SIZED FOR 750A PIPE SIZE (7.4L/S FLOW RATE). COOLING COIL CONTROL VALVE IS TO BE SIZED FOR 1000A PIPE SIZE (11.1L/S FLOW RATE). CONTRACTOR TO INCLUDE FOR 2m OF PIPING AND 1m OF DUCTWORK MODIFICATION OF EACH BRANCH CONNECTION TO ENABLE REPLACEMENT.
	6. EXISTING PNEUMATIC CONTROLLERS SERVING AH-001 AND AH-002 ARE TO BE REMOVED AND REPLACED WITH DIGITAL CONTROLLERS. THE EXISTING CONTROL PANEL IS TO REMAIN TO HOUSE THE NEW DIGITAL CONTROLLERS.

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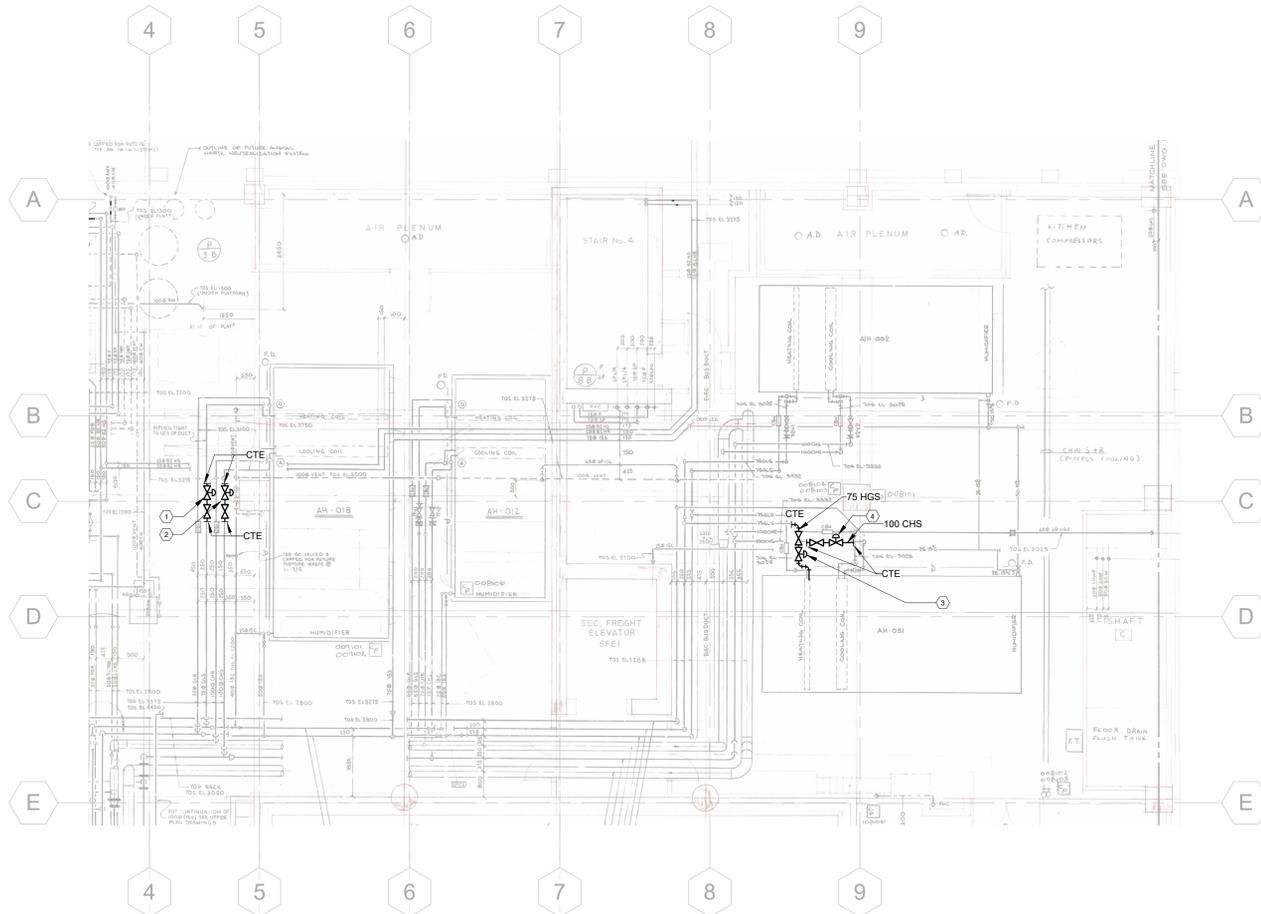
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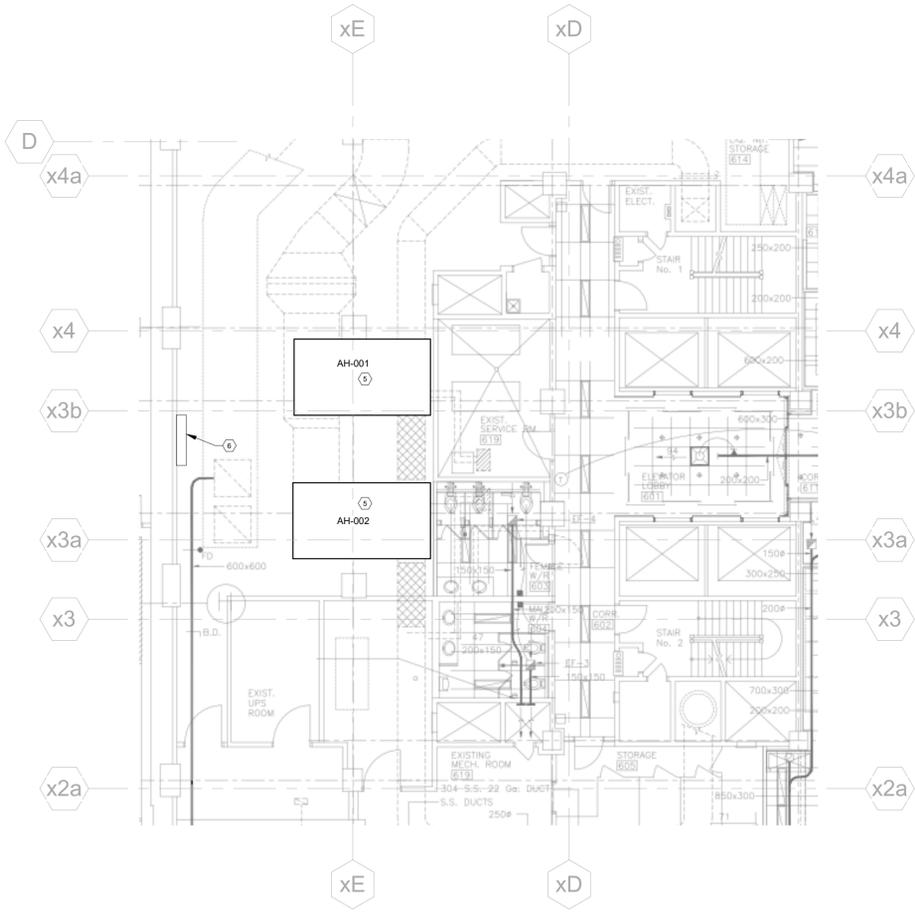
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2 LEVEL 06 - MECHANICAL ROOM (NORTH) AHU 31 & AHU 18
SCALE: 1 : 100



1 LEVEL 06 - BUILDING 620 MECHANICAL ROOM AHU 1&2
SCALE: 1 : 100

Rev.	Description	Date
4	ISSUED FOR ADDENDUM M-3	2024-09-18
3	ISSUED FOR TENDER	2024-08-14
2	ISSUED FOR BUILDING PERMIT	2023-12-19
1	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25

Rev. Description Date

Drawing Title:

HVAC PIPING - MECH ROOM - LEVEL 6 - II

1 : 100

Project No.: 0020711.00 Checked by: Checker

M2406B

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Transplant 2**

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AIR HANDLING UNITS - HYDRONIC COOLING & HEATING - GENERAL

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS		FILTERS		COILS		HUMIDIFIER	SOUND POWER - INLET/OUTLET (DB)								ELECTRICAL			OVERALL DIMENSIONS			WEIGHT (kg)	NOTES					
					TOTAL AIRFLOW (L/s)	OUTDOOR AIRFLOW (L/s)		SUPPLY FAN	PRE FILTER	FINAL FILTER	HEATING COIL	COOLING COIL	63 HZ		125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	8000 HZ	FLA	MCA	MOC	V/Ph/Hz	HEIGHT (m)	LENGTH (m)	WIDTH (m)							
AH-033A	HAAKON	-	MECH. RM	MHDU	5663	2831	50	SF-033A	2" MERV 8	12" MERV 14	HC-AH-033A	CC-AH-033A	H-1A	INLET	92	89	98	94	90	85	82	79	-	-	-	-	-	-	-	2.96	6.20	2.68	6872	1,2,3	
AH-033B	HAAKON	-	MECH. RM	MHDU	5663	2831	50	SF-033B	2" MERV 8	12" MERV 14	HC-AH-033B	CC-AH-033B	H-1B	INLET	93	90	98	94	90	85	82	79	-	-	-	-	-	-	-	-	-	-	-	6872	1,2,3
AH-TEMPORARY	HVAC RENTALS	-	6TH FLOOR ROOF	PALLIATIVE CLINIC	2833	2833	100	SF-TEMP	2" MERV 8	12" MERV 14	HC-AH-TEMP	CC-AH-TEMP	-	OUTLET	95	93	99	94	90	85	82	79	-	-	-	-	-	-	-	-	-	-	6872	4	

NOTES:
1. AH-033A AND AH-033B ARE TO BE STACKED.
2. I-BEAM RAIL TO BE PROVIDED FOR MOTOR REPLACEMENT AND SERVICING.
3. REFER TO MECHANICAL DRAWING M-7008 FOR AIR HANDLING UNIT COMPONENTS, DIMENSIONS AND WIRING DIAGRAM DETAILS.
4. UNIT TO BE MOUNTED ON NON-PENETRATING ROOF SUPPORT EQUAL TO PORTABLE PIPE HANGERS OR BIG FOOT.

AIR HANDLING UNITS - CHILLED WATER COIL

TAG	MANUFACTURER	MODEL	TOTAL AIRFLOW (L/s)	SENSIBLE CAPACITY (kW)	TOTAL CAPACITY (kW)	# OF COILS	# OF ROWS	FINS PER INCH	DIAMETER (mm)	FLUID E.F.T. (°C)	L.F.T. (°C)	FLOW (L/s)	W.P.D. (kPa)	E.A.T. DB (°C)	AIR TEMPERATURE E.A.T. WB (°C)	L.A.T. DB (°C)	L.A.T. WB (°C)	FACE AREA (sq-m)	FACE VELOCITY (m/s)	WEIGHT (kg)	NOTES
CC-AH-033A	HAAKON	5WC1010A	5663	142.7	232.3	1	10	10	15.9	7.2	15.4	6.75	24.3	32.2	22.8	11.61	11.35	2.14	2.65	453	
CC-AH-033B	HAAKON	5WC1010A	5663	142.7	232.3	1	10	10	15.9	7.2	15.4	6.75	24.3	32.2	22.8	11.61	11.35	2.14	2.65	453	
CC-AH-TEMP	HVAC RENTALS	-	2833	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

AIR HANDLING UNITS - HUMIDIFIER

TAG	BASIS OF DESIGN MANUFACTURER	LOAD (lbs/hr)	OVERALL DIMENSION (mm)	TUBE DIAMETER (mm)	TUBE SPACING ON CENTER (mm)	FACE VELOCITY (m/s)	ADSORPTION DISTANCE (mm)	AIRFLOW (L/s)	A.P.D. (inWC)	FUEL FUEL TYPE	STEAM PRESSURE (kPa)
H-1A	DRISTEEM	140	2337x762x127	38	150	2.06	432	5661	-	DIRECT STEAM	68.9
H-1B	DRISTEEM	140	2337x762x127	38	150	2.06	432	5661	-	DIRECT STEAM	68.9

AIR HANDLING UNITS - HOT WATER COIL

TAG	MANUFACTURER	MODEL	MODE	TOTAL AIRFLOW (L/s)	TOTAL CAPACITY (kW)	# OF COILS	# OF ROWS	FINS PER INCH	DIAMETER (mm)	FLUID E.F.T. (°C)	L.F.T. (°C)	FLOW (L/s)	W.P.D. (kPa)	AIR TEMPERATURE E.A.T. DB (°C)	L.A.T. DB (°C)	L.A.T. WB (°C)	FACE AREA (sq-m)	FACE VELOCITY (m/s)	WEIGHT (kg)	NOTES
HC-AH-33A	HAAKON	5HW1102B	NORMAL	5663	126.7	1	2	11	15.9	82.2	60.1	1.56	3.9	0	18.3	2.14	2.64	88.5		
HC-AH-33B	HAAKON	5HW1102B	NORMAL	5663	126.7	1	2	11	15.9	82.2	60.1	1.56	3.9	0	18.3	2.14	2.64	88.5		
HC-AH-33A	HAAKON	5HW1102B	SMOKE VENTING	5663	180.6	1	2	11	15.9	82.2	59.5	2.17	7.2	-21.1	5	2.14	2.64	88.5		
HC-AH-33B	HAAKON	5HW1102B	SMOKE VENTING	5663	180.6	1	2	11	15.9	82.2	59.5	2.17	7.2	-21.1	5	2.14	2.64	88.5		
HC-AH-TEMP	HVAC RENTALS	-	-	2833	105.8	1	2	8	15.9	76.7	59.4	1.61	9.6	-20	22.2	11.46	2.21	17.2		

AIR HANDLING UNITS - SUPPLY FANS

TAG	MANUFACTURER	QTY.	AIRFLOW (L/s)	E.S.P. (Pa)	T.S.P. (Pa)	FAN SPEED (RPM)	VFD	BHP (HP)	HP (HP)	RPM	FLA	V/Ph/Hz	NOTES
SF-033A/SF-033B	HAAKON	2	5663	498	1120	1897	YES	13.95	15.00	1750	14.1	575/3/60	
SF-TEMPORARY	HVAC RENTALS	1	2833	498	1264	3650	YES	5.1	5.59	1750	8.01	575/3/60	

EXHAUST FANS

TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	AIRFLOW (L/s)	E.S.P. (Pa)	POWER (kW)	BHP (kW)	MOTOR RPM	V/Ph/Hz	SPEED CONTROL	SOUND POWER (dB) OUTLET								WEIGHT (kg)	REMARKS	
													1	2	3	4	5	6	7	8	LwA	
EF-1	DSC	ROOF	PENNBARRY	FX30B	3304	336	2.24	2.01	1800	208/3/60	VFD	82	90	82	75	72	68	62	58	80	99	1.3
EF-2	DSC	ROOF	PENNBARRY	FX30B	3304	336	2.24	2.01	1800	208/3/60	VFD	82	90	82	75	72	68	62	58	80	99	1.3
RF-033A	MHDU	LEVEL 6 - MECHANICAL ROOM	PENNBARRY	SOX270-0091	3022	435	3.73	2.93	1800	575/3/60	VFD	80	87	78	74	73	70	65	53	79	161	1.2
RF-033B	MHDU	LEVEL 6 - MECHANICAL ROOM	PENNBARRY	SOX270-0091	3022	435	3.73	2.93	1800	575/3/60	VFD	80	87	78	74	73	70	65	53	79	161	1.2

NOTES:
1. CONFIGURED FOR 0-10V CONTROL SIGNAL FROM BAS.
2. C/W SPRING ISOLATORS.
3. C/W 300mm CURB WITH DAMPER TRAY AND LOW LEAKAGE MOTORIZED DAMPER. ROOF CURB IS TO BE INSTALLED ON CURB ADAPTOR TO SUIT EXISTING ROOF OPENING. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION. MECHANICAL CONTRACTOR IS TO PROVIDE CURB ADAPTOR FRAME AND COORDINATE PRIOR TO ORDERING FAN CURB TO ENSURE THE COMPLETE ASSEMBLY IS ACHIEVABLE USING THE EXISTING OPENING.

DUCT MOUNTED STEAM HUMIDIFIERS

TAG	BASIS OF DESIGN MANUFACTURER	MODEL	LOAD (lbs/hr)	OVERALL DIMENSION (mm)	TUBE DIAMETER (mm)	TUBE SPACING ON CENTER (mm)	FACE VELOCITY (m/s)	ADSORPTION DISTANCE (mm)	AIRFLOW (L/s)	A.P.D. (inWC)	FUEL FUEL TYPE	STEAM PRESSURE (kPa)
H-TEMP	DRISTEEM	-	124	686x794x185	50	304	7.62	432	2830	-	DIRECT STEAM	68.9

REHEAT COILS / BOOSTER COILS (LEVEL 2)

TAG	MANUFACTURER	MODEL	FINS PER INCH	# OF ROWS	FIN HEIGHT (mm)	FIN LENGTH (mm)	FACE AREA (SQ.M)	CAPACITY (kW)	AIRFLOW (L/s)	E.A.T. (°C)	L.A.T. (°C)	PRESSURE DROP (Pa)	FACE VELOCITY (M/S)	FLUID	FLOW RATE (L/s)	E.F.T. (°C)	L.F.T. (°C)	PRESSURE DROP (Pa)	NOTES
BC-2-1A	DAIKIN	5BS1020C	10	2	225	350	0.08	2.0	145	12.8	24.1	42	1.8	WATER	0.08	36.1	30.4	4185	
BC-2-1B	DAIKIN	5WQ1105B	11	5	300	300	0.09	3.4	145	12.8	32.0	57	1.6	WATER	0.15	36.1	30.4	6576	
BC-2-2A	DAIKIN	5BS1020C	10	2	225	400	0.09	2.6	190	12.8	24.1	55	2.1	WATER	0.11	36.1	30.4	7473	
BC-2-3A	DAIKIN	5BS0902C	9	2	225	575	0.13	3.5	250	12.8	24.1	42	1.9	WATER	0.15	36.1	30.4	13451	

REHEAT COILS/BOOSTER COILS(LEVEL 5)

TAG	MANUFACTURER	MODEL	FINS PER INCH	# OF ROWS	FIN HEIGHT (mm)	FIN LENGTH (mm)	FACE AREA (SQ.M)	CAPACITY (kW)	AIRFLOW (L/s)	E.A.T. (°C)	L.A.T. (°C)	PRESSURE DROP (Pa)	FACE VELOCITY (M/S)	FLUID	FLOW RATE (L/s)	E.F.T. (°C)	L.F.T. (°C)	PRESSURE DROP (Pa)	NOTES
BC-5-1A	DAIKIN	5BS0902C	9	2	225	300	0.07	2.0	145	12.8	24.3	52	2.1	WATER	0.08	38.8	33.3	3587	
BC-5-1B	DAIKIN	5WQ1204B	12	4	300	300	0.09	3.4	145	12.8	32.1	50	1.6	WATER	0.15	38.8	33.3	2092	
BC-5-2A	DAIKIN	5BS0802B	8	2	300	400	0.12	2.7	190	12.8	24.3	18	1.5	WATER	0.11	38.8	33.3	10163	
BC-5-2B	DAIKIN	5WQ1104B	11	4	300	400	0.12	4.5	190	12.8	32.1	45	1.5	WATER	0.19	38.8	33.3	3886	
BC-5-3A	DAIKIN	5BS1102C	11	2	300	550	0.17	4.1	300	12.8	24.3	45	1.8	WATER	0.17	38.8	33.3	12853	
BC-5-3B	DAIKIN	5WQ1104B	11	4	300	550	0.17	7.1	300	12.8	32.1	55	1.8	WATER	0.30	38.8	33.3	10163	
BC-5-4A	DAIKIN	5BD1002B	10	2	300	550	0.17	5.7	400	12.8	24.3	42	2.4	WATER	0.23	38.8	33.3	14946	
BC-5-4B	DAIKIN	5WQ1004B	10	4	375	700	0.27	10.1	425	12.8	32.1	42	1.6	WATER	0.42	38.8	33.3	14646	
BC-5-6A	DAIKIN	5WH1102B	11	2	525	750	0.41	10.0	710	12.8	24.3	28	1.8	WATER	0.41	38.8	33.3	897	
BC-5-7A	DAIKIN	5WH0902B	9	2	525	950	0.51	11.7	850	12.8	24.3	22	1.7	WATER	0.49	38.8	33.3	1495	
BC-5-8B	DAIKIN	5WH1203B	12	3	675	1050	0.74	29.4	1276	12.8	32.0	45	1.7	WATER	1.27	38.8	33.3	14049	

REHEAT COILS/BOOSTER COILS(LEVEL 10)

TAG	MANUFACTURER	MODEL	FINS PER INCH	# OF ROWS	FIN HEIGHT (mm)	FIN LENGTH (mm)	FACE AREA (SQ.M)	CAPACITY (kW)	AIRFLOW (L/s)	E.A.T. (°C)	L.A.T. (°C)	PRESSURE DROP (Pa)	FACE VELOCITY (M/S)	FLUID	FLOW RATE (L/s)	E.F.T. (°C)	L.F.T. (°C)	PRESSURE DROP (Pa)	NOTES
BC-10-1A	DAIKIN	5BS0901B	9	1	150	300	0.05	1.96	145	12.8	24.1	32	3.1	WATER	0.04	76.7	65.6	598	
BC-10-2A	DAIKIN	5BS0901B	9	1	225	250	0.06	2.68	190	12.8	24.1	37	3.3	WATER	0.06	76.7	65.6	897	
BC-10-3A	DAIKIN	5BS0901B	8	1	225	375	0.08	4.12	300	12.8	24.1	37	3.4	WATER	0.09	76.7	65.6	1794	
BC-10-4A	DAIKIN	5BS0901B	8	1	225	450	0.10	5.98	425	12.8	24.1	47	4.1	WATER	0.13	76.7	65.6	9565	

GRILLES AND DIFFUSERS

TAG	BASIS OF DESIGN MANUFACTURER	MODEL	TYPE	VOLUME CONTROL	LENGTH (mm)	WIDTH (mm)	DIMENSIONS DIAMETER (mm)	NECK DIAMETER (mm)	MATERIAL	NOTES
A	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	600	600			STEEL	REFER TO FLOOR PLANS
A1	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	300	300			STEEL	REFER TO FLOOR PLANS
B	EH PRICE	LFD	LAMINAR FLOW DIFFUSER	YES	900	600			STEEL	REFER TO FLOOR PLANS

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
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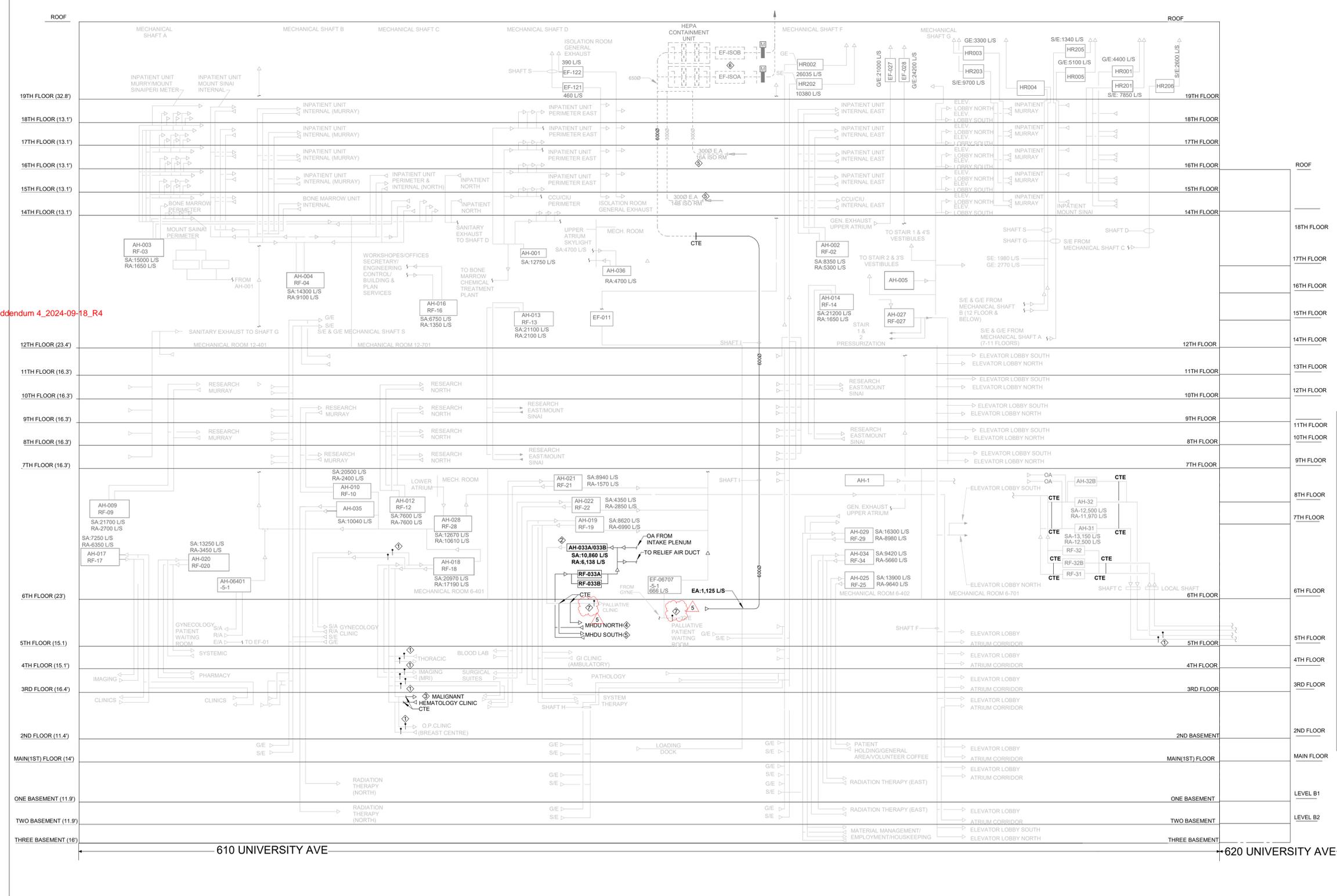
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- DRAWING NOTES:**
- 1 TAKE TRAVERSE MEASUREMENT OF AIRFLOW PRIOR TO CONSTRUCTION. REINSTATE AIRFLOW WHEN SERVICES ARE CALLED FOR CONSTRUCTION AND REBALANCE AIR HANDLING UNIT AS REQUIRED TO ACCOMMODATE REVISED AIRFLOW TO MAINTAIN RELATIVE PRESSURIZATION OF AREAS OUTSIDE OF THE MAIN SCOPE OF WORK. SYSTEM IS TO BE REBALANCED AGAIN UPON COMPLETION OF NEW WORK SCOPE.
 - 2 EXISTING AH-033 TO BE REPLACED WITH STACKED AH-033A/033B. EXISTING RETURN FAN RF-33 ABOVE EXISTING AH-033 SHALL BE REPLACED WITH RF-033A & RF-033B. DUCTWORK AND SERVICES SURROUNDING UNIT SHALL BE REWORKED TO ACCOMMODATE REVISED LAYOUT.
 - 3 MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA: 1573 L/S, RA: 1359 L/S
 - 4 MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA: 3278 L/S, RA: 2825 L/S
 - 5 MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA: 3873 L/S, RA: 3142 L/S
 - 6 ISOLATION EXHAUST FANS AND ASSOCIATED DUCTWORK ARE BEING PROVIDED AS PART OF ONGOING PROJECT.
 - 7 TAKE TRAVERSE MEASUREMENT OF AIRFLOW PRIOR TO CONSTRUCTION. REINSTATE AIRFLOW WHEN SERVICES ARE CALLED FOR CONSTRUCTION AND REBALANCE AIR HANDLING UNIT AS REQUIRED TO ACCOMMODATE REVISED AIRFLOW TO MAINTAIN RELATIVE PRESSURIZATION OF AREAS OUTSIDE OF THE MAIN SCOPE OF WORK. UPON INSTALLATION OF AH-TEMP TO FACILITATE THE REPLACEMENT OF AH-033 SYSTEM, REINSTATE AIRFLOWS MEASURED PRIOR TO CONSTRUCTION. REBALANCE AIRFLOWS UPON COMPLETION OF AIR HANDLING UNIT REPLACEMENT AND AGAIN UPON COMPLETION OF LEVEL 5 NEW WORK SCOPE.



REFER TO DRAWING M7011 FOR CONTINUATION

UHN_PMCC_Addendum 4_2024-09-18_R4

Rev.	Description	Date
5	ISSUED FOR ADDENDUM M-3	2024-09-18
4	ISSUED FOR TENDER	2024-08-14
3	ISSUED FOR BUILDING PERMIT SUBMISSION	2023-12-19
2	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
1	ISSUED FOR 95% CD SUBMISSION	2023-09-06

Drawing Title:

VENTILATION SCHEMATIC I

1 : 1

Project No.: 0020711.00 Checked by: Checker

M7010

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Transplant 2**

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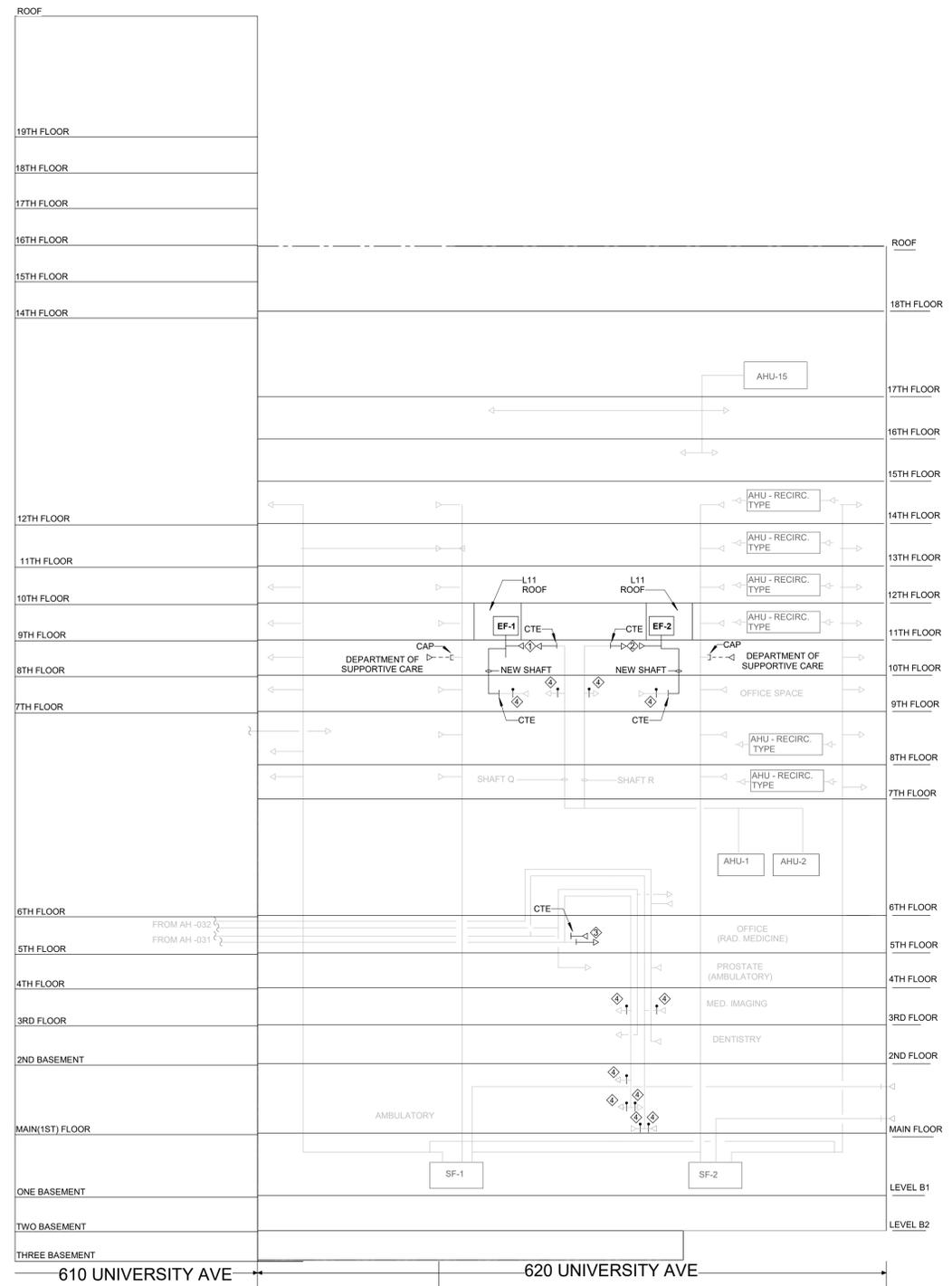
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- DRAWING NOTES:**
- ◇ MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA: 1148 L/S, EA: 1602 L/S.
 - ◇ MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA: 2004 L/S, EA: 1550 L/S.
 - ◇ MEASURE AIRFLOW PRIOR TO CONSTRUCTION AND BALANCE TO NEW AIRFLOWS UPON COMPLETION OF WORK. SA:3323 L/S, RA:3172 L/S, EA:123 L/S, GE:28 L/S.
 - ◇ TAKE TRAVERSE MEASUREMENT OF AIRFLOW PRIOR TO CONSTRUCTION. REINSTATE AIRFLOW WHEN SERVICES ARE CAPPED FOR CONSTRUCTION AND REBALANCE AIR HANDLING UNIT AS REQUIRED TO ACCOMMODATE REVISED AIRFLOW TO MAINTAIN RELATIVE PRESSURIZATION OF AREAS OUTSIDE OF THE MAIN SCOPE OF WORK. SYSTEM IS TO BE REBALANCED AGAIN UPON COMPLETION OF NEW WORK SCOPE.

UHN_PMCC_Addendum 4_2024-09-18_R4

REFER TO DRAWING M7010 FOR CONTINUATION



Rev.	Description	Date
2	ISSUED FOR ADDENDUM M-3	2024-09-18
1	ISSUED FOR TENDER	2024-08-14

Drawing Title:

**VENTILATION
SCHEMATIC II**

1 : 1

Project No.: 0020711.00 Checked by: Checker

M7011

VENTILATION SCHEMATIC II
SCALE: 1 : 1

GENERAL NOTES

- AIRFLOW SCHEMATIC DRAWING HAS BEEN RETRIEVED FROM BASE BUILDING DRAWINGS AND PROVIDED FOR REFERENCE OF AH-005 SYSTEM AIR AUDITING AND BALANCING SCOPE. PRIOR TO DEMOLITION, MEASURE AIRFLOW AT ALL TERMINAL LOCATIONS CONNECTED TO AH-005 AND SUBMIT TO CONSULTANT FOR REVIEW. UPON COMPLETION OF LEVEL 5 WORK, REBALANCE SYSTEM AH-005 TO ACCOMMODATE INCREASE IN AIRFLOW ON LEVEL 5, AND REBALANCE AIRFLOWS AT ALL OTHER TERMINAL LOCATIONS ON THE SYSTEM TO THE ORIGINAL DESIGN AIRFLOW INDICATED IN THE BASE BUILDING SCHEMATIC. WHERE THE ORIGINALLY MEASURED AIRFLOW EXCEEDS THE ORIGINAL DESIGN AIRFLOW, SEEK CONSULTANT INPUT FOR BALANCING AIRFLOW TO CARRY FORWARD. INCLUDE FOR NEW BELTS AND SHEAVES FOR AH-005 TO SATISFY AIRFLOW AS REQUIRED.

SHEET KEYNOTES

- EXISTING DESIGN AIRFLOW IN L5 VESTIBULE IS 142 L/S. REFER TO DRAWING 1305B FOR DEMOLITION SCOPE OF WORK. NEW AIRFLOW IS TO BE BALANCED TO 202 L/S. REFER TO DRAWING 2305B FOR NEW WORK SCOPE.



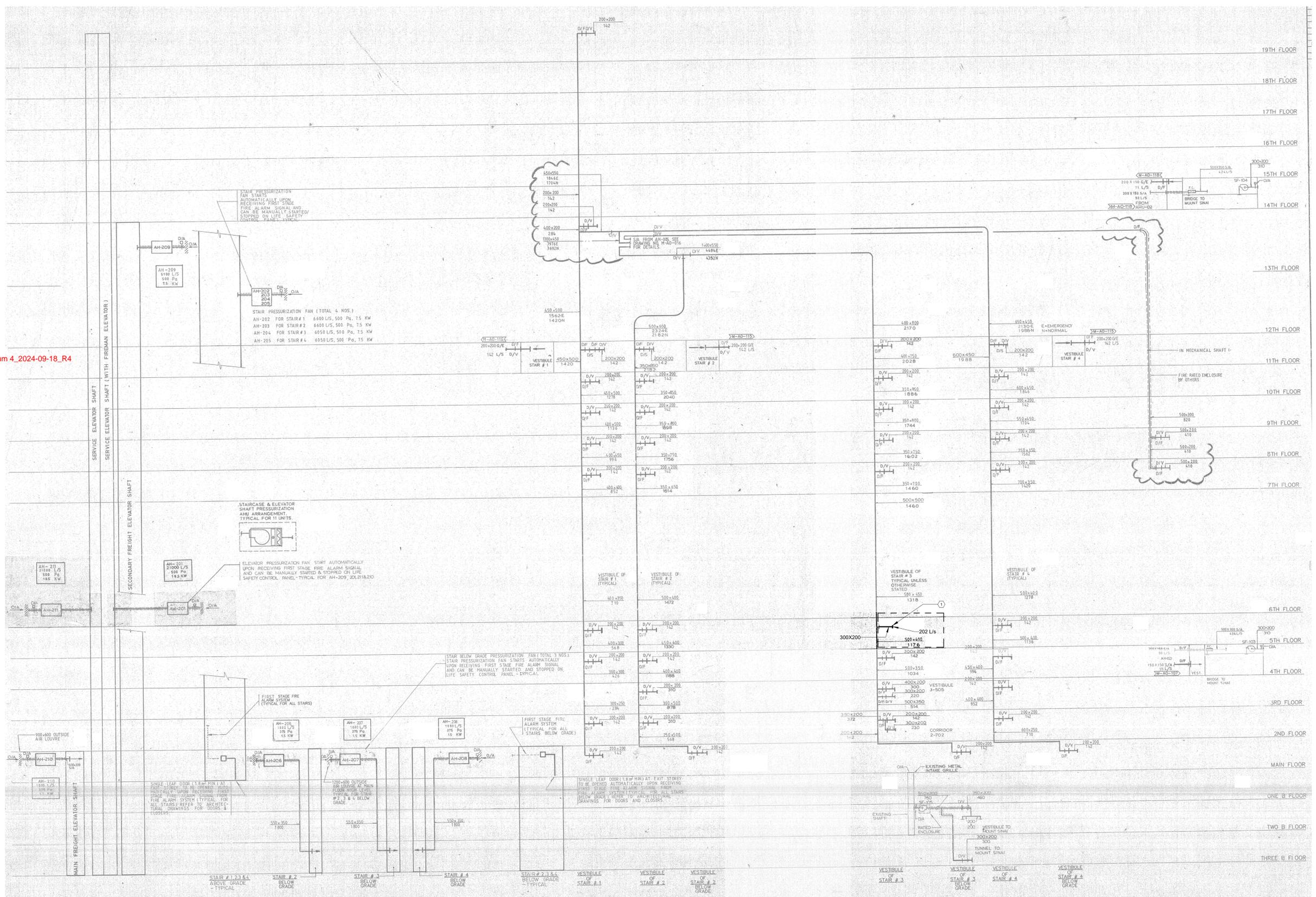
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Rev.	Description	Date
2	ISSUED FOR ADDENDUM M-3	2024-09-18
1	ISSUED FOR TENDER	2024-08-14

Rev. Description Date

Drawing Title:

VENTILATION SCHEMATIC III

1 : 100

Project No.: 0020711.00 Checked by: Checker

1 VENTILATION SCHEMATIC - AH-005 STAIRCASE AND ELEVATOR SHAFT PRESSURISATION
SCALE: 1 : 100

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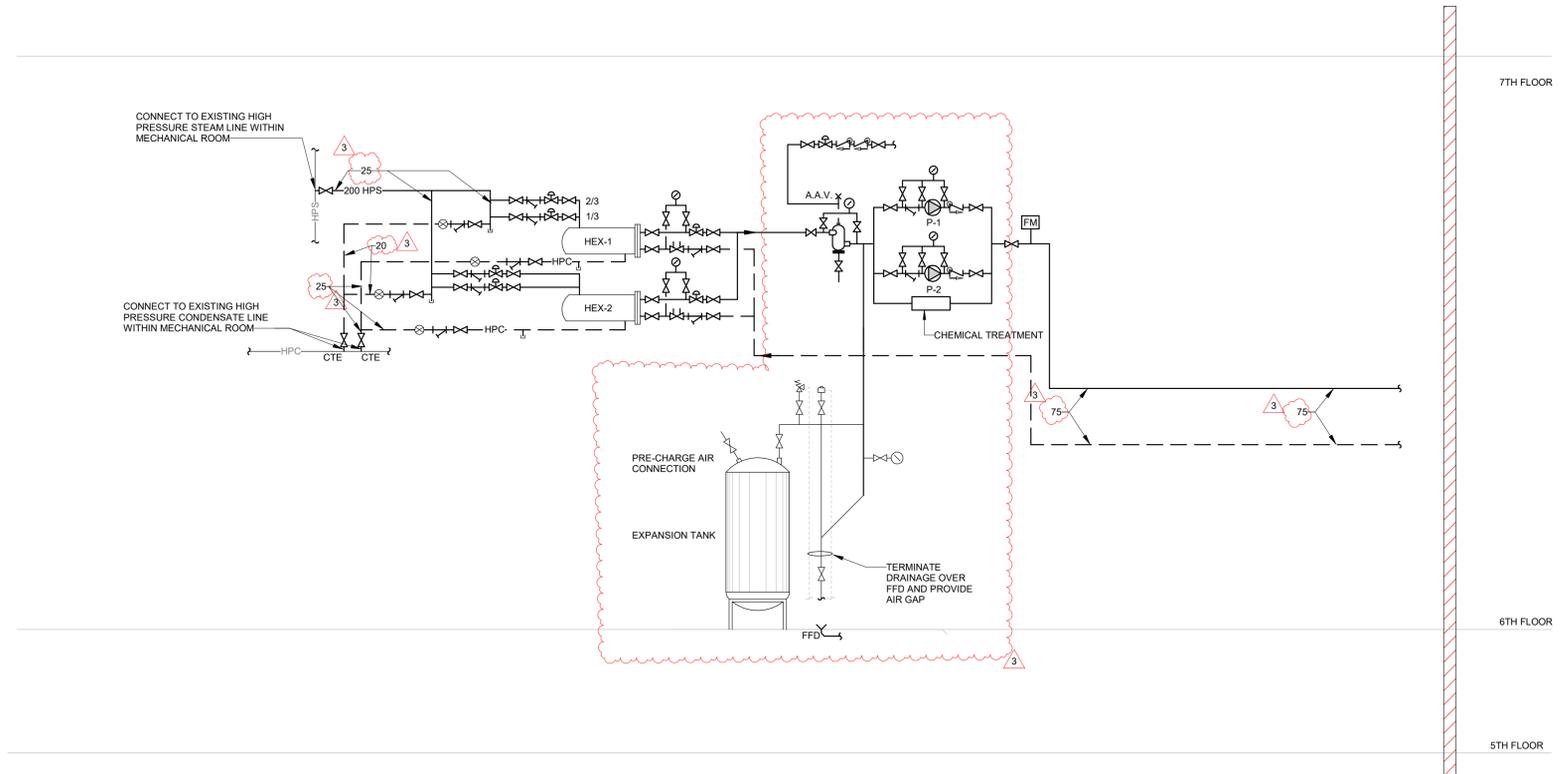
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UHN_PMCC_Addendum 4_2024-09-18_R4



Rev.	Description	Date
3	ISSUED FOR ADDENDUM M-3	2024-09-18
2	ISSUED FOR ADDENDUM M-1	2024-09-05
1	ISSUED FOR TENDER	2024-08-14

Rev. Description Date

Drawing Title:

**HEATING WATER
SCHEMATIC**

1 : 1

Project No.: 0020711.00 Checked by: Checker

M7013

HEATING WATER SCHEMATIC
SCALE: 1 : 1

**Princess Margaret
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5	ISSUED FOR ADDENDUM M-3	2024-09-18
4	ISSUED FOR TENDER	2024-08-14
3	ISSUED FOR BUILDING PERMIT	2023-12-19
2	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
1	ISSUED FOR 95% CD SUBMISSION	2023-09-06

Rev.	Description	Date
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Drawing Title:

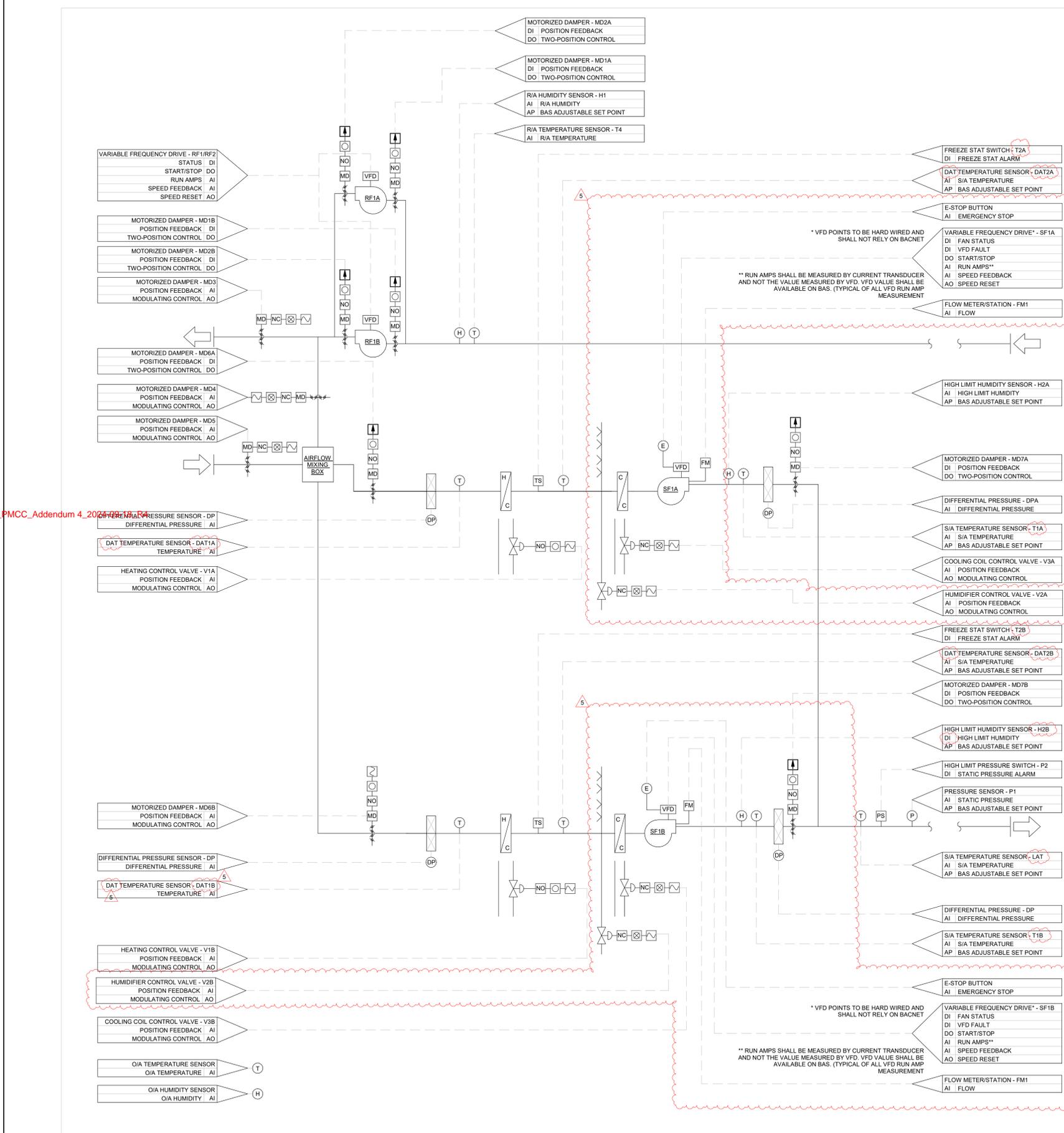
**MECHANICAL CONTROL
SEQUENCE III**

N.T.S.

Project No.: 0020711.00 Checked by: Checker

M7502

- OPERATING MODE:**
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
- SCHEDULED RUN TIME
- INITIAL SET UP:**
1. THE SYSTEM SHALL BE A 50% OUTDOOR AIR SYSTEM. DAMPERS SHALL BE BALANCED AND THEIR MINIMUM POSITIONS RECORDED TO A FIELD DETERMINED AIRFLOW AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
2. WHERE ECONOMIZER CONTROL IS AVAILABLE TO ALLOW FOR FREE COOLING, MINIMUM DAMPER POSITIONS SHALL BE RECORDED TO ENSURE THAT THE MINIMUM OUTDOOR AIR VALUE AS SCHEDULED IS PROVIDED AT ALL TIMES.
3. WHERE SMOKE VENTING IS AVAILABLE, SUPPLY FAN AND EXHAUST FAN VFD'S SHALL BE PROGRAMMED WITH A SMOKE VENTING OVERRIDE FAN SPEED.
4. MD1 & MD2 SHALL BE NORMALLY CLOSED.
5. MD3 SHALL BE NORMALLY OPEN.
6. V1, V3 & V4 SHALL BE CLOSED.
7. FANS SHALL BE BALANCED TO A FIELD DETERMINED AIRFLOW & STATIC PRESSURE AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
8. AFTER THE SYSTEM BALANCING AND COMMISSIONING IS COMPLETE, OBTAIN THE AIRFLOW DIFFERENTIAL BETWEEN THE SUPPLY FAN AND THE RETURN FAN. P1 SHALL BE LOCATED APPROXIMATELY TWO-THIRDS DOWNSTREAM/UPSTREAM OF THE FAN. FINAL LOCATION SHALL BE COORDINATED WITH THE BALANCING CONTRACTOR AND THE CONTROLS CONTRACTOR.
9. VFD SPEED SHALL BE FIELD OPTIMIZED TO AVOID FAN (TORQUE AND CURRENT) STALL CONDITIONS AND SHALL NOT OPERATE BELOW 30% SPEED.
10. SYSTEM SHALL BE ENABLED BASED ON SCHEDULED RUN TIME (MONDAY-SUNDAY - 9am-5pm). CONFIRM SCHEDULED RUN TIME WITH UHN PRIOR TO PROGRAMMING.
11. FANS SHALL BE ENABLED/DISABLED LOCALLY AT THE VFD OR REMOTELY THROUGH THE BAS.
12. RETURN FAN SHALL BE HARD WIRED INTERLOCKED WITH THE SUPPLY FAN SUCH THAT THE RETURN FAN SHALL BE ENABLED BEFORE THE SUPPLY FAN.
13. DURING THE INITIAL START-UP, BUT SHALL BE DISABLED AFTER THE SUPPLY FANS STOPS.
14. HUMIDIFIER SHALL BE SOFTWARE INTERLOCKED WITH FAN STATUS; FLOW SWITCH ALONE IS NOT ACCEPTABLE.
- GENERAL:**
WHERE THE FOLLOWING SEQUENCES ARE WRITTEN TO REFLECT CONTROL LOGIC OF ONE UNIT, IT SHALL BE UNDERSTOOD THAT THE SEQUENCES APPLY TO BOTH UNITS.
ALL SETPOINTS TO BE OPERATOR ADJUSTABLE.
- FAN CONTROL:**
ON COMMAND TO START MD1 & MD2 SHALL OPEN. UPON PROOF OF MOTORIZED DAMPER POSITION FANS SHALL BE ENABLED. MD1 SHALL BE INTERLOCKED WITH SF AND MD2 SHALL BE INTERLOCKED WITH RF1 TO ENSURE CONTROLS OPERATION WHEN FANS ARE OPERATING IN "HAND" OR "AUTO" MODE.
CONTROL SIGNALS SHALL BE DUPLICATED AT THE BAS.
SUPPLY FAN SHALL MODULATE TO MAINTAIN THE STATIC PRESSURE SET POINT DETERMINED BY P1.
RETURN FAN VFD SHALL TRACK THE SUPPLY FAN VFD SPEED AND MAINTAIN THE FIXED AIRFLOW OFFSET.
- ECONOMIZER (FREE COOLING) CONTROL:**
FREE COOLING IS ENABLED WHEN:
1. OIA ENTHALPY IS LESS THAN RIA ENTHALPY AND OIA TEMPERATURE IS LESS THAN RIA TEMPERATURE AND OIA DEWPOINT IS LESS THAN RIA DEWPOINT.
2. THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION REQUIRED TO DELIVER THE OUTDOOR AIR QUANTITY AS SCHEDULED. THE DAMPER SHALL MODULATE TO MAINTAIN THE MINIMUM POSITION FOR FREE COOLING.
3. THE EXHAUST AIR DAMPER SHALL TRACK THE OUTDOOR AIR DAMPER POSITION.
- HEAT WHEEL CONTROL:**
N/A
- FROST PREVENTION CONTROL SEQUENCE:**
N/A
- TEMPERATURE CONTROL:**
FREE COOLING IS NOT AVAILABLE AND COOLING IS REQUIRED.
1. T1 SHALL BE SET TO (12°C DRY BULB).
2. MD3, MD4 & MD5 SHALL BE IN THEIR MINIMUM POSITIONS.
3. V1 & V2 SHALL BE CLOSED.
4. V3 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
FREE COOLING IS AVAILABLE AND COOLING IS REQUIRED.
1. T1 SHALL BE SET TO (12°C DRY BULB).
2. V1, V2 & V3 SHALL BE CLOSED.
3. MD3, MD4 & MD5 SHALL MODULATE OPEN ACCORDING TO THE ECONOMIZER (FREE COOLING) CONTROL SEQUENCE ABOVE TO MAINTAIN THE T1 SET POINT.
IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL COOLING IS REQUIRED, V3 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
FREE COOLING IS NOT REQUIRED AND HEATING IS REQUIRED.
1. T1 SHALL BE SET TO (12°C DRY BULB).
2. MD3, MD4 & MD5 SHALL BE IN THEIR MINIMUM POSITIONS.
3. V2 & V3 SHALL BE CLOSED.
4. V1 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- HUMIDITY CONTROL:**
1. H1 SHALL BE SET TO 30% R.H.).
2. V2 SHALL MODULATE OPEN TO MAINTAIN THE H3 SET POINT. VALVE POSITION WILL BE LIMITED TO MAINTAIN H3 AT/BELOW SET POINT. H3 SHALL BE SET TO (90% R.H.).
- FIRE ALARM MODE:**
FANS SHALL (SHUT DOWN) DURING FIRE ALARM.
- SMOKE VENTING MODE:**
UPON MANUAL ACTIVATION OF THE FIRE ALARM SYSTEM OVERRIDE SWITCH FOR SMOKE VENTILATION AT THE FIRE ALARM PANEL THE FOLLOWING SHALL OCCUR:
1. T1 SHALL BE SET TO (12°C DRY BULB).
2. MD3 SHALL BE CLOSED.
3. MD1, MD2, MD6 & MD7 SHALL BE OPEN.
4. V2 & V3 SHALL BE CLOSED.
5. FANS SHALL OPERATE IN SMOKE VENTING MODE (SUPPLY FAN AND RETURN FAN VFD'S SHALL MODULATE TO RUN UNDER REDUCED AIR MODE TO SATISFY A MINIMUM OF 6 ACH TO THE FIRE FLOOR AREA.
6. V1 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- FAN FAILURE:**
UPON SUPPLY FAN OR RETURN FAN FAILURE, OR MANUAL COMMAND FOR ONLY ONE AHU TO OPERATE, THE FOLLOW SHALL OCCUR:
1. REMAINING OPERATIONAL FAN, CONTROL VALVES, AND DAMPERS SHALL REMAIN OPERATIONAL.
2. FAILED UNIT DAMPERS MD1, MD2, MD6 & MD7 SHALL BE CLOSED.
- SAFETY SHUT DOWN:**
HIGH LIMIT DUCT STATIC PRESSURE SENSOR P2 AT THE SUPPLY AIR MAIN SHALL BE HARDWIRED INTERLOCKED WITH THE SUPPLY FAN AND DISABLE THE FAN WHEN P2 EXCEEDS 3 IN.WC.
FREEZE STAT T4 SHALL BE HARD WIRED INTERLOCKED WITH THE SUPPLY FAN AND THE RETURN FAN. FANS SHALL BE DISABLED WHEN T4 DROPS BELOW 4°C. FANS MUST BE MANUALLY RESET PRIOR TO RESTARTING. CLOSE ALL DAMPERS.
MANUAL E-STOP BUTTON, MOUNTED ADJACENT AND SEPARATE FROM VFD, TO DISABLE ASSOCIATED AHU FANS.
- TEMPERATURE RE-SET:**
1. DAT SETPOINT - OPTIMIZED: THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE AND SHALL RESET THE DISCHARGE AIR TEMPERATURE SETPOINT BASED ON OUTSIDE AIR CONDITIONS AND SATISFYING ALL ZONE HEATING/COOLING REQUIREMENTS.
2. THE INITIAL DAT SETPOINT SHALL BE (15°C).
3. THE DAT SETPOINT SHALL INCREMENTALLY RESET BETWEEN A HIGH AND LOW OFFSET RANGE AS DESCRIBED BELOW. AS ZONE COOLING DEMAND INCREASES, A MINIMUM OF 3 COOLING REQUESTS (ADJUSTABLE), THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF THE LOW OFFSET. WITH NO COOLING REQUESTS, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM HIGH OFFSET. THE OPPOSITE SHALL OCCUR FOR HEATING REQUESTS.
A. HEATING/COOLING REQUESTS SHALL TYPICALLY BE DETERMINED AT THE TERMINAL UNIT ZONE LEVEL.
B. INCREMENT SHALL BE 0.1°C/MINUTE (ADJ).
4. WHEN OUTSIDE AIR DEW POINT TEMPERATURE IS ABOVE 14°C (ADJ), THE DAT SETPOINT SHALL RANGE FROM HIGH OFFSET OF +0°C (ADJ) TO A LOW OFFSET OF -2°C (ADJ).
5. WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS ABOVE 21°C (ADJ) AND DEW POINT IS BELOW 14°C (ADJ), THE DAT SETPOINT SHALL RANGE FROM HIGH OFFSET OF +1°C (ADJ) TO A LOW OFFSET OF -2°C (ADJ).
6. WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS BELOW 21°C (ADJ) AND DEW POINT IS BELOW 14°C (ADJ), THE DAT SETPOINT SHALL RANGE FROM HIGH OFFSET OF +4°C (ADJ) TO A LOW OFFSET OF -2°C (ADJ).
7. DEHUMIDIFICATION MODE: A RETURN AIR RH SENSOR SHALL OVERRIDE THE COOLING SEQUENCE ABOVE TO MAINTAIN A MAXIMUM OF (60% RH) FOR THE AREA SERVED BY THE AIR HANDLING UNIT.
8. IF RETURN RH IS GREATER THAN MAXIMUM SETPOINT AND CURRENT RESET DAT SETPOINT IS ABOVE INITIAL, THEN RESET TO INITIAL DAT SETPOINT. IF AFTER 15 MINUTES (ADJ) RH IS STILL GREATER THAN MAXIMUM SETPOINT WITH INITIAL DAT SETPOINT, THEN CONTINUE TO INCREMENTALLY RESET DOWN TO MINIMUM LOW OFFSET.
9. HEATING/COOLING FLAGS SHALL HAVE THE ABILITY TO BE IGNORED/REMOVED FROM THE SYSTEM TO AVOID UNNECESSARY TEMPERATURE RE-SETS.
- SYSTEM ALARMS & PRIORITY AT BAS:**
FAN FAILURE - COMMANDED ON/STATUS OFF
FAN IN HAND - COMMANDED OFF/STATUS ON
VFD FAILURE: FAULT CONTACT
DAMPER FAILURE: COMMANDED ON/CLOSED FEEDBACK
DAMPER IN HAND: COMMANDED OFF/OPEN FEEDBACK
HIGH SUPPLY AIR TEMPERATURE: T1 IS GREATER THAN 16°C FOR MORE THAN 30 MINUTES
LOW SUPPLY AIR TEMPERATURE: T1 IS LOWER THAN 10°C FOR MORE THAN 30 MINUTES
FREEZE STAT: T2 IS EQUAL TO OR LOWER THAN 4°C
HIGH RETURN AIR TEMPERATURE: T4 IS GREATER THAN 27°C FOR MORE THAN 30 MINUTES
LOW RETURN AIR TEMPERATURE: T4 IS LOWER THAN 18°C FOR MORE THAN 30 MINUTES
HIGH RETURN AIR HUMIDITY: H1 IS GREATER THAN 10% R.H. ABOVE DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES
LOW RETURN AIR HUMIDITY: H1 IS LOWER THAN 5% R.H. BELOW DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES
- SYSTEM TRENDS AT BAS:**
FAN STATUS
RUN AMPS
VFD SPEED
STATIC PRESSURE
DIFFERENTIAL PRESSURE
EQUIPMENT OPERATING HOURS
POSITION FEEDBACK
TEMPERATURE SET POINT AND ACTUAL SUPPLY AIR TEMPERATURE
CURRENT TRANSDUCER ON WIRE FEEDER TO VFD TO BE TRENDED AT BAS
- GENERAL NOTE RE: ALL BAS SEQUENCES**
BAS SEQUENCES TO BE IN COMPLIANCE WITH ASHRAE 36 AND SHALL INCLUDE FOR SETPOINT OPTIMIZATION.
- GENERAL NOTE RE: ALL BAS GRAPHICS**
BAS GRAPHIC TO INDICATE DEFAULT SETTING ADJACENT TO ANY OPERATOR ADJUSTABLE SETPOINT.
*AHU TO HAVE DISTECH FIELD CONTROLLER.
- NOTE:** ALL POINTS DESCRIBED IN THE SEQUENCE SHALL APPLY TO BOTH UNITS (A/B), EXAMPLE: WHERE T1 IS REFERENCED, THE SEQUENCE SHALL APPLY TO T1A AND T1B.
NOTE: SYSTEM TO BE PROVIDED WITH LOCAL UPS.



UHN_PMCC_Addendum 4_2024-09-10.rvt

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**23 75 00.01 - AIR HANDLING UNIT AH-033A/B - 50% OUTDOOR AIR
SCALE:N.T.S.**

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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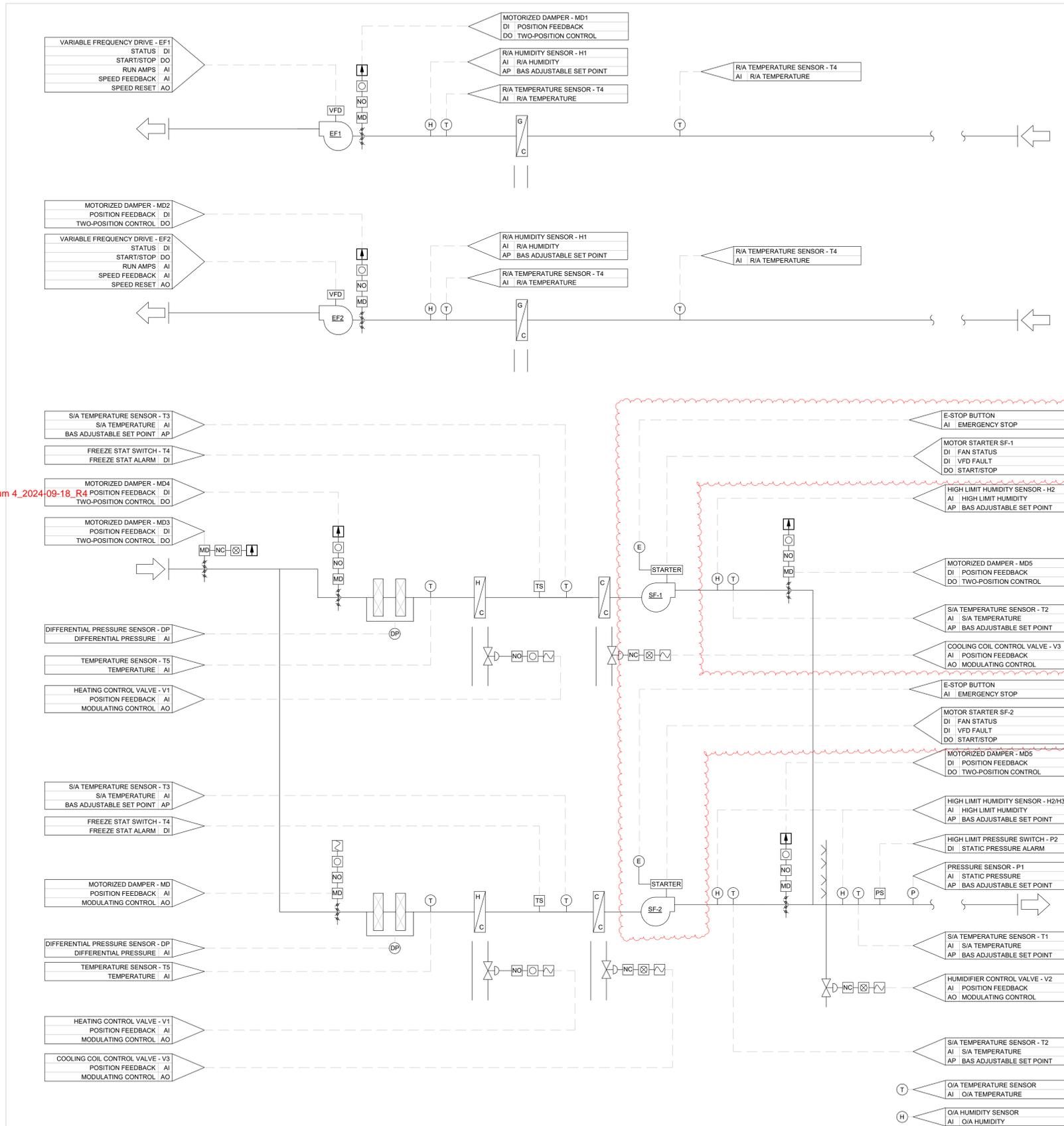
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- OPERATING MODE:
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
- SCHEDULED RUN TIME
- INITIAL SET UP:
THE EXISTING AHU SEQUENCE SHALL BE REINSTATED FOR ALL REPLACED CONTROL COMPONENTS. THE INTENT OF THE FOLLOWING SEQUENCE IS TO PROVIDE ADDITIONAL REFERENCE. WHERE THERE IS A DISCREPANCY, SUBMIT TO CONSULTANT AND OWNER FOR REVIEW.
THE SYSTEM SHALL BE A 100% OUTDOOR AIR SYSTEM. DAMPERS SHALL BE BALANCED AND THEIR MINIMUM POSITIONS RECORDED TO A FIELD DETERMINED AIRFLOW AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
WHERE ECONOMIZER CONTROL IS AVAILABLE TO ALLOW FOR FREE COOLING, MINIMUM DAMPER POSITIONS SHALL BE RECORDED TO ENSURE THAT THE MINIMUM OUTDOOR AIR VALUE AS SCHEDULED IS PROVIDED AT ALL TIMES.
WHERE SMOKE VENTING IS AVAILABLE, SUPPLY FAN AND EXHAUST FAN VFD'S SHALL BE PROGRAMMED WITH A SMOKE VENTING OVERRIDE FAN SPEED.
MD1 & MD2 SHALL BE NORMALLY CLOSED.
MD3 SHALL BE NORMALLY OPEN.
V1, V3 & V4 SHALL BE CLOSED.
FANS SHALL BE BALANCED TO A FIELD DETERMINED AIRFLOW & STATIC PRESSURE AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
AFTER THE SYSTEM BALANCING AND COMMISSIONING IS COMPLETE, OBTAIN THE AIRFLOW DIFFERENTIAL BETWEEN THE SUPPLY FAN AND THE RETURN FAN. P1 SHALL BE LOCATED APPROXIMATELY TWO-THIRDS DOWNSTREAM/UPSTREAM OF THE FAN. FINAL LOCATION SHALL BE COORDINATED WITH THE BALANCING CONTRACTOR AND THE CONTROLS CONTRACTOR.
VFD SPEED SHALL BE FIELD OPTIMIZED TO AVOID FAN (TORQUE AND CURRENT) STALL CONDITIONS AND SHALL NOT OPERATE BELOW 30% SPEED.
SYSTEM SHALL BE ENABLED BASED ON SCHEDULED RUN TIME (MONDAY-SUNDAY - 9am-5pm). CONFIRM OPERATIONAL HOURS WITH UHN PRIOR TO PROGRAMMING.
FANS SHALL BE ENABLED/DISABLED LOCALLY AT THE VFD OR REMOTELY THROUGH THE BAS.
EXHAUST FAN SHALL BE HARD WIRED INTERLOCKED WITH THE SUPPLY FAN SUCH THAT THE EXHAUST FAN SHALL BE ENABLED BEFORE THE SUPPLY FAN DURING THE INITIAL START UP, BUT SHALL BE DISABLED AFTER THE SUPPLY FANS STOPS.

- GENERAL:
- WHERE THE FOLLOWING SEQUENCES ARE WRITTEN TO REFLECT CONTROL LOGIC OF ONE UNIT, IT SHALL BE UNDERSTOOD THAT THE SEQUENCES APPLY TO BOTH UNITS.
 - ALL SETPOINTS TO BE OPERATOR ADJUSTABLE.
- FAN CONTROL:
ON COMMAND TO START MD1 & MD2 SHALL OPEN. UPON PROOF OF MOTORIZED DAMPER POSITION FANS SHALL BE ENABLED. MD1 SHALL BE INTERLOCKED WITH SF1 AND MD2 SHALL BE INTERLOCKED WITH SF1 TO ENSURE CONTROLS OPERATION WHEN FANS ARE OPERATING IN "HAND" OR "AUTO" MODE. CONTROL SIGNAL SHALL BE DUPLICATED AT THE BAS.
SUPPLY FAN SHALL MODULATE TO MAINTAIN THE STATIC PRESSURE SET POINT DETERMINED BY P1.
- ECONOMIZER (FREE COOLING) CONTROL:
FREE COOLING IS ENABLED WHEN:
• O/A ENTHALPY IS LESS THAN R/A ENTHALPY AND O/A TEMPERATURE IS LESS THAN R/A TEMPERATURE AND O/A DEWPOINT IS LESS THAN R/A DEWPOINT.
• T1 SHALL BE SET TO (12°C DRY BULB).
• MD3, MD4 & MD5 SHALL BE IN THEIR MINIMUM POSITIONS.
• V1 & V2 SHALL BE CLOSED.
• V3 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION REQUIRED TO DELIVER THE OUTDOOR AIR QUANTITY AS SCHEDULED. THE DAMPER SHALL MODULATE ABOVE THE MINIMUM POSITION TO ALLOW FOR FREE COOLING.
THE RETURN AIR DAMPER SHALL TRACK THE OUTDOOR AIR DAMPER POSITION.

- HEAT WHEEL CONTROL:
N/A
- FROST PREVENTION CONTROL SEQUENCE:
N/A
- TEMPERATURE CONTROL:
FREE COOLING IS NOT AVAILABLE AND COOLING IS REQUIRED.
• T1 SHALL BE SET TO (12°C DRY BULB).
• MD3, MD4 & MD5 SHALL BE IN THEIR MINIMUM POSITIONS.
• V1 & V2 SHALL BE CLOSED.
• V3 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- FREE COOLING IS AVAILABLE AND COOLING IS REQUIRED.
• T1 SHALL BE SET TO (12°C DRY BULB).
• V1, V2 & V3 SHALL BE CLOSED.
• MD3, MD4 & MD5 SHALL MODULATE OPEN ACCORDING TO THE ECONOMIZER (FREE COOLING) CONTROL SEQUENCE ABOVE TO MAINTAIN THE T1 SET POINT.
• IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL COOLING IS REQUIRED, V3 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- FREE COOLING IS NOT REQUIRED AND HEATING IS REQUIRED.
• T1 SHALL BE SET TO (12°C DRY BULB).
• MD3, MD4 & MD5 SHALL BE IN THEIR MINIMUM POSITIONS.
• V2 & V3 SHALL BE CLOSED.
• V1 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.

- HUMIDITY CONTROL:
• H1 SHALL BE SET TO 30% R.H.).
• V2 SHALL MODULATE OPEN TO MAINTAIN THE H3 SET POINT. VALVE POSITION WILL BE LIMITED TO MAINTAIN H3 AT/BELOW SET POINT. H3 SHALL BE SET TO (90% R.H.).
- FIRE ALARM MODE:
FANS SHALL (SHUT DOWN) DURING FIRE ALARM.
- SMOKE VENTING MODE:
UPON MANUAL ACTIVATION OF THE FIRE ALARM SYSTEM OVERRIDE SWITCH FOR SMOKE VENTILATION AT THE FIRE ALARM PANEL THE FOLLOWING SHALL OCCUR:
• T1 SHALL BE SET TO (7°C DRY BULB).
• MD1, MD2, MD4 & MD5 SHALL BE OPEN.
• V2 & V3 SHALL BE CLOSED.
• FANS SHALL OPERATE IN SMOKE VENTING MODE.
• V1 SHALL MODULATE OPEN TO MAINTAIN THE T1 SET POINT.
- FAN FAILURE:
UPON SUPPLY FAN OR RETURN FAN FAILURE, OR MANUAL COMMAND FOR ONLY ONE AHU TO OPERATE, THE FOLLOW SHALL OCCUR:
• REMAINING OPERATIONAL FAN SHALL AND CORRESPONDING CONTROL COMPONENTS SHALL REMAIN OPERATIONAL.
• FAILED UNIT DAMPERS MD1, MD2, MD6 & MD7 SHALL BE CLOSED.
- SAFETY SHUT DOWN:
HIGH LIMIT DUCT STATIC PRESSURE SENSOR P2 AT THE SUPPLY AIR MAIN SHALL BE HARDWIRED INTERLOCKED WITH THE SUPPLY FAN AND DISABLE THE FAN WHEN P2 EXCEEDS 3 INWC.
FREEZE STAT T4 SHALL BE HARD WIRED INTERLOCKED WITH THE SUPPLY FAN AND THE RETURN FAN. FANS SHALL BE DISABLED WHEN T4 DROPS BELOW 4°C. FANS MUST BE MANUALLY RESET PRIOR TO RESTARTING. CLOSE ALL DAMPERS.
MANUAL E-STOP BUTTON, MOUNTED ADJACENT AND SEPARATE FROM VFD, TO DISABLE ASSOCIATED AHU FANS.

- SYSTEM ALARMS & PRIORITY AT BAS:
- FAN FAILURE: COMMANDED ON/STATUS OFF
 - FAN IN HAND: COMMANDED OFF/STATUS ON
 - STARTER FAILURE: FAULT CONTACT
 - DAMPER FAILURE: COMMANDED ON/CLOSED FEEDBACK
 - DAMPER IN HAND: COMMANDED OFF/OPEN FEEDBACK
 - HIGH SUPPLY AIR TEMPERATURE: T1 IS GREATER THAN 16°C FOR MORE THAN 30 MINUTES
 - LOW SUPPLY AIR TEMPERATURE: T1 IS LOWER THAN 10°C FOR MORE THAN 30 MINUTES
 - FREEZE STAT: T2 IS EQUAL TO OR LOWER THAN 4°C
 - HIGH RETURN AIR TEMPERATURE: T4 IS GREATER THAN 27°F FOR MORE THAN 30 MINUTES
 - LOW RETURN AIR TEMPERATURE: T4 IS LOWER THAN 18°C FOR MORE THAN 30 MINUTES
 - HIGH RETURN AIR HUMIDITY: H1 IS GREATER THAN 10% R.H. ABOVE DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES
 - LOW RETURN AIR HUMIDITY: H1 IS LOWER THAN 5% R.H. BELOW DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES

- SYSTEM TRENDS AT BAS:
- FAN STATUS
 - RUN AMPS
 - VFD SPEED
 - STATIC PRESSURE
 - DIFFERENTIAL PRESSURE
 - EQUIPMENT OPERATING HOURS
 - POSITION FEEDBACK
 - TEMPERATURE SET POINT AND ACTUAL SUPPLY AIR TEMPERATURE
 - CURRENT TRANSDUCER ON WIRE FEEDER TO VFD TO BE TRENDED AT BAS

GENERAL NOTE RE: ALL BAS SEQUENCES
BAS SEQUENCES TO BE IN COMPLIANCE WITH ASHRAE 36 AND SHALL INCLUDE FOR SETPOINT OPTIMIZATION.

GENERAL NOTE RE: ALL BAS GRAPHICS
BAS GRAPHIC TO INDICATE DEFAULT SETTING ADJACENT TO ANY OPERATOR ADJUSTABLE SETPOINT.

* AHU TO HAVE DISTECH FIELD CONTROLLER.

NOTE: ALL POINTS SHOWN/TAGGED FOR ONE UNIT SHALL APPLY TO BOTH UNITS. TAGGING OF CONTROL POINTS ONLY SHOWN FOR ONE UNIT TO SIMPLIFY GRAPHIC.

NOTE: SYSTEM TO BE PROVIDED WITH LOCAL UPS.

4	ISSUED FOR ADDENDUM M-3	2024-09-18
3	ISSUED FOR TENDER	2024-08-14
2	ISSUED FOR BUILDING PERMIT	2023-12-19
1	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25

Rev.	Description	Date
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Drawing Title:

MECHANICAL CONTROL SEQUENCE IV

N.T.S.

Project No.: 0020711.00 Checked by: Checker

M7503

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Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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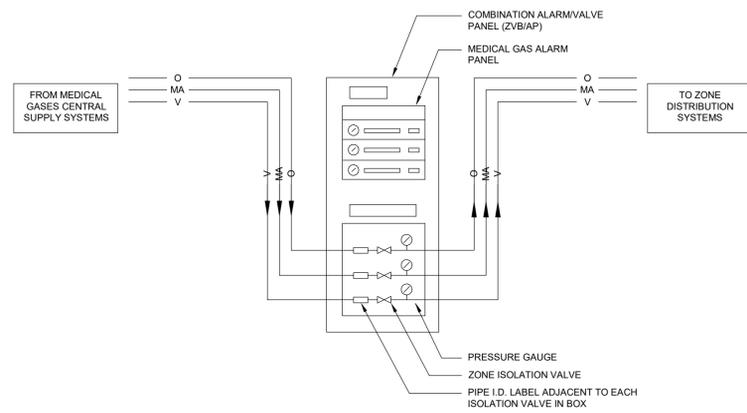
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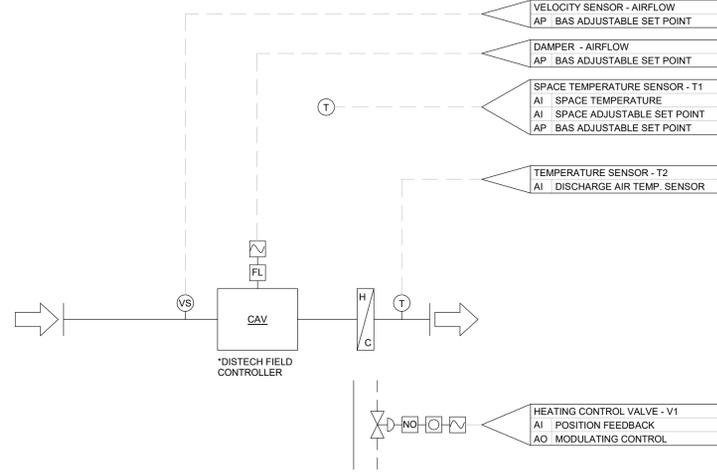
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SYSTEM MONITORING AT BAS:
1. MEDICAL AIR (MA) PRESSURE (AI)
2. VACUUM (V) PRESSURE (AI)
3. OXYGEN (O) PRESSURE (AI)

SYSTEM ALARMS AT BAS:
1. LOW MEDICAL AIR (MA) PRESSURE - (50 PSI ADJUSTABLE)
2. LOW VACUUM (V) PRESSURE - (-15 HG ADJUSTABLE)
3. LOW OXYGEN (O2) PRESSURE - (50 PSI ADJUSTABLE)

GENERAL NOTES:
1. MEDICAL GAS ALARM SHALL BE MONITORED CENTRALLY AND AT BAS



OPERATING MODE:
1. THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE:
* UNOCCUPIED/OCCUPIED SCHEDULE MODE

INITIAL SET UP:
1. CAV MODULATING DAMPER POSITION SHALL BE CALIBRATED AND BALANCED TO A FIELD DETERMINED AIRFLOW & STATIC PRESSURE AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
2. REHEAT COIL SHALL MAINTAIN THE SPACE TEMPERATURE SET POINT.

CONSTANT AIR VOLUME BOX TEMPERATURE CONTROL:

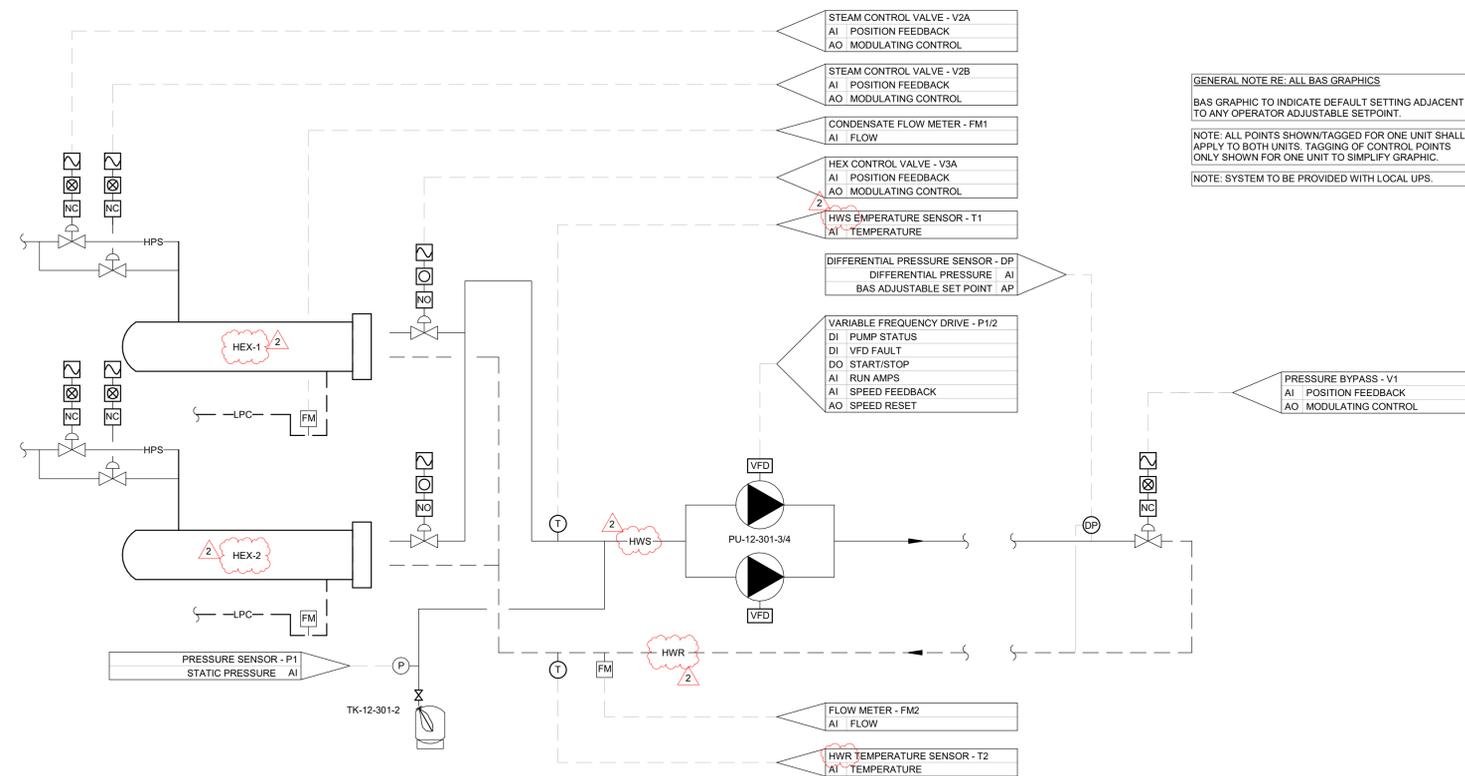
- CAV SUPPLY DAMPER POSITION SHALL BE OPEN TO SUIT AIRFLOW RATES REQUIRED TO MAINTAIN PRESSURIZATION WITHIN NEGATIVE PRESSURE AND CONTACT ILLNESS ROOMS. REFER TO CONTROL SEQUENCES ON M7605.
- V1 SHALL BE NORMALLY OPEN.
- THE SPACE OCCUPIED TEMPERATURE SET POINT SHALL BE (23.9)°C IN COOLING & (23.9)°C IN HEATING (ADJUSTABLE)
- SUPPLY VAV SHALL OPERATE AT CONSTANT VOLUME. IF THE SPACE TEMPERATURE DROPS BELOW SET POINT, RE-HEAT CONTROL SEQUENCE 23 36 00.03 SHALL BE INITIATED.

SYSTEM ALARMS & PRIORITY AT BAS:
* SPACE TEMPERATURE OUT OF RANGE (+/- 2°C)

SYSTEM TRENDS AT BAS:
* AIRFLOW
* POSITION FEEDBACK
* SPACE TEMPERATURE

2 22 60 00.01 - MEDICAL GAS ALARM AND MONITORING
SCALE: 1 : 1

3 23 36 00.05 - CONSTANT AIR VOLUME BOX WITH RE-HEAT IN A HEALTHCARE RENOVATION CONTROL SEQUENCE
SCALE: 1 : 1



GENERAL NOTE RE: ALL BAS GRAPHICS
BAS GRAPHIC TO INDICATE DEFAULT SETTING ADJACENT TO ANY OPERATOR ADJUSTABLE SETPOINT.
NOTE: ALL POINTS SHOWN/TAGGED FOR ONE UNIT SHALL APPLY TO BOTH UNITS. TAGGING OF CONTROL POINTS ONLY SHOWN FOR ONE UNIT TO SIMPLIFY GRAPHIC.
NOTE: SYSTEM TO BE PROVIDED WITH LOCAL UPS.

OPERATING MODE:
1. THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE:
* HEATING/COOLING COIL FLOW DEMAND

- INITIAL SET UP:
1. HEAT EXCHANGERS SHALL BE NORMALLY DISABLED AND OPERATE IN A LEAD/LAG CONFIGURATION. STEAM CONTROL VALVES SHALL BE NORMALLY CLOSED.
2. HEX-01 SHALL BE THE LEAD, HEX-02 SHALL BE THE LAG. PROVIDE AN ALTERNATING CHANGE OVER SEQUENCE FROM A LEAD/LAG OPERATION. THE SEQUENCE SHALL BE ON A PROGRAMMABLE SCHEDULE VIA THE BAS AND SHALL OCCUR (EVERY TUESDAY MORNING AT 10 AM) TO EQUALIZE EQUIPMENT RUN TIME.
3. SYSTEM SHALL BE ENABLED BASED ON A CALL FOR HEATING.

SYSTEM CONTROL:
1. ON COMMAND TO START, LEAD HEAT EXCHANGER ISOLATION VALVE V3A/B SHALL MODULATE OPEN. LEAD PUMP SHALL BE ENABLED AND SOFTWARE INTERLOCKED SUCH THAT OPERATION IS PROHIBITED UNTIL AT LEAST ONE ISOLATION VALVE IS OPEN. REFER TO VARIABLE SPEED PUMP SEQUENCE OF OPERATION FOR FURTHER INFORMATION ON PUMP CONTROL.
2. STEAM CONTROL VALVE V2A/B SHALL MODULATE TO MAINTAIN THE GLYCOL HEATING WATER SUPPLY SET POINT - T1.
3. BYPASS VALVE ON 16TH FLOOR SHALL MODULATE TO MAINTAIN DIFFERENTIAL PRESSURE BYPASS SET POINT. SET POINT SHALL BE NO GREATER THAN 110% OF THAT REQUIRED TO ACHIEVE THE DESIGN FLOW RATE THROUGH THE HEATING COILS AS DETERMINED BY THE BALANCING CONTRACTOR.

OPTIMIZATION:
1. DIFFERENTIAL PRESSURE SETPOINT SHALL BE DYNAMICALLY RESET BASED ON AHU AND BOOSTER COIL CONTROL VALVE POSITION FEEDBACK TO MAINTAIN MOST OPEN CONTROL VALVE AT 90% OPEN (ADJUSTABLE). FEEDBACK TO RESET SETPOINT ON A 15 MINUTE CYCLE.
2. DIFFERENTIAL PRESSURE BYPASS SET POINT SHALL BE 110% OF SYSTEM SETPOINT SUCH THAT BYPASS OCCURS AFTER VFD SPEED HAS REDUCED TO MINIMUM.

HEATING WATER OVERHEATING PROTECTION:
1. UPON LOSS OF FLOW, AS DETECTED BY FLOW METER FM2, STEAM CONTROL VALVES SHALL CLOSE AND SYSTEM SHALL SHUTDOWN AND ALARM AT BAS.
2. UPON DETECTION OF EXCESS TEMPERATURE, AS DETECTED BY TEMPERATURE SENSOR T1, STEAM CONTROL VALVES SHALL CLOSE AND SYSTEM SHALL SHUTDOWN AND ALARM AT BAS.

SYSTEM ALARMS & PRIORITY AT BAS:
* PUMP FAILURE: COMMANDED ON/STATUS OFF
* PUMP IN HAND: COMMANDED OFF/STATUS ON
* VFD FAILURE: FAULT CONTACT
* HWS TEMPERATURE OUT OF RANGE
* OVERHEATING PROTECTION ENABLED
* CONTROL VALVE FAILURE: COMMANDED OPEN/CLOSED FEEDBACK
* CONTROL VALVE IN HAND: COMMANDED CLOSED/OPEN FEEDBACK

SYSTEM TRENDS AT BAS:
* PUMP STATUS
* VFD FAULT
* RUN AMPS
* SPEED FEEDBACK
* DIFFERENTIAL PRESSURE
* EQUIPMENT OPERATING HOURS
* HWS TEMPERATURE
* HWR TEMPERATURE
* CONTROL VALVE POSITION FEEDBACK
* HEAT EXCHANGE EFFICIENCY AS MEASURED BY A COMPARISON BETWEEN STEAM ENERGY IN AND GLYCOL SYSTEM ENERGY.

2 ISSUED FOR ADDENDUM M-3 2024-09-18
1 ISSUED FOR TENDER 2024-08-14

Rev. Description Date

Drawing Title:

**MECHANICAL CONTROL
SEQUENCE V**

1 : 1

Project No.: 0020711.00 Checked by: Checker

M7504

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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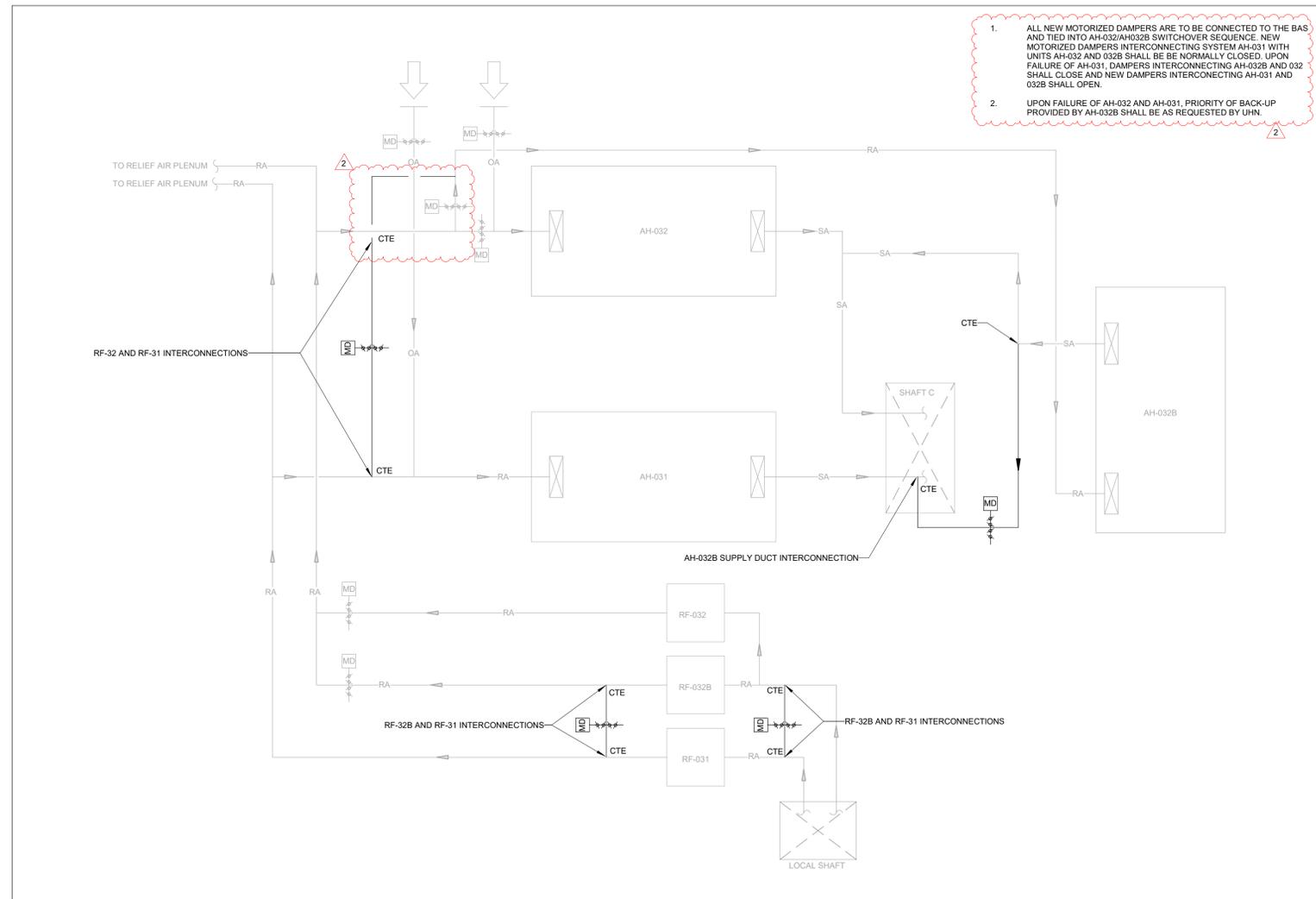
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UHN_PMCC_Addendum 4_2024-09-18_R4



2	ISSUED FOR ADDENDUM M-3	2024-09-182
1	ISSUED FOR TENDER	2024-08-14

Rev. Description Date

Drawing Title:

**MECHANICAL CONTROL
SEQUENCE VII**

1 : 1

Project No.: 0020711.00 Checked by: Checker

M7506

23 75 00.01 AIR HANDLING UNIT AH032A/032B/031 INTERCONNECTIONS
SCALE: 1 : 1

1 General

1.01 SUBMITTALS

- .1 Submit shop drawings/product data sheets for all products specified in this Section. Include motor data sheets and all required information.

1.02 CLOSEOUT SUBMITTALS

- .1 Submit a site inspection and start-up report from manufacturer's representative as specified in Part 3 of this Section.
- .2 Training attendance records.

1.03 QUALITY ASSURANCE

- .1 Fan coil units are to be CSA or cETL listed and labelled, factory assembled and tested, shipped to site in one-piece, and are to be in accordance with requirements of following codes and regulations:
 - .1 CAN/CSA-C22.2 No. 236, Heating and Cooling Equipment;
 - .2 UL/ANSI 1995, Heating and Cooling Equipment;
 - .3 ANSI/AHRI Standard 350, Sound Performance Rating of Non-Ducted Indoor Air-Conditioning Equipment;
 - .4 ANSI/AHRI Standard 440, Performance Rating of Room Fan-Coils;
 - .5 Applicable Provincial Codes and Regulations.

2 Products

2.01 HORIZONTAL FAN COIL UNITS

- .1 AHRI rated and certified capacity fan coil units in accordance with drawing schedule and complete with components specified below.
- .2 Cabinet constructed of heavy-gauge galvanized steel with all exterior panels insulated with minimum 15 mm (½") thick neoprene spray coated glass fibre lining material secured in place with adhesive and with all exposed edges treated and sealed to prevent any fibres from entering airstream, all meeting NFPA 90A requirements and 25/50 flame spread/smoke developed fire hazard ratings when tested to CAN/ULC-S102. Each cabinet is to be complete with:
 - .1 accessible galvanized steel filter holding frame and glass fibre, 25 mm (1") thick, disposable, UL Class 1, 25-30% efficient MERV 7 filters in accordance with requirements of UL 900, Air Filter Units, and complete with a cardboard frame;
 - .2 factory tested coils consisting of 12 mm (½") O.D. seamless copper tubes mechanically expanded into plate type aluminium fins and equipped with copper pipe headers, a manual air vent, and a drain plug;
 - .3 full width, watertight stainless steel primary drain pans sloped for positive drainage and equipped with 2, 20 mm (¾") O.D. drain connections, and factory insulated with 25/50 flame spread/smoke developed rated closed cell insulation when tested to CAN/ULC-S102 and NFPA 90A requirements, with secondary drain pans, constructed and insulated as for primary drain pans, to be provided where required to collect condensate from pipe headers and field supplied valves.

- .3 Centrifugal, forward curved, double width and inlet galvanized steel fan wheel, each dynamically balanced, complete with a 3-speed, resiliently mounted, thermal overload protected, permanent split capacitor motor conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical, and complete with a 3-speed plus "off" motor control switch with faceplate factory mounted in an electrical box secured to unit in an accessible location and factory connected to motor. Fan assemblies are to be accessible and easily removable.
- .4 Horizontal units are to be suspended, equipped with 4 top casing holes for hanger rod connections, and following:
 - .1 rubber-in-shear vibration isolation elements factory supplied with each unit for each suspension point;
 - .2 double deflection discharge grille or flanged discharge duct connection collar as indicated, and either a bottom or rear single deflection return air grille as shown;
 - .3 removable bottom and side panels, and bottom access to filter holding frame;
 - .4 for exposed units, a fused powder epoxy finish on casing and grilles.
- .5 Seismic restraint connection hardware factory secured to each unit.
- .6 Manufacturers:
 - .1 Johnson Controls Co. ENVIRO-TECH;
 - .2 Daiken Industries Inc.;
 - .3 Trane Canada;
 - .4 Carrier Corp.;
 - .5 Greenheck Fan Corp.;
 - .6 Engineered Air.

3 Execution

3.01 INSTALLATION

- .1 Provide fan coil units.
- .2 Secure each horizontal fan coil unit in place from structure by means of galvanized steel hanger rods, and vibration isolation elements supplied with fan coil units. Provide additional structural steel for fan coil unit support installation as required.
- .3 Brace and secure each unit in accordance with requirements specified in Section 20 05 48.16 – Seismic Controls for Mechanical Systems.
- .4 Provide shut-off valves and install a control valve in piping for each coil. Refer to drawing detail and piping schematic.

3.02 SYSTEM STARTUP

- .1 For equipment/system manufacturer certification requirements, refer to Section 20 05 00 – Common Work Results for Mechanical.

- .2 For equipment/system start-up requirements, refer to Section 20 05 00 – Common Work Results for Mechanical.

3.03 TRAINING

- .1 Include for a 1/2 day on-site operation demonstration and training session. Training is to be a full review of all components including but not limited to a full operation and maintenance demonstration, with abnormal events.

End of Section

1 General

1.01 SUBMITTALS

- .1 Submit shop drawings/product data sheets for all custom made air handling units. Include following:
 - .1 computer generated and certified fan performance curves;
 - .2 computer generated psychometric chart for each cooling coil;
 - .3 certified sound power data for discharge, radiated, and return positions by octave band;
 - .4 hardware for section-to-section site connections as applicable;
 - .5 dimensioned layouts;
 - .6 product data sheets for fan motors.
- .2 Submit manufacturer's colour chart to indicate standard colour range of paint finishes.
- .3 Shop drawings shall indicate unit dimensions, unit weight, required clearances, wall, door and base construction details, coil rack and drain pan details, isolation base detail, isolator selection, field connection details, damper details, lifting lug details, and trapping requirements for cooling coil condensate.
- .2.4 Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

1.02 CLOSEOUT SUBMITTALS

- .1 Submit with delivery of each unit a copy of factory test and inspection report as specified in Part 2 of this section, and include a copy of each report with O&M Manual project close-out data.
- .2 Submit a site inspection and start-up report from manufacturer's representative as specified in Part 3 of this section.
- .3 Training attendance records.

1.03 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit spare air filters as specified in Part 2 of this section.
- .2 Supply 4 L (3.5 qt) of touch-up paint with each custom made air handling unit.

1.04 QUALITY ASSURANCE

- .1 Custom made air handling equipment is to be rated (capacity, performance, efficiency and sound) and certified in accordance with requirements of following American National Standards Institute/Air-Conditioning, Heating and Refrigeration Institute Standards, and Air Movement and Control Association International Inc. Standards:
 - .1 AHRI 410, Forced-Circulation Air-Cooling and Air-Heating Coils;
 - .2 ANSI/AHRI 430, Performance Rating of Central Station Air-Handling Units;
 - .3 AMCA Standard 211, Product Rating Manual for Fan Air Performance;
 - .4 AMCA Standard 311, Certified Ratings Program – Product Rating Manual for Fan Sound Performance;

- .5 AMCA Standard 99-2408, Operating Limits for Centrifugal Fans.
- .2 Custom made air handling equipment is also to be in accordance with requirement of following Codes, Standards, and Regulations:
 - .1 CAN/CSA C22.2 No. 236/UL 1995, Heating and Cooling Units;
 - .2 ANSI/ASHRAE/IES 90.1, Energy Standard for Buildings Except Low Rise Residential Buildings;
 - .3 CSA or ETL certification and labelling for all electrical components;
 - .4 governing local Codes and Regulations.
- .3 The following are to be used as selection criteria and are to be as specified: Air flow rates, external static pressures, water flow rates, fan acoustic performance. The following are to be equaled or bettered: Coil face velocities, filter face velocities, casing leakage rates. The following are to be met within 10% of specified values: Water pressure drops.
- .4 Air handling unit manufacturer shall have factory weld certification for all structural welds in accordance with CSA W47.1 and CSA W59 and AWS D1.1. Manufacturers who are not certified will not be accepted.
- .5 Provide unit produced by a recognized manufacturer who maintains a local service agency and parts stock.
- .6 Air handling units and major components shall be products of the manufacturer regularly engaged in production of such equipment.
- .7 Fans shall conform to AMCA bulletins regarding testing and construction. (Airfoil fans shall bear the AMCA certified rating seal for airflow and sound).
- .8 Coils shall be ARI certified.
- .9 Filter media shall be ULC listed.
- .10 Unit shall be factory ETL(c) approved
- .11 After construction, units shall be cleaned thoroughly before shipping. All floor surfaces and wall surfaces shall be thoroughly degreased and cleaned. After cleaning, units shall be shrink wrapped using a heavy gauge heat shrinkable plastic wrap.
- .12 After assembly on site, units shall be cleaned thoroughly. All floor surfaces and wall surfaces shall be thoroughly degreased and cleaned. After cleaning, units shall be shrink wrapped using a heavy gauge heat shrinkable plastic wrap.
- .4.13 During storage, contractor shall store units in a dry heated environment. Fan wheels shall be rotated monthly during storage. Units shall be regularly inspected for moisture and any job site moisture shall be immediately removed.

2 Products

2.01 MANUFACTURERS

- .1 Custom Air Handling Units:
 - .1 Haakon Industries (Canada) Ltd.,
 - .2 Scott Springfield Mfg. Inc.,

- .3 Racan Carrier Co.,
- .2 Components:
 - .1 Fans:
 - .1 Twin City Fan and Blower,
 - .2 Loren Cook Co.,
 - .3 Greenheck Fan Corp.,
 - .4 CML Northern Blower Inc.;
 - .2 Heat transfer coils:
 - .1 Aerofin Canada Services Inc.,
 - .2 Heatcraft Inc.,
 - .3 Daikin.
 - .3 Filters:
 - .1 Camfil Farr Canada Inc.
 - .2 AAF International.

2.02 PRE-DELIVERY FACTORY INSPECTION AND TESTING

- .1 When each is completely assembled and ready for shipment, including assembly of shipping sections, following factory testing is to be performed:
 - ~~.1~~ pressure test each air handling unit to ensure the leakage rate of the casing does not exceed 0.5% of the unit airflow at 1.5 times the rated total static pressure for 4" thick casing units. Leakage test shall be performed with VFD and humidifier panels installed. Test shall be conducted in accordance with SMACNA duct construction manual. A calibrated orifice shall be used to measure leakage airflow. An officer of the air handling unit company shall certify test results. Forward copies of certified test results to the consultant. The consultant shall witness the pressure test. Provide for all transportation for the consultant and owner to the factory. pressure test of 3.0 kPa (with leakage not to exceed 1%, witnessed by Consultant, and all normal travel expenses incurred for 2 people to attend test in manufacturer's plant are to be included in Contract;
 - ~~.2~~ unit bases shall be flooded to a level of 1.25" after manufacturing to assure no leakage through the floor and the perimeter water barrier. The results of the flood test shall be certified by the manufacturer.
 - ~~.2.3~~ at time of factory pressure test, an inspection by the Consultant for defects and conformance to unit construction requirements of Contract.
- .2 Defects found which cannot be corrected while the Consultant is at manufacturer's plant, and/or failure of pressure test will result in rejection of unit(s), and unit(s) must be corrected and again examined by Consultant at a later date but prior to shipment, and Consultant's expenses for re-inspection are to be included in Contract.
- ~~.3~~ Factory tests and inspections are to be scheduled with the Consultant with a minimum of 7 working days' notice. Make travel and accommodation arrangements on behalf of Consultant, and ensure travel tickets, itinerary, etc., are in hands of Consultant well before factory visit departure date.

- .4 When each is completely assembled and ready for start-up onsite, following testing is to be performed:
 - .1 Unit manufacturer shall field pressure test each air handling unit to ensure the leakage rate of the casing does not exceed 0.5% of the unit airflow at 1.5 times the rated total static pressure for 4" thick casing units. Leakage test shall be performed with VFD and humidifier panels installed.
 - .2 Test shall be conducted in accordance with SMACNA duct construction manual. A calibrated orifice shall be used to measure leakage airflow.
- .3.5 An officer of the air handling unit company shall certify test results. Forward copies of certified test results to the consultant. The consultant shall witness the pressure test. Provide for all transportation for the consultant and owner to the factory.

2.03 CASING AND SECTION CONSTRUCTION

- .1 Factory custom made, sectional, modular, rigid air handling units with dimensions and arrangements as shown on drawings. Specific requirements of construction, in addition to requirements of drawing details, are as follows:
 - .1 adhesive backed aluminium duct tape applied to all metal joints in floor panels prior to erection of walls;
 - .2 except for perforated panels, interior panels are smooth for wash-down, and all joints are neatly caulked;
 - .3 units supplied in sections as required to fit through building openings or to suit lifting requirements, and shipping sections are to be properly sealed and prepared for highway shipping, and complete with shrink wrapped openings, rigging instructions, and all gasketing, caulking and fasteners for site assembly and connections;
 - .4 heavy-gauge hot dipped galvanized steel section-to-section connection brackets with heavy-duty non-corrosive hardware, designed for tight section-to-section connections;
 - .5 welded structural steel bases, insulated, equipped with galvanized sheet metal closure for the insulation, reinforcing welded steel cross-members as required, and lifting lugs;
 - .6 floor duct connections consisting of a floor opening reinforced and framed on underside of floor with welded structural steel angles, a #16 gauge G90 galvanized steel (unless otherwise specified) flanged duct connection collar welded or screwed in place and terminated with flange above floor, and framed, removable, hot dipped galvanized steel floor safety grating with perimeter hold-down clips, equal to Fisher & Ludlow "Flowforge";
 - .7 piping penetrations through casings equipped with temporary caps, and openings neatly and accurately cut or drilled, sealed with synthetic rubber type grommets by Kennard Ind. Inc., St. Louis, Mo., U.S.A, or approved equivalent, or tight fitting galvanized steel or aluminium escutcheon plates on both sides of casing;
 - .8 provide a minimum 300 mm (12") square #12 gauge galvanized steel panel as a backup plate to support outlet box for each light fixture, receptacle, switch, or other such component, and secure in place with sheet metal screws with exact locations to be confirmed prior to installation;
 - .9 unless otherwise indicated on drawings, 100 mm (4") thick semi-rigid glass fibre or mineral fibre insulation meeting 25/50 flame spread/smoke developed ratings when tested in accordance with CAN/ULC S102, and secured in place so it does not sag;
 - .10 exterior galvanized steel surfaces, including bottom panels and louvers are hand acid etched, chemically cleaned, coated with proper primer, then painted with 2, 100% covering coats of

eggshell equipment enamel with colour as selected from paint manufacturer's standard colour range;

.11 double wall type access doors constructed as for casing panels and in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible casing access door details and requirements, and each door complete with a pitot tube opening and section identification nameplate, including a warning sign for fan sections;

.12 equipped with factory secured seismic restraint connection hardware.

.13 Welded structural steel bases, insulated, equipped with galvanized sheet metal closure for the insulation, reinforcing welded steel cross-members as required, and lifting lugs.

.14 Unit shall be finished painted with two components, etch bond primer and finish painted with alkyd enamel, manufacturer standard colour. All uncoated steel shall be painted with grey enamel. All metal surfaces shall be pre-painted with vinyl wash primer to ensure paint bonds to metal.

~~.12~~

2.04 NORMAL ENVIRONMENT PLENUM FANS

- .1 Centrifugal plenum fans in accordance with drawing schedule, designed without a scroll type housing, and capable of operating over complete pressure class limits as specified in AMCA Standard 99-2408.
- .2 Heavy-gauge reinforced steel inlet plate with perimeter square formed lip, spun steel inlet cone bolted to inlet plate for smooth airflow into the venturi shaped inlet cone of fan wheel, and a welded structural steel framework forming a mounting base and bearing support platform welded to inlet plate.
- .3 Non-overloading wheel with backward inclined, die-formed, airfoil design steel blades continuously welded to a spun inlet cone, backplate, and cast iron hub, statically and dynamically balanced as an assembly, and designed for critical speeds of at least 1.25 times maximum class speed.
- .4 AISI C-1040 or C-1050 hot rolled steel fan shaft, accurately turned, ground, polished and ring gauged for accuracy, and sized for a first critical speed of at least 1.25 times maximum rated speed for fan, and heavy-duty, grease lubricated, ball or roller self-aligning pillow block type bearings selected for an AFBMA L-10 minimum average life in excess of 250,000 hours and equipped with extended copper tube lubrication lines terminated in lubrication fittings immediately inside fan section access door.
- .5 NEMA Premium TEFC motor, inverter duty, class F insulation, AEGIS shaft grounding motor with adjustable V-belt drive selected for 40% service factor based on motor nameplate data, an OSHA guard, re-greasable bearings with L10 of 150,000 hours for direct drive applications, Belt guard shall be sized to allow either sheave to be increased by two sizes. Acceptable motor manufacturer shall be Baldor.~~NEMA Premium TEFC motor with adjustable V-belt drive selected for 40% service factor based on motor nameplate data, and an OSHA guard, all conforming to requirement specified in Section 20-05-00—Common Work Results for Mechanical.~~
- .6 Rigid, welded structural steel, vibration isolated base with steel cross members, factory cleaned, deburred, and finished with epoxy enamel, and complete with slide type motor base, and stable, colour coded spring mounts with neoprene sound pads selected to suit static deflection and to operate at not greater than 2/3 solid load, and equipped with shipping restraints.
- .7 Rigid, open mesh galvanized steel safety screen enclosure with fan wheel access facilities, and a removable galvanized steel mesh inlet screen.
- .8 Waterproof flexible connection, indoor-outdoor Duro-Dyne Canada Inc. "DURALON" or DynAir Inc. "HYPOLON" woven fibreglass fabric coated on both sides with a special off-white synthetic rubber compound, factory installed between fan discharge and casing opening, with spring thrust restraints

secured to welded brackets on fan housing and by steel rods through fan casing with a steel back-up plate.

- .9 Variable pitch pulleys are not to be used on this project. Only fixed pulleys/sheaves will be accepted.

2.05 HYDRONIC HEAT TRANSFER COILS

- .1 Drainable coils designed and constructed to meet requirements of ASME Code Category "H" as a registered fitting, and complete with a TSSA CRN. Coil data, performance and specific features not specified below are to be in accordance with drawing detail. Each coil is to be complete with:
- .1 slide in-slide out galvanized steel (304 stainless steel for cooling coils) mounting framework in accordance with drawing detail;
 - .2 16 mm (5/8") O.D. seamless copper tubes mechanically expanded into and bonded to aluminium fins;
 - .3 welded Schedule 40 ASTM A53 seamless steel pipe headers with same end supply and return connections, and 9.5 mm (3/8") tappings for an air vent and a drain valve;
 - .4 flanged #14 gauge type 304 stainless steel casing designed to drain off standing water, and stainless steel intermediate tube support sheets;
 - .5 factory installed coil piping connections terminated through coil section casing using pipe, fittings, couplings, valves, and accessories as specified in Section 23 21 00 – Hydronic Piping and Pumps, sealed as specified above in this section, and capped for site connection of piping.

2.06 COOLING COIL DRAIN PANS

- .1 Stainless steel drain pans, each constructed with a cross-break and a double slope pitch to extended 32 mm (1-1/4") diameter drain connection located with a centreline a minimum of 75 mm (3") above unit base, and complete with 50 mm (2") of flexible elastomeric insulation meeting 25/50 flame spread/smoke developed ratings when tested in accordance with CAN/ULC S102.

2.07 FILTER FRAMING AND RACKS

- .1 Rigid, reinforced galvanized steel frame and rack assembly constructed to suit number, type, and size of individual filters comprising filter bank, and either side loading or face loading as indicated.
- .2 Side load racks complete with top and bottom channels for sliding filters in and out. Face load racks complete with closed cell neoprene sponge type gasketing on frame of each filter cell, and fasteners similar to Camfil Farr C-78 or C-78-2 to hold filters in place. Racks complete with galvanized steel blank-off sheets to prevent air bypass, and galvanized steel wire grid members to prevent loaded filters from being sucked out of filter rack.

2.08 FILTERS

- .1 Factory supplied filters with each unit as follows:
- .1 permanent construction filter: Camfil Farr Canada Inc. CS-5 25 mm (1") thick white, synthetic roll media factory secured in place in filter section prior to shipping;
 - .2 pre-filters: Camfil Farr Canada Inc. R30/30 WR disposable, replaceable, multi-layer, non-cellulose media, ULC listed and labelled Class 1, each enclosed in a waterproof frame, with a minimum efficiency of 25-30% and an arrestance value of 90-92% based on ASHRAE Standard 52.1, a MERV rating of 78A when tested to ASHRAE 52.2, and supplied to site in filter manufacturer's sealed cartons in sufficient quantities for initial loading of pre-filters at fan start-up and 2 sets of spare filters;

- .3 final-filters: Camfil Farr Canada Inc. "DURAFIL 4V" disposable, replaceable, extended surface media filters, ULC listed and labelled Class 1, consisting of microfine glass fibres formed into uniformly spaced pleats, fully bonded to frames and assembled in a V-bank configuration, minimum 80-85% efficient in accordance with ASHRAE Standard 52.1, with a MERV rating of ~~13~~14 when tested in accordance with ASHRAE Standard 52.2, and supplied to site in filter manufacturer's sealed cartons in sufficient quantities for initial loading at fan start-up, and 2 sets of spare filters.

2.09 FILTER GAUGES

- .1 Unless otherwise specified, Dwyer Instruments Inc. Series 605 "Magnehelic", 24 volt DC differential pressure gauges, one for each pre-filter bank, one for each final filter bank, each with $\pm 3\%$ accuracy with a range to suit application, an indicating transmitter with 4-20 mA output, and a mounting bracket.

2.10 MOTORIZED DAMPERS

- .1 T. A. Morrison & Co. Inc. "TAMCO" 100 mm (4") deep flanged aluminium dampers, parallel blade type for mixing applications, opposed blade type for open-shut service, each complete with an extruded 6063-T5 aluminum frame and blades, each blade with an integral slot to receive a gasket, and slip-proof aluminium and corrosion resistant zinc-plated steel linkage concealed in the frame and equipped with self-sealing and self-lubricating bearings consisting of a Celcon inner bearing fixed on hexagonal blade pin and rotating in a polycarbonate outer bearing inserted in frame.
- .2 Standard dampers, Series 1500, with aluminium end caps press-fitted to blade ends, and extruded silicone frame and blade gaskets secured in an integral slot within aluminium extrusions.
- .3 Insulated dampers, for all outdoor air intake and exhaust air applications, Series 9000, with thermally broken blades internally insulated with expanded polyurethane foam, and extruded TPE (Santoprene) side seals and extruded EDPM blade gaskets secured in an integral slot within aluminium extrusions.
- .4 Belimo, CSA certified, spring return, direct coupled electric motor damper actuator, 120 volt or 24 volt as required, electronic overload protected, complete with position indicator, a housing to suit mounting location, and additional features as required to suit application and control sequence. For Class I and Class II explosion-proof environments, Model ZS-260 explosion-proof motor enclosure.

2.11 CONTROLS

- .1 Refer to drawing control diagrams, sequences and points list. Control system components required for within air handling unit enclosures are to be provided by the Controls Contractor, in accordance with and compatible with product requirements specified in Section 25 05 02 – Building Automation System, and ~~factory-installed on site by the Controls Contractor at air handling unit manufacturer's plant.~~

2.12 NORMAL ENVIRONMENT ELECTRICAL ITEMS

- .1 Indoor fluorescent fixtures, Cooper Crouse-Hinds #VT2-232-LEX-120V-120-ER81-WL-U surface mounting, vapour-tight, CSA certified 1.2 m (4') long fixture with 2, 32 watt T-8 lamps, energy saving electronic ballast, reinforced fibreglass housing, gasketed high impact acrylic diffuser, mounting brackets, and water-tight conduit hub.
- .2 Cooper Crouse-Hinds #VFHF222GP surface mounting aluminium construction vapour-proof marine lights CSA certified, suitable for low ambient temperatures of -25°C (-13°F), and complete with 2, 32 watt T-8 lamps, solid state electronic ballast, heat resistant glass globe with guard, 18 watt compact fluorescent lamp, and for outdoor fixtures only, a Heath Zenith motion sensor attached to fixture.
- .3 Hubbell Canada Inc. # 1297 single pole, CSA certified, 15 ampere, 120 volt "PresSwitch" with red nylon actuator and pilot light and #1795 "PresSwitch" clear bubble silicone rubber coverplate.

- .4 Cooper Crouse-Hinds NRS Series, non-metallic, heavy-duty, front operated, quick make and break door interlock safety switches in accordance with CSA Standard C22.2 No. 4 and complete with a NEMA 2 enclosure where indoors and a NEMA 4X enclosure where outdoors.
- .5 Variable frequency drives suitable in all respects for application, and in accordance with requirements of Section 20 05 13.13 - Variable Frequency Drives for Mechanical Equipment.

2.13 FACTORY WIRING AND ELECTRICAL WORK

- .1 Wiring and electrical work factory installed by unit manufacturer is to include:
 - .1 installation of lighting fixtures, located where shown, each secured to a cast aluminium surface mounted box;
 - .2 switch, located approximately 1.2 m (4') above bottom of unit casing where shown, connected with load side power wiring to control unit lighting fixtures;
 - .3 receptacles installed on unit casing exterior approximately 450 mm (18") above bottom of casing with 4.5 m (15') centre-to-centre spacing and a minimum of 2 receptacles per unit, connected 2 receptacles per circuit with wiring terminated in a junction box with cover on exterior surface of unit;
 - .4 combination motor starter for each fan motor, secured to exterior of fan section casing and pre-wired to fan motor;
 - .5 120 volt single phase disconnect switch for switch and receptacles, secured to exterior of unit casing and pre-wired to devices;
 - .6 identified wiring for control devices, terminated in identified junction boxes on exterior of unit casing.
- .2 Unless otherwise specified, boxes are to be cast aluminium type with covers where required. Conduit, including flexible liquid-tight conduit at motor connections and all wiring is to be in accordance with Division 26 requirements.

2.14 FIELD ASSEMBLED AIR-HANDLING UNIT

- .1 The air-handling unit shall be field assembled on site by the contractor. All parts shall be pre-formed by the manufacturer and partially assembled where access is possible. The parts shall be labeled according to an assembly drawing. All assembly material required such as insulation, sealants, fasteners and hardware shall be supplied by the manufacturer as part of the kit.
- .2 Where access permits, sections of the exterior casing shall be pre-assembled in the factory. Otherwise, casing panels shall be shipped individually.
- .3 The unit base shall be made in factory-assembled sections with joining flanges for field assembly. The base and exterior sections shall be pre-painted and pre-insulated in the factory.
- .4 The doors and frames shall be pre-assembled (complete with windows where specified).
- .5 Where access permits, the coil and filter racks shall be pre-assembled and pre-painted in the factory.
- .6 The fan shall be assembled in the factory complete with Baldor motor, protective screening, belt guards and isolation base. The fan and guarding shall be pre-painted in the factory. The fan assembly shall undergo a test run in the factory. Where access permits, the fan assembly shall be shipped in one piece. If access does not permit shipping in one piece, the fan shall be disassembled and shipped in pieces.
 - .1 Fan sections shall include swing out lifting/hoisting beams to allow for replacement of motors.

- .7 The manufacturer shall supply a representative for a minimum of 3 days to supervise the assembly of the air-handling unit on the job-site. Contractor to coordinate exact length of time required to assemble unit with manufacturer.
- .8 The coils shall be installed on site by the contractor.
- .9 The air-handling unit shall be Touch up painted as needed by the contractor
- .10 The electrical panels shall be pre-assembled and pre-tested in the factory. The manufacturer shall provide all necessary conduits and fittings to extend the motor wiring to the electrical panel.
- .11 The air-handling unit manufacturer shall provide marine light fixtures, duplex receptacles, the light switch and the necessary conduit and fittings for field installation of the fixtures.
- .12 The contractor shall be responsible for installation of electrical equipment
- .13 Field wiring and assembly shall be done in accordance with the C.E.C.
- .14 The contractor shall be responsible for obtaining electrical approval of the final assembly.

2.15 ULTRAVIOLET LIGHTS

- .1 The UVGI surface irradiation system shall consist of heavy duty, factory assembled and tested light fixtures that emit short wave UVC light. Units shall be constructed and tested for HVAC environments, be suitable for operating temperatures between 32°F and 150°F, and suitable for airflow velocities up to 1000 FPM.
- .2 Unit housings shall be made of 304 stainless steel, with electrical connectors on both ends. Reflectors or approved equivalent shall be constructed of high spectral finished aluminum alloy with a minimum 85% reflectance of 254-nm UVC energy.
- .3 Emitter tube shall be of the high output, hot cathode, T5 (15mm) diameter, and medium bi-pin type or single ended four pin connectors. They shall produce 95% of their energy at 254 nm and be capable of producing the specified output at airflow velocities to 1000 fpm at temperatures of 35 - 150°F. UVC Emitters shall produce no ozone or other secondary contamination.
- .4 Power source shall be 120 VAC 60hz.
- .5 Emitters and fixtures shall be installed downstream of the cooling coil at right angles to the coil fins, such that UVC energy bathes all surfaces of the coil and drain pan.
- .6 Access door to UVC emitters shall be provided with an interlock switch which will cut power to the emitters when the door is opened. The window in this door shall be tested for use with UV lights.

2.16 ACOUSTICAL PERFORMANCE

- .1 The casing shall have been tested for acoustical performance by an independent laboratory that is accredited. Manufacturers shall submit sound data in compliance with the following:
 - .1 Test methods and facilities used to establish sound transmission loss values shall conform explicitly with the ASTM designation E90-85 and E413-73 or in accordance with AHRI260.
- .2 Refer to Mechanical Schedules for required sound power levels

2.17 CASING

- .1 Walls and roofs shall be constructed of 16 gauge galvanized steel 4" thick acoustic thermal panels. Inner liner of walls including upstream side of a plenum fan wall, and roofs of the cooling coil and Humidifier sections shall be constructed of 22 gauge washdown stainless steel. Insulation shall be 4" thick 4.0 lb.

density mineral fiber. Provide neoprene liner to seal insulation in sections with perforated panels. All permanently joined flanged panel surfaces shall be sealed with an individual strip of 1/8" X 3/8" tape sealer. Wall and roof seams shall be turned inward to provide a clean flush exterior finish. All panel seams shall be sealed during assembly to produce an airtight unit.

- .2 Internal liner shall be suitable for washing with a pressure washer or steam cleaned without risk of wetting the insulation. The liner shall be installed over top of the panel flanges and each liner seam shall be sealed with a lap joint. The wall liner shall be installed over top of the base water dam such that any water run-off from the liner will drip into the water tight base rather than into the wall panel. The roof liner shall be installed over top of the roof support so that water cannot enter the roof insulation.

2.18 INSULATION

- .1 All insulation used in air handling unit walls, roof and base shall have a Flame spread rating of less than 25 and a Smoke Developed rating of less than 50 per ASTM E84 and UL 723 and Can/ULC S102-M88.
- .2 Insulation shall meet NFPA 90A and 90B.

2.19 ACCESS DOORS

- .1 Access door construction and thickness shall match the rest of the unit casing. Corners shall be welded for rigidity. Spot welding of corner seems will not be accepted. 4.0 lb. density insulation shall be sandwiched between the outer and inner skins. A 10" round tempered glass window shall be provided in each door.
- .2 Provide Two chrome plated "Ventlok" Model #310 high pressure latches operable from either side of the door. Hinges shall be continuous piano type stainless steel. Door openings shall be fully gasketed with continuous 1/2" closed cell hollow round black gasket with a metal encapsulated reinforced backing that mechanically fastens to the door opening perimeter. Door frames shall be framed from 16 gauge galvanized steel with the outside of the door flush to the unit. Minimum door width shall be as shown on the plans but in no case shall an access door be less than 18". Door height shall be the maximum permitted by the height of the unit up to 72".
- .3 Doors shall open against positive pressure.

2.20 AIRFLOW MEASURING PROBES

- .1 Provide on each fan, air flow measuring probes.
- .2 Each airflow probe shall contain multiple, averaged velocity pressure taps located symmetrically around the throat of the fan inlet and a single static pressure tap located on the fan housing. The entire airflow monitoring probe must be located outside the inlet throat as to not obstruct airflow.
- .3 The probes shall be capable of producing steady, non-pulsating signal of the velocity pressure, independent of the upstream static pressure without adversely affecting the performance of the fan. The sensing probes shall be accurate $\pm 3\%$ of actual fan airflow. The fan inlet sensing rings shall be FreeFlo Sensing Ring as manufactured by Haakon Industries Ltd.

2.21 AIRFLOW DISPLAY

- .1 Provide on indicated fans a method of displaying digitally, in real time, the fans current air flow.
- .2 For interaction with a controller, the display shall output BACnet communication for each fan being monitored, and be capable of outputting one (1) 0-10VDC signal.
- .3 The display shall be capable of showing the airflow of ten (10) independent fans simultaneously, and communicating all connected fans through BACnet.

- .4 The controller shall incorporate two high accuracy low pressure transducers per connected fan.
- .5 The output signal shall be $\pm 0.5\%$ full scale accuracy.
- .6 The display must be water tight allowing for use in outdoor locations. If the display is not water tight it shall be enclosed in a weatherproof housing.

2.22 VIBRATION ISOLATION

- .1 An integral all weld steel vibration isolation base shall be provided for the fan and motor.
- .2 Provide open spring mounts with iso stiff springs, sound deadening pads and leveling bolts.
- .3 Horizontal stiffness shall be equal to vertical stiffness.
- .4 Spring deflection shall be 1".
- .5 Isolators shall have earthquake restraints. Upon request, the unit manufacturer shall submit a restraint detail certified by a professional engineer.

2.23 DRAINS

- .1 Provide 1 1/4" capped floor drain connections on the side of the unit for complete drainability of the base pan for all sections to allow drainage during washdown.

2.24 LIGHTS

- .1 Marine lights with LED bulbs and protective cast metal cage and glass globes complete with duplex receptacles shall be installed on the wall (across from) (beside) the access doors. One (1) switch with an indicator light shall be installed on the exterior of the unit. Factory wire from switch to all lights in EMT conduit with liquid tight connections. At all split sections, provide a one foot long piece of flexible conduit, with the extra wire spooled, for reconnection on site by the installing contractor. Electrical power shall be 120V/1/60.

2.25 TEST PORTS

- .1 Provide 0.5" diameter test ports for unit air stream testing in each plenum section between each component within the AHU. Test ports shall have a tube that extends between the inside and outside of the unit and a screwed cap on the exterior to allow access. The test ports shall have been flanged on the exterior to allow air seal and shall be flanged on the interior to cover the penetration of the casing.

2.26 STEAM HUMIDIFIERS

- .1 Air handling unit manufacturer shall mount steam grid provided by humidifier manufacturer. Balance of steam humidifier components shall be mounted in the field by the contractor. Provide minimum absorption distance downstream of humidifier as scheduled.
- .2 Steam supply and drain connections shall be on the same side of the AHU with both pipe connections extended 6" beyond the casing exterior wall at the factory.

2.27 HUMIDIFIER SECTION FLOORS

- .1 Floors in humidifier sections shall be constructed of 304 stainless steel and sloped towards a 32mm drain connection extended to side of unit, or:
- .2 A double sloped SS drain pan in accordance with CSA Z317.2;
- .3 Drain pan length shall be minimum double the absorption distance provided by the humidifier manufacturer. Insulation for drain pan shall meet requirements in article 2.9 of this specification.

2.28 INDOOR CURB

.14.1 A prefabricated heavy gauge galvanized steel, mounting curb shall be provided for field assembly in the mechanical room. The curb shall be a full perimeter type with complete perimeter support of the air handling unit and suitable for the weight of both stacked units. The curb height shall be determined by the air handling unit manufacturer to provide sufficient clearance for the installation of condensate traps based on static pressure in the section and the actual height of the drain leaving the unit. Gasket shall be provided for field mounting between the unit base and curb. The curb shall be seismically rated and shall attach securely to the unit.

3 Execution

3.01 INSTALLATION

- .1 Provide custom made air handling units.
- .2 The air-handling unit shall be field assembled on site by the contractor. Coordinate size of shipping sections, where access permits, with manufacturer.
- .3 VFD's to be installed on uni-strut (even if installed on walls). VFD's are to never be mounted onto the AHU's.
- .4 If access does not permit shipping in one piece, the fan shall be reassembled and harmonically balanced.
- .5 The manufacturer shall supply a representative for a minimum of 3 days to supervise the assembly of the air-handling unit on the job-site. Contractor to coordinate exact length of time required to assemble unit with manufacturer.
- .6 The coils shall be installed on site by the contractor.
- .7 The contractor shall be responsible for installation of electrical equipment.
- .8 Field wiring and assembly shall be done in accordance with the C.E.C.
- .9 The contractor shall be responsible for obtaining electrical approval of the final assembly.
- .10 Provide required rigging and hoisting/moving equipment required to move units to required locations. Perform rigging/hoisting/moving in accordance with unit manufacturer's directions and details.
- .11 Secure base mounting units in place, level, and plumb, on floor slab or lower unit.
- .12 Remove fan base hold-down clamps and other shipping restraints and protective packaging.
- .13 Shafts and pulleys to be laser aligned.
- .14 Carefully coordinate installation of each unit with other trades making connections to unit, in particular, control connections.
- .15 Brace and secure each unit in accordance with requirements specified in Section 20 05 48.16 - Seismic Controls for Mechanical Systems.
- .16 The air-handling unit shall be Touch up painted as needed.
- .17 AHU fan motor and other component specifications should be available outside the AHU
- .18 Coordinate with controls installation to ensure:
 - .1 Freeze stat install location to be downstream of heating coil.

- ~~.2 Freeze stat reset button to be installed within the outside chamber of the AHU plenum, within reach and not more than 6 feet high.~~
- ~~.3 High limit temperature cut-off to be installed downstream of the fan.~~
- ~~.19 Emergency E-stop button mounted adjacent to VFD.~~
- ~~.1 Provide custom made air handling units.~~
- ~~.2 Provide required rigging and hoisting/moving equipment required to move units to required locations. Perform rigging/hoisting/moving in accordance with unit manufacturer's directions and details.~~
- ~~.3 Secure base mounting units in place, level, and plumb, on floor slab or lower unit.~~
- ~~.4 Remove fan base hold-down clamps and other shipping restraints and protective packaging.~~
- ~~.5 Carefully coordinate installation of each unit with other trades making connections to unit, in particular, control connections.~~
- ~~.6 Brace and secure each unit in accordance with requirements specified in Section 20 05 48.16 – Seismic Controls for Mechanical Systems.~~

3.02 SYSTEM STARTUP

- .1 For equipment/system manufacturer certification requirements, refer to Section 20 05 00 – Common Work Results for Mechanical. When installation is complete but prior to duct connections, arrange for the unit manufacturer's representative to conduct a site leakage test on each unit. Site leakage tests are to duplicate factory leakage tests and if results of site tests indicate leakage in excess of factory test results, re-seal the unit(s) and repeat the tests until satisfactory results are obtained. Submit leakage test documentation to the Consultant.
- .2 For equipment/system start-up requirements, refer to Section 20 05 00 – Common Work Results for Mechanical.

3.03 CLOSEOUT ACTIVITIES

- .1 Include for a full 8 hour day on-site operation demonstration and training session. Training is to be a full review of all components including, but not limited to, a full operation and maintenance demonstration, with abnormal events.

End of Section

Project Name:	UHN PM Stem Cell Transplant Phase II Part B	Date Issued:	September 19, 2024
Quasar Project #:	HC-21-058		

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Addendum #: E-3

Revision #: 0

This Addendum forms part of the Contract Specifications and Drawings, and modifies the Bidding Documents, with Amendments and Additions noted below. This Addendum shall be added to the front of the specifications as issued. Bidders shall acknowledge receipt of this Addendum in the space provided in the Bid Form and include in bid amount.

This addendum includes modifications to the drawings and specifications as summarized below. Unless otherwise noted, all drawings listed below are attached herewith. Changes to drawings are highlighted with a revision bubble; include for all changes highlighted in the revision bubbles including, but not limited to, those items described below. Answers to Requests for Information below shall form part of the project specifications and are identified in bold following QCG (Quasar Consulting Group).

Requests for Information:

1. (67) Duress Alarm System found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210 & specifications section 28 49 00. Specifications do not include who are approved system provider for hospital. Please issue approved list of vendors with contact details.

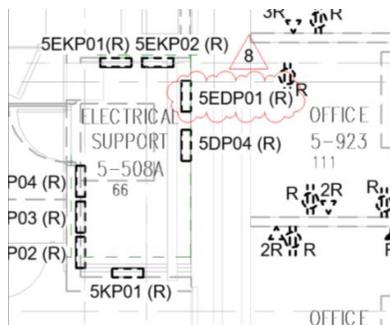
QCG E: (67) Specification 28 49 00.00 – Electronic Personal Protection System has been updated and has been issued as part of Addendum E-3 and it will include the UHN approved vendor and contact information, as well as all other update to the requirements as to further comply with Appendix E-1.

2. (68) Sound Masking System found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210. Tender Documents do not include such information. Please provide specifications for same.

QCG E: (68) Specification 27 51 19.00 – Sound Masking Systems has been issued as part of Addendum E-3

3. (146) Drwgs. E4002 & E4006 – Existing panel 5EDP01 to be demolish & location of this panel is not available on floor plans E1105A & E1105B. Pls. provide location to finalize length of new feeder require for panel 5VERP01

QCG E: (146)



4. (147) Our Data / Com System provider have following queries.

1)Please provide the specification of the required 24-Core OM4 Fiber Optic Cable?

2)Do we need to provide Innerduct or EMT conduit for Fiber optic cable as per Appendix E 4.2.11.9 (UHN Guidelines) or Spec Section 27 05 28.01?

3) Please provide the specification of the Innerduct for the 24-Core OM4 Fiber Optic Cable?

QCG E: (147) 1. Specification Section 27 13 23.00 – Communications Optical Fiber Backbone Cabling has been included as part of this Addendum E-3.

2. In Accordance with specification section 27 13 23.00 section 1.04.6.1 The preferred method for providing pathways is to use a combination of riser sleeves, innerduct and EMT conduit. Ensure to comply with section 1.04.6 of 27 13 23.00 – Communications Optical Fiber Backbone Cabling .

3. Refer to Section 27 05 28.01 – Pathways for Communications Systems – Inner duct And Specification Section 27 13 23.00 – Communications Optical Fiber Backbone Cabling.

5. (149) Spec section 27 15 01.13, Video Surveillance Communications Conductors and Cables, asks for new IP Cameras & associated equipment shall be supplied & installed by others under a separate contract. – Pls. confirm.

a) This means electrical contractors scope is to provide cables with conduit only. – Pls. confirm.

b) Clause 2.02 Cabling, mentions requirement of Plenum rated CAT6 Cabling. UHN Standard requirement says requirement of conduit. Pls. confirm, can we supply conduit with non plenum rated CAT6 Cable.

c) Section 28 01 20.71 Revisions and upgrades of Video Surveillance, Clause 3.01 Installation mentions, “Supply & Installation of CCTV hardware equipment and IP Cameras, as per vendors listed in the service master agreement of UHN”. This is contradictory to the requirement mentioned in Spec section 27 15 01.13. Please confirm under whose scope S & I of CCTV falls either electrical contractor or separate contract.

QCG E: (149) Specification 27 15 01.13 - Video Surveillance Communications Conductors and Cables has been updated and will be re- issued as part of Addendum E-3. (a) Specification section 27 15 01.13 includes for new IP Cameras, and associated equipment shall be supplied and installed as part of this contract. (b) Plenum rated category 6 cable will be used, conduits may be required if cabling is routed in wall cavities with the required for plenum rated cables, refer to section 3.01 of specification 27 15 01.13 – Video Surveillance Communications Conductor and Cables. (c) 27 15 01.13 – Video Surveillance Communications Conductor and Cables has been updated and has been reissued as part of Addendum E-3.

6. (156) Drwg. E4110 – SLD – Note 1 asks to replace panel LP-EL10 with new 82 circuits panel, but do we not find anywhere panel LP-EL10 on SLD or floor plan for 10th floor. Please provide location on floor plan of panel LP-EL10 with revised SLD & Panel Schedule.

QCG E: (156) Drawing E4110 we have revised note (1) to read as: “Existing EPP-10E and PP-10NN to be replaced with new panels. Transfer existing remaining connected loads to the new panel. Refer to panel schedule for exact circuit number required.

7. (157) Please provide location of existing busducts in electrical rooms on floor plans to decide length of new feeders.

QCG E: (157) Electrical Contractor’s additional site visit should have included locating the location of the existing busducts in the electrical rooms. The drawings E1105A and E2105A show the location of the existing electrical room busduct.

8. (159) SLD E4110 -

a) Panel 10BRP02, note 4 requires 144 circuits whereas panel schedule mentions 72 circuits. Pls. confirm number of circuits require for panel 10BRP02.

b) Note 4 also mentions to provide 150A / 3P Circuit Breaker for new panel 10BRP02. As per SLD this panel is feed from 3000A Bus Duct through 100A Switch Fuse unit. Pls. confirm whether we have to replace existing 100A Switch Fuse by new 150A Switch Fuse unit or we have to replace only fuses to 150A.

QCG E: (159) (a) & (b) Note (4) in drawing E4110 has been revised: “Existing 100A/3P Breaker for new panel 10BRP02. Provide 208/120V, 225A,3PH,4W Panel 10BRP02.” Refer to Electrical panel schedule for quantity of circuits required.

9. (160) SLD E6002 – Require to provide new 2 numbers of Switch Fuse units in Panel EPP-9EE & run new two feeders from these switch fuses units to new UPS’s on 2nd & 5th floors resp. Pls. provide location of panel EPP-9EE on 9th floor plan to decide length of feeders.

QCG E: (160) Location of EPP-9EE is now shown on E0109 for reference only, Electrical contractor to verify on site (attached as part of Addendum E-3).

10. (173) Within Spec Section 26 24 16 for panel boards, article 2.02.11 states that breakers labeled as “Spare” or “Space” shall constitute 20% of available breaker positions. Please clearly quantify number of spare breakers required for each panel in the electrical drawings/panel schedules to ensure all bidding manufacturers provide the same quantity of spare breakers. Otherwise only spare breakers/space indicated in electrical drawings/panel schedules will be considered

QCG E: (173) For quantity of circuit breaker, spare and spaces refer to electrical panel schedules.

11. (175) Spec Section 26 05 48 indicated and calls for new equipment with seismic restraints. As the scope of this project is addition to existing hospital, please confirm if this requirement of seismic restraints is required or if this is part of Quasar Master Specification document and not relevant to this project. Is the existing equipment in the hospital also equipped with seismic restraints?

QCG E: (175) Confirmed all new equipment shall be installed with seismic restraints. The existing equipment in the hospital is also equipped with seismic restraints.

12. (188) Can you provide a spec for the amplified speak though intercom located on the reception sneeze guard. (4/A0921 for reference)

QCG E: (188) Included Specification 27 51 23.00 – Intercommunications and Program Systems. As part of Addendum E-3

13. (189) Can you provide a spec for the amplified speak though intercom located on the reception sneeze guard. (4/A0921 for reference)

QCG E: (189) Included Specification 27 51 23.00 – Intercommunications and Program Systems. As part of Addendum E-3

14. (196) Please provide the location for below Ex. Panels:-

4EDP01 on 4th floor
EPP-9EE on 9th floor
6AAA9E on 6th floor

QCG E: (196) Location of panel 4EDP01 on 4th floor has been shown on drawing E0104, EPP-9EE on 9th floor has been shown on drawing E0109, both drawings are attached as part of Addendum E-3. For location of 6AAA9E on the 6th floor, refer to E0106 in Addendum E-2.

15. (198) DWG#E2210 - Please confirm if all ‘Interview Counselling rooms’ (typical 8) & one ‘exam room’ require hospital grade receptacles and should be considered for patient wiring testing.

QCG E: (198) Confirmed “Interview Counselling rooms” and the one exam room will require the hospital grade receptacles and should be tested in compliance with CSA-Z32 requirements.

16. (199) With reference to Drawing E-4305 please confirm that there will be only a single cable of 24 Core OM4 (FT6) from the primary telecom room 5-866 (E) to level 3 telecom room 610, a single cable of 24 Core OM4 (FT6) from the primary telecom room 5-866 (E) to level 1 telecom room 620 and a single cable 25-Pair Cat6A from the primary telecom room 5-866 (E) to level 1 telecom room 620.

QCG E: (199) E-4302, 4305, 4310 has been revised as per addendum E-3 to show additional details

17. (201) Appendix E-1 shows accepted vendor for Access Control & Video Surveillance is Johnson Control, which means we can work with either Securitas or Johnson Control. Pls. confirm.

QCG E: (201) Security has been confirmed as the accepted vendor for both Access Controls and Video Surveillance.

18. (202) 27 51 16 3.03.4 Public Address Section calls for (1) home run per zone as per drawings. The (2) drawings in question E4402 and E4405 show the PA speakers all on one zone in each drawing. Please confirm that only (1) PA zone in each drawing is correct, because the specification suggests that there should be multiple zones. If not, please identify the number of zones and their locations.

QCG E: (202) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 are included as part of Addendum E-3.

19. (203) Drawing E4402 shows the following notation: "TO EXISTING AMPLIFIER ???". Please clarify what this means and provide information on the existing amplifier and current load.

QCG E: (203) Refer to Specification 27.52.23.13 – Nurse Call Systems section 16 Public Address Operation. Updated E4402 and E4405 is included as part of Addendum E-3.

20. (204) 27 51 16 3.02.5 Public Address Section states to terminate all homerun cabling in the Main IT Room. The PA drawings show cabling going to (2) different Telecom Rooms (2-401 & 30). Please clarify the discrepancy

QCG E: (204) Specification 27 51 16 3.02.5 has been revised to "Terminate all home run zone cabling in Telecom Room 2-401 (for level 2) and Telecom Room 30 (for level 5)

21. (205) Drawing E4402 shows all the PA speakers connecting to an IP audio gateway, and not an amplifier as specified. Please provide the correct connections and the design intent here as there is no IP Gateway mentioned in the PA specification.

QCG E: (205) Refer to Specification 27.52.23.13 – Nurse Call Systems section 16 Public Address Operation.

22. (206) 27 51 16 3.02.5 Public Address Section states to terminate all homerun cabling in the Main IT Room. The PA drawings show cabling going to (2) different Telecom Rooms (2-401 & 30). Please clarify the discrepancy.

QCG E: (206) Specification 27 51 16 3.02.5 has been revised to "Terminate all home run zone cabling in Telecom Room 2-401 (for level 2) and Telecom Room 30 (for level 5)

23. (207) 27 51 16 2.02.4 Public Address Section states that the contractor is to provide network cabling for the system. Please confirm that any network cabling is to be provided by the network cabling vendor?

QCG E: (207) Electrical Contractor to provide wiring as per Public Address manufacturer requirements.

24. (208) The PA spec 27 51 16 mentions multiple zones paging numerous times, however the specified amplifier can only do a single zone. If you can provide a complete detail on all zones and number of speakers on each zone, we could suggest the required amplifier?

QCG E: (208) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 is included as part of Addendum E-3.

25. (209) 27 51 16 2.03.2.16.5 Public Address Section states that the system should have daily master clock synchronization. The TOA system specified is the most basic system and does not do several features including clock synchronization. Please provide a revised spec and design to address this and all previous questions.

QCG E: (209) There is no Master Clock Synchronization as there is no master clock system implemented in the design. Specification 27 51 16 removes section 2.03.2.16.5.

26. (210) Will all the paging on the public address system be performed by the phone system, or is there a need to have a paging microphone with selectable zone choices on it? The mic option is not listed in the spec but implied.

QCG E: (210) Specification Section 27 51 16.00 Public Address Systems section 2.03.2.8 mentions " System shall allow for broadcast of messages from different audio sources, including but not limited to, telephone, microphone, PC, mobile device and portable audio devices."

27. (215) Please provide specifications for amplified speak thru intercom at reception areas.

QCG E: Included Specification 27 51 23.00 – Intercommunications and Program Systems. As part of Addendum E-3

28. (220) Electrical Addendum 1, Q10 refers to Spec Section 28 01 20.71 & 28 01 10.71 of Video Surveillance & Access Control resp. These sections further ask to refer 28 10 00, 28 21 00 & 28 23 00 for Access Control, Surveillance Cameras & Video Management System respectively which are not included in tender documents. Please issue same to work properly.

QCG E: (220) Updated Spec section 28 01 20.71 and 28 01 10.71 and is included as part of Addendum E-3.

29. (221) Please confirm if the panel/breakers shown within the 2UPS1 are to be packaged within the UPS or is the intention for this to be a separately mounted panel nearby the UPS?

QCG E: (221) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

30. (222) Please provide pictures of existing panel 5DP02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available

QCG E: (222) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

31. (223) Please provide pictures of existing panel EPP-9EE and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (223) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

32. (224) Please provide pictures of existing panel 1ERP01 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available. 6. Please provide pictures of existing panel 6ELR02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (224) Provided some pictures as part of Addendum E-2. Contractor to confirm the answer to their own questions regarding the existing electrical equipment, by additional site visit.

33. (225) The panel schedules for Panel 2RP09, 2VERP01, 2EPL01, 2LP01, 5DP-5, 5RP06, 5RP07, 5RP12, 5ERP01, 5ERP02, 5ERP03, 5VERP01, 5VERP02, 5VERP03, 5VERP04, 5URP1, 6MEDP1, 6MERP1, PP-10NN, 10BRP01, 10BRP02, EPP-10EE, 10BERP01, 10BVERP01, 10BVERP02 & 10URP1 all show a column of both sides of the panel schedule for ?QUA.?. Please confirm if this refers to the quantity of breakers required? And if so, there are multiple quantities greater than QTY-1 which will impact the number of circuits in the panel versus what is shown in the respective panel schedules. Please clarify that the ?QUA.? column in the panel schedules refer to?

QCG E: (225) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

34. (226) Interrupting ratings for new panels are not provided in the electrical drawings or panel schedules, please advise and update electrical drawings to indicate required interrupting ratings (kA rating) based on existing upstream equipment. i) Within Spec Section 26 24 16 for panel boards, articles 2.02.4.1 & 2.02.5 mentions 65kA for 600V and a 10kA for 240V panels, please confirm if kA ratings are not indicated in electrical drawings/panel schedules nor will be updated if we can to utilize these specified interrupting ratings

QCG E: (226) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

35. (227) Within Spec Section 26 24 16 for panel boards, article 2.02.11 states that breakers labeled as ?Spare? or ?Space? shall constitute 20% of available breaker positions. Please clearly quantify number of spare breakers required for each panel in the electrical drawings/panel schedules to ensure all bidding manufacturers provide the same quantity of spare breakers. Otherwise only spare breakers/space indicated in electrical drawings/panel schedules will be considered.

QCG E: (227) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

36. (228) Please confirm if panel boards can exceed 42 circuits in a single tub where required as shown in panel schedules? Or if multi-section panel will be required for panels exceeding 42 circuits.

QCG E: (228) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

37. (229) Spec Section 26 05 48 indicated and calls for new equipment with seismic restraints. As the scope of this project is addition to existing hospital, please confirm if this requirement of seismic restraints is required or if this is part of Quasar Master Specification document and not relevant to this project. Is the existing equipment in the hospital also equipped with seismic restraints?

QCG E: (229) Confirmed all new equipment shall be installed with seismic restraints. The existing equipment in the hospital is also equipped with seismic restraints.

38. (230) Please confirm if scope of coordination studies and arc-flash hazard analysis is to also include for all existing equipment? The existing equipment is part of a large hospital system where a full-scale formal coordination study should already be existing and for any new coordination studies to include existing equipment is redundant and not advisable.

QCG E: (230) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

39. (231) Another Distribution System Provider: 1. Can you please request and advise make of the existing panel boards requiring retrofits. 2. KA Rating required all new panels. Besides this we have following requirement to seek competitive price from suppliers.

QCG E: (231) where KA is not indicated on the panel or existing single line diagram, refer to 26 24 16 section 2.02.4.1 & 2.02.5.

40. (232) Reference to SLD E4110, we have to provide 60A / 3P & 30A / 2P Fusible Switch Units in existing panel EPP-9EE. Is it possible to provide as separate sub panel powered through EPP-9EE panel instead of installing the Fusible Switch Units in panel EPP-9EE, in order to get competitive price from all distribution system manufacturer? Pls. advise.

QCG E: (232) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

41. (233) As per SLD E4102, for existing panel 5DP02, can we provide subpanel for 150A breaker powered through 5DP02, in order to get competitive price from all distribution system manufacturer? Pls. advise.

QCG E: (233) Provide Electrical provisions outlined in E4102.

42. (234) We are expecting more questions from PA & Sound Masking System Provider, since as per section 28 46 51 clause 1.02, specifications sections 27 41 00 ? Audio Video System & section 27 51 19 Sound Masking System are not issued with tender documents. Besides this both systems riser & zoning diagrams. Need to know who are authorised distributor for Duress Alarm System manufacturer from Toronto? Tech Works is System Manufacturer.

QCG E: (234) Response has been provided per (68) and (69).

43. (235) 27 51 16 2.03.3 Public Address Section states the vendor is to perform analysis and calculations including for each zone. Please provide complete details of each zone and the number of speakers required in each? .

QCG E: (235) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 are included as part of Addendum E-3.

44. (236) We have following requirement to seek competitive price from suppliers.

a. Reference to SLD E4110, we have to provide 60A / 3P & 30A / 2P Fusible Switch Units in existing panel EPP-9EE. Is it possible to provide as separate sub panel powered through EPP-9EE panel instead of installing the Fusible Switch Units in panel EPP-9EE, in order to get competitive price from all distribution system manufacturer? Pls. advise. b. As per SLD E4102, for existing panel

5DP02, can we provide subpanel for 150A breaker powered through 5DP02, in order to get competitive price from all distribution system manufacturer? Pls. advise.

QCG E: (236) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

45. (243) On Drawing E4102 specified new Junction Box to extend the wiring . Please specify the location of JB on Plan.

QCG E: (243) the junction box is shown on the electrical floor plan.

46. (244) Is there any preferred Sub-vendor used for PA System & AV System work?

QCG E: (244) Electrical Contractor is only responsible for Conduit and back box installation for AV systems. UHN Sub-Vendor for PA system is Conexall.

47. (268) Int the AHU drawing on M7009 show a connection to humidifier at the back of the AHU

a) Mech Drawing M2306A Detail 3, AH-033A/B are back -to-back with AH-022, and Columns at S14 and P14 appear to touch both units. There does not appear to be access.

b) Electrical Drawing E2106A Detail 2, shows Disc Switch in the same location, is there enough Clearance as noted in Electrical code

i. Note 4 does provide a provision for: EXACT LOCATION TO COORDIANTE WITH MECH. ON SITE

QCG E: b) The disconnect is to be located on the serviceable side of unit. Final connection of feeder and disconnect is to be coordinated on site as to comply with OESC clearance requirement for local disconnect.

l) Revised note 4: "Exact location to be coordinated with mechanical contractor on site.

48. (274) Electrical drawings E6007 and E2106A Deail2 show a single 15A circuit for H1 steam Humidifier Control, please confirm what this is for.

QCG E: (274) Electrical provision for mechanical humidifier is deleted.

49. (281) Drawing E2102, New IT Rack & PDU are required. Please provide specifications of the required PDU.

QCG E: (281) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

50. (282) Power Distribution Panels – Need photos for number of existing panels where we have to carry out modifications & install new breakers.

Please arrange following photos.

a) Photos of Switchboard / Distribution & Breaker Panels identification labels stating Switchboard / Panel name, Voltage, Current Capacity, Short Circuit (KA) Breaking Capacity with number of phases & wires details.

b) Photos of panel to identify which section is available to install new breakers.

c) Photo covering entire panel structure

QCG E: (282) Some of the pictures are provided as part of Addendum E-2, these pictures are based on previous electrical walkthroughs. Electrical Contractor can request additional site visit, any additional required information can be gathered as part of the site visit.

51. (283) Video Surveillance Communications Conductors and Cables - Section 27 15 01.13 specifies CAT6 cable plenum rated whereas Appendix E-1, Section 4.4 specifies CAT6A Cabling for Video Surveillance.

Please confirm following

a) Type of cable we have to provide CAT6 or CAT6A on site?

b) Is cable we have to provide should be plenum rated?

c) Is conduit required for plenum rated cable?

d) Or non plenum rated cable with conduit we can provide?

e) Are J type hooks permitted to use on site & in which area with plenum rated cable

QCG E: (283) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

52. (284) Need specifications for Security Access Control System & Video Surveillance CCTV System

QCG E: (284) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

53. (285) Intercom System found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210. Tender Documents do not include such information. Please provide specifications for same.

QCG E: (285) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

54. (286) Any existing basket type cable tray already installed on 2nd, 5th & 10th floors which we can use for data / com, access control & CCTV, Nurse Call or any other low voltage cabling. Pls. confirm.

QCG E: (286) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

55. (287) Duress Alarm System found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210 & specifications section 28 49 00. Specifications do not include who are approved system provider for hospital. Please issue approved list of vendors with contact details

QCG E: (287) Specification 28 49 00.00 – Electronic Personal Protection System has been updated and has been issued as part of Addendum E-3 and it will include the UHN approved vendor and contact information, as well as all other update to the requirements as to further comply with Appendix E-1

56. (288) Sound Masking System found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210. Tender Documents do not include such information. Please provide specifications for same.

QCG E: (288) Specification 27 51 19.00 – Sound Masking Systems has been issued as part of Addendum E-3

57. (289) Clock system found on floor plans for Power & Systems drawings E2102, E2105A, E2105B & E2210. Tender Documents do not include such information. Please provide specifications for same.

QCG E: (289) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

58. (290) Spec 28 01 80.81 requests for extra stock material for various FA Devices. Pls. specify quantity require for each device.

QCG E: (290) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

59. (291) Drwgs E0103 & E0104 mentions existing FA Panels to be replaced by new panels (Total 3). Pls. confirm make & system used on site of existing panels to be replaced by new one, in order to contact respective manufacturer for system reprogramming.

QCG E: (291) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

60. (292) Found existing FA System of Simplex during site visit. Please clarify following points regarding existing & new fire alarm systems.

a) Section 28 01 80.71 Revisions and Upgrades of Fire Detection and alarm, specifies JCI as system supplier whereas Section 28 01 80.81 Replacement of Fire Detection and Alarm specifies number of FA System Suppliers such as Simplex, Notifier, Chubb Edwards as well as Mircom. Pls. clarify how this is applicable? And which system supplier we have to use for example, Simplex since they are already on site. Pls. confirm.

b) Are new FA Devices from any one out of this system suppliers? Or we have to provide only JCI throughout the project? Pls. confirm.

QCG E: (292) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

61. (293) Is Hospital Grade Receptacle Testing required for this project? If yes, who can carry out this work? Pls. issue approved vendors list with specifications.

QCG E: (293) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

62. (294) Section- 28 01 80.71- 3.03.9- If we need to provide temporary fire alarm devices during renovation, please provide the list for them.

QCG E: (294) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

63. (295) Section- 28 01 80.81-2.01 & 2.02- According to section 28 01 80.71-2.01.4, the existing fire alarm system is Simplex (JCI). Please confirm if we need to only include JCI services. Additionally, Section-28 01 80.81.2.02 should apply only to Simplex (JCI). Please confirm.

QCG E: (295) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

64. (296) The following sections are asking to provide Extra stock materials & spare parts. Please confirm if we have to include all of them or if you can provide one consolidated list.

- 28 01 80.81-1.06
- 28 46 25-1.06
- 28 46 31-1.05
- 28 46 31.31-1.05
- 28 46 31.41-1.05
- 28 46 41-1.06
- 28 46 51-1.05
- 28.46.51.08-1.05

QCG E: (296) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

65. (297) On E4002, E4005 & E4010, please provide the existing panel schedule and feeder/conduit sizes for demolition of these panels: 5LP04, 5ELR01, 2ELP01, 5EDP01, 5EKP01, 5EKP02, 5DP03, RP-5RP06, RP-5RP07, 5DP04, 5DP05, 5KP01, 5KP02, 5KP03, 5KP04, 5LP05, 5RP06, 5RP07, RP-S5, RP-N5, PP-N5, 2RP09, 2LP01, LP-EL10, RP-ES10, RP-1ES10, RP-N10, RP-2S10, RP-C10, LP-L10, RP-1N10, RP-S10, 3S10, RP-2N10, RP-1S10, 3N10.

QCG E: (297) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

66. (299) Could you please confirm all the light fixtures specified in the luminaire schedule (Drwg E6000) require standard 0-10V dimming except the following: 2LT01, 5LT01, 10LT01, 5LT02, 10LT02, 5LT02A, 10LT02A, 5LT02B, 10LT02C, 10LT02B, 10LT03, 5LT19, 5LT25?

QCG E: (299) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

67. (300) We noticed “?” on different pages of the electrical drawings as follows. Please provide/confirm the details as applicable for these.

- E4002/E4102 on the 3rd floor transformer,
- E4005 on the last 60A breaker for DP-EM1 Panel,
- E4006 on the feeder from SWBD 6AAA11E to PDP-M-03E,
- E4010 on the bus duct for the 400A load and on the existing breaker in EPP-9EE for the 50A load,
- E4105 for the feeder on 2RP09/2LP01 and on the last 60A breaker for DP-EM1 Panel,
- E4106 on the feeder from SWBD 6AAA11E to PDP-M-03E,
- E4010 on the bus duct for the 400A load and on the existing breaker in EPP-9EE,
- E4110 for the 50 A breaker load in EPP-9EE
- E2205A- treatment bay adjacent to 5-893 room

QCG E: (300) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

68. (301) Please confirm the specifications for 5LT06A found on E2205B(Level 5) in the Washroom 5-837A. This fixture type is not listed on the Luminaire scheduled on E6000. Please find attached sketch.

QCG E: (301) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

69. (302) Reference is made to drawing# E4106 & E4102 & E4002- - The source for panel 5ERP01 is not matching with what is shown on the single line diagram E4102 and the note#5 on drawing E4002.

QCG E: (302) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

70. (304) Where are the locations of panel PP-5 and RP-N5 shown on single line diagram E4005?

QCG E: (304) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

71. (305) What is our electrical demolition scope of work, specifically on ceilings and partitions/walls? Is it to cut & make safe only and the rest by demolition contractor?

QCG E: (305) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

72. (306) There are some new electrical panels to provide at 6th floor. Are these scope of work under MHDU's category?

QCG E: (306) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

73. (307) Drawing #E4102- As per note#1- we assume Panel 2ELR01 is to be tagged as 2ELP01. Please revise.

QCG E: (307) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

74. (308) Where is the location of room 6-707 where the MCC-06-01E is situated? Is the drawing E0106 correctly showing the location of MCC-06-01E?

QCG E: (308) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

75. (310) During site visit, we were told that JCI is the Security System Vendor. We have contacted JCI and came to know that JCI is no longer a security system provider for Princess Margaret. Please provide the contact info for new security system vendor

QCG E: (310) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

76. (324) Some panel schedules such as for panels 5ERP01, 5ERP02, 5ERP03 are not matching with the notes (42 cct panels instead of 84cct) on single line diagram E4102. Suppliers/Manufacturers use panel schedules for pricing electrical panels. Please clarify if the panel schedules need any revisions.

QCG E: (324) Question is a repeat, please refer to Addendum E-1 for the answer to the question.

77. (325) Reference is made to drawing # E4102. As per this drawing, the feeders for 5UPS1 and 2UPS1 are to bring from existing panel EPP-9EE which is located at RM 918. Please indicate on the drawings, the location of RM918 with respect to location of 5UPS1 and 2UPS1 to help us find the feeder lengths.

QCG E: (325) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

78. (328) Drwg. E0106 is not readable. Pls. issue new.

QCG E: (328) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

79. (329) Need to know location of Switchboards SWBD-6AA12 & SWBD-6AA9E with 2 associated transformers TX-ACME (225KVA) on floor plans, in order to carry out necessary modifications.

QCG E: (329) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

80. (330) Need to know location of 1EDP02 Panel from first floor.

QCG E: (330) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

81. (331) Need to know location of 1EDP02 Panel from first floor.

QCG E: (331) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

82. (332) Received following questions from Nurse Call System supplier. Pls. advise.

#1 Are the over door lights to be integrated to in room smoke detector relay bases? In some room sit looks like they are and others not.

#2 Level 2 Plan E2102 has existing Austco Nurse Call installed in May of 2023. Should be a R&R project rather than a new install?

QCG E: (332) Electrical drawings show nurse call to be re-used. The smoke detector will only integrate with some dome lights in specific rooms, not all as this is an outpatient area and is not required by code.

83. (333) Sources for exhaust fan EF-1 and EF-2 shown on drawing E2111 are 12-EDP01, whereas as per drawing E4110, sources for EF-1 and EF-2 are different. We are assuming our estimate as per drawing E4110.

QCG E: (333) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

84. (341) Drwgs. E4002 & E4006 – Existing panel 5EDP01 to be demolish & location of this panel is not available on floor plans E1105A & E1105B. Pls. provide location to finalize length of new feeder require for panel 5VERP01.

QCG E: (341) Updated E1105A to contain location of 5EDP01. Which is included as part of Addendum E-3

85. (342) Our Data / Com System provider have following queries.

1. Please provide the specification of the required 24-Core OM4 Fiber Optic Cable?

2. Do we need to provide Innerduct or EMT conduit for Fiber optic cable as per Appendix E 4.2.11.9 (UHN Guidelines) or Spec Section 27 05 28.01?

3. Please provide the specification of the Innerduct for the 24-Core OM4 Fiber Optic Cable?

QCG E: (342) 1. Specification Section 27 13 23.00 – Communications Optical Fiber Backbone Cabling has been included as part of this Addendum E-3.

2. In Accordance with specification section 27 13 23.00 section 1.04.6.1 The preferred method for providing pathways is to use a combination of riser sleeves, innerduct and EMT conduit. Ensure to comply with section 1.04.6 of 27 13 23.00 –

Communications Optical Fiber Backbone Cabling .

3. Refer to Section 27 05 28.01 – Pathways for Communications Systems – Inner duct And Specification Section 27 13 23.00 – Communications Optical Fiber Backbone Cabling.

86. (343) Drwgs. E4102 & E4110 – As per SLD, we have to provide 5, 10 & 15KVA UPS which needs to be mounted on telecom rack. We need following information along with specifications for these UPS. Do

1. With reference to drwg E2102, please provide the preferred manufacturer and product part number for the required 5KVA rack-mount UPS?

2. With reference to drwg E2105A, please provide the preferred manufacturer and product part number for the required 15KVA rack-mount UPS?

3. With reference to drwg E2110, please provide the preferred manufacturer and product part number for the required 10KVA rack-mount UPS?

4. Do 5KVA UPS should come along with built in outgoing breakers or separate panel is required? Pls confirm.

QCG E: (343) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

87. (344) . Spec section 27 15 01.13, Video Surveillance Communications Conductors and Cables, asks for new IP Cameras & associated equipment shall be supplied & installed by others under a separate contract. – Pls. confirm.

a) This means electrical contractors scope is to provide cables with conduit only. – Pls. confirm.

b) Clause 2.02 Cabling, mentions requirement of Plenum rated CAT6 Cabling. UHN Standard requirement says requirement of conduit. Pls. confirm, can we supply conduit with non plenum rated CAT6 Cable.

c) Section 28 01 20.71 Revisions and upgrades of Video Surveillance, Clause 3.01 Installation mentions, “Supply & Installation of CCTV hardware equipment and IP Cameras, as per vendors listed in the service master agreement of UHN”. This is contradictory to the requirement mentioned in Spec section 27 15 01.13. Please confirm under whose scope S & I of CCTV falls either electrical contractor or separate contract.

QCG E: (344) Specification 27 15 01.13 - Video Surveillance Communications Conductors and Cables has been updated and will be re- issued as part of Addendum E-3. (a) Specification section 27 15 01.13 includes for new IP Cameras, and associated equipment shall be supplied and installed as part of this contract. (b) Plenum rated category 6 cable will be used, conduits may be required if cabling is routed in wall cavities with the required for plenum rated cables, refer to section 3.01 of specification 27 15 01.13 – Video Surveillance Communications Conductor and Cables. (c) 27 15 01.13 – Video Surveillance Communications Conductor and Cables has been updated and has been reissued as part of Addendum E-3.

88. (345) Drwg. E6005, Panel 5ERP02 schedule is for 100A, 42 circuits whereas note 8 from SLD E4102 mentions 225A, 84 circuits. Please confirm number of circuits & amperage require for panel 5ERP02.

QCG E: (345) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

89. (346) Drwg. E6006, Panel 5ERP03 schedule is for 100A, 42 circuits whereas note 8 from SLD E4102 mentions 225A, 84 circuits. Please confirm number of circuits & amperage require for panel 5ERP03.

QCG E: (346) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

90. (347) Drwg. E6002, Panel 2VERP01 schedule is for 225A, 84 circuits whereas note 9 from SLD E4102 mentions 100A, 84 circuits. Please confirm amperage require for panel 2VERP01.

QCG E: (347) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

91. (348) Panel 5URP1 requires how many circuits 18 or 24? Pls. confirm

QCG E: (348) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

92. (349) Panel 5DP02 – Need photos front & internal of panel along with for label to accommodate new 150A Breaker.

QCG E: (349) Provided some pictures as part of Addendum E-2. Contractor to confirm the answer to their own questions regarding the existing electrical equipment, by additional site visit.

93. (350) Drwg. E4110 – SLD – Note 1 asks to replace panel LP-EL10 with new 82 circuits panel, but do we not find anywhere panel LP-EL10 on SLD or floor plan for 10th floor. Please provide location on floor plan of panel LP-EL10 with revised SLD & Panel Schedule.

QCG E: (350) Drawing E4110 we have revised note (1) to read as: “Existing EPP-10E and PP-10NN to be replaced with new panels. Transfer existing remaining connected loads to the new panel. Refer to panel schedule for exact circuit number required.

94. (351) Please provide location of existing busducts in electrical rooms on floor plans to decide length of new feeders.

QCG E: (351) Electrical Contractor's additional site visit should have included locating the location of the existing busducts in the electrical rooms. The drawings E1105A and E2105A show the location of the existing electrical room busduct.

95. (352) Pls. confirm details of following panels as per panel schedule or SLD E4110.

- a) Panel 10BVERP01 – 84 or 72 circuits?
- b) Panel 10BVERP02 – 84 or 60 circuits?
- c) Panel 10BERP01 – 42 or 84 circuits? And 100A or 225A?
- d) Panel 10BRP01 - 84 or 60 circuits?

QCG E: (352) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

96. (353) SLD E4110 -

- a) Panel 10BRP02, note 4 requires 144 circuits whereas panel schedule mentions 72 circuits. Pls. confirm number of circuits require for panel 10BRP02.
- b) Note 4 also mentions to provide 150A / 3P Circuit Breaker for new panel 10BRP02. As per SLD this panel is feed from 3000A Bus Duct through 100A Switch Fuse unit. Pls. confirm whether we have to replace existing 100A Switch Fuse by new 150A Switch Fuse unit or we have to replace only fuses to 150A.

QCG E: (353) (a) & (b) Note (4) in drawing E4110 has been revised: "Existing 100A/3P Breaker for new panel 10BRP02. Provide 208/120V, 225A,3PH,4W Panel 10BRP02." Refer to Electrical panel schedule for quantity of circuits required.

97. (354) SLD E6002 – Require to provide new 2 numbers of Switch Fuse units in Panel EPP-9EE & run new two feeders from these switch fuses units to new UPS's on 2nd & 5th floors resp. Pls. provide location of panel EPP-9EE on 9th floor plan to decide length of feeders.

QCG E: (354) Location of EPP-9EE is now shown on E0109 for reference only, Electrical contractor to verify on site (attached as part of Addendum E-3).

98. (361) Please confirm if the panel/breakers shown within the 2UPS1 are to be packaged within the UPS or is the intention for this to be a separately mounted panel nearby the UPS?

QCG E: (361) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

99. (362) Please provide pictures of existing panel 5DP02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available

QCG E: (362) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

100. (363) Please provide pictures of existing panel EPP-9EE and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available..

QCG E: (363) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

101. (364) Please provide pictures of existing panel 1ERP01 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (364) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

102. (365) Please provide pictures of existing panel 6ELR02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available

QCG E: (365) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

103. (366) The panel schedules for Panel 2RP09, 2VERP01, 2EPL01, 2LP01, 5DP-5, 5RP06, 5RP07, 5RP12, 5ERP01, 5ERP02, 5ERP03, 5VERP01, 5VERP02, 5VERP03, 5VERP04, 5URP1, 6MEDP1, 6MERP1, PP-10NN, 10BRP01, 10BRP02, EPP-10EE, 10BERP01, 10BVERP01, 10BVERP02 & 10URP1 all show a column of both sides of the panel schedule for "QUA.". Please confirm if this refers to the quantity of breakers required? And if so, there are multiple quantities greater than QTY-1 which will impact the number of circuits in the panel versus what is shown in the respective panel schedules. Please clarify that the "QUA." column in the panel schedules refer to?.

QCG E: (366) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

104. (367) Interrupting ratings for new panels are not provided in the electrical drawings or panel schedules, please advise and update electrical drawings to indicate required interrupting ratings (kA rating) based on existing upstream equipment.
i) Within Spec Section 26 24 16 for panel boards, articles 2.02.4.1 & 2.02.5 mentions 65kA for 600V and a 10kA for 240V panels, please confirm if kA ratings are not indicated in electrical drawings/panel schedules nor will be updated if we can to utilize these specified interrupting ratings

QCG E: (367) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

105. (368) Within Spec Section 26 24 16 for panel boards, article 2.02.11 states that breakers labeled as "Spare" or "Space" shall constitute 20% of available breaker positions. Please clearly quantify number of spare breakers required for each panel in the electrical drawings/panel schedules to ensure all bidding manufacturers provide the same quantity of spare breakers. Otherwise only spare breakers/space indicated in electrical drawings/panel schedules will be considered

QCG E: (227) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

106. (369) Please confirm if panel boards can exceed 42 circuits in a single tub where required as shown in panel schedules? Or if multi-section panel will be required for panels exceeding 42 circuits.

QCG E: (369) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

107. (370) Spec Section 26 05 48 indicated and calls for new equipment with seismic restraints. As the scope of this project is addition to existing hospital, please confirm if this requirement of seismic restraints is required or if this is part of Quasar Master Specification document and not relevant to this project. Is the existing equipment in the hospital also equipped with seismic restraints?

QCG E: (370) Confirmed all new equipment shall be installed with seismic restraints. The existing equipment in the hospital is also equipped with seismic restraints.

108. (371) Please confirm if scope of coordination studies and arc-flash hazard analysis is to also include for all existing equipment? The existing equipment is part of a large hospital system where a full-scale formal coordination study should already be existing and for any new coordination studies to include existing equipment is redundant and not feasible

QCG E: (371) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

109. (372) Drawings E-6005, panel schedule for 5ERP01 & 5ERP02 identified as 42 circuit panel, whereas single line diagram E-4102 note-7 & 8 mentioned these are 84 circuit panel. Please clarify

QCG E: (372) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

110. (373) Drawings E-6006, panel schedule for 5ERP03 identified as 42 circuit panel, whereas single line diagram E-4102 note-8 mentioned these are 84 circuit panel. Please clarify.

QCG E: (373) Refer to Panel Schedule for exact number of circuits.

111. (378) Please provide the location for below Ex. Panels:-

4EDP01 on 4th floor
EPP-9EE on 9th floor
6AAA9E on 6th floor

QCG E: (378) Location of panel 4EDP01 on 4th floor has been shown on drawing E0104, EPP-9EE on 9th floor has been shown on drawing E0109, both drawings are attached as part of Addendum E-3. For location of 6AAA9E on the 6th floor, refer to E0106 in Addendum E-2.

112. (379) Please confirm if the panel/breakers shown within the 2UPS1 are to be packaged within the UPS or is the intention for this to be a separately mounted panel nearby the UPS?

QCG E: (379) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

113. (380) Please provide pictures of existing panel 5DP02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (380) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

114. (381) Please provide pictures of existing panel EPP-9EE and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (381) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

115. (382) Please provide pictures of existing panel 1ERP01 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (382) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

116. (383) Please provide pictures of existing panel 6ELR02 and details including the manufacturer/make, model, nameplate, interrupting rating and pictures showing overall panel to validate existing panel & space available.

QCG E: (383) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

117. (384) The panel schedules for Panel 2RP09, 2VERP01, 2EPL01, 2LP01, 5DP-5, 5RP06, 5RP07, 5RP12, 5ERP01, 5ERP02, 5ERP03, 5VERP01, 5VERP02, 5VERP03, 5VERP04, 5URP1, 6MEDP1, 6MERP1, PP-10NN, 10BRP01, 10BRP02, EPP-10EE, 10BERP01, 10BVERP01, 10BVERP02 & 10URP1 all show a column of both sides of the panel schedule for "QUA.". Please confirm if this refers to the quantity of breakers required? And if so, there are multiple quantities greater than QTY-1 which will impact the number of circuits in the panel versus what is shown in the respective panel schedules. Please clarify that the "QUA." column in the panel schedules refer to?

QCG E: (384) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

118. (385) Interrupting ratings for new panels are not provided in the electrical drawings or panel schedules, please advise and update electrical drawings to indicate required interrupting ratings (kA rating) based on existing upstream equipment.

i) Within Spec Section 26 24 16 for panelboards, articles 2.02.4.1 & 2.02.5 mentions 65kA for 600V and a 10kA for 240V panels, please confirm if kA ratings are not indicated in electrical drawings/panel schedules nor will be updated if we can to utilize these specified interrupting ratings.

QCG E: (385) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

119. (386) Within Spec Section 26 24 16 for panelboards, article 2.02.11 states that breakers labeled as "Spare" or "Space" shall constitute 20% of available breaker positions. Please clearly quantify number of spare breakers required for each panel in

the electrical drawings/panel schedules to ensure all bidding manufacturers provide the same quantity of spare breakers. Otherwise only spare breakers/space indicated in electrical drawings/panel schedules will be considered.

QCG E: (386) For quantity of circuit breaker, spare and spaces refer to electrical panel schedules.

120. (387) Please confirm if panelboards can exceed 42 circuits in a single tub where required as shown in panel schedules? Or if multi-section panel will be required for panels exceeding 42 circuits.

QCG E: (387) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

121. (388) Spec Section 26 05 48 indicated and calls for new equipment with seismic restraints. As the scope of this project is addition to existing hospital, please confirm if this requirement of seismic restraints is required or if this is part of Quasar Master Specification document and not relevant to this project. Is the existing equipment in the hospital also equipped with seismic restraints?

QCG E: (388) Confirmed all new equipment shall be installed with seismic restraints. The existing equipment in the hospital is also equipped with seismic restraints.

122. (389) Please confirm if scope of coordination studies and arc-flash hazard analysis is to also include for all existing equipment? The existing equipment is part of a large hospital system where a full-scale formal coordination study should already be existing and for any new coordination studies to include existing equipment is redundant and not feasible.

QCG E QCG E: (389) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

123. (390) Need to know who are authorised distributor for Duress Alarm System manufacturer from Toronto? Tech Works is System Manufacturer.

QCG E: (390) Specification 28 49 00.00 – Electronic Personal Protection System has been updated and has been issued as part of Addendum E-3 and it will include the UHN approved vendor and contact information, as well as all other update to the requirements as to further comply with Appendix E-1.

124. (391) DWG#E2210 - Please confirm if all 'Interview Counselling rooms' (typical 8) & one 'exam room' require hospital grade receptacles and should be considered for patient wiring testing.

QCG E: (391) Confirmed "Interview Counselling rooms" and the one exam room will require the hospital grade receptacles and should be tested in compliance with CSA-Z32 requirements.

125. (392) With reference to Drawing E-4305 please confirm that there will be only a single cable of 24 Core OM4 (FT6) from the primary telecom room 5-866 (E) to level 3 telecom room 610, a single cable of 24 Core OM4 (FT6) from the primary telecom room 5-866 (E) to level 1 telecom room 620 and a single cable 25-Pair Cat6A from the primary telecom room 5-866 (E) to level 1 telecom room 620..

QCG E: (392) E-4302, 4305, 4310 has been revised as per addendum E-3 to show additional details

126. (393) Electrical Addendum 1, Q10 refers to Spec Section 28 01 20.71 & 28 01 10.71 of Video Surveillance. & Access Control resp. These sections further ask to refer 28 10 00, 28 21 00 & 28 23 00 for Access Control, Surveillance Cameras & Video Management System respectively which are not included in tender documents. Please issue same to work properl

QCG E: (393) Updated Spec section 28 01 20.71 and 28 01 10.71 and is included as part of Addendum E-3.

127. (394) Appendix E-1 shows accepted vendor for Access Control & Video Surveillance is Johnson Control, which means we can work with either Securitas or Johnson Control. Pls. confirm

QCG E: (394) Security has been confirmed as the accepted vendor for both Access Controls and Video Surveillance.

128. (395) 27 51 16 3.03.4 Public Address Section calls for (1) home run per zone as per drawings. The (2) drawings in question E4402 and E4405 show the PA speakers all on one zone in each drawing. Please confirm that only (1) PA zone in each drawing is correct, because the specification suggests that there should be multiple zones. If not, please identify the number of zones and their locations.

QCG E: (395) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 are included as part of Addendum E-3.

129. (396) Drawing E4402 shows the following notation: "TO EXISTING AMPLIFIER ???". Please clarify the what this means and provide information on the existing amplifier and current load. .

QCG E: (396) Refer to Specification 27.52.23.13 – Nurse Call Systems section 16 Public Address Operation. Updated E4402 and E4405 is included as part of Addendum E-3.

130. (397) 27 51 16 3.02.5 Public Address Section states to terminate all homerun cabling in the Main IT Room. The PA drawings show cabling going to (2) different Telecom Rooms (2-401 & 30). Please clarify the discrepancy

QCG E: (397) Specification 27 51 16 3.02.5 has been revised to "Terminate all home run zone cabling in Telecom Room 2-401 (for level 2) and Telecom Room 30 (for level 5)

131. (398) Drawing E4402 shows all the PA speakers connecting to an IP audio gateway, and not an amplifier as specified. Please provide the correct connections and the design intent here as there is no IP Gateway mentioned in the PA specification.

QCG E: (398) Refer to Specification 27.52.23.13 – Nurse Call Systems section 16 Public Address Operation.

132. (399) 27 51 16 2.02.4 Public Address Section states that the contractor is to provide network cabling for the system. Please confirm that any network cabling is to be provided by the network cabling vendor?

QCG E: (399) Electrical Contractor to provide wiring as per Public Address manufacturer requirements.

133. (400) The PA spec 27 51 16 mentions multiple zone paging numerous times, however the specified amplifier can only do a single zone. If you can provide a complete details on all zones and number of speakers on each zone, we could suggest the required amplifier?

QCG E: (400) The number of speakers is shown the electrical plan, paging manufacturer to confirm provisions with regards to the number of amplifier and hardware required for proper installation.

134. (401) 27 51 16 2.03.2.16.5 Public Address Section states that the system should have daily master clock synchronization. The TOA system specified is the most basic system and does not do several features including clock synchronization. Please provide a revised spec and design to address this and all previous questions.

QCG E: (401) There is no Master Clock Synchronization as there is no master clock system implemented in the design. Specification 27 51 16 removes section 2.03.2.16.5.

135. (402) 27 51 16 2.03.3 Public Address Section states the vendor is to perform analysis and calculations including for each zone. Please provide complete details of each zone and the number of speakers required in each?

QCG E: (402) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 is included as part of Addendum E-3. For speaker quantity refer to electrical floor plans.

136. (403) 27 51 16 2.03.3 Public Address Section states the vendor is to perform analysis and calculations including for each zone. Please provide complete details of each zone and the number of speakers required in each?

QCG E: (403) For level (2) there is only one zone (Reception/Registration 1), for Level (5) there are three (3) zones, Nurse

Station 15.1.1, 15.2.1 and 15.2.2. Updated E4402 and E4405 is included as part of Addendum E-3. For speaker quantity refer to electrical floor plans.

137. (404) Can you please request and advise make of the existing panel boards requiring retrofits. KA Rating required all new panels.

QCG E: (404) where KA is not indicated on the panel or existing single line diagram, refer to 26 24 16 section 2.02.4.1 & 2.02.5.

138. (405) Reference to SLD E4110, we have to provide 60A / 3P & 30A / 2P Fusible Switch Units in existing panel EPP-9EE. Is it possible to provide as separate sub panel powered through EPP-9EE panel instead of installing the Fusible Switch Units in panel EPP-9EE, in order to get competitive price from all distribution system manufacturer? Pls. advise.?

QCG E: (405) Question is a repeat, please refer to Addendum E-2 for the answer to the question.

139. (406) As per SLD E4102, for existing panel 5DP02, can we provide subpanel for 150A breaker powered through 5DP02, in order to get competitive price from all distribution system manufacturer? Pls. advise

QCG E: (406) Provide Electrical provisions outlined in E4102.

140. (407) As per section 28 46 51 clause 1.02, specifications sections 27 41 00 – Audio Video System & section 27 51 19 Sound Masking System are not issued with tender documents. Besides this both systems riser & zoning diagrams. Please clarify.

QCG E: (407) Specification 27 51 19.00 – Sound Masking Systems has been issued as part of Addendum E-3

141. (415) On Drawing E4102 specified new Junction Box to extend the wiring. Please specify the location of JB on Plan.

QCG E: (415) JB is shown on floor plan as per design in E4102

142. (416) Is there any preferred Sub-vendor used for PA System & AV System work?

QCG E: (416) Electrical Contractor is only responsible for Conduit and back box installation for AV systems. UHN Sub-Vendor for PA system is Conexall (FA integration), PA system is by Austco (Nurse Call Integration)

143. (242) Is there any Temporary Lighting /power requirement for this project ?

QCG E: (242) Refer to electrical drawings for requirements of temporary power for temporary mechanical units. Temporary power for lighting is to be supplied by the electrical contractor where required.

144. (355) Please provide Make & photos of panel EPP-9EE.

QCG E: (355) Provided some pictures as part of Addendum E-2. Contractor to confirm the answer to their own questions regarding the existing electrical equipment, by additional site visit.

145. (269) Is there any preferred Sub-vendor used for PA System & AV System work?

QCG E: (269) (a) &(b) Confirmed provide local disconnect in serviceable area, where required provide disconnect switch c/w Aux contact.

146. (62) Paging (Public Address) System Section 27 51 16 - Who are specified system provider acceptable by hospital for Public Address System? Pls. confirm with contact details.

QCG E: (62) Austco will supply the public address system as part of the revised specification 27 51 16.00 – Public Address Systems

147. (130) Received following questions from Nurse Call System supplier. Pls. advise. Are the over door lights to be integrated to in room smoke detector relay bases? In some room sit looks like they are and others not.

QCG E: (130) Interconnection between smoke alarm and dome lights are specific to certain patient rooms as shown on the floor plan. The General note (13) on the electrical new work has been removed, since this facilities is an outpatient and does not require smoke detector integration with nurse call dome light

148. (161) Please provide Make & photos of panel EPP-9EE.

QCG E: (161) Some Photos are provided, where photos cannot be located or found. The Electrical contractor should add the panel or electrical device in question to a list of electrical equipment that needs to be located on site per additional site visit.

149. (178) Drawings E-6006, panel schedule for 5ERP03 identified as 42 circuit panel, whereas single line diagram E-4102 note-8 mentioned these are 84 circuit panel. Please clarify.

QCG E: (178) refer to panel schedule for total number of circuits. This issue was address on Addendum E-1

150. (424) Would it be possible to confirm/indicate the location of these existing panels below on the floor plan in the next addendum please? Panels- 5DP03, 5EDP01, 4EDP01 (They are on the demolition single diagram but don't show the area where they're located).

QCG E: (424) Updated (Room 5-508A) for Panel 5DP03 and 5EDP01. The DWG. E1105A, 4EDP01 can be found on DWG. E0104 Addendum E-3.

151. (427) Sound Masking (SM) System:

On Drawing E2110 Level 10 there are 9 SM- devices shown and Note 7 specified it will be connected to Sound Masking System. There is no Spec. 27-51-19 & riser in the specification/drawing for it. Please provide the details for the same. Additionally, please specify if there any Base building contractor for it?

QCG E: (427) Sound Masking 27-15-19 specs has been included. No Base building contractor/manufacturer has been identified to do this specific task, refer to specs for list of approved manufacturers.

Changes to Specifications:

1. **Refer to Specifications section 27 13 23.00 - Communications Optical Fiber Backbone Cabling**
 - a. Re-Issued as part of this Addendum
2. **Refer to Specifications 27 15 01.13 - Video Surveillance Communications Conductors and Cables**
 - a. Re-Issued as part of this Addendum
3. **Refer to Specifications 27 51 16.00 - Public Address Systems**
 - a. Re-Issued as part of this Addendum
4. **Refer to Specifications 27 51 19.00 - Sound Masking Systems**
 - a. Re-Issued as part of this Addendum
5. **Refer to Specifications 27 51 23.00 – Intercommunication and Program Systems**
 - a. Re-Issued as part of this Addendum
6. **Refer to Specifications 27 52 23.13 – Nurse Call Systems**
 - a. Re-Issued as part of this Addendum
7. **Refer to Specifications 28 01 10.71 - Revisions and Upgrades of Access Control**
 - a. Re-Issued as part of this Addendum

8. **Refer to Specifications 28 01 20.71 - Revisions and Upgrades of Video Surveillance**
 - a. Re-Issued as part of this Addendum
9. **Refer to Specifications 28 49 00.00 - Electronic Personal Protection Systems**
 - a. Re-Issued as part of this Addendum

These specifications now form as part of the contract documents.

Changes to Drawings:

1. **Drawing E-0001– ELEC. LEGEND & DRAWING LIST**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
2. **Drawing E-0101 – ELECTRICAL - 1ST FLOOR DEMOLITION & NEW WORK PLAN (MH)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
3. **Drawing E-0104 – ELECTRICAL - 4TH FLOOR DEMOLITION & NEW WORK PLAN (MHDU)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
4. **Drawing E-0109 – ELECTRICAL - 9TH FLOOR DEMOLITION & NEW WORK PLAN (DSC)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
5. **Drawing E-1102– POWER & SYSTEMS - DEMO WORK -LEVEL 02A PLAN (MH)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
6. **Drawing E-1105A– POWER & SYSTEMS- DEMO WORK LVL5A MHDU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
7. **Drawing E-1105B– POWER & SYSTEMS - DEMO WORK - LEVEL 5B PLAN (MHDU)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
8. **Drawing E-1110 – POWER & SYSTEMS - DEMO WORK -LEVEL 10 PLAN (DSC)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
9. **Drawing E-2102 – POWER & SYSTEMS - NEW WORK -LEVEL 02 PLAN (MH)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
10. **Drawing E-2105A – POWER & SYSTEMS - NEW WORK LVL 5A-MHDU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
11. **Drawing E-2105B – POWER & SYSTEMS - NEW WORK LVL 5B-MHDU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
12. **Drawing E-2106A– POWER & SYSTEMS - NEW WORK LVL5B-MHDU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3

13. **Drawing E-2110– POWER & SYSTEMS - NEW WORK - LEVEL 10 PLAN (DSC)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
14. **Drawing E-4040– LIGHTING CONTROL DIAGRAM – LEVEL 2**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
15. **Drawing E-4041– LIGHTING CONTROL DIAGRAM – LEVEL 5**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
16. **Drawing E-4042– LIGHTING CONTROL DIAGRAM – LEVEL 10**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
17. **Drawing E-4302– COMMUNICATIONS AND ACCESS CONTROL SYSTEM RISER DIAGRAM - NEW WORK LEVEL 02 (MH)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
18. **Drawing E-4305– COMMUNICATIONS AND ACCESS CONTROL SYSTEM RISER DIAGRAM - NEW WORK LEVEL 05 (MH DU)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
19. **Drawing E-4310 – COMMUNICATIONS AND ACCESS CONTROL SYSTEM RISER DIAGRAM - NEW WORK LEVEL 10 (DSC)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
20. **Drawing E-4402– NURSE CALL SYSTEM & PA SCHEMATIC DIAGRAM - LEVEL 02(MH)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
21. **Drawing E-4405– NURSE CALL & PA SYSTEM DIAGRAM - NEW WORK LVL 5 -MH DU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
22. **Drawing E-4110 – SINGLE LINE DIAGRAM - NEW WORK - BUILDING 620 LEVEL 10 (DSC)**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
23. **Drawing E-6000 – LUMINAIRE SCHEDULE**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3
24. **Drawing E-6007– ELECTRICAL PANEL SCHEDULES - MH DU**
 - Modification Clouded in Compliance with RFI question received and answered as part of Addendum E-3

Quasar Consulting Group



Jomuel Estranero, P.Eng.
Electrical Engineer

1 General

1.01 SUMMARY

- .1 This Section includes:
 - .1 The supply, delivery, supervision, coordination, and installation of equipment items specified herein and shown on the Drawings
 - .2 The testing, documentation, and instructions for completing the Fiber Backbone Cabling System
 - .3 Products supplied but not installed under this section, including loose equipment specified herein, which is to be turned over to the Owner at the completion of this project
- .2 Examine the contract documents in their entirety (including drawings and specification sections in the other divisions) for requirements or work which may affect work under this section, regardless of whether such requirements or work are specifically indicated in this section.
- .3 Contractor Shall Provide and Install
 - .1 The Contractor shall furnish and install telecommunications passive equipment, including:
 - .1 Fiber backbone cable
 - .2 Splicing and terminations
 - .3 Testing
 - .4 Administration
 - .2 Although such work is not specifically mentioned herein or on the Drawings, the Contractor shall furnish and install all miscellaneous items, accessories, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation, without claim for additional payment.
 - .3 The Contractor shall provide system testing and demonstration, system documentation, and instruction of Owner personnel, without claim for additional payment.
- .4 Errors or Omissions in Drawings or Documentation
 - .1 If any errors or omissions appear in Drawings, Specifications, or other documents, the bidding Contractor shall notify the Engineer no later than ten (10) days prior to submitting the bid.
 - .2 Should conflict occur in or between Drawings and Specifications, the bidding Contractor is deemed to have estimated the more expensive way of doing the work, unless the bidding Contractor has asked for and obtained written decision (addendum) before submission of the bid as to which method or materials will be required.
- .5 Related Sections:
 - .1 Section 26 05 26 – Grounding and Bonding for Electrical System.
 - .2 Section 27 05 00 – Common Work Results for Communications.
 - .3 Section 27 05 26 – Grounding and Bonding for Communication Systems.
 - .4 Section 27 05 53 – Identification for Communication Systems.
 - .5 Section 27 15 13 – Communications Copper Horizontal Cabling.

.6 Appendix E-1 Section 4.2.11 -Fiber Optic Backbone System Requirements

1.02 DEFINITIONS

- .1 ANSI – American Northern Standards Institute
- .2 AWG – American Wire Gauge
- .3 BICSI – Building Industry Consulting Service International
- .4 BCT – Bonding Conductor for Telecommunications
- .5 BD – Building Distributor – A distributor in which the building backbone cables terminate and at which connections to the campus backbone cables may be made
- .6 CP – Consolidation Point – A connection facility within Cabling Subsystem 1 for interconnection of cables extending from building pathways to the equipment outlet
- .7 EDA – Equipment Distribution Area – A space allocated for end equipment, including computer systems and telecommunications equipment
- .8 EF – Entrance Facility – An entrance to a building for both public and private network service cables, including wireless, that includes the entrance point of the building and continues to the entrance room or space
- .9 EIA – Electronics Industry Alliance
- .10 ER – Equipment Room – An environmentally-controlled, centralized space for telecommunications equipment that serves the occupants of the building, considered distinct from a Telecommunications Room (TR) because of the nature or complexity of the equipment.
- .11 ESD – Electro Static Discharge – The sudden flow of electricity between two electrically-charged objects caused by contact, an electrical short, or dielectric breakdown
- .12 ETL – Intertek Certification Services
- .13 IEC – International Electrotechnical Commission
- .14 IEEE – Institute of Electrical and Electronic Engineers
- .15 IDC – Insulation displacement contact
- .16 ISO – International Standards Organization
- .17 HC – Horizontal Cross-connect – A group of connectors, such as patch panels or punch-down blocks, that allow horizontal, backbone, and equipment cabling to be cross-connected with patch cords or jumpers
- .18 HDA – Horizontal Distribution Area – A space in a computer room where a Horizontal Cross-connect (HC) is located, and which may include LAN switches, Storage Area Network (SAN) switches, and Keyboard/Video/Mouse (KVM) switches for the end equipment located in the Equipment Distribution Areas (EDAs)
- .19 IC – Intermediate Cross-connect – A facility enabling the termination of different levels of backbone cabling and interconnection between them or equipment
- .20 MC – Main Cross-connect – A facility enabling the termination of backbone cables and their connection to incoming services, other backbone cabling or equipment

- .21 MDA – Main Distribution Area – The central point of distribution for the structured cabling system, which includes the Main Cross-connect (MC) and, when equipment areas are served directly from the MDA, may also include Horizontal Cross-connect (HC)
- .22 MM – Multi-Mode Fiber
- .23 NECA – National Electrical Contractors Association
- .24 NFPA – National Fire Protection Agency
- .25 NRTL – Nationally Recognized Testing Laboratory
- .26 TIA – Telecommunications Industry Association
- .27 SM – SingleMode Fiber
- .28 UL – Underwriters Laboratory
- .29 Building Backbone: cabling system consisting of media and termination hardware interconnecting MDFs to IDFs.
- .30 Horizontal: cabling system consisting of media and termination hardware interconnecting the Telecommunication Outlets (TOs) and the TRs.
- .31 Bonding: permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct safely any current likely to be imposed on it.
- .32 Channel: The end-to-end transmission path between two points at which application specific equipment is connected; encompasses all the elements of the horizontal cabling link, plus the equipment cords in the telecommunications spaces and work area.
- .33 Grounding: a conducting connection to earth, or to some conducting body that serves in place of earth.
- .34 LAN: Local area network.
- .35 UTP: Unshielded Twisted Pair.
- .36 FO: Fiber Optic
- .37 provide the work of this specification

1.03 REFERENCES

- .1 Most recent editions and addenda of the following documents:
- .2 ANSI/TIA 568 series, most recent revisions, addenda and systems bulletins. All applicable
- .3 ANSI/TIA-569 Telecommunications Pathways and Spaces, most recent revision including all relevant addenda and systems bulletins
- .4 ANSI/TIA-606 Administration Standard for Telecommunications Infrastructure, most recent revision including all addenda and systems bulletins
- .5 ANSI/TIA-607 Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, most recent revision including all addenda and systems bulletins
- .6 ANSI/TIA-862 Structured Cabling Infrastructure Standard for Intelligent Building Systems, most recent revision including all addenda and systems bulletins

- .7 ANSI/TIA-942 Telecommunications Infrastructure Standard for Data Centers, most recent revision including all addenda and systems bulletins
- .8 ANSI/TIA-1179 Healthcare Facility Telecommunications Infrastructure Standard, most recent revision including all addenda and systems bulletins
- .9 ANSI/TIA-4966 Telecommunications Infrastructure Standard for Educational Facilities, most recent revision including all addenda and systems bulletins
- .10 TIA-TSB-162 Telecommunications Cabling Guidelines for Wireless Access Points, most recent revision including all addenda and systems bulletins
- .11 TIA-526 Series – Standard Test Procedures for Fiber Optic Systems
- .12 TIA-942 – Telecommunications Infrastructure Standard for Data Centers
- .13 Telecommunications Distribution Methods Manual, most recent edition
- .14 Information Transport Systems Installation Methods Manual (ITSIMM), most recent edition
- .15 National Electric Codes (NEC) – all applicable
- .16 National Electric Codes (NEC) – all applicable
- .17 NECA/FOA 301– Installing and Testing Fiber Optic Cables
- .18 OSHA Standards and Regulations – all applicable
- .19 Local Codes and Standards – all applicable
- .20 UL444 – Standard for Safety of Communications Cable
- .21 UL 1666 – Standard for Safety of Flame Propagation Height
- .22 Local Authority Having Jurisdiction (AHJ)
- .23 Anywhere cabling standards conflict with one another or with electrical or safety codes, Contractor shall defer to the NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
- .24 Manufacturers' Recommendations - Install all cabling and termination devices per the manufacturers' recommended installation practices for the applications warranties.
- .25 Any violations of applicable standards or codes committed by the Contractor shall be remedied at the Contractor's expense.

1.04 SYSTEM DESCRIPTION

- .1 The Contractor will provide, install, and test a complete structured cabling system for the project's voice and data communications systems from the Telecommunications Outlet (TO) to the Telecommunications Room (TR), and between telecommunications spaces. The Contractor will provide and install all required components, as identified below.
- .2 Fiber Backbone Cabling
 - .1 Vertical and horizontal backbone cabling will consist of Multi-mode optical fiber cable installed from each TR to the Data Center.

- .3 Backbone Cabling Termination
 - .1 Provide fiber distribution enclosures at each end, sized for the number of fibers to be installed.
 - .2 Terminate with field-installable connectors or with fusion splicing of factory cable assemblies and modular connector panels or splice cassettes.
- .4 Typical Telecommunications Room (TR)
 - .1 Fiber optic cabling shall be terminated within open racks and/or enclosures with vertical and horizontal wire management.
 - .2 Shall terminate in Fiber Distribution patch panels.
 - .3 A Grounding and bonding system connected to the building's main grounding electrode system.
 - .4 The fiber optic backbone shall be complete with all required pathways to support and manage the cabling that runs from the racks to the equipment in the space, which shall be fitted with all accessories required to adequately support, terminate, test and certify the installation.
- .5 Pathways and Raceways
 - .1 Pathways and raceways are the support system for the infrastructure. All pathways and raceways shall conform to the standards referenced in this Section.
 - .2 All backbone cable shall be properly supported every 48 to 60 inches.
- .6 Using a Combination of Cable Supports
 - .1 The preferred method for providing pathways is to use a combination of riser sleeves, innerduct and EMT conduit.
 - .2 Fiber Optic cables shall be protected along its entire length by either EMT conduit when outside a Telecommunications space and with inner duct when within a Telecommunications space.
 - .3 Backbone fiber cable shall be placed in EMT conduit from ER to TR riser bank or armored fiber.
 - .4 All backbone cable shall also follow these cable tray/support pathways.

1.05 SUBMITTALS

- .1 Engineer's Review
 - .1 The Engineer's review of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the contract documents.
 - .2 With the shop drawings, the Contractor shall include an index sheet detailing all deviations from the contract documents, and will be held responsible for all deviations, unless the Contractor has received written approval from the Engineer for the specific deviation, separate from general shop drawing approval.
 - .3 The Engineer's review shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.
- .2 General Component Data
 - .1 For all products covered under this Section, the Contractor shall submit the following data for each component:

- .1 A Specification Section
- .2 The Manufacturer's name.
- .3 The Manufacturer's model and part number
- .3 Fiber Cable
 - .1 In addition to the general requirements above, the Contractor shall submit the following additional data:
 - .1 Cable identification numbers.
 - .2 Cable specifications including quantity of fibers, material, insulation, jacket, wavelength, attenuation, diameter, bend radius, core, cladding, coating, buffering, weight, and color.
 - .4 Splicing and Terminations
 - .1 In addition to the general requirements above, the Contractor shall submit splicing and terminating tools, materials, and methods.
 - .5 Testing and Test Results
 - .1 The equipment serial number.
 - .2 A graphic diagram documenting the test procedure, including all connectors, the light source (as applicable), the origin, and the destination of each cable tested.

1.06 QUALITY ASSURANCE

- .1 Standards for Materials and Equipment
 - .1 The Contractor shall provide all materials, equipment, and installation in compliance with the latest applicable standards from ANSI, FCC, ASTM, EIA/TIA, IEEE, NEC, NFPA, NEMA, OSHA, REA, and UL.
- .2 Installer Qualifications
 - .1 Refer to Section 27 05 00.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 To prevent damage, theft, soiling, and misalignment, protect equipment during transit, storage, and handling.
- .2 The contractor shall coordinate the secure storage of equipment and materials on site, or, if no on-site storage is available, shall provide their own secure storage at the Contractor's expense.
 - .1 Do not store equipment where conditions fall outside the manufacturer's recommendations for environmental conditions.
 - .2 Do not install damaged equipment. Remove environmental conditions from the site and replace damaged equipment with new equipment.
 - .3 If off-site storage of materials is necessary, this shall be at the Contractor's expense.

1.08 COORDINATION

- .1 The Contractor shall coordinate with all other trades. The Contractor will submit a schedule for the installation within 10 days of contract award
 - .1 The schedule shall include delivery, installation, and testing for conformance to specific job completion dates.
 - .2 At minimum, the schedule shall provide dates for the start of demolition, the completion of demolition, the installation start date, the completion of copper cabling, the completion of backbone cabling, the completion of testing and labeling, cutover, the completion of the final punch list, final inspection, and acceptance.
- .2 Meeting Attendance and Schedule Adherence
 - .1 The Contractor must attend all project-related meetings and adhere to schedule set by the Project Manager.
- .3 Final Inspection
 - .1 The Contractor is required to notify the Engineer of a proposed appointment for Final Inspection at least 72 hours before the appointment.
 - .2 Within five working days after the final inspection, the Contractor shall send final project documentation and warranty information to the Owner and Engineer. The final project documentation shall include, but may not be limited to:
 - .1 As-Built Drawings, in an AutoCAD format, with legible outlet address and cable paths.
 - .2 Outlet location spreadsheets.
 - .3 Warranty paperwork.
 - .4 A copy of the Final Inspection and Acceptance Signoff Sheet.

1.09 PROJECT CONDITIONS

- .1 Project Environmental Requirements
 - .1 Fiber Optic Cable Safety
 - .1 The following warnings shall be posted on the job site:
 - .2 Observe all warning signs on equipment and all written safety precautions in the equipment instruction and technical manuals.
 - .3 Always handle cable carefully to avoid personal injury. Care should be taken with individual fibers to prevent injury to the eyes or penetration of the fibers into the skin.
 - .2 Hazardous Materials Prohibition
 - .1 The Contractor shall ensure that all materials used in the project are asbestos-free, unless specifically authorized in writing by the Owner.
 - .3 Existing Conditions
 - .1 Verify that all conditions on the project site are acceptable for the Work specified in this Section. Prior to bid opening, notify the Consulting Engineer, in writing, of any

discrepancies, conflicts, or omissions. Otherwise, correct these issues at no additional cost to the Owner.

- .2 Continue to monitor the project site. If conditions develop that require a variance from the Specifications or Drawings, then immediately notify the Owner in writing. Otherwise, make recommendations, submit drawings showing how the Work may be installed, and, upon approval, proceed with the necessary changes without additional cost to the Owner.

.2 Record Drawings

- .1 Keep a complete set of all telecommunications drawings in the job site office for demonstration of the actual installation work specified in this Section.
- .2 Use this set of drawings for no other purpose.
- .3 Where any material, equipment, or system components are installed differently than what is shown on the drawings, indicate the differences clearly and neatly using ink or indelible pencil.
- .4 Upon completion of the project, submit the record set of drawings.

1.10 USE OF THE SITE

- .1 Where the Owner deems it necessary to place restrictions, use the site as directed by the Owner.
- .2 When proceeding with the work, do not interfere with the ordinary use of streets, aisles, passages, exits, or operations of the Owner. During the day, set up cones and barriers in hallways and walkways. Do not string cable down the hallways during normal hours.
- .3 Request a hazardous materials worksheet that identifies potentially-hazardous locations. Do not proceed with any work in locations where hazardous materials are known to be. Obtain instructions from the Contractor's Project Manager on and when to work in these areas.
- .4 Before leaving the room each day the contractor shall remove all trash and debris from the site.

1.11 CONTINUITY OF SERVICES

- .1 Take no action that will interfere with or interrupt existing building services, unless previous arrangements have been made with the Owner's representative. Arrange all work to minimize shutdown time.
- .2 The Owner's personnel shall perform shutdown of operating systems. When shutdown of systems is required, the Contractor shall give three (3) days advance notice.
- .3 Should building services be inadvertently interrupted:
 - .1 The Job Foreman shall immediately notify the Project Manager of the accidental disruption of services, the remedy, and how long it will take to restore services.
 - .2 The Contractor shall immediately furnish the labor, including overtime, the material, and the equipment necessary to promptly restore the interrupted service at no cost to the Owner.

1.12 WARRANTY

- .1 Refer to Section 27 05 00.

2 Products

2.01 GENERAL

- .1 All materials and products shall be:
 - .1 Appropriate for the intended use.
 - .2 Recognized as such by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories (UL), ETL SEMCO (ETL), the Canadian Standards Association (CSA) or the American National Standards Institute (ANSI).
 - .3 Permitted by the Authority Having Jurisdiction (AHJ).
- .2 All products shall be new, of the latest version at time of bid, and brought to the job site in original manufacturer's packaging. Used equipment and damaged material will be rejected.
- .3 Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with these requirements.
- .4 Cable lubricants specifically designed for installing communications cable may be used as needed to reduce pulling tension when pulling cable into conduit.
- .5 Take care during installation to prevent scratches, dents, chips, etc. Equipment with significant or disfiguring cosmetic flaws will be rejected.
- .6 All work area termination hardware, including mounting boxes, faceplates, and outlets, shall match the existing wall surface color as closely as possible.
- .7 All copper and fiber products shall be from a single manufacturer so that a single performance warranty covers all applications on vertical and horizontal links.
- .8 Provide products that are suitable for the intended use, including, but not limited to environmental, regulatory, and electrical factors.

2.02 SUBSTITUTION POLICY

- .1 Refer to Section 27 05 00 for General Requirements

2.03 OPTICAL FIBER CABLES

- .1 Optical Fiber Strands
 - .1 All optical fibers shall:
 - .1 Be usable and shall meet required specifications.
 - .2 Be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification.
 - .3 Consist of a doped silica core surrounded by a concentric glass cladding and have a matched clad design.
 - .4 Be proof tested by the fiber manufacturer at a minimum of 100 kpsi (0.7 GN/m²).
 - .5 Be coated with a dual layer acrylate protective coating that is in physical contact with the cladding surface.

- .6 Have a maximum attenuation value for each cabled fiber at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ on the original shipping reel.
- .2 Graded Index (50/125 μm OM4)
 - .1 The multimode fiber utilized in the OM4 optical fiber cable shall meet TIA-492AAAD, "Detail specification for 850-nm laser-optimized, 50- μm core diameter/125- μm cladding diameter class Ia graded-index multimode optical fibers of OM4 performance." The fibers shall have:
 - .1 A core diameter of $50.0 \pm 2.5 \mu\text{m}$.
 - .2 Core non-circularity of no more than 5%.
 - .3 A cladding diameter of $125.0 \pm 1.0 \mu\text{m}$.
 - .4 Cladding non-circularity of no more than 1.0%.
 - .5 A core-to-cladding concentricity of no more than $1.0 \mu\text{m}$.
 - .6 A coating diameter of $250 \mu\text{m}$, plus optional $900 \mu\text{m}$ buffer.
 - .7 A refractive index core (graded index).
 - .8 A numerical aperture of 0.200 ± 0.015 .
 - .9 Maximum attenuation of 2.3 dB/km at 850 nm, 0.6 dB/km at 1300 nm, and 1.0 dB/km at 1301-1380 nm.
 - .10 IEEE 802.3ae performance that supports laser-based 10 Gigabit Ethernet (GbE) operation in the 10GBASE-SR/SW (850 nm) and 10GBASE-LX4 (1310 nm) at 300 m and 10GBASE-LRM (1310 nm) at 220 meters.
 - .11 A minimum LED bandwidth of 500/500 MHz•km at 850/1300 nm.
 - .12 Attenuation uniformity with no point discontinuities greater than 0.08 dB at either 850 nm or 1300 nm.
 - .13 Water peak attenuation with a coefficient at 1380 nm that does not exceed the coefficient at 1300 nm by more than 3.0 dB/km.
 - .14 Macrobend attenuation due to 100 turns of fiber around a $75 \text{ mm} \pm 2 \text{ mm}$ diameter mandrel that does not exceed 0.05 dB at 850 nm or 1300 nm.
- .3 Fiber Optic Cable Fire Ratings
 - .1 Only OFCP listed optical fiber backbone cable is acceptable for use on this project.
- .4 Fiber Optic Cable Termination
 - .1 Where cables are installed, the $250 \mu\text{m}$ coated fibers contained in these cables may be terminated either by:
 - .1 Fusion splicing of factory-polished splice-on connectors or factory-terminated cable assemblies ("pigtailed").
 - .2 Cam-style mechanical splice connectors using a tool that provides calculated insertion loss at the point of termination

- .3 Individual fibers secured in a protective covering, such as an aramid-reinforced tube with connectors mated to the resulting assembly
- .5 Fiber Optic Cable Features
 - .1 The size and configuration of fiber optic cables shall be as shown on the Drawings.
 - .2 The buffered fibers shall be grouped in 6 and 12 fiber subunits.
 - .3 The fibers shall be stranded around a dielectric central member in the subunit.
 - .4 Layered aramid yarns shall serve as the tensile strength member of the subunit.
 - .5 To facilitate jacket removal, a ripcord may be applied between the aramid yarns and the subunit jacket.
 - .6 For physical and environmental protection, the subunit jacket shall be extruded over the aramid yarns. The jacket shall:
 - .1 Be continuous and free from pinholes, splits, blisters, or other imperfections
 - .2 Have a consistent, uniform thickness
 - .3 Be smooth, as is consistent with the best commercial practice
 - .7 The subunits shall be stranded around a dielectric central member, a ripcord shall be inserted beneath the outer jacket to facilitate jacket removal, an outer jacket shall be extruded around the subunits.
 - .8 An overall helically-wound interlocking metallic armor shall be provided, to surround the outer cable jacket, to which a listed outer jacket shall be applied.
 - .9 The individual fibers shall be color-coded for identification and shall meet these requirements:
 - .1 The optical fiber color coding shall be in accordance with EIA/TIA 598, "Optical Fiber Cable Color-Coding."
 - .2 The coloring material shall be stable over the temperature range of the cable, shall not be susceptible to migration, and shall not affect the transmission characteristics of the optical fibers.
 - .3 Color-coded buffered fibers shall not adhere to one another.
 - .10 The overall jacket for graded index cables as specified herein shall be aqua for distribution cables, or black for indoor-outdoor rated cables.

2.04 OPTICAL FIBER CONNECTORS

- .1 Fiber connectors – Pre-Polished Cam Style
 - .1 All tight-buffered indoor fiber cable shall be terminated using multimode LC Fiber Optic Connectors.
 - .2 LC cam connectors shall further have the following properties:
 - .1 Be a TIA/EIA-604 FOCIS-10 compatible connector that exceed exceeds ANSI/TIA-568.3-D requirements.

- .2 Have connector backbone and boot colors that follow ANSI/TIA-568.3-D suggested color identification scheme.
 - .3 Have insertion loss: 0.3dB average (multimode and singlemode)
 - .4 Have return loss: >26dB (10Gig™ multimode), >20dB (multimode), >50dB (singlemode) (Pick specific fiber type per project)
 - .5 Be a spring-loaded “Senior” rear pivot latch LC connector.
 - .6 Be a pre-polished cam style termination for in less than half the time of field polish connectors.
 - .7 Have patented re-termination capability provides yield rates approaching 100%.
 - .8 Feature a factory pre-polished fiber end face eliminates time-consuming field polishing to reduce installation costs, labor, scrap and the number of tools required.
 - .9 Be cam activated, with fiber and buffer clamp mechanisms that provide superior fiber and buffer retention with less sensitivity to fiber tensile loading.
 - .10 Have a range of cable retention boot assemblies that consistently provide higher than industry standard cable retention.
 - .11 Include a non-optical disconnect that maintains data transmission under tensile loads for jacketed cable.
- .3 Do not use crimp or screw-on fiber connectors
- .2 Fiber Connectors – Fusion Splice-On Connectors
 - .1 All fiber cable shall be terminated using multimode LC form factor Fusion-Splice Connectors
 - .2 LC Fusion-Splice Connectors shall further have the following properties:
 - .1 TIA/EIA-604 FOCIS-3 (for SC) and FOCIS-10 compatible (for LC)
 - .2 Include a pre-polished fiber which eliminates the need for field polishing and adhesives
 - .3 The connectors shall be composed of a ferrule assembly with integral fiber, a front housing, and a rear assembly, plus additional components as necessary by connector type (including angled physical contact polish)
 - .4 Fiber Compatibility: 50/125 Multimode OM4
 - .5 Fiber Size and Type: 250um coated fiber or 900um tight buffered fiber
 - .6 Ferrule Type: Factory polished zirconia ceramic
 - .7 Insertion Loss: multimode fiber is 0.10dB IL average, 0.25dB IL maximum
 - .8 Return Loss:); multimode fiber is > 30dB (UPC)
 - .9 The connectors shall exceed ANSI/TIA-568.3-D performance requirements for IL and RL
 - .10 Have a functional temperature range from -40°C to 75°C
- .3 Fiber connectors – Fusion Splice LC Pigtailes

- .1 All fiber cable shall be terminated using manufacture fabricated multimode LC form factor Fusion Splice Pigtail Connectors

2.05 OPTICAL FIBER DISTRIBUTION ENCLOSURES AND CONNECTOR PANELS

- .1 All Fiber Distribution Enclosures (FDEs) shall:
 - .1 Be rack-mounted, metal enclosures with removable doors and panels at front and rear
 - .2 Be designed for cable entry from the rear of the enclosure
 - .3 Be equipped with appropriate means for physically securing the cables in place, and shall provide sufficient rings, saddles, and guides to ensure that all cables and strands are dressed in a neat and workmanlike manner and to maintain the required minimum bend radii for all changes in direction
 - .4 Be equipped with an integral bonding lug or stud for securing the fiber strength member
 - .5 Provide space for six or twelve inserts
 - .6 Use modular snap-in coupler panels
 - .7 Have front and rear access panels be fitted with manufacturer-supplied labels for each enclosure, cable, and all termination positions
 - .8 Have blank connector panels for all available positions, unless the housing is ordered with optical fiber adapters pre-installed
- .2 Optical Fiber Connector Panels:
 - .1 A connector panel is a modular removable plate containing optical fiber connectors.
 - .2 Optical fiber couplers shall have:
 - .1 A modular unit of the same manufacture as the Fiber Distribution Enclosures, and shall have keyed openings on the front and rear to provide proper alignment of the connectors.
 - .2 Couplers will be factory-installed to maintain an appropriate A-B orientation throughout the optical link.
 - .3 Couplers will be aqua with ceramic alignment sleeves for 50 µm graded-index optical fiber.
- .3 Connector Panels
 - .1 Connector panels shall:
 - .1 Be manufactured from 16-gauge cold-rolled steel or injection molded polycarbonate for structural integrity
 - .2 Be finished with a black powder-coat texture to match other hardware
 - .3 Have a single mounting footprint
 - .4 Be available with three, four, six, eight, twelve, or twenty-four connector adapters in each panel
 - .5 Be both rack-mountable and wall-mountable

- .6 Be attached with two push-pull latches to allow for quick installation and removal
- .7 Be available with industry standard single-fiber and small form factor multi-fiber adapters, including the TIA/EIA 604 3A (SC), TIA/EIA 2 (ST) compatible, and TIA/EIA 604 10A (LC)
- .4 Blank Connector Panels
 - .1 Blank connector panels shall be available to fill unused space in the housings. The blank connector panels shall be:
 - .1 Attached with at least two push-pull latches to allow for quick installation and removal
 - .2 Manufactured from injection molded polycarbonate
 - .3 Finished with a wrinkled black texture to match the housing

3 Execution

3.01 GENERAL

- .1 Install all cables in accordance with project Drawings.
- .2 Provide any screws, anchors, clamps, tie wraps, distribution rings, miscellaneous grounding and support hardware, etc. needed to facilitate the installation of the cable plant system.
- .3 Furnish any special installation equipment or tools required to properly complete the installation.
- .4 Do not roll or store cable reels without an appropriate underlay.
- .5 Failure to follow the appropriate guidelines may require the installer to provide the additional material and labor required to bring the installation back into alignment with the guidelines. This shall also apply to any and all damages caused to the cables by the installer during the implementation.
- .6 Provide fire blocking at all fire-rated ceiling, wall, and floor penetrations.
- .7 Plug conduits where cabling has been installed in the main equipment room, backbone and other cable entrance locations with re-enterable duct seal of flame-retardant putty.
- .8 Provide bushings on all conduit ends.
- .9 All wiring, materials, and equipment must be listed and labeled by an NRTL. To certify that performance characteristics, meet ANSI/TIA 568 Standards, provide all Original Equipment Manufacturer (OEM) documentation to the Owner.
- .10 All techniques and fixtures used in the installation must minimize complexity must allow for easy maintenance of, and ready access to, all components for test measurements.
- .11 No self-tapping screws shall be used.
- .12 All parts shall be made of corrosion-resistant material, such as plastic, anodized aluminum, or brass.
- .13 All materials used in the installation shall be resistant to fungus growth and moisture deterioration.
- .14 To avoid corrosion caused by electrolysis between dissimilar metals under the environmental operating conditions specified, separate dissimilar metals with an inert dielectric material.
- .15 All empty innerduct or conduit shall include a non-corrosive pull-rope.

- .16 All of the pathways shown on the drawings are suggested routes for the Contractor to use as guidelines. Prior to construction, the Contractor shall coordinate in the field with other trades to determine the exact feeder, tie, and riser backbone cabling pathways. In any case where the communication pathway must be removed and re-routed, due to conflicts with other trades with which the Contractor did not previously coordinate, the Contractor is responsible for all costs associated with the removal and relocation.

3.02 OPTICAL FIBER CABLE

- .1 Install the optical fiber backbone in a continuous length from the FDE in the Data Center to an FDE within each TR.
- .2 Throughout its length, run the backbone cable in appropriate, listed raceway.
- .3 Leave a 3 m long maintenance loop at each end of the link, neatly contained in the integral management rings and saddles in a "figure 8" loop at the rear of the FDE.
- .4 Throughout the length of the cable, maintain the minimum bend radius and pulling force recommended by the manufacturer and required by industry standards, both during installation and after termination and testing.
- .5 On each end, remove all outer jacket and strength member materials to expose the individual 900-micron buffering of the individual strands for a length of 0.5 m (18 inches).
- .6 On each end, hold the cable ends securely in place with the cable clamping accessories in each FDE.
- .7 Route individual strands in the rear of the FDE in a neat and orderly fashion and place them so as not to create undue stress or micro bending of the strands.

3.03 CABLE BUNDLING MATERIALS

- .1 Secure all cable bundles with proper bundling or securing materials so as to ensure that the cable runs are securely held in place both vertically and horizontally.
- .2 Do not tighten bundling materials or securing devices so tightly that they deform the inherent cable geometry or construction.
- .3 Do not use cable ties or hook-and-loop tape to secure cable runs to other building systems such as electrical conduit, Electric Metallic Tube (EMT), sprinkler pipes, ceiling suspension members.
- .4 In environmental air-handling spaces, only use appropriately-listed materials.

3.04 SYSTEM ADMINISTRATION

- .1 Uniquely identify all components of the installed system by location, function, unit, and sub-unit.
- .2 Identify each location with a unique alphanumeric identifier.
- .3 Assign a unique alphanumeric identifier for each equipment enclosure in the building.
- .4 Identify each adapter module in each distribution or interconnect enclosure with an alphanumeric identifier.
- .5 Identify all conduits, trays, and pathways with a unique alphanumeric identifier.
- .6 Identify optical fiber cables by a textual label that indicates its type, strand count, point of origin, and termination.
- .7 Supply a Cable Identification Matrix

- .8 Supply all records in compliance with ANSI/TIA 606.

3.05 IDENTIFICATION

- .1 Before installing or terminating cable, confirm all specific labeling requirements with the Owner or the Owner's Engineer.
- .2 Mark each backbone cable at each endpoint and at all intermediate pull and access points and junction boxes with a label that indicates the origination and destination identifiers, the sheath identifier, and the strand or pair range.
- .3 Fiber Distribution Enclosures (FDEs)
 - .1 Mark each FDE with an adhesive label that indicates the range of circuits installed within it.
 - .2 Label each port with the origination and destination grid identifier and the individual strand ID.
 - .3 At each end of each cable, within 75 mm (3 inches) of the end of the sheath, place a self-laminating label that surrounds the outermost jacket and bears the appropriate cable identifier.
 - .4 On each equipment enclosure, affix self-adhesive labels, bearing the enclosure's identifier in block characters, at the top center of the front and rear doors or faces.
 - .5 In all enclosures, place a label directly adjacent to the shortest side of each adapter that bears that adapter's identifier. Rotate the characters on the labels to maintain a left to right, top to bottom orientation.
- .4 Refer to Section 27 05 53

End of Section

1 General

1.01 SECTION INCLUDES

- .1 Cabling requirements for IP based CCTV cameras.

1.02 RELATED REQUIREMENTS

- .1 Division 27 – Communications.
- .2 Appendix E-1 Section 4.3.8

2 Products

2.01 OWNER-FURNISHED PRODUCTS

- .1 New IP cameras, and associated equipment shall be supplied and installed as part of this contract.
- .2 This contractor shall be responsible for coordinating rough-in requirements.
- .3 Existing Manufacturer Contact Information: (Jayson Warrilow, Securitas Technology, M: 647-236-1458)

2.02 CABLING

- .1 Plenum rated Category 6 cabling in accordance with Division 27.
- .2 Conduits to be used when required, refer to installation section 3.01.2

3 Execution

3.01 INSTALLATION

- .1 In accordance with sections of Division 27.
- .2 Conduits may be required if cabling is routed in wall cavities with the required for plenum rated cables.
- .3 J Hooks are permitted as an acceptable pathway with plenum rated cables.

End of Section

1 General

1.01 SUMMARY

- .1 This Section covers the Specification and requirements for the provision of a complete Paging (Public Address) System, hereinafter referred to as the System.
- .2 Contractor shall provide all services, labor, materials, tools, and equipment required for the installation of a complete and perfectly operational System, in compliance with the Contract Documents. Materials and equipment shall include all structured cabling, conduits, pull boxes, outlets, sleeves, and all components required for a complete and perfectly functional System.
- .3 Contractor shall comply with all requirements of this Section, Specification and Design Drawings, and all applicable comms Standards and electrical Codes.
- .4 System shall be delivered free of engineering, manufacturing, installation, and functional defects.
- .5 System shall be designed, engineered, and installed to suit the Client's application and the installation environment.

1.02 RELATED REQUIREMENTS

- .1 Section 26 05 00 – Common Work Results for Electrical.
- .2 Section 27 05 00 – Common Work Results for Communications.
- .3 Section 27 05 26 – Grounding and Bonding for Communications Systems.
- .4 Section 27 05 28 – Pathways for Communications Systems.
- .5 Section 27 05 53 – Identification for Communications Systems.
- .6 Section 27 15 13 – Communications Copper Horizontal Cabling.
- .7 Section 28 05 00 – Common Work Results for Electronic Safety and Security.

1.01 DEFINITIONS

- .1 PA: Public Address System a.k.a. Paging System.
- .2 System: Refers to the Paging/Public Address System specified under this Section.
- .3 Provide: Furnish, install, terminate, label, test and certify a complete operating cabling system.
- .4 Contract Documents (CD): Design drawings, Specification, sketches, and schedules provided by the Consultant, which define Scope of Work, responsibilities, and requirements of Project.
- .5 Project: The Construction Project as defined and specified in Contract Documents.
- .6 Building: Building as described in Architectural Drawings and Contract Documents and where the System specified under this Section shall be installed.
- .7 Site: Site means the land and other places, as defined in Contract Documents, where the Works or Temporary Works are to be constructed.
- .8 Facility: Facility means all or any portion of buildings, structures, sites, roads, walks, passageways, parking lots, or other real or personal property, including the site where the building, property, structure, or equipment is located.

- .9 Channel: End-to-end transmission path between two points at which application specific equipment is connected; encompasses all the elements of the horizontal cabling link, plus the equipment cords in the telecommunications spaces and work area.

1.02 REFERENCES

- .1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 CSA Group
 - .1 CSA B651-18, Accessible Design for the Built Environment.
 - .2 CSA C22.1, Canadian Electrical Code, Part 1 Safety Standard for Electrical Installations.
 - .3 Ontario Electrical Safety Code (OESC).
 - .4 CSA C22.2 No. 214-17 (R2021), Communications Cables.
 - .5 CSA C22.2 No. 182.4-M90 (R2010), Plugs, Receptacles, and Connectors for Communication Systems.
 - .6 CSA C22.2 No. 60065:16 (R2020), Audio, video and similar electronic apparatus - Safety requirements (Adopted IEC 60065:2014, eighth edition, 2014-06, with Canadian deviations).
- .3 Ontario Building Code (OBC)
- .4 ANSI/TIA (Latest Revision of Standard)
 - .1 ANSI/TIA-568 – Commercial Building Telecommunications Cabling Standard Set.
 - .2 ANSI/TIA-569 – Telecommunications Pathways and Spaces.
 - .3 ANSI/TIA-606 – Administration Standard for Telecommunications Infrastructure.
 - .4 ANSI/TIA-607 – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
- .5 BICSI
 - .1 BICSI Telecommunications Distribution Methods Manual – Latest Edition
 - .2 BICSI Information Transport Systems Installation Manual – Latest Edition
- .6 Institute of Electrical and Electronic Engineers (IEEE)
- .7 Manufacturer's Specifications, Standards and Manuals – Latest Issue

1.03 SUBMITTALS

- .1 Contractor shall submit complete system design, and shop drawings for all system components and modules, for review and approval by the Consultant and the Owner, prior to any installation.
- .2 Submit for review by Consultant and Owner:
 - .1 Product data sheets of all components
 - .2 Wiring Diagrams

- .3 Sound Pressure Level (SPL) survey results

1.04 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with the requirements of Division 01 and Section 27 05 00.
- .2 Include in Record and Information Manuals:
 - .1 One (1) copy of each approved submittal.
 - .2 Test results.
 - .3 Certificate of System Completion.
- .3 Provide complete turnover package, including:
 - .1 As-Built Drawings.
 - .2 Schedule of cables, indicating for each cable, the cable identifier and the corresponding locations and identifiers of the speakers connected to that cable.
 - .3 Training and operator's manuals.
 - .4 Manufacturer's installation manuals.
 - .5 Software licenses.
 - .6 Configuration files.
 - .7 Preventive maintenance plan.
 - .8 Spare parts list.
 - .9 Warranty certificates and service agreements.
 - .10 Any other documentation required by Owner for proper handover of the system.

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Division 01 and Manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to Site in original factory packaging, labelled with Manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with Manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect System equipment from nicks, scratches, blemishes, and theft.
 - .3 Remove defective or damaged materials from Site, and replace with new, at no cost to Owner.
- .4 Coordinate storage space requirements with Owner to ensure space is allocated for storing equipment. Plan to potentially store materials off-site in case of insufficient storage space.

1.06 QUALITY ASSURANCE

- .1 Products certified by a recognized testing agency accredited by the Standards Council of Canada, and bear a certification mark from that agency indicating acceptance to Canadian standards.
- .2 Design, work, and materials shall comply with all applicable regulatory requirements and codes of Authority Having Jurisdiction (AHJ).
- .3 Follow closely manufacturer's written instructions. In case of conflict between manufacturer's instructions and Contract Documents, Consultant and Owner shall be informed to arbitrate in writing a final solution.

1.07 WARRANTY

- .1 Contractor shall provide a warranty covering the installation, material and workmanship for a period of two (2) years from the Date of Acceptance of the Project by Owner.
- .2 Contractor shall remedy covered defects within four (4) hours of notification of major failures or within twenty-four (24) hours of notification for individual station related problems.

2 Products

2.01 MANUFACTURERS

- .1 TOA.
- .2 Bogen.
- .3 AUSTCO (basis of design)
- .4 Approved equal.

2.02 GENERAL REQUIREMENTS

- .1 Contractor is fully responsible for the ultimate design and implementation of the System topology (physical and logical) best suited for the Project, in compliance with Owner's requirements.
- .2 Contractor shall provide all hardware components, including, speakers, amplifier(s), microphone, interface modules, controllers, cables, connectors, cable managers, mounting brackets, accessories, etc., as required for a complete and fully functional paging system.
- .3 Contractor shall be responsible to ensure that all products meet all requirements of the Drawings and Specification, and fits in the intended space. The final determination of a product being acceptable shall be established by the Consultant.
- .4 Contractor shall provide network cabling as required for system installation, in compliance with Section 27 15 00.
- .5 Contractor shall ensure that proposed equipment is adequate for the planned scope and functionality requirements of the solution, and shall ensure that system is scalable and flexible to accommodate additional capacity and future expansion.
- .6 All equipment installed in part or in whole in a plenum space shall be plenum rated.

2.03 SYSTEM DESCRIPTION

- .1 General

- .1 The Paging (Public Address) System shall be a centrally controlled zone-based audio system capable of transmitting audio messages and music to specific zones, groups of zones, or all zones in the Facility, as required.
- .2 System shall be designed, equipped and configured to function as:
 - .1 An effective audio music system.
 - .2 An effective and reliable building-wide Paging/PA system, for transmitting routine and critical audio announcements.
- .3 System shall allow for the connection of:
 - .1 Paging/Public Address interface modules
 - .2 Local music source (in equipped zones)
 - .3 Personal music sources or entertainers
 - .4 Microphone connections (in equipped zones)
 - .5 Wireless microphone systems
- .4 System shall include a portable music system for special events or outdoor event use.
- .2 Design Requirements
 - .1 Contractor shall provide a standard distributed 70-volt Public Address System, as indicated in the Specification and Drawings. System shall serve as a broadcast solution for live or pre-recorded audio messages, and for background music.
 - .2 System shall be properly rated and designed to deliver routine and critical audio announcements, at the defined audio level and with sufficient clarity, to all occupants of the facility.
 - .3 System shall deliver intelligible audio messages in all specified areas of the facility, including, but not limited to, the following areas:
 - .1 [Lobby.]
 - .2 [Common areas.]
 - .3 [Dining / bistro / bar areas / recreational and communal spaces.]
 - .4 [Hallways on all Building floors.]
 - .5 [Other Spaces as indicated in Specification and Drawings.]
 - .4 Speakers shall be deployed as required to ensure full coverage of specified areas.
 - .5 System and component models and architectures shall be built, proven and tested for use in comparable environments and building spaces.
 - .6 System shall support a minimum of [99] separate paging, unless otherwise noted; with each zone consisting of individually controlled group of speakers.
 - .7 System shall allow for an automated broadcast of scheduled pre-recorded messages to a programmable number or groups of zones.

- .8 System shall allow for broadcast of messages from different audio sources, including but not limited to, telephone, microphone, PC, mobile devices, and portable audio devices.
 - .9 Paging system interface and control unit(s) shall be rackmount and modular, allowing for added functionality and future expansion.
 - .10 System shall include field and termination equipment and all cabling necessary to provide a fully automated and functional System, designed to meet the paging requirements of Owner.
 - .11 Output sound level at 1.5 m above finished floor level shall be at least 10 dB higher than ambient noise level.
 - .12 System shall be non-proprietary and compliant with applicable codes and industry standards.
 - .13 System shall form a complete scalable solution from the existing scope of this project, and future expansion shall not require replacement or upgrading of the hardware and equipment provided as part of the initial solution.
 - .14 Contractor shall coordinate with Owner the placement of speakers, control and interface equipment, and modules.
 - .15 Facility shall be logically divided into separate zones controlled individually. Zones shall be defined based on the Facility's functional program and in coordination with the Owner's representative.
 - .16 System shall provide the following functionality:
 - .1 Single zone and multiple zone paging.
 - .2 Background music assigned by zone.
 - .3 Emergency zone group with choice of built-in tones or external tone source.
 - .4 Emergency all-facility page override.
 - .17 System's required interfaces with other systems, such as the fire alarm system, shall be implemented, for muting of public address system upon fire alarm or mass notification announcement.
 - .18 Interconnect with TKIS paging adapter by Austco
 - .19 Interconnect with VOIP Phones (Coordinate Requirements with UHN Digital)
 - .20 Paging system and all relevant hardware are by Austco
- .3 Design Analysis
- .1 Perform and submit as part of the design process the following analysis and calculations:
 - .1 Power supply requirements for each speaker and speaker zone of the System, in accordance with the manufacturer's specification and guidelines
 - .2 Power consumption and dissipation data under normal and maximum operating conditions
 - .3 Conductor size calculations for each cable run (based on distance between speakers, distance between amplifier and speakers, speaker tapping and number of speakers)

- .4 Cable schedule including cable types, lengths, and conductor sizes

2.04 MATERIALS

- .1 Paging System shall include, but is not limited to, the following components:
 - .1 Communications / audio cable(s).
 - .2 Microphone.
 - .3 Standard 70-volt line speakers.
 - .4 Interface devices / Controllers.
 - .5 Amplifiers.
- .2 Communications / Audio Cable(s):
 - .1 Communications / Audio cable shall be:
 - .1 16 AWG, 2-Conductor Shielded with drain wire, Plenum Rated FT6 Cable.
 - .2 Made with all-copper conductors.
 - .3 Compliant with UL, ULC or CSA and all applicable life safety code and regulations.
 - .4 Suitable and approved by Manufacturer for use as 70-volt speaker cable.
 - .2 Conductor size shall be specified based on design specs, number of speakers, speaker tapping power, and cable run distances. Comply with applicable cable sizing codes and standards.
 - .3 Contractor shall use a lower gauge wire where distances and speaker load requirements exceed the capacity/ampacity of specified cable.
 - .4 All cables running in part or in whole in the outdoor environment shall be weatherproof and outdoor rated.
- .3 Speakers:
 - .1 Type 1 Speaker – TOA PC-580R Standard Commercial Speaker– typically used in corridors, staff rooms, service and other non-client facing areas, requires BB-580 Back Box.
 - .2 Type 2 Speaker – TOA F-2232CU2 Music Zone Speaker – typically used in client facing areas, such as the Main & Private Dining Rooms, Demonstration Kitchens, Pubs, Fitness Rooms, Rev IT Up, Theatre/Chapel, Spa, Salon, Games Room, etc.
 - .3 Type 3 Speaker – TOA F-1300WPWT Outdoor Speaker – typically used in outdoor gathering spaces.
 - .4 Type 4 Speaker – TOA PC-580S Standard Square Surface Mount Commercial Speaker – typically used in service areas such as shipping and receiving where finished ceilings are not installed, requires Type 4 Speaker Back Box (QY-BB-580W).
 - .5 Speakers shall have the following specs:
 - .1 Speaker component diameter size of 250 mm (8 in).
 - .2 Designed for 70-volt audio systems.

- .3 Built-in multi-tap transformer with taps at ¼, ½, 1, 2, and 4 watts.
- .4 UL 1480 UUMW & UL 2043 plenum rated. Certified to work with emergency announcement systems.
- .6 Rated for commercial or enterprise use
- .7 Designed to be installed in both open structure/ceiling and drop ceiling configurations
- .8 Sized and rated to meet the Specification and design requirements
- .9 Equipped with built-in audio level adjustment mechanism
- .10 Speakers installed outdoor shall be weatherproof and outdoor rated.
- .4 Amplifiers:
 - .1 Zone Mixer Amplifier – TOA BG-2035, BG-2060, BG-2120, BG-2240, or BG-2480, used to power individual speaker zones (one per zone). Use appropriate model depending on speaker load per zone. Amplifier allows inputs for overhead paging, music and microphone wall plates (where applicable).
 - .2 Amplifier shall be rack mounted in Main IT Room.
 - .3 Amplifier shall be designed to natively support standard 70-volt line PA systems.
 - .4 Amplifier shall be properly sized and rated to provide 25% power over current system power requirement. Power requirement of the present System is defined as the total output power required to drive all speakers in all assigned zones of the facility at maximum capacity.
 - .5 Amplifier shall provide a frequency response of ±1 dB from 70 Hz to 15 kHz, and shall deliver rated power at less than 1% distortion.
 - .6 Amplifier shall allow for paging from telephone and/or microphone. The signal-activated paging channel shall automatically mute background music during a telephone page, eliminating the need for manual activation of switches and the use of external relays. Provision shall be included to set to mute the level of background music during a page. Music level shall be returned to its normal level after a page.
 - .7 The telephone paging channel shall have a VOX sensitivity adjustment to eliminate transmission of background noise, and automatic output leveling (ALC) to compensate for varying voice levels and paging techniques of persons using the system.
 - .8 An Audio Enhancement circuit shall be included to regenerate the harmonics lost during the amplification process and improve intelligibility. A control shall be provided to set the level of this effect.
 - .9 A night ringer shall be included to alert personnel of incoming calls. The night ringer shall be activated by a contact closure or by 90 Volt ring signal from the telephone line.
 - .10 Input terminals shall be furnished for a telephone line and Lo-Z balanced microphone. A choice of RCA jack or screw terminals shall be provided for the music source.
 - .11 Terminals shall also be provided to control music muting, typically during a mic page, and for contact closure or ring signal activation of the night ringer.
 - .12 Amplifier shall provide for 25 V and 70 V speaker line outputs.

- .13 Provision shall be included to drive a 600 ohm telephone line, using an accessory line-matching transformer.
- .14 Individual controls shall be provided to set the telephone and mic page volume, music volume, night ringer volume, VOX sensitivity, and music mute level. Bass and treble controls shall permit tonal adjustments. An automatic level control (ALC) and VOX sensitivity control shall be included. A peak level indicator shall illuminate when the amplifier is driven into clipping. A power indicator shall also be provided.
- .15 The amplifier shall operate from a 120 VAC, 60 Hz source, and shall be equipped with a resettable circuit breaker, and thermal and electronic overload protection or a slow blow fuse.
- .16 Amplifier shall be listed to CSA C22.2 no. 60065.
- .5 Coordinate with Client the provision of a microphone, if needed. Microphone shall be designed with a desk stand and a flexible gooseneck arm, and shall be fully compatible with the system. It shall be rated for commercial and enterprise applications. Microphone shall have control buttons to support multi-zone paging.
- .6 Interface and Control Modules
 - .1 Where applicable, all interface and telephone access modules shall meet the following requirements:
 - .1 Capable of direct connection to loop start and ground start trunks, to PBX or KEY paging ports with DTMF capability, and to IP T/R lines.
 - .2 Programmable using a PC Ethernet/IP interface to configure settings and functionality.
 - .3 Modular and rackmount, allowing for the addition of rackmount modules for future system upgrades and expanded functionality, unless specified otherwise.
 - .7 Contractor shall provide all software licensing required for programming the system and its components.

3 Execution

3.01 GENERAL

- .1 Examine installation areas and substrates prior to installation. Notify Owner and Consultant of any conditions which may adversely affect installation or subsequent use. Do not begin installation before unacceptable conditions have been rectified.
- .2 Install system in compliance with Specification, Design drawings, and Contract Documents.
- .3 Install paging system modules and components in compliance with Manufacturer's written instructions and guidelines.
- .4 Provide the following minimum separation from Electrical Power systems installed in conduits:
 - .1 50 mm from circuits of 300 volt and less.
 - .2 600 mm from circuits of 300 volt and higher.
 - .3 2 m from circuits between 600 V and 15 kV.
 - .4 3 m from circuits above 15 kV.
 - .5 Electrical systems shall NOT share the same pathway.

3.02 INSTALLATION

- .1 Amplifiers and Interface Modules Installation:
 - .1 Mount amplifier, interface modules and controllers in coordination with Owner's IT team, and in accordance with requirements of this Section.
 - .2 Mount amplifier and telephone paging interface on supplied plywood backboard in Main IT Room in proximity to the copper backbone.
- .2 Speakers Installation:
 - .1 Install speakers in accordance with Specification at the locations indicated in Design Drawings.
 - .2 Speakers shall be flush mounted on drop ceiling, or wall (surface) mounted, as required, in accordance with the requirements in this Section and the Design Drawings.
 - .3 Total number of speakers connected per single cable run shall not drive total channel power over eighty percent of the Amplifier's power rating.
 - .4 All speakers shall be tapped at 1 watt, unless specified otherwise.
 - .5 Number, groups and placements of speakers shall be coordinated with and approved by Owner's IT Team, prior to installation.
- .3 Speaker Cables:
 - .1 Speaker cables shall be run free air, supported by cable trays, as conditions permit.
 - .2 Install cables using the provided cable support and pathway systems, as specified in the Design Drawings. Cable runs into secure areas shall be enclosed inside EMT conduit.
 - .3 Conduit installation costs required for the System shall be included in quote.
 - .4 Install all speaker cable in accordance with communications cabling Specification and Owner's structured cabling standard and requirements.
 - .5 All speaker cables shall be home run through the communications riser and terminated in the Facility's Main IT Room.
 - .6 All speaker cables shall be labeled in accordance with Owner's standards and latest ANSI/TIA-606 Standard.
 - .7 Contractor shall provide clear documentation indicating for each cable, the cable identification and the location and identifiers of all speakers connected on that cable.
- .4 System and components shall be grounded and bonded as specified in Manufacturers' instructions and manuals, and in compliance with the latest ANSI/TIA-607 standard.
- .5 Terminate all homerun zone cabling in Telecom Room 2-401 (for level 2) and Telecom Room 30 (for level 5).
- .6 Install speakers flush mount facing downward on the suspended ceiling. In open ceiling spaces, mount speakers to fixed ceiling structures using manufacturer approved mounting brackets and accessories.
- .7 Where applicable, wire speakers in parallel by zone, based on adopted zone scheme.

- .8 Run all cable in compliance with the Design Drawings, Specification and Section 27 15 00. All cables inside the drop ceiling space shall be supported by J-hooks or cable trays as specified; cables in open ceiling areas shall run inside conduit.
- .9 Comply with the latest TIA-569 Standard. Ensure adequate separation between audio cables, and EMI sources, such as lighting fixtures and power cables, as specified in latest ANSI/TIA-569 Standard.
- .10 Program and configure the System as required, in accordance with specification and functional program, and in coordination with Owner and Consultant. If applicable, ensure all zones are properly configured and approved by Owner.
- .11 Coordinate with Austco & UHN Digital with regards to setting up any zoning.

3.03 SPEAKER ROUGH-IN

- .1 Type 1 & Type 4 Speaker Rough-in Requirements: For accessible ceilings (T-bar), back boxes shall be mounted in ceiling tiles utilizing rails for weight dispersion. Wire rough-in to allow for 1800 mm (6 ft) service loop at each speaker location.
- .2 Type 2 Speaker Rough-in Requirements: For accessible ceilings (T-bar) final installation to take place after ceiling grid installation, final installation will coincide with typical ceiling device installations. Wire rough-in to allow for 1800 mm (6 ft) service loop at each speaker location.
- .3 Type 3 Speaker Rough-in Requirements: Wire rough-in to allow for 1800 mm (6 ft) service loop at each exterior speaker location, cable conduit path (if applicable) should be cut flush to exterior surface to allow for unimpeded surface mount speaker installation.
- .4 Wiring Configuration: One home run 16 gauge 2 conductor cable per zone, terminating to Main IT Room as indicated in Design Documents. All adjacent speakers located in the same zone shall be wired in a daisy chain parallel configuration.

3.01 LABELING

- .1 Comply with latest ANSI/TIA-606, and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- .2 Follow requirements of Section 27 05 53 – Identification for Communications Systems.
- .3 Ensure identification on labels matches identification shown on submittal and Record drawings.

3.02 TESTING AND COMMISSIONING

- .1 Perform field tests and verification in accordance with system Manufacturer's standards and written guidelines. Ensure system's functionality passes verification tests, and meets design requirements.
- .2 Perform system commissioning in the presence of Owner, and validate that performance and functionality meet Owner's expectations and requirements.
- .3 Perform zone-by-zone and speaker-by-speaker acceptance tests to ensure that speakers and zones are connected and configured properly.
- .4 Test audio output using the microphone, pre-recorded messages and other audio devices specified for use by Owner.
- .5 Test telephone interface module, and ensure module works correctly, in accordance with System requirements and Manufacturer's instructions.

3.03 TRAINING

- .1 Train system operators and staff on using and performing basic troubleshooting of the system, in coordination with Owner's IT team. Provide one 2-hour training session.
- .2 Prepare and submit a soft copy of training material and manuals in PDF format, a minimum of five (5) business days before the scheduled System's training session.

End of Section

1 General

1.01 Section Includes

- .1 Sound masking systems.
- .2 [Paging systems.]

1.02 Related Requirements

- .1 Section 26 05 48 – Vibration and Seismic Controls for Electrical Systems.

1.03 References

- .1 CE: Conformance Européenne.
- .2 CSA CMP 75C FT6: Communications cable intended for use within buildings in ducts or plenums or other spaces used for environmental air.
- .3 EN 55103-1:1997: Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 1. Emission, Environment Category E2 - Commercial and Light Industrial (including theatres) Environment.
- .4 EN 55103-2:1996: Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 2. Immunity, Environment Category E2 - Commercial and Light Industrial (including theatres) Environment.
- .5 FCC: Part 15, Subpart B, Class A - Unintentional Radiators.
- .6 ICES-003 (Industry Canada): Interference-Causing Equipment Standard.
- .7 IEC 60065: Standard for Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- .8 RoHS: Restriction of Hazardous Substances Directive 2002/95/EC.
- .9 UL 1310: Standard for Class 2 Power Units.
- .10 UL 2043: Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; 1996.
- .11 UL 6500: Standard for Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General Use.
- .12 UL CL3P/CMP 75C: Communications cable intended for use in Class 2 or Class 3 circuits within buildings in ducts or plenums or other spaces used for environmental air.

1.04 Submittals

- .1 Submit under provisions of Section 01 33 00.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
 - .1 Preparation instructions and recommendations.
 - .2 Storage and handling requirements and recommendations.
 - .3 Installation methods.

- .3 Shop Drawings: Provide schematics of the system design on a floor plan showing the quantity, type and location of components, cabling, and accessories.

1.05 Closeout Submittals

- .1 Warranty Documentation. Provide warranty documentation, with start date(s) and service contact(s).
- .2 Record Documentation: Provide as-built schematics of the system design on a floor plan showing the quantity, type and location of components, cabling, and accessories.
- .3 System Reports:
 - .1 Provide reports in electronic form.
 - .2 Report an inventory of electronic system components, including model number, serial number, and firmware version.
 - .3 Report the verified quantity of speakers installed per local control zone.
 - .4 Report all system settings.
 - .5 Report testing and commissioning data.
- .4 System Settings Backup: Provide an electronic backup file of all system settings.
- .5 Security Items:
 - .1 Provide one set of keys for each locked equipment enclosure.
 - .2 Provide passwords to access control functions for hardware and software user interfaces.

1.06 Quality Assurance

- .1 Obtain required permits. Follow applicable codes, including regulatory testing and certifications.
- .2 Source all sound masking equipment from a single supplier. Source sound masking equipment from a manufacturer with a minimum of 10 years' experience manufacturing sound masking systems.
- .3 Have the system design confirmed by an authorized manufacturer representative.
- .4 Ensure the installation contractor has received instruction on the specified products.
- .5 Have the system configured and commissioned by an authorized manufacturer representative or their approved contractor.
- .6 Ensure supplementary materials meet applicable standards.

1.07 Pre-Installation Meetings

- .1 Convene minimum two weeks prior to starting work of this section.

1.08 Delivery, Storage, and Handling

- .1 Protect equipment from moisture during shipping, storage, and handling.

- .2 Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact.
- .3 Inspect manufacturer's packages upon receipt.
- .4 Handle packages carefully.

1.09 Project Conditions

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 Sequencing

- .1 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 Warranty

- .1 Provide a written product warranty covering sound masking components for defects in parts or assembly for a 5-year period from date of system startup.
- .2 Provide a written 1-year installation warranty.

2 Products

2.01 Manufacturers

- .1 Manufacturer List:
 - .1 LogiSon Acoustic Network
3-1050 Pachino Ct.; Burlington, ON, Canada L7L 6B9; Toll Free Tel: 866-LOGISON;
Tel: 905-332-1730; Fax: 905-332-8480; Email:[request info \(info@logison.com\)](mailto:info@logison.com); Web:
<https://www.logison.com>
 - .2 Cambridge Sound.
- .2 Substitutions will be reviewed.

2.02 System Components

- .1 Overview: Provide a networked-decentralized sound masking system with fully digital, centralized control down to individually addressable primary networked masking devices. These devices output a masking signal to a small group of speakers, creating a local control zone. The system is comprised of a selection of distributed primary networked masking devices, distributed secondary masking devices, loudspeakers, one or more control panel components, computer software, in- room occupant controls, cable assemblies, audio input modules, ceiling mount adaptors, and one or more power supplies.
- .2 Provide primary networked masking devices with:
 - .1 Network connectivity.
 - .2 A random digital masking signal generator.
 - .3 A third-octave masking signal equalizer.
 - .4 A one-octave audio signal equalizer.

- .5 A masking signal volume control.
- .6 An audio signal volume control.
- .7 Independent zone settings for masking, audio, and in-room occupant controls.
- .8 A 5 Watt audio amplifier.
- .9 Diagnostic functions.
- .10 Connections to control panel, other masking devices, and loudspeakers.
- .11 An overall diameter of 13.0 cm (5.1 in) and height of 4.5 cm (1.75 in).
- .3 Provide secondary masking devices with:
 - .1 A loudspeaker connection.
 - .2 Connections to other masking devices.
 - .3 An overall diameter of 13.0 cm (5.1 in) and height of 4.5 cm (1.75 in).
- .4 Provide loudspeakers with:
 - .1 A connection to a masking device.
 - .2 A suspension chain at least 51 cm (20 in) in length and tool-less length adjustment clip.
 - .3 An acoustically damped enclosure.
 - .4 Tool-less, on-site adjustment of loudspeaker orientation (up/down).
 - .5 An enclosure diameter of 16.5 cm (6.5 in) and height of 9.0 cm (3.5 in).
 - .6 A 10.0 cm (4.0 in), 25 Watt RMS, 16 Ohm loudspeaker driver with a frequency response of 100-10,000 Hertz (+/- 6 dB), sensitivity of 87 dBA at 1 Watt/1 meter and a magnet structure weight of 500 grams (17.6 ounces).
- .5 Provide a control panel component with:
 - .1 Network connectivity.
 - .2 A hardware user interface.
 - .3 Connections for audio input modules.
 - .4 Connections to primary networked masking devices, additional control panel components and a computer.
 - .5 A closed contact connection for priority page function.
 - .6 A serial connection for third-party control systems (optional model).
 - .7 An Ethernet connection and IP addressability.
 - .8 An overall height of 23.8 cm (9.4 in), width of 28.0 cm (11.0 in) and depth of 8.0 cm (3.2 in).
- .6 Provide system control software (Acoustic Network Manager) for:

- .1 System startup, including initialization and addressing of networked devices.
- .2 Masking signal volume and equalization.
- .3 Audio signal volume and equalization.
- .4 Masking timer scheduling.
- .5 All system zoning.
- .6 In-room occupant control setup.
- .7 Reporting of all system settings.
- .8 System diagnostics.
- .7 Provide audio broadcast zoning software (Page Director) for:
 - .1 Setup of user-defined audio zones.
 - .2 User zone selection via software interface.
- .8 Provide monitoring/notification software (Acoustic Network Supervisor) for:
 - .1 Email notification of errors to user-defined addresses.
 - .2 Email notification of system status at user-defined periods.
- .9 Provide in-room occupant controls with:
 - .1 Network connectivity.
 - .2 A display indicating function selection and settings.
 - .3 A keypad interface for controlling all functions, including masking/audio selection, volume, increase/decrease, audio source selection, and masking/audio mute.
 - .4 An infrared remote control receiver.
 - .5 A single gang enclosure.
- .10 Provide cable assemblies that:
 - .1 Carry power, audio, and control signals over a single cable assembly.
 - .2 Provide overmolded micro-connectors with positive locking mechanisms.
- .11 Provide audio input modules for:
 - .1 Audio input for microphone, telephone, or auxiliary audio sources.
 - .2 Analog to digital (D/A) conversion of audio signals.
 - .3 Input sensitivity adjustment.
- .12 Provide ceiling mount adaptors to:
 - .1 Attach on-site to convert plenum loudspeakers to ceiling plate loudspeakers.
- .13 Provide power supplies to:

- .1 Power the system components.

2.03 Regulatory Testing and Certifications

- .1 Provide system components conforming to and labeled for:
 - .2 Canada:
 - .1 Safety and Electrical: IEC 60065.
 - .2 Electromagnetic Interference (EMI): ICES-003.
 - .3 Plenum Rated Cabling: CSA CMP 75C FT6.
 - .4 Heavy Metals: RoHS.
 - .5 Low Voltage Power Supplies: UL 1310.

2.04 Design and Performance Requirements

- .1 Manufacturer to prepare sound masking design in accordance with location of sound masking equipment laid out in electrical drawing E2110.
- .2 System Architecture:
 - .1 Provide a networked-decentralized system with addressable masking devices installed alongside the loudspeakers throughout the system area.
 - .2 Provide a multi-tiered network architecture with:
 - .1 Tier one being a network of primary networked masking devices and a control component on each floor.
 - .2 Tier two being a network connecting the control panel components and a computer.
- .3 Addressing:
 - .1 Provide a system that detects all networked devices and automatically assigns them an address in sequence based on their location in the network on each floor.
- .4 System Design:
 - .1 Design system in accordance with manufacturer's specifications.
 - .2 Design system to cover all occupant spaces.
 - .3 Design local control zones based on:
 - .1 Common acoustical and installation conditions. Do not exceed [1] [2] [3] loudspeakers per zone.
- .5 System Control:
 - .1 Provide digital control for all system settings.
 - .2 Provide system control from a control panel component(s) with a hardware user interface.
 - .3 Provide system control from computer software.

- .4 Provide system control from in-room occupant controls.
- .5 Provide a user interface on the control panel for:
 - .1 Addressing of networked devices.
 - .2 System startup and initialization.
 - .3 Masking volume and contour adjustment.
 - .4 Paging volume and contour adjustment.
 - .5 All system zoning.
 - .6 Masking timer programming.
 - .7 Security functions.
 - .8 System diagnostics and monitoring.
- .6 Provide computer software for:
 - .1 Addressing of networked devices.
 - .2 System startup and initialization.
 - .3 Masking volume and equalization adjustment.
 - .4 Paging volume and equalization adjustment.
 - .5 All system zoning.
 - .6 Masking timer programming.
 - .7 Security functions.
 - .8 System diagnostics and monitoring.
- .7 Provide centralized system management across the site via control of multiple control panel components from a central computer location.
- .8 Provide Ethernet-enabled control panel components.
- .9 Prevent simultaneous adjustment of the system from multiple user control interfaces.
- .6 System Zoning:
 - .1 Provide independent digital zoning for timer, audio, and in-room occupant control functions.
- .7 Masking Sound Generation:
 - .1 Provide a sound masking generator for each local control zone.
 - .2 Provide a random masking sound generator.
- .8 Sound Masking Control:
 - .1 Provide each local control zone with independent control over the sound masking signal, including:

- .1 A third-octave equalizer with 23 bands ranging from 63 to 10,000 Hz.
- .2 A volume control with 0.5 dBA increments over a range of 35 to 85 dBA, measured at a distance of 1 metre.
- .3 A temporary mute function.
- .4 An off setting.
- .2 Provide a user enabled/disabled function to gradually ramp up the masking volume each time power is applied.
- .9 Timer Performance:
 - .1 Provide a timer in the control panel component to adjust masking volume according to a programmed schedule.
 - .2 Provide 9 individually programmable timer zones per control panel component.
 - .3 Allow each local control zone to be assigned to a timer zone.
 - .4 Allow unique schedules for each day of the week.
 - .5 Allow variable rates of volume adjustment for each scheduled change.
 - .6 Provide calendar-based programming.
 - .7 Provide programmable daylight saving time (DST) adjustments.
 - .8 Provide the ability to program 30 exception dates per zone.
 - .9 Provide the ability to program 3 exception timer schedules.
 - .10 Provide an acclimatization function to gradually increase the masking volume over a period of time, according to a programmed schedule and with independent schedules in each timer zone. Activate if system startup occurs post-occupancy.
- .10 Paging and Background Music ("Audio"):
 - .1 Provide ability to broadcast audio.
 - .2 Allow each local control zone to be individually assigned to an audio zone.
 - .3 Provide each masking device with independent control over the audio signal, including:
 - .1 An equalizer with at least 8 octave bands from 63 to 8,000 Hz.
 - .2 A volume control with 0.5 dBA increments over a range of 35 to 85 dBA, measured at a distance of 1 metre.
 - .3 A temporary mute function.
 - .4 The ability to disable the audio output.
 - .4 Provide a priority page override function temporarily setting all local control zones to a user- defined zone and volume level.
 - .5 Provide priority page override activation via a closed-contact on the control panel component or software.

- .6 Provide option to broadcast audio with or without interruption of the masking sound.
- .7 Provide audio broadcast zoning software (Page Director) for:
 - .1 Setup of user-defined audio zones.
 - .2 User zone selection via software interface.
- .11 In-Room Occupant Control:
 - .1 Provide wall-mounted, in-room controls giving occupants manual control over masking and audio volumes for any user-programmed combination of local control zones.
 - .2 Provide independent control of masking and audio volume.
 - .3 Provide independent mute function for masking and audio volume.
 - .4 Provide a programmable limit on range of adjustment for each of masking and audio volume.
 - .5 Provide audio channel selection.
 - .6 Provide an infrared remote control receiver.
 - .7 Provide automatic reset functions to return in-room occupant controls to default settings.
 - .8 Provide an enable/disable function for each of masking volume, masking mute, audio volume, audio mute, audio channel selection, and IR functions.
 - .9 Provide an infrared remote control.
- .12 Diagnostic Performance:
 - .1 Detect the quantity and type of networked devices connected to each control panel component.
 - .2 Detect the number of loudspeakers connected to each primary networked masking device and, in total, per control panel component.
 - .3 Verify that each networked device is communicating with the control panel component.
 - .4 Identify networked devices not communicating with the control panel component.
 - .5 Verify the system design, including required components, communication limits and power limits.
 - .6 Provide a loudspeaker monitoring function that:
 - .1 detects deviations from the expected number of functioning loudspeakers connected to each networked device, whether due to incorrect installation or speaker/cabling malfunctions
 - .2 initiates notifications upon detecting a speaker count error.
 - .3 is available over a wide range of masking settings.
 - .4 be capable of being enabled/disabled.

- .7 Provide continuous voltage metering that:
 - .1 Detects and reports on voltage at each networked device for ideal operation.
 - .2 Initiates notifications of insufficient voltage at a given networked device.
 - .3 May be enabled/disabled.
- .8 Provide a tone-burst function for locating loudspeakers from below the ceiling.
- .9 View diagnostics from a control panel component or computer software.
- .10 Provide monitoring/notification software that is capable of monitoring the status of all networked devices, including control panel components.
- .11 Provide software for email notification of errors and periodic system status updates to a user-defined contact list.
- .13 System Reporting:
 - .1 Provide a user interface capable of reading and displaying all current system settings.
 - .2 Generate detailed reports of all system settings.
 - .3 Report control panel component settings.
 - .4 Report the quantity and type of networked devices connected to each control panel component.
 - .5 Report masking settings for each primary networked masking device.
 - .6 Report Audio settings for each primary networked masking device.
 - .7 Report zone assignments.
 - .8 Report timer schedules.
 - .9 Report in-room occupant control settings.
 - .10 Report all networked device serial numbers and software/firmware versions, including control panel components.
 - .11 Generate reports in printed and editable electronic formats.
- .14 Physical Security:
 - .1 House the control panel component in a key-locked metal enclosure.
 - .2 Make cable connections to the control panel component inside the locked enclosure.
 - .3 Ensure no physical output controls are on the masking devices or loudspeakers.
- .15 Electronic Security:
 - .1 Provide three levels of password protection for access to system control functions.
 - .2 Provide user-definable programming for functions available at each password level.
 - .3 Backup all settings to an electronic storage medium.

- .4 Provide continuous monitoring of communications with each networked device.
- .5 Provide loudspeaker monitoring.
- .6 Support internal and external alarm device activation upon detection of communication error.
- .7 Provide option for email notification upon detection of system error.
- .8 Provide 128-bit encrypted communication between control panel components and a PC.
- .9 Store system settings in non-volatile memory in each networked device and control panel component.
- .10 Provide relay modules for connection to third-party alarm devices or security monitoring equipment (optional).
- .11 Provide a priority page override function.
- .12 Provide exception date programming for the masking timer function.
- .16 System Cabling:
 - .1 Connect networked devices using a single connector-based cable assembly providing power, control, and audio signals.
 - .2 Use cabling rated for air-handling plenums.
 - .3 Use connectors with positive locking mechanisms.
- .17 Failsafe Power Supply:
 - .1 Provide a power component that incorporates two independent power supplies designed to jointly power the system while both are in operation.
 - .2 Provide automatic and uninterrupted power transition in the event of a single power supply failure.
 - .3 Provide monitoring of power supply failure.
- .18 Aesthetics for Open Ceiling Installation
 - .1 Provide networked masking devices and loudspeakers designed for visible installation.
 - .2 Provide cabling colour-matched to the masking devices and loudspeakers.
 - .3 Provide braided steel cable for loudspeaker suspension.
 - .4 Provide connector-based cabling.
 - .5 Provide masking devices, loudspeakers, and cabling in white.
 - .6 Provide masking devices, loudspeakers, and cabling in charcoal.

3 Execution

3.01 Examination

- .1 Ensure that the site is at a stage suitable for the system installation.
- .2 Ensure that the site is constructed according to plans including wall locations, ceiling types and plenum barriers.
- .3 Ensure planned power sources have been provided.
- .4 Ensure planned space is available for centrally located components.
- .5 Ensure third-party components interfacing with the system have been provided.

3.02 Installation

- .1 Follow manufacturer's installation manual.
- .2 Follow the system design for location of system components and wiring.
- .3 Record any necessary changes to the system design on the plan.

3.03 Site Quality Control

- .1 Ensure plenum height meets manufacturer's minimum specifications.
- .2 Ensure the distance between the top of the loudspeaker and the deck meets manufacturer's minimum specifications.
- .3 Suspend loudspeakers in a level manner.
- .4 Minimize obstructions to loudspeakers.
- .5 Support cables properly in the ceiling.
- .6 Securely terminate cables.

3.04 System Startup and Commissioning

- .1 Follow manufacturer's manuals for system startup.
- .2 Follow manufacturer's manuals for configuration of system, according to system plan, including timer, audio, occupant controls, diagnostic, and security functions.
- .3 Sound Masking Commissioning:
 - .1 Set system to the appropriate overall volume.

Area	Overall Volume (DBA)
Open Office	47.0
Private Office	43.0
Meeting Room	42.0
Corridor	47.0
Reception Area	47.0

- .2 Set system to the sound masking curve.

Sound Masking Curve (45.0 dBA Overall Volume)

Band Center Frequency (Hz)	Target Band Level (dB)
100	46.9
125	45.9
160	44.7
200	43.9
250	42.7
315	41.4
400	40.4
500	38.9
630	37.4
800	35.4
1,000	33.7
1,250	31.4
1,600	29.4
2,000	27.4
2,500	24.9
3,150	22.4
4,000	19.4
5,000	16.4

Source: National Research Council of Canada sound masking curve from 100-5000 Hz.

For curves at different overall volumes, adjust target band levels by 1 dB for each 1 dBA change in overall volume.

- .3 Commission the sound masking system with:
- .1 Ceilings fully installed,
 - .2 All furnishings in place,
 - .3 Mechanical systems operating at normal daytime levels,
 - .4 No occupant noise during measurements.
- .4 Select a commissioning location within each local control zone:
- .1 Document the commissioning location precisely on a facility floor plan showing sound masking system design.
 - .2 Assign the commissioning location an alphanumeric ID.

- .5 Conduct third-octave sound level measurements:
 - .1 Use an ANSI Type 1 or 2 third-octave sound level analyzer.
 - .2 Set analyzer for A-weighted equivalent average level (Leq).
 - .3 Set analyzer for fast response.
 - .4 Hold the analyzer microphone oriented upwards at a height between 1.2 m to 1.4 m (4 feet to 4.7 feet) from the floor.
 - .5 Move the analyzer through a slow horizontal arc of at least 600 mm (2 feet) during the measurement period.
 - .6 Keep the analyzer at least 1 metre (3.3 feet) away from vertical or horizontal surfaces.
 - .7 Measure for at least 15 seconds.
- .6 Conduct a third-octave sound level measurement with the sound masking deactivated to document existing conditions at each commissioning location.
 - .1 Identify any third-octave band in existing conditions that exceeds the target band level for that location.
- .7 Adjust the sound masking at each commissioning location to conform to the sound masking curve and overall volume for that location, such that:
 - .1 The volume in each third-octave band from 100 Hz and 5000 Hz inclusive is within plus or minus two decibels (+/- 2 dB) of the target band level.
 - .1 Unless existing conditions exceed the maximum limit for the band.
 - .2 The overall volume is within plus or minus one half decibel (+/- 0.5 dBA) of the target overall volume.
 - .1 Unless existing conditions cause overall volume to exceed tolerances.
- .8 If the sound masking curve and overall volume requirements are not met at a commissioning location, modify the system design, installation, or commissioning, at the supplier's expense, until conformance is achieved.
 - .1 Unless deviation can be shown to be due to existing conditions.
- .4 Provide an electronic report of testing and commissioning data, including:
 - .1 Floor plan(s) showing all commissioning locations with ID references and local control zones.
 - .2 A table and graph of commissioned sound masking measurements for each commissioning location, including:
 - .1 Third-octave levels for bands within the sound masking curve.
 - .2 Overall volume level.
 - .3 The sound masking curve, overall volume and tolerances specified for that location.

- .3 Explanation of any sound masking measurements which exceed tolerances for the sound masking curve or overall volume with a table and graph of existing conditions measurements for each such commissioning location, including:
 - .1 Third-octave levels for bands within the sound masking curve.
 - .2 Overall volume level.

3.05 Cleaning and Waste Management

- .1 Remove empty packaging and other material waste.
- .2 Clean system components where required.

3.06 Closeout Activities

- .1 Demonstrate operational system to Owner's Representative.
- .2 Review closeout submittals with Owner's Representative.
- .3 Train Owner's Representative to maintain system and use any occupant controls or interfaces, as required.
- .4 Review service and support contacts.

3.07 Protection

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Modifications to existing intercom system, relocating and new intercom devices as indicated on the drawings, and system verification to the appropriate codes and standards. Complete systems shall be left ready for continuous and efficient satisfactory operation.
- .2 New devices connected directly to the existing intercom system shall of the manufacturer's current product selection, and to match the existing system.
- .3 Verify system upon completion of installation and submit verification report to the Consultant with close-out documents and as-built drawings.

1.2 RELATED REQUIREMENTS

- .1 26 05 00.00 - Common Work Results for Electrical
- .2 26 05 33.13 – Conduit for Electrical Systems.
- .3 Section 26 05 33.16 – Boxes for Electrical Systems.
- .4 27 05 00.00 - Common Work Results for Communications
- .5 27 05 28.00 - Pathways for Communications Systems
- .6 27 15 13.00 - Communications Copper Horizontal Cabling
- .7 Latest intercom verification report.

1.3 REFERENCES

- .1 The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only. Comply with latest edition / amendment referenced Code/Publication.
 - .1 Ontario Building Code.
 - .2 Ontario Electrical Safety Code.
 - .3 All requirements of the Authority Having Jurisdiction (AHJ).

1.4 SUBMITTALS

- .1 Provide submittals to the Consultant for review in accordance with Section 01.
- .2 All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.
- .3 Shop Drawings
 - .1 Include sufficient information, clearly presented, to determine compliance with drawings and specifications.
 - .2 Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, and device arrangement.
 - .3 Show annunciator layout and main control panel module layout, configurations and terminations.
 - .4 Show device layout, complete riser diagram, and auxiliary functions.

- .5 Show revised system programming.
- .6 The supplier of the system shall prepare a complete zoning schedule and artwork layout for active graphic to be included with submittal package.
- .4 Manuals
 - .1 Submit complete operating and maintenance manuals listing the manufacturer's name(s) including technical data sheets (with model numbers to be used indicated).
 - .2 Wiring diagrams indicating terminals and the interconnections between the items of equipment.
 - .3 Provide a clear and concise description of operation which gives, in detail, the information required to properly operate the equipment.

1.5 QUALITY ASSURANCE

- .1 Approvals
 - .1 The system shall have proper listing and/or approval from the following nationally recognized agencies:
 - .1 FM Factory Mutual.
 - .2 UL Underwriters Laboratories Inc.
 - .3 ULC Underwriters Laboratories Canada.
 - .2 All devices/components shall be suitable for the locations, environment, temperatures in which they are to be installed.
 - .3 The intercom and peripheral devices shall be manufactured 100% by a single manufacturer (or division thereof).

1.6 WARRANTY

- .1 All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance.

PART 2 - PRODUCTS

2.1 EXISTING & NEW SYSTEMS

- .1 Two-way System:
 - .1 Haven Tech Corp SC-100 Box Office/Transaction intercom, Window mounted with power supply. CA-1 Conduit, 75 mm hole.
 - .2 .2 APEX146 APEX DLX Podium Mic, ERIS-E3.5 85 mm powered studio monitors. MIX 8 Mackie 8 channel compact mixer. A201PP Dual 6 mm to 6 mm cable - 3048mm long. A110MC Mic cord – XLR F to XLR M – 3048mm long. A105MC mic cord – XLR F to XLR M – 1524mm

- .3 Each desk to have own mixer and speakers on either side of the glass. Each speak hole location to also have a microphone.
- .4 Mount mixer under each desk and coordinate final location on site.

2.2 EQUIPMENT AND MATERIAL, GENERAL

- .1 All equipment and components shall be new, and the manufacturer's current model.
- .2 All equipment and components shall be installed in strict compliance with manufacturers' recommendations.
- .3 Modify control panels and annunciators to supervise and annunciate additional and relocated devices. Additional devices shall be devices that are 100% compatible with existing controls and be ULC listed and labelled for connecting to respective control units. Include for manufacturer's authorized representative to perform control panel/transponder work, provision of required additional devices and to reprogram system software to accommodate renovation work.
- .4 Exact type of device to be used in each area of installation to be as recommended by system manufacturer to suit specific applications and to be approved for such use as per ULC standards. Devices in non-climatic controlled areas to be weatherproof, corrosion resistant and ULC listed for use in below freezing temperatures. System manufacturer to be responsible for ensuring compliance with these requirements.

2.3 CONDUIT AND WIRE

- .1 New conduit and wire for new zones and new devices to Section 27 15 01.19.
- .2 Conduit
 - .1 Conduit shall be in accordance with the Electrical Safety Authority (ESA), local and provincial requirements.
 - .2 All wiring shall be installed in conduit or raceway to Section 26 05 33.13 and Section 26 05 33.23.
- .3 Wire
 - .1 All intercom system wiring to suit new devices shall be new.
 - .2 CSA approved and ULC listed wire and cable, approved for intercom system circuits; with colour coded, insulated solid copper conductors; wiring shall be in accordance with local, provincial and national codes and as recommended by the manufacturer of the intercom system. Number and size of conductors shall be as outlined in the Ontario Electrical Safety Code and as recommended by the intercom system manufacturer.
 - .3 All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signalling system, as outlined in the Ontario Electrical Safety Code.
- .4 Terminal Boxes, Junction Boxes and Cabinets:
 - .1 All boxes and cabinets shall be listed for their purpose and use.]

PART 3 - EXECUTION

3.1 VERIFICATION OF CONDITIONS

- .1 Conduct an impedance test of initiation and signal circuits, and submit report to the Consultant. Report any discrepancies in circuit loading.

3.2 MONITORING OF SYSTEMS

- .1 In area that remain occupied and used by Owner during Work, monitoring and supervision of existing intercom system serving renovated areas, to be daily monitored to ensure that system is left in proper operating condition at end of each working day. Include for but not be limited to performing following:
 - .1 under presence of Owner's representative, check each morning and evening (start and end of work) of each day, system to ensure that it is in proper working condition;
 - .2 if portions of system are not in proper working order, provide temporary bypass wiring, and/or provide supervisory personnel to monitor systems for area affected;
 - .3 document and sign off with Owner's representative signing off also, each respective daily check condition;
 - .4 ensure that work to system does not affect portion of system serving areas outside of renovation/working areas.

3.3 INSTALLATION

- .1 Provide additional components and retrofit work as required. Locate existing head end equipment and annunciators.
- .2 Confirm exact sequence of operation of system with Owner and review with Consultant prior to start of Work.
- .3 Work in conjunction with this installation to meet requirements of latest editions of local governing building code, local governing electrical code.
- .4 In addition, work to meet Owner's standards, and recommendations and instructions from system manufacturer.
- .5 During work to the existing intercom system, the time and duration of interruption shall be approved by Owner and reviewed with Consultant.
- .6 Verify with existing intercom system manufacturer during Bid period, the exact requirements needed to provide renovation work. If necessary, visit site with manufacturer to review existing conditions. Items of clarification or proposed revisions to Bid Documents must be reviewed with Consultant during Bid Period.
- .7 Provide for the existing building intercom manufacturers to perform control panel/annunciator work required for work of this phase. Provide additional modules as required for connection of additional devices and zones.
- .8 Relocate devices to accommodate ceiling and wall demolitions and installation of new ceilings and walls.
- .9 When ceiling and/or wall work has been completed, disconnect temporary devices and existing devices in temporary locations. Locate devices in permanent locations to suit renovations work as per issued drawings and Consultant's directions. Connect, adjust, test and verify.
- .10 Provide required additional devices and install existing devices as required. Circuit device's to existing standards and in compliance with local governing codes and authorities. Unless otherwise noted in Contract Documents, do not load device circuits more than 80% capacity. Determine exact quantities of circuits based on requirements of governing codes and standards, and recommendations of system manufacturer.
- .11 Install the mounting plate of detectors to ceiling mounted boxes as required. Secure the detectors to the plates.

- .12 Where applicable, provide wiring in conduit and connections from smoke detector auxiliary relays to interconnected devices. Coordinate work of respective trades.
- .13 Review exact location of components with Consultant prior to roughing in.
- .14 Install all wiring in conduit (except for MI). All wiring connections associated with the intercom system shall be performed on terminal strips in junction boxes. When pulling wires into conduit, use lubricant and ensure that wires are kept straight and are not twisted or abraded. Neatly secure exposed wires in apparatus enclosures with approved supports or ties. All wires must be clearly identified at all termination points. In addition they shall be numbered with Brady Ltd. or Electrovert Ltd. Z type markers. Colour conductors for each part of the system in accordance with the system equipment manufacturer's recommendations.
- .15 Provide engraved Lamacoid identification nameplates for each equipment or wiring housing and secure to the front of the housing. Exact wording designations and sizes to be reviewed with Consultant prior to manufacture.
- .16 Ground and bond system as required by local governing electrical code and authority and system manufacturer.

3.4 FIELD QUALITY CONTROL

- .1 Testing and Verification
 - .1 Provide the service of a competent, factory trained engineer or technician authorized by the manufacturer of the intercom equipment to technically supervise and participate during all of the adjustments and tests for the system.
 - .2 Check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 - .3 Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the intercom system to technically supervise and participate during all of the adjustments and tests for the system.
 - .4 A representative of the electrical contractor shall be present to participate and assist the manufacturer representative during the course of the verification. The electrical contractor shall make good any deficiencies discovered during the verification. All devices, new and existing, shall be verified. The electrical contractor shall provide one person for assistance with the verification.
 - .5 Include all associated costs in the CCN.
 - .6 Carry out a complete intercom system test and submit report.
 - .7 On completion of the verification the manufacturer shall supply a certificate, together with detailed inspection record sheets showing location of each device and certifying the test results per unit, confirming that the system is installed, supervised and operational.
- .2 Manufacturer Services
 - .1 The manufacturer(s) of the intercom system shall make a complete inspection of all existing and new components installed for system following:
 - .1 That the system is complete in accordance with Specifications.
 - .2 That the system is connected according to ULC requirements.
 - .3 That the system is connected in accordance with the Manufacturer's recommendations.

- .4 That any subsequent changes necessary to conform to the above will be carried out with technical advice supplied by the Manufacturer.
- .5 That all intercom devices has been operated and are in good working order.
- .6 That all existing devices are in good working order. Include for replacement of any defective/damaged devices at no extra cost to Owner.
- .7 Where project work is phased and Owner requires occupancy at various stages, include for providing system testing, verification and certification after completion of each phase of work, to approval of local governing authorities. Upon Substantial Performance of the Project Work, include for providing system testing, verification and certification of the entire system work.
- .8 Arrange for manufacturers to supply reasonable amounts of technical assistance with respect to any changes required to conform to paragraphs above. During period of inspection, testing and verification, make Electricians available to do any required correction work and to assist during this Work.
- .9 On completion of verification, inspection and testing of system, obtain from manufacturer and testing company and forward to Consultant, a verification certificate together with detailed inspection reports listing each and every system component, its location in building and its acceptability. Verification certificate and inspection reports to be prepared and signed by certified testing technicians. Signed test reports to confirm that systems are installed and perform in accordance with requirements specified above. Submit minimum 2 hard copies and electronic copy.

3.5 DEMONSTRATION

- .1 At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.6 TRAINING

- .1 Provide instruction as required to the building personnel. "Hands-on" demonstrations of the operation of the system shall be provided.

END OF SECTION

1 General

1.01 SECTION INCLUDES

- .1 The specifications for the visual nurse call system are a description of the various components with the minimum operational sequence requirements. System shall comply with all applicable codes.
- .2 When all systems are completely installed and ready to be used, the successful supplier shall thoroughly instruct those appointed by the Owners in the complete operation of all systems provided by him for a minimum time of 4 hours (Two 2 hour sessions at times as directed by Owner to suit staff's requirements) unless in the opinion of the Consultant a longer instruction period is necessary.
- .3 Provide one separate system and provide zone indication to existing systems.
- .4 The Nurse Call equipment furnished under this specification shall be the standard product of one manufacturer Austco Tacera. Systems using third party manufactured power supplies, call cords and corridor annunciators will not be accepted. Field wiring shall be CAT5e or CAT6 cable, and all voice and data connections shall be by RJ-45 connectors
- .5 The nurse call system provisions will be comprised of the newest generation, state-of-the-art, wired nurse call system with all required features
- .6 The Nurse Call system shall continue to operate in case of network failure on a tone base system in accordance with UL-1069
- .7 The manufacturer shall provide availability of local service and maintenance by factory trained personnel from the authorized distributor of the equipment manufacturer. The distributor shall have available stock of the manufacturer's standard parts. 24-hour on-site maintenance shall be provided at no-cost to the purchaser for a period of twenty four (24) months from date of completion of installation
- .8 Manufacturer shall provide, free of charge, product firmware/software upgrades for a period of one year from date of installation for any product feature enhancements. Manufacturer shall provide a 5-year warranty on all Austco manufactured hardware
- .9 Tenderers shall provide a fully conforming bid; any areas of non-conformance to this document must be identified, documented and submitted seven (7) working days before

1.02 CLOSEOUT SUBMITTALS

- .1 Provide complete start-up verification report by manufacturer and include cost in tender price.

2 Products

2.01 MANUFACTURERS

- .1 Austco Tacera.
- .2 Contact Information: Tim Love (Tim.Love@austco.com, M: [416-624-2690](tel:416-624-2690))

2.02 CALL ASSISTANCE SYSTEM

- .1 The call assistance system is in this contract and shall be installed in each Barrier-Free Washroom.
- .2 Each system shall include:
 - .1 A horn/strobe mounted high and located in the General Office area which sounded when a pull cord station is activated.

- .2 Pull cord stations mounted 36 inches AFF and located in Barrier-Free Washroom, required.
- .3 Ceiling mount white dome light with lamp, interconnected to illuminate when a pull cord station has been activated, located outside associated room.

3 System Wiring

- .1 System cable shall consist of or Category 6 cable to all field devices and IP Controllers
- .2 All wiring shall test free from all grounds and shorts
- .3 All wiring shall terminate with manufacturer approved connectors
- .4 All Category 6 cable to be tested for performance and quality

4 System Description

- .1 Call-points and all other in-room devices, including patient stations, washroom emergency pull cord stations, and over door lights shall have its own unique embedded address allowing for auto discovery. Each device shall contain two RJ45 connectors enabling the option of sequential cabling of devices within the room or to other rooms
- .2 System components shall include, but not limited to the following:
 - .1 VoIP Master Stations
 - .2 VoIP Patient Station
 - .3 Patient Station – Modular
 - .4 Washroom Emergency Pull Cord Station
 - .5 RGB Dome Light
 - .6 Controllers / IPNET Routers
 - .7 Power Supplies
- .3 Call activation shall be by means of easy-to-identify, colored and back-illuminated call buttons, washroom emergency pull cords or patient call cords. All touch surfaces on devices shall be antibacterial to aid with infection control
- .4 Pre-announce tones for intercom calls and Public Address calls, and a green monitor LED to alert patients of an active speech circuit (microphone active)
- .5 The over door indicator LED lights shall have a minimum four segments with a minimum of 16 programmable flashing and non-flashing colour combinations to indicate call types priority

- .6 The system shall have all call handling and processing distributed amongst IP-based routers in a peer-to-peer network. The software for the operation of the nurse call sub-system in each unit will be fully embedded and the system will work independent of an attached nurse station on that unit
- .7 VoIP nurse master consoles with the ability to respond to calls out of sequence by simply selecting the call to be answered
- .8 Ability to sequentially display active calls by priority
- .9 Bright and clear touch screen display for the nurse stations shall indicate call priorities and room numbers in a prioritized list of at least eight (8) simultaneous calls with associated alarm color. All calls will have an elapsed timer indicating time since the call was activated (Duration)
- .10 Ability to initiate paging announcements to one room or selected rooms by software programming and simple touch panel selection
- .11 Administration of system servers, including configuration, is web-based and does not require any additional software to be loaded on any device
- .12 The server and client software shall be agnostic, allowing the use of Windows or Linux as the operating systems
- .13 Programming of the system is done locally or remotely using a web-based application by any PC with access to the network. Systems requiring proprietary software installed on a PC for system programming will not be considered
- .14 All configuration parameters and data history shall be stored in non-volatile, non-magnetic media such as compact flash. All calls on the system will also be logged and retained for a minimum of two (2) years which can be retrieved as an archival log at any time from any GUI
- .15 The system will include comprehensive activity reporting. All calls on the system will also be logged and retained for a minimum of two (2) years which can be retrieved as an archival log at any time from any GUI on the IP network
- .16 The master and routers and servers shall be directly connected to the IP network via manufacturer approved Ethernet switches
- .17 System shall operate during power failure for a minimum of 30 minutes utilizing battery backed UL-1069 power supplies (depending on volume of the alarms received during the backup battery power)
- .18 System shall be supervised for wiring shorts and opens between all devices (controllers, dome lights, patient stations, washrooms stations, etc.) at all times
- .19 The nurse call equipment shall conform to the relevant standards below:
 - .1 CUL-C22.2 NO. 205-12 Signal Equipment – Edition 2 issue date 2012/11/01
 - .2 UL-1069 Hospital Signaling and Nurse Call Equipment
 - .3 UL-2560 compliant

5 NURSE CALL EQUIPMENT SPECIFICATIONS

5.01 VOIP MASTER STATION

- .1 High resolution LCD desk mounted back lit 10" monitor c/w bright TFT touch-screen display and desk stand
- .2 Self-contained unit which shall not consist of separate/discrete components
- .3 Durable VoIP handset for two-way audio communication between patients and staff
- .4 Touch to select feature that allows users to easily navigate through software
- .5 Display a minimum of eight (8) active calls simultaneously each with an individual elapsed timer which increments since call was placed
- .6 Active calls displayed in order of priority and color coded for easy identification
- .7 Capable of storing customized messages for delivery to designated wireless phones or pagers
- .8 Capable of audio paging to individual rooms or groups of rooms using the VoIP handset
- .9 Master Station electronics are protected against power surge, cable shorts and power reversals
- .10 Must be powered by PoE+

6 VoIP Patient Station

- .1 Provide a single or dual Patient Station
- .2 The Austco Patient Station (dual or single) shall perform this function:
 - .1 Have a separate speaker and mic for true full duplex communication
 - .2 Includes 3 configurable alarm buttons for flexible call types.
 - .3 One single PoE+ Cat 6 cable for all power and communication
 - .4 Have one or Patient Call Cord connected to the Patient Station
 - .5 The Patient Station will have an individual IP address.
 - .6 Two ¼" Auxiliary jacks for call cords or medical equipment. These jacks are independent of the other buttons and receptacles on the unit
 - .7 Dummy plugs are not required
 - .8 If the cancel button is pressed for 5 seconds, the Patient Station will enter a temporary cleaning mode for 15 second and then automatically resume normal operation

- .9 Each of the three alarm buttons on the patient station have the ability to place three different calls per button through Multi-Tap programming (single press, press and hold for 3 seconds and triple tap)

7 Washroom Emergency Pull Cord Station

- .1 Water resistant flush wall mounted call tone complete with wipe clean surface pull cord and brightly coloured and clearly labelled handle with an icon for fast identification
- .2 Pull cord and handle made of nylon and capable of being disconnected to dip sterilize for improved infection control
- .3 15mm (.06") cancel button labeled cancel
- .4 Cancel button shall illuminate bright red for visual reassurance of call activation
- .5 Silicone material of the cancel buttons shall be imbedded with an anti-bacterial compound. Buttons with disposable stick-on anti-bacterial covers are not acceptable
- .6 Emergency Pull Cord Station shall have a 15 second cleaning mode to prevent accidental call activation during cleaning
- .7 The pull cord on the washroom station has the ability to place three different calls per pull through programming (single pull, pull and hold for 3 seconds and triple pull)
- .8 Emergency Pull Cord Station mounting plates shall be white and manufactured from a durable polycarbonate/ABS blend with snap-on surround to conceal screws
- .9 Cable connections shall be by modular RJ-45 connectors to suit CAT6 cable
- .10 Each Emergency Pull Cord Station shall be continuously supervised for faults
- .11 Emergency Pull Cord Station shall be capable of being replaced "hot" without removing system power, reprogramming or resetting controllers
- .12 Pull cord consists of a break-away point in the front that will separate prior to a load of 22lbs (10kgs)
- .13 The pull cord station electronics are protected against power surges, cable shorts and power reversals

8 RGB Dome Lights

- .1 Dome lights shall include four segments with RGB technology. Nine colour choices with flash rate and segment pattern choices LED's
- .2 It shall be possible to program, via a standard web-page, a light scheme to provide combination of color and steady or flashing for each of the priorities
- .3 Manufactured with a shatterproof heat-resistant polycarbonate plastic lens
- .4 Each dome light shall be continuously supervised for faults

- .5 Dome lights shall be capable of being replaced “hot” without removing system power, reprogramming or resetting controllers
- .6 Cable connections shall be by modular RJ-45 connectors to suit CAT6 cable
- .7 The dome light’s electronics are protected against power surges, cable shorts and power reversals
- .8 Dome lights shall include two solid state LEDs per colour for improved reliability and increased brightness

9 ***IP-ASA Appliance***

- .1 Rack mount appliance / server, 23.45” x 17.8” x 1.69”
- .2 1 x Integration LAN port (1 GbE) | 1 x Austco LAN port (1 GbE) with support for multiple VLAN traffic separation. An external switch which supports 802.1Q and VLAN tagging will be required to separate the AUSTCO LAN traffic to different VLANs.
- .3 Three pre-installed ACS virtual machines to reduce setup time and ACS management

10 **Controllers / IPNet Routers**

- .1 Controllers shall utilize TCP/IP connectivity and be compatible with any 10/100/1000 Mb network
- .2 On-board LED’s shall provide visual confirmation of network connectivity and system faults
- .3 Controllers shall be either a rack mountable version using a hub with slots for up to ten controller cards or single card wall mount unit
- .4 Capable of local or remote programming and diagnostics from any web-browser on the network
- .5 Each controller shall support up to 30 devices including dome lights and call-points
- .6 Firmware shall be upgradable in real time. The unit must reboot and become fully functional immediately
- .7 Each controller shall be continuously supervised for faults

11 **Power Supplies**

- .1 Power supplies shall output 24V DC and connect to 120V mains
- .2 24 V battery back-up and charging shall be provided with the battery back-up being capable of running the nurse call system for at least 30 minutes after mains failure (depending on volume of the alarms received during the backup battery power)
- .3 Power supplies shall be wall or rack mountable

- .4 External LED's shall indicate operational status and trigger alarms on mains failure or DC output failure
- .5 Electronic fuses protect the power supply and automatically reset when the overload is removed

12 SYSTEM OPERATIONS

12.01 THE SPECIFIED SYSTEM SHALL OPERATE IN THE MANNER DESCRIBED BELOW

BEDSIDE PATIENT STATION OPERATION

- .1 A patient call shall be activated following a momentary press of the button on a patient call-point or call pendant. On activation of a patient call, the system shall:
 - .1 Sound a reassurance tone on the call-point for the duration of the patient pressing the call button
 - .2 Indicate to the patient that the call has been placed by means of a red reassurance light at the bedside call-point
 - .3 Illuminate an over door light above the entrance way to the patient's room
 - .4 Display customized call priority text such as "Patient Call", bed/room number and time the call has been active on the touch screen of the designated nurse station for that room, and sound a slowly repeating patient call chime tone at the nurse station until the call is answered or cancelled
 - .5 Send customized call priority text such as "Patient Call" and the bed/room number to assigned master stations.
 - .6 Record the call and duration in the in-built call log
- .2 The patient call can be cancelled by a staff member entering the room and cancelling the call at the point of origin. On cancellation of a patient call, the system shall:
 - .3 Cancel the patient call from the Nurse Master Station
 - .4 Cancel the call-point reassurance light
 - .5 Cancel the patient call indication from the over-door light of that room
 - .6 Record the cancellation in the in-built call log

13 Answering Active Calls at the Nurse Station

- .1 To answer active calls on the nurse call system, staff shall pick up the handset and select the incoming call to connect to the room intercom and speak with the patient. This will have the following effect:

- .1 Chime at the patient's room and nurse station to indicate call connected
- .2 Connect the microphone on the patient station to the speech circuit

- .2 If programmed for call cancel, picking up the handset from the cradle will have the following effect:
 - .1 Cancel that patient call information from nurse.
 - .2 Cancel the red reassurance lights on the bed head panel

14 Washroom Call Operation

- .1 A washroom call shall be activated following a momentary pull of the cord on the pull-cord call-point. On activation of a washroom call, the system shall:
 - .1 Indicate to the patient that the call has been placed by means of a red reassurance light and a reassurance tone on the washroom pull-cord station
 - .2 Illuminate an over door light above the entrance way to the patient's room or washroom
 - .3 Display customized call priority text such as "Washroom Call", room number and time the call has been active with optional patient details via a patient database interface on the touch screen of the designated nurse station for that room and sound a slowly repeating patient call chime tone at the nurse station until the call is answered or cancelled
 - .4 Send customized call priority text such as "Washroom Call" and the bed/room number to assigned master stations
 - .5 Record the call and duration in the in-built call log

- .2 The washroom call can be cancelled by a staff member entering the room and cancelling the call at the point of origin. On cancellation of a washroom call, the system shall:
 - .1 Cancel the washroom call from the nurse station
 - .2 Cancel the call-point reassurance light
 - .3 Cancel the patient call indication from the over-door light of that room
 - .4 Record the cancellation in the in-built call log

15 *Nurse Station Operation*

15.01 ACTIVE CALLS

- .1 The touch screen display for the nurse stations shall indicate call priorities and room numbers in a prioritized list of at least twelve (12) simultaneous calls. All calls will have an elapsed timer indicating time since the call was activated (Duration)
- .2 Active call displays shall be accompanied by programmable, volume adjustable single, double and triple chime tones or pulsing buzzer sounds from the nurse station to indicate call priorities
- .3 Staff to Patient Intercom Operation (Voice Activation)
- .4 To answer active calls on the nurse call system, staff shall pick up the handset and select the incoming call to connect to the room intercom and speak with the patient. This will have the following effect
- .5 Chime at the patient's room and nurse station to indicate call connected
- .6 Connect the microphone on the patient station to the speech circuit
- .7 If programmed for call cancel, picking up the handset from the cradle will have the following effect
- .8 Cancel that patient call information from nurse stations.
- .9 Cancel the red reassurance lights on the bed head panel

16 **Public Address Operation**

- .1 When the "PA" icon on the nurse station is pressed, staff can select a room or group of rooms from a pick-list to make a public address to the corridor ceiling speakers.
- .2 Nurse Call Integrated PA system by Austco connect using the TKIS interface module.

17 **Execution**

17.01 INSTALLATION

- .1 Provide complete visual nurse call systems as shown on Drawings and as specified.
- .2 Mount calling station at bedsides 4'-6" above floor, unless noted otherwise, using suitable backbox and plaster ring.
- .3 Locate dome lights over doors on wall as required.
- .4 Flush-mount annunciator/control panels and provide wiring to calling stations and dome lights.
- .5 Install wiring in conduit in accordance with the recommendations of the manufacturer.

- .6 Revise security door zoning to suite relocated devices to new doors and add new security door zoning for existing security zones at existing Nurse Station Nurse Call Annunciator.
- .7 Provide specified nurse call system components complete with required accessories
- .8 Include costs for and arrange for system manufacturers authorized representative to program system
- .9 Provide control stations in location as shown. Mount interface receptacle station flush mounted in wall near stations. Connect devices to control unit and floor control stations as required
- .10 Provide flush mounting nurse call stations in locations as detailed on drawings. Provide stations in headwall units. Coordinate required dimensions (supply samples of devices) with manufacturer of headwall units
- .11 Provide bed stations, staff stations and emergency stations where shown. Stations shall be flush wall mounting. Each station shall be complete with matching faceplates and a call cord for stations equipped with receptacle provisions
- .12 Provide surface mounted dome lights where shown and connect complete. Mount each light to a flush wall or ceiling standard outlet box as required and as indicated. . Activation of domelight and smoke detector shall be annunciated at control stations
- .13 Provide all required system wiring. Wiring shall be copper conductor, colour coded, and in accordance with the system manufacturer's recommendations and instructions. Install wiring in conduit and cable tray and connect equipment in accordance with the system manufacturer's certified wiring diagrams and instructions and under direct supervision of the manufacturer. Provide and arrange for authorized system manufacturer's representative to make all final equipment connections
- .14 Install all devices and perform all work in accordance with the manufacturer's instructions and requirements and in accordance to all applicable codes of the governing bodies having jurisdiction

End of Section

1 General

1.01 SECTION INCLUDES

- .1 Modifications to existing access control system, including provision of new hardware, software licences, etc. to make a complete and functional system.

1.02 RELATED REQUIREMENTS

- .1 Appendix E-1 Section 4.3.7

1.03 WARRANTY

- .1 All new material and equipment furnished under this section shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance.

2 Products

2.01 EXISTING SYSTEMS

- .1 Software House C-Cure 9000 (Former)
- .2 Existing Manufacturer Contact Information: (Jayson Warrilow, Securitas Technology, M: 647-236-1458)

3 Execution

3.01 INSTALLATION

- .1 Install new components in accordance with manufacturer's instructions.
- .2 Maintain operation of the existing system at all times.

End of Section

1 General

1.01 SECTION INCLUDES

- .1 Modifications to existing video surveillance, including provision of new hardware, software licences, etc. to make a complete and functional system.

1.02 RELATED REQUIREMENTS

- .1 Appendix E-1 – UHN Guidelines for Specifications – Electrical Systems

1.03 WARRANTY

- .1 All new material and equipment furnished under this section shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance.

2 Products

2.01 EXISTING SYSTEMS

- .1 The existing video management system (DVMS) shall be from Genetec. (Former)
- .2 Refer to Appendix E-1 section 4.3.8.5 for the design criteria for video surveillance system.
- .3 Existing Manufacturer Contact Information: (Jayson Warrilow, Securitas Technology, M: 647-236-1458)

3 Execution

3.01 INSTALLATION

- .1 Supply & Installation of CCTV hardware equipment and IP Cameras, as per vendors listed in the service master agreement of UHN. Install new components in accordance with manufacturer's instructions.
- .2 Maintain operation of the existing system at all times.

End of Section

1 General

1.01 SUMMARY

- .1 All equipment, material and installation to be in accordance with the latest edition of codes and standards (CEC, OBC, OESC, TIA/EIA-568-B/569-B/606-A, CSA T527 and BICSI TDMM).
- .2 Comply with following Owner's documents for design and construction references; confirm with the owner for any addenda versions. Wherever there is discrepancy between this specification and the following standards, the one with the stricter requirement applies.
 - .1 Appendix E-1 Section 4.2.16.6
- .3 Provided dedicated Security and CCTV drawings set for detail design, construction and As-Built/Record.

1.02 SECTION INCLUDES

- .1 Furnish and Install a complete and operable Electronic Personal Safety Duress Alarm System as shown on the drawings and herein after described. The system shall be capable of high quality, reliable, and satisfactory operation as herein described.
- .2 The system shall have the ability to integrate with a Pocket Paging and or Computer Report Management System.
- .3 Furnish and Install all required Data Network Interfaces, Personal Computers, Software, and Associated Accessories required for a complete and operable system as herein described.
- .4 One complete and operable system shall be provided and defined as all conduit, raceways, cables, back boxes, contacts, software, etc. to achieve a complete and functional system. Also included are all power supplies, hardware, and interfaces to equipment supplied by others. Documents do not show or list every item to be provided. When an item not shown or listed is clearly necessary for proper installation and operation of the equipment and systems, provide, install, and test/certify, the item at no increase in contract price.

1.03 RELATED REQUIREMENTS

- .1 Drawings and General Provisions of Contract including General and Supplemental Conditions and Division 01 Specification Section, apply to the work of this Section.
- .2 Section 27 05 00 – Common Work Results for Communications.

1.04 SYSTEM DESCRIPTION

- .1 The system shall provide concealed Duress Alarm Push Button located under the desk or counter as shown on the drawings to active an alarm condition.
- .2 Each button shall have a Call Assurance Light to let the person under Duress know that an alarm call has been placed.
- .3 Multiple pressing of the alarm button will not in any way change or cancel the alarm.
- .4 The Alarm shall light a light and activate a repeating tone in the security office. By pressing the button associated with the flashing light the security officer shall simultaneously silence the tone and change the alarm light to steady at both the annunciator and the button of origination Call Assurance light.
- .5 To clear the call and reset the system the button of origination shall be pressed while the light is in the on Steady condition.

1.05 REFERENCES

- .1 Published Codes, Standards, Tests, or Recommended Standards of the Trade, Industry, or Government Organizations apply to these sections include but are not limited to:
 - .1 NFPA - National Fire Protection Association
 - .2 NEC- National Electrical Code - NFPA 70
 - .3 UL - Underwriter's Laboratories, Inc.
 - .4 ADA – Americans with Disabilities Act
 - .5 EIA – Electronic Industry Association
 - .6 NEMA – National Electrical Manufacturers Association
 - .7 NSCA – Nation Systems Contractors Association – Best Practices
 - .8 ASCII – American Standard Code for Information Interchange
 - .9 ASTM - American Society for Testing and Materials

1.06 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 The systems shall be the product of a manufacturer or an agency experienced in such work. The authorized representative of the manufacturer or aforementioned agency shall make the installation and connections of all equipment and test of the operation of the system.
 - .2 All items of a given type shall be the product of the same manufacturer.
 - .3 All items shall be of the latest technology, no discontinued models or products are acceptable.
 - .4 Installers shall have a minimum of 5 years experience in the installation of similar systems on at least 10 projects of similar scope.
 - .5 The Manufacturer or the Authorized Representative shall provide proof that within 60 miles of the project they maintain:
 - .6 A full compliment of parts to support the installation.
 - .7 Offer service by fully trained and qualified technicians during normal working hours.
 - .8 Will supply parts and service without delay and at a reasonable cost.
- .2 Substitutions:
 - .1 All materials and equipment shall conform to these specifications. No substitute materials may be used unless previously accepted in writing by the Architect.
- .3 Regulatory Requirements:
 - .1 Comply with NEC as applicable to construction and installation of system components and wiring.
 - .2 Conform to NFPA 70

- .3 Conform to HIPAA regulations relating to paging and public address systems.
- .4 Systems must be inspected and receive accreditation from all agencies such as OSHPOD and JCAHO if mandated by the owner. Suppliers of all systems must include all documentation and staff to support the owner during these inspections and certifications.
- .4 Submittals
 - .1 Refer to Section General Conditions and Related Sections for full details of submittal requirements.
 - .2 Provide full service contact information including company name, address, contact name, and phone number of authorized representative. Provide written proof from the Manufacturer of major system components affirming that the representative is duly authorized and trained to supply, support, and service the equipment.
 - .3 Provide a complete list of all equipment to be furnished.
 - .4 Provide Product Data: For each equipment component shown on the riser and or wiring diagram.
 - .5 Provide complete written sequence of operation for all factions of all systems.
 - .6 Provide dimensioned detail drawings of all special assemblies including custom panels, mounting assemblies, and location.
 - .7 Provide System Riser Diagram including:
 - .1 Annunciator / Master Stations
 - .2 Corridor Lights
 - .3 Zone Lights
 - .4 Patient Stations
 - .5 Pull Stations
 - .6 Data Collection Modules
 - .7 Data Interface Modules
 - .8 Personal Computers
 - .9 Power Supplies
 - .8 Provide Wiring Details of all connections between all systems components.
 - .9 Manufacturer Instructions: Provide manufacturer's written installation instructions.
 - .10 Proposed training program, including name and qualification of trainer(s), schedule of training, curricula, and written training materials.
 - .11 Closeout Submittals
 - .1 Refer to Section General Conditions and Related Sections for full details of closeout requirements
 - .2 As-Built Drawings indicating actual location and connection of components.

- .3 Operation and maintenance manuals for each system and equipment component.
- .4 Executed warranty documentation.
- .5 Submit Low-Emitting Material Declaration Form, together with applicable supporting documentation listing VOC content for all paints, coatings, adhesives, and sealants applied on Site. Factory applied finishes do not need to be submitted.

1.07 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following regarding warranties and guarantees.
- .2 Extend the manufactures warranty to the owner. The owner understands that manufactures warranties will vary from manufacturer to manufacturer.
- .3 Provide one year of free maintenance on the system from date of substantial completion and the owner's first beneficial use of the system.

1.08 DELIVERY, STORAGE, AND HANDLING

- .1 Refer to Section General Conditions and Related Sections for full details.
- .2 Deliver materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Store materials as recommended by manufacturer.
- .4 During construction all products must be protected from dust, dirt, and construction foreign matter including dents, bumps, and scratches.

1.09 WARRANTY

- .1 Refer to Section General Conditions and Related Sections for full details.
- .2 The installing manufacturer's representative shall guarantee all labor, parts, and installation for a period of 1 year from substantial completion or first beneficial use of the system.
- .3 Provide manufacturer 2-year warranty for the intercommunication and program system.
- .4 Upon written notification of unacceptable work or warrantee request the installing manufacturer's representative shall provide qualified technicians and parts within 24 hours of notification.

2 Products

2.01 MANUFACTURERS

- .1 The following manufacturers are known to provide products that meet or exceed these specifications.
 - .1 "Existing Manufacturers Contact Information: (Jayson Warrilow, Securitas Technology M: 647-236-1458)

2.02 ELECTRONIC PERSONAL SAFETY DURESS ALARM SYSTEM

- .1 System Description:
 - .1 The Duress System shall be a distributed processing intelligent network consisting of a combination of Intelligent Substations having four push buttons inputs and four light outputs, Intelligent Corridor Lights having four lights, and Master Stations capable of displaying up to

eight Substations. The buttons/lights shall be provided with custom printed color labeling per the Architect's instruction and clear adhesive Lexan faceplates to easily identify functions or staff. Annunciator panels with surface mounted or exposed labeling will be totally unacceptable under these specifications. The system shall be expandable up to 512 Substations on a single system.

- .2 The system shall use RS485 digital communication between intelligent devices. All Substations shall have two sets of dipswitches that allow addressing of each unit. One set of dipswitches will assign a Substation to a Master and the second set selects the column of lights on the Master to represent the Substation. Any Substation status change shall be reflected in the Master lights and annunciated by a tone. Any Masters, Substations, or Corridor Lights with the same address setting shall be totally interactive. This interaction shall allow multi-point control for tailoring a system to meet special needs.
- .3 All user interfaces shall employ moisture and electrostatic resistance to provide reliable yet friendly operation.
- .4 Wiring for the Duress System shall consist of two twisted pair network wiring from one device to the next. Size and type of wire shall be as recommended by the manufacturer of the system. Systems, which require a home run to a central equipment location will be totally unacceptable under this specification.
- .5 The Electronic Personal Safety Duress Alarm System shall be by Securitas.

2.03 ELECTRONIC SAFETY DURESS ALARM SYSTEM

- .1 System Description:
 - .1 Wireless Pendant Solution with push activation by staff.
 - .2 Wired Solution to respective desk in discrete locations, accessible only to staff. Refer to electrical drawings for location and quantity of duress alarm, refer to architectural drawings with regards to the elevation and mounting height.
 - .3 The alarm monitoring or response station shall be located at security desk of as designated by UHN, installation contractor to coordinate with UHN Security.

2.04 EQUIPMENT

- .1 The Duress System Intelligent Control Interface Module shall be a standard four gang electrical box mounting device constructed of ABS plastic with a water resistant lexan face plate. A minimum of four columns of four buttons and four lights shall be provided to allow both input and output. An electronic tone shall sound at the Master each time a light changes status. The tone must have an installer removable jumper to permanently disable the electronic tone if so desired. Two four position dip switches set by the installer shall determine the Module address. The Module shall be an intelligent electronic device requiring no more than 264 mA at 12 Volts DC for full operation. The Intelligent Module shall employ EIA standard RS485 digital communication. The system shall operate on two twisted pair parallel wiring. Systems requiring more than two twisted pairs from one station to the next for full operation shall not be considered under this specification.
The Duress System Interface Module shall be a product by Securitas.
- .2 The Duress System Intelligent Interface Module shall be a surface-mounting device constructed of cold rolled steel with a removable cover plate. The Module shall not have any lights or buttons and shall include screw terminals on the rear for support of passive push buttons and lights. Each push button screw terminal shall have an associated "LED" screw terminal to support a remote signaling light. Two four-position dipswitches set by the installer shall determine the group and Master address. Any two Intelligent Modules having the same address must be totally interactive. Any system not capable of

installer programmable interaction of Modules shall not be considered under this specification. The Interface Module shall be an intelligent electronic device requiring no more than 60 mA at 12 Volts DC for full operation. The system shall operate on two twisted pair parallel wiring. Systems requiring more than two twisted pairs from one Module to the next for full operation shall not be considered under this specification. The 5250-DCS push button screw terminals shall operate as a multi-function momentary switch with the first push of each button changing the status from off to flashing, and after the master has acknowledged the call changing the light to steady the second push changing the output to off. Two software configurations are included with each unit. When the software select switch is in the down position, all inputs are set to normally open momentary contact monitoring. When the "S" switch is in the up position all inputs are set to normally closed contact monitoring.

The Duress System Intelligent Interface Modules shall be a product by Securitas.

- .3 The recessed Duress Alarm Push Button shall be a surface mounting device with integral acknowledge light. To prevent accidental false alarms, the button shall be recessed inside a durable plastic housing measuring no more than 1" high, 2" wide, and 2.3125" deep. The call acknowledge light shall be a wide angle super bright LED for long life reliable operation.
The Duress System Alarm Push Button shall be a product by Securitas.
- .4 The Duress System Wall Mount Help Button Station shall be a standard one gang electrical box mounting device constructed of ABS plastic with a water-resistant Lexan faceplate. A large 1.25-inch square red push button clearly labeled "HELP" shall be included with a call confirmation light to indicate that a call has been placed. The push button Station shall be a passive electronic device requiring no more than 2 mA at 12 Volts DC for full operation.
The Duress System Room Status Help Button Station shall be a product by Securitas.
- .5 The Duress System shall be supplied with a 12-Volt Direct Current power supply capable of powering all devices, as shown on plans, simultaneously with a minimum of 25% reserve power. The power supply shall be UL/CSA Listed for use with alarm and signaling systems. A surface mounting case shall be included to house the power supply. This unit shall operate from an input of 100 to 240 Volts AC and supply a minimum of 7.0 Amps at 12-Volts DC. The Duress System Power Supply shall be a product by Securitas.

2.05 ACCESSORIES

- .1 Wire and Cable
 - .1 System Network Wire shall be 18 AWG stranded twisted two pair cable with overall jacket. Wire twist shall be industry standard audio twist per foot or greater. Jacket material shall be compliant with NFPA and NEC codes for the type of location in which the cable is installed.
 - .2 All patch Cords shall be CAT6 type standard network patch cords.
 - .3 All Adapters, Plugs, and connectors shall be included as required.
- .2 Cable Management
 - .1 Cable management shall be as shown on the plans.
 - .2 Where not shown on the plans wire shall be open run through concealed spaces and dressed using tie-wraps and screw mount tie-wrap holders on all exposed open runs.
 - .3 In all cases wire routing and cable management shall be compliant with NEC and all Codes, Standards, and Best Practices applicable.

3 Execution

3.01 INSTALLATION

- .1 Provide duress alarms in the following locations:
 - .1 Duress alarms in reception area
 - .2 Duress alarms in all barrier free washrooms
 - .3 Duress alarms in fare-box audit room
 - .4 Duress alarms tie into intrusion detection system.
 - .5 Strobes and audible annunciators outside protected area/rooms
- .2 The Contractor shall furnish and install all interconnected cable, equipment, miscellaneous parts and accessories to make a complete and fully operational system as described herein and as shown on the drawings.
- .3 All cables shall be sized in accordance with manufactures recommended cabling requirements. All cable and wire shall be air plenum rated even if installed in conduit.
- .4 Equipment shall be installed and wired in accordance with accepted engineering and installation practices. Only the highest degree of workmanship will be accepted. Install in accordance with Electronic Systems Technician (EST) practices.
- .5 All cables shall be run continuously and no splicing may be made in any cable run.
- .6 Cable and wiring routed through inaccessible spaces or spaces where there is risk of damage to conductors shall be installed in conduit or raceways supplied by other sections of this specification.
- .7 All cable and wiring shall be run concealed in ceiling spaces or surface raceways, except for in wiring closets such as the Main Distribution Frame (MDF).
- .8 All cable and wiring shall be securely fastened to the permanent building structure. Cable and wire not installed in raceway shall be supported at regular intervals appropriate to the cable and wire size. Cable and wiring shall not lay loose on ceiling tiles or grids and shall not be suspended from or attached to existing conduit.
- .9 Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer have published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torque per NEC specification.
- .10 The following circuit types shall be installed in their own conduits:
 - .1 Microphone and control lines
 - .2 Control lines
 - .3 AC power lines
- .11 Provide a #6 AWG insulated copper ground wire from the main equipment to the building main ground bus.
- .12 Install in accordance with NFPA 70 and manufacturer recommended installation procedures.

3.02 FIELD QUALITY CONTROL

- .1 Cleaning
 - .1 Clean all devices, cabinets, and housings as recommended by electronic industry manufacturer.
- .2 Labeling
 - .1 All wiring and connections must be clearly labeled using industry standard permanent marking devices. Contractor shall identify and tag all cables with permanent type markers to denote locations served.
 - .2 All user interfaces must be clearly and permanently labeled for their intended use. All front panel controls used in the normal operation of the system shall be clearly labeled using plastic laminate engraved labels or approved equal. Labels shall be firmly affixed to the panel or device. Dymo or Kroy tape adhesive backed lettering is not acceptable. Each major system component shall be labeled as to function and area served.
- .3 Site Tests/Inspection
 - .1 Post Occupancy testing: Test inputs and outputs of all devices to verify compliance with functionality of designed system.
 - .2 Verify installed cable is free of opens grounds and shorts.
 - .3 Verify ventilation for equipment is adequate for installed units.

3.03 DEMONSTRATION

- .1 Provide instruction to the Owner or their appointed representative related to operation, maintenance and programming of all systems Training sessions shall be on-site, limited to 15 people maximum in any one session. Sessions shall last approximately one (1) hours each. In addition, Contractor shall provide a minimum of four (4) hours training for system administrator.
- .2 Follow-up training must be provided on all systems, one (1) week after cutover.
- .3 Provide demonstration and training by a staff member/trainer who is certified by the system manufacturer to provide training.

3.04 FINAL CHECKOUT AND ACCEPTANCE

- .1 The Contractor shall verify that the system is complete and fully operational before requesting final approval and before scheduling system demonstration.
- .2 This Contractor shall be available to demonstrate the operation and use of the system to the Architect/Engineer and to the Owner's representatives.
- .3 At the time of the demonstration, this Contractor shall furnish to the Owner one (1) complete record manuals.
- .4 Substantial Completion of the system will start the warranty period for both material and labor.

End of Section

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
LINE TYPES	
	NEW WORK
	WORK TO BE DEMOLISHED, OR REMOVED
	EXISTING MATERIAL/EQUIPMENT/SERVICES TO REMAIN
	FUTURE WORK (NOT IN SCOPE)
	EXTENTS OF FIRE ALARM ZONE, WET LOCATION, OR OTHER AREA AS NOTED ON PLANS
ABBREVIATIONS	
E	EXISTING TO REMAIN
R	EXISTING TO BE DEMOLISHED/REMOVED
ER	EXISTING IN RELOCATED POSITION
RR	REMOVE AND RELOCATE
C	CEILING MOUNTED CONNECTION
W	WALL MOUNTED CONNECTION
F	FLOOR MOUNTED CONNECTION
CL	CENTRE LINE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
O/C	OVER COUNTER
U/C	UNDER CABINET
U/F	UNDER RAISED FLOOR
CCT	CIRCUIT
CTE	CONNECT TO EXISTING
AFCI	ARC FAULT CIRCUIT INTERRUPTER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
IG	ISOLATED GROUND
TL	TWIST LOCK
TR	TAMPER RESISTANT
WG	WIRE GUARD
WP	WEATHER PROOF
EX	EXPLOSION PROOF
HZ	HAZARDOUS LOCATION
RI	ROUGH-IN ONLY
NIC	NOT IN CONTRACT
SIM	SIMILAR TO
Typ.	TYPICAL
ABBREVIATIONS - CODES AND STANDARDS	
OBC	ONTARIO BUILDING CODE
OESC	ONTARIO ELECTRICAL SAFETY CODE
OFC	ONTARIO FIRE CODE
ABBREVIATIONS - CEILING TYPES	
ACT	ACOUSTIC CEILING TILE (T-BAR)
EXP	EXPOSED CEILING
OWSJ	OPEN WEB STEEL JOISTS
PCC	PAINTED OR POPCORN CEILING ON EXPOSED CONCRETE
WD	WOOD CEILING
ANNOTATIONS	
CL	CLOSET
WR	WASHROOM
CONDUIT AND BOXES	
	CONDUIT WITH END BUSHING
	CONDUIT UP
	CONDUIT DOWN
	CONDUIT CONTINUES
	JUNCTION BOX
	PULL BOX
	HAND HOLE
CONNECTIONS TO EQUIPMENT	
DW	DISHWASHER
FR	FRIDGE
MW	MICROWAVE
HD	HAND DRYER, ALLOW UP TO 208V-1PH-20A
	1-PHASE DIRECT CONNECTION OUTLET AS NOTED.
	3-PHASE DIRECT CONNECTION OUTLET AS NOTED.
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	SYSTEM FURNITURE WALL FEED FOR POWER AND TELECOMMUNICATIONS UNLESS NOTED OTHERWISE. 'C' ADJACENT TO SYMBOL DENOTES CEILING FEED, 'F' ADJACENT TO SYMBOL DENOTES FLOOR FEED.
W	ADJACENT TO 3-PHASE DIRECT CONNECTION. DENOTES WALL SYSTEM FURNITURE FEED FOR POWER AND COMMUNICATIONS.
	CONNECTION TO SINGLE PHASE MOTOR, HP (KW) AS NOTED. PROVIDE LOCAL DISCONNECT.
	THREE PHASE MOTOR, HP (KW) AS NOTED. PROVIDE LOCAL DISCONNECT.
LIGHTING CONTROLS REFER TO SPECIFICATIONS AND RESPECTIVE SCHEDULES FOR EXACT REQUIREMENTS	
	SWITCH OR OTHER USER INTERFACE DEVICE AS DESCRIBED ON LIGHTING CONTROLS SCHEDULE.
	3-WAY SWITCH
DIM	ADJACENT TO SWITCH, DENOTES DIMMING SWITCH.
K	ADJACENT TO SWITCH, DENOTES KEY SWITCH.
T	ADJACENT TO SWITCH, DENOTES COUNTDOWN TIMER SWITCH
AT	ADJACENT TO SWITCH, DENOTES ASTRONOMICAL TIMER SWITCH
DS	ADJACENT TO SWITCH, DENOTES DOOR SWITCH
PIR	PASSIVE INFRARED SENSOR
DT	DUAL TECHNOLOGY SENSOR
UT	ULTRASONIC SENSOR
OS	SENSOR (TYPE UNKNOWN)
M	ADJACENT TO SWITCH, DENOTES MASTER CONTROL FOR ALL LUMINAIRES IN A ROOM OR SPACE, OR AS NOTED.
	WALL MOUNTED SWITCH/DUAL TECHNOLOGY VACANCY SENSOR. LINE VOLTAGE TO SUIT CONTROLLED CIRCUIT, OR AS NOTED.
	CEILING MOUNTED OCCUPANCY SENSOR. PIR DENOTES 'PASSIVE INFRARED', UT DENOTES 'ULTRASONIC' (OR MICROPHONIC), DT DENOTES 'DUAL TECHNOLOGY'. 'OS' DENOTES UNKNOWN TECHNOLOGY.
	WALL MOUNTED OCCUPANCY SENSOR.
DISTRIBUTION EQUIPMENT	
	TRANSFORMER, PLAN VIEW
	SURFACE MOUNTED LIGHTING AND RECEPTACLE PANELBOARD
	RECESSED RECEPTACLE AND LIGHTING PANELBOARD
	DISTRIBUTION PANELBOARD
	DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	CONTACTOR
	LOOSE STARTER, COORDINATE STARTING CHARACTERISTIC WITH EQUIPMENT REQUIREMENTS.
	COMBINATION STARTER.
VFD	ADJACENT TO STARTER, DENOTES VARIABLE FREQUENCY DRIVE
POWER RECEPTABLES AND BOXES	
	120V U-GROUND DUPLEX RECEPTACLE.
	120V U-GROUND DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER TOP OR AT HIGH LEVEL AS INSTRUCTED ON SITE / ARCHITECTURAL DRAWINGS.
	120V U-GROUND 20A DUPLEX RECEPTACLE.
	120V U-GROUND 20A DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER TOP OR AS INSTRUCTED ON SITE.
	120V U-GROUND DUPLEX RECEPTACLE - AUTOMATICALLY CONTROLLED (ASHRAE 90.1-2013, 8.4.2).
	120V U-GROUND DUPLEX RECEPTACLE - HALF OF RECEPTACLE AUTOMATICALLY CONTROLLED (ASHRAE 90.1-2013, 8.4.2).
	MANUALLY CONTROLLED SPLIT RECEPTACLE
	120V U-GROUND QUAD RECEPTACLE.
	INDICATES RECEPTACLE COMPLETE WITH ONE TYPE A AND ONE TYPE C USB CHARGING PORTS.
	14-30R RECEPTACLE FOR LAUNDRY DRYER, OR OTHER RECEPTACLE AS NOTED
	14-50R RECEPTACLE FOR ELECTRONIC RANGE, OR OTHER RECEPTACLE AS NOTED. PROVIDE 40A/2P BREAKER TO SUIT...
	SPECIAL RECEPTACLE. VERIFY OUTLET REQUIREMENTS PRIOR TO ROUGH-IN.
	SPECIAL RECEPTACLE. VERIFY OUTLET REQUIREMENTS PRIOR TO ROUGH-IN.
	FLOOR RECEPTACLE OR RECEPTACLE IN FLOOR BOX (POWER ONLY)
	SERVICE POLE. PROVIDE POWER TO JUNCTION BOX IN CEILING SPACE ABOVE. DEVICES ON POLE AS NOTED ON PLANS.
FB1	ADJACENT TO FLOOR RECEPTACLE, DENOTES FLOOR BOX TYPE
HDMI	HDMI OUTLET
.	ADJACENT TO DEVICE, DENOTES DEVICE CONNECTED TO EMERGENCY POWER
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
VIDEO SURVEILLANCE	
	CCTV CAMERA
C/P	CCTV CAMERA, CEILING OR POLE MOUNTED
	CCTV CAMERA, WALL MOUNTED
PTZ	PAN-TILT-ZOOM
LIGHTING FIXTURES SYMBOLS IN ACCORDANCE WITH IES DG-3-00 AND IES HB-10-11 WHERE NOT DETAILED OTHERWISE HERE. REFER TO LIGHTING FIXTURE SCHEDULE FOR FURTHER DETAILS AND EXACT FIXTURE REQUIREMENTS.	
	LINEAR LUMINAIRE, SURFACE MOUNTED TO CEILING
	LINEAR LUMINAIRE, RECESSED IN CEILING
	LINEAR LUMINAIRE, SUSPENDED, PENDANT, CHAIN, STEM, OR AIRCRAFT CABLE HUNG TO SUIT APPLICATION, OR AS NOTED IN SCHEDULE. 'X', WHEN USED DENOTES POWER FEED LOCATION.
	LINEAR LUMINAIRE, WALL MOUNTED
	AS ABOVE, CONNECTED TO EMERGENCY OR NIGHT LIGHTING CIRCUIT AS INDICATED.
	ROUND OR SQUARE DOWNLIGHT, RECESSED
	RECESSED DOWNLIGHTS, CONNECTED TO EMERGENCY OR NIGHT LIGHT CIRCUIT
	ROUND SUSPENDED LUMINAIRE
	WALL SCONCE OR OTHER WALL MOUNTED LUMINAIRE.
	CONNECTED TO EMERGENCY CIRCUIT. PROVIDE CUL 924 LISTED SHUNT TRIP RELAY OR EQUAL TO PERMIT CONTROL OF LUMINAIRE WITH ZONING BASED ON LOCAL LIGHTING CONTROLS.
NL	LUMINAIRE CONNECTED TO NON-EMERGENCY NIGHT LIGHT CIRCUIT (24 HOUR)
A, B, Z1, Z2, ETC.	DENOTES ZONING/CIRCUITING ASSIGNMENTS FOR LUMINAIRES AND CONTROLS IN THE SAME SPACE.
EMERGENCY LIGHTING REFER TO EMERGENCY LIGHTING SCHEDULE FOR EXACT FIXTURE REQUIREMENTS.	
	CEILING OR WALL MOUNTED ILLUMINATED EXIT SIGN. SHADED AREA INDICATES ILLUMINATED FACE. PROVIDE DIRECTIONAL ARROWS AS INDICATED ON PLANS.
	CEILING OR WALL MOUNTED ILLUMINATED EXIT SIGN. SHADED AREA INDICATES ILLUMINATED FACE. PROVIDE DIRECTIONAL ARROWS AS INDICATED ON PLANS.
SL	DENOTES 'SELF-LUMINOUS' EXIT SIGN
PL	PHOTOLUMINOUS EXIT SIGN
	EMERGENCY LIGHTING BATTERY UNIT, WITH AND WITHOUT HEADS.
	ONE AND TWO HEAD WALL MOUNTED EMERGENCY LIGHTING REMOTE UNITS.
	ONE AND TWO HEAD CEILING MOUNTED EMERGENCY LIGHTING REMOTE UNITS.
	RECESSED EMERGENCY REMOTE HEAD.
EM	DENOTES 'EMERGENCY'
CCT	CORRELATED COLOUR TEMPERATURE
CRI	COLOUR RENDERING INDEX
TELECOMMUNICATIONS	
	SYSTEM FURNITURE FEED.
W	ADJACENT TO SYSTEM FURNITURE FEED, DENOTES WALL SYSTEM FURNITURE FEED FOR COMMUNICATIONS.
F	ADJACENT TO SYSTEM FURNITURE FEED, DENOTES FLOOR SYSTEM FURNITURE FEED FOR COMMUNICATIONS.
C	ADJACENT TO SYSTEM FURNITURE FEED, DENOTES CEILING SYSTEM FURNITURE FEED FOR COMMUNICATIONS (SERVICE POLE OR DROP CORD AS NOTED).
CABLE TRAY (LADDER TYPE)	
CABLE TRAY (BASKET TYPE)	
	WALL MOUNTED DATA (D) OR VOICE (V) OUTLET. PROVIDE 1V AND 10 UNLESS NOTED OTHERWISE.
	WALL MOUNTED TELEPHONE (TELEPHONE) OUTLET. PROVIDE 1V UNLESS NOTED OTHERWISE.
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	
PANEL DESIGNATION	
PANEL DESIGNATION: 10VELP01	
FLOOR LEVEL	
PANEL DESIGNATION	
LR	NORMAL LIGHTING AND RECEPTACLE BRANCH CIRCUIT PANEL
LP	NORMAL LIGHTING BRANCH CIRCUIT PANEL
RP	NORMAL RECEPTACLE BRANCH CIRCUIT PANEL
VELR	VITAL SYSTEM LIGHTING & RECEPTACLE BRANCH CIRCUIT PANEL
DP	DISTRIBUTION PANEL
VER	VITAL SYSTEM RECEPTACLE BRANCH CIRCUIT PANEL
ERP	DELAY-VITAL SYSTEM RECEPTACLE BRANCH CIRCUIT PANEL/ EMERGENCY RECEPTACLE PANEL
ATS	AUTOMATIC TRANSFER SWITCH

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	WALL MOUNTED DATA OUTLET. PROVIDE 1D UNLESS NOTED OTHERWISE.
	WALL MOUNTED TELEVISION OUTLET.
	VOICE, DATA, OR TV OUTLET AS DESCRIBED ABOVE, MOUNTED ABOVE COUNTER TOP OR AS INSTRUCTED ON SITE.
HDMI	HDMI OUTLET.
AV	AUDIO VIDEO GANG, AS NOTED.
WIFI	WIRELESS ACCESS POINT (WIFI)
	AUDIO VISUAL SYSTEM SPEAKER, CEILING MOUNTED.
	AUDIO VISUAL SYSTEM SPEAKER, WALL MOUNTED.
	PUBLIC ADDRESS SYSTEM SPEAKER, CEILING MOUNTED.
	PUBLIC ADDRESS SYSTEM SPEAKER, WALL MOUNTED.
	PUBLIC ADDRESS SPEAKER, WALL MOUNTED HORN SPEAKER.
PS	PUBLIC ADDRESS SYSTEM HANDSET
ASCP	PUBLIC ADDRESS SYSTEM ADMIN CONTROL CONSOLE
	PUBLIC ADDRESS SPEAKER VOLUME CONTROL SWITCH.
INT	INTERCOM
IDC	INSULATION DISPLACEMENT CONNECTION
	CLOCK
	GPS CLOCK SYSTEM MASTER TRANSMITTER
	GPS CLOCK SYSTEM GPS RECEIVER
	GPS CLOCK SYSTEM SATELLITE TRANSMITTER (RECEIVER)
	GPS CLOCK SYSTEM RECEIVER SWITCH
ACCESS CONTROL AND DOOR HARDWARE	
CRD	CARD READER
DLR	DOOR ALARM SOUNDER
DCR	DOOR CONTACT
ODCC	OVERHEAD DOOR CONTACT
ELC	ELECTRIC LATCH
EST	ELECTRIC STRIKE
EPFC	ELECTRIC POWER TRANSFER CABLE
PHH	POWER TRANSFER HINGE
KS	KEY SWITCH
ELM	ELECTROMAGNETIC LOCK
MLR	MOTORIZED LATCH RETRACTION. PROVIDE 120 V.
RES	REQUEST TO EXIT SENSOR
MHR	MUSHROOM HEAD BUTTON FOR 'REQUEST TO EXIT' MAGLOCK RELEASE, OR OTHER PUSH BUTTON AS INDICATED.
RF	BARRIER FREE DOOR OPERATOR PUSH BUTTON
WTS	TOUCHLESS 'WAVE SWITCH' FOR DOOR OPERATOR CONTROL
DB	DOOR BELL C/W SOUNDER AND STROBE
DB	DOOR BELL
DURESS SYSTEM	
DB	DURESS BUTTON (MOUNTED ON UNDERSIDE OF TABLETOP)
DB-W	WALL MOUNTED DURESS BUTTON WITH POLYCARBONATE ANTI-TAMPER COVER
DB-L	DURESS SYSTEM STROBE LIGHT
CACF	CENTRAL ALARM AND CONTROL FACILITY
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FAAG	FIRE ALARM ACTIVE ANNUNCIATOR C/W GRAPHIC
FAPG	FIRE ALARM PASSIVE GRAPHIC
DGP	DATA GATHERING PANEL
FAZ	FIRE ALARM ZONE
FSZ	FIRE ALARM SUPERVISORY ZONE
FDSPCP	FIRE DETECTION, SUPPRESSION, AND PRE-ACTION CONTROL PANEL
FDSCP	FIRE DETECTION AND SUPPRESSION CONTROL PANEL
	FIRE ALARM PANEL, (FACP, FAAP, FAMP) AS DENOTED ON PLANS
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	
NURSE CALL SYSTEM	
NSR	NURSE CALL STAFF REGISTER
NSR-E	NURSE CALL EQUIPMENT AND AREA CONTROL UNITS
NSR-B	NURSE CALL CODE BLUE STATION
NSR-W	NURSE CALL CODE WHITE STATION
NSR-P	NURSE CALL CODE PINK STATION
	NURSE CALL VIOLENT SITUATION WIRELESS (CODE WHITE) INFRARED RECEIVED, CEILING MOUNTED. 'RX' WHERE SHOWN DENOTES RADIO FREQUENCY RECEIVER.
	PATIENT WANDERING
	INFANT PROTECTION
	TELEMETRY ANTENNA
NA	NARCOTICS ALARM LIGHT
NA	NARCOTICS CABINET ALARM ANNUNCIATOR 'DS' WHERE SHOWN INDICATES DOOR SWITCH
L	'LASER IN USE' LIGHTING FIXTURE - WALL MOUNTED
L	'LASER IN USE' LIGHTING FIXTURE - CEILING MOUNTED
XR	'X-RAY IN USE' LIGHTING FIXTURE - WALL MOUNTED
XR	'X-RAY IN USE' LIGHTING FIXTURE - WALL MOUNTED
DETAIL REFERENCES	
	SHEET KEYNOTE
	REVISION NUMBER
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
FIRE DETECTION - INITIATION DEVICES	
	MANUAL PULL STATION (MPS)
LX	WHERE NOTED ADJACENT TO MANUAL PULL STATIONS, DENOTES PULL STATION C/W POLYCARBONATE (LEXAN) COVER.
WG	WHERE NOTED ADJACENT TO MANUAL PULL STATIONS, DENOTES PULL STATION C/W WIRE GUARD COVER.
A	WHERE NOTED ADJACENT TO MANUAL PULL STATIONS, SMOKE DETECTOR, DENOTES DEVICES C/W AUXILIARY CONTACT.
	PHOTOELECTRIC SMOKE DETECTOR
	SAME AS ABOVE, WALL MOUNTED
SA	WHEN ADJACENT TO PHOTOELECTRIC SMOKE DETECTOR, INDICATES RESIDENTIAL SMOKE ALARM
	RESIDENTIAL SMOKE ALARM, 120 VOLT, COMPLETE WITH STROBE. FOR AREAS AS INDICATED ON PLANS BY 'CO', PROVIDE INTEGRAL CARBON MONOXIDE DETECTION.
	SAME AS ABOVE, WALL MOUNTED
	DUCT MOUNTED SMOKE DETECTOR
CO	CARBON MONOXIDE DETECTOR
VESDA	VERY EARLY SMOKE DETECTING APPARATUS
BSOT	BEAM SMOKE DETECTOR TRANSMITTER
BSDR	BEAM SMOKE DETECTOR RECEIVER (OR REFLECTOR)
ASD	ASPIRATING SMOKE DETECTOR
ESCA	END OF LINE (EOL) DEVICE ON ZONE INITIATION OR SIGNAL CIRCUITS
	HEAT DETECTOR - FIXED TEMPERATURE
	ADJACENT TO HEAT DETECTOR, DENOTES 'HIGH TEMPERATURE'
	HEAT DETECTOR - 94 DEGREES C (200 DEGREES F) FIXED TEMPERATURE
	HEAT DETECTOR - 58 DEGREES C (135 DEGREES F) FIXED TEMPERATURE AND RATE OF RISE
	LINEAR HEAT DETECTION CABLE
FS	WATER - FLOW SWITCH
FIRE DETECTION AND ALARM - SUPERVISORY DEVICES	
LT	LOW TANK LEVEL
LO	LOSS OF POWER
LT	LOW TEMPERATURE
PS	PRESSURE SWITCH
SV	SUPERVISED VALVE
MDM	ADDRESSABLE MONITOR DEVICE
FIRE DETECTION AND ALARM - SIGNALLING DEVICES	
	FIRE ALARM BELL, WALL MOUNTED.
	ADJACENT TO BELL OR HORN, DENOTES CEILING MOUNTED.
	FIRE ALARM HORN
	ADJACENT TO FIRE ALARM HORN, DENOTES 'MINI' HORN
	FIRE ALARM HORN/STROBE, WALL MOUNTED.
	FIRE ALARM EVACUATION SPEAKER, CEILING MOUNTED
	FIRE ALARM EVACUATION SPEAKER, COMPLETE WITH STROBE LIGHT, CEILING MOUNTED
	FIRE ALARM EVACUATION SPEAKER, WALL MOUNTED
	FIRE ALARM EVACUATION SPEAKER COMPLETE WITH STROBE LIGHT, WALL MOUNTED
SS	SILENCE SWITCH
	FIRE ALARM WALL MOUNTED STROBE LIGHT
FIRE DETECTION AND ALARM - VOICE COMMUNICATION DEVICES	
FF	EMERGENCY TELEPHONE FOR FIREFIGHTERS USE
FIRE DETECTION AND ALARM - OTHER DEVICES	
END	END OF LINE DEVICE
WG	WIRE GUARD
ES	'DO NOT ENTER' SIGN
ES	KEY SWITCH FOR FIREFIGHTER CONTROL OF ELEVATOR RECALL, OR AS NOTED
IM	ISOLATOR MODULE
OR	OUTPUT RELAY, FUNCTION AS INDICATED
CM	CONTROL MODULE
MD	MONITOR MODULE
MD	MAGNETIC DOOR HOLDER AND RELEASING DEVICE ('HOLD OPEN')
	FIRE SUPPRESSION RELEASING STATION
	FIRE SUPPRESSION ABORT STATION
SINGLE LINE DIAGRAM	
	AIR CIRCUIT BREAKER
	MOLDED CASE CIRCUIT BREAKER
	DISCONNECT (UNFUSED)
	FUSE
	METERING CABINET
	TRANSFORMER
	BUS DUCT
THIS LEGEND IS GENERIC. ALL SYMBOLS LISTED MAY NOT BE APPLICABLE FOR THIS PROJECT. REFER TO FLOOR PLANS TO DETERMINE USED DEVICES AND EQUIPMENT.	

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	GENERATOR
	AUTOMATIC TRANSFER SWITCH
	AUTOMATIC TRANSFER SWITCH COMPLETE WITH SINGLE SIDED BYPASS ISOLATION
	AUTOMATIC TRANSFER SWITCH COMPLETE WITH SINGLE SIDED BYPASS ISOLATION
ATS	AUTOMATIC TRANSFER SWITCH
C	CONTACTOR
DP	DISTRIBUTION PANELBOARD
LP	LIGHTING PANELBOARD
MCB	MOBILE CONNECTION BOX
MCC	MOTOR CONTROL CENTRE
MTS	MANUAL TRANSFER SWITCH
RP	RECEPTACLE PANELBOARD
SPD	SURGE PROTECTIVE DEVICE
STS	STATIC TRANSFER SWITCH
SWBD	SWITCHBOARD
TX	TRANSFORMER
UPS	UNINTERRUPTIBLE POWER SUPPLY
HEALTHCARE POWER SYMBOLS	
	CEILING COLUMN TYPE ISOLATED POWER CENTRE WITH MECHANICAL AND ELEC. SERVICES 'A' DENOTES TYPE AS SCHEDULED ON DRAWINGS OR SPECIFICATIONS.
	LINE ISOLATION MONITORING FOR ISOLATED POWER CENTRES
	SLAVE MODULE FOR ISOLATED POWER CENTRES, TYPES AS SCHEDULED ON DRAWINGS.
	REMOTE ALARM PANEL FOR ADJACENT ISOLATED POWER CENTRE.
	CENTRALLY LOCATED REMOTE ALARM STATION FOR ISOLATED POWER CENTRES, SEE SCHEDULE.
	GROUND JACK TO FOR ISOLATED POWER SYSTEM
	DOUBLE GROUND JACK FOR ISOLATED POWER SYSTEM
	THE PATIENT ROOMS ARE CLASSIFIED AS 'INTERMEDIATE CARE AREAS' PER CSA-Z32 AND ACCORDINGLY WILL REQUIRE HOSPITAL GRADE RECEPTACLES IN THESE SPACES.
	MEDICAL GAS ALARM PANEL
	MEDICAL GAS CONTROL PANEL
	MEDICAL SERVICE COLUMN FOR PATIENT BEDHEAD ARRANGEMENT. 'A' DENOTES TYPE AS SCHEDULED ON THE DRAWINGS OR SPECIFICATIONS.

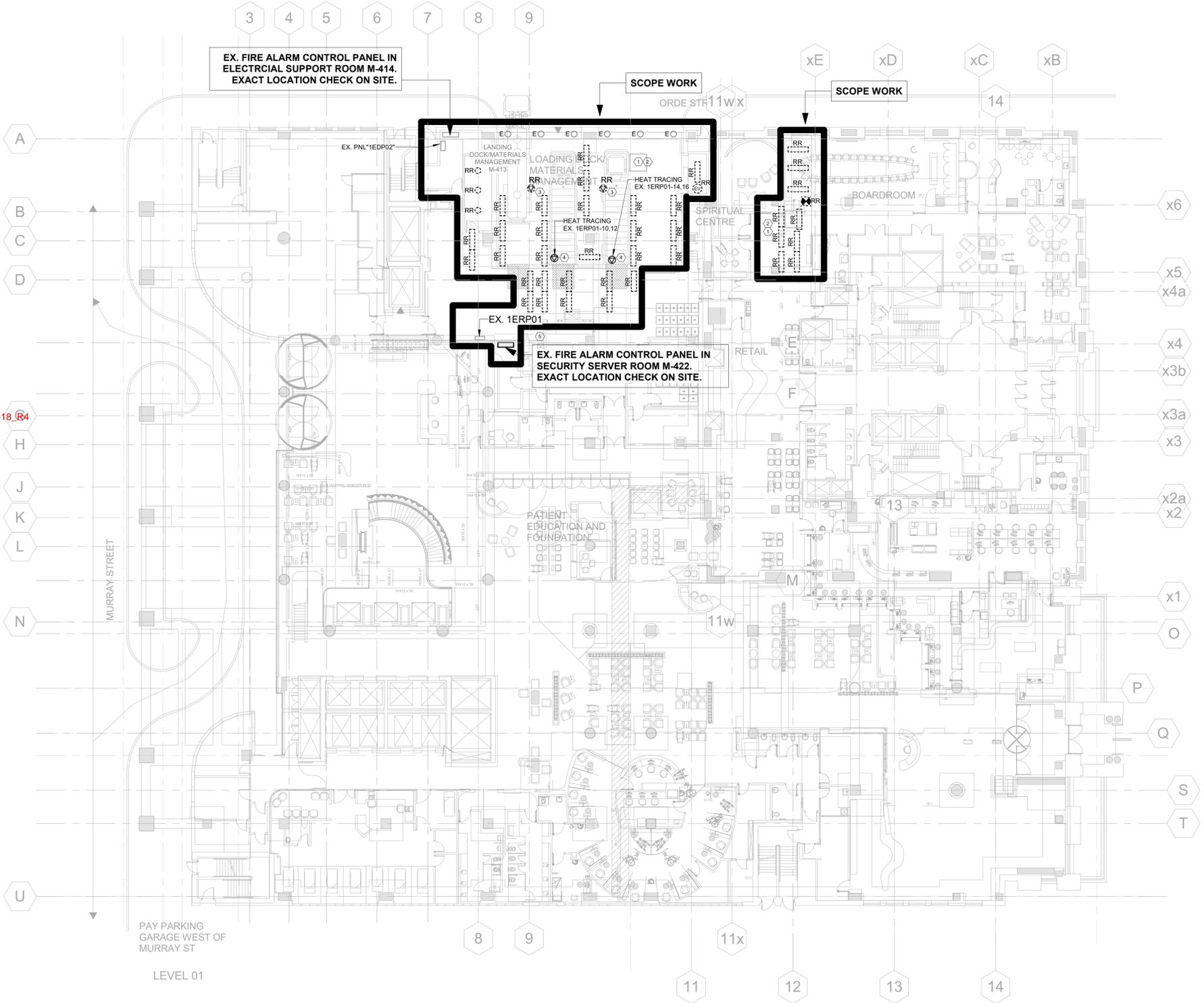
SHEET KEYNOTES	
1	REMOVE, RELOCATE AND CONNECT COMPLETE ALL CEILING DEVICES IN DENOTED AREAS TO ALLOW FOR MECHANICAL REWORK TO TAKE PLACE IN THE CEILING SPACE ABOVE. RE-VERIFICATION OF THE FIRE ALARM SYSTEM WILL BE REQUIRED. CONTRACTOR TO CONFIRM EXACT LOCATIONS AND QUANTITIES OF ALL CEILING DEVICES PRIOR TO TENDER CLOSE. CONTRACTOR TO INCLUDE FOR ADDITIONAL VISITS WITH THE UNDERSTANDING THAT DEMOLITION AND NEW WORK MAY NOT BE COMPLETED ON THE SAME DAY. ALL WORK SHALL BE COMPLETED AFTER HOURS TO ALLOW FOR NORMAL OPERATIONS TO CONTINUE DURING HOSPITAL OPERATING HOURS. REFER TO ARCHITECTURAL AND PLUMBING PLANS FOR ADDITIONAL INFORMATION.
2	ELECTRICAL CONTRACTOR TO PRICE FOR UP TO 5% ADDITIONAL DEVICES THAT MAY NOT BE CAPTURED IN PLAN DUE TO EXISTING SITE CONDITIONS.
3	REMOVE THE EXISTING JUNCTION BOX FOR EXISTING HEAT TRACING CONTROLLER. WIRING BACK TO SOURCE. GFI BREAKER FOR THE EXISTING HEAT TRACING SET TO "SPARE". UPDATE PANEL DIRECTORY AFTER COMPLETE.
4	PROVIDE NEW JUNCTION BOX FOR NEW HEAT TRACING CONTROLLER. PROVIDE 30A/2P GFI BREAKER IN EXISTING PANEL 1ERP01 AND WIRING FOR THE HEAT TRACING CONTROLLER. COORDINATE THE JUNCTION BOX WITH MECHANICAL ON SITE. CHECK EXISTING PANEL SPACE AND PANEL CAPACITY PRIOR TO INSTALLED. THE 30A/2P GFI BREAKER KIA RATING TO MATCH EXISTING PANEL KIA RATING.
5	UPDATE EXISTING FIRE ALARM PANEL TO SUIT NEW FIRE ALARM CIRCUITS PROVIDED. PROVIDE NEW SUB FIRE ALARM PANEL IF EXISTING PANEL SPACES ARE NOT ENOUGH.

KEY PLAN ELECTRICAL DEMO & NEW SHEET GENERAL NOTES

1	REMOVE, RELOCATE AND CONNECT COMPLETE ALL CEILING DEVICES IN DENOTED AREAS TO ALLOW FOR MECHANICAL REWORK TO TAKE PLACE IN THE CEILING SPACE ABOVE. RE-VERIFICATION OF THE FIRE ALARM SYSTEM WILL BE REQUIRED. CONTRACTOR TO CONFIRM EXACT LOCATIONS AND QUANTITIES OF ALL CEILING DEVICES PRIOR TO TENDER CLOSE. CONTRACTOR TO INCLUDE FOR ADDITIONAL VISITS WITH THE UNDERSTANDING THAT DEMOLITION AND NEW WORK MAY NOT BE COMPLETED ON THE SAME DAY. ALL WORK SHALL BE COMPLETED AFTER HOURS TO ALLOW FOR NORMAL OPERATIONS TO CONTINUE DURING HOSPITAL OPERATING HOURS. REFER TO ARCHITECTURAL AND PLUMBING PLANS FOR ADDITIONAL INFORMATION.
2	ELECTRICAL CONTRACTOR TO PRICE FOR UP TO 5% ADDITIONAL DEVICES THAT MAY NOT BE CAPTURED IN PLAN DUE TO EXISTING SITE CONDITIONS.
3	COORDINATE AND REFER TO ARCHITECTURAL CONSTRUCTION CONTROL PLANS (G501) AND G502 FOR AREA OF CEILING WORKING THAT EFFECT CEILING MOUNTED POWER DEVICES, FIRE ALARM DEVICES, LOW VOLTAGE SYSTEM DEVICES AND LIGHTING FIXTURES. VERIFY THESE ITEMS' QUANTITY AND LOCATION PRIOR TO REMOVING. RECORDING THESE ITEMS' LOCATION FOR REINSTALLED BACK AFTER THE CEILING BACK.

9	ISSUED FOR ADDENDUM E-3	2024-09-19
8	ISSUED FOR ADDENDUM E-2	2024-09-11
7	ISSUED FOR ADDENDUM E-1	2024-09-05
6	ISSUED FOR TENDER	2024-08-14
5	ISSUED FOR BUILDING PERMIT	2023-12-19
4	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
3	ISSUED FOR 95% CD SUBMISSION	2023-09-06
2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

Rev. Description Date



1 ELECTRICAL - 1ST FLOOR DEMOLITION & NEW WORK PLAN
SCALE 1: 200

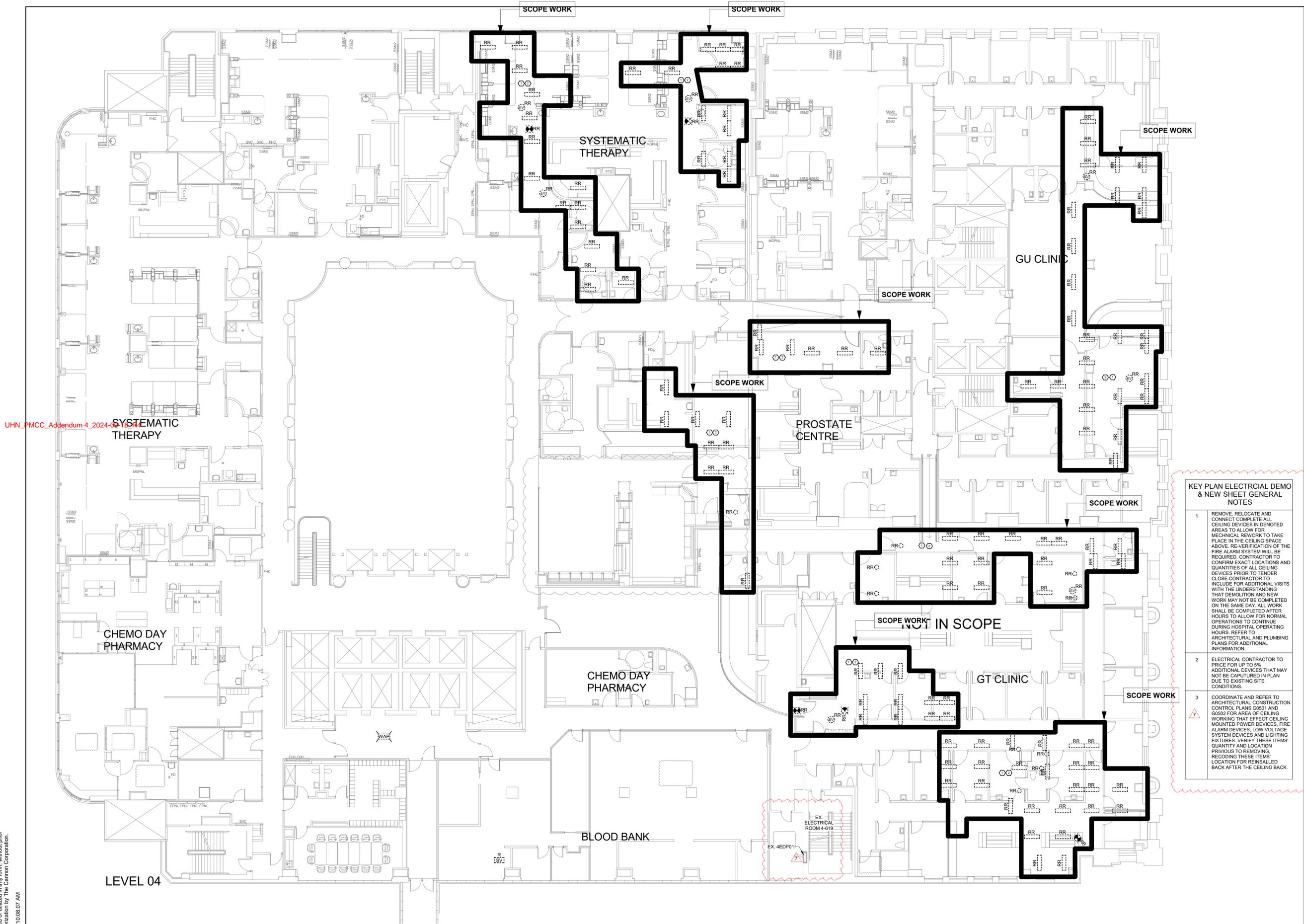
Drawing Title:

**ELECTRICAL - 1ST FLOOR
DEMOLITION & NEW
WORK PLAN (MH)**

As indicated

Project No.: 0020711.00 Checked by: JG

E0101



KEY PLAN ELECTRICAL DEMO & NEW SHEET GENERAL NOTES

- 1 REMOVE, RELOCATE AND CONNECT COMPLETE ALL CEILING DEVICES IN DENOTED AREAS TO ALLOW FOR MECHANICAL REWORK TO TAKE PLACE IN THE CEILING SPACE ABOVE. RE-VERIFICATION OF THE FIRE ALARM SYSTEM WILL BE REQUIRED. CONTRACTOR TO CONFIRM EXACT LOCATIONS AND QUANTITIES OF ALL CEILING DEVICES PRIOR TO TENDER CLOSE. CONTRACTOR TO INCLUDE FOR ADDITIONAL VISITS WITH THE UNDERSTANDING THAT DEMOLITION AND NEW WORK MAY NOT BE COMPLETED ON THE SAME DAY. ALL WORK SHALL BE COMPLETED AFTER HOURS TO ALLOW FOR NORMAL OPERATIONS TO CONTINUE DURING HOSPITAL OPERATING HOURS. REFER TO ARCHITECTURAL AND PLUMBING PLANS FOR ADDITIONAL INFORMATION.
- 2 ELECTRICAL CONTRACTOR TO PRICE FOR UP TO 5% ADDITIONAL DEVICES THAT MAY NOT BE CAPTURED IN PLAN DUE TO EXISTING SITE CONDITIONS.
- 3 COORDINATE AND REFER TO ARCHITECTURAL CONSTRUCTION CONTROL PLANS G0501 AND G0502 FOR AREA OF CEILING WORKING THAT EFFECT CEILING MOUNTED POWER DEVICES, FIRE ALARM DEVICES, LOW VOLTAGE SYSTEM DEVICES AND LIGHTING FIXTURES. VERIFY THESE ITEMS' QUANTITY AND LOCATION PRIOR TO REMOVING. RECORDING THESE ITEMS' LOCATION FOR REINSTALLED BACK AFTER THE CEILING BACK.

Rev.	Description	Date
7	ISSUED FOR ADDENDUM E-3	2024-09-19
6	ISSUED FOR TENDER	2024-08-14
5	ISSUED FOR BUILDING PERMIT	2023-12-19
4	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
3	ISSUED FOR 95% CD SUBMISSION	2023-09-06
2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

Drawing Title:

ELECTRICAL - 4TH FLOOR DEMOLITION & NEW WORK PLAN (MHDU)
As indicated

Project No.: 0020711.00 Checked by: JG

E0104

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LEVEL 04

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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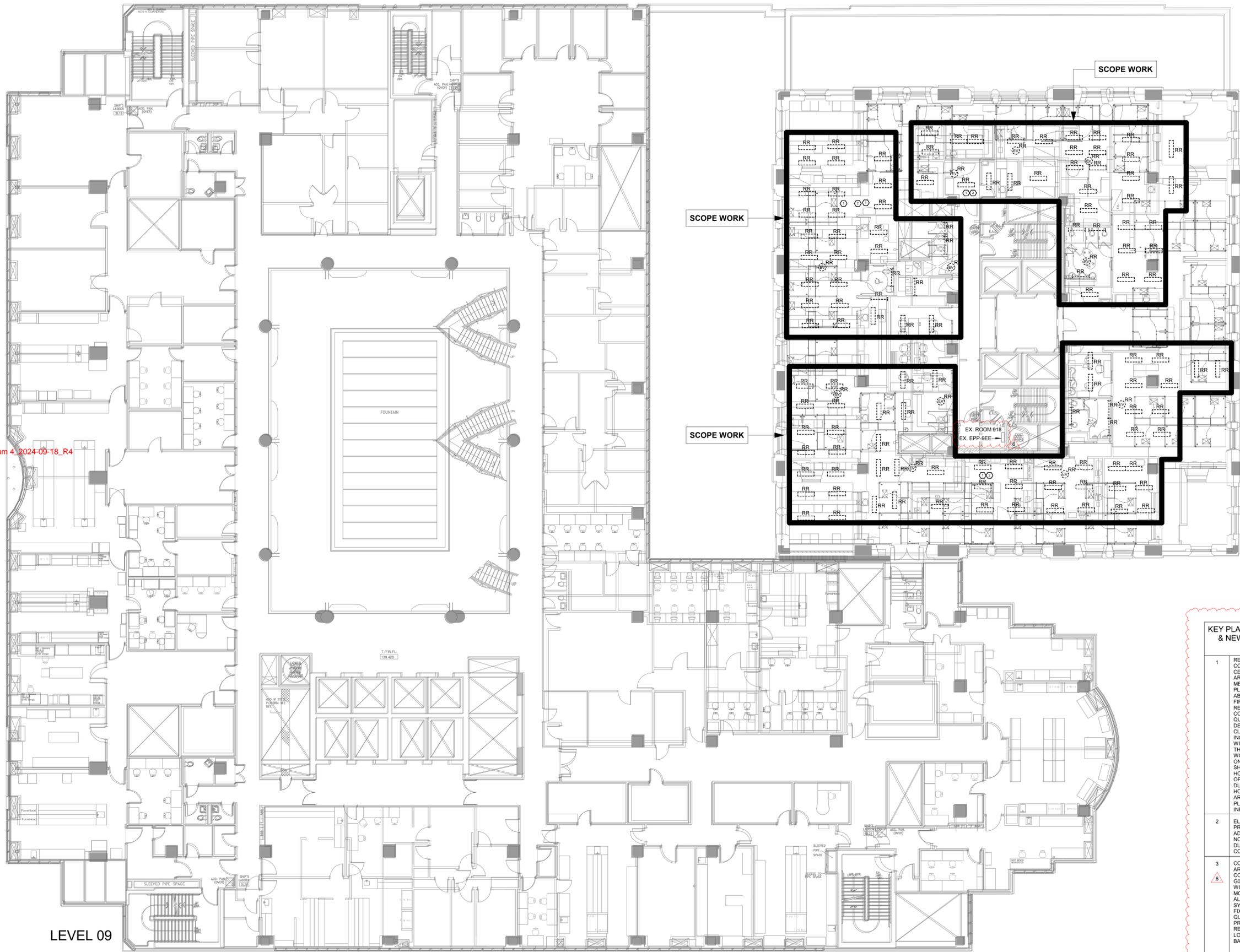
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UHN_PMCC_Addendum 4_2024-09-18_R4



KEY PLAN ELECTRICAL DEMO & NEW SHEET GENERAL NOTES

- REMOVE, RELOCATE AND CONNECT COMPLETE ALL CEILING DEVICES IN DEMOTED AREAS TO ALLOW FOR MECHANICAL REWORK TO TAKE PLACE IN THE CEILING SPACE ABOVE. RE-VERIFICATION OF THE FIRE ALARM SYSTEM WILL BE REQUIRED. CONTRACTOR TO CONFIRM EXACT LOCATIONS AND QUANTITIES OF ALL CEILING DEVICES PRIOR TO TENDER. CLOSE CONTRACTOR TO INCLUDE FOR ADDITIONAL VISITS WITH THE UNDERSTANDING THAT DEMOLITION AND NEW WORK MAY NOT BE COMPLETED ON THE SAME DAY. ALL WORK SHALL BE COMPLETED AFTER HOURS TO ALLOW FOR NORMAL OPERATIONS TO CONTINUE DURING HOSPITAL OPERATING HOURS. REFER TO ARCHITECTURAL AND PLUMBING PLANS FOR ADDITIONAL INFORMATION.
- ELECTRICAL CONTRACTOR TO PRICE FOR UP TO 5% ADDITIONAL DEVICES THAT MAY NOT BE CAPTURED IN PLAN DUE TO EXISTING SITE CONDITIONS.
- COORDINATE AND REFER TO ARCHITECTURAL CONSTRUCTION CONTROL PLANS G501 AND G502 FOR AREA OF CEILING WORKING THAT EFFECT CEILING MOUNTED POWER DEVICES, FIRE ALARM DEVICES, LOW VOLTAGE SYSTEM DEVICES AND LIGHTING FIXTURES. VERIFY THESE ITEMS' QUANTITY AND LOCATION PRIOR TO REMOVING. RECORDING THESE ITEMS' LOCATION FOR REINSTALLED BACK AFTER THE CEILING BACK.

Rev.	Description	Date
6	ISSUED FOR ADDENDUM E-3	2024-09-19
5	ISSUED FOR TENDER	2024-08-14
4	ISSUED FOR BUILDING PERMIT	2023-12-19
3	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
2	ISSUED FOR 95% CD SUBMISSION	2023-09-06
1	ISSUED FOR 90% CD SUBMISSION	2023-07-31

Rev. Description Date

Drawing Title:

ELECTRICAL - 9TH FLOOR DEMOLITION & NEW WORK PLAN (DSC)

As indicated

Project No.: 0020711.00 Checked by: JG

E0109

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1 ELECTRICAL - 9TH FLOOR DEMOLITION & NEW WORK PLAN
SCALE 1: 200

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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**POWER AND SYSTEMS DEMOLITION PLAN
GENERAL NOTES:**

- ALL EQUIPMENT AND DEVICES ON THIS DRAWING ARE EXISTING TO BE DISCONNECTED AND REMOVED OR RELOCATED UNLESS DENOTED WITH AN 'E' OR OTHERWISE DENOTED AS EXISTING TO REMAIN. CUT BACK AND REMOVE CONDUIT AND WIRING BACK TO SOURCE PANEL. DEVICES/EQUIPMENT DENOTED WITH AN 'E' ARE EXISTING TO REMAIN. ELECTRICAL CONTRACTOR TO NOTE THAT NOT ALL DEVICES ARE SHOWN. ELECTRICAL CONTRACTOR TO SITE VERIFY EXACT QUANTITY OF DEVICES TO BE DEMOLISHED DURING TENDER PHASE SITE WALK-THROUGH.
- FOLLOWING DEMOLITION AND REMOVAL OF EXISTING CEILINGS, THE CONTRACTOR SHALL REMOVE ALL EXISTING REDUNDANT AND UN-USED LINE VOLTAGE AND LOW VOLTAGE WIRING. EXISTING WIRING THAT IS REQUIRED TO REMAIN IN OPERATION SHALL BE PROPERLY FASTENED/SUSPENDED FROM THE CEILING. ANY EXISTING JUNCTION BOXES WITHOUT COVERS SHALL BE PROVIDED WITH SUITABLE COVERPLATES.
- ENSURE THAT ALL ELECTRICAL LIFE SAFETY SERVICES AND SERVICES FOR EXISTING EQUIPMENT THAT ARE REQUIRED TO REMAIN IN SERVICE SHALL BE PROTECTED.
- ALL EXISTING ELECTRICAL EQUIPMENT WHICH IS NO LONGER REQUIRED SHALL BE REMOVED AND DISPOSED OF OFF SITE UNLESS OTHERWISE NOTED. BE RESPONSIBLE AND PAY FOR ANY DAMAGE TO THE BUILDING INCURRED BY WORK OF THIS CONTRACTOR OR REPAIR TO THE SATISFACTION OF THE OWNER AND CONSULTANT.
- CARRY OUT THE WORK WITH A MINIMUM OF NOISE, DUST AND DISTURBANCE.
- WHERE EQUIPMENT OR DEVICES ARE REMOVED CUT BACK AND REMOVE CONDUIT AND WIRING BACK TO SOURCE PANEL.
- REFER TO NEW PLAN FOR NEW LOCATION OF RELOCATED EQUIPMENT AND DEVICES.
- WHERE REMOVED EQUIPMENT AFFECTS THE OPERATION OF EXISTING EQUIPMENT TO REMAIN THE CONTRACTOR SHALL REPLACE/MAKE GOOD BRANCH WIRING AS REQUIRED TO ENSURE CONTINUITY OF OPERATION OF REMAINING EQUIPMENT.
- THE CONTRACTOR SHALL BE AWARE THAT NOT ALL EXISTING EQUIPMENT AND DEVICES REQUIRED TO BE REMOVED ARE NECESSARILY INDICATED ON THIS PLAN. THE CONTRACTOR SHALL STILL BE RESPONSIBLE FOR REMOVING ALL SUCH EQUIPMENT AS REQUIRED TO FACILITATE THE COMPLETE DEMOLITION.
- REMOVE ALL EXISTING REDUNDANT BX WIRING AND CONDUITS IN CEILING SPACE. VERIFY EXACT EXTENT ON SITE.
- ELECTRICAL CONTRACTOR TO ENGAGE THE BASE BUILDING FIRE ALARM CONTRACTOR FOR ANY FIRE ALARM WORK WITHIN THE SCOPE OF THIS PROJECT.
- EXISTING LUMINAIRES WITHIN AREA OF DEMOLITION TO BE REMOVED AND DISCARDED. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING LAYOUT. EXACT QUANTITY TO BE CONFIRMED ON SITE BY CONTRACTOR.
- RETURN ALL REMOVED DEVICE AND LIGHT FIXTURES TO HOSPITAL FACILITIES. IF THE HOSPITAL DOES NOT WANT THE DEVICES TO BE RETURNED, THEN THE CONTRACTOR SHALL INCLUDE FOR PROPER DISPOSAL.
- ENSURE CIRCUIT INTEGRITY FOR ALL BRANCH CIRCUITS SERVING AREAS OUTSIDE OF SCOPE OF WORK. TRANSFER CIRCUITS TO NEW PANELS WITHIN SCOPE AS REQUIRED.
- ELECTRICAL CONTRACTOR TO PRICE FOR ADDITIONAL DEMOLITION OF UP TO 5% OF DEVICE THAT MAY NOT HAVE BEEN SHOWN FOR BOTH LIGHTING, POWER AND SYSTEMS, DUE TO EXISTING SITE CONDITIONS. REFER TO ARCHITECTURAL PHASING FOR DEMOLITION SCHEDULE.

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4	ISSUED FOR 95% CD SUBMISSION	2023-09-06
3	ISSUED FOR 90% CD SUBMISSION	2023-07-31
2	ISSUED FOR 50% CD SUBMISSION	2023-05-08
1	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13

Rev. Description Date

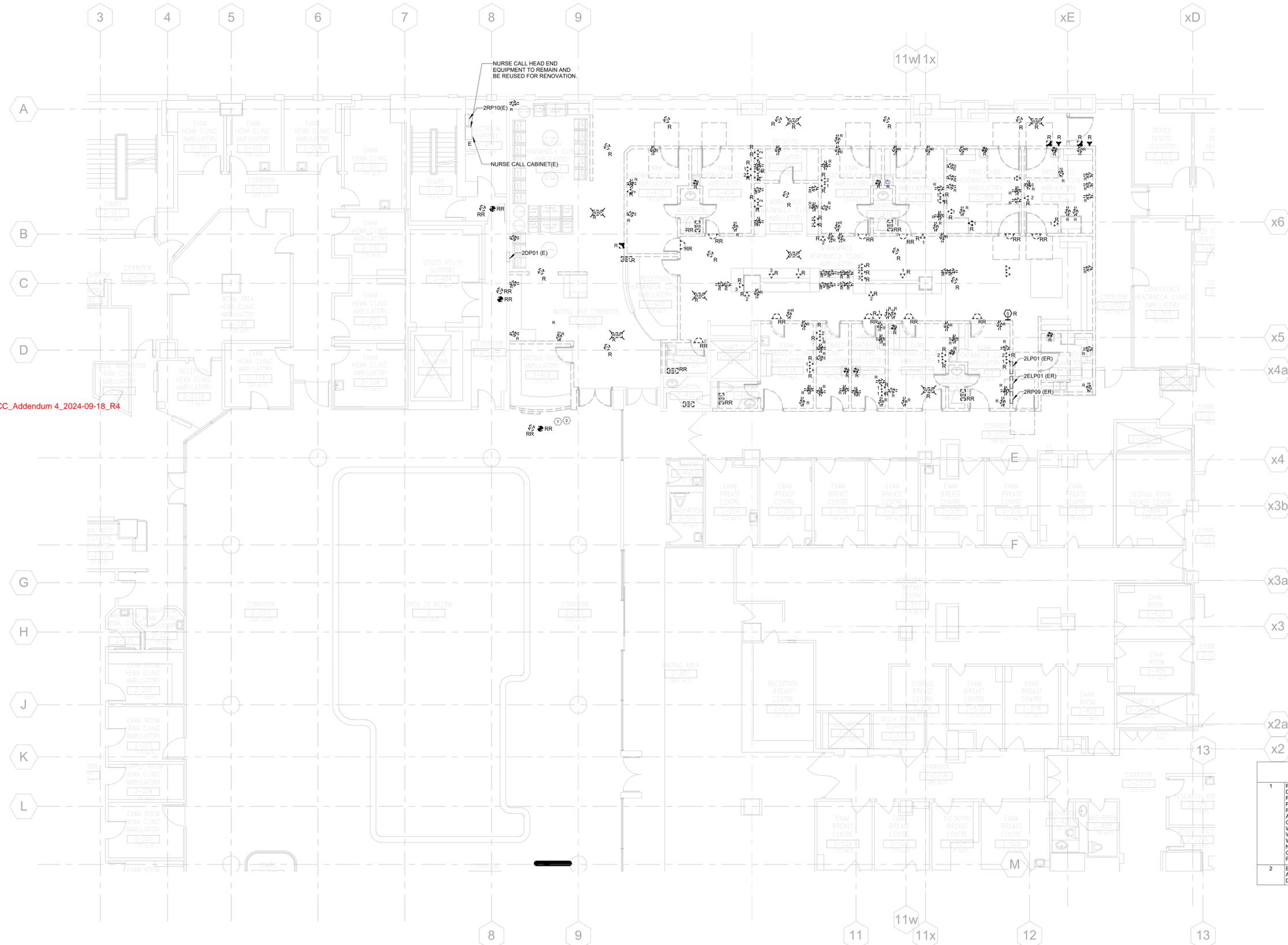
Drawing Title:

**POWER & SYSTEMS -
DEMO WORK -LEVEL 02A
PLAN (MH)**

As indicated

Project No.: 0020711.00 Checked by: JG

E1102



SHEET KEYNOTES

1	REMOVE, RELOCATE AND CONNECT COMPLETE ALL CEILING DEVICES IN DENOTED AREAS TO ALLOW FOR MECHANICAL REWORK TO TAKE PLACE IN THE CEILING SPACE ABOVE. RE-VERIFICATION OF THE FIRE ALARM SYSTEM WILL BE REQUIRED. CONTRACTOR TO CONFIRM EXACT LOCATIONS AND QUANTITIES OF ALL CEILING DEVICES PRIOR TO TENDER CLOSE. CONTRACTOR TO INCLUDE FOR ADDITIONAL VISITS WITH THE UNDERSTANDING THAT DEMOLITION AND NEW WORK MAY NOT BE COMPLETED ON THE SAME DAY. ALL WORK SHALL BE COMPLETED AFTER HOURS TO ALLOW FOR NORMAL OPERATIONS TO CONTINUE DURING HOSPITAL OPERATING HOURS. REFER TO ARCHITECTURAL AND PLUMBING PLANS FOR ADDITIONAL INFORMATION.
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UHN_PMCC_Addendum 4_2024-09-18_R4

POWER AND SYSTEMS PLAN - DEMO WORK - LEVEL 02A (MH)
SCALE: 1 : 100

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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POWER AND SYSTEMS DEMOLITION PLAN
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SHEET KEYNOTES

- REMOVE POWER CONNECTION FOR EXISTING MECHANICAL EQUIPMENT IN CEILING. WIRING BACK TO SOURCE. THE BREAKER FOR THE MECHANICAL EQUIPMENT SET TO "SPARE" IF IT IS DEDICATED CIRCUIT FOR THE MECHANICAL EQUIPMENT AFTER COMPLETION. UPDATE PANEL DIRECTORY ACCORDINGLY.
- NEW JUNCTION BOX TO EXTEND EMERGENCY POWER TO NEW FUTURE VITAL SYSTEM PANEL 5VRRP01.

Rev.	Description	Date
8	ISSUED FOR ADDENDUM E-3	2024-09-19
7	ISSUED FOR ADDENDUM E-1	2024-09-05
6	ISSUED FOR TENDER	2024-08-14
5	ISSUED FOR BUILDING PERMIT SUBMISSION	2023-12-19
4	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
3	ISSUED FOR 95% CD SUBMISSION	2023-09-06
2	ISSUED FOR 90% CD SUBMISSION	2023-07-31
1	ISSUED FOR 50% CD SUBMISSION	2023-05-08

Rev. Description Date

Drawing Title:

**POWER & SYSTEMS-
DEMO WORK LVL5A
MHDU**

As indicated

Project No.: 0020711.00 Checked by: JG

E1105A

UHN_PMCC_Addendum 4_2024-09-18_R4

POWER AND SYSTEMS PLAN - DEMO WORK - LEVEL 05A (MHDU)

SCALE: 1 : 100

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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Rev. Description Date

Drawing Title:

**POWER & SYSTEMS -
DEMO WORK - LEVEL 5B
PLAN (MHDU)**
As indicated

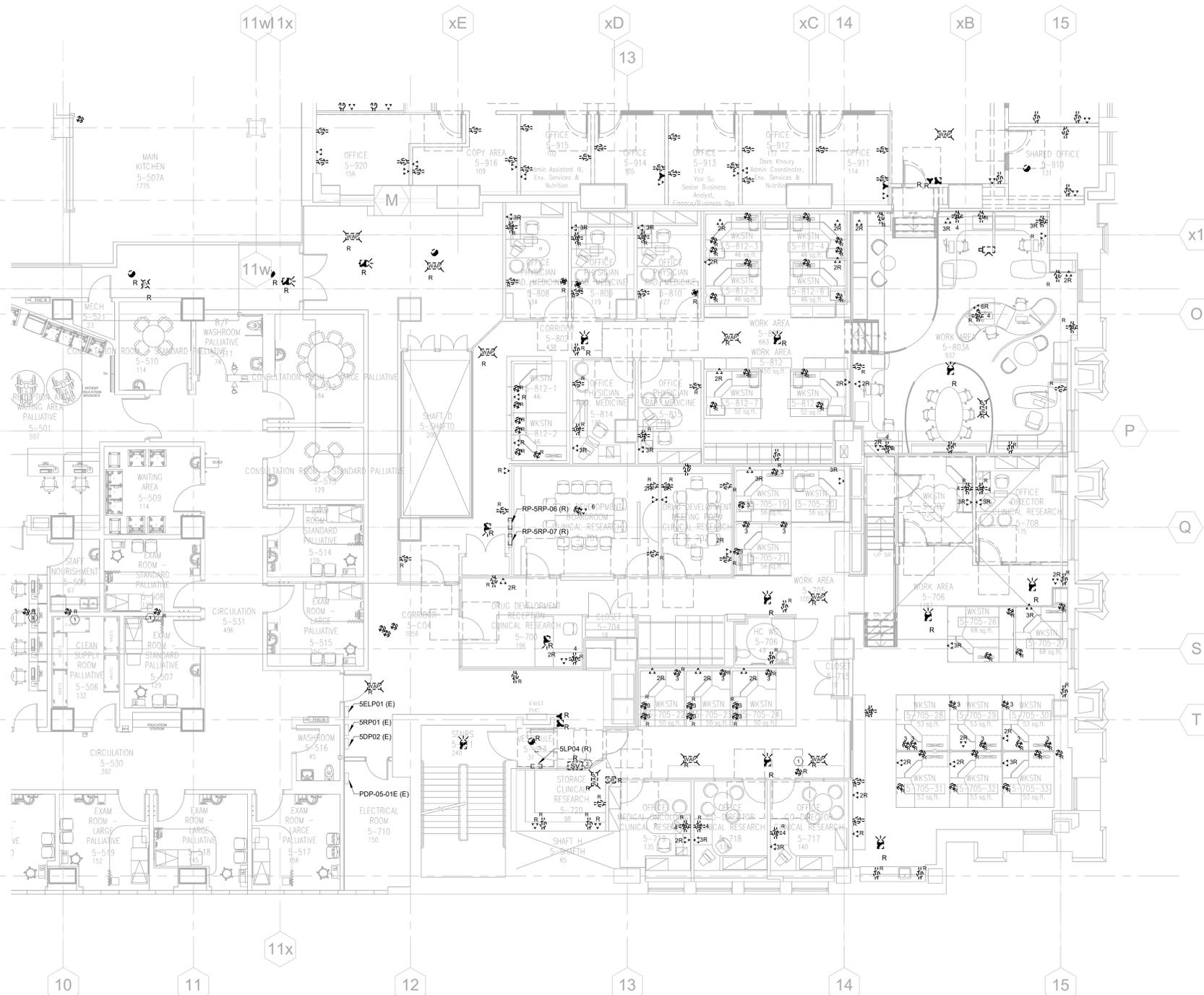
Project No.: 0020711.00 Checked by: JG

E1105B

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- DISCONNECT THE EXISTING SUPERVIDED VALVE FROM EXISTING FIRE ALARM SYSTEM AND MAKE EXISTING FIRE ALARM CONTINUE WORKING DURING DEMOLITION PHASE. RECONNECT NEW SUPERVIDED VALVE TO EXISTING FIRE ALARM SYSTEM.

- POWER AND SYSTEMS DEMOLITION PLAN
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1 POWER AND SYSTEMS PLAN - DEMO WORK - LEVEL 05B (MHDU)
SCALE: 1 : 100

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Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
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Rev. Description Date

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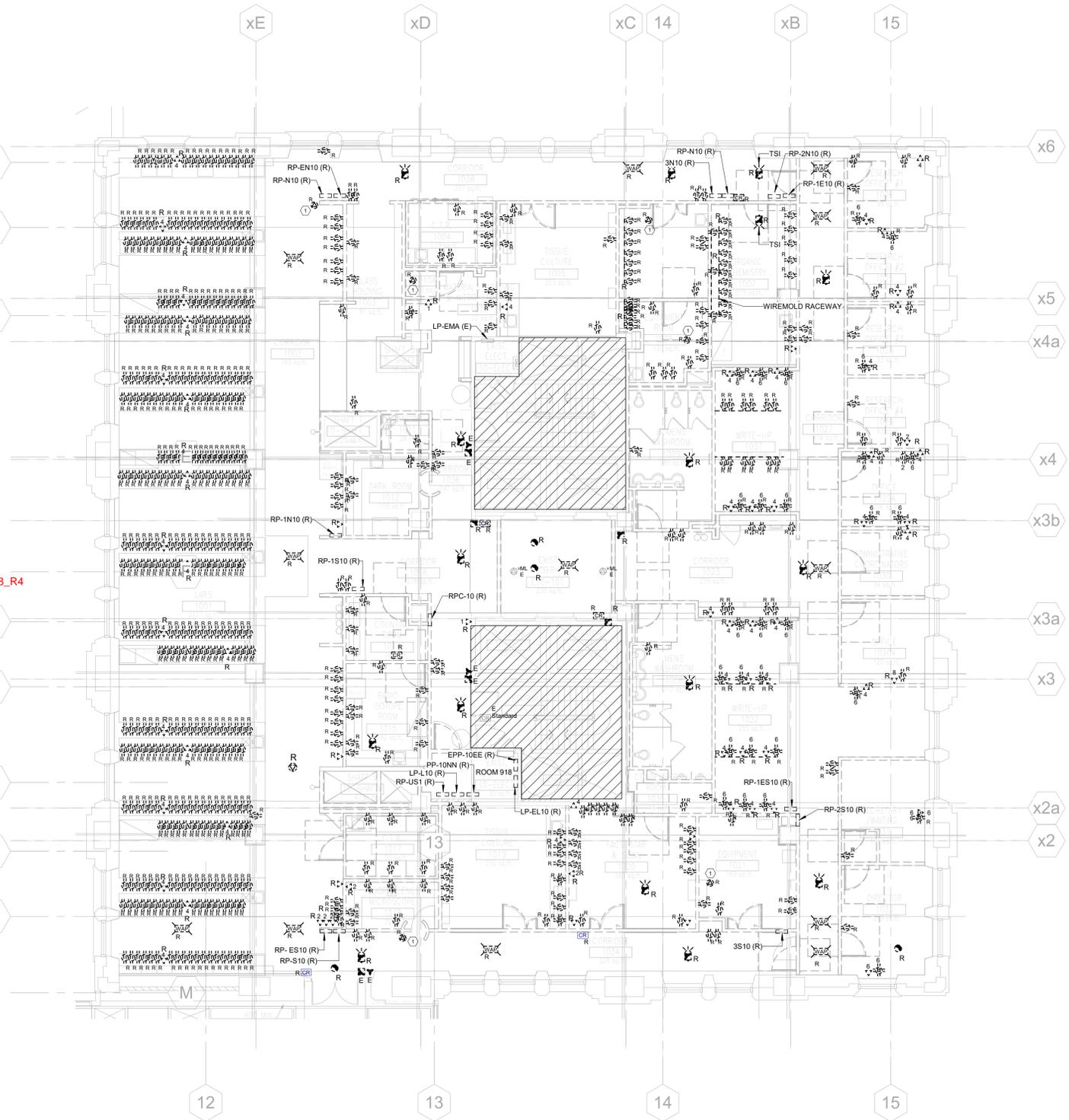
**POWER & SYSTEMS -
DEMO WORK -LEVEL 10
PLAN (DSC)**

As indicated

Project No.: 0020711.00 Checked by: JG

E1110

UHN_PMCC_Addendum 4_2024-09-18_R4



SHEET KEYNOTES	
1	REMOVE POWER CONNECTION FOR EXISTING MECHANICAL EQUIPMENT IN CEILING. WIRING BACK TO SOURCE.

1 POWER AND SYSTEMS PLAN - DEMO WORK - LEVEL 10 (DSC)
SCALE: 1 : 100

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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**POWER AND SYSTEMS NEW PLAN GENERAL
NOTES:**

1. COMPLY WITH THE ONTARIO ELECTRICAL SAFETY CODE, CSA-232 AND THE ONTARIO BUILDING CODE. SUBMIT FINAL INSPECTION CERTIFICATE UPON COMPLETION OF WORK TO OWNER.
2. ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL AND EQUIPMENT VENDOR DRAWINGS. SUBSEQUENTLY ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL SUB-TRADES AND EQUIPMENT VENDORS.
3. PROVIDE LAMACOID IDENTIFICATION NAMEPLATES FOR ALL EQUIPMENT, FEEDERS, DISCONNECTS, LIGHT SWITCHES AND HOSPITAL GRADE RECEPTACLES.
4. ALL ELECTRICAL SERVICES SHALL COMPLY WITH CSA-232 STANDARDS. ALL RECEPTACLES ARE CRITICAL CARE AND REQUIRES THIRD PARTY TESTING.
5. ELECTRICAL EQUIPMENT REMOVED MUST BE ISOLATED AND DISCONNECTED AT THE SOURCE PRIOR TO REMOVAL OPERATIONS. DURING ISOLATION AND DISCONNECTION PROCEDURES DANGER TAGS MUST BE USED TO IDENTIFY ANY FEEDERS OR EQUIPMENT REMAINING ENERGIZED TO ACCOMMODATE NEW CONSTRUCTION. UPDATE THE WRITTEN PANEL BOARD DIRECTORIES TO REFLECT 'SPARES' FOR CIRCUITS BEING DEMOLISHED.
6. OBTAIN PERMISSION FOR OUTGAGES FROM THE CLIENT'S REPRESENTATIVE AT LEAST 14 DAYS PRIOR TO THE OUTAGE. IN ACCORDANCE WITH THE PROCESS OF THE FACILITY MANAGER, COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF EQUIPMENT AND RECEPTACLES WITH OWNER ON SITE TO SUIT FINAL PLACEMENT OF EQUIPMENT. FAILURE TO DO SO MAY REQUIRE THE DEVICES TO BE RELOCATED AT THE COST OF THE ELECTRICAL CONTRACTOR.
7. ALL DEVICES COVER PLATES TO BE ANTIMICROBIAL. RECEPTACLE COVER PLATES TO BE STAINLESS STEEL. RECEPTACLE FOR PATIENT BED ON EMERGENCY POWER TO BE RED OR MATCH EXISTING BUILDING.
8. ALL CONDUITS IN EXPOSED CEILING AREAS SHALL BE RUN TIGHT TO THE UNDERSIDE OF THE SLAB ABOVE AND ABOVE EXISTING AND NEW HVAC DUCTWORK. ALLOW FOR LB CONNECTORS AS REQUIRED TO SUIT STRUCTURAL BEAMS. DO NOT RUN CONDUIT MID-SPAN.
9. UPDATE PANEL SCHEDULE ACCORDINGLY AFTER CONSTRUCTION COMPLETED.
10. ONCE THE NEW FIRE ALARM DEVICES ARE INSTALLED, TESTED, AND VERIFIED, REMOVE FIRE ALARM DEVICES CW RELATED WIRES AND CONDUITS IN THE RENOVATION AREAS.
11. POSITIVE PRESSURE ISOLATION ROOM PATIENT BED AREA TO BE CLASSIFIED AS CRITICAL CARE AREA.
12. NOTE NURSE CIRCUIT NUMBERING IS FOR GROUPING PURPOSES ONLY. CONTRACTOR TO CONFIRM EXACT CIRCUITING ON SITE AND PRIOR TO TENDER.
13. CONTRACTOR TO TEST AND VERIFY ALL RELOCATED FIRE ALARM DEVICES IN ACCORDANCE OF THE LATEST ULCS-5537.
14. MAINTAIN CIRCUIT CONTINUITY FOR EXISTING DEVICES TO REMAIN THAT MAY BE AFFECTED BY THE DEMOLITION OF OTHER DEVICES OR FIXTURES FOR PLUG-IN EQUIPMENT CONFIRM EXACT CSA CONFIGURATION OF REQUIRED RECEPTACLE PRIOR TO PURCHASE AND INSTALLATION.
15. THE ELECTRICAL CONTRACTOR SHALL PROVIDE 15A, 120V JUNCTION BOX OUTLETS MOUNTED IN CEILING SPACE FOR USE BY MECHANICAL CONTROLS CONTRACTOR FOR CONTROLS POWER. THE LOCATIONS SHALL BE AS INDICATED ON THIS DRAWING. ALL LOAD SIDE 120V WIRING FROM THIS BOX TO CONTROLS TRANSFORMER AND TERMINATIONS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR.
16. CONFIRM EXACT LOCATION OF ALL MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR PRIOR TO ROUTING IN ELECTRICAL SERVICES. STARTER LOAD SIDE WIRING SHALL BE SAME AS LINE SIDE WIRING.
17. ALL CONDUITS IN EXPOSED CEILING AREAS SHALL BE RUN TIGHT TO THE UNDERSIDE OF THE SLAB ABOVE AND ABOVE EXISTING AND NEW HVAC DUCTWORK. ALLOW FOR LB CONNECTORS AS REQUIRED TO SUIT STRUCTURAL BEAMS. DO NOT RUN CONDUIT MID-SPAN.
18. MAINTAIN CIRCUIT CONTINUITY FOR EXISTING DEVICES TO REMAIN THAT MAY BE AFFECTED BY THE DEMOLITION OF OTHER DEVICES OR FIXTURES. PROVIDE ONE (1) CAT6A JACK AND CABLE TO ALL SECURITY CAMERA LOCATIONS. CABLING TO HOMERUN TO THE PRIMARY LAN ROOM (ELECTRICAL ROOM XX).
19. PROVIDE ONE (1) CAT6A JACK AND CABLE TO ALL TV LOCATIONS. CABLING TO HOMERUN TO THE PRIMARY LAN ROOM (ELECTRICAL ROOM XX-XXX).
20. ALL OTHER OUTLETS SHALL HAVE TWO (2) CAT6A JACKS (AS INDICATED ON DRAWING).
21. IN CORRIDORS CAT6A CABLING SHALL BE INSTALLED IN XXX CABLE TRAY OR NEW J-HOOKS. IF CABLE TRAY IS USED, THE FILL RATE SHALL NOT EXCEED 40%. IF NEW J-HOOKS ARE INSTALLED, EACH J-HOOK SHALL NOT HOLD MORE THAN 25 CAT6A CABLES.
22. ALL EV SPEAKERS IN PATIENT WASHROOMS SHALL BE WATERPROOF TYPE.
23. PROVIDE HDMI CABLE FOR MAXIMUM 30FT LENGTH. CONFIRM EXACT RUN LENGTH ON-SITE AND IF LENGTH EXCEEDS 30FT, PROVIDE CAT6A CABLE FROM HDMI BEDSITE OUTLET TO HDMI OUTLET BEHIND TV. EXTENDERS BY UHN.

Rev.	Description	Date
9	ISSUED FOR ADDENDUM E-3	2024-09-19
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
5	ISSUED FOR 95% CD SUBMISSION	2023-09-06
4	ISSUED FOR 90% CD SUBMISSION	2023-07-31
3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

Rev. Description Date

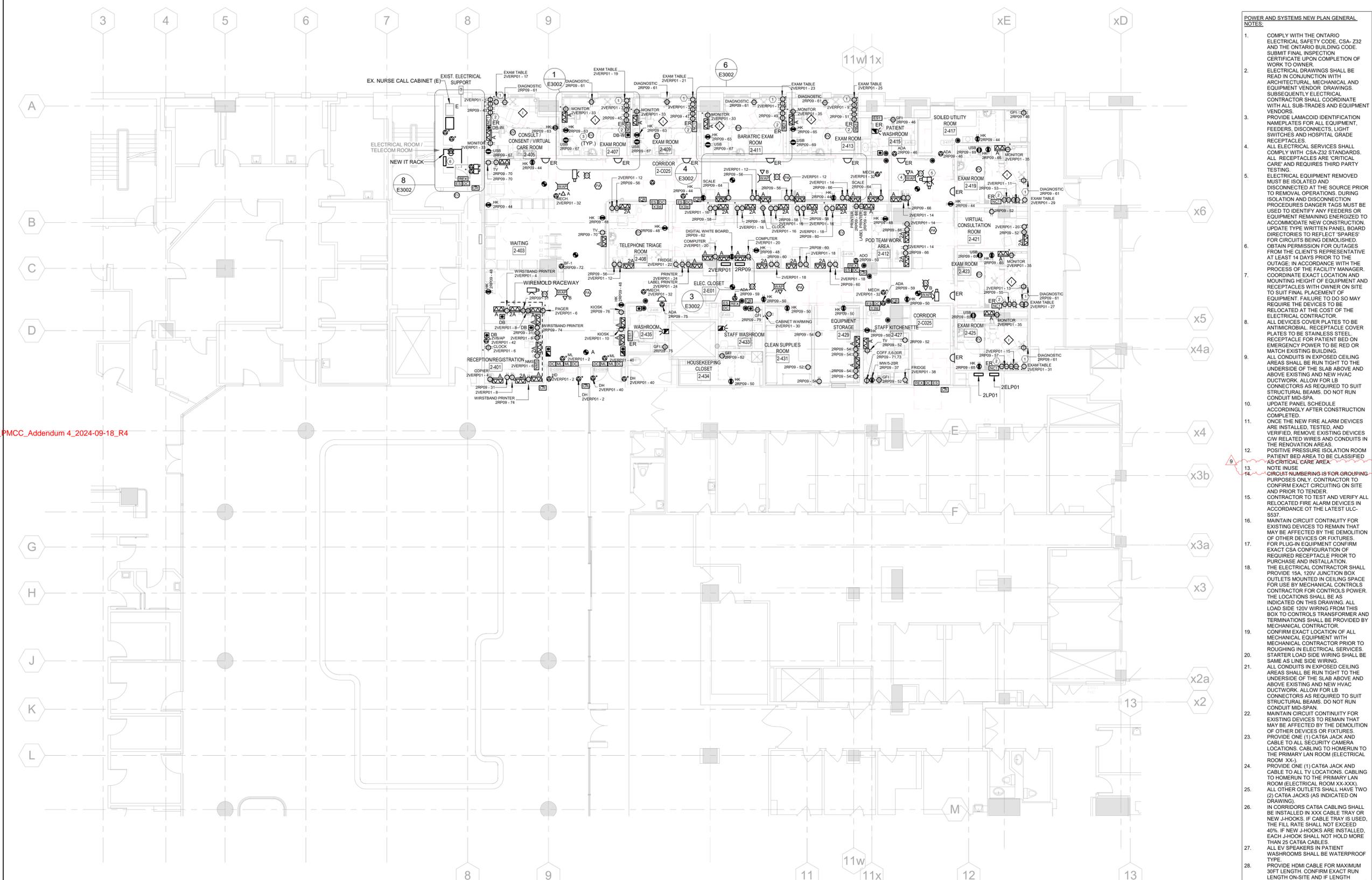
Drawing Title:

**POWER & SYSTEMS -
NEW WORK - LEVEL 02
PLAN (MH)**

As indicated

Project No.: 0020711.00 Checked by: JG

E2102



SHEET KEYNOTES

- 1 DEDICATED CIRCUIT FOR EXAM/TREATMENT TABLE (TYPICAL).
- 2 EXISTING NURSE CALL FROM L2 HEAD AND NECK CLINIC TO BE RE-PURPOSED TO SERVE NEW EXAM ROOMS (TYPICAL).
- 3 NEW FIRE ALARM DEVICES TO BE UPLOADED TO JCI FIRE WORKSTATION (ACTIVE GRAPHIC) AND FLOOR LAYOUT UPON COMPLETION OF VERIFICATION (TYPICAL).
- 4 PROVIDE ADDITIONAL 10' OF SLACK CABLE TYPICAL FOR ALL WIRELESS ACCESS POINT (TYPICAL).
- 5 PROVIDE ADDITIONAL 10' OF SLACK CABLE TYPICAL FOR ALL CCTV CAMERA (TYPICAL).
- 6 NEW RACK MOUNTED SKVA, 30 MINS. BATTERY IN DADA RACK IN LEVEL 2 EXIST. ELECTRICAL SUPPORT ROOM. COORDINATE WITH DATA RACK.

1 POWER & SYSTEMS - NEW WORK - LEVEL 02 PLAN
SCALE: 1 : 100

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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SHEET KEYNOTES	
1	LOCAL ALARM, MUSHROOM PUSH BUTTON, "PRESS FOR EMERGENCY ASSISTANCE" WITH A LOCAL AUDIBLE ALARM SENT TO DSC RECEPTION (1046).
2	NEW FIRE ALARM DEVICES TO BE UPLOADED TO JCI FIRE WORKSTATION (ACTIVE GRAPHIC) AND FLOOR LAYOUT UPON COMPLETION OF VERIFICATION (TYPICAL).
3	PROVIDE ADDITIONAL 10' OF SLACK CABLE TYPICAL FOR ALL WIRELESS ACCESS POINT (TYPICAL).
4	PROVIDE ADDITIONAL 10' OF SLACK CABLE TYPICAL FOR ALL CCTV CAMERA (TYPICAL).
5	10URP1 CONNECT TO 10URP1 THAT IS 10VIA UPS SET CAV 30 MIN 5 BATTERIES. THE SUPS1 AND SUPR1 EXACT LOCATIONS TO COORDINATE ON SITE.
6	FOR BOOKING SYSTEM MONITOR, POE CABLE SUPPLY POWER FOR THE MONITOR. COORDINATE WITH BOOKING SYSTEM DESIGN REQUIREMENT.
7	SOUND MASK SPEAKER TO BE CONNECTED TO SOUND MASK SYSTEM. PROVIDE 120V 5-20R RECEPTACLE AND CONNECT TO NEAREST 120/208V PANEL FOR THE SOUND MASK SYSTEM DESIGN.
8	NEW RACK MOUNTED 10KVA, 30 MIN. BATTERY IN DADA RACK IN ELECCOM. ROOM 1036. COORSIANTIE WITH DATA RACK.
9	EXISTING ROOM 918 ON LEVEL 9 BE RIGHT BELOW EXIST. ELEC. RM 10-E02.

- POWER AND SYSTEMS NEW PLAN GENERAL NOTES:**
- COMPLY WITH THE ONTARIO ELECTRICAL SAFETY CODE, CSA-232 AND THE ONTARIO BUILDING CODE. SUBMIT FINAL INSPECTION CERTIFICATE UPON COMPLETION OF WORK TO OWNER.
 - ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL AND EQUIPMENT VENDOR DRAWINGS. SUBSEQUENTLY ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL SUB-TRADES AND EQUIPMENT VENDORS.
 - PROVIDE LAMACOID IDENTIFICATION NAMEPLATES FOR ALL EQUIPMENT, FEEDERS, DISCONNECTS, LIGHT SWITCHES AND HOSPITAL GRADE RECEPTACLES.
 - ALL ELECTRICAL SERVICES SHALL COMPLY WITH CSA-232 STANDARDS. ALL RECEPTACLES ARE CRITICAL CARE AND REQUIRES THIRD PARTY TESTING.
 - ELECTRICAL EQUIPMENT REMOVED MUST BE ISOLATED AND DISCONNECTED AT THE SOURCE PRIOR TO REMOVAL OPERATIONS. DURING ISOLATION AND DISCONNECTION PROCEDURES DANGER TAGS MUST BE USED TO IDENTIFY ANY FEEDERS OR EQUIPMENT REMAINING ENERGIZED TO ACCOMMODATE NEW CONSTRUCTION. UPDATE TYPE WRITTEN PANEL BOARD DIRECTORIES TO REFLECT "SPARES" FOR CIRCUITS BEING DEMOLISHED. OBTAIN PERMISSION FOR OUTAGES FROM THE CLIENT'S REPRESENTATIVE AT LEAST 14 DAYS PRIOR TO THE OUTAGE. IN ACCORDANCE WITH THE PROCESS OF THE FACILITY MANAGER. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF EQUIPMENT AND RECEPTACLES WITH OWNER ON SITE TO SUIT FINAL PLACEMENT OF EQUIPMENT. FAILURE TO DO SO MAY REQUIRE THE DEVICES TO BE RELOCATED AT THE COST OF THE ELECTRICAL CONTRACTOR.
 - ALL DEVICES COVER PLATES TO BE ANTIMICROBIAL RECEPTACLE COVER PLATES TO BE STAINLESS STEEL RECEPTACLE FOR PATIENT BED ON EMERGENCY POWER TO BE RED OR MATCH EXISTING BUILDING. ALL CONDUITS IN EXPOSED CEILING AREAS SHALL BE RUN TIGHT TO THE UNDERSIDE OF THE SLAB ABOVE AND ABOVE EXISTING AND NEW HVAC DUCTWORK. ALLOW FOR LB CONNECTORS AS REQUIRED TO SUIT STRUCTURAL BEAMS. DO NOT RUN CONDUIT MID-SPAN.
 - UPDATE PANEL SCHEDULE ACCORDINGLY AFTER CONSTRUCTION COMPLETED.
 - ONCE THE NEW FIRE ALARM DEVICES ARE INSTALLED, TESTED, AND VERIFIED, REMOVE EXISTING DEVICES CIVIL RELATED WIRES AND CONDUITS IN THE RENOVATION AREAS.
 - POSITIVE PRESSURE ISOLATION ROOM PATIENT BED AREA TO BE CLASSIFIED AS CRITICAL CARE AREA.
 - NOTE INUSE
 - CIRCUIT NUMBERING IS FOR GROUPING PURPOSES ONLY. CONTRACTOR TO CONFIRM EXACT CIRCUITING ON SITE AND PRIOR TO TENDER.
 - CONTRACTOR TO TEST AND VERIFY ALL RELOCATED FIRE ALARM DEVICES IN ACCORDANCE OF THE LATEST ULCS-857.
 - MAINTAIN CIRCUIT CONTINUITY FOR EXISTING DEVICES TO REMAIN THAT MAY BE AFFECTED BY THE DEMOLITION OF OTHER DEVICES OR FIXTURES.
 - FOR PLUG-IN EQUIPMENT CONFIRM EXACT CSA CONFIGURATION OF REQUIRED RECEPTACLE PRIOR TO PURCHASE AND INSTALLATION.
 - THE ELECTRICAL CONTRACTOR SHALL PROVIDE 15A, 120V JUNCTION BOX OUTLETS MOUNTED IN CEILING SPACE FOR USE BY MECHANICAL CONTROLS CONTRACTOR FOR CONTROLS POWER. THE LOCATIONS SHALL BE AS INDICATED ON THIS DRAWING. ALL LOAD SIDE 120V WIRING FROM THIS BOX TO CONTROLS TRANSFORMER AND TERMINATIONS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR.
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 - MAINTAIN CIRCUIT CONTINUITY FOR EXISTING DEVICES TO REMAIN THAT MAY BE AFFECTED BY THE DEMOLITION OF OTHER DEVICES OR FIXTURES. PROVIDE ONE (1) CAT6A JACK AND CABLE TO ALL SECURITY CAMERA LOCATIONS. CABLING TO HOMERUN TO THE PRIMARY LAN ROOM (ELECTRICAL ROOM XX-).
 - PROVIDE ONE (1) CAT6A JACK AND CABLE TO ALL TV LOCATIONS. CABLING TO HOMERUN TO THE PRIMARY LAN ROOM (ELECTRICAL ROOM XX-XX). ALL OTHER OUTLETS SHALL HAVE TWO (2) CAT6A JACKS (AS INDICATED ON DRAWING).
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 - ALL EV SPEAKERS IN PATIENT WASHROOMS SHALL BE WATERPROOF TYPE.
 - PROVIDE HDMI CABLE FOR MAXIMUM 30FT LENGTH. CONFIRM EXACT RUN LENGTH ON-SITE AND IF LENGTH EXCEEDS 30FT, PROVIDE CAT6A CABLE FROM HDMI BEDSITE OUTLET TO HDMI OUTLET BEHIND TV. EXTENDERS BY UHN.

10	ISSUED FOR ADDENDUM E-3	2024-09-19
9	ISSUED FOR ADDENDUM E-2	2024-09-11
8	ISSUED FOR TENDER	2024-08-14
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1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

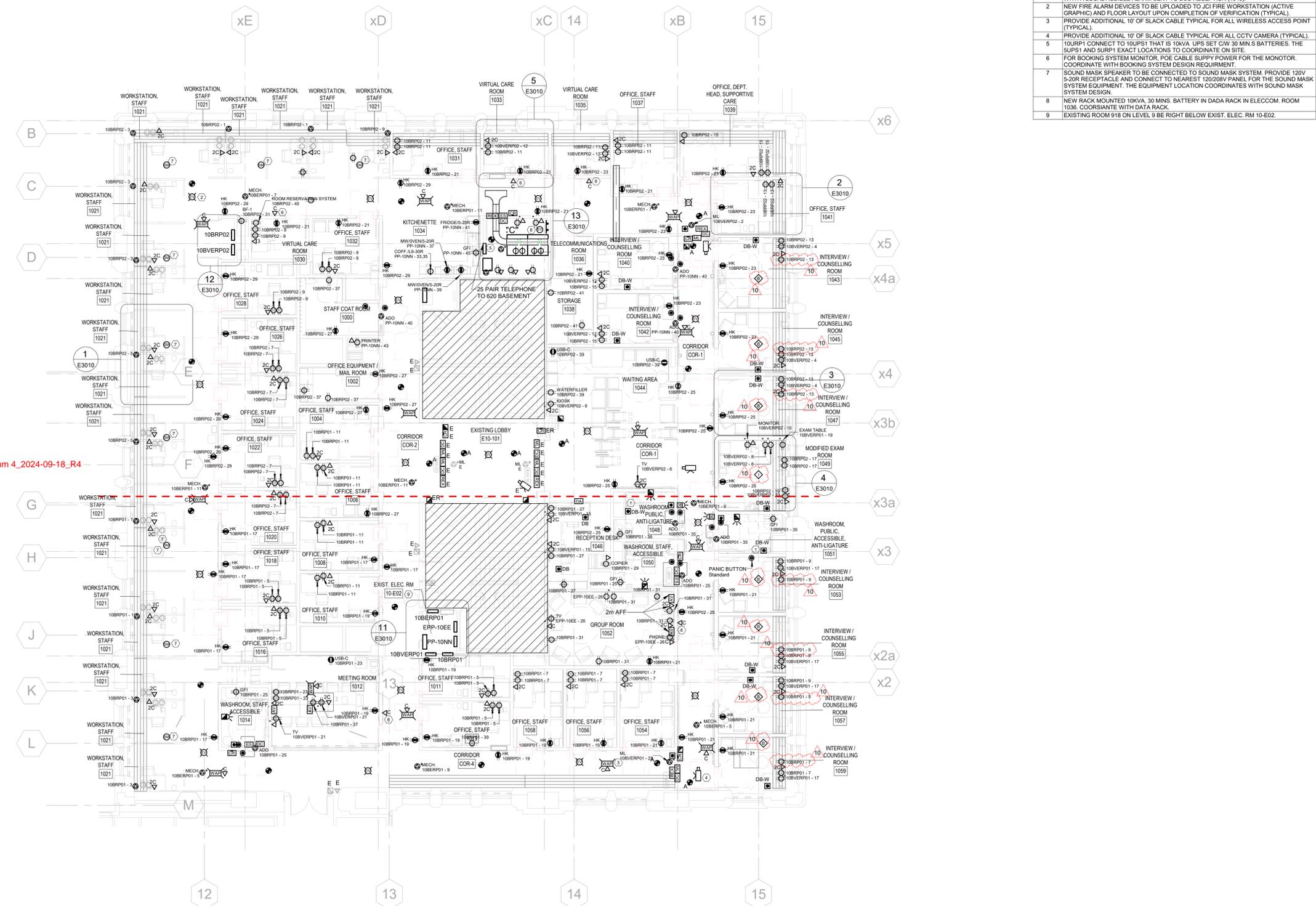
Rev.	Description	Date
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Drawing Title:

**POWER & SYSTEMS -
NEW WORK - LEVEL 10
PLAN (DSC)**
As indicated

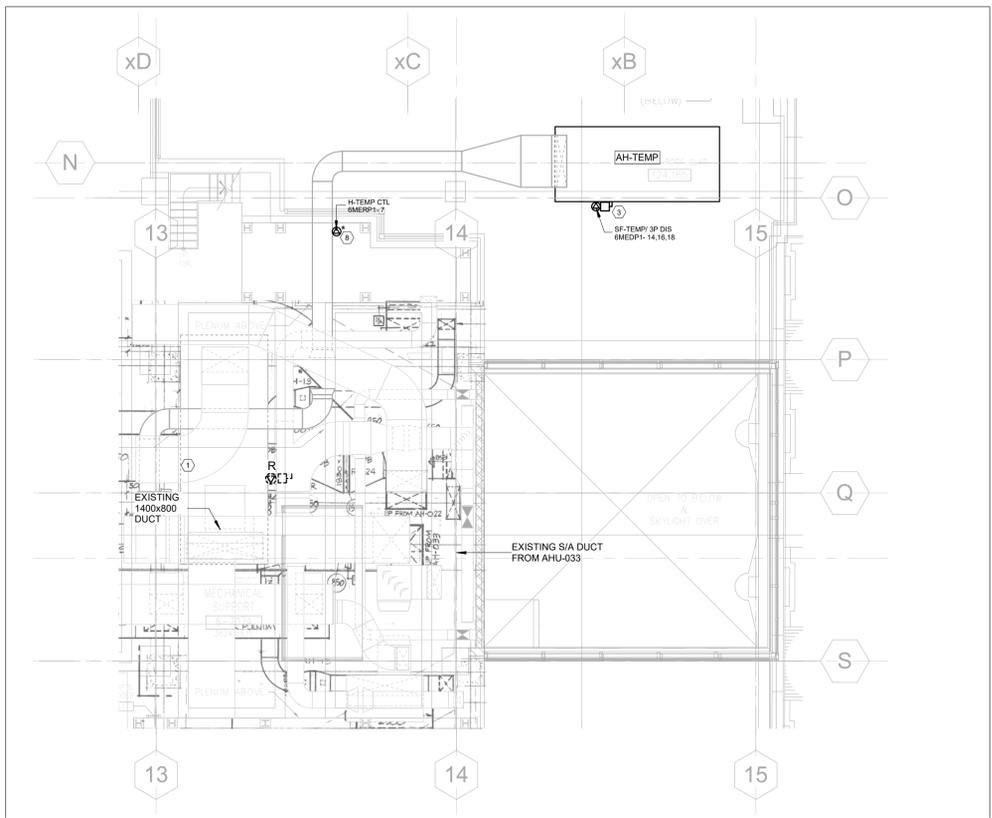
Project No.: 0020711.00 Checked by: JG

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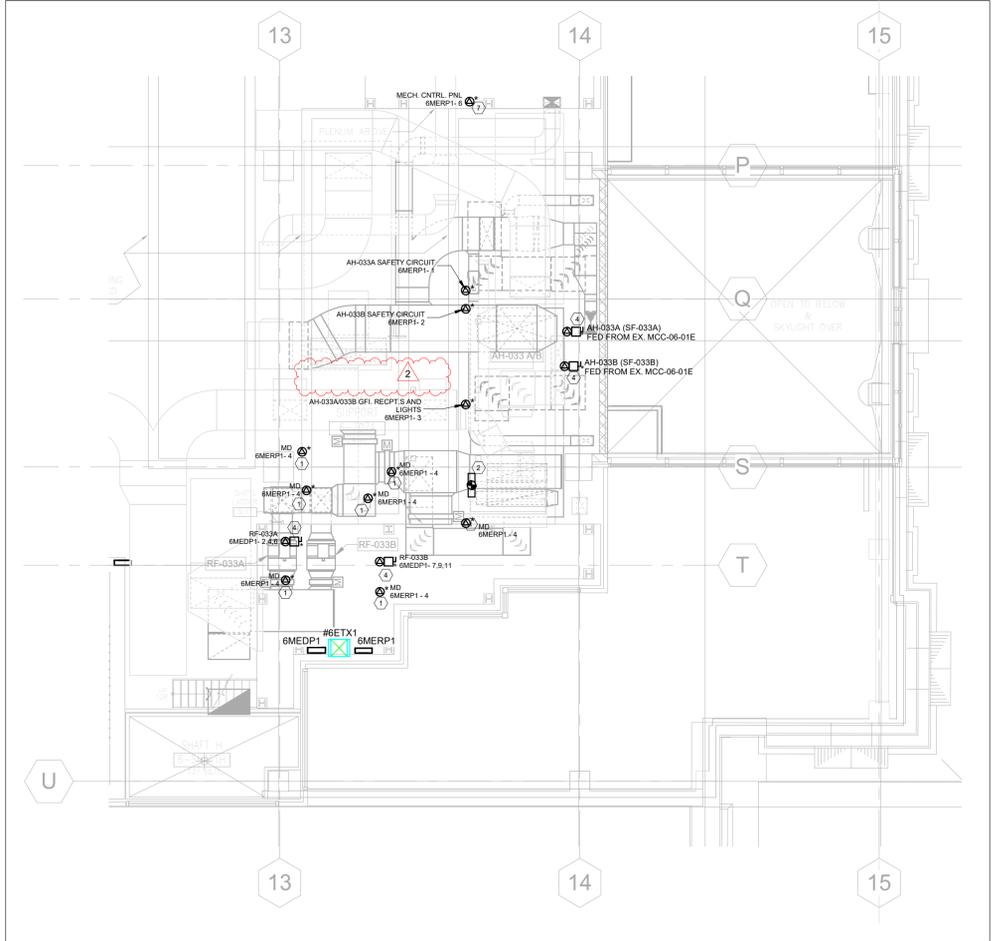


1 POWER & SYSTEMS - NEW WORK - LEVEL 10 PLAN (DSC)
SCALE: 1 : 100

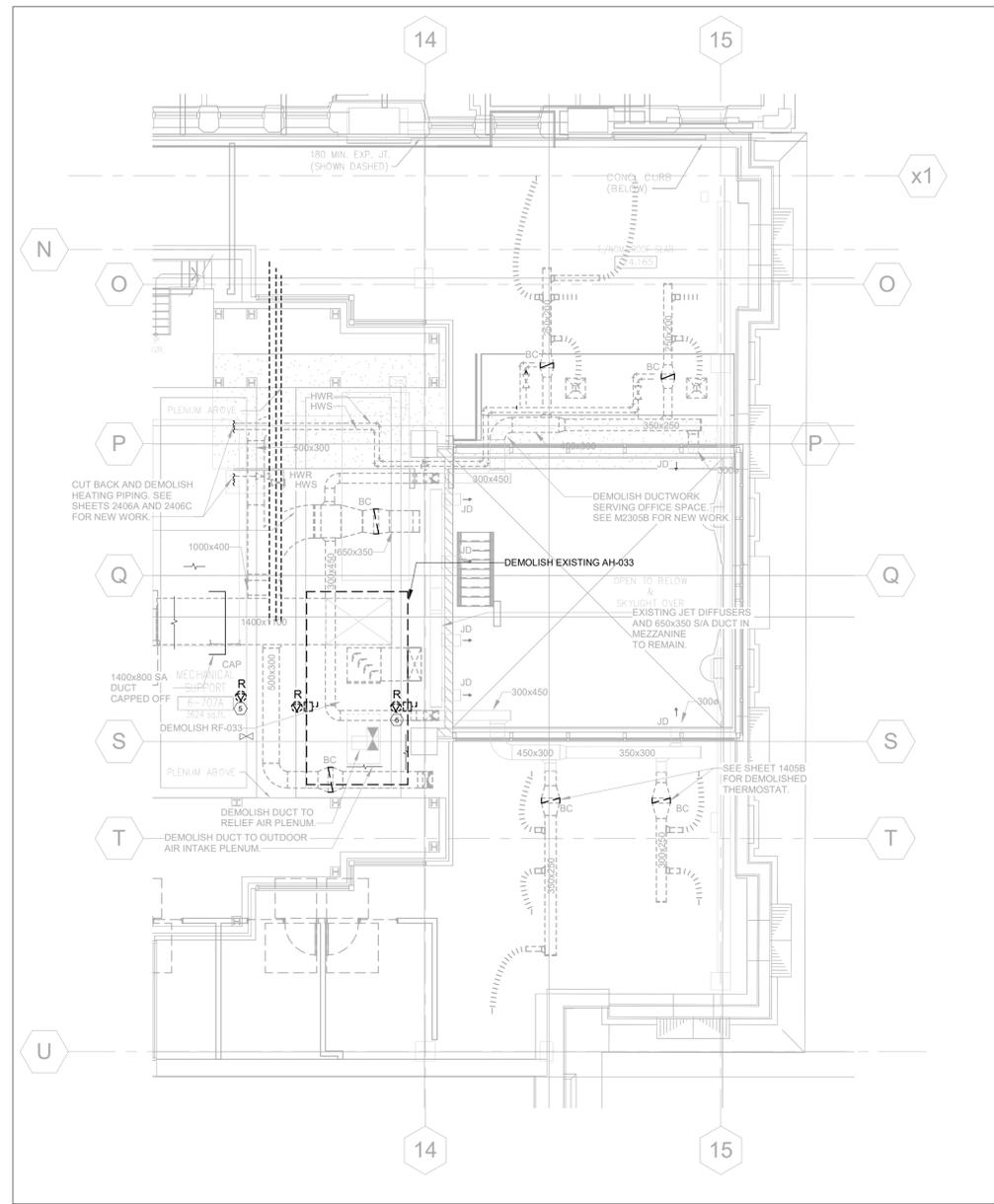
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UHN_P MCC_Addendum 4_2024-09-18_R4
L6 TEMPORARY AIR HANDLING UNIT - MECHANICAL ROOM - PHASE 1 POWER
 SCALE: 1 : 100



LEVEL 06 - UPPER - MECHANICAL ROOM - PHASE 3 POWER
 SCALE: 1 : 100



L6 MECHANICAL ROOM AND L5 MEZZANINE - HVAC - DEMOLITION - PHASE 2
 SCALE: 1 : 100

SHEET KEYNOTES

- MOTORIZED FIRE DAMPER MAX. TEN (10) MOTORIZED DAMPERS ON ONE CIRCUITS. EXACT LOCATION AND QUANTITY COMFORM AND COORDINATE ON SITE WITH MECH. MOTORIZED FIRE DAMPERS TO BE CONNECTED TO FIRE CONTROL PANEL. COORDINATE ON SITE FOR FIRE ALARM CONTROL PANEL LOCATION.
- DUCT SMOKE DETECTORS EXACT LOCATIONS AND QUANTITY TO COORDINATE WITH MECHICAL ON SITE.
- THE DISCONNECT SWITCH SIZE POWER REQUIREMENT TO COORDINATE WITH RENT AH UNIT. AFTER REMOVE RENT AH UNIT, REMOVE THE DISCONNECT SWITCH AND THE WIRING BACK TO SOURCE. COORDINATE EXACT LOCATION ON SITE.
- EXACT LOCATION TO BE COORDINATED WITH MECHANICAL CONTRACTOR ON SITE.
- REMOVE POWER FOR EXISTING MECHANICAL CONTROL PANEL AND EXTEND THE WIRING TO NEW MECH. CONTROL PANEL. EXACT LOCATION WITH MECH. COORDINATE ON SITE.
- REMOVE POWER FOR DEMOLISHED AH-033 AND RF-033. ALL WIRING BACK TO SOURCE.
- PROVIDE NEW POWER JUNCTION BOX FOR NEW MECH. CONTROL PANEL. EXTEND EXISTING WIRING FOR DEMOLISHED EXISTING MECH. CONTROL PANEL TO THE NEW MECH. CONTROL PANEL LOCATION. EXACT LOCATION COORDINATE WITH MECH. ON SITE.
- POWER FOR H-TEMP STEAM HUMIDIFIER CONTROL. AFTER REMOVE THE H-TEMP. WIRING BACK TO SOURCE. SET "SPARE" FOR THE BRNACH. UPDATE PANEL SCHEDULE. EXACT LOCATION COORDINATE ON SITE WITH MECH.

- POWER AND SYSTEMS NEW PLAN GENERAL NOTES:**
- COMPLY WITH THE ONTARIO ELECTRICAL SAFETY CODE, CSA-232 AND THE ONTARIO BUILDING CODE. SUBMIT FINAL INSPECTION CERTIFICATE UPON COMPLETION OF WORK TO OWNER.
 - ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL AND EQUIPMENT VENDOR DRAWINGS. SUBSEQUENTLY ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL SUB-TRADES AND EQUIPMENT VENDORS.
 - PROVIDE LAMACOID IDENTIFICATION NAMEPLATES FOR ALL EQUIPMENT, FEEDERS, DISCONNECTS, LIGHT SWITCHES AND HOSPITAL GRADE RECEPTACLES.
 - ALL ELECTRICAL SERVICES SHALL COMPLY WITH CSA-232 STANDARDS. ALL RECEPTACLES ARE CRITICAL CARE AND REQUIRES THIRD PARTY TESTING.
 - ELECTRICAL EQUIPMENT REMOVED MUST BE ISOLATED AND DISCONNECTED AT THE SOURCE PRIOR TO REMOVAL OPERATIONS. DURING ISOLATION AND DISCONNECTION PROCEDURES DANGER TAGS MUST BE USED TO IDENTIFY ANY FEEDERS OR EQUIPMENT REMAINING ENERGIZED TO ACCOMMODATE NEW CONSTRUCTION. UPDATE TYPE WRITTEN PANEL BOARD DIRECTORIES TO REFLECT 'SPARES' FOR CIRCUITS BEING DEMOLISHED.
 - OBTAIN PERMISSION FOR OUTAGES FROM THE CLIENT'S REPRESENTATIVE AT LEAST 14 DAYS PRIOR TO THE OUTAGE. IN ACCORDANCE WITH THE PROCESS OF THE FACILITY MANAGER. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF EQUIPMENT AND RECEPTACLES WITH OWNER ON SITE TO SUIT FINAL PLACEMENT OF EQUIPMENT. FAILURE TO DO SO MAY REQUIRE THE DEVICES TO BE RELOCATED AT THE COST OF THE ELECTRICAL CONTRACTOR.
 - ALL DEVICES COVER PLATES TO BE ANTIMICROBIAL. RECEPTACLE COVER PLATES TO BE STAINLESS STEEL. RECEPTACLE FOR PATIENT BED ON EMERGENCY POWER TO BE RED OR MATCH EXISTING BUILDING.
 - ALL CONDUITS IN EXPOSED CEILING AREAS SHALL BE RUN TIGHT TO THE UNDERSIDE OF THE SLAB ABOVE AND ABOVE EXISTING AND NEW HVAC DUCTWORK. ALLOW FOR LB CONNECTORS AS REQUIRED TO SUIT STRUCTURAL BEAMS. DO NOT RUN CONDUIT MID-SPAN.
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 - STARTER LOAD SIDE WIRING SHALL BE SAME AS LINE SIDE WIRING.
 - ALL CONDUITS IN EXPOSED CEILING AREAS SHALL BE RUN TIGHT TO THE UNDERSIDE OF THE SLAB ABOVE AND ABOVE EXISTING AND NEW HVAC DUCTWORK. ALLOW FOR LB CONNECTORS AS REQUIRED TO SUIT STRUCTURAL BEAMS. DO NOT RUN CONDUIT MID-SPAN.



**Princess Margaret
 Cancer Centre Stem Cell
 Transplant 2**
 Part B
 (MH, MHDU, DSC)



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Rev.	Description	Date
2	ISSUED FOR ADDENDUM E-3	2024-09-19
1	ISSUED FOR TENDER	2024-08-14

Drawing Title:
**POWER AND SYSTEM -
 MECH ROOM (MHDU) -
 LEVEL 6 SOUTH**
 As indicated
 Project No.: 0020711.00 Checked by: JG

E2106A

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Transplant 2**

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ONE-LINE

WIRE LEGEND

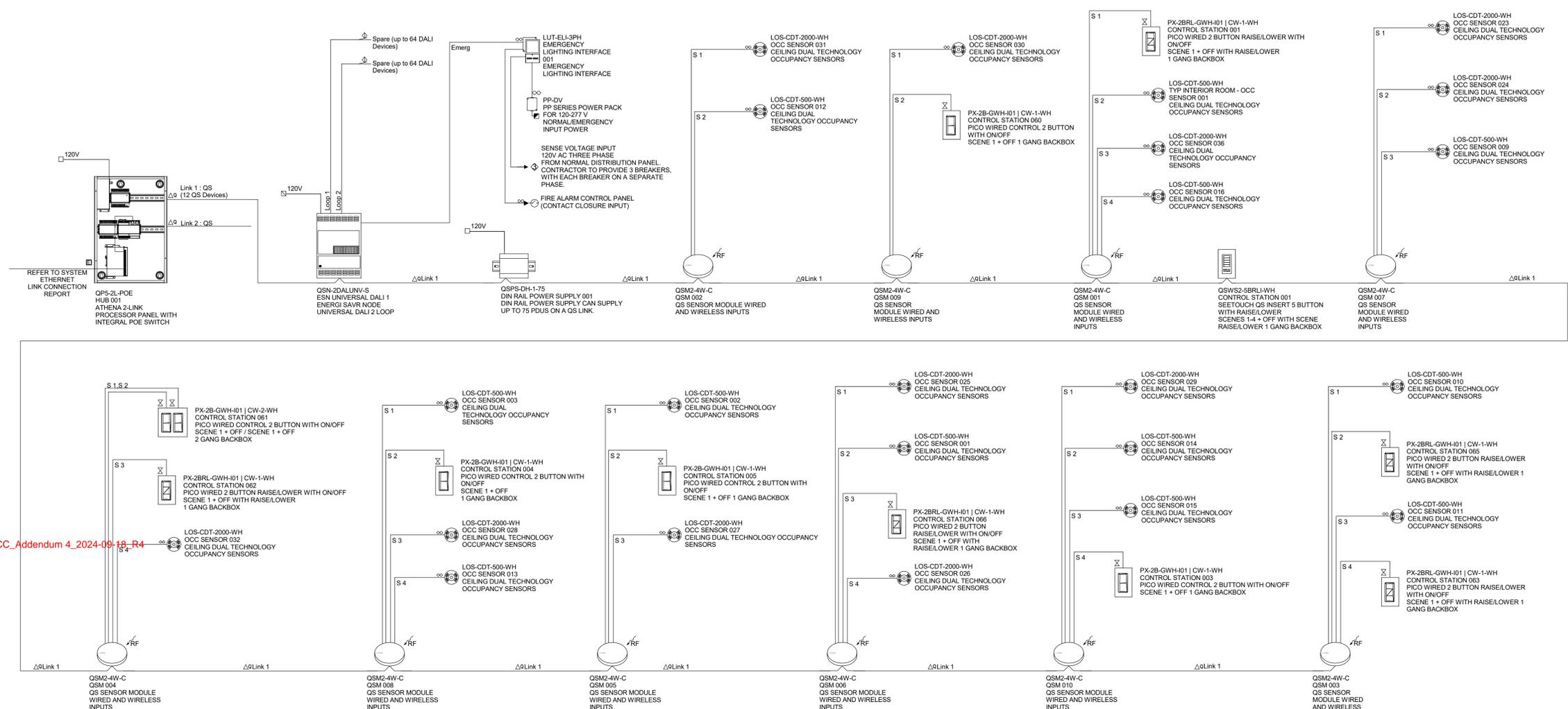
- △ QS CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4)*
- △ QS CONTROL LINK (CONNECT WIRES 1, 3 AND 4. DO NOT CONNECT WIRE 2)*
- ▽ PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3, 4 AND 5)*
- ▽ PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4. DO NOT CONNECT WIRE #5)*
- ▷ PANEL CONTROL LINK (CONNECT WIRES 1, 3, 4 AND 5. DO NOT CONNECT WIRE #2)*
- ◁ QS SIVIOIA SHADE CONTROL LINK*
- △ BELDEN CABLE 1387A (OR EQUIVALENT)
- NORMAL INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
- NORMAL-EMERGENCY INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
- ◇ 3 PHASE 4 WIRE INPUT POWER, 4 #12 AWG (4 SQ MM) + GROUND
- ▷ 2 #12 AWG (4 SQ MM) + GROUND
- ▷ 3 #12 AWG (4 SQ MM) + GROUND
- ◇ 0-10 V SIGNAL: 2#18AWG (1.0 SQ MM)
- ∞ 2#18 AWG (1.0 SQ MM)
- ∞ 3#18 AWG (1.0 SQ MM)
- ◇ ECOSYSTEM BUSLOOP*
- ◇ DALI LOOP
- ◇ T-SERIES TUNABLE-WHITE LOOP
- X LUTRON SENSOR CABLE C-CBL-522S OR USE 4#22 AWG (1.0 SQ MM)
- X LUTRON SENSOR CABLE C-CBL-522S OR USE 3#22 AWG (1.0 SQ MM)
- DMX CABLE: USE LUTRON GRX-CBL-DMX-250/GRX-CBL-DMX-500 OR BELDEN #9729 (NON-PLENUM) OR BELDEN #9729 (PLENUM) OR DURA FLEX 224 WA CABLE.
- ETHERNET CABLE: CAT5E OR BETTER CABLE FOR LUTRON NETWORK TERMINATED WITH RJ45 CONNECTORS (NOT PROVIDED BY LUTRON). 328 FT (100 M) MAXIMUM RUN.
- FIBER OPTIC CABLE FOR LUTRON NETWORK TERMINATED WITH APPROPRIATE FIBER OPTIC CONNECTORS (NOT PROVIDED BY LUTRON). TERMINATED WITH RJ45 CONNECTORS (NOT PROVIDED BY LUTRON). 328 FT (100 M) MAXIMUM RUN.
- RF CONNECTION
- WIRED CONNECTION

FOR DETAILED DEFINITION OF PRODUCT CAPABILITIES REFER TO PRODUCT SPECIFICATION SUBMITTAL SHEETS.

△ THERE ARE UNPOWERED DEVICES ON THE LINK
△ NOT FOR CONSTRUCTION

NOTES:

1. THE LIGHTING CONTROL DIAGRAM ILLUSTRATED FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY AND COMPLETE BASED ON SELECTED MANUFACTURE PRODUCTS AND LIGHTING LAYOUT.
2. VERIFY DEVICES' LOCATIONS AND QUANTITY ON SITE TO COMPLETE.
3. POWER PACKS RELATED TO PATIENT WASHROOM CEILING MOUNTED SENSORS SHALL BE INSTALLED IN CORRIDOR T-BAR CEILING TO EASY ACCESS FOR MAINTENANCE. IF THERE IS NO T-BAR CEILING AROUND, PROVIDE ACCESSIBLE PANEL IN CEILING FOR MAINTENANCE. COORDINATE ON SITE TO COMPLETE.
4. VERIFY DEVICES SELECTIONS AND LOCATIONS TO ENSURE APPROPRIATE POWER TO EACH DEVICE.
5. FOR ANY FORWARD/REVERSE PHASE, 3-WIRE, 0-10 V AND SWITCHING LED DRIVERS, VERIFY THE NUMBER OF DRIVERS SUPPORTED ON EACH DEVICE.
6. DALI2 NODE USED WHERE FIXTURES COMPLETE WITH DALI2 DRIVER ARE INVOLVED. COORDINATE WITH FIXTURE MANUFACTURER DURING SHOP DRAWING STAGE.
7. THE BASIS OF DESIGN INVOLVES 0-10V CONTROL OF LIGHTING. SEE RCP PLANS FOR ZONING AND COORDINATE WITH LUTRON FOR QUANTITY OF QSN NODE REQUIRED ON NORMAL AND EMERGENCY ZONES.



UHN_PMCC_Addendum 4_2024-09-18_R4

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L2 LIGHTING CONTROL DIAGRAM
SCALE: N.T.S

Drawing Title:

**LIGHTING CONTROL
DIAGRAM - LEVEL 2**

N.T.S

Project No.: 0020711.00 Checked by: JG

E4040

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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ONE-LINE

WIRE LEGEND

- Δ0 QS CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4)*
- Δ0 QS CONTROL LINK (CONNECT WIRES 1, 3 AND 4. DO NOT CONNECT WIRE 2)*
- ∇7P PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3, 4 AND 5)*
- ∇7P PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4. DO NOT CONNECT WIRE #5)*
- ∇P PANEL CONTROL LINK (CONNECT WIRES 1, 3, 4 AND 5. DO NOT CONNECT WIRE #2)*
- ∇S QS SVOIA SHADE CONTROL LINK*
- ΔT BELDEN CABLE 1387LA (OR EQUIVALENT)
- NORMAL INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
- NORMAL EMERGENCY INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
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- ▷ 2 #12 AWG (4 SQ MM) + GROUND
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- X LUTRON SENSOR CABLE C-CBL-522S OR USE 4#22 AWG (1.0 SQ MM)
- X LUTRON SENSOR CABLE C-CBL-522S OR USE 3#22 AWG (1.0 SQ MM)
- DMX CABLE USE LUTRON GRX-CBL-DMX-250/GRX-CBL-DMX-500 OR BELDEN #9729 (NON-PLENUM) OR BELDEN #89729 (PLENUM) OR DURAFLEX 22/A CABLE.
- ETHERNET CABLE, CAT5E OR BETTER CABLE FOR LUTRON NETWORK TERMINATED WITH RJ45 CONNECTORS (NOT PROVIDED BY LUTRON). 328 FT (100 M) MAXIMUM RUN.
- FIBER OPTIC CABLE FOR LUTRON NETWORK TERMINATED WITH APPROPRIATE FIBER OPTIC CONNECTORS (NOT PROVIDED BY LUTRON). REQUIRES DEDICATED FIBER OPTIC LINK (SINGLE-MODE OR MULTI-MODE).
- RF CONNECTION
- WIRED CONNECTION

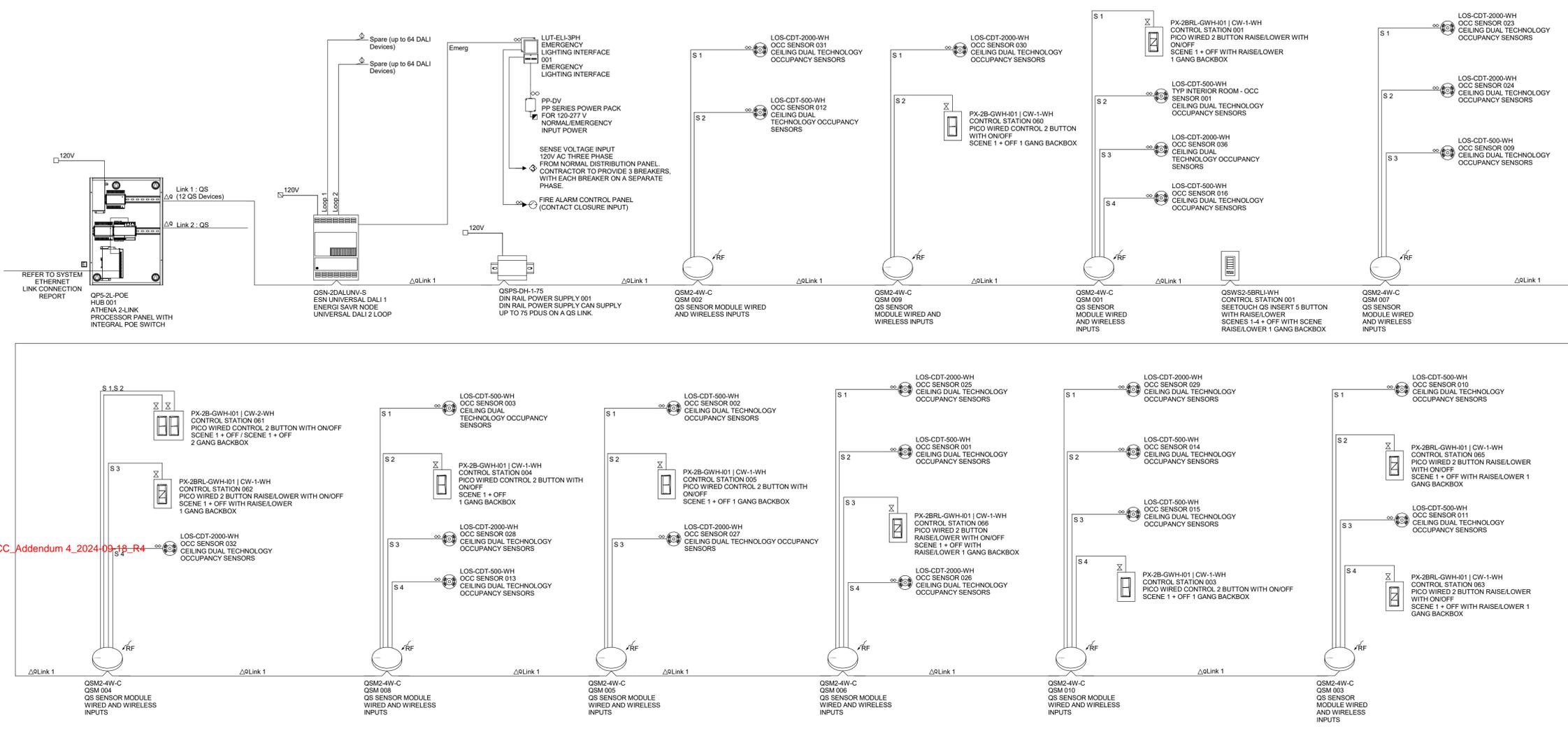
*PLEASE REFER TO NOTES ON WIRING FOR MORE WIRING GUIDELINES.
**REFER TO LOAD SCHEDULE FOR FEED AND LOAD INFORMATION

FOR DETAILED DEFINITION OF PRODUCT CAPABILITIES REFER TO PRODUCT SPECIFICATION SUBMITTAL SHEETS.

▲ THERE ARE UNPOWERED DEVICES ON THE LINK
▲ NOT FOR CONSTRUCTION

NOTES:

1. THE LIGHTING CONTROL DIAGRAM ILLUSTRATED FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY AND COMPLETE BASED ON SELECTED MANUFACTURE PRODUCTS AND LIGHTING LAYOUT.
2. VERIFY DEVICES' LOCATIONS AND QUANTITY ON SITE TO COMPLETE.
3. POWER PACKS RELATED TO PATIENT WASHROOM CEILING MOUNTED SENSORS SHALL BE INSTALLED IN CORRIDOR. T-BAR CEILING TO EASY ACCESS FOR MAINTENANCE. IF THERE IS NO T-BAR CEILING AROUND, PROVIDE ACCESSIBLE PANEL IN CEILING FOR MAINTENANCE. COORDINATE ON SITE TO COMPLETE.
4. VERIFY DEVICES SELECTIONS AND LOCATIONS TO ENSURE APPROPRIATE POWER TO EACH DEVICE.
5. FOR ANY FORWARD/REVERSE PHASE, 3-WIRE, 0-10 V AND SWITCHING LED DRIVERS, VERIFY THE NUMBER OF DRIVERS SUPPORTED ON EACH DEVICE.
6. DALI2 NODE USED WHERE FIXTURES COMPLETE WITH DALI2 DRIVER ARE INVOLVED. COORDINATE WITH FIXTURE MANUFACTURER DURING SHOP DRAWING STAGE.
7. THE BASIS OF DESIGN INVOLVES 0-10V CONTROL OF LIGHTING. SEE RCP PLANS FOR ZONING AND COORDINATE WITH LUTRON FOR QUANTITY OF QSN NODE REQUIRED ON NORMAL AND EMERGENCY ZONES.



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2	ISSUED FOR ADDENDUM E-3	2024-09-19
1	ISSUED FOR TENDER	2024-08-14

Rev.	Description	Date
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Drawing Title:

**LIGHTING CONTROL
DIAGRAM - LEVEL 5**

N.T.S

Project No.: 0020711.00 Checked by: JG

E4041

Princess Margaret Cancer Centre Stem Cell Transplant 2

Part B (MH, MHDU, DSC)

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ONE-LINE

WIRE LEGEND

- △ QS CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4)*
- △ QS CONTROL LINK (CONNECT WIRES 1, 3 AND 4. DO NOT CONNECT WIRE 2)*
- ▽ PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3, 4 AND 5)*
- ▽ PANEL CONTROL LINK (CONNECT WIRES 1, 2, 3 AND 4. DO NOT CONNECT WIRE #5)*
- ▷ PANEL CONTROL LINK (CONNECT WIRES 1, 3, 4 AND 5. DO NOT CONNECT WIRE #2)*
- <S QS SIVOIA SHADE CONTROL LINK*
- △ BELDEN CABLE 1387A (OR EQUIVALENT)
- NORMAL INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
- NORMAL-EMERGENCY INPUT POWER 2 #12 AWG (4 SQ MM) + GROUND
- ◇ 3 PHASE 4 WIRE INPUT POWER, 4 #12 AWG (4 SQ MM) + GROUND
- > #2 #12 AWG (4 SQ MM) + GROUND
- > #3 #12 AWG (4 SQ MM) + GROUND
- > #4 #12 AWG (4 SQ MM) + GROUND
- > #5 #12 AWG (4 SQ MM) + GROUND
- > #6 #12 AWG (4 SQ MM) + GROUND
- > #7 #12 AWG (4 SQ MM) + GROUND
- > #8 #12 AWG (4 SQ MM) + GROUND
- > #9 #12 AWG (4 SQ MM) + GROUND
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- > #15 #12 AWG (4 SQ MM) + GROUND
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- > #17 #12 AWG (4 SQ MM) + GROUND
- > #18 #12 AWG (4 SQ MM) + GROUND
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- > #98 #12 AWG (4 SQ MM) + GROUND
- > #99 #12 AWG (4 SQ MM) + GROUND
- > #100 #12 AWG (4 SQ MM) + GROUND

- ◇ DALI LOOP
- T-SERIES TUNABLE-WHITE LOOP
- X LUTRON SENSOR CABLE C-CBL-522S OR USE #422 AWG (1.0 SQ MM)
- X LUTRON SENSOR CABLE C-CBL-522S OR USE #322 AWG (1.0 SQ MM)
- DMX CABLE. USE LUTRON 6RVC-CBL-DMX-250GRX-CBL-DMX-500 OR BELDEN #89729 (NON-PLENUM) OR BELDEN #89729 (PLENUM) OR DURA FLEX 224 WA CABLE
- ETHERNET CABLE. CAT5E OR BETTER CABLE FOR LUTRON NETWORK TERMINATED WITH RJ45 CONNECTORS (NOT PROVIDED BY LUTRON), 329 FT (100 M) MAXIMUM RUN.
- FIBER OPTIC CABLE FOR LUTRON NETWORK TERMINATED WITH APPROPRIATE FIBER OPTIC CONNECTORS (NOT PROVIDED BY LUTRON). REQUIRES DEDICATED FIBER OPTIC LINK (SINGLE-MODE OR MULTI-MODE)
- RF CONNECTION
- WIRED CONNECTION

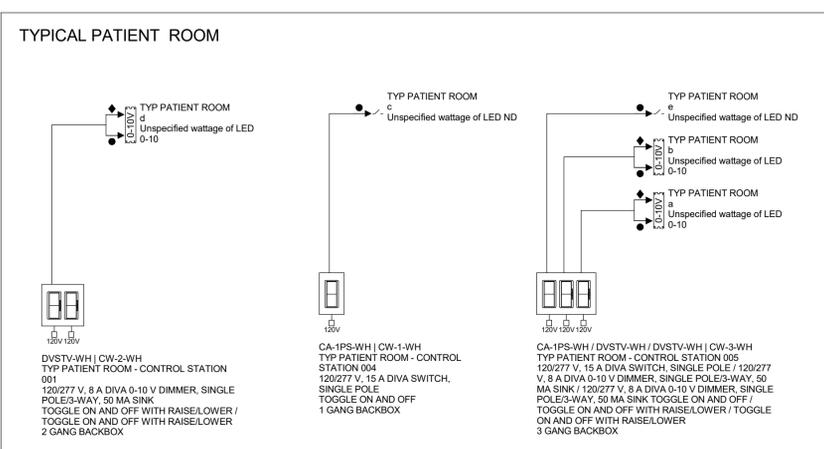
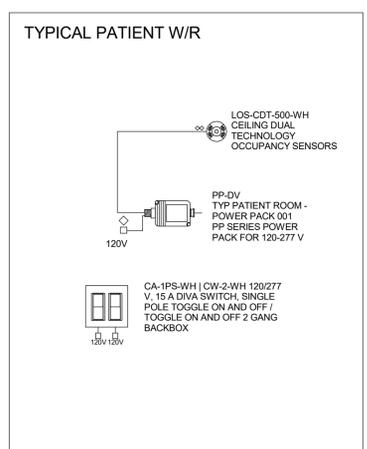
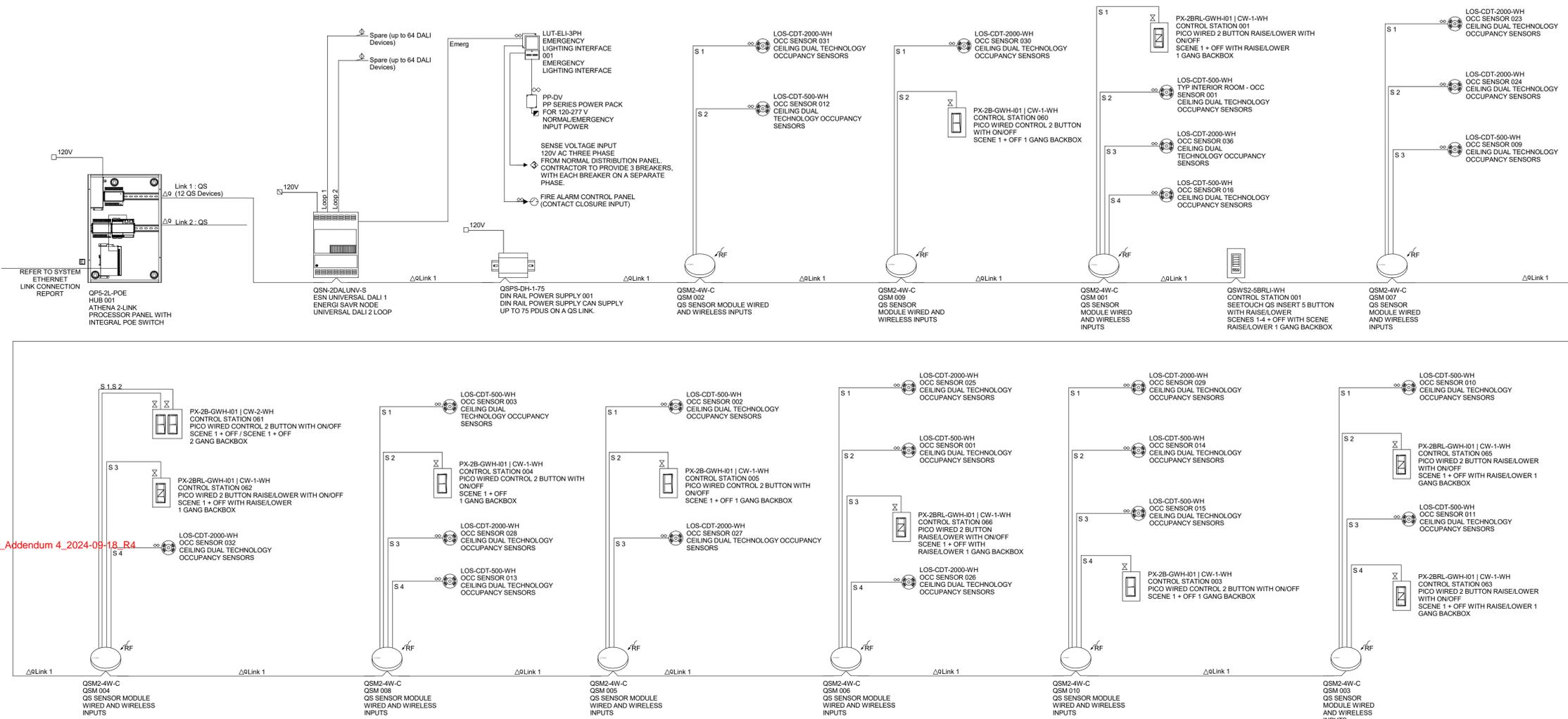
*PLEASE REFER TO NOTES ON WIRING FOR MORE WIRING GUIDELINES
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FOR DETAILED DEFINITION OF PRODUCT CAPABILITIES REFER TO PRODUCT SPECIFICATION SUBMITTAL SHEETS.

▲ THERE ARE UNPOWERED DEVICES ON THE LINK
▲ NOT FOR CONSTRUCTION

NOTES:

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- VERIFY DEVICES SELECTIONS AND LOCATIONS TO ENSURE APPROPRIATE POWER TO EACH DEVICE.
- FOR ANY FORWARD/REVERSE PHASE, 3-WIRE, 0-10 V AND SWITCHING LED DRIVERS, VERIFY THE NUMBER OF DRIVERS SUPPORTED ON EACH DEVICE.
- DALI2 NODE USED WHERE FIXTURES COMPLETE WITH DALI2 DRIVER ARE INVOLVED. COORDINATE WITH FIXTURE MANUFACTURER DURING SHOP DRAWING STAGE.
- THE BASIS OF DESIGN INVOLVES 0-10V CONTROL OF LIGHTING. SEE RCP PLANS FOR ZONING AND COORDINATE WITH LUTRON FOR QUANTITY OF QSN NODE REQUIRED ON NORMAL AND EMERGENCY ZONES.



L10 LIGHTING CONTROL DIAGRAM

SCALE: N.T.S

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E4042

**Princess Margaret
Cancer Centre Stem Cell
Transplant 2**

**Part B
(MH, MHDU, DSC)**

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9	ISSUED FOR ADDENDUM E-3	2024-09-19
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
5	ISSUED FOR 95% CD SUBMISSION	2023-09-06
4	ISSUED FOR 90% CD SUBMISSION	2023-07-31
3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

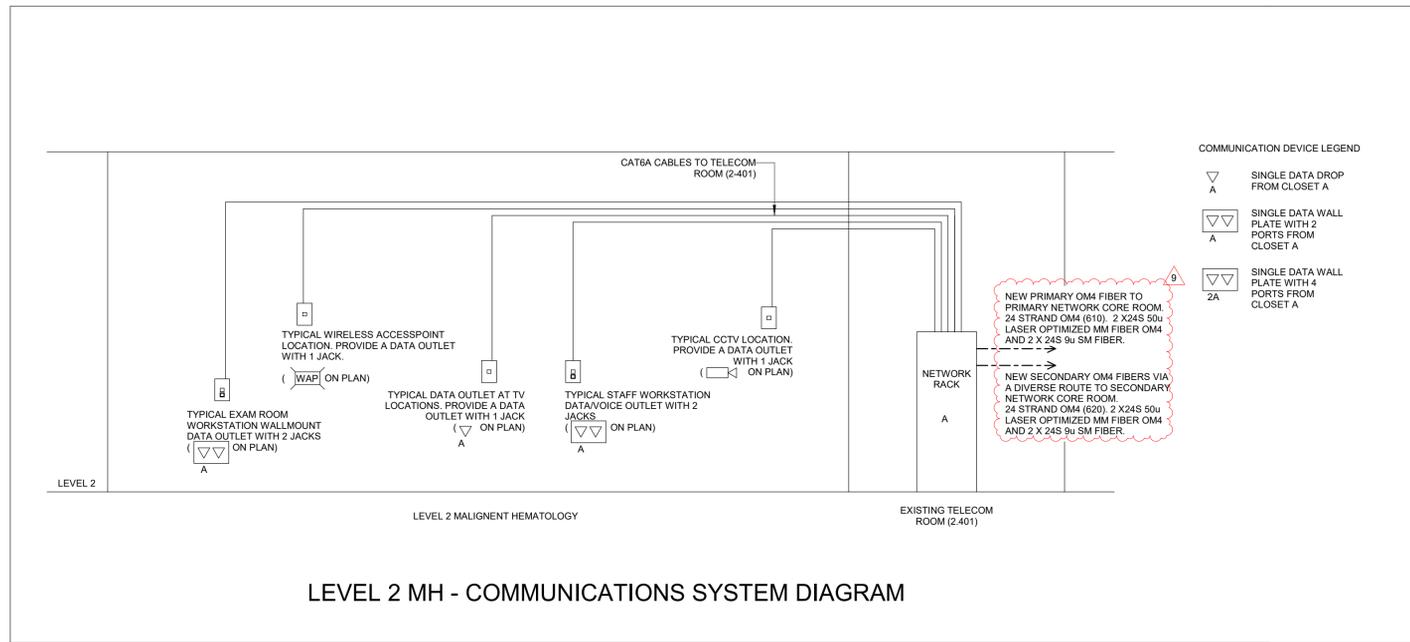
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Drawing Title:

**COMMUNICATIONS AND
ACCESS CONTROL
SYSTEM RISER DIAGRAM
- LEVEL 02 (MH)**

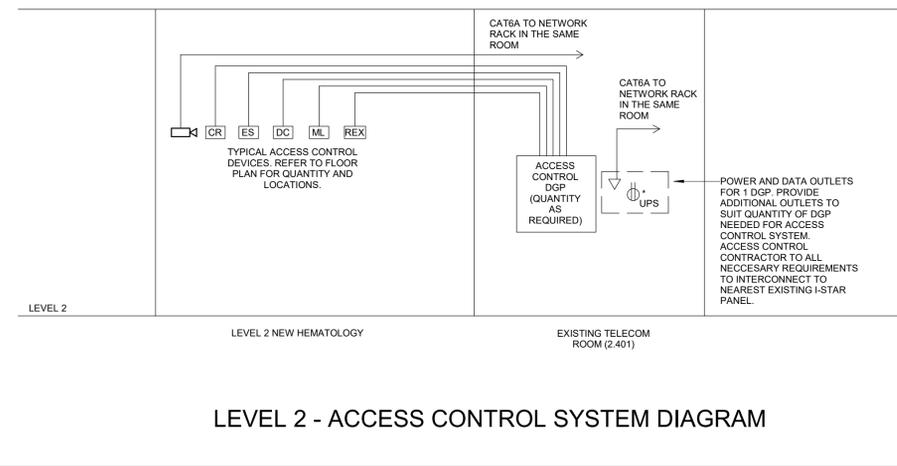
Project No.: 0020711.00 Checked by: JG

E4302



COMMUNICATION DEVICE LEGEND

- ▽ SINGLE DATA DROP FROM CLOSET A
- ▽▽ SINGLE DATA WALL PLATE WITH 2 PORTS FROM CLOSET A
- ▽▽ SINGLE DATA WALL PLATE WITH 4 PORTS FROM CLOSET A



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3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGNOFF	2022-12-16

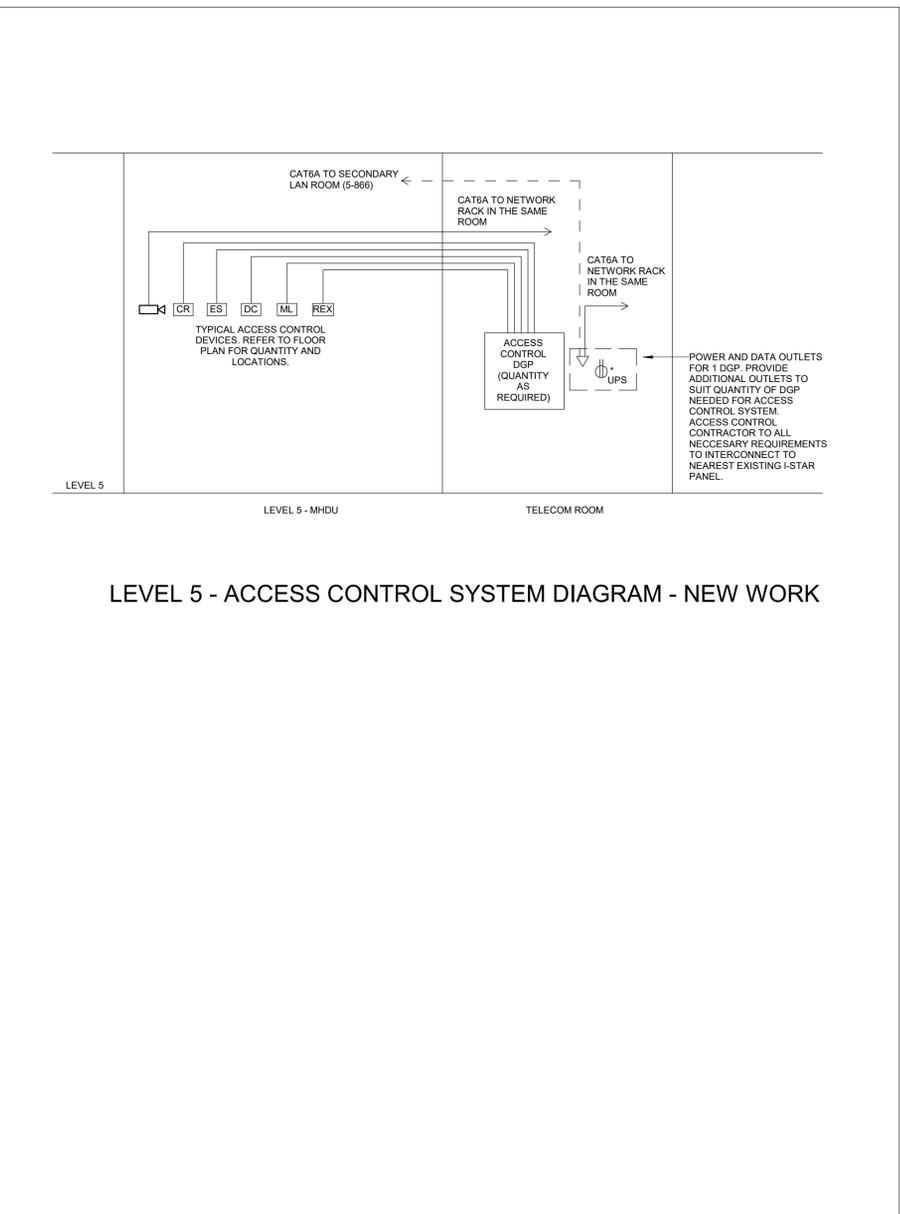
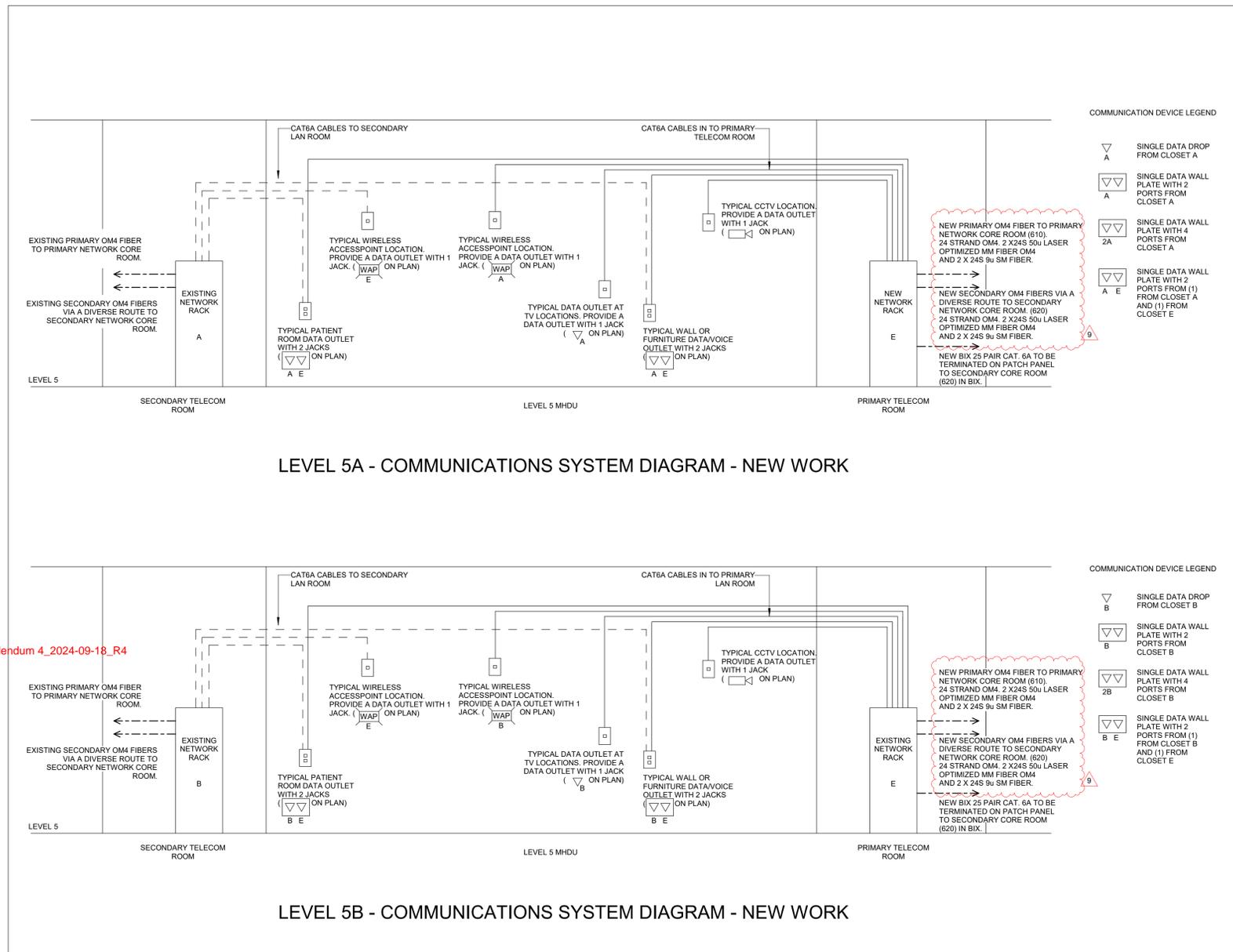
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Drawing Title:

**COMMUNICATIONS AND
ACCESS CONTROL
SYSTEM RISER DIAGRAM
- NEW WORK - LVL 05**

Project No.: 0020711.00 Checked by: JG

E4305



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8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
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3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

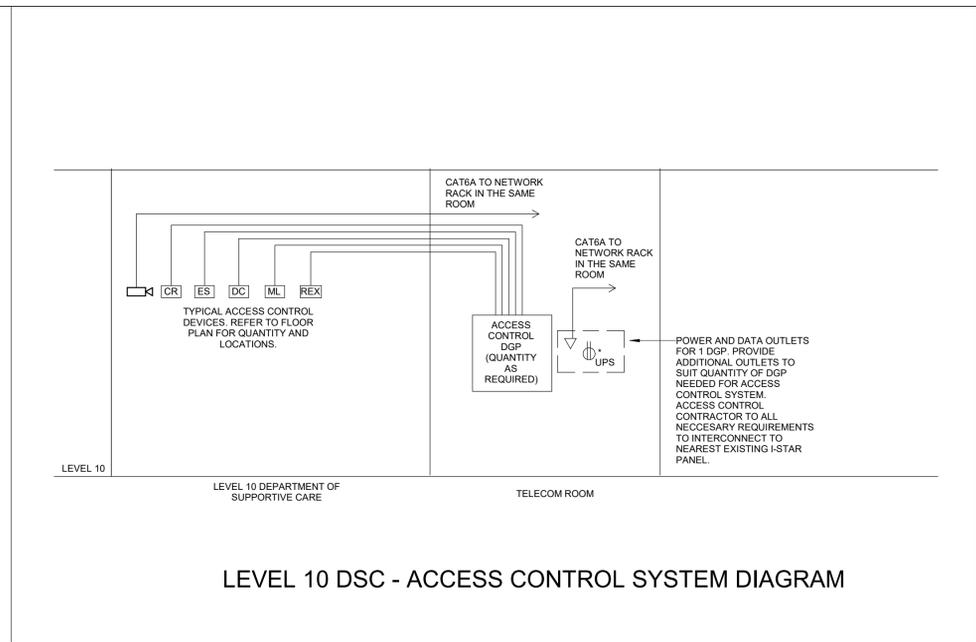
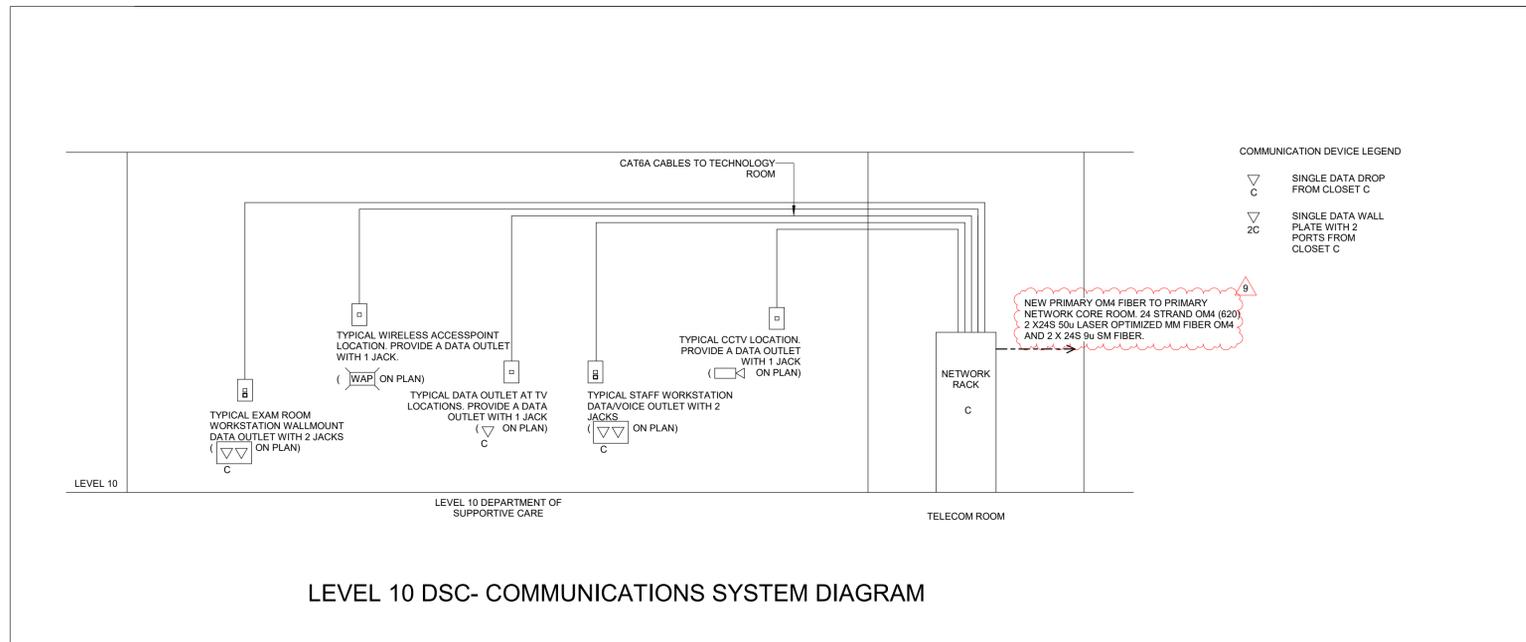
Rev.	Description	Date
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Drawing Title:

**COMMUNICATIONS AND
ACCESS CONTROL
SYSTEM RISER DIAGRAM
- NEW WORK - LEVEL 10
(DSC)**

Project No.: 002071 Checked by: JG

E4310



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3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

Rev.	Description	Date
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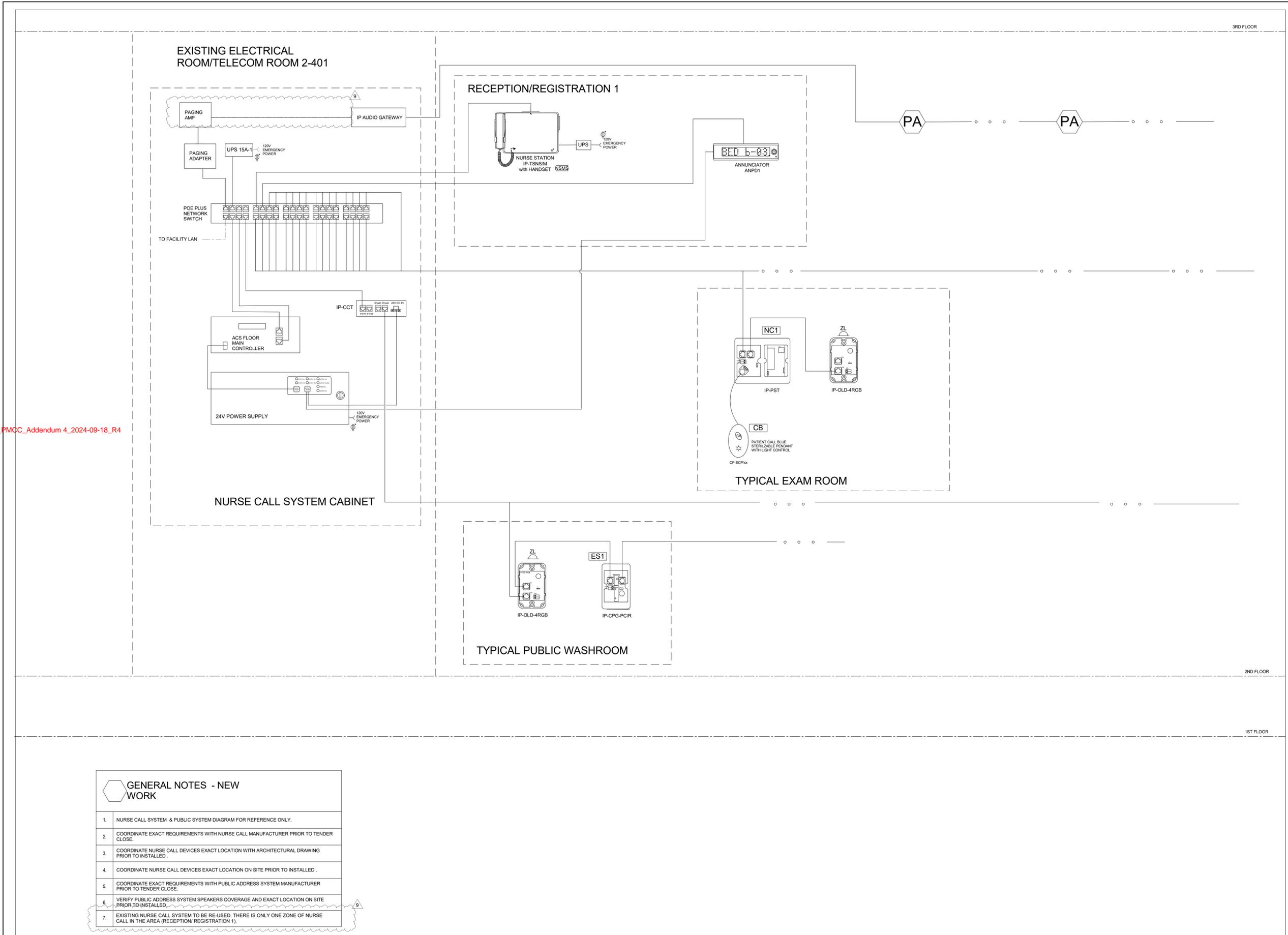
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**NURSE CALL SYSTEM &
PA SCHEMATIC DIAGRAM
- LEVEL 02 (MH)**

1 : 1

Project No.: 0020711.00 Checked by: JG

E4402



GENERAL NOTES - NEW WORK

- NURSE CALL SYSTEM & PUBLIC SYSTEM DIAGRAM FOR REFERENCE ONLY.
- COORDINATE EXACT REQUIREMENTS WITH NURSE CALL MANUFACTURER PRIOR TO TENDER CLOSE.
- COORDINATE NURSE CALL DEVICES EXACT LOCATION WITH ARCHITECTURAL DRAWING PRIOR TO INSTALLED.
- COORDINATE NURSE CALL DEVICES EXACT LOCATION ON SITE PRIOR TO INSTALLED.
- COORDINATE EXACT REQUIREMENTS WITH PUBLIC ADDRESS SYSTEM MANUFACTURER PRIOR TO TENDER CLOSE.
- VERIFY PUBLIC ADDRESS SYSTEM SPEAKERS COVERAGE AND EXACT LOCATION ON SITE PRIOR TO INSTALLED.
- EXISTING NURSE CALL SYSTEM TO BE RE-USED. THERE IS ONLY ONE ZONE OF NURSE CALL IN THE AREA (RECEPTION/ REGISTRATION 1).

UHN_PMCC_Addendum 4_2024-09-18_R4

9	ISSUED FOR ADDENDUM E-3	2024-09-19
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
6	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
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2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGNOFF	2022-12-16

Rev.	Description	Date
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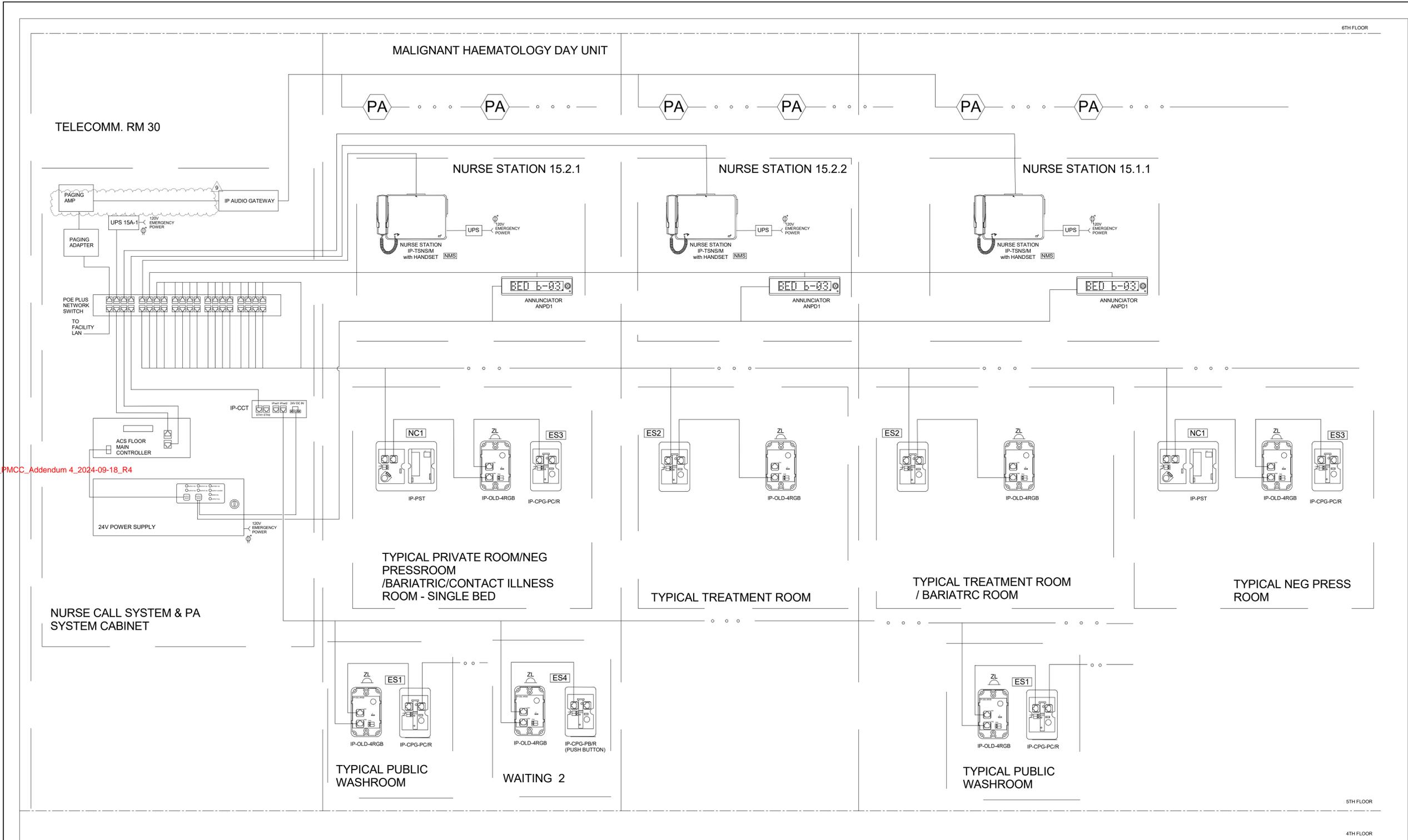
Drawing Title:

**NURSE CALL & PA
SYSTEM DIAGRAM - NEW
WORK LVL 5 - MHDU**

1 : 1

Project No.: 0020711.00 Checked by: JG

E4405



- GENERAL NOTES - NEW WORK**
- NURSE CALL SYSTEM & PUBLIC SYSTEM DIAGRAM FOR REFERENCE ONLY.
 - COORDINATE EXACT REQUIREMENTS WITH NURSE CALL MANUFACTURER PRIOR TO TENDER CLOSE.
 - COORDINATE NURSE CALL DEVICES EXACT LOCATION WITH ARCHITECTURAL DRAWING PRIOR TO INSTALLED.
 - COORDINATE NURSE CALL DEVICES EXACT LOCATION ON SITE PRIOR TO INSTALLED.
 - COORDINATE EXACT REQUIREMENTS WITH PUBLIC ADDRESS SYSTEM MANUFACTURER PRIOR TO TENDER CLOSE.
 - VERIFY PUBLIC ADDRESS SYSTEM SPEAKERS COVERAGE AND EXACT LOCATION ON SITE PRIOR TO INSTALLED.
 - NEW NURSE CALL SYSTEM. THERE IS THREE ZONE OF NURSE CALL IN THE AREA (NURSE CALL STATIONS 15.1.1, 15.2.1 AND 15.2.2).

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**Princess Margaret
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Part B
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10	ISSUED FOR ADDENDUM E-3	2024-09-19
9	ISSUED FOR ADDENDUM E-1	2024-09-05
8	ISSUED FOR TENDER	2024-08-14
7	ISSUED FOR BUILDING PERMIT	2023-12-19
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3	ISSUED FOR 50% CD SUBMISSION	2023-05-08
2	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

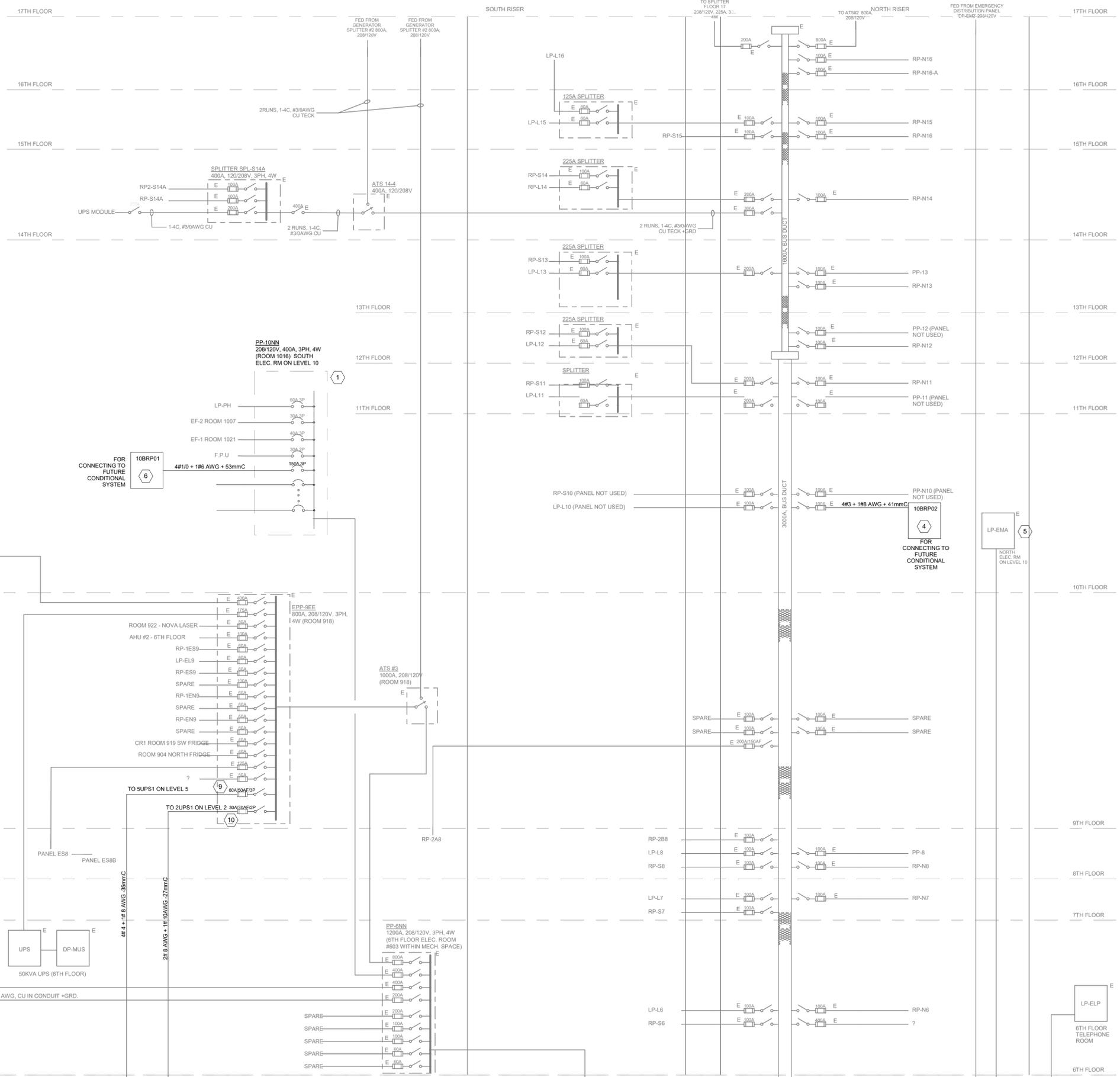
Rev. Description Date

Drawing Title:
**SINGLE LINE DIAGRAM -
NEW WORK - BUILDING
620 LEVEL 10 (DSC)**
1 : 25
Project No.: 0020711.00 Checked by: JG

E4110

SHEET KEYNOTES - NEW WORK

- EXISTING EPP-10E AND PP-10NN TO BE REPLACED WITH NEW PANELS. TRANSFER EXISTING CONNECTED REMAINED LOADS TO NEW PANEL. REFER TO PANEL SCHEDULE FOR DETAILS.
- PROVIDE NEW 150A/3P BREAKERS FOR NEW PANEL 10BVERP01 AND 10BVERP02. PROVIDE 208/120V, 225A, 3PH, 4W PANELS FOR 10BVERP01 AND 10BVERP02.
- PROVIDE NEW 100A MAINS, 120/208V 3PH, 4W PANELS 10BRP01.
- EXISTING 100A/3P BREAKER FOR NEW PANEL 10BRP02. PROVIDE 208/120V, 225A, 3PH, 4W PANEL 10BRP02.
- EXISTING LP-EMA TO BE REMAINED. UPDATE PANEL DIRECTORY AFTER COMPLETE THE WORKS.
- PROVIDE NEW 225A MAINS, 120/208V 3PH, 4W PANEL 10BRP01.
- PROVIDE NEW ICAT RACK MOUNTED 10kVA 30 MIN. BATTERY UPS SET (10UPS1) MOUNTED ON DATA RACK. COORDINATE WITH DATA RACK FOR MORE INFORMATION.
- PROVIDE NEW 100A MAINS PANEL 10URP1. EXACT PANEL LOCATION COORDINATE ONSITE.
- PROVIDE NEW 60A/50AF/3P FUSED SWITCH IN EPP-9EE PANEL FOR NEW SUPS1 SET. CHECK PANEL SPACE PRIOR TO INSTALL THE NEW SWITCH.
- PROVIDE NEW 30A/30AF/2P FUSED SWITCH IN EPP-9EE PANEL FOR NEW ZUPS1 SET. CHECK PANEL SPACE PRIOR TO INSTALL THE NEW SWITCH.



UHN_PMCC_Addendum 4_2024-09-18_R4

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BUILDING 620

FOR CONTINUATION SEE E4102 PANEL SUPS1
FOR CONTINUATION SEE E4102 PANEL ZUPS1
FOR CONTINUATION SEE E01
FOR CONTINUATION SEE E01
FOR CONTINUATION SEE E01
FOR CONTINUATION SEE E01

Princess Margaret
Cancer Centre Stem Cell
Transplant 2

Part B
(MH, MHDU, DSC)

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10	ISSUED FOR ADDENDUM E-3	2024-09-19
9	ISSUED FOR TENDER	2024-08-14
8	ISSUED FOR BUILDING PERMIT	2023-12-19
7	ISSUED FOR MOH 4.1 SUBMISSION	2023-09-25
6	ISSUED FOR 95% CD SUBMISSION	2023-09-06
5	ISSUED FOR 90% CD SUBMISSION	2023-07-31
4	ISSUED FOR 50% CD SUBMISSION	2023-05-08
3	ISSUED FOR MOH 3.2 SUBMISSION	2023-03-13
2	DESIGN DEVELOPMENT SIGNOFF	2022-12-16
1	DESIGN DEVELOPMENT SIGN-OFF	2022-12-02

Rev.	Description	Date
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Drawing Title:

LUMINAIRE SCHEDULE

1 : 1

Project No.: 0020711.00 Checked by: JG

E6000

TYPE	SYMBOL	DESCRIPTION	MANUFACTURER AND CAT NO. SEE NOTE 1	VOLTAGE/ INPUT WATTS	LUMEN PACKAGE (3500 K CCT UNLESS NOTED OTHERWISE) MINIMUM 80 CRI	MOUNTING	LIGHTING CONTROL	REMARKS
	2LT01 5LT01	DUO MED EXAM LED LIGHT, ANTI-MICROBIAL FINISH - T-BAR	AMICO L-SDM-120-I-A2E2-L35-L40-B-G 90CRI	120V / 20W	6354 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	EXAM LIGHT/PATIENT ROOM
	5LT01A	DUO MED EXAM LED LIGHT, ANTI-MICROBIAL FINISH - DRY WALL CEILING NEGATIVE PRESSURE ROOM	AMICO L-SDM-120-I-A2E2-L35-L40-B-G 90CRI	120V / 20W	6354 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	NEGATIVE PRESSURE EXAM LIGHT/PATIENT ROOM
	2LT02	2X4 LED LIGHT - T-BAR TYPE	PEERLESS-ELECTRIC LACH3-24-26-35K-12 80 CRI	120V / 20W	2603 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	OFFICE STORAGE, ETC
	5LT02 10LT02	2X4 LED LIGHT - T-BAR TYPE	PEERLESS-ELECTRIC LACH3-24G-30-35K-12 80 CRI	120V / 24.46W	3037 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	OFFICE/ SOLIDE HOLDING
	5LT02A 10LT02A	2X4 LED LIGHT - GWB TYPE	PEERLESS-ELECTRIC LACH3-24G-48-35K-12 80 CRI	120V / 40W	4847 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	KITCHEN
	5LT02B	2X4 LED LIGHT - SUSPENDANT	PEERLESS-ELECTRIC LACH3-24G-48-35K-12 80 CRI	120V / 40W	4847 LUMENS / 3500K / 80 CRI	SUSPENDANT	0-10V DIMMING	IT ROOM
	10LT02C	2X4 LED LIGHT - T-BAR TYPE EXAM LIGHT	PEERLESS-ELECTRIC LACH3-24G-64-35K-12 80 CRI	120V / 56W	6538 LUMENS / 3500K / 90 CRI	RECESSED	0-10V DIMMING	MODIFIED EXAM ROOM
	10LT02B	2X4 LED LIGHT - T-BAR TYPE	PEERLESS-ELECTRIC LACH3-24G-40-35K-12 80 CRI	120V / 32W	4031 LUMENS / 3500K / 90 CRI	RECESSED	0-10V DIMMING	MODIFIED EXAM ROOM
	10LT03	2X2 LED LIGHT - T-BAR TYPE	PEERLESS-ELECTRIC LACH3-22G-46-35K-12 80 CRI	120V / 36W	4600 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR/COMMON AREAS
	2LT04 5LT04	4" LED DOWNLIGHT, ANTI-MICROBIAL FINISH	PRESCOLITE LFR-4RD-M-15L230TD9XW-DMT_LFR-4RD-T-SS 90CRI	120V / 20W	1502 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	PATIENT ROOM
	5LT04A	4" LED DOWNLIGHT, ANTI-MICROBIAL FINISH - NEGATIVE PRESSURE ROOM	PRESCOLITE LFR-4RD-M-25L35K9XW-DM1_LFR-4RD-T-SS	120V / 20W	2384 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	NEGATIVE PRESSURE PATIENT ROOM
	5LT04B	4" LED DOWNLIGHT, ANTI-MICROBIAL FINISH	PRESCOLITE LFR-4RD-M-30L35K9XW-DM1_LFR-4RD-T-SS	120V / 26W	2841 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	PATIENT ROOM/NEGATIVE PRESSURE PATIENT ROOM
	10LT05 2LT05 5LT05	2' LED LINEAR FIXTURE	3L-PT-D-2'-C1-35K9-D125-D00-1C-UNV	120V / 21.18W	2500 LUMENS / 3500K / 90 CRI	RECESSED	0-10V DIMMING	WASHROOM
	5LT05A	2' LED LINEAR FIXTURE - NEGATIVE PRESSURE ROOM	3L-PT-D-2'-C1-35K9-D125-D00-1C-UNV	120V / 21.18W	2500 LUMENS / 3500K / 90 CRI	RECESSED	0-10V DIMMING	NEGATIVE PRESSURE WASHROOM
	10LT06 2LT06 5LT06	4" LED DOWNLIGHT, ANTI-MICROBIAL FINISH	PRESCOLITE LFR-4RD-M-15L230TD9XW-DMT_LFR-4RD-T-SS 90CRI	120V / 20W	1500 LUMENS / 4000K / 90 CRI	RECESSED	0-10V DIMMING	WASHROOM
	10LT07	8' RECESSED LED LINEAR FIXTURE	RMPD-1L35K-8-MB-L1-1-D-UNV-80CRI	120V / 24W	2800 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	RECEPTION
	2LT08 5LT08	24' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-24-MB-L1-80CRI	120V 84W	8412 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	COORDOR LIGHT
	2LT09 5LT09	32' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-32-MB-L1-80CRI	120V 112W	11880 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	2LT10	4' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-4-MB-L1-80CRI	120V 30.6W	3226 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	2LT11 5LT11	12' LED RECESSED DIRECT LINEAR FIXTURE - DRY CEILING TYPE	METALUMEN RMD-1L35K-12-MB-L1-80CRI	120V 42W	4206 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	NURSE STATION LIGHT
	2LT12	2X4 LED LIGHT	SDL-3-1ACF-24-44-35K-MV 80 CRI	120V / 31W	4533 LUMENS / 3500K / 80 CRI	SUSPENDANT	0-10V DIMMING	SOLIED UTILITY
	2LT13	12' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-12-MB-L1-80CRI	120V 42W	4206 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	WAITING AREA
	5LT14	4' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-4-MB-(L4MODIFIED) 80 CRI	120V 30W	3226 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT14A	4' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-4-MB-L3 80 CRI	120V 30W	3226 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT15	3" LED DOWNLIGHT	PRESCOLITE LTR-3RD-H-SL15L-DM1_LTR-3RD-T-SL35K9MDS	120V / 21W	1482 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	NURSE STATION/STAFF LOUNGE
	5LT15A 5LT16	3" LED DOWNLIGHT	PRESCOLITE LTR-3RD-H-SL10L-DM1_LTR-3RD-T-SL35K9MDS	120V / 11.9W	1032 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	NURSE STATION/ELEVATOR LOBBY
	5LT17	16' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-16-MB-L3 80CRI	120V 96W	9540 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT17	32' LED RECESSED DIRECT LINEAR FIXTURE - T-BAR CEILING TYPE	METALUMEN RMD-1L35K-32-MB-L3 80 CRI	120V 193W	19080 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT19	4' LED LINEAR STRIP LIGHT - UNDER CABINET	COLUMBIA CUC4-CS-ED120	120V 25W	1630 LUMENS / 3500K / 80 CRI	SURFACE MOUNTED	0-10V DIMMING	STAFF LOUNGE UNDER CABINET SELECTABLE CCT
	5LT20	1X4 LED LIGHT - T-BAR TYPE	PEERLESS PNLG-BL-14G-40W-35K 80CRI	120V 39W	1482 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT21	2X4 LED LIGHT - DRY WALL CEILING TYPE	PEERLESS PNLG-BL-24-30W-35K	120V 41W	4014 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	RECEPTION
	5LT21A	2X4 LED LIGHT - DRY WALL CEILING TYPE	PEERLESS PNLG-BL-24-25W-35K-12	120V 20W	2539 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	SOILED HOLDING
	5LT21G	2X4 LED LIGHT - T-BAR TYPE	PEERLESS PNLG-BL-24G-29W-35K	120V 28W	3917 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	SOILED HOLDING
	5LT22	24' LED RECESSED DIRECT LINEAR FIXTURE - DRYWALL CEILING TYPE	METALUMEN RMD-1L35K-24-MB-L3 80 CRI	120V 145W	14310 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	COORDOR LIGHT
	5LT23	4' LED RECESSED DIRECT LINEAR FIXTURE - DRYWALL CEILING TYPE	METALUMEN RMD-1L35K-4-MB-L3 80 CRI	120V 24W	2385 LUMENS / 3500K / 80 CRI	RECESSED	0-10V DIMMING	CORRIDOR
	5LT24	2' LED WALL FIXTURE	METALUMEN RMD-1L35K-2-MB-(L4-MODIFIED)-W-80CRI WALL 2FT LONG	120V 15W	1914 LUMENS / 3500K / 80 CRI	WALL MOUNTED AT 2100mm	0-10V DIMMING	CORRIDOR S-C20
	5LT25	1' x 4' LED SUSPENDANT FIXTURE	COLUMBIA LIGHTING MPS-4-35K XL-F-W-E	120V 56.6W	7860 LUMENS / 3500K / 80 CRI	SUSPENDANT AT 2400mm	0-10V DIMMING	SHELL SPACES
	X1	EXIT SIGN WITH DIRECTION SINGLE FACE - WALL MOUNTED	EMERGI-LITE	120V				
	X2	EXIT SIGN WITH DIRECTION DOUBLE FACE - CEILING MOUNTED	EMERGI-LITE	120V				

LIGHTING FIXTURE SCHEDULE NOTES:

- UNLESS NOTED OTHERWISE, ACCEPTED ALTERNATE MANUFACTURES AND SUPPLIERS: ACUITY BRANDS LIGHTING, COOPER LIGHTING SOLUTIONS, HUBBELL LIGHTING, PEERLESS ELECTRIC, SIGNIFY (FORMERLY PHILIPS LIGHTING), VISCOR/VISIONEERING.
- WHERE AN INCOMPLETE MODEL/CAT NO. IS LISTED, MANUFACTURERS/SUPPLIERS MUST CONFIRM THE PROPOSED FIXTURE WITH THE CONSULTANT A MINIMUM OF ONE WEEK PRIOR TO TENDER CLOSE.
- SUBMIT SHOP DRAWINGS FOR CONSULTANT'S REVIEW PRIOR TO PLACING ANY ORDER.

Branch Panel: 5VERP03

Location: 120/208 Wye
 Supply From: 5VERP01
 Mounting: SURFACE
 Enclosure:
 Phases: 3
 Wires: 4
 A.I.C. Rating:
 Mains Type:
 Mains Rating: 225 A
 MCB Rating:

Notes:

CKT	Circuit Description	QUA	Trip	Poles	A	B	C	Poles	Trip	QUA	Circuit Description	CKT		
1	EXAM LGT IN PAIT. RMS 5-911, 913, 915...	5	20 A	1	100 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-911	2		
3	LTG IN RM 5-907, VS RMS 5-911A, 919A, 905...	12	20 A	1		203 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-913	4	
5	EXAM LGT IN PAIT. RMS 5-905, 903, 925, 927, 92...	8	20 A	1			158 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-915	6
7	EXAM LGT IN PAIT. RMS 5-924, 926, 928, 930	4	20 A	1	80 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-917	8	
9	EM LGT IN COORRIDOR 5-C05	13	20 A	1		471 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-919	10	
11	EM LGT IN RMS 5-920, 401, C05, 402	10	20 A	1			321 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-925	12
13	EM LGT IN RMS 5-403, 405, 407, 409	6	20 A	1	128 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-927	14	
15	EXIT SIGNS	10	20 A	1		50 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-929	16	
17	SPARE - EM LGT	--	20 A	1			0 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-930	18
19	SPARE - EM LGT	--	20 A	1	0 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-928	20	
21	SPARE - EM LGT	--	20 A	1		0 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-926	22	
23	SPARE - EM LGT	--	20 A	1			0 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-924	24
25	SPARE - EM LGT	--	20 A	1	0 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-906	26	
27	RECP.T S IN 5-912, 920, 921	5	15 A	1		880 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-903	28	
29	RECP.T S IN NURSING STATION 5-920	4	15 A	1			1146 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-908	30
31	RECP.T S IN 5-920, 921	2	20 A	1	1224 VA	540 VA			1	15 A	3	RECP.T FOR MONITOR IN RMS 5-911, 913, 915	32	
33	RECP.T S IN MEDICATION PREPARATION RM...	4	15 A	1		486 VA	540 VA		1	15 A	3	RECP.T FOR MONITOR IN RMS 5-917, 919, 925	34	
35	RECP.T S IN RECEPTION/REGISTRATION...	5	15 A	1			980 VA	540 VA		1	15 A	3	RECP.T FOR MONITOR IN RMS 5-927, 929, 930	36
37	RECP.T S IN RECEPTION/REGISTRATION 5-401	5	15 A	1	1220 VA	540 VA			1	15 A	3	RECP.T FOR MONITOR IN RMS 5-928, 926, 924	38	
39	RECP.T S IN NURSING ASSESSMENT RM 5-403	5	15 A	1		710 VA	540 VA		1	15 A	3	RECP.T FOR MONITOR IN RMS 5-905, 903, 908	40	
41	TV IN C-05	1	15 A	1			240 VA	900 VA		1	15 A	6	RECP.T FOR COMPUTERS IN RMS...	42
43	RECP.T S IN NURSING ASSESSMENT RM 5-405	6	15 A	1	910 VA	600 VA			1	15 A	4	RECP.T FOR COMPUTERS IN RMS 5-917, 919	44	
45	CARTS IN RMS 5-909, 920	2	20 A	1		1224 VA	900 VA		1	15 A	6	RECP.T FOR COMPUTERS IN RMS...	46	
47	CARTS IN RMS 5-403, 405	2	20 A	1			1792 VA	1220 VA		1	20 A	1	ELE. BED IN PAIT. RM 5-911	48
49	KIOSK IN WAITING RM 5-401	1	20 A	1	500 VA	1220 VA			1	20 A	1	ELE. BED IN PAIT. RM 5-913	50	
51	DOOR 5-401 DH, ML IN WAITING...	3	20 A	1		1500 VA	1220 VA		1	20 A	1	ELE. BED IN PAIT. RM 5-915	52	
53	ML DOOR 5-C05	1	15 A	1			900 VA	1220 VA		1	20 A	1	ELE. BED IN PAIT. RM 5-917	54
55	POWER FOR ZVB/AP IN RM 5-920	1	15 A	1	500 VA	1220 VA			1	20 A	1	ELE. BED IN PAIT. RM 5-919	56	
57	SPARE	--	20 A	1		0 VA	1220 VA		1	20 A	1	ELE. BED IN PAIT. RM 5-905	58	
59	SPARE	--	20 A	1			0 VA	1584 VA		1	20 A	1	ELE. BED IN PAIT. RM 5-903	60
61	SPARE	--	20 A	1	0 VA	1220 VA			1	20 A	1	ELE. BED IN PAIT. RM 5-908	62	
63	SPARE	--	20 A	1	0 VA	180 VA			1	15 A	1	LIFT IN PAIT. RM	64	
65	SPARE	--	20 A	1			0 VA	180 VA		1	20 A	1	DIGITAL WHITE BOARD IN 5-920, 401	66
67	SPARE	--	--	1	--	0 VA			1	15 A	--	SPARE	68	
69	SPARE	--	--	1	--	0 VA			1	15 A	--	SPARE	70	
71	SPARE	--	--	1	--	0 VA			1	15 A	--	SPARE	72	
73	SPARE	--	--	1	--	0 VA			1	15 A	--	SPARE	74	
75	SPARE	--	--	1	--	0 VA			1	15 A	--	SPARE	76	
77	SPARE	--	--	1	--	--	--	--	1	--	--	SPARE	78	
79	SPARE	--	--	1	--	--	--	--	1	--	--	SPARE	80	
81	SPARE	--	--	1	--	--	--	--	1	--	--	SPARE	82	
83	SPARE	--	--	1	--	--	--	--	1	--	--	SPARE	84	
Total Load:					11801 VA	11982 VA	11581 VA							
Total...					99 A	100 A	97 A							

Legend:

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Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals
HEALTH CARE FACILITY LIGHTING	200 VA	100.00%	200 VA	
RECEPTACLE	31196 VA	70.00%	21837 VA	
				Total Conn. Load: 35364 VA
				Total Est. Demand: 28005 VA
				Total Conn.: 98 A
				Total Est. Demand: 72 A

Notes:

Branch Panel: 5VERP04

Location: ELECTRICAL ROOM 5-ELC4
 Supply From: 5VERP01
 Mounting: SURFACE
 Enclosure:
 Phases: 3
 Wires: 4
 A.I.C. Rating:
 Mains Type:
 Mains Rating: 225 A
 MCB Rating:

Notes:

CKT	Circuit Description	QUA	Trip	Poles	A	B	C	Poles	Trip	QUA	Circuit Description	CKT		
1	LTG	2	20 A	1	20 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-882	2	
3	EM LGT IN SHELL SPACES 5-872...	4	20 A	1		226 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-880	4	
5	SPARE -LTG	--	20 A	1			0 VA	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-876	6
7	SPARE -LTG	--	20 A	1	0 VA	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-874	8	
9	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-871	10	
11	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	360 VA		1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-873	12	
13	SPACE - SHELLED SPACE 5-859	--	--	1	--	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-870	14	
15	SPACE - SHELLED SPACE 5-859	--	--	1	--	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-883	16	
17	SPACE - SHELLED SPACE 5-859	--	--	1	--	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-885	18	
19	SPACE - SHELLED SPACE 5-859	--	--	1	--	360 VA			1	15 A	1	PATIENT BED TWO (2) RECP.T S IN RM 5-887	20	
21	SPACE - SHELLED SPACE 5-859	--	--	1	--	540 VA			1	15 A	3	RECP.T FOR MONITOR IN RMS 5-882, 880, 876	22	
23	SPACE - SHELLED SPACE 5-859	--	--	1	--	540 VA			1	15 A	3	RECP.T FOR MONITOR IN RMS 5-878, 871, 873	24	
25	SPACE - SHELLED SPACE 5-859	--	--	1	--	540 VA			1	15 A	3	RECP.T FOR MONITOR IN RMS 5-879, 883, 885	26	
27	SPACE - SHELLED SPACE 5-859	--	--	1	--	180 VA			1	15 A	1	RECP.T FOR MONITOR IN RMS 5-887	28	
29	SPACE - SHELLED SPACE 5-859	--	--	1	--	1244 VA			1	15 A	3	WORKSTATIONS IN NURSING RM 5-884	30	
31	SPACE - SHELLED SPACE 5-859	--	--	1	--	1224 VA			1	15 A	2	WORKSTATIONS IN NURSING RM 5-884	32	
33	SPACE - SHELLED SPACE 5-859	--	--	1	--	1240 VA			1	15 A	4	RECP.T S & P TUBE, PHONE, IN RMS 5-884, 886	34	
35	SPACE - SHELLED SPACE 5-859	--	--	1	--	1224 VA			1	15 A	2	WORKSTATIONS IN RMS 5-877, 878	36	
37	SPACE - SHELLED SPACE 5-859	--	--	1	--	500 VA			1	15 A	1	POWER FOR ZVB/AP IN RM 5-884	38	
39	SPACE - SHELLED SPACE 5-859	--	--	1	--	0 VA			1	15 A	--	SPARE	40	
41	SPACE - SHELLED SPACE 5-859	--	--	1	--	0 VA			1	15 A	--	SPARE	42	
43	SPACE - SHELLED SPACE 5-859	--	--	1	--	0 VA			1	20 A	--	SPARE	44	
45	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	46	
47	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	48	
49	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	50	
51	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	52	
53	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	54	
55	SPACE - SHELLED SPACE 5-859	--	--	1	--	--	--	--	1	--	--	SPARE	56	
57	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	58	
59	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	60	
61	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	62	
63	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	64	
65	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	66	
67	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	68	
69	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	70	
71	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	72	
73	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	74	
75	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	76	
77	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	78	
79	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	80	
81	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	82	
83	SPACE	--	--	1	--	--	--	--	1	--	--	SPARE	84	
Total Load:					3724 VA	3266 VA	4088 VA							
Total...					32 A	27 A	35 A							

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals
RECEPTACLE	9832 VA	70.00%	6882 VA	
				Total Conn. Load: 11078 VA
				Total Est. Demand: 8129 VA
				Total Conn.: 31 A
				Total Est. Demand: 23 A

Notes:

Branch Panel: 5URP1

Location: TELECOMMUNICATIONS ROOM 5-866
 Supply From: EX EPP-9EE
 Mounting: SURFACE
 Enclosure:
 Phases: 3
 Wires: 4
 A.I.C. Rating:
 Mains Type:
 Mains Rating: 100 A
 MCB Rating:

Notes:

CKT	Circuit Description	QUA	Trip	Poles	A	B	C	Poles	Trip	QUA	Circuit Description	CKT	
1	RACK RECP.T. IN TELE. RM 5-866	1	30 A	2	2500 VA	1000 VA			2	30 A	1	RACK RECP.T. IN TELE. RM 5-866	2
3													4
5	RACK RECP.T. IN TELE. RM 5-866	1	30 A	2		2500 VA	1000 VA						6
7													8
9	RECP.T. INTELE. RM 5-866	1	15 A	1			1000 VA	0 VA					10
11	RECP.T. INTELE. RM 5-866	1	15 A	1			180 VA	--					12
13	RECP.T. INTELE. RM 5-866	1	15 A	1	180 VA	--							14
15	RECP.T. INTELE. RM 5-866	1	15 A	1			180 VA	--					16
17	SPARE	--	15 A	1			0 VA	--					18
19	SPARE	--	15 A	1	0 VA	--							