.1 Introduction

The Construction Standards presented in this volume are issued as an instrument of implementing the University's policies and achieving it's goals in relation to a functional, sustainable and aesthetically pleasing built environment.

Throughout this document, the terms "University of Victoria", "University", "UVic" and "Owner" shall be understood as identifying the same institution.

.2 University Construction Standards

The Standards are addressed to the Architects, Engineers and other professionals providing consulting services to the University.

The Standards have been produced to provide maximum value to the University (defined as the balance between capital construction cost and long-term operational and maintenance costs), through uniformity, compatibility, functionality, durability and quality.

.3 Use of University Construction Standards

.1 The Standards shall be incorporated in the design and construction documentation for all new or renovation building projects.

.2 The Standards address only issues and items particular to the University of Victoria and thus rely on the Consultants' professional competence for compliance with all applicable codes and industry standards. The Standards are not contract specifications. It is Consultants' responsibility to produce complete and coordinated specifications.

.3 The Standards are intended to provide general direction to design professionals but do not intend to replace or inhibit their design, technical creativity or judgment.

.4 The Standards may be superseded by particular requirements of a space, a user, or authorities having jurisdiction. Therefore, the Standards shall be implemented with the assumption that statements such as "unless noted otherwise", "except particular project requirements", etc. apply throughout. A justified deviation from Standards' provisions may be considered, as authorized in writing by the Project Officer.

.4 University Departments

During the course of a project, the following departments, units and individuals are instrumental in managing the project to provide information, reviews, comments, decisions and approvals.

.1 Facilities Management (FMGT): the University department that manages construction projects, operates and maintains facilities and grounds.

.2 Designated Officer or Project Officer: the individual assigned to manage a project. The Designated Officer or Project Officer is the main contact and typically represents the University for all regular communications and contractual issues, including communication within UVic departments and FMGT units.

.3 Director, Capital Development: As the overall design and consulting services authority, provides direction for design, sustainability and contractual issues; reviews finishes and colours, etc.

.4 Director, UVic Planning and Sustainability: Provides review of sustainability, site planning and design, and variance issues.

.5 Facilities Interior Planning and Logistics (FM-IPL): Provides review of interior planning, finishes and colours.

.6 Accessibility Coordinator (FM-AC): Provides review of accessibility items.

.7 Safety Coordinator (FM-SC) – Provides review WorkerSafe and other General Safety concerns.

.8 Waste Reduction Coordinator (FM-WRC): Provides input on Waste Reduction.

.9 Facilities Management Grounds (FMGR): Represents the University for landscape related technical issues and practices.

.10 Janitorial (FMJA): review of finishes, washroom accessories and miscellaneous items.

.11 FMGT Shops – review and comment on issues of their specialty:
- .1 FMCA = Carpentry Shop
- .2 FMPA = Paint Shop
- .3 FMME = Mechanical Shop
- .4 FMPL = Plumbing Shop
- .5 FMEL = Electrical Shop

.5 General Project Procedures

.1 All project communication with the University shall be conducted through the Designated Officer or Project Officer.

.2 The University project number must appear on all documents and correspondence.

.3 The University of Victoria is under the jurisdiction of both the District of Oak Bay and the District of Saanich. Ensure documents comply with the bylaws of the applicable jurisdiction.

.4 The boundaries of the Project Site are to be clearly defined within the documents. The Contractor's Use of Site shall be primarily limited to the defined Project Site.

.6 University Review

.1 During a given project, the University reviews the Consultant's design and construction documents at pre-established milestones. The University's reviewers may include (but are not limited to) the Designated Officer, User Groups, and other FMGT Units and individuals. The Project Officer will coordinate University's review activities, and provide resulting comments back to the Consultant for consideration.

.2 The University's review is undertaken to assess the satisfaction of Client requirements and the Project's general compliance with the Program of Requirements and University Design and Construction Standards. The University's reviews are not design, technical, and/or coordination checks. It is the Consultant's responsibility produce complete and well-coordinated final documents.

.7 UVic Legal Description

All University projects located on campus shall use the following Legal Description:

Parcel Identifier (PID) 018-583-890 and Legal Description: Lot 1, Sections 31, 44, 45, 71 and 72, Victoria District, Registered Plan Number: VIP 57957.

.8 BC Government Policies

Procurement, building design and product selection shall conform to the following policies:

.1 The New West Partnership Trade Agreement – (NWPTA)

.2 Wood First Policy:
- .1 Whenever possible, consider extensive use of wood with design solutions, including exterior assemblies protected from weather, such as soffits, supporting elements under canopies, etc.
- .2 The use of Beetle Kill Pine lumber is considered desirable for projects.

.9 Contract Documents

.1 For addition and/or renovation projects, the University will provide the base floor plans of the existing building in AutoCAD format. As-built information will be provided as it is available.

.2 **SI Metric Units**
- .1 All University projects shall be designed and annotated (drawings, specifications, shop drawings, manuals, as-built documents, etc.) in SI Metric Units.

.3 **Drawings**

.1 Drawings shall include the following information:
  .1 BC Building Code analysis.
  .2 Identification of all new and/or existing fire separations and make-up of rated assemblies.

.4 **Specifications**
  .1 Use long-form specifications in 8 ½" x 11" (letter) size booklet format whenever possible..
  .2 Specifications on drawings are only acceptable for the smallest projects, and with prior approval from the Project Officer.

.10 Acceptable Products / Manufacturers and Equivalents

.1 In accordance with applicable Provincial and Federal Government legislation (The New West Partnership Trade Agreement - NWPTA), specify a minimum of three (3) equivalent products, of different manufacturers, compliant with UVic Standards, for each section of the Work, except:
  .1 Items identified in UVic Standards as "alternates not acceptable" or similar statement.
  .2 Where mandatory to match existing, or be compatible with other campus installations.
  .3 Highly specialized items that require one particular product.

.2 Unless otherwise noted, all listed products shall allow the substitution of a product with an approved equivalent.

.3 Process and procedures for equivalency and substitution approval:
  .1 Upon receipt of a request for a product substitution, from Contractor or Manufacturer, the Consultant shall undertake all necessary research to establish if the proposed product is a true equivalent of the specified product
  .2 Provide a letter to FMGT, stating their recommendation for approval.
  .3 FMGT will review the Consultant's recommendation and will advise the Consultant of approval or rejection.
  .4 The University will not review any product without a clear written assessment of equivalency and recommendation of approval from Consultant.

.11 Work Not In Contract (NIC)

.1 Refer to items that are not part of the construction contract as "NIC".

.2 Typically, the following items are Not in Contract (NIC):
  .1 Paper towel holders, toilet paper dispensers, soap dispensers, waste receptacles. All concealed blocking and backing for the above items must be provided.
  .2 Furniture (except for built-in furnishings)
  .3 Vending machines

.1 General Building Design Requirements

Building designs shall consider the following University general building design principles:

.1 Rain garden type detention ponds are desirable for building stormwater management.

.2 Green roofs are typically not desirable. The use of green roofs may be acceptable for particular applications, as approved by the Owner. Alternative solutions such as low albeido exposed membrane assemblies and other sustainable approaches to roofing are encouraged.

.3 Stair access to roof levels is required in the case of rooftop mechanical penthouses or where roof mounted equipment will require frequent maintenance access. Stair access is also required where green or vegetated roofs are installed.

.4 Waste Chutes shall not be used.

.5 Where parapet walls are used, consider designing to suit guard height requirements to limit Fall Protection requirements.

.6 Exterior doors; particularly main entry ways shall be protected by the use of roof canopies or overhangs.

.7 Waterless urinals shall not be used.

.8 General mechanical cooling for buildings is only provided under special circumstances as directed or approved by FMGT.

.9 Drinking fountains are not typically chilled.

.10 Site furniture, steps, railings, retaining walls etc., shall be designed to be skateboard deterrent.

.11 The coordination of flooring, wall, ceiling and window treatment materials and finishes is required to achieve the overall required acoustical performance of the room or space.

.12 Accessible washroom compartments that meet the code specified dimensions provide only a tight fit for functionality. Where space permits, provide an additional 300mm of space in one or both dimensions.

.13 Abuse resistant surfaces shall be specified in high traffic, or areas subject to abuse. In corridors, consider wall protection to minimum 1200 mm above finish floor.

.1 Conduct

.1 The Contractor shall enforce order and discipline among workers and not employ unfit persons.

.2 Prior to the commencement of Work, the Contractor shall become familiar with University Harassment and Smoking Policies. The Contractor is solely and entirely responsible for the implementation and enforcement of these Policies on the Site.

.1 University Discrimination and Harassment Policy
http://www.uvic.ca/shared/shared_usec/docs/policies/GV0205_1150_.pdf

.2 University Smoking Policy - smoking prohibited within 10 metres of building entrances structures and air intakes.
http://www.uvic.ca/shared/shared_usec/docs/policies/AD2405_6450_.pdf

.2 Access to Site

.1 The Contractor shall not close or obstruct streets, sidewalks, lanes or other public rights of way without having first obtained required authorization from the Owner and permits from the Authorities having Jurisdiction.

.2 The Contractor shall maintain adequate means of egress from the Project and shall not diminish, by his operations, adequate access/egress from the adjacent existing premises of the Owner.

.3 The Project Site

.1 The Contractor shall be restricted in the use of the premises to inside the Project Site, which shall be defined by the project's perimeter hoarding. Site or other specific works outside the perimeter hoarding shall be authorized by the Project Officer.

.2 Only commercial vehicles carrying tools or materials for the work are permitted temporarily on site. Vehicles owned by persons employed on the Work shall be parked in the University General Parking lots. Parking permits are available for longer term projects. Daily parking permits are also available at coin operated machines at the entrance roads. All persons employed on the work shall obey the Traffic and University Parking Regulations, as indicated in the document below.

.1 Traffic and Parking Regulations
http://www.uvic.ca/shared/shared_usec/docs/policies/BP3205_6800_.pdf .

.4 Work Hours and Restrictions

.1 Construction shall be conducted in a manner which results in the least disruption to on-going operations and the core mission of delivery of education to students.

.2 Work on site shall be limited to the period between 7:00 and 19:00 unless special permissions are granted by the Project Officer.

.3 The University reserves the right to restrict construction activity which is deemed to adversely interfere with the use of the university lands, premises or activities.

.5 Contractors' Use of Elevators

.1 As applicable to both new and existing facilities, the Contractor is responsible to provide adequate protection of all surfaces (use blankets, plywood liner, etc), and strictly enforce the elevator load limit. The Contractor is responsible for all construction-related damage and necessary remedies to elevators (repairs, replacement, service calls), during the course of construction.

.6 Temporary Facilities

.1 The Contractor and Sub-contractors shall provide Construction Facilities and Temporary Accommodation as they require for the performance of Work.

.2 On a case by case basis, depending on the type of construction, project size and location, the provisions identified below may only be applicable in part and may be scaled down to suit the project.

.1 For interior renovation projects, the Contractor's office and storage may be located within an existing facility and most utilities will be provided by the University. Confirm with FMGT.

.2 The Consultant shall review with FMGT the items below, confirm which conditions apply, and clearly identify requirements in the Contract Documents.

.1 Contractor's Offices

.2 Equipment, Tool and Materials Storage sheds and/or trailers

.3 First Aid

.4 Sanitary Facilities

.5 Water Supply

.6 Temporary Heating, Power and Light

.7 Temporary Barriers and Enclosures

.1 Construction Site Hoardings.

.1 Perimeter hoarding to be minimum 2400mm high

.2 Locate vehicular access lockable gates where least disruptive to street traffic. Locations shall be approved by FMGT.

.2 Interior Barriers and Enclosures - Coordinate location with FMGT:

.1 Provide enclosures for separating spaces in which dust-generating activities are executed, to protect workers, the public, sensitive equipment, and areas or surfaces where work has been completed.

.2 All work adjacent to laboratories, or other clean spaces, shall be isolated during demolition and construction work.

.3 The Consultant shall specify areas and required type of protections: dust, humidity, fire, smoke, sound, etc.

.3 Partitions Enclosures

.1 Partitions shall be rigid (framed) slab to slab, with dust proof sealed perimeter and joints.

.4 Containment Barrier

.1 Shall consist of a plastic curtain seamlessly fixed and sealed to perimeter to fully restrict dust and particles infiltration into the clean area.

.8 Site Security

.1 The Contractor shall be responsible for construction site security.

.2 Neither the Owner or the Consultant will be responsible for any loss or damage to materials, property or equipment of the Contractor, Sub-contractors or Sub-subcontractors.

.3 Co-ordinate with Campus Security to inform them when authorized overtime work is to take place, and inform them of any theft or damage at the Site.

.10 Tree Protection

.1 Existing trees that are to be retained on a construction site shall be protected.

.2 During demolition and construction work, the area beneath the drip line shall be enclosed and protected by a fence - see figure 1.

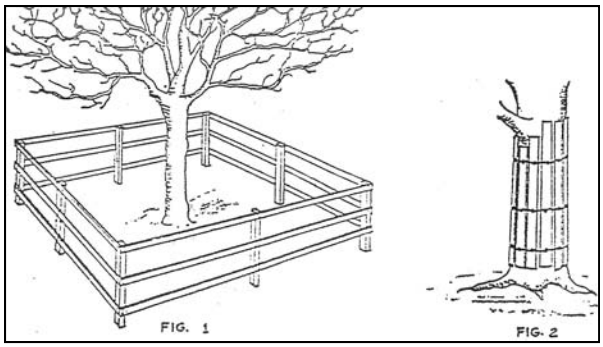


Figure 1 – Tree Protection

.3 Activities and storage of materials and equipment within this area are prohibited. Prevent poor drainage and excessive heat. The protection fence shall:

.1 Be of min. 1.2 meters in height, be erected before construction starts and remain until the project's completion.

.2 Be constructed of orange snow fencing securely fastened to metal stakes, or 2 x 4 wood, driven into the ground. Other forms of protection must be discussed with FMGR.

.3 Not be lifted or removed at any time for vehicular and equipment access, to prevent soil compaction in the root zone and air depletion.

.4 When a fenced area is impractical, wrap tree trunks with burlap protected with 19x50mm planks extending from grade to the lowest limbs - see figure 2. Planks shall be placed close together and secured in place with three bands of stapled wire.

.5 Any pruning of the branches or roots must be done by a professional Arborist, in consultation with FMGR. Storage of building materials, soil or equipment is not permitted inside the protection area.

.1 Shop Drawings

.1 The Consultant shall specify shop drawing requirements for each applicable section of work.

.2 Where the production of shop drawings results in a modification to the contract documents, the Consultant shall provide written notification to the Owner when a change in the work is required. Where a modification does not require a change in the work, but results in a change of appearance, performance, or in a manner otherwise of importance or interest to the Owner, the Consultant shall ensure all changes are approved by the Owner and documented as necessary prior to approval of the shop drawings.

.3 The Consultant shall provide final shop drawing approvals prior to directing on-site mock-ups or construction.

.2 Mock-ups

.1 The Consultant shall specify requirements for mock-ups in the construction documents. Mock-up requirements shall clearly outline the frequency, size, scope, and locations of the work to be demonstrated. The Consultant shall specify free-standing mock-ups where more suitable for both construction and review.

.2 Mock-ups shall be constructed, reviewed and approved by the Consultant prior to the Contractor commencing general installation of the relevant items of work on the site. The Consultant shall specify a timeframe for scheduling of mock-up reviews.

.3 Where the construction of a mock-up suggests a modification to the contract documents or the approved shop drawings is necessary, the Consultant shall provide written notification to the Owner when a change in the work is required. Where a modification does not require a change in the work, but results in a change of appearance, performance, or in a manner otherwise of importance or interest to the Owner, the Consultant shall ensure all changes are approved by the Owner. The Consultant shall direct shop drawing revisions as required, and further mock-up requirements.

.4 Mock-ups shall generally be specified for, but not limited to the following sections of work:

.1 Building Envelope

.1 Exterior Wall Assemblies:

.1 Exterior wall assembly details, including cladding joints/seams, tie-in details to foundations, roofs, doors, glazing, and other penetrations, and interfaces with other adjacent wall assemblies.

.2 Windows, Doors, Skylights, Curtain Walls Storefronts etc:

.1 Mock-up installations of varying assembly types for third party air and water penetration verification testing.

.3 Roof Assemblies:

.1 General roof assembly detailing, including parapet and building wall tie-ins, mechanical curbs and penetrations, special equipment anchorages and supports, and scupper and drain details.

2 Interior Finishes

.1 Millwork, trims, and custom cabinetry.

.2 Layout and transitions of floor finishes, tile work, wall coverings, panelling etc.

.3 Third Party Inspection and Testing

.1 During the design stage, the Consultant shall provide for the Owner's approval, a comprehensive listing of recommended third party testing and inspection services (beyond those required by the BC Building Code or other Authority Having Jurisdiction) for the project. Provide a detailed description of the test purpose, the relevant performance criteria, reason for testing (ie. required by warranty) and a listing of pre-qualified service providers. Upon the Owner's approval, the specifics shall be outlined in the construction documents.

.2 At a minimum, third party testing and inspection services shall include, but not be limited to the following:

- .1 Roofing and Waterproofing
  - .1 Third party inspection to suit the Roofing Contractors Association of BC (RCABC) Warranty requirements; and
  - .2 Leak detection
    - .1 Flood testing; or
    - .2 Electric conductance testing (Detec or similar).
- .2 Windows, curtainwall and other fenestration assemblies
  - .1 Water penetration testing.
- .3 Air Barrier
  - .1 Assembly air tightness testing; or
  - .2 Whole building air tightness (or zone testing).

.3 For large capital projects, consider the following third party inspection services:

- .1 Master Painter's Institute /Master Painter and Decorator's Association testing and inspection
- .2 Architectural Woodwork Manufacturer's Association of Canada Guarantee and Inspection Service.

.4 Testing phases shall be clearly broken out into the following categories and requirements as applicable:

- .1 Manufacturer In-Plant Testing or Laboratory Testing
  - .1 General Test Description:(ie.window water penetration, air-leakage, structural etc.)
  - .2 Quantity and specimen size.
  - .3 Regulated testing standard and test method (ASTM, CSA, AAMA etc.).
  - .4 Performance Criteria.
  - .5 Requirements for remedial work and additional testing if failure of initial testing to meet the specified performance criteria.
- .2 Mock-up Testing and Inspection (In-situ or separate)
  - .1 General Test Description:(ie.window water penetration, air-Leakage etc.)
  - .2 Quantity, location and scope of work to be captured by the test(s).
  - .3 Regulated testing standard and test method (ASTM, CSA, AAMA etc.).
  - .4 Performance Criteria.
  - .5 Requirements for remedial work and additional testing if failure of initial testing to meet the specified performance criteria.
- .3 General Field Testing and Inspection (In-situ).

.1 General Test Description:(ie.window water penetration, air-Leakage etc.)
.2 Quantity, locations, project milestones and scope of work to be captured by the tests.
.3 Regulated testing standard and test method (ASTM, CAB, AAMA etc.).
.4 Performance Criteria.
.5 Requirements for remedial work and additional testing if there are failures of the general testing to meet the specified performance criteria.

.2 The Consultant shall recommend and arrange all third party testing and inspection agencies on behalf of the Owner. The Consultant shall recommend a budget for testing and inspection costs to be expected for the project.

.3 Testing and Inspection costs shall be borne by the Owner. Where additional third party services are required due to specified tests or inspections failing to achieve the requirements of the contract documents as determined by the Consultant, the Consultant shall specify that the Contractor, not the Owner shall bear the additional cost.

.4 The Consultant shall specify the requirements of the Contractor when they are required to provide labour, materials, equipment, supervision, facilities or utilities to:
.1 provide access to areas of the work to be tested or inspected;
.2 prepare portions of the work for testing beyond the general scope of the work (ie. temporary work);
.3 isolate and protect adjacent areas of the work;
.4 provide facilities (ie. pressure chambers) to suit the specified testing methods.

.5 The Owner expects the Consultant, on the Owner's behalf, to observe all third party testing and/or inspection as necessary to assure the specified performance requirements have been verified, especially where any professional judgement or interpretation is applicable. The Consultant shall provide the Owner with advanced notice of all third party testing and/or inspection should the Owner wish to attend.

.6 The Consultant shall ensure the documents provide the Owner the ability to request additional testing and/or inspection services beyond those specified.

.7 The cost of Inspections and Tests required by laws, ordinances, rules, regulations, etc, shall be included in the Contract Price, and shall be the sole responsibility of the Contractor.

.8 Where applicable, the University generally retains and directs the following third-party agencies in advance, and independent from the process described above:
.1 Hazardous Materials Testing, Abatement and Removals
.2 Geotechnical Services

.4 Third Party Agency Limitations

.1 The services of a third party agency shall in no way relieve the Contractor's obligations to perform the Work of the Contract.
.3 Agencies shall not be authorized to:

.1 Release, revoke, alter enlarge or interpret on the requirements of the Contract Documents.

.2 Approve or accept any portion of the Work.

.3 Perform any duties of the Contractor.

.5 Performance Specifications

.1 Where performance based specifications are utilized for sections of work which require third party testing, the Consultant shall:

.1 Specify all required performance criteria. References to industry specifications, test methods, manufacturer's published performance data, or any other external documentation shall not comprise the sole performance standard.

.2 Specify performance criteria in units of measurement that can be referenced in the BC Building Code or applicable standards and regulations referenced within the code.

.1 Typical Construction and Deconstruction Waste Management Practices

.1 The University is targeting a minimum overall construction waste diversion rate of 75% as outlined in UVIC's *Sustainability Action Plan*. It is generally expected the provisions of this section will be implemented and administered by the Consultant for all projects, however, it is recognized that the function of this section in its entirety may be excessive for smaller scale projects. As such, pending approval from FMGT, the Consultant may amend the requirements of this section to suit project specific needs. Notwithstanding any adjustment to the administrative and/or functional process described herewith, all projects shall aim to generate the least amount of waste possible.

.1 **New Construction**:

Processes shall be employed to limit construction generated waste, including that caused by damage due to mishandling, improper storage or inadequate protection. Special provisions shall also aim to minimize over-packaging and excessive quantity estimating.

.2 **Deconstruction or Renovation**:

Complete deconstruction, or partial in the case of renovation projects, shall be carried out in such a way as to salvage for reuse and recycling the largest amount of materials possible.

.2 UVIC's objective is to minimize waste disposal in landfills or incinerators. On new construction projects this means careful recycling of job site waste, and on deconstruction projects this also means careful removal for salvage.

.3 The requirements of this section shall be considered a minimum standard for all LEED and Non-LEED projects. Additional commentary regarding Waste Management requirements for LEED projects can be found within Section 1.6 – Sustainability Requirements.

.2 Regulatory Requirements

.1 Where feasible, the University typically removes all hazardous materials prior to the start of a Project. However, where removal and disposal of hazardous materials are required as part of a construction project, such work shall conform to applicable codes and regulations. The handling and disposal of all hazardous and banned materials shall be in accordance with the BC Environmental Management Act and Hazardous Waste Regulation, and regional and municipal regulations. Hazardous and banned materials may include, but are not limited, to asbestos, drywall (banned from disposal), underground storage tanks, Polychlorinated Biphenyls(PCBs), abandoned chemicals (gasoline, pesticides, herbicides, flammable and combustible substances), freon from cooling equipment, lead-based paints, smoke detectors, and mercury containing switches.

.2 Only licensed brokerage, storage, transfer and disposal facilities which comply with the requirements of local municipal or Capital Regional District (CRD) Bylaws, or those licensed or regulated by other jurisdictions shall be used by the Contractor for the recycling and disposal of waste materials.

.3 For a list of compulsory materials to be recycled, and a list of materials strictly prohibited for landfill disposal, refer to the CRD website: *http://www.crd.bc.ca/waste/*

.3 Project Waste Management Provisions

.1 The Contractor's submittals to the Owner and the Consultant shall include the following:

.1 **Construction Waste Management Plan (WMP)**

.1 **Part 1 - Pre-Construction Material Quantify Estimates**

Prior to commencing the Work, provide an estimate of deconstruction and construction job site generated waste materials to be salvaged, recycled or disposed of. Materials shall be quantified using industry standard units of measurement. A reference table of common waste generation rates for construction projects is included at the end of this section. This table can be utilized for estimating construction generated waste quantities if the Contractor does not have sufficient historical data or established programs to generate their own estimates.

Along with the Pre-Construction Estimates, the Contractor shall provide a written submission, to the satisfaction of the University, describing in detail the following:

.1 The intended destinations for the various waste materials identified.

.2 The intended job site separation and collection facilities and procedures.

.3 The proposed deconstruction methodology and sequencing (if applicable).

.4 The schedule for deconstruction (if applicable).

.5 The location, security and protection of storage areas (if materials are to be stored on site).

.6 The details on materials handling and removal procedures on project sites with space constraints.

.2 **Part 2 – Project Update**

Provide a monthly update of actual deconstruction and construction job site generated waste materials. Indicate whether these materials were salvaged, recycled, or disposed of, and the receiving facility.

Note: A sample WMP is attached to the end of this section for reference. A Contractor generated form containing the same general information is also acceptable. Included with the sample plan is a reference guide of suggested storage and handling procedures for salvageable materials.

.4 Waste Management Implementation

.1 **Meetings:**

.1 The Contractor shall coordinate and conduct Project Waste Management meetings. Meetings shall include Subcontractors and Suppliers affected by the WMP. Review of the WMP and each subsequent update of the plan shall be a regular meeting agenda item. At a minimum, waste management goals and issues shall be discussed at the following meetings:

.1 Pre-bid meeting.

.2 Pre-construction meeting.

.3 Regular job-site meetings.

.2 **Administration**:

.1 Manager: The Contractor shall designate an on-site representative responsible for instructing workers and overseeing, documenting, and updating the WMP.

.2 Distribution: The Contractor shall distribute copies of the WMP to all Subcontractors and Suppliers.

.3 Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling procedures to be used by all parties at the appropriate stages of the Project. For deconstruction projects the Contractor shall provide on-site direction to identify materials intended for salvage, outline procedures for removal, storage and handling, and confirm requirements for reusing salvaged materials within the project.

.4 Separation facilities: The Contractor shall establish and label a specific area to facilitate separation of materials for recycling and salvage. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

.5 Application for Progress Payments: The Contractor shall submit with each Application for Progress Payment an updated WMP with the “Part 2 - Project Update” section completed for the invoicing term. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment.

.1 Submit to the Consultant and/or Owner way-bills, invoices and other documentation confirming that all materials have been delivered to the required locations.

.2 Any materials salvaged by the Contractor, Subcontractors, employees or agents for their own re-use elsewhere, or any items gifted to a third party for re-use must be accounted for. In these situations where way-bills, invoices or other documentation are not available, The Contractor shall still declare the materials, quantities, and destination within the WMP. Upon request, the Contractor shall submit a written declaration that such materials have been, or are intended to be salvaged. It is important that the overall quantities of all waste materials are inventoried within the WMP to verify the University’s minimum 75% waste diversion goals.

.6 Project Waste Summary: The Contractor shall submit with the final Application for Payment a summary WMP for the Project. The submission shall generally be a

summation of the monthly WMP submissions which will provide an overall synopsis of the total project Waste Management performance. Failure to submit this information will render the application incomplete and will result in holdback of the final payment.

Waste Management Plan
Construction and Deconstruction Projects

University of Victoria | Facilities Management

Name of Company	Contact Person	Tel:	UVIC Project Officer
Project Site	Project Type	☐ New Construction ☐ Partial Deconstruction ☐ Complete Deconstruction	Total Square Footage

Pre-Construction Estimates

(Complete this section prior to commencing the Work)

Project Update

(Complete this section each month for submission with application for progress payment)

For Period: To:

Material	Estimated Generation	Salvaged	Recycled	Disposed	Facility	Comments
Wood - Glulam Beams	*400 bd.ft.*	*350 bd. ft*			*Storage*	*Delivered to Owner's Storage Compound*

Certifed By:

Name	Title	Signature	Date

Explanatory Note:
Column 1: - "Material" - enter materials targeted for salvage, recycling, and/or disposal
Column 2: - "Estimated Generation" - enter the estimated volumes, quantities or number of salvageable, recyclable, and waste mateials to be generated (ie. cu. yd., cu. m., tonnes, bd. ft. etc.) For partial or complete deconstruction projects, quantity estimates shall be based on in-situ materials. For new construction, additions, renovations etc., estimates for construction generated waste materials shall be calculated based on the waste generation rates provided, or based upon the Contractor's historical data.
Column 3: - "Salvaged" - enter the volumes or quantities of materials, or number of items salvaged (refer to units above)
Column 4: - "Recycled" - enter the volumes or quantities of materials recycled (refer to units above)
Column 5: - "Disposed" - enter the volumes or quantities of materails disposed (refer to units above)
Column 6: - "Comments" - enter any additional comments or details

New Construction Projects
Typical Waste Generation Rates (for WMP estimating purposes)

	Residential/Commercial High-rise Construction		Institutional Low-rise Construction		Commercial Low-rise Construction		Residential Low-rise Construction	
Material	**cu.yd./ 1,000 sq.ft.**	**tonnes/ 1,000 sq.ft.**	**cu.yd./ 1,000 sq.ft.**	**tonnes/ 1,000 sq.ft.**	**cu.yd./ 1,000 sq.ft.**	**tonnes/ 1,000 sq.ft.**	**cu.yd./ 1,000 sq.ft.**	**tonnes/ 1,000 sq.ft.**
wood	3.3	0.40	7.0	0.86	5.6	0.68	6.0	0.73
drywall	3.6	0.92	0.9	0.22	0.2	0.05	1.1	0.27
metal	0.2	0.09	0.4	0.21	--	--	--	--
concrete/ asphalt	1.7	1.79	0.7	0.99	--	--	0.04	0.05
corrugated cardboard	--	--	--	--	7.1	0.14	2.4	0.05
other	5.6	1.54	0.2	0.54	1.0	0.27	0.5	0.14
Total	**14.4**	**4.74**	**9.2**	**2.82**	**13.9**	**1.14**	**10.04**	**1.24**

Explanatory note:

Waste generation rates vary depending on project type and size, subtrade efficiency, accurate material estimation, on-site materials storage procedures and product packaging.

Estimate the volumes or quantities of materials generated on the site by multiplying the floor area of your project with the generation rates listed for the different materials.

Handling & Storage Procedures

Item or Material by Division	Suggested Action
03 CONCRETE	
Cast-in-place Concrete	Recyclable - usually too large for salvage and reuse
Precast Concrete	Recyclable - usually too large for salvage and reuse
04 MASONRY	
Concrete Block	***Salvageable*** - if not concrete filled - recyclable if filled with concrete
Paving Stones	***Salvageable*** - stack and palletize for easy removal
Brick	***Salvageable*** - if set with lime-based mortar - recyclable if set with concrete
Decorative Concrete Block	***Salvageable*** - if not concrete filled - recyclable if filled with concrete
05 METALS	
Reinforcing Steel (rebar)	Recyclable - usually imbedded in concrete, therefore not reusable
Steel Flashing and Trim	Recyclable - usually not in suitable condition for reuse
Interior Metal Wall Studs	Recyclable - usually too time-consuming to save in suitable condition for reuse
Structural Steel	***Salvageable*** - includes I-Beams, H-Beams, Square Tubing, Pipe, and Chanel Iron - ensure care is taken to keep straight - separate by size and type
Cast Iron	Recyclable - usually too old and brittle for reuse
Copper	Recyclable - rarely salvageable due to the high likelihood of damage while salvaging
Aluminum Soffit and Trim	Recyclable - usually not in suitable condition for reuse
Misc. Steel	***Salvageable*** - includes Pipe, Q-decking, Square-tubing, and Wilson joists - prior to reuse must determine the item's structural ability to meet current Building Code - recyclable if item is bent or structural ability is compromised
06 WOOD, PLASTICS & COMPOSITES	
Regular Wood Framing	***Salvageable*** - all lumber should be slated, stacked and banded according to dimension and lengths - stacks should be kept uniform (ensure piles can be accommodated on truck deck, recommend stacking 2 piles side by side to a maximum width of 4' per pile including dunnage and maximum height of 3' to 4')
Pressure Treated Wood Framing	***Salvageable*** - same as regular wood framing
Regular Plywood Sheathing	***Salvageable*** - stack in piles keeping full sheets together and partial sheets together in lots of 50 pieces - separate by thickness - recommend stacking nail side to nail side - materials should be kept dry by covering with plastic sheeting (which also allows for air flow)
Pressure Treated Plywood Sheathing	***Salvageable*** - same as regular plywood sheathing - do not mix with regular plywood sheathing
Laminated Beams	***Salvageable*** - beams should be kept dry by covering with plastic sheeting (to allow for air flow) - beams should be supported in such a manner as to keep them straight and should be slated to allow air flow when stacked
Wood Truss Joists	***Salvageable*** - joists should be supported in such a manner as to keep them straight and should be slated to allow air flow when stacked - protect from rain
Heavy Timbers/Posts	***Salvageable*** - all timber should be sorted according to dimension and length - timber should be slated to allow air flow - all damaged ends should be trimmed - protect from rain
Washroom Counters	***Salvageable*** - if fixtures are removed, counters can be stored vertically – protect from rain
07 THERMAL & MOISTURE PROTECTION	
Roofing Gravel	***Salvageable*** - reusable
Fiberglass Bat Insulation	***Salvageable*** - protect from rain
Rigid Fiberglass Insulation	***Salvageable*** - protect from rain
Polystyrene Rigid Insulation	***Salvageable*** - stack and band for easy transport
Copper Flashing	Recyclable - usually too time-consuming to save in suitable condition for reuse
Roof Drains, Metal	Recyclable - usually too time-consuming to save in suitable condition for reuse

08 OPENINGS	
Doors, Metal	***Salvageable*** - remove with full frame and hardware - apply a metal self tapping screw through the top of the door to hold it in the frame as a unit - label keys belonging to each door
Doors, Wood	***Salvageable*** - remove with full frame and hardware - nail the door through the frame to keep from falling out of jam - label keys belonging to each door
Bi-Fold Doors, Metal	***Salvageable*** - remove all hardware parts and attach to door (e.g. in plastic zip lock bags) - wrap track on edge of door with duct tape
Bi-Fold Doors, Wood	***Salvageable*** - remove all hardware parts and attach to door (e.g. in plastic zip lock bags) - screw track on edge of door
Overhead Doors	***Salvageable*** - must be removed carefully (as doors have spring assembly) - all door hardware should be kept together with door- (hinges, screws, rollers, guides etc.) - door panels should be stacked face to face - track should be marked left and right - note, it is very important to keep all parts
Metal Sliding Doors	***Salvageable*** - dependent on size and condition of doors and hardware - recyclable otherwise if too large or not in suitable condition
Mechanical Closures	***Salvageable*** - dependent on age and physical condition
Panic Hardware	***Salvageable*** - keep all parts together (e.g. in plastic zip lock bags)
Patio Doors	***Salvageable*** - remove and stand vertically with drains to the bottom
Aluminum Windows	***Salvageable*** - dependent on size - smaller windows should always be salvaged but larger windows can be difficult to resell (especially if fixed/non-opening) - recyclable otherwise by removing glass and recycling frame
Steel Windows	***Salvageable*** - dependent on size – smaller windows can be salvaged but limited marketability - recyclable otherwise by removing glass and recycling metal frame
Sealed Glass Units	***Salvageable*** - limited marketability - store vertically or horizontally - ensure panels are level or supported in order to prevent damage to the seal
Unframed Glass Mirrors	***Salvageable*** - store vertically on either a carpet, cardboard, or rubber surface for protection - recommend storing face to face
Store Fronts	***Salvageable*** - best to be keep in one unit - store on A-frame rack and tie back
Skylights	***Salvageable*** - ensure that seal is not broken - store where not affected by wind
09 FINISHES	
Carpet/Carpet Tiles	***Salvageable*** - dependent on condition
Terra Cotta Tile	***Salvageable*** - dependent on quantities available, since sometimes difficult to match if product is obsolete
Wood Base Board	***Salvageable*** - remove, denail (if possible), stack face to face, and hold together with duct tape - keep sizes and lengths together (if possible)
Hardwood Flooring	***Salvageable*** - if tongue and groove flooring - remove, denail, stack face to face, and hold together with duct tape - keep lengths together (if possible) - thin strip flooring is not salvageable (i.e. too thin for refinishing)
Gypsum Panels	Recyclable
Wood Paneling	***Salvageable*** - dependent on condition (otherwise not cost effective) - recyclable otherwise (with clean wood)
Metal Suspension System	Recyclable - usually too time-consuming to save in suitable condition for reuse
Specialty Wood Finishes	***Salvageable*** - includes mantels, built-in shelving, bookcases, crown moldings, and window sash - keep all trim work where possible
Cabinets	***Salvageable*** - includes kitchen and bathroom cabinets - if possible, photograph the cabinet in place prior to removal to indicate potential reuse and to give purchasers a better idea of how the cabinets would look in place

10 SPECIALTIES	
Toilet Partitions	***Salvageable*** - must ensure all hardware is available
Framed Glass Mirrors	***Salvageable*** - store vertically on either a carpet or rubber surface for protection - recommend storing face to face
Towel Racks, Soap Dispensers, and Other Washroom Accessories	***Salvageable*** - for commercial products ensure all keys to open units are included
Shower Stalls	***Salvageable*** - if acrylic stalls - ensure the stall is suitable condition and not cracked or overly worn
Chalk boards and White boards	***Salvageable*** - limited marketability
Metal Lockers	***Salvageable*** - for ease of handling and resale, break into units of 6 or less
Old Hardware	***Salvageable*** - includes glass door knobs, hinges, and antique items
11 EQUIPMENT	
Household appliances	***Salvageable*** - dependent on condition - includes fridges, stoves, stove hoods, dish washers, freezers, washers, and dryers - recyclable otherwise
12 FURNISHINGS	
Metal File Cabinets	***Salvageable*** - dependent on condition - recyclable otherwise
Metal Shelving Unit	***Salvageable*** - when dismantling ensure all bolts, nuts and additional parts are kept together - recommend marking sections in order to make it easier to re-erect
Commercial Metal Racking	***Salvageable*** - when dismantling ensure all bolts, nuts and additional parts are kept together - recommend marking sections in order to make it easier to re-erect
Metal Desks	***Salvageable*** - dependent on condition - recyclable otherwise
Wood Desks	***Salvageable*** - dependent on condition - recyclable otherwise
14 CONVEYING EQUIPMENT	
Winches	***Salvageable*** - dependent on mechanical condition - recyclable otherwise
22 PLUMBING	
Toilets	***Salvageable*** - limited marketability due to current Plumbing Codes (white toilets offer the best resale opportunities) - recyclable otherwise (sink with concrete and taps with metals)
Urinals	***Salvageable*** - ensure there are no cracks and the hardware is working - recyclable otherwise (sink with concrete and taps with metals)
Ceramic Sinks	***Salvageable*** - dependent on condition - recyclable otherwise (sink with concrete and taps with metals)
Stainless Steel Tanks	***Salvageable*** - dependent on previous usage (sometimes required to destroy for contamination reasons) - recyclable otherwise
Janitor Sinks	***Salvageable*** - dependent on condition - recyclable if made of old cast iron
Bath Tubs	***Salvageable*** - dependent on condition and colour (white bath tubs and old claw foot tubs offer the best resale opportunities)
23 HVAC	
Radiators	***Salvageable*** - dependent on size (for ease of handling, 20 to 25 ribs would be the maximum suitable size for salvaging) and condition - recyclable otherwise
Hot Water Tanks	***Salvageable*** - if year 1995 or newer - recyclable otherwise
Suspended Blow Heaters	***Salvageable*** - if year 1990 or newer - recyclable otherwise
Wall Mount Radiators	***Salvageable*** - dependent on condition - recyclable otherwise
Wall Mount Electric Radiators	***Salvageable*** - dependent on condition - recyclable otherwise
Mechanical Water Pumps & Tanks	***Salvageable*** - dependent on condition - recyclable otherwise
Oil Interceptor	Recyclable
Oil Storage Tank	***Salvageable*** - dependent on previous usage (sometimes required to destroy for contamination reasons) - recyclable otherwise
Ventilation Ducting	***Salvageable*** - dependent on size and condition - recyclable otherwise
Metal Ducting\Ventilation	***Salvageable*** - dependent on size and condition - recyclable otherwise
Stainless Steel Ducting\Ventilation	***Salvageable*** - dependent on size and condition - recyclable otherwise

23 HVAC Cont'd	
Copper Ducting\Ventilation	***Salvageable*** - dependent on size and condition - recyclable otherwise
Aluminum Ducting\Ventilation	***Salvageable*** - dependent on size and condition - recyclable otherwise
Piping	***Salvageable*** - dependent on size and condition - recyclable otherwise
Exhaust Hood, Galvanized Metal	***Salvageable*** - dependent on size and condition - recyclable otherwise
Exhaust Hood, Stainless Steel	***Salvageable*** - dependent on size and condition - recyclable otherwise
Supply Air Units	***Salvageable*** - dependent on age, condition, and marketability - specialty item
Return Air Metal Grill	***Salvageable*** - dependent on condition or if considered a specialty item - recyclable otherwise (with metals)
Fresh Air Metal Diffuser	***Salvageable*** - dependent on condition or if considered a specialty item - recyclable otherwise (with metals)
Fire Bells	***Salvageable*** - dependent on condition or if considered a specialty item - recyclable otherwise (with metals)
Air Receiver Tank	***Salvageable*** - based on marketability - specialty item
Compressor Tank	***Salvageable*** - based on marketability - specialty item
Compressor Motor	***Salvageable*** - dependent on age and condition - recyclable otherwise
After Cooler	***Salvageable*** - based on marketability - specialty item
Boilers (hot water heating)	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
HVAC Roof Systems	***Salvageable*** - dependent on age and condition - recyclable otherwise
Gas Furnaces	***Salvageable*** - dependent on size and condition and if year 1995 or newer - recyclable otherwise
26 ELECTRICAL	
Transformers	Usually tested for PCBs and if confirmed, then handled as a special waste - ***salvageable*** otherwise
Switch Boxes	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
Receptacle Switches	***Salvageable*** - dependent on age and condition - landfilled otherwise
Receptacle Plugs	***Salvageable*** - dependent on age and condition - landfilled otherwise
Heat Detectors	***Salvageable*** - dependent on age, size and condition - landfilled otherwise
Exhaust Fans	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
Electrical Ceiling Blade-Fans	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
Incandescent Light Fixtures	***Salvageable*** - dependent on age, size and condition - recyclable or landfilled otherwise
Fluorescent Light Fixtures	Usually tested for PCBs and if confirmed, then handled as a special waste - ***salvageable*** otherwise - dependent on age and condition
Battery Lighting Fixtures (wall mount)	***Salvageable*** - dependent on age (as sometimes batteries are limited to holding a charge) - landfilled otherwise
Exit Lights	***Salvageable*** - dependent on age (as sometimes batteries are limited to holding a charge) - landfilled otherwise
Panel Boxes	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
Commercial Vapor Lights	***Salvageable*** - dependent on age and condition - landfilled otherwise
Street Lights on Poles	***Salvageable*** - dependent on age, size and condition - recyclable otherwise
32 EXTERIOR IMPROVEMENTS	
Asphalt Paving	***Salvageable - reuse for temporary road construction***
Chain Link Fencing	***Salvageable - roll up chain link and cut off posts to maximum length possible - all accessories (tops, clamps, bolts, straps, etc.) should be kept together in a container and labeled***
Wood Fencing	***Salvageable - if possible, dismantle in sections for easy re-erection - cut posts off at ground level***

.1 As-Built Documents

.1 As early as possible prior to application for final payment, the Contractor shall review, seal and sign one Draft copy of the As-Built documents to the Consultant and the Owner.

.2 Once the as-built documents have been accepted by the Owner and the Consultant as complete, the Contractor shall submit Final As-Built Documents:

.1 Hard Copies - Two (2)

.2 PDF Electronic Copies - Two (2)

.2 Operations and Maintenance Manual

.1 Submit to the Consultant, at Substantial Performance of the Work, for University use, in the consultant approved, complete and final version:

.1 Two (2) Hard Copies – organized in 3-ring binders

.2 Two (2) PDF Electronic Copies of full binder contents on CD, DVD, or flash drive.

.2 Organize data as instructional manual for use by Owner's personnel.

.3 Organize information in 3 ‘D’ ring binders:

.1 Commercial quality, with durable and cleanable plastic covers.

.2 To fit 215mm x 280mm size paper.

.4 When multiple binders are used, correlate data into related consistent groupings and identify contents of each binder on spine.

.5 Cover: identify each binder with type or printed title “OPERATION AND MAINTENANCE MANUAL”; list title of project and identify subject matter of contents.

.6 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.7 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

.9 Contents of Manual to include:

.1 Project Team Listing

.1 Consultants: Contact names, roles, contact information, scope of services.

.2 Contractors: Contact names, contact information, scope of work.

.3 Testing and Inspection Agencies: Scopes of service, contact names and contact information.

.2 Complete Products Listing:

.1 Assembled in each Section, provide a list of all products:

.1 Manufacturer

.2 Model/Product Number

.3 Color / Finish

.4 Supplier

.5 LEED Compliance

.3 Certificates of Acceptance: Relevant certificates issued by authorities having jurisdiction, including Occupancy Certificate.

.4 Final inspection reports by testing agencies, municipal, safety and other Authorities.

.5 Training of University O&M staff.

.6 Shop Drawings

.7 Warranties, Bonds and Service and Maintenance Contracts original documents shall be provided and bound in a separate volume, as identified in this section.

.1 Insert copies of the original Warranties, Bonds and Service and Maintenance Contracts in all Manuals, within the related Section of Work.

.3 Warranties, Bonds, and Service / Maintenance Contracts

Attend to all Warranties, and Service / Maintenance Contracts in accordance with industry standards, with particular attention to the following

.1 Conduct joint eleventh month warranty review, measured from time of acceptance, by FMGT and Consultant.

.2 Information in binders to be organized as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain Warranties, Bonds and Service and Maintenance Contracts, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties, bonds and service and maintenance contracts until time specified for submittal.

.3 Submittals

.1 Number of original documents required: one (1) each. Provide one (1) 3 'D' ring binder titled "Warranties Bonds and Service and Maintenance Contracts" to include all original documents.

.2 Insert copies of original Warranties Bonds and Service and Maintenance Contracts in all Operating and Maintenance Manuals (4), within the related Section of Work.

.3 Electronic Copy: submit full binder contents, in the approved, complete and final version, on CD or DVD.

.4 Warranty Tags

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Consultant or Departmental Representative, as directed.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

.1 Project Site Signage

.1 The Contractor shall, prior to commencing Work on the site, supply and install a Project Identification sign fabricated from 19 mm medium density overlay plywood, trimmed edges, suitably supported and braced.

.2 The Project Support Officer will provide the final signage layout in digital format for the Consultant and Contractor's use. Refer to the 'Sample – Project Site Signage" immediately following this section.

.3 No signage, other than specified above, shall be displayed on campus without written approvals from FMGT.

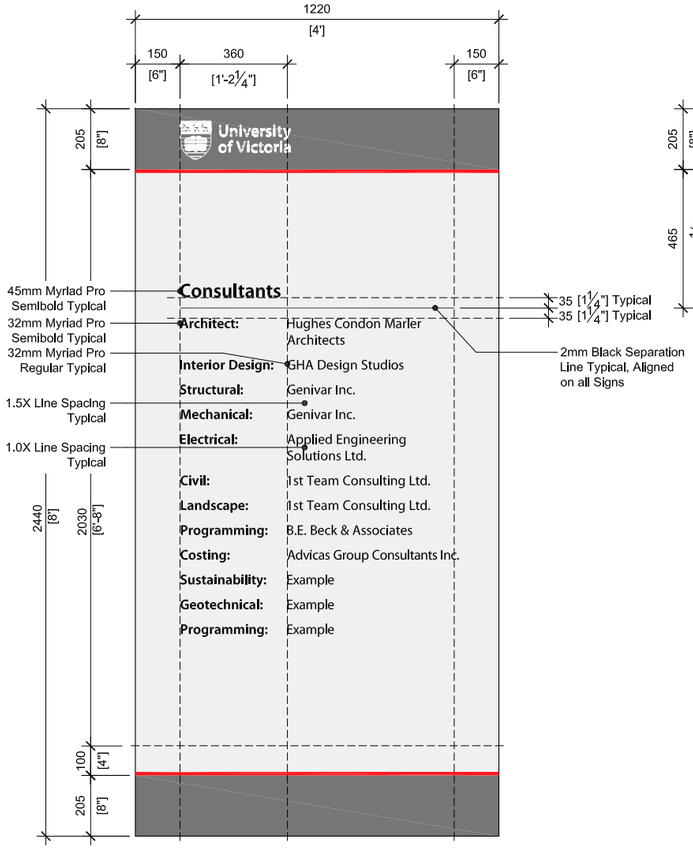
.2 Interior Wayfinding Signage

Refer to Section 19 "Interior Wayfinding Signage".

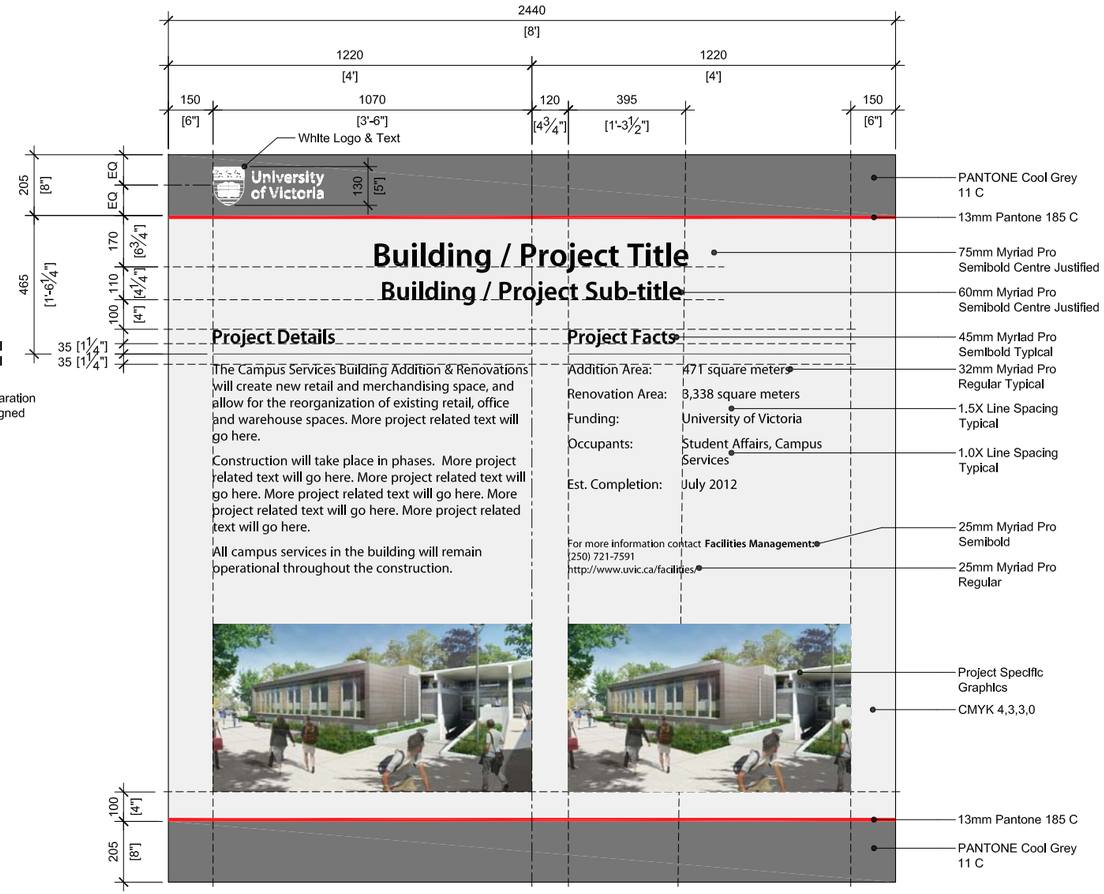
.3 Exterior Wayfinding Signage

Refer to Section 20 "Exterior Wayfinding Signage".

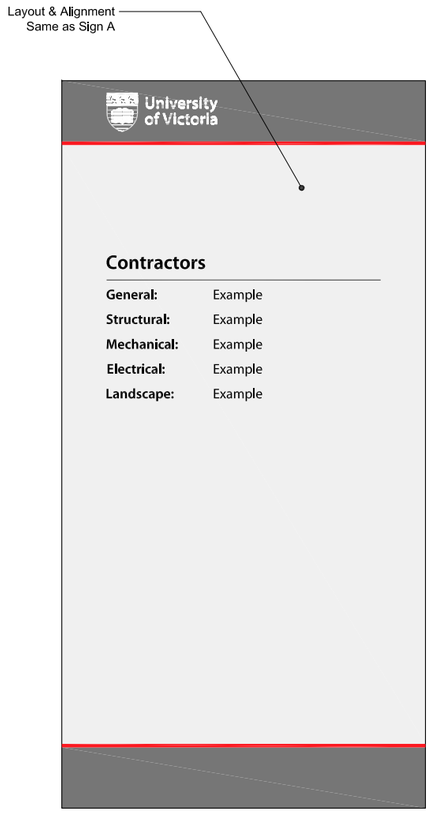
Sample - Project Site Signage



A



B



C

Notes:

- PANTONE Cool Grey 11 C CMYK 60,51,51,20
- CMYK 4,3,3,0
- PANTONE 185 C CMYK 0,91,76,0
- Black
- White

University of Victoria
Facilities Management

Title:

Date:
Scale:
Drawn By:
Project Number:
Drawing No.

.1 Sustainability – General University Requirements

.1 Sustainability is a priority and long-term commitment of the University. It is pursued holistically at all levels: energy, transportation, construction, and waste management.

.2 Environmentally responsible construction practices shall focus on, but not be limited to:

- .1 Energy efficiency
- .2 Environmental preservation: earth, water and atmosphere, with emphasis on GHG reduction.
- .3 Waste management recycling.
- .4 Durable product selections, containing environmentally friendly, recycled, bio-degradable, and non-toxic materials wherever possible.
- .5 Manufacturing from renewable resources and regional procurement.
- .6 Indoor air quality, occupant health and wellness.
- .7 Building/site design that encourage the members of UVic community to become environmentally aware and adopt new, sustainable paradigms and actions.

.3 LEED Gold standards shall be incorporated in all projects, regardless of their intended certification status. During programming and schematic design, Consultants shall document the project's sustainability objectives for the Project Officer.

.2 LEED® Projects

.1 The University is aiming to certify all New Construction, Major Renovations and Major Tenant Improvement projects to LEED Gold Standards.

.2 The following shall be considered mandatory credits / objectives for LEED projects:

.1 **Sustainable Sites**:

.1	Credit 1 –	Site Selection	1 Point
.2	Credit 4.1 –	Alternative Transportation: Public Transportation Access:	3 points
.3	Credit 4.2 –	Alternative Transportation: Bicycle Storage and Changing Rooms	1 Point
.4	Credit 5.1 -	Site Development: Protect and Restore Habitat	1 Point
.5	Credit 5.2 -	Site Development Maximize Open Space	1 Point
.6	Credit 6.1 -	Stormwater Design: Quantity Control	1 Point
.7	Credit 6.2 -	Stormwater Design: Quality Control	1 Point
.8	Credit 8 -	Light Pollution Reduction	1 Point
		Total:	**10 Points**

.2 **Water Efficiency:**

.1	Credit 1 -	Water Efficient Landscaping	2 Points
.2	Credit 3 -	Water Use Reduction	2 Points
		Total:	**4 Points**

.3 **Energy and Atmosphere:**

.1	Credit 1 -	Optimize Energy Performance	10 Points
.2	Credit 3 -	Enhanced Commissioning	2 Points
.3	Credit 4 -	Enhanced Refrigerant Management	2 Points
.4	Credit 5 -	Measurement and Verification	3 Points
.5	Credit 6 -	Green Power	2 Points
		Total:	**19 Points**

.4 **Materials and Resources:**

.1	Credit 2 -	Construction Waste Management	2 Points
.2	Credit 4 -	Recycled Content	1 Point
.3	Credit 5 -	Regional Materials	1 Point
		Total:	**4 Points**

.5 **Indoor Environmental Quality:**

.1	Credit 1-	Outdoor Air Delivery Monitoring	1 Point
.2	Credit 2-	Increased Ventilation	1 Point
.3	Credit 3.1-	Construction IAQ Management Plan: During Construction	1 Point
.4	Credit 3.2-	Construction IAQ Management Plan: Before Occupancy:	1 Point
.5	Credit 4.1-	Low-Emitting Materials: Adhesives and Sealants	1 Point
.6	Credit 4.2-	Low-Emitting Materials: Paints and Coatings	1 Point
.7	Credit 4.3-	Low-Emitting Materials: Flooring Systems	1 Point
.8	Credit 4.4-	Low-Emitting Materials: Composite Wood and Agrifibre Products	1 Point
.9	Credit 6.1-	Controllability of System: Lighting	1 Point
.10	Credit 6.2-	Controllability of System: Thermal Comfort	1 Point
.11	Credit 7.1-	Thermal Comfort: Design	1 Point
.12	Credit 8.1-	Daylight and Views: Daylight	1 Point
.13	Credit 8.2-	Daylight and Views: Views	1 Point
		Total:	**13 Points**

.6 **Innovation in Design:**

.1	Credit 1-	Innovation in Design	2 Points
.2	Credit 1-	LEED Accredited Professional	1 Point
		Total:	**3 Points**

.7 Regional Priority:

.1	Credit 1-	Durable Building	1 Point

.2	Credit 2-	Regional Priority Credit	1 Point
		Total:	**2 Points**

.1 General

.1 Discuss with FMGT Project Representative the project specific Commissioning requirements for smaller projects.

.2 For all new construction and large renovations, provide full building commissioning in general conformance with *ASHRAE Guideline 0 – The Commissioning Process and* the additional references within *Guideline 0*. Full building commissioning shall include, but not be limited to the following systems:

- .1 Building Energy Systems
  - .1 HVAC Systems and Controls
  - .2 Electrical Systems
  - .3 Lighting and Daylighting Systems and Controls
- .3 Plumbing Systems, including DHW systems and fixtures.
- .4 Building Envelope systems and components
- .5 Elevators and other Conveying/Accessiblity Systems

.3 Administration

.1 The Commissioning Manager shall be an independent member of the consultant team, with the sole responsibility to administer the Commissioning Process.

.1 General Requirements

.1 Deconstruction shall be specified in lieu of reference to demolition as standard practice. Deconstruction shall conform with the requirements of Section 1.3 – Construction Waste Management with respect to sorting all materials for recycling, and tracking all waste and recyclable quantities and disposal facilities.

.2 The University Sustainability Action Plan specifies a minimum 75% construction demolition waste diversion rate.

.2 Preparatory Work by Others

.1 FMGT is responsible to arrange for the coordination and execution of NIC work. This normally includes:

- .1 Removal of salvaged materials that are not part of Construction Contract.
- .2 Removal (temporary) of obstructing street furniture, outdoor signs, lamp post sign blades, bollards etc, including access to the site and site-related signage etc.

.3 Hazardous Materials

.1 The typical University procedure is to remove all hazardous materials prior to the start of a Project.

.2 Should materials resembling spray or trowel applied asbestos, or other existing previously unidentified hazardous material, be encountered in course of deconstruction, Contractor shall stop work, take preventative measures, and notify Consultant and Project Officer immediately. Do not proceed until written instructions have been received.

.1 General

.1 All work shall conform to the latest edition of the BC Landscape Standard, issued by the British Columbia Society of Landscape Architects (BCLSA), unless approved by the Owner otherwise.

.2 Preserve and enhance the overall character of the campus through the elements of landscape. Use continuity and consistency as design principles to create a coherent relationship between buildings and structures that may be quite different in their architectural expression.

.1 Consider trees as the most important elements to define the functional and visual character of spaces.

.2 Douglas fir is the primary planting material, followed by other evergreens such as cedar, sequoia and arbutus (broadleaf), as well as the deciduous oak, maple and dogwood. Shrubs shall be of a wider variety.

.3 The established policy of the University stipulates that existing trees shall be retained wherever possible. Where tree removals over 100mm diameter are necessary, the University strives to provide 3 new trees on campus to replace every 1 tree removed.

.4 In areas of brush and small trees under 100mm in diameter, the area to be cleared will be marked out by the University. Where existing trees over 100mm in diameter interfere with construction, the University will clearly mark the individual trees which are to be removed if required as part of the Work.

.2 Plantings

.1 The University quadrangle is strongly defined by formal planting, walkways and the surrounding architecture. Trees in this space are primarily Pin Oak, Garry Oak and Douglas Fir. All future formal planting within the quadrangle shall be consistent with the existing.

.2 Maintain the informal planting and natural plant material growth outside the quadrangle.

.3 Plant materials shall be selected with the acknowledgement that UVic practices Integrated Pest Management. Discuss plant combination to be applied in specific location with FMGR.

.4 Areas of the site to be "reforested" - i.e., areas where planting will recover the quality of native growth - will primarily be Douglas Fir, Western Red Cedar, Big Leaf Maple and Dogwood.

.5 Transition areas between forest and developed areas shall be provided with plant materials compatible to both areas.

.6 Areas closer to buildings (domesticated areas) shall use trees such as Pacific Crabapples, Red Oaks, Pin Oak, Garry Oak and Maples.

.7 In special circumstances, other specimen materials may be required by the botanical studies program for educational purposes, as directed by FMGT in co-ordination with FMGR and the Biology Department.

.6 Shrubs shall be chosen to define space, complement buildings, control circulation and provide wind screening. In developed areas, ground cover shall be primarily lawn, supplemented by other materials with proven performance suitability on campus. Shrubs and ground cover are elements of space continuity; however, the extent of their use shall be evaluated in relation to the cost of maintenance required for the first two years of plant establishing.

.7 Annuals provide desirable bright colour, but should be used only in contained areas where irrigation is available, and maintenance and replacement are not problematical (ie. courtyards).

.8 Mulching (fertile mulch) of planting beds is required. Hog fuel type of Bark mulch is prohibited. Consult FMGR.

.9 UVic prefers the short-term use of irrigation to establish plants (maximum 2 growing seasons) Low water, drought tolerant planting is encouraged.

.3 Planting Warranty

.1 One full year labour and planting.
.2 Materials warranty to be provided for all landscape work.

.4 Irrigation

.1 Irrigation is required in all contained planting areas.
.2 Drip irrigation shall not to be used except in special circumstances as determined by FMGR.
.5 Polyvinyl pipe sizes: Class 200 pipe is preferred as a minimum in all applications; Class 160 may be used in special circumstances, with FMGR approval.
.6 Reinstatement following construction:
  .1 All irrigation systems impacted by construction to be reinstated by contractor.
  .2 Systems to be tested and verified by FMGT Grounds.
  .3 Equipment Standards:
    .1 Lawn sprinkler heads: Hunter I20 heads
    .2 Shrub beds: Hunter PGJ-00 Heads on 3'-0" risers (gray male male) supported by metal posts.
    .3 All heads use flexy approximately 2'-0" from pipe to head.

.5 Landscape Materials

.1 Soil Additives
  .1 Manure: Well-rotted mushroom manure, to requirements of BC Landscape standard.
  .2 Sand: Hard, granular sharp sand to CSA A82 SO-M1976, well-washed and free of impurities.
  .3 Peatmoss: Horticultural grade, to the BC Landscape standard.
  .4 Wood Residuals: Content of sawdust (such as fir or hemlock) shall not cause a C to N ratio higher than 40:1. Cedar or redwood sawdust shall not be present in the soil mix.
  .5 Dolomite Lime: Horticultural commercial grade, finely and uniformly ground, containing not less than 20% by weight.
  .6 Compost: Well-rotted vegetable matter, free of impurities and chemicals.

.2 Fertilizers
  .1 Standard commercial brands, meeting requirements of Canada Fertilizer Act, packed in waterproof containers with weight, analysis and manufacturer's name clearly marked. Granular, pelleted, or pill form, dry and free-flowing. Applied fertilizers must not contain a Phosphorus % in excess of 1% of total weight of overall applied fertilizer.

.3 Planting Soil
  .1 Shall be substantially free from roots, sticks, building materials, wood chips, pollutants, crab grass, noxious weeds or seeds/parts thereof.
    .1 Maximum requirements of dolomite lime to require pH: 220kg/100sq.m (100lbs/1000sf)
    .2 Salinity: maximum saturation extract conductivity 3.0 millihos/cm at 25°C.
    .3 Total Nitrogen: 0.2-0.4% by weight.
    .4 Available Phosphorus: 50-70ppm.
    .5 Available Potassium: 50-100ppm.
    .6 Cation Exchange Capacity: 30-50meq.
    .7 Carbon to Nitrogen Ratio: maximum 40:1.
    .8 Allowable pH: lawns 6.0-6.5; planting areas 5.0-60.
    .9 Texture:

.1 Dry weight organic content (compost) 30-50%
.2 Particle size glasses: rock and gravel (2mm) 0-3%.
.3 Sand (0.05 & 2mm) 30-35%.
.4 Silt & Clay (0.05mm) 15-20%.
.5 Clay (0.002mm) 0-10%.

.4 Bark Mulch
.1 Dark brown in colour, 25mm and smaller, Douglas fir or Hemlock, free of chunks and all foreign and harmful material.

.5 Landscape Reinstatement

.1 Soil Preparation and Placement
.1 Supply, prepare and place planting medium where indicated on drawings and as affected by the work.
.2 Prior to placement, do not move or work soil or additives when they are excessively wet, frozen, extremely dry or in any manner which will adversely affect soil structure.
.3 Protect soil, additives and fertilizers against extreme wetting and against contamination by weeds and insects.
.4 Deliver and store fertilizers and chemical ingredients in the original manufacturer's containers.
.5 Place a minimum 50mm layer of bark mulch in all planting beds.
.6 Thoroughly mix soil with additives to produce planting medium.
.7 Scarify compacted sub-grades to a minimum depth of 100mm (4") prior to placing planting soil.
.8 Place planting soil to depth of 225mm for groundcover areas, 450mm for shrubs and gardens.
.9 Individual plants shall have shrub pit 300mm wider and 150mm deeper than root-ball.
.10 Crown or slope for positive surface drainage.
.11 Do not compact, but finish the surface smooth, uniform and firm against deep footprints.
.12 Protect planted areas with 1220mm high temporary fencing.

.2 Grass
.1 Reinstate topsoil as per FMGT Standard mix (see "typical soil preparation and placement notes above).
.2 Roll out topsoil to compact prior to sodding.
.3 Replant using sod.
.4 Apply Quickstart fertilizer.

.

.1 Paving and Surfacing Materials

.1 Typical paving materials for pedestrian and traffic surfaces (walkways, plazas, stairs, ramps, etc):
- .1 Concrete:
  - .1 Exposed Aggregate (10mm nominal size)
  - .2 Broom Finish (preferable for wheelchair access areas)
  - .3 Smooth troweled finish not acceptable
- .2 Concrete Pavers:
  - .1 Nominal sizes, permeable installation
- .3 Asphalt
  - .1 Roadways
  - .2 Parking Areas
  - .3 Pathways
- .4 Gravel
  - .1 Service Roads
  - .2 Paths/Trails
  - .3 Garden Areas (crushed rock or limestone, consult FMGR)

.2 Minimize the surface area of paved and impermeable surfaces:
- .1 Use permeable paving wherever possible.
- .2 EcoGrid and other similar systems shall only be used where directed by FMGT.

.2 Exterior Walkways and Concrete Work

.1 All walkways shall be minimum 1200 mm wide, and sized to suit the intensity of traffic, prominence of location, etc.

.2 Concrete Sidewalks
- .1 Provide mock-up area to review aggregate exposure above concrete.
- .2 Control Joints: space at 3000mm, or match existing pattern.
- .3 Flyash: use in concrete mixture; maximum 20% of cementitious content.
- .4 Concrete slab thickness:
  - .1 Sidewalks and Walkways: minimum 100 mm thick.
  - .2 Vehicular Traffic Sidewalks: minimum 150 mm thick.

.3 Concrete Base for Light Standards
- .1 provide base upstand, either as a trapezoid extension of the sidewalk (preferred) or independent, to prevent light pole damage from landscape equipment.

.3 Drainage of Pedestrian Paved Areas

.1 Walkways 1,200mm wide and level lengthwise shall have a continuous cross fall slope of 2%. Walkways in excess of 1,200mm wide should be crowned.

.2 Large Paved Areas shall be sloped to drains, minimum 1% to maximum 2% fall. Where falls are 2%, provide sufficient number of drains to prevent "dishing".

.3 Provide positive slopes away from entrances and exits, not less than 4%, to adequate storm drains, gratings or landscape. Do not extend the 4% slope for more than 2m horizontally.

.4 Fire and Service Vehicle Accessibility

.1 Review with the Fire Departments - Municipal Fire Chiefs of both Saanich and Oak Bay, in the early planning stages and obtain their agreement to the following:

.1 Design and location of fire access roads, fire hydrants, annunciator panels, etc.

.1 Design fire access roads as "loop" (no dead-ends). "Y"s may be considered, subject to above agreement.

.5 Service Vehicle Accessibility and Service Areas

.1 Road Access: Provide road access for service, shipping/ receiving and waste removal to all major buildings.

.2 Loading Platforms: To be provided only where requested by Users, to satisfy a particular demand. Where required, design shall consider all appropriate WBC requirements regarding steps and guardrails.

.3 Waste Receptacle Containment: Building and site design shall provide adequate operational space for waste containers (refer to Section 2.5 – Site Furninshings for typical Waste Receptacle Specifications). Minimum requirements for most buildings include:

.1 Concrete Pad

.1 Ground Level (not on a loading dock)

.2 Confirm dimensions with FMGR-WRC

.3 Where exterior wet waste containers (bagged food disposal, animal and biological wastes, etc.) are required, they shall be located near the service entry of the building, in the same vicinity but separated from other waste containers.

.2 Access

.1 Direct in-line service access to front-load waste containers shall be at least 1.5 times the length of an industry standard front-load compactor truck.

.2 Access and operation of typical waste collection vehicles are usually accommodated by the fire truck access standards for lane widths, turning radii and load bearing capability, OR:

.1 Minimum access width of 3.65m to any front-loads waste container enclosures.

.2 Minimum vertical clearance above waste containers of 4.25m.

.3 A ramp or ground level access (no steps) from the building to the service area is required to allow recycling totes to be wheeled easily to designated outside pickup area.

.6 Parking

.1 The number and capacity of parking lots within Ring Road shall not be increased.

.2 Where possible and without compromising adequate visual clearance for safety, parking lots shall be visually screened from the principal roads and buildings by one or a combination of planting, or depressing the lot below existing grade. Mounding shall only be used in consultation with FMGR.

.1 Bike Racks

.1 The University uses three types of manufactured bike racks. Refer to drawings immediately following this section.

- .1 Type A – typical unrestricted placement
- .2 Type B, with wheel stop – placement at 500mm against a wall or structure
- .3 Type C, with wheel stop – placement at 275mm against a wall or structure.

.2 Bike and Motorcycle Canopy

.1 UVic has developed standardized bicycle and motorcycle canopy structures. The number of bays and bay width may vary to suit site conditions. When necessary for site design, request canopy drawings from Project Officer.

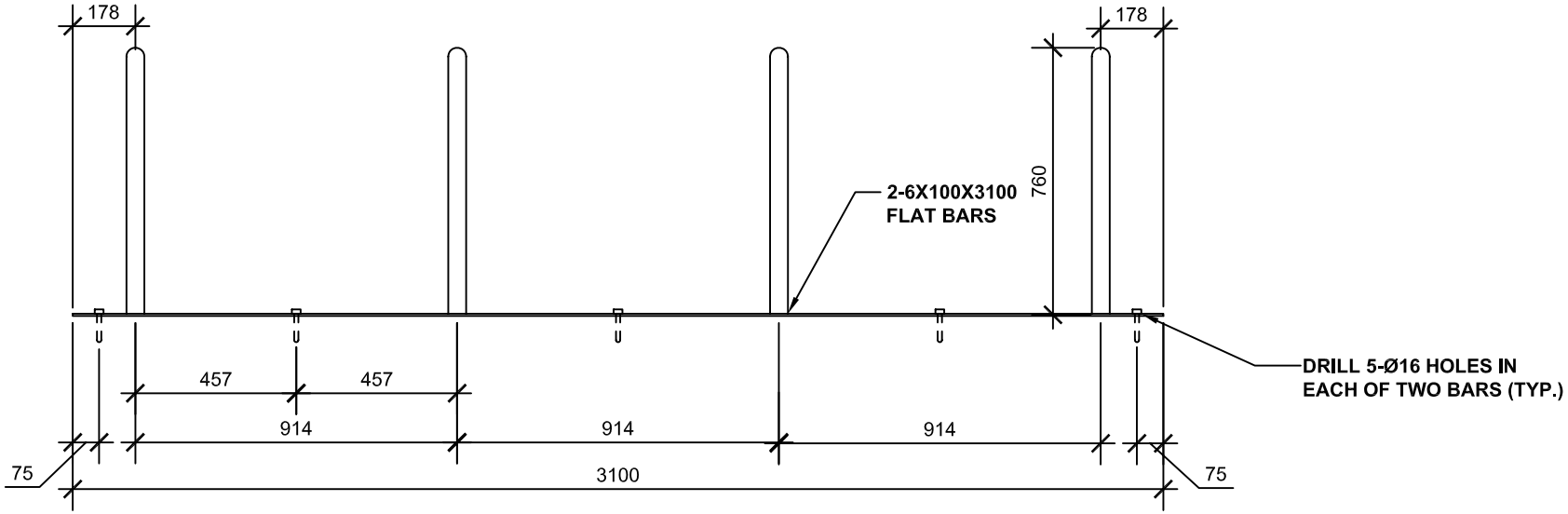
.3 Waste Receptacles

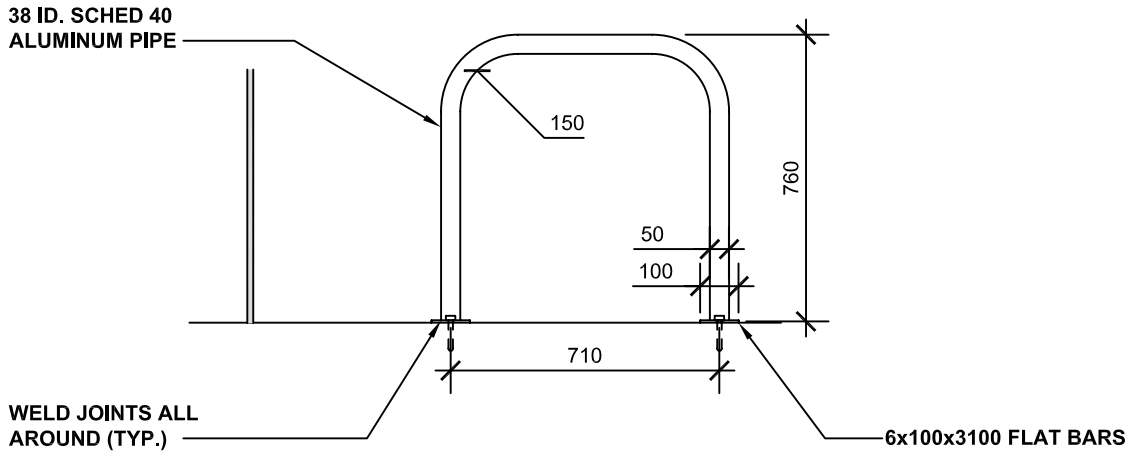
.1 Typical waste receptacles:

- .1 Waste receptacles: 610x610x710mm high, exposed aggregate concrete containers, from Mackays Precast.
- .2 Waste receptacles for buildings: Schaefer GMT Cart, from Rollins Machinery – 2 sizes:
  - .1 Grey 360L – 610 x 890 x 1010mm high,
  - .2 Blue or Brown 240L – 585 x 740 x 1070mm high.

.2 Waste Receptacle Enclosures

- .1 Provide screening such that waste bins are visible only from the direction of service vehicle approach.



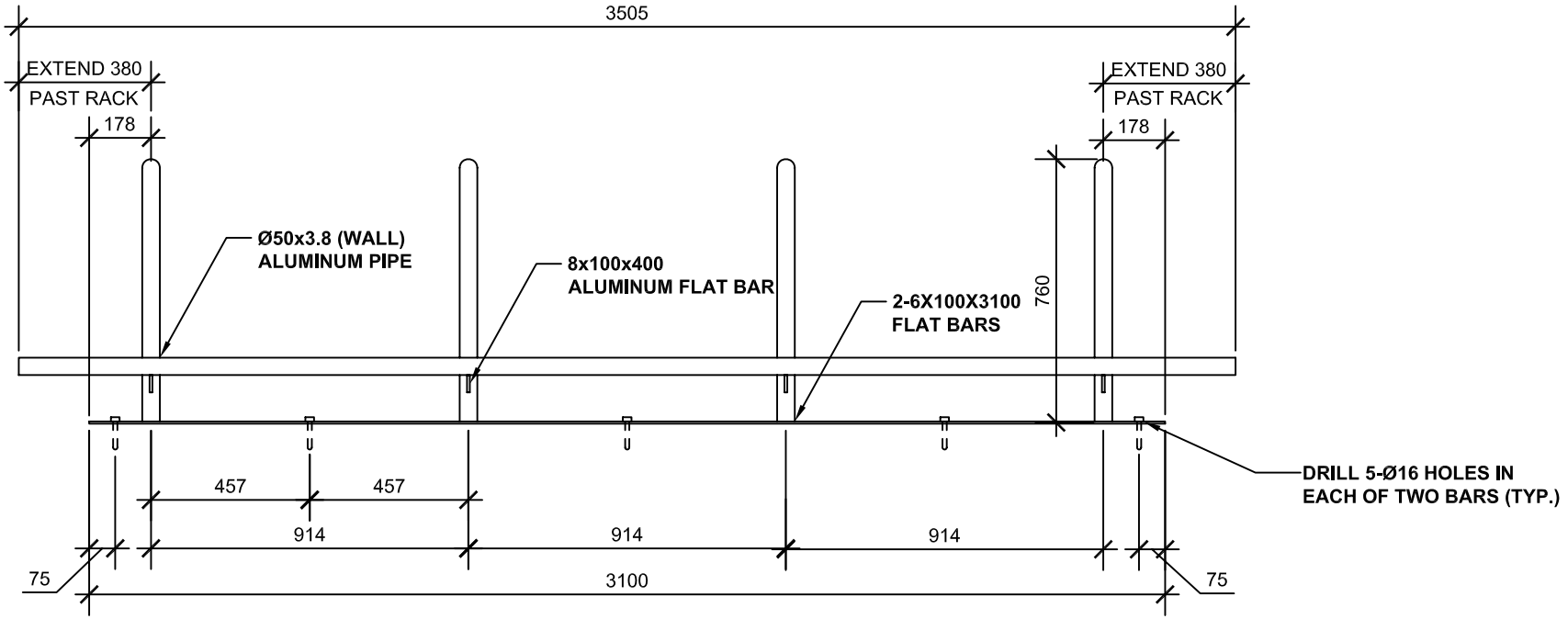


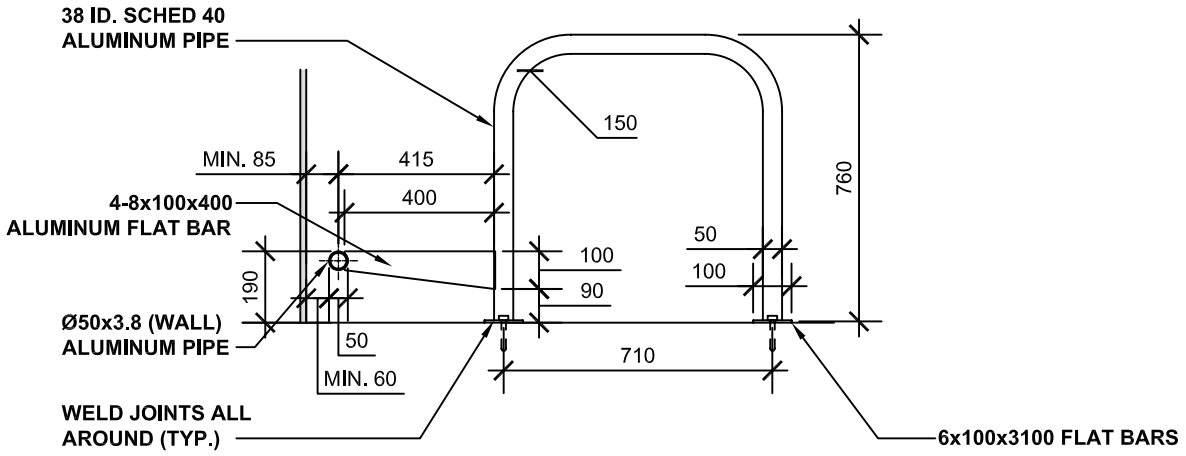
Notes:
BEAD BLAST ENTIRE UNIT
UPON COMPLETION

University of Victoria
Facilities Management

Title:
UVIC STANDARDS
MANUFACTURED EXTERIOR
SPECIALTIES
BIKE RACK-TYPE A

Date:	JULY 25, 2008
Scale:	1:20
Drawn By:	FMGT
Project Number:	
Drawing No.	1 OF 1



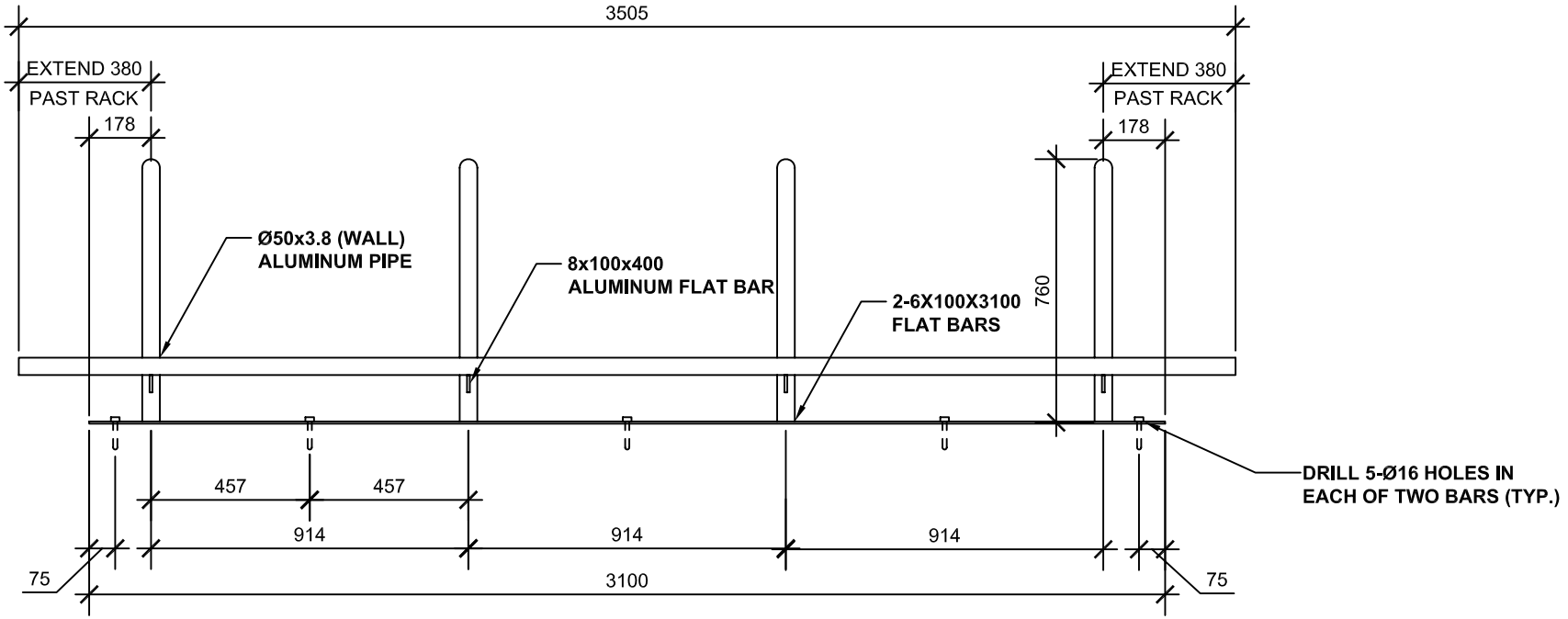


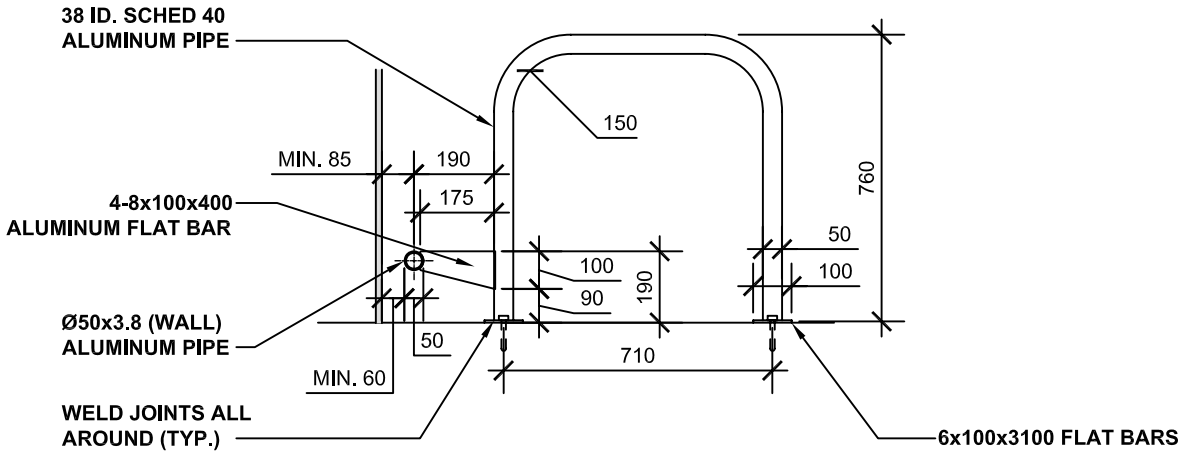
Notes:
BEAD BLAST ENTIRE UNIT
UPON COMPLETION

University of Victoria
Facilities Management

Title:
UVIC STANDARDS
MANUFACTURED EXTERIOR
SPECIALTIES
BIKE RACK-TYPE B

Date:	JULY 25, 2008
Scale:	1:20
Drawn By:	FMGT
Project Number:	
Drawing No.	1 OF 1





Notes:
BEAD BLAST ENTIRE UNIT
UPON COMPLETION

University of Victoria
Facilities Management

Title:
UVIC STANDARDS
MANUFACTURED EXTERIOR
SPECIALTIES
BIKE RACK-TYPE C

Date: JULY 25, 2008
Scale: 1:20
Drawn By: FMGT
Project Number:
Drawing No. 1 OF 1

.1 Structural Requirements

.1 Design concrete structures targeting a design service 'Long Life' as defined in the CSA-S478 (R2007) Guideline on Durability in Buildings.

.2 Structural designs to conform to Part 4 of the British Columbia Building Code. Do not use Part 9 for structural references of any kind.

.3 Increase live load resistances to suit UVIC occupancies as required. Discuss specialized uses and occupancies with FMGT.

.1 Performance Standards

.1 Design load-bearing masonry structures targeting a design service ‘Long Life’ as defined in the CSA-S478 (R2007) Guideline on Durability in Buildings.

.2 Typical masonry ties to be stainless steel; 2 piece. Tie type and spacing to be identified in the Specifications.

.3 Masonry expansion and control joints to be identified on the Drawings.

.4 All structural steel masonry support to be stainless steel or hot-dipped galvanized.

.5 Where galvanized sheet metal or aluminum masonry thru-wall flashings are used, provide fully reinforced, bonded sheet membrane separator between masonry and flashing.

.6 Veneer masonry surfaces near grade to receive a clear anti-graffiti coating where specified by FMGT.

.1 Structural Requirements

.1 Design steel structures targeting a design service ‘Long Life’ as defined in the CSA-S478 (R2007) Guideline on Durability in Buildings.

.2 Provide shop drawings and Letters of Assurance signed and sealed by a professional engineer licensed in the Province of BC for all applicable structural steel fabrications such as handrails/guardrails, miscellaneous angles, brackets, lintels, seismic restraints etc.

.1 Finishes

.1 Typical finishes for exposed (outdoor) metal fabrications:

.1 Hot-dip Galvanized.

.2 Stainless Steel.

.3 Clear Anodized Aluminum.

.2 Where painted assemblies are required use durable factory finish (preferred), or a marine grade system:

.1 Electrostatic Painting

.2 Factory Pre-painted Process

.3 Epoxy coat and aliphatic urethane topcoat, marine grade system. For increased durability, consider galvanized steel for painted assemblies.

.1 Performance Requirements

.1 Design wood frame structures targeting a design service 'Long Life' as defined in the CSA-S478 Guideline on Durability in Buildings.

.2 All structural design of wood framing to comply with Part 4 of the BCBC. Do not use Part 9 of the BCBC for any structural design references.

.3 Protect all wood frame components in contact with concrete, masonry or other building materials susceptible to moisture.

.4 All exposed wood framing to be preservative treated or treated with other factory or field applied treatment, coating, or preservative.

.5 All wood frame design and detailing to accommodate material shrinkage.

.6 Finger jointed studs are not acceptable for exterior wall construction.

.7 All exterior wall and roof sheathing to be plywood. OSB and gypsum board are not acceptable products.

.8 Subfloors to be tongue and groove plywood; glued and screwed.

.9 All wood shear walls are to be sheathed with plywood.

.10 All manufactured wood products are to be protected from weather exposure at all times including delivery, storage and installation.

.1 Performance Requirements

.1 AWMAC Manual of the Architectural Woodwork Association of Canada

.2 Quality Standard for materials and installation shall be in accordance with the definitions of terms from the current edition of the AWMAC Manual:

.1 "Custom" Grade: typical standard

.2 "Premium" Grade: areas with enhanced architectural character, such as executive boardrooms and offices, ceremonial rooms, performing arts facilities, prestigious areas of high public use, etc.

.3 The use of products from local manufacturer's is preferred.

.4 Avoid adhesives, preservatives, hardeners, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

.5 MDF to be formaldehyde-free and recycle certified.

.6 Plywood shall be Exterior Grade (i.e. manufactured with formaldehyde-free adhesives).

.7 Design of all furnishings shall primarily consider the use of standard size, pre-manufactured, freestanding modular furniture wherever possible.

.8 Wall mounting: all wall mounted shelves, pilasters, coat hooks, panels, modular furniture, etc., shall be fastened either into wall studs or suitable backing materials, for adequate load capacity and seismic restraint. Freestanding units shall be seismically restrained.

.9 Consult with FMGT to confirm the following requirements:

.1 Cabinet and Door Hardware: Provide 2% additional hardware stock of each type and finish.

.2 Mock-ups: Provide freestanding mock-ups for large or enhanced architectural character projects.

.3 Wall-mount shelving: To be included within the Contractor's work.

.4 Surface finishes for specialized uses: Provide chemical and wear resistance in labs, darkrooms, etc.

.1 Typical Cabinetry

.1 Typical cabinet construction shall be 19mm Baltic Birch plywood, G2S.

.2 Endangered wood species must not be used. Sustainable and certified wood species are preferred. Encouraged materials are as follows: Ash, Birch, Cherry, Cypress, Hemlock, Magnolia, Oak, Pine, Spruce, Sycamore, or Walnut.

.3 Solid wood and veneer materials are acceptable; maple or birch. Confirm with FMGT quality requirements for specific locations.

.4 The use of mechanical fasteners is preferred over adhesives.

.5 Maximize recycled content.

.6 Drawer construction to be minimum 12 mm (1/2") plywood (Birch or Apple).

.7 Edge banding: Solid 6 mm (1/4") birch or same species as veneer when hardwood veneer is used.

.8 Standard Finish: Clear

.2 Laboratory Cabinetry

.1 Wood to be used only with approval from FMGT. Preference is for pre-fabricated metal casework with factory finishes.

.2 Provide a 50 mm clear plastic lip at the front of all shelving used for chemical storage to avoid spillage.

.3 Design for vibration control.

.3 Typical Countertops / Work Surfaces

.1 Materials

- .1 High pressure plastic laminates (1 1/8” min. thickness)
  - .1 Application: Administration areas, Staff lounges and kitchen areas, general purpose surfaces.
  - .2 General Purpose or High Wear to suit application:
    - .1 1.20mm thick: Flatwork, Countertops
    - .2 1.00mm thick: Vertical surfaces (backsplashes) and postforming work
    - .3 0.75mm thick: Backing sheets
  - .3 Provide finished surface (or backer sheet when concealed) on all surfaces of the core
  - .4 1 1/8” minimum thickness
  - .5 MDF shall be the typical core material
  - .6 Plywood core to be used in the following locations:
    - .1 Counterops with plumbing
    - .2 High humidity and moisture locations
    - .3 Food service areas
  - .7 Edging: Solid surface, laminate rolled edge, or PVC T Mold Edge (confirm with FMGT)
- .2 Stainless Steel (minimum 14 ga. grade 304)
  - .1 Application: Food preparation areas.
- .3 Solid cast epoxy resin (ie. Corian)
  - .1 Application: Washrooms

.4 Laboratory Countertops / Work Surfaces

.1 Design to minimize joints. Where possible, tops to be continuous with no open seams

.2 Surfaces to be integral with backsplash

.3 All edges to be rounded

.4 Acceptable materials (Confirm selection requirements with FMGT):

.1 Solid cast epoxy resin.

.2 Stainless steel (minimum 14 ga grade 304) (mandatory for Containment Level 4 labs).

.3 Resin-impregnated natural stone.

.4 Laboratory grade plastic laminate (1 1/8” min. thickness)

Note: The following assemblies are typical throughout the campus, and are normally installed by the Contractor, or in special instances by FMCA.

.1 Wall-mounted Shelving

.1 Each office shall be provided with wall-mounted shelving, 305 mm wide, birch plywood.

.2 Shelving quantities per office: vertical spacing at 355 mm o/c; bottom shelf at 405 mm above finished floor, to a max. stack of 5 shelves. Horizontally, total shelving length max. 12.2 lin.m.

.3 Pilasters: single slot, 2100mm length throughout, including where only 3 or 4 shelves are specified. Products:

.1 Reeve, heavy duty wall standard and bracket system, Brillatone (Satin Zinc) finish, as supplied by Matthews Store Fixtures and Shelving.

.1 Wall standard: Line 700; 3.2 mm thick steel; screw holes at 305 mm o/c.

.2 Wood shelf bracket: 81- L/R -10

.2 Coat Hooks

.1 Coat hooks are typically installed on the interior wall adjacent to the hinge side of door, mounted on a 125 mm wide birch ply panel, with the bottom edge at 1550mm above finished floor. Provide hooks spaced as indicated in the table, in the rooms identified below. Adjust spacing to fit 3 hooks on a 650 mm panel and 4 hooks on an 800 mm panel.

.1 Each office shall be equipped with two (2) hooks, installed as shown in table below.

.2 Each meeting room and designated lab or seminar room, which is not served by a closet or alcove, shall be equipped with 3 to 5 hooks, installed as shown in table below.

No of hooks	Centered on panel, and spaced at (mm)	Length of panel (mm)	Vertical panel edge from corner of room (mm)
2	450	650	200
5	150	800	100

.2 Coat Hooks shall be heavy-duty, metal, satin chrome or brushed aluminum finish:

Acceptable Products:

.1 Bobrick B6827 (satin stainless steel)

.2 Bradley 9134

.3 140 mm long 237BCV(Brushed Chrome)

.3 Closets and Coat Alcoves

.1 Each closet and coat alcove shall have one:

.1 Hat shelf: 450 mm wide, birch ply.

.2 Adjustable chrome-finish hanging rod: Richelieu, rod #122.208.140; bracket #1225-140.

.1 Cabinet and Shelving Hardware

.1 Use only heavy duty hardware.

.2 Cabinet Locks: Schlage “CL” series

In order to maintain consistent keying throughout the campus, alternates are not acceptable for cabinet locks. Mount flush to face of cabinetry.

.1 Review locking and keying requirements with UVic.

.2 Keyway to be specified by UVic and Key Schedule to be supplied by UVic.

.3 Door locks: CL100PB (25 mm throw bolt) c/w trim collar 36-031 and slot strike 10-052.

.4 Drawer locks: CL200PB (19 mm throw bolt) c/w trim collar 36-031 and slot strike 10-052.

.5 Finish: 626 - satin chromium plated.

.6 Cylinder alignment: vertical (horizontal alignment not acceptable)

.3 Metal bolt - to be installed at the stationary door of a pair with a lockable active door.

.1 Richelieu - B 375-180, chromium or nickel finish, complete with recessed mounted slot strike installed with countersunk screws.

.4 Hinges: heavy-duty, concealed European design, min. 105^0 opening, self-closing operation and secure joint to resist removal of door, c/w mounting plates. Provide hinges for full overlay and twin application, as required. Finish: 626 - satin chromium. Product: Blum Modul 107^0.

.5 Drawer slides: side mount, ball bearings, full extension, telescoping, trigger disconnect, chrome or zinc finish. Products (select to suit use):

.1 Accuride: 3832 series - 45 kg rating; 3640 series - 90 kg rating (storage drawers)

.2 Grant, HEG-4932 - load rating 60 kg.

.6 Latches: magnetic touch. Product: Richelieu 9783-145.

.7 Pulls: wire type D-pull 9 mm diameter, 96 mm centres, 26 mm depth, chrome satin finish. Product: Gallery 945-26D, or Richelieu 2214-175.

.8 Flush Pulls for sliding glass doors: Richelieu D010127 satin chrome.

.9 Glass for cupboard doors: 6 mm thick, clear, tempered.

.10 Door and Drawer bumpers: 5 mm diameter, neutral colours; 2 bumpers per door up to 1200 mm in door height; 3 bumpers per door over 1200 mm in door height; 2 bumpers per drawer.

.11 Adjustable shelf supports: (semi)recessed (not surface mounted) pilasters c/w seismic support clips. Products: Richelieu, Pilasters 2552G c/w clips 242762G.

.12 Grommets to suit wiring through millwork components: cable entry plug, plastic, typical, Ø72 mm, larger Ø where required. Product: Richelieu A 60.0910-90, or larger size, as required.

.6 Hardware Schedule

.13 Consultant shall produce the Hardware Schedule, as part of project documentation.

1. Performance Requirements

.1 Regardless of exposure classification and climate zone, building envelope components and assemblies shall be designed using rainscreen principles.

.2 Building envelope design shall include consultation with a Building Envelope Professional (BEP), or other Registered Professional recognized by the Authority Having Jurisdiction who is actively practicing in the field of Building Science and Enclosure Design.

.3 Building envelope design shall avoid thermal bridging wherever possible. Continuous insulation is encouraged in all design and shall consider the effects of thermal bridging for all structural materials, backing, fasteners, clips, z-bars, hat channels etc.

.4 Where structural components penetrate the building envelope, materials shall be suitable for exterior exposure (ie. corrosion protection for metals or preservative treatment for wood).

.5 General building envelope design shall consider ease of maintenance and renewals. Components with limited designed service lives shall be easily accessible for renewals without the requirement for significant deconstruction of longer life components. For example, windows in masonry openings shall be detailed such that removal of the window frame shall not require demolition of the masonry.

1. Performance Requirements

.1 All below grade membrane substrates shall be provided with adequate slope to drain. Below grade membranes shall be fully bonded to the substrate for ease of leak identification.

.2 Below grade membrane assemblies shall be designed to accommodate cyclical temperature movements, serviceability, and deflection tolerances of the substrate. Cracks and joints of the substrate shall be carefully detailed.

.3 All below grade membranes shall be complemented with means to limit the effects of hydrostatic pressure from adjacent landscaping materials. Drainage mat or alternative products are required.

.4 Below grade membranes shall be tested for leaks prior to backfilling.

.5 Protect all leading edges of membranes at vertical terminations. Provide mechanically attached termination bars and counter flashings at exposed locations.

1. Performance Requirements

.1 Insulation shall be installed outboard of the plane of air-tightness (ie. the air barrier shall be on the warm side of the insulation). Insulation shall be installed tight to the air barrier plane. Design of 'split insulation' wall assemblies shall demonstrate effective control of moisture (condensation) with a considerable safety tolerance.

.3 Insulation retention and furring shall be designed to minimize the effects of thermal bridging.

.4 Insulation products installed in locations (ie. wall cavities) susceptible to moisture must be intended for such purposes with regards to performance and overall durability.

.6 Where spray applied urethane insulation systems are specified, installationshall be in conformance with the CUFCA (Canadian Urethane Foam Contractors Association), "Manual for Installers of Spray Polyurethane Foam Thermal Insulation", carried out by a certified installation Contractor.

1. Performance Requirements

.1 All new and retrofit building design shall define a continuous air barrier. All building envelope drawings and details, and shop drawings shall clearly identify the plane of air tightness and identify all air barrier materials and components.

.2 Compliance of the continuous air barrier shall be demonstrated by one of the following methods:

.1 Materials: Using individual materials that have an air permeability not to exceed 0.02 L/s·m² under a pressure differential of 75Pa when tested in accordance with ASTM E2178.

.2 Assemblies: Using assemblies of materials and components that have an average air leakage not to exceed 0.2 L/s·m² under a pressure differential of 75Pa when tested in accordance with ASTM E2357 or ASTM E1677.

.3 Building: Testing the complete building and demonstrating that the air leakage rate of the building envelope does not exceed 2.0 L/s·m² under a pressure differential of 75Pa when tested in accordance with ASTM E779 or an equivalent approved method.

1. Cladding Design Guidelines

.1 Cladding systems shall be designed and installed utilizing rainscreen principles, where the cladding represents the first plane of protection. Cladding systems shall be compartmentalized vertically, and typically broken at each floor line to facilitate drainage and ventilation of the rainscreen cavity.

.2 Cladding systems shall be designed to suit renewals of adjacent components such as membranes, doors, windows, vents etc. without requiring extensive removal, alteration or replacement of the cladding.

1. Performance Requirements

.1 Roofing and waterproofing shall conform to the requirements of the Roofing Contractors Association of British Columbia (RCABC) Standards, as outlined in the RCABC Roofing Practices Manual.

.2 All new and re-roofing assemblies shall pursue the RCABC third party five (5) or ten (10) year guarantee (RGC Guarantee). Confirm desired warranty standard for each specific project with FMGT. Close-out submittals from the Contractor shall include all Warrantee certificates and documentation addressed to the Owner, registered in the Owner's name, and shall include copies of all inspection and testing reports where applicable.

.3 An independent roofing inspection agency shall be retained by UVIC to satisfy the requirements of the RGC Guarantee. UVIC will cover all costs for inspection and testing services as required to satisfy the RGC Guarantee. Re-inspection and testing required as a result of failures or faulty workmanship (re-work) by the Contractor shall be paid for by the Contractor. The Contractor shall be required to coordinate all roofing work in cooperation with the inspection agency to satisfy the inspection requirements of the RGC Guarantee.

.3 Low slope roofs shall typically be designed as IRMA or MIRMA assemblies. Conventional roof assemblies (exposed membrane) are not preferred and shall be avoided wherever possible. Where protected (inverted) membrane assemblies are utilized, ballast and overlay materials shall be easily removable to suit maintenance and repairs. Cast-in-place concrete or asphalt overlays are not acceptable

.4 All low slope roofing shall have a minimum of 2% slope to drain.

.5 Provide one (1) overflow scupper per roof drain where roof parapets exceed 100mm in height. Scuppers are to be a minimum of 3" in diameter.

.6 Provide walking paths from service access hatches, ladders or access stairs to all rooftop equipment which requires servicing. Walkways to typically be 2'x2'x2" precast concrete pavers on adjustable pedestals. Cast-in-place concrete or duckboards are not acceptable.

.7 Performance standards for roof insulation shall be as per the minimum requirements as described in Section 7.3. Protection board shall be provided between all insulation and membrane layers.

.8 Where conventional roof assemblies are required for special circumstances, vapor retarders shall be fully adhered modified bitumen sheet membranes.

.9 Provide termination bars to mechanically secure all membrane up-turns. Provide counter-flashings as required to protect exposed leading edges.

.10 Gum-lips, pitch pockets, and other sealant dependent detailing shall be avoided wherever possible. Provide drawing details showing upstands for all penetrations.

.11 In re-roofing projects, all debris shall be disposed of through a contained waste chute. Debris shall never be thrown from a rooftop in any circumstance.

1. Performance Requirements

.1 Flashing and Sheet Metal shall conform to the requirements of the Roofing Contractor's Association of British Columbia (RCABC) Standards, as outlined in the RCABC Roofing Practices Manual.

.2 Architectural sheet metal to be fabricated in accordance with the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) manual, latest edition.

.3 Metal flashings shall remain for cosmetic purposes and for protection to primary waterproofing materials. Flashings shall not be relied upon for waterproofing.

.4 Provide continuous clip-type fasteners at all parapet flashings (same material as flashing).

.5 Avoid surface fasteners.

.1 Firestopping and Smoke Seals

.1 For renovation projects, in addition to the necessary new joints and penetrations, specify the firestopping of all existing assemblies where firestopping is damaged, discontinued or absent.

.2 Use the same product for all like applications, the same manufacturer throughout the project, and compatible materials for restoration work.

.3 Tag penetrations and every 3 meters of joint seal with printed tags

.1 indicating:

Product

System #

Installed by: (name and phone number of subcontractor)

Repenetrated by & Date

.2 and stating:

CAUTION! FIRESTOP - DO NOT REMOVE, PUNCTURE OR DISCONTINUE UNLESS PREPARED TO RE-SEAL IMMEDIATELY WITH PROPER PRODUCTS AND METHOD!

.4 Floor Sleeves

.1 Where possible, use metal sleeves for floor penetrations to prevent/mitigate the consequences of leakage or flooding.

.2 Specify coordination of the fire-stop contractor with mechanical and electrical trades, to ensure adequate selection and construction of firestopping systems.

.5 Cable tray penetrations

.1 As through-wall cabling is often updated, cable tray penetrations shall be closed with a fire stop system for active openings.

.6 Preferred Product: Hilti Canada

1. Performance Requirements

.1 Sealants shall not be designed as the primary waterproofing component.
.2 Use only premium high performance sealants.
.3 Use backer rods or bond breakers at all joints including fillets.
.4 All joints shall be tooled.
.5 Solvent curing products are not preferable in interior applications.

2. Applications:

Exterior:

.1 Where urethane sealants are specified, preference is for multi-component products.

Interior:

.1 General purpose caulking, exposed acoustical sealant: single component, pure acrylic latex.
.2 Concealed acoustical sealing: non-skinning, non-hardening single component synthetic rubber.
.3 Glazing applications: single component silicone.
.4 Sanitary applications, including washrooms, food service, countertops etc.,: mildew resistant silicone (clear).

.1 General Design Requirements

.1 Window assemblies shall be designed using rainscreen principles; pressure equalized, with internal drainage and ventilation capabilities. Storefront glazing assemblies are not acceptable products for exterior exposure.

.2 Glazing shall be designed to limit unwanted solar heat gain into occupied spaces, and shall manage visible light transmittance in coordination with mechanical and electrical systems.

.3 Specify at a minimum, the following performance criteria for all window and curtainwall assemblies :

- .1 Energy Performance: (maximum assembly U-Value)
- .2 Solar Heat Gain Coefficient: (NFRC assembly rating)
- .3 Visible Light Transmittance: (NFRC rating)
- .4 Air Tightness Rating: Fixed
- .5 Air Tightness Rating: Operable (A)
- .6 Water Tightness Rating: (B)
- .7 Wind Load Resistance Rating: (C)
- .8 Forced Entry Resistance: (F)
- .9 Sound Attenuation:

.4 Minimum Energy Performance:

.1 Low-Rise Residential Buildings:

.1 Exceed by 10% the performance standards specified by the Energy Star Qualifying Criteria for Windows Sold in Canada.

.2 Mid & High-Rise Residential, and Commercial Buildings (minimum code compliance with ASHRAE 90.1 – 2004)

.1 Comply with BSR/ASHRAE/USGBC/IESNA Standard 189.1 – Standard for the Design of High Performance Green Buildings Except Low Rise Residential Buildings. A general summary of the required performance is as follows:

- .1 Maximum Assembly U-Value:
  - .1 Non-metal framing: U- 1.42 W/m^2 °K
  - .2 Metal frame curtainwall / storefront: U- 2.00 W/m^2 °K
  - .3 Metal framing: all other: U- 2.57 W/m^2 °K
- .2 U-Values to be published values provided by manufacturer based upon the NFRC ratings which consider all components within the fenestration area as defined by ASHRAE.
- .3 Maximum Assembly Solar Heat Gain Coefficient (SHGC)
  - .1 Nonresidential: 0.35 (all exposures)
  - .2 Residential: 0.40 (all exposures)
- .4 SHGC values to be published values provided by manufacturer based upon the NFRC ratings which consider all components within the fenestration area as defined by ASHRAE. ASHRAE alternative compliance of compliance using C.O.G. SHGC values are acceptable.

.2 Finish

.1 Aluminum:
  .1 Clear Anodized typical for new construction
  .2 Bronze Anodized or other finish to match existing where necessary.
  .3 Provide physical samples to FMGT for approval during design stage.
.2 Composite: Light Colors Only

.3 Hardware

.1 Hardware: Premium hardware as recommended by manufacturer for compatibility.
.2 Latching/locking devices shall be cam handle type (rotor operators, push bars are not acceptable).
.3 Hardware finish: To complement frames or match/complement existing in-situ products. Provide samples to FMGT for approval during design stage.
.4 Opening restrictors shall be installed to limit window *opening* as follows:
  .1 Typical: 150mm
  .2 Residential Units: 100mm.
.5 Opening operation
  .1 Residential units in dorms: awning or casement opening, unless approved otherwise.
.6 Screens shall not be provided, except some ground floor rooms, reviewed on a case by case basis.

.7 Operable windows in laboratories and other specialty spaces are to be installed with specialized hardware to suit opening only during a mechanical system failure or shutdown.

.4 Approved Products:

.1	Curtain Wall:	Kawneer 1600 system with AA900 IsoWeb Rainscreen Vent Operables (casement or awning only)
.2	Punched Windows:	Kawneer 5500 or 5525 IsoWeb Rainscreen windows with AA900 IsoWeb Rainscreen Vent Operables (casement or awning only)

.5 Quality Assurance

.1 Testing and Verification of Performance: In accordance with Section 1.2 – Quality Assurance & Quality Control:

  .1 In-Plant Testing

    .1 Manufacturer to test minimum 5% of windows (minimum 2) prior to shipments to site. Verification letter shall accompany shipments.

  .2 Field Testing – Water Penetration

    .1 Preferred: ASTM E1105 by using AAMA 502-02 Test Method B.

    .2 Contractor to provide full wall assembly detailing in area of all tests (for a minimum distance of 600mm beyond rough opening). Where stucco is the exterior finish, plywood may be used as a temporary cladding for the test, otherwise the specified cladding is to be in place at the time of testing.

.3 Test a minimum of 5% (minimum 2) of the total quantity of windows. One of the 5% shall be a mock-up test completed prior to installation of additional windows on site.

.4 For each testing failure, the original specimen plus an additional shall be re-tested at no cost to the Owner. The costs to repair, replace, or adjust the assemblies prior to re-testing shall be at no cost to the Owner.

.5 All modifications required to pass field tests must be performed on all other affected or similar assemblies.

.1 General Design Considerations

.1 Building entrances shall typically be aluminum, or wood when required to match an existing condition. Use steel exterior doors at locations with low public traffic (utility rooms, service access etc.). Exterior metal doors and frames shall be thermally broken wherever possible.

.2 Wood doors are typical for all interior locations. Use steel doors alternatively in high traffic applications, to satisfy required fire resistance ratings, for security purposes, or to match an existing condition.

.3 Typical door sizes
- .1 Typical thickness: 44 mm.
- .2 Minimum stile and top rail width: 125mm aluminum; 150mm wood doors.
- .3 Bottom rail: min 250mm
- .4 Minimum width: 900 mm single and 1800 mm double doors.
- .5 Mechanical rooms: minimum width 1200 mm, single or double doors. Double doors shall have the active leaf 900 (or 915) mm wide.

.4 Interior doors and windows used with modular wall partitions are desirable in office and meeting room locations to minimize the impacts of churn.

.5 The University encourages the use of glass panels in interior doors, to provide natural light in corridors. Frameless glass doors shall be avoided.

.6 All fasteners within secured areas shall be tamper resistant torx (or pin-in-torx, or torx TR).

.7 Interior door locations shall provide adequate clearance behind the door opened at 90^0 and the adjacent wall. The clearance between the edge of hinge side frame and adjacent wall:
- .1 100 mm – typical at offices, classrooms, labs, etc.
- .2 650 mm – typical at filing rooms, lunchrooms, office supply storage, etc.

.8 Shop drilling and notching shall be specified wherever possible.

.2 Quality Assurance

.1 Exposed exterior doors, particularly glazed assemblies within curtain wall or window wall assemblies shall specify required performance criteria as outlined in Section 8.1.

.2 Provide requirements for third party testing and verification of performance criteria as outlined in Sections 1.2 and 8.1.

.3 Wood Doors

.1 Faces (rated and non-rated assemblies):
- .1 Type 1: Hardwood veneer; solid core, rotary cut sound birch or maple.
  Finish: clear factory coating, satin sheen.
  Application: Typical; General offices, Classrooms.
- .2 Type 2: Hardboard, solid core, painted.
  Application: Residences, other locations as approved by FMGT.

.3 Core: Solid wood or composite core (mineral core is not acceptable).

.4 Steel Doors

.1 Use hollow core, welded assemblies (pressed seams not acceptable)

.2 Thickness of materials (minimum / mm):

.1	Face sheet – interior doors typical	1.2 (18 gauge)
.2	Face sheet - exterior doors	1.6 (16 gauge)
.3	Top and Bottom Channels	1.2 (18 gauge)

.5 Frames

.1 Use steel frames for typical interior doors and windows

.1 All frames to be welded pressed steel. Knock-down steel frames are not acceptable.

.2 Throat size to suit GWB wall construction for wrap around assembly.

.

.1 General

.1 Use one manufacturer's products for related items.

.2 Aluminum store front doors must use the hardware indicated below, including FBB/NRP leaf hinges (continuous or pivots not acceptable).

.3 Products: to simplify maintenance and minimize parts stock, the following are University standards for all new and existing buildings, including Student Residences suites. ALL PRODUCTS LISTED BELOW SHALL BE AS SPECIFIED (NO SUBSTITUTIONS).

.2 Locksets, Locks and Latches

.1 Finish

.1 TYPICAL: satin chromium (# 626).

.2 Where necessary to match existing: oil rubbed bronze (#613).

.2 Electric hardware is preferred over electric strikes.

.3 Locksets - Keyed:

- Schlage 'ND' series - 6-pin cylinder - Rhodes lever handle (handle types other than lever are acceptable only when matching existing style takes priority, on a case by case basis).
- Key schedule and Keyway to be supplied by UVIC.

.4 Locksets – Key Pad: Schlage AD200CY70-PRK-RHO-626-PD with key override.

- This item shall be installed at User's request with cost to the department (not the project).

.5 Deadbolts: Schlage B600 series (installed 150 mm o/c above locksets)

.6 Special function locksets may be used only with the FMGT Executive Director approval.

.3 Exit Devices

.1 Panic Hardware:

- Von Duprin "33/35" or "98/99" series.
- Cylinder dogging is required unless using for EL hardware.
- Interior doors (lecture halls and corridor doors): where vertical rod is required use surface mounted less bottom rod application.
- Exterior doors (store front aluminum doors): where vertical rod is required internal rods are acceptable, top and bottom rods are required.

.4 Door Closers and Accessories:

.1 Door closers: shall be surface mounted (not recessed), heavy-duty, made by a manufacturer having service facilities in British Columbia, time adjusted for wheelchair entry at regular speed.

.1 Acceptable product: LCN 4041 series, adjusted to level 3 for interior doors and level 5 for exterior doors with "back check selector valve" set on for all parallel arm applications.

.2 Provide thru-bolt connection for closers used with particleboard filled doors (ie. typical solid core).

.2 Astragal: MUST be installed (on keyed side of door) at all double doors with <u>one leaf fixed</u>, as required to provide security and maintain the alignment of the door leaves and door hardware.

.3 Co-ordinator: None

.5 Automatic Door Operators:

.1 Automatic Openers shall be established in consultation with FMCA Locksmith and as follows:

- Product: Horton 7100 series, or pre-approved equal.
- Interior and exterior activation pads shall be hardwired.

.2 Electric power transfers: Von Duprin EPT 2 or EPT 10 as required

.3 Battery operated activators are not acceptable.

.4 Where possible, avoid mounting automatic door actuators (buttons) on the door frame. Provide in locations that suit ease of access and safe approach to the door such as an adjacent wall.

.6 Hardware Schedule:

Note: Schlage Vandlgard locksets are to be used used on all new buildings. Lockset type at additions and renovations must be confirmed with the FMCA Locksmith, on a case by case basis.

.1 Exterior Doors
- Lockset: "Night Entry" - except for exit only doors (i.e. if a key is used to open a door, the door must automatically relock when the user removes the key)
- Panic hardware in public areas
- Door closers: LCN 4041
- Hinges: FBB/NRP (Butt hinges only)

.2 Service rooms (Janitor, Mechanical, Electrical, Communications, Elevator Machine Rooms, etc.)
- Lockset: Schlage ND80PD/RHO or ND96PD/RHO (Vandlgard). Use PLY on exterior applications.
- Door closers: LCN 4041

.3 Washrooms (single user – without door opener)
- Lockset: Schlage ND73PD/RHO or ND97PD/RHO (Vandlgard)
- Door closer: LCN 4041
- Accessible washrooms require a delayed action closer

.4 Washrooms (single user – with door opener)
- Auto door opener: Horton 7100 Series
- Lockset: Schlage ND10S/RHO
- Deadbolt: Schlage B660P – installed 150mm o/c above lockset
- Electric Hardware: provide as required

.5 Washrooms (multiple users)
- Deadbolt: Schlage B663
- Door closer: LCN 4041 delayed action
- Push-Pull door hardware

.6 Offices
- Lockset: Schlage ND53PD/RHO or ND92PD/RHO (Vandlgard)
- Door closer: LCN 4041, only where required by Code

.7 Classrooms
- Lockset: Schlage ND70PD/RHO or ND94PD/RHO (Vandlgard)
- Door closer: LCN 4041, only where required by Code

.8 Classrooms (with card access)
- Lockset: Schlage ND80PD/RHO or ND96PD/RHO (Vandlgard)
- Door closer: LCN 4041

.9 Labs
- Lockset: Schlage ND60PD/RHO or ND93PD/RHO (Vandlgard) OR ND80PD/RHO or ND96PD/RHO (Vandlgard)
- Door closer: LCN 4041, only where required by Code.

.10 Student Residence Rooms
- Locksets: Schlage ND73PD/RHO or ND97PD/RHO (Vandlgard)
- Door closer: LCN 4041 - mounted on hallway side of door.

.11 Stairwell - Coordinate with BCBC exiting requirements:
- Doors with regular hardware: “Classroom” setup (can be left locked or unlocked using a key).
- Doors with card access: fail-secure “Storeroom” setup.
- Stairwell - Coordinate with BCBC exiting requirements:

.12 Padlocks – Schlage KS23D2300.

.7 Keys

.1 Doors, padlocks and cabinet locks shall be keyed as directed. Keying shall be to the University of Victoria grandmaster and master key system, using a Schlage quad/numerical keyway. All cylinders must be construction keyed.

.2 Construction Master Keying Systems may be required on new and large projects, as designated by the FMGT Executive Director. Such systems shall be established in consultation with the FMCA Locksmith.

.3 For projects with **under 50 locksets**: cylinders and keys are Not In Contract (installed by FMCA).

Provide sufficient notice to FMCA Locksmith for acquisition of materials.

.4 For projects with **over 50 locksets**: Hardware supplier to supply all cylinders and keys as per UVic’s Keying Schedule. Allow for:
- 15 copies of Grandmaster key
- 10 copies of each Master key
- 10 copies of Construction master key
- 4 extractor keys
- 8 keys per cylinder
- 200 key blanks
- 20 additional cylinders (10 standard cyls, 5 mortise cyls, 5 rim cyls.)
- All keys and key blanks stamped “**DO NOT DUPLICATE**”

.5 Hardware, cylinders and the 10 construction keys to be shipped to the site contractor for installation.

.6 All keys (grandmasters, masters, change keys, extractors and key blanks) shall be shipped by registered mail or courier directly from the manufacturer to the UVic Carpenters Shop.

.7 Construction plugs are removed by FMCA after Substantial Performance has been granted.

.8 Door Hardware and Keying Schedules Review Process

.1 Door Hardware Schedule

.1 Door Hardware Schedule must be submitted to FMCA Locksmith for review prior to tender. Corrections and changes will be noted and returned for updating.

.2 The final Hardware Schedule must be resubmitted and approved by FMCA Locksmith before ordering any materials.

.2 Keying Schedule: UVic FMCA shall provide a Keying Schedule after the final Hardware Schedule approval.

.1 General

.1 Provide adequate access to utilities above suspended ceilings. Ventilate ceiling spaces as required.

.2 Specify water resistant and washable ceiling surfaces in high humidity spaces (food preparation, showers, washrooms, etc.)

.2 Provide mould resistant and anti-microbial treated products where suitable such as high moisture locations, food service areas etc.

.2 Acoustical Ceilings

.1 Metal t-bar suspension systems and acoustic tile units.

.1 Prefinished baked enamel; white.

.2 Typical: 610x1220 mm grid with 15/16" reveal

.3 Custom: only where necessary to match existing layout or areas designed for enhanced architectural appeal, 610x610mm grid; tegular or square lay-in; white, or other system to suit application.

.4 Duty: intermediate for typical ceiling tile (mineral fibre. Heavy duty for wood or GWB panels

.5 Products: Armstrong Prelude; Donn; Approved equivalent.

.3 Acoustical Units for Suspended Ceiling System

.1 Gypsum panels are preferred; acoustic tiles are acceptable alternatives:

.1 Gypsum panel

.1 Square lay-in

.2 Acceptable Manufacturers:

.1 Armstrong - Prelude;

.2 CGC – Donn

.3 approved equivalent

.2 Acoustic Tile

.1 Mineral Fibre Panel, medium texture, white

.2 Noise Reduction Coefficient (NRC) designation of 0.70 typical (0.55 minimum)

.3 Ceiling Attenuation Class (CAC) rating 40 (35 minimum)

.4 Light Reflectance (LR) of minimum 0.84.

.5 Products - Preferred:

.1 Armstrong - School Zone Fine Fissured, 19 mm thick, no added formaldehyde.

.2 CGC - Radar ClimaPlus high NRC

.6 Products – Acceptable (with budget constraints and if not in conflict with LEED certification):

.1 Armstrong Fine Fissured, 16 mm thick

.2 CGC - Radar ClimaPlus

.3 Armstrong Dune

.1 General Flooring Selection Considerations

.1 Carpet Tile (Refer to Section 9.4)
- .1 Classrooms
- .2 Lecture Halls
- .3 Computer Labs
- .4 Seminar Rooms
- .5 Office spaces
- .6 Meeting and Conference Rooms

.2 Ceramic Tile (Refer to Section 9.5)
- .1 Lobbies and Entryways (extend minimum 10m from entrances)
- .2 Corridors
- .3 Washrooms and Shower Rooms
- .4 Lunch Rooms
- .5 Food Service Spaces

.3 Linoleum (Refer to Section 9.3)
- .1 Corridors
- .2 Lunch Rooms
- .3 Food Service Spaces
- .4 Laboratories (non wet)

.4 Sheet Vinyl (Refer to Section 9.3)
- .1 Washrooms and Shower Rooms (Small)
- .2 Laboratories (wet and/or chemical exposure)
- .3 Janitorial / Utility

.5 Polished Concrete / Terrazzo
- .1 Lobbies and Entryways
- .2 Corridors
- .3 Mechanical, Electrical and Service Spaces

.2 Matting

.1 Walk-off Entry Mats
- .1 Institutional Grade
- .2 Extend min. 4m from entrances on slip-resistant surfaces and 6m on slippery floors.
  - .1 Matting shall be installed on flush floor; mat wells (depressions) are not acceptable.
  - .2 Acceptable products: min. 7.94 mm thick; nylon polypropylene; vinyl backed, heavy edged and containing min. 30% recycled material:
    - .1 Grizzly FX, or 3M Normad 8850

.1 Sheet Linoleum 2.5mm thick – PREFERRED Resilient Sheet Flooring

.1 Applicable areas: dry areas (corridors, lecture theatres, classrooms, lunchrooms). Acceptable Products:

.1 Marmoleum Real - by Forbo Flooring Systems.

.2 Linoleum Harmonium XF - by Tarkett / Johnsonite.

.2 Sheet Vinyl - V1.

.1 Applicable areas: occasionally wet (labs, cafeteria, dining areas, washrooms, etc). Acceptable Products:

.1 Preferred: Tarkett iQ Optima or Granit (2.0 mm homogeneous)

.2 Acceptable, (limited budget):

.1 Armstrong - Connection Corlon, wearing surface: minimum 1.27mm.

.2 Tarkett – Contract Plus, 2.0 mm Homogeneous with PUR surface treatment.

.3 Sheet Vinyl – V2.

.1 Applicable areas: occasionally wet and where chemical resistance is required (labs, chemicals storage, etc). Acceptable Products:

.1 Tarkett iQ Optima (GOOD chemical resistance)

.2 Tarkett Acczent - Glass or Steel - (EXCELLENT chemical resistance)

.4 Sheet Vinyl – V3 - Slip Retardant, Safety Flooring:

.1 Applicable areas: wet floors (food service; labs; washrooms, etc). Acceptable products:

.1 Labs and Washrooms: Tarkett Safe-T Sheet.

.2 Food Service, Ramps, heavy traffic areas: Altro Designer 25

.5 Sheet Vinyl - V4 - Slip Retardant:

.1 Applicable areas: wet floors (showers, change rooms).

.2 Acceptable products - homogeneous, 2.0mm thick, raised texture surface, slip retardant, waterproof c/w flash-coved base:

.1 Showers: Tarkett Granit Multisafe and Altro Marine 20 - by Altro Floors

.2 Locker & Change Rooms: Tarkett Safe-T Sheet

.6 Seams: heat welded, thread in colour to match flooring.

.7 Guarantee: five (5) years.

.8 Accessories

.1 Stair Nosings

.1 Stair nosings shall be flexible vinyl, wire reinforced nose, with co-extruded 50mm wide photo-luminescent strip, in colours to be selected from manufacturer's standard range. Acceptable product:

.1 Johnsonite Safety-T-First

.2 At carpet use double undercut style PIVCD-XX to suit carpet thickness.

.3 At linoleum use style PIRCN-XX to suit linoleum thickness.

.4 Fill void between nose and tread with Epoxy caulking, to prevent ungluing of nosing.

.2 Reducer strips: provide at all exposed edges of flooring materials. Where flooring terminates in a door opening, centre reducer under door.

.1 General:

.1 Carpet tile is the preferred carpet product used on campus. Broadloom is not acceptable.

.2 The University maintains a list of pre-qualified carpet suppliers, and pre-approved product list standard for all applications on campus.

.3 Select carpet from the pre-approved product range as identified below, to suit project budget.

.2 Suppliers and Products:

Supplier	**Floor Coverings International**	P: 250-704-0010
Contact	Suzette Goldsworthy	F: 250-370-0203
	C: 250-883-4964	E: suzette.goldsworthy @floorcoveringsinternational.com

Manufacturer	Collection - Pattern - Pattern Name	Price
Mannington	Down To Earth Collection	higher price
Mannington	Everywhere Collection	
Mannington	Viewfinder Collection	
Mannington	Cartography Collection	
Tandus	Crayon / Mayhem Ii / Haiku	
Shaw Contract	Shade Collection - Brilliance, Striking, Umbra, Eclipse	
Shaw Contract	Steppin Out Collection - Bon Jour, Welcome	
Shaw Contract	Repartee	
Shaw Contract	Right Choice Collection - In A Snap, That The Ticket, Instant Style	
Shaw Contract	Work Tile Collection - Focus, Embrace, Escape	
Shaw Contract	Spice Collection - Borneo, Malang, Seram	

Supplier	**Island Floor Centre Ltd**	P: 250-475-7743
Contact	Bob English	F: 250-475-3399
		E: bobenglish@islandfloors.com

Manufacturer	Collection - Pattern - Pattern Name	Price
Shaw Contract	No Rules Collection - In A Snap, Nothing To It, Simply Done, Colour Play, Kinetic	medium price
Shaw Contract	Blox - Shadow Play	
Interface Floors	Entry Level	
Interface Floors	Cubic	
Interface Floors	Cubic Colours	
Interface Floors	Cubic Form Function Collection - Profile, Grillwork, Turbulence, Equation	
Interface Floors	Viewpoint Collection - Panorama, Urban Grid, Pathways, Peak District	

Supplier	**Graphic Office**	P: 250-544-3506
Contact	Larry Myhres	F: 250-544-6663
	C: 250-713-2959	E: lmyhres@graphicoffice.com

Manufacturer	**Collection - Pattern - Pattern Name**	**Price**
Milliken Contract	Bioview & Biogrid - Major & Minor	**lower price**
Milliken Contract	Design Rhythms - Classic Currents Moonspinner, Quiet Leafery, Zirconia	
Milliken Contract	Sisal Style - Savanna, Sisal Cord	
Milliken Contract	Sisal Duet - Major & Minor	
Milliken Contract	Raffia - Ribbon, Tex	
Milliken Contract	English Rattan - Rattan Squares	
Milliken Contract	Simply This - Classic - Block, Column, Cross Section	
Milliken Contract	Simply This - Elemental - Archetype, Mode	
Milliken Contract	Simply This Essential - Graph, Lined, Squared	
Milliken Contract	Simply This - Modern - Chaise, Chiari	
Milliken Contract	Simply This - Modern - Nelson, Tubular	
Milliken Contract	Simply This - Stated - Phased, Positive, Reverse	
Milliken Contract	Straight Talk - Candid Shot, Eye Contact, Open Book, Snap Back	
Milliken Contract	Theory - Blip, Cram, Dewey, Eueka, Mad Professor, Pop Quiz, Quiet Please, Stacks	
Milliken Contract	Simply That - Artistic - Avant- Display - Exhibit	
Milliken Contract	Simply That - Inspired - Air, Ambiance, Atmosphere	
Milliken Contract	Simply That - Structured - City Block, High Rise	
Milliken Contract	Simply That - Timeless - Am, Clockwise, Synchronicity, Tick Tock	
Milliken Contract	Remix - Bebop, Freestyle, Shimmy, Strut	

.1 Ceramic Tiling

.1 Ceramic tile types:

.1 Flooring tile: slip-resistant, non-glazed porcelain.

.2 Wall Tile: glazed porcelain.

.2 Tile size: between 200x200 and 400x400 to minimize amount of grout lines and facilitate floor slope to drain. Other sizes (i.e. 100x200, 100x400, etc) are acceptable for base and accent colour band applications. Small mosaic tiles are not acceptable in any application.

.3 Grout: stain and/or acid resistant, where required. Avoid light colours grout.

.4 Wet spaces

.1 Preferred: tiling of entire wall surface.

.2 Acceptable (constrained budget): partial tiling, extended as follows:

.1 Horizontally min. 200 mm past the edge of showers and tubs.

.2 Vertically to min. height of 1800mm in washrooms and 2000mm at showers / tubs.

.1 Quality Assurance & Control

.1 The design of all paint and coating systems, surface preparation and maintenance shall be in accordance with the Master Painter's Institute (MPI) – Architectural Painting Specification Manual (Latest Edition) for new surfaces, and the MPI Maintenance Repainting Manual (Latest Edition) for re-painting and previously un-coated surfaces.

.2 For projects that contain both new and existing surfaces, specify both new and existing systems as necessary (ie. INT 9.2B (new) & RIN 9.2B)

.3 For existing surfaces, DSD values shall be evaluated and specified by the Consultant. Alternatively, specify minimum system requirements (including prep, priming, sealing etc.) as described by the MPI standard.

.4 All paint systems shall be MPI "premium grade". Other materials such as linseed oil, shellac, thinners, solvents, etc. shall be the highest quality product of an MPI listed manufacturer.

.2 Approved Paint Manufacturers

.1 As per MPI Approved Products Listings:

.1 Preferred: General Paint, Cloverdale Paints

.2 Acceptable: Benjamin Moore, Pratt and Lambert

.3 Exterior Painting

.1 Metal fabrications

.1 Marine grade system, such as epoxy coat and aliphatic urethane topcoat.

.2 Typical gloss level: semi-gloss for miscellaneous metals.

.2 Exposed Architectural Concrete

.1 Anti-graffiti coating.

.4 Interior Painting

.1 Interior walls and ceilings:

.1 All areas: Latex, MPI gloss level 3 "eggshell like".

.2 Laundry rooms, public wash / shower / bathrooms / prep areas: washable latex G5 (semi-gloss) finish.

.3 Public change / wash / shower rooms and "clean" or "sanitary" areas such as food preparation and laboratory areas: epoxy (tile-like) MPI gloss level 5 (semi-gloss) finish.

.4 Custodial Closets:

.1 Throughout: washable latex MPI Gloss Level 5 (semi-gloss)

.2 Behind and adjacent to floor sink: epoxy (tile-like) G5 (semi-gloss) finish. Extend:

.1 Horizontally min. 200 mm past the edge of floor sinks.

.2 Vertically to min. height of 900mm.

.5 Colours:

.1 Student Family Housing only: Cloverdale 937-2W. Formula: B-3 C-25 I-0.05

.2 Academic Buildings: Confirm with FMGT Project Officer.

.1 Old standard – only to match existing: 937-2W

.2 New standard – typical: 8443 - Cloverdale

.2 Doors, frames, trim and sills: MPI gloss level 5 (semi-gloss) finish.

.1 Acoustics

.1 Partitions shall extend to the underside of slab above and have batt sound insulation in wall cavity. Provide specific sound transmission class (STC) ratings when separating a core learning space from and adjacent space

- .1 STC-45 if the adjacent space is a corridor, staircase, general office or conference room.
- .2 STC-50 if the adjacent space is another core learning space or the outdoors.
- .3 STC-53 if the adjacent space is a restroom.
- .4 STC-60 if the adjacent space is a music room, mechanical equipment room, cafeteria, or other public assembly space.

.2 Provide specific sound transmission class (STC) ratings when separating the following space types:

- .1 STC-45 Office to Office
- .2 STC-52 Executive Offices to adjacent spaces
- .3 STC-53 Restroom to offices
- .4 STC-60 Office to music room, mechanical equipment room, cafeteria or other public assembly space.

.3 Maintain the integrity of sound control ratings through walls and floors; specify adequate sealing of perimeter joints, walls to windows joints and all penetrations.

.1 Area of Use:

.1 All Lecture Halls and Classrooms shall be equipped with Chalkboard Slider Units – black surface. Whiteboards shall not be used in these spaces, due to fumes, increased maintenance and costs.

.2 Offices, boardrooms or labs shall be equipped with fixed chalkboards, whiteboards and tackboards, as directed by FMGT.

.2 Perimeter Trim and Fastening to Wall Preparation

.1 Perimeter trim: extruded anodized aluminum channel, 1.5mm thick material, fitted around panels with closed mitred corners. Single layer, fixed units fastening to wall preparation as follows:

.1 Offices / Corridors - surface mounted fasteners: pre-punch perimeter trim at 610 o.c.

.2 Classrooms / Boardrooms - concealed clip fasteners: back fasten trim to backing sheet.

.3 Acceptable Manufacturers:

.1 Shanahan's / Richelieu - Panel Products / Steelcase – PolyVision.

.4 Dimensions – Use Standard Board Sizes

.1 Chalkboards and Markerboards (Whiteboards)

Fixed & Slider Panel Widths (mm)	Slider Panel Height (mm)	Overall Slider Unit Height (mm)	Fixed Panel Height (mm)
1220; 1830 or 2440	1070	1220	1220

.2 Tackboards:

Width (mm)	Height (mm)
305	460
1220; 1830 or 2440	1220

.5 Installation

.1 Install slider units and fixed, 1220 mm high boards with bottom edge of at 915 above finished floor.

.6 Products

.1 Chalkboards and Markerboards (Whiteboards)

.1 Facing sheet: 2 coats fired vitreous porcelain enamel on 24 gauge steel.

.1 Chalkboards: porcelain enamel, colour BLACK.

.2 Markerboards (Whiteboards): porcelain enamel, colour WHITE.

.2 Core material: 12.5 mm high density, moisture resistant fibreboard; free of tar material.

.3 Provide trays of extruded aluminum, not less than 64 mm wide, with ends polished and bevelled.

.4 Horizontal 2-tracks top hung chalkboard sliders (3 layers: 2 sliders + fixed back panel). Maximize the length of sliders, within the overall chalkboard unit, to minimize vertical seams; do not exceed 2400 lengths, to prevent heavy panels and difficulty of operation.

.2 Tackboards

.1 Facing sheet: vinyl fabric laminated under pressure to fibreboard.

.2 Core material: 12.5 mm cellulose fibre insulating board; free of tar material.

.3 Finish - Vinyl finishes acceptable to the University are:

SHANAHANS	RICHELIEU - PANEL PRODUCTS
VT-203 Smoke grey	LF-303 Mist grey

.1 Toilet Compartments

.1 Toilet compartments

.1 Shall be designed for heavy traffic, shall have superior durability, reparability and be scratch-, dent-, marking-, moisture- and impact-resistant. Use finishes that require minimal maintenance and allow easy graffiti removal; satin finish both sides.

.2 Design stalls size to allow adequate installation and functionality of all accessories.

.2 Toilet partitions types

.1 Typical: Solid Colour Reinforced Composite (SCRC), Solid Phenolic, Solid Plastic, or Plastic Laminate, to suit budget. Acceptable products:

.1 Bobrick – Sierra 1090

.2 Hadrian

.2 Acceptable: for non-public, limited budget projects, or to match existing: powder coated steel. Products:

.1 Shanahan's

.3 Washroom partitions: Floor Mounted Overhead Braced.

.4 Urinal partitions: Wall Hung

.5 Each compartment to be complete with the following hardware:

.1 Combination coat hook/door bumper. Locate at 915mm height on inside of stall door in accessible stalls.

.2 Combination stop/ latch - with emergency lift feature.

.3 Non-removable self closing hinges - with emergency lift feature.

.4 Door d-pulls on interior and exterior of stalls for accessible compartments.

.5 Seat at dressing cubicles.

.1 General

.1 Where spacial separation and building code requirements permit, consider modular demountable wall partition systems for all interior space division.

.2 System Requirements:

.1 Selection of system to be based on long-term availability of components and finishes.

.2 Partition System: demountable and relocatable, non progressive, extend in four directions at posts without disturbing other panels. Accommodate floor to ceiling height variations of up to 25mm.

.3 System to be approved for installation in seismic areas. Installations shall include for all miscellaneous bracing to suit the seismic criteria.

.4 System design to suit easy integration with furniture and case goods

.5 System to accommodate electrical outlets and switches on posts or in panels, and wiring in posts, base, cap or panels as necessary.

.6 Preference should be give to GreenGuard certified products / systems.

.7 Minimum STC rating: 40. Discuss sound attenuation requirements for each specific application.

.8 Standard framing material: extruded aluminum, clear anodized or powder coated finish.

.9 Standard panel types: Face mounted or glazed-in

.10 Standard panel materials: Plain gypsum board (painted), Pre-decorated gypsum board, wood panel, acoustic panel (fabric).

.11 Doors and frames to be coordinated with Section 8.2.

.3 Coordination:

.1 Coordinate electrical and communications requirements and components with FMEL and UVic SYST and as directed by FMGT.

.1 Corner Guards

.1 Provide wall exterior corner guards, or other suitable means of protection at all exposed gypsum board corners susceptible to damage.

.2 Minimum 1200mm above floor.

.3 Products: Korogard or approved equivalent.

.1 General

.1 Each washroom on Campus shall be provided with the accessories listed below. In order to maintain product consistency throughout the campus, alternates are not acceptable for these products.

.2 All necessary surface/assembly preparation shall be described in the drawings and specifications.

.3 Coordinate with FMGT for work to be included within the project and alternatively any items to be provided by the University.

.2 Products

.1 **Paper Towel Dispensers** - One dispenser for every three washbasins

	Product	Description	Supplier
.1	Frost #101 9.5"h x 10.5"w x 6.75"d	Single fold paper towels cabinet #101 Wheelchair accessible	Wesclean / ACME
.2	Kruger Designer 2 #9772 15.62"h x 10.5"w x 8.5"d	Roll towel cabinet	ACME
.3	KimberlyClarke Professional 12" x 16" x 9.5	Roll towel cabinet	Unisource
.4	Kimberly Clarke Model #06904 14.3"h x 8.9"w x 2.8"d	Slimfold towel dispenser	Unisource

.2 **Toilet Roll Dispensers** - One dispenser for each WC

.1	Kimberly Clarke JRT 52 x 33.4 x 14.6 cm	combination dispenser toilet rolls cabinet	Unisource
.2	Frost 150	1.5 Size uncovered small toilet roll holder	Wesclean / ACME

.3 **Soap Dispenser**s - One dispenser for every two washbasins

.1	Deb – 1L 9.25"h x 5.25"w x 4.5"d	foam soap dispenser	ACME
.2	Tork #570028A 11.5"h x 4.5"w x 4.5"d	liquid soap dispenser	Bunzyl
.3	Gojo #5150-06 10.5"h x 6.25"w x 5"d	foam soap dispenser	Unisource

.4 **Sanitary Napkin Disposal** - One disposal for each WC in Women's washroom

.1	Rubbermaid mod #6140 12.5”w x 10.75”h x 5"d	sanitary napkin disposal	ACME

.5 **Wastepaper Receptacles** - Minimum one receptacle for each washroom

.1 Base: "Rubbermaid" No. 3568 - 14.5" wide x 4.5" deep x 24" high

.2 Top: "Rubbermaid" No. 2662 - 14.7" wide x 14.7" deep x 5" high

.3 Colour: Gray

.6 **Sanitary Napkin Dispenser** - One dispenser for each Women's washroom

.1 "G.H. Wood" No. 113047 - 12" wide x 6" deep x 27" high (approximate dimensions)

.2 Wall mount double combination vendor
.3 25 cent coin dispensing
.4 Finish: Stainless Steel

.7 Grab Bars - Locate in each accessible toilet compartment:

.1 One at 120°, 600mm (or 180°, 1200mm) and one at 180°, 450mm x 32mm dia. X min.
.2 1.25mm wall tubing of 304 stainless steel, 76mm dia.
.3 Wall flanges concealed screw attachment, flanges welded to tubular bar, provided with steel backing plates and all accessories.
.4 Knurl bar at area of hand grips.
.5 Grab bar material and anchorage to withstand downward pull of 2.2 kN.

1. Exterior Access Facilities

.1 Rooftop Access

.1 Provide Worksafe BC / OHS approved facilities to suit safe access to all roof areas for service and maintenance:

.1 Fall Restraint

.1 Parapet walls designed as guard elements (min. 1070mm height) are encouraged to serve as permanent fall restraint facilities.

.2 Where permanent fall restraint is not achievable, provide alternative means or procedures for providing temporary fall restraint as outlined in Worksafe BC Part 11 and OHS Regulation.

.3 Where fall restraint facilities are not achievable, provide Worksafe BC approved fall arrest systems.

.4 The Consultant shall provide a roof plan demonstrating the ability of designed fall arrest or fall restraint systems to collectively provide full access to all roof areas.

.2 Exterior Wall Access

.1 Provide Worksafe BC/ OHS approved facilities to suit safe access to building exterior walls for routine cleaning and maintenance (ie. window washing) personnel.

.2 Design considerations shall assume suspension access (ie. bosains chair) to all exterior windows shall be provided where safe access to the exterior of windows cannot be achieved from the interior.

.3 Permanent exterior access facilities may consider capacity for swing stages or other larger access equipment.

.4 Any system that spans or cantilevers over a parapet, shall be provided with adequate designated bearing surfaces. Bearing on parapet flashings, or similar surfaces that may be damaged, is not acceptable.

2. Money-Changing and Vending Equipment

.1 Obtain FMGT approval for the location of these items.

.1 Preferred placement is in specifically designed alcoves; do not place in areas with enhanced architectural character, such as feature lobby walls, etc.

.2 Money-Changing and Vending Equipment shall be secured to a wall or floor with access to power.

.3 The power supply shall be enclosed to stop unauthorized access.

3. Laboratory Fume Hoods

.1 Metal under-counter storage cabinets, when part of a fume hood unit, must have a removable access panel in back to permit servicing of the plumbing pipes.

.2 Solvent/chemical storage cabinets which do not have removable back panels must be installed in a manner which will allow easy removal of cabinet. In this case, the fume hood must be supported independently of the storage cabinet below. Hung fume hood with threaded rod to raise and lower with turn buckle.

4. Acid Storage Cabinets

.1 Vent all cabinets.

1. Design Considerations

.1 Drapery use is limited to residential projects, to match existing conditions, or as directed by FMGT.

.2 Provide drapery to all exterior windows. Drapery to extend full width of window plus sufficient distance both sides of window to allow draperies to stack back, beside window opening.

.3 During Design and Contract Documents phase, consult with the Project Officer and FIPL for selection, review and approval of products.

2. Fabric

.1 Ensure that one type of fabric is utilized for all window treatment in the complex, selected as follows:

- .1 no lining required
- .2 double fullness
- .3 triple French pleat/pinch pleat
- .4 100mm double hem, lock-stitched
- .5 100mm headings, double hem with continuous piece of waterproof buckram
- .6 25mm side hems, double turned, lock-stitched
- .7 serge all seams and overlock with safety stitched
- .8 weight all seams and outside corners
- .9 use best quality pre-shrunk mercerized cotton thread to match fabric colour
- .10 Acceptable Products:
  - .1 100% Polyester Trevira, Washable, Inherently Flame resistant
  - .2 1370mm or 1830mm wide

3. Track and Accessories

.1 All drapery track and window treatment headrails are to be securely fastened by toggle bolts or molly anchors, not more than 610 mm o.c.

4. Drapery Hardware

.1 Hand Draw System Standard (pinch pleat)

.2 Fling Rods are not required

.3 Single Channel Track: Kirsch/Draco #94003 - Finish #90 Aluminum

.4 End Caps: #94141 - Finish #61 Bright Zinc

.5 Overlap Masters: RH & LH #94113 & 94114

.6 Glides/Carriers: #9670 - Finish # 25 white

.7 Brackets; type shall be determined in consultation with FIPL and UVic Housing and be consistent with window/building design: #94140 Ceiling, #94132 Wall, Finish #61 Bright Zinc.

1. Design Considerations

.1 Provide Roller Window Shades and Roll-Down Blinds as follows:

- .1 Sunscreen Shades 3% Open – typical to all exterior windows and glazed doors exiting on staff's decks.
- .2 Blackout Shades: typical to interior windows of learning spaces, meeting rooms, labs, etc, that require blackout for visual presentations or experiments, as well as offices that require total privacy.
- .3 Sunscreen and Blackout Shades combination: typical to exterior windows (installed in common housing) of the spaces that require blackout shades, as described above.

.2 Operation

- .1 Typical: Chain and sprocket roller shade manually operated action with infinite positioning.
- .2 Motorized operation at rooms of special designation that require front console control, such as: large classrooms, representative videoconferencing rooms, large boardrooms, etc.

2. Roller Shade System

.1 Factory assembled unit including: extruded aluminum housing / cassette box closed on all sides, 2 end brackets, shade tube, extruded aluminum fascia and hembar, shadecloth guide and fabric. Acceptable products:

- .1 Teleshade by Solarfective Products Ltd., by Cascadia Design, Vancouver, B.C.
- .2 Roller Shade Systems by SunProject of Canada Ltd
- .3 MechoShade by MechoShade Systems Inc.,

3. Sunscreen Fabric

.1 Dense shadecloth, suitable for clear low 'E' glazing.

.2 Composition: Woven, vinyl coated fiberglass (64% vinyl / 36% fiberglass core yarn), halogen free, dimensionally stable, tensioned to keep the warp ends straight and minimize or eliminate weave distortion to keep the fabric flat.

.3 Weight: min 470 g/m2.

.4 Thickness: minimum 0.48 mm.

.5 UV Blockage: minimum 95%

.6 Openness factor to be selected by Consultant:

- .1 UVic Standard: 3% open.
- .2 Special conditions may grant consideration for 5% open on North elevations shaded for early sun and 1% for exposed east and west elevations.
- .3 Provide consistent product, colour and appearance for the entire building, irrespective of various different openness factors.

.7 Acceptable products (alternative colours, to suit individual project, may be considered):

- .1 Phifer - Sheerweave, Style 2703, 3% open, two-sided fabric, GreenGuard Certified. Preferred colour: P91, Oyster Pewter.
- .2 Phifer - Sheerweave, Style 2410, 3% open, GreenGuard Certified. Preferred colours: P14 - Oyster Pearl Gray; Q21 - Beige Pearl Gray; V20 - Pearl Gray.
- .3 MechoShade EcoVeil 3% open. Preferred colour 1563 Grey.

4. Blackout Fabric

.1 Room darkening shade shall be 100% opaque material, 3 or 4 ply, PVC or vinyl laminated to both sides of 100% fibreglass base fabric. Washable, flame retardant treated and fade resistant.

.2 Thickness: 0.45 mm.

.3 Mesh Weight: 340 g/m2.

.4 Acceptable product:

.1 Preferred: Phifer - Sheerweave 7100 Series Blackout. Preferred colour: Q06 Bone Platinum.

.2 Acceptable (for budget constrains):

.1 Solarfective – SolarStop Blackout Fabric, 4 pl. Preferred colour: 5005 – Grey

.2 Duplex Solids. Preferred colour: 043 – Light Grey

5. Accessories

.1 Bottom rail: Extruded aluminum hem-bar with integral grooves to accommodate fabric guide carrier at ends. Soft vinyl welt on bottom of bar.

.2 Installation brackets: Concealed type as required to support assembly.

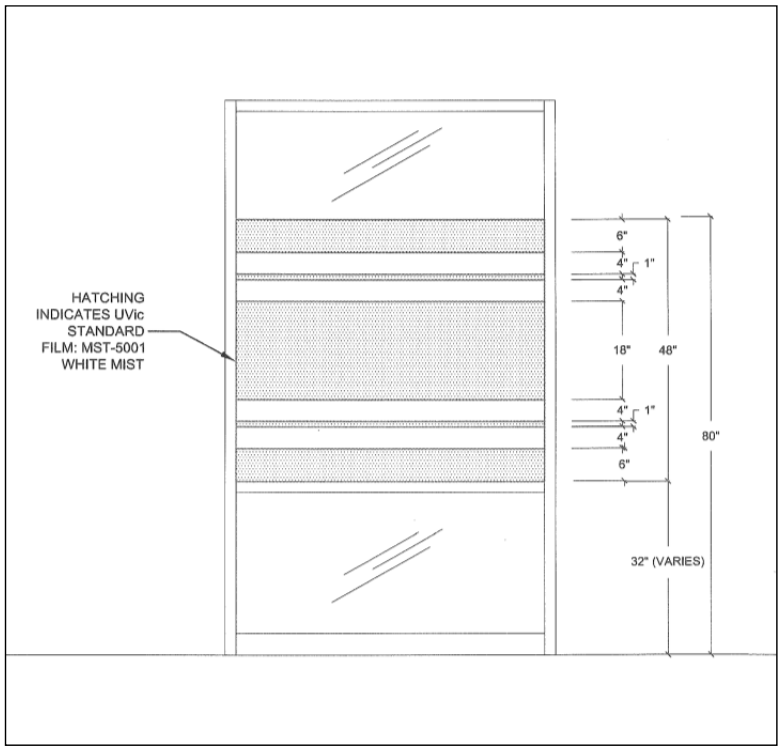
1. Interior Window Film

.1 Use interior window film at all locations that require permanent privacy. Do not use blackout or fabric for this purpose.

.2 Acceptable product: Lintec Mistlass MST 5001 White Mist, or approved equal with the following properties:

.1	Visible Light Transmission – VLT	71%
.2	UV Light Transmission	<1%
.3	Total Energy Transmission	68%
.4	Visible Light Absorption	16%
.5	Shading Coefficient	.83
.6	Material	Multi-ply Polyester
.7	Surface Texture	Matte
.8	Adhesive	Pressure Sensitive
.9	Roll Width (may differ)	1250mm
.10	Roll Length (may differ)	30m

The following drawing represents an example of a window film installation. Facilities Management Interior Planning and Logistics department will collaborate and assist with film application locations and design details. Final design approvals will be made by the Manager of Interior Planning and Logistics and/or the Director, Capital Projects.



.1 Design Considerations

.1 Typical elevator use: combined passenger and freight elevator. Design as a passenger elevator. Car shall also be capable of handling standard office furniture, equipment and supplies.

.2 Elevators exclusively used for freight shall be designed and designated as freight elevators.

.3 Each building shall be equipped with at least one elevator capable to transport a B.C. Ambulance Service stretcher in the prone position, and two attending paramedics.

.4 Floor Security may be necessary during non-working hours at each floor. Provide capability of key-operated control buttons in cab.

.5 Full maintenance service for the entire warranty period of 12 months shall be specified.

.6 Provide *Traction Elevators* in buildings with over 3 stops, or heavy traffic conditions and *Hydraulic Elevators*: in buildings with 2 or 3 stops, light to medium traffic. Roped elevators are prohibited.

.2 Entrances, Equipment, Car Components and Finishes

.1 Markings, on both sides of entrance: conventional and Braille.

.2 Elevator floor: non-slip and fire rated; ceramic tile preferred.

.3 Baseboards: 300mm high, satin stainless steel, to prevent damage from carts and wheelchairs.

.4 Car front, operating panel, handrail and entrance (frame & door) finish: satin stainless steel.

.5 Specify one set of cab protection blankets and mounting pins.

.3 Telephone - emergency two-way communications device (help push button) – in each elevator cab:

.1 The dialler shall be installed in the analogue voice gateway, in the Telecommunications Rm.

.2 The help button shall be wired to a:

.1 Junction box, in the elevator machine room in the case of conventional elevators.

.2 Jack located in a designated panel, in the case of machine room-less elevators. Panel shall be lockable, wall recessed and located in the vicinity of elevator.

.3 Final connections to Campus Security Services shall be coordinated with UVic Telephone Services

.4 Provide long distance telephone to manufacturer for emergency response.

.4 Emergency Power Operation

.1 Elevator shall be equipped with a UPS battery system, to provide communication, travel and door opening to the nearest station in the direction of travel, or to the exiting (usually ground) floor.

.5 UVic Identification, Operating and Maintenance Requirements

.1 Elevator Manufacturer shall provide full service training access to UVic and/or its service agent.

.2 Elevator Manufacturer shall provide original parts to any third party, for post warranty maintenance.

.3 Controllers and other pieces of equipment shall be non-proprietary and fully compatible.

.4 Facilities Management will assign a UVic elevator number to the unit(s).

.5 The following information shall be engraved on the control station(s) panel:

.1 Government Installation Number

.2 UVic Elevator Number XY

.3 No Smoking

.6 Acceptable Products

.1 Machine room-less Eco-Space from Kone Elevator Company. Approved Installer: Kone Elevator.

.2 Other Acceptable Manufacturers:

.1 Gen 2 by Otis Elevator.

.2 ThyssenKrupp Elevator Co.

.3 Schindler Elevator Corporation – 400A Product.

.1 General

.1 The Mechanical Consultant shall submit to UVic, Facilities Management a design philosophy for the proposed building mechanical and plumbing systems. Major components of the philosophy must be accepted in principle by Facilities Management prior to the Construction document stage. Any deviations from the prescribed guidelines must be approved in writing by UVic Facilities Management.

.2 Consultants are expected to produce designs that meet User needs and allow Facilities Management to continue to meet those needs in the future in a safe efficient manner.

.3 Drawings shall show all mechanical and plumbing equipment in elevation or isometric in details when required. Ensure mounting heights for the equipment are specified. Consider maintenance access and function as part of the design. No mechanical room layout will be accepted with poor or difficult access for maintenance.

.4 For new buildings, connection to the campus heating mains for primary heating or back-up only shall be discussed and agreed to with Facilities Management. As of 2010 the source of heat to the campus heating mains is four natural gas fired boiler plants (with backup diesel fuel for the largest plant).

.5 The buildings within Ring Road and many of the larger buildings outside Ring Road are primarily heated by the campus mains heating system. Each building has a heat exchanger (or heat exchangers) to separate the campus heating water from the building heating water. The design was based on campus heating water entering the heat exchangers at 115^{o}C (240^{o}F) and leaving at 93^{o}C (200^{o}F) and the building water leaving at 93^{o}C (200^{o}F) (or 88^{o}C (190^{o}F) for the oldest buildings) and returning at between 71^{o}C (160^{o}F) and 82^{o}C (180^{o}F) (or 66^{o}C (150^{o}F) and 77^{o}C (170^{o}F) for the oldest buildings). However the campus mains typically run at about 111^{o}C (232^{o}F).

.6 The campus mains may in future run at a lower temperature. Design of new heaters in existing buildings to provide the required heating with a heating water inlet temperature of 82^{o}C (180^{o}F) or lower and design all new buildings served by the campus heating mains with a maximum building heating water supply temperature of 82^{o}C (180^{o}F) or lower. All design temperatures to be discussed with FMGT.

.7 The installation of rooftop equipment shall avoid placement within “Control Zones” (the area between an unguarded edge of a building or structure and a line which is set back a safe distance of at least two meters).

.8 FMGT Operations shall be consulted in the design and layout of all Mechanical Room and service spaces as the end user of the facility.

.9 Obtain parts supplier lists from FMGT Operations. Only products available through these suppliers shall be specified for:

- .1 Plumbing
- .2 HVAC
- .3 Fire Protection

.2 Mechanical Cooling

.1 UVic buildings are generally not air conditioned for occupant comfort. Where conditions require mechanical cooling, submissions for variance from this guideline shall be made as part of the initial submission of project design philosophy.

.3 Sustainable Design

.1 The University is committed to working towards reducing its negative impact on the environment. That includes consuming less energy and reducing CO_2 and other environmentally harmful emissions. It also includes all initiatives that have been identified in such programs as LEED.

.2 The Consultant shall determine from Facilities Management the extent to which a new building or a renovation should incorporate environmentally friendly measures in the mechanical systems. Even if there is no plan to participate in a LEED or other program, the consultant shall give due consideration to incorporating all practical measures to achieve sustainable mechanical systems. This is acknowledged as a complex balance between capital and life-cycle costs, functionality, dependability, consistence with existing systems, material and equipment, proven performance, flexibility in operation, flexibility to accommodate future changes, simplicity, operability, maintainability, visual and audible impact, use of natural resources, impact on the environment and perhaps other important issues for a given system.

.3 The Consultant shall provide a list during schematic design of the intended sustainable measures that will be taken for a project. The consultant shall also list other sustainable measures that are recommended or suggested even though they may initially exceed the scope of the project for consideration by Facilities Management.

.4 Systems shall be designed to minimize the use of municipal water and to preserving ground water conditions.

.5 Systems shall be designed to minimize consumption of electrical power and fossil fuels. Electrical resistive heat shall be avoided.

.6 Systems shall be designed to minimize emissions to air, water and ground.

.4 Existing Systems

.1 An acceptable schedule for interrupting existing systems and services must be arranged in advance with Facilities Management. A minimum of 48hrs notice shall be the expected timeframe for service shut-downs.

.2 Existing services may be shut down or placed back in service only by Facilities Management shop personnel.

.3 Arrange work to minimize the duration of the shut down of any existing services.

.4 Protect systems from contamination and protect areas outside of combustion zone.

.5 Mechanical Rooms

.1 Coordinate with Architect to locate Mechanical Rooms in areas accessible from outdoors. Confirm that sufficient space is provided to remove largest piece of equipment from the Mechanical Room.

.2 Where rooftop mechanical rooms are designed, stairway or elevator access to the roof is mandatory, to suit service and maintenance requirements.

.3 Provide full perimeter containment wells encompassing DHW or other water tanks / storage equipment with adequate drainage.

.6 Acceptable Products

.1 Obtain a list of mechanical parts suppliers from Facilities Management. Specify matching products. This includes but is not limited to the following areas:

.1 Plumbing.
.2 Fire Protection.
.3 HVAC.

.7 Site Services

.1 Avoid running site utilities through or under buildings. Exceptions must be accepted in advance by Facilities Management.

.8 Operation and Maintenance Manuals

.1 Coordinate requirements with Section 1.4.

.2 Plumbing and Mechanical Sections shall be separated.

.9 Record Drawings

.1 Record drawings shall be electronic AutoCAD drawings and electronic pdf format drawings and must comply with Industry Standard.

.10 Electric Motors

.1 Open drip-proof except where service requires different.
.2 Specify high or premium efficiency.
.3 Specify inverter duty where driven by variable frequency drive.
.4 Motors less than 1/2 hp shall be 120/1/60. Motors 1/2 hp and larger shall be three phase.

.11 Belt Drives

.1 Specify multiple belt drives with matching belts on 3/4 hp motors and larger.
.2 Adjustable bases with adjusting screws for alignment and belt tension.
.3 Specify variable pitch motor sheave only up to 7.5 hp.
.4 Motor sheaves shall be steel or cast iron.
.5 Drives shall be selected for minimum 150% of motor hp.
.6 Do not specify synchronous belt drives.

.12 Drive Guards

.1 Specify means to permit lubrication and use of test instruments with guards in place.

.13 Unprotected Fan Inlets or Outlets

.1 Guards or screens, removable for servicing.

.14 Spare Parts

.1 Specify provision of the following spare parts:
  .1 One set of belts for each drive.
  .2 One set of filter media for each filter or filter bank in addition to final operating set.

.15 Automatic Drains

.1 Automatic air vents, relief vents and any automatic drain from a closed piping system shall be located in an accessible location where the drainage can be readily and easily observed. Where the source of the drainage (e.g. automatic air vent) cannot be easily observed, that drain shall be clearly labelled to indicate the type and location of the source.

.1 General

.1 All plumbing shall comply with the BC Plumbing Code.

.2 Avoid th**e** use of storm pumps and sanitary sewer system pumps if possible. Design within reasonable limits to ensure that all areas possible are drained by gravity systems.

.3 All necessary storm and sanitary pumps shall be tied into emergency power, and sump levels shall be monitored electronically through the B.A.S.

.4 All sanitary sumps within buildings must have gas tight covers and be vented to outdoors.

.5 Floor drains connected to sump pumps must have backflow valves.

.6 Do not use floor drains in private washrooms, specify only in public washrooms and where automatic flushing devices are used.

.7 Review acid waste requirements with Facilities Management.

.8 Confirm that all plumbing equipment requiring annual or more frequent maintenance is readily accessible. Provide minimum 900mm clear around equipment.

.9 Specify curbs and house keeping pads under equipment and around pipe penetrations in Mechanical rooms.

.10 Where solar collectors are planned or contemplated, consult with Facilities Management for approval of concept. Panel locations shall be readily accessible for maintenance.

.11 Backflow prevention is required on all primary water supplies into buildings.

.2 Non-Potable Water

.1 Wastewater from the Outdoor Aquatic Facility (an aquaculture facility south of the Cunningham Building) is cleaned and chlorinated and piped around a portion of the campus. It is available for non-potable use which primarily to 2010 has been used for flushing water closets and urinals. There is sufficient capacity for this use for many more buildings. Facilities Management has a set of guidelines for its use and the design of the system (requires pumping, a small open storage tank and municipal water make-up with air gap to the tank). Even if the Treated Water is not being extended to a new building, consideration should be given to piping the water supply piping to the water closets and urinals separately from the rest of the building domestic water piping so retrofitting Treated Water in the future does not require re-piping the building domestic cold water. Note that the best use is for central heavily used washrooms; it may not be practical to extend piping to a single, distant, low-usage fixture.

Determine with Facilities Management whether the Treated Water or piping for future use should be included in the project.

.3 Acid Waste

.1 The Elliott, Petch and Cunningham buildings each have an acid waste piping system. There is a UVic laboratory policy of not putting any unacceptable waste down drains. As of 2010 the issue of whether laboratory plumbing renovations should connect to that system with acid resistant piping or non-acid resistant piping is under review. In the meantime all connections to these systems shall be with materials designed for acid waste. For each project, confirm in advance of design the status of that decision.

.2 Do not specify plastic piping for use in building except for acid waste systems.

.3 All buried acid wastes system piping shall be glass type.

.4 Salvage

.1 UVic does not have extensive storage facilities for salvaged material. Typically the Plumbing Shop will wish to have salvaged plumbing sinks and trim in good condition and laboratory gas outlets and turrets from benches or fume hoods. Glass acid waste piping and fittings has also typically been salvaged.

.2 On renovation projects the Consultant shall submit a list of items to be considered for salvage to Facilities Management at the start of the design stage. The Consultant shall coordinate with Facilities Management to determine all materials to be salvaged and the roles of the Plumbing Shop and contractor in the work of salvage which shall then be clearly specified.

.3 Sometimes Plumbing Shop prefers to use its own forces to remove the material to be salvaged in advance of the construction contract. Other times they prefer the Contractor to remove the materials and store them on site for the Shops to remove.

.4 All materials to be salvaged shall carefully removed and stored to prevent damage and the contractor shall obtain a signed receipt from the Plumbing Shop for all salvaged materials.

.5 Sleeves

.1 Specify Schedule 40 steel pipe sleeves at points where pipes pass through masonry, concrete or fire rated assemblies and at Mechanical Room floor penetrations to stories below.

.2 Sleeves shall have an annular fin continuously welded at midpoint where passing through foundation walls.

.3 Specify fill for voids around pipes.

.4 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof, fire retardant, non-hardening mastic.

.5 Where sleeves pass through walls or floors, provide space for fire stopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity. Ensure there is no contact between copper tube or pipe and ferrous sleeve.

.3 Escutcheons

.1 Specify escutcheons on pipes passing through walls, partitions, floors and ceilings in finished areas.

.2 Chrome or nickel plated brass or Type 302 stainless steel, one piece type with set screws.

.1 General System Design

.1 Use air systems in combination with perimeter radiation. Perimeter radiation shall be capable of being operated independent of the air system.

.2 Avoid all air systems.

.4 Zone mechanical systems by intended occupancy, separate interior and exterior zones.

.5 Provided reheat coils in each interior zone.

.6 All air handling units shall have heating or preheat coils even if building load indicate that one is not required.

.7 Proposed fan volume control schemes based on building static pressure must have prior approval from FMGT.

.8 Do not specify variable pitch in motion fans.

.9 Design all air handling units with minimum 15% spare volumetric and static pressure capacity.

.10 Buildings with no mechanical cooling (typical) shall have cooling circulation air increased by minimum of 25% or have sufficient volume to meet WCB requirements with respect to maximum space temperature, whichever is greater. Consider additional costs of construction and compare to cost of adding and operating mechanical cooling.

.11 Radiant heating panels shall not face windows.

.12 Provide separate exhaust to all photocopier rooms or areas. Exhaust to outdoors.

.13 Ensure sufficient air mixing within the occupied space on VAV systems under all operating conditions.

.14 VAV systems shall have reheat coils.

.15 Window mounted air conditioners and exhaust fans are not acceptable.

.16 All exhaust ductwork within the building shall be under negative pressure.

.17 Specify separate ventilation and heat recovery systems for Mechanical and Electrical rooms.

.18 Do not specify sidewall supply registers for classroom applications.

.19 Laboratory design shall meet best practices of applicable AHRAE design standards, and /or the equivalent CSA standard recognized by the BC Building Code.

.20 Return and supply fans requiring volumetric tracking shall have same type devices for volume control, i.e. inlet dampers must be only used with inlet dampers, VFD’s with VFD’s etc.

.21 If fume hood exhaust systems are located in mechanical penthouses they shall be located in separate self contained area within the Mechanical Penthouse.

.22 Where fume hood fans are contained within mechanical penthouses, pressurize the penthouse with supply air from the building from a safe outside source to avoid the possibility of recirculation exhaust air into the service space and to provide flushing of contaminants if a minor duct leak occurs. Fumes from industrial lab process shall be removed from spaces by the use of dedicated exhaust systems (not recirculation permitted).

.23 Ventilations systems shall be designed to limit bio-contamination. Spaces containing 'like-risks' can share ventilation systems, while bio and chemical ventilation systems shall be separated to avoid cross contamination.

.24 Humidification shall be applied to each specific zone which requires local control. Avoid upstream humidification and downstream dehumidification.

.2 Air Outlets and Inlets

.1 Do not specify balancing dampers at the face of air outlets and inlets. Locate balancing dampers sufficient distance into the ductwork to maintain acceptable sound level within the conditioned space. (NC 30 35 or less)

.2 Co-ordinate with architectural discipline.

.3 Outside Air Intake Louvers

.1 Locate outside air intake louvers as far away as practical from all sources of contamination; avoid locating intakes at loading docks, fume hood exhausts, generator exhausts. Outside air intake louvers are not to be located on roof tops where fume hood exhausts are located.

.2 Locate outside air intake louvers as high as possible above grade and shall not be at grade level.

.3 Where below grade intakes are unavoidable install bird/debris screen on outside of the louvers.

.4 Where roof top parapets or screening hinder effective cross ventilation exhaust discharges, plumbing stacks and other contaminated discharges shall be elevated above air intakes at a minimum distance proscribed by code/regulation and/or good engineering practices.

.4 Painting

.1 Specify corrosion resistant primer paint to ferrous supports and site fabricated work (pewter gray).

.5 Salvage

.1 UVic does not have extensive storage facilities for salvaged material. Air conditioners, motors, variable frequency drives in good condition have previously been considered for salvage. Occasionally a small fan or a fume hood in good condition has been salvaged.

.2 On renovation projects the Consultant shall submit a list of items to be considered for salvage to Facilities Management at the start of the design stage. The Consultant shall coordinate with Facilities Management to determine all materials to be salvaged which shall then be clearly specified.

.3 The Mechanical Shop prefers the Contractor to remove the materials and move them to a designated storage place on campus.

.4 All materials to be salvaged shall carefully removed and handled to prevent damage and the contractor shall obtain a signed receipt from the Mechanical Shop for all salvaged materials.

.6 Photocopier exhaust.

.1 Provide exhaust air from photocopier rooms, areas with large photocopiers (larger than a typical office copier) and areas for regular large copy production.

.1 Identification

.1 When identifying systems and components in existing buildings, the new items shall be numbered sequentially with existing systems.

.2 The Consultant shall inventory all existing equipment during the design phase and provide FMGT a comprehensive equipment listing with the proposed new labelling scheme for review and approval. Upon approval, equipment labelling requirements shall be clearly specified within the construction documents.

.2 Labels

.1 Provide laminated plastic labels with black face and white centre, 100 mm x 35 mm x 2.5 mm thickness for the following applications:
- .1 Gauges and Panels engrave with 6 mm high lettering.
- .2 Equipment and Fume Hoods engrave with 10 mm high lettering.

.3 Ceiling Access

.1 Color Coded Dots:
- .1 Provide self-adhesive color coded dots 6 mm in diameter to delineate ceiling access..

.4 Valve Tags

.1 Tags shall be 40 mm diameter brass or laminated plastic with 10 mm engraved with sequential numbering.
.2 Hang with chains from valves.
.3 Provide a valve tag list.

.5 Stenciled Letters

.1 Black stencilled letters and numbers 25 mm high, to sign painting standards.
.2 Black stencilled direction arrows shall be 175 mm long by 56 mm wide.

.6 Duct Work and Access Panels

.1 Use the system designators stated on the drawing and specification.
.2 Duct identification and direction arrows shall be located on all duct runs in Mechanical Rooms and Penthouses. Maximum distance between markings shall be 8 meters.
.3 Where ducts pass through walls or partitions identify ducts on both sides of the wall beside each access panel.
.4 Access Panels shall be identified according to function.

.7 Piping

.1 Provide painted or manufactured labels, arrows, bands as required in mechanical and service rooms for easy identification.
.2 Where pipes pass through walls or partitions identify pipes on both sides of the wall.
.3 Maximum distance between markings shall be 8 meters where exposed or above ceilings.
.4 Identify at all access panels.
.5 Identify at all valves except where otherwise clearly and easily identified.

.8 Manufacturer's Nameplates

.1 Do not paint, insulate or cover manufacturers' name plates or regulatory registration plates on equipment.

.1 General Requirements

.1 Insulation shall be installed by qualified insulation fitters.

.2 Insulation shall be installed in accordance with the requirements and recommendation of B.C. Insulation Contractors Association Manual.

.2 Campus Heating Mains

.1 This system may operate with up to 116°C [241°F] water.

.2 Provide minimum 50mm [2”] thick, mineral fibre insulation on piping (not drains) with vapour barrier jacket and where in trenches or manholes provide a generous coating of water water-proofing sealer.

.3 Mains valves 65 mm (NPS 2-1/2) and larger shall have bonnets insulated with removable insulation jackets.

.3 Refrigeration Piping (including chilled water)

.1 Where installed outdoors, provide a continuous aluminum jacket finish (to prevent birds removing the insulation).

.2 Provide closed-cell insulation and best industry practice to seal surface at all locations including hangers and exposed fittings.

.4 Insulation Finish

.1 Provide aluminum jacket over all outdoor insulation.

.2 Provide an all service jacket and pre-fitted PVC jacketed elbows and fittings for all indoor insulated pipe with the exception of:

.1 Provide a “Thermocanvas” type finish and pre-fitted PVC jacketed fittings on all piping in mechanical rooms and where exposed to occupant view.

.1 General Requirements

.1 All new ventilations systems, or those affected by the project shall be cleaned by a professional cleaning Trade Contractor with appropriate equipment and trained personnel.

.2 The following air systems shall be cleaned as specified by the Mechanical Consultant:

.1 Supply, Return, Relief, Exhaust
.2 Air Conditioning

.3 All components within each new or affected system shall be thoroughly cleaned to the Consultants satisfaction.

.4 On new construction, renovation or retrofit projects, the ductwork shall be cleaned before the air systems are balanced or calibrated.

.5 All damper positions shall be marked before cleaning and returned to their original position unless the system is to be balanced.

.6 Cleaning shall generally include high capacity power vacuum, compressed air or wire brushing. Solvent cleaning to be avoided.

.2 Filters

.1 The cleaning Contractor shall replace any temporary or existing filters and supply and install new filters as specified by the Consultant after the air system is cleaned.

.1 Campus Heating Mains

.1 All piping shall be Schedule 40 steel to ASTM A53 Grade B.

.2 All piping shall be welded except manual air vent and drain valves may be screwed and piping downstream of them may be screwed.

.3 Manual air vent and drain valves shall be ball valves with wing-type (not lever-type) handles.

.4 There shall be no high or low point in the piping between heating mains manholes. If this cannot be avoided then air vents/drains must be provided at the high/low point.

.5 Valves (other than air vent and drain valves) shall be class 150 ball valves. 150pisq/400°F. >=1 ½" must must be equipped with gear driven operator to slow speed to open valve. >= 4" to have ¾" gate bypass for warmup.

.6 For the most part these mains run underground. Where underground they shall run in a concrete trench typical in design and construction to the existing which are designed for water-tightness and to have removable lids.

.7 Mains valves, drain valves and vents shall be in accessible manholes or in building mechanical rooms.

.8 Where possible arrange take-offs for a building to be valved such that future shutdown of a section of the mains will not interrupt service to the building.

.2 Builidng Heating, Heat Recovery, and Chilled Water Piping and Valves

.1 Piping may be steel to ASTM A53 Grade B or type L copper, to ASTM B88M-86.

.2 Connections for steel pipe shall be welded and flanged on pipe NPS 2-1/2 [65 mm] diameter and larger and shall be screwed on pipe NPS 2 [50 mm] diameter and smaller.

.3 Connections for copper pipe shall be brazed with silver base brazing alloy, 538ºC [1000ºF] melting point but with soldered to screwed cast bronze fittings (to ANSI B16.18) or wrought copper fittings (to ANSI B16.22).

.4 Grooved mechanical couplings are not acceptable.

.5 Press-fit type couplings are not acceptable.

.6 Valves NPS 2-1/2 [65 mm] and larger shall be flanged. Valves NPS 2-1/2 (65 mm) and smaller shall be soldered or screwed.

.7 Butterfly valves may only be used on Heat Recovery or Chilled Water System systems or Heating Water systems where the maximum design temperature does not exceed 180°F (82°C).

.8 Balance valves shall be multiple-turn, memory stop, positive shut-off with inlet and outlet pressure connections, calibrated for flow measuring.
Acceptable Products: Armstrong CBV, Tour & Anderssen STA.

.3 Pressure Gauges

.1 Minimum 85 mm (3-1/2" diameter), with isolating cock, Imperial and S.I. units. Selected for normal working pressure is about mid-range.

.2 Dwyer magnehelic gauge across each filter bank

.4 Piped systems Cleaning

.1 For the campus heating mains, process water lines or chilled water lines, retain the services of a professional Cleaning Agency to supervise the chemical cleaning and flushing of the new piping. Facilities Management Mechanical Shop will provide the subsequent chemical treatment.

.1 Coordination Requirements

.1 Coordinate with the University of Victoria [UVic] Facilities Management – Plumbing Shop.

.2 Contact UVic Facilities Management for water supply information from the UVic water model.

.3 Coordinate verification of the sprinkler system with UVic Plumbing Shop. Contact UVic Facilities Management in advance of verification to provide opportunity for Plumbing Shop personnel to be present during verification. If a code consultant has been retained, coordinate design with their recommendations.

.2 General

.1 Submit to UVic, Facilities Management a design philosophy for the proposed building fire protection systems. Major components of the philosophy must be accepted in principle by Facilities Management before the project can proceed to Construction. Consultants are expected to produce designs that meet user needs and allow Facilities Management to continue to meet those needs in the future in a safe efficient manner.

.2 New buildings shall be fully sprinklered regardless of code requirements. Renovated facilities in fire sprinklered buildings shall be designed to maintain the fire sprinkler protection. Generally, renovated facilities in non-fire sprinklered buildings will not require fire sprinklers but may require roughed-in fire sprinkler piping to accommodate future building fire sprinklers

.3 UVic is largely self-insured and has a policy to manage risk and enhance the safety of its facilities to the benefit of faculty, staff, students, and visitors. Fire sprinkler protection at the University shall be consistent with standard industry practice with reasonable deviations to increase system longevity and provide flexibility for subsequent renovation.

.4 Clearly determine with Facilities Management in advance whether the systems will be designed under Scenario 1 or Scenario 2 of the B.C. Building Code and whether or not the services of a Code Consultant are required.

.5 NFPA Codes (latest edition) and BC Building Code shall be used to determine level of protection required.

.6 UVic campus straddles two jurisdictions – Saanich and Oak Bay. The specific jurisdiction that a particular building is in will be the Authority Having Jurisdiction.

.7 UVic's fire protection systems shall meet latest applicable NFPA codes and the Authority Having Jurisdiction policies in effect.

.8 All fire protection systems shall be designed by Consultant firms and Professional Engineers specializing in fire protection design. Mechanical Engineers wishing to undertake the designs must demonstrate that they posses fire protection design experience. The intent of this requirement is to ensure that designs not only meet the minimum code requirements but meet specific building requirements which can only be evaluated by an expert in the field.

.9 All contract documents and 'as built' drawings must meet criteria outlined in NFPA 13. All calculations must be sealed by a Professional Engineer registered in British Columbia.

.10 Provide fire hydrants to meet UVic and Saanich/Oak Bay requirements.

.11 Information on water supply available for fire fighting must be obtained through UVic Facilities Management which has a model for the UVic water system (Focus Engineering).

.12 Do not specify Halon Systems. Pre-action and clean agent systems shall only be provided where the need is coordinated in advance with Facilities Management.

.13 Coordinate with Electrical Consultant for the fire alarm panel monitoring requirements for flow switches and valves and for heat tracing and alarming of wet pipes exposed to freezing conditions.

.14 Typically conceal all piping (but not necessarily standpipe risers in stairwells). Coordinate with the Architect for chases and enclosures to conceal the piping where necessary.

.3 Final Functional Testing

.1 Certify fire systems have been tested to meet requirements of Authorities Having Jurisdiction.

.2 Insulate or conceal work only after testing and approval by the Authorities Having Jurisdictions and the Fire Protection Design Engineer and after the Plumbing Shop has been given notice and the opportunity to review.

.3 Conduct tests in presence of the Fire Protection Design Engineer and Authorities Having Jurisdiction who wish to be present.

.4 Coordinate verification of the sprinkler system with the Plumbing Shop. Contact UVic Facilities Management in advance of verification to provide opportunity for Plumbing Shop personnel to be present during verification.

.5 Test fire systems in accordance with Authorities Having Jurisdiction and as required by applicable codes.

.6 Operate all control valves to verify proper operation of the valve and associated tamper switch.

.7 Operate all test connections to verify water flow switch operation.

.8 Provide project record drawings and maintenance manuals to Facilities Management prior to building turnover.

.4 Fire Pump

.1 Design system to avoid the need for a fire pump. Specify a fire pump only where the system cannot reasonably be designed without one and only after consulting with Facilities Management.

.2 Where a fire pump is provided include a metered bypass for testing the fire pump.

.5 Painting

.1 All exposed fire protection piping and equipment shall be painted red.

.2 Specify at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work (pewter grey).

.6 System Drains

.1 System drains shall be piped to drains sufficient to handle the full anticipated flow.

.7 Building Fire Protection Water Service

.1 Provide a single combined domestic/fire protection water service to a building unless there is a compelling reason to provide two separate services.

.2 Sprinkler system drains should discharge to a sanitary sewer drain, not a storm drain.

.8 Spare Parts and Cabinet

.1 Specify spare parts to suit the critical requirements of the project.

.2 Specify the following spare parts at minimum:

.1 Sufficient numbers (minimum of 6) of spare sprinkler heads of each type used on the project.
.2 Sprinkler wrench, recessed head socket type with ratchet, to fit all sprinkler heads
.3 One set of packing and one casing joint gasket for each pump.
.4 Provide a red cabinet with name plate “SPARE SPRINKLERS” suitable for storing the spare sprinklers and wrenches.

.9 Signs

.1 Provide all control, drain and test valves with signs hung by a chain identifying the type of valve, the area (floor or portion of the building) affected by the valve and whether Normally Open or Normally Closed. Submit the wording to UVic Facilities Management for approval.

.10 Pressure Gauges

.1 Gauges shall be minimum 85 mm (3 ½”) diameter, bourdon type pressure gauge, 0-200 psi or 0 – 250 psi.

.11 Fire Sprinkler Systems/Standpipes

.1 Zone control valves may be concealed if a sufficiently sized access panel is provided to allow for maintenance and testing. Coordinate location with Facilities Management.

.2 Provide a shut off valve (to be easily accessible and visible) at the base of each standpipe riser. Do not locate in crawl space.

.3 A building with a standpipe system shall have a flow switch monitored for trouble alarm in the main to detect flow from the standpipe.

.4 Pipe shall be ferrous to NFPA 13 except drain pipe may be copper to NFPA 13. Do not use plastic piping.

.5 Flexible head drops shall not be used.

.6 Ring type hangers are not acceptable.

.7 Snap–let type fittings are not acceptable.

.8 Provide chrome plated fire hose valves in finished areas.

.12 Sprinklers Subject to Freezing

.1 Where sprinkler main piping is wet and subject to freezing, provide heat tracing connected to the fire alarm panel with high/low temperature monitoring. Coordinate with the Electrical Consultant.

.13 Dry Pipe Alarm Valve

.1 Dry pipe alarm valves, trim packages, accelerators and air maintenance devices, shall all be of the same manufacturer.

.14 Inspector’s Test and Drains

.1 For each zone provide an inspector’s test and drain in a lockable panel, cage or room not subject to vandalism. The discharge shall be into a drain riser on multi-storey buildings.

.1 Cross Connection Control

.1 Cross connection control shall be carried out in accordance with the Capital Regional District Bylaw No. 3516 which references CSA Standard B64.10 – 2007.

.2 Following installation, a test report completed by a certified tester shall be submitted to the Owner, indicating satisfactory operation of each device.

.3 Tests are to be conducted well in advance of date of Substantial Completion.

.4 Provide one repair kit for every cross connection control device installed.

.5 Dual premise backflow preventers are required on primary water supplies into the building. Design must include means of testing equipment on an annual basis without shutting down the building water supply. Equipment shall be installed in accessible location or appropriate access facilties provided (ie. platforms).

.6 Specify backflow preventers as required by BC Plumbing Code and the Capital Regional District Bylaw No. 3516 which references CSA Standard B64.10 - 2007.

.7 Specify strainers for all domestic water systems upstream of the premise backflow preventers.

.2 Trap Primers

.1 Past experience with many types of manufactured trap primers has resulted in the conclusion that they are not all reliable.

.2 Provide trap priming for all floor drains and for hub drains where it is likely that low or intermittent usage will allow the trap to lose its liquid seal.

.3 Proceeding from most preferred to least preferred, consider a DDC controlled control valve system of trap priming with backflow prevention a manufactured electronic trap priming system (e.g. Zurn Z-1020) with backflow prevention for a single trap where a regularly used plumbing fixture is close by, a Zurn Z-1022 trap primer with a fixed air-gap accessory for a single trap where a regularly used plumbing fixture is not close by, a Precision Plumbing Products Model P-1 trap primer adjusted for a continuous slow drip.

.4 Locate trap primers where they are easily serviced (janitor rooms, mechanical rooms, under counters and use unions and isolating valves to facilitate replacement.

.3 Cold Water Pressure Booster Systems

.1 If any project requires a booster system consult Facilities Management for water supply details.

.4 Isolation Valves

.1 Provide isolation valves as close as practical to each fixture for each group of plumbing fixtures:
- .1 At each main branch supply point.
- .2 At each piece of equipment.
- .3 As required by the applicable codes and bylaws.

.5 Drain Valves

.1 Specify at low points and at section isolating valves unless otherwise specified.

.2 Ball valves, NPS 3/4 with male hose end and cap for small quantity drainage. NPS 1-1/2 for large (zone) quantity drainage with removable reducer to male hose end and cap.

.1 Plumbing Piping Type

.1 Domestic water piping shall be type L hard drawn copper tubing to ASTM B88 or type L copper pipe to ASTM B42.

.2 Fittings shall be copper to ASTM B16.18, brass to ASTM B16.22, press type, or mechanical formed tee type (T-Drill).

.3 Do not specify flexible drainage piping.

.4 Do not specify ABS or PVC pipe under traffic areas with less than 30” cover.

.2 Piping Tests

.1 Provide a hydrostatic test on all new piping at 1380 kPa (200 psig) for 8 hours.

.1 Plumbing Fixtures - Public

.1 All plumbing fixtures at UVic are considered “Public” except for those that are in individual residential suites (e.g. cluster housing, family housing, don suite in a student residence) which are referred to as “Private”.

.2 Water Closets
- .1 Wall Hung
- .2 Acceptable Manufactuers: American Standard, Crane, Toto
- .3 Seats: Bemis or equivalent
- .4 Trims: Hands Free, Stainless Steel, by Delta Commercial, Sloan or Toto
- .5 Capacity: 6 lpf maximum, processing a minimum of 500g of solids in accordance with MaP standards as issued by Veritec Consulting Inc. And Koeller and Company

.3 Urinals:
- .1 Acceptable Manufactuers: American Standard, Crane, Toto
- .2 Capacity: 6 lpf maximum
- .3 Waterless urinals are not acceptable.
- .4 Trims: Hands free, stainless steel, by Delta Commerical, Sloan or Toto

.4 Lavatories
- .1 Vitreous China
- .2 Acceptable Manufactuers: American Standard, Crane, Toto
- .3 Trims: Hands free, by Delta Commerical or Sloan

.5 Power for the hands free controls shall be building power (on standby power where provided for that building). Battery-powered units are not acceptable even where automatic recharging is included in the fixture.

.6 Showers:
- .1 Field constructed (tile)
- .2 Solid surface (acrylic)
- .3 All accessible showers and all showers in lockable rooms shall be grouted under the base to prevent deflection. Grout by general contractor.
- .4 Accessible shower trim shall be compliant with CSA B651.

.7 All fixtures shall be white and colour-matched (there is a variety of whites) where within a single room.

.8 All washroom fixtures within the building shall be, where possible, of the same manufacturer.

.9 Specify water conserving type of fixtures and trim.

.10 Provide a chrome plated, hot and cold hose outlet under the lav counter (preferably in the Male washroom) for each group of Public washrooms. Standard of acceptance: Delta 28T8183.

.2 Plumbing Fixtures – Private

.1 “Private” plumbing fixtures are those that are located in washrooms that serve only a single residential suite, e.g. cluster housing, family housing, don suite in a residence building. Common washrooms for a group of student residence rooms are considered “Public”.

.2 Water closets

.1 Tank Type; Floor mounted
.2 Capacity: 6 lpf maximum, processing minimum 500g of solids
.3 Color: White
.4 Seat: Closed front; white
.5 Trims: Stainless Steel
.6 Acceptable Manufacturers: American Standard, Crane, Toto

.3 Lavatories
.1 Vitreous China; manufacturers: American Standard, Crane, Toto
.2 Trims: Single lever, brass body. Acceptable manufacturers are Delta, Moen, Crane.

.4 Showers
.1 Field constructed (tile)
.2 Solid surface (acrylic)
.3 All accessible showers and all showers in lockable rooms shall be grouted under the base to prevent deflection. Grout by general contractor.
.4 Accessible shower trim shall be compliant with CSA B651.

.3 Accesible Water Closet

.1 Accessible water closets shall provide suitable back support for the user
.1 Water closet with tank – provide bolted connection for lid to tank and ensure tank design is suitable to act as a support.
.2 Water closet without tank – provide a toilet seat with adequately positioned wall support to provide support to the user.
.3 Acceptable Product: Crane – Hymont 3701 / Hymont Jr. 3816 / A.S. Madera.

.4 Janitorial Plumbing Fixtures

.1 Sinks: Moulded stone, floor mounted type, 600 mm x 900 mm.

.2 UVic will provide an automatic cleaning solution dispenser. Provide a separate ½" RPBA water connection with backflow prevention for chemical soap connection.

.3 The faucet shall be reinforced and be complete with a pail hook. The mixing of hot and cold water shall be manual.

.4 Standard of acceptance for the sink is Fiat MSB 3624. Acceptable manufacturer: Williams

.5 Standard of acceptance for the faucet is Delta 28T-2383.

.5 Food Services

.1 Standard of acceptance for trims: T&S Brass

.6 Laboratory Plumbing Fixtures

.1 Most existing laboratories constructed or renovated before 2009 have Tech/Cambridge Brass trim with corrosion resistant finish. More recently (when that finish was no longer available) Tech/Cambridge Brass trim with chrome finish has been used or WaterSaver. This trim includes water faucets, compressed air and gases outlets both inside fume hoods and wall or counter mounted except that chrome finish has not been used in fume hoods.

.2 Where a renovation requires only a very few fixtures and there are others remaining, check with the Plumbing Shop to determine if they have in stock matching trim available to be used for the renovation. If not, evaluate the relative corrosion potential for the installation

and select trim to match the existing with chrome finish unless the corrosion potential is high and in that case select WaterSaver with suitable finish.

.3 Trim for sinks are typically hot and cold gooseneck type with type handles except for ADA trim which shall have blade handles, vacuum breaker and tapered, barbed nozzles except sometimes aerator type outlets for wash-up sinks. Many outlets had aspirators in the past but consideration shall be given to compressed air aspiration (check with Facilities Management). Some sinks require distilled/deionised water outlets. They are typically gooseneck type.

.4 Laboratory sinks are typically 316 stainless steel with counter-top flange (although with suitable counter and where coordinated with the Architect, under-counter mount is acceptable), no ledge-back, cross strainer outlet. Standard of acceptance Aristaline Acceptable manufacturers are Architectural Metal Industries, Franke, Steel Queen

.7 Emergency Fixtures

.1 Emergency water at all emergency showers and eyewashes supply shall be tempered and not exceed to Max 20° C.

.2 Emergency showers/eye wash stations shall have ‘stay open’, hand controlled valves.

.3 Emergency showers/eye wash stations shall each have a floor drain plumbed in, complete with trap primers.

.4 Eye wash shall be specified as eye wash only not face and eye wash combination.

.5 Emergency shower/eye wash isolating valves shall not be readily accessible to the user.

.6 All eyewash and emergency showers shall be provided as per WCB requirements.

.7 All plumbing fixtures and trim used in handicapped accessible locations shall comply with the British Columbia Building Code

.8 Drinking Fountains

.1 All buildings over 600 gross square metres shall have at least one accessible drinking water fountain, located in a public area. The drinking fountain should include an appropriate fixture for filling water bottles.

.2 Drinking water fountains shall not be cooled.

.3 Drinking water fountains shall not have filters (no backflow preventers will be required).

.4 Drinking water fountains shall only be located inside buildings at level 1 entrance lobbies and should be visible from the exterior.

.1 Roof Drains

.1 Consider possible roof deflections when positioning roof drains. Do not locate drains near beams and columns which tend to become high spots on flat roofs with minimum slopes.

.2 Provide minimum of two (2) roof drains to all major roof areas as insurance against clogging and flooding (e.g., two at 75 m diameter preferred even if 1 at 100 mm diameter will do).

.3 Where roof areas are enclosed by parapet walls, coordinate with Architect for provision of scuppers for relief in emergency flooding situations as per the B.C. Plumbing Code.

.1 Pumping of Sewage

.1 Sewage pumping systems are undesirable and every reasonable effort must be made to design a building project that incorporates gravity sewerage systems. If, however, gravity systems are not possible then do the following:

.2 All portions of the building that can be gravity drained shall be gravity drained.

.3 Provide a high water alarm through the BMS.

.4 Where a source of emergency power is available pumps and controls shall be connected to emergency power.

.5 All floor drains at or below the flood level of sewer pump sump shall have backwater valves.

.2 Pumps Seals

.1 Specify mechanical seals compatible with intended service on all pumps

.1 General

.1 Water heaters with storage capacity of 180 L or less and heating capacities of 4.5 kW or less may be electric and shall have a drain pan piped to drain.

.2 For larger tanks and heating capacity, the heat source shall be the campus heating mains. The maximum required domestic hot water temperate shall be 60°C [140°F]. Where hotter domestic water is required it shall be boosted from 60°C [140°F] using a heating source other than the campus heating mains. Natural gas or other service over electric is preferred. Temporary hot water source [140°F] for low occupancy periods (ie summer break) should be installed to accommodate central heating plan shutdowns for maintenance service.

.3 For tanks heated by campus heating mains and where interruption of domestic hot water service is particularly problematic (e.g. food services, laboratories), provide two brazed-plate, double-wall heat exchangers in parallel with isolating valves so one can be removed for cleaning while the other remains in service. Otherwise provide a single brazed-plate, double-wall heat exchanger. Consider multiple 450L glass-lined, insulated storage tanks or single stainless steel tank.

.2 DHW Recirc Automatic Flow Valves

.1 Domestic hot water recirculation valves shall be pressure independent constant flow, factory set, stainless steel. Standard of acceptance: Griswold standard flow cartridge.

.2 Select valves flow settings for minimum flow required to maintain warm water throughout the system and size the recirculation piping and pump accordingly.

.3 DHW Recirc

.1 Provide sufficient balancing valves to ensure adequate flow through each domestic hot water recirculation branch to maintain hot water.

.2 DHW recirculation pump controls on the DDC with return water temperature sensor point.

.1 Distilled and deionized Water Systems

.1 In each of the Elliott and the Cunningham buildings there is a distilled water system. PVC piping shall be used to extend or modify the system.

.2 In the Petch building there is a deionised water (reverse osmosis) system. It is a loop with constantly circulating water. Extension or modification shall maintain the single loop flow. Single pipe branches to outlets shall be kept as short as practical. Modify or extend with PVC.

.3 FMGT will coordinate any temporary shutdowns of the existing systems as required.

.3 Where users provide purifiers, pipe the distilled water to them.

.4 Use distilled water compatible outlets/faucets.

.2 Compressed Air

.1 Use copper for compressed air piping.

.1 General

.1 Main Campus Loop – Industrial type, minimum boiler efficiency of 85%; gas fired.

.2 Off Campus Loop – Condensing boiler (if supply water temperature demands permit); minimum life span – 20 years.

3. Minimum life span to exceed 25 years (industrial grade) for greater than 250,000 btu/hr burner rating (input).

.1 Mechanical Cooling

.1 Some spaces require mechanical cooling because of equipment heat gain or process driven requirements.

.2 Air cooled split systems or evaporating type condensers (closed or open) using treated water for make-up may be used. Systems using municipal water or other portable water (pass through cooling) are not acceptable.

.3 Packaged roof-top equipment is generally not acceptable.

.4 Units with modulating cooling capacity are preferred (e.g Mitsubishi variable refrigerant flow, inverter compressors).

.5 Consider heat pump units instead of cooling only. Multi-zone heat pump systems must have master controls that communicate with the BAS.

.6 For a new building consider a centralized cooling system with chilled water if numerous spaces (present or future) are anticipated to require cooling.

.7 Refrigerants shall not be CFC or HCFC type. R134a, R407c and R410a refrigerants are acceptable. For low temperature refrigeration R507 is acceptable.

.1 Ductwork

.1 All ductwork shall be metal, typically galvanized steel. Flexible ductwork is not acceptable.

.2 Fume hood duct shall normally be 18 gauge, 316 stainless steel, continuously welded. Exceptionally corrosive situations may require more corrosion resistant materials.

.3 Flexible duct of 300 mm maximum length is acceptable only on a horizontal branch duct to an individual diffuser to allow alignment with the ceiling grid. It may provide a maximum of 15 degrees change in direction. No flexible duct shall be used for diffuser necks.

.4 Ductwork shall be to SMACNA standards excluding beaded, crimp joints and snaplock seams. Adjustable elbows must be the same gauge as the adjoining duct and only used if all sectional joints are sealed and secured in the installed position.

.5 Ducts shall be sealed to SMACNA Seal Classification A or B as appropriate for the rated working pressure.

.6 Specify access panel each side of heating coils.

.7 Specify filter protection of heat recovery coils.

.8 Motorized control dampers are strongly preferred over backdraft dampers.

.9 Balance dampers of same material as the ductwork and shall have bushing-type bearings and a quadrant operator capable of locking the damper in a fixed position.

.10 Avoid ductwork acoustical liners. Employ other methods acceptable to FMGT.

.1 Heat Exchangers

.1 Heat exchangers using Campus Heating Water or any service over 82ºC [180ºF] shall be brazed plate type (not gasketted, plate-and-frame type).

.2 Heat exchangers for domestic hot water heating shall be double-wall brazed plate type.

.3 Heat exchangers for hydronic systems with water temperature 80ºC [180ºF] or below may be plate and frame or brazed plate type.

.4 Heat exchangers anticipated to be in year-round service shall be installed as a pair each having 60% of design capacity and each with valves and unions so as to be removable without interfering with the operation of the other. This allows removal for replacement or cleaning. Duplex heat exchangers for domestic hot water heating shall only be considered where interruption of domestic hot water would be very disruptive (e.g. laboratory use, food services use).

.5 Provide a two-way control valve on the campus mains return from the heat exchanger. Provide a 20 mm (NPS 3/4) heat exchanger by-pass between the campus mains supply and return with a modulating control valve (c_v between 1.5 and 2.0), a throttling valve and isolation valves.

.6 The building heating water pumps shall be designed either with duplex pumps or with valves and piping that can provide back-up in the event of failure of any one pump.

.7 The heating coils should be on a separate heating water circuit from radiation to allow for different scheduled temperature control.

.8 Provide flexible piping connectors on all piping conections. Standard of acceptance: Flextech Style FB26-TF.

.9 Provide isolating valve, pressure gauge, thermometer, temperature sensor on each pipe connection.

.10 Standard of acceptance: Alpha Laval Brazed Plate – Model CB200

.1 Outdoor Air Handling Units

.1 Select for long-life, weather tightness, good quality.

.2 Standard of Acceptance: Haakon, Scott Springfield or equal.

.3 On large units include a service corridor or mechanical (non-plenum) room for controls.

.4 Include over-head lifting point for motors 7.5 hp and larger.

.5 Variable frequency drives are required where variable volume control is required.

.6 Pilot lights on plenum light switches.

.7 Quality plenum door hardware.

.8 Exterior doors lockable and keyed to suit appropriate UVic mechanical access key.

.9 Weather louvres preferred to exterior hoods.

.10 Electrical power and controls wiring in EMT conduit.

.11 Typically locate air handlers in Mechanical Rooms. When necessary locate outdoors. Coordinate access to equipment with Architect. Typically full stairway access is required to Mechanical Rooms and to roof top equipment with paver walkways across roof and around equipment to protect roofing. Coordinate railings/fall protection with Architect.

.1 Centrifugal Fans

.1 Bearings: Heavy duty pillow-block, grease lubricated ball or roller self aligning type, minimum life of AFBMA L-10 80k or AFBMA L-50 400k.

.2 Extend grease nipples to exterior of guards.

.3 Sound power levels to AMCA 311.

.4 Statically and dynamically balanced, constructed in conformity with AMCA 99.

.5 Ratings: based on tests performed in accordance with AMCA 211, and ASHRAE 51.

.6 Units shall bear AMCA certified rating seals.

.1 Filters

.1 Filters for service rooms, protection of heat recovery coils or for small air handling units (less than 500 l/s) shall be minimum MERV 8. Standard of acceptance is 50 mm thick AAF AM-AIR 300. Acceptable product is Farr 30/30.

.2 Filters for air handling systems over 500 l/s shall be a combination of a MERV 8 pre-filter and a MERV 13 final filter unless user requirements stipulate a higher value. Pre-filter standard of acceptance: 100 mm thick AAF AM-AIR 300, acceptable product: Farr 30/30. Final filter standard of acceptance, 100 mm thick AAF AM-AIR Varicell II, acceptable product: Farr Econocell.

.3 Preference for pre-filter bank to be slide-in type. Final filter bank shall be built up from gasketted, individual filter frames with spring clips.

.4 Separate filter gauge for each filter bank. Standard of acceptance: Dwyer Series 2000.

.5 Design for suitable access for changing filters.

.1 Fume Hoods

.1 Design and install fume hoods to comply with recognized authorities (CSA, ASHRAE) as prescribed in Part 6 of the BCBC. Perform risk assessment to determine if fume hood and/or cabinets (including bio safety) should be connected to emergency power.

.2 Ductwork shall be stainless steel type 316, 18 ga minimum, 2B finish except No. 4 finish where in exposed occupied spaces and shall be suitable for the gas and/or vapours carried from source to exhaust fan. Strong corrosive fumes may attack stainless steel and other materials may need to be specified.

.3 Ducts from fume hoods shall be routed to the roof of the building as directly as possible for discharge above the re-circulation cavity boundary of the structure.

.4 Horizontal ducts shall be kept to a minimum and shall be graded up in direction of air flow.

.5 Exhaust fans shall have interior surfaces in contact with the air stream coated with a chemical resistant coating.

.6 Canvas or any other flexible connections are not acceptable on the discharge side of the fan.

.7 Provide control handles on the exterior of the fume hood for all fume hood services.

.8 New fume hoods shall have flow monitors/alarms as per CSA standards.

.9 Avoid sound attenuators on fume hood exhaust fans. Select fans with lower sound level instead.

.1 General

.1 The control system shall be fully electric / electronic except for remaining existing pneumatic controls. Special applications may require pneumatic activation.

.2 All controls work shall be done by one of the following Reliable Controls Corporation representatives:
- .1 Foster Air Conditioning Ltd.
- .2 Houle Electric Ltd.
- .3 Kerr Controls Inc.

.3 All products used shall be manufactured by Reliable Controls Corporation or where they do not manufacture required products the products used shall be as recommended by Reliable Controls Corporation for incorporation into their controls system.

.4 All work shall be consistent with the latest University of Victoria standards for controls systems including all hardware, software and graphics. The specified controls contractors are expected to be fully conversant with those standards and shall allow for all measures required for the specified work to meet those standards

.5 Provide modifications to the control system complete with all necessary components and connections to achieve the specified functions.

.6 Include for any required expansion of the existing DDC system to accommodate the required additional control inputs and outputs. All new outputs shall each have an integral HOA toggle switch.

.7 New controls panels shall be the MACH Series controllers designed and built by Reliable Computer Systems. New controllers shall have a minimum 10% spare points. Controllers must be capable of communicating with RCP protocol on both main and sub network as well as BACnet.

.8 The control system and all controllers and hardware shall be BACnet Testing Laboratories (BTL) certified.

.9 All control panels and components (except valves, dampers and sensors) shall be located in the mechanical rooms or in service rooms or spaces as acceptable to Facilities Management.

.10 Program a trend log and, where appropriate, totalization for each point.

.11 The Mechanical Consultant shall coordinate with the Electrical Consultant which systems shall be hard-wired under the electrical documents to shut down in the event of detection of a fire.

.2 Existing Controls

.1 Most of the older buildings have pneumatic controls but almost all have a central DDC system that was retrofitted in the 1990's. When these buildings are renovated, replace the local pneumatic controls within the renovation area and provide all new controls within the renovation area with compatible electronic sensors, actuators and control valves controlled by the DDC system. Provide additional control panel capacity as required for the controls. Note the requirement for new controls outputs to have an HOA switch on each output. Modify the controls sequence to suit. Update the controls graphics to include all new and modified controls.

.2 Remove all reasonably accessible redundant pneumatic tubing and all redundant pneumatic controls components and tightly cap all remaining pneumatic tubing ends.

.3 Remove all reasonably accessible redundant controls conduit, wiring and equipment.

.4 The long term objective is to eliminate the pneumatic controls except where required for special applications.

.3 Alarms

.1 Software alarms shall be identified as regular or critical. Critical alarms shall be connected from the DDC system to the campus alarm system for monitoring and response by Campus Traffic and Security.

.4 Identification

.1 Label and identify all panels and points with a numbering system consistent with UVic's DDC network numbering system.

.2 Identify all controls with symbols relating directly to the control diagram. Use plasticized tags, engraved brass, aluminum, metalphoto or laminated plastic labels and secure them to, or adjacent to, the control devices with key chains.

.3 Identify all junction box covers with control company label. Paint junction box covers to UVic standard colour.

.4 Identify with colour bands, all conduits at all junction and pullboxes, at both sides of wall and floors and at not more than 7.5 m [25 ft] intervals along the length. Identification bands to be sprayed on and not less than 100 mm [4"] wide. Bands shall be colour to UVic standard.

.5 Use colour coded conductors, white for neutral.

.6 All manual switches, unless they come with standard nameplates, shall be labelled with engraved plastic laminate nameplates to clearly indicate the service. Wording on nameplates shall be subject to approval by Facility Management.

.7 Identify all DDC panels and associated devices with symbols relating directly to the control diagram. Provide plastic labels for each input and output point with the following information:
- .1 Point descriptor.
- .2 Point type and channel number.
- .3 Corresponding DDC panel number.

.8 Mount an input/output layout sheet within each DDC panel. This sheet shall include the name of the points connected to each controller.

.2 Graphics and points acceptance procedures

.1 A copy of each graphical screen page both new and modified existing shall be signed off and dated by the Controls Contractor and Facility Management's representative. Any changes shall be noted. This signed set shall be left on site as the "Record Drawings".

.2 A summary print out of each group of point types for each panel shall be printed after commissioning and calibration. Each sheet shall be signed by the Controls Contractor's commissioning person, and Facility Management's representative.

.3 If any changes are noted during spot checks they shall be manually written on the original print out with the date and signature of person noting changes.

.3 Testing and Commissioning

.1 The Controls Contractor shall comprehensively commission and test all components and functions of the controls system and provide documentation to verify.

.2 Consider whether the system warrants a comprehensive seven day test.

.4 Demonstration to Owner

.1 The Controls Contractor shall demonstrate to Facility Management's designated personnel the adjustment, operation and maintenance, including pertinent safety requirements, of the controls equipment and system provided to the satisfaction of Facility Management's representative.

.5 Electrical Components, Wiring and Conduit

.1 Carrier System:
- .1 All wiring for 24 volts or less in mechanical service spaces, in stud walls or where exposed to view shall be run in EMT conduit except wiring to all operators and to all sensors subject to vibration shall be run in flexible metallic conduit for the final 900 mm [3 feet].
- .2 Provide conduit for all wiring between the fire alarm panel and the DDC panels.
- .3 All wiring for over 24 volts shall be run in EMT conduit.
- .4 Provide steel fittings with nylon throats for all conduit connections.

.2 Wire:
- .1 Line voltage power or switched power wiring - #12 gauge copper wire minimum.
- .2 Line voltage control wiring - #14 gauge copper wire, length not to exceed 50 meters; #12 gauge copper wire, lengths exceeding 50 meters.
- .3 Low voltage - wire as directed by applicable electrical codes and requirements but minimum #20 gauge.

.3 Cable: Data transmission cable shall be minimum Cat. 5e cable.

.6 Temperature Sensors

.1 Room temperature sensors in staff areas (non-student, non-public areas) - two-wire type with up/down temperature adjust.

.2 Room temperature sensors in student or public areas – no user interface input.

.7 Control Valves and actuators

.1 Standard of acceptance: Belimo ball valve, B200 series with stainless steel ball and characterizing disc in the inlet of 2-way valves and in the control ports of 3-way valves.

.2 Consider whether spring return or fail to last controlled position is desired for each valve.

.3 Acceptable Products: Johnson Controls, Honeywell

.8 Control Dampers

.1 Low leakage type with blade and frame seals.

.2 Blades shall be horizontal in vertical mounted dampers.

.3 Acceptable Products: Ruskin CD-36, TAMCO Series 1000 (T.A.Morrison), Johnson Controls, Honeywell.

.4 Control valves on campus heating mains shall be selected to operate continuously at 121°C (250°F).

.9 Control Damper Actuators

.1 Electric/Electronic Damper Actuators:
- .1 Actuators shall be direct coupled.
- .2 Spring return.
- .3 Acceptable Products: Belimo.

.10 Standby Power

.1 Consider whether the controls system should be on standby/emergency power, or UPS when central applications are controlled or the equipment being controlled is on emergency power. Consider the impact of power transfer to the control system and whether a UPS system is appropriate.

.11 Controls Points

.1 Provide current sensors for all motor-driven equipment except small fan-coils, unit heaters, force flow heaters, washroom exhaust fans for individual washrooms, and other minor, non-critical equipment.

.2 Monitor supply air temperature downstream of every VAV box with a heating coil.

.3 Determine in advance with Facilities Management whether every office should have its own independent temperature control or if offices are to be grouped under a single temperature control.

.4 Monitor the building incoming domestic water pressure before the premise backflow prevention and after the building prv.

.5 Provide pressure differential monitoring across major air filter banks.

.6 Provide differential pressure or current sensors across pumps.

.7 Provide an independent output for each of the return air damper, the outdoor air damper and the relief damper on mixed air systems.

.8 Monitor all equipment remote alarm contacts.

.9 For variable frequency drives provide output to control ON/OFF and speed and monitor ON/OFF status, run speed, alarm contact

.10 Provide ON/OFF control for all motor-driven equipment unless manually operated.

.11 Provide control and operating schedule for DHW recirc pumps.

.12 Provide hard wired low-temperature shutdown (freeze protection) for air handling systems and monitor its status.

.13 Generally provide control of all mechanical equipment but not to override or replace integral equipment controls and safeties (e.g. boiler enable/disable but not burner ON/OFF).

.14 Monitor the temperature of any electrically freeze-protected piping or equipment.

.15 Monitor the status of regular/emergency/standby electrical power.

.16 Monitor status of automated glycol make-up systems and glycol tank level alarm.

.17 Monitor closed pipe systems pressure at or hydraulically near the expansion tank.

.18 Monitor DHW temperature. Where DHW heating is by heating water, control the heating.

.19 Monitor the pneumatic controls air pressure.

.20 Monitor campus heating mains water temperature to and from the building heat exchanger and monitor the flow to it to provide energy monitoring and totalization. Consider use of manufactured energy monitoring equipment.

.21 Provide a campus mains two-way control valve in the return from the building heat exchanger.

.22 Provide a small control valve (c_v between 1.5 and 2.0) between the campus mains supply and return pipes (prevent thermal shock if main valve closes for extended period).

.23 Provide temperature monitoring of the building heating mains and of each individually pumped heating circuit.

.24 Provide alternating control of duty and standby equipment.

.25 Monitor all mass and energy meters provided with contacts for remote monitoring.

.1 Drawings

.1 Consultants are to prepare drawings in AutoCAD format for all projects and submit a record set of drawings in AutoCAD and PDF formats at project completion.

.2 Drawings shall be sufficiently detailed to provide complete electrical systems and shall indicate the following as a minimum:

- .1 Legend of symbols
- .2 Site plan with site services
- .3 Site services details
- .4 Power distribution details and layouts
- .5 Communications risers and layouts
- .6 Power distribution riser and bumpless transfer system details
- .7 Emergency power distribution
- .8 Exit and emergency lighting
- .9 Fire alarm system riser and layout
- .10 Cable tray system layout and details
- .11 Major conduit runs for site services, AV equipment in lecture theatres, AV equipment in teaching spaces, assistive listening systems, and communications
- .12 Mechanical and owner's equipment schedules
- .13 Generator system layout, including standby and emergency auto-transfer switches.

.2 Codes and Standards

.1 Codes and standards applicable to electrical installations for the University of Victoria Campus are as follows:

- .1 British Columbia Building Code (BCBC) latest adopted edition
- .2 Local Municipal Codes and Standards
- .3 National Model Energy Code for Buildings (MNECB)
- .4 Provincial Fire Marshall Regulations
- .5 Workers' Compensation Board (WCB) Regulations
- .6 Fire Marshall Act
- .7 Applicable NFPA Regulations
- .8 Canadian Electrical Code (CEC) latest adopted edition
- .9 CSA Standards
- .10 ULC Standards
- .11 University of Victoria Communications Systems Guidelines
- .12 Laboratory Bio Safety Guidelines
- .13 IES (Illuminating Engineering Society) Standards

.3 Electric Motors, Equipment and Controls

.1 Variable frequency drives for HVAC equipment are typically provided by mechanical contractors, however, electrical contractors are responsible for obtaining a copy of shop drawings for drives and insert them in electrical operating and maintenance manuals.

.4 Wiring Identification

.1 Identify Wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1

.4 Use colour coded wires in communication cables, matched throughout system.

.5 Group neutral with associated conductors in junction boxes.

.5 Conduit, Junction Box and Cable Identification

.1 Junction box covers are to be colour coded as follows

.1 Fire Alarm – red

.2 Communications – Green

.3 Mechanical Controls – Blue

.4 Emergency Power – Yellow

.5 Audio-Visual and Intercom - Orange

.6 Security System - White

.2 Colour coding for cables/wire shall be as follows: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Communications Category 5E	Yellow	
Communications Category 6 or 6A	White	
Other Communication Systems	Green	Blue
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

.6 Single Line Electrical Diagrams

.1 Single line diagrams shall be provided on all new building projects, as follows:

.1 Provide laminated single line electrical diagram in main electrical room.

.2 Provide laminated fire alarm riser diagram, plan and zoning of building at fire alarm control panel and at remote annunciator.

.3 Where an indoor passive graphic is indicated on plans, provide graphic printed on photographic archival paper in a plexi-glass frame.

.4 Where an outdoor passive graphic is indicated on plans, provide aluminum sub-limation graphic with an aluminum frame.

.5 Drawings: 600 x 600 mm minimum size.

.7 Mounting Heights

.1 Mounting heights for electrical devices shall be as follows where possible. Where these heights cannot be achieved, obtain written instructions from the University of Victoria for alternate mounting heights.

.2 In offices and laboratories, mounting heights for receptacles and communications outlets are generally 150mm above counter height, unless not physically possible.

.3 Install electrical equipment at following heights unless indicated otherwise.
- .1 Local switches: 1400 mm.
- .2 Wall receptacles:
  - .1 General: 300 mm.
  - .2 Above top of continuous baseboard heater: 200 mm.
  - .3 Above top of counters or counter splash backs: 150 mm.
  - .4 In mechanical rooms: 1400 mm.
- .3 Panelboards: as required by Code or as indicated.
- .4 Communications outlets: 300 mm.
- .5 Wall mounted telephone and intercom outlets: 1500 mm.
- .6 Fire alarm stations: 1200 mm.
- .7 Fire alarm bells: 2100 mm (or if in conflict with ceiling, 300mm below ceiling).
- .8 Television outlets: 300 mm.
- .9 Wall mounted speakers: 2100 mm.
- .10 Clocks: 2100 mm.
- .11 Thermostats: 1525mm
- .12 Door bell pushbuttons: 1500 mm.
- .13 Where possible, wall mounted devices such as lighting switched and thermostats shall be aligned vertically.

.8 Operating and Maintenance Manuals

.1 Submit a copy of operating and maintenance manuals for review, two weeks prior to substantial completion. This will be reviewed and returned within one week.

.2 Submit two hard copy sets and one digital copy set on CD of final operating and maintenance manuals for equipment or as requested by the general section of the contract two (2) weeks prior to substantial completion of the project. Include descriptive and technical data, all shop drawings, operating procedures, routine and preventative maintenance, wiring diagrams, spare parts lists, warranties, service companies, suppliers for replacement parts, test results, fire alarm certificate of verification, electrical inspection authority certificate and contract guarantee.

.3 Hard copy manuals shall be inserted in "**RED**" coloured heavy duty three ring binders, with lettering on the spine identified as "OPERATING AND MAINTENANCE MANUAL", project title and system names.

.4 Obtain and include a copy of all variable frequency drive shop drawings provided by the mechanical contractor on the project in manuals.

.5 Include in maintenance data:
- .1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
- .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts list. Advertising, sales or generic literature is not acceptable. All operations and maintenance data must pertain to the specific products used.
- .3 Wiring and schematic diagrams and performance curves.
- .4 Names and addresses of local suppliers for items included in maintenance manuals.
- .5 Copy of reviewed shop drawings
- .6 Guaranties and Warranties information

.7 Test reports and systems demonstration: Include copies of all applicable test reports and manufacturer's letters verifying test completion.

.8 Certificates; Include a copy of final certificates from electrical inspection authority, fire chief, and other authorities having jurisdiction over the work.

.9 Schedules: All schedules included in the technical specifications 9motor schedules, lighting fixture schedules, panel schedules, security zone schedules, fire alarm schedules, low voltage relay schedules, dimmer schedules, etc.) shall be updated to reflect all changes made during tender and construction period.

.1 General

.1 This section applies to underground primary conductors fed from the University of Victoria 15kV primary voltage infrastructure.

.2 Main electric services to new buildings typically requires dual radial primary voltage feeders from the main distribution loop to each building in order to achieve a dual bumpless power transfer system.

.3 The following provides technical requirements for primary voltage systems cabling, manholes, terminations and support hardware.

.2 Rubber Insulated Cables 5001 - 15000 V

.1 15 kV cables shall be #250 MCM single-core copper, Class B stranding, with semi-conducting shield cover core conductor, 90° C rated tre-retardant insulation of cross-linked thermosetting polyethylene material, 15 kV rated for 100% voltage level, semi-conducting insulation shield overlaid with metallic wire or tape shield as described below, separator tape over shield, and extruded PVC jacked rates –40° C.

.2 In general, all 15kV cables to be connected to the existing underground distribution system shall have concentrically served copper wire shield made up of 14 #18 strands (or equal) to match the established University standard installation and to withstand 3000 A of ground fault current for 0.2 second.

.3 For projects requiring total cable quantities less than 1000 m, the following alternative shield construction, cable installation and grounding arrangement may be acceptable by obtaining prior written permission from the University:

.1 Cable construction utilizing overlapping copper tape shield providing 100% coverage over the semi-conducting layer, and

.2 Cable installation which provides an additional #4/0 green insulated copper conductor installed in the same duct as the 3-phase conductors, and,

.3 Grounding arrangement which provides for the direct and effective bonding of the additional #4/0 grounding conductor to the cable shield ground leads at each end of the phase cables.

.4 The use of alternative shielding shall require each trefoil of feeder to have an accompanying #4/0 grounding cable in the same duct in addition to the standard duct bank grounding conductor which shall be separately installed in a 50 mm duct as shown on the drawings.

.4 The construction and testing of HV cables shall be in general accordance with ICEA Publication S-66-524 and AEIC Specification No. 5-71.

.5 Cables shall be as manufactured by Canada Wire and Cable, CGE, Phillips, Pirelli, or Northern Electric Ltd.

.6 HV cable grips for single cable or trefoil bundle: high grade, non-magnetic tin-coated bronze strand construction. Kellems Type 022-01 (closed mesh), 022-02 (split mesh, lace closing).

.7 HV cable identification tag ties: Thomas & Betts Nylon Ty-Rap # TY529M.

.3 Concentric Neutral Power Cables 5001 - 15000 V

.1 Concentric neutral power cable: to NEMA WC7-1992/ICEAS-66-524.

.2 Single copper conductor, size as indicated.

.3 Semi-conducting strand shield.

.4 compact round.

.5 Insulation: cross-linked thermosetting polyethylene material rated 90EC and 15kV for 133 % voltage level.

.6 Semi-conducting insulation shielding layer.

.7 Copper neutral wires applied helically over insulation shield equivalent to 133 % full capacity.

.8 Separator tape over neutral wires.

.9 Extruded PVC jacket rated minus 40EC.

.4 Connectors and Terminations Rubber Insulated Cables

.1 Copper crimp-on compression connectors as required sized for conductors.

.2 All terminations 5kV and above shall meet IEEE 48.

.3 Indoor 15 kV high voltage switchgear cable termination: complete with stress cones, shield grounding devices, and lugs. 3M Quick-Term II, 5620K series, Raychem HVT-152 series, or equal.

.4 kV rated submersible, 600 A, elbow-type, non-loadbreak power distribution connector: Elastimold 650 LR series, complete with all necessary components, adapters, spade terminals, plugs, caps, connectors, and shield grounding devices suitable for the type and size of cable specified and compatible for connection to existing standard connectors in use at the University. The connector is to be equipped with voltage test points and all necessary bolts and hex nuts for assembling and dismantling without the use of hot-stick tools.

.5 Manhole Cable Support Hardware

.1 Hot-dipped galvanized continuous concrete preset inserts for mounting of steel channel supports: Cantruss RH2C or equal.

.2 41 x 41 mm hot-dipped galvanized continuous concrete preset inserts for mounting of steel channel supports: Cantruss RH2C or equal.

.3 Steel channels for mounting of cable brackets: as specified.

.4 Porcelain ‘slip on’ insulators, suitable for use with cable brackets specified: Pursley “Power-Strut” PS-1500 (for single cables) and PS-1501 (for trefoil cable bundle) or equal.

.5 Heat shrink boots for cable bracket ends: T&B HSC, Raychem ESC, 3M ICEC, or equal.

.6 Duct Allocation Signs In Manholes

.1 216 x 216 mm drawings on standard bond paper, sealed with thermally applied clear plastic laminate on both sides, sandwiched between two clear plexiglass plates.

.2 Install duct allocation signs at each duct entry location in each new and existing re-used manholes.

END OF SECTION

.1 Materials

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper alloy sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper alloy sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for stranded copper conductors.

.3 Stud clamp bolts.

.4 Bolts for copper conductors.

.5 Sized for conductors as indicated.

.4 Clamps or connectors for armoured cable and flexible conduit as required to: CAN/CSA-C22.2 No.18.

.1 General Requirements

.1 In general, wiring to be used at the University of Victoria shall be:

.1 Typically use insulated 98% conductivity copper conductor wiring enclosed in EMT (steel) conduit for the general wiring systems unless otherwise indicated.

.2 Aluminium conductors are not desirable. Upon special permission from FMEL they may only permitted for feeder conductors larger than 3/0 AWG.

.3 Obtain approval of FMEL for the usage of any Teck wiring. Where permitted, Teck wiring up to 750 system volts to be PVC jacketed armoured cable, multi-copper conductor type Teck90 1000 volt having a PVC jacket with FT-4 flame spread rating.

.4 Flexible armoured AC90 cabling (BX) shall not be used for the general wiring system other than final drops to recessed light fixtures in concealed locations. Drops to receptacle outlets is not permitted. AC90 is permitted in tight spaces such as millwork and lab benches.

.5 All control wiring except HVAC controls as specified in Mechanical Divisions is to be provided by the Electrical Contractor. This includes low voltage control wiring for motorized blinds and shades, to owner supplied equipment, to door access and security, to assistive hearing system, to audio-visual (AV) equipment.

.2 Wire and Cable General

.1 Conductors: stranded for 10 AWG and larger. Minimum size #12 AWG, copper.

.2 Insulation to be 600 volt RW90XLPE (X link) for the general building wiring in conduit.

.3 Use RWU90XLPE for underground installations.

.4 Site services sub-circuits, including site lighting, to be minimum #10 AWG for power and #12 for controls. Increase wiring size for lengthy and/or loaded circuits so that system will not exceed the maximum voltage drop as recommended by the Canadian Electrical Code CSA 22.1.

.5 Main feeders to be conduit and copper insulated wiring unless otherwise noted on drawings. Provide ground wiring for all conduits below slabs. Increase conduit size as required.

.6 Armoured AC90 cable may only be utilized for recessed tee bar luminaire drops from ceiling mounted outlet boxes. "Tite Bite" connectors and their counterparts of other manufacturers shall not be used. Use anti-short connectors. Cable from luminaire to luminaire is not permitted. Allow nominally 900mm [3'] extra cable looped and supported in the ceiling space to permit fixture relocations of one tile space.

.7 TBS90 #14 AWG stranded shall be used in all switchgear assemblies. Current transformer secondary wiring shall be #12 AWG stranded. Current transformer leads shall incorporate ring type tongues for termination purposes.

.8 Conductors to be colour-coded. Conductors No.10 gauge and smaller shall have colour impregnated into insulation at time of manufacture. Conductors size No.8 gauge and larger may be colour-coded with adhesive colour coding tape, but only black insulated conductors shall be employed in this case, except for neutrals which shall be white wherever possible. Where colour-coding tape is utilized, it shall be applied for a minimum of 50 mm at terminations, junctions and pullboxes and condulet fittings. Conductors not to be painted.

.3 Teck Cable

.1 Teck cable may be used in special situations such as feeds to motors and equipment. For all other uses, obtain permission from UVic. Cables shall be chemically cross-linked thermosetting polyethylene rated type RW90, 600 V with inner jacket of polyvinyl chloride material. The armour shall be interlocking aluminum. The outer jacket shall be low-acid-

gas-emitting fire-retardant PVC rated for low temperature, black. Connectors shall be watertight approved for TECK cable.

.4 Armoured Cables

.1 The use of insulated copper AC90 cable with interlocking aluminum sheathing is permitted for drops to luminaires, not exceeding 3m in length and in difficult confined spaces and millwork.

.5 Armoured Fire Alarm Cable

.1 The use of flexible armoured fire alarm cable from junction box to ceiling mounted fire alarm device is permitted. Use SECUREX® II cable, fire rated to CSA FT4 requirements. Cable shall be armoured with interlocked aluminum tape armour. Cable armour shall be colour coded “red”. This type of cable may also be used for renovations projects where conduit installation is difficult.

.6 Wire Installation

.1 Install wiring as follows:

.1 All wires are to be pulled in together in a common raceway, using liberal amounts of approved lubricant.

.2 All power circuits connected to isolated ground type receptacles are to have individual separate neutral c/w insulated bonding conductor.

.3 No combining of circuits onto common neutral will be permitted. Use 2 pole or 3 pole breakers for combined circuits, no connector clips will be allowed.

.4 All dimmer circuits are to have individual neutral conductors for each circuit.

.5 Group all circuit conductors with their respective neutral conductor and provide identification of circuit number on conductors at all junction boxes.

.6 Group all cables wherever possible on channels.

.7 For all control cabling, ground control cable shield.

.8 Installation of conduit in concrete slabs in NOT permitted unless specifically approved in written by addendum during tender stage. All conduit shall be surface mounted under floor slabs.

END OF SECTION

.1 General

.1 This section covers work required for grounding of primary switchgear and for connection to the campus grounding system.

.2 Materials

.1 Use only ground rod electrodes, copper clad steel 19 mm dia by 3 m long. A minimum of four ground rods shall be provided and connected to the main grounding buss in the main electrical room.

.2 Conductors for installation of campus ground in duct system and manholes shall be PVC-insulated, coloured green, stranded, untinned, soft annealed copper wire size # 4/0 AWG, unless noted otherwise.

.3 Conductors: bare, stranded, untinned, soft annealed copper wire, size # 3/0 AWG, for ground bus, electrode interconnections, metal structures, transformers, switchgear, ground connections.

.4 Bonding Conductor: # 2/0 AWG stranded soft annealed copper.

.5 Conductors for grounding cable sheaths, raceways, pipe work, screen guards, switchboards, potential transformers: PVC-insulated, coloured green, stranded, untinned, soft annealed copper wire, size # 4 AWG.

.6 Conductors: No. 3/0 AWG extra flexible (425 strands) copper conductor for connection of switch mechanism operating rod to gradient control mat, fence gates, vault doors.

.7 Cable sheath isolating sleeves: Elastimold or equal, to match 15 kV cable connector kits on campus.

.8 Wall-mounted ground bus shall be copper ground bus mounted on insulated supports on wall of electrical room. Bus to be 75 mm wide and 6 mm thick. Length of bus to suit connection requirements.

.3 Grounding Installation

.1 Install continuous grounding system including electrodes, conductors, connectors, accessories, as indicated and to requirements of local authority having jurisdiction.

.2 Install connectors to manufacturers instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to electrodes, structural steel work, using copper welding by thermit process or approved crimp-on type compressive connectors.

.4 Neutral Grounding

.1 Connect transformer neutral and distribution neutral together using 1000 V insulated conductor to one side of ground test link, the other side of the test link being connected directly to main station ground. Ensure distribution neutral and neutrals of potential transformers and service banks are bonded directly to transformer neutral and not to main station ground.

.2 Interconnect electrodes and neutrals at each grounding installation.

.3 Connect neutral of station service transformer to main neutral bus with tap of same size as secondary neutral.

.4 Ground transformer tank with continuous conductor from tank ground lug through connector on ground bus to primary neutral. Connect neutral bushing at transformer to primary neutral in same manner.

.5 Grounding In Manholes

.1 Install conveniently located grounding stud, electrode, size 2/0 AWG stranded copper conductor in each manhole.

.2 Install ground rod with lug for grounding connection in each manhole so that top projects through bottom of manhole.

.6 Cable Sheath Grounding

.1 Bond single conductor, metallic sheathed cables together at one end only. Break sheath continuity by inserting insulating sleeves in cables.

.2 Use No. 6 AWG flexible copper wire soldered, not clamped, to cable sheath.

.3 Connect bonded cables to ground with No. 2/0 AWG copper conductor.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Use # 4/0 AWG bare copper cable for main ground bus of substation.

.6 Use tinned copper conductors for aluminum structures.

.7 Campus Ground

.1 Extend from existing manhole infrastructure a # 4/0 insulated ground to substation wall-mounted ground bus in main electrical room. Run through 50 mm duct.

.1 General

.1 The use of AC90 (BX) cabling inside buildings is generally permitted only for luminaire drops and in tight spaces such as millwork and lab benches. Special permission must be obtained in writing from the Consultant and FMEL for uses elsewhere.

.2 This section describes the accepted types of conduit and underground ducts for the campus.

.3 The use of electric non-metallic tubing (ENT) is **not** permitted on campus.

.4 To provide flexibility, conduit home run fill should be limited to 20% in order to accommodate pulling of future conductors.

.5 Conduit is not permitted inside concrete slabs for educational buildings. All conduit shall be surface mounted under suspended slabs. Underground conduit shall be "under" the slab.

.2 Basic Wiring Method

.1 Underground or in concrete exterior to building:

.1 All wiring shall be in PVC DB2 conduit, complete with bonding conductor sized to suit.

.2 Concrete walls and slabs interior to building:

.1 All wiring shall be in rigid PVC conduit, complete with bonding conductor sized to suit (minimum ¾").

.2 Conduit shall run under slabs-on-grade and NOT in concrete, sized to suit.

.3 All wiring in areas of suspended slabs shall be EMT surface mounted to the underside of slab.

.4 Partition walls and ceilings:

.1 All wiring to be run in EMT conduit for branch circuits. EMT for fire alarm and low voltage raceways, and EMT and wire for all feeders and surface wiring in electrical and mechanical rooms.

.5 T-bar ceilings:

.1 EMT and wire to junction box with flexible armoured cable drops for individual luminaires (no feed through wiring to luminaires allowed, except for luminaires butted together). Allow adequate cable to relocate luminaire one T-bar space in any direction.

.6 Motors and transformer connections (and all equipment that vibrates):

.1 Short (600 to 1200mm) PVC jacketed flexible conduit with liquid tight connectors shall be used. Wire shall be stranded for all sizes. Allow sufficient slack to avoid strain on connectors at extreme extension of equipment movement.

.7 Surface raceways - interior:

.1 All surface raceways shall be EMT, except if located without protection in areas susceptible to damage, which shall be rigid steel conduit.

.8 Surface raceways - exterior:

.1 All surface raceways shall be rigid PVC conduit, protected from damage and excessive heating to the Consultant's satisfaction.

.9 Gutters/Wireways:

.1 Gutters/wireways for branch circuits above and below electrical panels shall be minimum of 250mm high. Depth and width shall be as required by Electrical code.

.3 Location

.1 Locate electrical devices on walls with main regard for convenience of operation and conserving wall space, in conjunction with the electrical drawings. Switches, receptacles, fire alarm pull stations, etc. generally to be vertically lined up where items are in the same general location. Adjacent common devices to be installed in common outlet box.

.2 Do not install outlets back-to-back in party wall; allow minimum one stud space horizontal clearance between boxes. Install behind all outlets in party walls a Lowry Acoustic backing pad.

.3 Locate light switches on latch side of doors. Locate disconnect devices in mechanical rooms on latch side of door.

.4 All outlets located on exterior walls to be complete with moulded plastic vapour barriers to maintain integrity of wall vapour barrier system.

.5 All raceways and wiring shall be installed concealed in building fabric, except for mechanical and electrical rooms where they shall be installed on the surface.

.6 All outlet boxes, junction boxes, and cabinets to hold electrical devices shall be mounted so the equipment can be flush mounted.

.7 All junction boxes and other raceway access devices shall be mounted avoid being visible from public areas. Obtain approval for any and all junction boxes that (due to the building design) cannot be concealed.

.8 All junction boxes mounted, out of necessity, on surface of solid walls shall be painted to match adjacent surface, with junction boxes painted to match designated system.

.4 Installation

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

.3 Use electrical metallic tubing (EMT) except above 2.4 m not subject to mechanical injury.

.4 Use rigid PVC conduit underground, in corrosive areas, and surface mounted in wet areas not subject to damage.

.5 Use flexible metal conduit for connection to motors in dry areas, connection to recessed incandescent fixtures without a prewired outlet box, connection to surface or recessed fluorescent fixtures and work in movable metal partitions.

.6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 Use explosion proof flexible connection for connection to explosion proof motors. Install conduit sealing fittings in hazardous areas. Fill with compound.

.8 Minimum conduit size for lighting and power circuits: 21 mm.

.9 Minimum size for conduit home runs shall be 21 mm.

.10 Provide minimum 50% spare capacity in conduit for all branch circuits.

.11 Install fish cord in empty conduits.

.12 Run 2-27 mm spare conduits up to ceiling space and 2-27 mm spare conduits down to ceiling space from each flush panel. Terminate these conduits in junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.

.13 All conduits shall be fastened to structure with steel straps (no cast type straps allowed).

.14 All EMT fittings to be steel (no cast type fittings).

.5 Rigid PVC Ducts and Raceway

.1 Install PVC conduit and fittings using new PVC cement, approved by the conduit manufacturer. PVC Cement to be Low VOC type.

.2 Clean terminations with solvent and bevel inside edge of field cut conduit.

.3 Protect conduit and fittings from water and keep dry while making connections.

.4 Secure PVC raceway using PVC clamp on surface runs, and use tie wire in concrete slab when connecting to rebar.

.6 EMT Raceway

.1 Insure that fittings are installed on raceway to provide effective continuity of raceway ground

.7 Fire Stopping

.1 Apply ULC approved fire stopping assembly to all conduit penetrations passing through fire rated walls and floors.

.2 Provide shop drawings showing details for each type of application on the project. Shop drawings shall include catalogue data and installation details.

.3 For all communication sleeves accessible via ceilings or in stacked closets/rooms passing through floors, provide 2 hour rated STI EZ-PATH assembly. Provide minimum four(4) 100mm square sleeves between each floor and each communication closet/room.

.1 General Information

.1 In general, the use of cable tray along corridors is preferred for communications cable installation and management. Where space permits, cable tray shall be minimum 300mm wide and 150mm deep. Ladder type tray with rungs at minimum every 150mm is required. Where there is insufficient space, use basket tray as specified.

.2 Cable tray shall also be provided inside communications rooms running along the perimeter of the room.

.3 Where cable tray is install in server rooms, tray will be exposed and will require multiple receptacle outlets of various CSA configurations. This will require confirmation with the FMGT Project Officer prior to design

.2 Cable Tray – Centre Hung Type

.1 Centre hung supported tubular member steel tray system, complete with minimum C-1 load rating and triangular 100mm deep rungs spaced at 150mm centres.

.2 Tray sections joined by two bolt splice connector complete with 12mm diameter threaded steel rod support assembly.

.3 Cable tray to be bottom rung supported nominal 305mm wide.

.4 Rungs to be complete with protective end caps.

.3 Cable Tray – Basket Type

.1 Ceiling steel rod cantruss rack supported 150mm wide wire basket type tray system, 50mm high, and 50mm x 100mm mesh pattern.

.2 Heavy gauge zinc plated carbon steel wire.

.3 Provide radiused drop outs at each cable tray termination (5 positions) and 8 positions above optical table.

.4 Provide 10mm threaded rods for support of cable tray.

.5 Provide plastic protector caps for protection from irregular cuts.

.6 Provide 90 degree horizontal elbows (radiused corners) at all turns.

.4 Installation

.1 Support cabletrough on one or both side(s) depending on if the cabletrough is centre hung or basket tray style.

.2 Cable tray system is not to pass through walls. Penetration at all wall locations to consist of minimum four (4) 50mm conduit sleeves, complete with bushings at each end, and sealed around conduits to maintain integrity of wall separation system. Where penetrations pass through fire rated assemblies, use four (4) 100mm square STI EZ-Path fire stopping sleeves.

.3 Provide bonding of cable tray system using #6 copper bonding conductor connected to building ground system in accordance with Canadian Electrical Code.

.5 Cables In Cabletrough

.1 Lay cables into cabletrough individually using rollers when necessary to pull cables.

.2 Secure cables in cabletrough at 6 m centres, with nylon ties.

.3 Identify cables every 30 m with size 2 nameplates.

.1 General

.1 The University's power distribution and communications campus backbone consists of underground ducts and manholes which provide durability and flexibility during maintenance operations and when new facilities are being constructed.

.2 Consideration shall be given to design new ductbanks that have spare capacity and that provide flexibility for providing services to potential future campus development sites.

.3 Typical ductbanks for the campus will includes concrete encased ducts that carry power, telephone cabling, copper data communications cabling, fiber optic cabling, security cabling and fire alarm cabling.

.2 Cable Protection

.1 Provide plastic marker tape with metallic backing strip above all ductbanks in order to facilitate future locating of ducts.

.3 Direct Burial Of Cables

.1 Direct buried cables are to be avoided as much as possible. When needed, they shall be enveloped in sand bedding and separated as required by code.

.2 Underground cable splices not acceptable.

.3 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.

.4 Cable separation shall be as prescribe by the Canadian Electrical Code.

.4 Cable Installation In Ducts

.1 Installation of cables in ducts is the preferred underground installation. Cabling shall be installed without splices inside ducts

.2 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.3 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

.4 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

.5 After installation of cables, seal duct ends with duct sealing compound.

.5 Markers

.1 Mark cable every 150 m along duct runs and changes in direction.

.2 Mark underground splices.

.3 Where markers are removed to permit installation of additional cables, reinstall existing markers.

.4 Install cedar post type markers.

.5 Lay concrete markers flat and centred over cable with top flush with finish grade.

.6 Field Quality Control

.1 All cables and wires shall be checked for phase rotation, for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

.2 After installing cable but before splicing and terminating, contractors are to perform insulation resistance test with 1000 V megger on each phase conductor.

.3 Provide Consultant with list of test results showing location at which each test was made, circuit tested and result of each test.

.4 Remove and replace entire length of cable if cable fails to meet any of test criteria.

.1 General

.1 The University requires that all main service power distribution be provided with owner's digital information metering. The metering equipment must also be provided with Ethernet port for connection to the campus central monitoring system.

.2 The use of meters can be a valuable tool for monitoring energy consumption and well and monitoring abnormalities such as low/high power factor, harmonic distortion and phase imbalance.

.3 The type of digital metering in this section is typically not suitable for achieving the LEED® measurement and verification credit due to cost. For LEED® measurement and verification, the use of DDC system CT's is acceptable.

.4 Digital metering products shall be Power Measurements 7550 ION Digital Metering System for educational buildings and Power Measurements 7330 ION Digital Metering System for residential buildings. These meters shall measure the following as a minimum:

.1 Meter to display true RMS value of: A – 3-phase current, V – L to L or L to N, 3-phase voltage, kW – kilowatts, kVA – kilovolt amperes, KVAR – kilovolt amperes reactive, Pf – power factor, F – frequency, kWd – kilowatt demand, Ad – amperes demand, kWh – kilowatt hours, programmable LED for energy (kWh) pulsing, V_{uax} - auxiliary input to 120 V AC/DC

.2 Record and store the following information in meter memory: V - max/min at 1 second interval, A – max/min at 1 second interval, F – max/min at 1 second interval, kW – max/min at 1 second interval, Pf – max/min (or kVA max/min) at 1 second interval, kWd – at field programmable intervals of 1 minute to 30 minutes; set at 1 minute, Ad – per kWd.

.5 Connection of Ethernet to campus monitoring system will be provided by University forces.

.1 System Description

.1 The use of central low voltage lighting controls provides the University with energy management capabilities, which enhance its sustainability and reduce greenhouse gas emissions. The central control systems are programmable and tied to the overall campus energy management system.

.2 Central low-voltage controls systems are to be provided with low-voltage relays, switches, photoelectric daylighting sensors, programmable scanners, timeclocks, occupancy sensors, vacancy sensors. The preferred vendor for this system is Douglas Controls.

.3 In video conferencing spaces and spaces which are provided with dimming fluorescent and/or incandescent lighting, central relay controls with low-voltage switching shall be provided in addition to local incandescent or fluorescent dimmer controls.

.4 In classrooms, provide sufficient relays and control switches to accommodate full lighting level, 50% lighting levels, whiteboard illumination, front and back of classroom illumination. The use of luminaires with T5HO fluorescent lamps and stepped ballasts may be appropriate in these spaces.

.5 For LEED® projects, special attention to controllability of lighting must be considered in the control system design.

.2 Dimming Switches

.1 Incandescent dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. Dimmers shall be advanced solid-state circuitry with silicon symmetrical switch, LED push button switch separate from slide to turn dimmer on/off, rated 1000 watts at 120V.

.2 Electronic low voltage dimmers shall be full range dimmers designed to produce 0 to 100% brightness control by means of single slider. They shall be provided with advanced solid-state circuitry with silicon symmetrical switches, LED push button switch separate from slide to turn dimmer on/off. Rated at 425 watts.

.3 Fluorescent line voltage dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. These shall be provided with advanced solid-state circuitry with silicon symmetrical switch and line voltage control interfaces to work with Advance Mark X or Lutron Hi-Lume/Eco-10 T5 and T8 electronic ballasts. Units are to have LED push button switch separate from slide to turn dimmer on/off, rated at 1000 watts at 120V.

.4 Fluorescent low voltage dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. These dimmers shall be advanced solid-state circuitry with silicon symmetrical switch with low voltage (0-10VDC) control signal to interface to Advance Mark VII or Motorola Helios T5 and T8 dimming ballasts.

.5 All dimmers shall have LED push button switch separate from slide to turn dimmer on/off and be complete with 120V power supply where required, have multi-location capability, be equipped with radio/TV interference filter. Accepted manufacturers: Lightolier Sunrise ZP425QE or Lutron Equivalent

.3 Occupancy Sensor Lighting Control

.1 Wall mounted wall switch style PIR occupancy sensors shall have adjustable delayed-off time setting 30 seconds to 30 minutes, and 180° field of view. Product shall be Wattstopper or Sensor Switch equal.

.2 Ceiling mounted PIR occupancy sensors with 120V controls shall have adjustable delayed-off time setting 20 seconds to 15 minutes, 360° field of view, and built-in isolated relay. Product shall be Leviton #ODC0S-I1W or Sensor Switch equal.

.3 Ceiling mounted PIR occupancy sensors with 24Vcontrols shall have adjustable delayed-off time setting 15 seconds to 30 minutes, 360° field of view, 24VDC supply, and built-in isolated relay. Product shall be Wattstopper 'CI' series with range suitable for coverage area and complete with Wattstopper power pack or Sensor Switch equal.

.4 Photosensitive Daylighting Control

.1 Light Level Switch shall be accomplished with indoor ceiling or wall mounted photo conductive cell that switches a circuit for a stepped ballasts off when sufficient daylight is sensed, resulting in a 50% lighting output for the luminaires being controlled Acceptable product: Wattstopper #LS-100 with range suitable for sensing area and complete with Wattstopper power pack.

.5 Exterior Lighting Electronic Time Clock/Photocell Control

.1 Electronic controls for exterior lighting shall consist of a microprocessor controlled low voltage lighting control panel with adjustments and indications built into face of controller. Douglas #WPC-5577 photometric controller. The system shall comprise of two output groups, each with three Douglas Relay outputs (max two 20Arelays per output) and two on/off momentary outputs, a master override buttons built into the control panel, memory backup (7 days), an astronomical clock and a remote photo sensor complete with weatherproof mounting package. Douglas #WPS-5527. Manufacturer: Douglas or Leviton equivalent.

.6 Exterior Lighting Combination Time Clock and Photocell Control

.1 Combination timeclosk and photocell controls shall comprise of recessed mounted adjustable photocell capable of switching 1500 watt load, a 365 day electronic timing control centre complete with photo control feature, a time clock controls 3 circuits independently, complete with manual bypass switch for each circuit and shall be complete with 24 hour reserve power timing mechanism. Manufacturer: Intermatic #ET70415CR or equivalent.

.2 Contactor to switch exterior lights to 40 Amp rated poles as required, electrically held controlled by 120 volts from photocell/time clock. Acceptable manufacturers: Square D, Cutler-Hammer

.7 Low Voltage Lighting Switching System

.1 Low voltage relays shall be mounted in lighting relay cabinet sized to hold relay groups complete with barriers for relays from different sources, sequencer/scanner/scheduler, nodes, modules, controls, and transformer. Each relay cabinet shall be provided with four spare relays minimum. Control relays for new cabinets to be 2 wire, latching, 20A, 1-pole HID type. Douglas #WR-6161 and control relays for KO type cabinets to be 2 wire, latching, 20A, 1-pole KO mount type. Douglas #WR-6221. Provide additional enclosures as required to house new relays.

.2 Transformer shall be 120V primary/24V secondary, 40VA steady draw. Douglas #WR-4075-120. Source of power to transformer shall be from emergency power distribution.

.3 Sequencers/Scanners shall provide programmable Douglas sequencers/scanners #WRS-2224.

.4 Systems shall have network nodes at each lighting control panel for communications between panels using LON Works protocol. Douglas#WNX-2624.

.5 Low voltage switches shall be Douglas low voltage switches complete with mounting brackets and brushed stainless steel cove plates. Provide filler plates in unused button sections. Switches shall be:

.1 2 Wire LED switches Élan Series capable of switching up to minimum (8) eight low oltage relays. Douglas #WR-8600 Series.

.2 2 Wire Mullion type #WN-3851/WN-38012 capable of switching up to minimum four (4) low voltage relays.

.3 2 Wire non-LED switches #WR-8001 capable of switching up to minimum (8) eight low voltage relays.

.4 Programmable data line switches to control groups of relays from anywhere in theW-2000 network (i.e. useful for master switching stations). Douglas #WNS-2300 Series.

.5 Key switches to be Douglas #WRK-8611.

.6 Provide LAN/web-based interface for remote monitoring by UVic Electrical Shop. Douglas Network Manager #WNP-2150. Provide data outlet at lighting controls location in Electrical Room and connect to network manager.

.7 Provide 120V relay connected to local lighting circuit. Connect this relay to a Delay Timer (Douglas #WTS-4181) and connect the delay timer output to the programmable scanner input to indicate power failure. In the event of a power failure, all lighting relays for circuits from Emergency Power Panel to be enabled.

.8 Interior Lighting Time Clock Control

.1 For University residence buildings, a central low-voltage control system may not be required and in such cases, time clock controlling 3 circuits independently, complete with manual bypass switch for each circuit shall be provided. Control of corridor lighting shall be such that emergency night lighting is left un-switched while the remaining lighting is controlled by timer to reduce energy consumption by turning parts of the corridor lighting off at late night hours. Manufacturer: TORK 'W' series.

.2 Interface the corridor lights to turn on when the fire alarm system is activated.

.9 Installation

.1 Locate and install equipment such that it is acceptable to maintenance staff and to keep noise away from teaching spaces.

.2 Provide complete system verification and commissioning including training to University Maintenance staff.

.1 General

.1 Each building exterior lighting system is to be controlled using a single photocell connected to contactors in appropriate quantity to control the lighting system designed by the consultant. Exterior lighting controls shall also include a timeclock and a manual override switch.

.2 Photoelectric Lighting Control

.1 Photocells shall be cabinet wall mounted, capable of switching 1800 watts, 5000 operations at the rated voltage for the lighting system. The system shall also operate satisfactory between a plus or minus 10% voltage range and a temperature range: minus 40 °C to plus 40 °C.

.3 Contactor

.1 Contactors are to be waterproof cabinet mounted capable of switching multiple lamp circuits with total lighting load of 6000 watts.

.1 General Information

.1 Lecture theatres and teaching spaces that require dimming controls or controls using Crestron audio-visual interface shall be provided with a networked lighting control system with DMX communication interface..

.2 Acceptable Manufacturers

.1 Lutron Electronics Co. Inc. or approved equal.

.2 All lighting control equipment - dimming panels, switching panels, dimming ballasts, control panel and controls - shall be manufactured by a single manufacturer.

.3 Panels

.1 The networked lighting control system shall be installed in a panel which is completely pre-wired by the manufacturer. These panels and components are to be U.L.C. or CSA marked as appropriate.

.2 Panels are dedicated feed through type and are not required to contain branch circuit protection. Branch circuit power is obtained from the associated power panel. Refer to the Dimmer/Switch System details.

.3 Panels shall be cooled via free-convection, unaided by fans, and capable of continuous operation to all of these section specifications within an ambient temperature range of $0^{o}C$ ($32^{o}F$) to $40^{o}C$ ($104^{o}F$).

.4 Control Panels shall be able to control a “scene” or “preset” is a specific look or mood created by different lighting zones set at different intensities. A “zone” is one or more lighting circuits, which are controlled together as a group.

.5 In the event that any of the communication lines to any of the dimmer and/or relay panels is interrupted for any reason, the lights controlled by those panels shall remain at their current levels until the interruption is cleared. In the event of a control station failure or interruption of a communication line to any of the controls, the lights controlled by those stations shall remain at their current levels. The control system shall have non-volatile memory backup that can store all system data for one year minimum. It shall not be necessary to reboot the system manually nor use any tape or floppy disk/hard drive to restore the system once power has been restored - system shall automatically return to its previous state. The main processor shall be protected by an integral isolation transformer and shall meet the ANSI/IEEE specification for transient protection.

.6 Control Panel: Lutron Cat. # GRAFIK EYE 3000 System.

.7 Dimmer Panels shall be constructed of dimmer modules with four circuit dimmer modules rated 20A (16A continuous) at 120V per circuit. Module shall be capable of controlling incandescent, tungsten, magnetic low voltage and neon/cold cathode sources directly. Module shall be capable of controlling fluorescent (using dimming ballasts) and electronic low voltage sources (using electronic transformers) directly. All dimmers shall be voltage regulated so that a ±10% variation in line voltage shall cause no more than a ±5% variation in load voltage when dimmer is operating at 40V (5% light output). Filtering shall be provided in each dimmer so that the current rise time shall be at least 350µsec at 50% rated dimmer capacity as measured from 10-90% of the load current waveform at a 90^{o} conduction angle, and at no point rise faster than 30µA/msec. Manufacturers shall note that additional filters may be required to meet this specification. These filters need not be integral to the dimming module, but must be integral to the dimming cabinet.

.4 Controls

.1 The control panel shall have a built-in dry contact A/V interface for monitoring emergency stand-by power status and activating full brightness scene. Lutron Cat. #GRXAV.

.2 Wallstation Controls shall be 2-button remote wall station: for activation of pre-programmed scenes at control panel. Lutron Cat. #SJ2BSL C-Touch remote activator. White finish complete with lockable cover. Wall stations are to be provided on the wall at the front of all lecture theatres and teaching spaces as well as in the lecture booth. Stations shall also be provided at the entrance of lecture and teaching space to provide a preset scene for entering and accessing the space safely.

.3 In large lecture theatres, lighting shall be controlled in banks running front to back and side-to-side. Control of lamps individually in each luminaire is preferred over dimming.

.4 All digital control stations shall be provided with a lockable front hinged cover.

.5 Provide 5-50mm conduit from instructor's console to control booth.

.6 Provide 25mm conduit from instructor's console to motorised shade operators for low-voltage control wiring.

.5 Programming

.1 Pre-programming is to be completed by Lutron prior to delivery.

.2 Final programming of dimmer system is to be done by Lutron once system is substantially complete.

.6 Field Quality Control

.1 Testing and Inspection: complete system is to be tested and inspected in accordance with manufacturers recommendations.

.2 One copy of the test results is to be provided to electrical design Consultant and one copy is to be included in each maintenance manual.

.7 Spare Parts

.1 Two (2) dimmer modules

.8 Field Quality Control

.1 On completion of installation, manufacturer representative shall be notified to carry out site inspection and report any inconsistencies to the [Department Representative] [Consultant].

.1 General

.1 New buildings are to be provided with an indoor unit substation designed to accept 15kV and 25kV primary voltages, however, the primary voltage connected will be 15kV.

.2 Indoor unit substation are to be provided with:

.1 Primary switchgear including two incoming 25kV and one 25kV outgoing SF6 gas filled switches.

.2 Dual bumpless transfer primary switching controls including uninterrupted power supply, programmable logic controller, HMI control interface and outlet jack.

.3 Primary switch contact lights with manual momentary switch located on the primary switch enclosure.

.4 Power Transformer.

.5 Secondary switchgear.

.6 Digital information metering

.3 The unit substation is suitable for use on a 12.47kV/25kV, 3-phase, 3-wire, 60 Hz grounded system with a 3-phase fault level of 5,000 A.

.4 The high voltage unit substation consists of an assembly of high voltage switchgear, transformer, bus bar, and all equipment and connections necessary to make a complete installation.

.5 Provide DANGER – HIGH VOLTAGE signs for all high voltage switchgear cubicle doors and transformer enclosures.

.6 Provide adequate lifting lugs for transformer as well as all cubicle sections.

.7 Install all unit substation components and auxiliary equipment in sheet steel cubicles.

.8 Cubicles shall be of formed code-gauge sheet steel construction with all panel edges turned into the framework. All panels (including side panels) not installed against walls or adjacent cubicles shall be hinged with “hold down” bolts. All other panels shall be welded in place. Enclosure panels shall be well braced and reinforced to prevent vibration.

.9 Provide keyless porcelain lamps in HV fused disconnect switch and transformer cubicles complete with a labelled flush-mounted switch on the cubicle door of the main switch.

.10 All panels on which relays, meters, meter switches, metering test blocks, controls, and other similar apparatus are mounted shall be hinged to give ready access to equipment wiring when the door is opened. These panels shall be completely barriered from high voltage cubicles.

.11 The unit substation shall be assembled by a single manufacturer regularly engaged in the fabrication of such equipment and shall be completely shop assembled and tested prior to delivery to the site.

.12 Interlocks shall be provided as shown on the drawings.

.13 Provide continuous lamicoid or neatly painted mimic single line diagram fastened to the front of switchgear and extending from cubicle to cubicle.

.14 A, B, and C phase designation shall be made obvious in the back of each cell.

.2 Quality Assurance

.1 Submit ten (10) copies of production test results to [Departmental Representative] [Consultant]. Do not ship equipment until test results have been accepted by [Departmental Representative] [Consultant].

.3 Extra Materials

.1 Include three (3) fuse refills for primary switched.

.4 Indoor Unit Substation

.1 Primary switchgear: indoor, 25 kV, 600 A, 3 phase, 4 wire, interrupting capacity 250 MVA, symmetrical, BIL 95 kV.

.2 Interior mounted metal-enclosed unit substation.

.3 Provide a 15kV class interior mounted metal-enclosed unit substation, c/w provision for dual radial feeders.

.4 All sections, high voltage and low voltage, when bolted together shall present a unified aesthetic appearance.

.5 The unit substation shall be adequately and naturally ventilated (louvers on the substation roof are not permitted). Louver sizes for the core and coil assembly shall be as recommended by the transformer manufacturer.

.5 High Voltage Switchgear Cubicles

.1 The high voltage switchgear cubicles shall include a fixed disconnect switch and accessory components, all completely factory assembled and type tested.

.2 The cubicles shall be complete with appropriately sized, CSA-approved, split support for high voltage cables and shall be suitable for the installation of stress cone cable terminations specified elsewhere. Details of the terminations shall be provided on submission of shop drawings. Terminals shall be pre-drilled holes to accept one-hole crimp-on type compression lugs.

.3 Service entrance cubicle shall have provision for padlocking by Owner.

.4 The minimum rating of the integrated assembly shall be as follows:

.1 Voltage Class: 12.47/25 kV
.2 BIL: 95 kV
.3 Minimum short circuit capacity: 250 MVA at 25kV
(symmetrical for all current carrying components)
.4 60 Hz withstand 55 kV for circuit breakers
.5 Main bus, continuous current: 600 A

.5 Bus bar supports shall be NEMA BIL rated epoxy or porcelain insulators. All bus bars shall be designed to withstand thermal and electromagnetic stresses at the specified ratings and shall be tin-plated copper construction.

.6 Nameplates shall be permanently fixed to the exterior of each enclosure indicating:

.1 Manufacturer's name
.2 Switchgear kV
.3 Switchgear BIL
.4 Switchgear maximum short circuit MVA
.5 Switchgear momentary amperes
.6 Switchgear fault closing amperes
.7 Switchgear continuous bus amperes
.8 Switchgear year of manufacture
.9 Switchgear drawing numbers
.10 Circuit breaker catalogue number

.7 The high voltage switchgear shall be designed, manufactured and tested in accordance with CSA 22.2 No. 31 and shall bear CSA approval label and meet the requirements of the local Inspection Authority.

.6 Bus Bars

.1 Three phase and full capacity neutral bare busbars, continuous current rating 600 A extending full width of multi-cubicle switchboard suitably supported on insulators.

.2 Main connections between busbars, major switching components of continuous current rating to match major switching components.

.3 High conductivity copper for busbars and main connections.

.4 Brace busbar system to withstand stresses resulting from short circuit currents specified.

.5 Tin surfaced joints, secured with non-corrosive bolts and washers, tightened with torque wrench in accordance with manufacturer's recommendations.

.6 Identify phases of busbars by suitable marking.

.7 Busbar connectors when switchgear shipped in more than one section.

.7 Grounding

.1 Copper ground bus not smaller than 50 x 6 mm extending full width of multi-cubicle switchboard and situated at bottom.

.2 Lugs at each end for size 4/0 AWG grounding cable.

.3 Bond non-current carrying parts, including switchgear framework, enclosure and bases to ground bus.

.8 Dual Primary Load Interrupter Switches

.1 15k/25V, 600A continuous, 3-pole, gang-operated, SF6 gas filled, non-automatic type. All arcing accompanying interruption shall be contained within completely enclosed interrupting units. The units shall be mechanically operated by and interlocked with the interrupter blades so as not to open until the blades have cleared the main contacts by a distance greater than the external flash over distance across the interrupting unit. Manual remote operating HMI interface permitting operation of switches from a safe distance is required.

.2 Interrupting rating to match that of switchgear.

.3 Inspection windows shall be of wired safety glass or laminated heat-tempered safety-plate glass, gasket mounted at the front. Windows shall be so located that the open and closed position of the switches can be readily seen from the exterior of the enclosure.

.4 Live-line neon-type indicating lights shall be connected on each phase of the incoming cubicles. Indicating lights shall be connected to the line side of the disconnect switch and shall be visible through the inspection window.

.5 Operating handles shall be externally mounted and non-removable and shall provide for latching and padlocking in open positions. They shall swing in a vertical plane normal to the front face of the switchgear.

.6 Provide two Form C contacts on each load break switch. Wire from one contact on each switch to two status inputs on the digital metering system (two separate status points for each contact). The contacts will be wired to indicate which feeder is currently energized and in conjunction with primary parallel transfer system.

.7 Provide Kirk key type interlocking as shown on the drawings with two keys and three locks as shown. Provide full operating instructions as indicated on drawings inscribed on lamicoid labels and installed at the operating handle location of each load break switch.

.8 Provide inspection luminaires to observe the open/closed status of load break switch contacts. Luminaires shall have keyless porcelain lamp holders, complete with 100W rough service lamp and a labelled flushmounted switch on the cubicle door of the load break switch.

.9 Dual Primary Parallel Transfer System

.1 Provide a complete dual primary parallel transfer switch system as indicated on drawings and specified herein.

.2 Key Interlock Synchronization Control Station

.3 Provide control station as shown on the drawings and completely manufactured, pre-wired, and tested at the factory. Submit factory test reports to the Consultant.

.4 The Synchronizing Check relay shall be verified by the independent testing agency for phase angle allowance, and voltage difference. This testing will be required to meet IEEE / ANSI / NETA standards. The standard of acceptance shall be the power system simulator microprocessor based relay test set known as the Doble system. Sync-check relays shall be Basler BE1-25 M1E-A6P-N4S3F.

.5 The programmable relay shall be proven for all required functions and tested, commissioned, and witness verified, to the satisfaction of the Consultant and electrical maintenance staff. Programmable relay shall be Moeller “Easy” 618-AC-RC.

.6 Provide solenoid operated key release designated as ”K1” on the drawings, complete with 1 N.O. and 1 N.C. auxiliary contacts.

.7 Provide test switches as shown on the drawings. Test switches shall be ABB/Westinghouse Flexitest Type FT-1 or equivalent.

.8 Provide adjustable volume, selectable tone alarm horn, Edwards 5540B or equal.

.9 Provide a locking handle for the control station front door. Key for the front door handle shall be identical to substation.

.10 The manufacturing and pre-wiring of control station to be of matching quality and appearance to unit substation equipment.

.11 Potential Transformers:

.1 Potential transformers (PTs) shall comply with the latest edition of CAN3-C13 and IEEE C57.13.

.2 Provide potential transformers of the number shown on drawings complete with heavy gauge steel draw-out assembly, disconnecting and grounding means, and primary and secondary fuses. The potential transformers shall have the following characteristics:

.3 Insulation: 15 kV, 95 kV BIL

.4 Ratio: as shown on drawings

.5 Continuous thermal rating (30°C rise above 55°C ambient): minimum 500VA

.6 CSA accuracy class: 0.3 WXYZ, 0.6 ZZ

.7 The steel draw-out assembly shall typically include all the standard features of the switchboard manufacturer’s 15 kV class PT drawer, complete with pre-drilled mounting provision for a second PT core. The drawer shall be a compact assembly designed to fit into the switchboard cubicle.

.8 PT drawers shall be completely manufactured, pre-wired, and tested at the factory. Submit factory test reports to the Consultant.

.9 Provide warning signs on PT draw-out assemblies.

.10 Provide solid bus bar taps complete with bus bracing and support insulators from the switchgear main bus to the PT-1 and PT-2 high voltage stab connectors. Cable taps

are not acceptable unless factory test results are submitted for Consultant's approval, showing compliance with BIL rating of 95 kV crest.

.12 Switchboard and Control Station Wiring:

.1 Provide the monitoring and control devices complete with all necessary wiring, fuses, fuse blocks, and terminal blocks for external and internal connections. Identify all terminals clearly with the appropriate control circuit wire numbers.

.2 All control wiring to shall be Type TBS or SIS and shall conform to CSA C22.2 No. 31. Provide wire numbering sleeves for all conductors.

.13 Relay Programming

.1 Provide two non-volatile memory cards EASY-M-16K, for use with the Moeller programmable relay. One card will be used to load a standardized control program. The second card shall be a spare. Program the relay as follows:

.2 Relay starts in RUN mode when the power is switched on (to ride through momentary power interruption when switching CS-1).

.3 If control power to the relay is on, and I1 is not turned on within 1 minute of I2 being turned on, initiate alarm; otherwise, turn on Q1 to proceed with paralleling.

.4 If control power to the relay is on, and I2 is on, and I4 and I5 are both off continuously for more than 5 minutes, initiate alarm.

.5 If I1 is on and I2 is on, initiate alarm.

.6 If I2 remains on for more than 5 minutes, initiate alarm.

.7 Alarm: Flash Q2, turn on Q3, and turn on Q4 to sound the horn.

.8 Horn Silence: If I3 is turned on momentarily, turn off Q4 and check all "initiate alarm" conditions listed above. If any alarm condition remains, continue flashing Q2, even though the horn is turned off. If alarm conditions have all cleared, turn off Q2.

.9 Submit full program printout and ladder-type logic circuit diagram for Consultant's approval.

.10 Upon receiving the Consultant's approval, store the circuit diagram, as well as all the parameter settings for the circuit diagram, and all the system settings in both memory cards.

.11 Provide a 4 hour training session for UVic personnel in the use and programming of the relays.

.12 Demonstrate, during the training session, how to program the circuit diagram and how to transfer the program to relays.

.13 Hand over both memory cards to UVic upon completion of working session.

.14 Field Tests

.1 Perform tests in accordance with Section 26 05 01.

.2 Inspect and test load break switches as follows:

.3 Inspect and check quick-make, quick-break operation

.4 Check contact resistance ("millivolt drop" test)

.5 Check operation of all auxiliary contacts

.6 Test all interlocking procedures

.7 Fully test the correct and safe operation of the parallel transfer system.

.8 The entire system and its operation shall be demonstrated with operational training of the procedures, calibrations, and safety interlocks to the electrical maintenance staff. Allow for minimum two training sessions for the staff.

.10 Fusible Load Interrupter Switch

.1 3-pole, gang-operated, 25kV, 600 A continual, non-automatic load interrupter switch. Operating handle externally mounted and non-removable, and provides for latching and padlocking in open position. It shall swing in a vertical plan normal to the front face of the switchgear. Provide Kirk key type interlocking as shown on the drawings. Include full operating instructions on a nameplate mounted above the opening handle of each unit.

.2 Continuous full load rating: 600 A, interrupting rating: 20 kA symmetrical.

.3 Voltage rating: 25 kV.

.4 Interphase barriers.

.1 Inspection window mounted at the front. Window located so that the open and closed position of the switch can be readily seen from the exterior of the enclosure.

.5 Interrupting rating that of switchgear.

.6 Fixed operating handle.

.7 Provide non-renewable current-limiting type fuses. Provide 3 spare fuses of the same type and rating, and install in a separate metal cabinet in the electrical room.

.11 Load Break Switch

.1 Indoor load break switch with integral fuse holders.

.2 Ratings:

Voltage:	7.2/12.5 kV
BIL:	95 kV
Continuous current rating:	600 Amps
Interrupting Capacity:	250 MVA
Fault closing (RMS):	20,000 Amps
Momentary rating (RMS):	40,000 Amps

.2 Switches:

.1 Gang operated with manual actuator that can be locked in the "off" position and position indicator. Phase to phase and phase to ground insulating barriers. Energized components to be supported from the mounting frame on porcelain insulators. Provide current-limiting fuses equipped with striker pins to give blown fuse protection (failure of one fuse to open other phases). Provide three spare fuses mounted at the cubicle.

.4 Trip Power: Provide adequate capacitor power supply for automatic tripping of the load break switch.

.5 Trip Relays: Ground fault on secondary side of transformer. Thermal relay to trip on high transformer temperature.

.12 Main Dry Type Transformer

.1 Refer to Section 26 12 16 Dry Type, Medium Voltage Transformers**.**

.13 Secondary Switchgear

.1 Secondary switchgear: indoor, 120/208V, [__] A, 3-phase, wye connected, maximum short circuit current [42] kA, manufactured to CSA C22.2 No. 31.

.2 Matches primary switchgear enclosure construction and outline exactly.

.3 Cubicles contain:

.4 Digital metering system complete with current transformers.

.5 Distribution circuit breakers.

.6 Copper bus including double capacity neutral from transformer to distribution cubicles including vertical buses. Bus ratings as per Drawings.

.7 The switchboard has provision for all outgoing feeder cables as well as allowance for future cables.

.8 Distribution Circuit Breakers:

Moulded-case, fixed mount with bus extensions for rear connection.

[42] kA 1.C. min.

Adjustable thermal-magnetic trip elements or adjustable electronic trip units per drawings. Tripping characteristics shall be set per the coordination study requirements.

.9 Digital Metering System: Refer to Section 26 09 02 Metering and Switchboard Instruments

.14 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 01 - Electrical General Requirements.

.2 Nameplates: Switchgear designation: label - white plate, black letters, 30mm high lettering, engraved Main 12.5 kV Switchgear, L.R.C.

.15 Coordination Study

.1 Provide a Computer Programmed System Coordination Study using ETAP software, prepared on time characteristic curves plotted on KE form 485258 log graph paper, showing the system selectivity from the main substation down to the largest low voltage breaker on the main secondary switchboard for this project. The study will be completed and stamped by a professional engineer registered in BC. The study shall include the following:

.2 Supply authority's relays or fuses protecting the incoming service.

.3 Main and feeder protective devices necessary to insure coordination.

.4 Main feeder cable damage curve.

.5 Transformer single and three phase thermal damage curve.

.6 Symmetrical and asymmetrical fault current calculations will be completed and recorded, verifying protection of various elements of the system.

.7 A summation chart showing all ratings and settings with reference to the appropriate curve.

.8 Recommendations and conclusions of the effectiveness of the coordination study.

.9 Protective devices associated with the largest motor.

.10 Protective devices associated with the standby emergency power plant.

.11 The drawings will not be hand drawn but shall be of computer graphics quality.

.16 Acceptable Manufacturers

.12 Subject to full compliance with the requirements of these Specifications, equipment supplied by the following distributors/manufacturers is acceptable:

.1 Siemens Electric

.2 Schneider Group

.3 Cutler Hammer

.1 General

.1 Dry type medium voltage transformers shall be designed and included in the primary unit substation. The transformer shall be rated for 115,00kV and 25,000kV primary but connected to and fused for 15,000kV.

.2 The unit shall be kept heated and dry to prevent moisture and dampness from penetrating transformer.

.2 Shop Drawings

.1 Shop drawings shall include:

.1 Dimensioned drawing showing enclosure, mounting devices, terminals, taps, internal and external component layout.

.2 Technical data shall include kVA rating, primary and secondary voltages, frequency, three phase, polarity or angular displacement, full load efficiency, regulation at unity pf, BIL, insulation type, and sound rating.

.3 Control Submittals

.1 Submit to [Department Representative] [Consultant] [6] copies of standard factory test certificates of each transformer and type test of each transformer in accordance with CSA C9.

.4 Transformer Characteristics

.1 Transformer shall be as follows:

.1 Type: 3-phase, dry type natural air ventilated, ANN (T type or Scott connection type not acceptable).

.2 Rating: [300] kVA

.3 Voltages: Primary: 25000 V delta.

.4 Secondary: 120/208 V wye, solidly grounded.

.5 Frequency: 60 Hz

.6 Coil Winding Material: Copper

.7 Insulation Class: Class H (Class 220 system) non-hygroscopic, VIP type

.8 Impedance: Approximately 6.0% at 135°C.

.9 Voltage Taps: 4 full capacity taps, 2½% each, 2 above and 2 below rated voltage.

.10 Sound Level: Maximum 68 dB when installed on vibration isolators within enclosure at ANN rating.

.11 Voltage Class: 15 kV

.12 BIL: 95 kV

.13 Max. Full Load Temperature Rise: 115°C average temperature rise for the windings measured by resistance when operating continuously at full load in 40°C maximum ambient.

.14 Max. Magnetizing Inrush Current: 12 times rated full load current.

.2 Provide a ventilated formed sheet-steel enclosure with bolted removable sides compatible with enclosures of adjacent cubicles. Enclosure panels shall be well braced and reinforced to prevent vibration. Provide transformer with “coil-face taps” behind a hinged locked door key-interlocked with the transformer primary disconnecting device such that it is impossible to open the door with the switch closed. Identify the door as to function and affix thereto a nameplate with detailed connection diagram, key-interlocks, and instructions for tap-changing.

.3 Provide for transformer an enclosure-mounted thermometer and a thermostat having its temperature-sensing element affixed to the core and coil assembly in such a way as to best

sense the winding temperature. Remote current actuated sensing devices are not acceptable. Set the thermostat to operate main fusible load interrupter shunt trip mechanism and a remote bell when the temperature reaches 100% of this rating. Wire via identified terminals in the control cubicle section of the low voltage switchboard for extension by others to remote Building Alarm Panel/Building Automation System.

.4 Insulation panels on the interior of transformer enclosures shall be provided if necessary to maintain electrical clearances.

.5 Provide flexible connections between transformer and high voltage and low voltage bus bars.

.6 Each transformer shall have vibration dampers placed between core/coil and structural members.

.7 Provide terminal board, tap changing links, and suitable solderless connections.

.8 Mount transformer core and coil assemblies on vibration isolators and restrain with Mason Industries Type 'Z1011' snubbers.

.9 Special additional features shall be as follows:

.1 All terminations shall use a minimum of 2 bolts.

.2 All connections shall be made from flat bus bar for solid bolting (clamped round rod not allowed).

.3 Solid material shall be used for coil end blocks.

.4 All bus bars shall be fully insulated.

.5 All bus bar mounting hardware shall include Belleville washers.

.6 All non-conductor mounting shall have 2 lock nuts.

.10 Transformers shall be supplied with a copper grounding pad at the base.

.11 Nameplate shall be installed on transformer clearly showing the following information:

.1 Manufacturer's name.

.2 Transformer serial number and year of manufacture.

.3 Rated kVA.

.4 Rated high and low voltage levels.

.5 Rated frequency.

.6 Connection diagram and physical terminal markings.

.7 Percentage impedance at rated voltage.

.8 Temperature rise (or total temperature).

.9 Insulation class.

.10 HV BIL.

.11 Voltage tap data.

.12 Total weight of transformer.

.12 Transformer shall be manufactured and tested (production tests) in accordance with CSA C9-M1981 incorporating modifications as specified herein. Submit production test reports.

.13 Transformer shall be manufactured by Square D, Hammond Manufacturing Co. Ltd., Canadian General Electric Co. Ltd., ABB Inc., Skyway, Magnetek-Polygon, Tracon Engineering, or approved equal subject to compliance with these specifications.

.14 Transformer manufacturers listed above as well as all manufacturers requesting approval during the tender period must submit the following information pertaining to total losses (iron, copper, and other miscellaneous losses) no later than 10 days prior to tender closing. The figures shall include transformer enclosure losses:

.1 No load.

.2 25% load.
.3 50% load.
.4 75% load.
.5 100% load.

.5 Enclosure

.1 Fabricated from sheet steel.
.2 Bolted removable panels for access to tap connections, enclosed terminals [fan brackets] [fans] [other accessories].
.3 Conductor entry:
.1 Knockouts.
.2 Potheads.
.3 Junction boxes.
.4 Bushings.
.5 Clamping rings.
.6 Entry for [busbars] [cable].

.6 Accessories

.1 Winding temperature detector relay and sensing elements two sets of SPDT contacts.
.2 Wiring and terminal box for protective devices.
.3 Digital type winding temperature indicator with alarm contacts.
.4 Fans for forced air cooling, [___] V, [___] phase, 60Hz, with thermostat control.
.5 Grounding terminal: inside of enclosure.

.7 Field Quality Control

.6 Energize transformers and apply incremental loads:
.1 0% for 4 hours.
.2 10% for next 1 hour.
.3 25% for next 2 hours.
.4 50% for next 3 hours.
.5 Full load.
.6 At each load change, check temperatures ambient, enclosure and winding.
.7 Adjust cooling fan controls if required.

.1 General

.1 Materials and installation for low voltage switchgear for controlling relatively large loads - 2000 A or larger.

.2 Provide and install a complete distribution centre as indicated on the plans.

.3 The available space is restrictive, and the electrical equipment has been designed to accommodate this. All proposed manufacturers shall take particular note of this when pricing equipment, and include for any variations to their standard equipment in the tender sum.

.4 This section of specification includes main distribution centres, and fused disconnects in main distribution circuits

.2 Shop Drawings & Product Data

.1 Submit shop drawings and product data that indicates:

- .1 Floor anchoring method and foundation template.
- .2 Dimensioned cable entry and exit locations.
- .3 Dimensioned position and size of bus.
- .4 Overall length, height and depth of complete switchgear.
- .5 Dimensioned layout of internal and front panel mounted components.

.2 Include time-current characteristic curves for circuit breakers and fuses rated 250A and higher.

.3 Storage And Protection

.1 Store switchgear on site in protected, dry location. Cover with plastic to keep off dust.

.2 Provide energized strip heater in each cell to maintain dry condition during storage.

.4 Extra Materials

.1 Provide maintenance materials including:

- .1 3 fuses for each type above 600 A.
- .2 6 fuses for each type up to and including 600 A.

.5 Rating

.1 Secondary switchgear: indoor, [347/600] [120/208] V, 3 phase, 4 wire, 60 Hz, minimum short circuit capacity [65] kA (rms symmetrical), in amperage capacity sized to Canadian electrical Code plus a 25% spare capacity.

.6 Enclosure

.1 Main incoming section to contain:

- .1 Moulded case circuit breaker sized as indicated.
- .2 Digital metering.

.2 Distribution sections to contain:

- .1 Moulded case circuit breakers sized as indicated.
- .2 Copper bus, from main section to distribution sections including vertical bussing.

.3 Metal enclosed, free standing, floor mounted, dead front, indoor, CSA Enclosure 1 [2] cubicle unit.

.4 Access from front [and rear].

.5 Steel channel sills for base mounting in single length common to multi-cubicle switchboard.

.6 Interior lighting: 100 W lamp in porcelain lampholder in each cubicle with externally mounted switch and pilot light.

.7 Receptacle: 120 V, single phase, 60 Hz, duplex, U-ground, in each cubicle.

.7 Busbars

.1 Three phase and full capacity neutral bare busbars, continuous current rating self-cooled, extending full width of cubicles in the switch board, suitably supported on insulators.

.2 Main connections between bus and major switching components to have continuous current rating to match major switching components.

.3 Busbars and main connections: 99.3% conductivity copper.

.4 Provision for extension of bus on both sides of unit without need for further drilling or preparation in field.

.5 Tin plated joints, secured with non-corrosive bolts and Belleville washers.

.6 Identify phases of busbars by suitable marking.

.7 Busbar connectors, when switchboard shipped in more than one section.

.8 Grounding

.1 Copper ground bus not smaller than 50 x 6 mm extending full width of cubicles inside the switchboard and situated at bottom.

.2 Copper lugs at each end for size #4/0 grounding cable, connect to main ground bus.

.9 Ground Fault Unit

.1 For main breakers rated at 1000 amps, 347/600 volt or higher, or 2000 amps at 120/208 volt or higher, provide ground fault breaker unit.

.10 Moulded Case Circuit Breakers

.1 Rated for fault as indicated on one line.

.2 Common-trip breakers with single handle and trip mechanism for multipole applications.

.3 Magnetic instantaneous trip elements in circuit breakers, 400A and above, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-10 times current rating.

.4 Manufacturer: Square D, Cutler-Hammer.

.11 Moulded Case Circuit Breakers – Current Limiting

.1 Rated for fault as indicated on one line.

.2 Common-trip breakers with single handle and trip mechanism for multipole applications

.3 Breakers up to 225 Amp to limit fault (RMS Symmetrical Amps) to 10,000A at 51,600 Amp input.

.4 Manufacturer: Square D, Cutler-Hammer.

.12 Fusible Disconnects And Fuses

.1 Disconnect switches shall be heavy duty, lockable position, complete with HRC fuses.

.2 Disconnects shall have quick make/quick break mechanism.

.3 Disconnects shall be adapted for HRC fuses.

.4 Manufacturer: Square D, Cutler-Hammer.

.13 Fuses

.1 All fuses shall be designed for special fault limiting.

.2 Fuse sizes 30A - 350 Amp shall be bus low peak LPN-RK1 (or equivalent fuse providing equal or better fault limiting characteristics).

.3 Fuse sizes 400 - 600 Amp shall be bus T-tron type JJN (or equivalent fuse providing equal or better fault limiting characteristics).

.14 Equipment Identification

.1 Nameplates:

.1 White plate, black letters, size 7.

.2 Complete switchgear labelled: "[120] [208] [600] V".

.3 Main cubicle labelled: "Main Breaker" or "Main Switch".

.4 Branch disconnects labelled: "Feeder Panel ____"

.1 General Information

.1 This section applies to service entrance rated service equipment and buildings not equipped with a unit substations.

.2 Service Entrance Board

.1 Service entrance board shall have cubicles, free standing, dead front, size as required. Frame and structure of enclosure and all components to be secured to earthquake standards.

.2 These boards shall have a barrier metering section from adjoining sections and be compliant with B.C. Hydro metering standards.

.3 Bus bars and main connections shall be copper.

.3 Moulded Case Circuit Breakers

.1 Fully rated for available fault.

.2 Common-trip breakers with single handle and trip mechanism for multipole applications.

.3 Magnetic instantaneous trip elements in circuit breakers, 400A and above, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-10 times current rating.

.4 Moulded Case Circuit Breakers - Current Limiting

.1 Fully rated for available fault.

.2 Common-trip breakers with single handle and trip mechanism for multipole applications.

.3 Breakers up to 225 Amp to limit fault (RMS Symmetrical Amps) to 10,000A at 51,600 Amp input.

.5 Fusible Disconnects

.1 Disconnect switches shall be heavy duty, lockable position, complete with HRC fuses, quick make/quick break mechanism, adapted for HRC fuses.

.6 Fuses

.1 All fuses shall be designed for special fault limiting.

.2 Fuse sizes 30A - 350 Amp shall be bus low peak LPN-RK1 (or equivalent fuse providing equal or better fault limiting characteristics).

.3 Fuse sizes 400 - 600 Amp shall be bus T-tron type JJN (or equivalent fuse providing equal or better fault limiting characteristics).

.7 Grounding

.1 Copper ground bus extending full width of cubicles and located at bottom.

.2 Copper lugs at each end for size #4/0 grounding cable, connect to main ground bus.

.8 Equipment Identification

.1 Provide equipment identification nameplates with:

.1 White plate, black letters, size 30mm lettering.

.2 Complete board labelled: "120/208 600V".

.3 Branch disconnects labelled: "Feeder Panel ____"

.9 Manufacturers

.1 Manufacturer: Square D, Cutler-Hammer, Seimens.

.1 General Information

.1 Panels may be recessed in walls in corridors of building, however, it is preferable to have such equipment located in electrical rooms and closets.

.2 All panels shall have hinged lockable front doors.

.2 References

.1 Canadian Standards Association (CSA International)

.1 CSA C22.2No.29 latest edition, Panelboards and enclosed Panelboards.

.3 Panelboards

.1 Panelboards: to CSA C22.2No.29 and product of one manufacturer.

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 [250] [600] V panelboards: bus and breakers rated for A (symmetrical) interrupting capacity as required.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards shall be provided with minimum 50% spare capacity for future breaker additions..

.5 Two keys for each panelboard and key panelboards alike.

.6 Copper bus with neutral of same ampere rating as mains.

.7 Mains: suitable for bolt-on breakers.

.8 Trim with concealed front bolts and hinges.

.9 Trim and door finish: baked grey enamel.

.4 Breakers

.1 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.2 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

.3 Lock-on devices for fire alarm, clock outlet, emergency lighting, door supervisory controls, intercom systems, stairway lighting, exit and night light circuits.

.5 Equipment Identification

.1 Provide equipment identification nameplate for each panelboard size 4 engraved.

.2 Nameplate for each circuit in distribution panelboards size 2 engraved.

.3 Complete circuit directory with typewritten legend showing location and load of each circuit.

.6 Installation

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.

.3 Mount panelboards to height to meet CSA-22.1 breaker mounting height requirements.

.4 Connect loads to circuits.

.5 Connect neutral conductors to common neutral bus with respective neutral identified.

.6 Provide written directory cards indicating devices and equipment being fed, including the room number.

.1 General Information

.1 Group motor starters in mechanical or electrical rooms in a motor control centre. Obtain permission from FMGT if loose starters have to be used.

.2 Motor control centre are to be install on a concrete housekeeping pad..

.2 Shop Drawings

.1 Submit shop drawings that indicate:

.1 Outline dimensions

.2 Configuration of identified compartments.

.3 Floor anchoring method and dimensioned foundation template.

.4 Cable entry and exit locations.

.5 Dimensioned position and size of busbars and details of provision for future extension.

.6 Schematic and wiring diagrams.

.3 Supply Characteristics

[347/600] [120-/208] V, 60Hz, wye connected, 3 phase, 4 wire, grounded neutral.

.4 Vertical Section Construction

.1 Independent vertical sections fabricated from rolled flat steel sheets bolted together to form rigid, completely enclosed assembly.

.2 Each vertical section divided into compartment units, minimum 305 mm high, or as indicated.

.3 Each unit to have complete top and bottom steel plate for isolation between units.

.4 Horizontal wireways, equipped with cable supports, across top and bottom, extending full width of motor control centre, isolated from busbars by steel barriers.

.5 Vertical wireways c/w doors for load and control conductors extending full height of vertical sections, and equipped with cable tie supports. Installation wiring to units accessible with doors open and units in place.

.6 Openings, with removable coverplates, in side of vertical sections for horizontal wiring between sections.

.7 Incoming cables to enter at [top] [bottom] with terminals.

.8 Provision for outgoing cables to exit via top or bottom with terminals.

.9 Removable lifting means.

.10 Provision for future extension of both ends of motor control centre including busbars without need for further drilling, cutting or preparation in field.

.11 Divide assembly for shipment to site, complete with hardware and instructions for re-assembly, as recommended by the manufacturer.

.5 Sills

.1 Continuous 75 mm channel iron floor sills for mounting bases with 19 mm diameter holes for bolts.

.6 Busbars

.1 Main horizontal and branch vertical, three phase and neutral high conductivity tin plated copper busbars in separate compartment [bare] self-cooled, extending entire width and

height of motor control centre, supported on insulators and rated as required using standard products.

.2 Branch vertical busbars for distribution of power to units in vertical sections.

.3 No other cables, wires, equipment in main and branch busbar compartments.

.4 Brace buswork to withstand effects of symmetrical short-circuit current as required.

.5 Bus supports: with high dielectric strength, low moisture absorption, high impact material and long creepage surface designed to discourage collection of dust.

.7 Ground Bus

.1 Copper ground bus extending entire width of motor control centre.

.2 Vertical ground bus strap, full height of section, tied to horizontal ground bus, engaged by plug-in unit ground stab.

.8 Motor Starters And Devices

.3 Refer to Section 26 29 10 Motor Starters to 600 V.

.9 Starter Unit Compartments

.1 Units EEMAC size 5 and smaller, circuit breaker units 225A and smaller, plug-in type with self-disconnect. Guide rail supports for units to ensure that stabs make positive contact with vertical bus. Provision for units to be installed or removed, off load, while buses energized.

.2 Unit mounting:

.1 Engaged position - unit stabbed into vertical bus.

.2 Withdrawn position - unit isolated from vertical bus but supported by structure. [Terminal block accessible for electrical testing of starter].

.3 Provision for positive latching in either engaged or withdrawn position and padlocking in withdrawn position.

.4 Stab-on connectors free floating tin plated clips, self-aligning, backed up with steel springs.

.3 External operating handle of circuit switch interlocked with door to prevent door opening with switch in "on" position. Provision for [3] padlocks to lock operating handle in "off" position and lock door closed.

.4 Hinge unit doors on same side.

.5 Overload relays manually reset from front with door closed.

.6 Pushbuttons and indicating lights mounted on door front.

.7 Devices and components by one manufacturer to facilitate maintenance.

.8 Pull-apart terminal blocks for power and control to allow removal of starter units without removal of field wiring.

.10 Equipment Identification

.1 Motor control centre main nameplate: size No. 7, engraved “MCC ##” on the first line, “[347/600V] [120/208V] 3 phase, 4 wire” on the second line.

Individual compartment nameplates: size No. [5], engraved as indicated.

.1 General Information

.1 Indoor aluminum service poles are to be used to provide power and communications outlets to work stations and equipment in open spaces where floor boxes are not acceptable.

.2 Indoor Service Poles

.1 Indoor service poles: extruded aluminum sections to ASTM B317, brushed finish.

.2 Nominal length of poles: from floor to ceiling, with plus or minus 50 mm adjustment. Total adjustment: 100 mm. Refer to Architectural Drawings and Elevations for ceiling heights.

.3 Service poles approximately 100 mm square with snap-on covers to provide access to wiring without removing unit. Barrier to isolate power from communication systems.

.4 Service poles with fastening accessories at top of pole to secure to inverted T-Bar ceiling using set screws to permit relocation. Flange at ceiling to conceal wiring.

.5 Metal sleeve at bottom of pole to conceal vertical adjustment. Removable and Reversible grip-tight devices for carpet and tile floors to prevent movement of poles.

.6 Service poles with prewired duplex receptacles as indicated, four knockout holes for communication. [Cord with moulded set extending 3 m from top of pole.] [3TW No.12 AWG leads terminating in utility box with cover, mounted at top of pole].

.1 General Information

.1 Switches, receptacles, wiring devices, cover plates and their installation is covered under this section.

.2 In general, wiring devices are to be specification grade throughout with the exception of residential buildings where residential grade devices are acceptable.

.2 Switches

.1 15 A, 120 V, single pole, double pole, three-way, four-way switches, as indicated, to: CSA-C22.2 No.55 and CSA-C22.2 No.111.

.2 Manually-operated general purpose ac switches with terminal holes approved for No. 10 AWG wire, silver alloy contacts, urea or melamine moulding for parts subject to carbon tracking, suitable for back and side wiring and white toggle.

.3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

.3 Receptacles

.1 Provide a minimum of one general purpose maintenance receptacle outlet at 15m intervals in corridors and common spaces. Outlets are to be CSA 5-20RA type fed from 20A-1P branch circuit breakers. Feed no more than eight (8) general maintenance outlets from a single branch circuit.

.2 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with white urea moulded housing, suitable for No. 10 AWG for back and side wiring, break-off links for use as split receptacles, eight back wired entrances, four side wiring screws, and triple wipe contacts and rivetted grounding contacts.

.3 Duplex receptacles in corridors and for general maintenance, CSA type 5-20 RA, 125 V, 15 A, U ground, t-slot, to: CSA-C22.2 No.42 with white urea moulded housing, suitable for No. 10 AWG for back and side wiring, break-off links for use as split receptacles, eight back wired entrances, four side wiring screws.

.4 Triple wipe contacts and rivetted grounding contacts. Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with white urea moulded housing, suitable for No. 10 AWG for back and side wiring, and four back wired entrances, 2 side wiring screws.

.5 Other receptacles with ampacity and voltage different from those above shall be compatible with equipment being served.

.6 Clock hanger outlets, 15 A, 125 V, 3 wire, grounding type, suitable for No. 10 AWG for installation in flush outlet box.

.4 Cover Plates

.1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.

.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.3 Stainless steel, vertically brushed, 1 mm thick cover plates cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.

.4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.6 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.

.1 General Information

.1 This section is for equipment and installation for ground fault circuit interrupters (GFCI).

.2 The use of GFCI receptacles is also required for use within 1.5m of sinks in laboratories and washrooms.

.2 Materials

.1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144.

.2 Components comprising ground fault protective system to be of same manufacturer.

.3 Breaker Type Ground Fault Interrupter

.1 Single or Two pole ground fault circuit interrupter for 15-20 A, 120 V, 1 phase circuit c/w test and reset facilities.

.4 Ground Fault Life Protector

.1 100 A, 2 pole circuit breaker to supply power to mains of 100 A, 208 V, 3 phase panel and complete with, automatic shunt trip breaker, zero sequence current sensor, facilities for testing and reset, CSA Enclosure 1, surface mounted, and ground fault trip indicator light.

.5 Ground Fault Protector Unit

.1 Self-contained with 15 A, 120 V circuit interrupter and duplex or single receptacle complete with solid state ground sensing device, facility for testing and reset, and CSA Enclosure 1, flush mounted with stainless steel face plate.

.6 System Ground Fault Protection Panel

.1 Self-contained panel suitable for 120/208 V, 3 phase, 4 wire, grounded supply with automatic 100 or 225 A breaker with shunt trip, ground fault relay factory set at 10 mA with inverse time delay characteristics from pick-up 1 s to 0.025 s, zero sequence current sensor, provision for testing and reset, and CSA Enclosure 1, surface mounted.

.7 Pump Protection Panel

.1 Ground fault personnel protection shall be provided for pump control panel circuits rated for 20 hp at 208 V 50 hp at 600 V, 3 phase grounded supply with test button, ground indicator light, reset button, line and load terminal blocks and control terminal block for wiring to starter control, unit sensitivity: 10 mA, and CSA Enclosure 1, surface mounted, contact rating: 5 A, 120 V, 60 Hz.

.1 Section Includes

.1 Materials for moulded-case circuit breakers, circuit breakers, and ground-fault circuit-interrupters.

.2 Submittals

.1 Include time-current characteristic curves for breakers with ampacity of 225 A and over or with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

.3 Breakers

.1 Moulded-case circuit breakers, Circuit breakers, and Ground-fault circuit-interrupters,: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation [with temperature compensation for 40 degrees C ambient.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.5 Circuit breakers with interchangeable trips as indicated.

.6 Circuit breakers to have minimum 10,000 symmetrical rms interrupting capacity rating.

.7 All circuit breakers used for emergency generator power distribution shall be fully rated. The use of series rated breakers is NOT acceptable.

.4 Thermal Magnetic Breakers

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

.5 Magnetic Breakers

.1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

.6 Current Limiting And Series Rated Thermal Magnetic Breakers

.1 Thermal magnetic breakers with current limiters.

.1 Time current limiting characteristics of fuses limiters coordinated with time current tripping characteristics of circuit breaker.

.2 Co-ordination to result in interruption by breaker of fault-level currents up to interrupting capacity of breaker.

.2 Series rated breakers to be manufacturer tested and listed. Breakers to be applied following manufacturer's guidelines and accepted best practice.

.1 Breakers applied following manufacturer's guidelines and accepted best practice.

.7 Solid State Trip Breakers

.1 Moulded case circuit breaker to operate by means of solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and tripping time for phase and/or ground fault short circuit protection, as required.

.8 Optional Features

.1 Include:

.1 Shunt trip.

.2 Auxiliary switch.

.3 Motor-operated mechanism c/w time delay unit.

.4 Under-voltage release.

.5 On-off locking device.

.6 Handle mechanism.

.1 General

.1 Fusible or non-fusible, horsepower rated disconnect switch in CSA Enclosure 1, to CAN/CSA C22.2 No.4 size as indicated.

.2 Provision for padlocking in on-off switch position by three locks.

.3 Mechanically interlocked door to prevent opening when handle in ON position.

.4 Fuses: size as indicated, in accordance with Section 26 28 14 - Fuses - Low Voltage.

.5 Fuseholders: to CSA C22.2 No.39 relocatable and without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indication on switch enclosure cover.

.1 General

.1 Materials and installation for contactors for system voltages up to 600 V

.2 Contactors: to CSA C22.2 No.14.

.3 Mechanically held controlled by pilot devices as indicated and rated for type of load controlled. Half size contactors not accepted.

.4 Fused switch combination contactor as indicated.

.5 Complete with 2 normally open and 2 normally closed auxiliary contacts unless indicated otherwise.

.6 Mount in CSA Enclosure 1 unless otherwise indicated.

.7 Include following options in cover:

- .1 Red indicating lamp.
- .2 Stop-Start pushbutton.
- .3 Hand-Off-Auto or On-Off selector switch, as indicated.

.8 Control transformer as required.

.1 General

.1 Connect emergency distribution to fire pump controller. Fire pump controller will be provided by the Mechanical Contractor..

.2 Make all connections to the fire pump controller, as required by the Mechanical Contractor.

.3 Provide fire pump alarm monitoring in accordance with NFPA20. This shall include the following:

.1 Pump or motor running.

.2 Loss of phase.

.3 Phase reversal.

.4 Controller connected to alternate source

.1 General

.1 This section includes the requirements for starters MCC mounted or loose mounted..

.2 Shop Drawings And Product Data

.1 Submit shop drawings that indicate, mounting method and dimensions, starter size and type, layout of identified internal and front panel components, enclosure types, wiring diagram for each type of starter, and interconnection diagrams.

.3 Extra Materials

.1 Provide listed spare parts for each different size and type of starter:

.1 3 contacts, stationary.

.2 3 contacts, movable.

.3 1 contacts, auxiliary.

.4 1 control transformer[s].

.5 1 operating coil.

.6 2 fuses.

.7 10% indicating lamp bulbs used.

.4 Starters

.1 Starters: to IEC 947-4 with AC4 utilization category.

.5 Manual Motor Starters

.1 Single or three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:

.1 Switching mechanism, quick make and break.

.2 One or three overload heater(s), manual reset, trip indicating handle.

.2 Accessories:

.1 Toggle switch, heavy duty labelled as indicated.

.2 Indicating light: heavy duty type and colour as indicated.

.3 Locking tab to permit padlocking in "ON" or "OFF" position.

.6 Full Voltage Magnetic Starters

.1 Magnetic and combination magnetic starters of size, type, rating and enclosure type as indicated with components as follows:

.1 Contactor solenoid operated, rapid action type.

.2 Motor overload protective device in each phase, manually reset from outside enclosure.

.3 Wiring and schematic diagram inside starter enclosure in visible location.

.4 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.

.2 Combination type starters to include fused disconnect switch with operating lever on outside of enclosure to control disconnect, and provision for:

.1 Locking in "OFF" position with up to 3 padlocks.

.2 Independent locking of enclosure door.

.3 Provision for preventing switching to "ON" position while enclosure door open.

.3 Accessories:

.1 Selector switches: heavy duty labelled as indicated.
.2 Indicating lights: heavy duty type and color as indicated.
.3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.

.7 Magnetic Starter, Reduced Voltage, Auto-Transformer

.1 Auto-transformer starter closed circuit transition type, of size, type, rating and enclosure type as indicated and with following components:
.1 Three-3 pole contactors.
.2 Auto-transformer with [50%, 65% and 80%] [65% and 85%] taps.
.3 One adjustable pneumatic timing relay.
.4 One-3 pole manual reset overload device.
.5 Thermal overload protection of auto-transformers.

.2 Accessories:
.1 Selector switches heavy duty labelled as indicated.
.2 Indicating lights: heavy duty type and color as indicated.
.3 Auxiliary control devices as indicated.

.8 Variable Frequency Drives

.1 Variable frequency drives are specified by Mechanical Consultant but require consultation with FMEL.
.2 Obtain a copy of shop drawings from the Mechanical Contractor and insert a copy into each Operating and Maintenance Manual.

.9 Control Transformer

.1 Single phase, dry type, control transformer with primary voltage as indicated and 120 V secondary, complete with secondary fuse, installed in with starter as indicated.
.2 Size control transformer for control circuit load plus 20% spare capacity.

.10 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 01 - Common Work Results - Electrical.
.2 Manual starter designation label, white plate, black letters, size 1, engraved.
.3 Magnetic starter designation label, white plate, black letters, size 1 engraved.

.1 General

.1 New buildings are to be provided with a new diesel fired emergency/standby power generator complete with sub-base fuel tank, sound attenuated weatherproof enclosure.

.2 Generators shall generally be mounted outdoors on a reinforced concrete slab.

.3 The fuel tank shall have a volume capable of 72 hours of run time at full load.

.4 Where buildings require both emergency and standby power distribution, two auto-transfer switches will be required in order to separate the two distribution sets.

.5 The generator enclosure is to be vandal and rodent proof.

.6 All equipment shall be new and of current production by a national firm who manufacturers the generator and control panel and who assembles the standby generator set as a matched unit having a service and parts organization within British Columbia.

.7 Single supplier: the supplier shall be the manufacturer's authorized distributor, who shall provide initial start-up services, conduct field acceptance testing, and warranty service. The supplier shall have 24-hour service availability and factory-trained service technicians authorized to do warranty service on all warrantable products.

.2 Operation and System

.1 The standby power system is to be designed to energize the complete power service automatically on failure of normal power or when being tested.

.2 The transfer switch shall include an automatic energizing mode that will cycle the emergency power system to run for an adjustable period on pre-selected days and time annually.

.3 All signals shall be indicated remotely via annunciator in the electrical room. Annunciator shall be compliant with all requirements of CSA C282-(latest edition) and have all required indicators displayed on the annunciator.

.4 The generator system shall be a liquid cooled diesel electric generating unit with control panel, with combined control, transfer and power isolating and by-pass panel.

.5 All operating and maintenance data is to be provided in operating and maintenance manuals, at substantial completion stage of the project. The data must also include all testing and verification reports.

.3 Warranty

.1 Contractor shall hereby warrant the diesel generating unit, equipment and accessories against defects and malfunction for five years from the date of substantial completion commissioning stage.

.4 Maintenance - Extra Materials

.1 Provide spare materials for generator systems as noted in the following clauses.

.2 For panels provide following:

- .1 One spare control circuit breaker per rating.
- .2 Twenty four spare indicating light bulbs per rating.
- .3 One spare control relay and socket per rating and contact arrangement.
- .4 One spare contactor operating coil.
- .5 One set of contacts (3) for transfer contactor.

.3 Provide generator unit with standard set of engine manufacturer's spare parts for one year normal operation 1,000 operating hours. Spares to include:

- .1 Six fuel filter elements for each type of fuel filter/water separator.

.2 Six lubricating oil filter elements.

.3 Three air cleaner elements.

.4 Where metric size nuts and bolts are used, provide one set of sockets complete with ratchet handle and set of combination wrenches, to fit sizes used.

.5 Provide conclusive evidence that Canadian distributor has been established and will stock in Canada spare parts likely to be required during normal life of engine.

.5 Maintenance - Tools

.1 Supply suitable engine barring device and battery manufacturer's standard set of tools for battery service.

.1 Battery service tools to include hydrometer, one plastic bottle for topping up purposes and one insulated battery terminal wrench.

.2 Provide complete set of specialized tools required for proper care, adjustment and maintenance of equipment supplied.

.6 Generator Plant

.1 The generation plant shall consist of a fully automatic #2 diesel engine driven electrical generation plant completely equipped with the following:

.1 Fuel system and sub-base fuel tank

.2 Exhaust system

.3 Cooling system

.4 Battery starting system, including battery charger

.5 All automatic controls

.6 Radio suppression to commercial standards

.7 Block heater

.8 Surge suppression

.9 Fully rated breakers for emergency power, standby power, fire pump power and load bank power connection.

.2 The unit shall be designed to provide a minimum of 25% spare capacity.

.7 Diesel Engine – Generator Set

.1 Diesel engine-generator set fueled with #2 diesel. Diesel engines requiring premium fuels shall not be considered.

.2 Performance:

.1 Voltage regulation shall be ±1.5% for any constant load between no load and rated load.

.2 Maximum transient voltage dip shall not exceed 25% below rated voltage on application of the single largest surge load step at a 0.8 power factor.

.3 Maximum transient voltage rise shall not exceed 12% above rated voltage on removal of full load at 0.8 power factor.

.4 Transient recovery time is 1 second.

.5 Stability plus or minus 0.25%.

.6 Frequency regulation shall be isochronous from steady state no load to steady state rated load.

.7 The diesel engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, with the engine-generator set at operating temperature.

.8 Motor starting capability shall be a minimum of two 5 horsepower motors. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.

.9 The unit shall be capable of delivering 10% overload for one hour in every twelve hours of continuous operation, without exceeding maximum permissible temperature rise.

.10 The unit shall be capable of providing stable voltage and pick up of essential loads within 10 seconds.

.11 The generator shall be equipped with surge suppression and the excitation system shall include an instantaneous overcurrent shutdown capability after 10 seconds.

.12 A wide range of load power factors can be expected on campus. Generator design and performance shall accommodate extreme power factors applicable to specified install locations. Consult with FMEL for generator selection.

.3 AC Generator

.1 The AC generator shall be: synchronous, four pole, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc(s).

.2 All insulation system components shall meet NEMA MG1 temperature limits for Class H, 125°C insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 80°C at 40°C ambient.

.3 A permanent magnet generator (PMG) shall provide excitation power for immunity from voltage distortion caused by non-linear loads. The PMG shall sustain excitation power for optimum motor starting and to sustain short circuit current at approximately 300% of rated current for not less than 10 seconds.

.4 The automatic voltage regulator shall be temperature compensated, solid-state design. The voltage regulator shall be equipped with three-phase RMS sensing the regulator shall control buildup of AC generator voltage to provide a linear rise and limit overshoot.

.5 Voltage control is to be in accordance with applicable CSA Bulletins.

.4 Engine-Generator Set Control

.1 Provide cycle cranking of 15 SEC (ON)/15 SEC (OFF) for three attempts (75 SEC). If engine fails to start, indicate overcrank on the alarm status panel, but continue attempts to start.

.2 The engine shall comply with all requirements of SCAQMD Rule 1470 and be Tier 3 approved in Canada. Provide all supporting documentation showing that this criteria is met.

.3 The control shall shut down and lock out upon: overspeed, low lubricating oil pressure, high engine temperature, or operation of a remote manual stop station. A panel mounted switch shall reset the engine monitor and test all the lamps.

.4 The CSA Type 3 weatherproof enclosed control panel shall be mounted on the generator set with vibration isolators. A front control panel illumination lamp with on/off switch shall be provided.

.5 Engine generator set control shall be of solid state design. Relays will be acceptable only for high current circuits. Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine.

.5 Base

.1 The engine-generator set shall be mounted on a heavy duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.

.2 The generator set shall be equipped with factory installed vibration isolators mounted between the set and fabricated steel base to prevent distortion of alignment between generator and engine when installed. Base channel and all parts to withstand this force without damage.

.3 The base is to have earthquake restraint as required by local codes.

.4 The exhaust flex-connector and all exposed exhaust components, including muffler, shall be fully insulated by means of a thermofibre blanket-type heat resistant wrapping, 25mm thick, with SS mesh inner liner and silicone/aluminized outside cover secured by stainless steel lacing hooks and wire.

.5 The engine shall be radiator cooled and equipped with a pusher fan. The cooling system shall be filled with a solution of 50 percent ethylene glycol. Provided shall be a translucent overflow coolant recovery reservoir.

.6 A 115 VAC engine jacket heater, sufficient to maintain coolant at 40°C, shall be provided complete with thermostat and electrical disconnect on engine start, if required to prevent element damage.

.7 Motorized (spring open/power close) air inlet and (gravity close) exhaust shutters shall be sealed to minimize air leakage and shall automatically open whenever the engine is started.

.8 Circuit Breaker:

.1 Shall be mounted on the generator and shall be a non-automatic trip free thermal magnetic moulded case circuit breaker in CSA type 3 (weatherproof) enclosure complete with neutral bar isolated from ground.

.2 Circuit breakers shall be 3 pole fully rated 3Ø, 4 wire operation.

.8 Remote Annunciator

.1 Supply a remote annunciator suitable for surface mounting, with audible alarm and status indicator. (Locate in main electrical room)

.2 Provide and install a 20-light LED type remote alarm annunciator with horn, located as shown on the drawings or in a location that can be conveniently monitored by facility personnel. The remote annunciator shall provide all the audible and visual alarms called for by CSA 282 (latest edition) NFPA Standard 110 for level 1 systems for the local generator control panel.

.9 Generator Enclosure

.1 The sound attenuated genset housing shall be a rigid, free-standing, vandal-resistant cabinet, fabricated to EEMAC 3 standards with sufficient bracing to form a structure capable of withstanding wind, snow and ice loading. The roof shall have a minimum 100 mm overhang and provide rain gutters over all doors and openings. External hinges shall each feature a waterproof cap and lower grease fitting to permit pressure lubrication.

.2 After fabrication the metal surfaces of the enclosure shall be prepared to SSPC-SP6 commercial blast. Immediately following surface preparation, a 3 mil coating of zinc rich epoxy metal primer shall be applied. Primer coating material shall be Amercoat 68HS. After curing, two additional 2 mil coats of aliphatic polyurethane shall be applied, Amercoat 450HS approved, for a total 7 mil film thickness.

.3 Alternatively, galvanized metal surfaces shall be prepared with an etching primer, Metaprime 39103/39104 approved. Following this, two separate 2 mil coats of aliphatic

polyurethane shall be applied, Amercoat 450HS coating material approved, for a total 4 mil film thickness.

.4 Access to all regularly serviced items within the enclosure shall be provided by at least two hinged lockable doors on each side.

.5 The enclosure must be vandal resistant. Externally accessible fasteners shall preferably be blind head (e.g. stove bolts) although Allen head will be permissible. Air inlet and outlet openings shall be designed such that objects of any size directed at the enclosure from vertically downward to horizontally flat cannot enter and shall be sized such that inlet air velocity is below the level at which water penetration will occur. No other enclosure openings will be allowed

.10 Generator Noise

.1 The engine exhaust system shall incorporate a seamless, stainless steel flex-connector and critical silencing type muffler, all mounted within the genset enclosure. Discharge shall be into the air outlet hood, downstream of the radiator. Sound attenuated air inlet and discharge hoods with opening bird screens shall be rectangular in shape and match the profile of the enclosure.

.2 Genset overall full load operating noise level shall be less than 65 dbA when measured at a distance of 7 meters from any side of the enclosure and 1 meter above ground. This shall be demonstrated during shop testing.

.3 Ducting and sound attenuation components shall be designed and supplied by an approved manufacturer specializing in this type of work. Manufacturer shall be Excel Engineering, Alum-Tekko Industries or Sonic Engineering

.11 Transfer Switch Equipment

.1 New automatic transfer switch shall be Thomson Technology. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure. Transfer switches shall also be continuously rated in ambient temperatures of -10°C to +30°C, relative humidity up to 95% (non-condensing), and altitudes up to 3,048 meters. Transfer switch equipment shall have a withstand and closing rating (WCR) in RMS symmetrical amperes greater than the available fault currents shown on the drawings.

.2 Transfer switches are to be complete factory assembled transfer equipment with electronic control designed for surge voltage isolation, voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts. Transfer switches rated through 1000 amperes shall be equipped with permanently attached manual operating handles and quick-break, quick-make over-centre contact mechanisms suitable for safe manual operation under load.

.3 Automatic Controls shall be solid-state and designed for a high level of immunity to power line surges and transients. Solid-state under-voltage sensors shall simultaneously monitor all phases of both sources. Pick-up and drop-out settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase. Voltage sensors shall have field calibration of actual supply voltage to nominal system voltage. Voltage sensors shall be temperature compensated. Automatic controls shall signal the engine-generator set to start upon signal from normal source sensors. Solid-state time delay start, adjustable from 0 to 5 seconds (factory set at 2 seconds) shall avoid nuisance start-ups. Battery voltage starting contacts shall be gold, dry type contacts factory wired to a field wiring terminal block. The maximum reaction time of 10 seconds permitted under CSA standard C282-(latest edition) shall include the adjustable 0 to 5 second delay. The switch shall retransfer the load to the normal source (after normal power restoration) after a time delay transfer, adjustable from 0 to 120 seconds. Retransfer time delay shall be immediately bypassed if the emergency power source fails. Factory set at one minute.

The switch shall retransfer the load to the normal source if the generating set output interrupts after normal source restores voltage. Controls shall signal the engine-generator set to stop after a time delay, adjustable from 0 to 30 minutes, beginning on return to the normal source. Power for transfer operation shall be from the source to which the load is being transferred.

.4 Retransfer - Momentary position to override retransfer time delay and cause immediate return to normal source.

.1 General

.1 In general, lighting design shall consider sustainability and energy efficiency in order to meet the desire sustainability goals of the University.

.2 Although this section makes reference to compact fluorescent lamps and fixtures, these are not preferred by the University. The preference is to use 4' long fluorescent lamps throughout the building, where possible. The use of LED downlighting may be considered in some situations, however, prior approvals must be obtain from the [Department Representative] [University Facilities Management].

.3 Lighting shall be designed to IES, BC Building Code and WCB requirements on all projects.

.2 Lamps

.1 Incandescent lamps:

.1 Bulb shape A to 150W, medium base, inside frosted, 130V rated.

.2 Halogen lamps:

.1 PAR30S IR type lower wattage energy saving types lamps, 4,200 hours average life, minimum initial lumens

.1 40W, Spot 10°, Flood 25°, Wide Flood 40° - 720 (equivalent to 60W non-IR)

.2 50W, Spot 10°, Flood 25°, Wide Flood 40° - 970 (equivalent to 75W non-IR)

.3 50W (130V long life), Spot 10°, Flood 25°, Wide Flood 40° - 650 (equivalent to 50W non-IR)

.4 Manufacturer: GE Quartzline, Philips

.2 MR16 type to be 12V, solid nickel steel pins, and total infill ceramic base. Lamp life rated 4000 hours, enclosed reflector with clear glass cover, 3000K colour.

.1	Narrow spot	10° to 13° beam angle
.2	Spot	20° to 26° beam angle
.3	Narrow flood	32° to 35° beam angle
.4	Flood	38° to 45° beam angle
.5	Wide Flood	55° to 65° beam angle

.6 Manufacturer: EYE Iwasaki Electric Co. Ltd., Philips, Osram

.3 Fluorescent Lamps

.1 T8-Type

.1 Instant start 265 mA, bulb shape T8, medium bi-pin base, 20,000 hours life, 3500K, CRI 86 (min), Minimum initial lumens:

.1 30W - 2950 lumens T8

.2 Acceptable manufacturer: Philips Energy Advantage 835

.2 T5-Type

.1 Programmed start high output, bulb shape T5, miniature bi-pin base, 35,000 hours life, 3500k, CRI 98 (min), minimum initial lumens:

.1 54W – 5000 lumens T5

.2 Acceptable manufacturer: Philips F54T5

.3 PL Type

.1 Instant start, two pin base, double looped or quad, rated average life 10,000 hours, colour temperature 3500k, minimum initial lumens:

.1 13W - 1250

.2 26W - 1800

.2 Manufacturer: Osram, Phillips

.4 Compact Fluorescent

.1 Instant start, four pin base, twin tube, rated average life 20,000 hours, colour temperature 3500K, minimum initial lumens:

40W - 3150 lumens.

.4 Metal Halide:
.1 ED type bulb, mogul base for vertical mount and position oriented mogul base for horizontal use, 20,000 hours average life, colour temperature 3000 degrees K, minimum initial lumens:
.1 100W - 8000 250W - 21500
.2 175W - 14000 400W - 37000
.3 Manufacturer: Philips M/3K/ALTO

.5 High Pressure Sodium
.1 Bulb shape E, mogul base, rated life 24,000 hours, colour corrected type, 2200K colour temperature, colour rendering index: 65, coated, minimum initial lumens:
.1 70W - 5985
.2 100W - 8800
.3 150W - 13500

.3 Ballasts

.1 Fluorescent electronic ballast:
.1 All fluorescent ballasts are to be electronic, instant start or programmed start type, refer to luminaire schedule. Rating: 60Hz voltage as indicated. Suitable for lamp quantity as indicated in luminaire schedule.
.2 Totally encased and shall not exceed 25°C temperature rise over 40°C ambient.
.3 Ballast shall have a power factor of 90% or above.
.4 Ballast shall not contain PCBs.
.5 Sequenced start progression which first heats cathode filaments and then ignites lamp.
.6 Sound rated: shall not exceed Class A.
.7 Mounting: integral with luminaire.
.8 Warranted for five years - date of installation to be marked on ballast.
.9 Input total harmonic distortion (THD) shall not exceed 10%.
.10 Ballast shall have a frequency of operation of 20 kHz or greater and operate without visible flickers.
.11 Electrical contractor to provide 10 spare ballasts.
.12 Advance Centium or Optanium or pre-approved equal.

.2 Fluorescent Electronic 50/100 Step Dim Type Ballast
.1 All fluorescent ballast's are to be electronic type. Rating: 60Hz voltage as indicated, for use with rapid start lamps, and shall have an average lamp current crest factor of 1.4.
.2 Ballast shall have a ballast factor of 95%.
.3 Sequenced start progression which first heats cathode filaments and then ignites lamp.
.4 Mounting: integral with luminaire.
.5 Warranted for five years - date of installation to be marked on ballast.
.6 Input total harmonic distortion (THD) shall not exceed 10%.
.7 Ballast shall have a frequency of operation of 20 KHz or greater and operate without visible flickers.
.8 Step dim function to switch ballast between 50% and 100% output.
.9 Electrical contractor to provide 10 spare ballasts.
.10 Manufacturer: Advance Optanium or pre-approved equal.

.3 Fluorescent dimmable ballast
.1 All fluorescent ballast's are to be electronic type. Rating: 60Hz voltage as indicated, for use with rapid start lamps, and shall have an average lamp current crest factor of

1.4.

.2 Ballast shall have a power factor of 90% or above.
.3 Ballast shall not contain PCBs.
.4 Sequenced start progression which first heats cathode filaments and then ignites lamp.
.5 Mounting: integral with luminaire.
.6 Warranted for five years - date of installation to be marked on ballast.
.7 Input current Third Harmonic content shall not exceed 10%, and total harmonic distortion (THD) of less than 10%.
.8 Ballast shall have a frequency of operation of 20 KHz or greater and operate without visible flickers.
.9 Dimmable to 5% output.
.10 Electrical contractor to provide 10 spare ballasts.
.11 Manufacturer: Lutron or Advance Mark Series

.4 Metal Halide ballast: design linear type:
.1 Rating: 60Hz voltage as indicated, for use with metal halide lamp
.2 Totally encased and designed for 40°C ambient temperature
.3 Power factor: minimum 95% with 95% of rated lamp lumens
.4 Type: constant wattage auto-transformer
.5 Capacitor: non PCB
.6 Input voltage range: plus or minus 10% of nominal.
.7 Minimum starting temperature: minus 29°C at 90% line voltage
.8 Mounting: indoor and outdoor integral with luminaire, or as noted.
.9 Crest factor: 1.8 minimum

.5 High pressure sodium ballast: to ANSI C82.4-1978, design linear type:
.1 Rating: voltage as indicated, for use with high pressure sodium lamp.
.2 Totally encased and designed for 40°C ambient temperature
.3 Power factor: minimum 95% with 95% of rated lamp lumens.
.4 Type: constant wattage, isolated secondary magnetic regulated with matching igniter as recommended by manufacturer.
.5 Capacitor: non-PCB.
.6 Input voltage range: plus 5% to minus 5%.
.7 Minimum starting temperature: minus 34°C at 90% line voltage.
.8 Mounting: indoor integral with luminaire, unless noted otherwise.

.4 Finishes

.1 Baked enamel finish:
.1 Conditioning of metal before painting:
.1 For corrosion resistance conversion coating to ASTM F1137.
.2 For paint base, conversion coating to ASTM F1137.
.2 Metal surfaces of luminaire housing and reflectors finished with high gloss baked enamel or alzak aluminum to give smooth, uniform appearance, free from pinholes or defects.
.3 Reflector and other inside surfaces finished as follows:
.1 White, minimum reflection factor 85%.
.2 Colour fastness: yellowness factor not above 0.02 and after 250 hours exposure in Atlas fade-ometer not to exceed 0.05.
.3 Film thickness, not less than 0.03 mm average and in no areas less than 0.025 mm.
.4 Gloss not less than 80 units as measured with Gardner 60E gloss meter.

.5 Flexibility: withstand bending over 12 mm mandrel without showing signs of cracking or flaking under 10 times magnification.

.6 Adhesion: 24 mm square lattice made of 3 mm squares cut through film to metal with sharp razor blade. Adhesive cellulose tape applied over lattice and pulled. Adhesion satisfactory if no coating removed.

.2 Alzak finish:

.1 Aluminium sheet fabricated from special aluminum alloys and chemically brightened, subsequently anodically treated to specifications established by Alcoa, to produce:

.1 Finish for mild commercial service, minimum density of coating 7.8 g/m^2, minimum reflectivity 83% for specular, 80.5% for semi-specular and 75% for diffuse.

.2 Finish for regular industrial service, minimum density of coating 14.8 g/m^2, minimum reflectivity 82% for specular and 73% for diffuse.

.3 Finish for heavy duty service, minimum density of coating [21.8] g/m^2, minimum reflectivity 85% for specular, 65% for diffuse.

.5 Accessories

.1 Pendant Mounting

.1 Pendant mounting shall be with white enamelled luminaire tubing provided as an accessory with luminaire unless otherwise specified.

.2 Slope ceiling mounting adapters shall be white enamelled supports provided as an accessory with luminaire unless otherwise specified.

.2 Wire Guards

.1 Wire guards shall be spot welded at crossing of members and be a minimum of 4.5mm thick galvanized steel. Guards shall be hinged from either side and be secured using wing nuts

.6 Exterior Lighting Controls

.1 All exterior luminaires, whether indicated on plans or not, must be provided with photocell and timer controls complete with manual override switch

.7 Lenses

.1 Refer to luminaire schedule.

.8 Luminaires

.1 For luminaire specifications, refer to luminaire schedule except for luminaires at white boards in teaching spaces.

.2 Luminaires for whiteboards in teaching spaces shall be Insite Compact-5 Interior Architectural Fluorescent or equivalent with T5HO lamp placed continuously along the entire length of whiteboards. The switching arrangement shall be such that each 8 foot section can be switched separately. Whiteboard luminaires shall be wall mounted above whiteboards.

.1 Equipment

.1 Emergency lighting equipment: to CSA C22.2 No.141.

.2 Supply voltage: [120] [347] V, ac.

.3 Output voltage: 24 V dc.

.4 Operating time: 30 minimum. Where a generator is placed indoor, provide emergency lighting battery pack a two lighting heads lasting a minimum of a 2 hour duration.

.5 Battery: sealed, maintenance free.

.6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus 10% input variations.

.7 Solid state transfer circuit.

.8 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.9 Signal lights: solid state, for 'AC Power ON'.

.10 Lamp heads: remote, 345 degrees horizontal and 180 degrees vertical adjustment. Lamp type: quartz 18 W.

.11 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.

.12 Finish: standard factory white.

.13 Auxiliary equipment:

- .1 Ammeter.
- .2 Voltmeter.
- .3 Test switch.
- .4 Time delay relay.
- .5 Battery disconnect device.
- .6 AC input and DC output terminal blocks inside cabinet.
- .7 Shelf or wall Bracket.
- .8 Cord and single twist-lock plug connection for AC.
- .9 RFI suppressors.

.14 Acceptable Manufacturers: Ready-Lite, Emergi-Lite, Beghelli, Thomas & Betts

.1 Standard Units

.1 Exit lights: to CSA C22.2 No.141 and CSA C860, packaged in accordance with the Canadian Code for Preferred Packaging guidelines.

.2 Housing: extruded aluminum housing, brush aluminum finish .

.3 Face and back plates: extruded aluminum .

.4 Lamps: multiple, LED-12W, 120 or 347 V.

.5 Operation: designed for 50,000 hours of continuous operation without relamping.

.6 Letters: 150 mm high x 19 mm, with 13 mm thick stroke, red on die-cast aluminum face, reading EXIT.

.7 [Downlight: translucent acrylic in bottom of unit.]

.8 Face plate to remain captive for relamping.

.9 Acceptable Product: Ready Lite #CX5000 Series or Emergi-Lite, Beghelli and Thomas & Betts equal.

.1 System Description

.1 Install a complete Global Positioning System (GPS) Master – GPS Satellite Synchronous Wireless Clock System to tie into existing campus system. The GPS clock system is to include GPS receivers and transmitters and clocks, as manufactured by Primex Wireless.

.2 Clocks are typically required in all classrooms, laboratories, lecture theatres, study spaces and other locations as defined by the University of Victoria.

.3 The system is to be modular in design to allow for future expansion.

.2 Wireless Master Transmitter

.1 Transmitter shall be one watt complete with 16 selectable channels on 72 MHz frequency, DST bypass switch, time zone adjustment switch, LCD display, durable metal housing, integral antenna mounted on top of transmitter housing, wall mounting rack, UPS battery back-up, and extended four (4) year warranty. Primex #14143.

.3 GPS Receiver

.1 GPS receiver to be compatible with master transmitter and complete with #14014 interconnecting coaxial cable, mounting bracket and hardware.

.4 Clocks

.1 12 hour analog type complete with second hand sweep and 12 ½" diameter high impact polycarbonate lens, brushed aluminum metal frame, integral receiver for wireless communication to master transmitter, and custom UVic logo on clock face to match existing campus clocks. Provide clock lock mounting option for tamper control. Finish shall be brushed aluminum. Connect at 120V to wall mounted recessed clock type receptacle. Primex #SNS4Z180-120V (single sided), #SNS4Z227-120V (dual-sided).

.5 Electronic Transmitting Unit

.1 Electronic transmitting unit: solid state transmitter with 120 V, 60 Hz power supply, oscillator, 2 stage push pull power amplifier capable of generating [250] W of carrier signal power.

.2 Signal output: coupled to building main secondary bus through capacitors mounted in transmitter unit.

.6 Satellite Access

.1 Include Industry Canada application fee for 1Watt Satellite Access. Primex #IC2365-1.

.7 Clock Power

.1 Clocks shall be powered via a 120 volt outlet. Battery operated units are **not** acceptable.

.1 System Description

.1 Provide complete conduit system, including junction boxed and pull string for the installation of a door access control system. The door access control system will be provided by University of Victoria Campus Security Forces.

.2 Provide 120 volt power for door access control panels and components as required and as indicated.

.3 Access control infrastructure shall include:

.1 Junction boxes and conduit for card readers, as indicated.

.2 Junction boxes and conduit for motion sensors, as indicated.

.3 Conduit to door frames for door contacts, as indicated.

.4 Conduit to operable windows on the main floor for window contacts.

.1 System Description

.1 Provide complete conduit system, including junction boxed and pull string for the installation of a audio-visual systems in lecture theatres, classrooms and video conferencing rooms. The audio-visual systems will be provided by University of Victoria Forces.

.2 Provide 120 volt power for audio-visual systems and components as required and as indicated.

.3 Lecture Theatre Audio-Visual infrastructure shall include:

- .1 Conduit from lecturn cabinets to central dimming controls for respective spaces
- .2 Conduit from lecture theatre control booths to lecturn cabinet
- .3 Conduit from control booth to wall mounted and ceiling mounted speakers.
- .4 Receptacle outlets at lecturn cabinets, minimum 4 circuits and duplex receptacles.
- .5 Data outlets at lecturn cabinets

.4 Classroom Audio-Visual infrastructure shall include:

- .1 Conduit from ceiling overhead projector to lecturn at teaching position
- .2 Ceiling receptacle for overhead project

.1 General Description

.1 The University requires that all new fire alarm system control panel, components, and devices, as required for the project, be Secutron 2900 Series and fully compatible with the existing fire alarm infrastructure on campus..

.2 System Description

.1 Fully supervised, microprocessor-based, fire alarm system, utilizing digital techniques for data control, and multiplexing techniques for data transmission.

.2 System to carry out fire alarm and protection functions, including receiving alarm signals; initiating single-stage alarm; supervising components and wiring; actuating graphic displays and auxiliary functions; initiating trouble signals and signaling to the University Campus monitoring system.

.3 Zoned, coded, single-stage.

.4 Modular in design to allow for future expansion.

.5 Operation of system shall not require personnel with special computer skills.

.6 System is to include but not be limited to:

.1 New Central Control Unit (CCU) in separate enclosure with power supply, stand-by batteries, central processor with microprocessor and logic interface, main system memory, input-output interfaces for alarm receiving, annunciation/display, and program control/signaling.

.2 Power supply.

.3 Initiating/input circuits.

.4 Output circuits.

.5 Auxiliary circuits.

.6 Class A wiring configuration.

.7 Addressable manual and automatic initiating devices.

.8 Audible and visual signaling devices.

.9 End-of-line resistors.

.10 Remote annunciation and general alarm activation.

.11 Field control modules

.3 System Operation

.1 Activation of any manually actuated or automatic detection, or sprinkler system addressable alarm device is to:

.1 Cause audible and visual alarm indication at CCU and visual indication at remote annunciator.

.2 Cause controlled operation of the audible and visual signal devices throughout the building (capability for both continuous and temporal sound patterns).

.3 Indicate device that initiated the alarm at CCU.

.4 Transmit signal to University Campus monitoring station.

.2 Provision to silence signals by “alarm silence” switch at control unit and remote annunciator.

.3 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.

.4 Actuation of any sprinkler system supervisory device to:

.1 Indicate respective supervisory zone at CCU and remote annunciator.

.2 Cause audible signal to sound at CCU and visual indication at remote annunciator.

.3 Display the activated device type and location.

.5 Resetting alarm or supervisory device to return system indications/functions back to normal at control unit and remote annunciator.

.6 Trouble on system to:

.1 Give audible and visible indication of circuit in trouble at the CCU and visual indication at remote annunciator.

.2 Acknowledge trouble condition to silence audible indication; visual indication to remain until trouble is cleared and system is back to normal at control unit and remote annunciator.

.7 Trouble on system: suppressed during course of alarm.

.8 Trouble condition on any circuit in system is not to initiate alarm conditions.

.9 In the event of a CCU microprocessor failure, alarm-initiating circuits are to report alarms in the conventional collective mode for each addressable line, and alert signals are to sound throughout.

.10 Response time, from initiation of an alarm to registration at the CCU and activation of all signaling devices, is not to exceed 10 seconds.

.11 Signaling devices are to be active for 1 minute before they can be de-activated.

.4 Control Panel

.1 Central Control Unit (CCU): Secutron 2900 Series.

.5 Auxiliary Circuits

.1 Auxiliary contacts for control functions.

.2 Actual status indication (positive feedback) from controlled device.

.3 Alarm and/or supervisory trouble on system to cause operation of programmed auxiliary output circuits.

.4 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.

.5 Auxiliary circuits: rated at 2 A, 24 VDC or 120 VAC, fuse-protected.

.6 Products-Of-Combustion Detectors

.1 Smoke Detector – Addressable Dual chamber, photoelectric, twistlock, plug-in type with fixed wire-in base assembly with integral red alarm LED. Detector to be addressable type c/w electronics to communicate detector's status, and field adjustable address setting.

.2 Duct Smoke Detector – Addressable Dual chamber, ionization, twistlock, plug-in type with fixed wire-in base assembly with integral red alarm LED. Detector to be addressable type c/w electronics to communicate detector's status, and field adjustable address setting.

.7 Heat Detectors

.1 Thermal fire detectors, addressable, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise.

.2 Thermal detectors, addressable, fixed temperature: 57°C.

.8 Remote Led Alarm Indicator

.1 Remote indicating LED #RA400ZA to indicate status of concealed devices.

.9 Manual Alarm Stations

.1 Addressable manual pull station compatible with fire alarm panel.

.10 Audible Signal Appliances (Gongs/Bells)

.1 Bells 250mm diameter, red..

.2 Audible signal alarms in Suites - sonalerts complete with built-in silence switch supervised isolation module for each device. Group modules in electrical closets on respective floors.

.11 Visual Signal Appliances (Strobe Lights)

.1 Visual signal alarms in suites designated for hearing impaired –combination temporal horn/strobe complete with silence switch and supervised isolation module for each device. Group modules in electrical closets on respective floors.

.12 Fault/Isolation Modules

.1 Provide fault/isolation modules for all fire alarm zones and supervisory circuits.

.13 Smoke Alarms

.1 In suites: Dual ionization type, 120VAC.

.2 In suites designated for hearing impaired: Dual ionization type complete with horn/strobe, 120VAC.

.14 Door Holders

.1 Provide electromagnetic hold-open devices for smoke control doors.

.2 Door holders to be complete with all necessary mounting hardware and accessories. Provide flush mounting boxes in finished areas and matching surface boxes in unfinished areas or as required to suit the application. Provide solid backing for all mounting boxes.

.3 Provide the following features:

.1 Rated for 120V AC. continuous service.

.2 Power source for hold-open devices in nearest electrical panelboard or as indicated. Install breakers as required and label clearly. Group hold-open devices on dedicated circuits on a floor by floor basis or to suit layout.

.3 De-energize hold-open devices during an alarm condition, using appropriate addressable output modules. Do not use relays energized by a bell circuit. Provide dual voltage relays as required.

.4 Provide manual switch override of magnetic door holders and locate in Main Electrical Room.

.15 Mechanical System Control

.1 Provide control of mechanical system air handling equipment during an alarm condition, as indicated on the drawings and specified under the Mechanical Division.

.2 Provide addressable output modules to enable smoke removals fans as described in the Mechanical Specifications. Provide separate override control switches in both the control panel and the remote annunciator panel(s).

.3 Provide relay contact to DDC system to signal the status of the fire alarm system.

.4 Provide relay contacts to DDC system to signal the status of the smoke removal switches.

.16 Kitchen Equipment Fire Suppression System

.1 Provide relay interlocks to kitchen cooking equipment fire suppression system control panel for fire alarm activation and cooking equipment shut-down as indicated on plans.

.17 Sprinkler System

.1 Provide waterflow/tamper modules for connection to sprinkler system for monitoring of flow switches and valves. .

.2 Provide input modules for connection of pressure switches for monitoring.

.3 Provide alarm/trouble indication of heat tracing system at the control panel and remote annunciator panel.

.4 Where the building is equipped with a fire pump, provide four trouble LED annunciation zones on the fire alarm system indicating the following:

.1 Pump or motor running

.2 Loss of phase

.3 Phase reversal

.4 Controller connected to alternate source

.18 Annunciator

.1 Provide and install flush mounted LED back-lit remote graphic annunciator c/w driver, LCD display, scroll, acknowledge button, system re-set system trouble, power on, and signal silence, where indicated on plans.

.2 Annunciator to be complete with brushed aluminum trim and hinged lockable cover.

.3 Where the building is equipped with a fire pump, provide four trouble LED annunciation zones on the fire alarm system indicating the following:

.1 Pump or motor running

.2 Loss of phase

.3 Phase reversal

.4 Controller connected to alternate source

.4 Provide 100 watt, 120 volt ceramic strip heater inside annunciator enclosure for exterior weatherproof mounted annunciator panels. Monitor strip heater via the fire alarm system and provide trouble indicator. Provide 120 volt power to heater, whether shown or not on plans.

.19 Wire And Cable

.1 Conductor Insulation: Minimum rating 300 volts. Single conductor RW90XLPE (X-link).

.2 Multi-conductor cables 105°C with outer PVC jacket, colour coded, FAS rated.

.3 Conductor sizes as follows:

.1 To initiating circuits: #18 AWG minimum, and in accordance with manufacturer's requirements.

.2 To signal circuits: #16 AWG minimum, and in accordance with manufacturer's requirements.

.3 To control circuits: #12 AWG minimum, and in accordance with manufacturer's requirements.

.4 Size all fire alarm wiring for maximum 3% voltage drop at maximum load at last device in run.

.4 Fire alarm bell circuits to be Red/Black stranded 2C#12 only.

.5 Red fire alarm LV cable 3C#18 or 5C#18 with “fire alarm” written on jacket is to only be used for fire alarm.

.6 All wiring to be copper.

.7 All wiring to be tag identified at the points of connection.

.8 Provide a ground conductor with all system wiring and bond all metal parts including device boxes.

.9 All fire alarm system wiring to be in conduit except short drops from ceiling junction box to detectors mounted in T-Bar ceiling may be rated fire alarm system cable.conduit and boxes

.1 General

.1 Site services to buildings require underground services installed in trenches, manholes, reinforced concrete encasement of ducts, etc.

.2 This section covers the supply and installation of underground civil work required for electrical installations. The civil work shall include but not be limited to:

- .1 Trenching and excavation
- .2 Concrete encasement rebarring, etc. of underground raceways
- .3 Manholes and pull boxes
- .4 Concrete luminaire bases
- .5 Sand bedding and back filling
- .6 Repairing existing grade finish
- .7 Pull pits beneath main switchgear, secondary distribution centres, and in Communications Rooms.

.2 Protection of Existing Features

.1 Contractors are to be made aware of existing features, trees, sidewalks, walkways, roadways, and other items which must be protected from damage.

.3 Clearances and Depth of Raceways

.1 Unless specifically stated on plans, the following clearances are to be maintained for all underground raceways, to be used for power cables and communications.

- .1 Between communication and power raceways:
  - .1 in concrete encasement - 75mm
  - .2 direct buried raceway - 300mm
- .2 From all gas, water (except landscape sprinkler lines) and sewer utilities:
  - .1 1000mm running parallel
  - .2 500mm at crossings
  - .3 150mm at crossings is allowed if electrical raceway is concrete encased for length of crossing, plus 1000mm to either side of crossing.
- .3 From landscape sprinkler lines
  - .1 1000mm running parallel
  - .2 150mm at crossings if sprinkler lines are run over electrical lines.

.2 Unless specifically stated on plans, the following clearances are to be maintained for all underground direct buried cables for power and communications:

- .1 Between communications and power - 600mm.
- .2 From all gas, water (except landscape sprinkler lines) and sewer utilities:
  - .1 1500mm running parallel
  - .2 1000mm at crossings.
  - .3 150mm at crossings is allowed if cable is sleeved with duct and concrete encased for 1000mm to either side of crossing.

.3 Unless specifically stated on the plans, the following depth of raceways shall be a minimum from top of duct:

- .1 Roadways and private property except rock excavation:
  - .1 Communications - 600mm
  - .2 Secondary power to 750 volts - 600mm

.3 Power above 750 volts - 900mm

.2 Rock excavation:

.1 All systems - 150mm from the top of concrete encasement. All raceways to be concrete encased with a minimum of 50mm concrete all round.

.4 Unless specifically stated on the plans all cables shall be buried to a minimum of 1000mm.

.4 Backfill

.1 Sand shall mean screened pit material, free of all organic material. Screen shall eliminate all stones over 5mm in diameter and any sharp debris.

.2 Selective granular material shall mean material found in excavation or obtained from a gravel pit, that excludes rubble, hard packed clays, sharp objects or rock that could cut duct or cable, and be free of all stones over 50mm in diameter.

.3 Native material, shall mean material found on site, excluding material that would deteriorate over time, for example wood scraps or rubble, and stones over 300mm in diameter.

.4 Crushed rock and drain rock shall be as obtained from reputable gravel pit, clean of rubble and fines.

.5 Concrete Mix

.1 Type 10 Portland cement, min. compressive strength 20 Mpa at 28 days, slump 50-75mm at point of discharge, nominal coarse aggregate.

.6 Drainage

.1 Floor drain in each manhole to consist of floor drain, backwater valve trap and pipe connection to provide positive drainage to storm drain system.

.2 Sump pit 300 x 300 x 125mm with rock drainage only allowed if specifically noted for each location.

.3 Provide power connections to sump pumps indicated on mechanical or civil drawings.

.7 Manhole

.1 Concrete manhole neck to bring cover flush with finished grade or 40mm above grade in unpaved areas.

.2 Build up neck with brick and mortar to achieve above.

.3 Precast concrete manholes, for primary power and communications services where indicated on plans.

.4 Concrete manhole neck to bring cover flush with finished grade or 40mm above grade in unpaved areas.

.5 Build up neck with brick and mortar to achieve above.

.6 Size 4.3 metres long x 2.5 metres wide x 1.8 metres inside depth. AE Precast Products Ltd. #4212-'C' Series Manhole Type.

.7 Manhole to be complete with knockout windows, steel reinforcement, unistrut channel supports (all sides), pulling irons, circular sump complete with metal cover, grounding sleeve, and #C-23/23A cast iron frame and traffic rated cover marked "Electrical" for power services, and "Communications" for communications service manholes.

.8 Manholes to be complete with minimum 610mm deep concrete sump complete with concrete base, cast iron grate, and suitable for 100mm mechanical drainage service entry.

.9 Seal all penetrations.

.8 Manhole Frames

.1 Cast iron manhole frames and covers road rated.

.2 Hinged checker plate standard covers for pre-cast manholes or pullboxes.

.9 Ground Rods

.1 Ground rods - 3 metre copperweld. Provide ground rod to each manhole.

.10 Cable Racks

.1 Cantruss preset inserts for rack mounting, hot dip galvanized cable racks and supports on all faces of manholes and pullboxes - two if side exceeds 1.2m long.

.11 Luminaire Bases

Supply and install luminaire bases consisting of round concrete reinforced bases. In landscape areas, bases are to be 100mm above finish grade and flush with grade at concrete surfaces.

.12 Cable Pulling Equipment

Pulling irons of galvanized steel rods, size, shape and location as indicated.

Standard polypropylene pull rope with tensile strength 5kN continuous in each duct run.

Best Practices Guide for Teaching and Learning Spaces

2010 - References: Alex Solunac, Ron Stevens, Classroom Design Manual 3rd edition

PART 1 GENERAL – Applicable to all Teaching and Learning Spaces (TLSs)

1.1. Introduction

This guide is to be used as a reference guide for best practices for standards dealing with the design of learning and teaching space at the University of Victoria. As each room has its own unique properties, the following standards apply to very basic requirements for providing a standard that is expected in teaching spaces on campus. This guide is by no means the only reference that architects or designers should use. *It is essential that Client Technologies be involved in every step of the process with the design and development of learning and teaching spaces on campus*.

Students have the fundamental right to a classroom learning environment that allows them to:

- see anything presented visually (sight lines),
- hear any audible presentation free from noise and distortions (acoustics), and
- be physically comfortable (air flow, temperature, furniture, etc.)

regardless of the method of instruction used. Any classroom design plan should first meet these requirements before meeting other needs.

As there are very different requirements for learning and teaching rooms, this guide focuses on five categories:

1. Lecture Halls,
2. Classrooms,
3. Computer Labs
4. Sciences Labs
5. Videoconferencing Rooms.

Separate guidelines have been provided for each type of classroom. However, the boundaries between them are not absolute and require some interpretation based on individual facilities and applications.

The provisions of this part (PART 1) apply to all Teaching and Learning Spaces, unless otherwise noted. Parts 2 to 6 specify additional requirements specific to each type of space.

1.2. Design Elements

1. Site and spatial relationships

Teaching and Learning Spaces (TLSs) should be separated from noise-generating activities inside or outside the building. To reduce external noise, sound buffers must separate classrooms from areas such as streets, parking lots, housing areas, plazas or other areas where students gather, recreation sites, athletic fields, waste pickup sites and loading docks. To reduce internal noise, classrooms should be isolated from building mechanical systems, elevators, restrooms, vending areas and other noise generating areas.

2. Building Entrances

To reduce the impact of exterior noise and temperature differences, all building entrances should have two sets of doors, one from the outside into a vestibule and a second from the

vestibule into the building. Building entrances should be near classrooms to limit the distance students must travel through non-instructional areas to reach classrooms.

Large capacity classrooms and lecture halls should be located closest to the building entry. Large numbers of students walking through hallways can disturb classes already in session; consider sound absorbing surfaces in corridors, where necessary to control noise.

If classrooms must be located on upper floors, the stairways must accommodate the number of students who may leave and arrive at the same time.

3. Restrooms

Restrooms shall be located on each floor and their capacity be calculated according to the number of students in the area during the class change, rather than to the capacity of the classrooms. To prevent noise transmission, classrooms and restrooms shall not have a common wall or ceiling.

4. Doors

All classroom and lecture hall doors shall be min. 900mm wide and have a vision panel in order to prevent injury when being opened. Vision panels shall be of shatter-resistant glass, tinted to reduce light transmission. Code permitting, the area of glass shall not exceed 375cm^2 (60 sq in). The base of the vision panel shall be at 1070mm and the top not lower than 1820mm (42" to 72") above the floor.

Door handles shall be leaver type (not knobs) for accessibility. All doors shall be equipped with hardware that provide a slow and quiet closure to a tight sound seal when fully closed. To facilitate traffic flow during the change of classes, provide door hold-open hardware.

Doors shall not contain ventilation louvers, as they permit sound transmission from hallways.

Doors should be located to minimize congestion problems in the hallway when classes are changing. When possible, doors should be recessed into the room so that the door does not swing into the hallway and shall not swing into the primary flow of traffic, to minimize the danger of someone in the hallway walking into the leading edge of the door. If it is necessary for the door to open into the hallway, provide visual identification (such as the tile pattern on the floor) to indicate the amount of space required by a swing-open door.

5. Spatial Configuration

There must be no posts, pillars or any other obstructions anywhere inside a TLS, that would block the view of the teaching area or screens from any seat.

6. Seating

At least 10% of the seating in all classrooms shall be for left-handed students.

All classrooms shall provide seating for students with a disability (1 for up to 25, 2 for 26 – 50, 4 for 51 – 300, 6 for 300-500).

Tablet armchairs shall provide the student with at least 1,000cm^2 (150 sq in) of writing surface and 1.2 to 1.4m^2 (13 – 15 sq ft) of space.

Classrooms with tables and chairs require a minimum of 1.85m^2 (20 sq ft) for each student.

Tables shall be 460 - 610mm deep.

1.3. Acoustics – Lecture Halls and Classrooms

1. General - Good listening conditions (i.e. a quiet room) depend on four basic factors:
    1. The amount of noise entering the room from outside sources.
    2. The loudness of the various sound sources within the room (with or without amplification)
    3. The distribution of sound to all parts of the room
    4. The fidelity and clarity of the sound (lack of echo, reverberation, distortion etc.)

2. Walls

Walls should have a minimum Sound Transmission Class (STC) rating of 52. All walls shall extend to the structural floor or roof above (do not stop at the dropped ceiling). This will reduce noise transmission as well as improve security.

Higher STC ratings and special wall construction details must be included whenever classrooms must be located adjacent to, above or below restrooms, mechanical rooms, elevator shafts etc.

Concrete masonry units may be used as structural walls, but may have to be covered with another finish in order to provide proper acoustics.

3. Ceiling

Sound must be loud enough to be heard by people sitting at the rear of the room as well as those at the front. The ceiling is the most critical element inside the room assuring effective distribution and appropriate volume of sound throughout the room. The ceiling should act as a sound mirror, reflecting sound downwards to blend with the direct sound. This is why the ceiling should include significant amounts of hard surfaced material.

The surface of the ceiling must be designed to accommodate the required acoustical properties of the room. The area of the ceiling that should be covered with acoustical tile is related to ceiling height.

Ceiling height clearance		Proportion of Acoustic Tile
2,440mm	(8')	40 to 50 percent
3,050mm	(10')	50 to 60 percent
3,660mm	(12')	50 to 60 percent

*These numbers assume the use of acoustical tile with a Noise Reduction Coefficient (NRC) of 0.70 typical (0.55 minimum) in a ceiling suspension system.

4. Floors

Classrooms with less than 75 students should have carpeted floors unless the walls and ceilings contain acoustically absorbent material, otherwise they can have a hard surface.

The colors of the floors should remain within the medium spectrum and complement those of the walls.

5. Isolation from Mechanical System Noise

The mechanical systems supporting classrooms shall generate a background noise of no more than NC 35. To achieve this, the HVAC system requires careful design, competent instillation and balancing, and regular maintenance. Factors that influence the design of a quiet operating system include air handlers or fans located away from the classrooms; low velocity of air within the room; and proper sizing and acoustical treatment of ducts, returns and diffusers.

1.4. Lighting Systems and Controls

1. General Lighting

The control of light in a general purpose classroom has become increasingly important with the growing use of technology. While adequate lighting levels can be achieved through a variety of approaches, it is essential that all instructional spaces have a range of lighting possibilities, from a comfortable level for reading and seeing the chalkboard to sufficient darkening at the projection screen to accommodate various types of projection while still permitting enough light in the seating area for note taking. Selection of lighting systems should meet program requirements while achieving energy efficiency.

The room lights should provide 550 to 650 lux (50 to 60 foot-candles) at each writing surface, including the teaching station. Diffusers used in ceiling fixtures shall be non reflective. General lighting shall be uniformly distributed throughout the room. Excessive illumination can be as debilitating to students as too little illumination.

2. Types of Lighting

   Provide ceiling recessed fixtures, to avoid interference with visual image projection. Light fixtures shall not be mounted near the projection screen where they could interfere with the projected image. *Hanging lighting is not to be used in lecture halls, classrooms, seminar rooms, laboratories, computer labs, video conference rooms or any teaching areas.*

3. Note-Taking/ Dimmable Lighting

   To provide low light in the seating area so that students can take notes during projection, two approaches are commonly used in general purpose classrooms. In both approaches, the front zone near the screen is turned off.

   For rooms with incandescent lights, dimmers work well and provide excellent control of the lighting levels.

   With fluorescent lights, controlling individual tubes within each fixture provides the ability to lower light levels (i.e. turning off two of three tubes in a three tube fixture). For example, one switch can be an on/off control for two of the tubes in a three tube fixture. A second switch can control the third tube. In a room with 50 foot candles of light at the student work surface, turning off two tubes can reduce the level to 16 2/3 foot candles.

4. Chalkboard Lighting

   Illumination of the chalkboard shall be 10-15 lumens distributed uniformly across the entire writing surface. If the lecture hall or classroom is designed with a large amount of chalkboard/whiteboard, the lights over the writing surface should be controlled in separate sections to permit illumination of a portion of the board while one projection screen is in use. Proper selection and installation of the board lighting should ensure that the lamps in the fixtures will not be visible to students seated in the front rows. The board lighting should not interfere with the raising/lowering of the screen(s).

   Acceptable chalkboard lighting product: Insight - Compact-5 CF5HO T5HO Lamp / SMM Wall Mount / Multiple Luminaire Run.

   Lighting shall run the full length of the boards and the switches for the lighting should be labeled and located close to the teaching area. For long runs of lighting, they should be in two switchable zones.

5. Ambient Light

   Ambient light within the room should be controlled so that it is far away from the projections screen(s) and is not a visual distraction. Blackout blinds, curtains or shutters are required for this.

6. Emergency and Aisle Lighting

   Emergency lighting and exit signs shall be self illuminating and be located so that they do not interfere with the image on the projection screens, or provide visual distraction to the audience

7. Controls

   All switching shall be kept simple, with the user in mind. Light switches shall be clearly labeled as to function. Standardization among rooms is recommended. There should be a simple on/off switch located at the entrance door of the room. If there is more than one door to the room, there should be switches located at each door. A bank of light switches should be located in the teaching area near or at the podium. This will allow the professor the ability to change lighting with little disruption to the class.

The lighting shall be banked so that it is possible to switch zones of ceiling light from the front to the rear of the room so as to maintain higher light levels in the rear of the room while reducing the light level in the front when using various projection devices at the front of the room.

A work light must be provided in the instructor area but care should be taken to insure that the light does not spill onto the projection screen. A ceiling mounted incandescent pot light with barn doors or baffles above the teaching area are acceptable, or a desk mounted gooseneck task light is also acceptable.

To accommodate projection needs, room lights should be switched by zone, with the zones running parallel to the screen. At least two zones are needed, one for the projection screen area at the front of the room and the other for the seating area. The larger the room the more zones are required.

All automated light control systems should provide for a manual override.

1.5. Electrical and Telecommunications Services

1. General

It is essential that all teaching rooms be provided with ample electrical power to meet all present-day needs as well as have additional power available for future applications.

The number of electrical outlets in the room depends in part on the special functions that may be assigned to the room. In general, rooms below a capacity of 50 should have a single duplex outlet in each side wall of the room, one fourplex outlet in the centre of the rear wall of the room, and three outlets in the front of the room (one fourplex outlet located in the centre of the front wall and one duplex outlet near each corner). A computer lab or science lab will require many more outlets located on bench or desk areas. The number of outlets required is very much dependent on the user's needs.

No outlets anywhere in the classroom should be controlled by a switch that could be confused for a light switch.

In rooms with capacities of 50 to 75, there should be two outlets evenly spaced in each side wall, three fourplex outlets at the front wall, and two fourplex outlets at the rear.

All wall outlets shall be mounted 450 to 610mm (18" to 24") above the floor. In addition, electrical service (and conduit / cable trays) should be provided in the ceiling for future projection and wireless communication capability.

All classrooms shall be connected to campus networks for voice, data, and video communication.

All low-voltage connections should be separated from the electrical circuits to the room. The low-voltage services should be isolated from each other through separate conduit. These services include controls for the audio, video, data and voice feeds. These circuits should not be tied to ground.

All conduits should have pull strings in them when installed.

All conduits, trays and cabling should be clearly labeled at all termination locations so that a knowledgeable person who has never seen the installation before can identify the services in the room.

2. AV Cabinets

UVic has two standard AV cabinets: "B" and "D" type (**see Appendix 1 & 2**).

There are other kinds of existing cabinets on campus, but all new teaching rooms are destined to have a B or D type cabinet. Both cabinets are to have power and data.

The cabinet is both, the instructor's teaching desk and the operation center for the teaching space. The cabinet shall provide lighting, projection, sound and electric blinds control, as well as space to place a laptop, notes and other instructional material.

As each room has its own AV requirements, a brief overview of standards for the cabinet can be explored, but it is by no means set for each room, as requirements vary.

Power: Cabinets should have a double gang outlet in the cabinet. This should be located in the Technician access area. A single gang outlet should be located on the top of the cabinet for instructor use. Additional power may be required depending on the nature of the room.

Data Port location:

.1 "B" type Cabinets should have eight data ports, including six located in the Technician access area. Two data ports should be located on the top of the cabinet for instructor use. Additional data may be required depending on the nature of the room.

.2 "D" type Cabinets should have four data ports, including two located in the Technician access area. Two data ports should be located on the top of the cabinet for instructor use. Additional data may be required depending on the nature of the room.

Lighting: If lighting switches are to be located on the cabinet, they should be labeled and located to one side, as to not interfere with the teaching space required for notes or a laptop.

Screen or blind controls: If these controls are to be located on the cabinet, they should be labeled and located to one side as to not interfere with the teaching space required for notes or a laptop.

3. Video Data Projectors

Video Data Projectors (VDPs), have become the main electronic teaching tool in classrooms. As other older technologies such as 16mm film and 35mm Slide Projectors are becoming rare in classrooms, the VDP has the option of showing slides (Power Point, Keynote, etc.) and video. It has the ability to be flexible as technology advances and changes. The VDP is usually mounted on the ceiling of a classroom or in the ceiling of a media booth if it is a large lecture hall.

For optimum results with a VDP, control of natural and artificial light is critical. Window coverings must be opaque. Room lights must be designed so that the projected image is not washed out, and allow for note taking – dimmable to 5 to 10 foot-candles over the student area.

The conduit that provides a feed from the cabinet to the VDP should be 2 inches in diameter. At the location of the ceiling mount for the VDP there should be a single gang for power and a data port.

4. Audio Conduit

All speakers conduits shall be 50mm (½ inch) diameter if it is for a single cable run. If more cables are expected to travel in the same conduit, the diameter of the conduit should rise with the number of cables. Speaker locations are at the front of a room usually one speaker on each side of the screen. Larger rooms will require additional speakers and their locations will have to be decided at the design phase. All speaker conduits should home run to the AMP in the AV cabinet or booth.

5. Shutdown Timers

Shutdown Timers are devices developed at UVic to safely shutdown VDPs that have been left on after a class has finished. The shutdown timer is a motion sensor, and therefore has to be installed at a location in the room where the sensor has a clear view of the room. It should be placed up close to the ceiling and it requires a dedicated ½" conduit with a single gang box at the sensor location with a home run to the cabinet. It should not be placed behind a pull down screen or in an area where things can be placed to block its view.

1.6. Projection Surfaces, Chalkboards and Whiteboards

1. Screens

   Lecture theatres should always have a high ceiling at the front of the class to accommodate a projected image on the wall surface above the chalkboards (*the projection surface*). Often in large lecture theatres, two or three projected images are projected concomitantly. The wall that is to be used as a projection surface shall be painted a C4 flat paint.

   Electric Screens are not desirable as they cover chalkboard space when they are down; they can malfunction, and the turn-around time for repair is extensive and expensive.

   Classrooms, Labs and Seminar Rooms shall have a 2,130mm (84") Da-Lite, matte white, wall mounted pull down screen. This is a standard in all UVic classrooms. Screens shall not be mounted near an air exhaust/intake duct since airflow can cause the screen to move.

2. Visual Display Surfaces

   All Lecture Halls and Classrooms shall be equipped with Chalkboard Slider Units (2 deep or 3 layers) – black surface, located at the front of the classroom

   1. The length of sliders, in relation to the overall chalkboard length, shall be determined to minimize vertical lines (a 16' chalkboard shall have 2 – 8' sliders).
   2. Sliders shall be mounted at 915mm above floor and extend to 2,130mm (1,220mm overall height, including frame).
   3. Whiteboards shall not be used in these spaces, due to fumes, increased maintenance and costs.

   Boardrooms or labs shall be equipped with fixed chalkboards, whiteboards and tackboards, as directed by FMGT.

PART 2 LECTURE HALLS

2.1. General

Lecture Halls are defined as any TLS that can seat more than 50 students.

Lecture Halls should be located on the ground floor near entrances to facilitate the movement of students in and out of the hall.

2.2. Design Elements

1. Space Geometry - General

   The complexity of design increases with the size of the space. It is not a linear process; design mistakes that may go unnoticed in a small seminar room will be magnified many times in a large lecture hall to the point that the space may become dysfunctional.

2. The Room

   To provide good sight lines and acoustics, lecture halls should be a modified fan-shaped design. Student seating can be arranged up to 45 degrees off the center axis of the room to provide good viewing angles from all seats.

   Depth to width ratio shall be no greater than 1.5, measured at the midpoint of the seating area.

   All lecture halls should have more than one entrance to the room.

3. Floor

   The desirable slope of the floor in a lecture hall is 1:12. If the rise from one row to the next is not more than 100mm, then the seating in each row shall be offset to permit clear visibility to the front of the room.

   The slope of the floor in a lecture hall should maximize sight lines.

   Provide adequate landings to sloped floors that extend over 9m (30 feet).

4. Stage

   There should be no stage or elevated area at the front of the room. This is required in order to maximize the area above the chalkboards for the projection of images from the Video Data Projector(s) (VDP). Also, as observed and stated by UVic faculty, a stage hampers teaching and separates the class from the teacher.

5. Ceiling

   Ceiling heights will vary, depending upon the size of the room. All lecture halls will have VDPs installed in them. There must be a clear path between the VDP and the projection surface.

   Optimum ceiling height guidelines are listed below:

Distance to last row	Rear of the lecture hall	Front of the lecture hall
15,250 mm (50 ft)	3,050 mm (10 ft)	5,180 mm (17 ft)
22,900 mm (75 ft)	3,050 mm (10 ft)	6,700 mm (22 ft)
30,500 mm (100 ft)	3,050 mm (10 ft)	8,550 mm (28 ft)

6. Projection Screen

   The screen has an aspect ratio of 4:3

   Typically, the bottom of the screen area is at the same elevation with the top of the chalkboard and projects outwards to allow the installation of chalkboard lighting.

   The distance from the screen to the farthest viewer: no more than four times the screen width

   The distance from the screen to first row of seats: no less than two times the screen width

2.3. Acoustics

Attempt to provide walls that are not parallel. Walls shall have a rough or textured surface.

2.4. Lighting Systems and Controls

See the same titled heading in PART 1, above.

2.5. Electrical and Telecommunications Services

1. AV Cabinets

   UVic requires that a "B" type cabinet is installed in lecture halls. (Appendix 1).

   In all large lecture halls a height-adjustable lectern is required for presenters with a disability. UVic is using the *Egan 2002 ADA Lectern* for lecture halls.

2. Video Data Projectors

   See the same titled heading in PART 1, above.

3. Audio Conduit

   Lecture halls require additional speakers and their locations will have to be decided at the design phase.

4. Shutdown Timers

   Conduit to cabinet - provide:

   - 50mm (2") conduit to the VDP location, (one 50mm conduit per VDP).
   - individual 13mm (½") conduit to each speaker location.
   - 13mm (½") conduit running to the shutdown timer.
   - Extra conduit as required by the design of the room.

5. Projection Booths

   Lecture halls shall have projection booths at the back of the rooms. These rooms are to provide security and to isolate the sound and heat generated by the VDP(s) from the main room. The booths are to be keyed to a technician access only key. The booths can in many cases house AV and data support equipment. The booths shall:

   .3 have a large window that looks out into the lecture hall.

   .4 provide power and data for each VDP location on the ceiling in the booth.

   .5 have adequate air flow, as the VDPs generate a substantial amount of heat.

   .6 be provided with a 50mm (2") conduit for each VDP. This conduit in most cases runs to the front of the lecture hall to the AV /Instructor desk.

   .7 have lights that are on a dimmer system, controlled from within the room.

   Access to the booths should be from outside the lecture hall. This is to provide technicians with a way to enter the booth while classes are in session without disturbing the class.

2.6. Projection Surfaces and Chalkboards

1. Screens

   Maximize the projection area above the chalkboard, to allow for a larger projected image to be seen by students. This is a critical issue: the projected image shall be as high on the wall as possible. Items like hanging lights, HVAC and conduit can cause problems with viewing and are not acceptable.

2. Chalkboards

   See the same titled heading in PART 1, above.

PART 3 CLASSROOMS

3.1. General

Classrooms are defined as any TLS that can seat 20 - 75 students and have at least 32.5m² (350 sq ft) of space. They are the most numerous on the UVic campus. Well designed classrooms are a critical factor in creating an appropriate environment for effective instruction.

3.2. Design Elements

1. Space Geometry - General

   Classrooms shall be designed so that the length is approximately 1.5 times the width of the room. Rooms that are wider than they are deep normally present unacceptable viewing angles for projected materials and for the chalkboard. With the increased use of projected materials, especially computer imaging, the shape and dimensions of classrooms are more critical than ever before.

2. The Room

   The front wall (including thermostats, light switches, etc.) of the room behind the instructor area should have no protrusions into the room so that a chalkboard can be installed across the entire wall of the instructor area.

3.3. Acoustics

See the same titled heading in PART 1, above.

3.4. Lighting Systems and Controls

1. Note-Taking / Dimmable Lighting

   See the same titled heading in PART 1, above AND provide:

   - multiple zones running from front to back of classroom.
   - dimmable fluorescent fixtures for general seating area. Sufficient light is required for student note taking during instruction with VDP, with no light wash on screen surface.
   - separate or dedicated task light (focus, dimmable) at instructor's millwork location.
   - control of lights for room, located at teaching area.

2. Instructor Lighting

   A desk mounted goose neck light is required for instructor's use. This is to be mounted on the desktop of the "B" or "D" cabinet.

3.5. Electrical and Telecommunications Services

1. AV Cabinets

   UVic requires that a "D" type cabinet or a "B" type cabinet is to be installed in classrooms (depending on size of room or requirements for equipment, please see attached PDF).

   In all large classrooms a height-adjustable lectern is required for presenters with a disability. UVic is using the *Egan 2002 ADA Lectern* for lecture halls.

2. Video Data Projectors - see the same titled heading in PART 1, above

3. Audio Conduit - see the same titled heading in PART 1, above

4. Shutdown Timers

   See the same titled heading in PART 1, above AND provide:

Conduit to cabinet:

- 50mm (2") conduit to the VDP location, (one 50mm (2") conduit per VDP).
- individual 13mm (½") conduit to each speaker location.
- 13mm (½") conduit running to the shutdown timer.
- extra conduit required depending on the design of the room.

3.6. Projection Surfaces and Chalkboards

1. Screens

   Often in classrooms two images are projected on to the screens; one from the VDP and one from the Overhead projector.

   Classrooms should have a high ceiling at the front of the class to accommodate a projection surface on the wall above the chalkboards.

   When the ceiling height does not allow a projection surface on the wall above the chalkboards, provide 2,150mm (84") Da-Lite, mate white, wall mounted pull down screens. Install screens as high as possible.

2. Chalkboards

   Chalkboards sliders as described in the same titled heading in PART 1, above .

PART 4 COMPUTER AND SCIENCES LABS

4.1. General

Computer labs and Science labs are similar in room layout, but often the electrical and data requirements are very different.

These points should be examined with the user groups for these kinds of rooms as their requirements will be very specific with concern to the kind of equipment (and amount of equipment) that is used in the rooms.

As far as Audio Visual needs are concerned, the same rules that are found in the first five pages of this document can be applied in these kinds of rooms. There is often more HVAC in these rooms due to heat from computers or to exhaust chemical smells from experiments. The requirements to keep the noise level down are often more of a challenge in these rooms.

4.2. Design Elements

1. Space Geometry - General

   The projection screen or chalkboard defines the front of the room. The cabinet shall be mounted in this area so that teaching faculty can utilize the screen and chalkboard easily.

4.3. Acoustics

See the same titled heading in PART 1, above AND provide:

4.4. Lighting Systems and Controls

1. General Lighting - see the same titled heading in PART 1, above
2. Controls - see the same titled heading in PART 1, above
3. Chalkboard Lighting - see the same titled heading in PART 1, above

4.5. Electrical and Telecommunications Services

1. AV Cabinets

   Provide extra power outlet in labs to accommodate the extra electronic items that are used. There should be extra data and power located in areas where AV is required.

   Most labs use a “D” type cabinet.

2. Video Data Projectors

   If a VDP is to be installed, it is usually mounted on the ceiling, 4,300mm (14’) from the center of the pull down screen.

3. Audio Conduit

   At the location of the ceiling mount for the VDP there should be a single gang for power and a data port.

4.6. Projection Surfaces and Chalkboards

1. Screens

   Provide 2,150mm (84”) Da-Lite, mate white, wall mounted pull down screens. Install screens as high as possible.

2. Chalkboards - see the same titled heading in PART 1, above

PART 5 SEMINAR AND MEETING ROOMS

5.1. General

As classrooms that can accommodate up to 20 students, *Seminar Rooms* are designed to facilitate interaction and face-to-face discussion among students and instructor. These rooms sometimes are used also for departmental meetings or conferences, but their primary use is for small class instruction.

5.2. Design Elements

1. The Room

   The projection screen or chalkboard defines the front of the room. If achieving maximum capacity is an objective, a single entrance at the front of the room will allow the incorporation of the entry space into the instruction area. A single rear entrance reduces interruptions from late-arriving students but will require more space.

   Although a formal teaching or presentation area is usually not as elaborate in a seminar/meeting room, the front of the room shall be large enough to accommodate a lectern or ”D” type cabinet, and provide enough space for an overhead projector on a cart.

5.3. Acoustics

See the same titled heading in PART 1, above AND provide:

5.4. Lighting Systems and Controls

1. General Lighting - see the same titled heading in PART 1, above
2. Controls - see the same titled heading in PART 1, above
3. Chalkboard Lighting - see the same titled heading in PART 1, above

5.5. Electrical and Telecommunications Services

1. AV Cabinets: ”D” type cabinet installed when instructed by FMGT.
2. Video Data Projectors

   If a VDP is to be installed, it is usually mounted on the ceiling, 4,300mm (14’) from the center of the pull down screen.

3. Audio Conduit

   The conduit that provides a feed from the cabinet to the VDP shall be 50 mm (2”) in diameter. At the location of the ceiling mount for the VDP there should be a single gang for power and a data port.

4. Dedicated Circuits

   The room shall have one or more dedicated circuits on a breaker not shared by any other room, and at least one grounded 120 volt duplex outlet centered on each wall mounted 450-610mm (18-24”) above the floor.

5.6. Projection Surfaces and Chalkboards

1. Screens

   Provide 2,150mm (84”) Da-Lite, mate white, wall mounted pull down screens. Install screens as high as possible.

PART 6 VIDEOCONFERENCE ROOMS

6.1. General

Videoconferencing is continually gaining importance as an effective method of communication and the design of these rooms shall reflect their significance.

6.2. Design Elements

1. The Room

   The room design shall provide excellent sightlines between the videoconferencing camera and everyone in the room. Therefore, the room shall be of a square or wide rectangle design.

2. Paint

   The room should be painted in a light blue or light gray color In order to enhance skin tone. Benjamin Moore paint numbers 1627 or 829 are ideal. The worst wall color to use is white, as it creates too much of a contrast and can literally erase the faces of participants by casting facial features in deep shadow.

3. Furniture

   Conference room tables: A lighter, but not reflective, surface is good as it will allow for some light bounce from VC lighting up into the faces of the participants causing less shadows on their faces.

6.3. Acoustics

1. General

   The videoconference room design has a tremendous impact on the audio and video systems used in the room. The room acoustics affect both the microphone pickup and the audio playback in the room. Room acoustics are a critical element in minimizing the echo-cancellation problems, and potential feedback problems.

   HVAC noise, reverberation and reflections that may not be noticeable to a person seated in the room can be problematic when a microphone is open in the room. A microphone does not have the sophisticated biological processing that the human brain has for ignoring unwanted sounds in favour of the desired sounds. The performance of the entire audio chain is directly tied to the decay of sound in the room.

   Videoconference rooms shall not be built next to or share a wall with a washroom. Plumbing noises can bleed though walls.

2. Walls

   Fabric on the walls: not always necessary if the first two items can provide sufficient sound dampening.

3. Ceiling

   Provide acoustic ceiling tiles or sound absorbent panels to reduce bounce echo off of the conference room table.

4. Floors

   Flooring shall be carpet to reduce bounce echo and to prevent audible noise from shoes or chair legs on the floor.

5. Doors and Windows

The door(s) into the videoconference room shall be made of solid wood and have rubber around the bottom to prevent outside noise from entering the room. There should be no vents in the door that will allow for outside noise to compromise the video conference.

If there are windows in the room they must be double pane and they must provide a solid seal to prevent outside noise from entering the videoconference.

6. Isolation from Mechanical System Noise

The HVAC systems should be dampened so that they cannot be heard when a conference is in session. A droning background noise can be picked up by microphones and transmitted at a much louder volume to the distance sites.

6.4. Lighting Systems and Controls

1. General Lighting

Lighting for videoconference rooms is one of the most important factors in successful videoconferencing. The goal is to have the room evenly lighted to prevent harsh light shadows on the percipients faces and bodies, but to have the front of the room, where the screens or monitors are situated, as dark as possible so that the distant site's images are bright and not washed out from the lighting in the room. The lighting controls should be set up in banks from the front of the room to the back. Scoop lighting (lighting that is manufactured for Videoconferencing rooms) should be used in the room. The Scoop lighting should be on separate lighting controls from the regular room lighting.

Left: **regular room lighting,** ***Right:*** **videoconferencing lighting**

The lighting controls for the room should be set up with the following options:

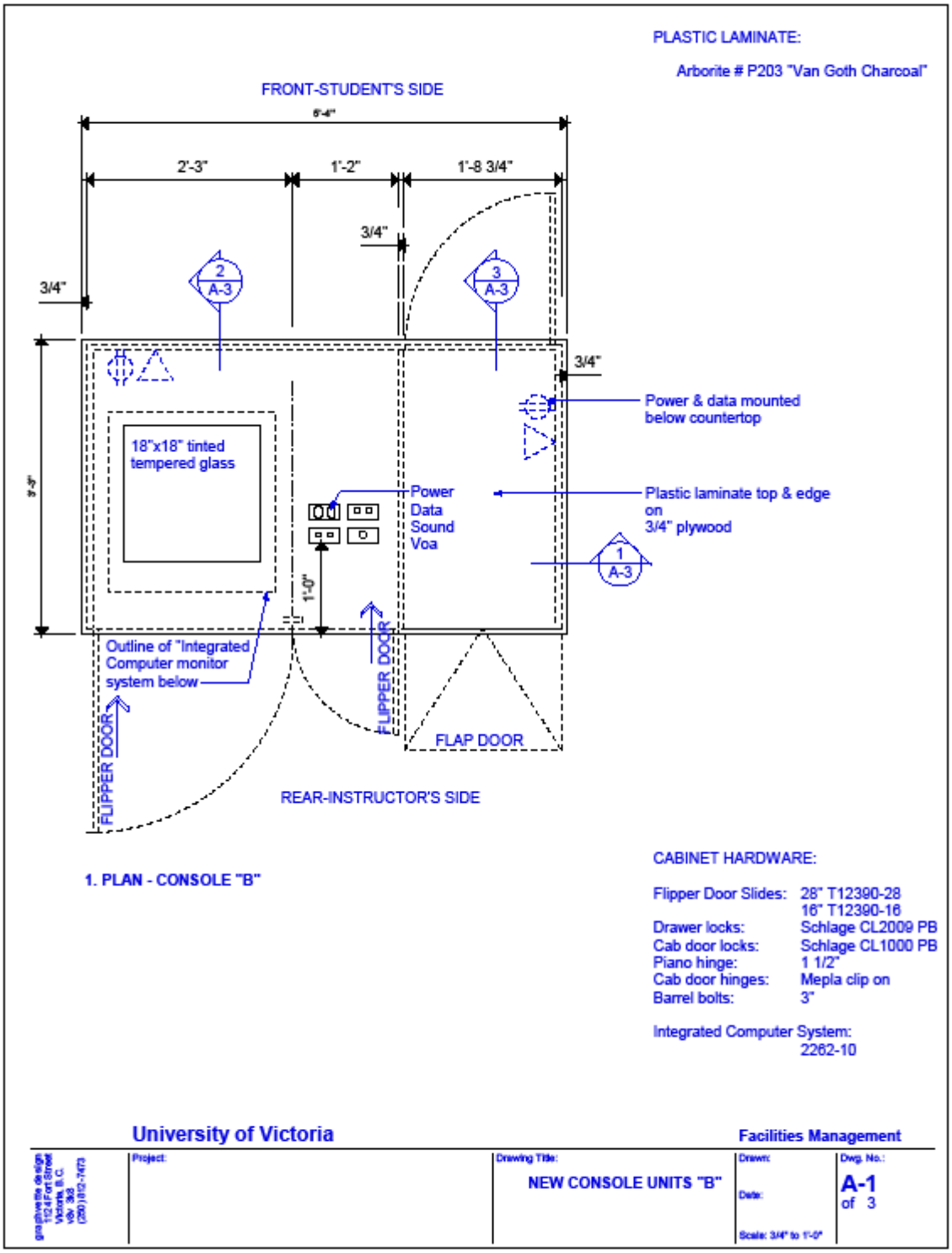
1. Scoop lighting should be used to prevent unwanted spill from the room lighting to fall on the screen or monitors. It is essential to use this lighting when designing a videoconference room.
2. Hanging lighting should not be used in a videoconference room.
3. Regular room lighting should be flush-mounted in the ceiling to avoid interfering with visual image projection and so that the camera on the videoconference unit can be on a wide shot of the room and not have the lights in its field of view.
4. Incandescent lighting can be used in videoconference rooms. Many rooms have both the scoop lighting and regular room lighting on dimmers.
5. Ambient light can cause problems with videoconferencing. Heavy blackout drapes or curtains are preferred for windows. They also work to dampen the reflective nature of sound in the room. Venetian blinds are not good as they can cast shadows or patterns on the faces of the people in the conference, and are poor for light control.

6.5. Electrical and Telecommunications Services

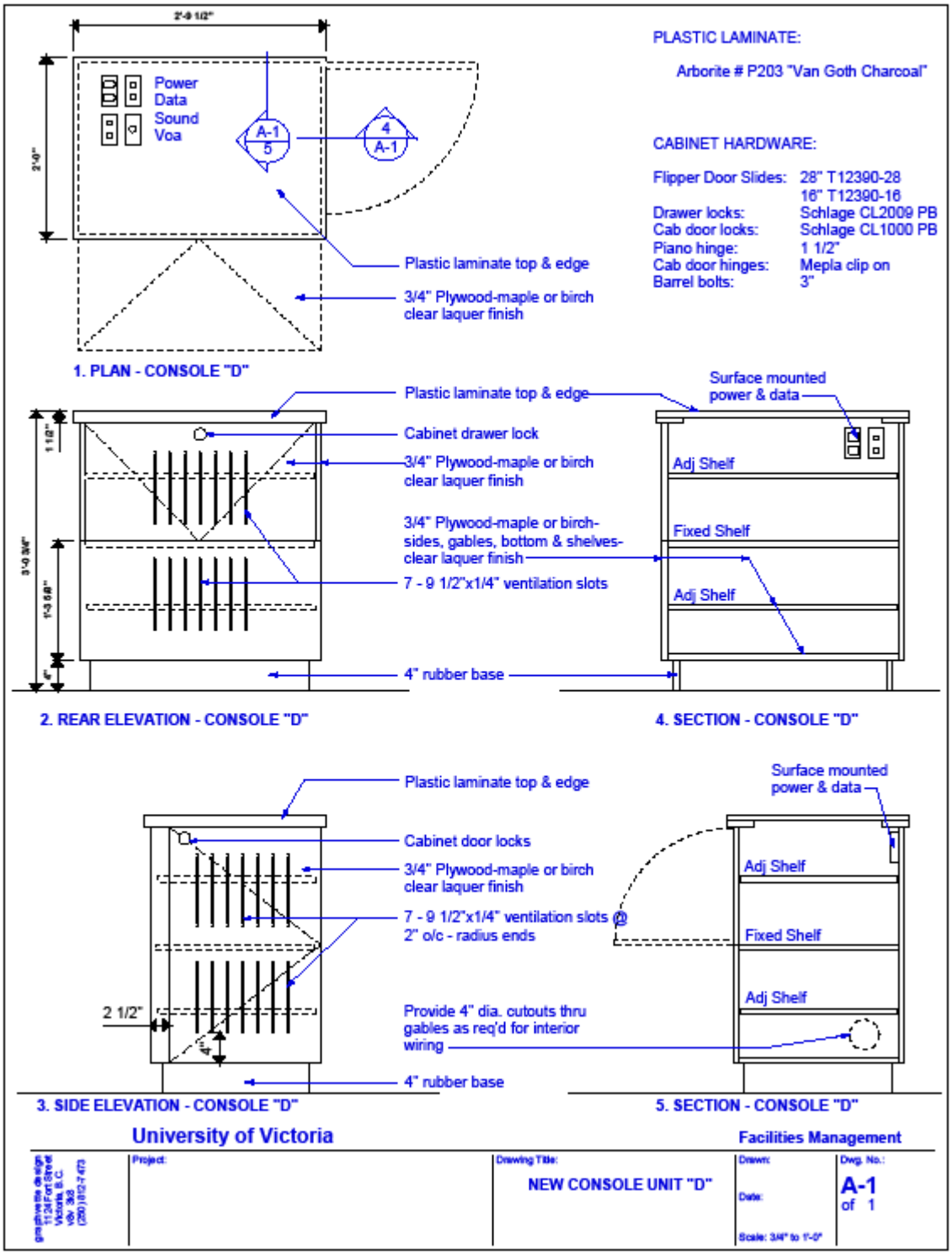
Electrical and data outlets should be located in a few key places in the room. Provide:

1. A dual gang power outlet on the wall where the monitors are to be placed. This is to provide power for the monitors, the codec and video camera.
2. Two data ports located in the same area as above.
3. 38mm (1 $^{1}/_{2}$") conduit in place next to the above power and data ports. This conduit shall run to an area where the room computer or laptop will be used. This might be at a podium or desk or under the conference table depending on the set up.
4. A dingle gang power and data under the conference table.
5. Standard power and data ports on the walls of the room to accommodate laptops.

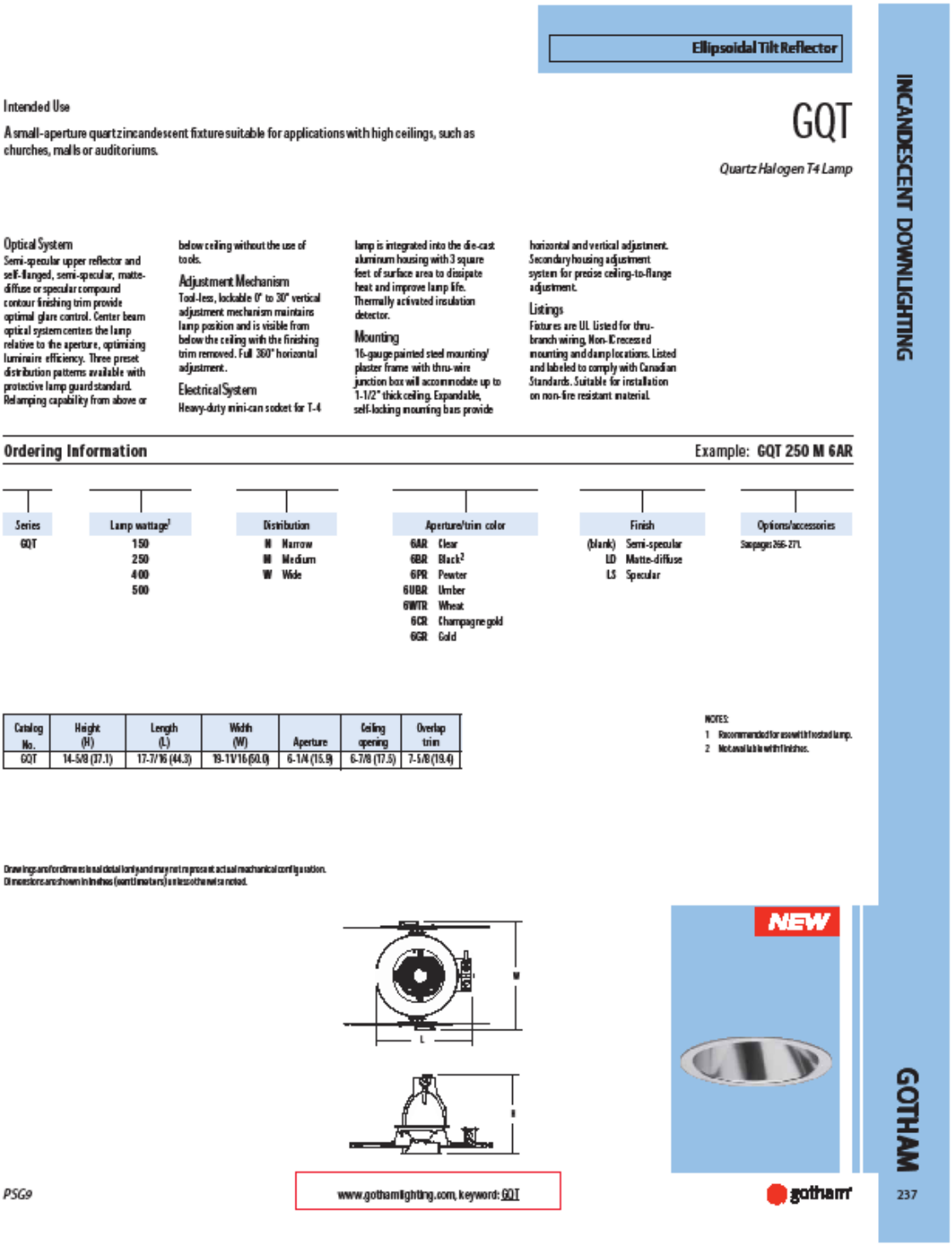
Appendix 1: Specific Equipment - Cabinet B



Appendix 2: Specific Equipment - Cabinet D



Appendix 3: Sample front of classroom lighting



Ellipsoidal Tilt Reflector

INCANDESCENT DOWNLIGHTING

GQT

Quartz Halogen T4 Lamp

Intended Use

A small-aperture quartz incandescent fixture suitable for applications with high ceilings, such as churches, malls or auditoriums.

Optical System
Semi-specular upper reflector and self-flanged, semi-specular, matte-diffuse or specular compound contour finishing trim provide optimal glare control. Center beam optical system centers the lamp relative to the aperture, optimizing luminaire efficiency. Three preset distribution patterns available with protective lamp guard standard. Relamping capability from above or below ceiling without the use of tools.

Adjustment Mechanism
Tool-less, lockable 0° to 30° vertical adjustment mechanism maintains lamp position and is visible from below the ceiling with the finishing trim removed. Full 360° horizontal adjustment.

Electrical System
Heavy-duty mini-can socket for T-4 lamp is integrated into the die-cast aluminum housing with 3 square feet of surface area to dissipate heat and improve lamp life. Thermally activated insulation detector.

Mounting
16-gauge painted steel mounting/plaster frame with thru-wire junction box will accommodate up to 1-1/2" thick ceiling. Expandable, self-locking mounting bars provide horizontal and vertical adjustment. Secondary housing adjustment system for precise ceiling-to-flange adjustment.

Listings
Fixtures are UL Listed for thru-branch wiring, Non-IC recessed mounting and damp locations. Listed and labeled to comply with Canadian Standards. Suitable for installation on non-fire resistant material.

Ordering Information Example: **GQT 250 M 6AR**

Series	Lamp wattage[1]	Distribution	Aperture/trim color	Finish	Options/accessories
GQT	150 250 400 500	N Narrow M Medium W Wide	6AR Clear 6BR Black[2] 6PR Pewter 6UBR Umber 6WTR Wheat 6CR Champagne gold 6GR Gold	(blank) Semi-specular LD Matte-diffuse LS Specular	See pages 266-271.

Catalog No.	Height (H)	Length (L)	Width (W)	Aperture	Ceiling opening	Overlap trim
GQT	14-5/8 (37.1)	17-7/16 (44.3)	19-11/16 (50.0)	6-1/4 (15.9)	6-7/8 (17.5)	7-5/8 (19.4)

NOTES:
1 Recommended for use with frosted lamp.
2 Not available with H finishes.

Drawings are for dimensional detail only and may not represent actual mechanical configuration. Dimensions are shown in inches (and millimeters) unless otherwise noted.

NEW

PSG9

www.gothamlighting.com, keyword: GQT

gotham

GOTHAM

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Appendix 4: Sample Lectern for Instructors with a disability

202 ADA Lectern

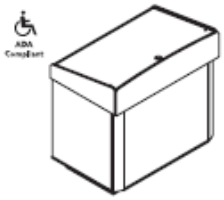
EGAN

Height-adjustable 202 ADA Lectern is equipped with a push button, electric-lift mechanism that adjusts the working height from 34–44". Inside clearance accommodates wheelchair access and complies with the Americans with Disabilities Act. Wiring grommets for field setup of laptops, tablets and microphone.

S2LH

202 ADA Lectern

(S2LH)



Code	Dimensions
S2LH	Upper-Height Position: 39"w x 44"h x 25"d
	Lower-Height Position: 39"w x 34"h x 25"d
	Worksurface: 38"w x 24"d
	Inside Clearance: 30"w x 24"d

- Electric lift motor has a one-year warranty.
- Aluminium extrusion "bumper" corners help prevent damage when moving.
- 2" locking casters for easy mobility.

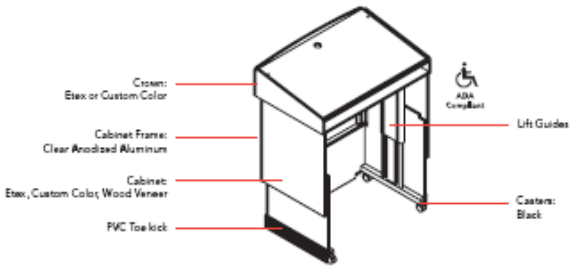
* Custom Color and Etex in any combination.
† Two Custom Colors in any combination.

Finish Combinations

Crown	Lower Cabinet	Price
Etex	Etex	$4,370
Etex*	Custom Color*	$4,490
Same Custom Color		$4,490
Custom Color†	Custom Color†	$4,610
Etex	Veneer	$5,390
Custom Color	Veneer	$5,510

Lectern Options

Code	Price	Description
B	$160	Lamp—12" electric goose neck lamp complete with dimmer switch.
T	$130	Clock/Timer—Liquid Crystal Display clock timer with front control buttons. The clock is flush-mounted in the top right corner of the crown support. Battery included.



Specify Crown finish followed by cabinet finish, as shown in sample code below.

Select An Etex Finish

EganMetallic	Black	Charcoal	Gray	Platinum	Putty	Sand	Slate	Taupe
EM	BL	CL	GR	PT	PY	SN	SL	TA

Select A Wood Veneer Finish

Light Oak	Medium Oak	Dark Oak	Black Oak
LO	MO	DO	BO

Cherry	Mahogany	Natural Maple	Walnut
CH	MA	MP	WA

* Veneer available on Cabinet only with an Etex or Custom Color Crown.
- For Custom Color, specify your desired color System ID, see page 44.
- For Custom Stain, add $120. Details on page 44.
- For Custom Logo details, see page 43.
- Custom Color Volumes are available on this product, see page 44.

How To Order This Product:

S2 LH PT MP BT

S2	LH	PT	MP	BT
202 Lecterns & Centers	ADA Lectern	Crown Finish: Etex Platinum	Cabinet Finish: Maple Veneer	Options: Lamp, Clock/Timer

University of Victoria | British Columbia Canada

Draft

University of Victoria

Communication Systems Guidelines

July 2009

1 Building Requirements

1.1 Telecommunication Rooms

1.1.1 Access

1.1.1.1 Telecommunication Room access will be restricted to Network Service's staff, or personnel specifically authorized for access by UVic Network Services. Telecommunication Rooms will be set-aside for the exclusive purpose of housing equipment associated with telecommunication service delivery. Any equipment, material, or service, which requires access by the building occupant, non-authorized personnel, or outside agency, is prohibited.

1.1.1.2 All entrance doors to the Telecommunication Rooms will be lockable.

1.1.1.3 Room numbers are to identify the exterior of the Telecommunication Room, with no reference made to its status of Telecommunication Room.

1.1.1.4 Every effort will be made for Telecommunication Room doors to swing outwards.

1.1.2 General

1.1.2.1 Telecommunication Rooms should be vertically aligned.

1.1.2.2 Telecommunication Room layout diagrams are based on standard Telecommunication Room sizes and will have rectangular shaped walls and floors. If the finished room sizes or shapes differ from the sample TR layout diagrams the layouts will need to be reconsidered by UVic Network Services, with possible significant component relocation to maintain necessary clearances. See Entrance Telecommunication Room Layouts (Appendix E) and Secondary Telecommunication Room Layouts (Appendix F).

1.1.2.3 19 mm plywood is required to cover all wall surfaces from the floor to the 2.44 m height to allow for hardware mounting and cable routing and anchoring.

1.1.2.4 Telecommunication Rooms will have cable trays. See Cable Tray Detail.

1.1.2.5 To facilitate the installation of cable tray 3 sections of Unistrut (or compatible) are required to run wall to wall on the ceiling. See Entrance Telecommunication Room Layouts (Appendix E) and Secondary Telecommunication Room Layouts (Appendix F).

1.1.2.6 Telecommunication Rooms should be located away from sources of electromagnetic interference (transformers, motors, x-ray, induction heaters, arc welders, radio, radar) until interference is less than 3 V/m across the frequency spectrum.

1.1.2.7 Sources of flooding, including overhead plumbing, will be avoided. With the exception of sprinkler systems, no piping, ductwork, mechanical equipment or power cable shall be allowed to pass through the Telecommunication Room.

1.1.2.8 Proper grounding and bonding is required for all patch panels, racks & cable trays.

1.1.2.9 Sealed concrete flooring is desired. Where flooring material is unavoidable, mono coloured finish will be used to produce a result where it is possible to locate small lengths of broken fibre created during fibre-optic cable terminations.

1.1.2.10 On completion of the contractor work within a Telecommunication Room, the area will be left in a clean state, free from debris.

1.1.2.11 Telecommunication Rooms will service areas not greater than 900 sm.

1.1.2.12 Telecommunication Rooms must not be more than 90 m of cable-distance from all associated communications outlets.

1.1.2.13 Telecommunication Rooms will have horizontal cable installed between the patch panels and communications outlets. See Horizontal Cable Detail.

1.1.2.14 Telecommunication rooms will have riser conduits to adjacent Telecommunication Rooms. See General Riser Conduit Detail.

1.1.2.15 Conduits are to be installed between a top floor Telecommunication Room and the roof. See Roof Conduit Detail.

1.1.2.16 Telephone riser cables will be installed between the Entrance Telecommunication Room and each of the Secondary Telecommunication Rooms. See 25-pair Cat5e Copper Riser Cable.

1.1.2.17 Telecommunication Rooms are not to have false ceilings, and all surfaces should be treated to reduce dust with walls and ceilings painted white or pastel to improve visibility.

1.1.2.18 The project's designated UVic Network Service Technician will review the Telecommunication Room final layout designs prior to construction approval.

1.1.2.19 The temperature within a Telecommunication Room will be limited to between 10 to 30 degrees C.

1.1.2.20 The humidity within a Telecommunication Room will be 10% to 80% non-condensing.

1.1.2.21 The Telecommunication Room will have at a minimum positive filtered air pressure.

1.1.2.22 Telecommunication rooms should have chilled water fan coil units to maintain temperature at 21 C.
1.1.2.23 A fan to draw heat from the rooms into an adjacent corridor will be required, but will only activate in the event of a power failure.
1.1.2.24 Telecommunication Rooms will have fire-rated doors.
1.1.2.25 Telecommunication Rooms will have automatic smoke detectors.
1.1.2.26 Telecommunication Rooms will have ambient lighting to 100-footcandles over the total room area by switched fluorescent lighting.
1.1.2.27 Doors will be fitted with dust sweeps.
1.1.2.28 Dust must be less than 100 micrograms/cubic meter/24 hour period.

1.1.3 Entrance Telecommunication Rooms

1.1.3.1 The minimum dimension of an Entrance Telecommunications Room is expected to be 2.75 m x 2.89 m.
1.1.3.2 Entrance Telecommunication Rooms will usually be sited on the lower floor.
1.1.3.3 Duct bank leading out to a manhole or pull box is required and will be clearly labelled at both ends. See General Backbone Conduit Detail.
1.1.3.4 The contractor is responsible for the purchase, installation, bonding and permanent fastening (bolting down) of fibre frame and relay racks to the building structure. See Components to be supplied by the Contractor (Appendix A).
1.1.3.5 All fibre-optic cables will be terminated in panels in a fibre frame. See Riser Cable Detail , Backbone Cable Detail and Components to be supplied by the Contractor (Appendix A).

1.1.4 Secondary Telecommunication Rooms

1.1.4.1 With the exception of the floor that houses the Entrance Telecommunication Room, each floor of every building will at a minimum have one Secondary Telecommunication Room.
1.1.4.2 The minimum dimension of a Secondary Telecommunication Room is expected to be 2.75 m x 2.59 m.
1.1.4.3 The contractor is responsible for the purchase, installation, bonding and permanent fastening (bolting down) of the relay racks to the building structure. See Components to be supplied by the Contractor (Appendix A).
1.1.4.4 All fibre-optic cables will terminate in a rack or on wall-mounted boxes. See Riser Cable Detail and Components to be supplied by the Contractor (Appendix A).

1.1.5 External Service Provider Telecommunication Space

1.1.5.1 A separate space designated for the exclusive use of External Service Providers is required to house communication equipment not related to, or under the control of UVic Network Services to assure researchers, granting agencies, auditors, etc., that UVic data are not exposed to third parties.
1.1.5.2 ESP Telecommunication space should be positioned within close proximity to an Entrance or Secondary Telecommunication Room.
1.1.5.3 The entrance way will be lockable, and keyed as a sub key to the UVic campus Telecommunication Room key set.
1.1.5.4 The recommended dimension of an External Service Provider Telecommunication Space is expected to be approximately 2 m x 1 m.
1.1.5.5 A minimum of two 50 mm conduits will be run between the External Service Provider Telecommunication Space and an Entrance or Secondary Telecommunication Room. See General Riser Conduit Detail.

1.1.6 Power

1.1.6.1 Standard “110v 15A” receptacles should be provided with circuit wiring adequate to upgrade to 20A service in the future.
1.1.6.2 All circuits (120v and 208v) terminating within an Entrance or Secondary Telecommunication Room will be connected to Emergency Generator backup power.
1.1.6.3 Circuits (120v and 208v) terminating in an External Service Provider Telecommunication Space may be connected to UPS or Emergency Generator at the Service Provider’s expense.
1.1.6.4 All circuits (120v and 208v) terminating on UPS or Emergency Generator must be clearly identified at the electrical outlet. See TR layouts Figure 2 (Appendix E), Figure 3 (Appendix E), Figure 4 (Appendix E), Figure 5 (Appendix E), Figure 7 (Appendix F), Figure 8 (Appendix

F), Figure 9 (Appendix F), Figure 10 (Appendix F).

1.1.6.5 The project's designated UVic Network Service Technician will review the Telecommunication Room power requirements prior to implementation.

1.1.7 Uninterruptible Power Supply

1.1.7.1 In buildings where centralized UPS is not provided, standalone UPS units will be provided for each Entrance or Secondary Telecommunication Room.

1.1.7.2 Entrance and Secondary Telecommunication Room UPS hardware must have Emergency Generator backup power support.

1.1.7.3 All electronic equipment located in an Entrance or Secondary Telecommunication Room will be supported by UPS.

2 Cable

2.1 Cable Detail

2.1.1 General

2.1.1.1 Contractors are requested to source the fibre-optic cable from Berk-Tek. Alternate manufacturers may be approved by special application to the project's designated UVic Network Services Technician (netadmin@uvic.ca).

2.1.1.2 Horizontal copper cable that is considered to be part of the UVic campus-cable infrastructure will be manufactured by AMP.

2.2 Horizontal Cable

2.2.1 Unshielded Twisted Pair

2.2.1.1 The length of any twisted pair horizontal cable shall not exceed 90 m.

2.2.1.2 The horizontal communications cable shall run without a splice between the Telecommunication Room and the communication outlet.

2.2.1.3 Horizontal cables will be as noted in the 'Components to be supplied by the Contractor (Appendix A)'.

2.2.1.4 All horizontal UTP wiring is to be terminated at the designated patch panel within the Telecommunication Room. The patch panels will be clearly labelled "Data-In".

Patch panel descriptions are as follows;

Panel	Description
Data-In	Horizontal Cable
Data-Out	Network Hardware
Tele-Out	Riser to the entrance closet

2.2.1.5 Implementation

2.2.1.5.1 The contractor will be responsible for the installation of the "Data-In" and "Tele-Out" patch panels. The number of horizontal cable runs will determine the quantity of patch panels. The panel locations are indicated on the TR layout diagrams. See TR layouts Figure 3 (Appendix E) and Figure 8 (Appendix F).

2.2.1.5.2 An indication of the patch panels to be supplied under the contract and their physical location is noted on the TR layout diagrams by a solid outline. The total number of voice and data connections required will determine the actual quantity of panels to be installed. Contact UVic Network Services at the 80% drawing stage for final layout drawings. See TR layouts Figure 3 (Appendix E) and Figure 8 (Appendix F).

2.2.1.5.3 Patch panels that are indicated by a dotted outline are for installation by UVic Network Services and identify space that must be kept clear of cable runs etc. See TR layouts Figure 3 (Appendix E) and Figure 8 (Appendix F).

2.2.1.5.4 UVic Network Services will be responsible for the installation of the "Data-Out" patch panels.

2.2.1.5.5 Telecommunication Rooms will be outfitted with patch panels, which will be mounted on adjustable deep wall brackets, sized to accommodate the bend radius of the horizontal cable and will have cable management rings. The cable management rings are to be mounted at the hinged ends of each patch panel. For positioning detail review the TR layout diagrams. See TR layouts Figure 3 (Appendix E), Figure 8 (Appendix F) and Components to be supplied by the Contractor (Appendix A).

2.2.1.5.6 Cable runs will have sufficient lengths of cable left for connection to patch panels within the Telecommunication Room.

2.2.1.5.7 All cables shall be bundled and supported to the walls at intervals of approximately 600 mm with tie-straps and saddles, Velcro type straps or specially designed cable clamps.

2.2.1.5.8 To avoid unnecessary stress on the cable, bundles will not be secured so tightly that the cable jacket deforms.

2.2.1.5.9 When cable lubricant is required, the chemical make-up must be compatible with the cable's outer sheath.

2.2.1.5.10 Cable installations need to be neatly dressed against the sidewalls of Telecommunication Rooms. On backboards, care must be taken to ensure that they do not obstruct other cables, mounted equipment or cable entry points.

2.2.1.5.11 Cable runs on cable backboards must be installed parallel to building lines and follows the perimeter of the backboard.

2.2.1.5.12 The cables are to be connected to the Telecommunication Room patch panels in sequential order and where possible by room number. The Data Jacks should be sequential within the rooms.

Example: Room 101 = D1, D2, D3
Room 102 = D4, D5, D6 etc.

2.2.1.5.13 A nylon pull string shall be left in all raceways after installation of the cable.

2.2.1.5.14 Cable Certification – All cables will:

- be certified/approved by CSA standard PCC FT4 flammability test, and UL CMR,
- meet or exceed the requirements in the National Electrical Manufactures Associated (NEMA) Standard for Low-loss Extended-frequency Premises Telecommunication Cable,
- meet or exceed the performance requirements of Level V of the Underwriters Laboratories Inc. specifications, and cable surface markings shall indicate this classification.

2.3 Riser Cable

2.3.1 General Fibre-Optic Riser

2.3.1.1 The fibre-optic riser cable shall run from the Entrance Telecommunication Room to each of the Secondary Telecommunication Rooms. See TR layouts Figure 1 (Appendix E) and Figure 6 (Appendix F).

2.3.1.2 UVic Network Services will terminate all fibre-optic cable.

2.3.1.3 Fibre-optic cable termination components will be manufactured by ADC. See Components to be supplied by the Contractor (Appendix A).

2.3.1.4 Implementation

2.3.1.4.1 Reverse bends (100-180 degrees) are not permitted. A pull box must be used as an alternative in these situations.

2.3.1.4.2 Care must be taken with laying cables in cable trays to ensure that runs are parallel and cable criss-crossing is minimized.

2.3.1.4.3 Cable installations need to be neatly dressed against the walls of Telecommunication Rooms or installed in appropriate cable tray. On backboards, care needs to be taken to ensure that they do not obstruct other cables, mounted equipment or cable entry points.

2.3.1.4.4 Cable runs on cable backboards must be installed parallel to building lines and follow the perimeter of the backboard.

2.3.1.4.5 A nylon pull string shall be left in all raceways after installation of the cable.

2.3.2 Singlemode Fibre-Optic Riser

2.3.2.1 A 12-fibre, premises distribution, riser rated, singlemode, fibre-optic cable shall be installed between the Entrance Telecommunication Room and each of the Secondary Telecommunication Rooms. See Components to be supplied by the Contractor (Appendix A).

2.3.3 Multimode Fibre-Optic Riser

2.3.3.1 A 12-fibre, premises distribution, riser rated, 50/125 um, OM4, laser optimized, multimode fibre-optic cable shall be installed between the Entrance Telecommunication Room and each of the Secondary Telecommunication Rooms. See Components to be supplied by the Contractor (Appendix A).

2.3.4 25-pair Cat5e Copper Riser

2.3.4.1 One telephone riser cable will be installed between the Entrance Telecommunication Room and each of the Secondary Telecommunication Rooms to connect to a 48-port 'tele-out' patch panel. See Components to be supplied by the Contractor (Appendix A) and TR layouts Figure 1 (Appendix E), Figure 3 (Appendix E), Figure 6 (Appendix F) and Figure 8 (Appendix F).

2.3.4.2 Implementation

2.3.4.2.1 25-pair cables will have sufficient lengths of cable to allow for connection to "Tele" patch panels located within the Telecommunication Rooms.

2.3.4.2.2 The cable will be terminated on the panels in each of the Secondary Telecommunication Rooms as indicated on the TR layout diagrams as follows;

Cable	Pair Per Jack	Jack Numbers	25th Pair	Comment
1	1	1 to 24	Spare	Fold back spare pair
2	1	25 to 48	Spare	Fold back spare pair

- Secondary Telecommunication Rooms will have the telephone risers terminated with one pair per patch panel jack following the standard T568A colour code. The pair will be punched down on the blue position of each jack. The Violet/Slate pair should be left long enough to reach any position on the row and coiled or folded back. See Wiring Illustration (Appendix D).
- Entrance Telecommunication rooms will have the telephone risers terminated on BIX 1A strips following the standard T568A colour code. All 25 pairs are to be terminated. The Violet/Slate on the last position is to be labelled as 'spare'.
- Entrance Telecommunication Rooms will have tie cables connecting the "Tele Out" patch panels to the BIX strips and will be terminated the same as the riser cable from the Secondary Telecommunication Rooms.
  - Each path (jack) shall be tested end to end for proper wire map (pair 1 straight through to the end).
  - Each panel position should be labelled using the UVic Standard. See 25-Pair Copper Riser Cable Labels.

2.4 Backbone Cable

2.4.1 Singlemode Fibre-Optic Backbone

2.4.1.1 A minimum of two 72-fibre, riser rated, singlemode fibre-optic cables shall be provided between the Entrance Telecommunication Room of the new building and two locations to be confirmed with the project's designated UVic Network Service Technician. See TR layout Figure 1 (Appendix E) and Components to be supplied by the Contractor (Appendix A).

2.4.1.2 The cable shall be run in duct provided specifically for that purpose. If the cable is to share a duct with other cable, it shall be run in a separate inner duct.

2.4.1.3 UVic Network Services will terminate all fibre-optic cable.

2.4.1.4 Fibre-optic cable termination components will be manufactured by ADC. See Components to be supplied by the Contractor (Appendix A).

2.4.1.5 Backbone cables will have service loops within the entrance facility. The amount of fibre left in the entrance room should de the distance from the point of entry to the farthest point in the room routing around the perimeter plus 20 metres.

2.4.2 Multi-pair 24 gauge OP Copper Backbone

2.4.2.1 A minimum of one multi-pair 24 gauge OP copper cable shall be provided between the Entrance Telecommunication Room of the new building and a location to be confirmed with the project's designated UVic Network Service Technician. The cable pair count will be decided by the UVic Network Services. See TR layout Figure 1 (Appendix E) and Components to be supplied by the Contractor (Appendix A).

2.4.2.2 Implementation

2.4.2.2.1 The installation must comply with local and provincial codes.

2.4.2.2.2 Install and terminate OP multi-pair backbone cable in the Entrance Telecommunication Rooms of the new building. Verify pair count requirement with the project's designated UVic Network Service Technician prior to implementation. See TR layout Figure 2 (Appendix E) and Components to be supplied by the Contractor (Appendix A).

3 *Infrastructure*

3.1 General Infrastructure

3.1.1 Standard Communications Outlet

3.1.1.1 A standard communications outlet is considered to be a double gang box and must have space to accommodate four modular jacks. See Components to be supplied by the Contractor (Appendix A).

3.1.1.2 All modular jacks will be black.

3.1.1.3 Two of the four positions will have modular jacks installed and will be connected via horizontal cable to the designated Telecommunication Room. The two remaining positions will be filled with blank inserts.

3.1.1.4 The communications outlet must not be more than 90 metres of cable-distance from the designated Telecommunication Room.

3.1.1.5 In offices designated for full-time members of the Faculty and Professional Staff, the communications outlets are to be installed in quantities of two.

3.1.1.6 In general work-areas or electrical rooms, only one communications outlet is required.

3.1.1.7 Standard faceplates are to be used unless electronic approval is received from the project's designated UVic Network Service Technician. See Components to be supplied by the Contractor (Appendix A).

3.1.1.8 Implementation

3.1.1.8.1 When coiling cable at the communications outlet a minimum bending radius of 4 x the cable diameter or 25 mm, whichever is greater, shall be maintained.

3.1.1.8.2 Cable runs will have a 400 mm length of cable left coiled up at the communications outlet for termination in RJ45 jacks.

3.1.1.8.3 Communications outlet faceplate shall be flush mounted with the finished wall, at the same height as power receptacles.

3.1.1.8.4 Communications outlets shall be positioned to enable easy, unobstructed access and shall be clear of millwork.

3.1.1.8.5 Communications outlets on joint use surface raceway shall be single gang duplex cutouts.

3.1.1.8.6 Communications outlets on large surface raceway shall be dual gang duplex cutouts.

3.1.2 Non-Standard Outlet Box

3.1.2.1 A non-standard communications outlet is a single gang box and has one or two modular jacks. See Components to be supplied by the Contractor (Appendix A).

3.1.2.2 Non-standard communications outlets will have at least one of the modular jacks connected via horizontal cable to the designated Telecommunication Room.

3.1.2.3 Single modular jack communications outlets are to use the faceplate identified in ' Components to be supplied by the Contractor (Appendix A)' unless electronic approval is received from the project's designated UVic Network Services Technician.

3.1.2.4 Double modular jack communications outlets are to use the faceplate identified in 'Components to be supplied by the Contractor (Appendix A)' unless electronic approval is received from the project's designated UVic Network Services Technician.

3.1.2.5 Implementation

3.1.2.5.1 See Standard Communications Outlet Implementation Detail.

3.1.3 Modular Jack

3.1.3.1 Cable termination at the communications outlet shall be 8-pin modular jack (RJ45) and be approved to EIA/TIA 568A Standards. See Components to be supplied by the Contractor (Appendix A).

3.1.3.2 The Modular Jack's part number will be as noted in the 'Components to be supplied by the Contractor (Appendix A)'.

3.1.3.3 Provide wall plates containing two (2) or four (4) cutouts (stainless steel only).

3.1.3.4 'Telephone' modular jacks are referred to by the generic term 'Communication' or 'Data' Jacks.

3.1.3.5 Blanks will be fitted into unused cutouts.

3.1.3.6 Communications outlets shall be connected to the cable using the following ISDN Standard for telephone and data outlets (568a):

Pair	PIN No.	Colour Code
3T	1	Wh-Green
3R	2	Green
2T	3	Wh-Orange
1R	4	Blue
1T	5	Wh-Blue
2R	6	Orange
4T	7	Wh-Brown
4R	8	Brown

3.1.4 Courtesy Telephone Requirements

3.1.4.1 Wiring shall be installed to the courtesy telephone location confirmed in the building design layout.

3.1.4.2 One 120v power receptacle will be provided at the location of the telephone.

3.1.4.3 The installation of a vandal resistant, motorized TTY for public facilities will be installed at the discretion of Campus Security and Facilities Management.

3.2 Cable Infrastructure

3.2.1 General Cable Infrastructure

3.2.1.1 Wiring shall meet all Provincial and Local Electrical Codes.

3.2.1.2 Communications' cable system wiring and equipment shall be in accordance with good engineering practices as established by CAN/CSA T529, T530, EIAA'A 568A Standards, BICSU-TDM and CSA 22.1 Canadian Electrical Code, Part 1.

3.2.1.3 All references to Codes, Standards, and Regulations noted in these guidelines are to be taken as the ***latest or most current in effect*** at the time of the installation.

3.2.1.4 All wiring shall test free from all ground loops and shorts. All wiring shall be installed in the conduit system, specifically designated for this purpose.

3.2.1.5 All cables shall be free from defects caused by, but not limited to shorts, kinks, tight bends, damaged conductors, and wiring crossovers.

3.2.1.6 All cables shall be free from splices.

3.2.1.7 Incoming cable is to be dressed to the patch panels on the opposite side of the hinge.

3.2.1.8 In open office environments the preferred method of extending the conduit from the communications outlet to the cable tray is via perimeter walls. If this is not possible then Power and Communications poles or pony walls should be used.

3.2.1.9 The contractor will ensure that all patch panels are grounded (bonded).

3.2.1.10 All communication pathway installed shall be metallic, including but not limited to cable trays, surface raceways, conduit, pull boxes, and power and communications poles, unless otherwise specifically noted. Plastic raceway may be approved by special application to the project's designated UVic Network Services Technician (netadmin@uvic.ca).

3.2.2 25 mm Horizontal Conduit (optional)

3.2.2.1 The conduit is not to exceed 15 m in length.

3.2.2.2 The conduit must not have more than three right-angle bends, and can be flexible, PVC or E.M.T.

3.2.2.3 Nylon pull strings are to be left in each conduit after cable installation.

3.2.2.4 For individual communications outlets where wall cavities are not available or recessed conduit is not possible (e.g., exposed concrete walls) 25 mm equivalent surface raceway shall be used.

3.2.2.5 Surface raceway in conjunction with flexible conduit may be used to feed modular furniture.

3.2.2.6 If conduit is installed, associated junction boxes and pull boxes shall be galvanized steel complete with cover plate unless otherwise indicated or required by Canadian Electrical Code. See Components to be supplied by the Contractor (Appendix A).

3.2.2.7 Implementation

3.2.2.7.1 Reverse bends (100-180 degrees) are not permitted. A pull box must be used as an alternative in these situations.

3.2.2.7.2 In exceptional cases, where the conduit length or number of bends is outside the guidelines, pull boxes will be installed.

3.2.3 Surface Raceway

3.2.3.1 Work area outlets on surface raceway shall be located so that the communications equipment will be no further away than 3 m from the communications outlet.

3.2.3.2 When the surface raceway is used to distribute power and communications cable, a pre-manufactured barrier, separating communications cable and communications outlets from power cables and power outlets, shall be installed in the centre raceway.

3.2.3.3 Surface raceways shall be continuous around corners. Provide manufacturer's corner pieces and vertical sections where two joining sections are at different elevations.

3.2.3.4 Implementation

3.2.3.4.1 The surface raceway shall parallel building lines and hug ceilings, baseboards, and corners.

3.2.3.4.2 The surface raceway base shall be mechanically fastened to walls and supporting structures.

3.2.3.4.3 The surface raceway shall maintain its integrity when passing through a wall or supporting structure. The raceway cover shall be cut 100 mm from either side of the penetration.

3.2.3.4.4 Surface raceway extending into the false ceiling shall connect to an appropriate "Entrance End Fitting".

3.2.3.4.5 When installing surface raceway, pre-manufactured bends and fittings must be used. Installation shall be in accordance with the manufacturer's instructions.

3.2.3.4.6 Wire clips shall be installed in two-piece surface raceway at 450 mm centres.

3.2.3.4.7 When installing cable in surface raceway, cable fill shall not exceed 40%.

3.2.4 Power and Communications Pole

3.2.4.1 Power and Communications poles will be used for communications system wiring requirements in open floor spaces to extend communications cable to freestanding workstations in a room.

3.2.4.2 Power and Communications poles for modular furniture are available from the manufacturer of the furniture and shall be used for top feeding of the communications wiring.

3.2.4.3 Implementation

3.2.4.3.1 Power and Communications poles shall be fixed at the floor and ceiling to minimize movement or rotation of the poles.

3.2.4.3.2 Power and Communications poles shall extend into the ceiling and connect to an appropriate size pull box.

3.2.4.3.3 If the system requires the installation of fibre-optic cable in Power and Communications poles, a minimum 25 mm deep extension shall be installed to increase the depth of the outlet.

3.2.4.3.4 When pulling cable into Power and Communications poles, fill shall not exceed 40%.

3.2.5 Cable Tray

3.2.5.1 From each Telecommunication Room, cable tray shall be installed in the main corridor false ceiling.

3.2.5.2 When cable trays are fed by conduit, the conduit shall be attached to the edge of the tray with a bracket designed for this purpose. Alternatively the conduit shall be stubbed above and within 150 mm of the tray and terminate in a bonding bushing. Conduit will be bonded to the tray with a No. 6 AWG bonding conductor.

3.2.5.3 All conduit ends shall be bushed or terminated with an insulated throat connector.

3.2.5.4 Communications cable is generally supported between the cable tray and the communications outlet by "J" hooks or "Velcro Straps".

3.2.5.5 All cable trays shall be installed parallel to the building lines, keeping conduit length to an absolute minimum.

3.2.5.6 Where cable tray size is not specified, the cable tray shall be sized to not exceed a 28% fill ratio after all the cables are installed. Where there are zero bends in the cable tray, the fill ratio may be increased to 40%.

3.2.5.7 A nylon pull string shall be left in all raceways after installation of the cables.

3.2.5.8 All empty cable trays shall be clearly and permanently marked at both ends to indicate destination and function. The markings shall be clearly visible after construction is completed.

3.2.5.9 Cable trays shall be supported using the manufacturer's standard supports such that wherever possible one side of the tray is both accessible and unencumbered by support members to permit convenient placement of cables. Otherwise utilize suspended trapeze

racks, with cable trays securely bolted to the support assemblies. Provide additional supports under all fittings of 600 mm radius or larger. Brace all supports to withstand the loads due to pulling in of cable. All supports shall permit a minimum of 150 mm vertical adjustment.

3.2.5.10 Proximity to potential sources of electromagnetic interference (e.g., motors, transformers, power cables, florescent lighting etc) must be avoided when designing communications cable pathways.

Minimum clearance shall be provided:

Distance	Direction	Description
1200 mm		From large motors or transformers
305 mm	Vertical	From adjacent conduits, pipes, ductwork
600 mm	Horizontal	From adjacent conduits, pipes and ductwork
450 mm		From conduit and cables used for electrical power distribution
120 mm		From fluorescent lighting

3.2.5.11 Proper grounding and bonding is required.

3.2.5.12 Pathways and cables should cross perpendicular to fluorescent lighting and electrical power cables or conduits, not gradually over long distances.

3.2.5.13 Additional clearance requirements, as noted in the CAN/CSA-T530 (Building Facilities Design Guidelines for Telecommunications) and EIA/TIA 569 (Commercial Building Standard for Telecommunications Pathways and Spaces) must be followed.

3.2.5.14 Clearances relating to electrical safety and separation of electrical communications systems in a building as specified in the Canadian Electrical Code Part 1 must be followed.

3.2.5.15 Implementation

3.2.5.15.1 Care must be taken not to attach conduits and cables containing power conductors to communication cable tray supports.

3.2.5.15.2 Where conduit is stubbed above and within 150 mm of the tray and terminates in a bonding bushing, care must be taken to ensure that the bonding lugs are not placed in the path of the cables.

3.2.5.15.3 Telecommunication Rooms will have cable trays extending into the ceiling space of the communication room, which continue through the room until terminating against the wall opposite to that which the tray entered.

3.2.5.15.4 Cable “drop outs” will be provided where cables are routed between trays at different elevations.

3.2.5.15.5 Communication cables shall be fastened together on a system-by-system basis by use of Velcro cable ties on maximum 3 m centres.

3.2.6 Riser Conduit

3.2.6.1 A minimum of four 100 mm fire stop sleeves will be run between vertically aligned Telecommunication Rooms. In situations where the Telecommunication Rooms are not vertically aligned, it is deemed acceptable to provide an alternate path via cable tray. See TR layouts Figure 1 (Appendix E) and Figure 6 (Appendix F).

3.2.6.2 A minimum of two 50 mm conduits will be run between the External Service Provider Telecommunication Space and an Entrance or Secondary Telecommunication Room. See TR layouts Figure 1 (Appendix E) and Figure 6 (Appendix F).

3.2.7 Backbone Conduit

3.2.7.1 A 9 duct bank leading out a manhole or pull box is expected and will be clearly labelled at both ends. See TR layout Figure 1 (Appendix E).

3.2.8 Roof Conduit

3.2.8.1 Where possible, conduits should penetrate the roof above the Telecommunication Room doorway where electronic equipment would not be expected to reside.

3.2.8.2 A minimum of two 2” 50 mm conduits will be installed between a top floor Telecommunication Room and the roof. One will be designated for the exclusive use of

UVic Network Services, and the second for External Service Providers. The conduits will be fitted with a weather resistant entrance cap for service drop conductors. See TR layout Figure 6 (Appendix F).

4 Contractor Requirements

4.1 General

4.1.1 Standards and Certification Requirements

4.1.1.1 Installers will be AMP, minimum ACT-1 trained and certified.

4.1.1.2 Installations are to be performed according standards and guidelines defined under:

- Province of British Columbia Building Code,
- ANSI data and telecommunication standards,
- CSA telecommunication cable and wiring standards,
- EIA standards for data, telecommunications and audio video,
- IEEE 802 standards,
- ISDN standards,
- ISO standards,
- UVic fire, safety, and security standards,
- UL LAN cable certification program.
- Non-compliant work will be removed and replaced at the Contractor's expense.

4.2 Commissioning

4.2.1 Installation Requirements

4.2.1.1 The Contractor shall employ competent cable installers who are trained and certified by AMP.

4.2.1.2 The Consultant prior to the commencement of functional and electrical performance testing shall inspect all systems visually. The installation and interface equipment will be inspected for compliance with the Industry Standards with particular attention given to the following criteria:

- Neatness, clamping, and harnessing or cabling and wiring,
- Wire and cable identification and labelling,
- Cable and connections, ground clamps, and terminal strips,
- Completeness,
- Nameplates, identification plates, and markings,
- Safety,
- Grounding,
- Continuity and polarity.

4.2.1.3 The project's designated UVic Network Service Technician prior to the commencement of functional and electrical performance testing shall inspect all systems visually. The installation and interface equipment will be inspected for compliance with the Industry Standards with particular attention given to the criteria noted above.

4.2.2 Testing

4.2.2.1 All testing shall be performed end to end from the patch panel to data jack after final installation is completed. Testing is to meet or exceed the performance requirement of EIA/TIA 568A, TSB67, and SP195.

4.2.2.2 ***Permanent Link tests*** will be performed as per Industry specifications.

4.2.2.3 All horizontal data cables shall be tested individually, and test results will include Closet No., Room / Office No., and Data / Telephone Label No.

4.2.2.4 Horizontal cables will only be accepted if they 'PASS' the Industry Standard Permanent Link Test parameters defined for the category of cable being tested.

4.2.2.5 The Contractor shall supply the Owner and the Consultant with test results for approval and system acceptance, presented in electronic disk format (CSV format). All test results are to be supplied in an electronically searchable format, via email to the Facilities Management Project Officer and UVic Network Services 'netadmin@uvic.ca' as soon as the testing is complete.

4.2.2.6 Test results must include the Telecommunication Room number from which cables terminate and indicate the following information:

- Telecommunication Room
- Room number of outlet box location
- Communication jack number

Example: A cable runs from Clearihue Telecommunication Room c008a to office C071, Data Jack D04, therefore it would have a test label ID of 'c008aRMc071D04'.

4.3 Labelling Requirements

4.3.1 Label Type

4.3.1.1 Labelling on patch panels and on wall plates is to be done with a Brother P-Touch or similar labeller using tape that produces black lettering on white tape.

4.3.2 Patch Panel

4.3.2.1 Patch panels should be labelled consecutively with "0+", "100+" etc. with all labels affixed directly to the patch panel. See TR layouts Figure 3 (Appendix E) and Figure 8 (Appendix F).

4.3.2.2 The callout area for each jack of the "Data-In" patch panels should be labelled with the room number of the location where the corresponding circuit will be found. Labels like "231", "253a" etc are all that should appear on these labels, there is no need to repeat the data jack numbers as the information should be readily apparent from the manufacturer's silk-screening (1 to 96) in conjunction with the "100+" panel label assignment.

4.3.3 Wall Plate

4.3.3.1 The patch panel designations are key to the following wall port labelling scheme:

- Communication jacks at the remote wall plate derive their numbering based on the position to which they are wired on the corresponding patch panel.
- Data circuits wired to the first "Data-In" panel (0+) will receive labels "D1" to "D96", circuits wired to the 2nd "Data-In" panel (100+) will receive labels "D101" to "D196" (by adding 100 to the patch panel location where the circuit is terminated) etc.
- The data ("D107" etc.) labels are the only labels that need to go on the remote wall plates.

4.3.4 Raceway

4.3.4.1 All empty raceway shall be clearly and permanently marked at both ends to indicate destination and function. The markings shall be clearly visible after construction is completed.

4.3.5 Fibre-Optic Riser Cable

4.3.5.1 Fibre-Optic riser cable labelling is the responsibility of UVic Network Services.

4.3.6 25-Pair Copper Riser Cable

Cable	Pair Per Jack	Jack Numbers	25th Pair	Comment
1	1	1 to 24	Spare	Fold back spare pair
2	1	25 to 48	Spare	Fold back spare pair
3	1	49 to 72	Spare	Fold back spare pair
4	1	73 to 96	Spare	Fold back spare pair

Each panel position should be labelled as follows:

Secondary Tele Com Rm Number - 333
Entrance Tele Com Rm Number - 029
Cable Number - 3
Label: “333-029-49, “333-029-50”, etc. to “333-029-72”

4.3.7 Fibre-Optic Backbone Cable

4.3.7.1 The installing contractor must label the cable clearly and permanently at both ends.

4.3.8 Multi-pair Copper Backbone Cable

4.3.8.1 The installing contractor must label the cable clearly and permanently at both ends.

Contact UVic Network Services if labeling instructions are unfamiliar or unclear.

5 *Appendix*

5.1 Appendix A Components to be supplied by the Contractor

Confirm with UVic Network Services PRIOR to ordering components (Paul Nightingale pauln@uvic.ca/250-472-4536 or Pat Todd ptodd@uvic.ca/250-721-6548)

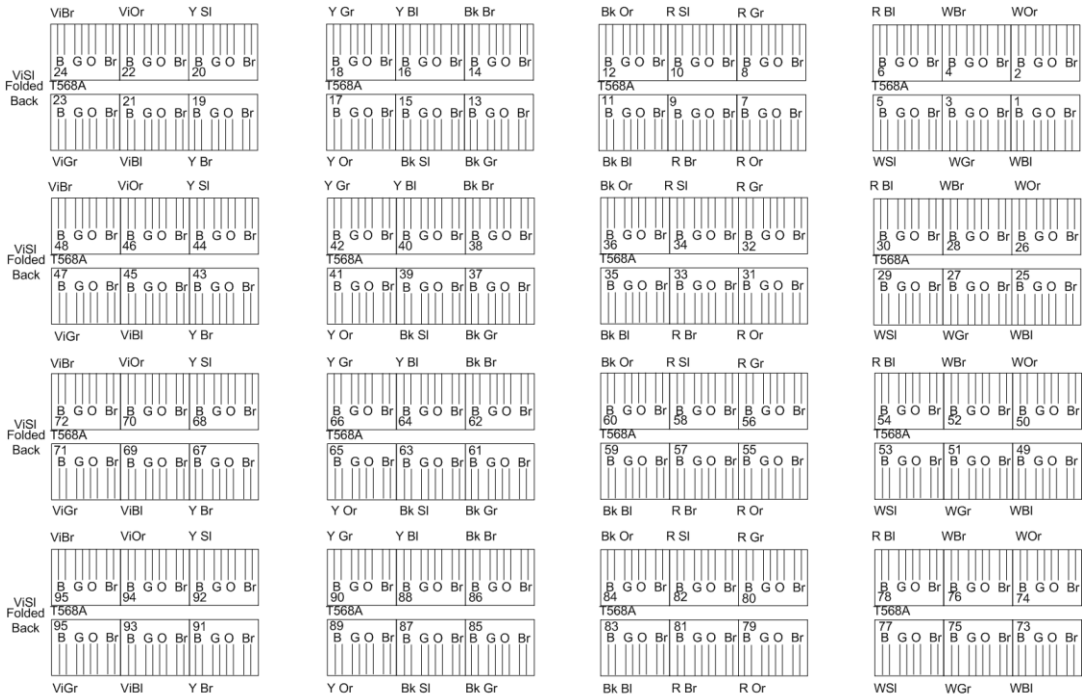
Component	Part Number	Description	Comments
Racks and Patch Panels:			
7' Unequal Flange Rack (Fibre Frame)	PWUEF-7X19ERN	ADC 7' Unequal Flange Rack (Fibre Frame)	One for each end of the backbone fibre
Inter bay Management Panel	E-501-L139	ADC PANEL, 7' X 5" INTERBAY MANAGEMENT PANEL W/ TROUGH FILLER KIT	One for each end of the backbone fibre
Relay Rack	EM-19-77/700RR1	Electron Metal - Welded Rack; Width - Usable - 19.00 in; Capacity - Rack Units - 44U; Height - Imperial - 82.62 in; Height - Metric - 209.8 cm; Frame Material - Steel, 12 gauge; Rack Mounting Holes - Front; Base Type - Bolt Down; Base WxD - Imperial - 20.50 x 15.00 in; Base WxD - Metric - 520.7 x 381.0 mm; Cable Management - Vertical - None; Cable Management - Horizontal - None; Color - Black; Manufacturer Series - 700	For entrance facility and each secondary telecom room
Fibre Infrastructure Components:			
Fibre Risers:			
FL2 24 Combo Termination Splice Module	FL2-24TS525	24-F RACK-MT ENCLOSURE 19" 3U EMPTY	One for each end
Singlemode Six Packs	FL2-6PJSC605R	Singlemode 6pak Connector Plug-in, SC Ang 8 Deg, 5 m Pigtails, for Rack-Mount	Based on the number of SMF cables
Multimode Six Packs	FL2-6P6GC605R	Multimode 6pak Connector Plug-in, LC, 5 m Pigtails, for Rack-Mount	Based on the number of MMF cables (
Fibre Splice Tray	FL2-RSPLICE-HS	FL2000 Splice Deck, Heat Shrink Fusion	One for each 12 fibres

Fibre Cable Clamp	FL2-ACC009	CABLE CLAMP KIT FOR .2" to .4" DIAMETER CABLES	
Heat Shrink Sleeves	FST-ACC002	ADC - FIBER PROT SLEEVE PKG(1) ACP	1 per fusion splice
Lower Cable Trough	FL2-ACC012	ADC - LOWER CABLE TROUGH	
Bonding grounding kit for FL1000 and FL2000	FL2-ACC006	FL1000 GROUNDING BONDING KIT	
Backbone Fibre:			
FL2 72 Combo Termination Splice Module	FL2-72TS140	72 F PORT PANEL ENCLOSURE TERMINATION SPLICE	One for each end
Singlemode Six Packs	FL2-6PJSC605R	Singlemode 6pak Connector Plug-in, SC Ang 8 Deg, 5 m Pigtails, for Rack-Mount	Based on the number of SMF cables
Fibre Splice Tray	FL2-RSPLICE-HS	FL2000 Splice Deck, Heat Shrink Fusion	One for each 12 fibres
Fibre Cable Clamp	FL2-ACC007	CABLE CLAMP KIT FOR .50 .60 .70 .80 DIAMETER CABLES	
Heat Shrink Sleeves	FST-ACC002	ADC - FIBER PROT SLEEVE PKG(1) ACP	1 per fusion splice
Lower Cable Trough	FL2-ACC012	ADC - LOWER CABLE TROUGH	
Bonding grounding kit for FL1000 and FL2000	FL2-ACC006	FL1000 GROUNDING BONDING KIT	
Copper Infrastructure Components:			
Tele-Out Panels:			
48 Port Patch Panel	215915	48-PORT PANEL 110-MOD 8W8P FLAT T568A CAT5E 5500 SERIES BLACK 2U	Cat5e risers from entrance facility to secondary telecom rooms
Data-In and Data-Out Panels:			
96 Port Patch Panel	1375016-2	96-PORT PANEL 110-MOD 8W8P 4U T568A/B CAT6 SL SERIES	Data-in panels
Patch Panel Adjustable Wall Bracket – 4U	EM-19-4U/ADWB H2-BK		Adjustable wall brackets for data-in patch panels
Patch Panel Cable Management	556561-1	CABLE MANAGEMENT RING 7.0" HIGH	
Patch Panel Cable Support Bars	557548-1	CABLE MGMT SUPPORT BRACKET	One per panel
Horizontal:			
Patch Cables – White – 1.8m (6ft)	219889-6	Copper Media Patch Cords: Assembly	

		Type - Modular Patch Cord; Category - 6; Cable Type - 4 Pair UTP; Conductor Size - AWG - 24; Conductor Stranding - Stranded; Jacket Rating - CM; Cable Color - White; End Connector - A - Modular, 8-Wire T568A/B; End Connector - B - Modular, 8-Wire T568A/B; End Style - A - Plug, White Boot; End Style - B - Plug, White Boot; Length - Metric – 1.8m; Length - Imperial - 6 ft	
Cable IP connections, CMP, 23AWG, White	219567-x	4-Pair Maximum: Cable Type - UTP Horizontal; Category - 6; Jacket Rating - CMP; Conductor Count - 4 Pair; Conductor Size - AWG - 23; Conductor Stranding - Solid; Color - White; Length - Metric - 305m; Length - Imperial - 1000 ft, Plenum rated	X denotes colour and packaging (1 – white/wooden reel, 2-white/reel-in-a-box)
Cable IP connections, CMR, 23AWG, White	219560-x	4-Pair Maximum: Cable Type - UTP Horizontal; Category - 6; Jacket Rating - CMP; Conductor Count - 4 Pair; Conductor Size - AWG - 23; Conductor Stranding - Solid; Color - White; Length - Metric - 305m; Length - Imperial - 1000 ft, Riser rated	
Standard Outlet Box Faceplate Stainless steel 4 modular jacks	2FM-(4)0E-AMP 2 gng- (4) AMP110	Semtron - Stainless Steel Faceplate, 4-Port	
Non-Standard Outlet Box Faceplate Stainless steel 1 modular jack for Wall Phone	1-OE-A5-/PHONE-DPIP	Semtron - Stainless Steel Faceplates, Single Gang for Wall Phone, 1-Port	Stud spacing to match Cisco VoIP phone CP-7906G
Non-Standard Outlet Box Faceplate Stainless steel 2 modular jacks	1FM-(2)00E-AMP 1 gng- (2) AMP110	Semtron - Stainless Steel Faceplates from Semtron, Single Gang, 2-Port	
Modular Jacks IP connection	1375055-2	Module Type - Modular UTP Jack;	

		Connection - IDC - Press-Fit; Mounting - Faceplate, Adapter; Configuration - 8-Wire RJ45; Wiring Code - T568A/B; Category - 6; Color – Black	
Pull Box Galvanized Steel			
Junction Box Galvanized Steel			
Cat 6 Dust Cover – Black	1375187-2	Cat6 RJ-45Jacks: Cat. 6 with dust cover; Wiring pattern: T568A/T568B; Color: black	
Cable Tray and components			
Riser:			
12-fibre, premises distribution, riser rated, singlemode fibre-optic cable	Berk-Tek PN PDR012AB0707	12-fibre, premises distribution, riser rated, singlemode fibre-optic cable	
12-fibre, premises distribution, riser rated, OM3 50/125 um, support for 550m, multimode fibre-optic cable	Berk-Tek PN PDR012FB3010/F5	12-fibre, premises distribution, riser rated, lazer optimized OM4 50/125 um, supports 10Gb at 550m, multimode fibre-optic cable	
25-pair Cat5e Riser , 24 AWG, Grey	AMP PN 1499418-2 or Berk-Tek PN 10061456	24 AWG, UTP, NEC/NFPA CMR rated cable with grey lead-free jacket	
Backbone:			
72-fibre, loose tube, riser rated, singlemode fibre-optic cable	Berk-Tek PN LTR12B072AB0403	72-fibre, loose tube, riser rated, singlemode fibre-optic cable	
100-pair 24 gauge Copper Cable	100-pair 24 gauge Copper Backbone Outside Plant Cable	100-pair 24 gauge Copper Cable	

Appendix D Telephone Riser Wiring

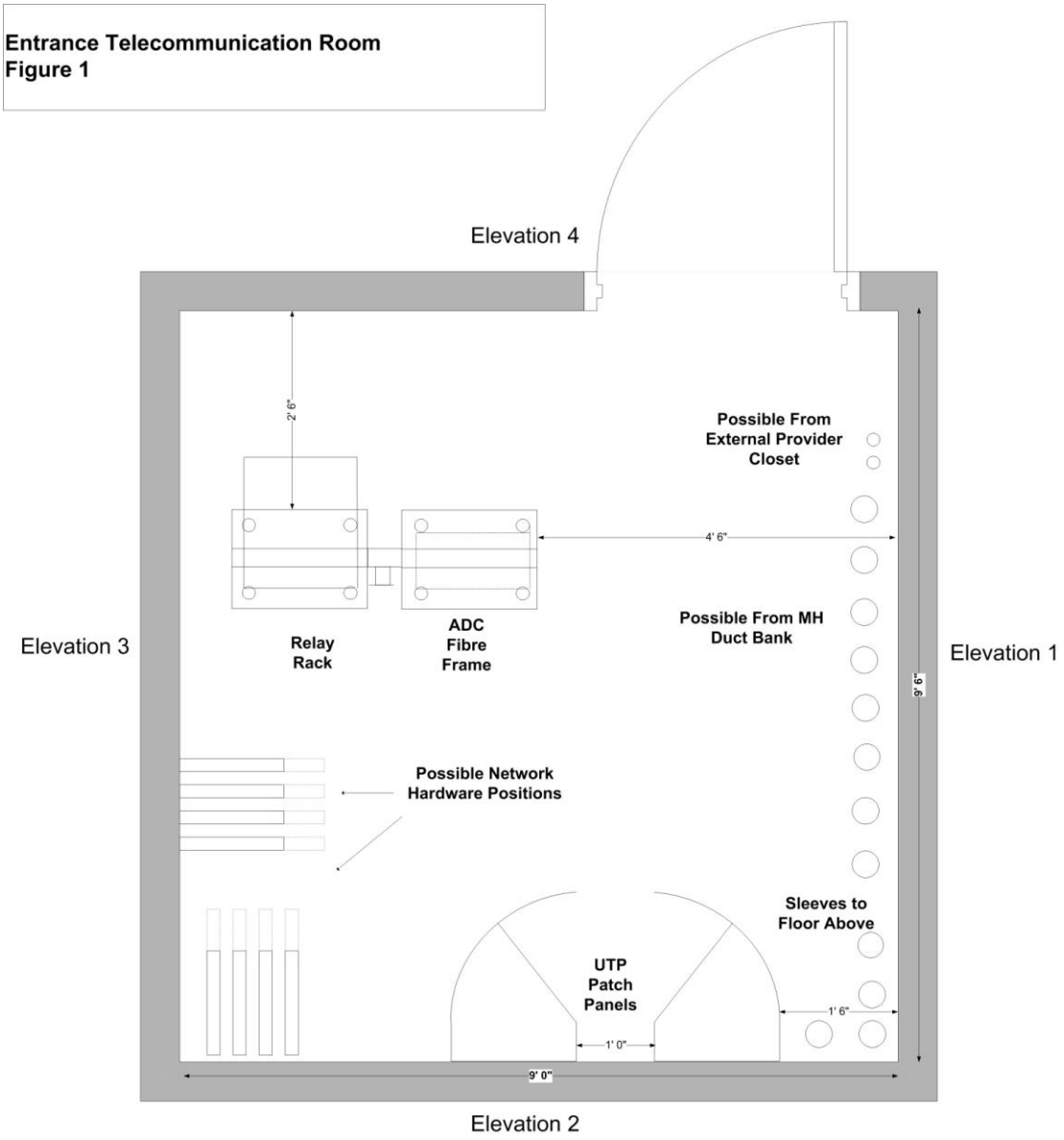


Back of AMP Panel

5.2 Appendix E Entrance Telecommunication Room Layouts

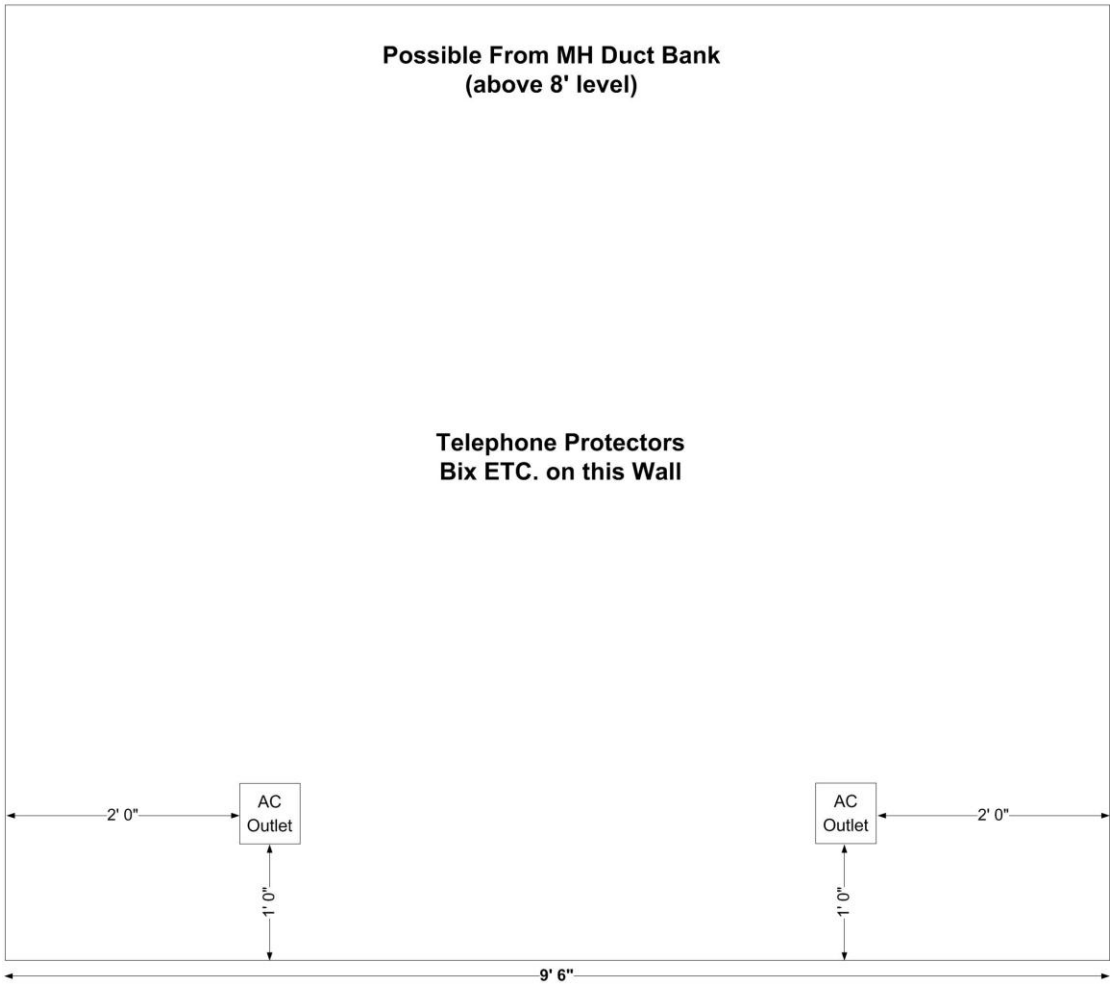
5.2.1 Figure 1 Typical Entrance Telecommunication Room Layouts

Entrance Telecommunication Room
Figure 1

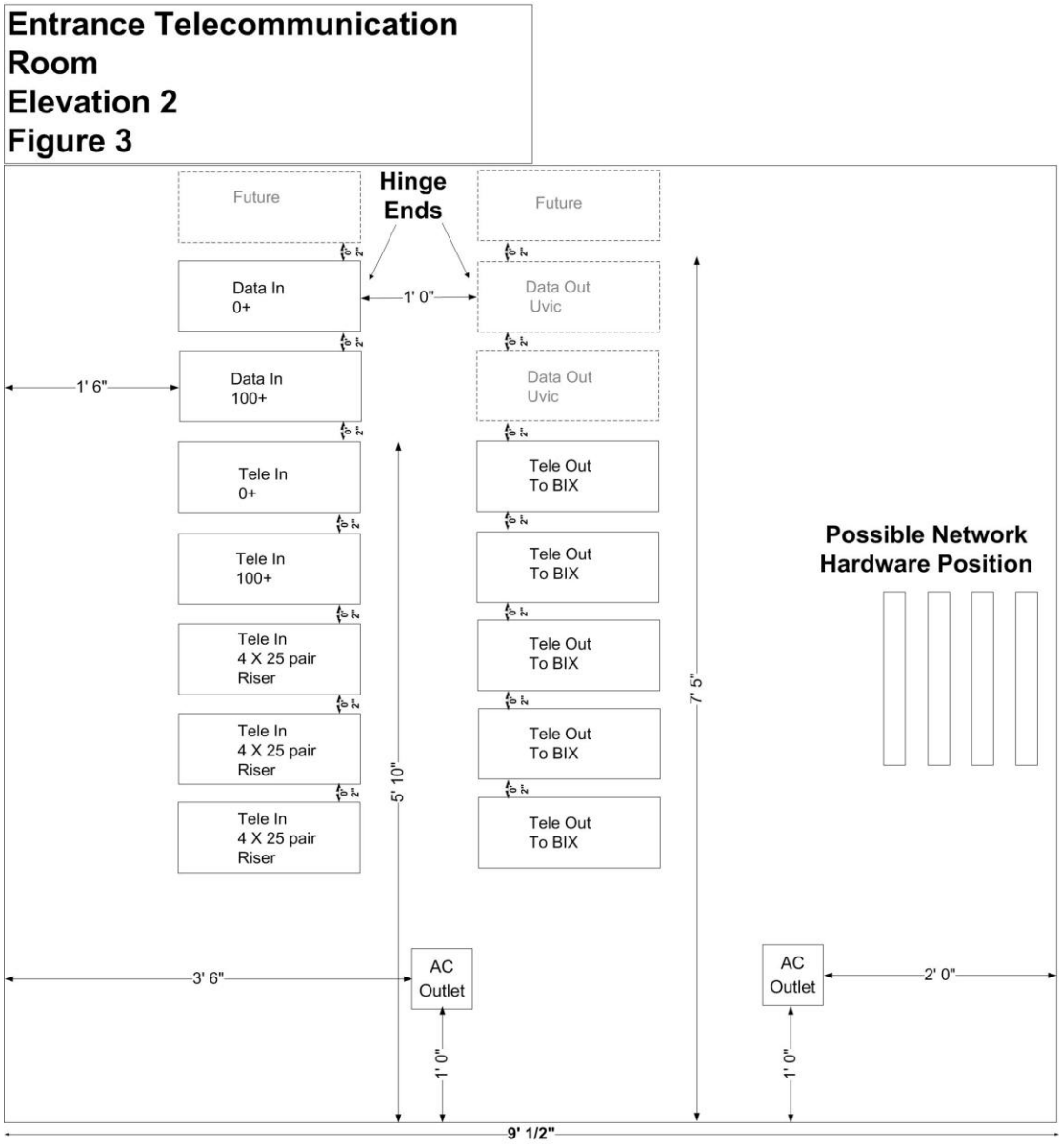


5.2.2 Figure 2 Typical Entrance Telecommunication Room Layouts

Entrance Telecommunication Room
Elevation 1
Figure 2

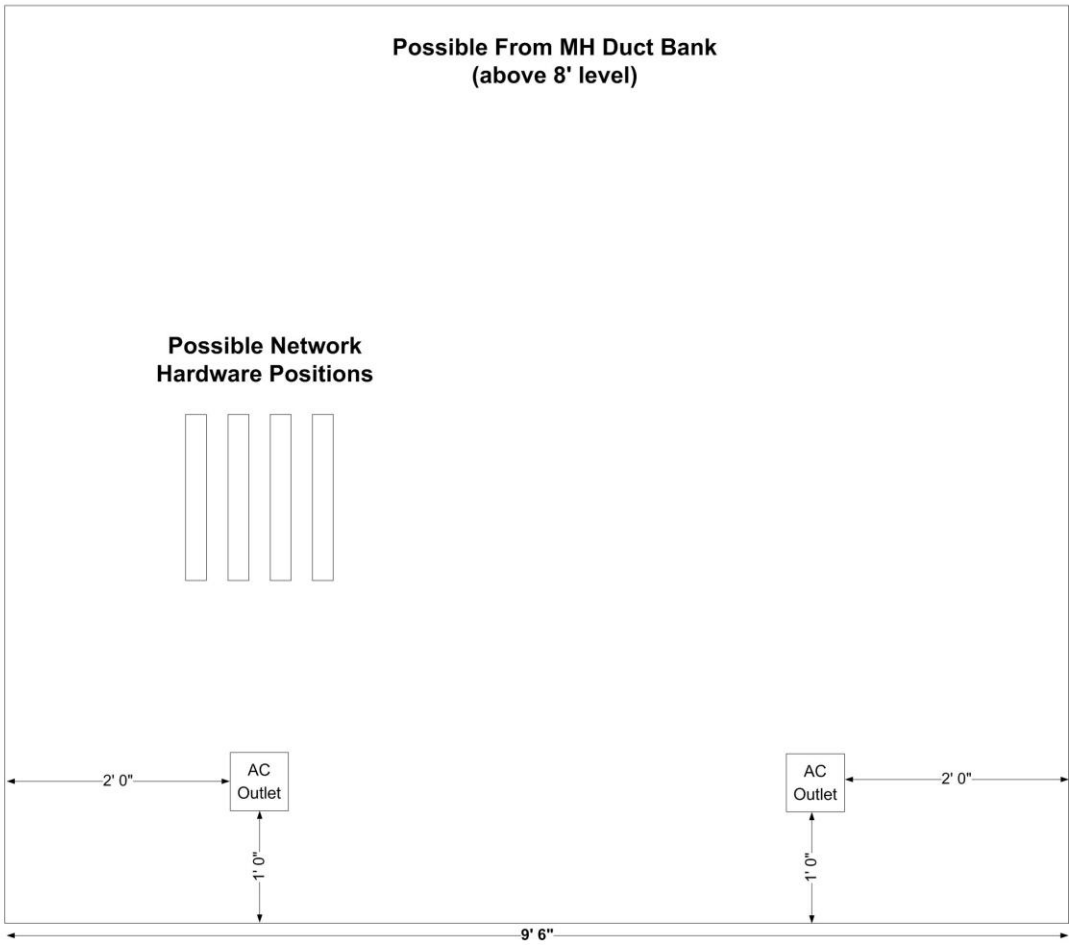


5.2.3 Figure 3 Typical Entrance Telecommunication Room Layouts



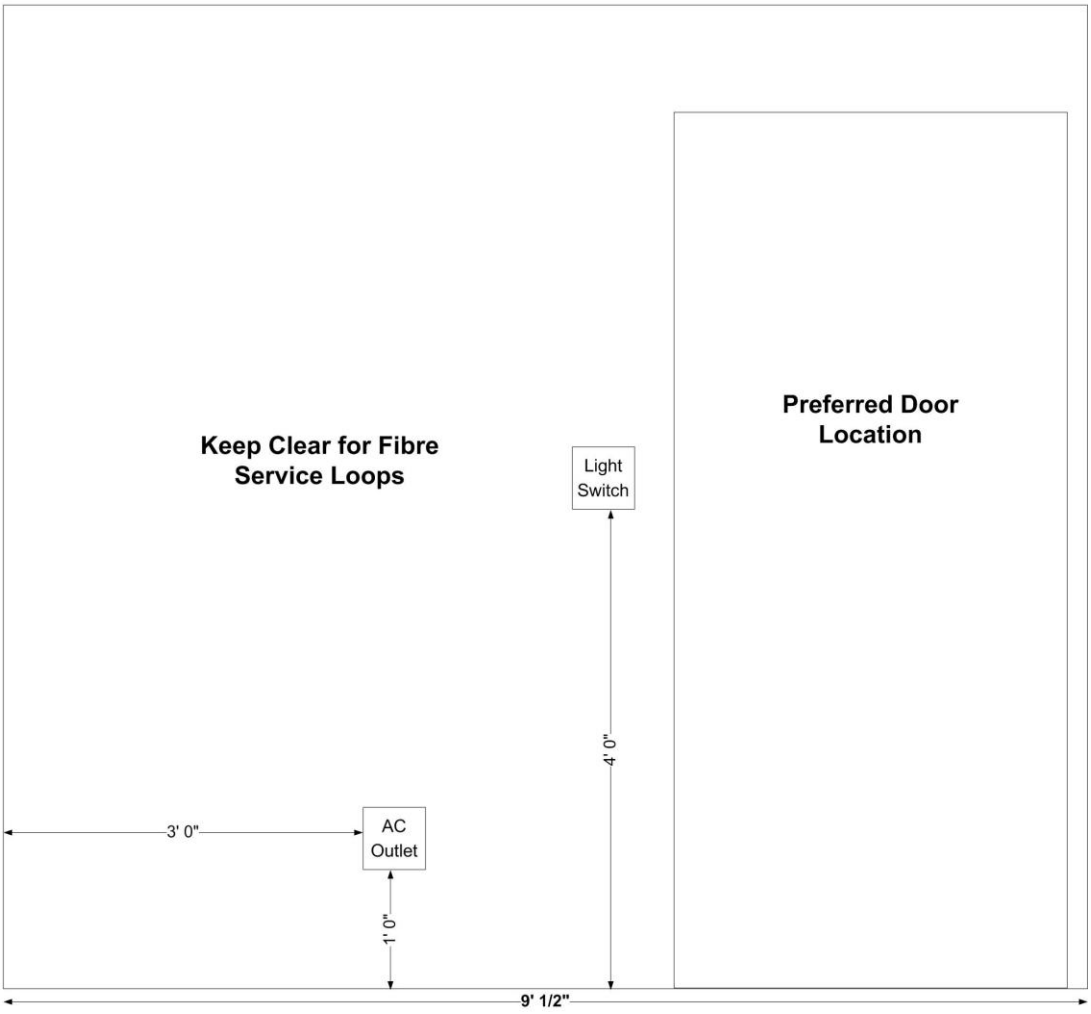
5.2.4 Figure 4 Typical Entrance Telecommunication Room Layouts

Entrance Telecommunication Room
Elevation 3
Figure 4



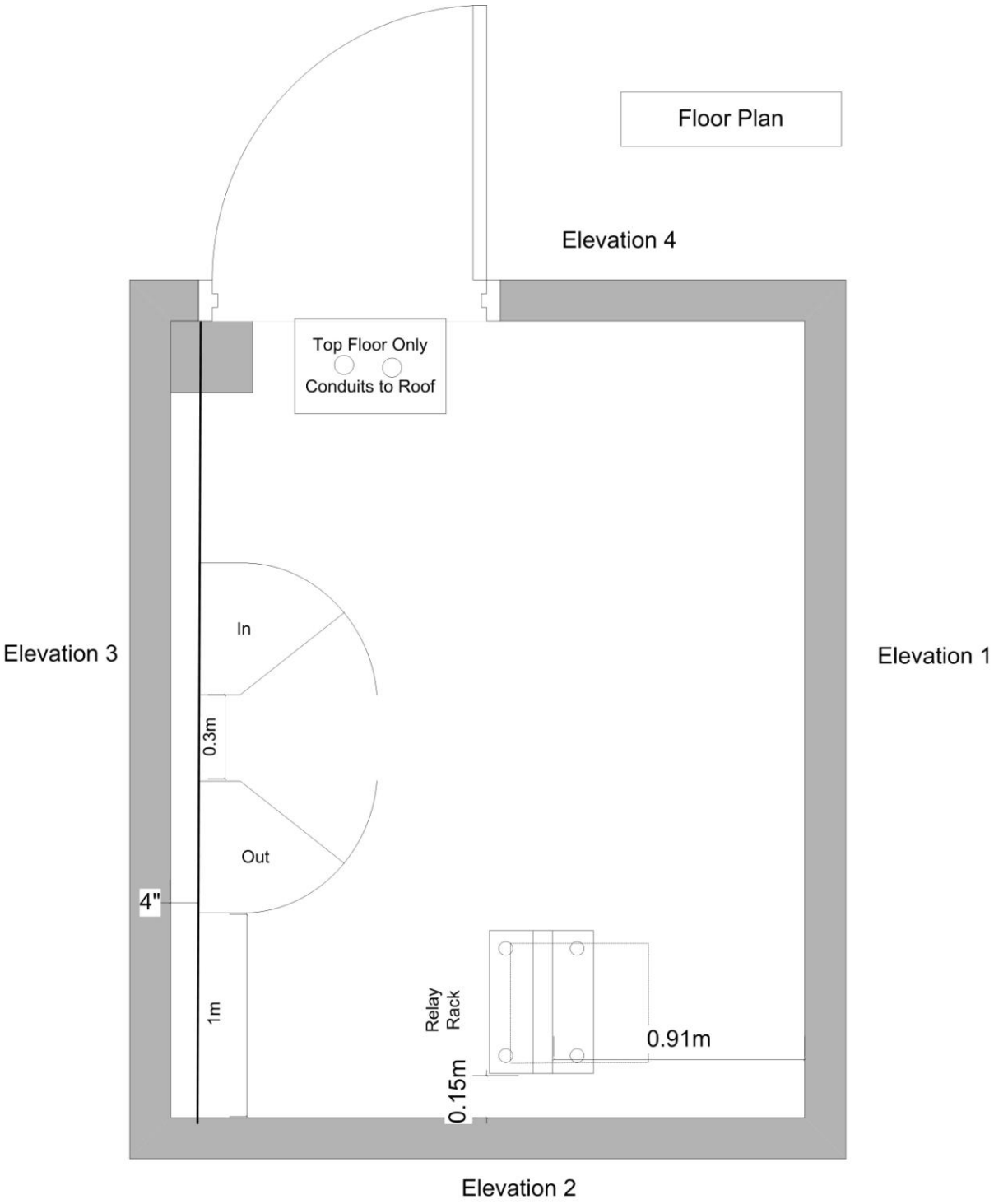
5.2.5 Figure 5 Typical Entrance Telecommunication Room Layouts

Entrance Telecommunication Room
Elevation 4
Figure 5

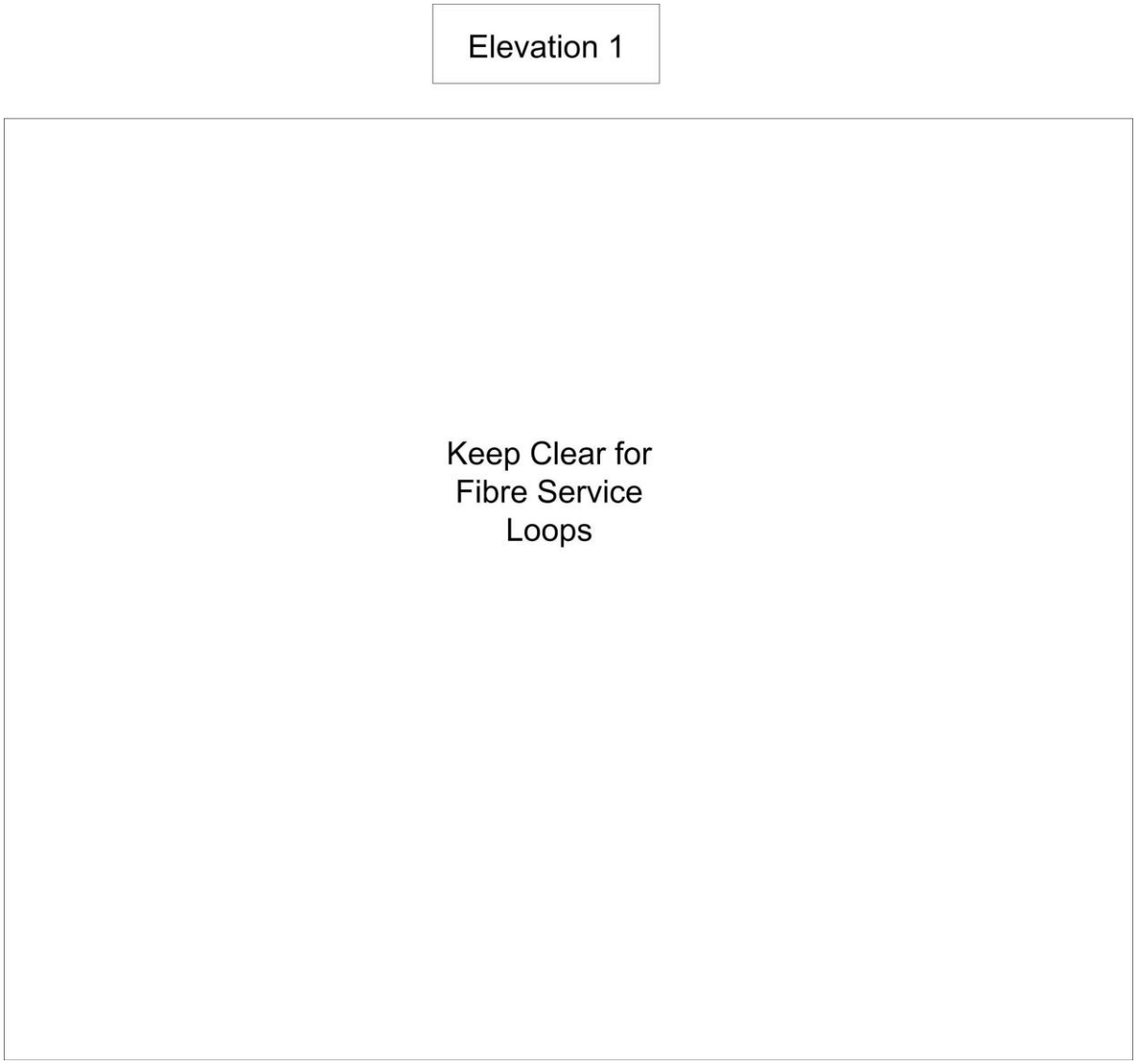


5.3 Appendix F Secondary Telecommunication Room Layouts

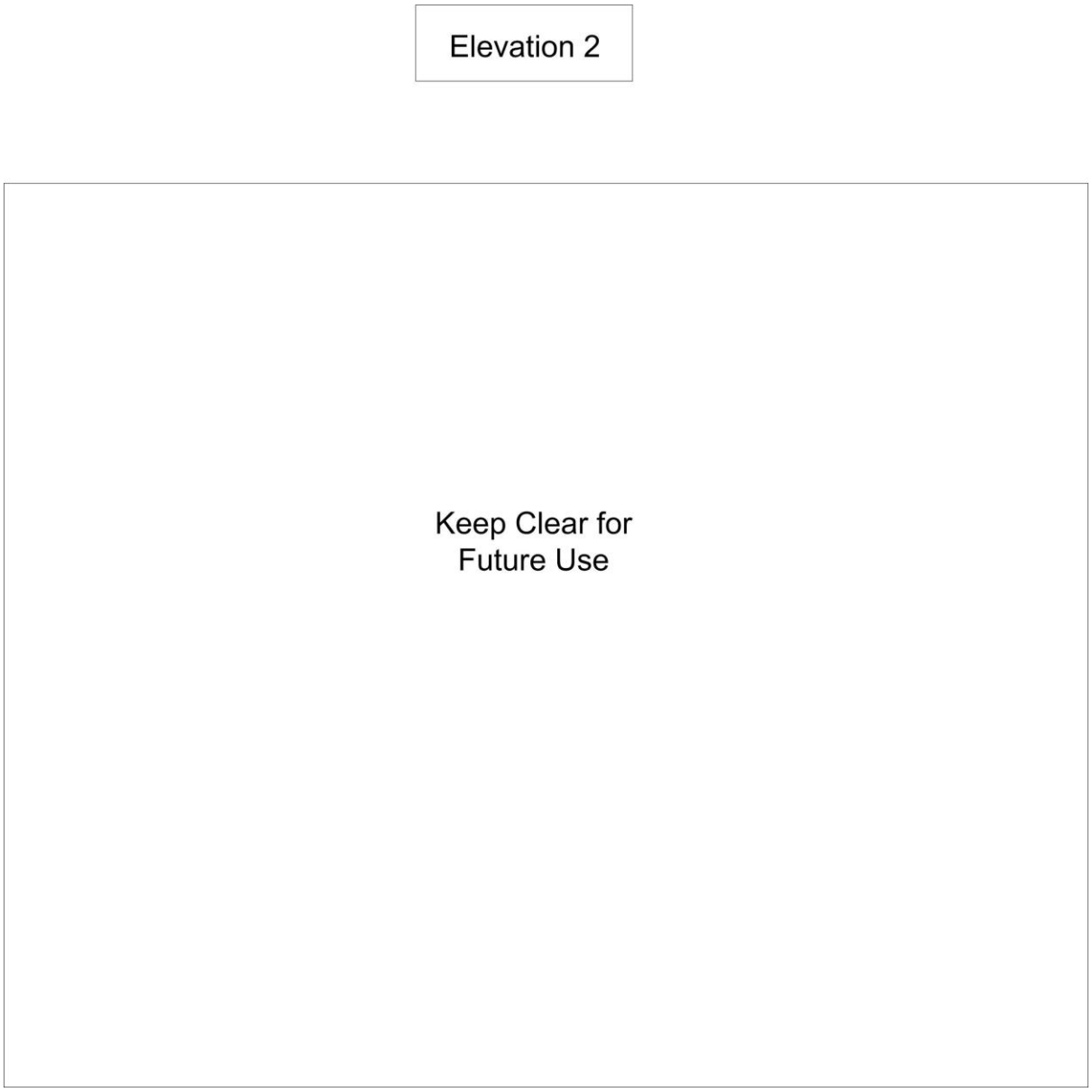
5.3.1 Figure 6 Typical Secondary Telecommunication Room Layouts



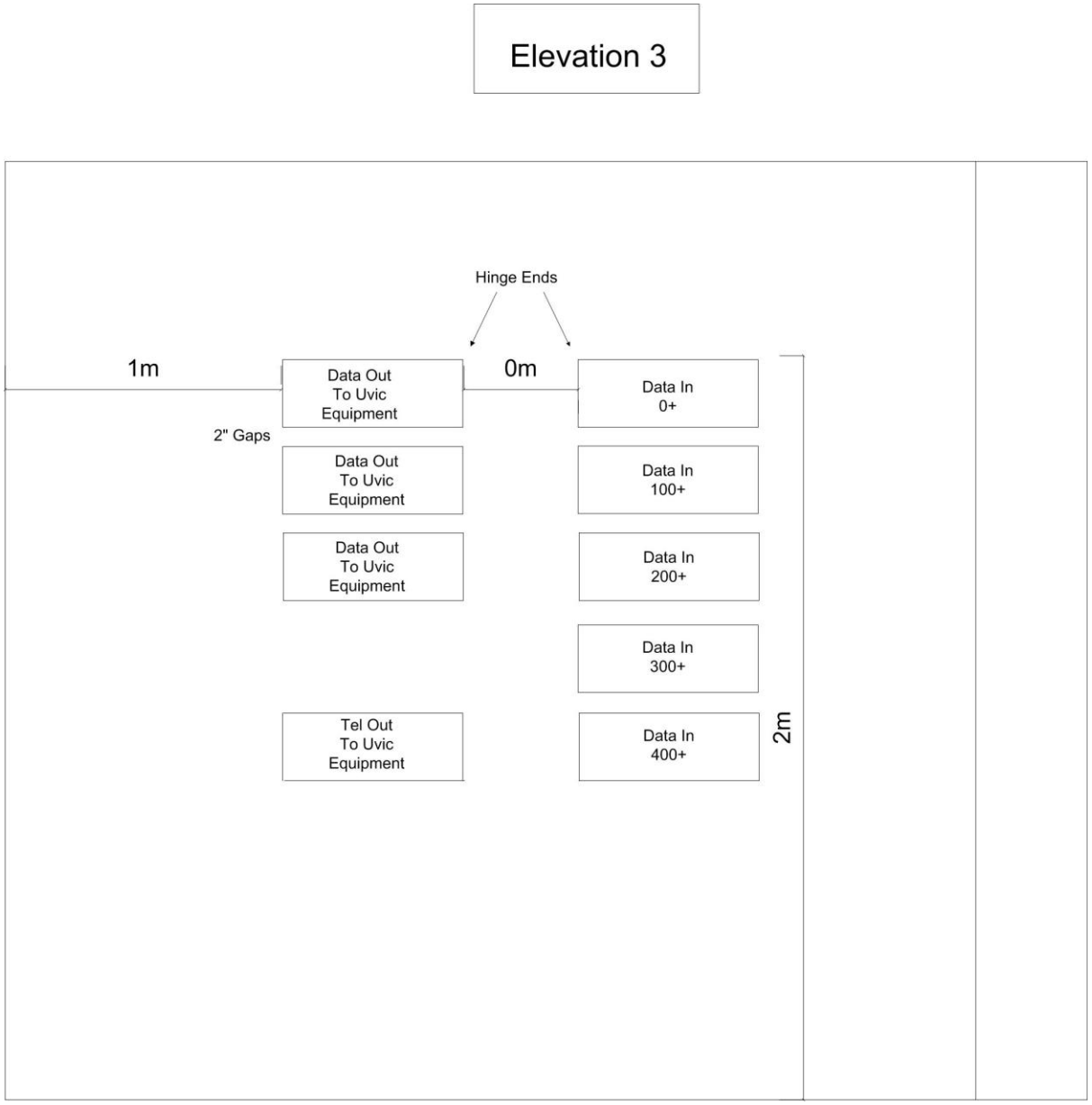
5.3.2 Figure 7 Typical Secondary Telecommunication Room Layouts



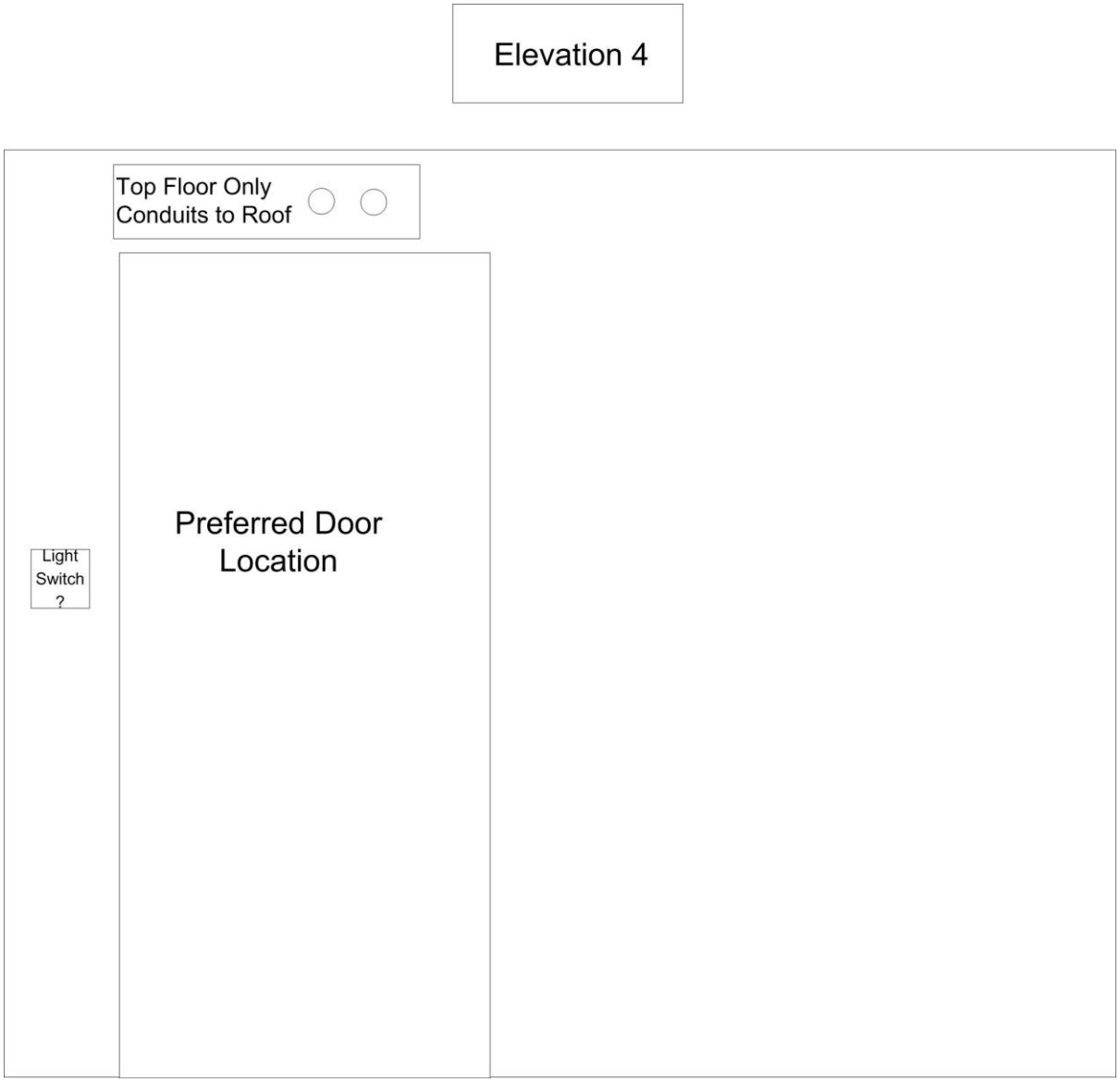
5.3.3 Figure 8 Typical Secondary Telecommunication Room Layouts



5.3.4 Figure 9 Typical Secondary Telecommunication Room Layouts

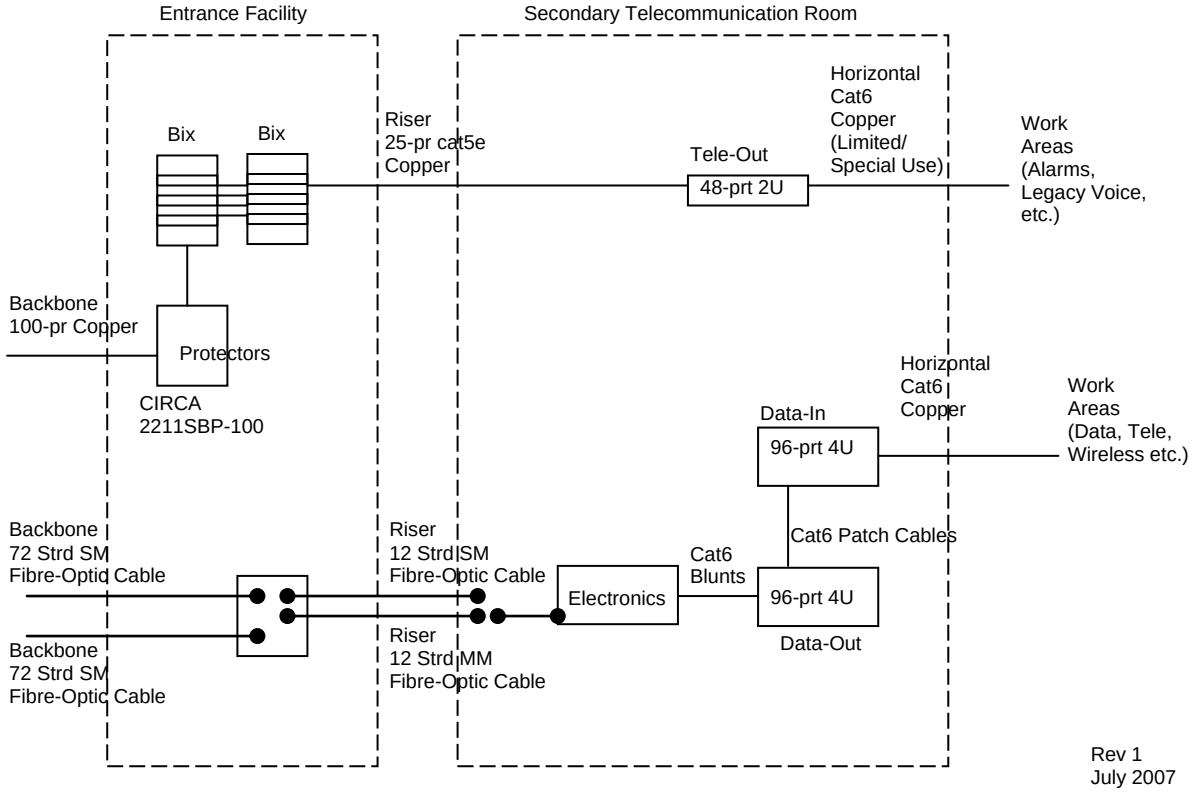


5.3.5 Figure 10 Typical Secondary Telecommunication Room Layouts



5.4 Appendix G Typical Cabling Diagram

Typical Cabling Diagram



5.5 Appendix H Contractor Information Sheet

July 20, 2007 Rev 06.10.03

Contractor Information Sheet for Installing Data/Tel Lines

Patch Panel

- Incoming cable is to be dressed to the 96 port patch panel on the opposite side of the hinge or through the cut out in the furred out wall.
- When a new patch panel is added it will be labelled 100+, 200+ etc. depending on how many have previously been installed. For example if there is only one previously installed panel (0+) then next one will be labelled 100+ or if there are two panels previously installed the next one will be labelled 200+ and so on.
- When connecting multiple horizontals, where possible connections shall be grouped sequentially by room number and then by data jacks within the rooms keeping in mind that the panel number plus the silk screened numbers provided by the panel manufacturer will be the number that will appear on the wall plate (see **Wall Jack**).
  Example: Room 101 = D31, D32, D33
  Room 102 = D34, D35, D36 etc.
- Punch down must be to EIA/TIA 568A standard.
- A black on white label indicating room number only is to be affixed directly to the patch panel above the jack using a P-touch or similar labeller.

Wall Jack

- Communication jacks are generic and support data, voice, wireless, etc. services. They are generically referred to as 'data' or 'communication' jacks.
- The patch panel labels of 0+, 100+, 200+ etc. indicates what the jack numbers will be at the remote wall port. Data circuits wired to the first "Data-In" panel (0+) will receive labels "D1" through "D96" ("D48" on 48 port panels), on the second panel "D101" through "D196", on the third "D201" through "D296", and so forth.
- There should be a minimum of 1' 6" of cable coiled in the box behind the jack after termination.
- A black on white label indicating the number of the patch panel jack connected at the other end prefixed with a "D" shall be affixed on the wall plate. For example: D101, D302, etc.

25-pair Riser

- Telephone riser cable installed between the entrance facility and secondary telecommunications rooms should be terminated on a 48-port patch panel in the secondary telecommunication room and bix in the entrance facility.

Testing

- All testing shall be performed end to end from the patch panel to communication jack after final installation is completed.
- A 'Permanent Link' test will be performed and is expected to meet or exceed the performance requirement of EIA/TIA 568A, CAT5e/CAT6 as appropriate.
- Tests results must include the Telecommunication Room number from which cables terminate and indicate the following information:
  - Telecommunication Room
  - Room number of outlet box location
  - Communication (Data) jack number

  Example: A cable run from Clearihue Telecommunication Room C008a to office C071, communication jack D4 would have a test label ID of C008aRMC071D4.

For additional information or clarification of this document please contact:
Network Services (Paul Nightingale) at 472-4536 or 883-4480 or Pat Todd at 721-6548.

6 Amendments to the Document

Section Number	Section Description	Change Date
2.2.1.4	Horizontal Cable	July 2007
2.2.1.5.1	Horizontal Cable	July 2007
2.2.1.5.5	Horizontal Cable	July 2007
2.3.4.1	Riser Cable	July 2007
2.3.4.2.2	25-pr Cat5e Copper Cable	July 2007
3.1.3.4	Modular Jacks	July 2007
4.3.3.1	Labelling	July 2007
4.3.2.2	Labelling	July 2007
Appendix G	Typical Cabling Diagram	July 2007
Appendix H	Contractor Information Sheet	July 2007
5.3	Appendix C	August 2007
5.6	Telecom Room Layouts	March 2008
1.1.3.3	Entrance Telecommunications Rooms	May 2008
2.3.3.1	Multimode Fibre-Optic Riser	May 2008
2.4.1.1	Singlemode Fibre-Optic Backbone	May 2008
3.1.4	Courtesy Telephone	May 2008
3.2.7.1	Backbone Conduit	May 2008
Appendix A	Components to be supplied by the Contractor	May 2008
Appendix B	Components required to meet Category 5e Standard	May 2008
Appendix C	Components required to meet Category 6 Standard	May 2008

University of Victoria | Facilities Management

Interior Wayfinding Signage

Design Standards

05/25/12

CONTENTS

SIGNAGE POLICY

This document shall be read in conjunction with University of Victoria signage policy.

The policy can downloaded through the University of Victoria Website at the following location:
http://www.uvic.ca/universitysecretary/policies/index.php

NAMING CONVENTIONS

Facilities Management will use its discretion to abbreviate or otherwise alter the official names of university entities on signage with the aim of facilitating ease of wayfinding. In most cases, this involves removing redundancies from the beginning official names such as "Department of", "University of Victoria" and "Office of". The intent is to permit visitors to easily read a list of building occupants in alphabetical order. The use of ampersands will not be permitted.

The follow are examples of official names as compared to names used for signage.

GENERAL OFFICES

Official Name	**Sign**
Department of Writing	Writing General Office
Faculty of Science	Science General Office
School of Child and Youth Care	Child and Youth Care General Office

OFFICES

Official Name	**Sign**
Office of the Registrar	Registrar
Office of Indigenous Affairs	Indigenous Affairs
Benefits	Benefits
Equity & Human Rights Office	Equity and Human Rights

SERVICES

Official Name	**Sign**
Department of Accounting Services	Accounting Services
Department of Printing & Duplicating Services	Printing and Duplicating Services
Department of UVic Communications Services	Communications Services

OFFICIAL NAMES THAT BEGIN WITH "UNIVERSITY OF VICTORIA" OR "UVIC"

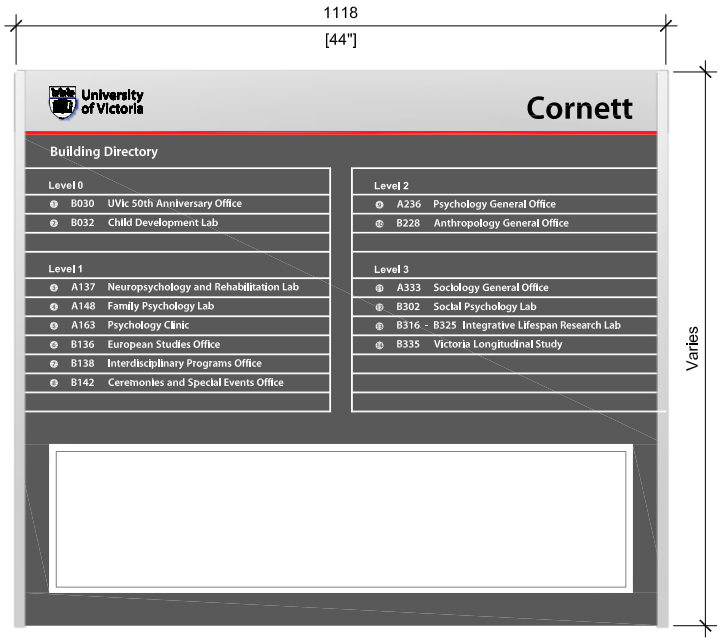
Official Name	**Sign**
University of Victoria Art Collections	Art Collections
University of Victoria Archives	Archives
Office of the University Secretary	University Secretary
University Systems	University Systems

Building Directory [D1]

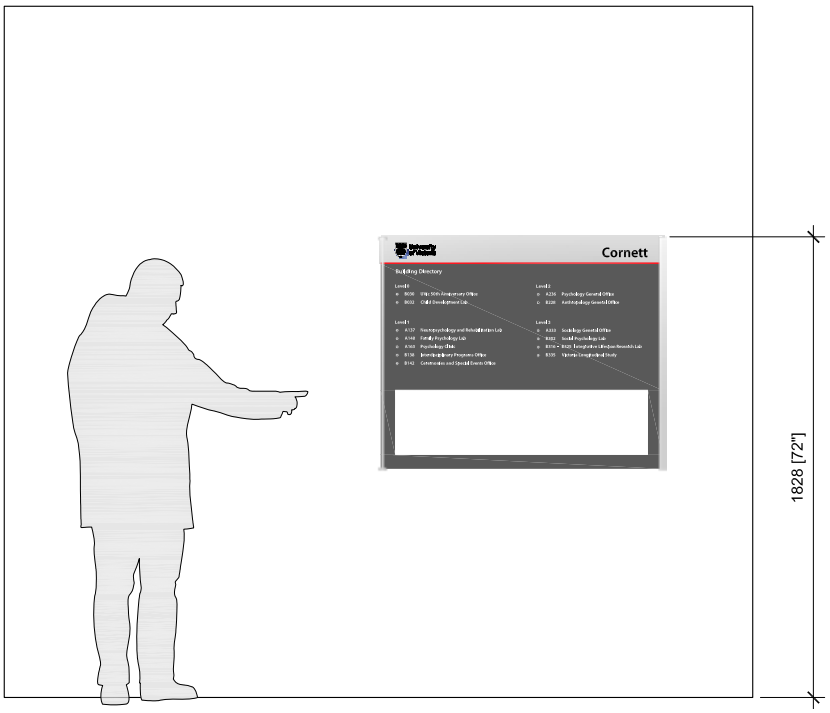
Intent:
Building Directories are to be installed in strategic locations within building lobbies and/or at all major entrances. The intent is to capture the attention of building users upon entry and help direct them to their intended destination.

Size:
1118mm x Varies [44" x Varies]

General Sign Construction:
Constructed of G1S plywood backer with a layer of lamicoid adhered to the surface. Two layers of laminate are applied on top of this at the header, with vinyl logos and letters as shown. On the body of the sign add lamicoid strips complete with reveals and engraved text and arrows. Behind map insert, substitute white styrene (refer to details) for lamicoid. Printed plans are to be supplied by UVic and will be displayed behind a matte acrylic cover with a white vinyl border applied to the back. Insert plan by temporarily removing angle and lamicoid panel on one side of sign. Adhere acrylic cover to styrene with double sided tape on three sides, with the fourth side left open for map insertion. Apply aluminum angles to the sides of the sign. Refer to section details, materials list and specifications for complete construction and material information.



Main Directory [D1]



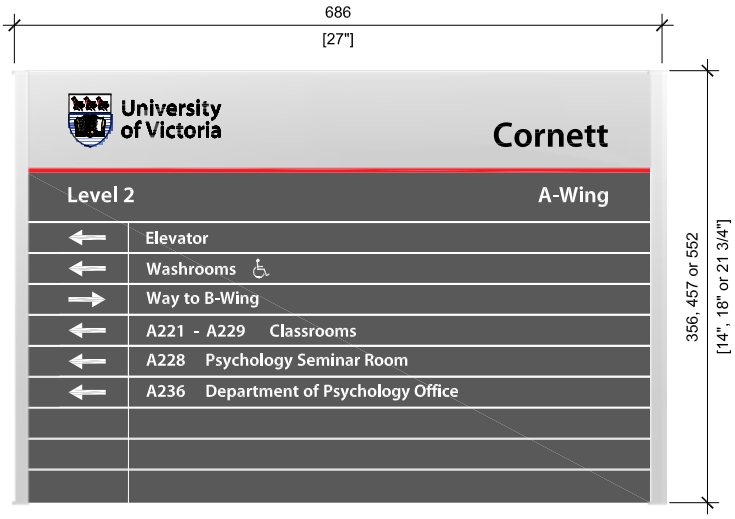
Installation of Main Directory [D1]

Sub-Directory [SD1,SD2,SD3]

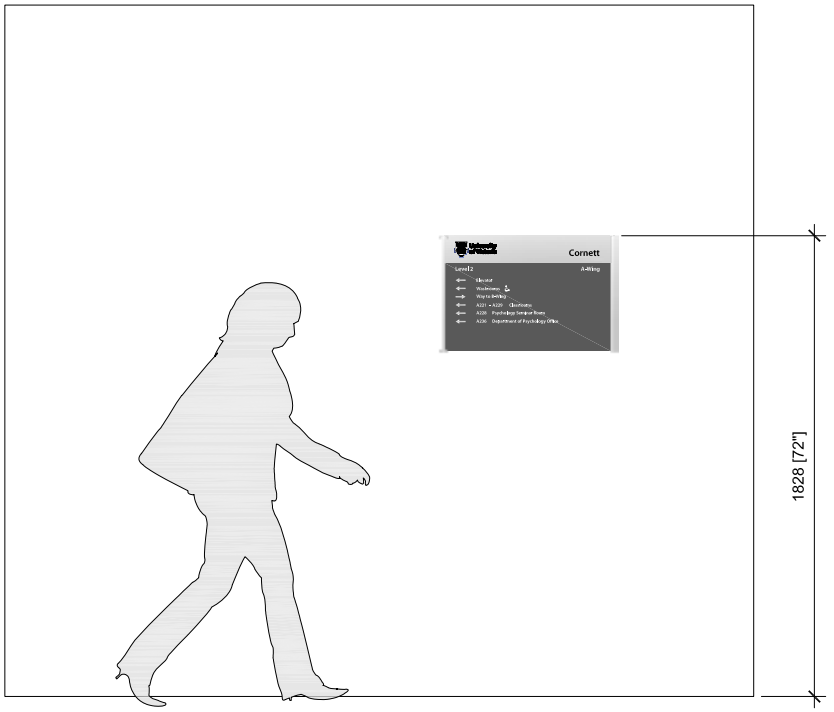
Intent:
Sub Directories to be installed in strategic locations near stairwells, elevators, and/or secondary entrances. The intent is to direct building occupants to their destination.

Size:
SD1 686mm x 356mm [27" x 14"]
SD2 686mm x 457mm [27" x 18"]
SD3 686mm x 552mm [27" x 21¾"]

General Sign Construction:
Sign constructed of 3/4" plywood backer with one continuous layer of Lamicoid adhered to the surface. On the header of the sign apply two layers of laminate with vinyl logos, vinyl graphics on top of the laminate. Add Lamicoid strips to body of the sign as shown in elevation complete with reveals and engraved text and arrows. Apply aluminum angles to the sides of the sign. Refer to section details, materials list and specifications for complete construction and material information.



Sub-Directory [SD1,SD2,SD3]



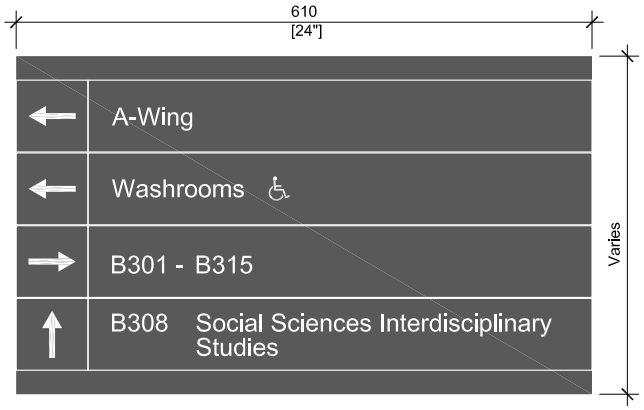
Installation of Sub-Directory [SD1,SD2,SD3]

Wall Mounted Wayfinding [W1]

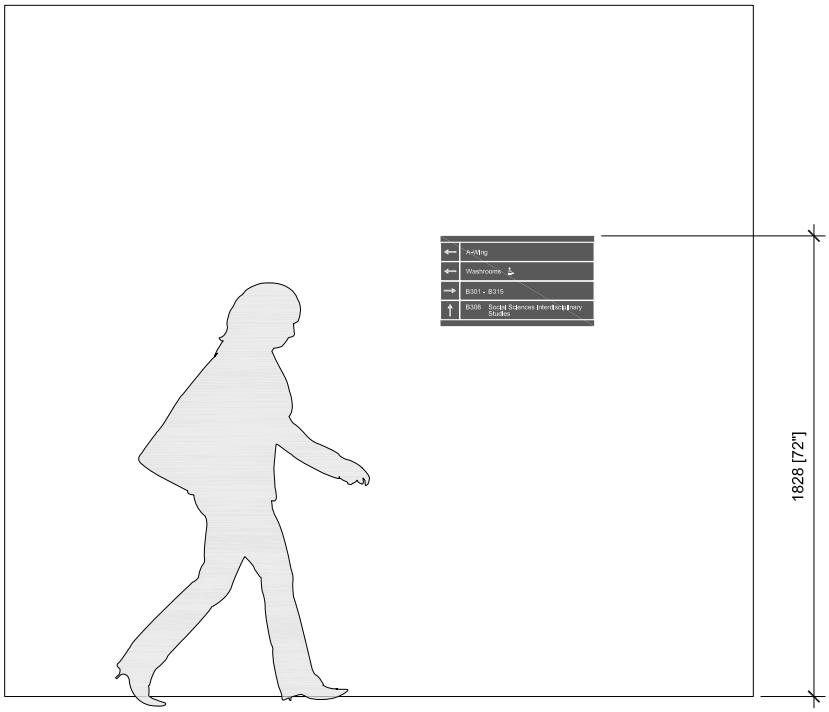
Intent:
Wall Mounted Wayfinding signs are installed at corridor intersections and other strategic locations. The intent is to direct building occupants to their destination and reassure them that they are heading in the right direction.

Size:
W1 610mm x Varies [24" x Varies]

General Sign Construction:
Sign constructed of one continuous layer of lamicoid with engraved lamicoid panels on top. Sign is to be applied to wall surface using double sided tape. Refer to section details, materials list and specifications for complete construction and material information.



Wall Mounted Wayfinding [W1]



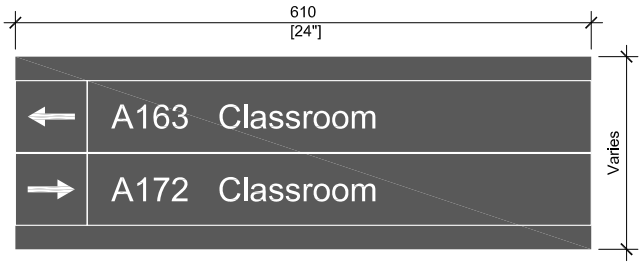
Installation of Wall Mounted Wayfinding [W1]

Suspended Wayfinding [W2]

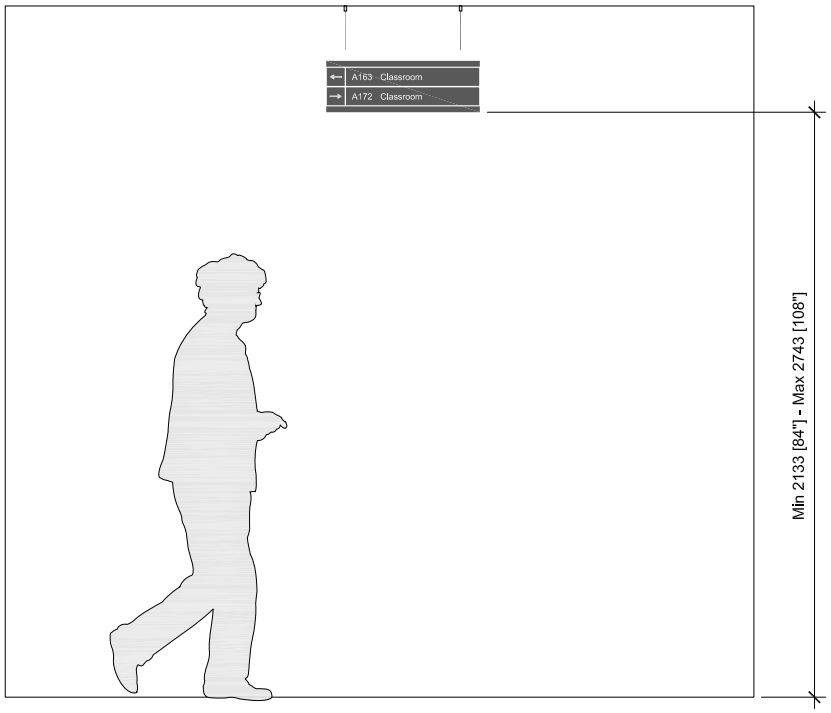
Intent:
Suspended Wayfinding signs are installed at corridor intersections and other strategic locations. The intent is to direct building occupants to their destination and reassure them that they are heading in the right direction. These signs will be utilized when walls do not permit Wall Mounted Wayfinding signs.

Size:
W2 610mm x Varies [24" x Varies]

General Sign Construction:
An aluminum backer sandwiched between a continuous layer of lamicoid, both sides, with engraved lamicoid panels on top. Suspended from ceiling with hanging hardware. Maximum 4 lines of text. Refer to section details, materials list and specifications for complete construction and material information.



Suspended Wayfinding [W2]



Installation of Suspended Wayfinding [W2]

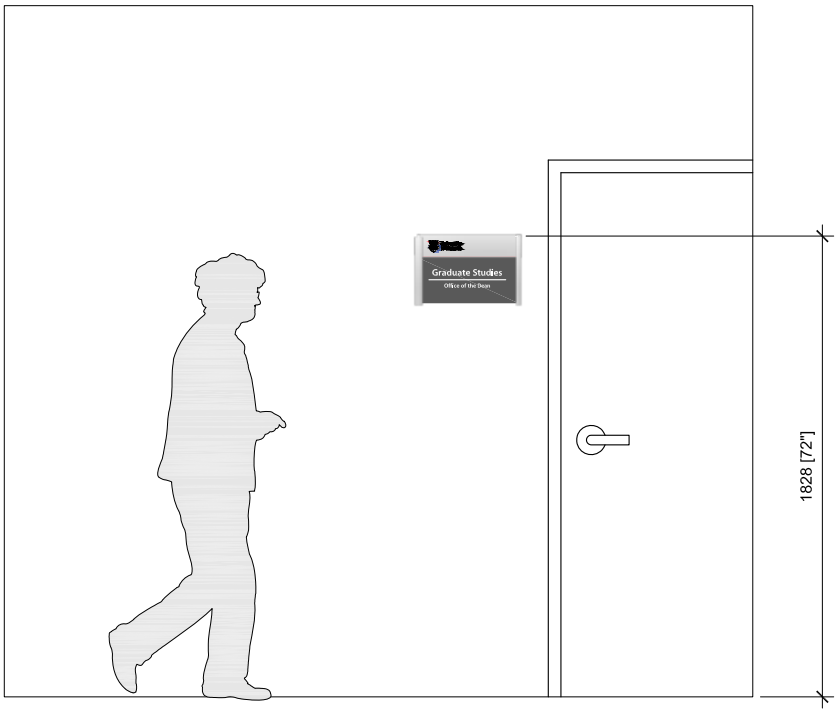
Department Identification Signs
[DEP1a, DEP1b, DEP1c, DEP2a, DEP2b, DEP2c]

Intent:
Department Identification Signs to be installed at main entrance to departmental main offices and building facilities. The intent is to provide a formal and consistent appearance to departmental identification.

Size:
DEP1a 406mm x 267mm [16” x 10-1/2”]
DEP1b 406mm x 267mm [16” x 10-1/2”]
DEP1c 406mm x Varies [16” x Varies]
DEP2a 610mm x 356mm [24” x 14”]
DEP2b 610mm x 356mm [24” x 14”]
DEP2c 610mm x Varies [24” x Varies]

Materials:
Sign constructed of a 3/4” G1S plywood backer with one continuous layer of Lamicoid adhered to the surface. On the sign header apply two layers of laminate with vinyl logo and graphics as shown. On the body of the sign is a second layer of lamicoid with engraved letters and graphics. Apply aluminum angles to the sides of the sign. Refer to section details, materials list and specifications for complete construction and material information.

Department Identification Sign [DEP1a]



Installation of Department Identification Sign [DEP1b]

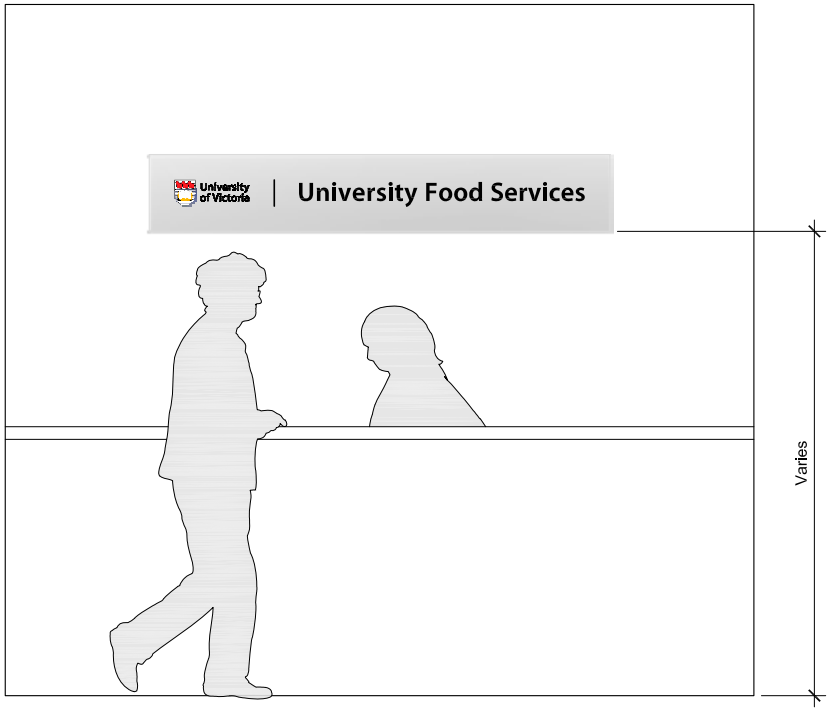
Department Identification Banner [DEP3]

Intent:
Department Identification Banner is to be installed behind reception counters or on bulkheads at reception areas. The intent is to provide a formal and consistent appearance to departmental identification.

Department Identification Banner [DEP3]

Size:
DEP3 254mm x Varies [10” x Varies]

Materials:
Sign constructed of a 3/4” G1S plywood backer with one continuous layer of plastic laminate adhered to the surface, top, bottom and sides. Vinyl decals are applied to the laminate. Refer to section details, materials list and specifications for complete construction and material information.



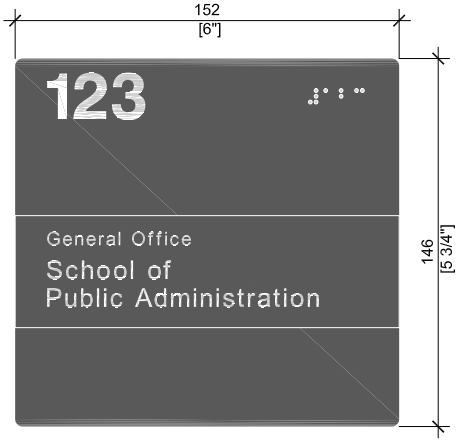
Installation of Department Identification Banner [DEP3]

Room Number Door Plates [ID1]

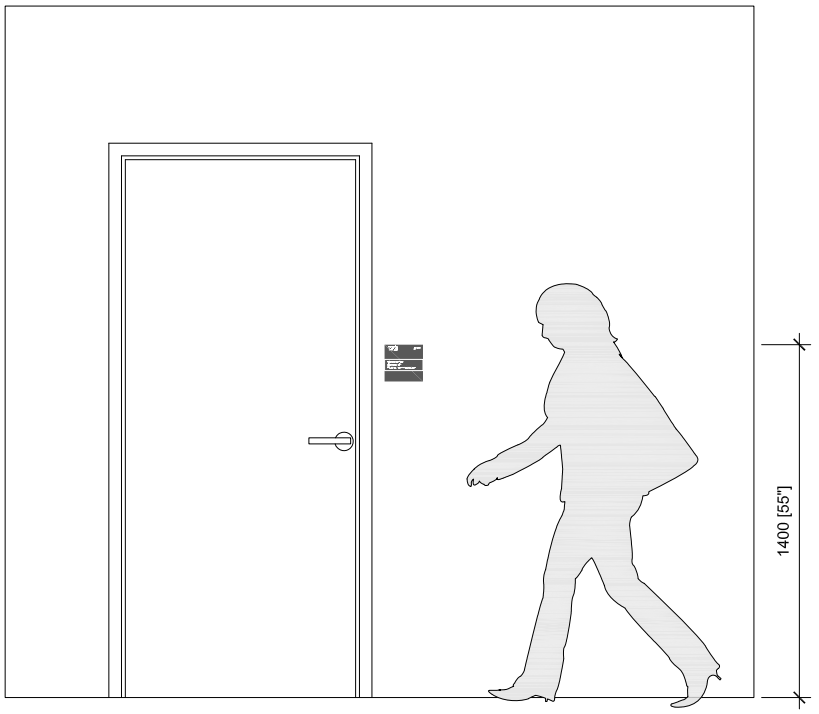
Intent:
This wall mounted sign identifies rooms and department offices.

Size:
152mm x 146mm [6" x 5-3/4"]

General Sign Construction:
Consists of one layer of lamicoid adhered to wall with double sided tape, topped with a lamicoid panel with engraved text (panel to be supplied by UVic). Embossed lamicoid room number is to be ADA compliant and true, tapered and tactile. The braille raster balls shall be grade two braille, lower case only and numerals shall always have the Braille 'number follows' character before them. Refer to section details, materials list and specifications for complete construction and material information.



Room Identification Sign [ID1]



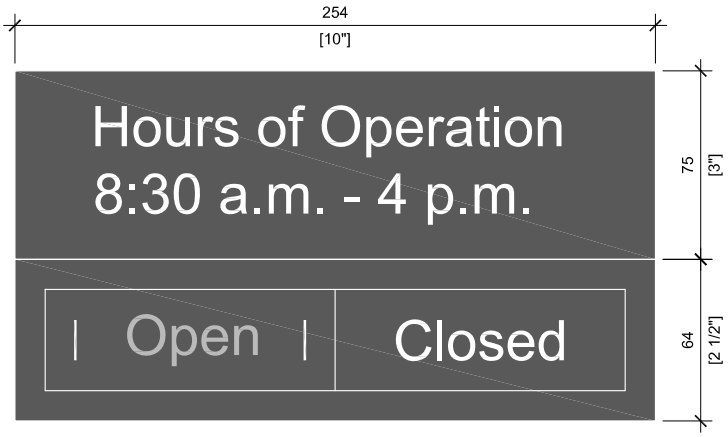
Installation of Room Identification Sign [ID1]

Office Information Signs [ID2, ID3, ID4]

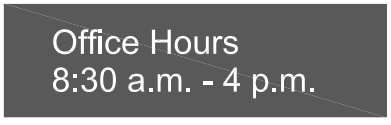
Intent:
These wall mounted signs establish information about the operating hours and open status of Departments / Offices.

Size:
ID2 254mm x 75mm [10" x 3"]
ID3 254mm x 64mm [10" x 2-1/2"]
ID4 254mm x 81mm [10" x 2"]

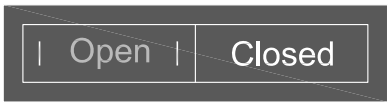
General Sign Construction:
One or two layer(s) of lamicoid with engraved text. Where ID2 or ID4 is used in combination with ID3, two layers of lamicoid are required to match the thickness of ID3, which is always constructed of two layers of lamicoid because of the sliding panel (see details). If ID2 or ID4 are used on their own then only one layer of engraved lamicoid is required. Refer to secton details, materials list and specifications for complete construction and material information.



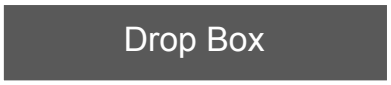
Office Information Signs [ID2 combined with ID3]



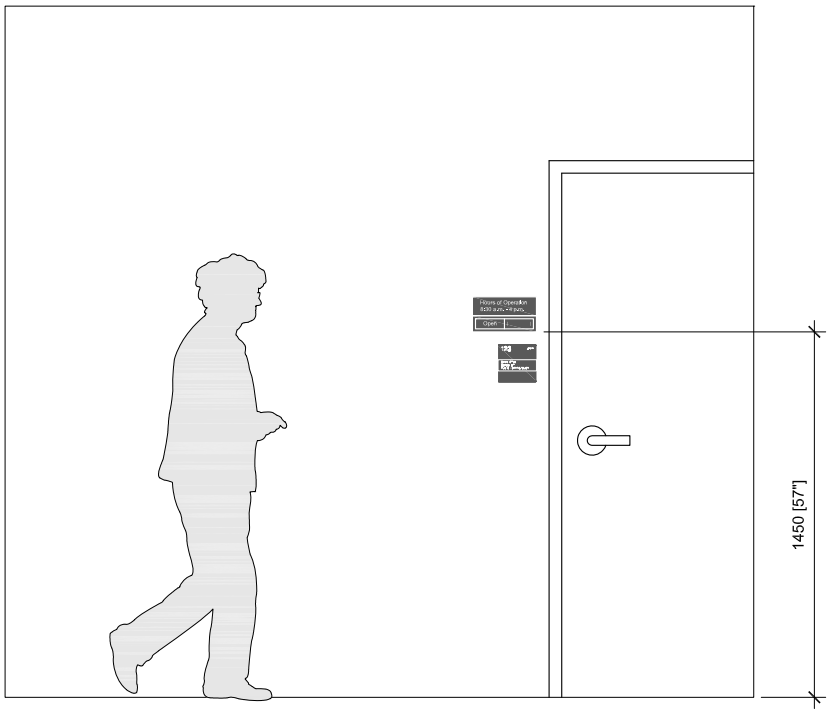
Office Hours Sign [ID2]



Sliding Sign [ID3]



Drop Box / Mail Slot Sign [ID4]



Installation of Office Information Signs [ID2 combined with ID3]

Projecting Office Information Signs [PID1a, PID1b, PID2a, PID2b]

Intent:
These two sided projecting signs direct you to various Departments / Offices / Help Desks.

Size:
PID1a 406mm x 76mm [16" x 3"]
PID1b 406mm x 76mm [16" x 3"]
PID2a 406mm x 76mm [16" x 3"]
PID2b 406mm x 76mm [16" x 3"]

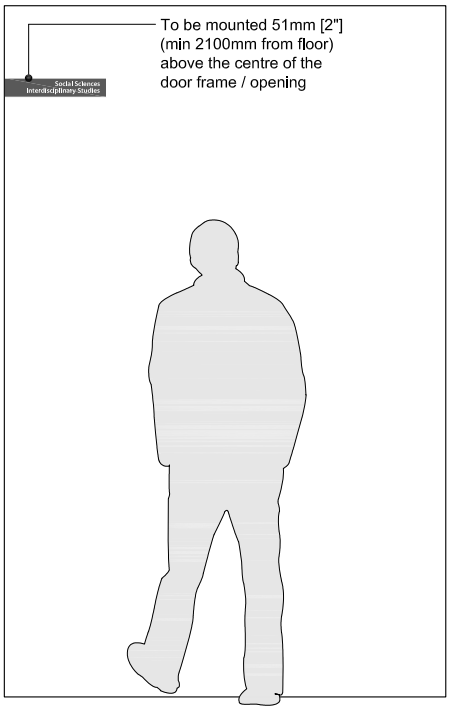
General Sign Construction:
One layer of engraved lamicoid on either side of an aluminum backer. Refer to details, materials list and specifications for complete construction and material information.

Projecting Office Information Sign [PID1a]

Projecting Office Information Sign [PID1b]

Projecting Office Information Sign [PID2a]

Projecting Office Information Sign [PID2b]



Installation of Projecting Office Information Signs

Washroom Door Signs [WID1-WID12]

Intent:
Washroom Signs are to be installed on washroom doors to help identify the facilities.

Size:
178mm x 254mm [7" x 10"]
241mm x 254mm [9-1/2" x 10"]
291mm x 254mm [11-1/2" x 10"]

General Sign Construction:
One engraved lamicoid panel (3) with 30 degree beveled edges, all four sides, adhered to door surface with double sided adhesive (20). Digital files of the logos to be supplied by UVic.

Installation of Washroom Door Signs

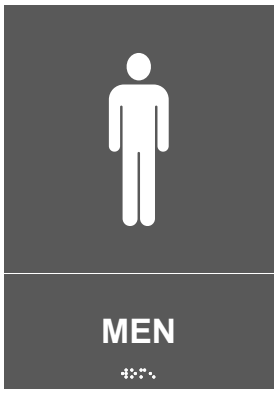
Accessible Female Washroom [WID1]

Accessible Male Washroom [WID2]

Accessible Unisex Washroom [WID3]

[WID1-WID12] Washroom Door Signs Cont.

Female Washroom [WID4]



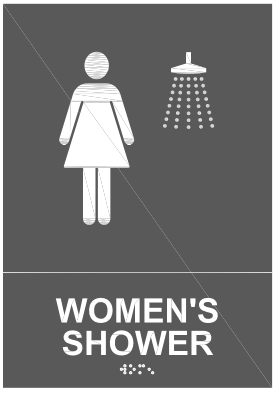
Male Washroom [WID5]

Unisex Washroom [WID6]

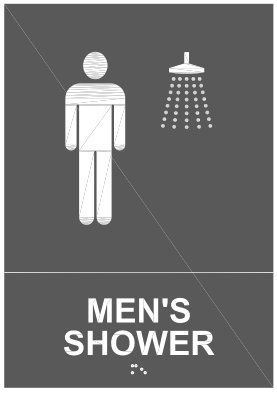
Accessible Female Shower [WID7]

Accessible Male Shower [WID8]

Accessible Unisex Shower [WID9]



Female Shower [WID10]



Male Shower [WID11]

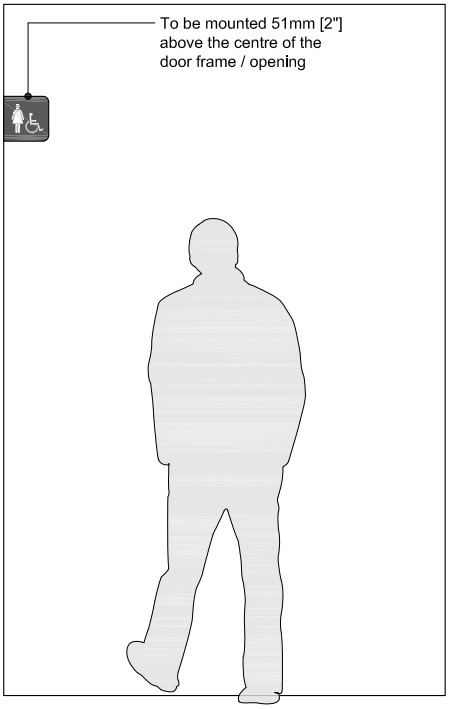
Unisex Shower [WID12]

Projecting Washroom Signs [WP1, WP2, WP3, WP4, WP5, WP6]

Intent:
Projecting Washroom Signs are to be installed above washroom doors to help identify facilities that are within corridors.

Size:
178mm x 178mm [7" x 7"]
241mm x 178mm [9-1/2" x 7"]

General Sign Construction:
Custom aluminum mounting bracket with engraved lamicoid panels on either side. Digital files of the logos to be supplied by UVic.



Installation of Projecting Washroom Signs

Accessible Female Washroom [WP1]

Accessible Male Washroom [WP2]

Accessible Unisex Washroom [WP3]

Female Washroom [WP4]

Male Washroom [WP5]

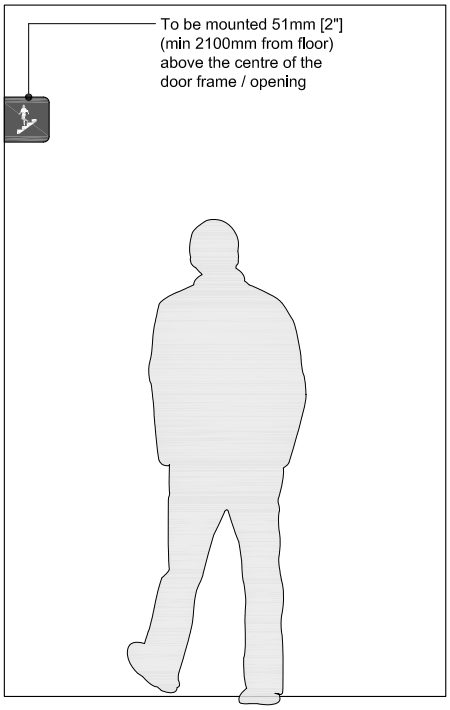
Unisex Washroom [WP6]

Projecting Signs [P1, P2]

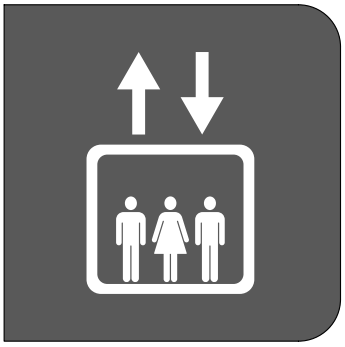
Intent:
Projecting Signs are to be installed above doors to help identify facilities that are within corridors.

Size:
178mm x 178mm [7" x 7"]

General Sign Construction:
Custom aluminum mounting bracket with engraved lamicoid panels both sides. Digital files of the logos to be supplied by UVic.



Installation of Projecting Signs



Projecting Elevator Sign [P1]

Projecting Stairwell Sign [P2]

University of Victoria | Facilities Management

Safety and Information Signage

Design Standards

04/30/12

CONTENTS

SIGNAGE POLICY

This document shall be read in conjunction with University of Victoria signage policy.

The policy can downloaded through the University of Victoria Website at the following location:
http://www.uvic.ca/universitysecretary/policies/index.php

Safety Signs [N1]

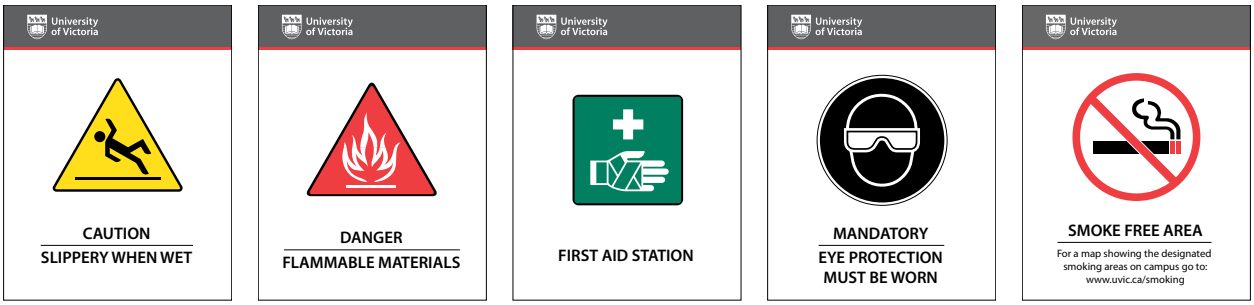
Intent:
Located at key areas to provide information about hazards, safety and prohibitions. Where appropriate, logos shall be consistent with CAN/CSA-Z321-96 Signs and Symbols for the Workplace.

Size:
216mm x 279mm [8.5" x 11"]

General Sign Construction:
Consists of a sheet of non-glare acrylic/plexi with a vinyl decal reverse printed, and applied to the back of the plexi. A second layer of white vinyl is applied after the graphic, so the sign is opaque.

Colors:

Pantone 425C	Pantone 185C	Pantone 109C	Pantone 341C	Process Black



Warning *Danger* *Safety* *Mandatory* *Prohibition*

Warning

Danger

Safety

Prohibition

Mandatory

Notices [N2]

Intent:
Located at key areas to provide information. Where appropriate, logos shall be consistent with CAN/CSA-Z321-96 Signs and Symbols for the Workplace.

Size:
216mm x 279mm [8.5" x 11"]

General Sign Construction:
Consists of a sheet of non-glare acrylic/plexi with a vinyl decal reverse printed, and applied to the back of the plexi. A second layer of white vinyl is applied after the graphic, so the sign is opaque.

Colors:
Pantone 425C Pantone 185C

Notice Example [N2]

Notice Example [N2]

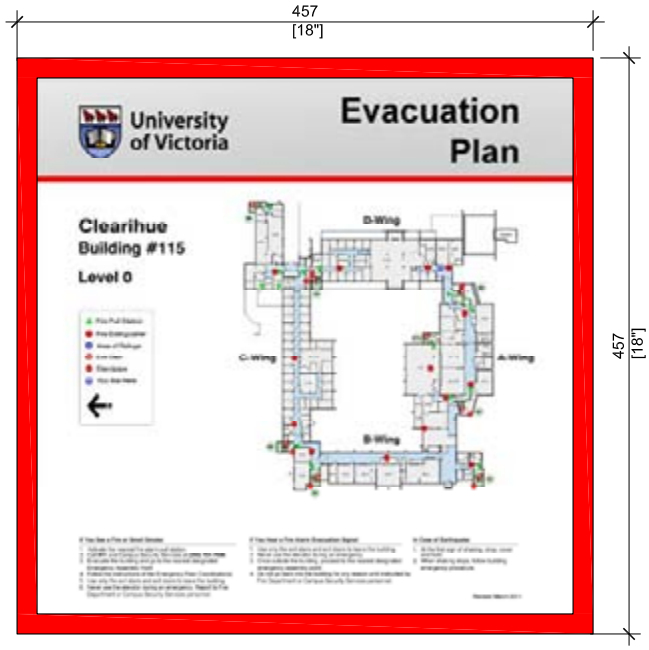
Notice Example [N2]

Evacuation Plan Sign [E1]

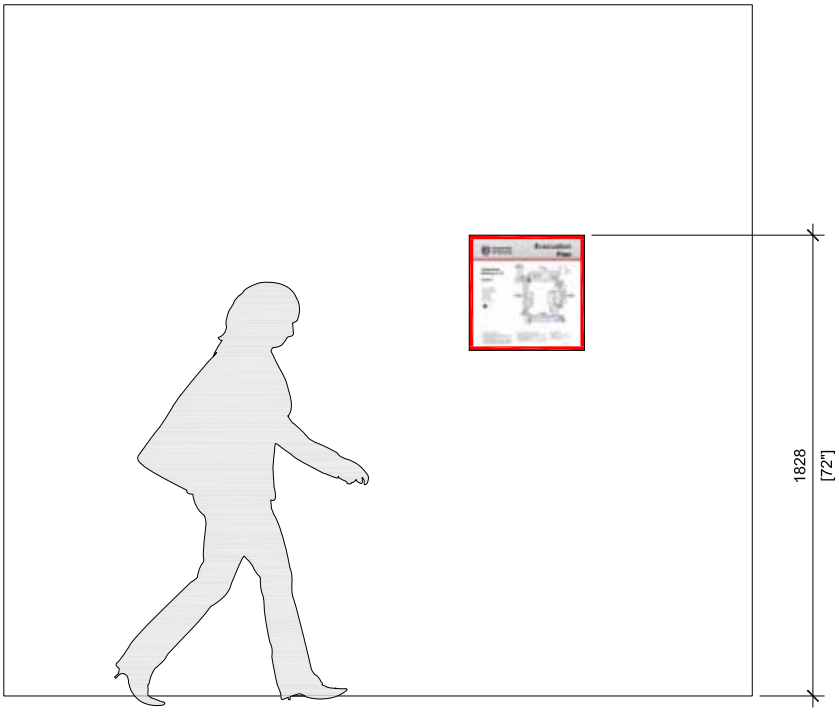
Intent:
Located at key areas to outline emergency procedures in the event of an evacuation, as well as locating pull stations, fire extinguishers, areas of refuge, exit stairs and standpipes.

Size:
457mm x 457mm [18" x 18"]

General Sign Construction:
Consists of a sheet of non-glare acrylic/plexi with a 16mm red vinyl strip applied to the back. The plexi frame is taped on three sides to a foam board backer. A paper plan will be supplied by UVic, and is to be inserted at the top edge of the sign where the tape is absent. Refer to details, materials list and specifications for complete construction and material information.



Evacuation Plan Sign [E1]



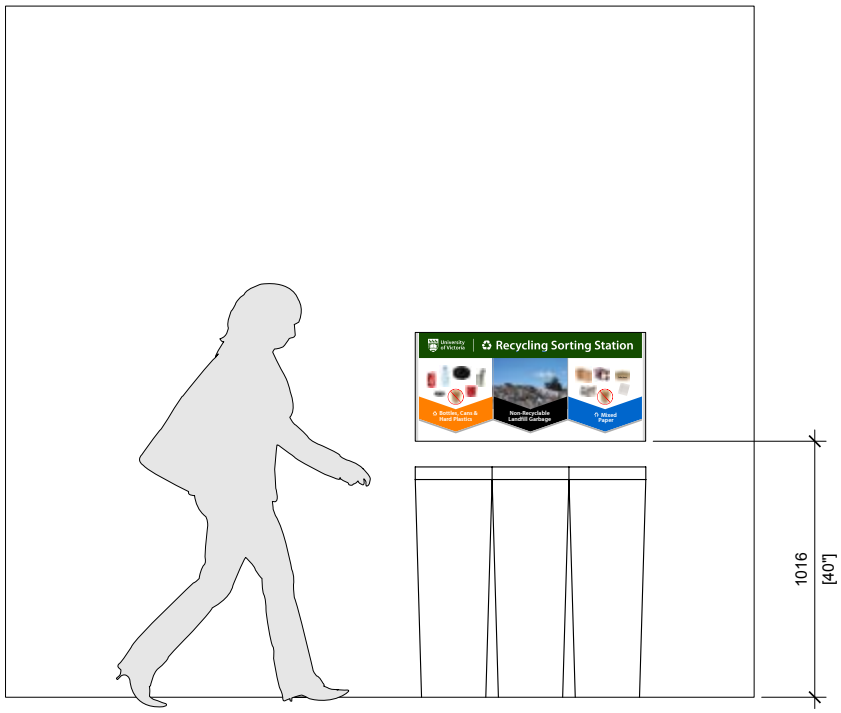
Installation of Evacuation Plan [E1]

Garbage and Recycling Sign [G1]

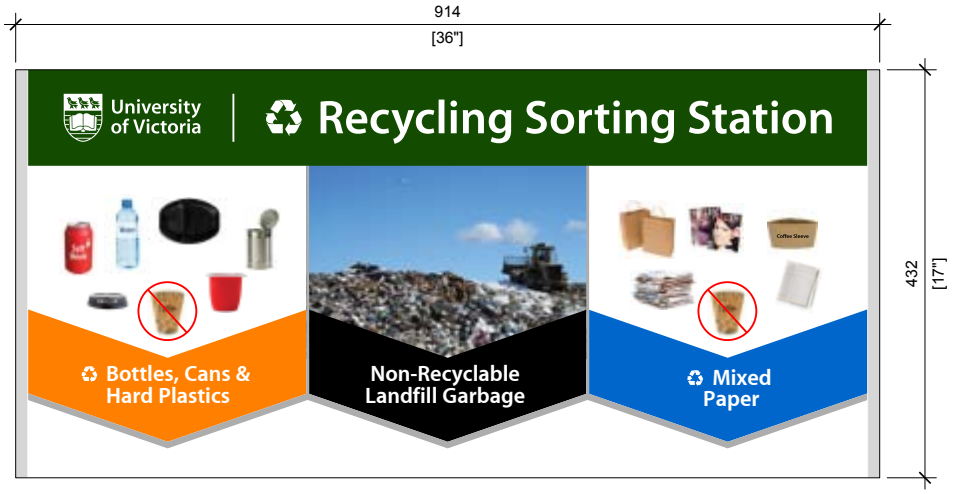
Intent:
Garbage and recycling signs are to illustrate proper disposal areas for various waste items.

Size:
432mm x 914mm [17" x 36"]

General Sign Construction:
Finished plywood backer with vinyl graphic applied to face, wrapped over top edge and down the back of the sign 3". Apply aluminum angles to the sides of the sign as shown. A continuous t-slot is routered into the back of the plywood for hanging. Temporarily remove one angle to slide sign onto fasteners. Refer to details, materials list and specifications for complete construction and material information.



Installation of Garbage and Recycling Sign [G1]



Garbage and Recycling Sign [G1]

University of Victoria | Facilities Management

Interior Wayfinding Signage and Safety and Information Signage

Specifications and Details

05/25/12

CONTENTS

1.1 SUMMARY OF WORK

1. This contract is for the fabrication, delivery to site and installation of interior wayfinding signage. This Interior Wayfinding Specification and Details document shall be read in conjunction with additional project specific documents, including:

   .1 Location Plans and Sign Content drawings.

   .2 Asbestos handling procedures included as an Appendix to this document.

   .3 UVic RFT document including bid form, instructions to bidders and general conditions.

1.2 CONTRACT METHOD

1. The Contract method for this work will be outlined in the UVic RFT document.

1.3 PROJECT COORDINATION

1. Coordinate progress of the work, including progress schedules, submittals, use of site, utilities and construction closures within building with Facilities Management.

1.4 CUTTING AND PATCHING

1. Responsibility: Cutting and patching shall be located and paid for by the Contractor.

2. Approvals: Submit written request in advance of cutting or alteration which affects:

   .1 Structural integrity of any element of the Project.

   .2 Integrity of weather-exposed or moisture-resistant elements.

   .3 Efficiency, maintenance, or safety of any operational element.

   .4 Visual qualities of sight-exposed elements.

   .5 Work of Owner or separate Contractor.

   .6 Disruption of other occupancies within the building.

3. Inspection:

   .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

   .2 After uncovering, inspect conditions affecting performance of Work.

   .3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Make Good, defined as matching adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed in ambient light from a distance of 1500mm. In renovation areas, "make good" means repairing substrate surfaces and, in areas not scheduled for refinishing, refers to patching, repairing, and finishing to match adjacent surfaces and includes applying a new paint finish to surface up to the next change in plane in all directions.

4. Execution:

.1 Execute Work to avoid damage to other Work.

.2 Prepare proper surfaces to receive patching and finishing.

.3 Employ workers, experienced in the Work to be cut or patched to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.4 Cut rigid materials using power saw or core drill. Pneumatic or impact tools not allowed.

.5 Where alterations to existing surfaces are required, restore Work with new products and make good.

.6 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

1.5 SUBMITTALS

1. Provide submittals listed for review with reasonable promptness and in an orderly sequence so as to not cause delay in the Work. Provide a schedule of submittals at commencement of the project.

2. Work affected by the submittal shall not proceed until review is complete.

3. Review submittals prior to submission to the Facilities Management. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the Work and the Contract Documents.

4. Verify field measurements and affected adjacent Work are coordinated.

5. Provide submittals as electronic copies from the Contractor to the Consultant and/or Facilities Management.

6. Provide Material Safety Data Sheets (MSDA) to Facilities Management on all products intended for use in the building.

7. Submit in accordance with Division 1 of the Tender Requirements.

8. Product Data:

.1 Manufacturer's product literature indicating units and designs selected.

9. Proofs:

   .1 Submit proofs indicating overall size, layout, wording, kerning, removable and interchangeable components, access panels, fasteners and mounting methods for each required sign.

   .2 Submit full scale mock ups of signs as required by the UVic RFT document for review by the Consultant and/or Facilities Management. Upon acceptance this sign may be used as a part of the final installation.

   .3 Do not proceed with fabrication of signage until submittals have been approved by the Consultant and/or Facilities Management.

   .4 The contractor shall maintain a hand annotated set of Record Drawings to be supplied to Facilities Management at the completion of work.

1.6 WORK IN EXISTING PREMISES

1. Perform Work in or on existing building in accordance with the Specification and Drawings in their entirety as they apply.

2. Execute each part of the Work in existing building by workers specializing in such Work.

3. Patching or replacement of damaged existing surfaces and materials shall be done by workers experienced in the type of Work to be patched. Make patches indistinguishable in final assembly. Paint surfaces out, wall-to-wall in color to match existing where areas are patched.

4. Maintain continuation of fire protection and fire rated assemblies in existing building.

5. Maintain existing exits and provide proper and safe means of egress from all parts of existing building to open spaces at all times to the approval of jurisdictional authorities.

1.7 OWNER'S USE OF EXISTING BUILDING

1. The existing building will remain in full use and occupancy throughout the duration of construction of the Work.

1.8 CONTRACTOR'S USE OF EXISTING BUILDING

1. Limit access of construction personnel to existing building only at locations approved by the Consultant and/or Facilities Management.

2. Ensure that construction personnel perform Work in existing building only as required under the Contract; and that they do not use rest of building as access to Work Area, except for portions of Work located in other parts of the existing building.

3. Do not interrupt mechanical or electrical services of the existing building unless approved by

prior arrangements with the Consultant and/or Facilities Management. Give the Consultant and/or Facilities Management five (5) working days notice of intention to interrupt mechanical or electrical services in the existing building in any area, and obtain written permission from Facilities Management.

1.9 REGULATORY REQUIREMENTS

1. Execute the Work in accordance with applicable bylaws, regulations, and building codes; conform to latest published revisions, addenda, supplementary and appropriate current standards presently recognized and enforced by authorities having jurisdiction.

2. All construction must conform with the following laws, regulations, codes, practices and standards, as replaced or amended from time to time, unless specifically exempted on the Building Permit.

   .1 2006 British Columbia Building Code.

   .2 2006 British Columbia Fire Code.

   .3 2006 British Columbia Plumbing Code.

   .4 2006 British Columbia Electrical Code Regulation.

3. Should conflicts arise between one document or authority and another, obtain clarification from the Consultant and/or Facilities Management before proceeding with the Work. The most stringent regulation will govern.

4. Submit all permits and certificates of inspection provided by authorities having jurisdiction.

5. Should material resembling spray or trowel-applied asbestos be encountered, notify the Consultant and/or Facilities Management immediately. Work performed on asbestos containing material surfaces shall be undertaken in strict accordance with the Asbestos Handling Procedures. Refer to Appendix B for detailed requirements for handling of asbestos. Provision of all equipment and materials required for asbestos handling is the responsibility of the Contractor.

1.10 FIRE-RATED ASSEMBLIES

1. Maintain the continuity of fire-rated assemblies whether or not shown on the Drawings.

1.11 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1. Sanitary Facilities: Existing facilities may be used during the construction period. Maintain in clean condition.

2. A continuous supply of potable water will be provided for construction use.

3. Temporary Telephone: Provide and pay for temporary telephone necessary for own use.

4. Arrange with Facilities Management for storage of equipment on site and maintain, in a clean and

orderly condition.

5. Maintain the Work in tidy condition, free from the accumulation of waste products and debris.

6. Remove waste material and debris from the building at the end of each working day.

7. Maintain areas free of dust and other contaminants during operations. Prevent spread of dust and contaminants to other parts of the building.

8. Execute the Work in accordance with applicable bylaws, regulations, and BC Building Code; conform to the latest published revisions, addenda, supplementary and current standards. Comply with federal and provincial legislation, guidelines and codes of practice, including WorkSafeBC.

1.12 MATERIAL AND EQUIPMENT

1. Product and Material Quality:

   .1 Defective products will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

2. Storage, Handling and Protection:

   .1 Handle and store products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

   .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact.

3. Manufacturer's Instructions:

   .1 Unless otherwise indicated in the Specifications, install products in accordance with manufacturer's instructions.

   .2 Notify the Consultant and/or Facilities Management in writing, of conflicts between the Specifications and manufacturer's instructions, so that the Consultant and/or Facilities Management may establish the course of action.

   .3 Improper installation or erection of products, due to failure to comply with these requirements, authorizes the Consultant and/or Facilities Management to require removal and reinstallation at no increase in Contract Price.

4. Hazardous Materials Information:

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets (MSDS) in accordance with jurisdictional authorities.

.2 Deliver copies of Material Safety Data Sheets (MSDS) to Facilities Management on all products intended for use in the building.

.3 Refer to Asbestos handling Procedures in attached Appendix B.

5. Workmanship: Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.

1.13 PROJECT WASTE MANAGEMENT

1. Employ processes that ensure the generation of as little waste to the landfill as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection, or other factors as well as minimizing over packaging and poor quality estimating.

2. Be responsible to provide and pay for proper disposal and salvage of construction materials and waste on the project. Unless otherwise shown on the drawings or described in the specifications, all salvaged materials become the property of the Contractor.

3. Provide a location and facilities for separation of materials for waste or potential salvage and recycling. Recycled materials may be collected together and sorted off-site.

4. Hazardous materials are to be separated, stored and disposed of in accordance with the requirements of the authorities having jurisdiction including the Provincial Waste Management Act and BC Special Waste Regulation.

1.14 PROGRESSIVE CLEANING

1. Maintain the Work in tidy condition, free from accumulation of waste products and debris.

2. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

3. Remove waste material and debris from the site and deposit in waste container at the end of each working day.

4. Do not dispose of waste or volatile materials such as mineral spirits, solvents, oil, or paint thinner into sewer or drainage systems.

1.15 PROJECT CLOSEOUT

1. Final Cleaning:

   .1 Leave the Work broom clean before the inspection process commences.

   .2 Clean and polish glass, hardware, stainless steel, aluminum, chrome, porcelain enamel, baked enamel, plastic laminate, lamicoid, vinyl, mechanical and electrical fixtures.

   .3 Replace broken, scratched or disfigured glass.

   .4 Remove stains, spots, marks and dirt from decorative Work, electrical and mechanical fixtures, furniture fitments and walls.

   .5 Vacuum clean and dust building interiors, inside millwork, behind grilles, louvres and screens.

   .6 Damp mop floors in preparation for sealing and waxing.

2. Upon completion of the Work, submit to Facilities Management red-line, hand-edited, Record Drawings of each sign in the Work of this Contract. Refer to 1.5 Submittals.

3. Submit manufacturer's maintenance instructions, and necessary tools to change signage. Include a written record of all drawings and materials including quantities submitted to the Owner at completion of Work.

END OF SECTION

1 GENERAL

1.1 DOCUMENTS

1. This Specification document forms part of the Contract and is to be read, interpreted and coordinated with all other parts, including the Tender Requirements issued under separate cover.

1.2 SUMMARY

1. Provide material, equipment and services necessary for and incidental to the supply and installation of directional signage as indicated and specified.

1.3 QUALITY CONTROL

1. Installer: Company specializing in the installation of signs specified with a minimum of five (5) years proven experience for projects of similar size and complexity.

2 PRODUCTS

2.1 MANUFACTURERS

1. Engraver's Express (1-800-663-1149) website: www.engraversexpress.com.
2. ND Graphics (604-527-7940) website: www.ndgraphics.com
3. Scapa North America (1-613-432-8545) website: www.scapa.com.
4. 3M Canada (1-800-364-3577) website: www.solutions.3mcanada.ca
5. Mustang Systems (1-866-288-3946) website: http://www.mustang-systems.ca/.
6. Richelieu (1-800-361-6000) www.richelieu.com
7. Com Sign (1-888-452-9019) www.commercialsigns.com
8. Acklands-Grainger Inc. (250-384-1111) www.acklandsgrainger.com

2.2 FASTENERS

1. In a solid block/concrete wall surface:
    1. Use metal self expanding anchors and screws, of an appropriate length and number to support sign load.
2. In a gypsum board wall surface:
    1. Size screws to ensure 6mm (1/4") minimum to 13mm (1/2") maximum penetration into studs behind drywall.
    2. Use metal self expanding drywall anchors and screws of appropriate size and strength to support load at unsupported drywall locations.

2.3 FABRICATION

1. Metric dimensions are rounded up/down and are for information only. Signs are to be built to Imperial dimensions.

2. All centred text is based on centre of uppercase letters. Do not consider 'tails' of letters which extend below baseline.

3. Build units square, true, accurate to size and free from visual or performance defects.

4. Accurately fit and securely join sections to obtain tight, closed joints except where reveals are detailed.

5. Exposed fasteners permitted only where indicated or approved by the Consultant and/or Facilities Management and to be inconspicuous and same finish and colour as base material, or as noted.

6. Polish exposed edges to smooth, slightly convex profile.

7. Apply isolating coating to aluminum in contact with dissimilar metals, concrete or masonry.

8. Manufacturer's nameplates on sign surface locations to be invisible in completed work.

3 EXECUTION

3.1 EXAMINATION

1. Examine the job conditions and surfaces to which the work is to be fixed. Be responsible for selecting suitable mounting or graphic technique for each sign. Do not mount signs onto surfaces which are not flat. Do not mount signs in locations which will obscure lights, exit signs or other signs.

2. Report to the Consultant and/or Facilities Management unsatisfactory conditions preventing the proper installation of the Work.

3. Commencement of the Work implies acceptance of the surfaces and conditions.

3.2 INSTALLATION

1. Deliver signs to the site fully assembled complete with all mounting screws and other accessories. Signs to be disassembled as necessary for mounting.

2. Locate signs plumb, level and true according to Drawings and site instructions. Provide necessary shims.

3. Comply with sign manufacturer's installation instructions and approved proofs/shop drawings.

4. Review the installation locations and conditions with the Consultant and/or Facilities Management prior to installation of signs to ensure understanding and compliance with the intent of the Specifications.

3.3 TOUCH UP

1. Remove fingerprints and other markings and leave faces and edges in clean condition.

2. Remove markings made during the course of installation from adjacent finished surfaces. Restore finishes as necessary to original condition.

END OF SECTION

MATERIALS LIST

1. Silver Plastic Laminate: Supplied by Richelieu
   Nevamar MXT003T Silver, Grade: HF-4 (HGP) 0.039”

2. Gerber Vinyl Text/Logo/Graphic: Supplied by ND Graphics
   FX Foils printed on GSP 220 15” wide white vinyl:

a) Red datum line:	“Ruby Red”	GCS-53
b) Black graphic:	“Black”	GCS-12
c) UVic Logo:	“Cobalt Blue”	GCS-37
d) UVic Logo:	“Tomato Red”	GCS-13
e) UVic Logo:	“Yellow”	GCS-15
f) Building Directory:	“White”	GSP-220
g) Recycling:	“Dark Green”	GCS-56
h) Recycling:	“Vivid Blue”	GCS-17
j) Recycling:	“Grey”	GCS-31
k) Recycling:	“Orange”	GCS-14

   Note: All vinyl text/logo/graphic to be flat cut.

3. Lamicoid: Supplied by Engraver’s Express
   Multi-layered abrasion, heat and chemical resistant phenolic sheet stock
   EnCore ArmorCore 312-227m (1/16” - 1.6 mm) Grey/White, Matte Finish

4. Text/Arrow/Graphic Engraved into Lamicoid; cutter size and depth as required to create sharp edges/corners and match existing signs. Typeface to be Myriad Pro Semibold unless implicitly stated otherwise.

5. Metal Angle Frame: Supplied by Richelieu
   1/16” x 1/2” x 1” Annodized Aluminum alloy; Satin Finish

6. 3/4” G1S Plywood backer board, clear finish

7. Hanging sign hardware manufactured by Mustang Systems (www.mustang-systems.ca) and supplied by Westwind Design in Calgary, Alberta, or Mustange Visual Displays in Ontario. Approved alternatives may be used.
   Suspension Panel Kit: C1103 Suspension Panel Kit
   For dropped ceilings include: C1712 Ceiling Sheild

8. Contact cement: LePage Pres-Tite Green Contact Cement, designed to bond lamicoid/laminate to wood

9. Robertson FH#8 Screw

10. Custom 14 gauge Aluminum Backer/Mounting Bracket, edges ground smooth

11. 1.5mm non-glare Clear Acrylic Sheet/Plexi

MATERIALS LIST CONTINUED:

(12) Braille Raster Balls (Raster Spheres), clear finish.

(13) Double Sided Tape: Supplied by Engraver's Express
Scapa Extra Tack 4403; To adhere plastic lamicoid to aluminum backer/aluminum backer to aluminum backer

(14) Double Sided Tape: Supplied by Acklands Grainger
3M Highland 9579; To adhere removable lamicoid strips

(15) Clear finished, 3/4" good both sides birch plywood backer

(16) T-slot
Router a standard t-slot into the back of the plywood to accept:
- a #8 wood screw or similar fastener if fastened to a gwb wall
- either a wood screw with a concrete anchor or a tapcon/scru-it anchor or similar if fastened to a concrete/block wall

(17) Not Used

(18) Lamicoid: Supplied by Engraver's Express
Multi-layered abrasion, heat and chemical resistant phenolic sheet stock.
Lamicoid embossing material applied to main Lamacoid panel with text cut out leaving it embossed on panel.
1/32' Encore Braille Core with adhesive backing
- Embossed letters/numbers "Bright White" 204-113

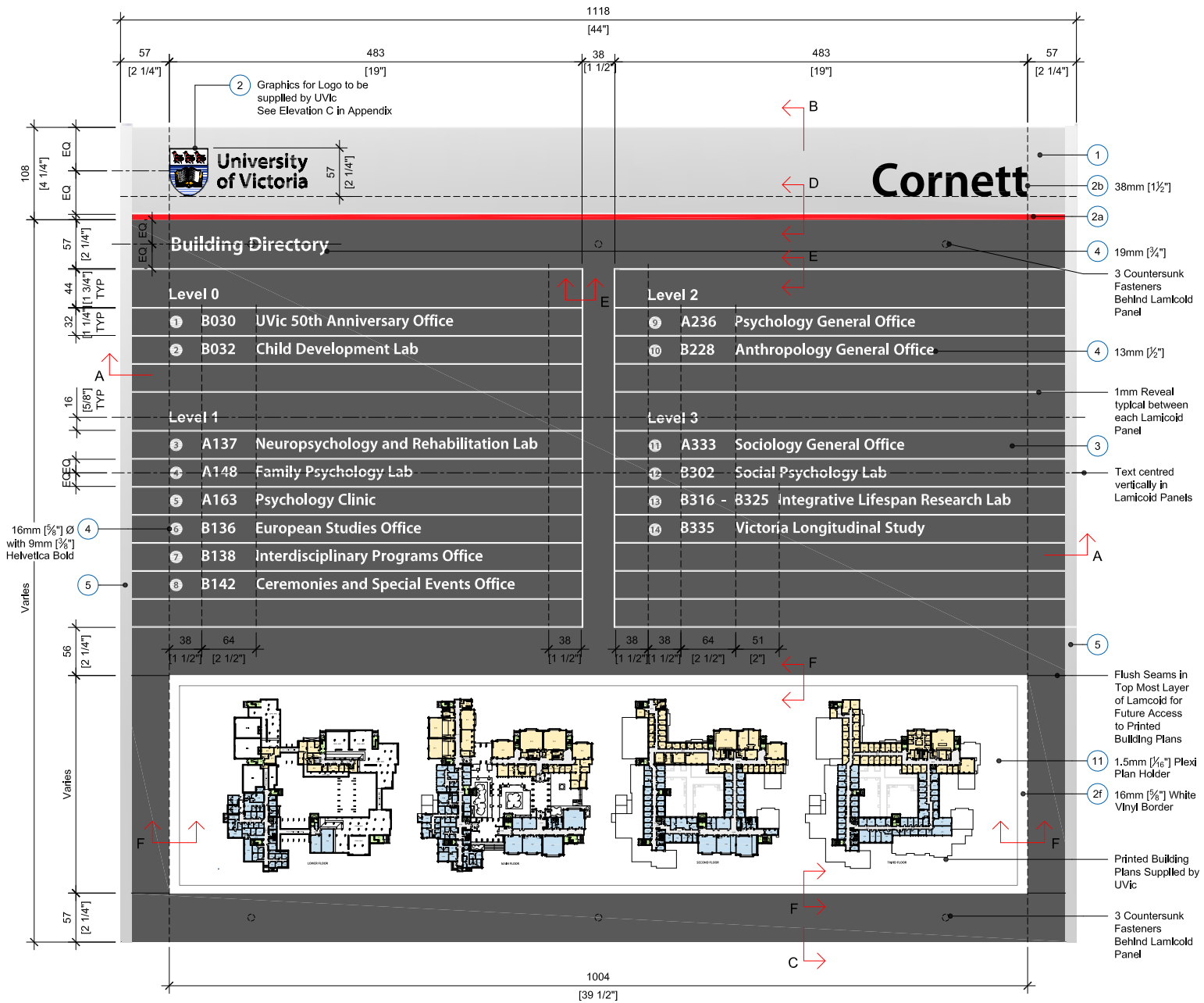
(19) Pan head screws, finish to match aluminum backer
To secure projecting signs to walls

(20) Double Coated Foam Tape: Supplied by Acklands
12mm 3M 4026; To adhere clear plexi sheet to plastic laminate, and lamicoid to walls/doors

(21) 0.5mm Thick High Impact Styrene

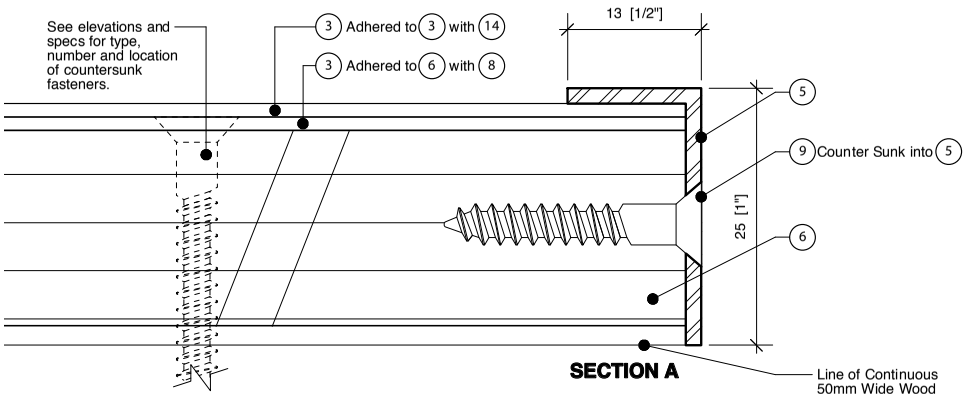
(22) 3mm Sintra Foam Board, White

NOTE: Where an adhesive listed above is deemed to be inappropriate for the materials that are being adhered together, contact the Consultant and/or Facilities Management with alternates and provide backup information from the supplier regarding the alternate's suitability.


1118
[44"]
57
[2 1/4"]
483
[19"]
38
[1 1/2"]
483
[19"]
57
[2 1/4"]
2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
University of Victoria
Cornett
Building Directory
Level 0
1 B030 UVic 50th Anniversary Office
2 B032 Child Development Lab
Level 1
3 A137 Neuropsychology and Rehabilitation Lab
4 A148 Family Psychology Lab
5 A163 Psychology Clinic
6 B136 European Studies Office
7 B138 Interdisciplinary Programs Office
8 B142 Ceremonies and Special Events Office
Level 2
9 A236 Psychology General Office
10 B228 Anthropology General Office
Level 3
11 A333 Sociology General Office
12 B302 Social Psychology Lab
13 B316 - B325 Integrative Lifespan Research Lab
14 B335 Victoria Longitudinal Study
16mm [5/8"] Ø with 9mm [3/8"] Helvetica Bold
Varies
1004
[39 1/2"]
1 2b 38mm [1½"] 2a 4 19mm [¾"] 3 Countersunk Fasteners Behind Lamicoid Panel 4 13mm [½"] 1mm Reveal typical between each Lamicoid Panel 3 Text centred vertically in Lamicoid Panels 5 Flush Seams in Top Most Layer of Lamcoid for Future Access to Printed Building Plans 11 1.5mm [1/16"] Plexi Plan Holder 2f 16mm [5/8"] White Vinyl Border Printed Building Plans Supplied by UVic 3 Countersunk Fasteners Behind Lamicoid Panel

14

[D1 DETAILS]



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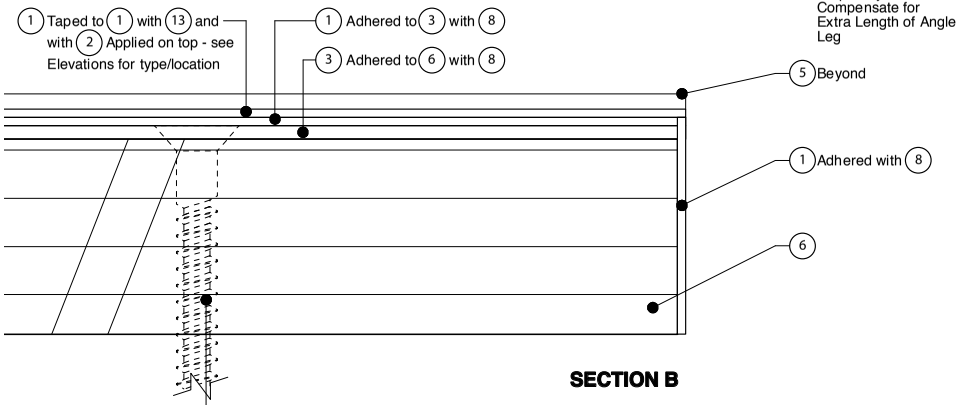

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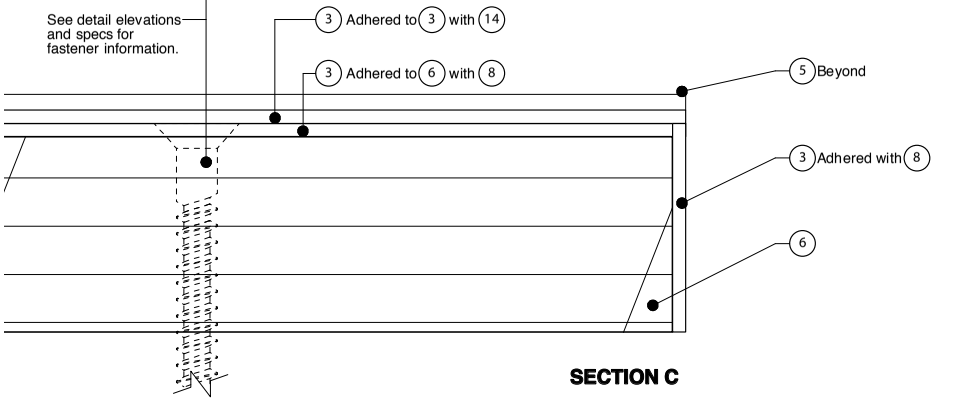

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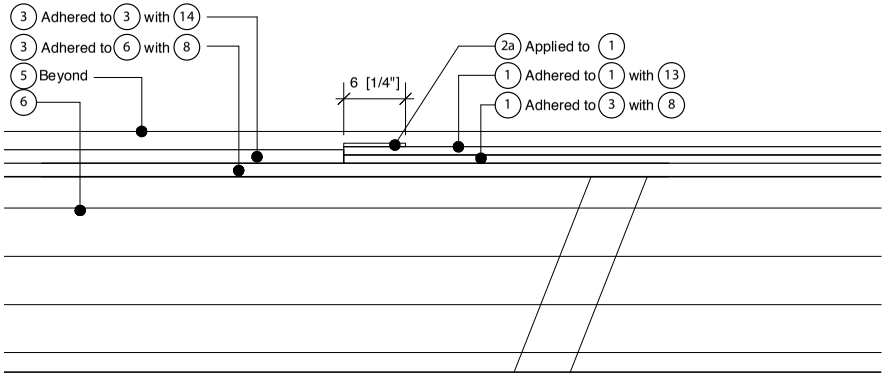

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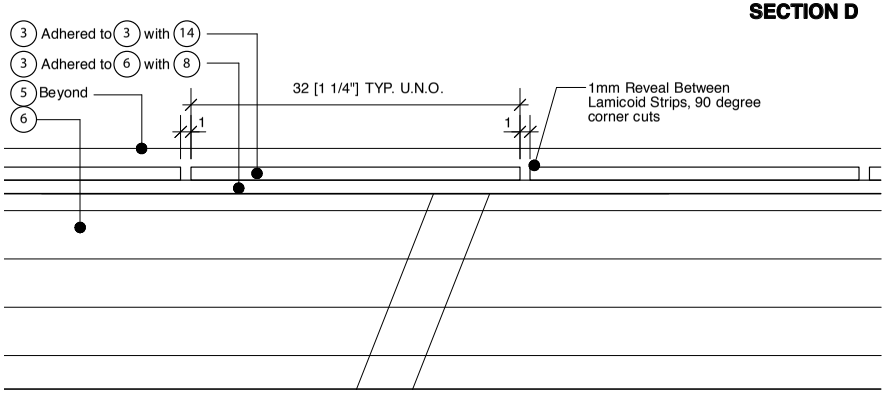

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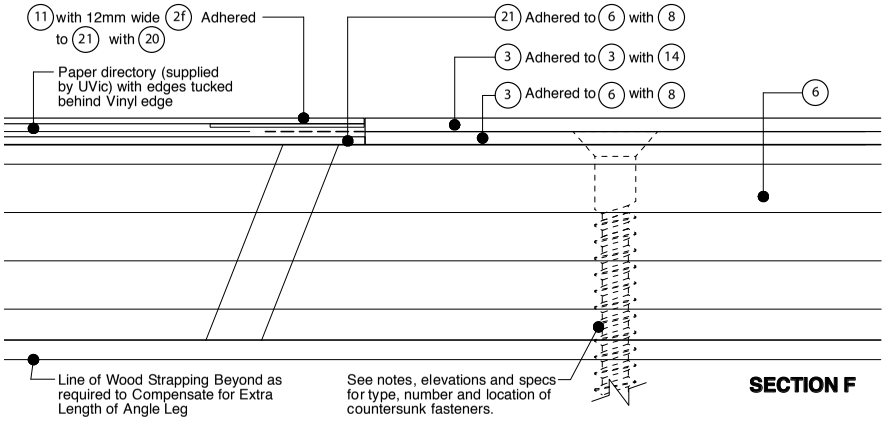

SECTION F

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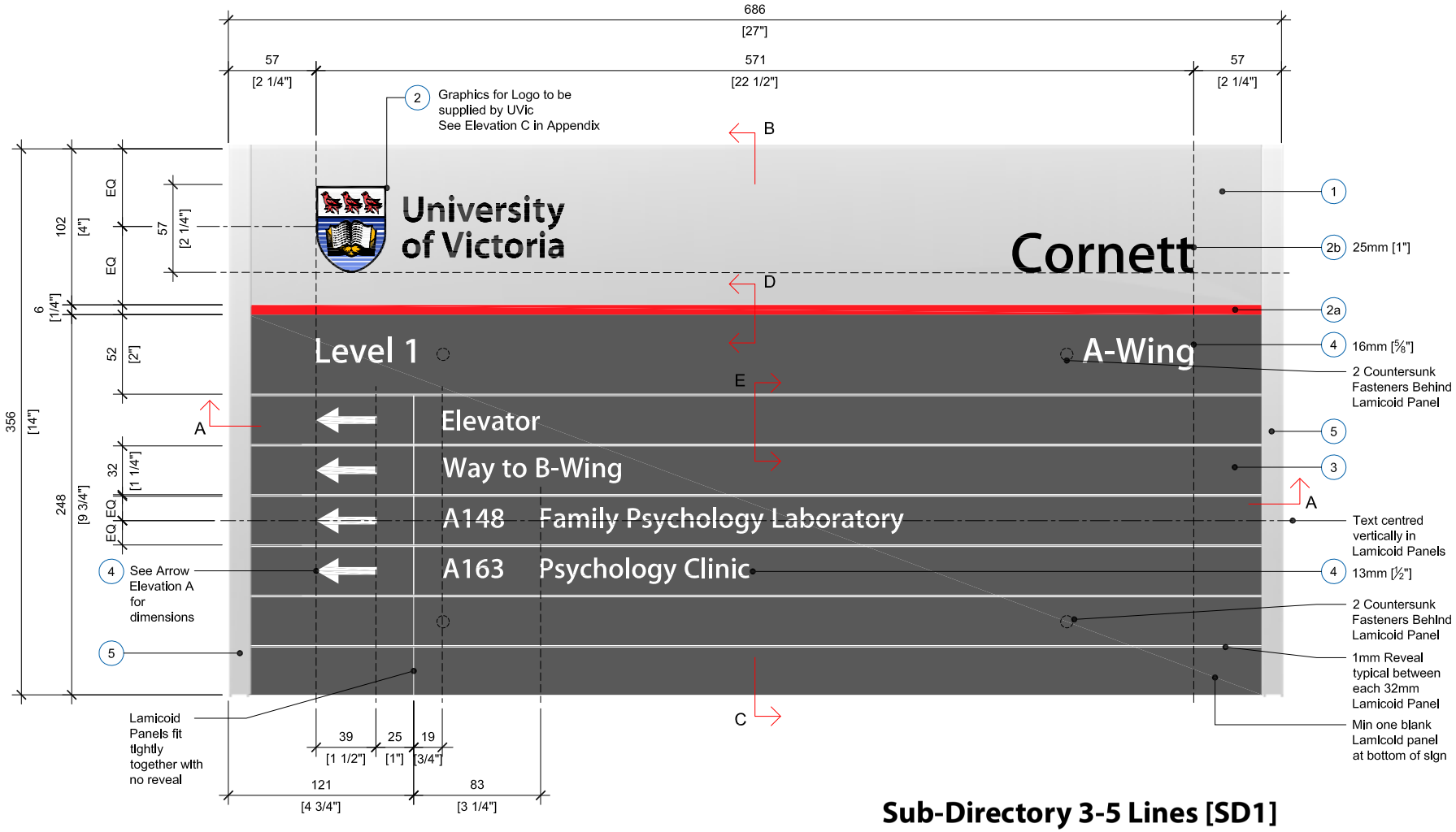

Sub-Directory 3-5 Lines [SD1]

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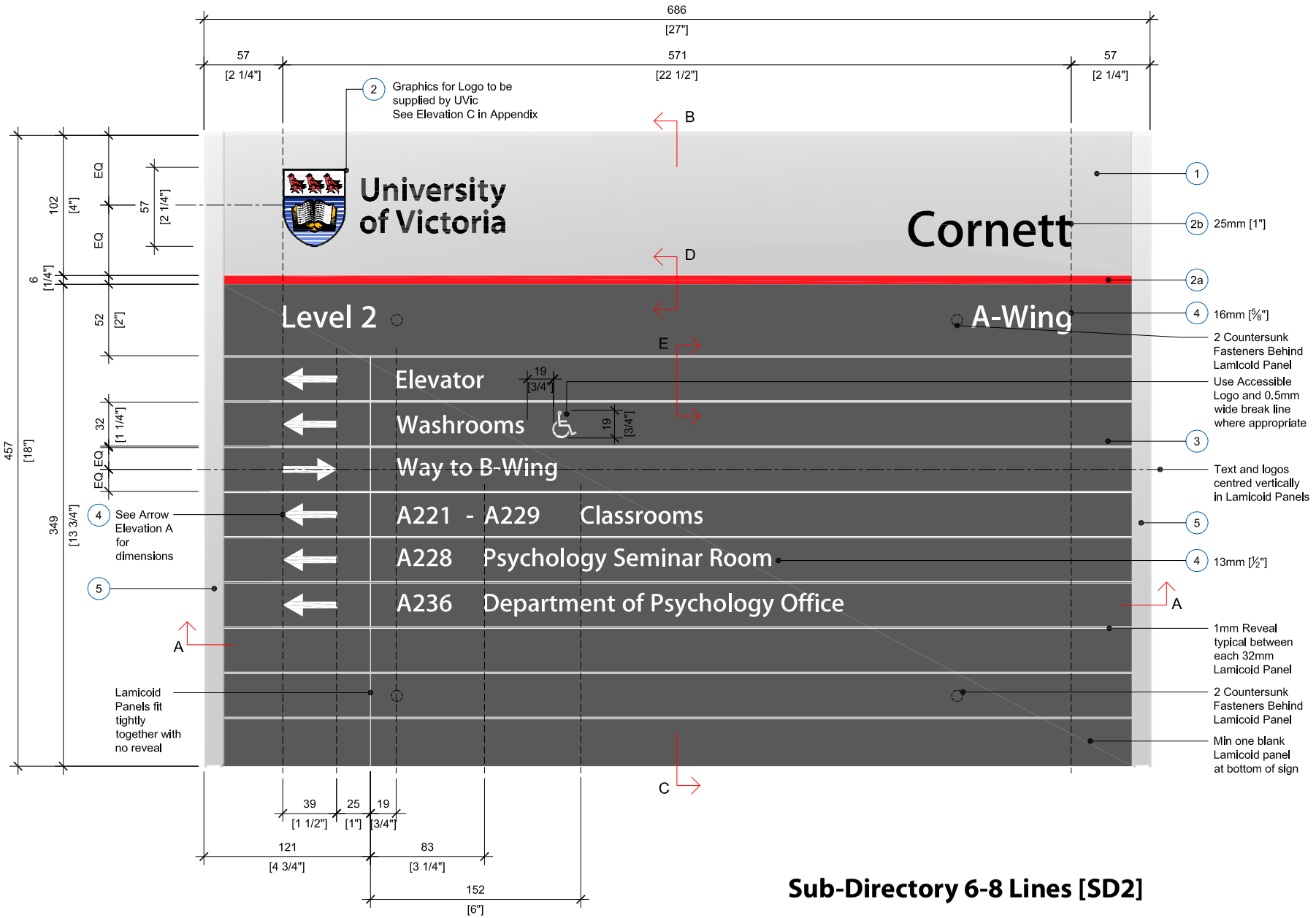
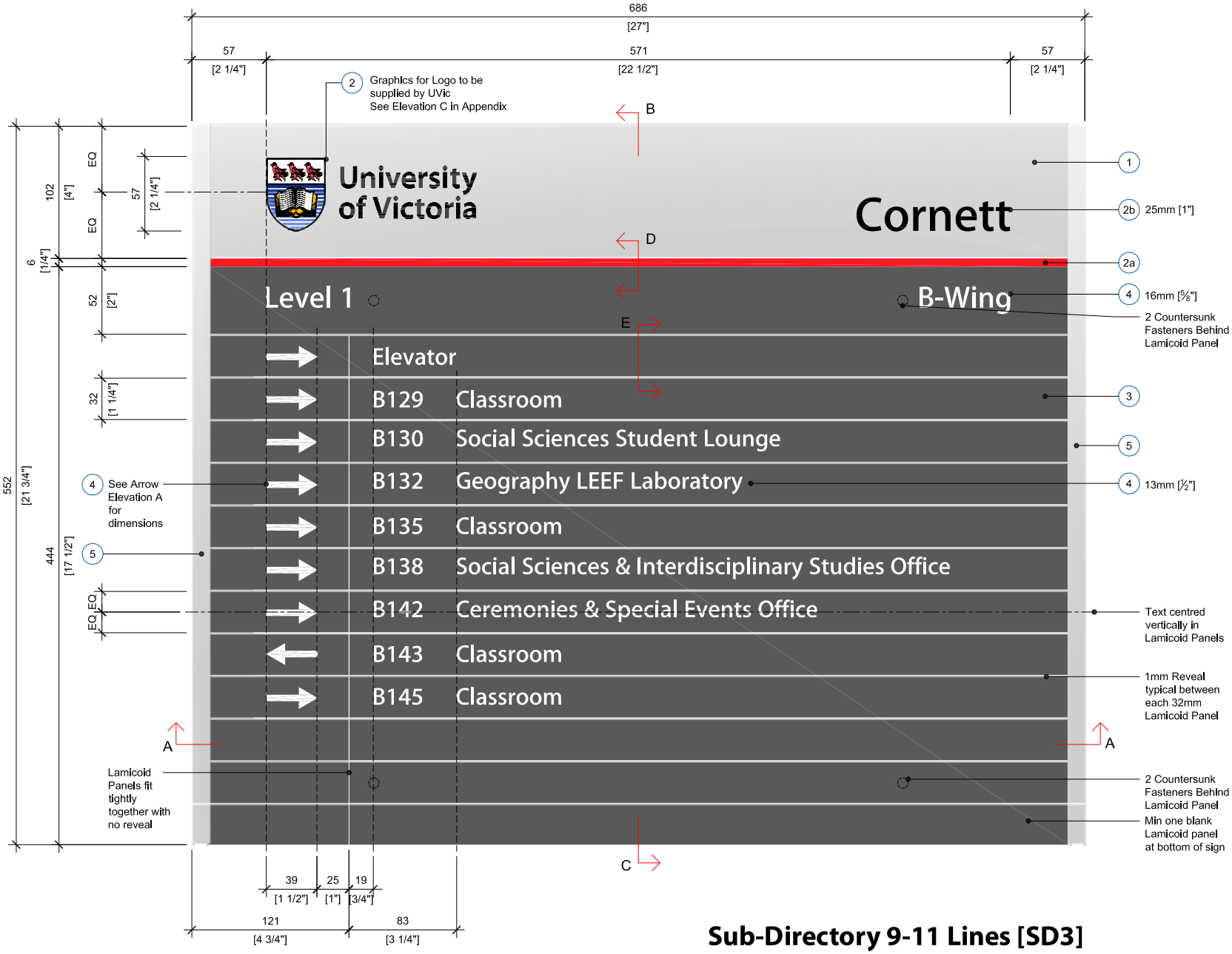
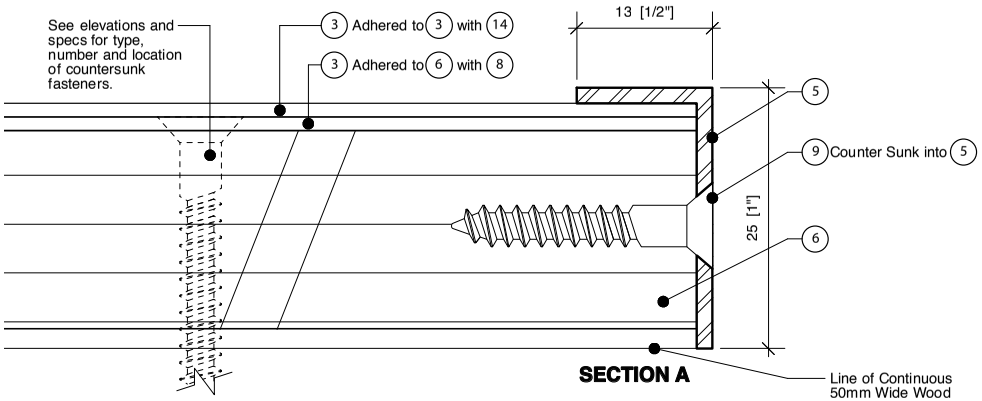


Sub-Directory 6-8 Lines [SD2]



Sub-Directory 9-11 Lines [SD3]



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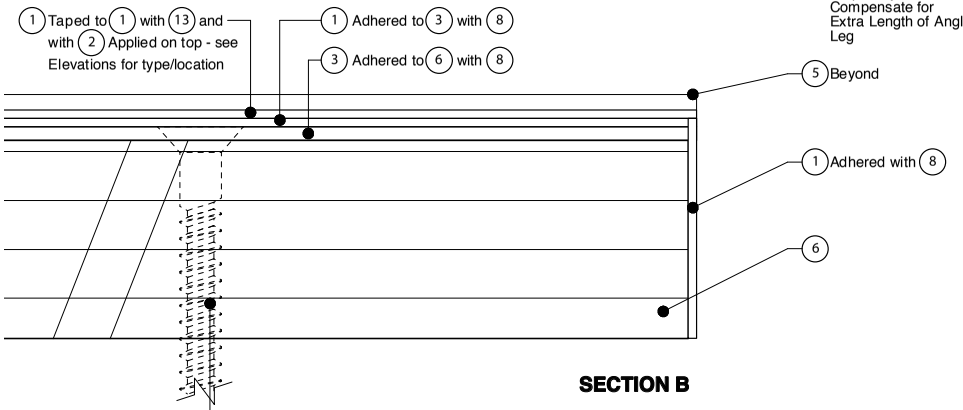

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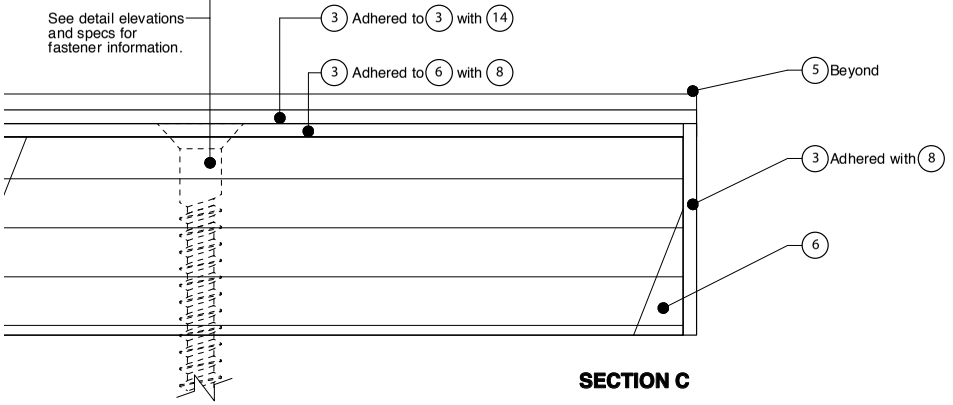

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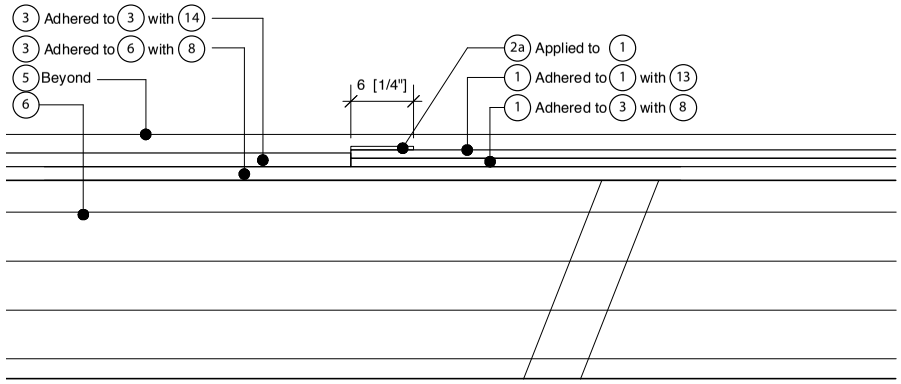

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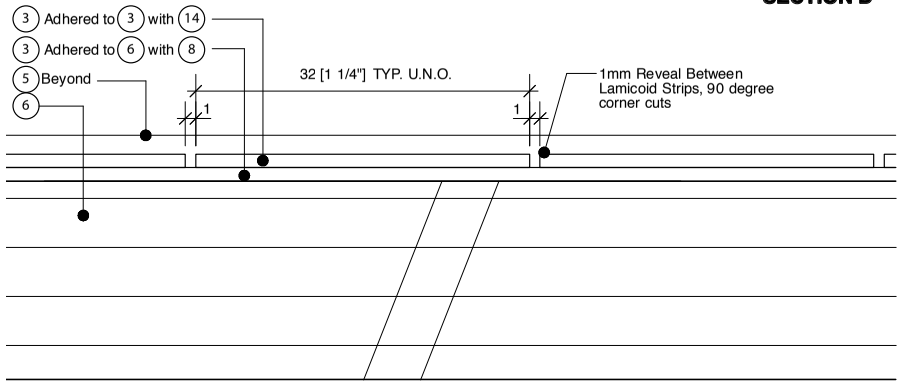

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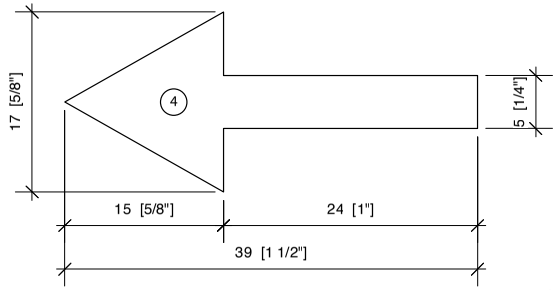
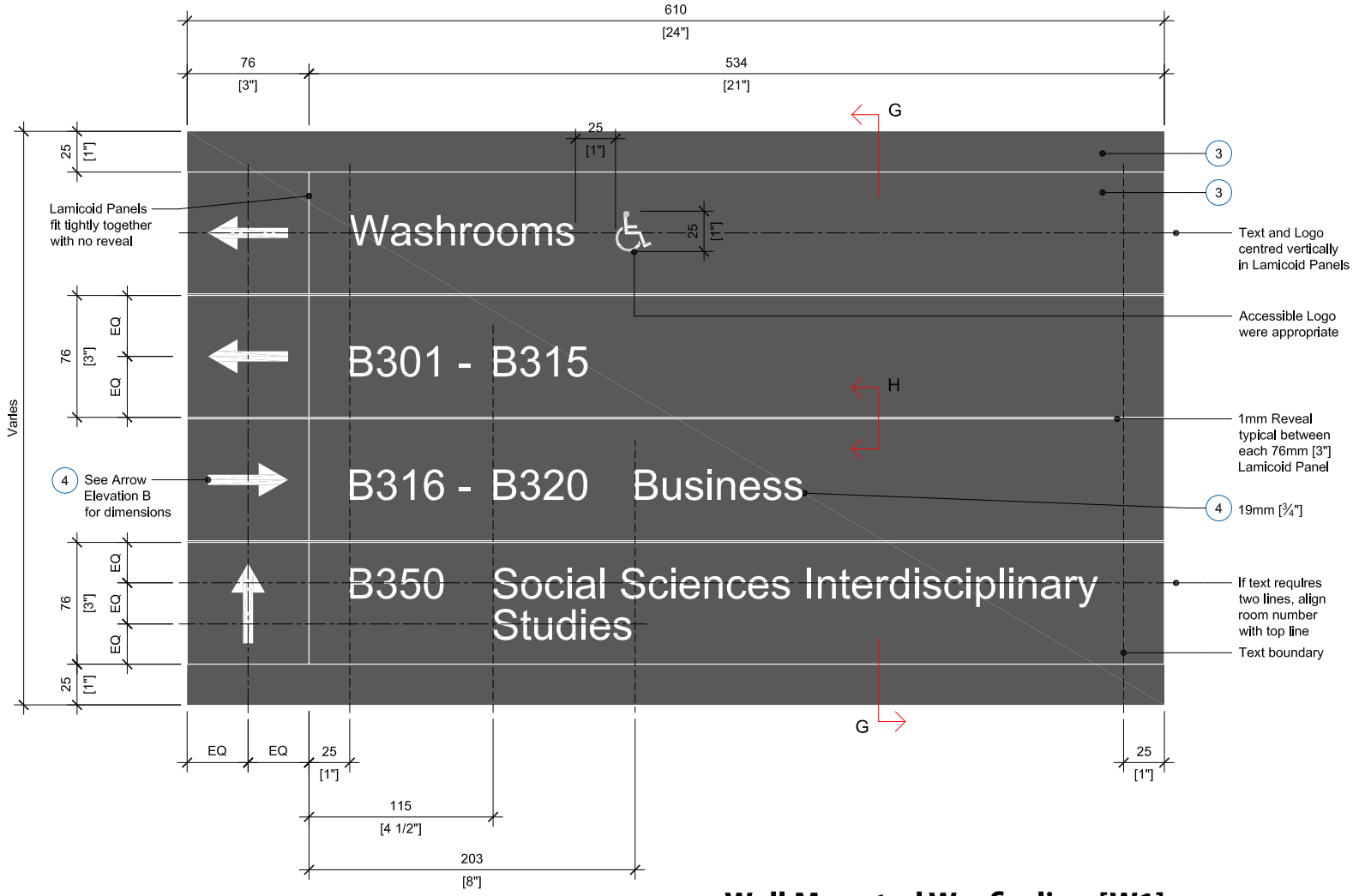


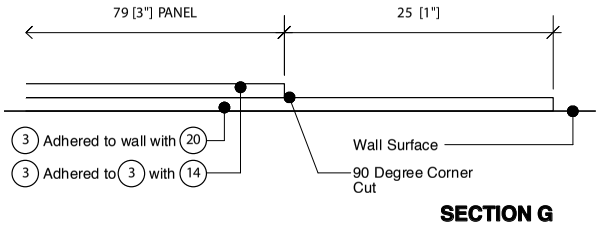
ELEVATION A

19



Wall Mounted Wayfinding [W1]

20



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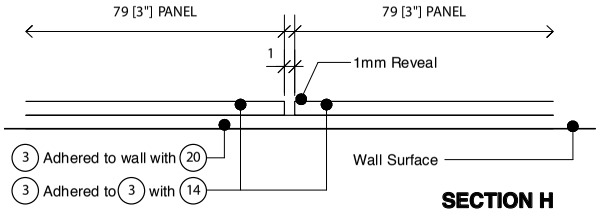

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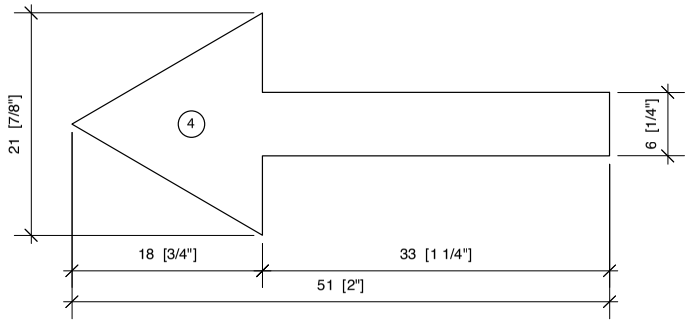

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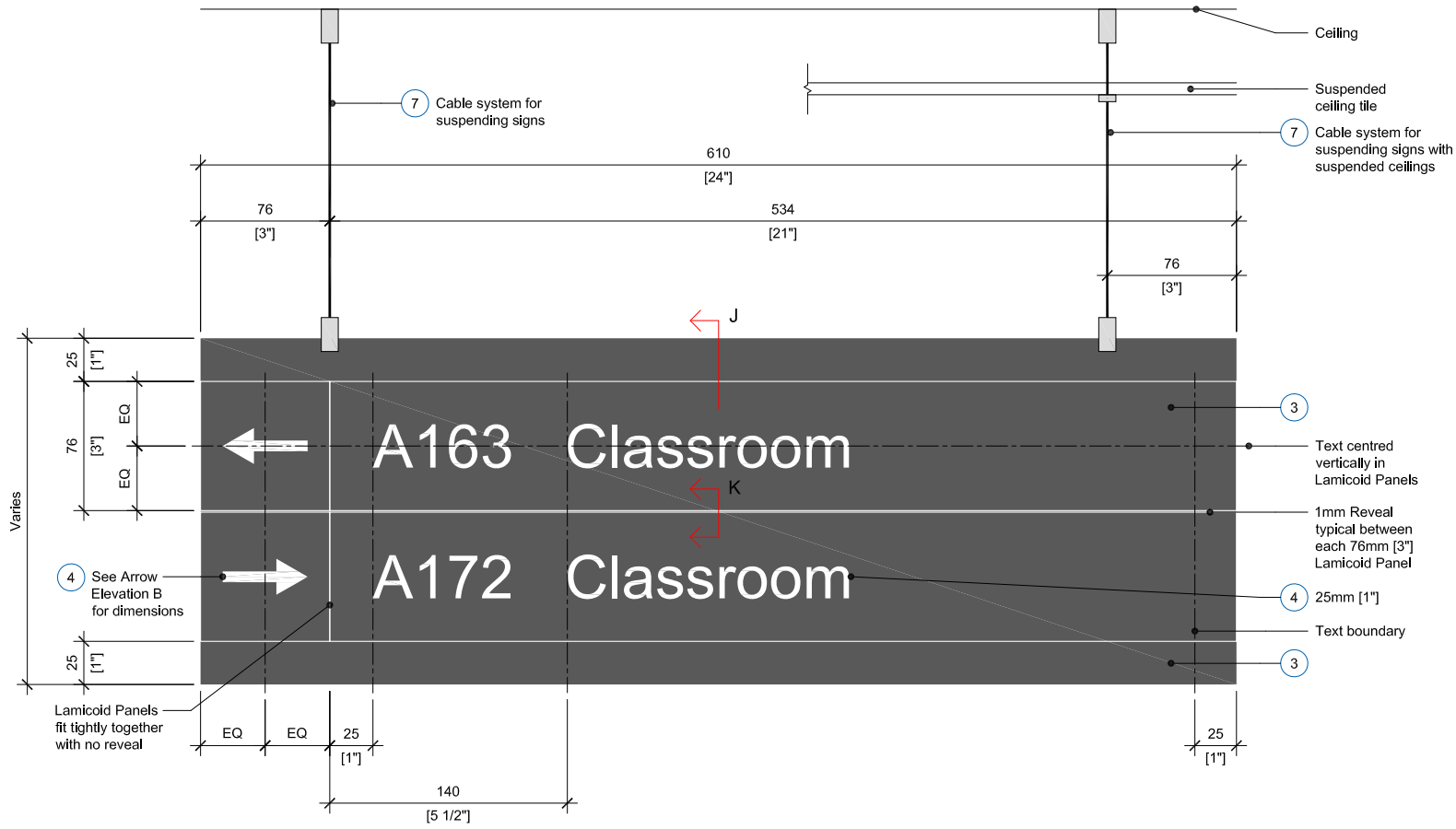
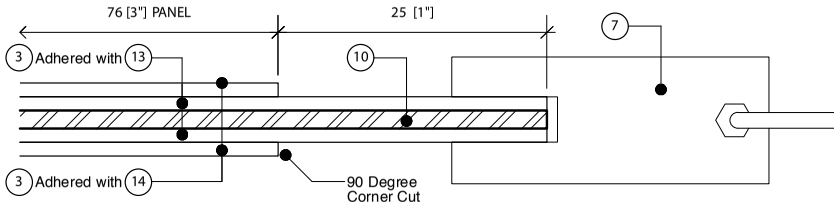


Suspended Wayfinding [W2]

22



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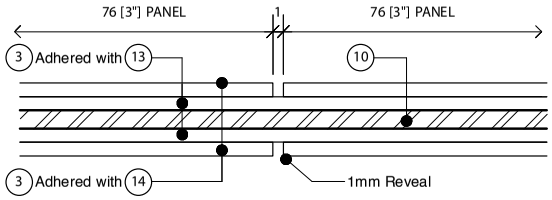

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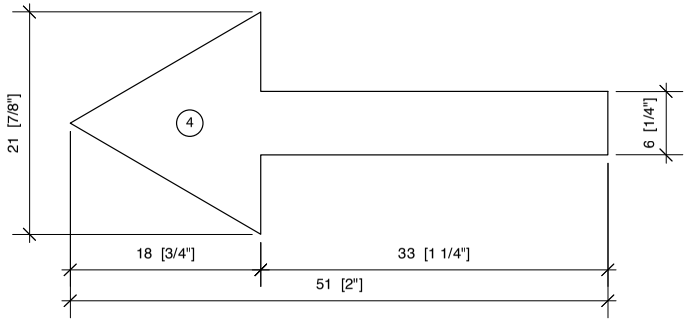

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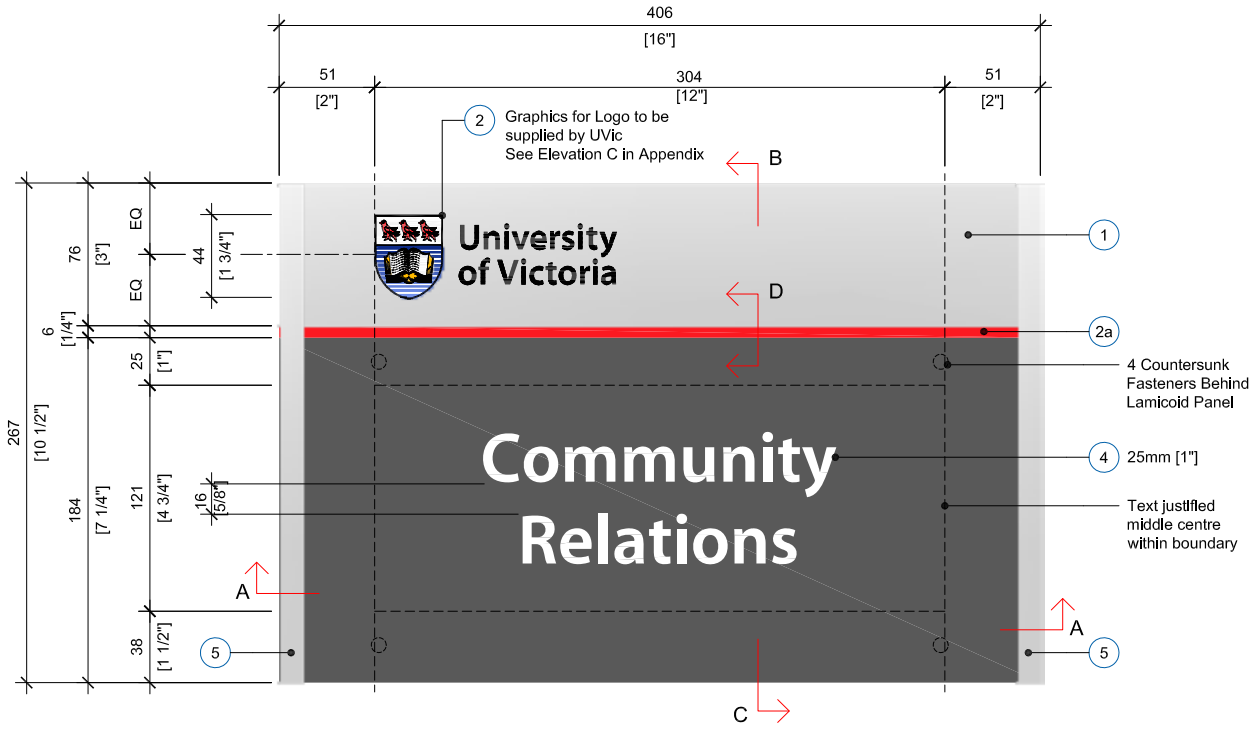
406
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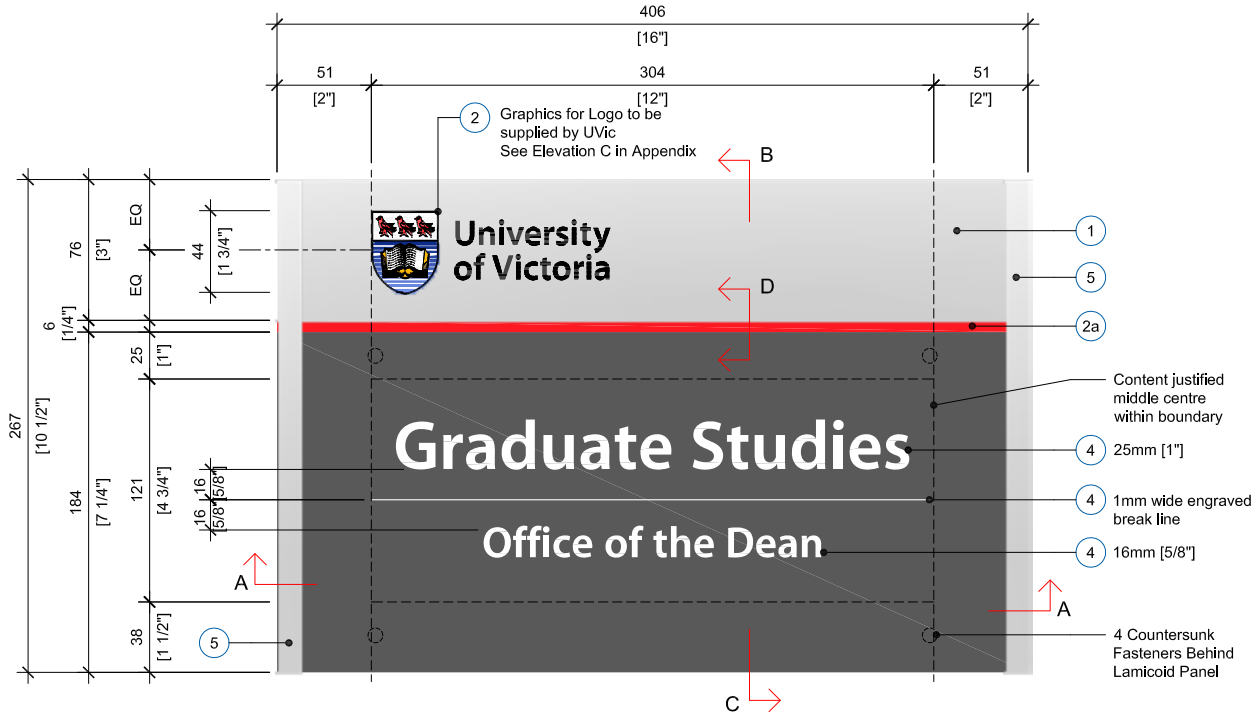
51
[2"]
304
[12"]
51
[2"]
2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
B
D
A
C
University of Victoria
Community Relations
1
2a
4 Countersunk Fasteners Behind Lamicoid Panel
4 25mm [1"]
Text justified middle centre within boundary
5
267
[10 1/2"]
184
[7 1/4"]
121
[4 3/4"]
76
[3"]
44
[1 3/4"]
EQ
EQ
6
[1/4"]
25
[1"]
16
[5/8"]
38
[1 1/2"]

DEP1a

24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51
[2"]
304
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51
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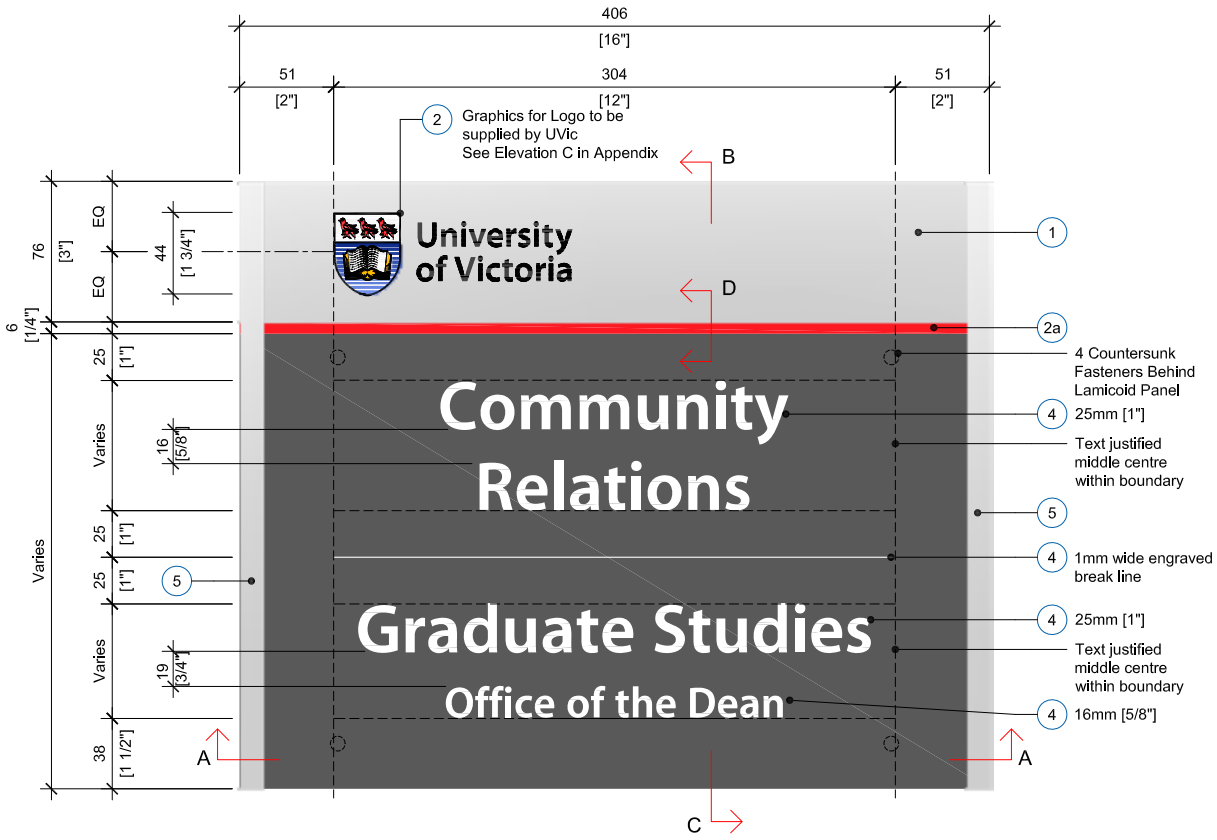
2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
B
D
A
C
University of Victoria
Graduate Studies
Office of the Dean
1
5
2a
Content justified middle centre within boundary
4 25mm [1"]
4 1mm wide engraved break line
4 16mm [5/8"]
4 Countersunk Fasteners Behind Lamicoid Panel
267
[10 1/2"]
184
[7 1/4"]
76
[3"]
EQ
EQ
6
[1/4"]
25
[1"]
121
[4 3/4"]
44
[1 3/4"]
16
[5/8"]
16
[5/8"]
38
[1 1/2"]

DEP1b

25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304
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51
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2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
B
D
A
A
C
University of Victoria
Community Relations
Graduate Studies
Office of the Dean
6 [1/4"]
76 [3"]
EQ
44 [1 3/4"]
EQ
25 [1"]
Varies
16 [5/8"]
25 [1"]
25 [1"]
Varies
19 [3/4"]
38 [1 1/2"]
1
2a
4 Countersunk Fasteners Behind Lamicoid Panel
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Text justified middle centre within boundary
5
4 1mm wide engraved break line
4 25mm [1"]
Text justified middle centre within boundary
4 16mm [5/8"]

DEP1c

26


610
[24"]
57
[2 1/4"]
495
[19 1/2"]
57
[2 1/4"]
2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
B
University of Victoria
1
D
2a
4 38mm [1 1/2"]
A
Text justified middle centre within boundary
A
5
4 Countersunk Fasteners Behind Lamicoid Panel
C
5
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102 [4"]
EQ
57 [2 1/4"]
EQ
6 [1/4"]
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19 [3/4"]
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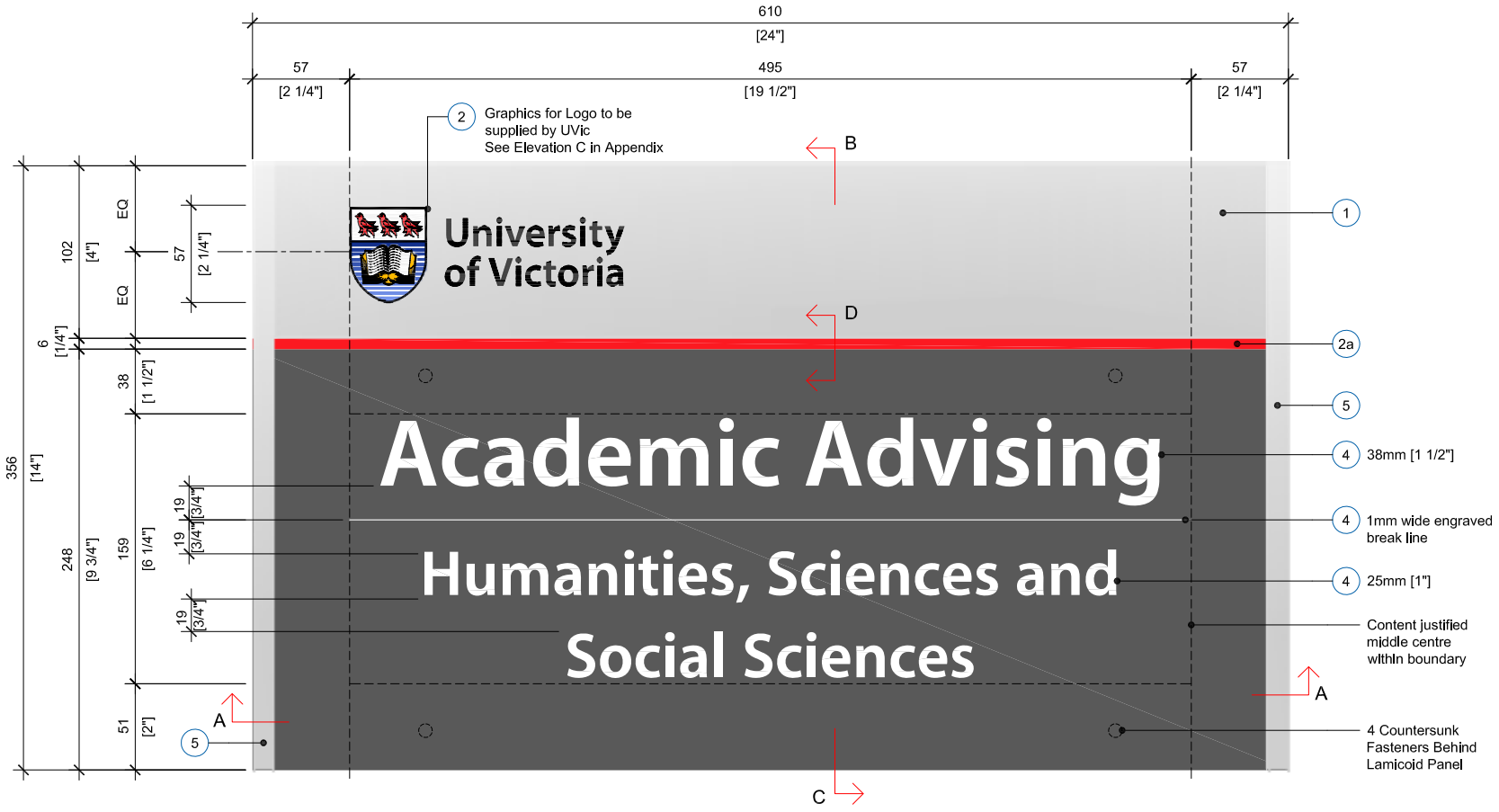
51 [2"]
International and Exchange Student Services

DEP2a


610
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57
[2 1/4"]
495
[19 1/2"]
57
[2 1/4"]
2 Graphics for Logo to be supplied by UVic See Elevation C in Appendix
B
University of Victoria
1
D
2a
5
4 38mm [1 1/2"]
4 1mm wide engraved break line
4 25mm [1"]
Content justified middle centre within boundary
A
4 Countersunk Fasteners Behind Lamicoid Panel
Academic Advising
Humanities, Sciences and Social Sciences
C
A
5
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EQ
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EQ
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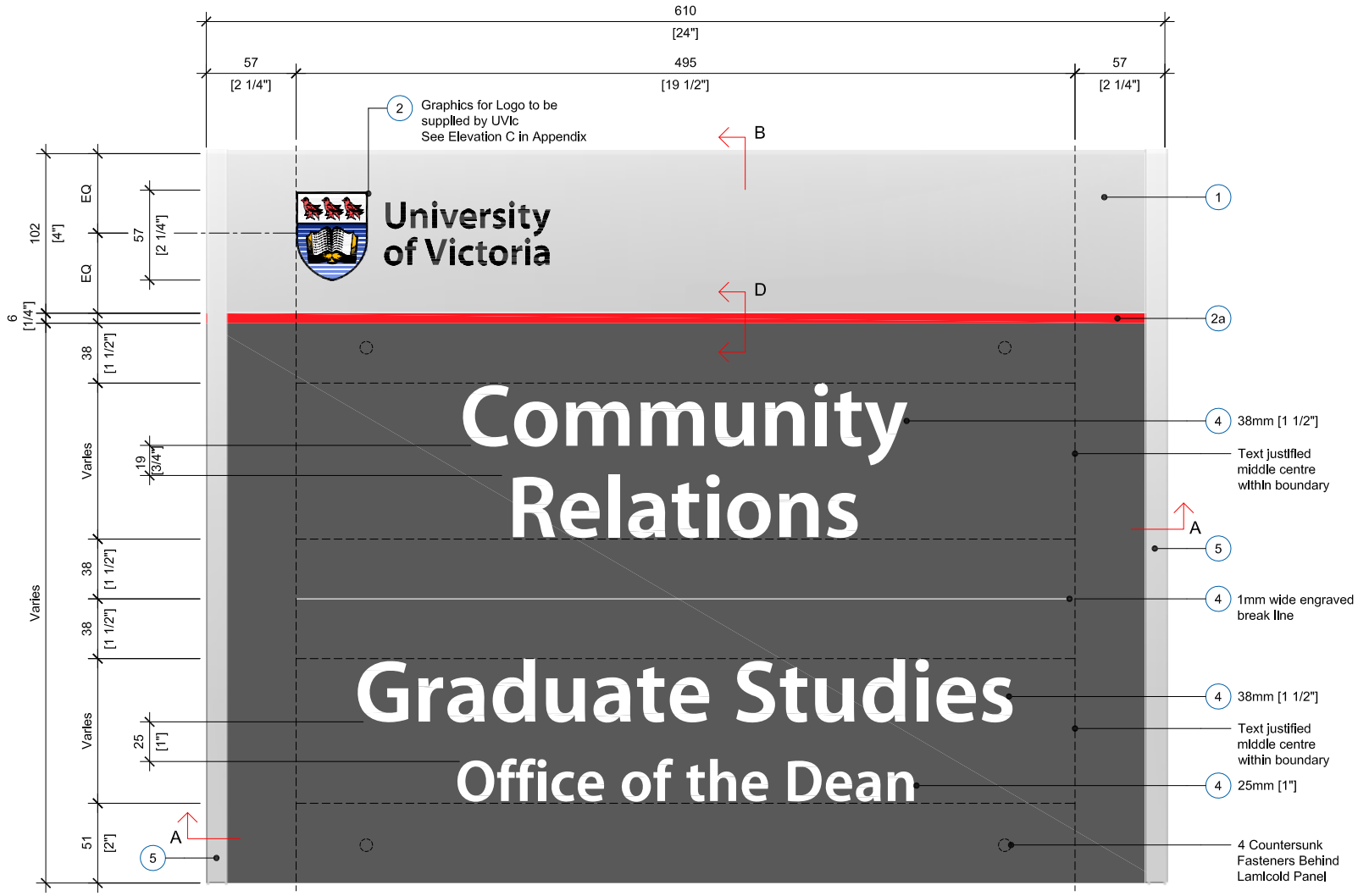
DEP2b

28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57
[2 1/4"]
2 Graphics for Logo to be supplied by UVIc See Elevation C in Appendix
B
D
A
University of Victoria
Community Relations
Graduate Studies
Office of the Dean
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EQ
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Varies
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2a
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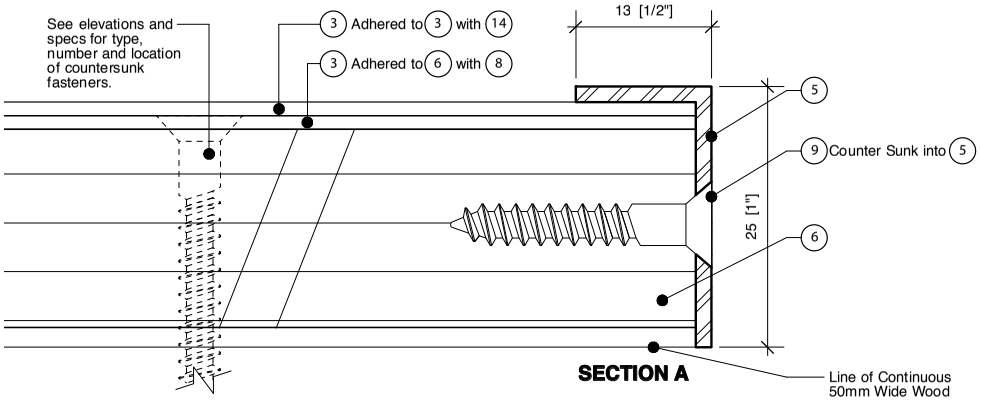
DEP2c

AREA IDENTIFICATION [DEP1 & 2 DETAILS]



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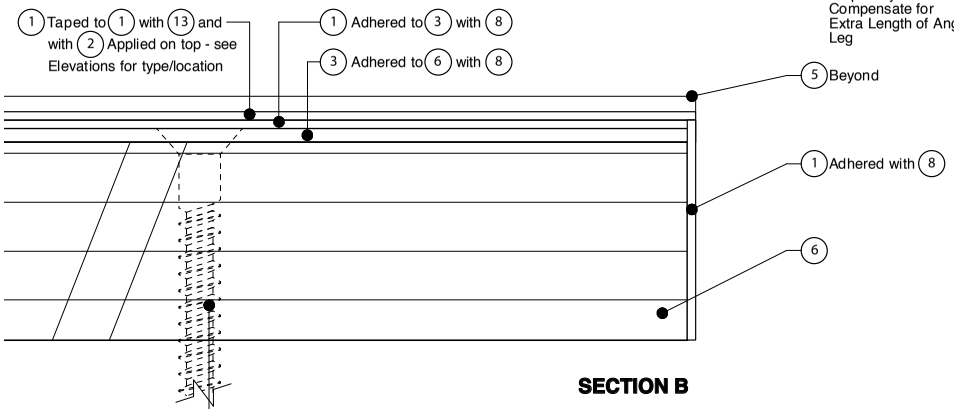

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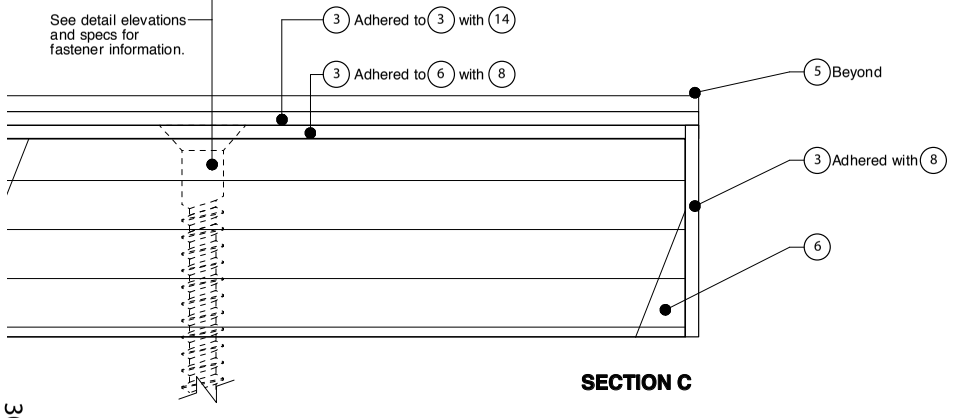

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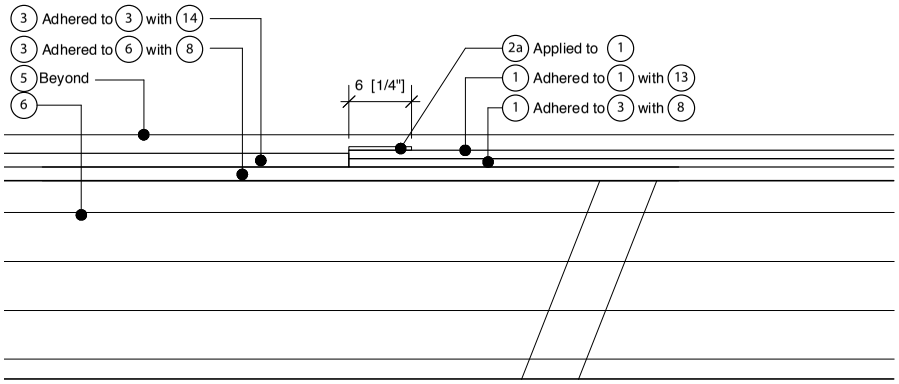

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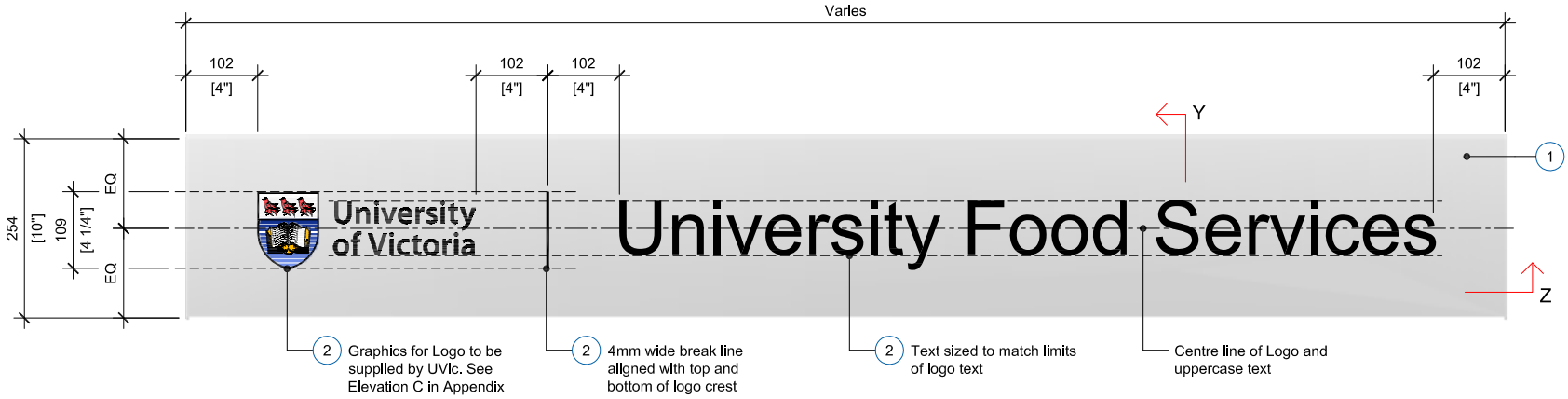

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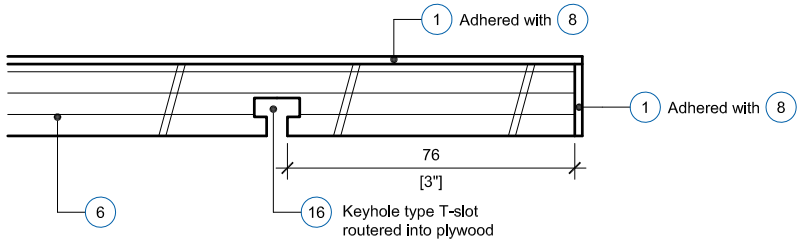

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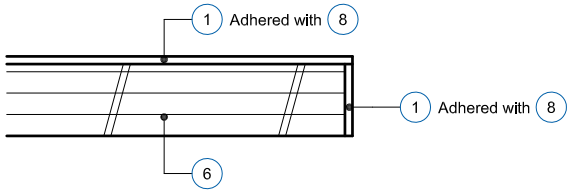

Section Z

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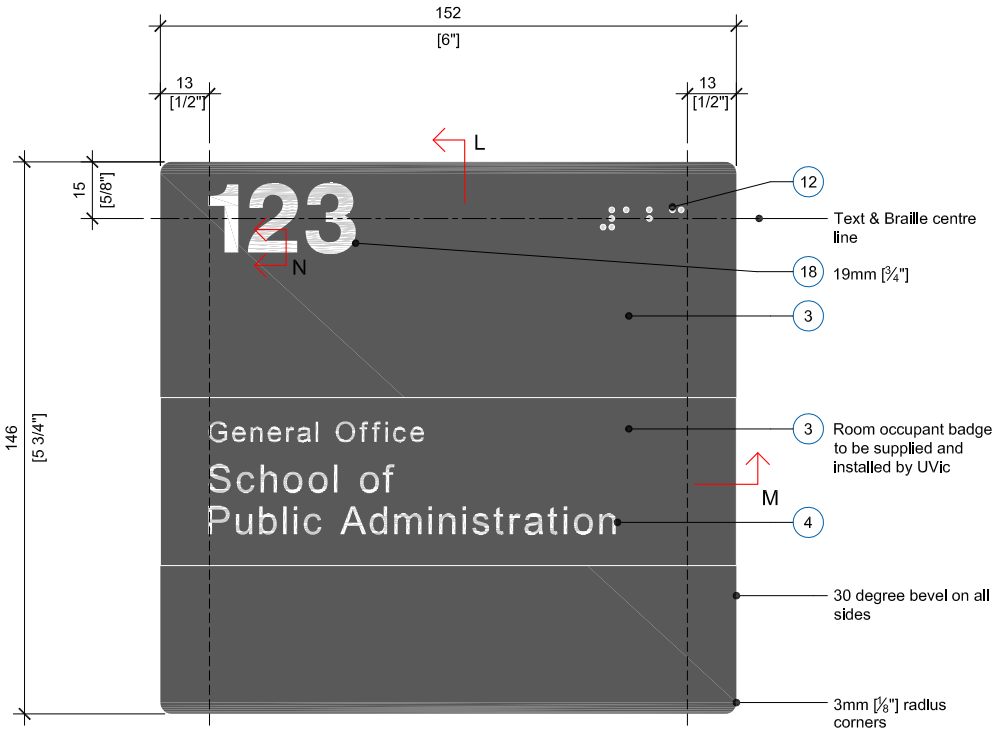

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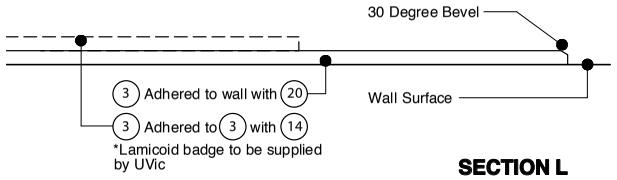

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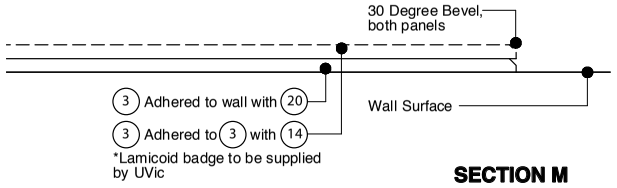

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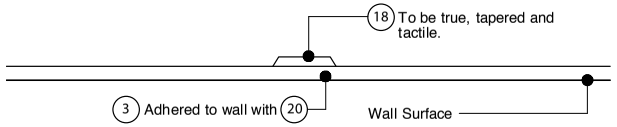
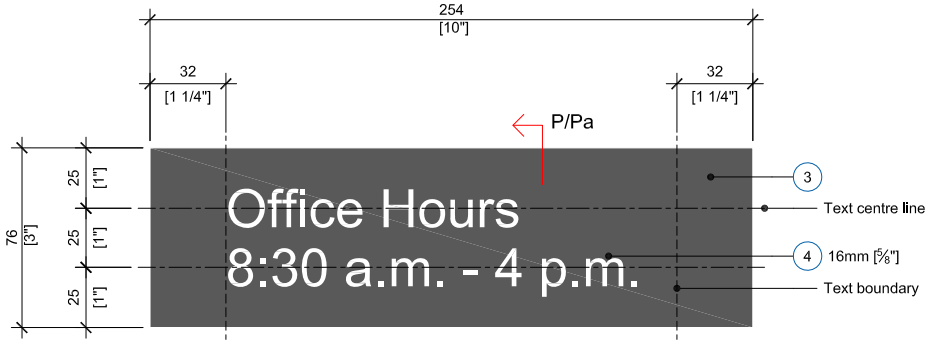


NOTE:
See Appendix for typical bevel information

SECTION N



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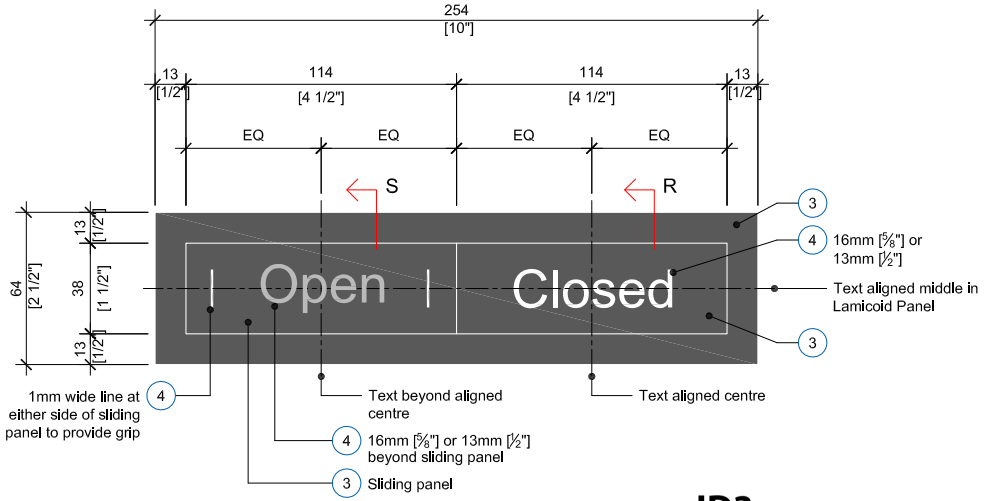

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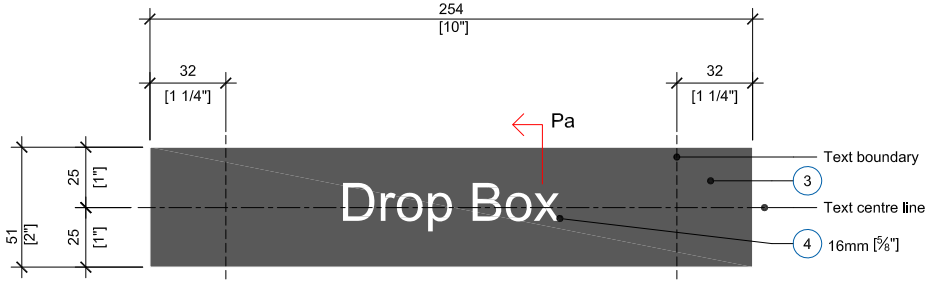

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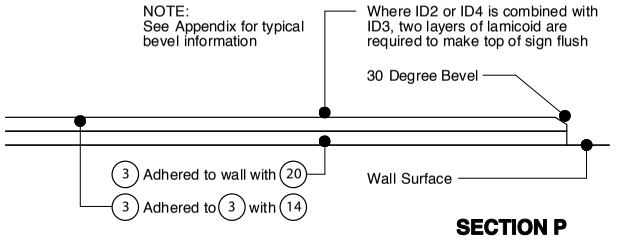

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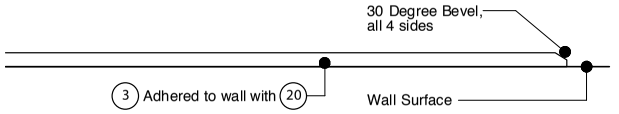
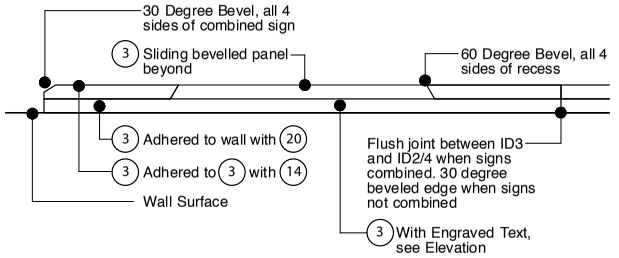


SECTION Pa



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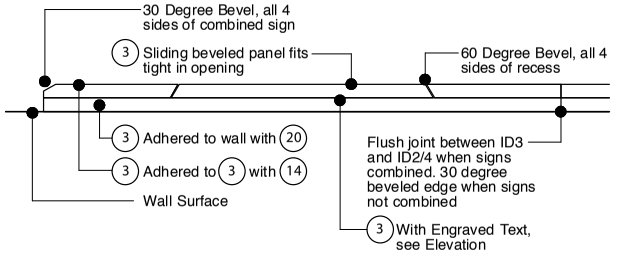
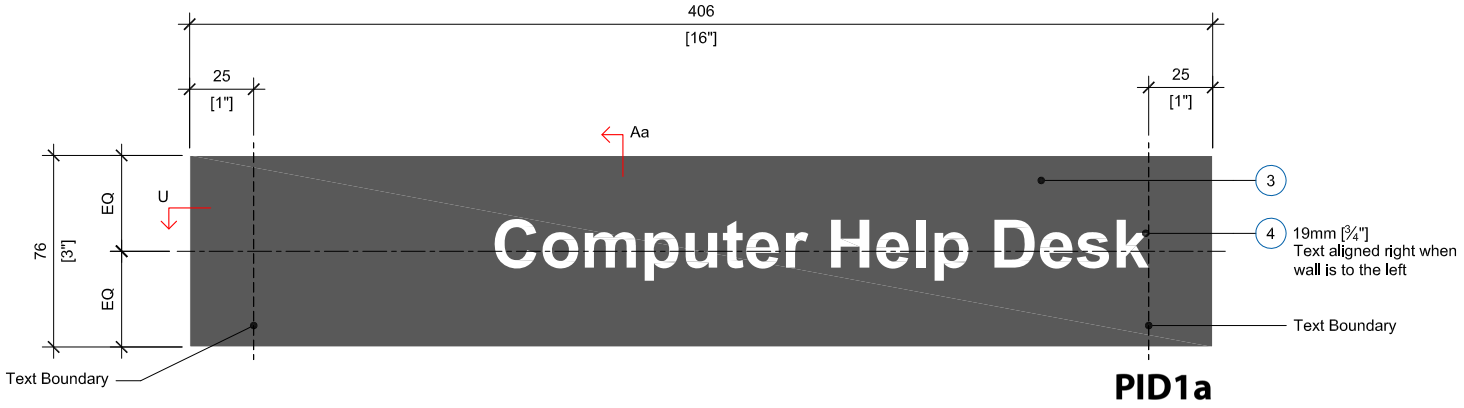
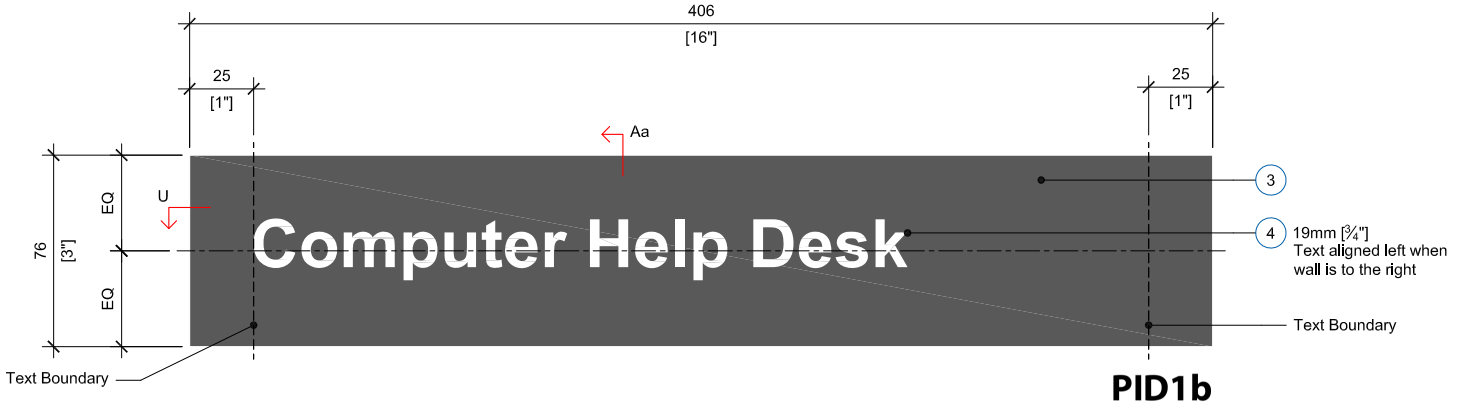


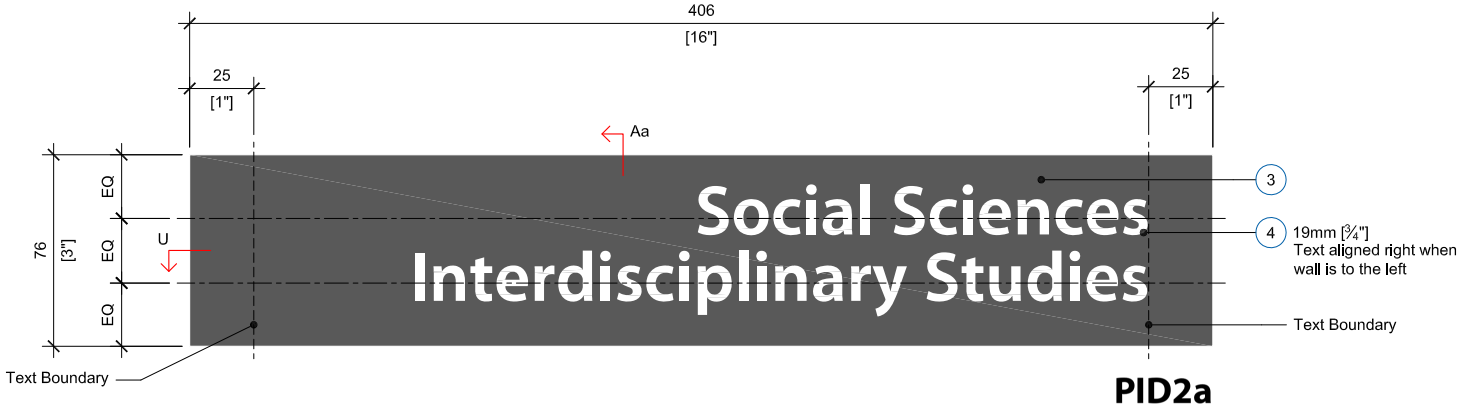
SECTION S



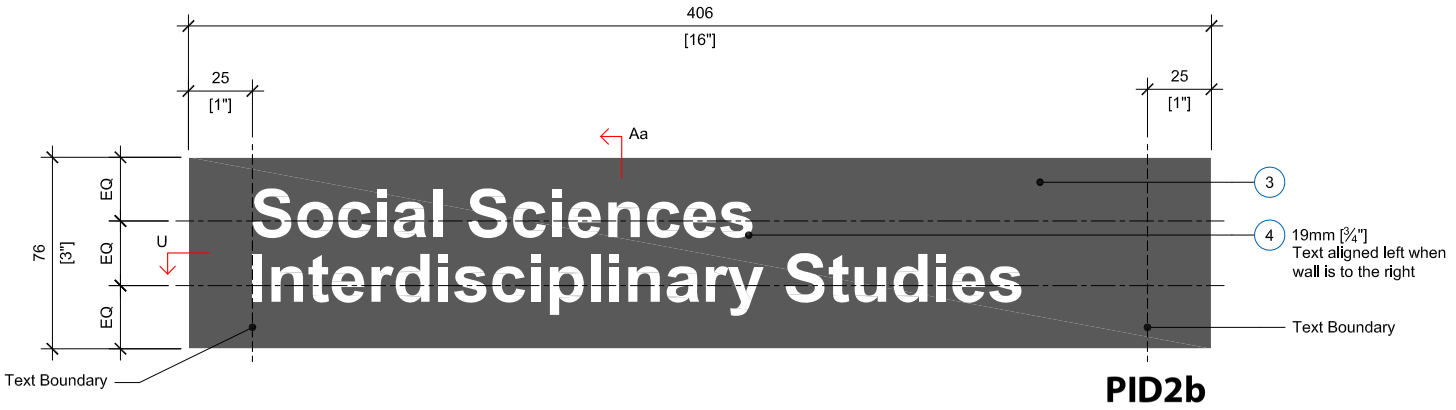
PID1a



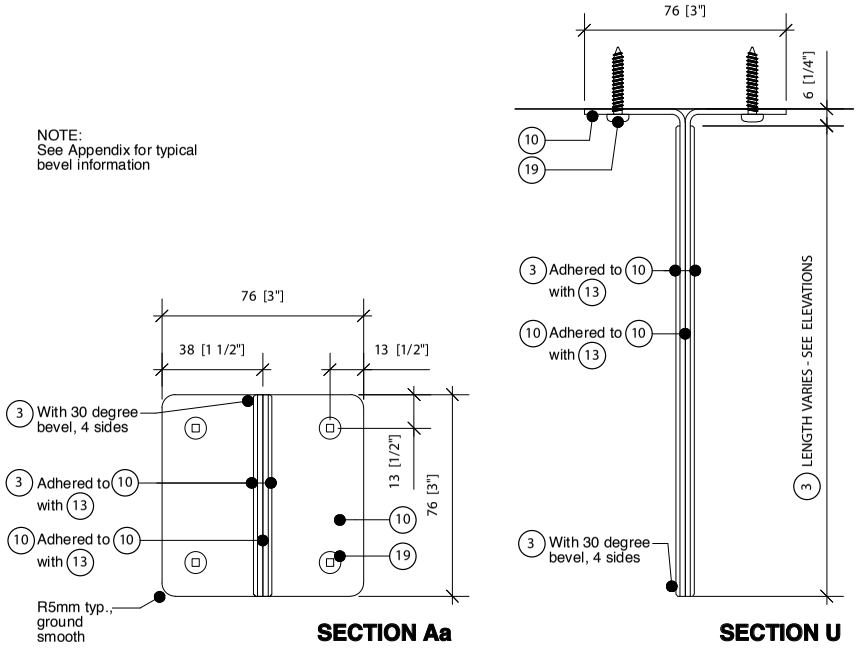
PID1b



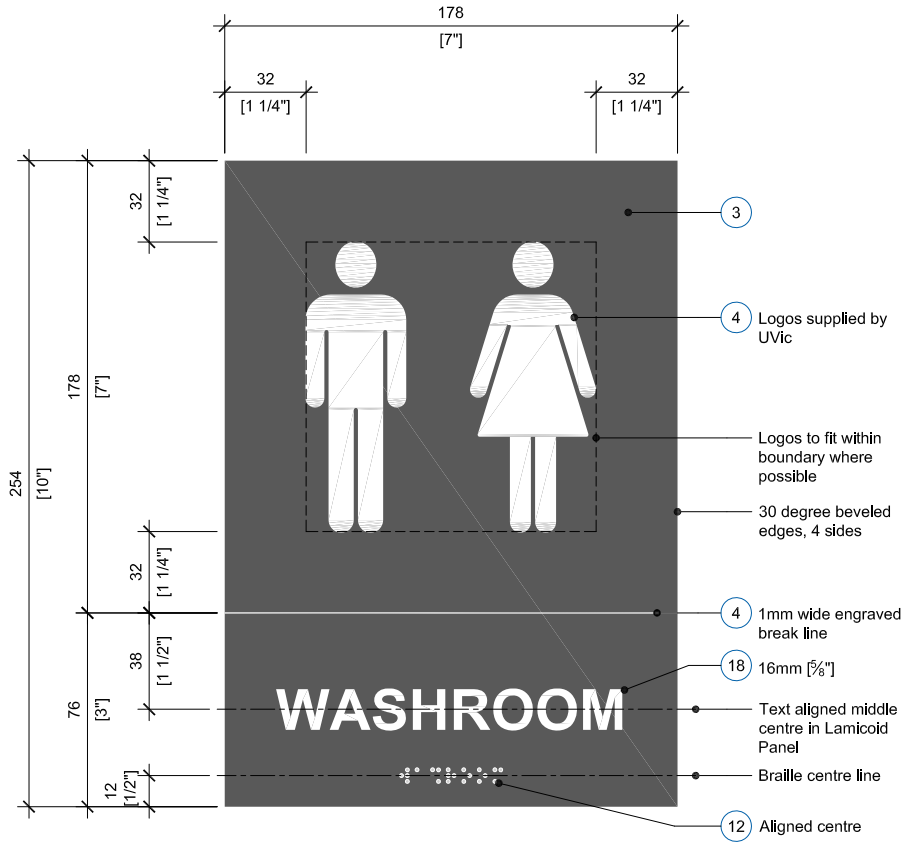
PID2a


406
[16"]
25
[1"]
25
[1"]
Aa
76
[3"]
EQ
EQ
EQ
U
Social Sciences
Interdisciplinary Studies
3
4
19mm [¾"]
Text aligned left when
wall is to the right
Text Boundary
Text Boundary

PID2b


NOTE:
See Appendix for typical
bevel information
76 [3"]
38 [1 1/2"]
13 [1/2"]
3 With 30 degree bevel, 4 sides
3 Adhered to 10 with 13
10 Adhered to 10 with 13
R5mm typ., ground smooth
13 [1/2"]
76 [3"]
10
19
SECTION Aa
76 [3"]
6 [1/4"]
3 Adhered to 10 with 13
10 Adhered to 10 with 13
3 With 30 degree bevel, 4 sides
3 LENGTH VARIES - SEE ELEVATIONS
SECTION U

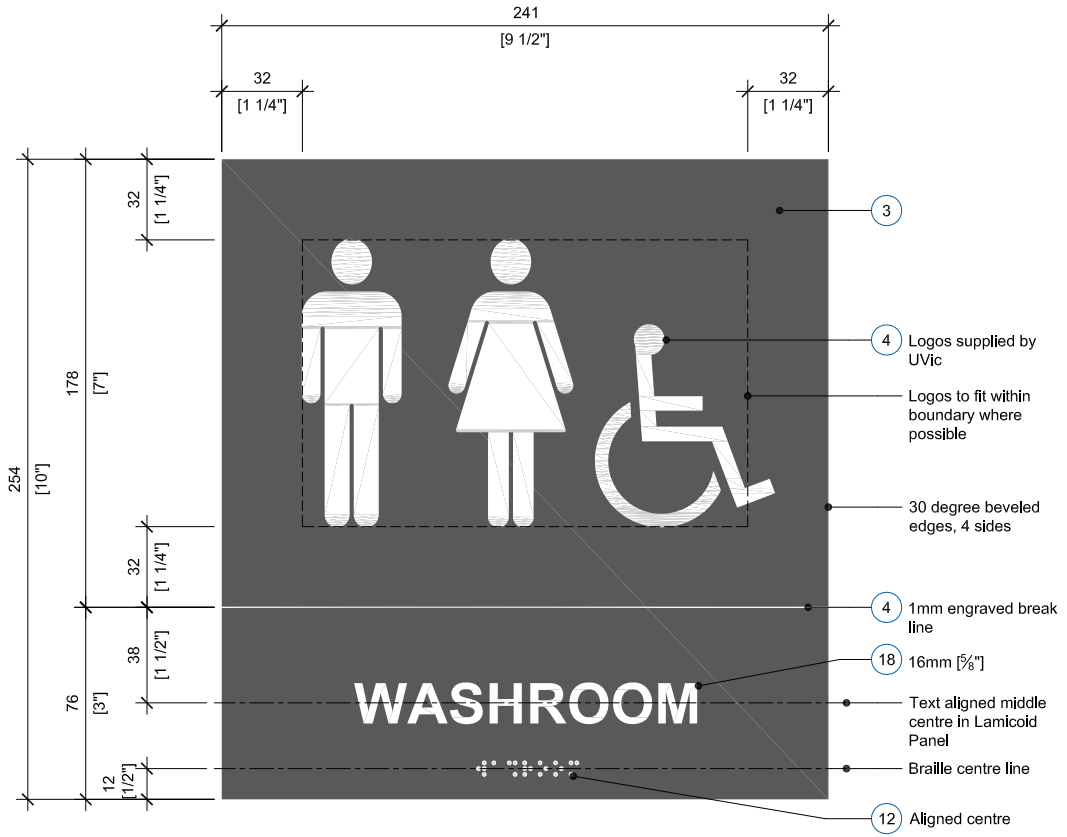
35



Note:
Repeat notes, dimensions and materials from WID6 for signs WID1, WID2, WID4, WID5, WID10 and WID11.

Adhere sign to the wall surface using material number (20), double sided tape.

WID6



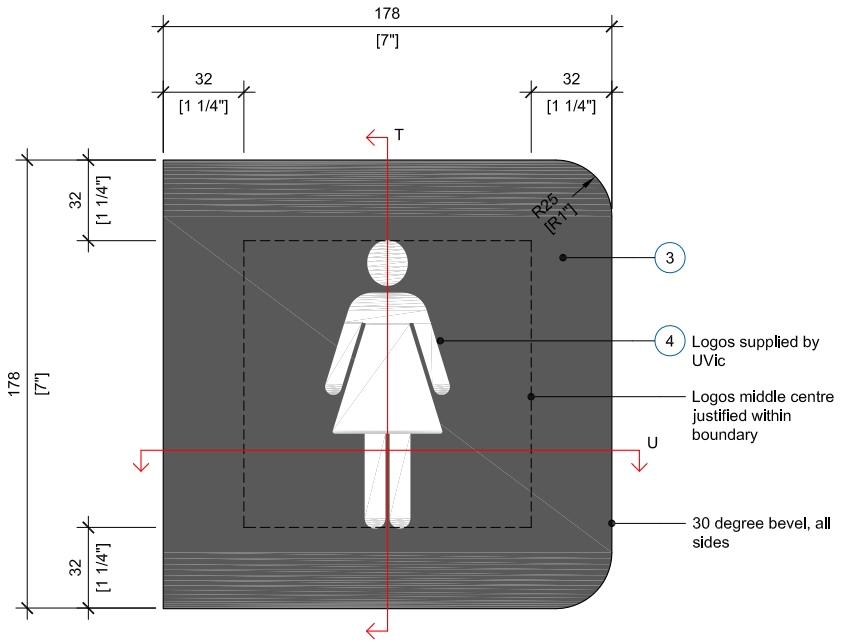
Note:
Repeat notes, dimensions and materials from WID3 for signs WID7, WID8 and WID12.

Adhere sign to the wall surface using material number (20), double sided tape.

WID3

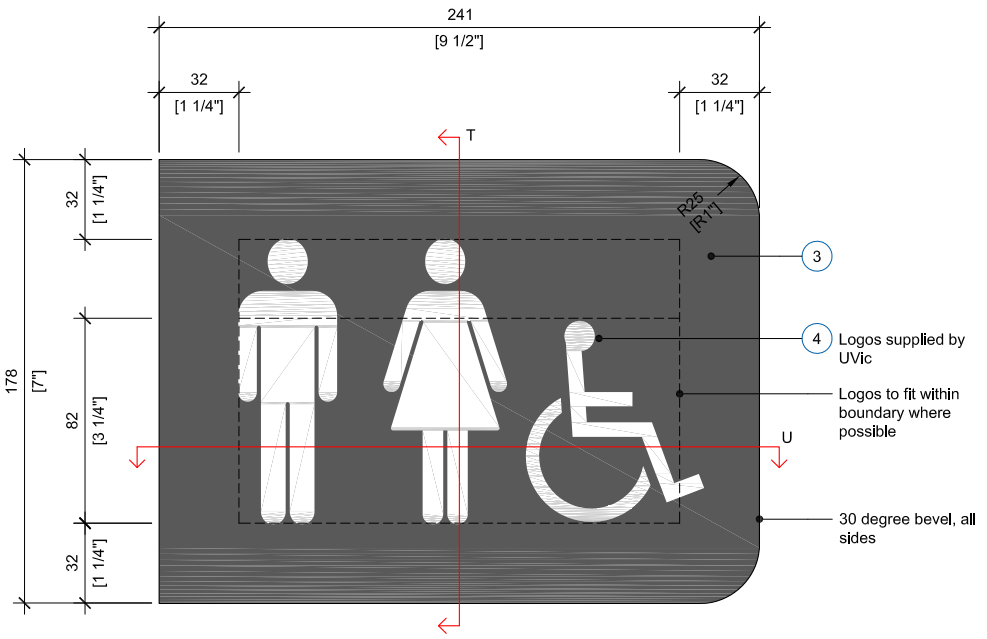
Note:
Adhere sign to the wall surface using material number (20), double sided tape.

WID9



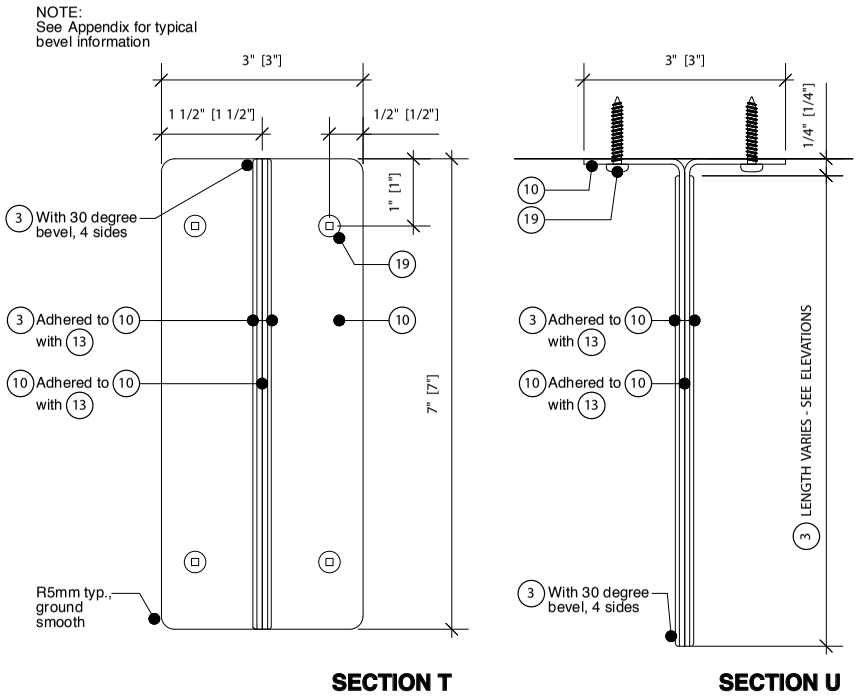
Note:
Repeat notes, dimensions and materials from WP4 for signs WP1, WP2, WP5 and WP6.

WP4

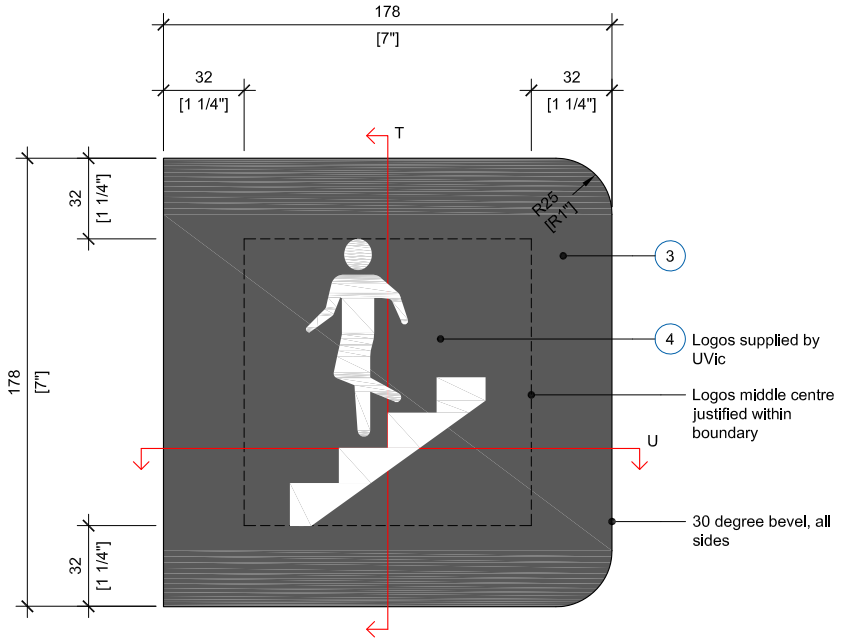


WP3

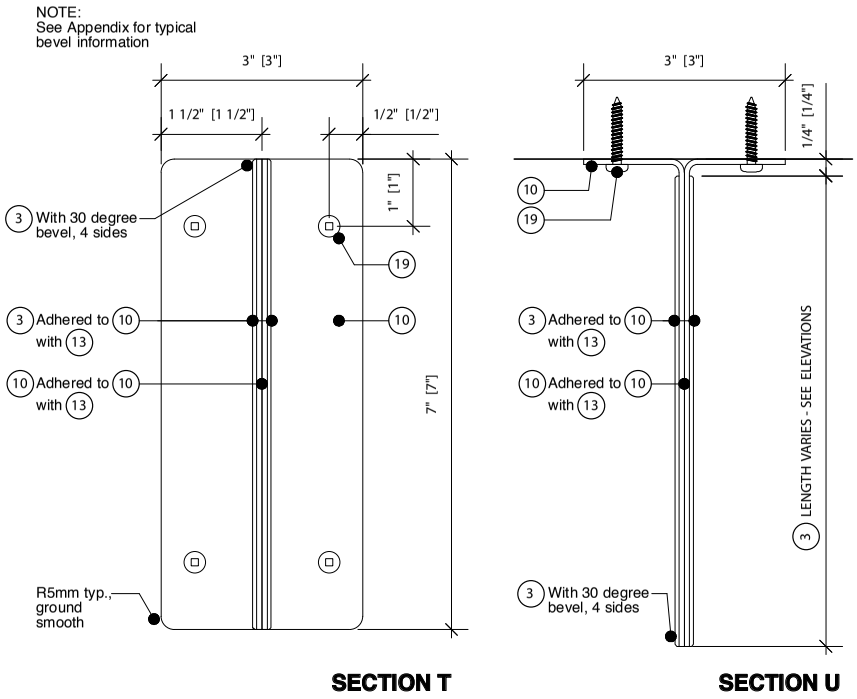
WASHROOM IDENTIFICATION
[WP DETAILS]



40



P1 & P2

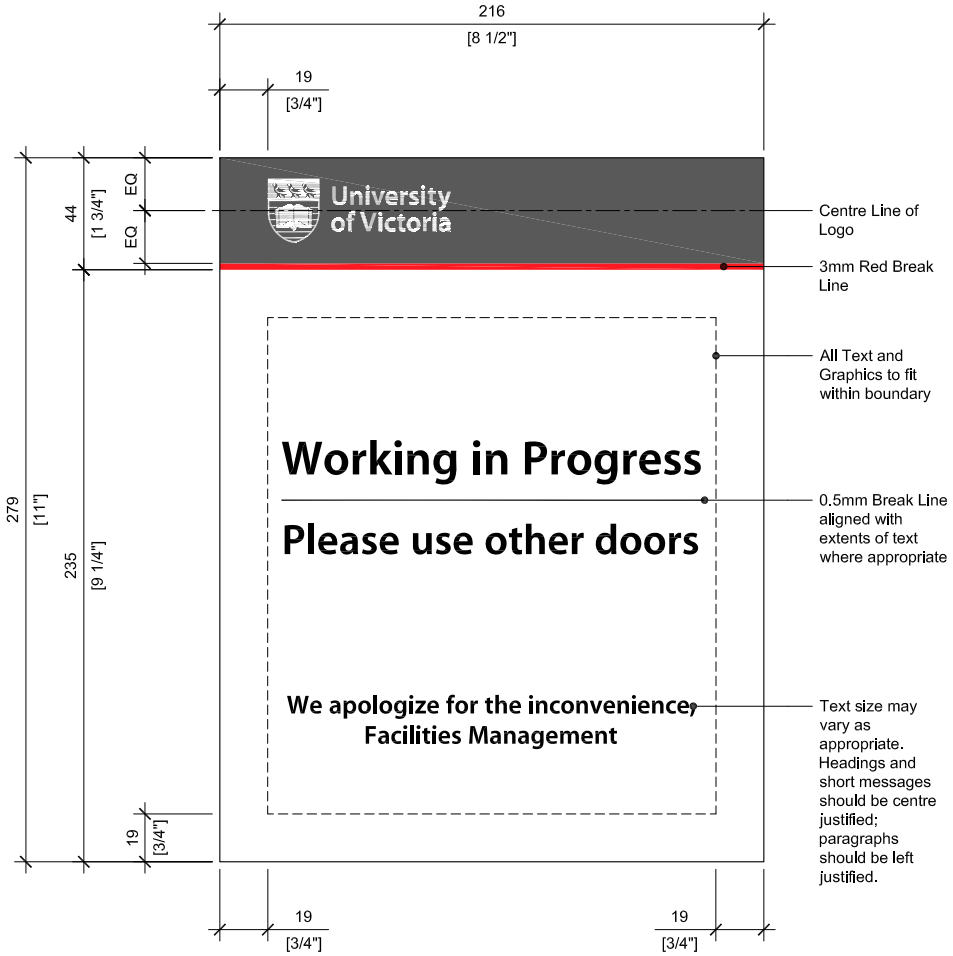


SECTION T **SECTION U**

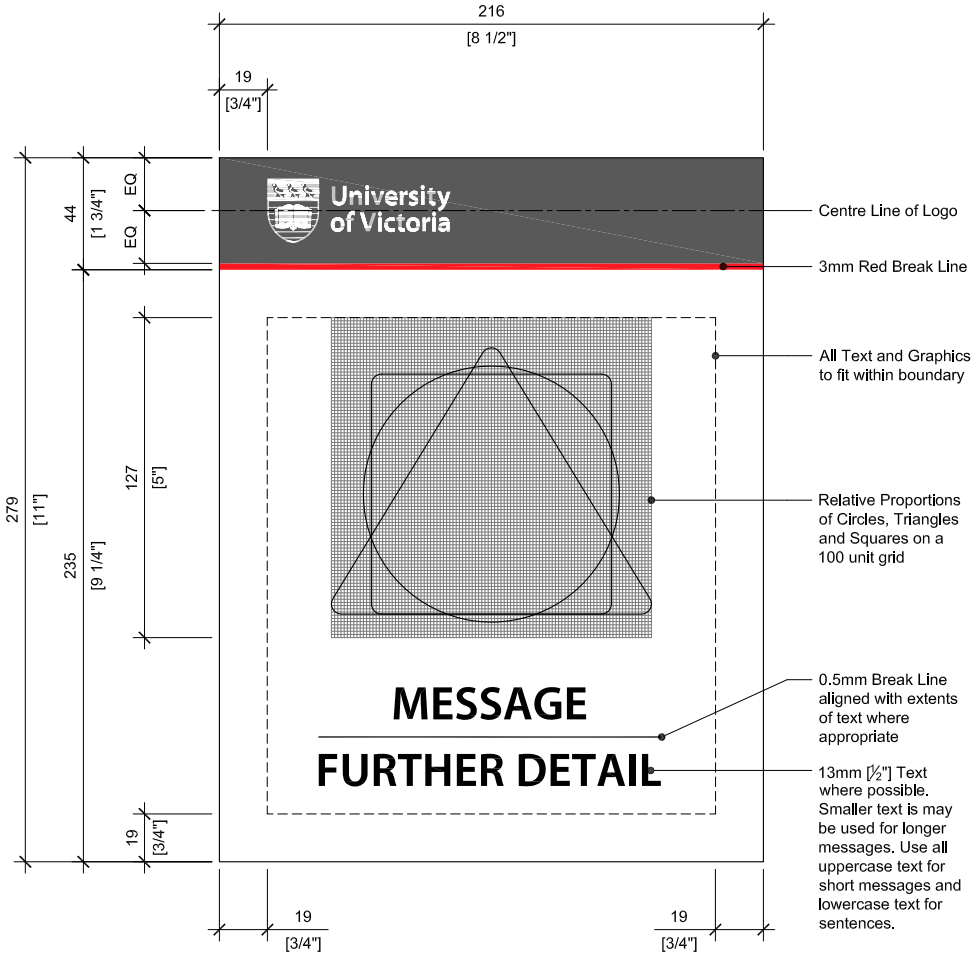
41

Colors:

Grey: Pantone 425C | Red: Pantone 185C | Yellow: Pantone 109C | Green: Pantone 341C | Black: Process Black



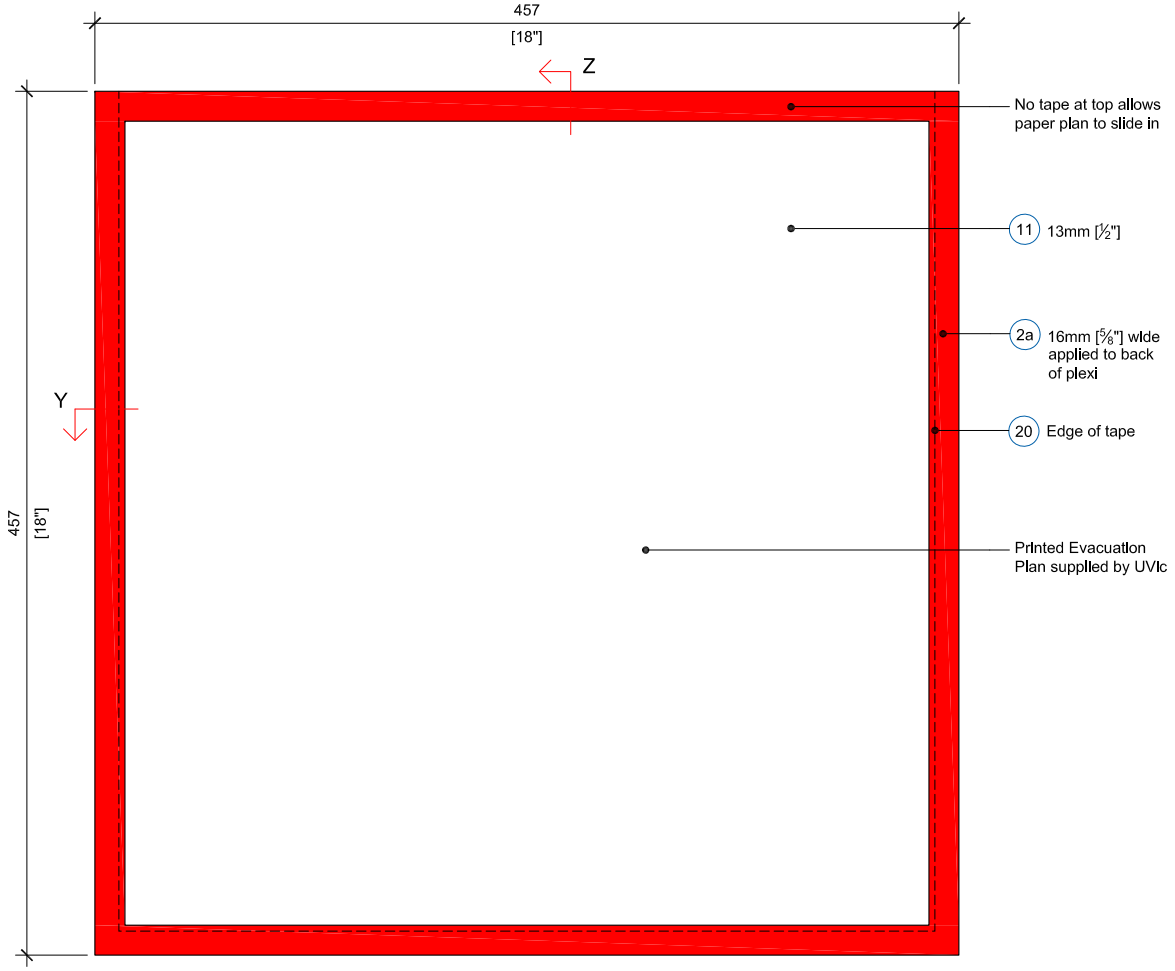
N2

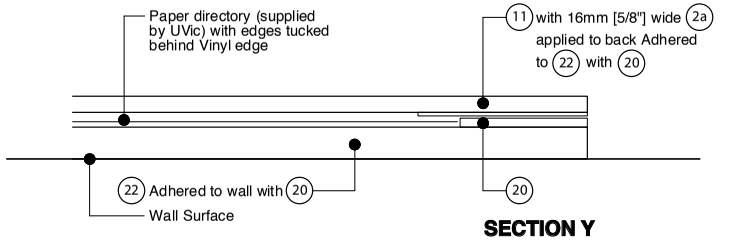


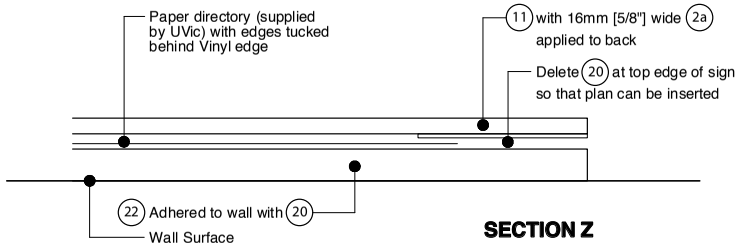
N1

42

EVACUATION PLAN [E1 DETAILS]





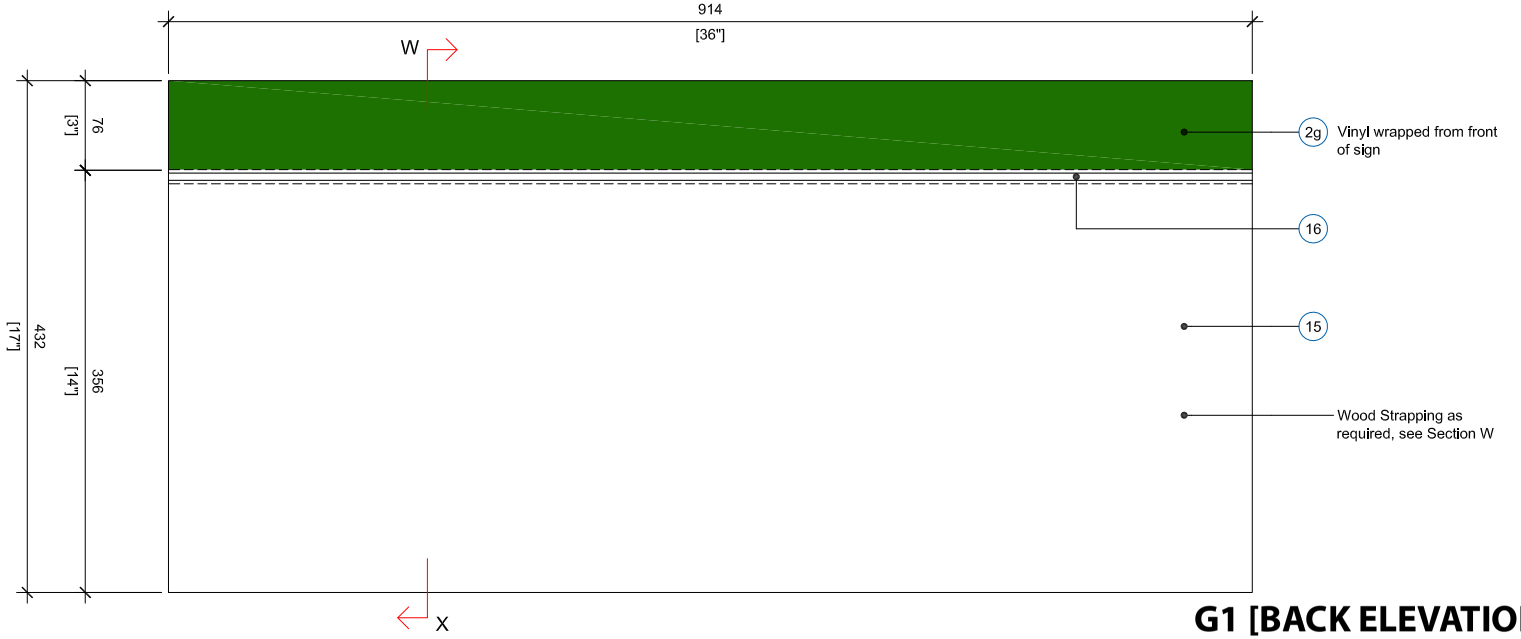


E1

43

GARBAGE AND RECYCLING SIGN [G1 DETAILS]

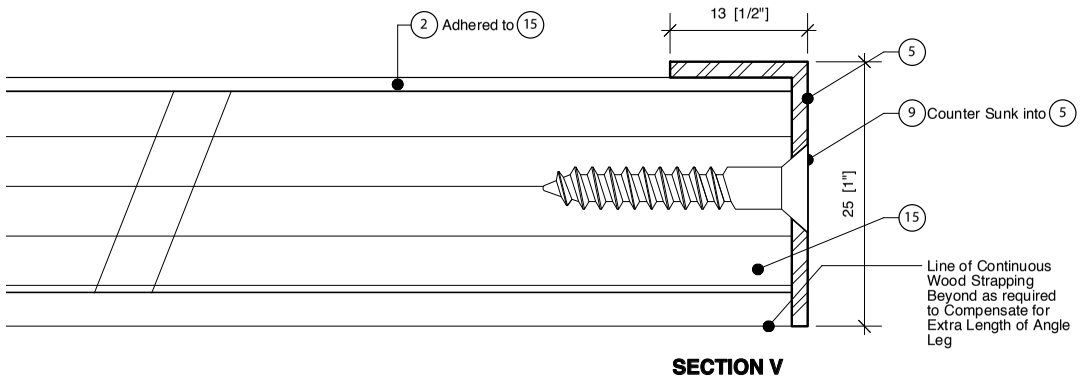
G1 [FRONT ELEVATION]



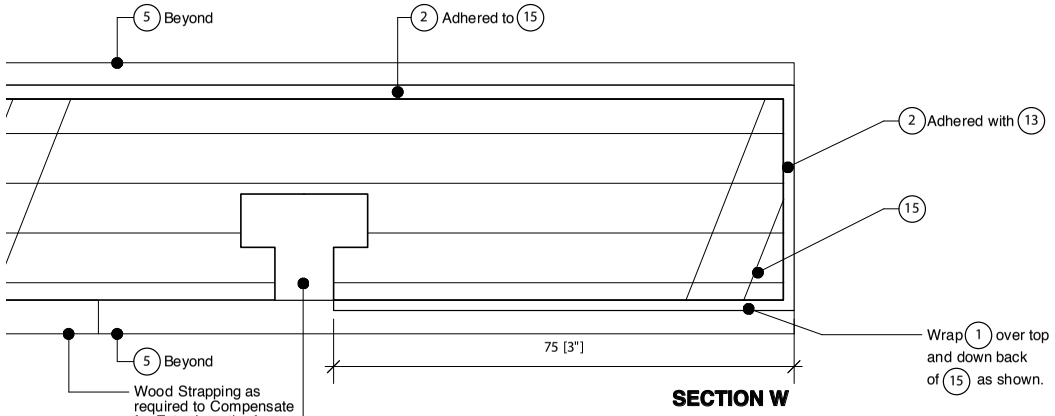
G1 [BACK ELEVATION]

44

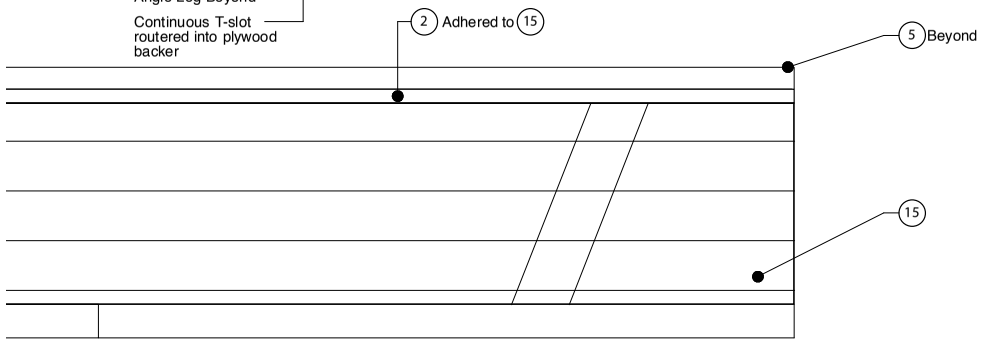
GARBAGE AND RECYCLING SIGN
[G1 DETAILS]



SECTION V



SECTION W



SECTION X

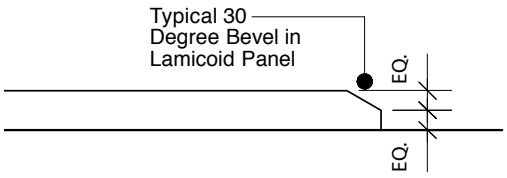
45

ELEVATION C

Note:

- University of Victoria logos must maintain proportions and may not be altered, stretched or skewed. A digital copy of the logo will be provided.

ELEVATION D



TYPICAL BEVEL DETAIL

University of Victoria | Facilities Management

Exterior Wayfinding Signage

Design Standards

05/25/12

CONTENTS

SIGNAGE POLICY

This document shall be read in conjunction with University of Victoria signage policy.

The policy can downloaded through the University of Victoria Website at the following location:
http://www.uvic.ca/universitysecretary/policies/index.php

Main Gateway [Sign 1]

Intent:
Main Gateway Signs will be used at major entrances to the university at locations visible to motorists. The signs will inform visitors that they are arriving on the campus, and establish the aesthetic and colors for the other wayfinding signs.

Size:
4.0m x 2.0m [13.1' x 6.5']

Main Gateway [Sign 1]

Parking Lot [Sign 2A & 2C]

Intent:
Parking Lot Signs will be placed along major roads to define entrances to major parking areas. The signs define the parking lot number, types of parking available, and times when pay parking is applicable. Sign 2C also provides information about the buildings easily accessible from this parking lot.

Size:
Sign 2A 1.3m x 1.8m [4.1' x 5.9']
Sign 2C 1.2m x 2.3m [4' x 7.5']

Parking Lot [Sign 2A]

Parking Lot [Sign 2C]

Building Identification [Sign 3A & 3B]

Intent:
Building Identification Signs will be placed along major roads to identify buildings. The signs define the building name, and the name of major theatres or gathering spaces.

Size:
Sign 3A 1.7m x 1.3m [5.6' x 4.3']
Sign 3B 1.2m x 1.3m [4' x 4.3']

Building Identification [Sign 3A]

Building Identification [Sign 3B]

Map Directory Kiosk [Sign 4]

Intent:
Map Directory Kiosks are designed to offer information to motorists as they arrive to campus and are in need of information. The kiosks will generally be located at vehicular pullouts on major routes entering campus and on Ring Road. Content will include a map of the campus, and a directory listing of all buildings, residences and departments.

Size:
4.5m x 3.2m [14.8' x 10.5']

Map Directory Kiosk [Sign 4]

Digital Message Board [Sign 5]

Intent:
Digital Message Boards will be used alongside major vehicular routes where they are visible to motorists. The signs will inform visitors about events and activities on campus.

Size:
3.4m x 3.8m [11.2' x 12.5']

Digital Message Board [Sign 5]

Directional [Sign 6]

Intent:
Directional signs will be used as required in order to direct motorists to hard to find areas.

Size:
Sign 6A 1.4m x 1.3m [4.6' x 4.3']
Sign 6B 1.2m x 2.0m [4' x 6.6']

Building Identification [Sign 3B]

Directional [Sign 6B]

Green Space Identification [Sign 7]

Intent:
Green Space Identification Signs will be used alongside major vehicular routes where they are visible to motorists. The signs will inform visitors about gardens and feature green spaces on campus.

Size:
1.7m x 1.2m [5.6' x 4']

Green Space Identification [Sign 7]

Map Directory Kiosk [Sign 8]

Intent:
Map Directory Kiosks will be used alongside major pedestrian routes and within parking lots. The intent is to help direct visitors who have already parked, or are entering the campus on foot. The kiosk contains a campus map and building, residence and department directories.

Size:
2.9m x 3.7m [9.5' x 12.1']

Map Directory Kiosk [Sign 8]

Major Directional [Sign 9]

Intent:
Major Directional Signs will be placed at major pedestrian intersections throughout the campus. The intent is to help direct pedestrian traffic to their intended destination. The kiosk contains a campus map and building, residence and department directories.

Size:
0.8m x 2.8m [2.5' x 9.2']

Major Directional [Sign 9]

Intermediate Directional [Sign 10]

Intent:
Intermediate Directional Signs will be placed at pedestrian intersections throughout the campus. The intent is to help direct pedestrian traffic to a building in close proximity. The sign contains a list of buildings in the area and directional arrows pointing to them.

Size:
1.0m x 1.4m [3.3' x 4.6']

Intermediate Directional [Sign 10]

Street Blade [Sign 11]

Intent:
Street Blades will be placed at pedestrian intersections throughout the campus. The intent is to help direct pedestrian traffic to a building in close proximity. Blades contains names of buildings in close proximity and point in the direction of these buildings.

Size:
1.0m x 3.3m [3.3' x 10.8']

Street Blade [Sign 11]

Minor Directional A [Sign 12]

Intent:
Minor Wayfinding Signs will be placed at pedestrian intersections throughout the campus. The intent is to help direct pedestrian traffic to a building in close proximity. The sign contains a list of buildings in the area and directional arrows pointing to them.

Size:
1.0m x 1.6m [3.3' x 5.2']

Minor Directional A [Sign 12]

Minor Directional B [Sign 13]

Intent:
Minor Directional B Signs will be attached to buildings as required throughout the campus. The intent is to help direct pedestrian traffic to a building in close proximity. The sign contains a list of buildings in the area and directional arrows pointing to them.

Size:
0.6m x 0.4m [2' x 1.2']

Minor Directional B [Sign 13]

Event Sign [Sign 14]

Intent:
Event Signs are 'A-frame' signs that are designed for temporary use to help display a message or advertise an event.

Size:
0.6m x 0.9m [2' x 3']

Event Sign [Sign 14]

Minor Pedestrian Map [Sign 15]

Intent:
Minor Pedestrian Maps are located in various locations around campus. The intent is to allow the map to direct visitors to their intended destination. The signs contain a campus map and building, residence and department directories.

Size:
0.6m x 1.8m [2' x 6']

Minor Pedestrian Map [Sign 15]

University of Victoria | Facilities Management

Exterior Wayfinding Signage

Specifications and Details

05/28/12

Sheet List	
Sheet Number	Sheet Name

Sign No. 1
Vehicular - Main Gateway

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 1 - Main Gateway
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
crest - reversed monochromatic

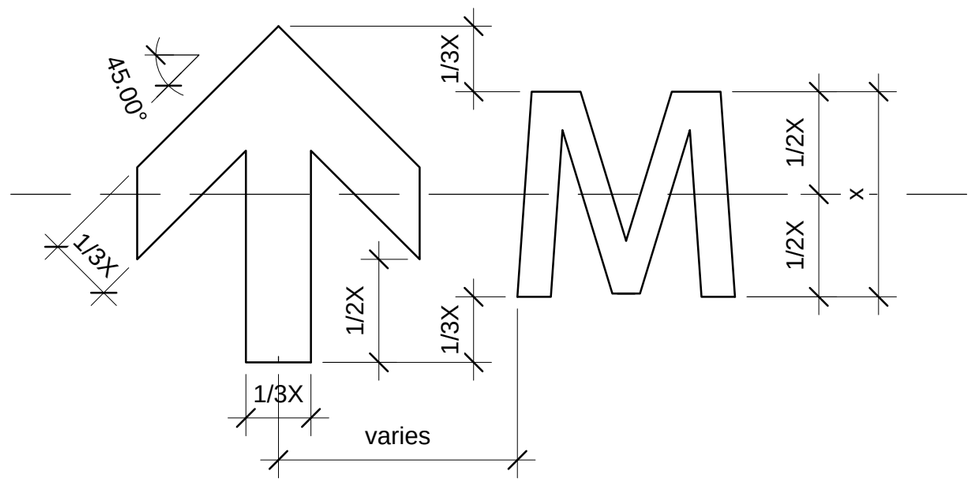
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

full colur

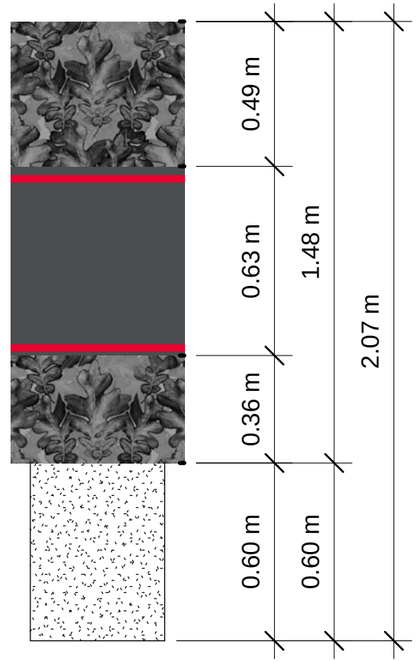
opaque monochromatic

opaque monochromatic reversed

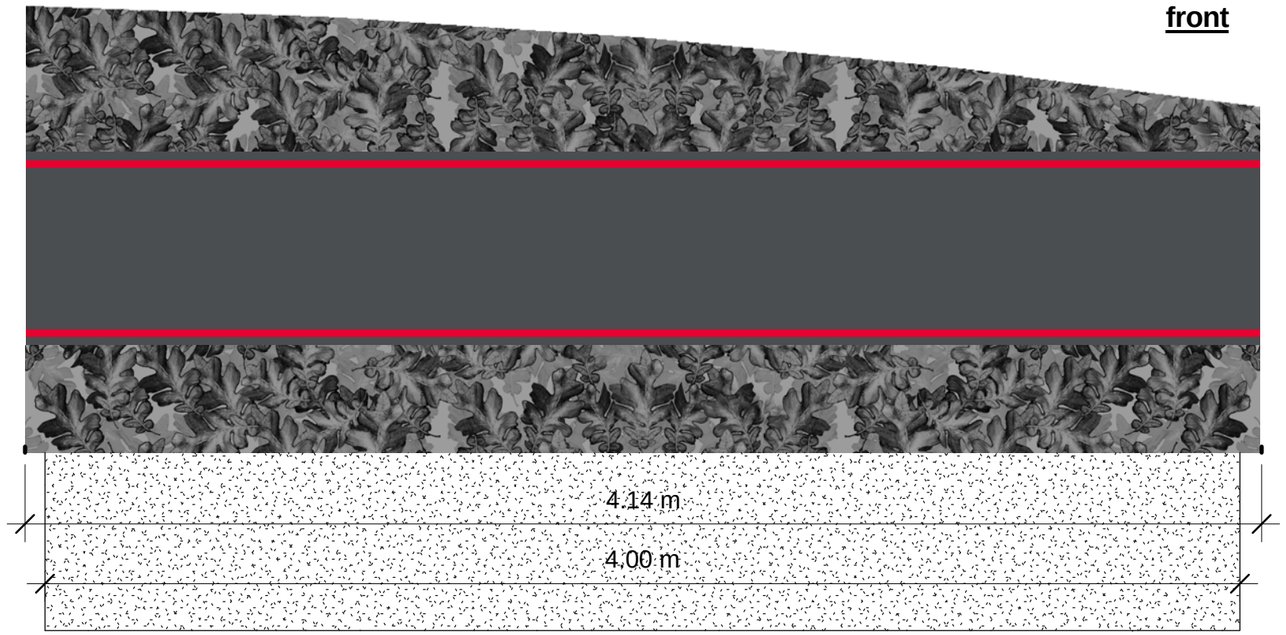
project:	Campus Wayfinding	sign:	Sign No. 1 - Main Gateway	sheet number:	02	University of Victoria
number:	FM 09-8567	sheet name:	typography, colours and pictograms			
issue date:	Jan 31, 2012	scale:	as noted			

side

front



side



back

gateway sign scale 1:20

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012

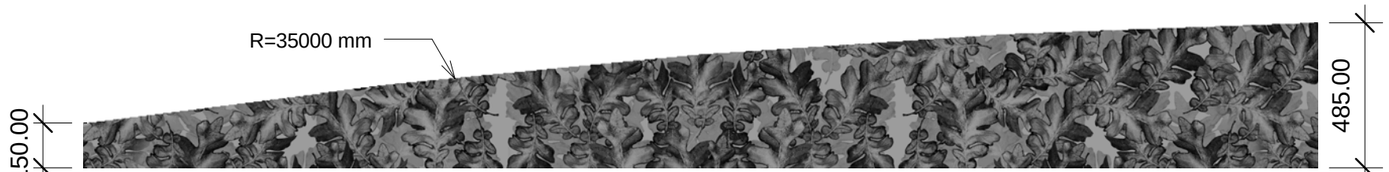
sign:	Sign No. 1 - Main Gateway
sheet name:	sign design - overview
scale:	as noted

sheet number: 03

University of Victoria

Back panel (not shown here) to be one piece, digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. Aluminum panel thickness to be 3.2mm

(top) Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate.
Aluminum panel size: 4130mm x 485mm x 6.4mm



(front - top) Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate.
Aluminum panel size: 4130mm x 485mm x 6.4mm

(front - main) Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate, with push-thru acrylic pictograms.
Aluminum panel size: 4130mm x 650mm x 6.4mm

(front - bottom) Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate.
Aluminum panel size: 4130mm x 360mm x 6.4mm

Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate.
Aluminum panel size:
580 mm x 1170 mm x 3.2 mm

Clear acrylic (pictograms):
Plaskolite OPTIX, Chemcast GP or equivalent

First surface prints:
Vinyl: 3M IJ180, MPI 2005 or equivalent
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent.

2nd surface prints:
CAV-50 reverse print - i/w/i (2nd surface)
Overlaminate: 3M 8914, Avery DOL 6060
or equivalent (first surface)

1) Vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Where applicable wrap vinyl and overlaminate over the edges of the alu. panel.
4) All panels to be mechanically festened to substrate.
5) Manufacturer to confirm all dimensions prior to fabrication.
6) Manufacturer to ensure watertightness of panel conenctions.

Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate.
Aluminum panel size:
580 mm x 1495 mm x 3.2 mm

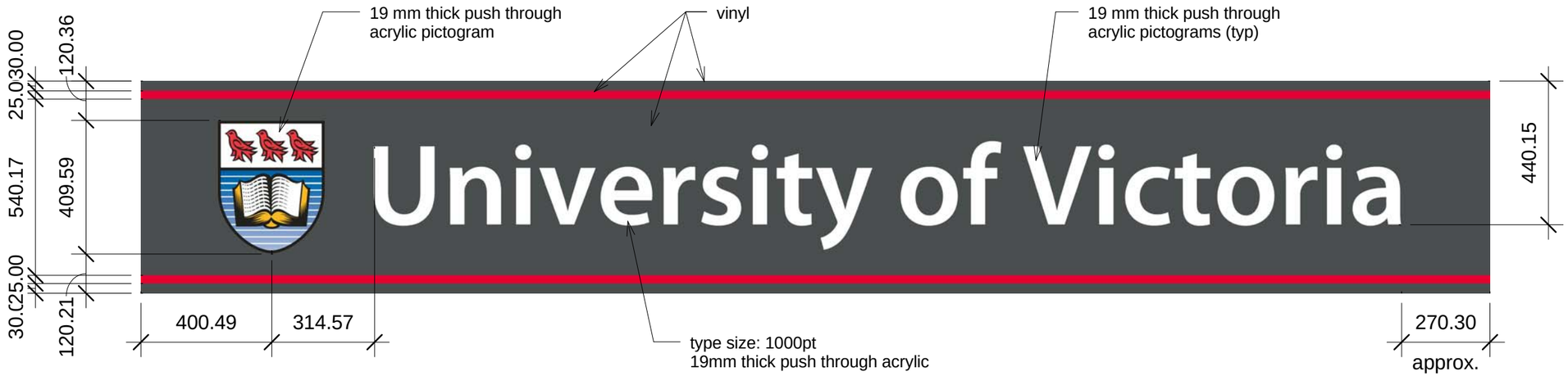
scale 1:20

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 1 - Main Gateway
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

University of Victoria



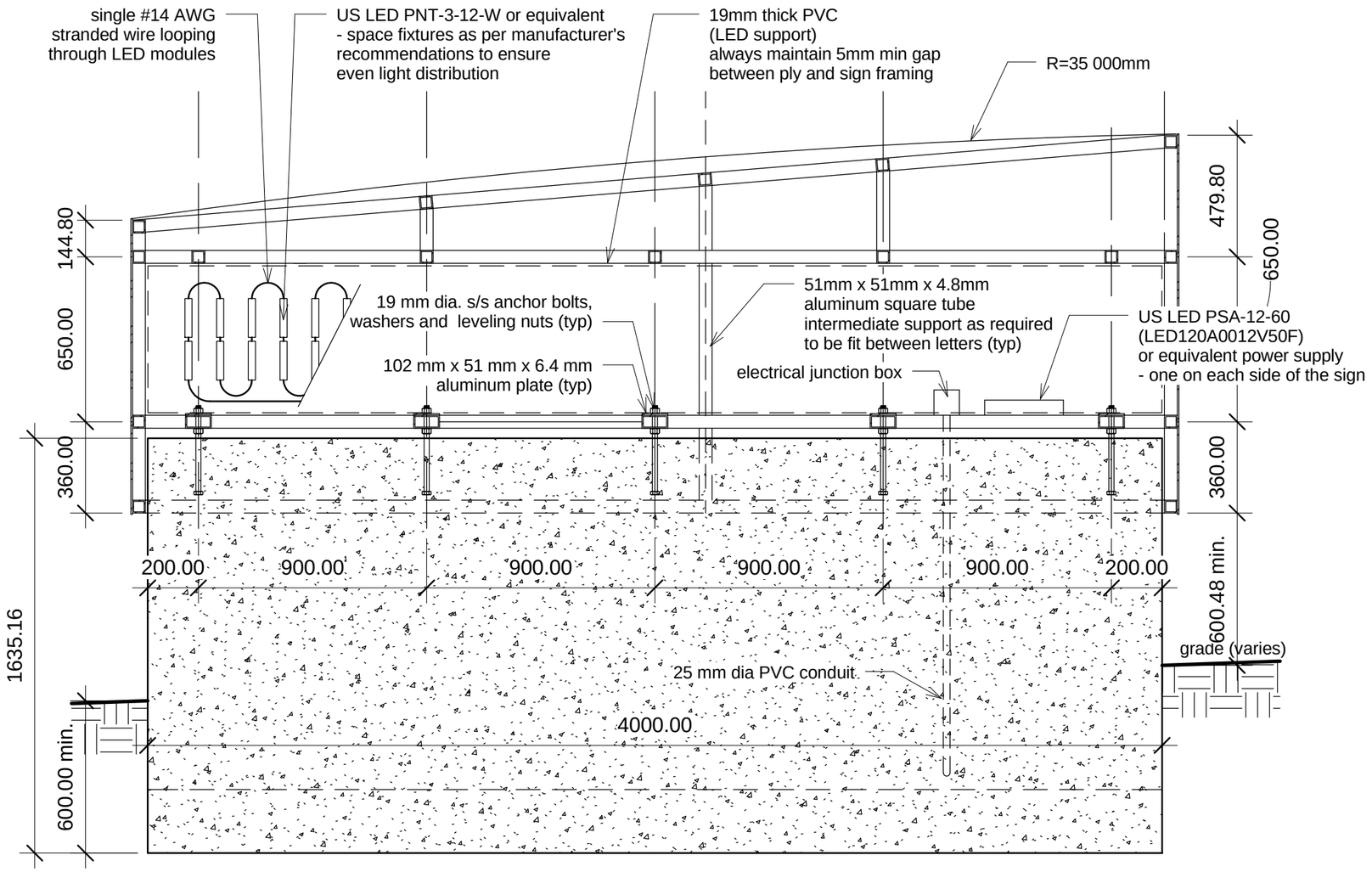
front panel with push thrugh pictograms
scale 1:15

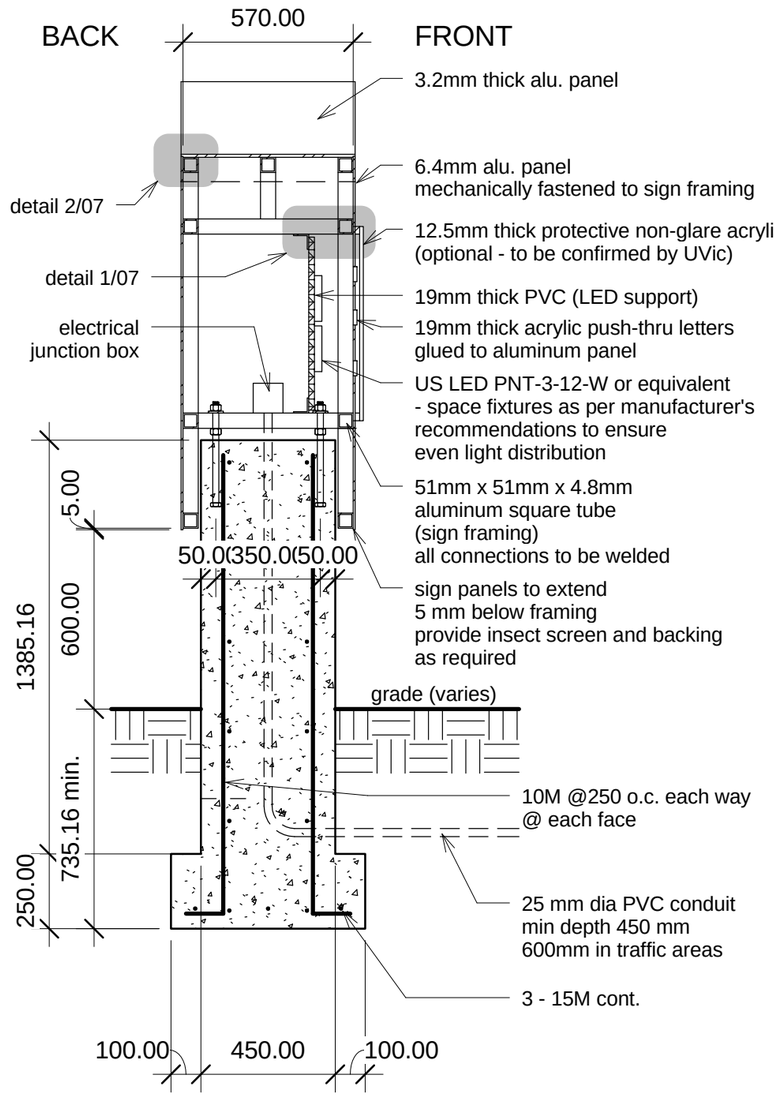
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012

sign:	Sign No. 1 - Main Gateway
sheet name:	sign design - graphic design details - cont
scale:	as noted

sheet number: 05

University of Victoria





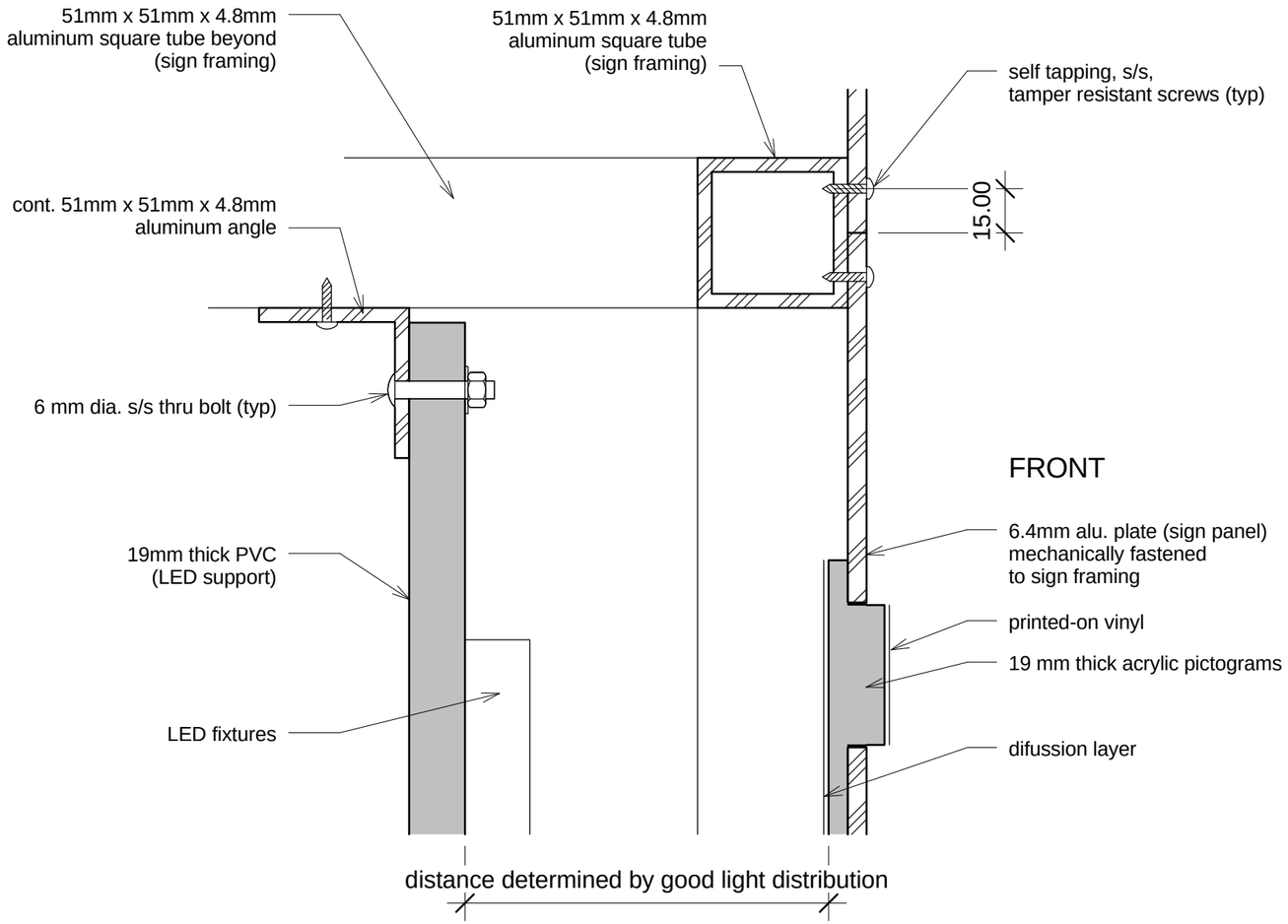
General Notes:
1) provide ventilation holes as required
2) US LED PSA-12-60 power supply to provide ource of power to a max.
of 50 MegaBright 12 LED Modules
3) Sign must have a CSA label as an assembly
4. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

long section scale 1:20

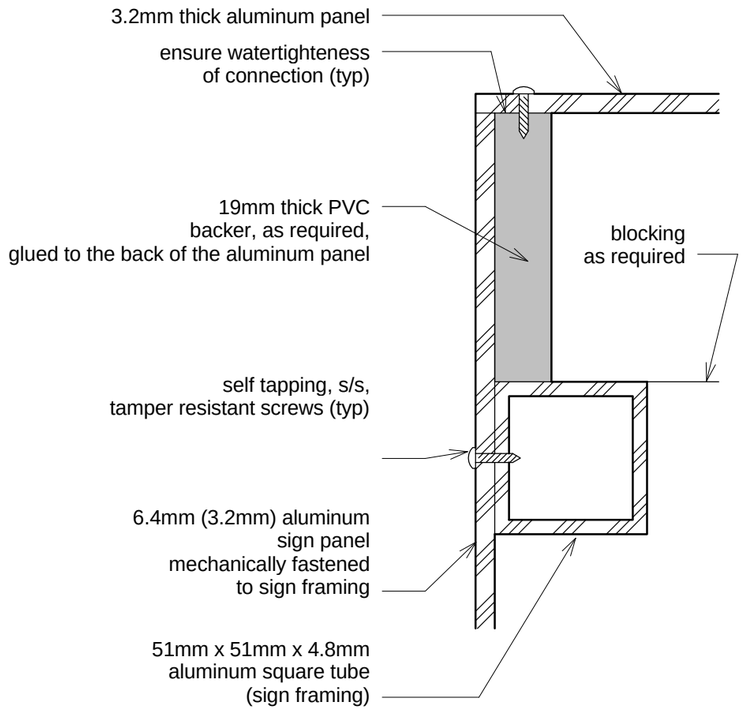
cross section scale 1:20

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 1 - Main Gateway
sheet name:	sign construction - sections
scale:	as noted
sheet number:	06

University of Victoria



detail 1 scale 1:2



detail No. 2 scale 1:2

General Notes:
1) provide ventilation holes as required
2) US LED PSA-12-60 power supply to provide ource of power to a max.
of 50 MegaBright 12 LED Modules
3) Sign must have a CSA label as an assembly
4. Manufacturer to verify all dimensions prior to sign fabrication. All discrepancies
should be reported to the Architect.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 1 - Main Gateway
sheet name: sign construction - details
scale: as noted

sheet number: 07

University of Victoria

GENERAL NOTES

1. Provide sign ID stickers as per proposed location plan.
   Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Manufacturer to verify all dimensions prior to sign fabrication. All discrepancies should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility to build the work in conformance with the contract documents. Structural Engineer shall not be responsible for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

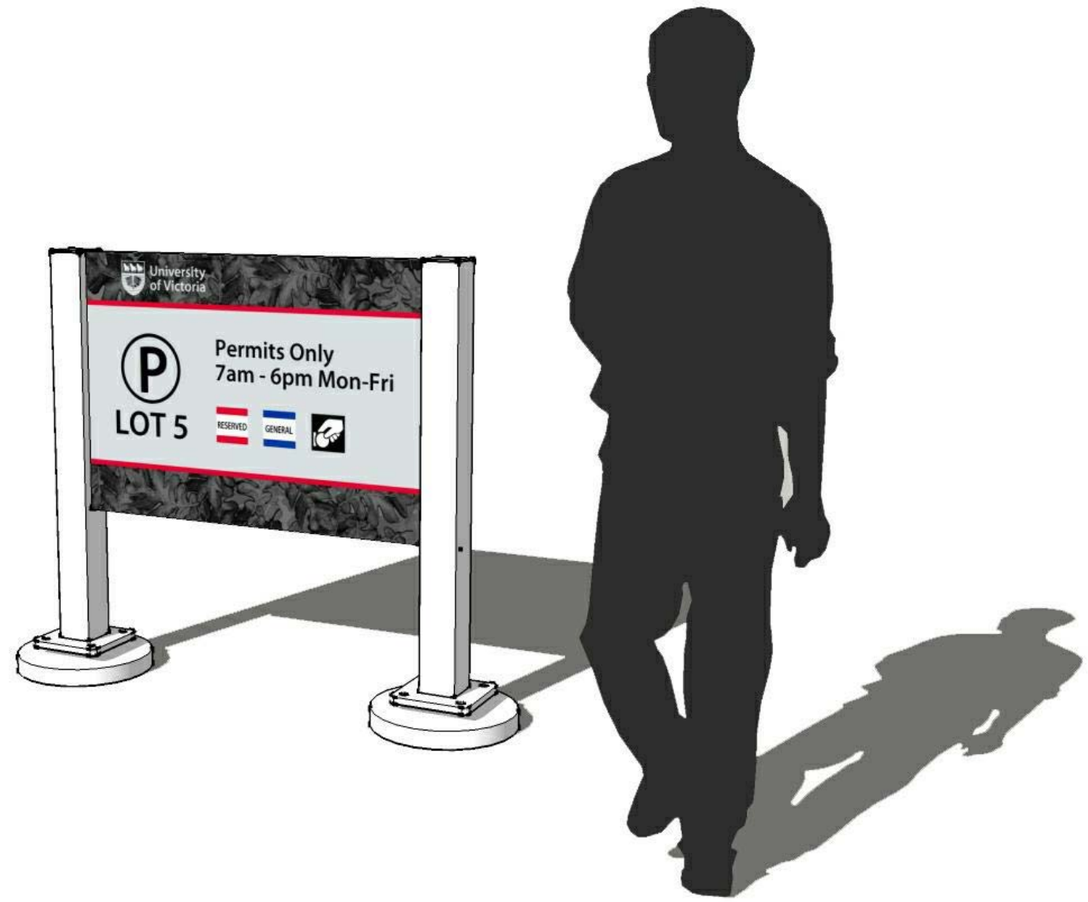
STRUCTURAL NOTES (cont)

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded 300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer. Anchor bolts to be secured with "Pentagon" security nuts.

ELECTRICAL NOTES

1. Signs must be provided with CSA label
2. LED modules, power supplies, cable, wire and junction box must be integral with signs
3. All electrical installations to be done in accordance with the Canadian Electrical Code and as reccomended by the LED lighting manufacturer.
4. Run 2#8 +GND conductors in 27mm PVC conduit from sign to existing campus exterior lighting pole standard. Intercept existing underground conduit, install an H20 rated flush junction box with bolt-on cover and splice into exterior lighting circuit.
4. The sign manufacturer shall provide an electrical shop drawings indicating input power requirements and a schematic wiring diagram for the sign.



Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 2A
Vehicular - Parking Lot

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2A - Parking Lot
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

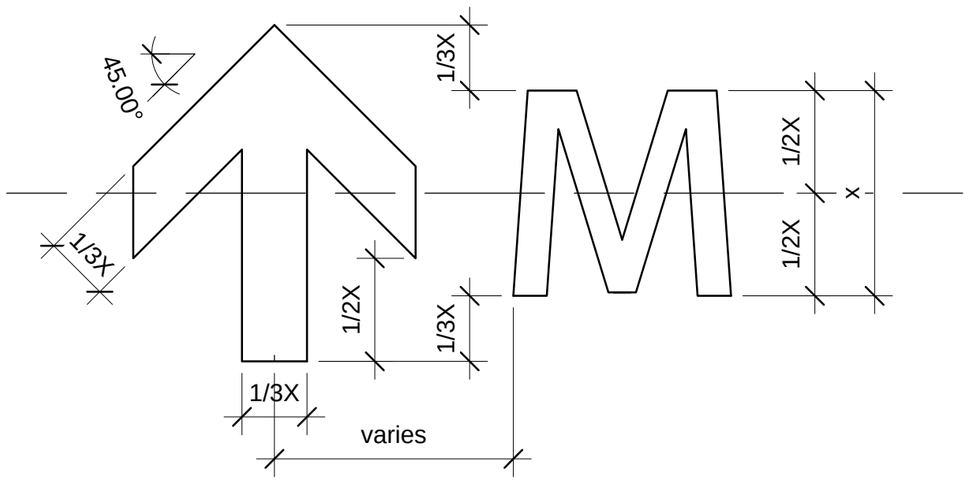
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

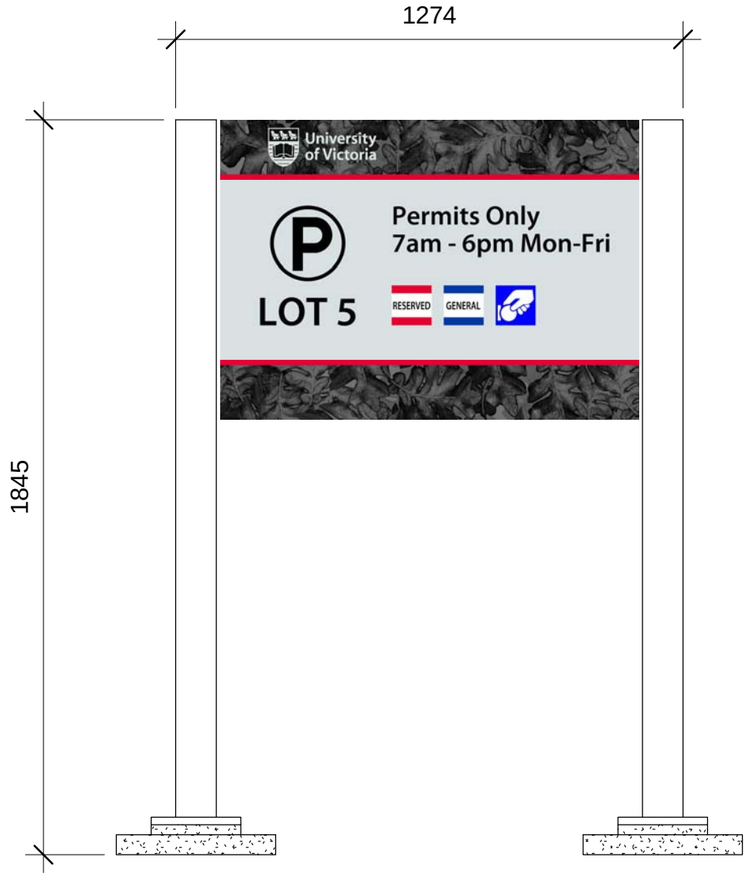
opaque monochromatic

University of Victoria

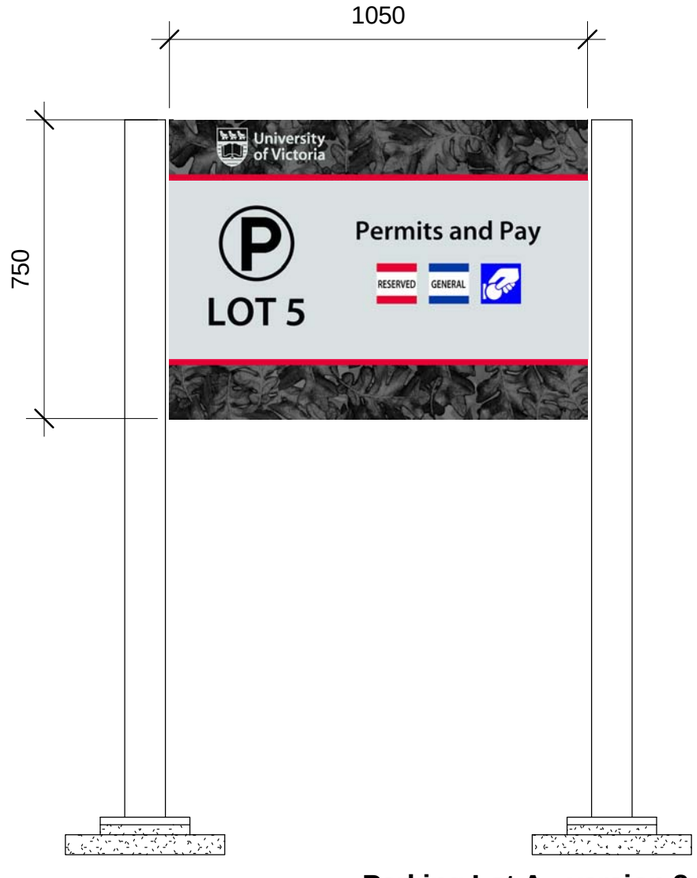
opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 2A - Parking Lot	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



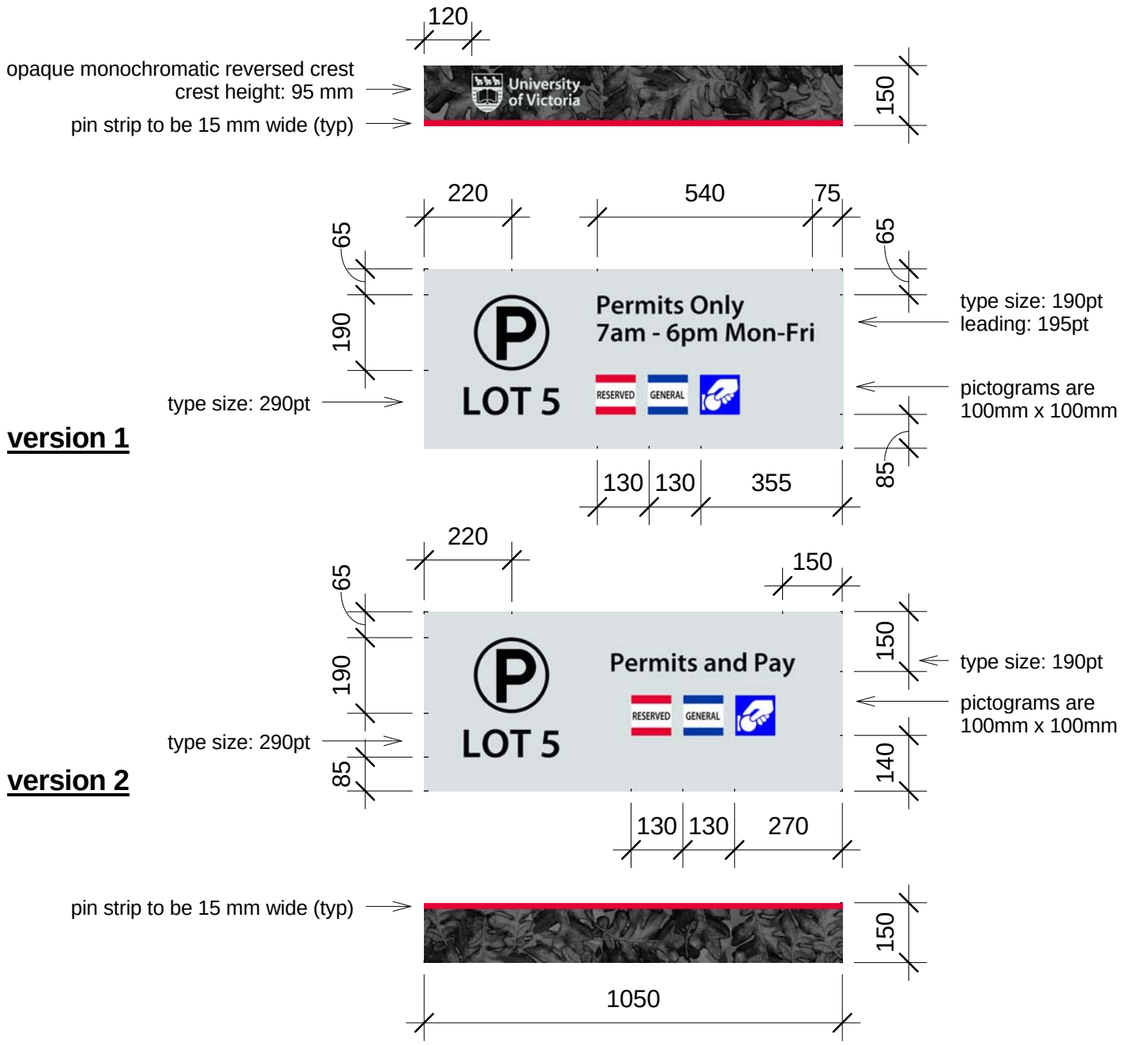
Parking Lot A - version 1
scale 1:15



Parking Lot A - version 2
scale 1:15

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 2A - Parking Lot
sheet name:	sign design - overview
scale:	as noted
sheet number:	03

University of Victoria



version 1

version 2

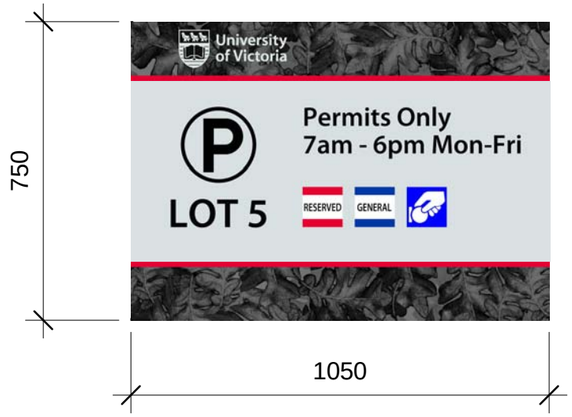
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1050 mm x 750 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout

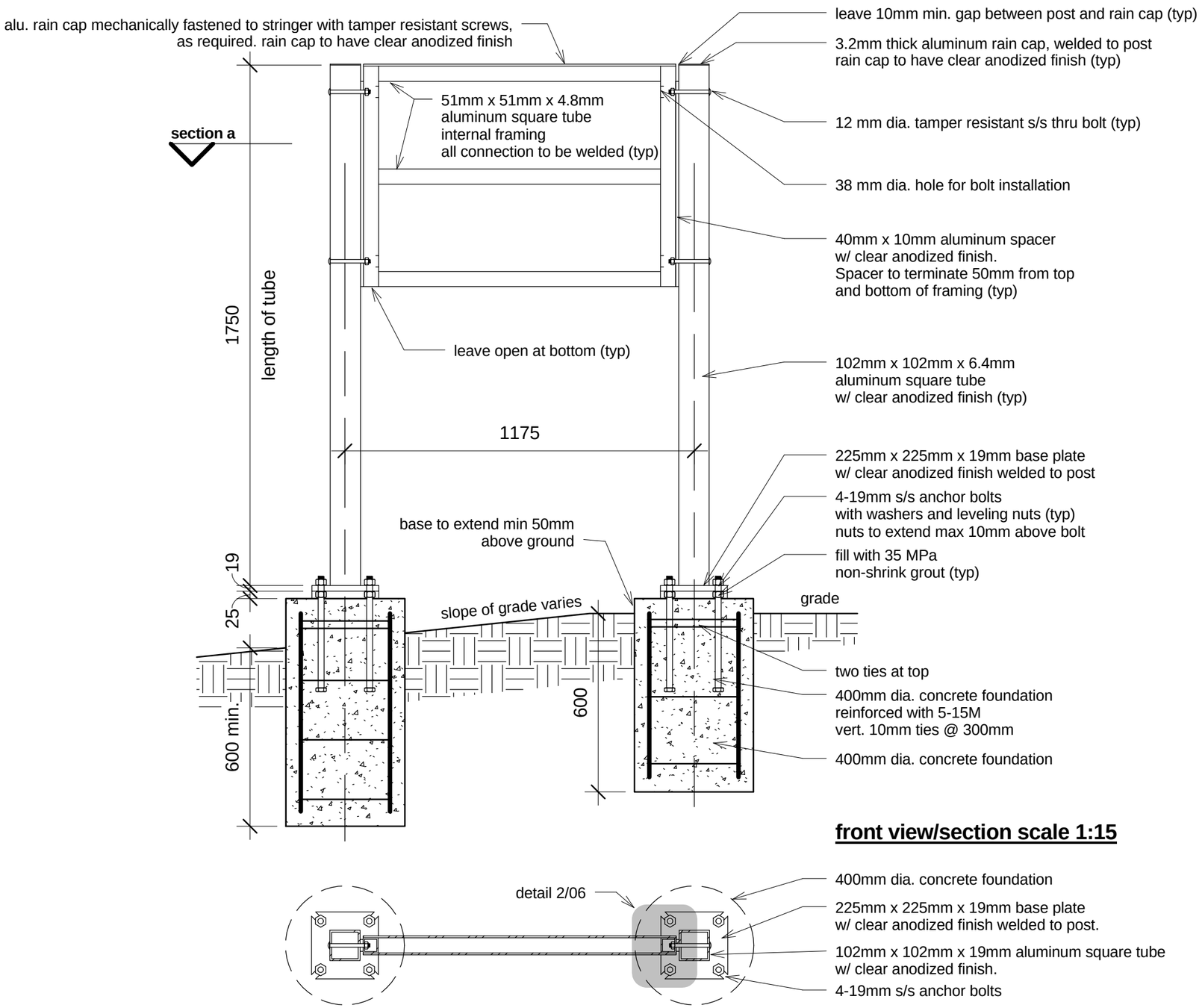


scale 1:15

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 2A - Parking Lot
sheet name:	sign design - graphic design details
scale:	as noted

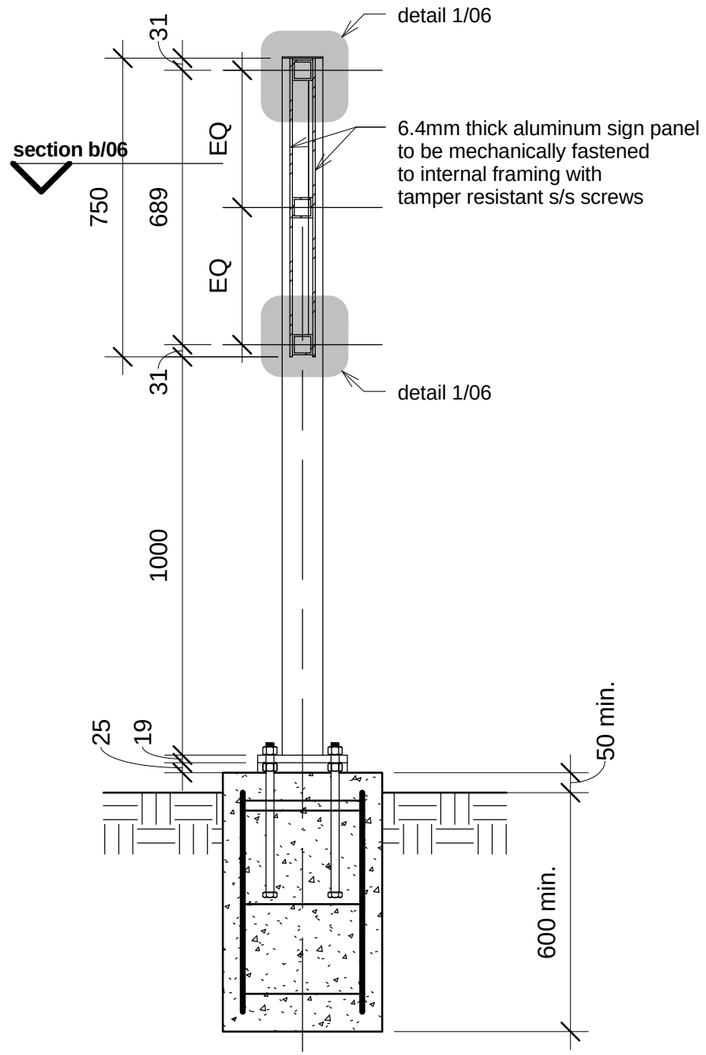
sheet number: 04

University of Victoria



front view/section scale 1:15

section a scale 1:15

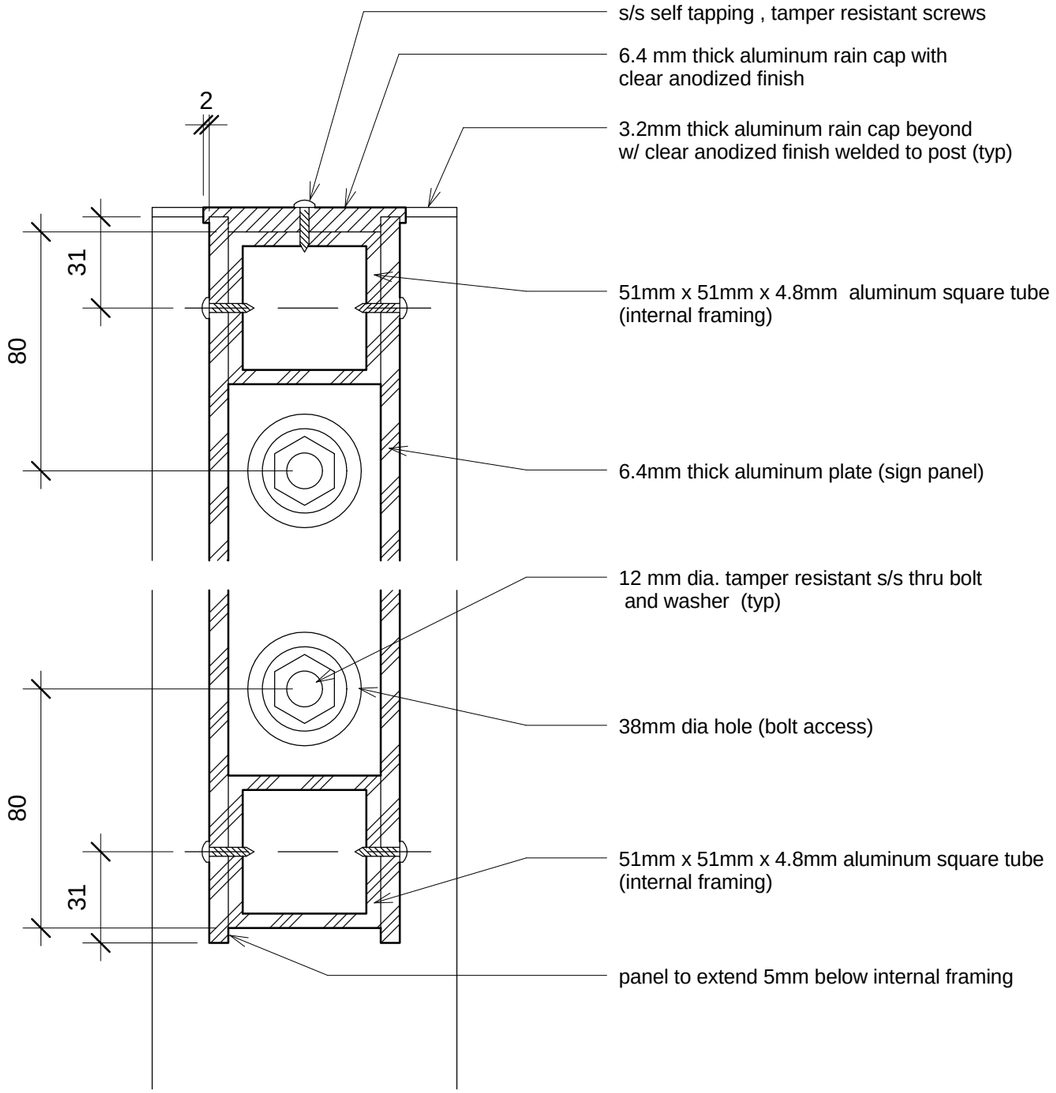


side view/section scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 2A - Parking Lot
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria



General Note:
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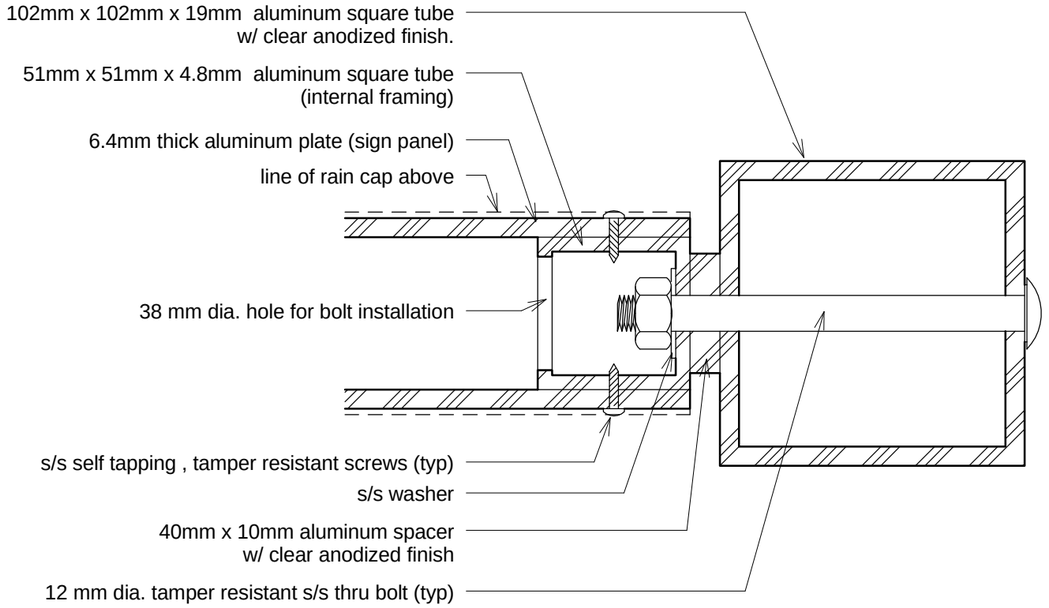
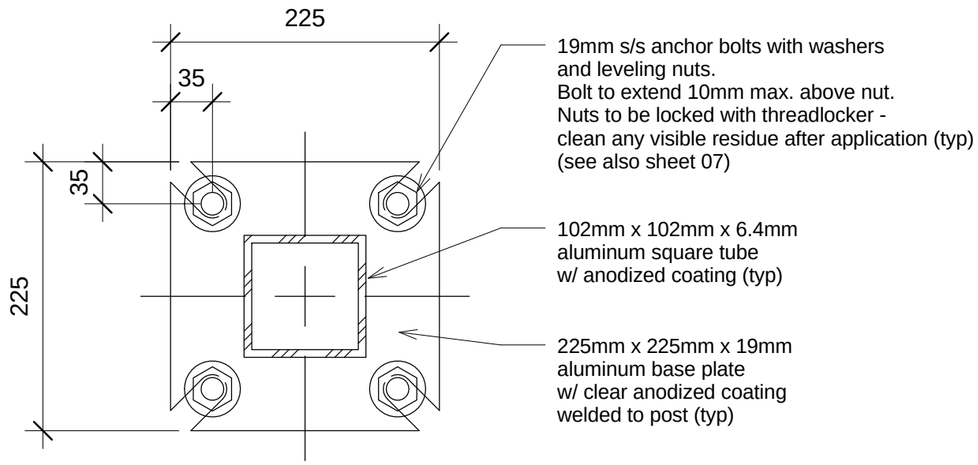
section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2A - Parking Lot
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
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or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2A - Parking Lot
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 2C
Vehicular - Parking Lot

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2C - Parking Lot
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTONE 424 C
application: background

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

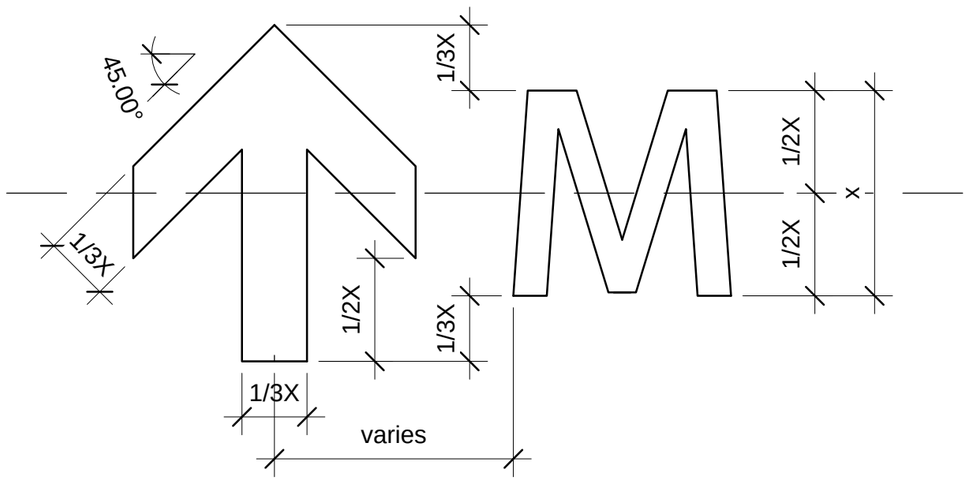
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

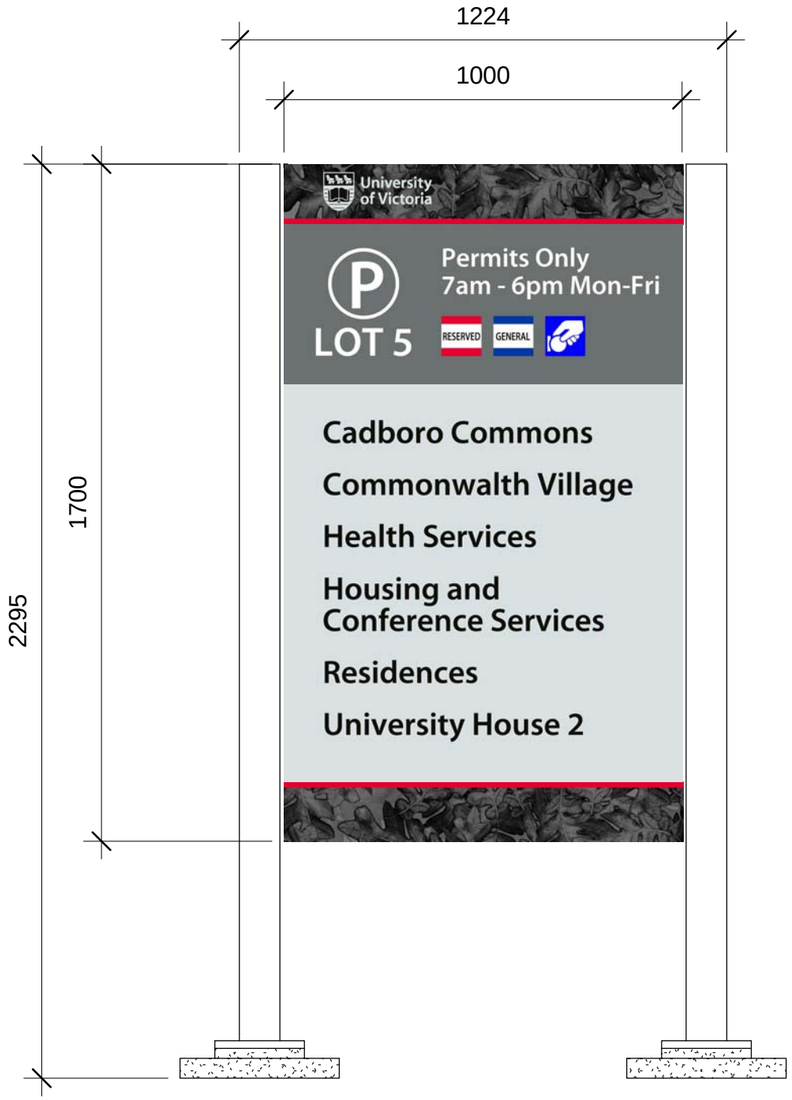
opaque monochromatic

University of Victoria

opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 2C - Parking Lot	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



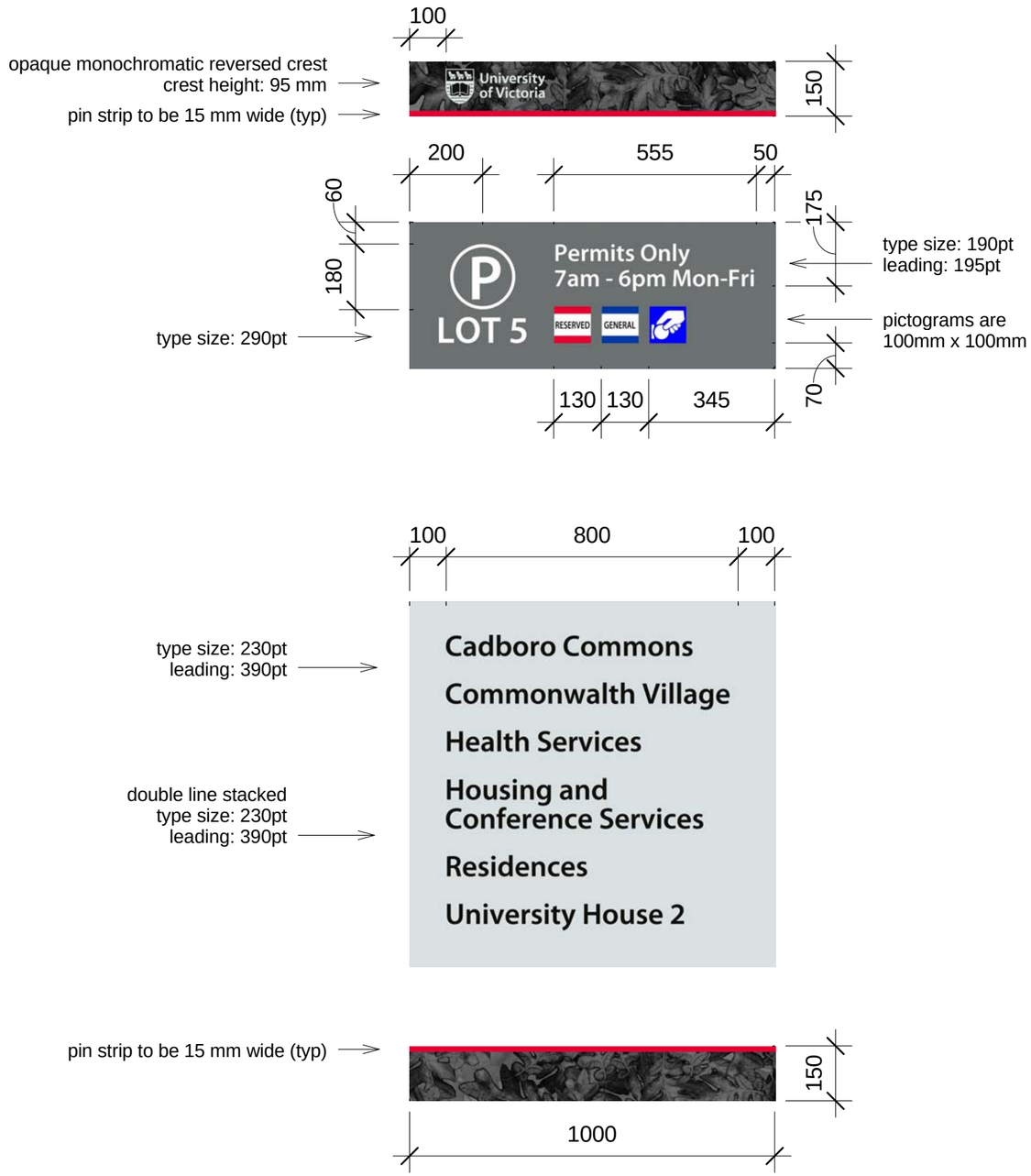
Parking Lot C
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2C - Parking Lot
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria



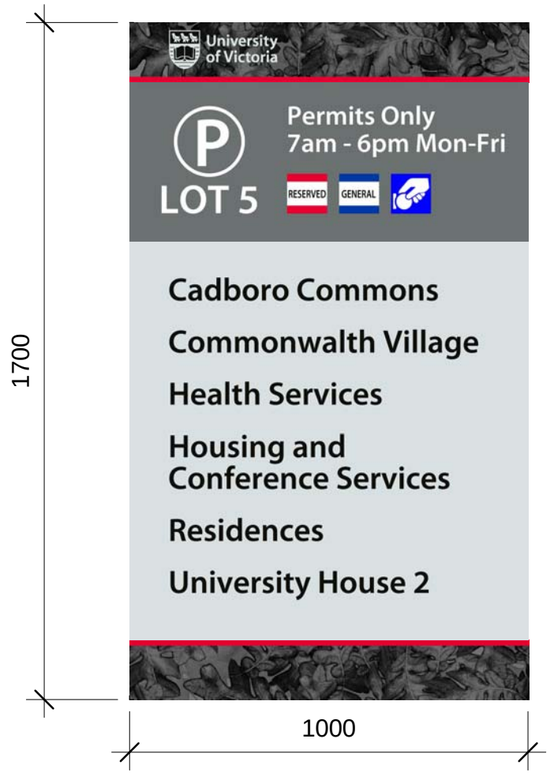
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1050 mm x 750 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout



scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2C - Parking Lot
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

University of Victoria

project:
number:
issue date:

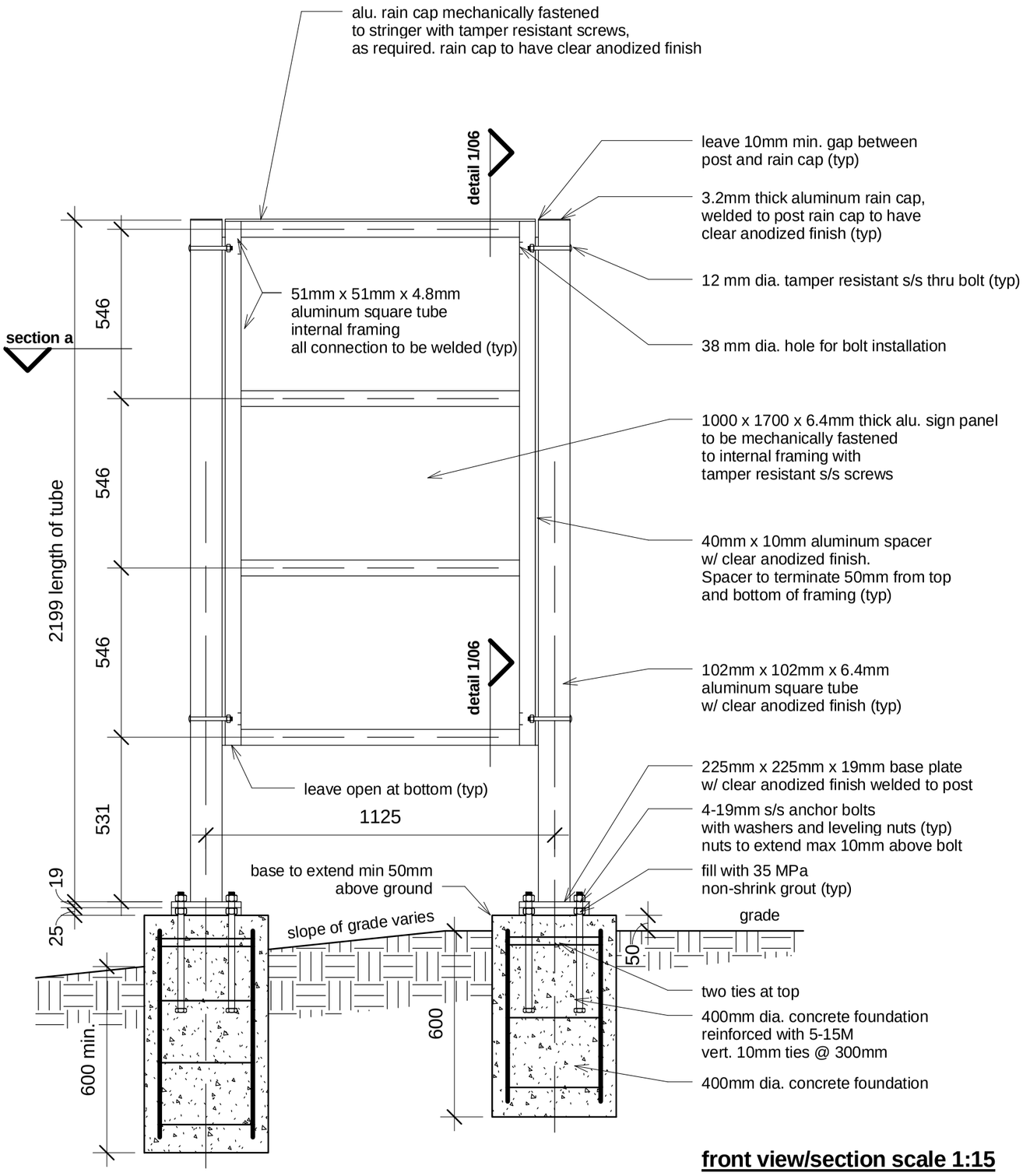
Campus Wayfinding
FM 09-8567
Jan 31, 2012

sign:
sheet name:
scale:

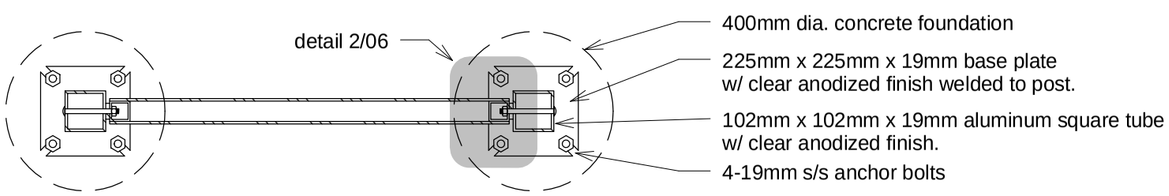
Sign No. 2C - Parking Lot
sign construction - sections
as noted

sheet
number:

05



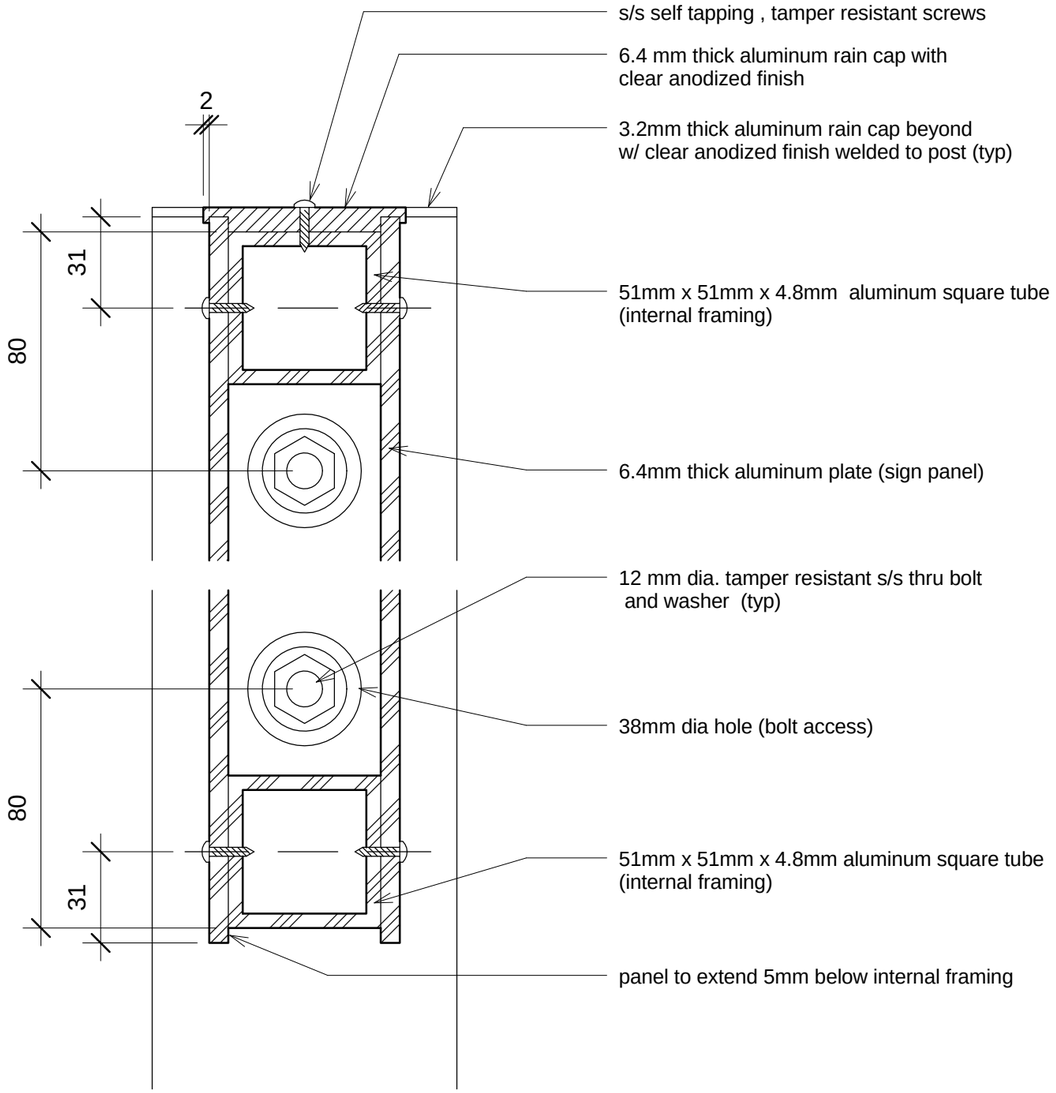
front view/section scale 1:15



section a scale 1:15

General Note:
Manufacturer to verify all diemnsions
prior to sign fabrication. All discrepancies
should be reported to the Architect.

University of Victoria



General Note:
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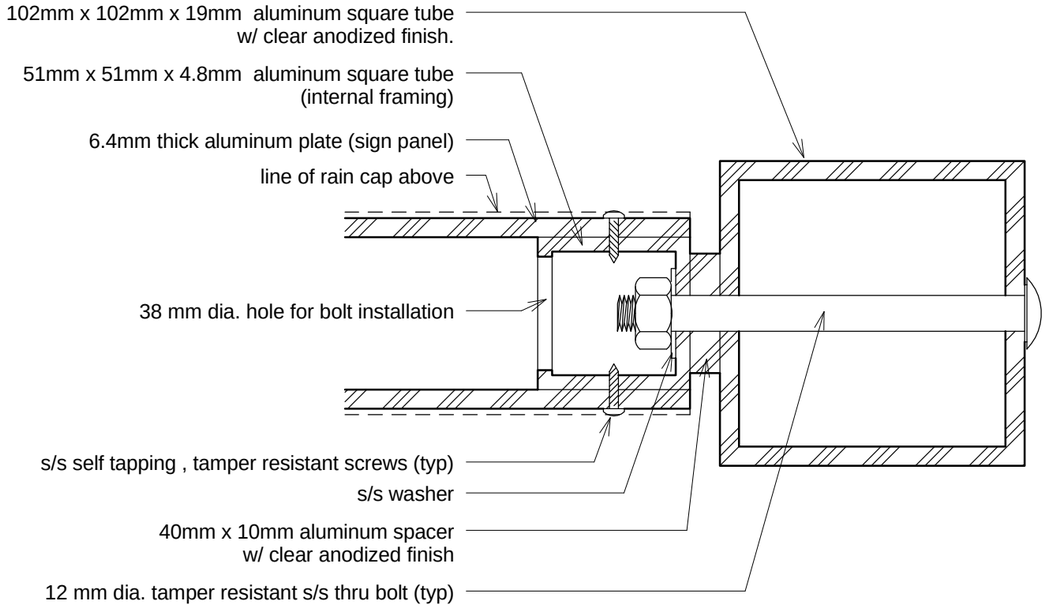
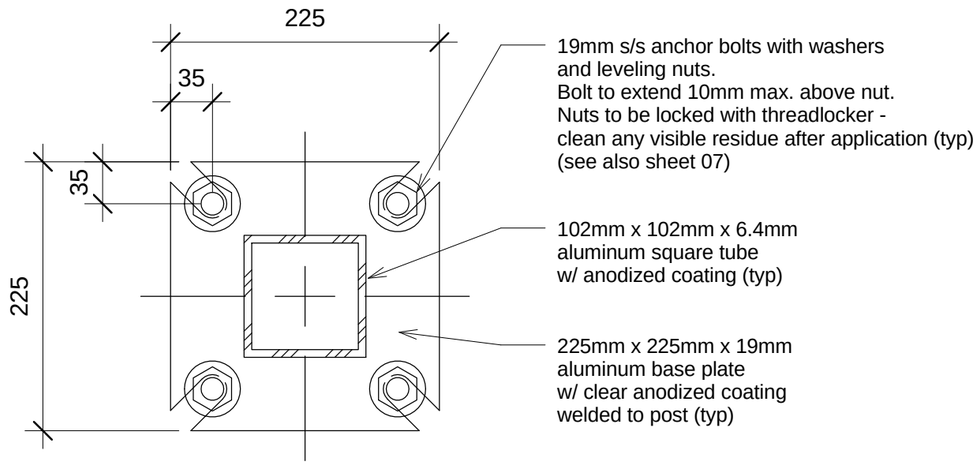
section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2C - Parking Lot
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
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2. Fasteners:
foundation (anchor bolts):
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nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
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to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 2C - Parking Lot
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 3A
Vehicular - Building Identification

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3A - Building Identification
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

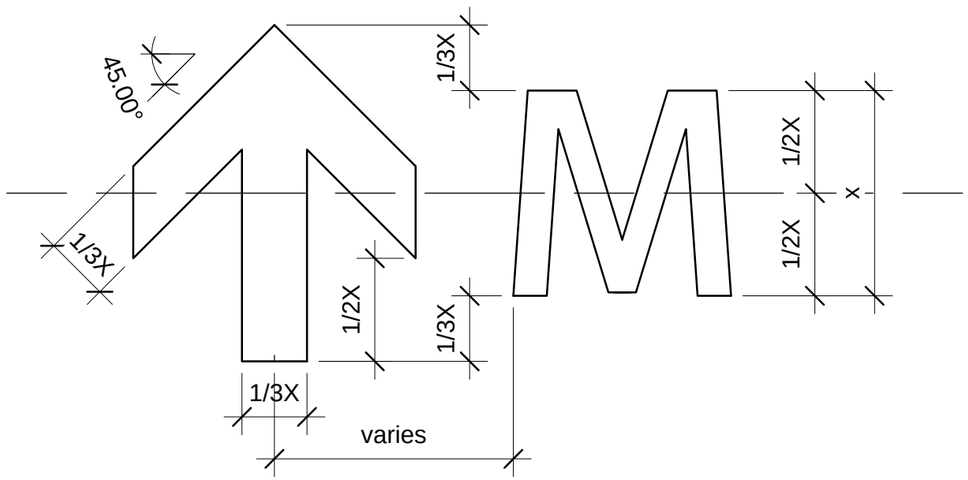
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

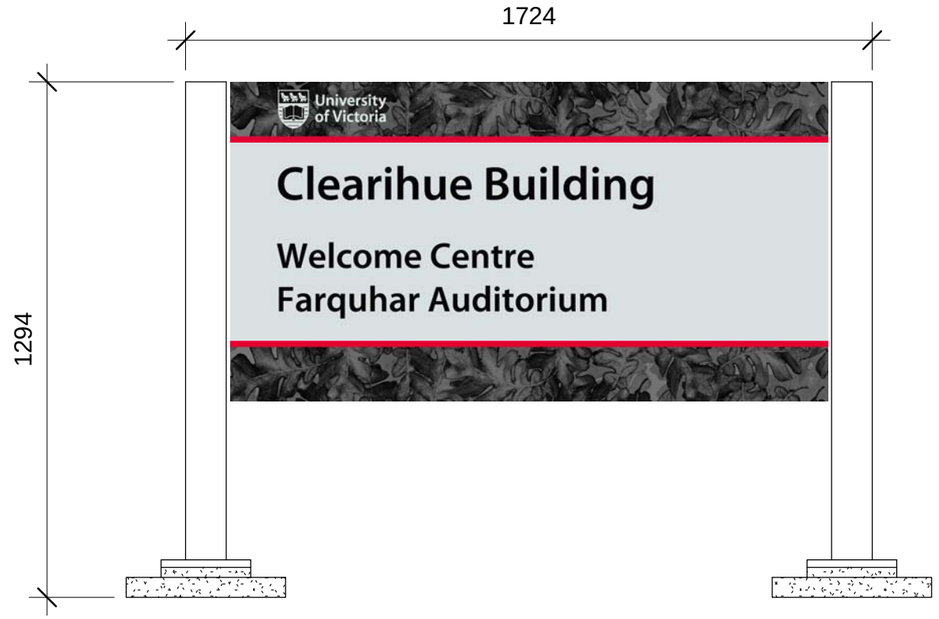
opaque monochromatic

University of Victoria

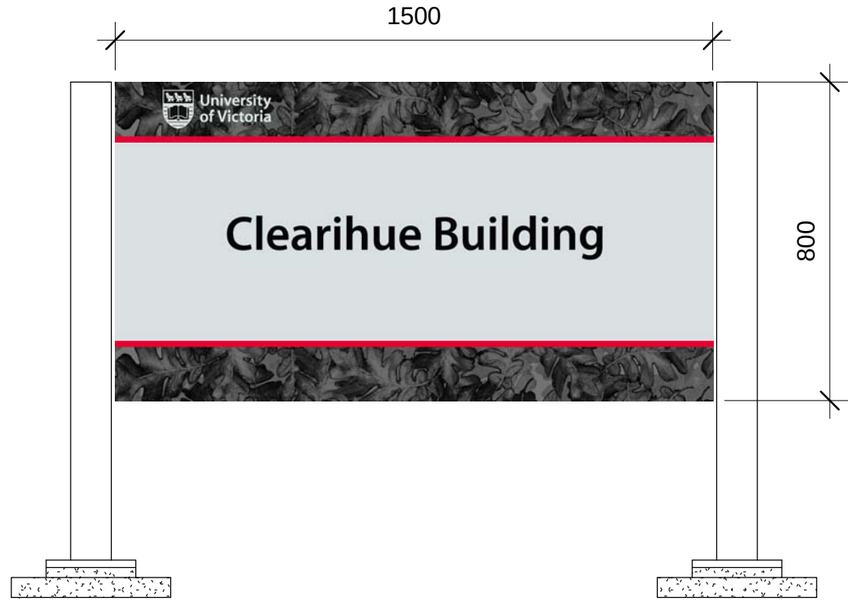
opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 3A - Building Identification	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria

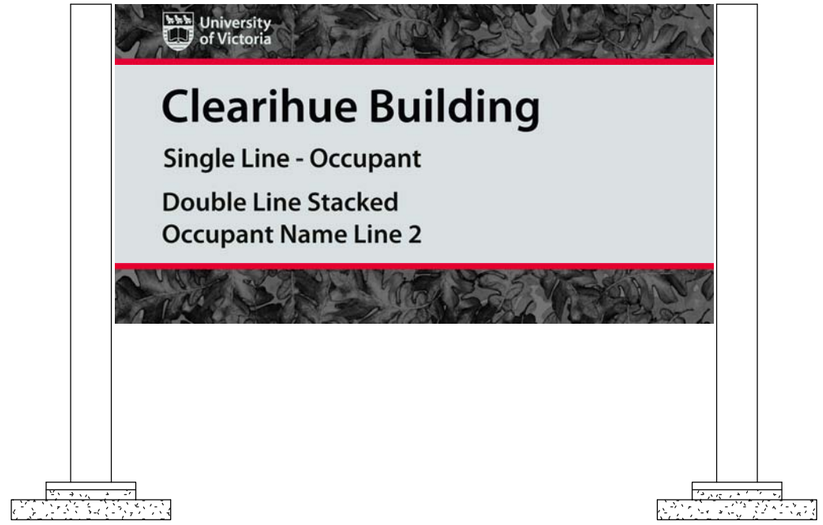


building name with occupant names
scale 1:15



building name, text in one line
scale 1:15

building name, text in two lines
scale 1:15



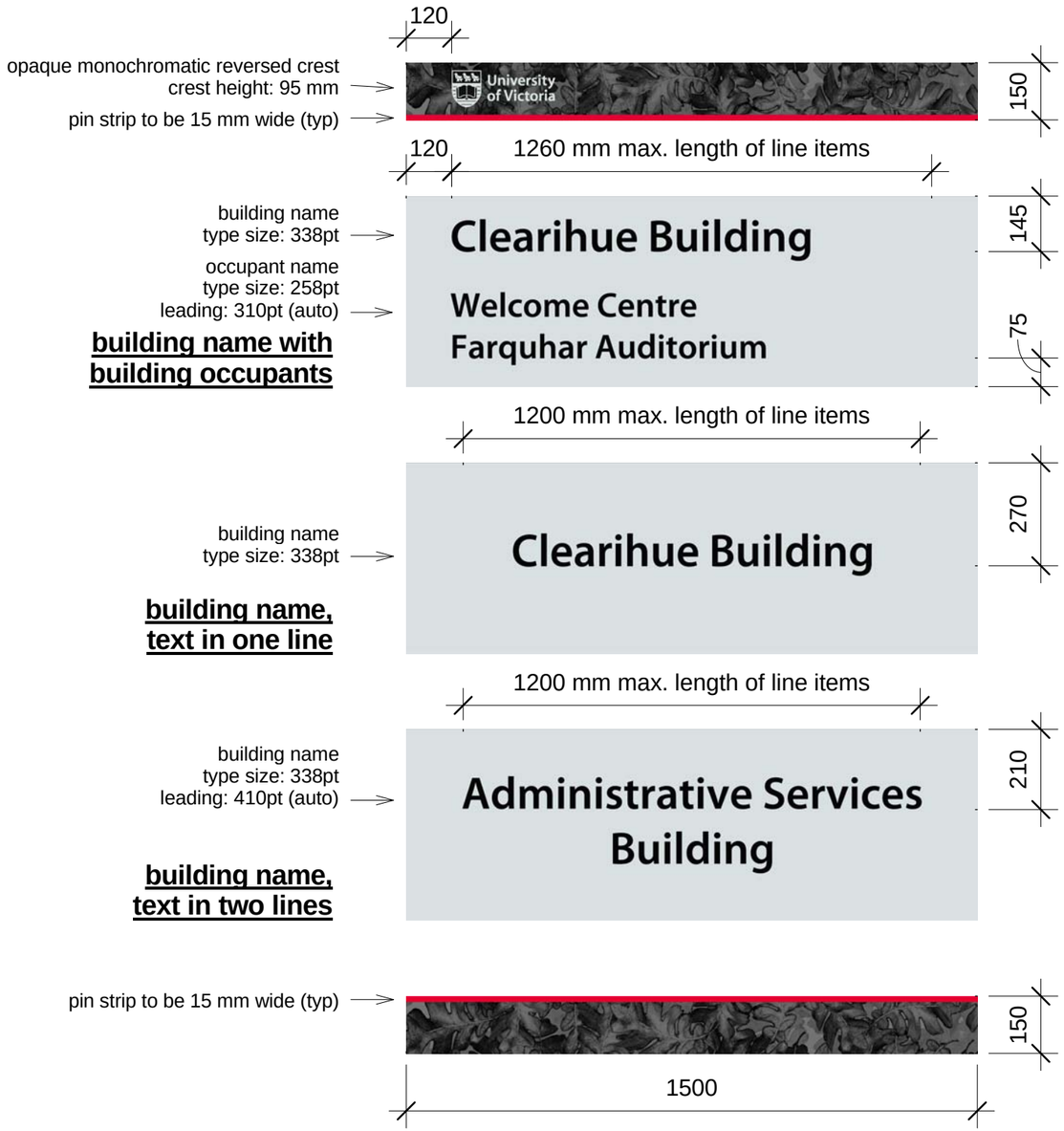
building name, text in two lines (double line stacked)
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3A - Building Identification
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria



scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1500 mm x 800 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout

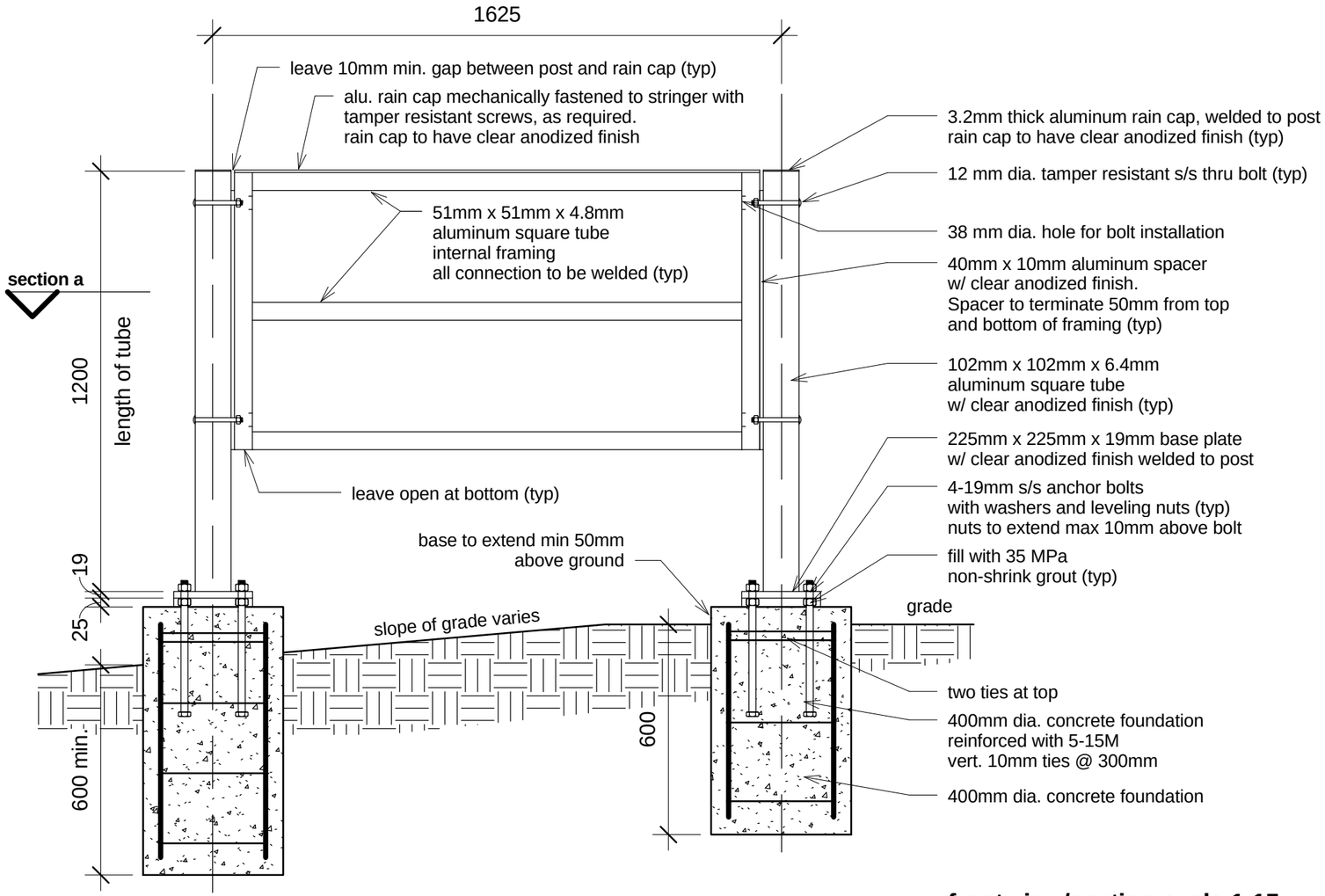
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

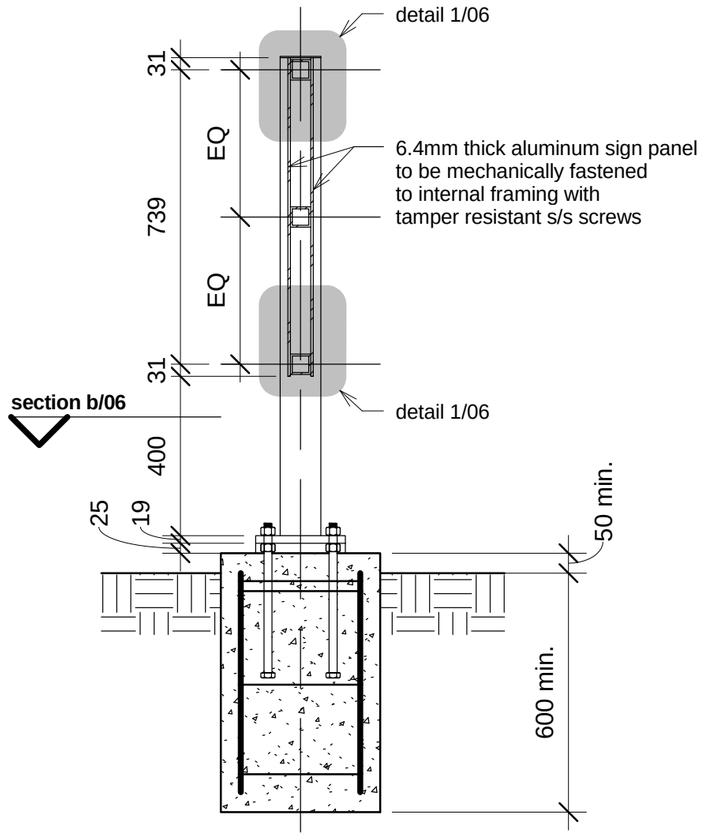
sign: Sign No. 3A - Building Identification
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

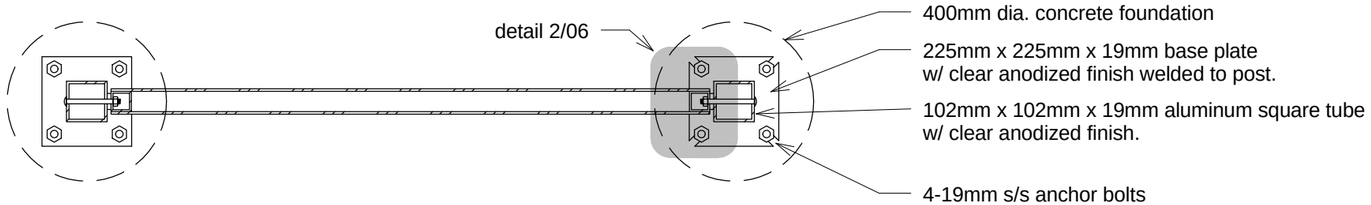
University of Victoria



front view/section scale 1:15



side view/section scale 1:15

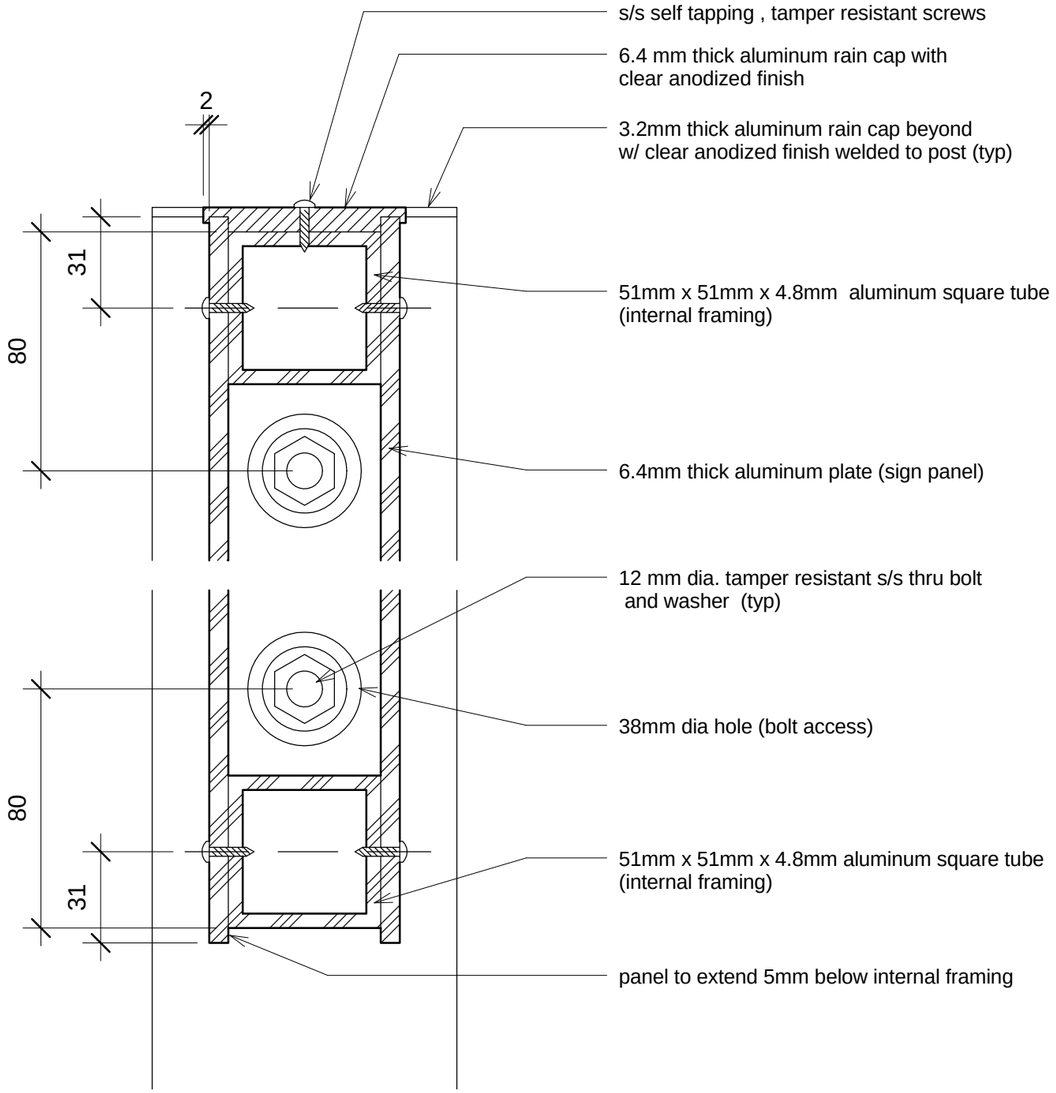


section a scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

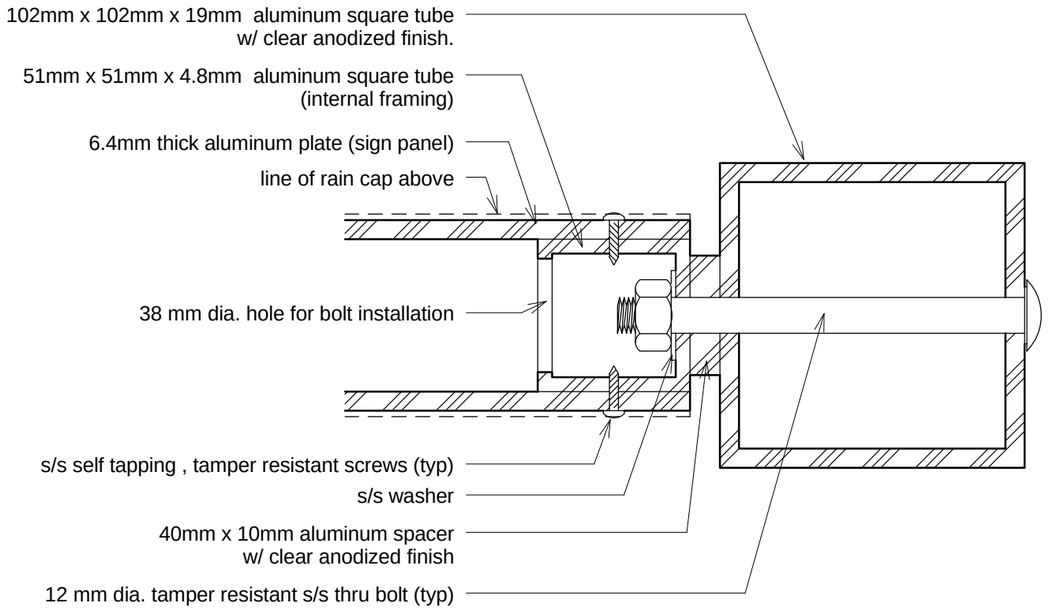
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 3A - Building Identification
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria

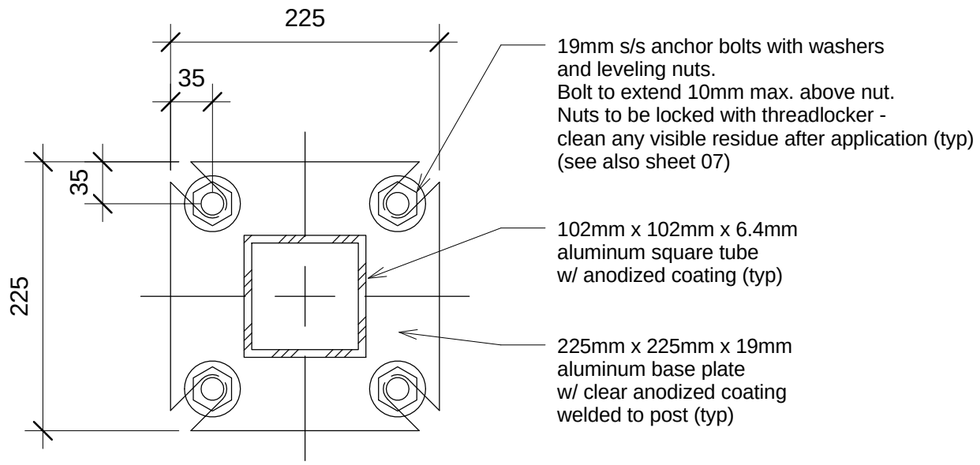


General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3A - Building Identification
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3A - Building Identification
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 3B
Vehicular - Building Identification

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3B - Building Identification
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

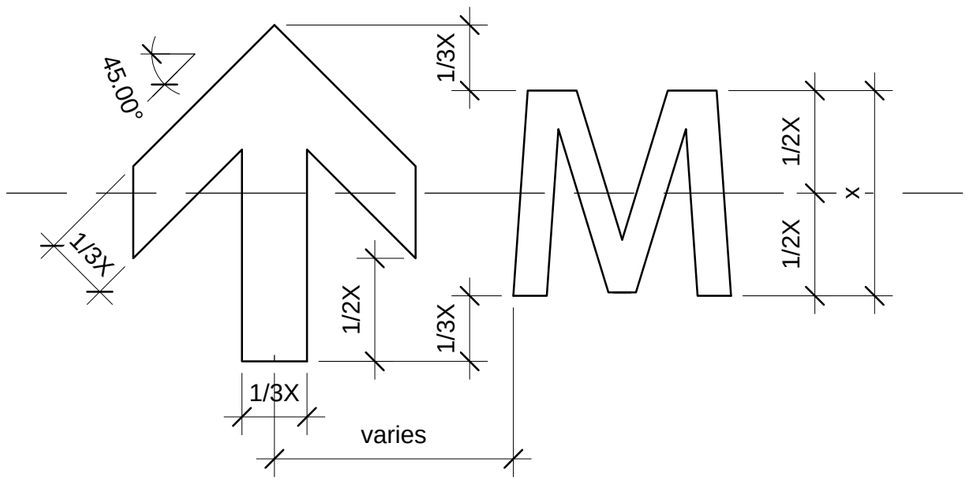
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

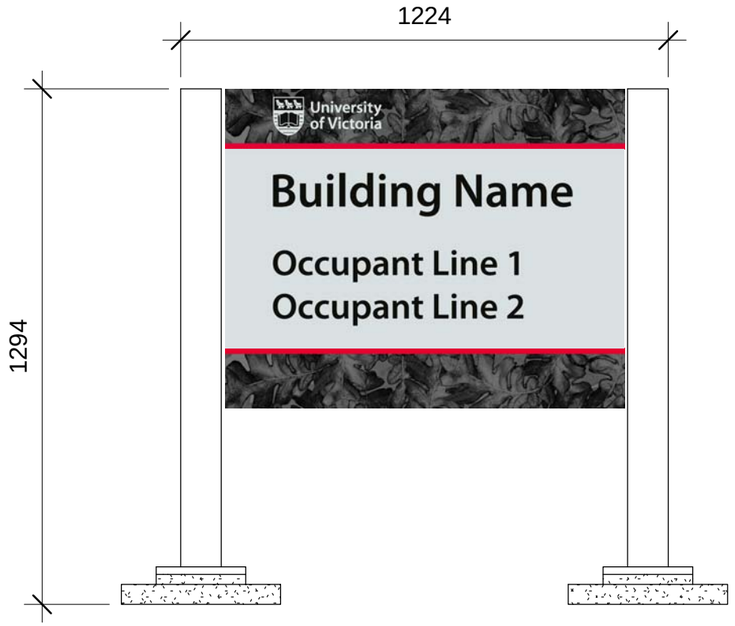
opaque monochromatic

University of Victoria

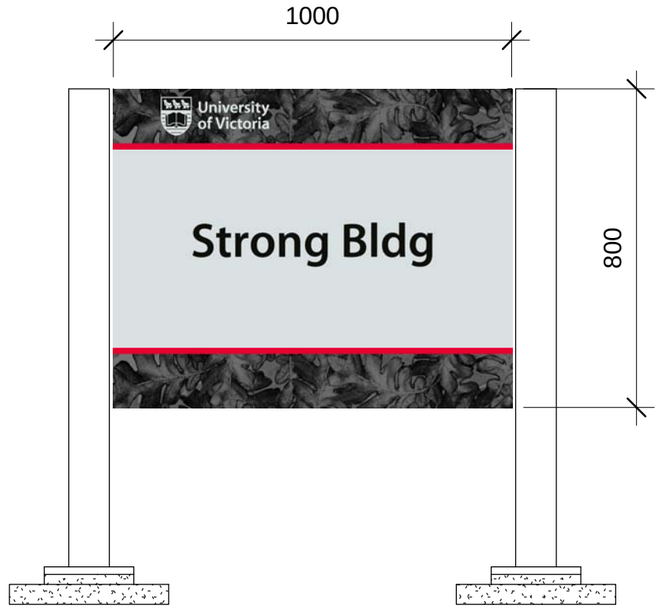
opaque monochromatic reversed

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 3B - Building Identification
sheet name:	typography, colours and pictograms
scale:	as noted
sheet number:	02

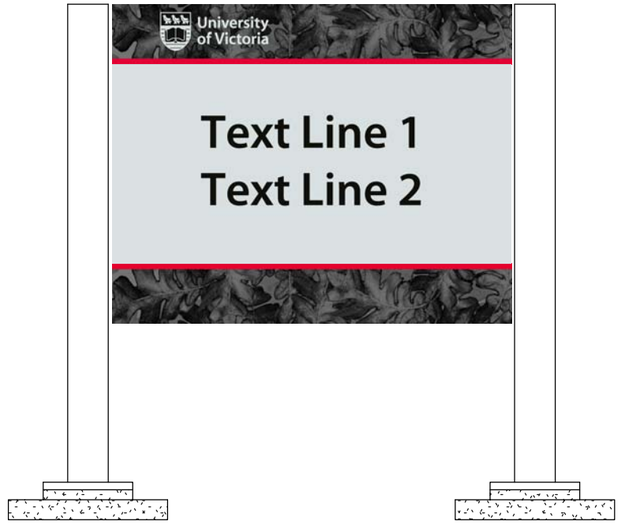
University of Victoria



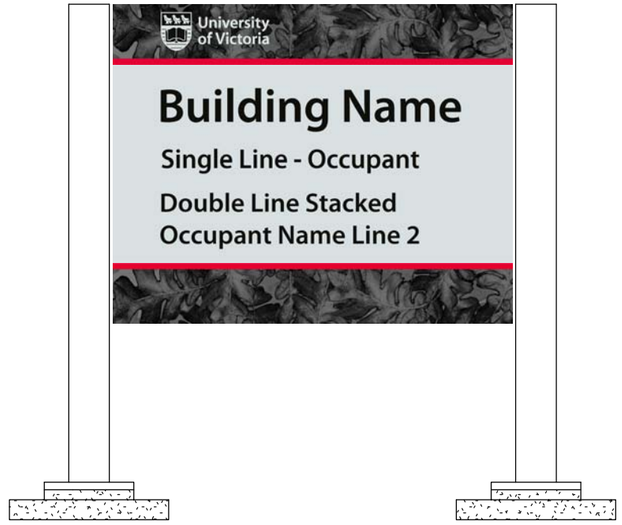
building name with occupant names
scale 1:15



building name, text in one line
scale 1:15



building name, text in two lines
scale 1:15



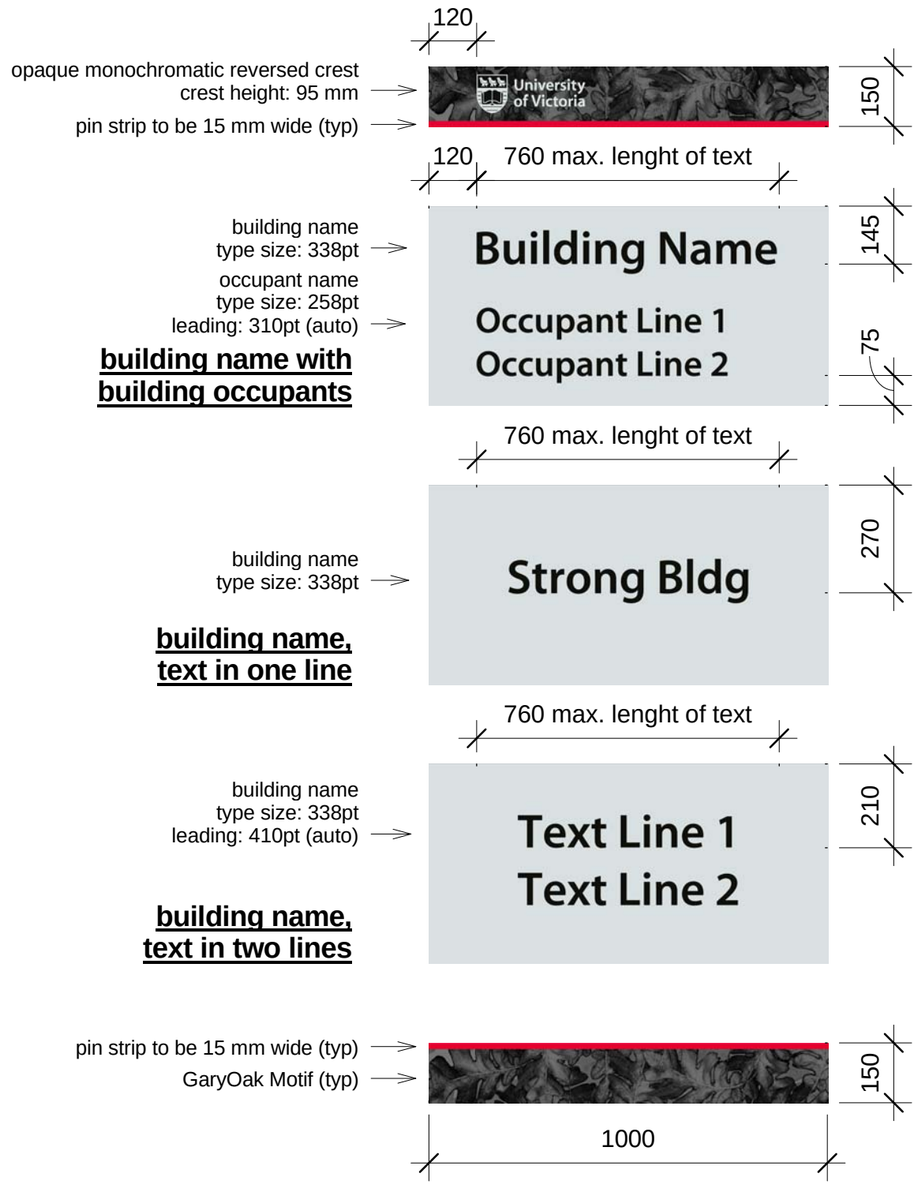
building name, text in two lines (double line stacked)
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3B - Building Identification
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria



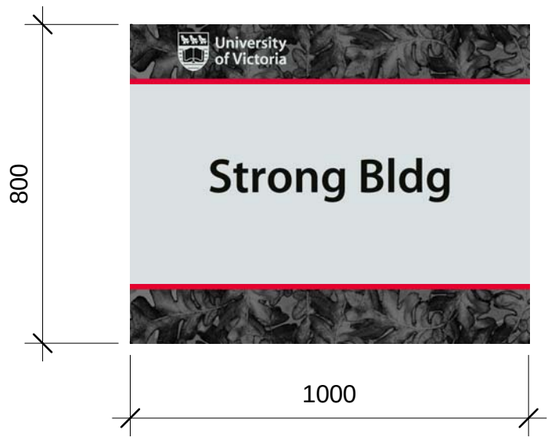
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1000 mm x 800 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout



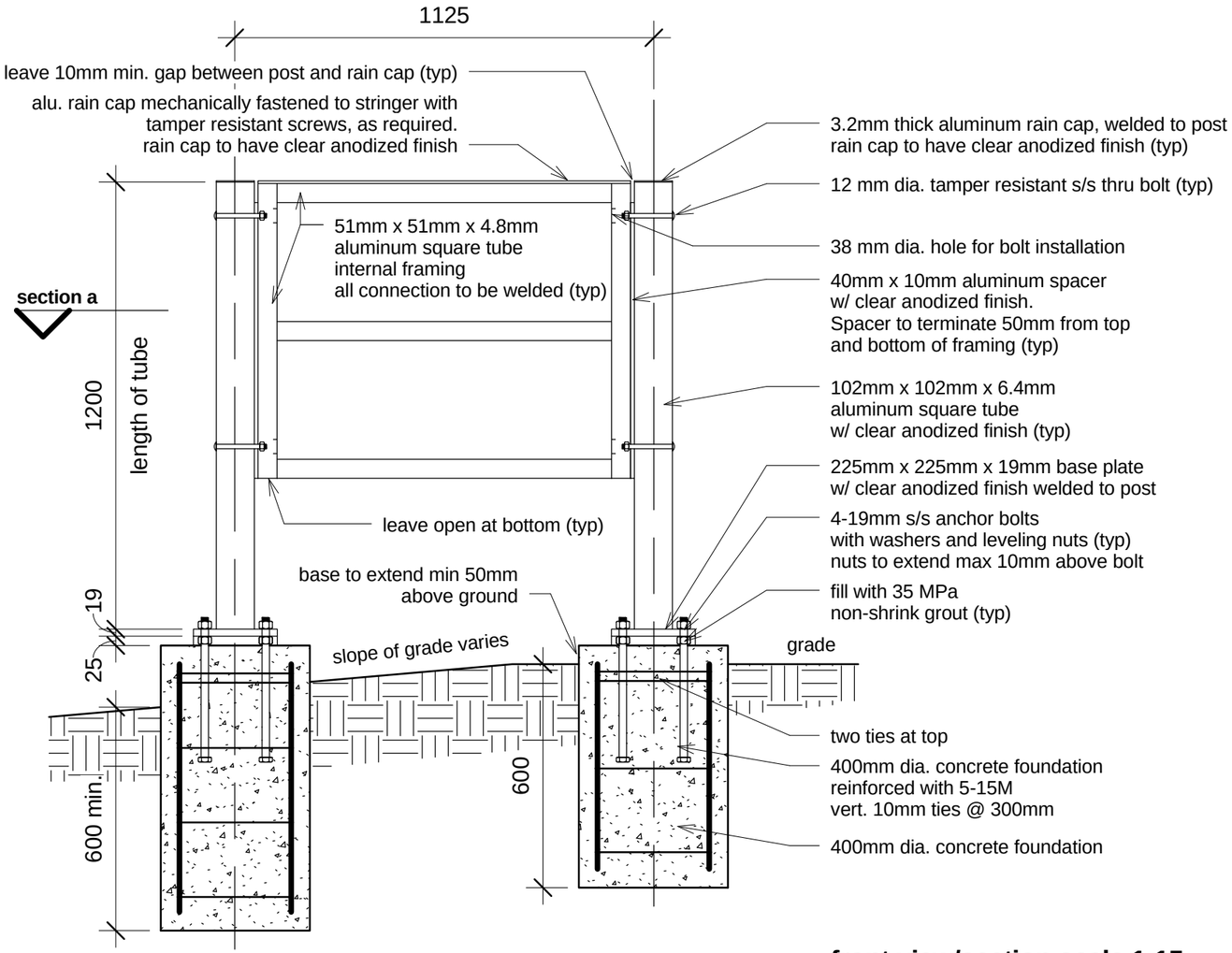
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

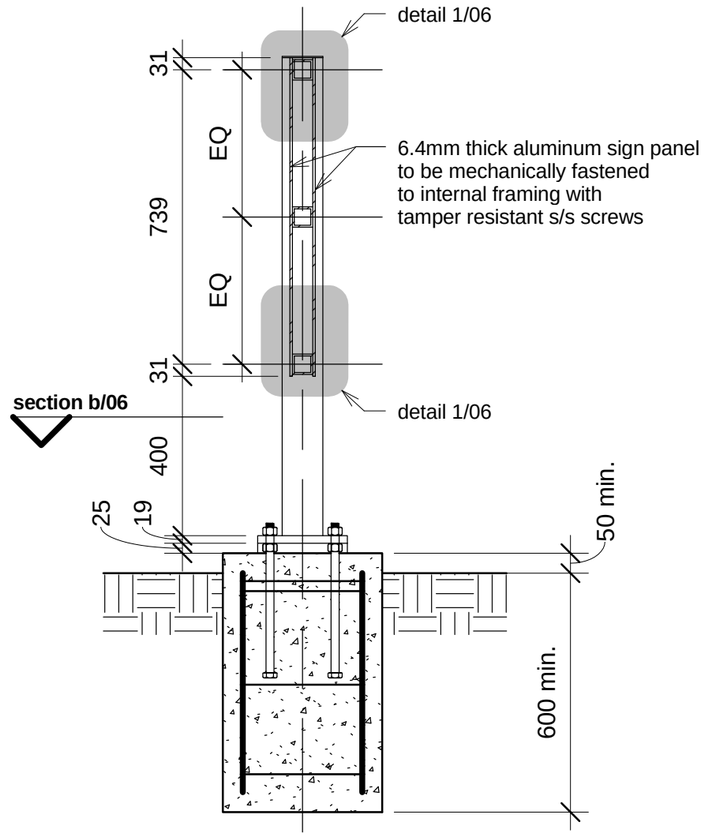
sign: Sign No. 3B - Building Identification
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

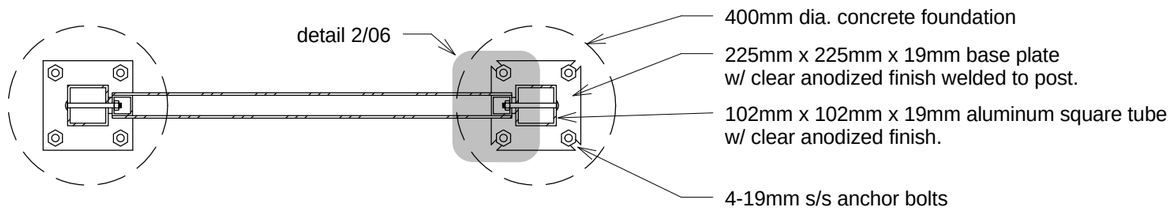
University of Victoria



front view/section scale 1:15



side view/section scale 1:15

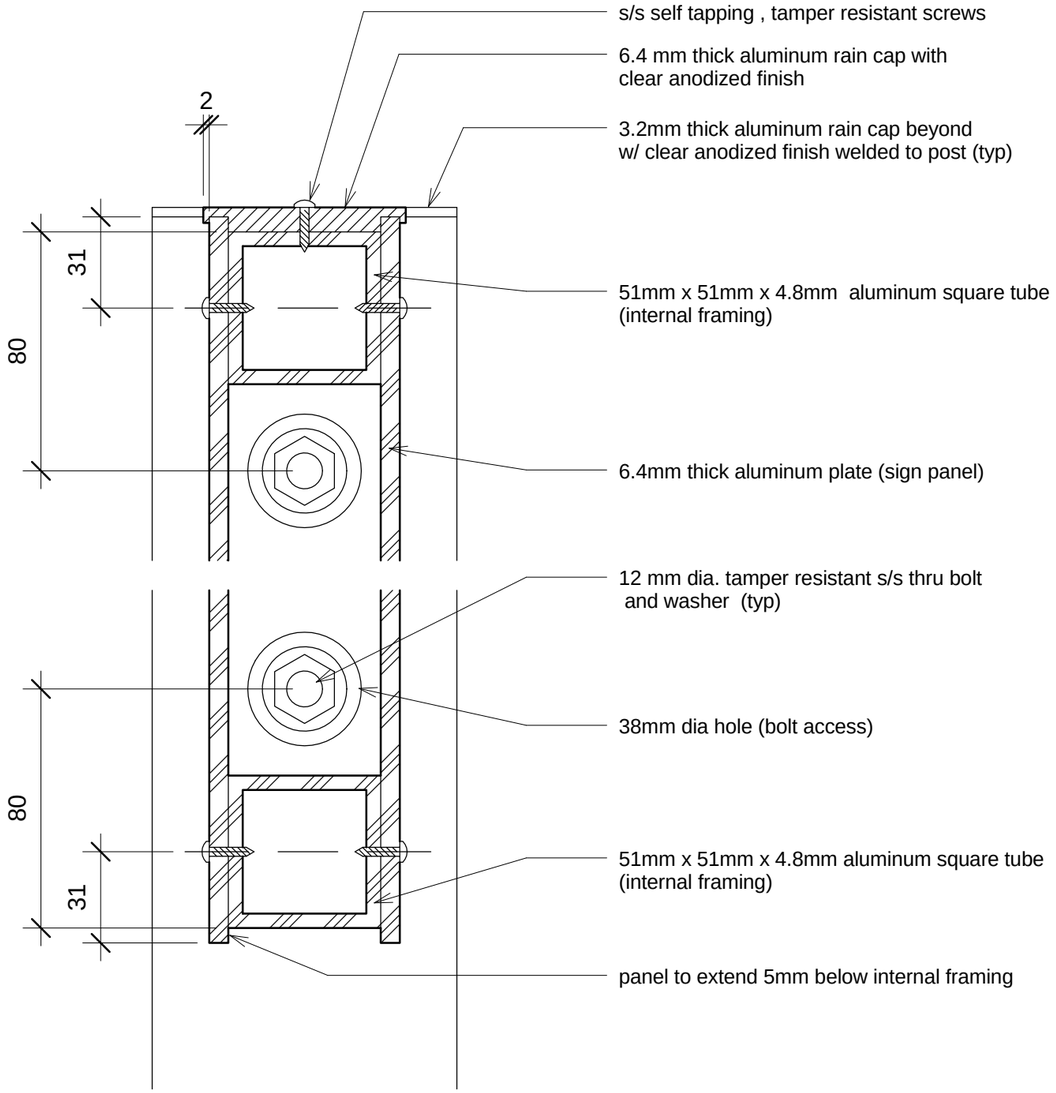


section a scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

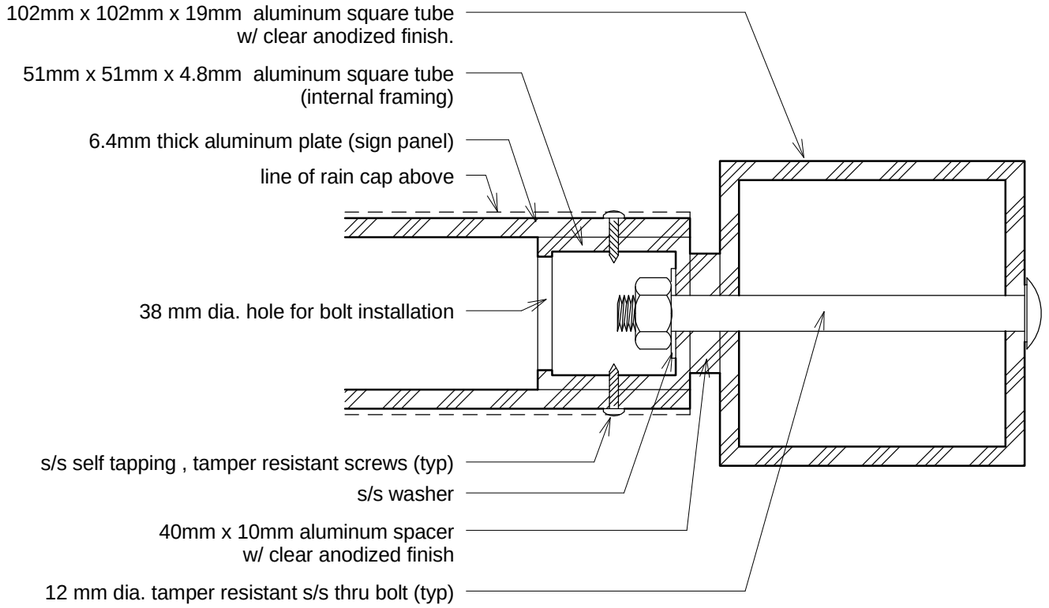
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 3B - Building Identification
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria

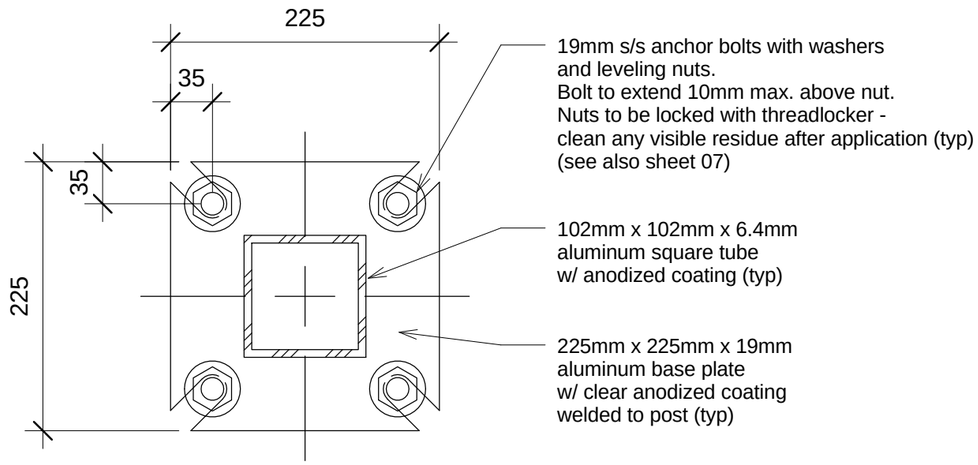


General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3B - Building Identification
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

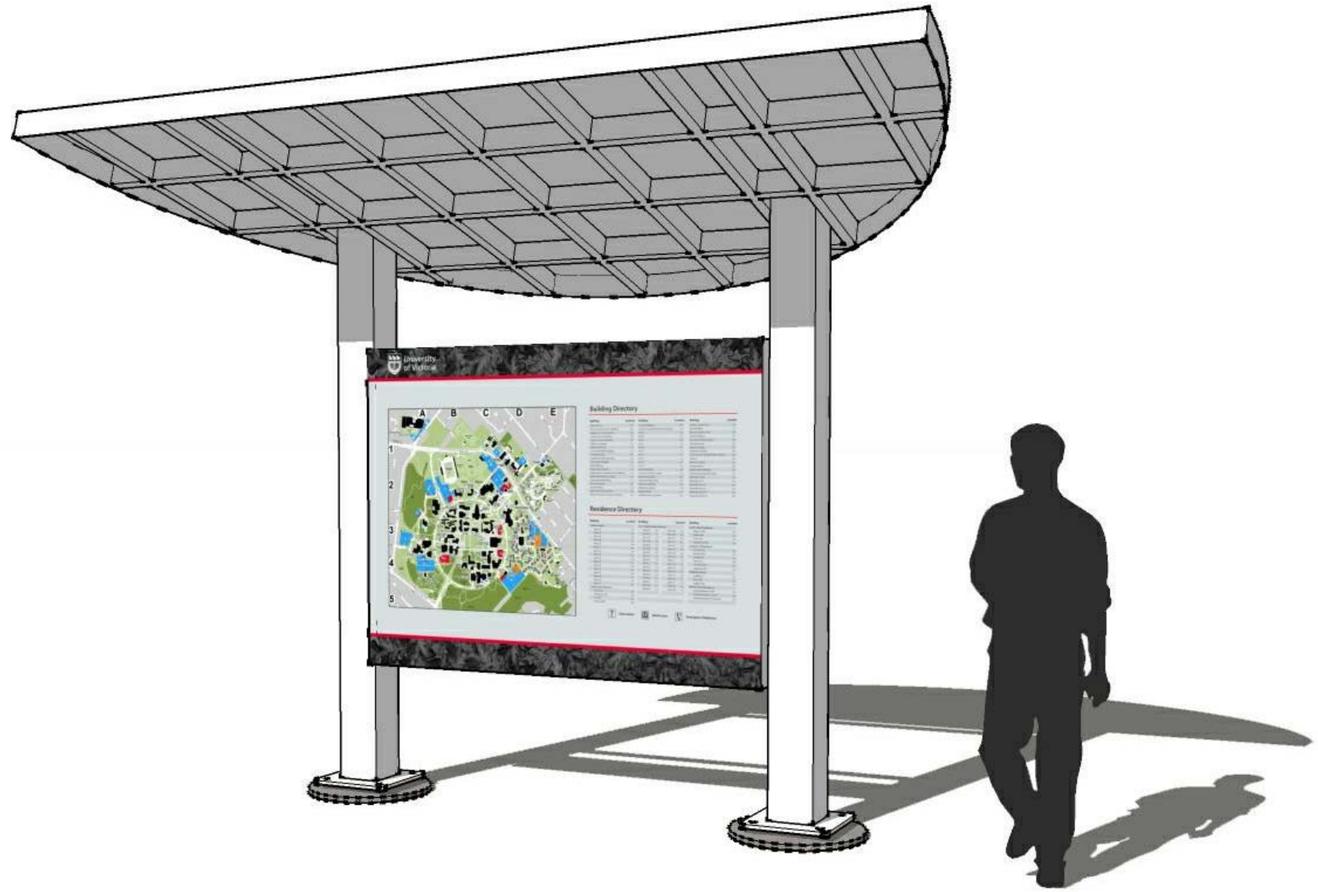
TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 3B - Building Identification
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria



Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - overview - cont.
05	sign design - graphic design details
06	sign construction - cross section
07	sign construction - sections
08	sign construction - canopy plan and details (anodized)
09	sign construction - canopy plan and details (painted)
10	sign construction - details
11	general notes - structural and electrical

Sign No. 4
Vehicular - Map Directory Kiosk

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating

PANTONE 185 C
pinstrip, arrows

PANTONE 426 C
text

PANTEONE 7541 C
background, UVic Logo

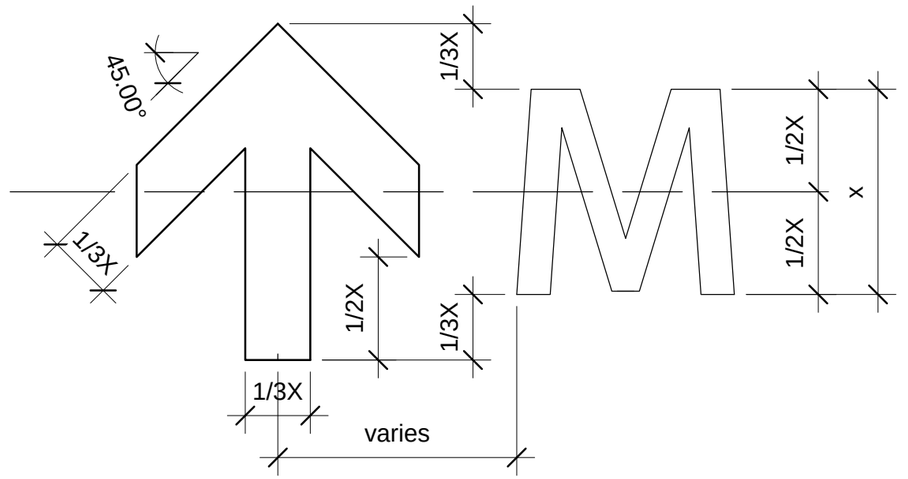
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

University of Victoria

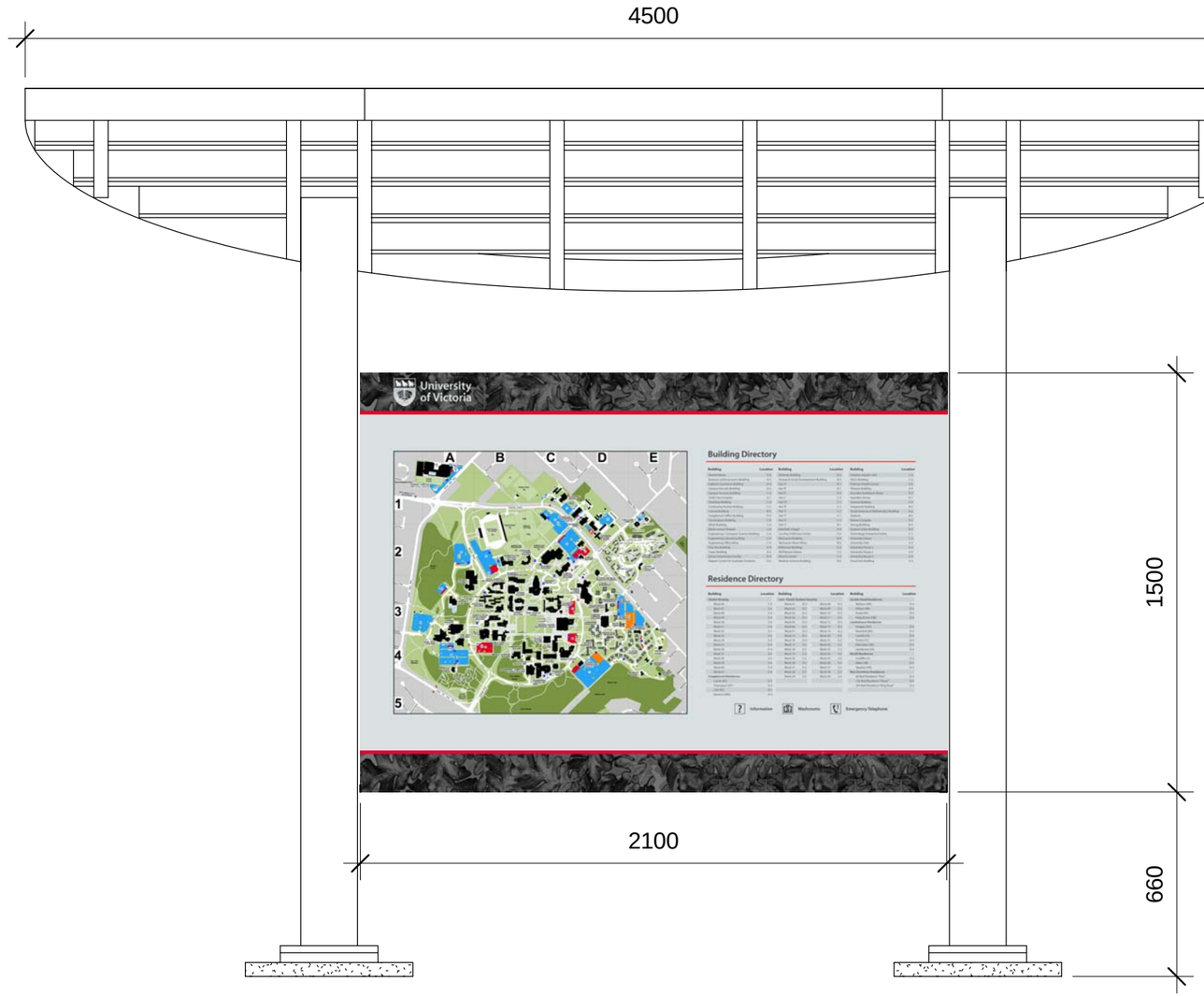
University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

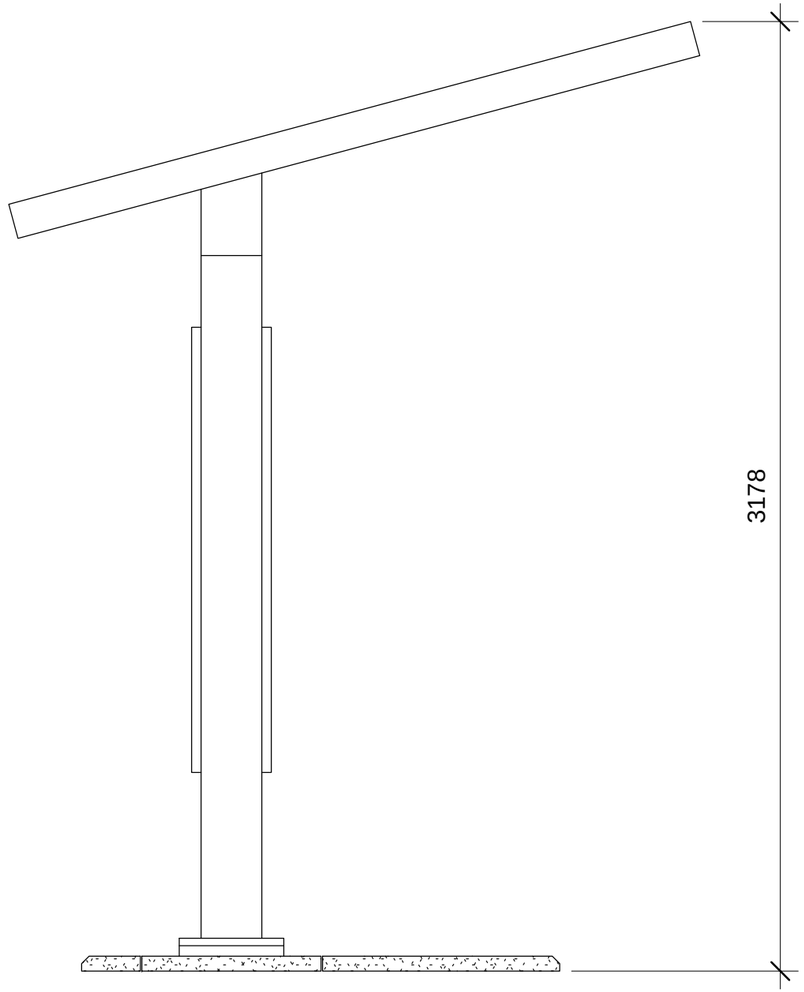
sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: typography, colours and pictograms
scale: as noted

sheet number: 02

University of Victoria



front elevation scale 1:20



side elevation scale 1:20

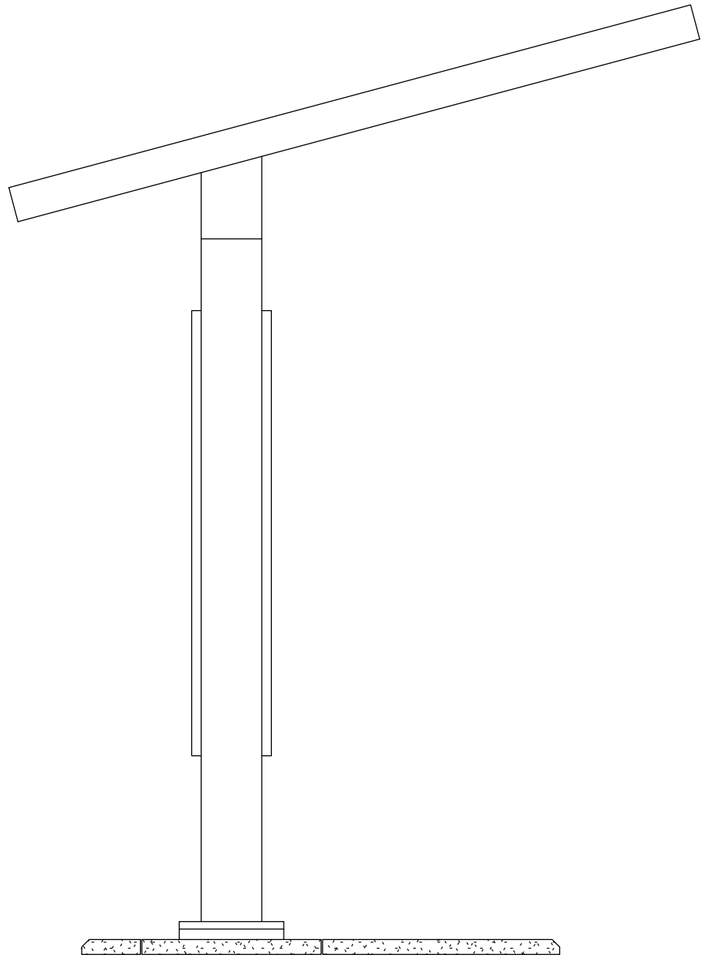
project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria

back elevation scale 1:20



side elevation scale 1:20

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012

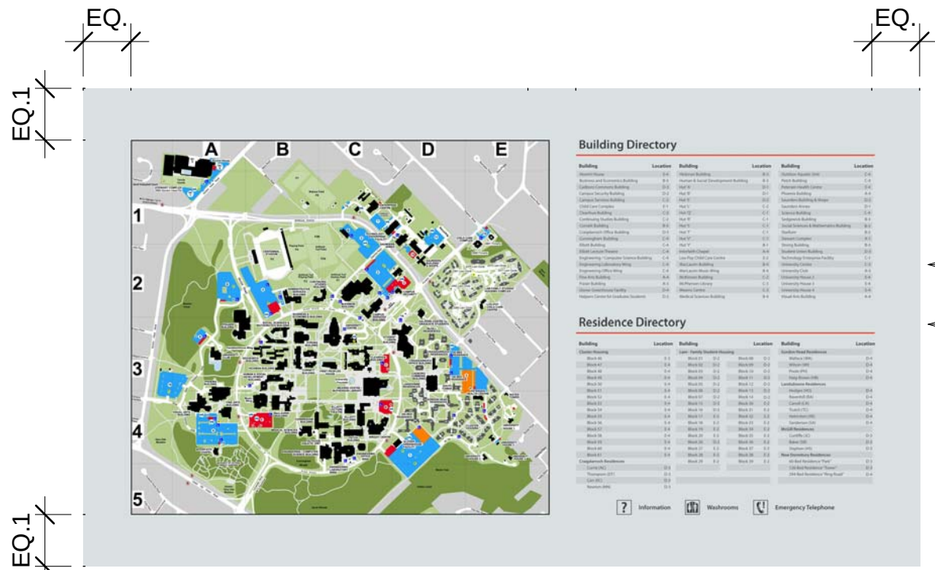
sign:	Sign No. 4 -Vehicular Map Directory Kiosk
sheet name:	sign design - overview - cont.
scale:	as noted

sheet number: 04

University of Victoria

graphic panel shown for reference only.
image to be provided
in digital format by University of Victoria

If single sided unit then the back panels to be
one 2400mm x 750mm, 6.4mm thick aluminum panel
with clear anodized coating.



directory map shown for reference only.
current directory map to be provided
in digital format by University of Victoria

main back panel scale 1:20

front scale 1:20

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece):
2100 mm x 150 mm x 6.4 mm
Vinyl: 3M IJ180, MPI 2005
or equivalent
Overlaminate: 3M 8914, Avery DOL 6060
or equivalent.

non-glare clear acrylic panel,
digitally printed-on vinyl, diffusion layer.
Acrylic panel size: 2100 mm x 1200 mm x 6.4 mm

directory map to be provided in digital format
by University of Victoria (typ)

type size: 30.65pt

type size: 90pt

Non-glare clear acrylic: 2100 mm x 1200 mm x 6.4 mm
Plaskolite OPTIX Abrasion Resistant Non-Glare
or equivalent.

First surface prints:
Vinyl: 3M IJ180, MPI 2005 or equivalent
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent.

2nd surface prints:
CAV-50 reverse print - i/w/i (2nd surface)
Overlaminate: 3M 8914, Avery DOL 6060
or equivalent (first surface)

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.

Bottom Panel - size and material
similar to Top Panel

Refer to Adobe Photoshop files
for detailed sample layout

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: sign design - graphic design details
scale: as noted

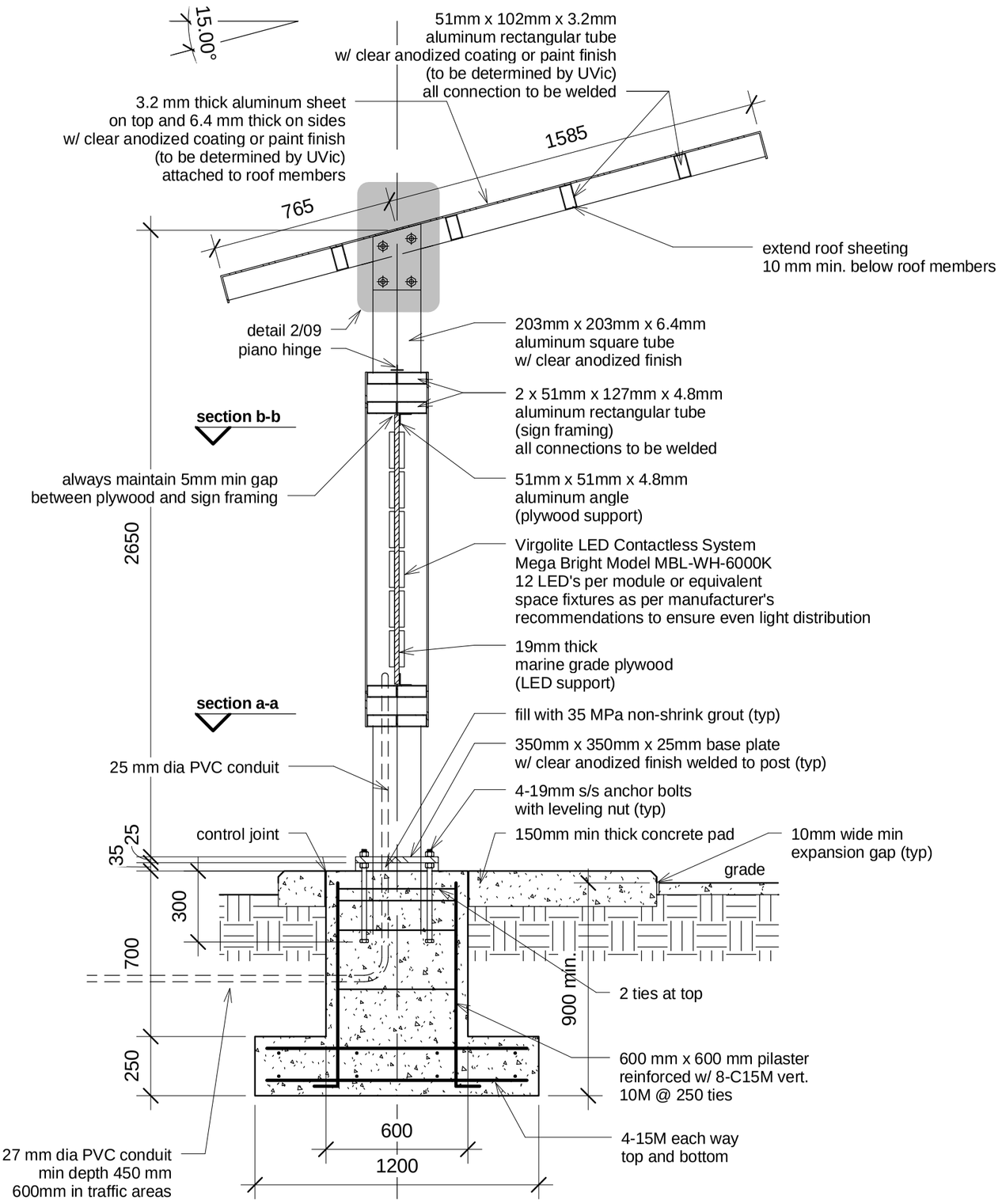
sheet number: 05

University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: sign construction - cross section
scale: as noted

sheet number: 06



1) provide ventilation holes as required
2) Leltek Virgolite LMPS -750 power supply
to provide source of power to a maximum
of 50 MegaBright 12 LED Modules
3) Sign must have a CSA label as an assembly

General Note:
Manufacturer to verify all diemnsions
prior to sign fabrication. All discrepancies
should be reported to the Architect.

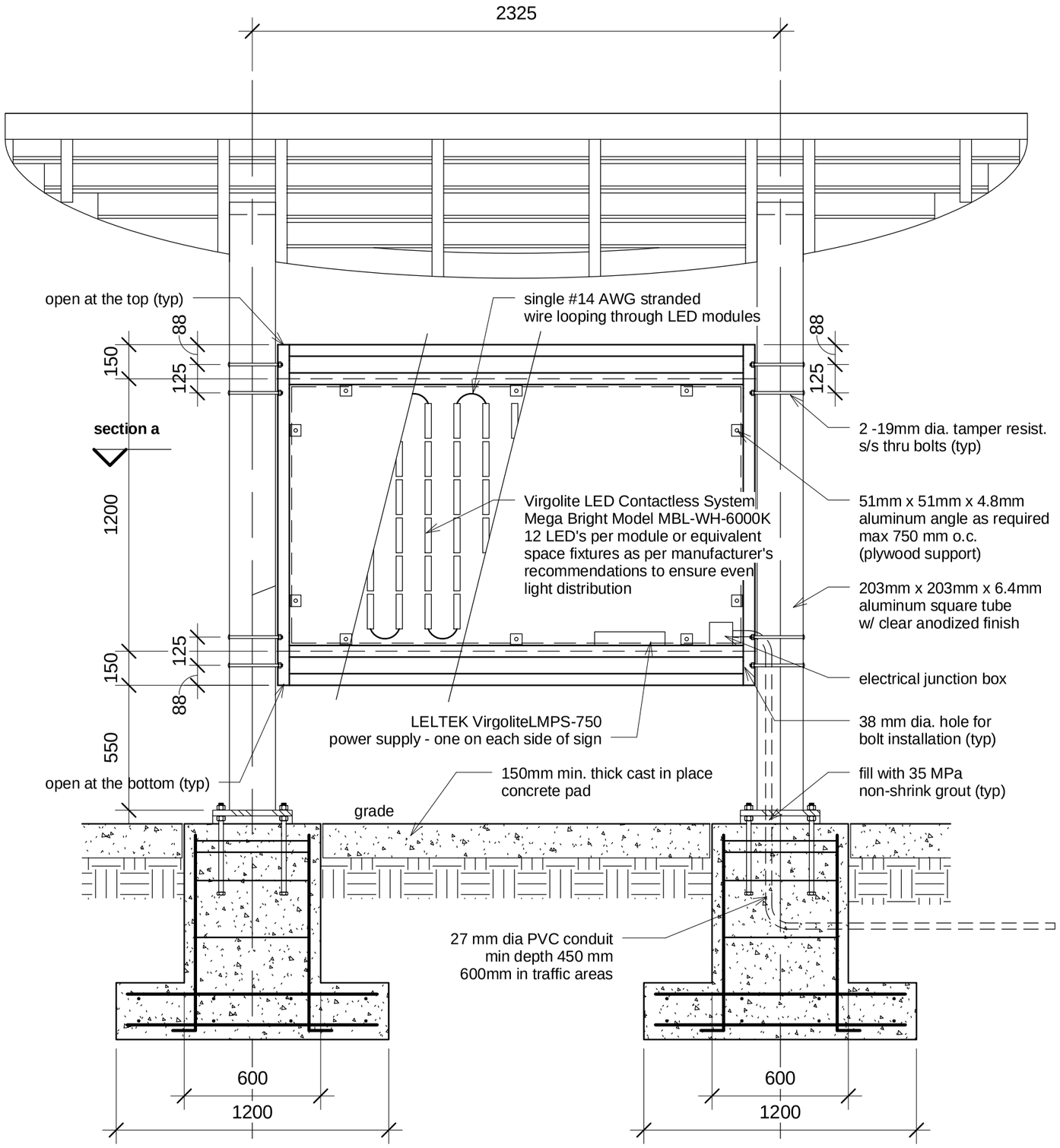
cross section **scale 1:20**

University of Victoria

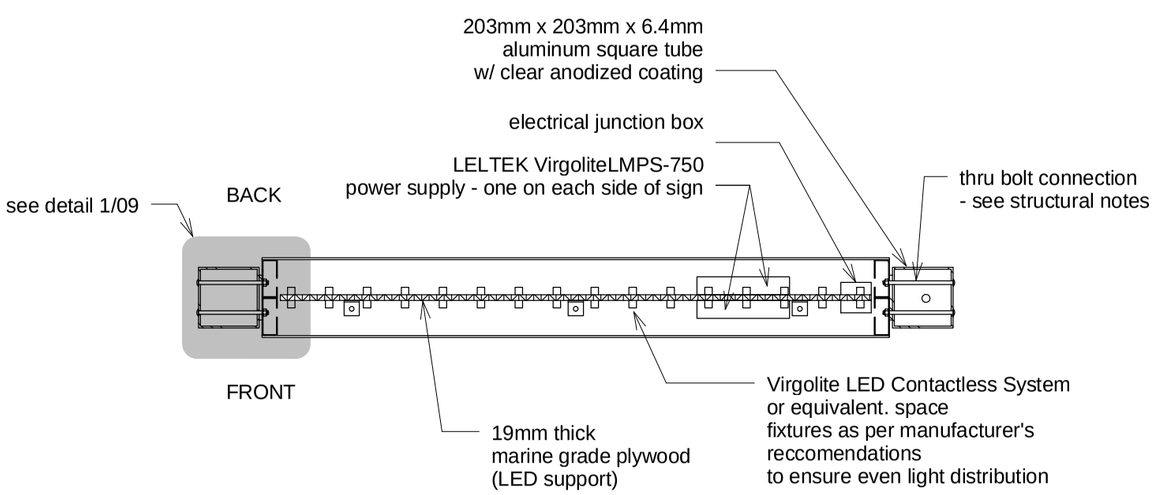
project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: sign construction - sections
scale: as noted

sheet number: 07



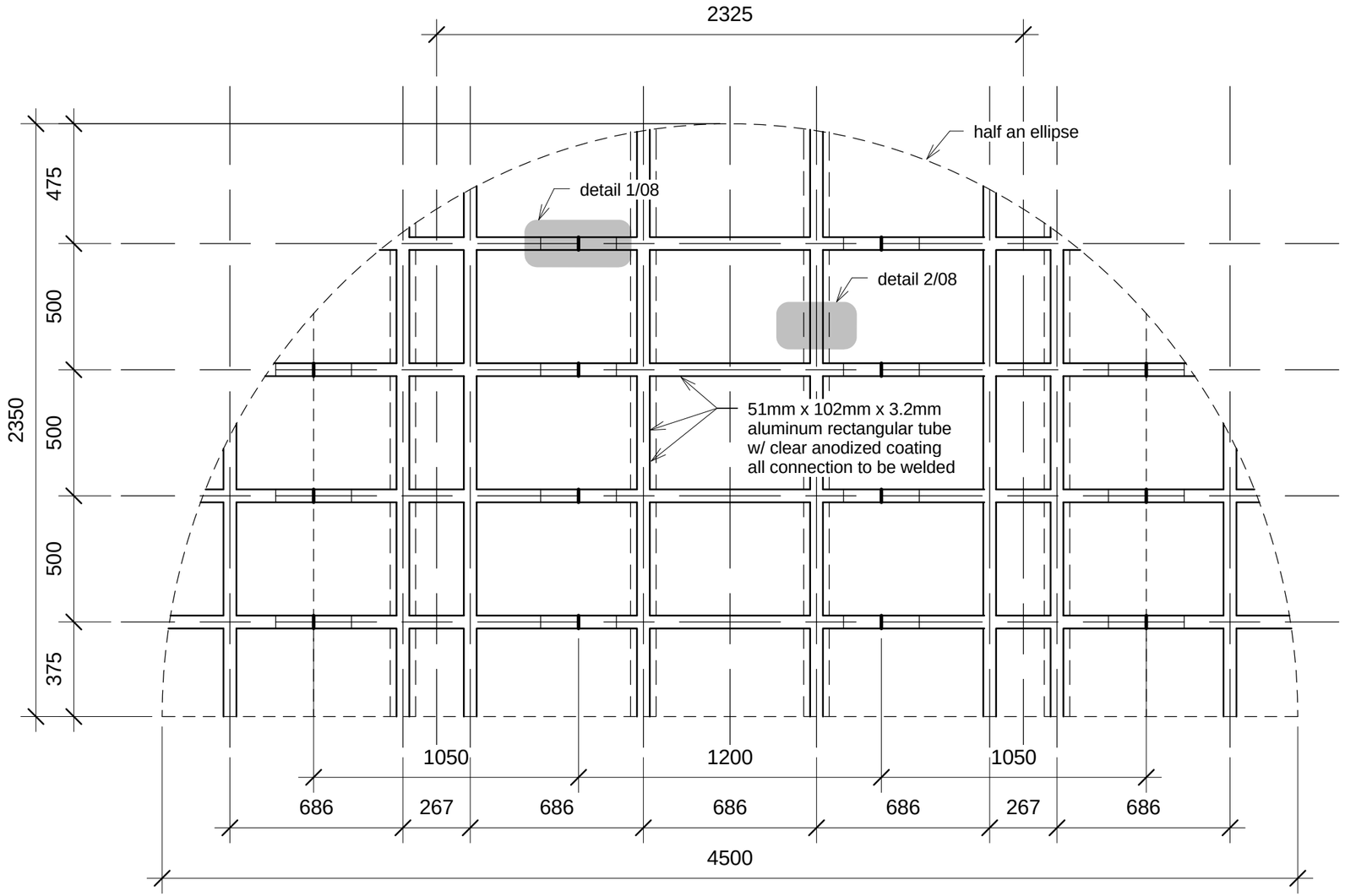
long section scale 1:20



General Note:
Manufacturer to verify all diemnsions
prior to sign fabrication. All discrepancies
should be reported to the Architect.

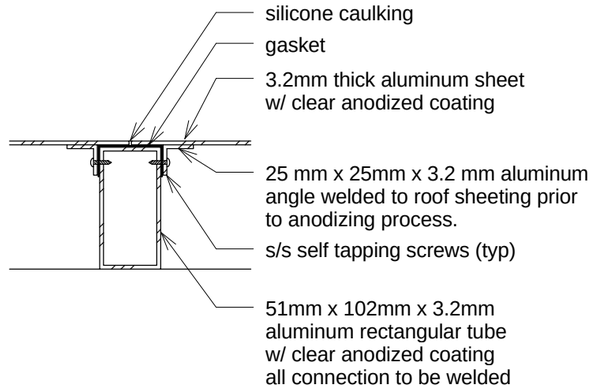
section a scale 1:20

University of Victoria

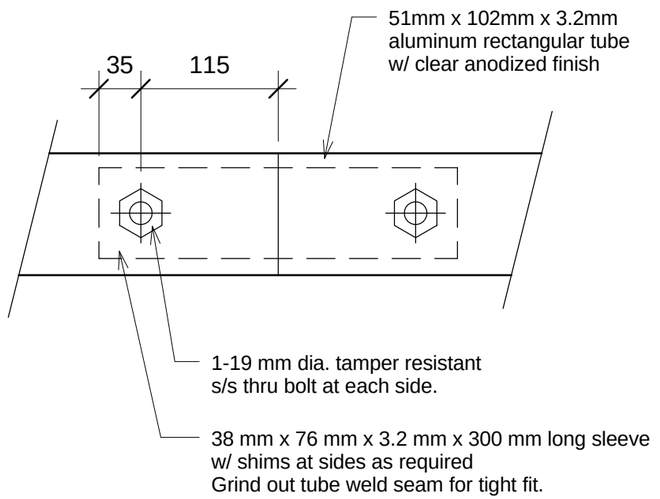


General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

canopy (anodized finish option) plan scale 1:20



detail 2 scale 1:5



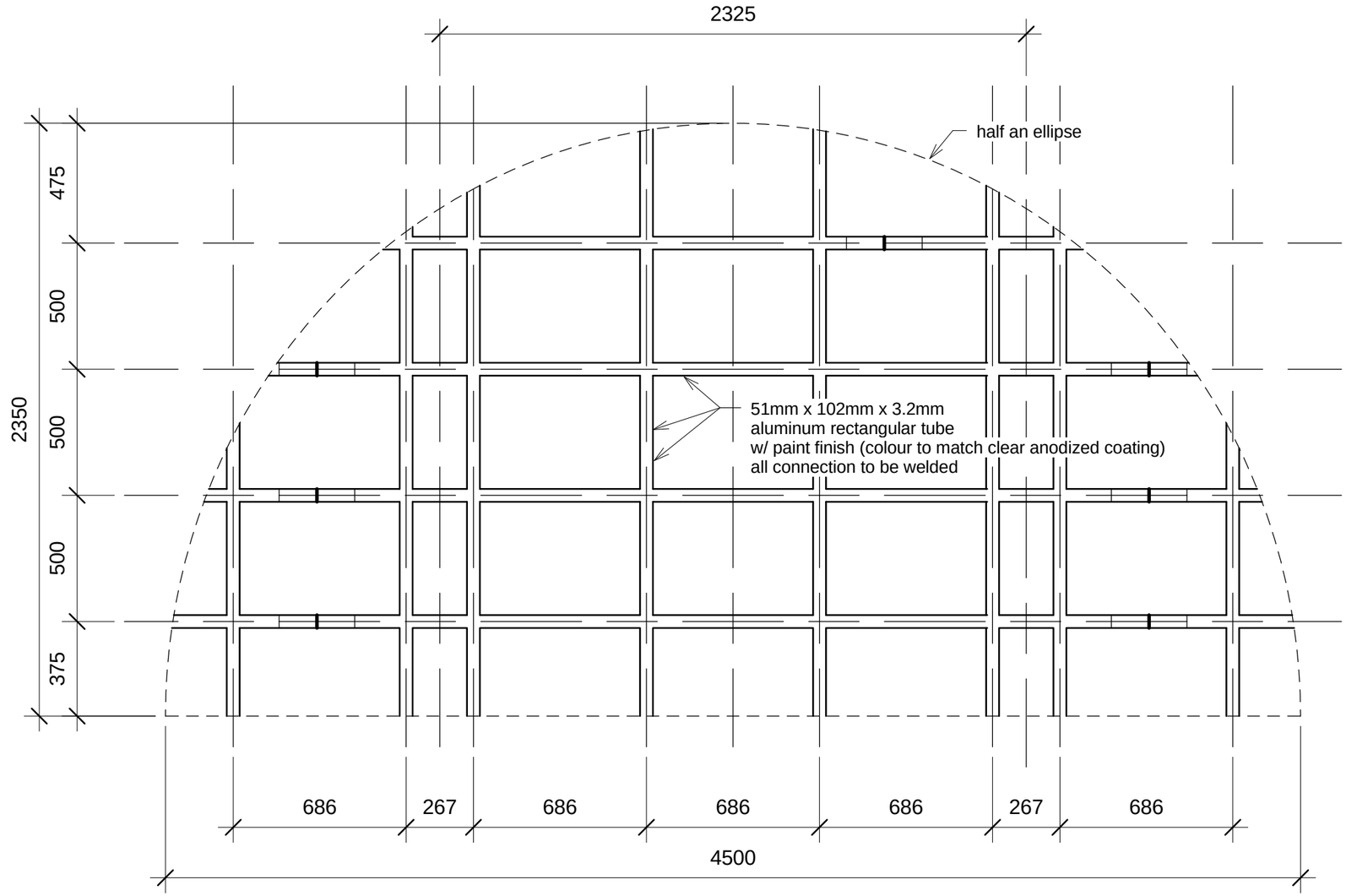
detail 1 (side view) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 4 -Vehicular Map Directory Kiosk
sheet name: sign construction - canopy plan and details (anodized)
scale: as noted

sheet number: 08

University of Victoria



General Note:
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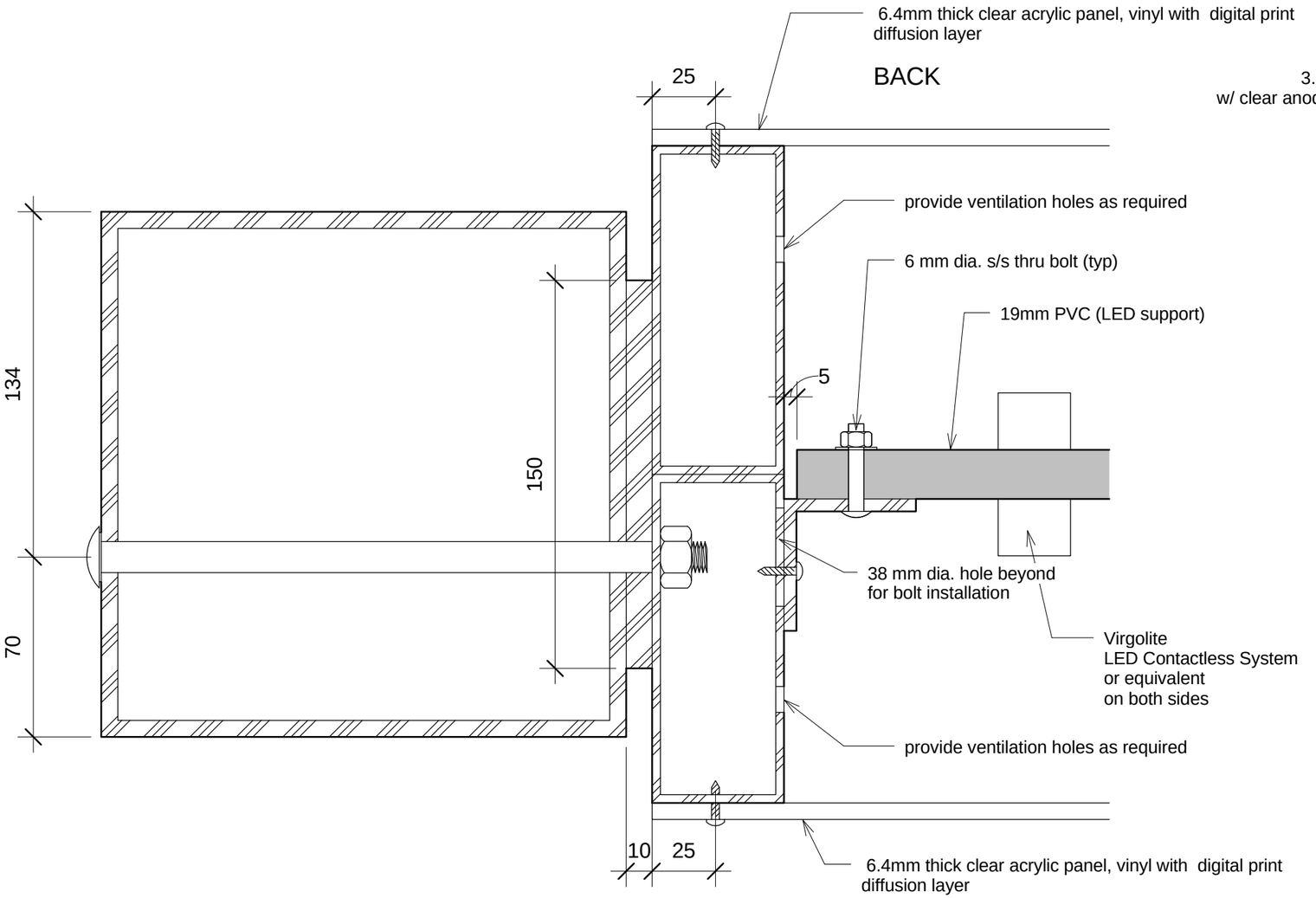
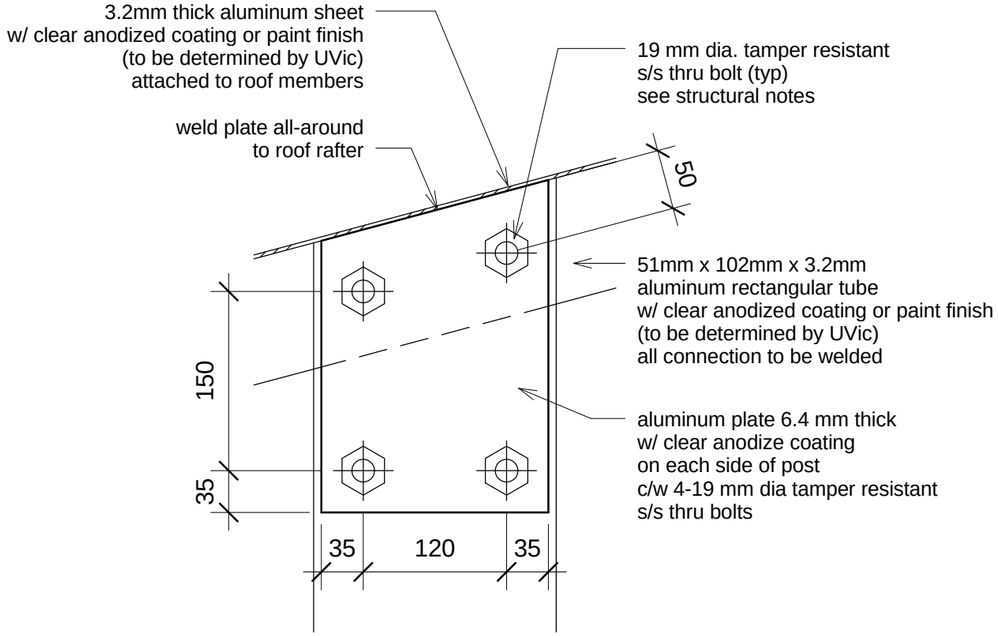
canopy (paint finish option)
plan scale 1:20

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 4 -Vehicular Map Directory Kiosk
sheet name:	sign construction - canopy plan and details (painted)
scale:	as noted
sheet number:	09

University of Victoria



plan detail 1 scale 1:2



detail 2 scale 1:5

project:	Campus Wayfinding	sign:	Sign No. 4 -Vehicular Map Directory Kiosk	sheet number:	10
number:	FM 09-8567	sheet name:	sign construction - details		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria

STRUCTURAL NOTES

DRAWINGS
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DESIGN
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2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

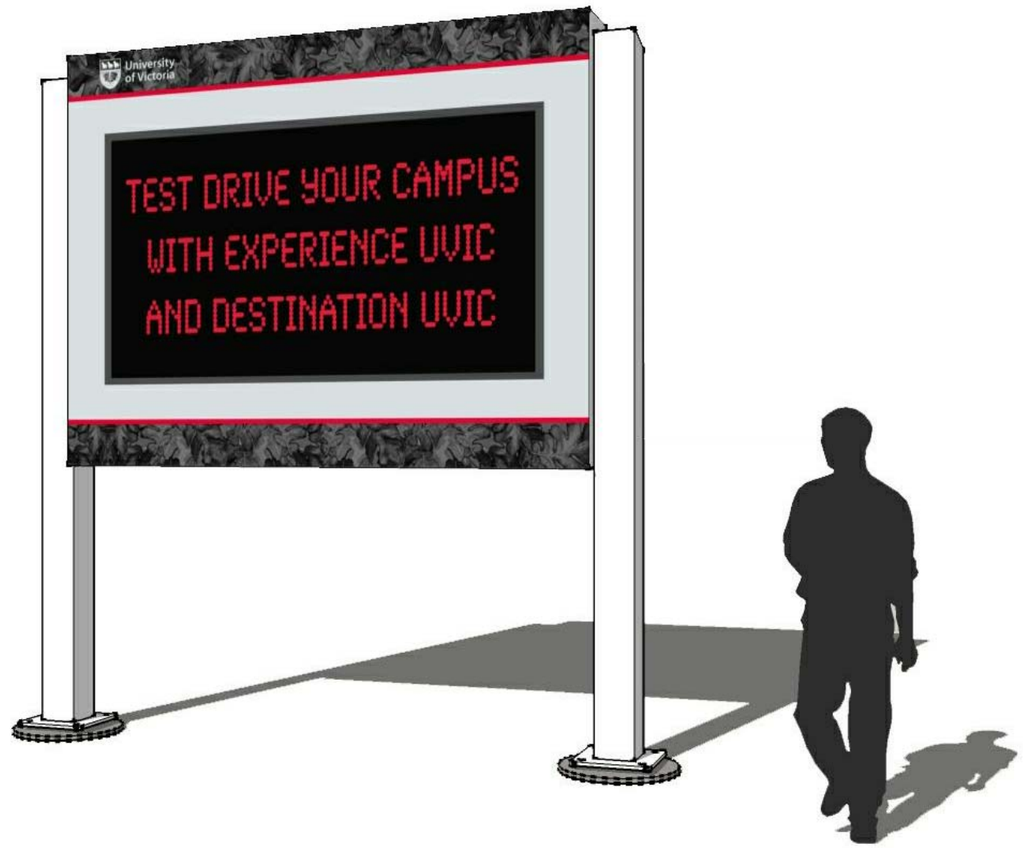
STRUCTURAL NOTES (cont)

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded 300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer. Anchor bolts to be secured with "Pentagon" security nuts.

ELECTRICAL NOTES

1. Signs must be provided with CSA label
2. LED modules, power supplies, cable, wire and junction box must be integral with signs
3. All electrical installations to be done in accordance with the Canadian Electrical Code and as reccomended by the LED lighting manufacturer.
4. Run 2#8 +GND conductors in 27mm PVC conduit from sign to existing campus exterior lighting pole standard. Intercept existing underground conduit, install an H20 rated flush junction box with bolt-on cover and splice into exterior lighting circuit.
4. The sign manufacturer shall provide an electrical shop drawings indicating input power requirements and a schematic wiring diagram for the sign.



Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - general information
06	structural an electrical general notes

Sign No. 5
Digital Message Board

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 5 - Digital Message Board
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating

PANTONE 185 C
pinstrip, arrows

PANTONE 426 C
text

PANTEONE 7541 C
background, UVic Logo

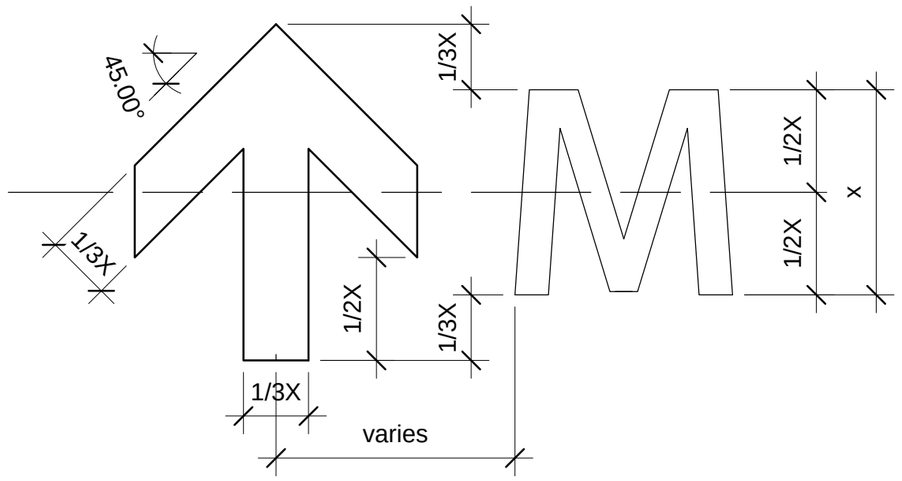
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

University of Victoria

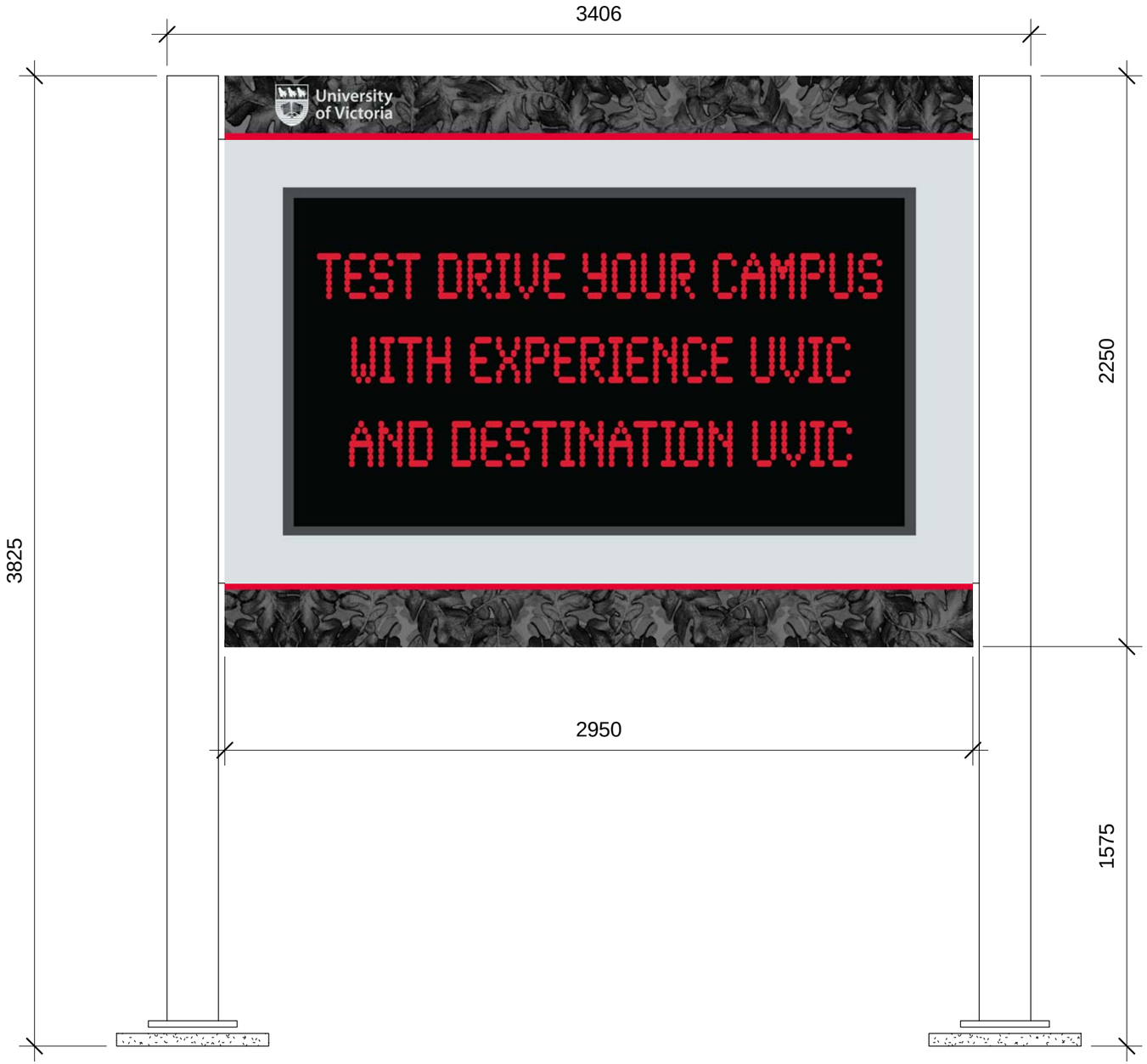
University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 5 - Digital Message Board
sheet name: typography, colours and pictograms
scale: as noted

sheet number: 02

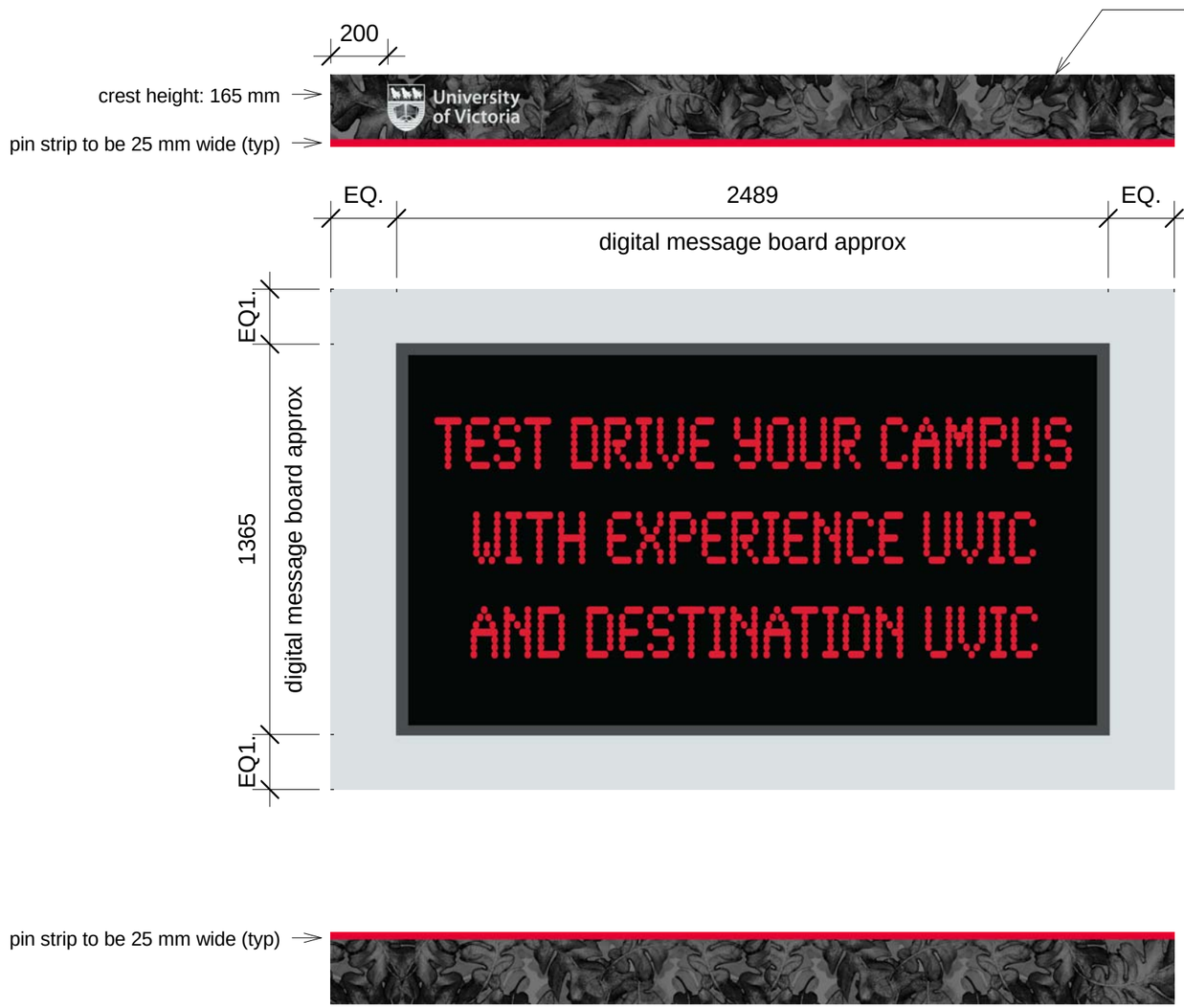
University of Victoria



double sided/single sided sign
scale 1:20

project:	Campus Wayfinding	sign:	Sign No. 5 - Digital Message Board	sheet number:	03
number:	FM 09-8567	sheet name:	sign design - overview		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece):
2950 mm x 250 mm x 6.4 mm

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 2950 mm x 1750 mm x 6.4 mm

Vinyl: 3M IJ180, MPI 2005 or equivalent
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece):
2950 mm x 250 mm x 6.4 mm

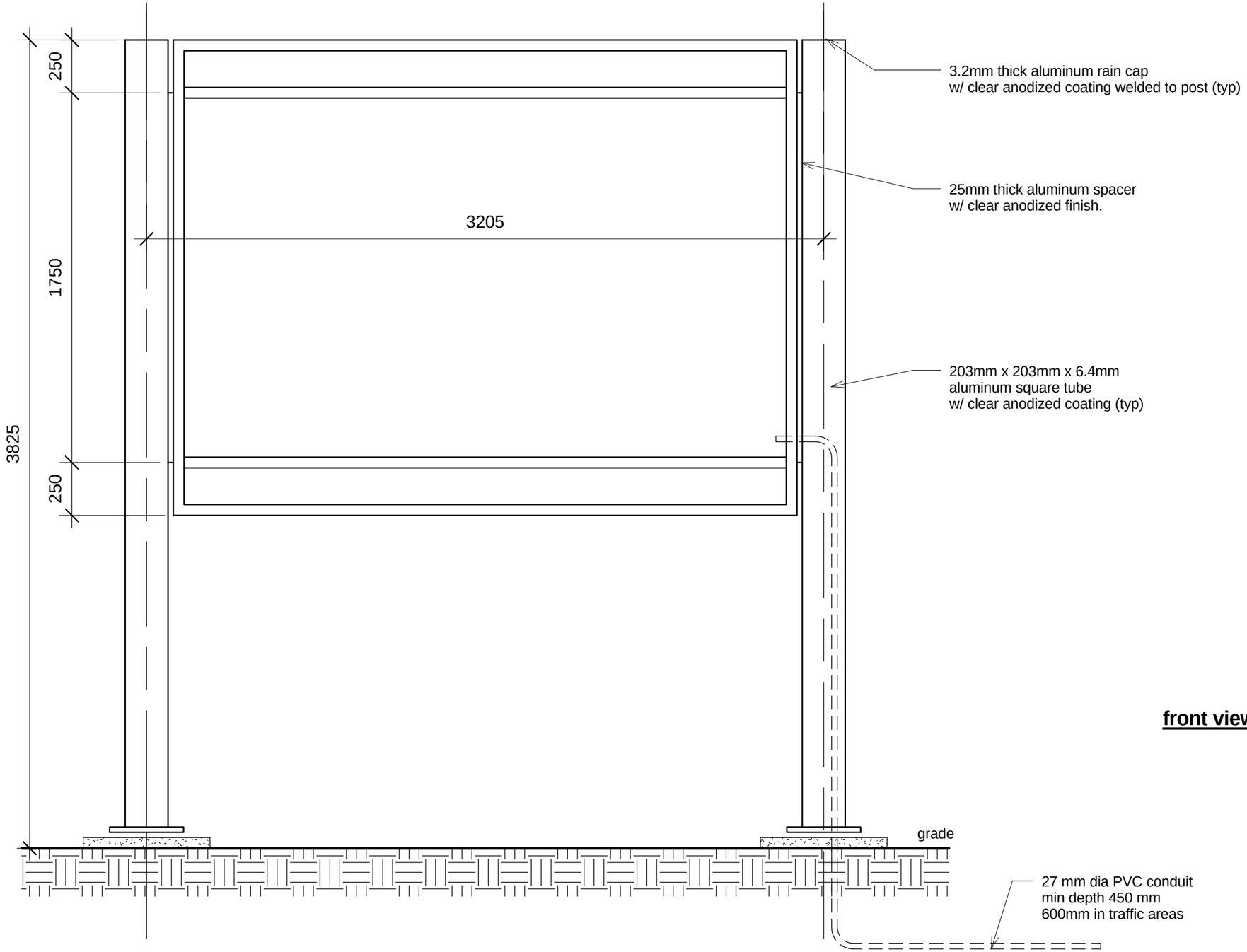
double sided/single sided unit scale 1:20

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 5 - Digital Message Board
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

University of Victoria



front view/section **scale 1:20**

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 5 - Digital Message Board
sheet name: sign construction - general information
scale: as noted

sheet number: 05

University of Victoria

STRUCTURAL NOTES

DRAWINGS
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DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility to build the work in conformance with the contract documents. Structural Engineer shall not be responsible for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL NOTES (cont)

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded 300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer. Anchor bolts to be secured with "Pentagon" security nuts.

ELECTRICAL NOTES

1. Signs must be provided with CSA label
2. LED modules, power supplies, cable, wire and junction box must be integral with signs
3. All electrical installations to be done in accordance with the Canadian Electrical Code and as reccomended by the LED lighting manufacturer.
4. Run 2#8 +GND conductors in 27mm PVC conduit from sign to existing campus exterior lighting pole standard. Intercept existing underground conduit, install an H20 rated flush junction box with bolt-on cover and splice into exterior lighting circuit.
4. The sign manufacturer shall provide an electrical shop drawings indicating input power requirements and a schematic wiring diagram for the sign.

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 6
Vehicular - Directional

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - Directional
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

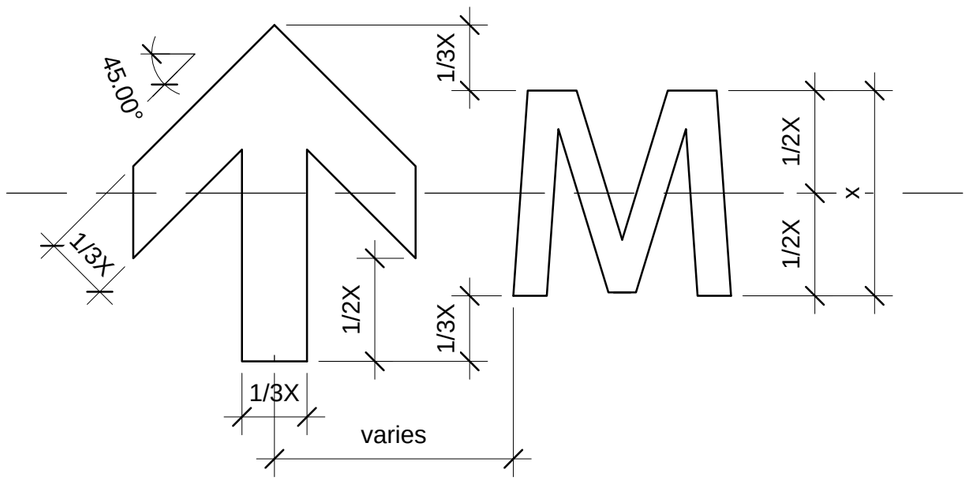
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

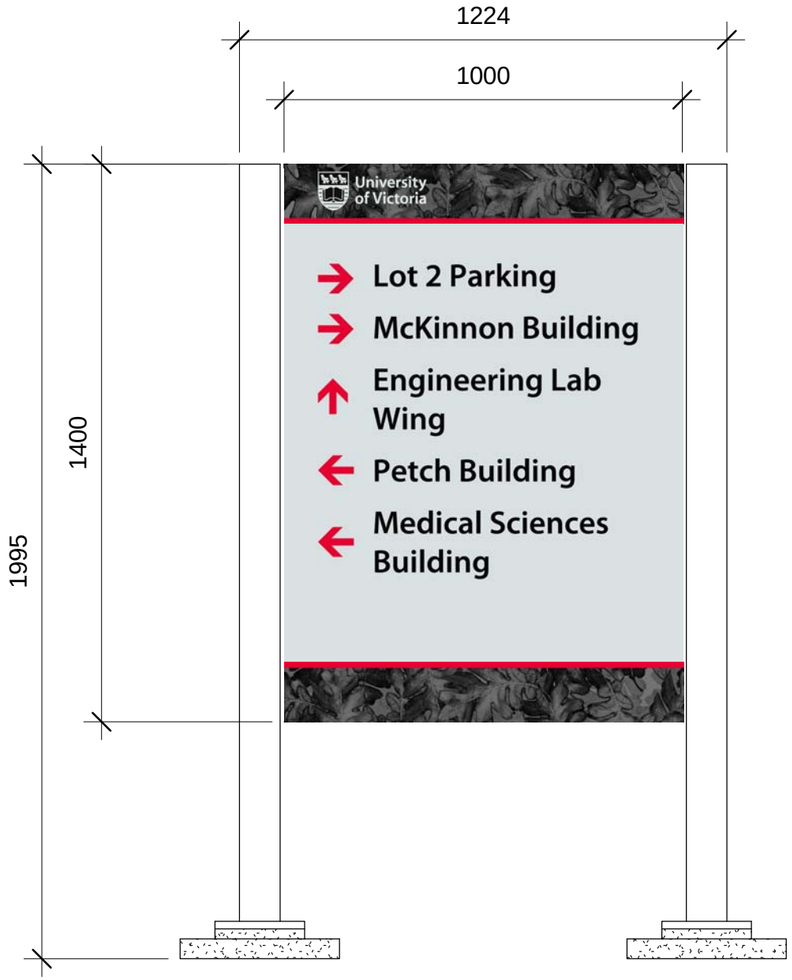
opaque monochromatic

University of Victoria

opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 6 - Directional	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



Directional version 1
scale 1:15

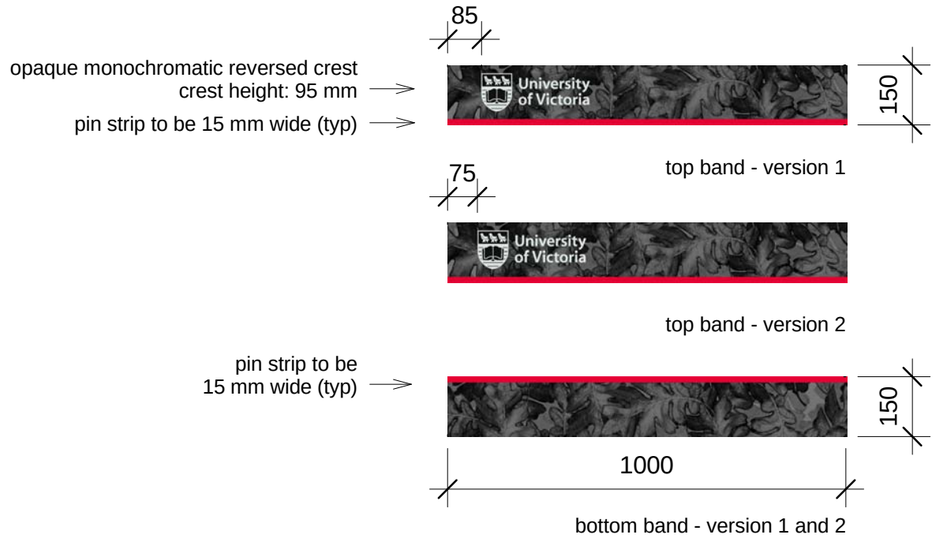
Directional version 2
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - Directional
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria

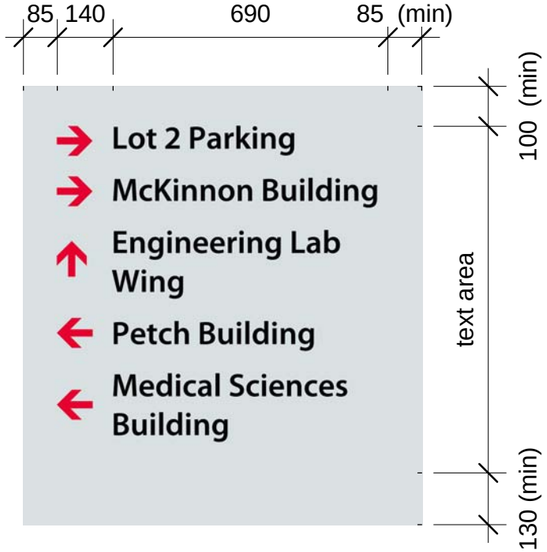


Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1000 mm x 1400 mm x 6.4 mm
See sheet 05 for details.

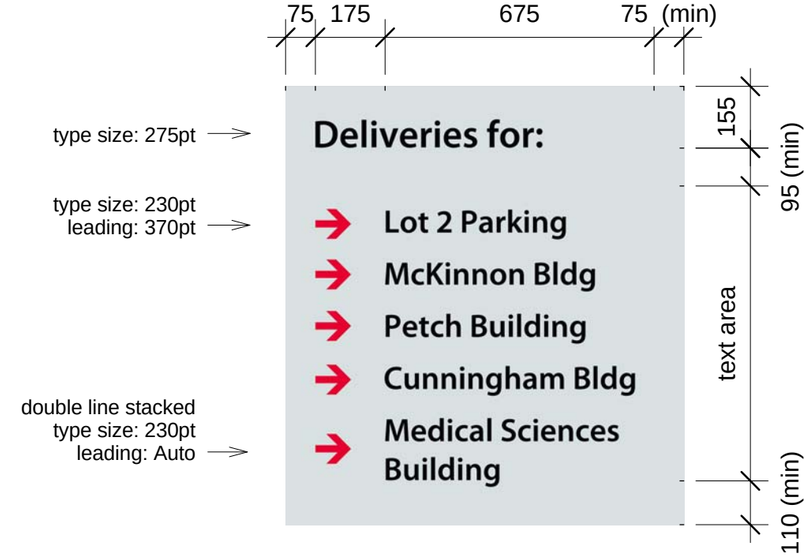
Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout

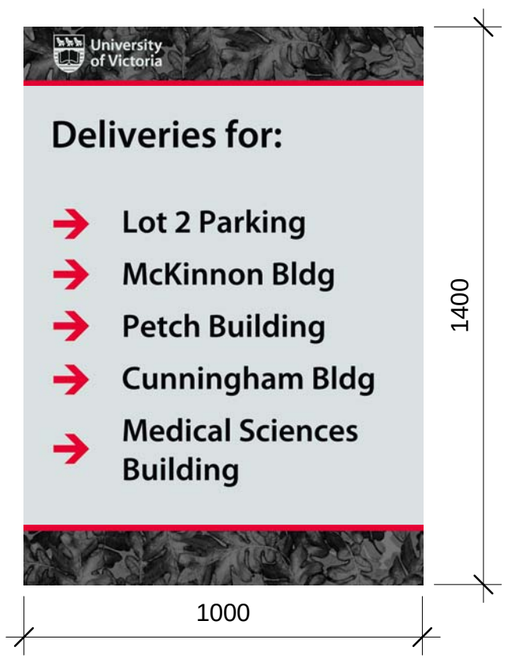


version 1



version 2

version 1



version 2

scale 1:15

scale 1:15

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 6 - Directional
sheet name:	sign design - graphic design details
scale:	as noted
sheet number:	04

University of Victoria

project:
number:
issue date:

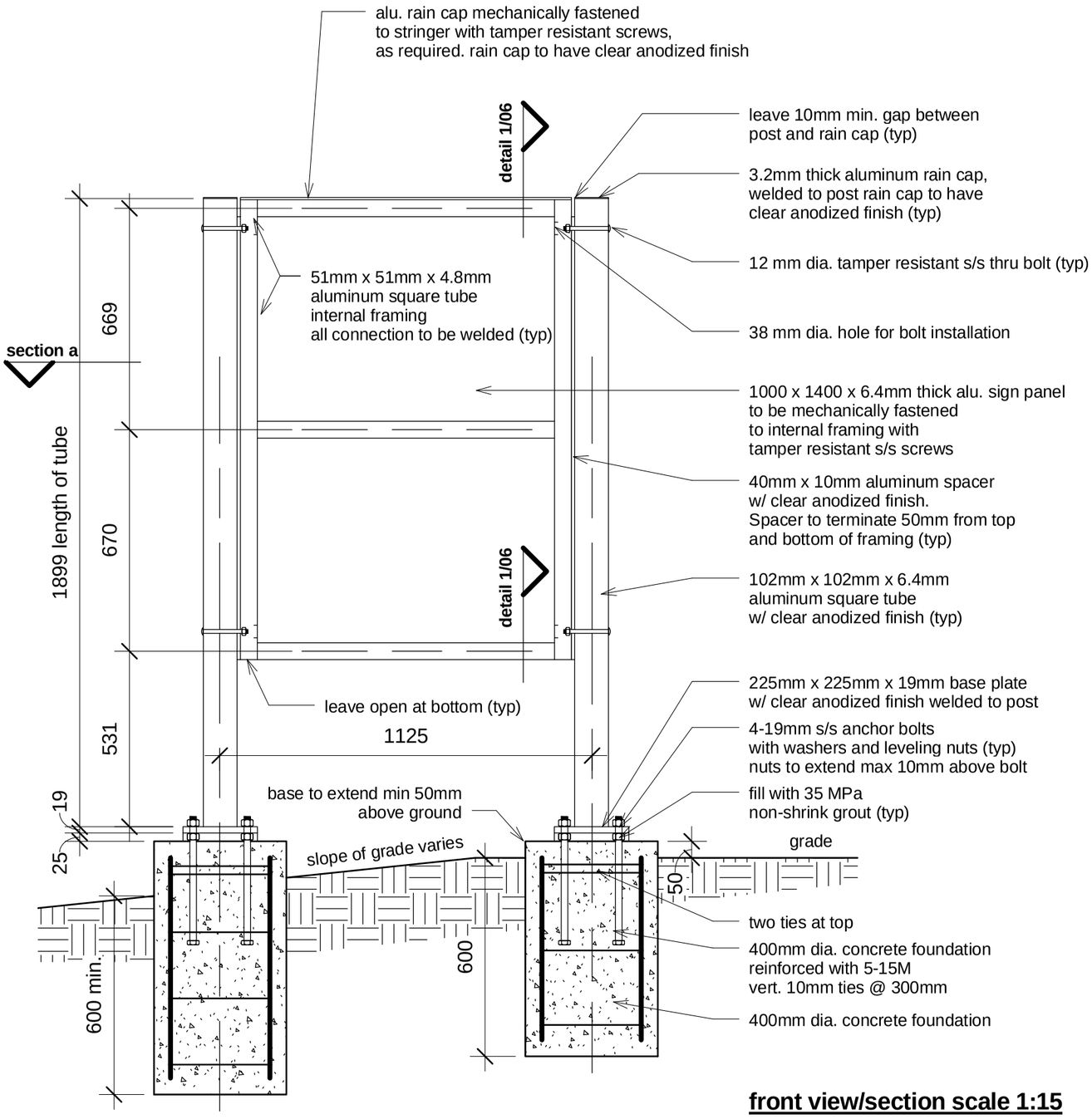
Campus Wayfinding
FM 09-8567
Jan 31, 2012

sign:
sheet name:
scale:

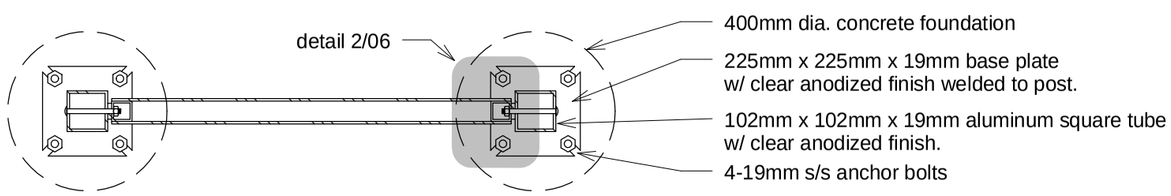
Sign No. 6 - Directional
sign construction - sections
as noted

sheet
number:

05



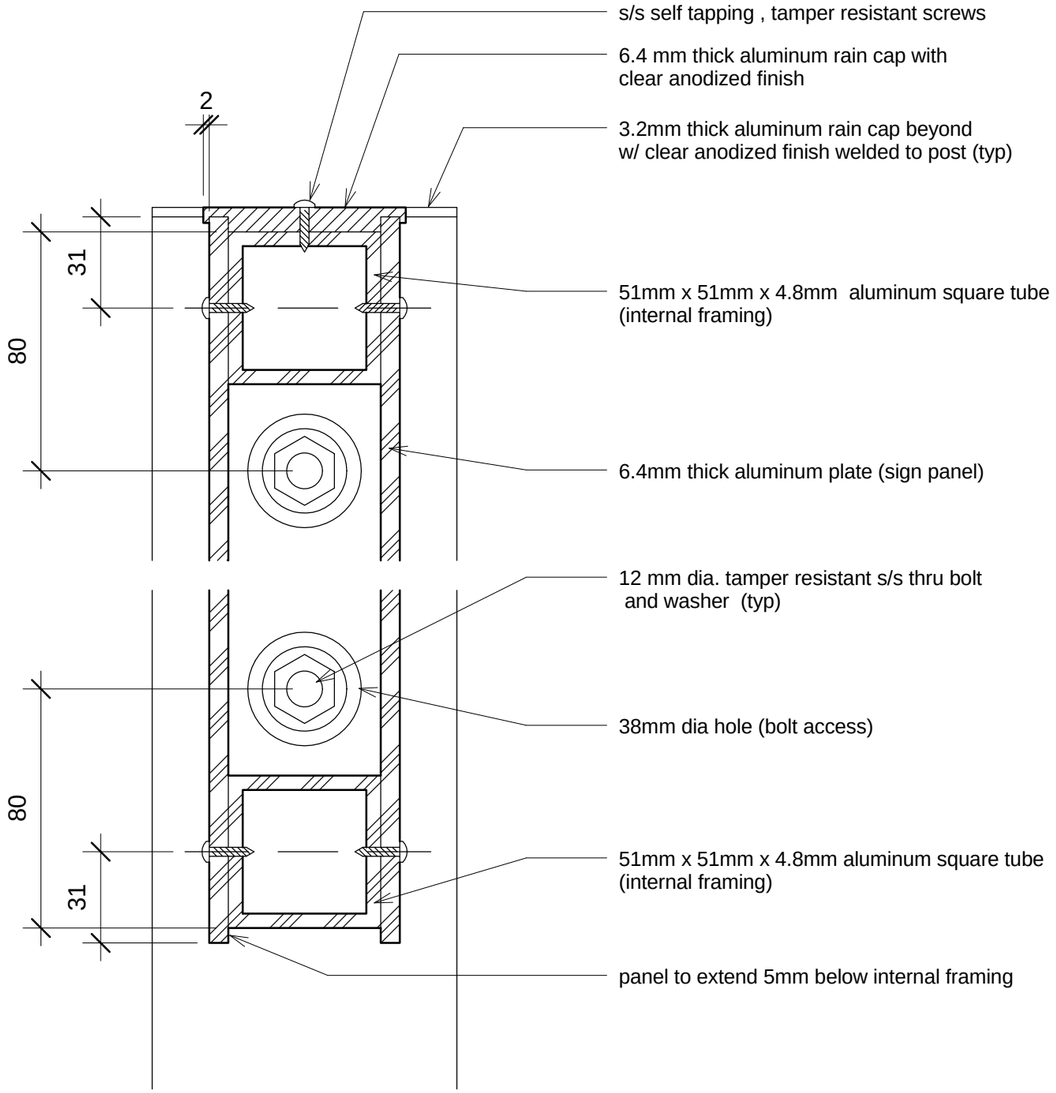
front view/section scale 1:15



section a scale 1:15

General Note:
Manufacturer to verify all diemnsions
prior to sign fabrication. All discrepancies
should be reported to the Architect.

University of Victoria



General Note:
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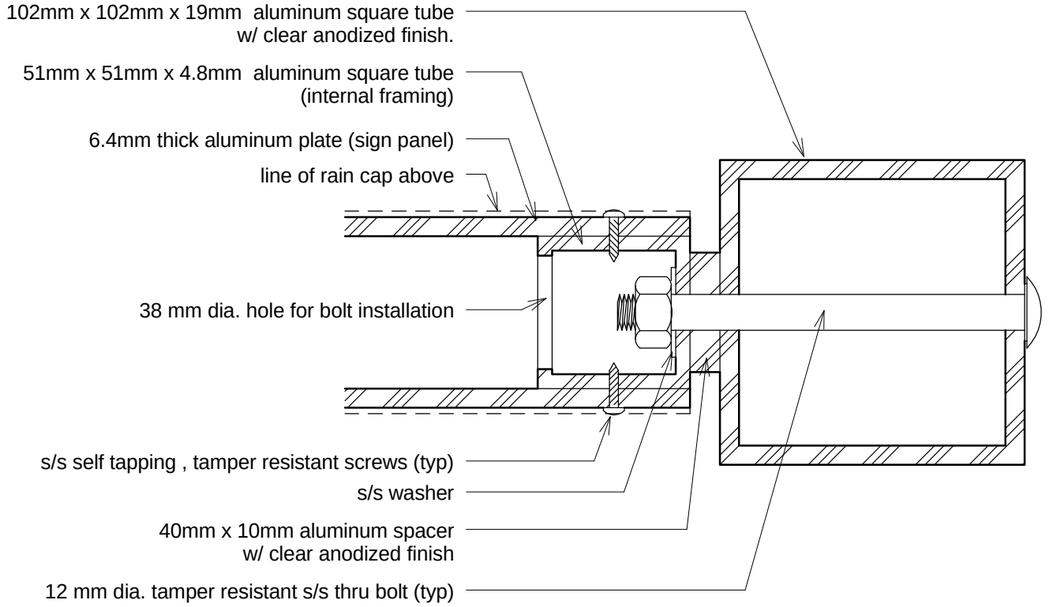
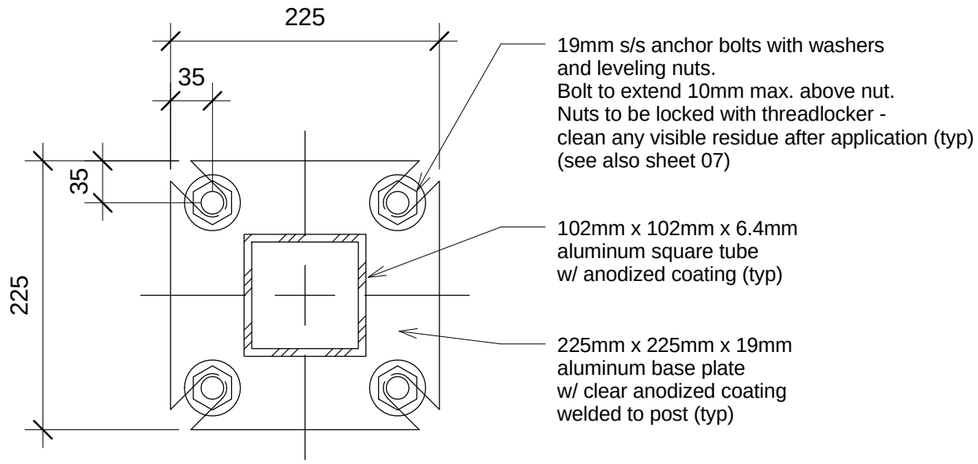
section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - Directional
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

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for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
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3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - Directional
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 6
Vehicular - Directional
University House 1

project: Campus Wayfinding - Phase 1
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - University House 1
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

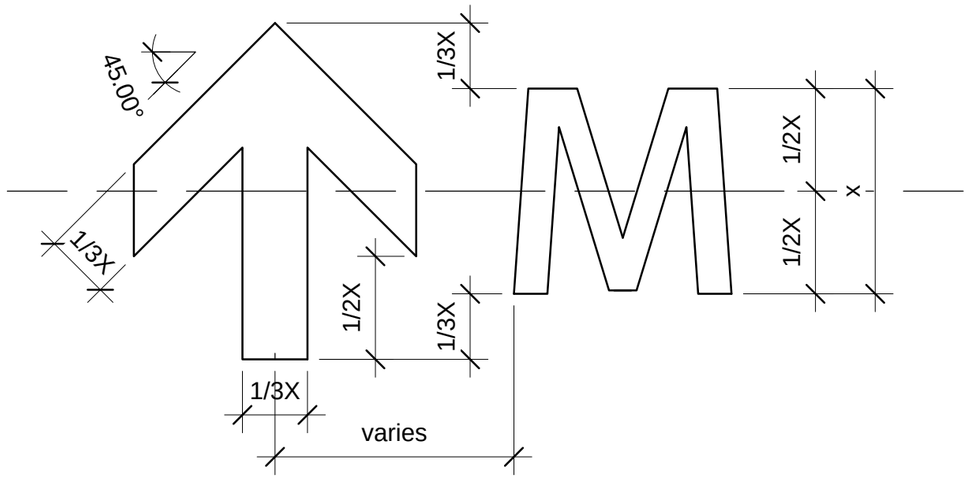
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

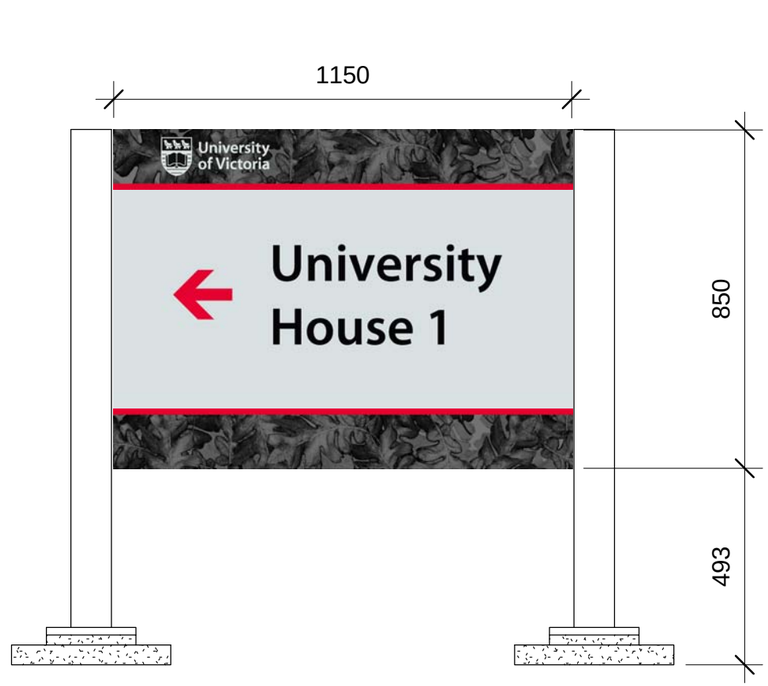
opaque monochromatic

University of Victoria

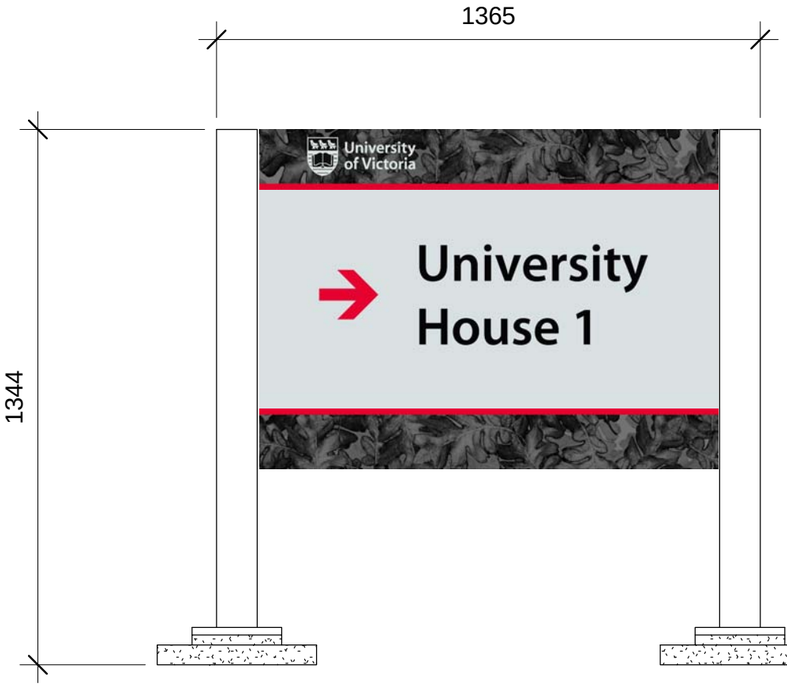
opaque monochromatic reversed

project:	Campus Wayfinding - Phase 1	sign:	Sign No. 6 - University House 1	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



north elevation scale 1:15

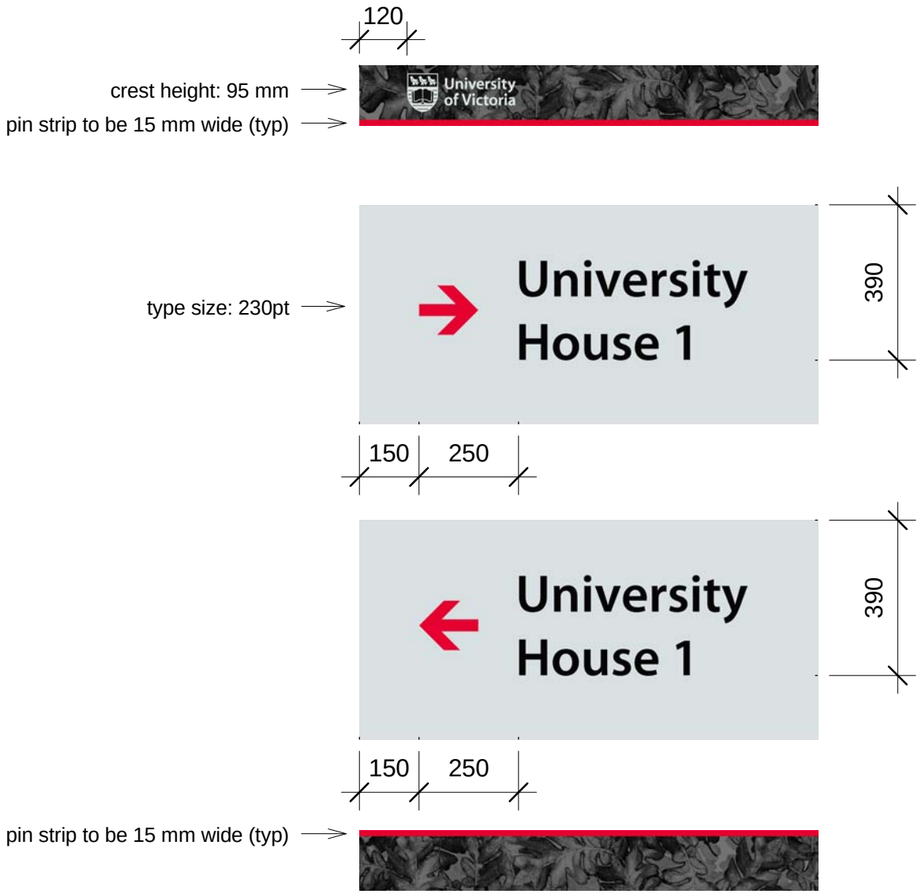


south elevation scale 1:15

project:	Campus Wayfinding - Phase 1
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 6 - University House 1
sheet name:	sign design - overview
scale:	as noted

sheet number: 03

University of Victoria



scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1150 mm x 850 mm x 6.4 mm

Reflective vinyl: SRV (white reflective)
Overlaminate: DOL 6060

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.

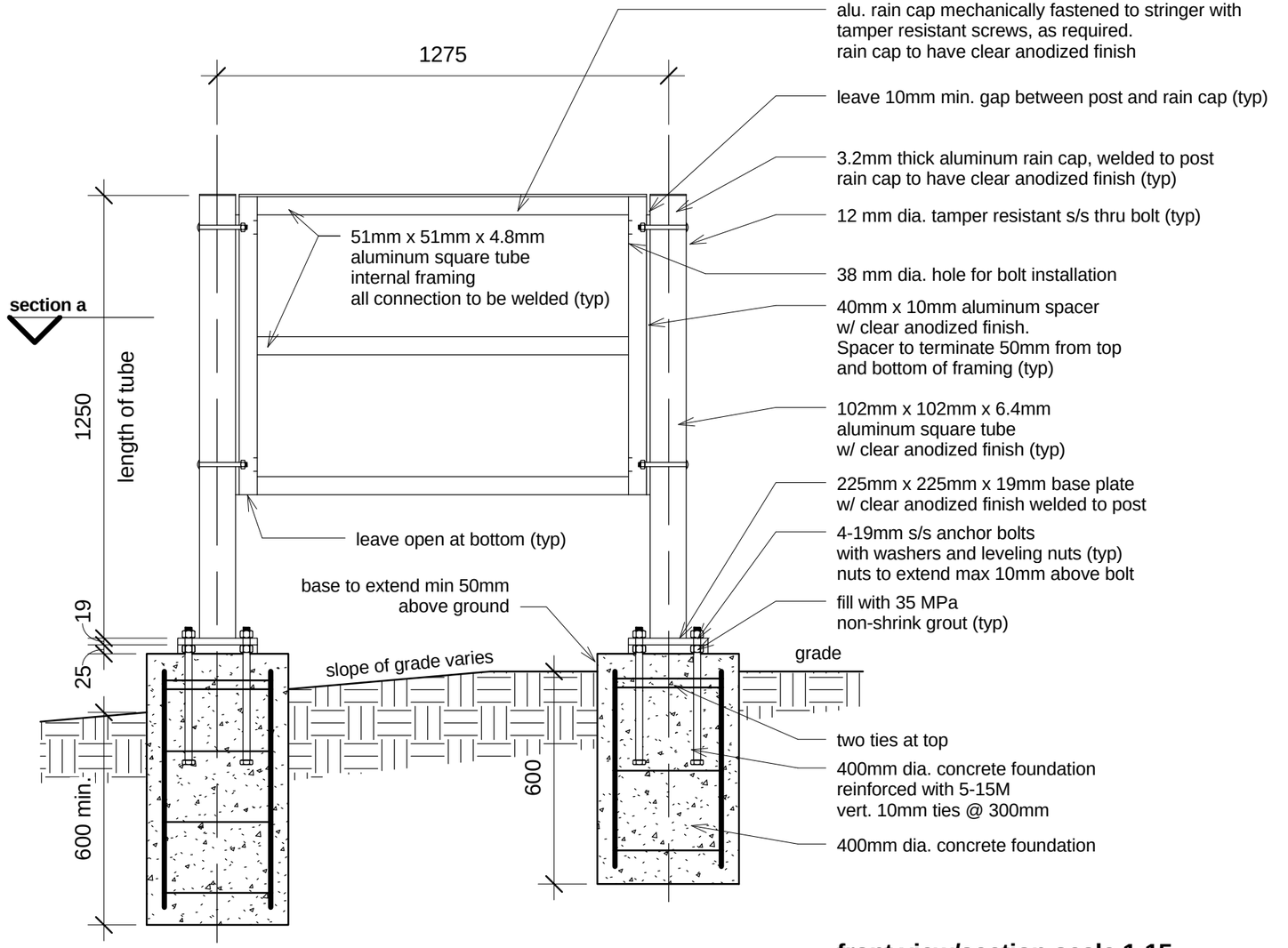
Refer to Adobe Photoshop files for detailed sample layout

project: Campus Wayfinding - Phase 1
number: FM 09-8567
issue date: Jan 31, 2012

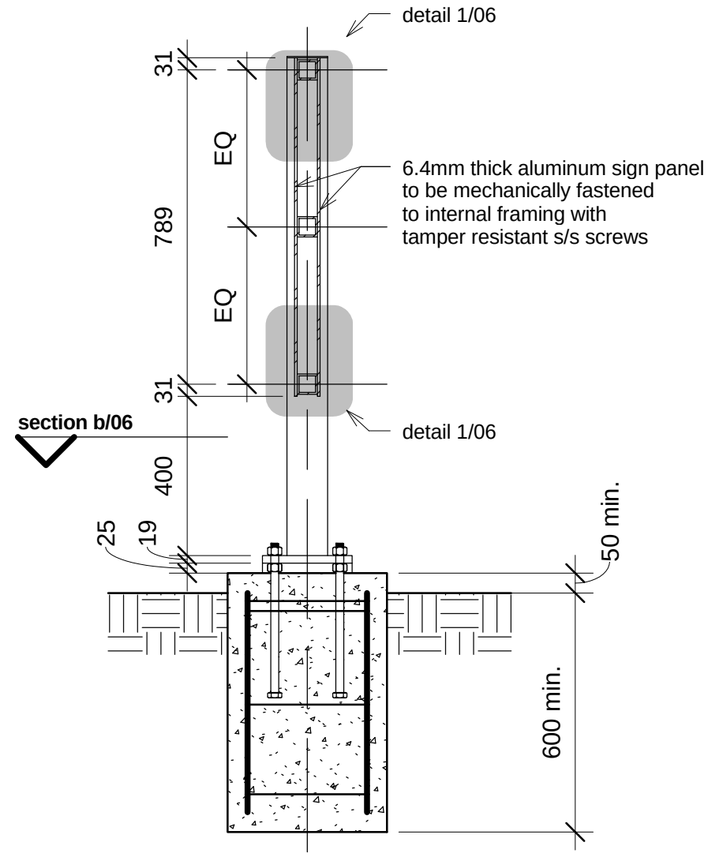
sign: Sign No. 6 - University House 1
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

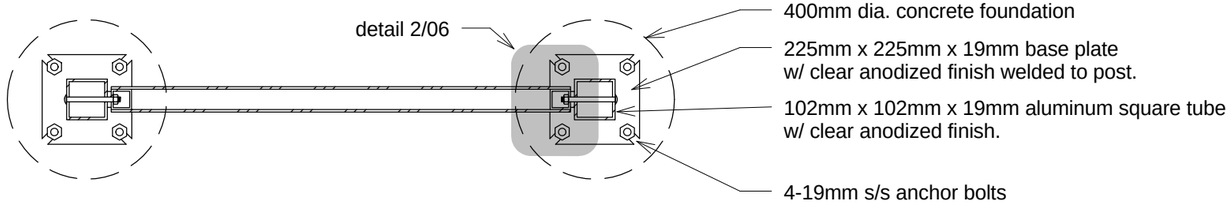
University of Victoria



front view/section scale 1:15



side view/section scale 1:15

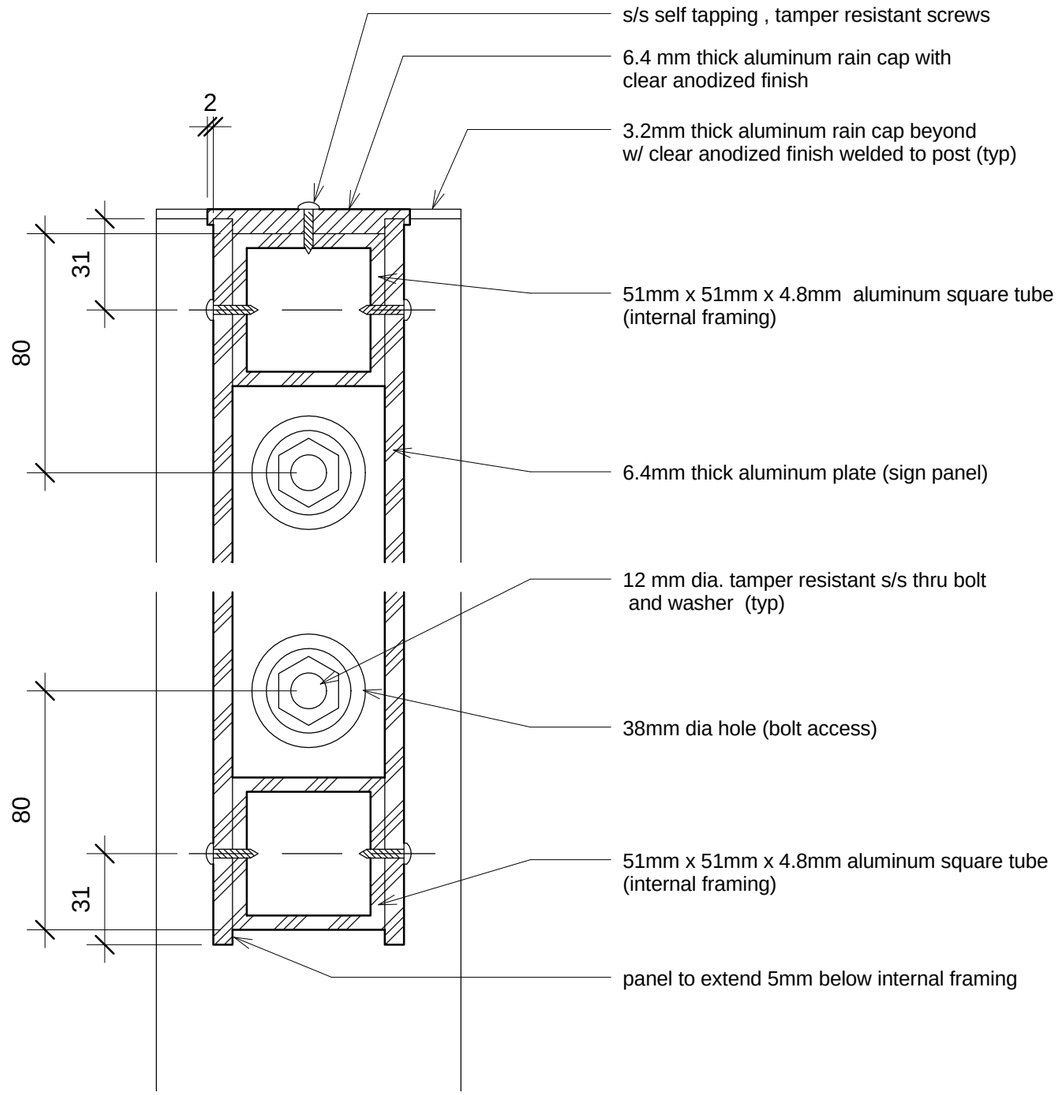


section a scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project:	Campus Wayfinding - Phase 1
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 6 - University House 1
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria



General Note:
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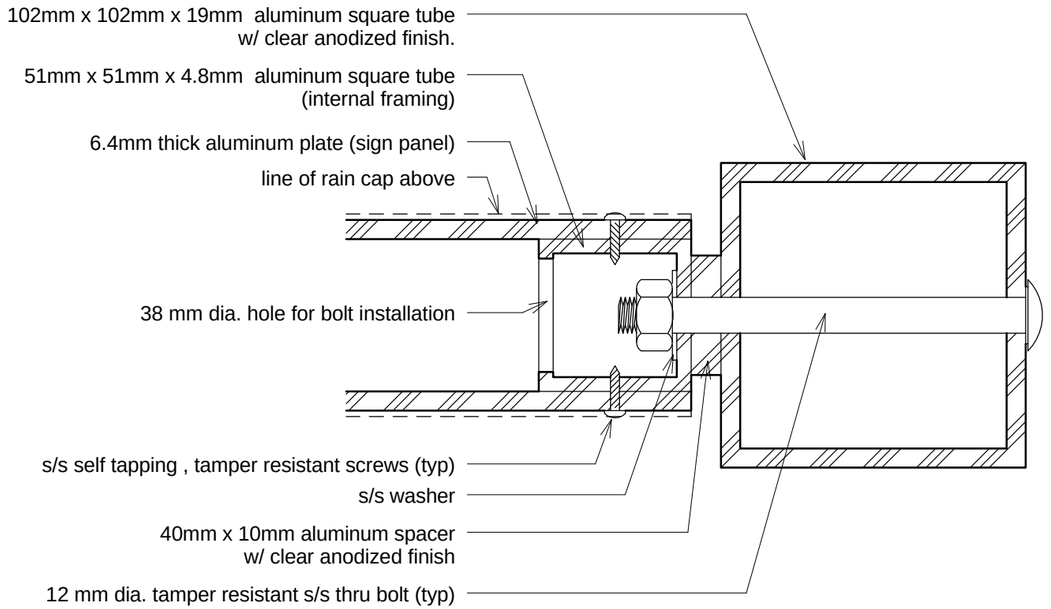
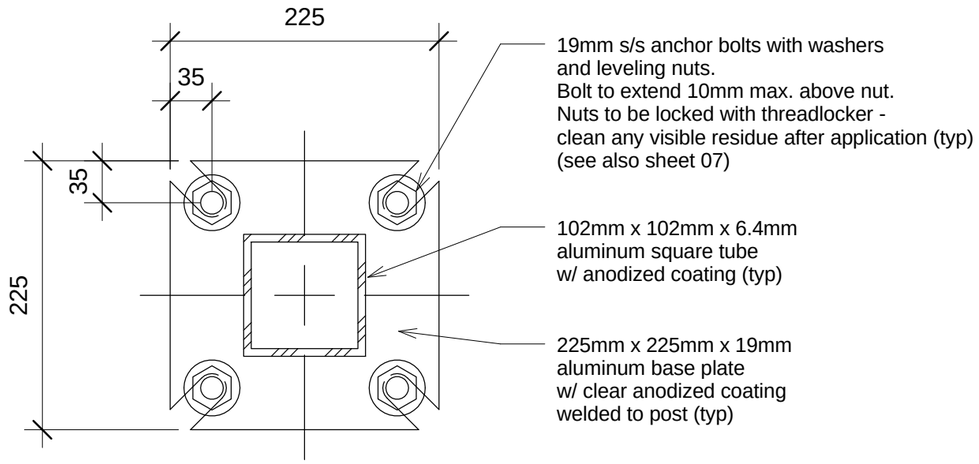
section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project:	Campus Wayfinding - Phase 1
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 6 - University House 1
sheet name:	sign construction - details
scale:	as noted

sheet number: 06

University of Victoria

GENERAL NOTES

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Form and placement of stickers on signs is to be coordinated with University of Victoria
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nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
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1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding - Phase 1
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 6 - University House 1
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 7
Vehicular - Finnerty Gardens

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 7 - Finnerty Gardens
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 368 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

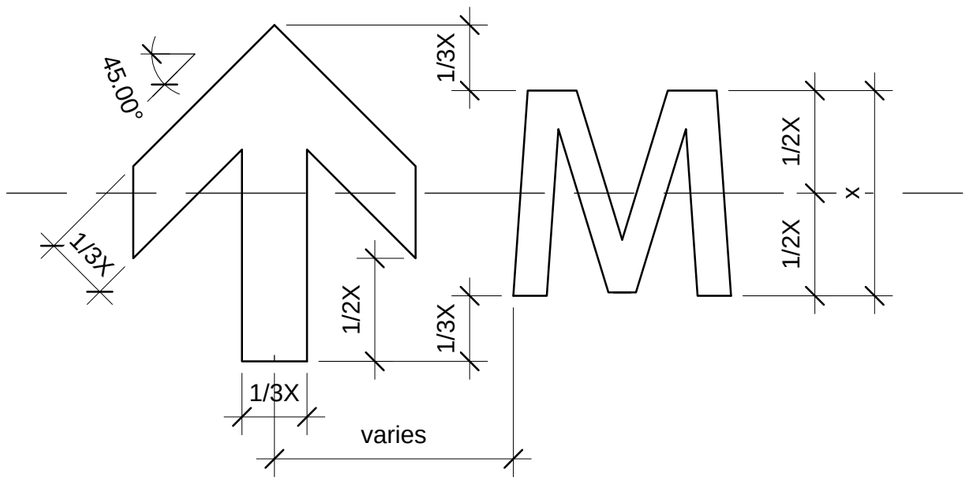
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

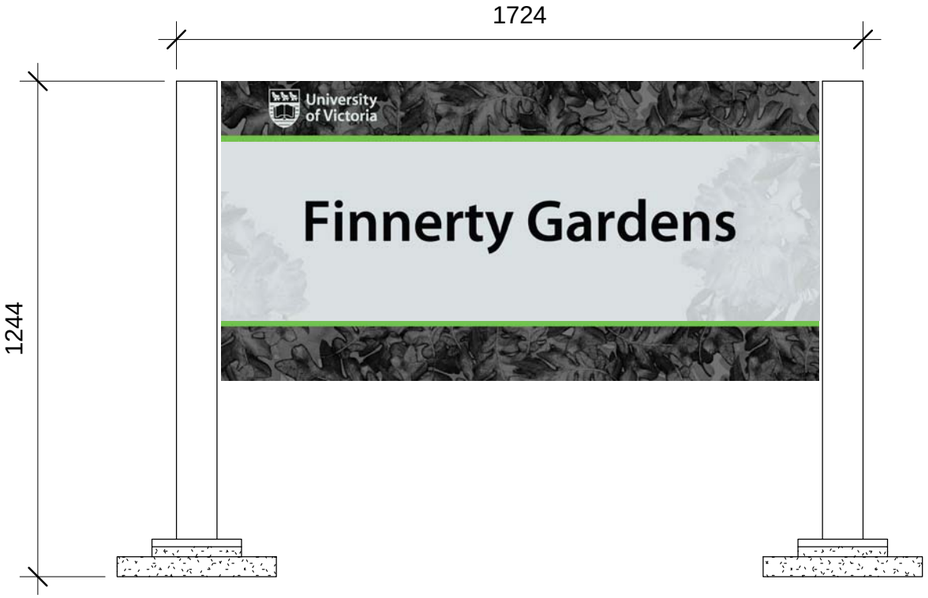
full colur

opaque monochromatic

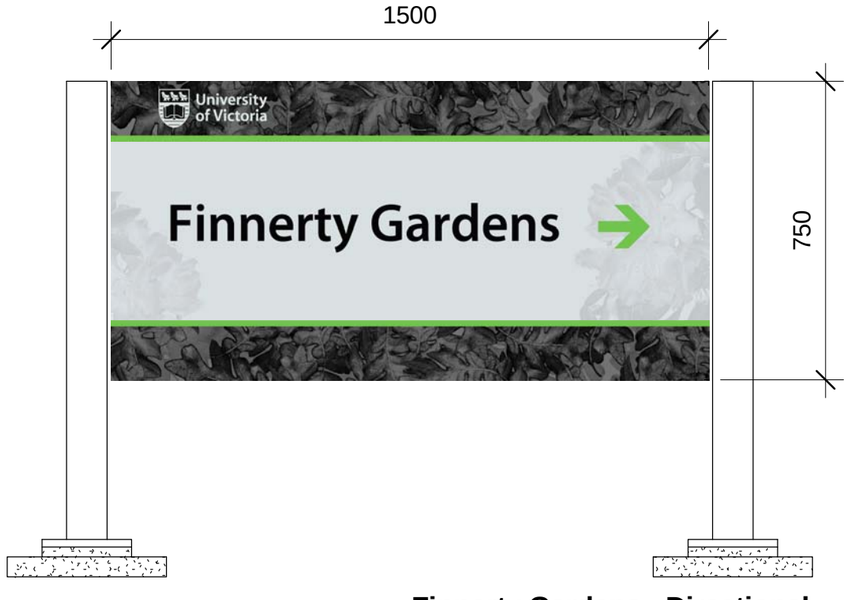
opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 7 - Finnerty Gardens	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



Finnerty Gardens - Primary
scale 1:15



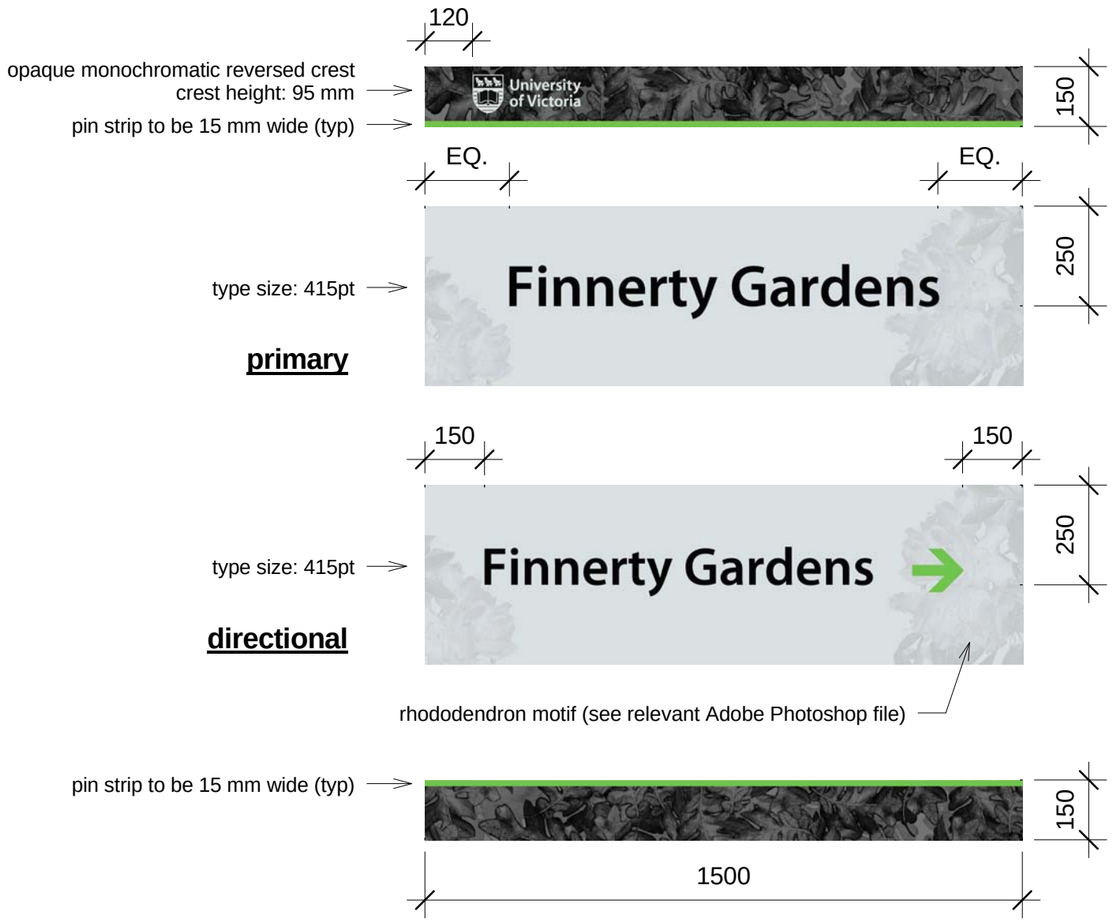
Finnerty Gardens - Directional
scale 1:15

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012

sign:	Sign No. 7 - Finnerty Gardens
sheet name:	sign design - overview
scale:	as noted

sheet number: 03

University of Victoria



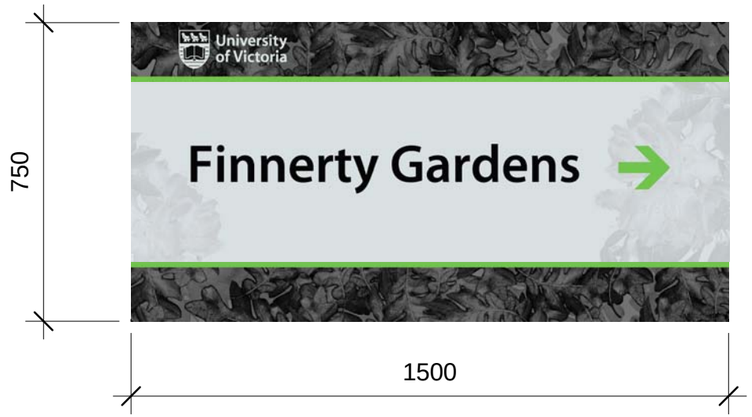
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 1500 mm x 750 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1)	One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2)	Use compatible UV inks and overlaminates as recommended by manufacturer
3)	Wrap vinyl and overlaminate over the edges of the aluminum panel.
4)	If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

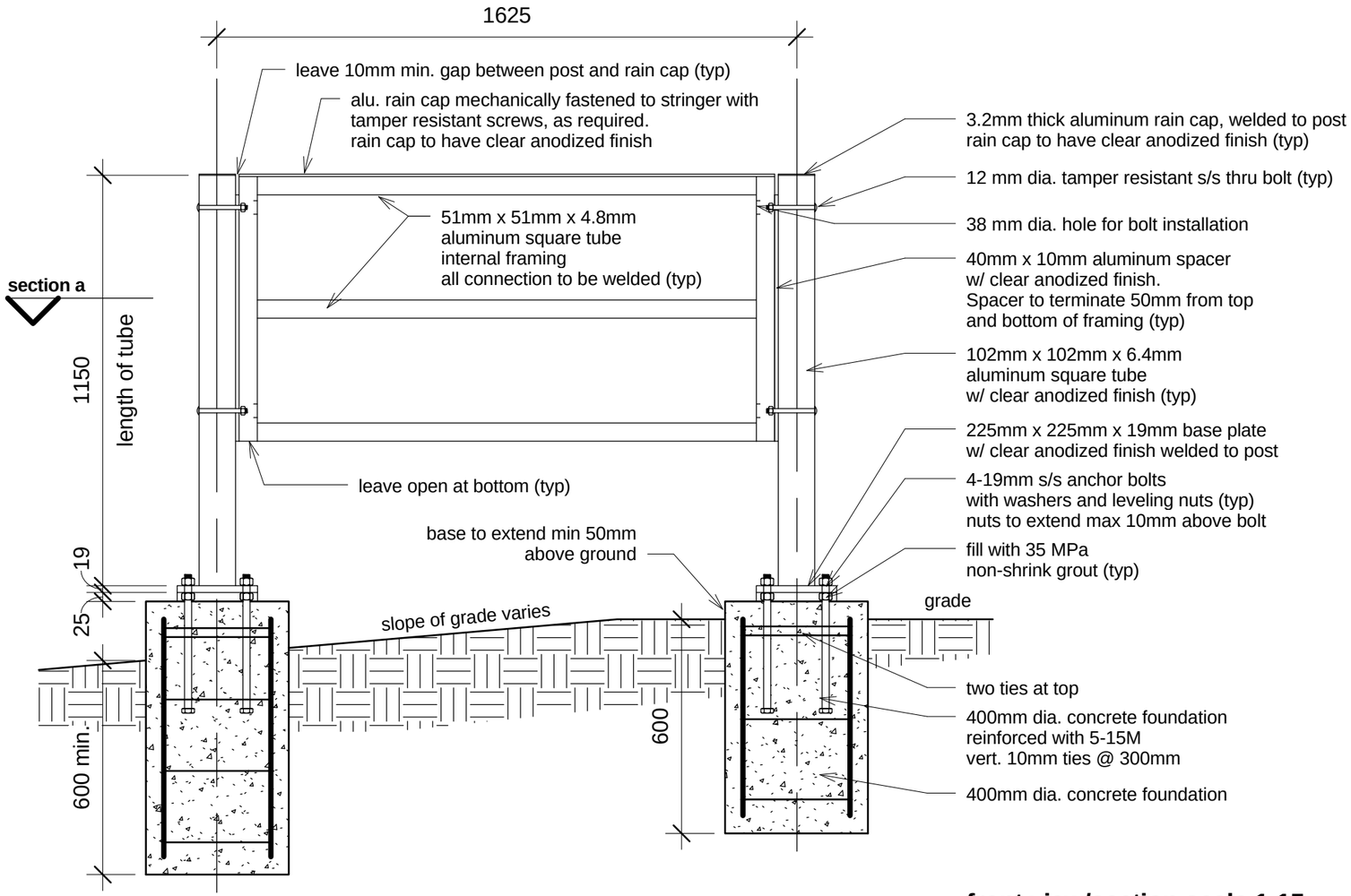
Refer to Adobe Photoshop files for detailed sample layout



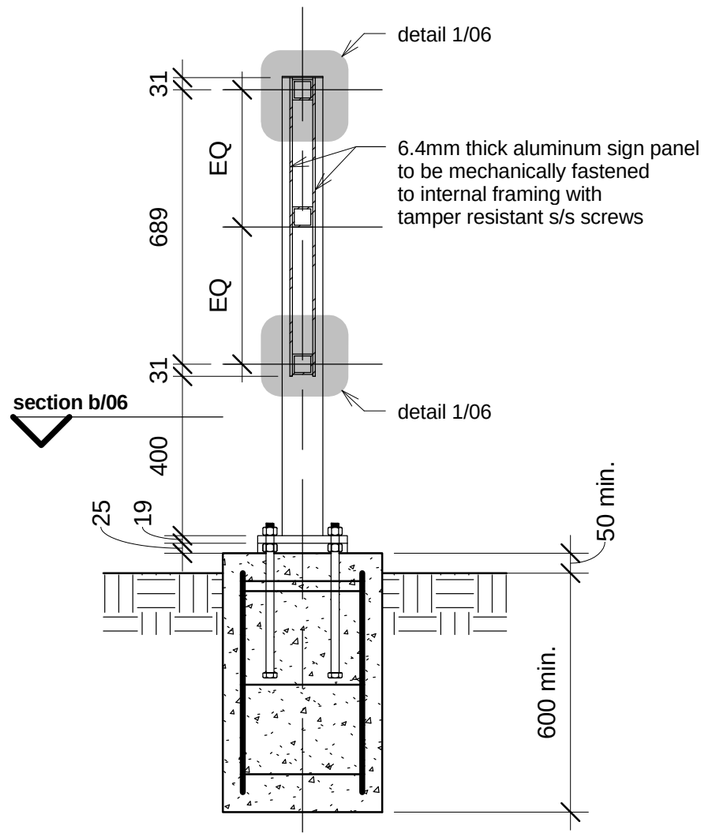
scale 1:15

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 7 - Finnerty Gardens
sheet name:	sign design - graphic design details
scale:	as noted
sheet number:	04

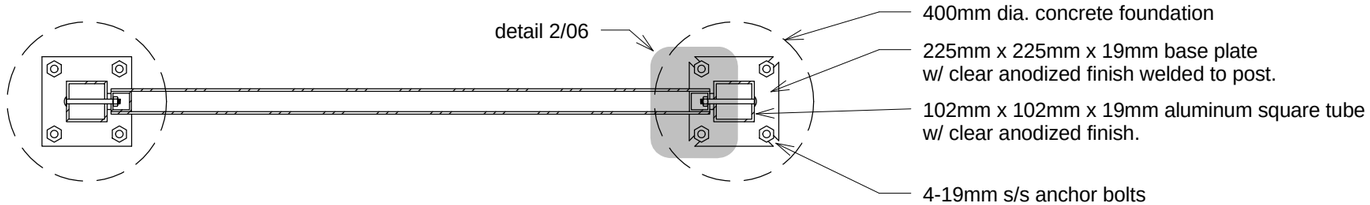
University of Victoria



front view/section scale 1:15



side view/section scale 1:15

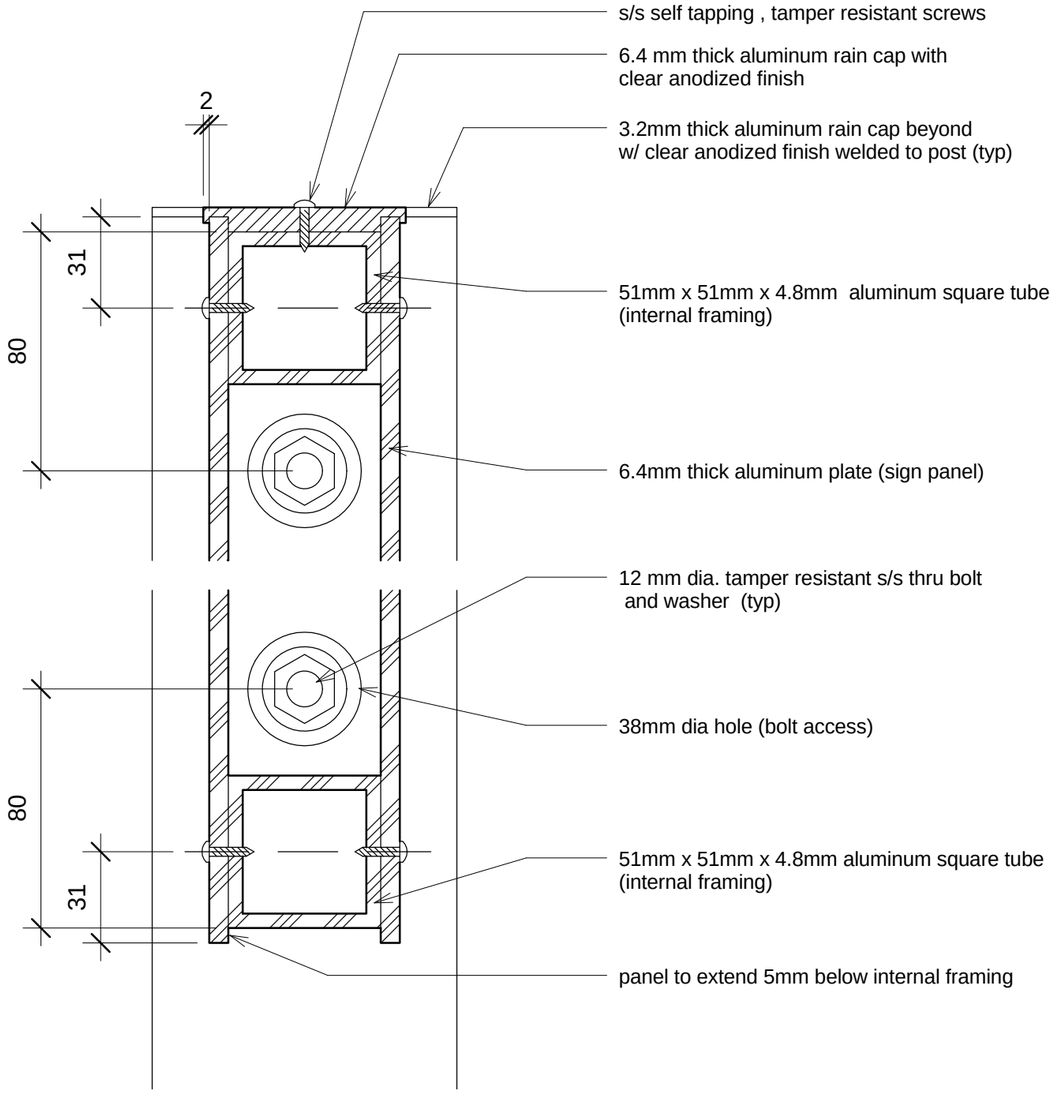


section a scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

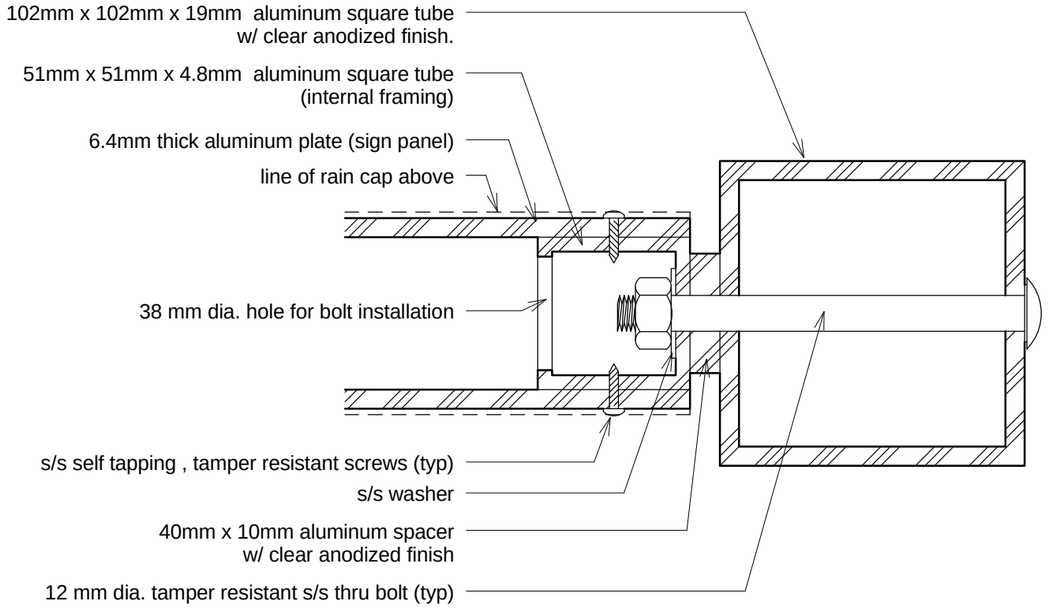
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 7 - Finnerty Gardens
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria

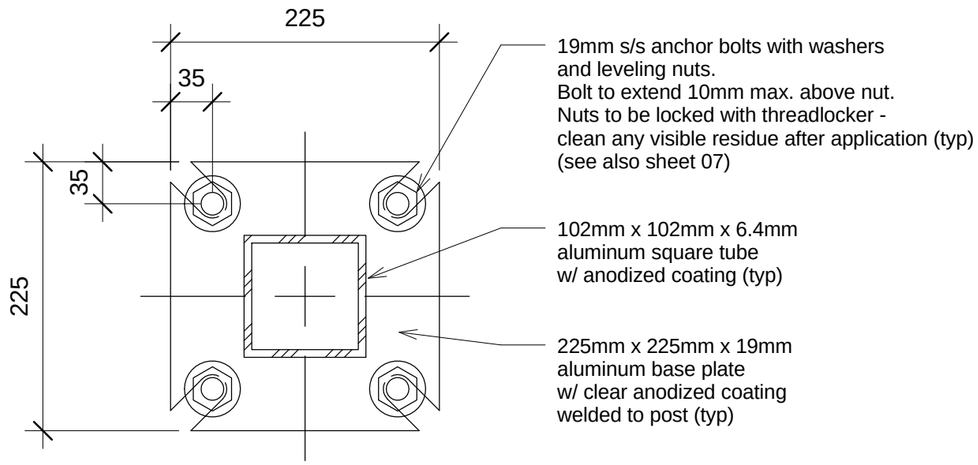


General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 7 - Finnerty Gardens
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
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6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 7 - Finnerty Gardens
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - overview cont.
05	sign design - graphic design details
06	sign design - graphic design details cont.
07	sign construction - cross section
08	sign construction - section plans
09	sign construction - painted canopy plan and details
10	sign construction - details
11	typical concrete slab
12	general notes

Sign No. 8
Pedestrian - Map Directory Kiosk

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
crest - reversed monochromatic

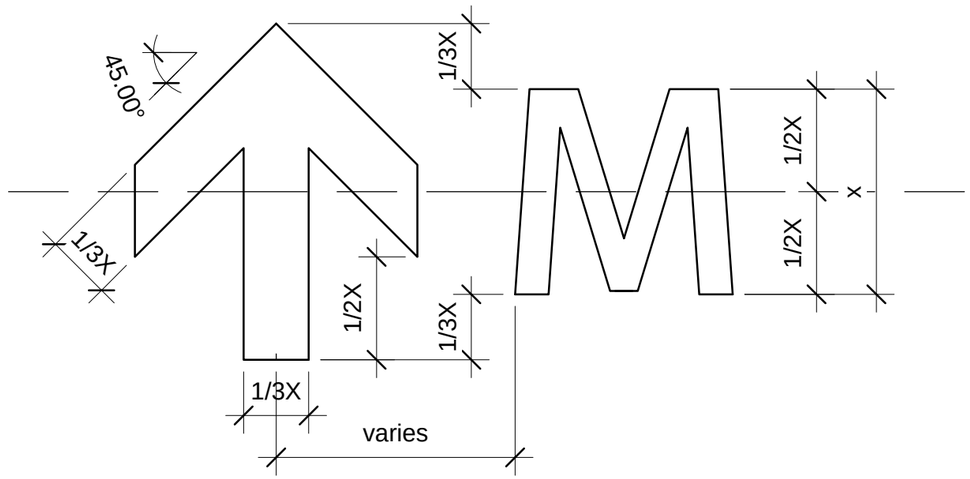
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



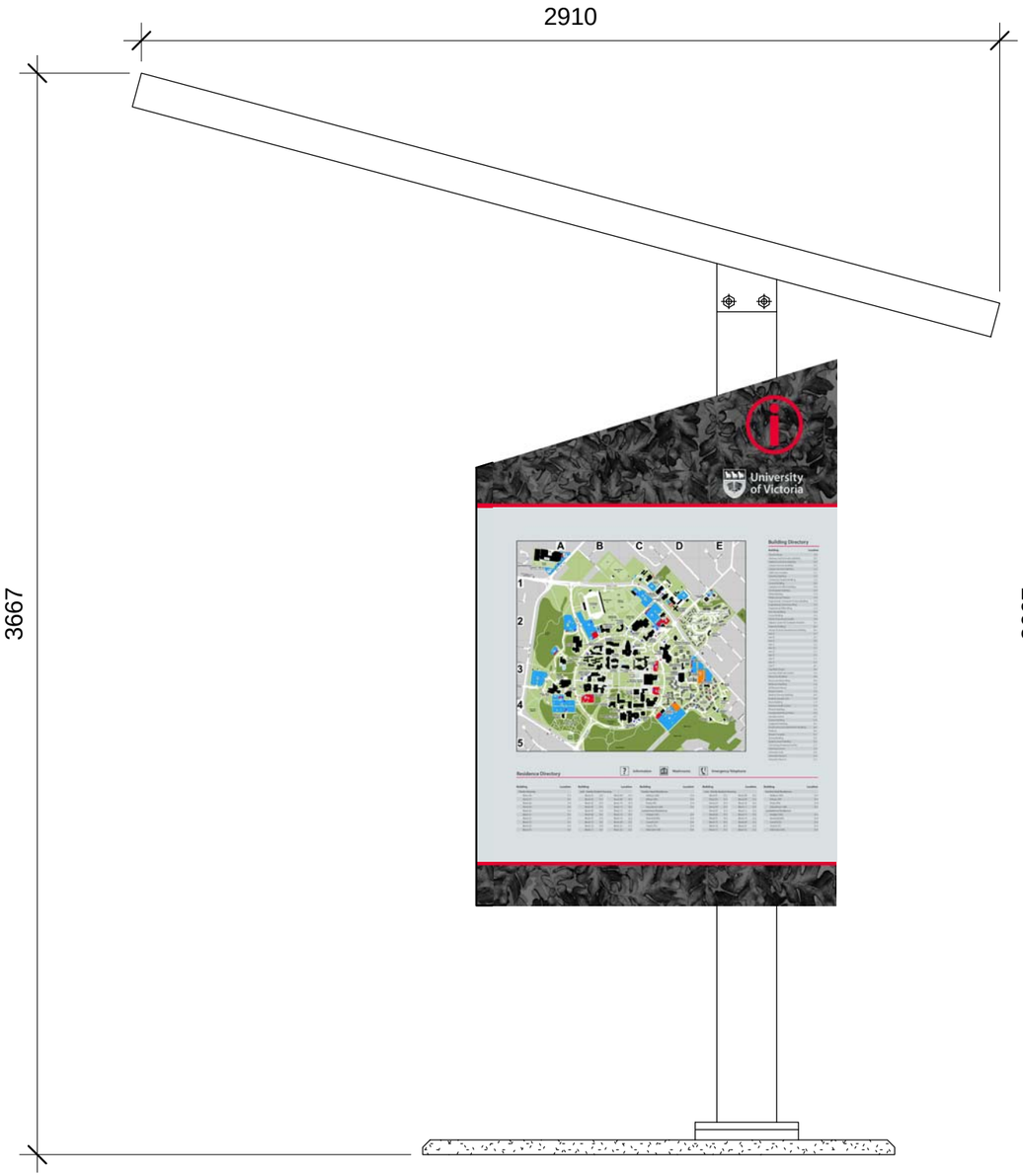
University of Victoria Logo, horizontal standard

full colur

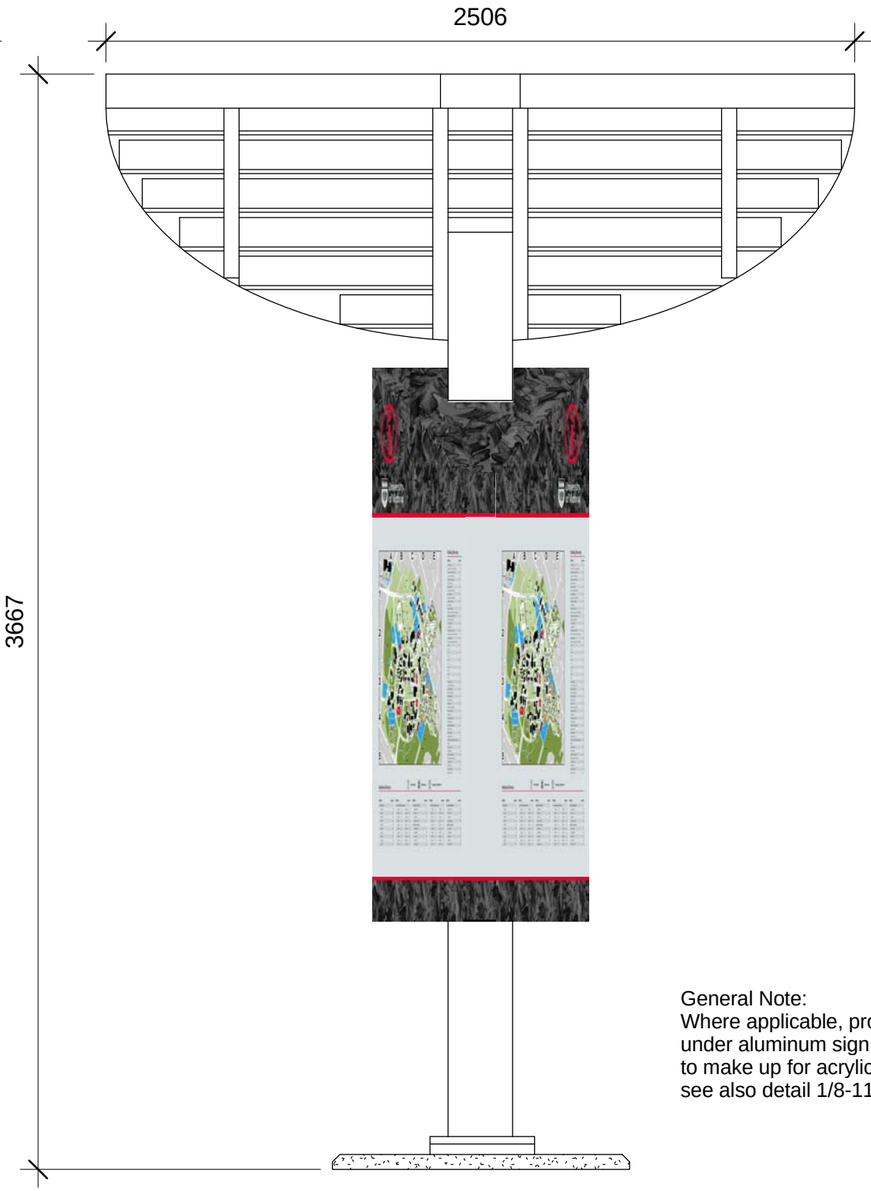
opaque monochromatic

opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 8 Pedestrian Map Directory Kiosk	sheet number:	02	University of Victoria
number:	FM 09-8567	sheet name:	typography, colours and pictograms			
issue date:	Jan 31, 2012	scale:	as noted			



side elevation scale 1:20



front elevation scale 1:20

General Note:
Where applicable, provide 6.4mm thick aluminum spacer under aluminum sign panels
to make up for acrylic panel thickness
see also detail 1/8-11

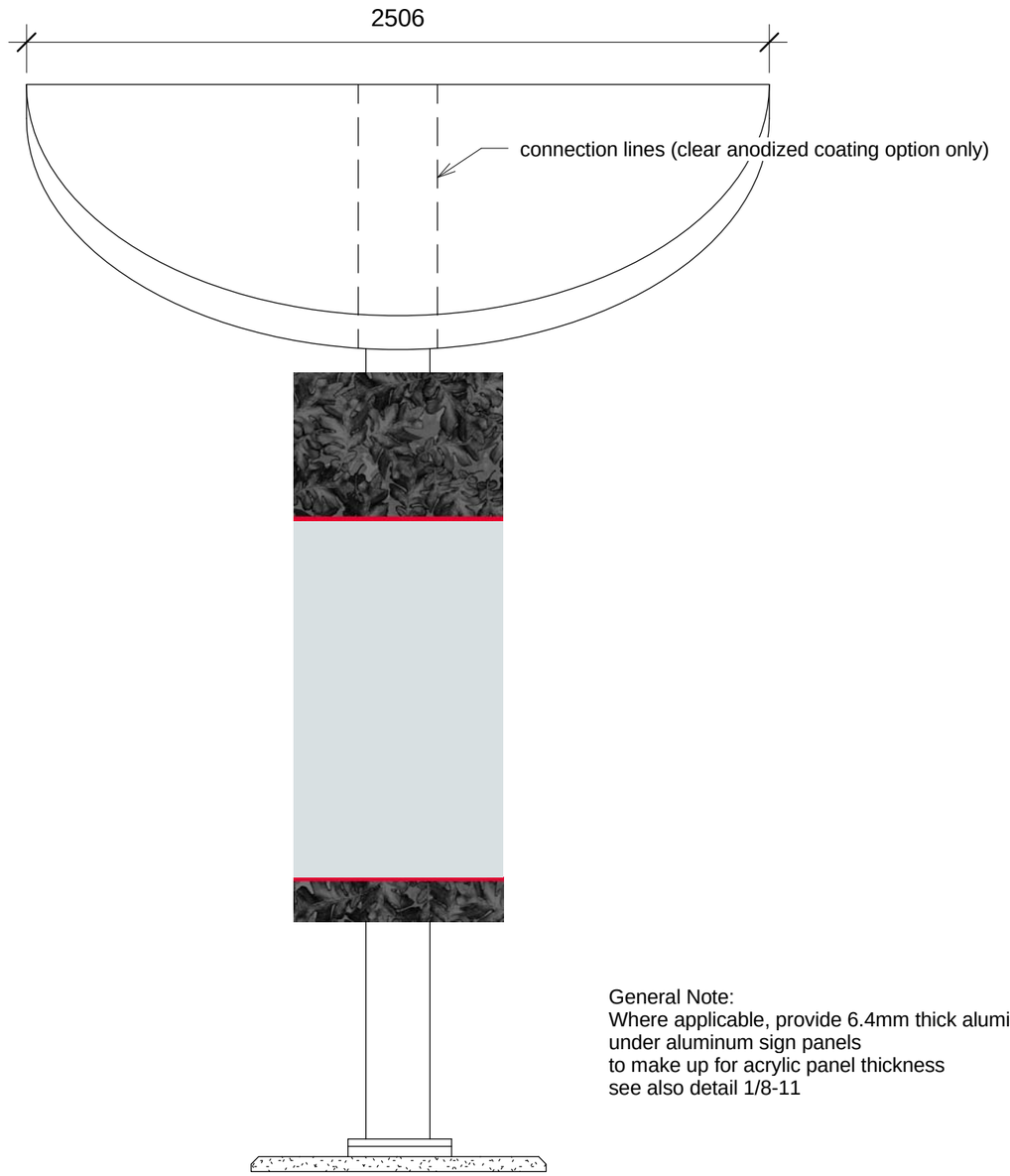
project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign design - overview
scale: as noted

sheet number: 03

University of Victoria

side elevation scale 1:20

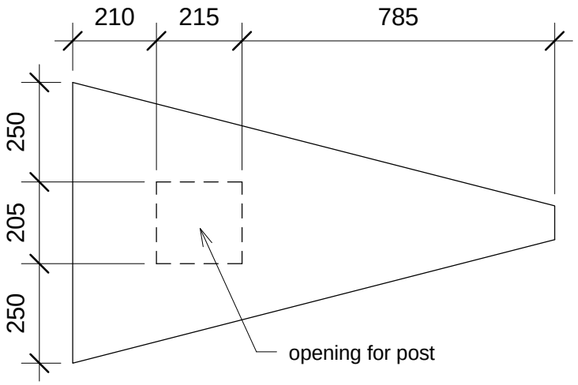


back elevation scale 1:20

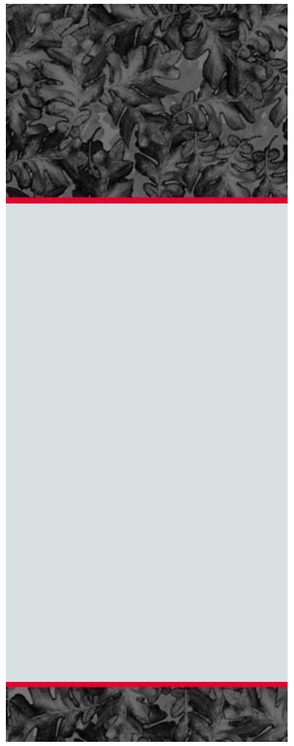
General Note:
Where applicable, provide 6.4mm thick aluminum spacer
under aluminum sign panels
to make up for acrylic panel thickness
see also detail 1/8-11

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 8 Pedestrian Map Directory Kiosk
sheet name:	sign design - overview cont.
scale:	as noted
sheet number:	04

University of Victoria

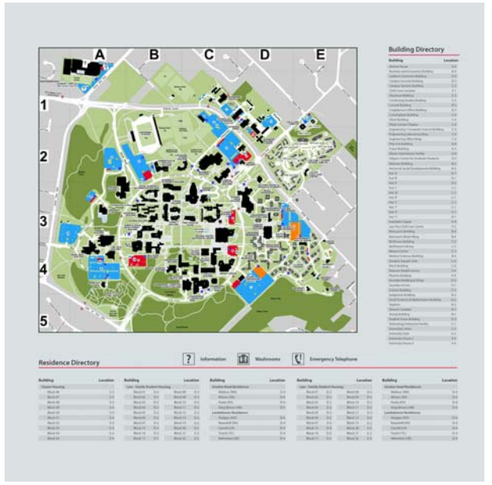


top panel:
3.2mm thick aluminum with
digitally printed vinyl (Gary Oak motif)
protected with anti-graffiti,
optically clear overlaminate.



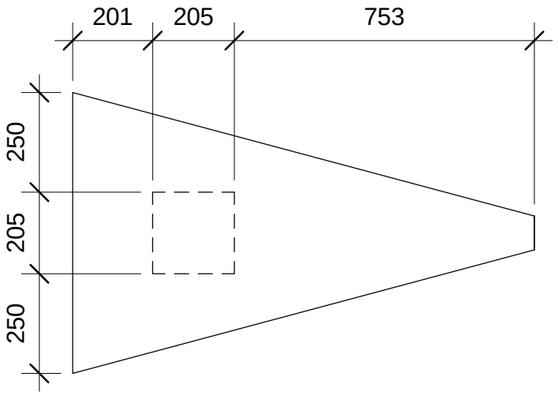
back panel:
Digitally printed vinyl protected
with anti-graffiti,
optically clear overlaminate.
Aluminum panel size:
710 mm x 1848 mm x 3.2 mm

Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate.
19mm thick acrylic push-thru pictogram
Aluminum panel size:
1190 mm x 500 mm x 3.2 mm



non-glare clear acrylic panel,
digitally printed-on vinyl, diffusion layer.
Acrylic panel size: 1200 mm x 1200 mm x 6.4 mm

Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate.
Aluminum panel size:
1190 mm x 150 mm x 3.2 mm



bottom panel:
3.2 mm thick aluminum with
clear anodized coating

Non-glare clear acrylic:
Plaskolite OPTIX Abrasion Resistant Non-Glare
or equivalent.
Clear acrylic (pictograms):
Plaskolite OPTIX, Chemcast GP or equivalent

First surface prints:
Vinyl: 3M IJ180, MPI 2005 or equivalent
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent.

2nd surface prints:
CAV-50 reverse print - i/w/i (2nd surface)
Overlaminate: 3M 8914, Avery DOL 6060
or equivalent (first surface)

1) Vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Where applicable wrap vinyl and overlaminate over the edges of the alu. panel.
4) All panels to be mechanically festened to substrate.
5) Directory map shown for reference only. directory map with all associated texts and pictograms to be provided in digital format by University of Victoria
6) Manufacturer to confirm all dimensions prior to fabrication.

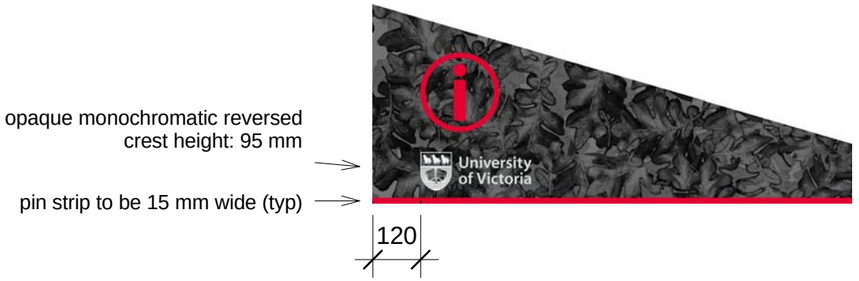
General note:
Manufacturer to confirm all dimensions
prior to fabrication.

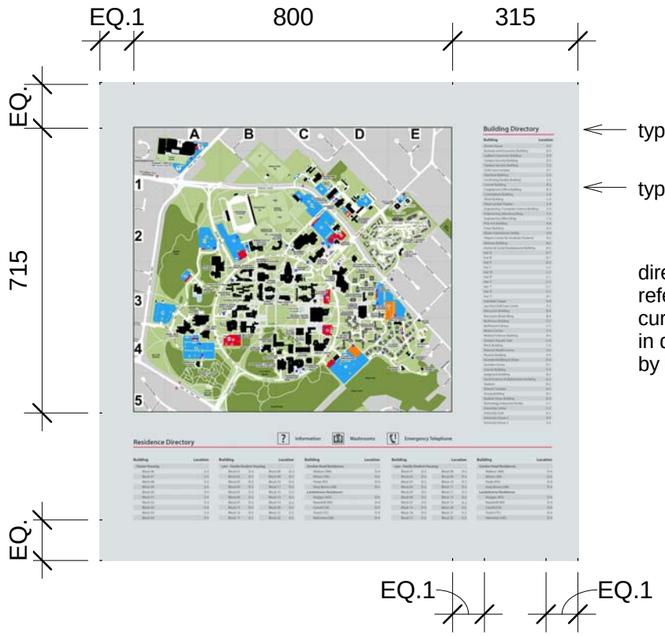
project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

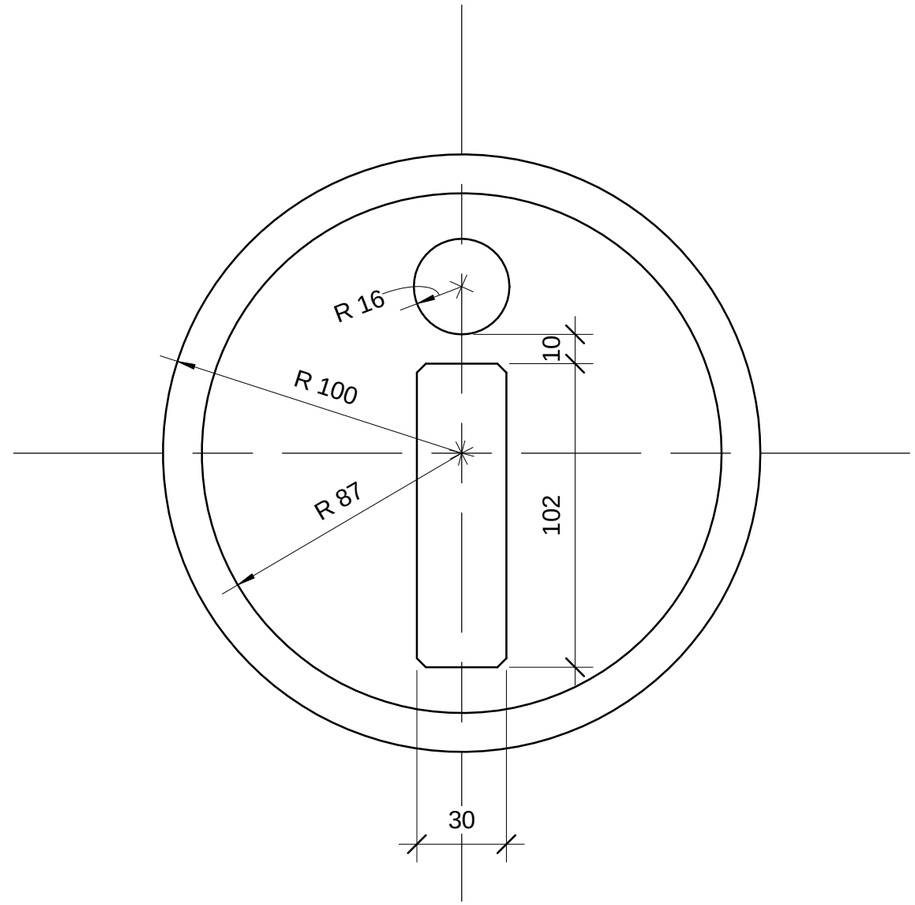
sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign design - graphic design details
scale: as noted

sheet number: 05

University of Victoria







General note:
Manufacturer to confirm all dimensions
prior to fabrication.

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 8 Pedestrian Map Directory Kiosk
sheet name:	sign design - graphic design details cont.
scale:	as noted

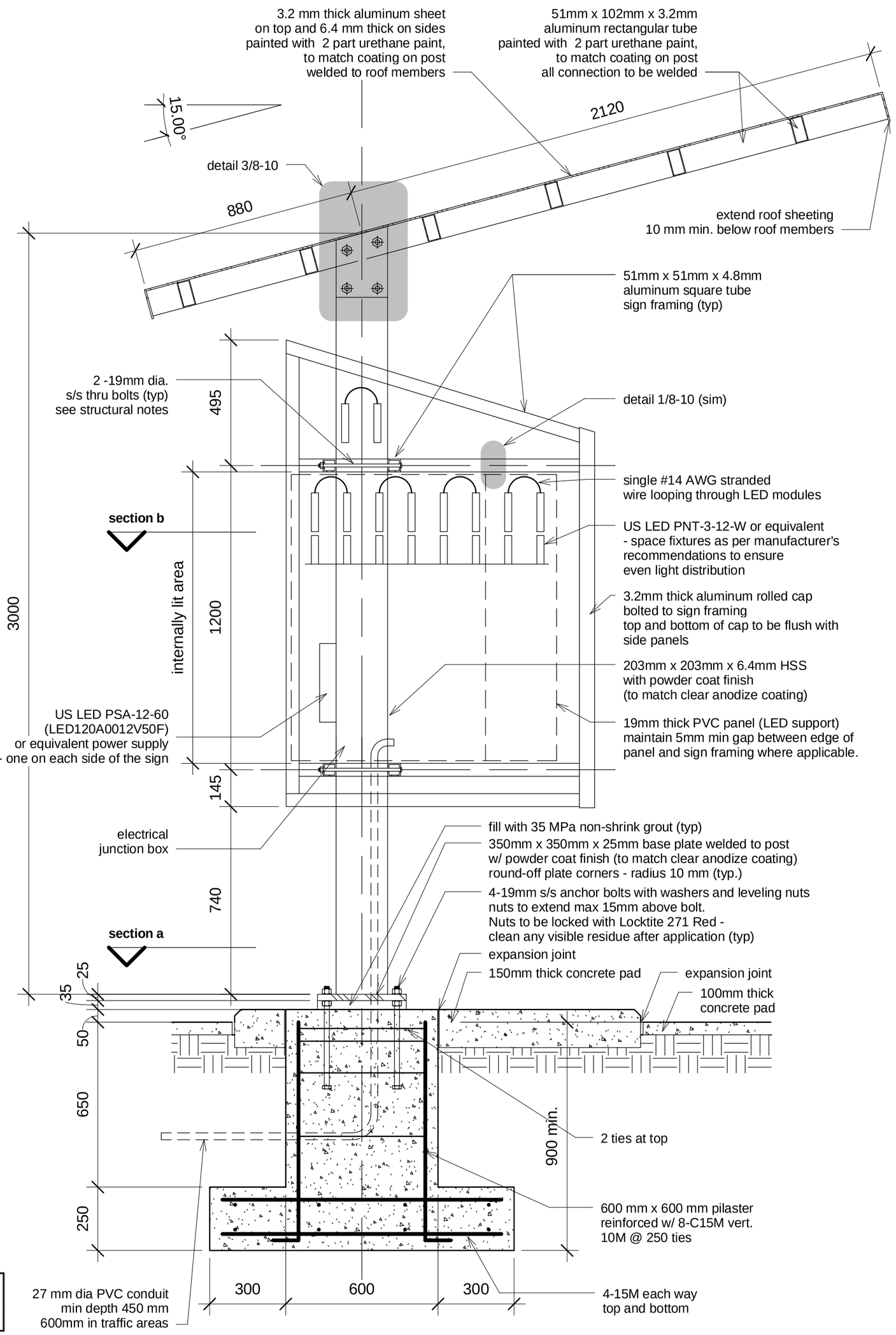
sheet number: 06

University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign construction - cross section
scale: as noted

sheet number: 07



long section scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

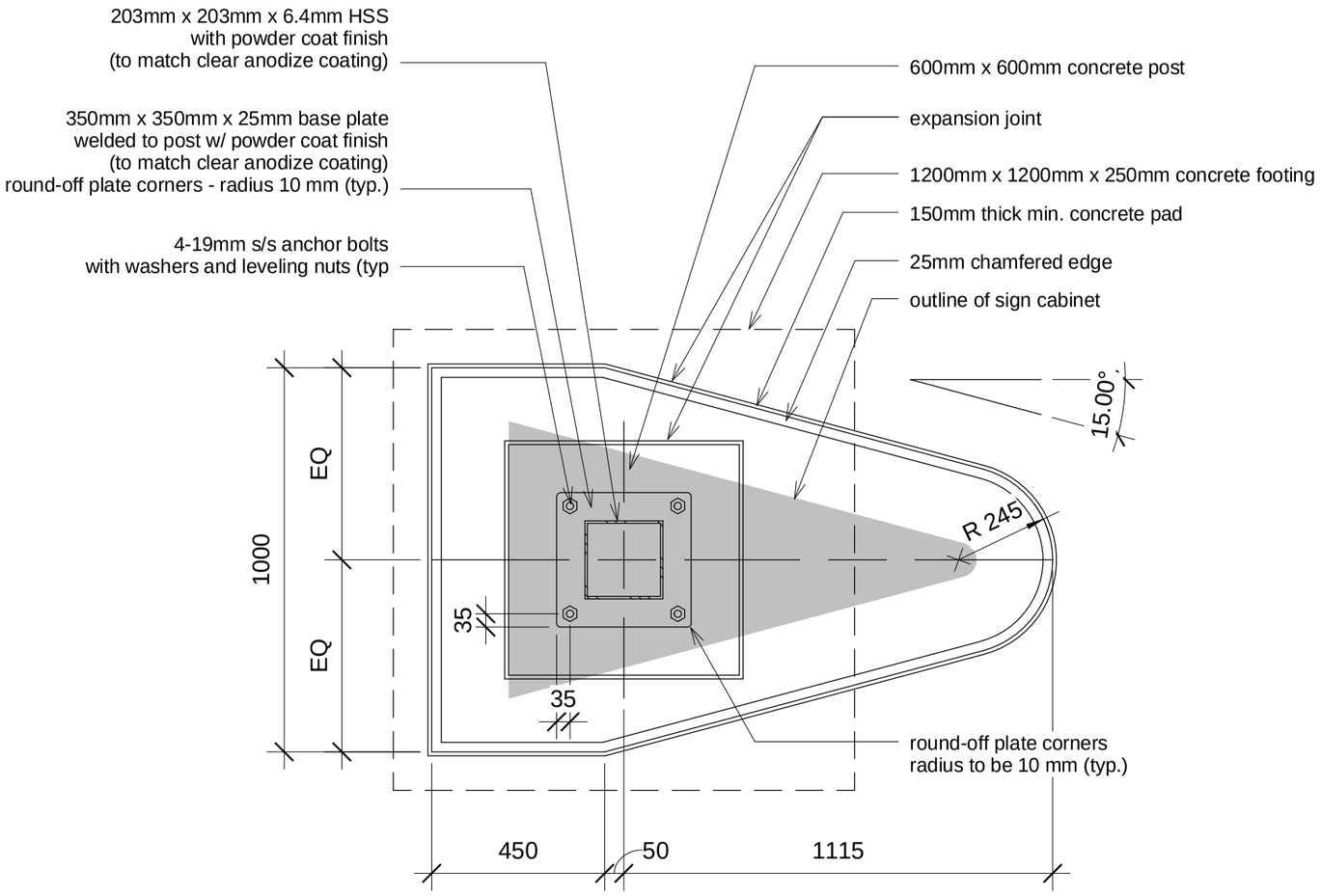
1) provide ventilation holes as required
2) US LED PSA-12-60 power supply to provide source of power to a maximum of 50 MegaBright 12 LED Modules
3) Sign must have a CSA label as an assembly

University of Victoria

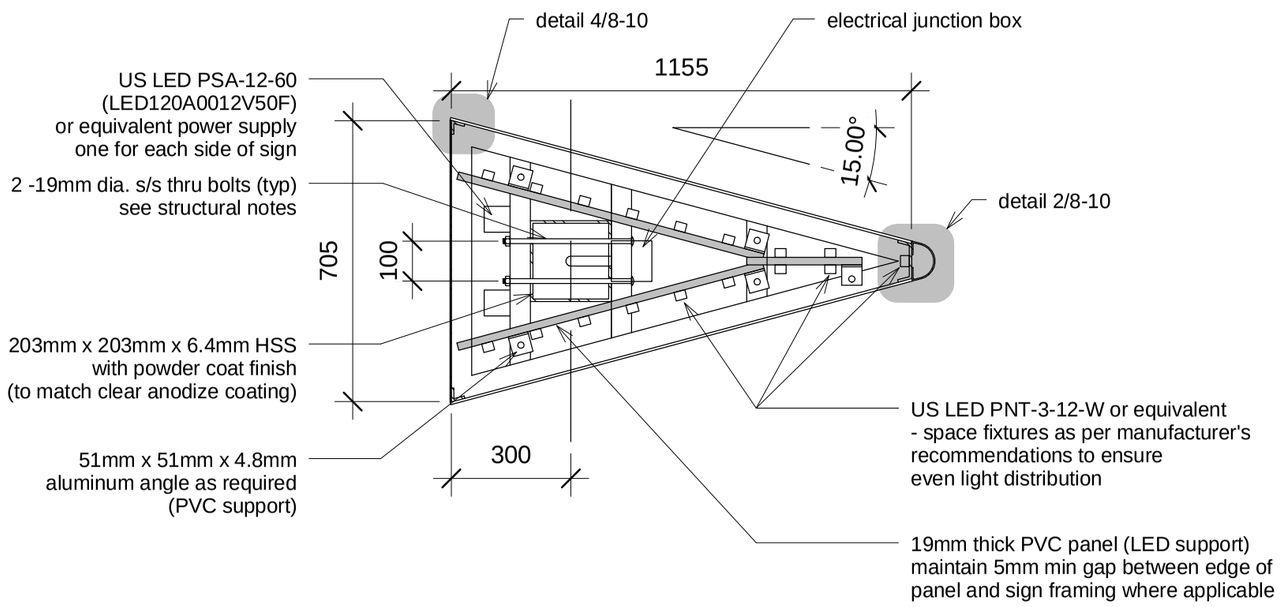
project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign construction - section plans
scale: as noted

sheet number: 08



section a scale 1:15



section b scale 1:15

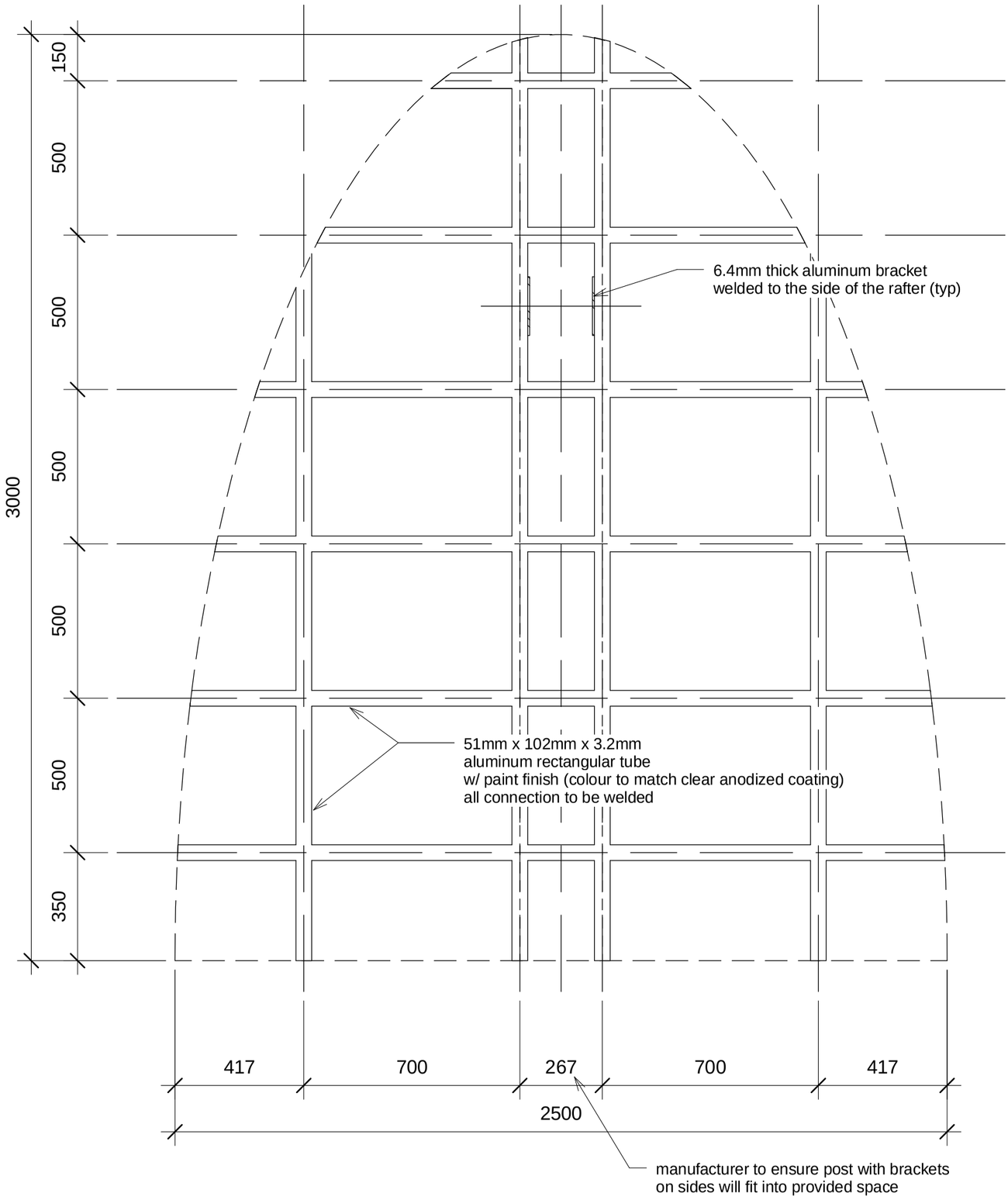
General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign construction - painted canopy plan and details
scale: as noted

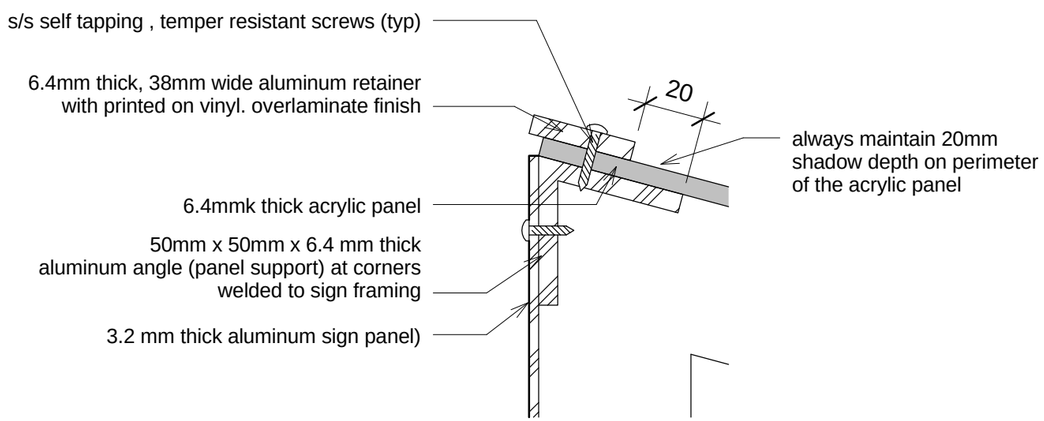
sheet number: 09



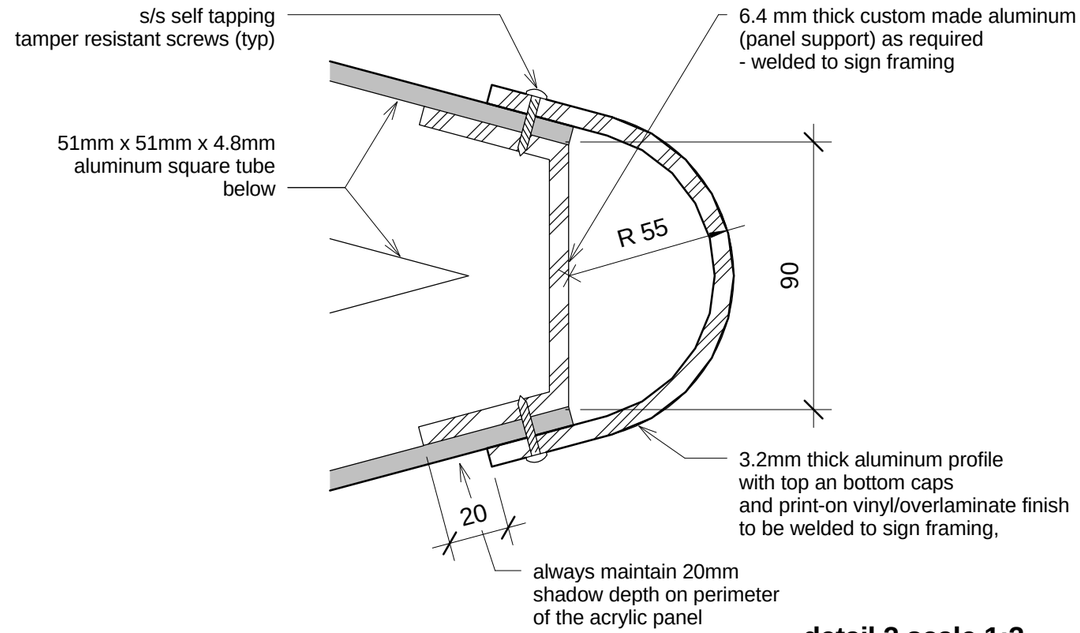
roof (paint finish option)
plan scale 1:15

University of Victoria

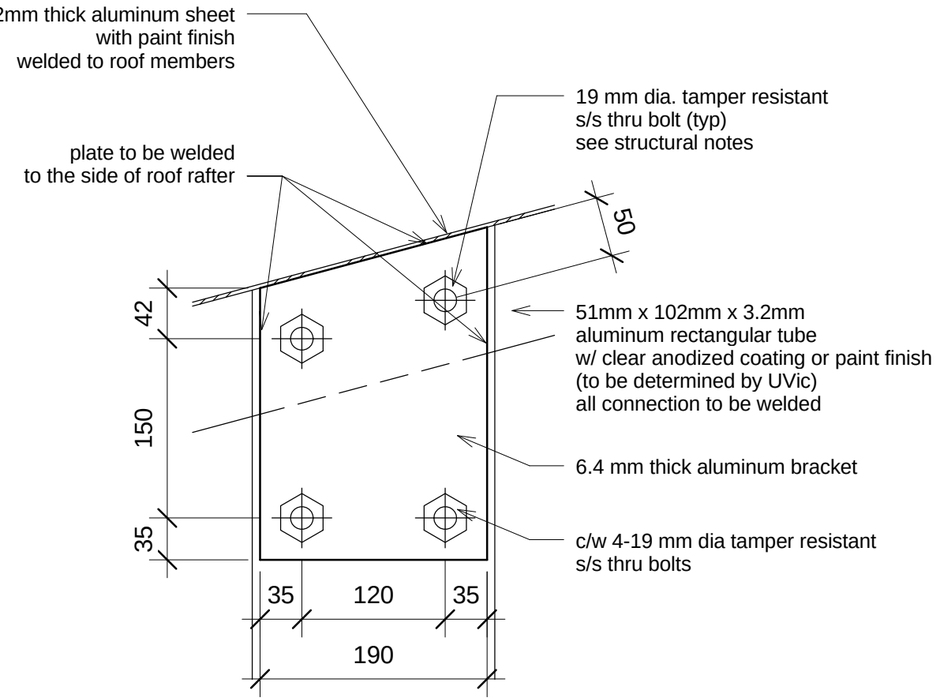
General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.



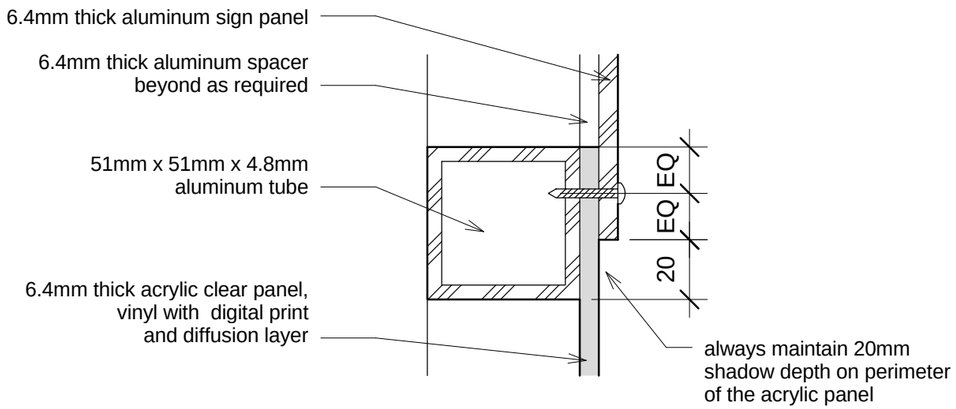
detail 4 scale 1:2



detail 2 scale 1:2



detail 3 scale 1:5



detail 1 scale 1:2

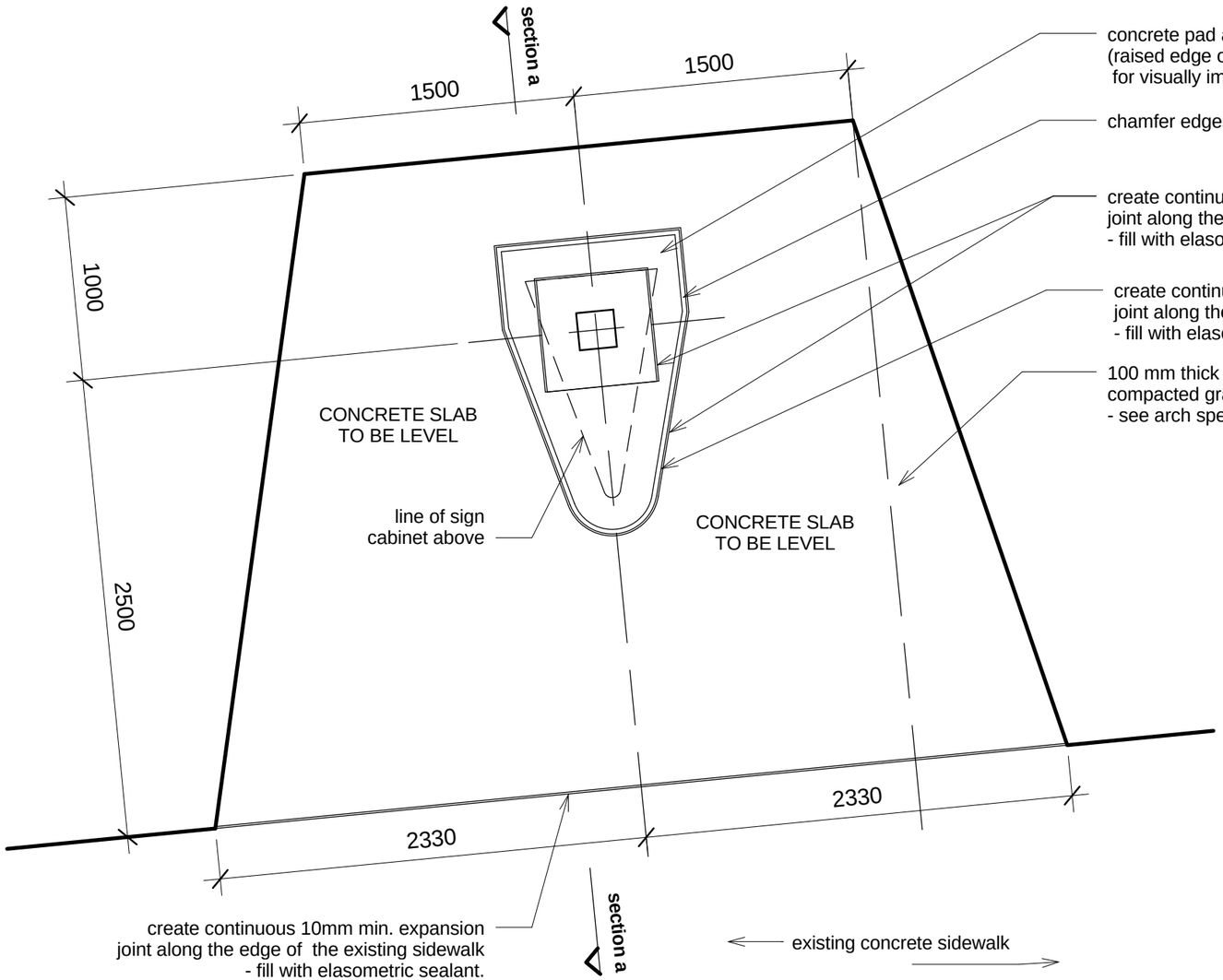
General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 8 Pedestrian Map Directory Kiosk
sheet name: sign construction - details
scale: as noted

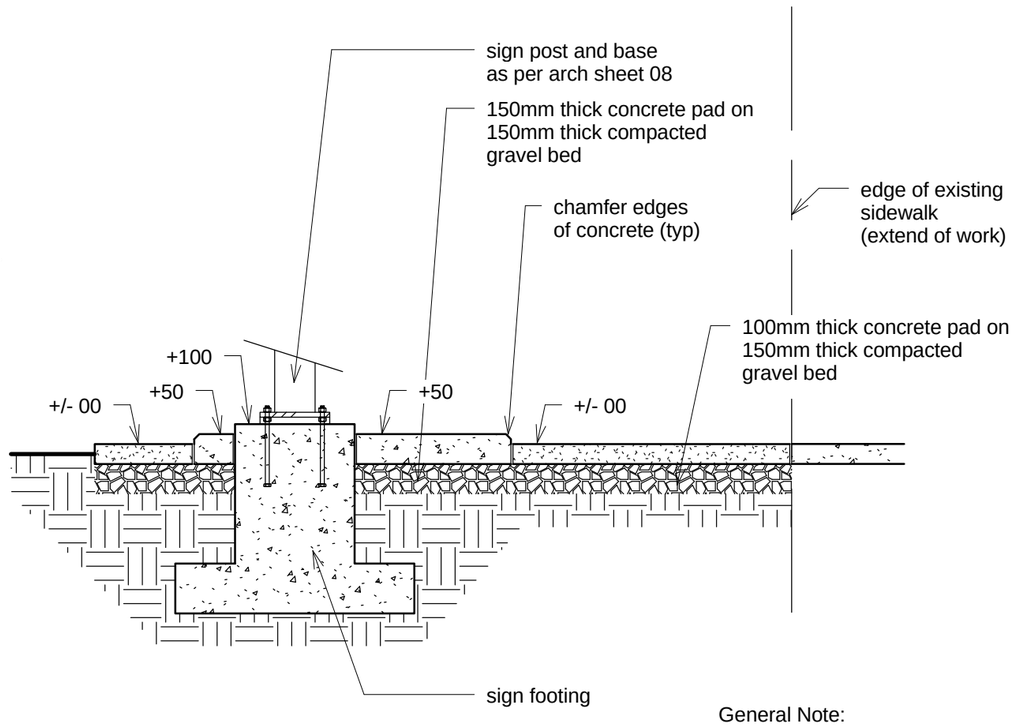
sheet number: 10

University of Victoria



General Notes:

1) top of 100mm thick concrete slab to be flush with existing sidewalk. Concrete pad is to be modified accordingly - always maintain 50mm height difference.
2) drawing should be read in conjunction with arch. specifications
3) Contractor to verify all dimensions on site prior to sign installation



1. plan view scale 1:30

2. section a-a scale 1:30

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 8 Pedestrian Map Directory Kiosk
sheet name:	typical concrete slab
scale:	as noted
sheet number:	11

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
    foundation (anchor bolts):
    bolts: Fastenal part #47349 (3/4" s/s threaded)
    washers: Fastenal part #71027 (3/4" s/s wahers)
    nuts: Fastenal part #70717 (3/4" s/s nuts)
    panels:
    security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
4. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with the Structural Engineer.
3. The work to be reviewed shall be generally complete.

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.

STRUCTURAL NOTES (cont)

6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

ELECTRICAL NOTES

1. Signs must be provided with CSA label
2. LED modules, power supplies, cable, wire and junction box must be integral with signs
3. All electrical installations to be done in accordance with the Canadian Electrical Code
   and as reccomended by the LED lighting manufacturer.
4. Run 2#8 +GND conductors in 27mm PVC conduit from sign to existing campus
   exterior lighting pole standard. Intercept existing underground conduit, install an
   H20 rated flush junction box with bolt-on cover and splice into exterior lighting circuit.
4. The sign manufacturer shall provide an electrical shop drawings indicating
   input power requirements and a schematic wiring diagram for the sign.

Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - section
06	sign construction - plans and sections
07	sign construction - details
08	sign construction - push thru pictogram
09	general notes

Sign No. 9
Pedestrian - Major Directional

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 9 - Major Directional
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
crest - reversed monochromatic

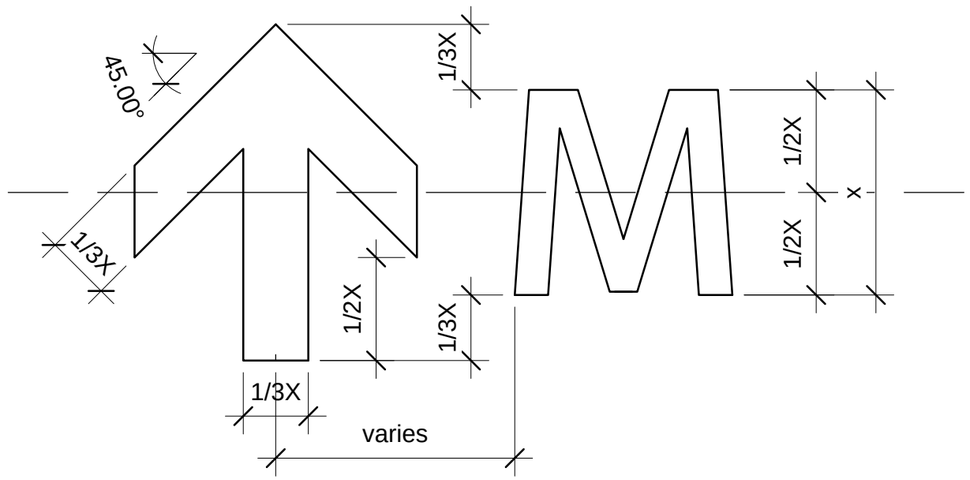
gary oak motif - digital file is to be delivered
by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

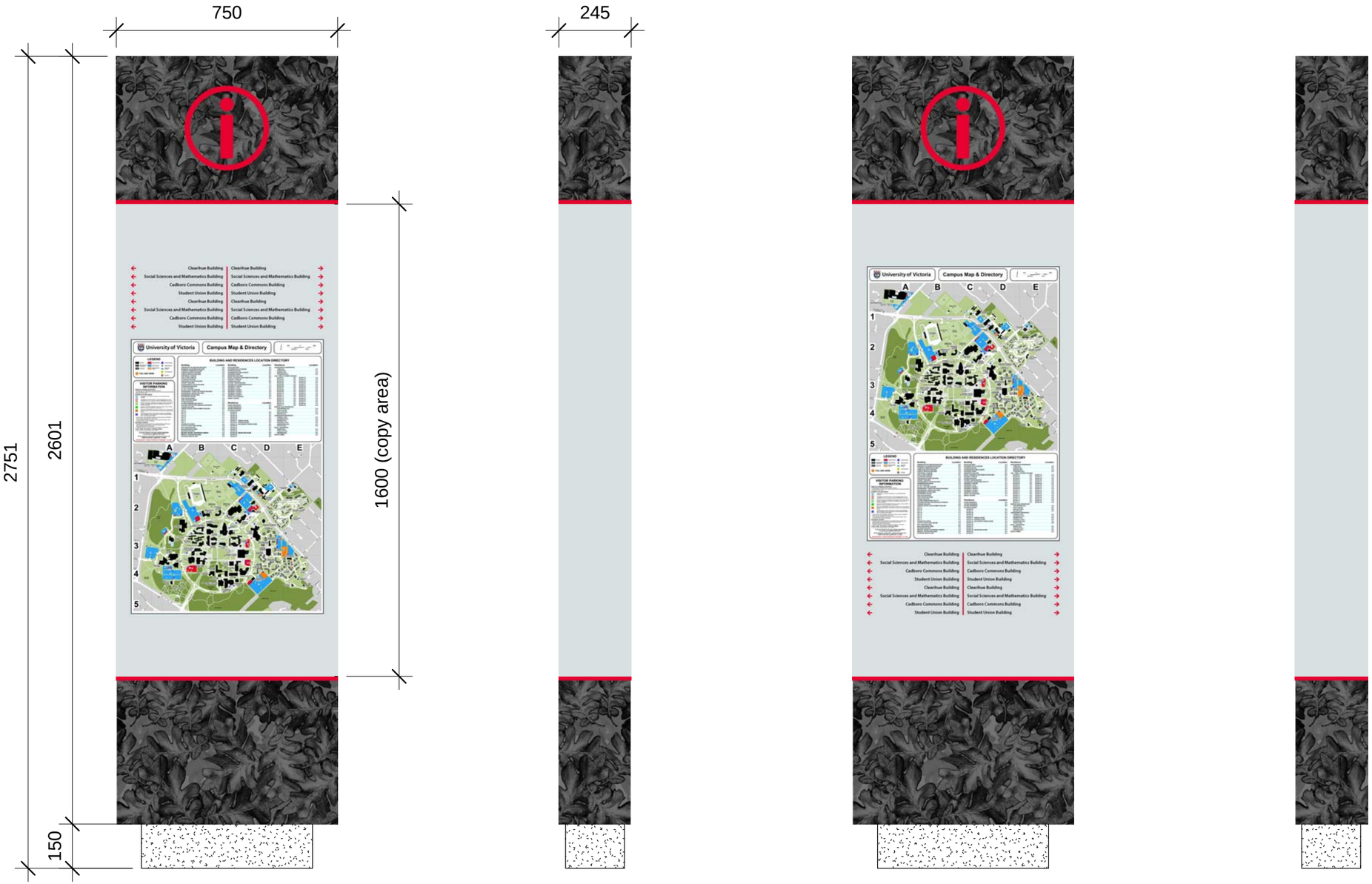
full colur

opaque monochromatic

opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 9 - Major Directional	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



back **side** **front** **side** **scale 1:15**

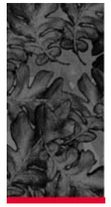
General Note:
Where applicable, provide 6.4mm thick aluminum spacer under aluminum sign panels to make up for acrylic panel thickness
see also detail 3/9-07

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 9 - Major Directional
sheet name:	sign design - overview
scale:	as noted
sheet number:	03

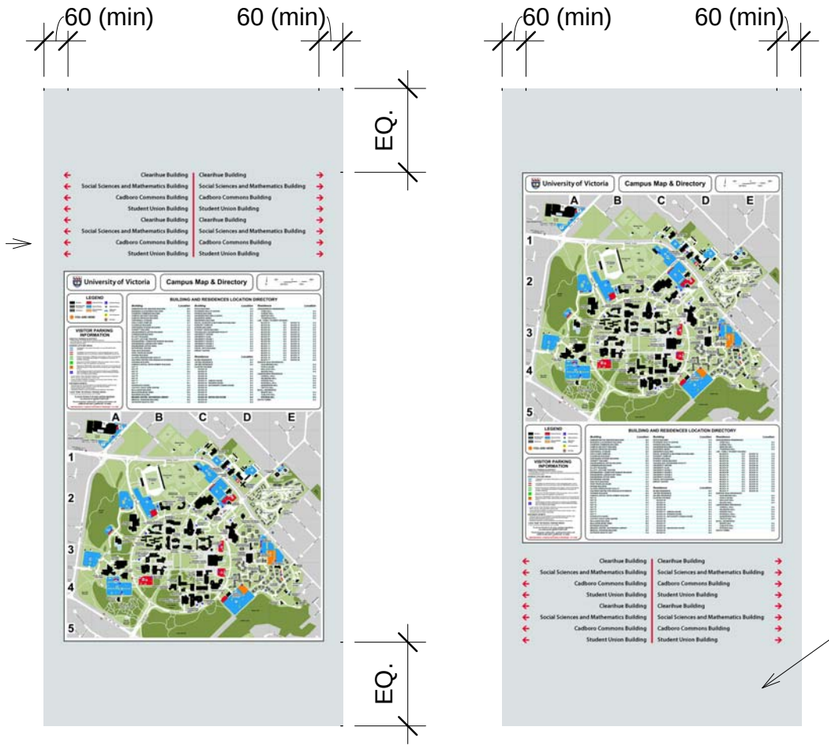
University of Victoria

Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. Aluminum panel size: 283 mm x 744 mm x 3.2 mm

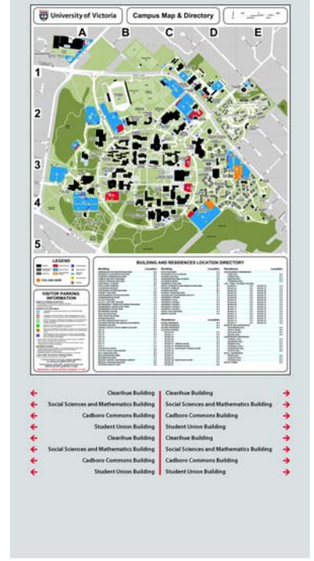
Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. Aluminum panel size: 270 mm x 506 mm x 3.2 mm



Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. 19mm thick acrylic push-thru pictogram - see dwg 08 for details. Aluminum panel size: 744 mm x 506 mm x 6.4 mm



Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. For aluminum panel size see sign construction drawings



Non-glare clear acrylic:
Plaskolite OPTIX Abrasion Resistant Non-Glare or equivalent.
Clear acrylic (pictograms):
Plaskolite OPTIX, Chemcast GP or equivalent

First surface prints:
Vinyl: 3M IJ180, MPI 2005 or equivalent
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent.

2nd surface prints:
CAV-50 reverse print - i/w/i (2nd surface)
Overlaminate: 3M 8914, Avery DOL 6060 or equivalent (first surface)

1) Vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Where applicable wrap vinyl and overlaminate over the edges of the alu. panel.
4) All panels to be mechanically festened to substrate.
5) Directory map shown for reference only. directory map with all associated texts and pictograms to be provided in digital format by University of Victoria
6) Manufacturer to confirm all dimensions prior to fabrication.
7) Manufacturer to ensure watertightness of panel conenctions.

Refer to Adobe Photoshop files for detailed sample layout

pin strip to be 15 mm wide (typ)

Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. Aluminum panel size: 270 mm x 506 mm x 3.2 mm

Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate. Aluminum panel size: 744 mm x 506 mm x 6.4 mm

scale 1:15

sides

front

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 9 - Major Directional
sheet name: sign design - graphic design details
scale: as noted

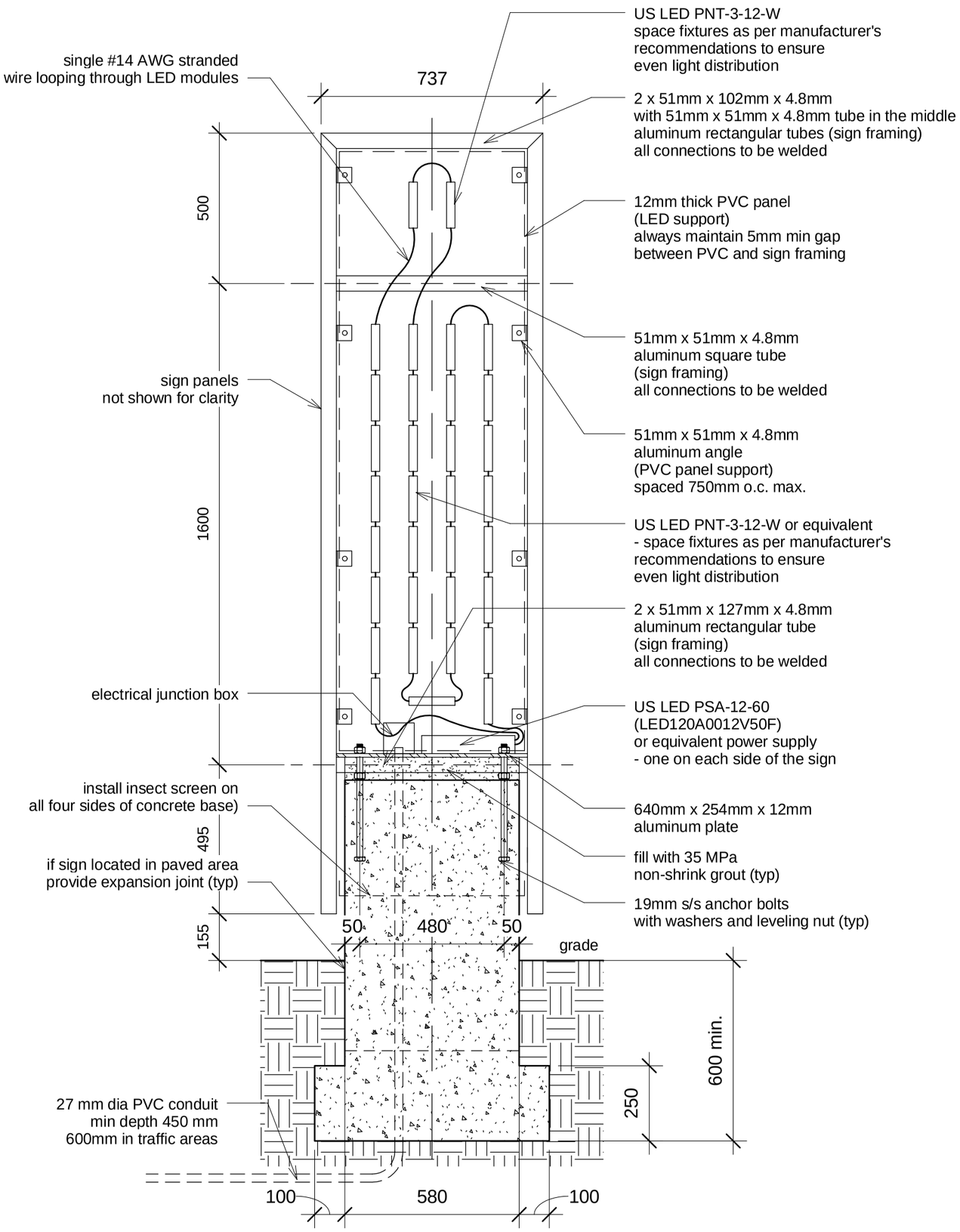
sheet number: 04

University of Victoria

project:
number: Campus Wayfinding
issue date: FM 09-8567
Jan 31, 2012

sign:
sheet name: Sign No. 9 - Major Directional
scale: sign construction - section
as noted

sheet
number: 05



1) provide ventilation holes as required
2) US LED PSA-12-60power supply to provide source of power to a max. of 50 MegaBright 12 LED Modules
3) Sign must have a CSA label as an assembly

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

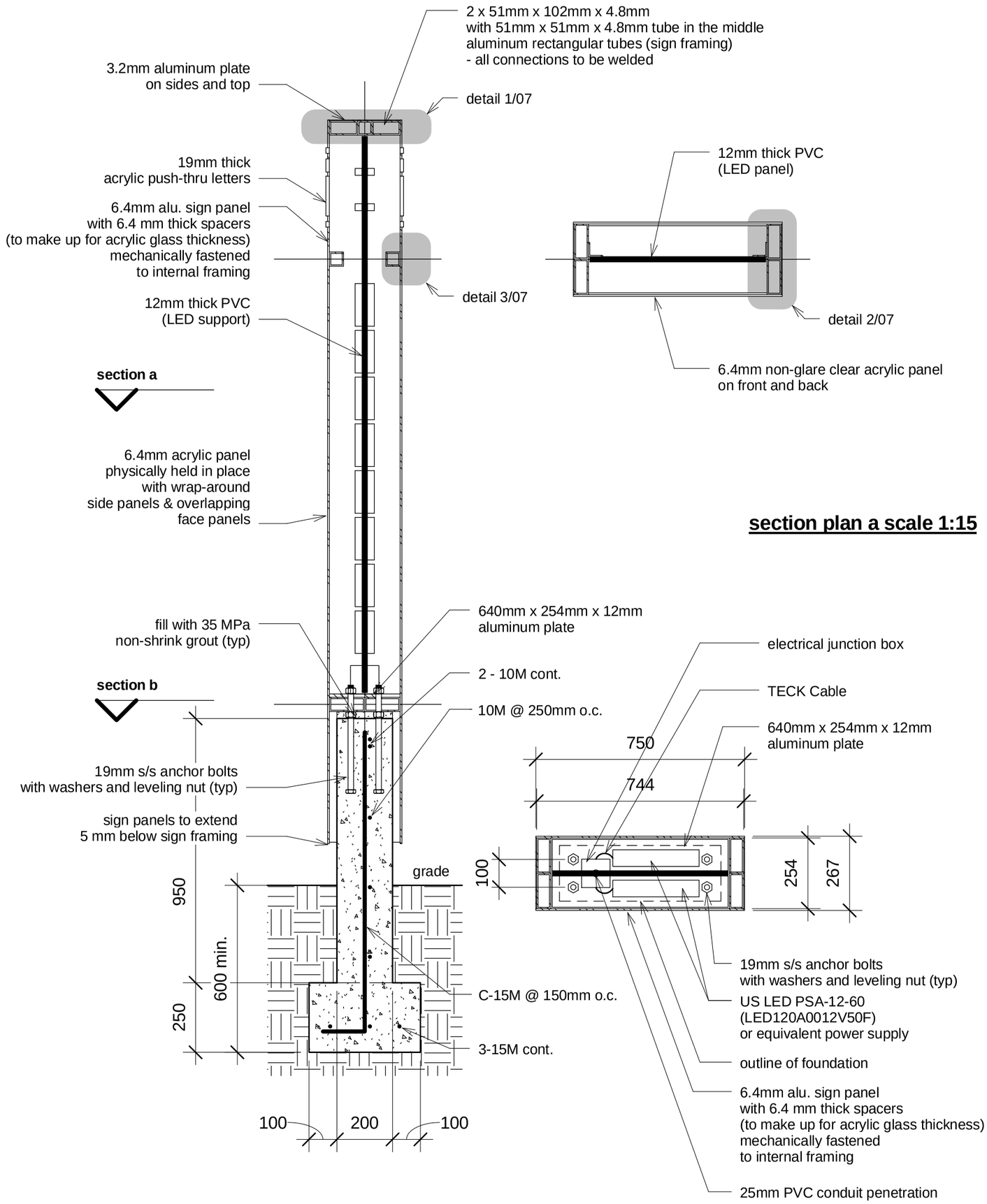
University of Victoria

long section scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 9 - Major Directional
sheet name: sign construction - plans and sections
scale: as noted

sheet number: 06



section plan a scale 1:15

cross section scale 1:15

section plan b scale 1:15

University of Victoria

General Note:
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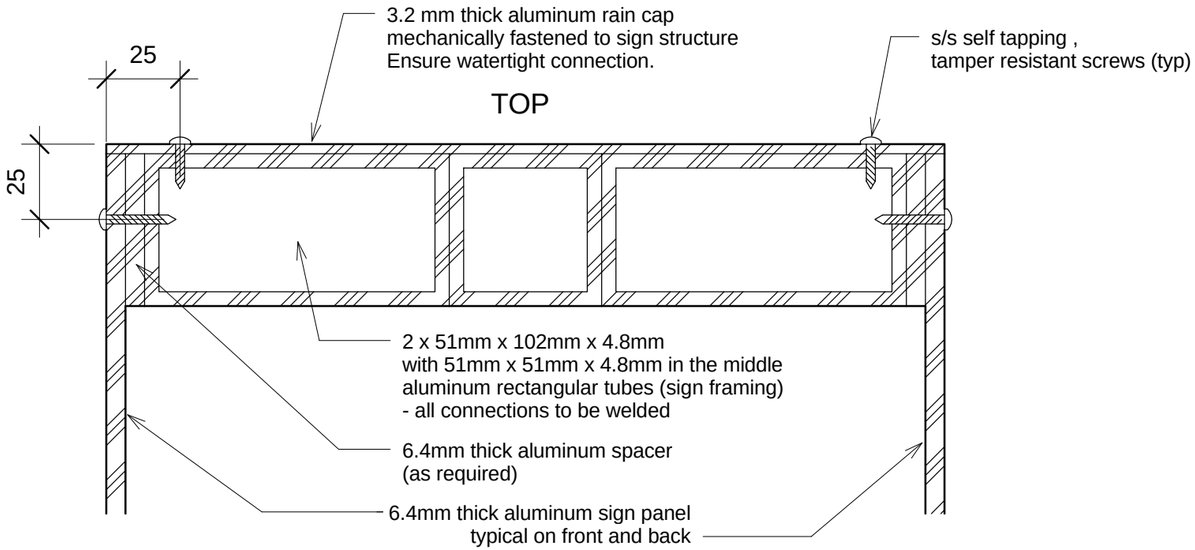
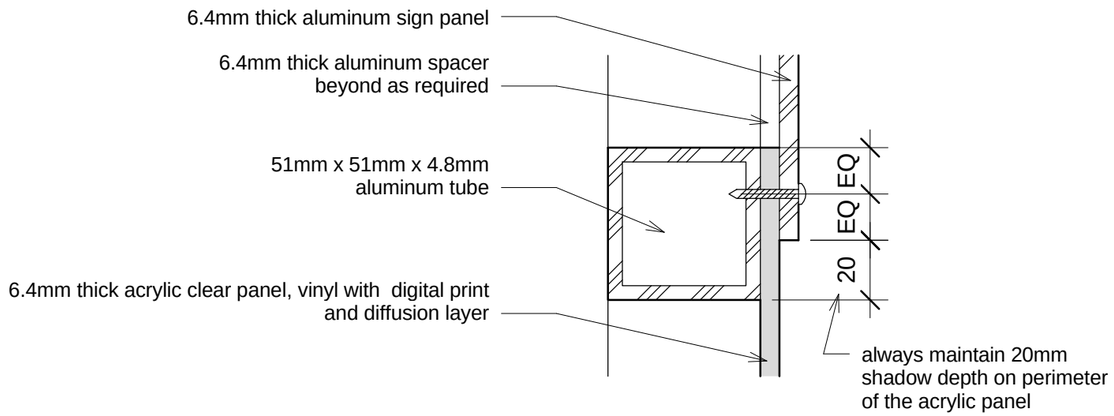


detail 1 scale 1:2



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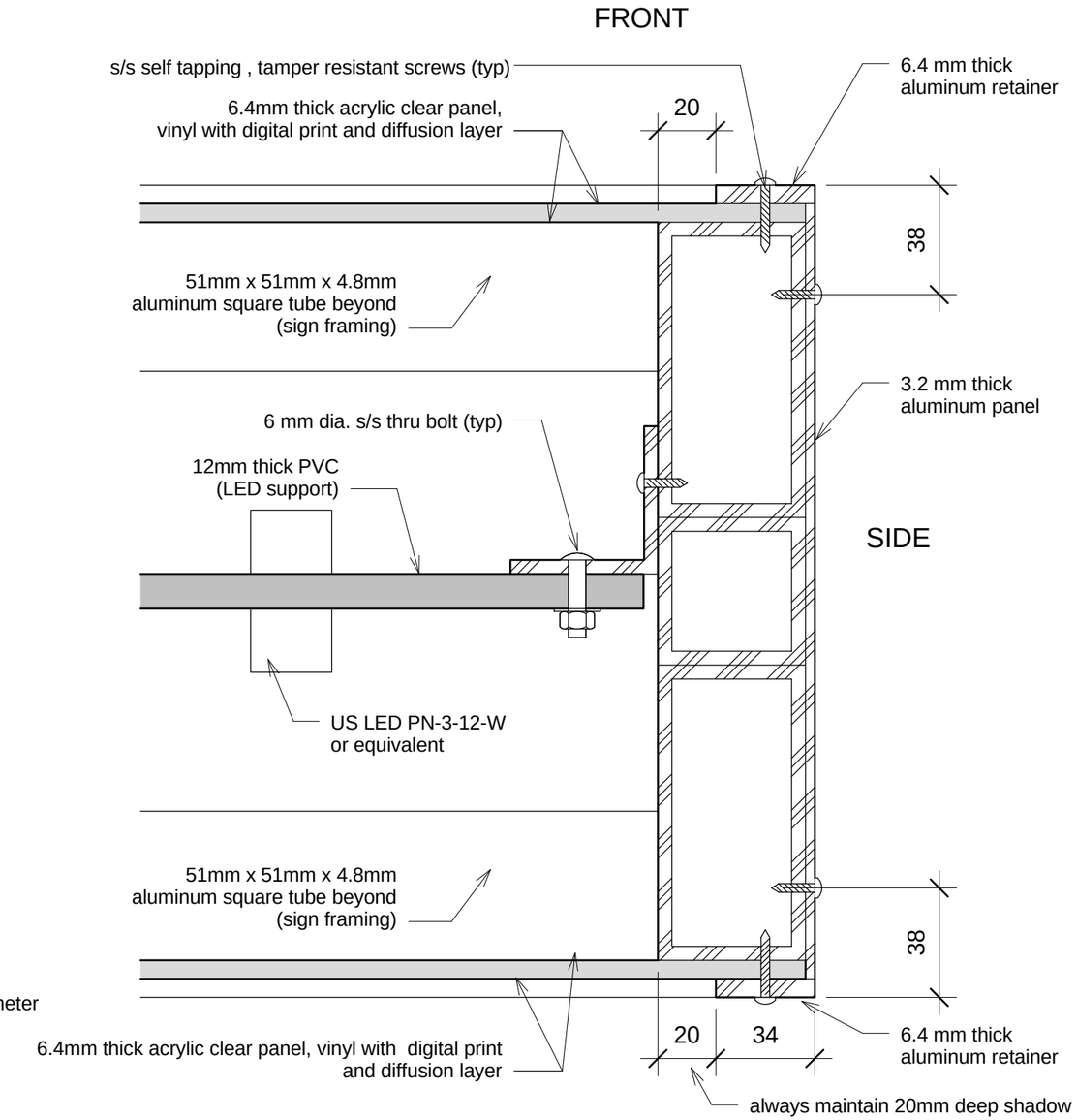
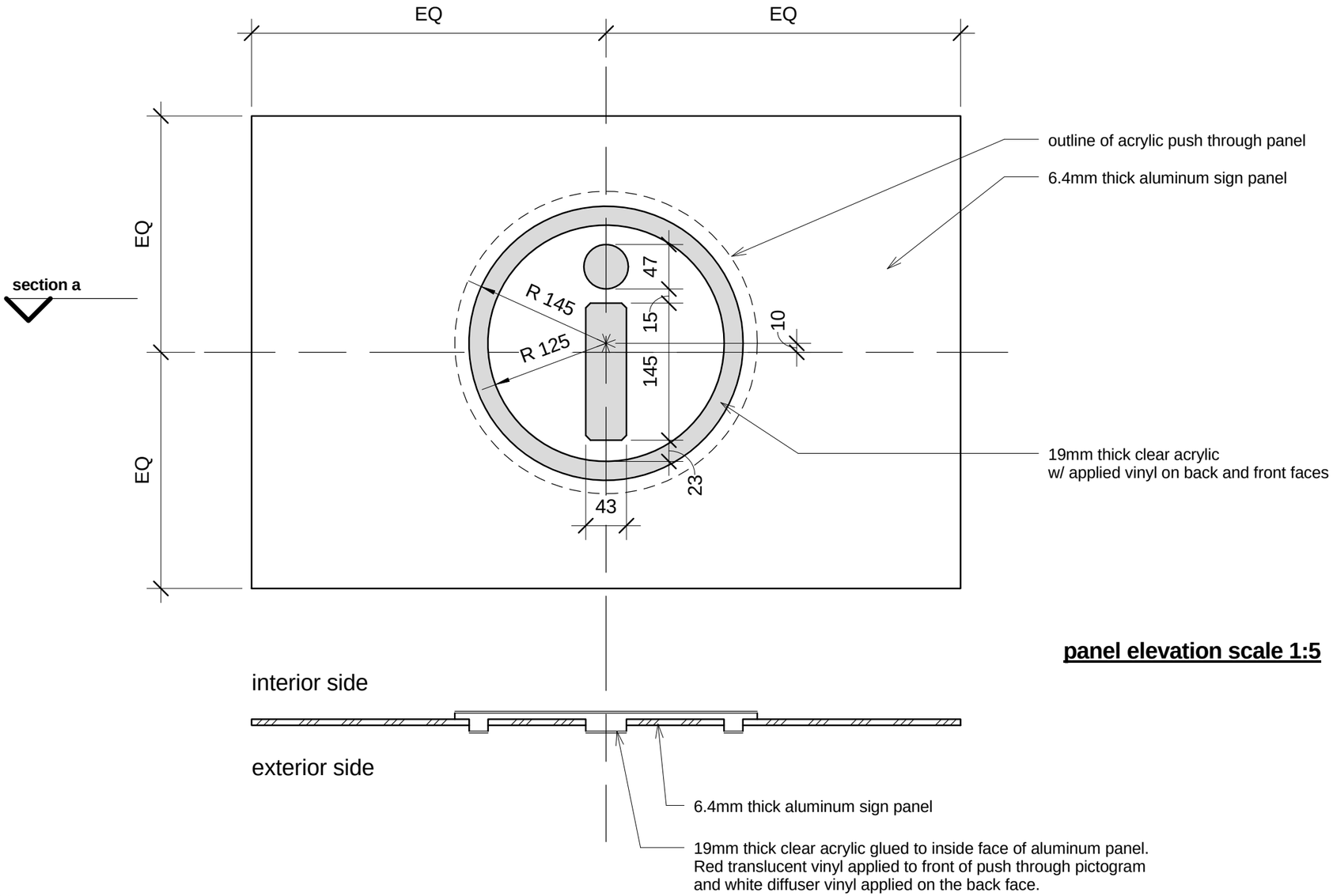
detail 3 scale 1:2



detail 2 scale 1:2

project:	Campus Wayfinding	sign:	Sign No. 9 - Major Directional	sheet number:	07
number:	FM 09-8567	sheet name:	sign construction - details		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



panel elevation scale 1:5

section a scale 1:5

General Note:
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project:	Campus Wayfinding	sign:	Sign No. 9 - Major Directional	sheet number:	08
number:	FM 09-8567	sheet name:	sign construction - push thru pictogram		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
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panels:
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2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.

STRUCTURAL NOTES (cont)

6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

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3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
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9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
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10. Provide 6 mm cap plates for all tube members uno.
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thickness of the thinnest part being connected uno. Welds to be ground smooth.

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1. Connection hardware to be stainless steel uno.
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4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

ELECTRICAL NOTES

1. Signs must be provided with CSA label
2. LED modules, power supplies, cable, wire and junction box must be integral with signs
3. All electrical installations to be done in accordance with the Canadian Electrical Code
and as reccomended by the LED lighting manufacturer.
4. Run 2#8 +GND conductors in 27mm PVC conduit from sign to existing campus
exterior lighting pole standard. Intercept existing underground conduit, install an
H20 rated flush junction box with bolt-on cover and splice into exterior lighting circuit.
4. The sign manufacturer shall provide an electrical shop drawings indicating
input power requirements and a schematic wiring diagram for the sign.

Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes - structural

Sign No. 10
Pedestrian - Intermediate Directional

project: Campus Wayfinding
number: FM 09-8567
issue date: January 31, 2012

sign: Sign No. 10 - Intermediate Directional
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating

PANTONE 185 C
pinstrip, arrows

PANTONE 426 C
text

PANTEONE 7541 C
background, UVic Logo

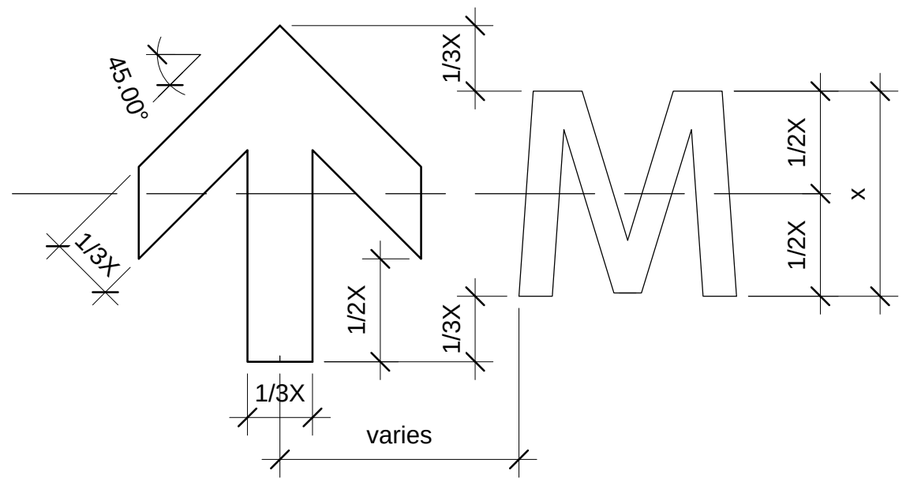
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

University of Victoria

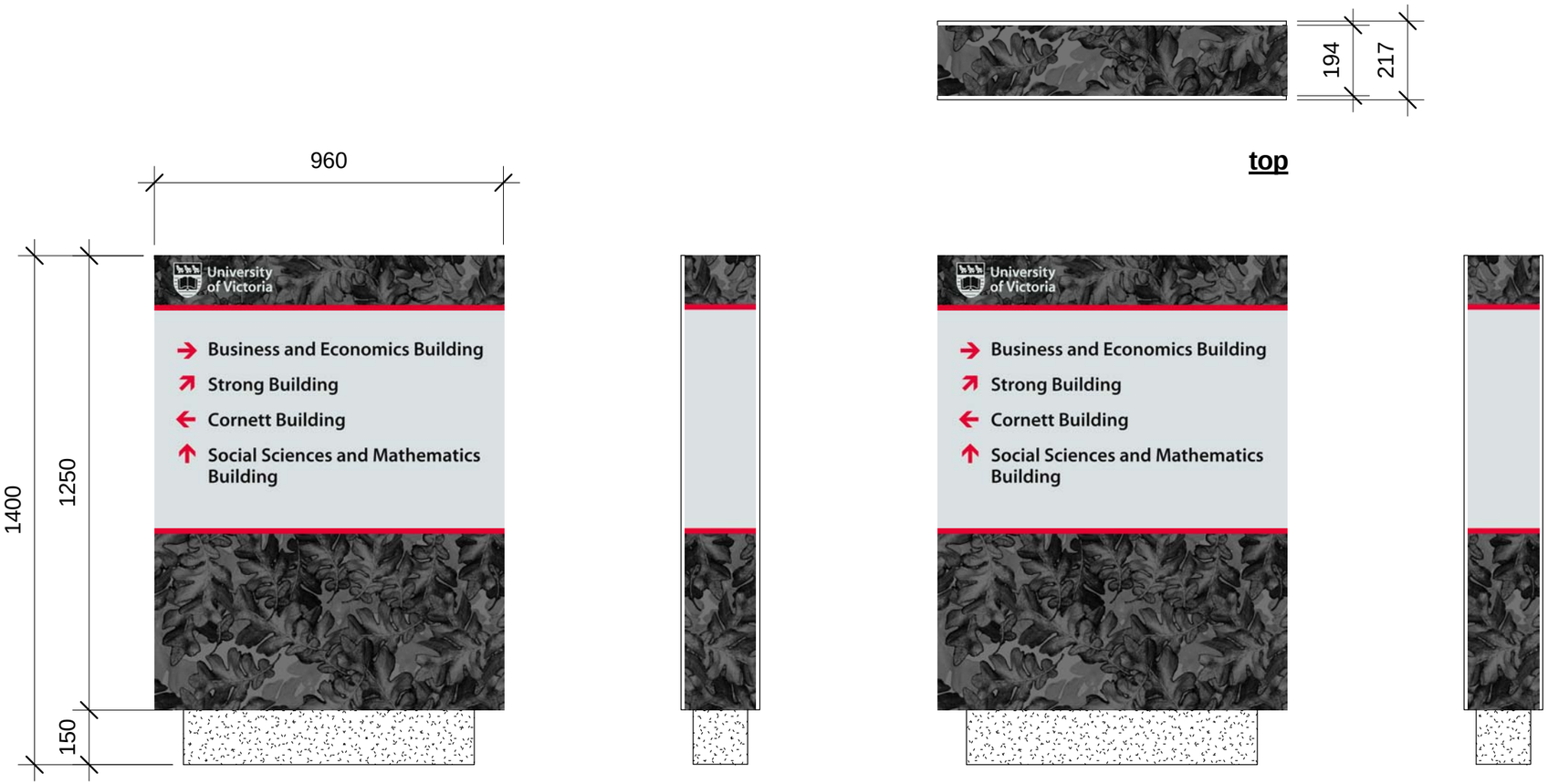
University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: January 31, 2012

sign: Sign No. 10 - Intermediate Directional
sheet name: typography, colours and pictograms
scale: as noted

sheet number: 02

University of Victoria



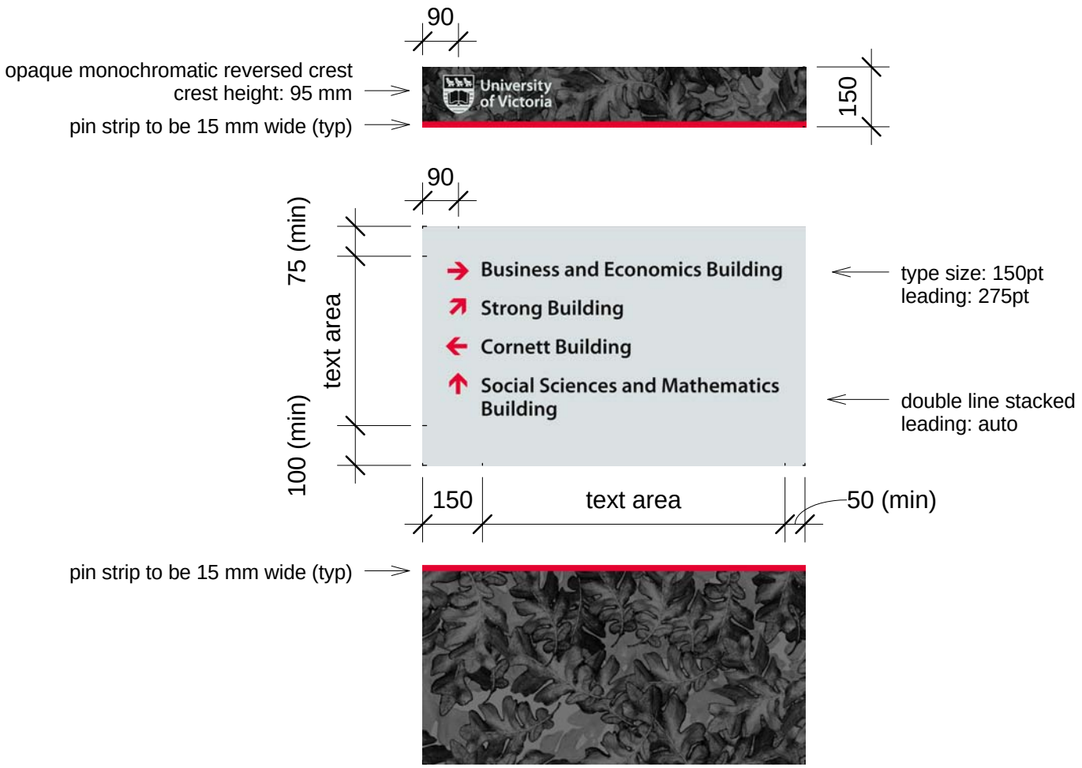
top

back **side** **front** **side**

scale 1:15

project:	Campus Wayfinding	sign:	Sign No. 10 - Intermediate Directional	sheet number:	03
number:	FM 09-8567	sheet name:	sign design - overview		
issue date:	January 31, 2012	scale:	as noted		

University of Victoria



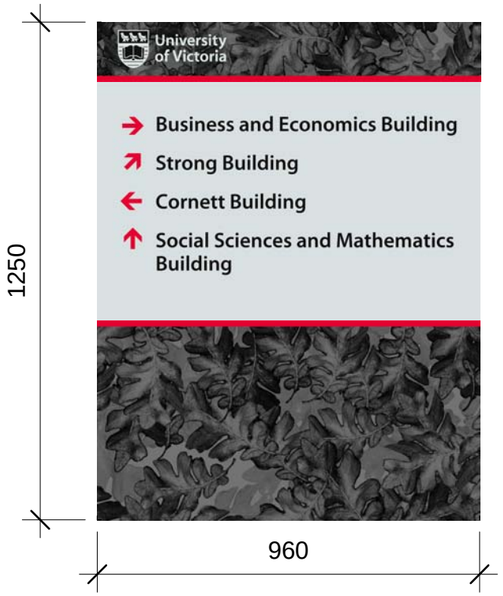
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Front/Back aluminum panel size (one piece): 960 mm x 1250 mm x 6.4 mm
Top Aluminum panel size (one piece): 194 mm x 960 mm x 3.2 mm
Side aluminum panle size (one piece): 194 mm x 1243.6 mm x 3.2 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panels.

Refer to Adobe Photoshop files for detailed sample layout

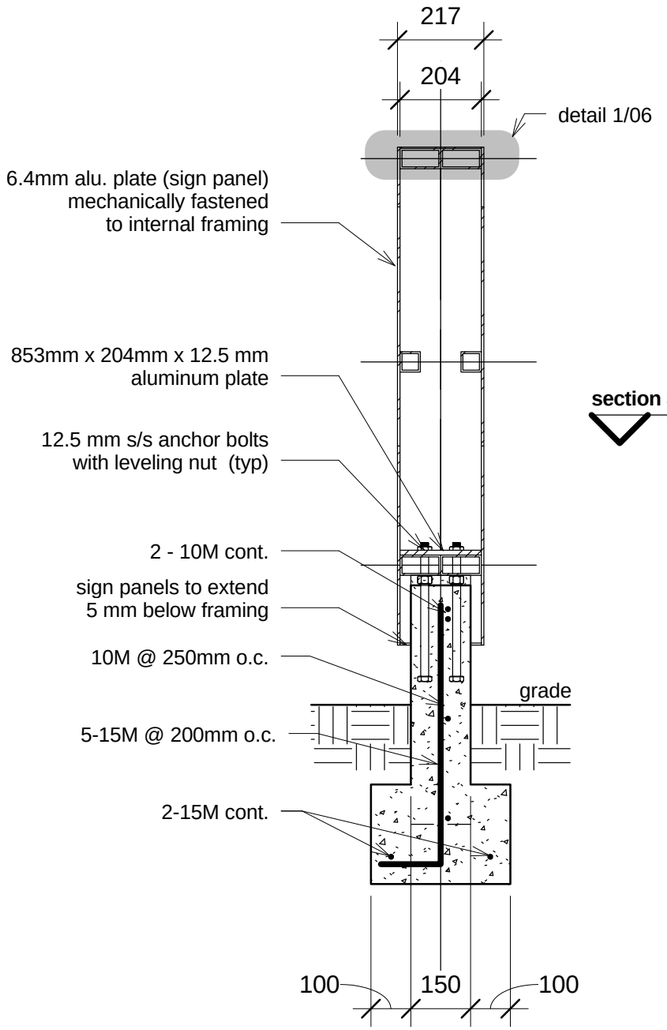


scale 1:15

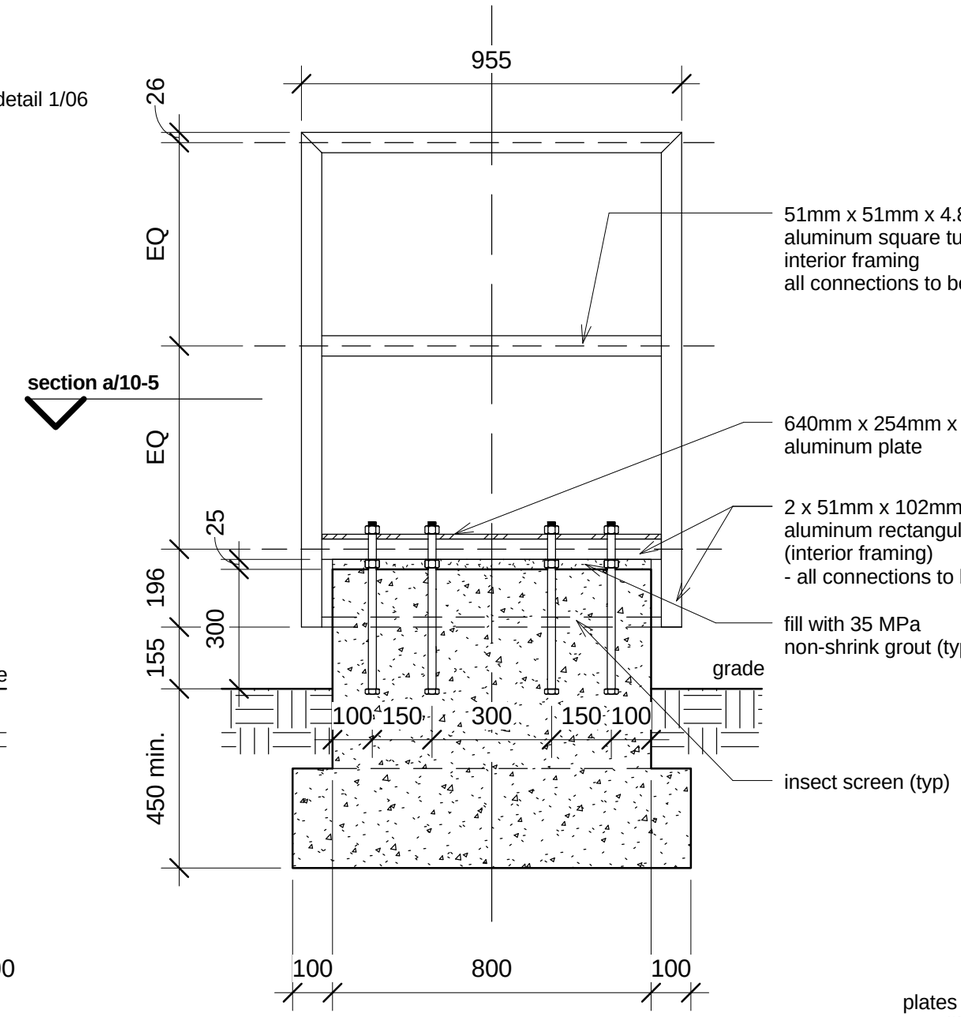
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	January 31, 2012
sign:	Sign No. 10 - Intermediate Directional
sheet name:	graphic design details
scale:	as noted
sheet number:	04

University of Victoria

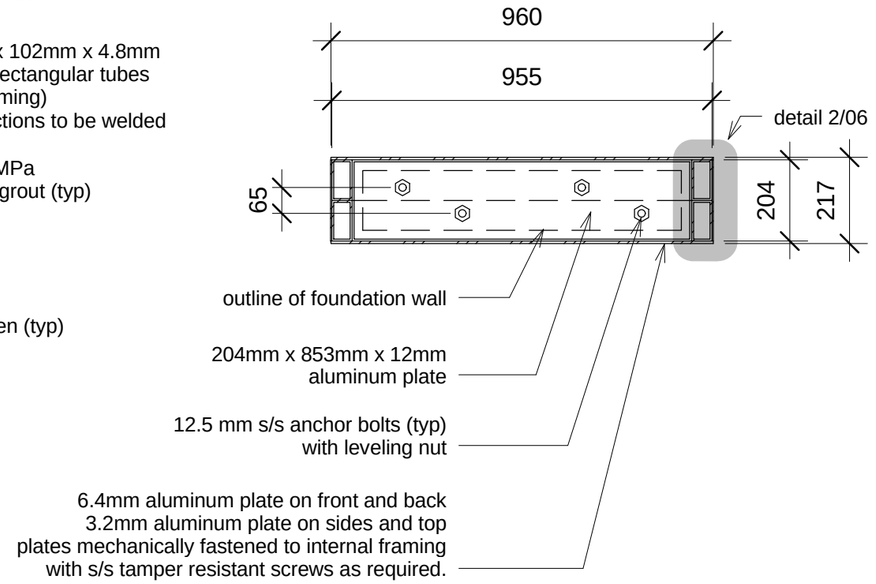
General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.



cross section scale 1:15



long section scale 1:15



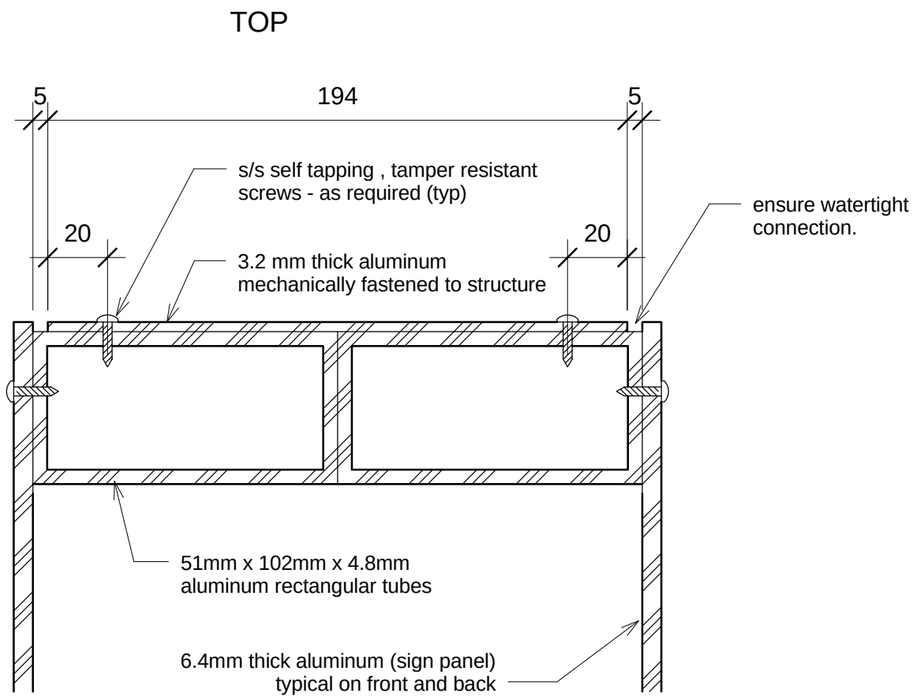
plan section a scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: January 31, 2012

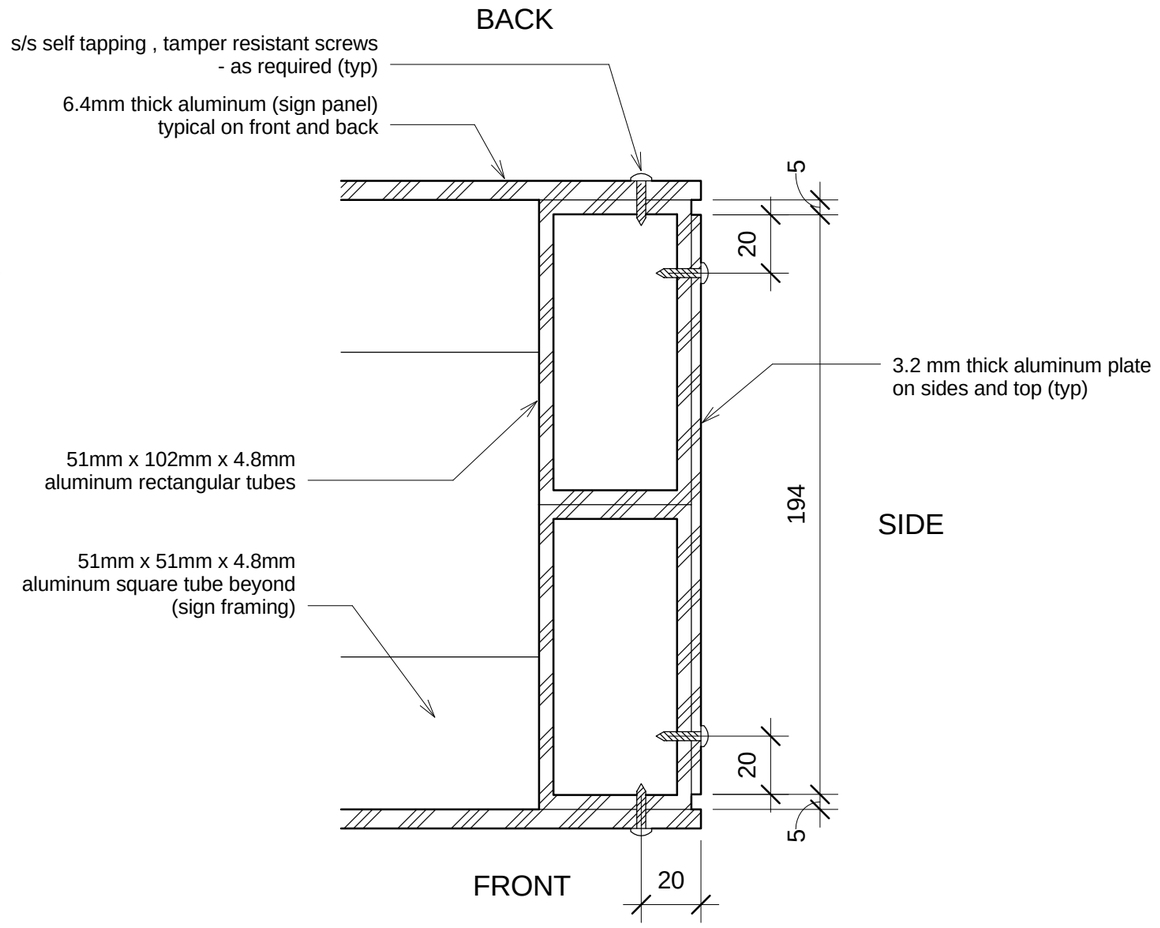
sign: Sign No. 10 - Intermediate Directional
sheet name: sign construction - sections
scale: as noted

sheet number: 05

University of Victoria



section detal 1 scale 1:2



plan detal 2 scale 1:2

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	January 31, 2012
sign:	Sign No. 10 - Intermediate Directional
sheet name:	sign construction - details
scale:	as noted
sheet number:	06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design/graphic design details
04	sign construction - sections and plans
05	general notes

Sign No. 11
Pedestrian - Street Blade

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 11 - Street Blade
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application: pinstrip, arrows

white
application: text

PANTONE Cool Gray 11 C
application: background

PANTONE Black 3 C
application: background

PMS Black 3C
black anodized
application: blade body

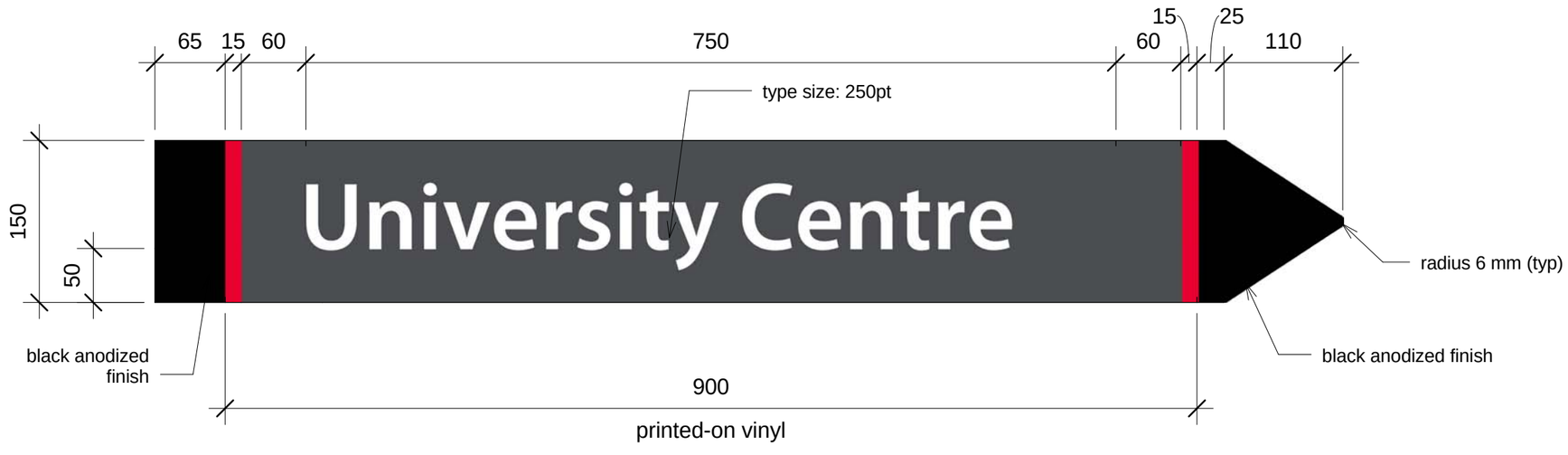
samples of typeface family

Myriad Pro Semi Bold

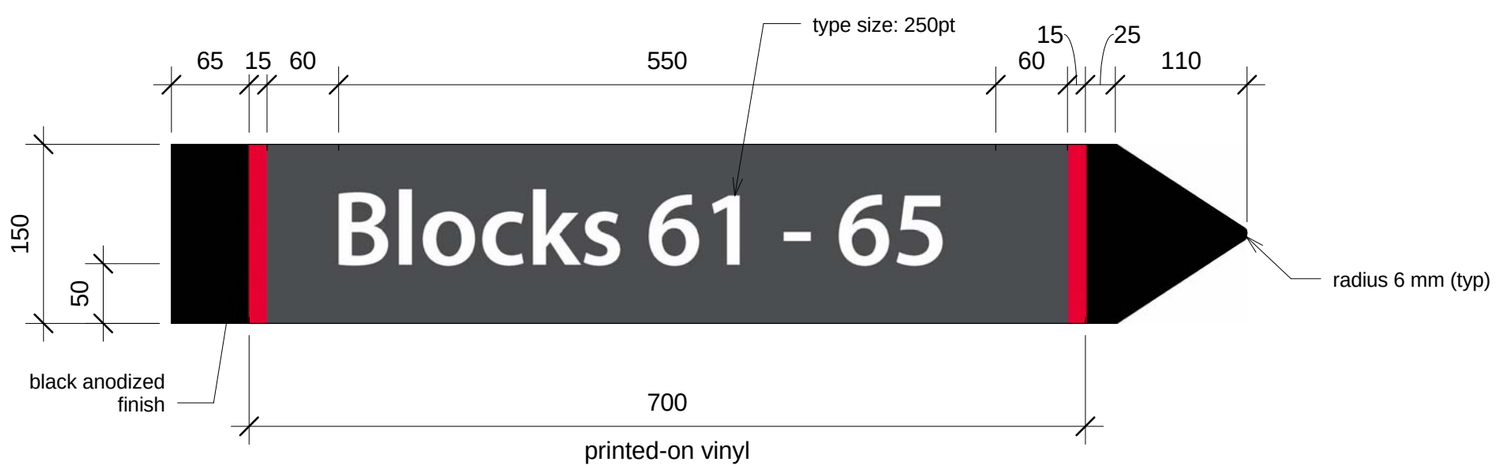
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

project:	Campus Wayfinding	sign:	Sign No. 11 - Street Blade	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



blade type a (long) double sided scale 1:5



blade type b (short) double sided scale 1:5

Description
Digitally printed vinyl protected with anti-graffiti, optically clear overlaminate

Blade:	black anodized aluminum
Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) If long text message, then typeset should be scaled down horizontally to fit in the provided space - coordinate all cases with University of Victoria

Refer to Adobe Photoshop files for detailed sample layout

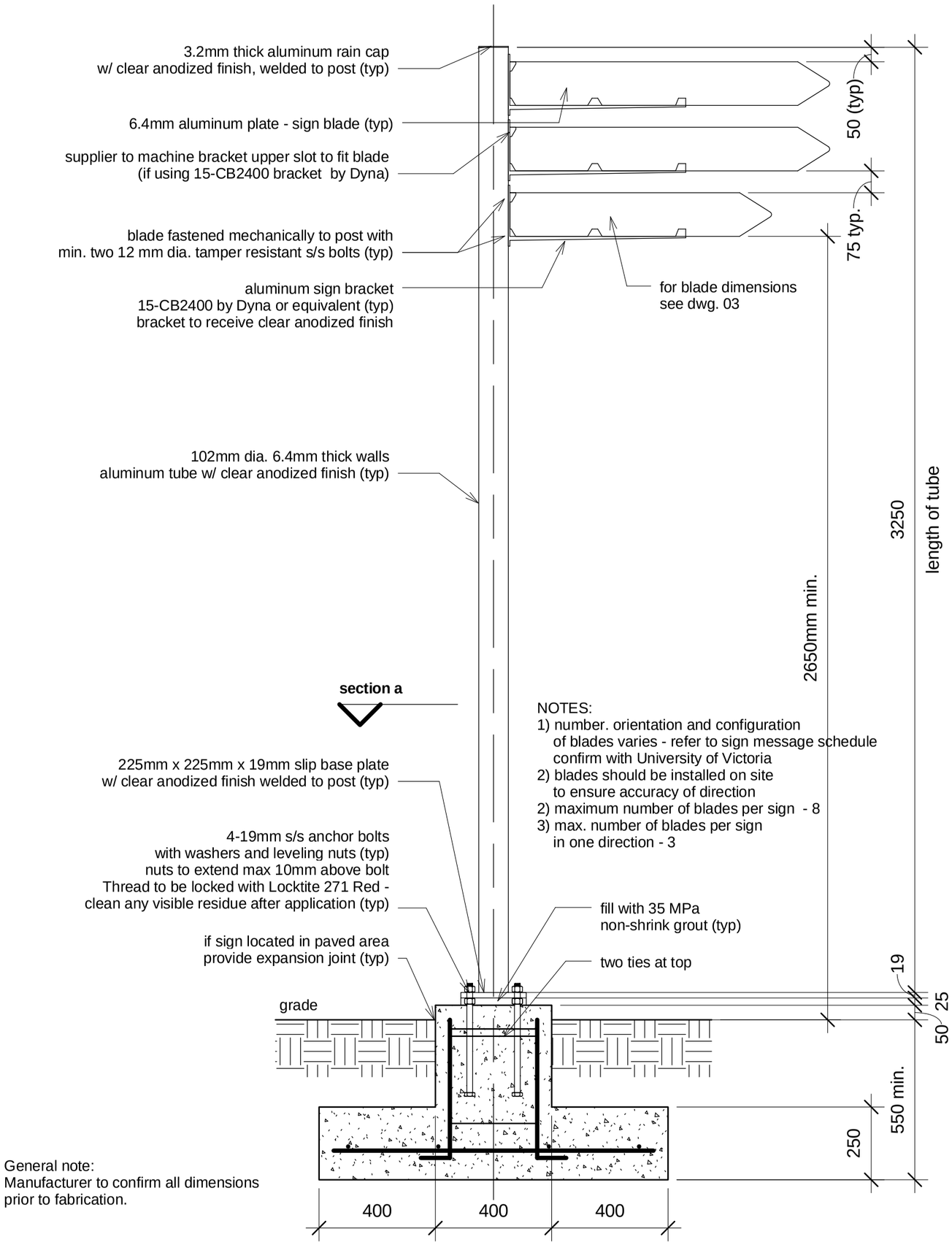
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 11 - Street Blade
sheet name:	sign design/graphic design details
scale:	as noted
sheet number:	03

University of Victoria

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

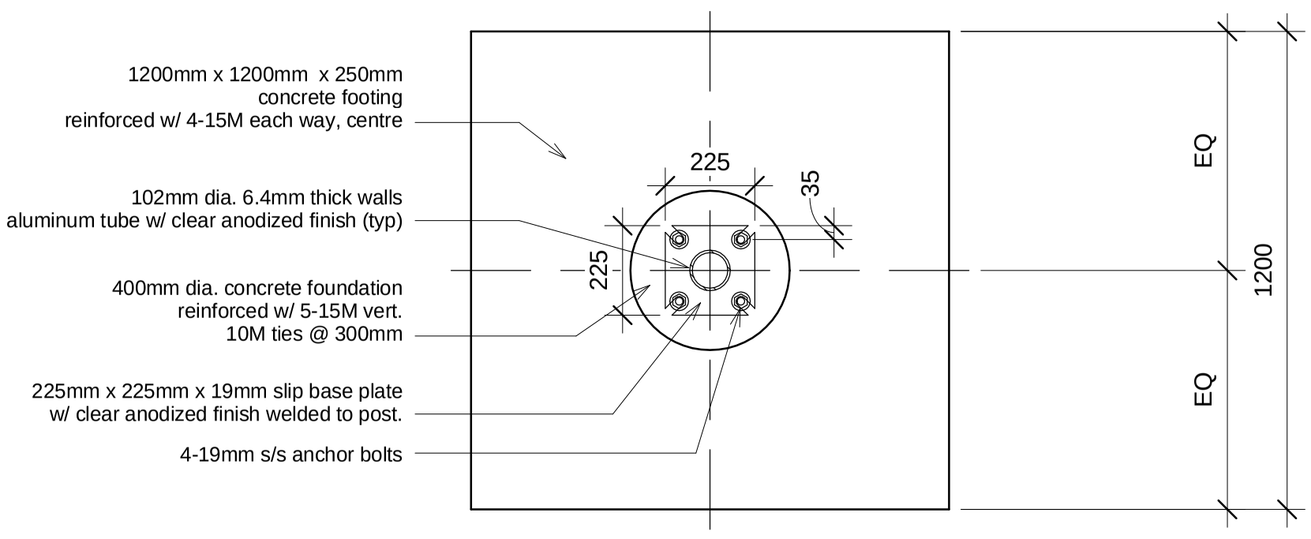
sign:
sheet name: Sign No. 11 - Street Blade
scale: sign construction - sections and plans
as noted

sheet number: 04



General note:
Manufacturer to confirm all dimensions
prior to fabrication.

front view/section scale 1:15



plan a scale 1:15

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
bracket/posts:
thru bolts: Fastenal part #73815 (3/8" s/s x 1" button Socket cap screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating) are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may be necessary for construction safety, which is the responsibility of the contractor.
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3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
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2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded 300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer. Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 11 - Street Blade
sheet name: general notes
scale: as noted

sheet number: 05

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design - overview
04	sign design - graphic design details
05	sign construction - sections
06	sign construction - details
07	general notes

Sign No. 12
Pedestrian - Minor Wayfinding A

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 12 - Minor Wayfinding A
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic

PANTEONE 7541 C
application: background,
back panel (single sided sign)
crest - reversed monochromatic

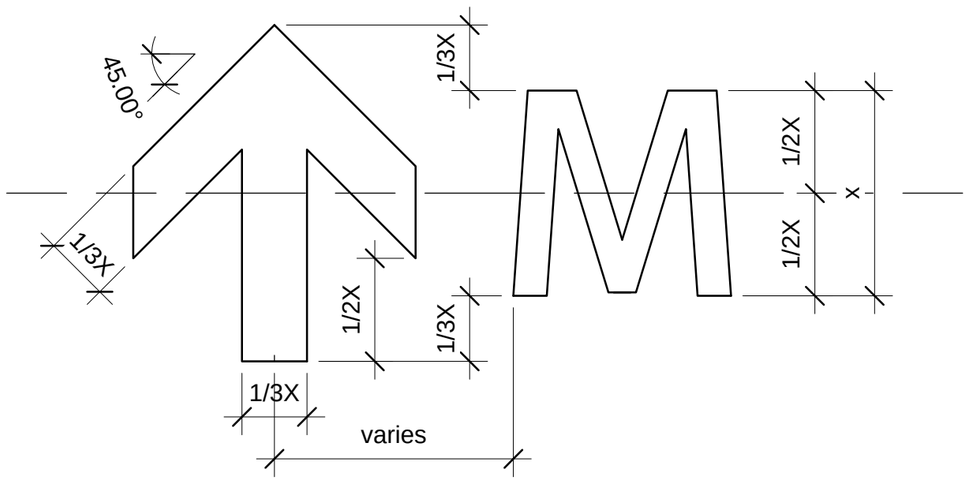
gary oak motif - digital file is to be delivered
by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

University of Victoria

full colur

University of Victoria

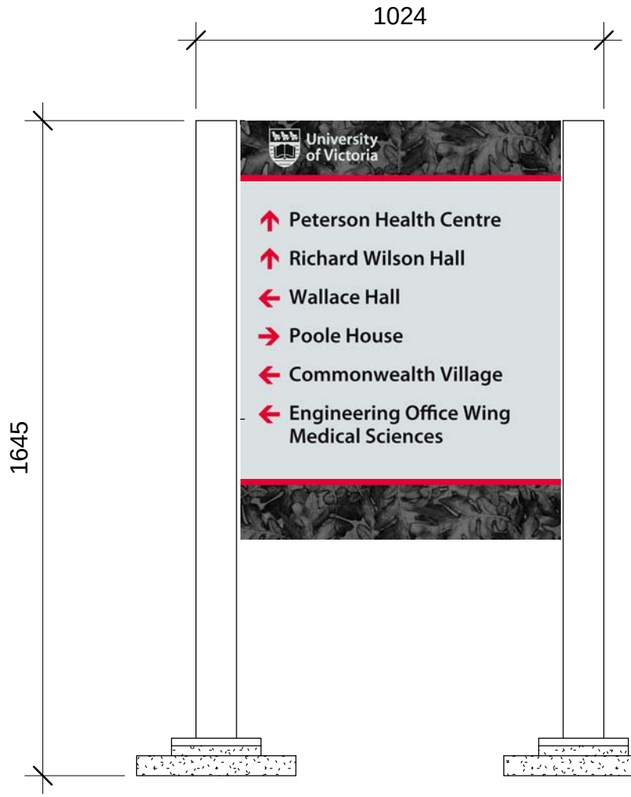
opaque monochromatic

University of Victoria

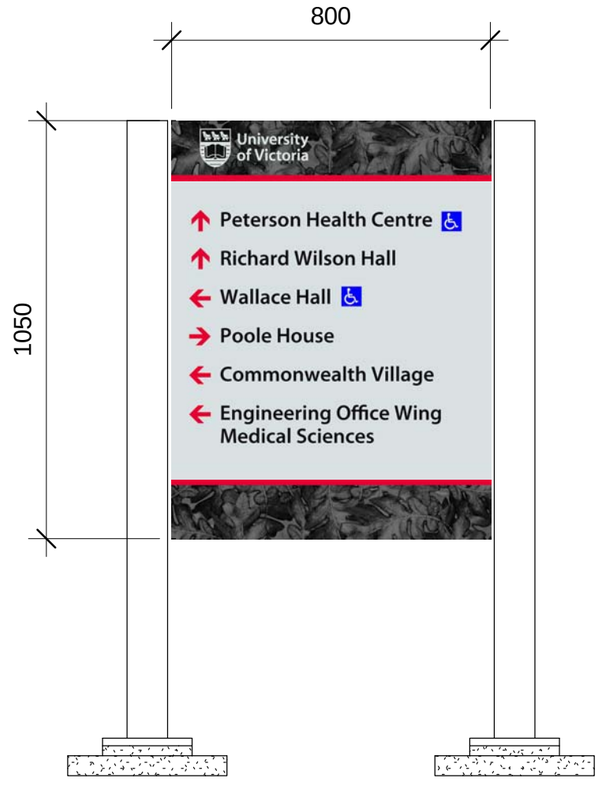
opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 12 - Minor Wayfinding A	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



Minor Wayfinding A
scale 1:15



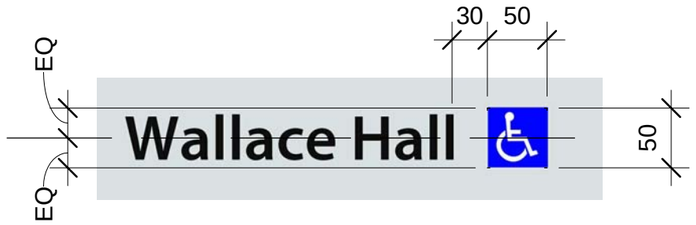
Minor Wayfinding A (with pictograms)
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

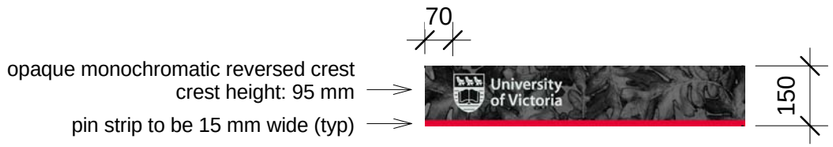
sign: Sign No. 12 - Minor Wayfinding A
sheet name: sign design - overview
scale: as noted

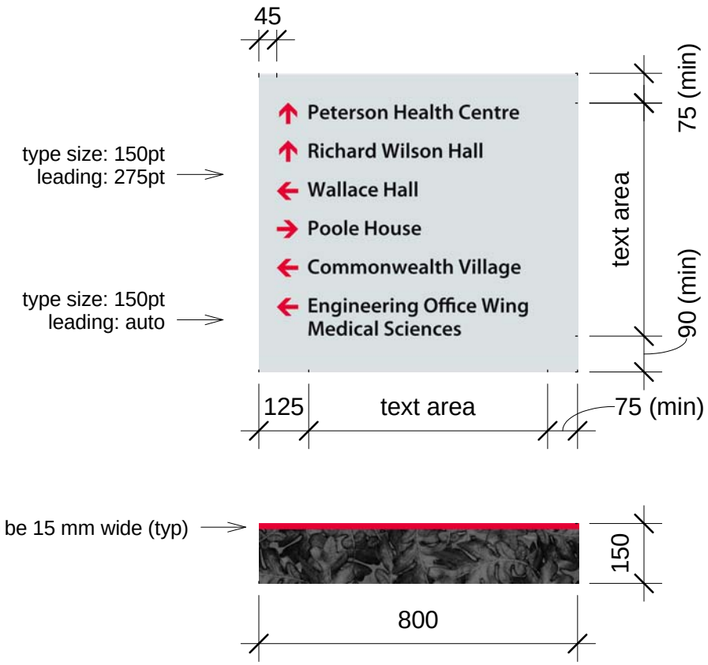
sheet number: 03

University of Victoria



placement of pictogram
scale 1:5





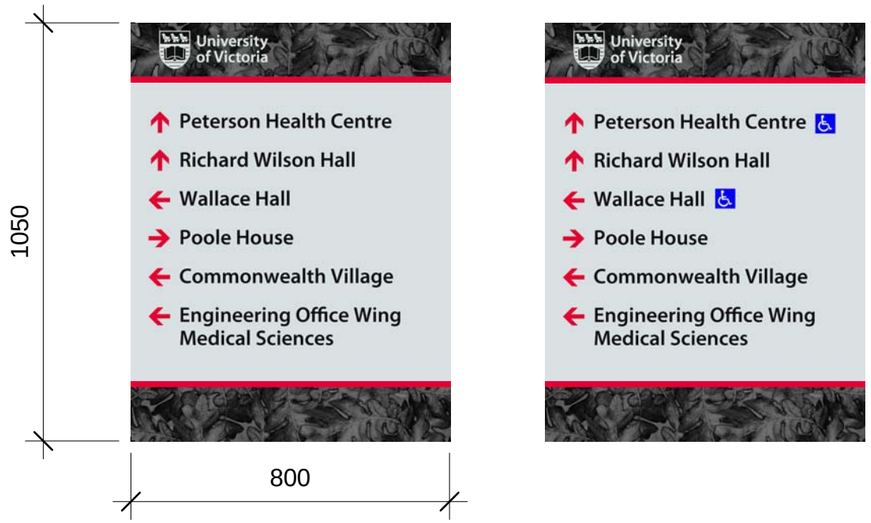
scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
Aluminum panel size (one piece): 800 mm x 1050 mm x 6.4 mm
See sheet 05 for details.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1)	One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2)	Use compatible UV inks and overlaminates as recommended by manufacturer
3)	Wrap vinyl and overlaminate over the edges of the aluminum panel.
4)	If single sided sign then back panel to receive vinyl printed with PANTEONE 7541 C

Refer to Adobe Photoshop files for detailed sample layout



option without pictograms

option w/ pictograms

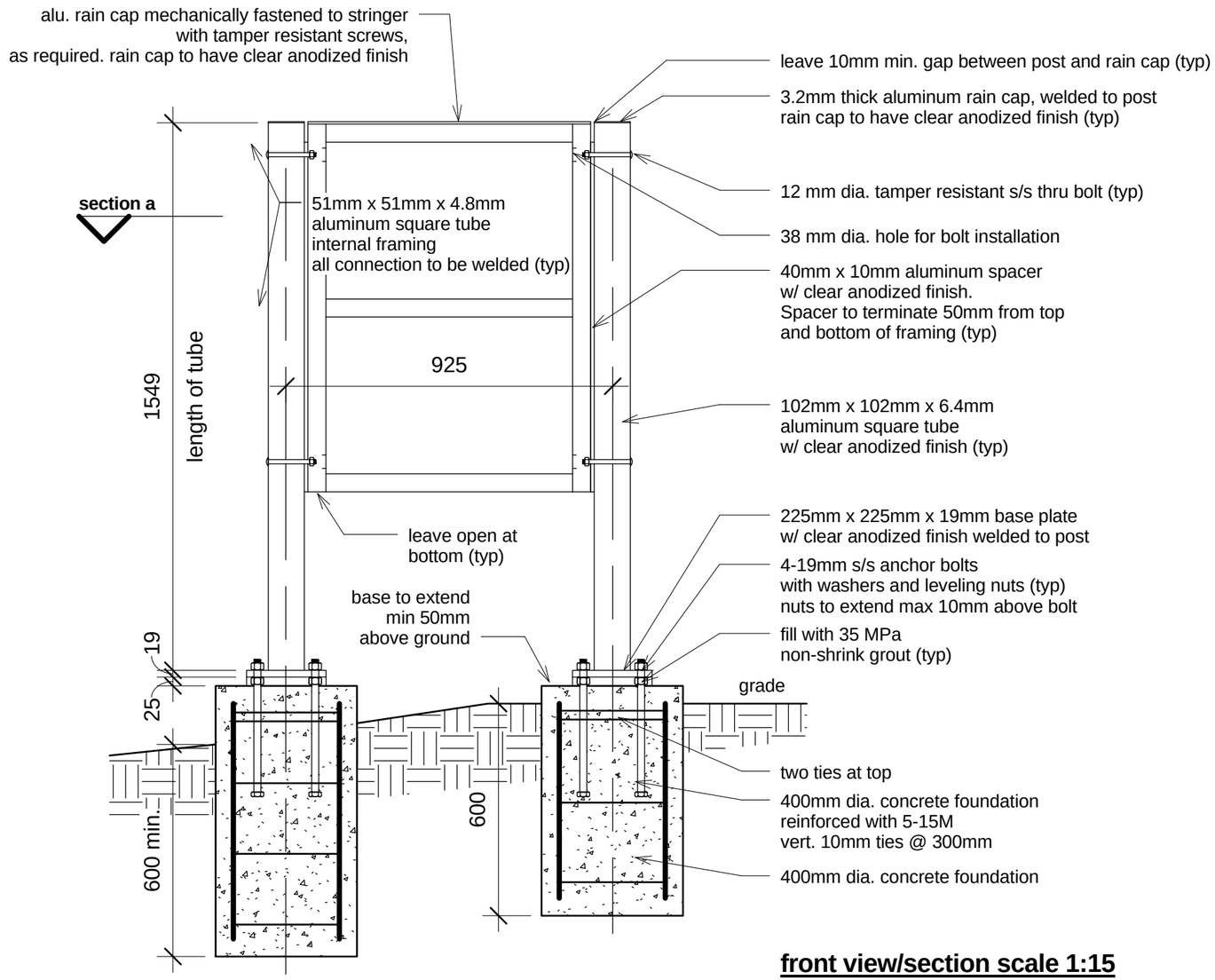
scale 1:15

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

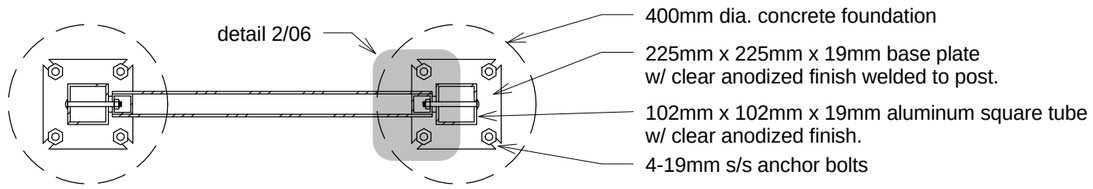
sign: Sign No. 12 - Minor Wayfinding A
sheet name: sign design - graphic design details
scale: as noted

sheet number: 04

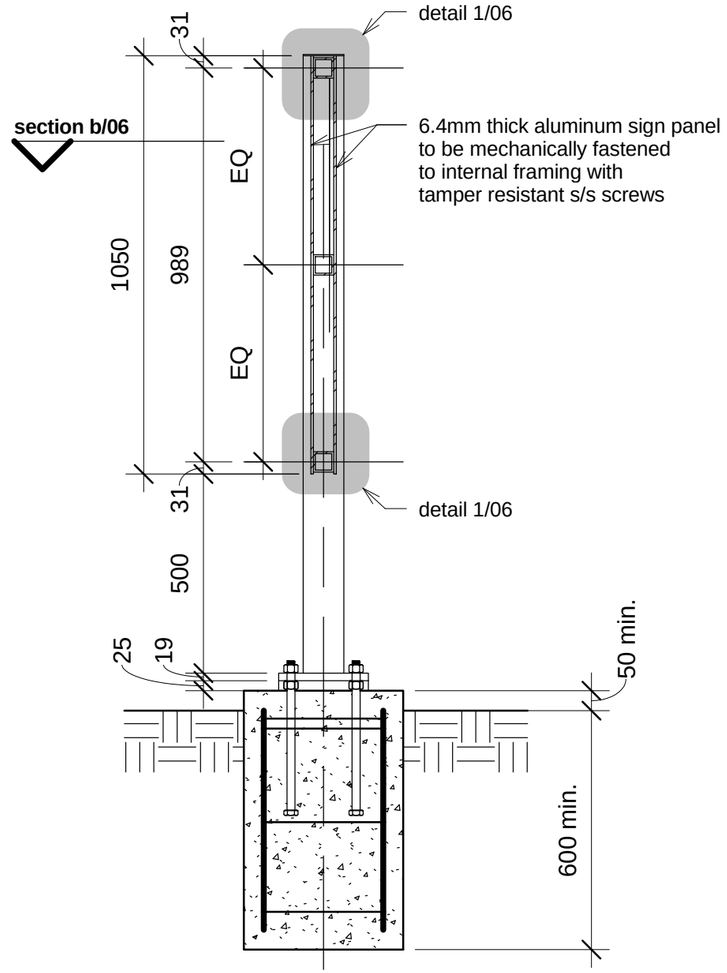
University of Victoria



front view/section scale 1:15



section a scale 1:15

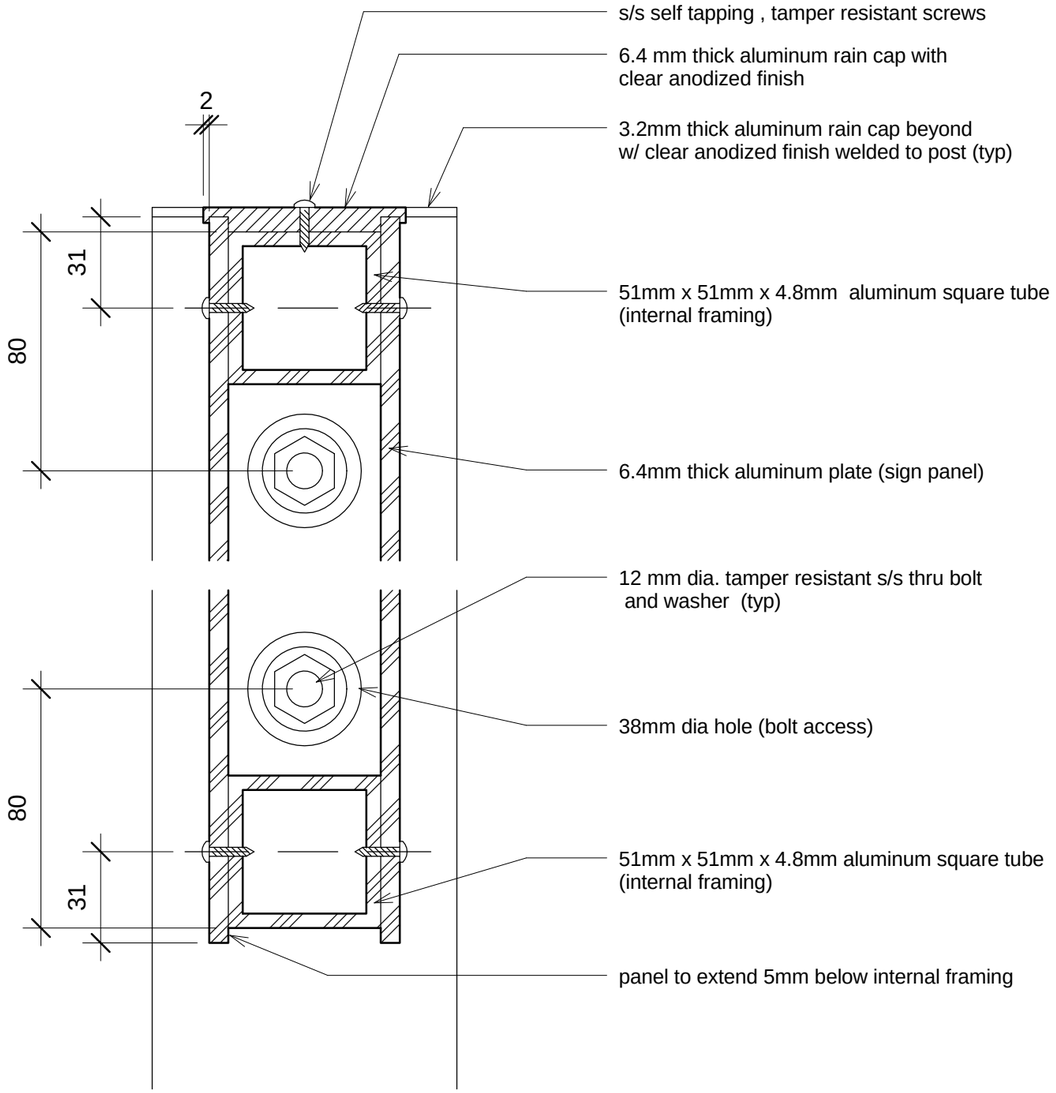


side view/section scale 1:15

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

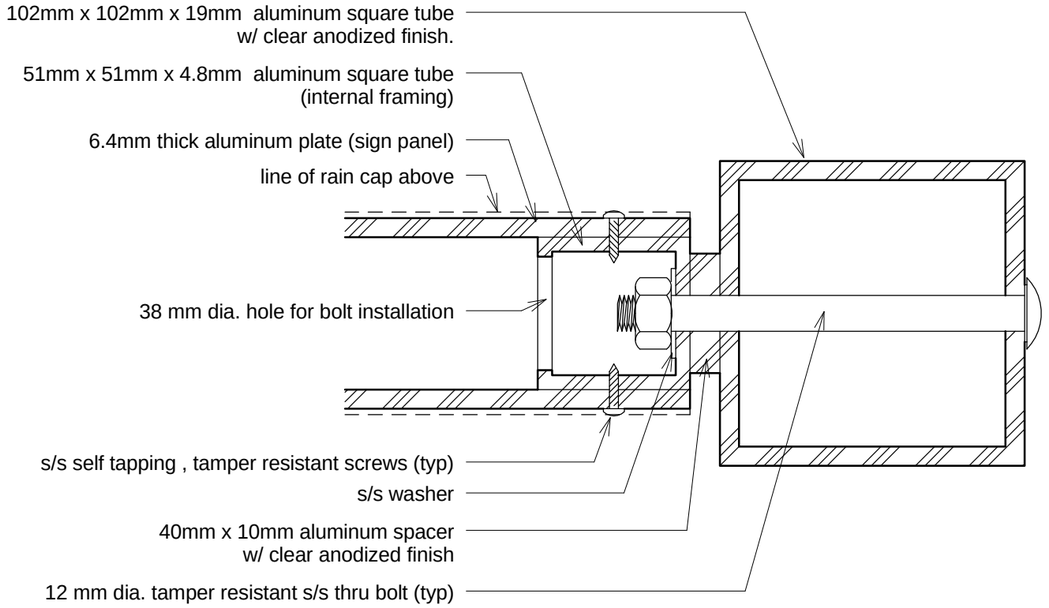
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 12 - Minor Wayfinding A
sheet name:	sign construction - sections
scale:	as noted
sheet number:	05

University of Victoria

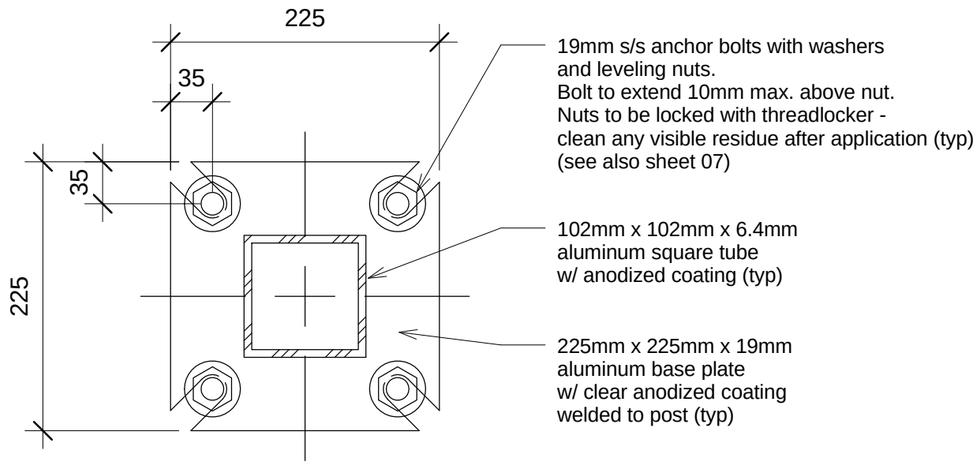


General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

section detail 1 scale 1:2



section detail 2 scale 1:2



section b (slip base) scale 1:5

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 12 - Minor Wayfinding A
sheet name: sign construction - details
scale: as noted

sheet number: 06

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
foundation (anchor bolts):
bolts: Fastenal part #47406 (1/2" s/s threaded rod)
washers: Fastenal part #71021 (1/2" s/s washers)
nuts: Fastenal part #70714 (1/2" s/s nuts)
posts:
thru bolts: Fastenal part #174786 (1/2" s/s x 5" button Socket Cap Screw)
thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
thru bolt nuts: 70714 (1/2" s/s nuts)
panels:
security screws panel attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
rain cap attachment: Fastenal part #BS0160024SSH200 (10-24 x 3/4" button head security screw)
3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 12 - Minor Wayfinding A
sheet name: general notes
scale: as noted

sheet number: 07

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	sign design/graphic design details
03	sign and graphic design
04	sign and graphic design, mounting details
05	general notes

Sign No. 13
Pedestrian - Minor Wayfinding B

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 13 - Minor Wayfinding B
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

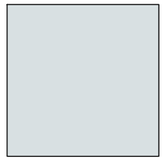
University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic



PANTEONE 7541 C
application: background,
crest - reversed monochromatic

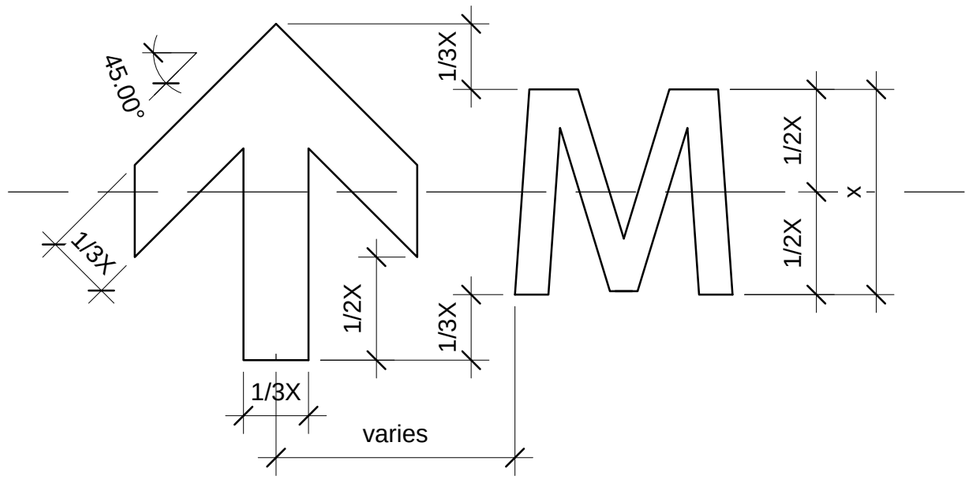
gary oak motif - digital file is to be delivered
by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

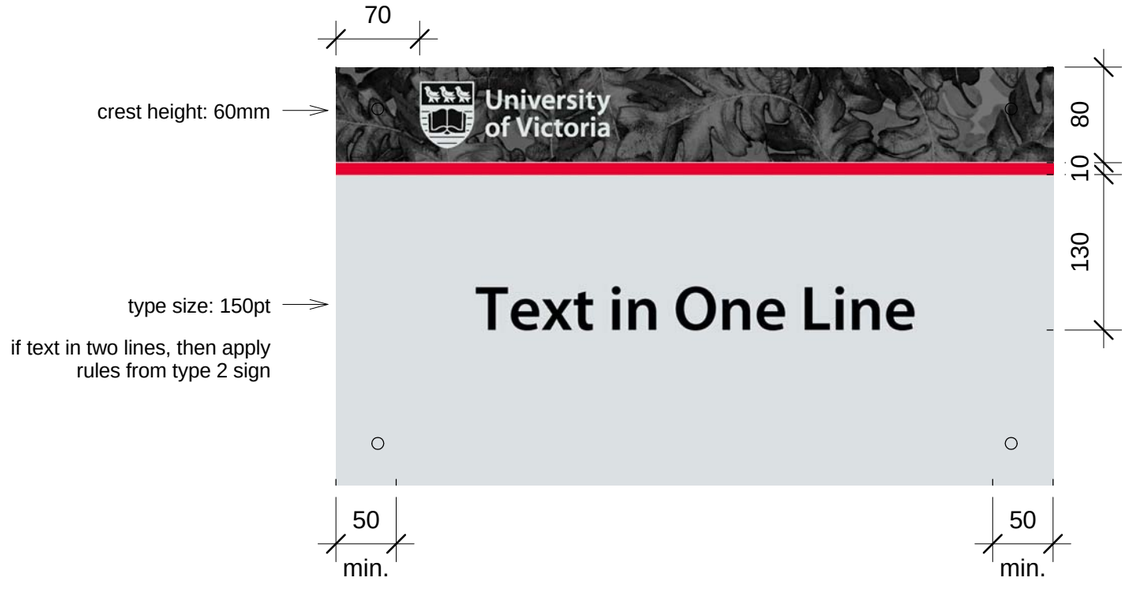
full colur

opaque monochromatic

opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 13 - Minor Wayfinding B	sheet number:	02
number:	FM 09-8567	sheet name:	sign design/graphic design details		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



type 1 sign scale 1:5

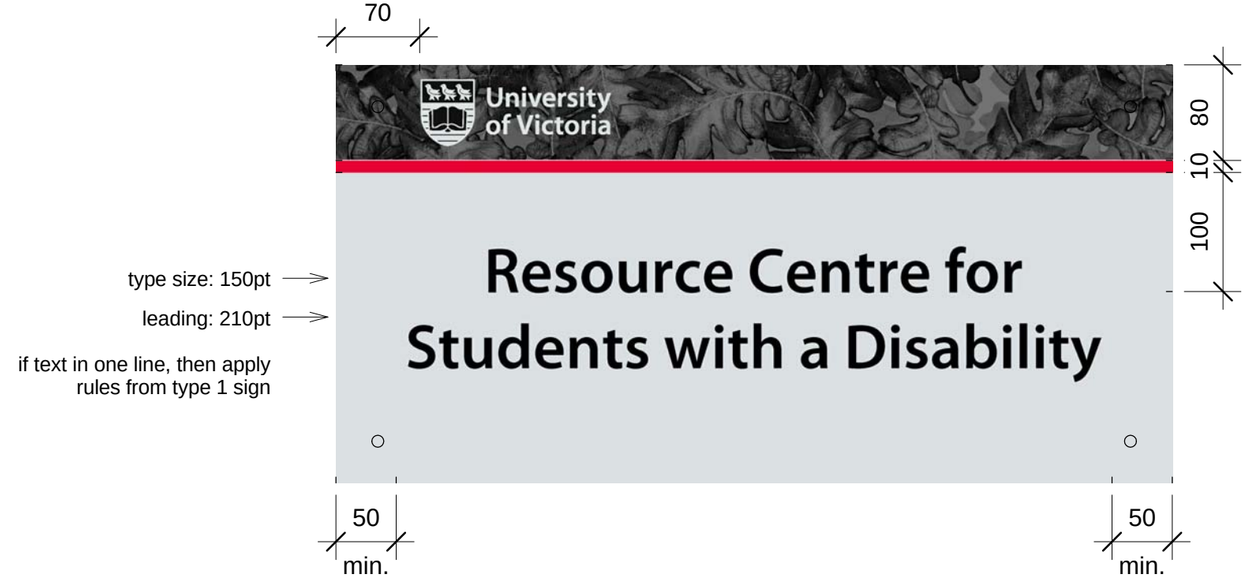
Aluminum panel size:
600 mm x 350 mm x 6.4 mm

Description:
One sided sign.
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate. Vinyl and overlaminate to lap over the sign edges.

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1)	One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2)	Use compatible UV inks and overlaminates as recommended by manufacturer

Refer to Adobe Photoshop files for detailed sample layout

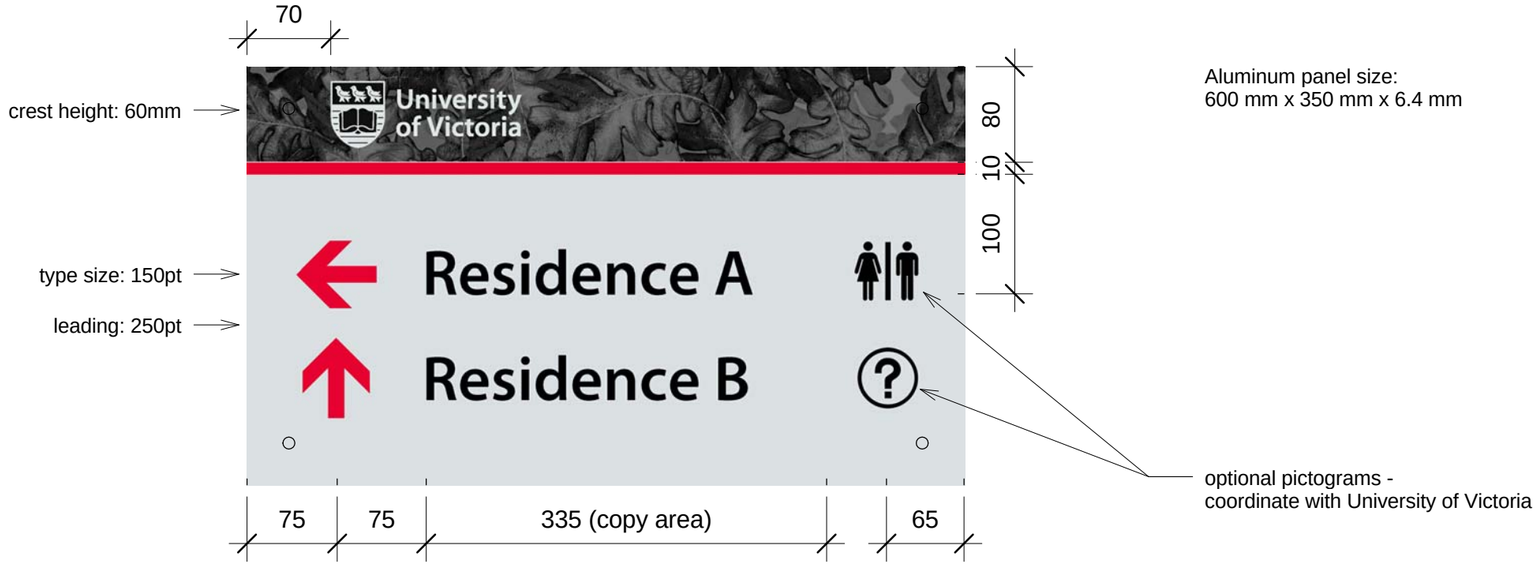


type 2 sign scale 1:5

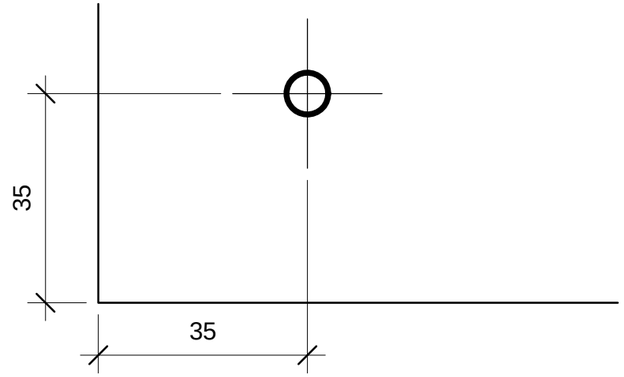
Aluminum panel size:
700 mm x 350 mm x 6.4 mm

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 13 - Minor Wayfinding B
sheet name:	sign and graphic design
scale:	as noted
sheet number:	03

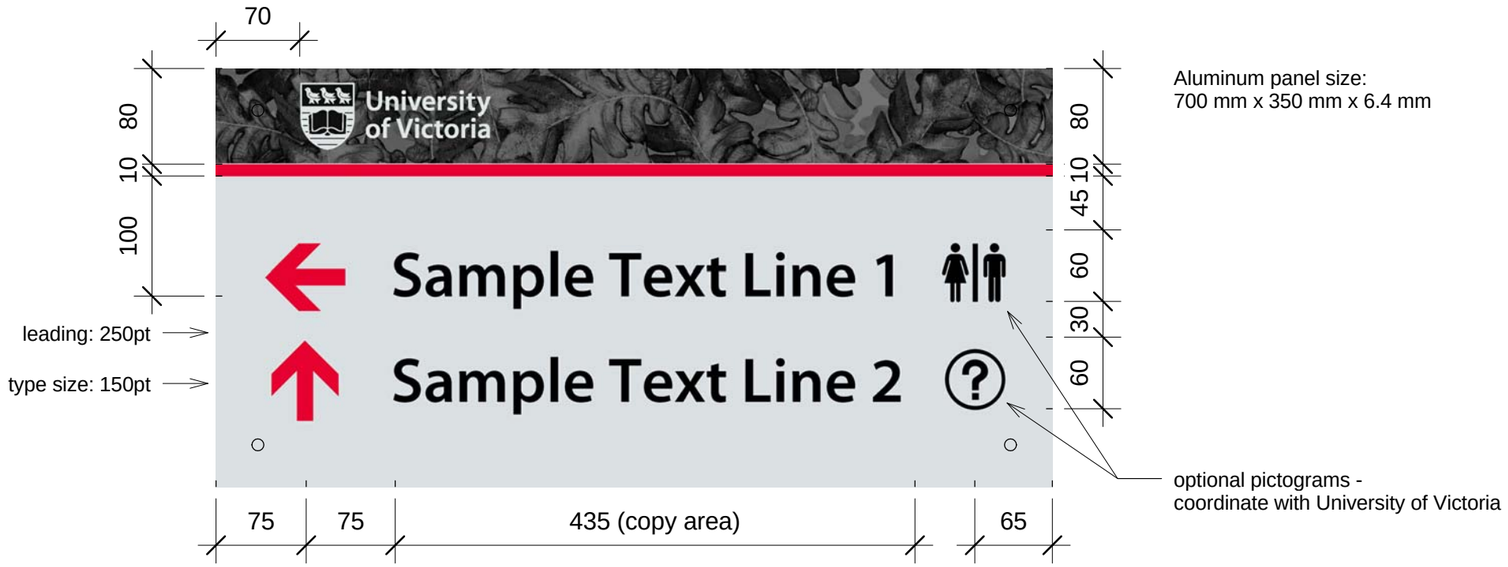
University of Victoria



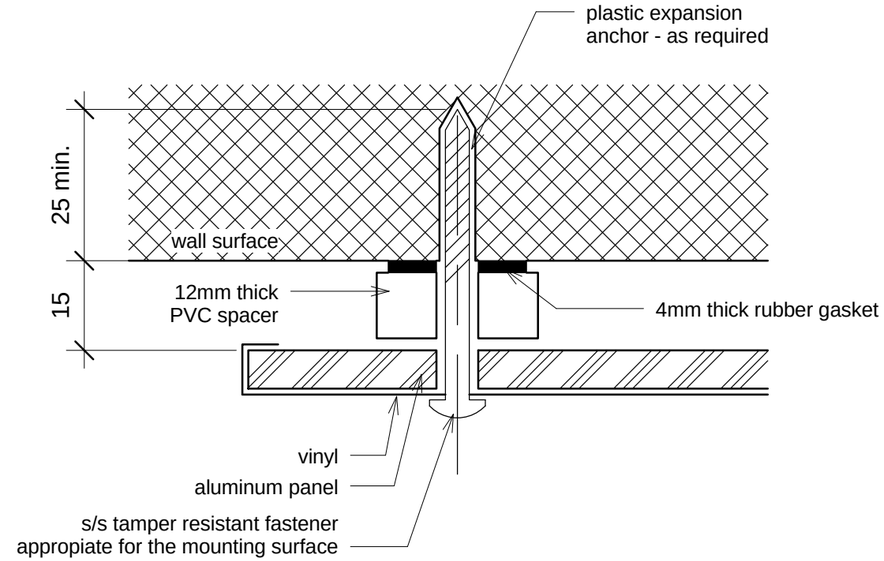
type 3 sign scale 1:5



fastener typical location on sign scale1:1



type 4 sign scale 1:5



typical mounting detail scale 1:1

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 13 - Minor Wayfinding B
sheet name: sign and graphic design, mounting details
scale: as noted

sheet number: 04

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
panels:
security screws panel attachment: Fastenal part #160951 (10 x 2" button head tapping screw s/s 6 lobe)
3. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility to build the work in conformance with the contract documents. Structural Engineer shall not be responsible for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled to be carried out during normal business hours unless special arrangements are made with Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded 300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer. Anchor bolts to be secured with "Pentagon" security nuts.

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 13 - Minor Wayfinding B
sheet name: general notes
scale: as noted

sheet number: 05

University of Victoria

Sheet List	
Sheet Number	Sheet Name

01	title sheet and drawing list
02	sign design/graphic design details
03	sign and graphic design
04	sign construction

Sign No. 14 - Event Sign

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 14 - Event Sign
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

University of Victoria

core colours

PANTONE 185 C
pinstrip, arrows

PANTONE 426 C
text

PANTEONE 7541 C
background, UVic Logo

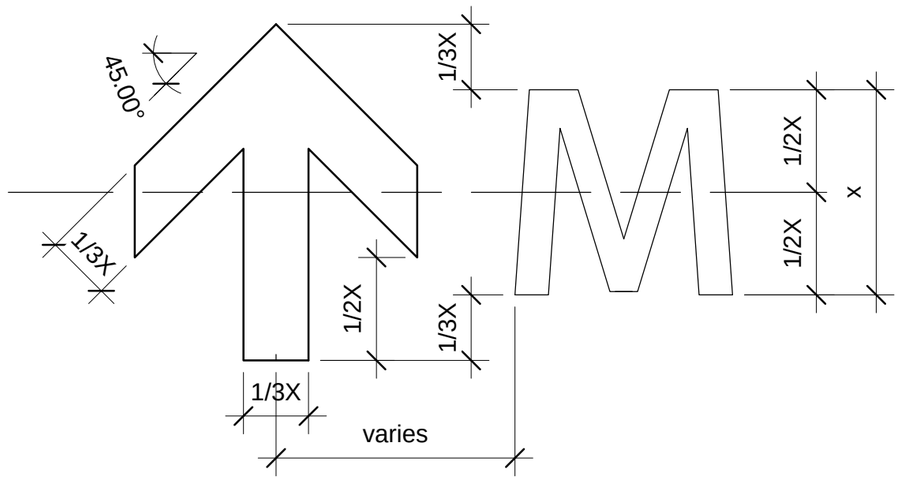
gary oak motif - digital file is to be delivered by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

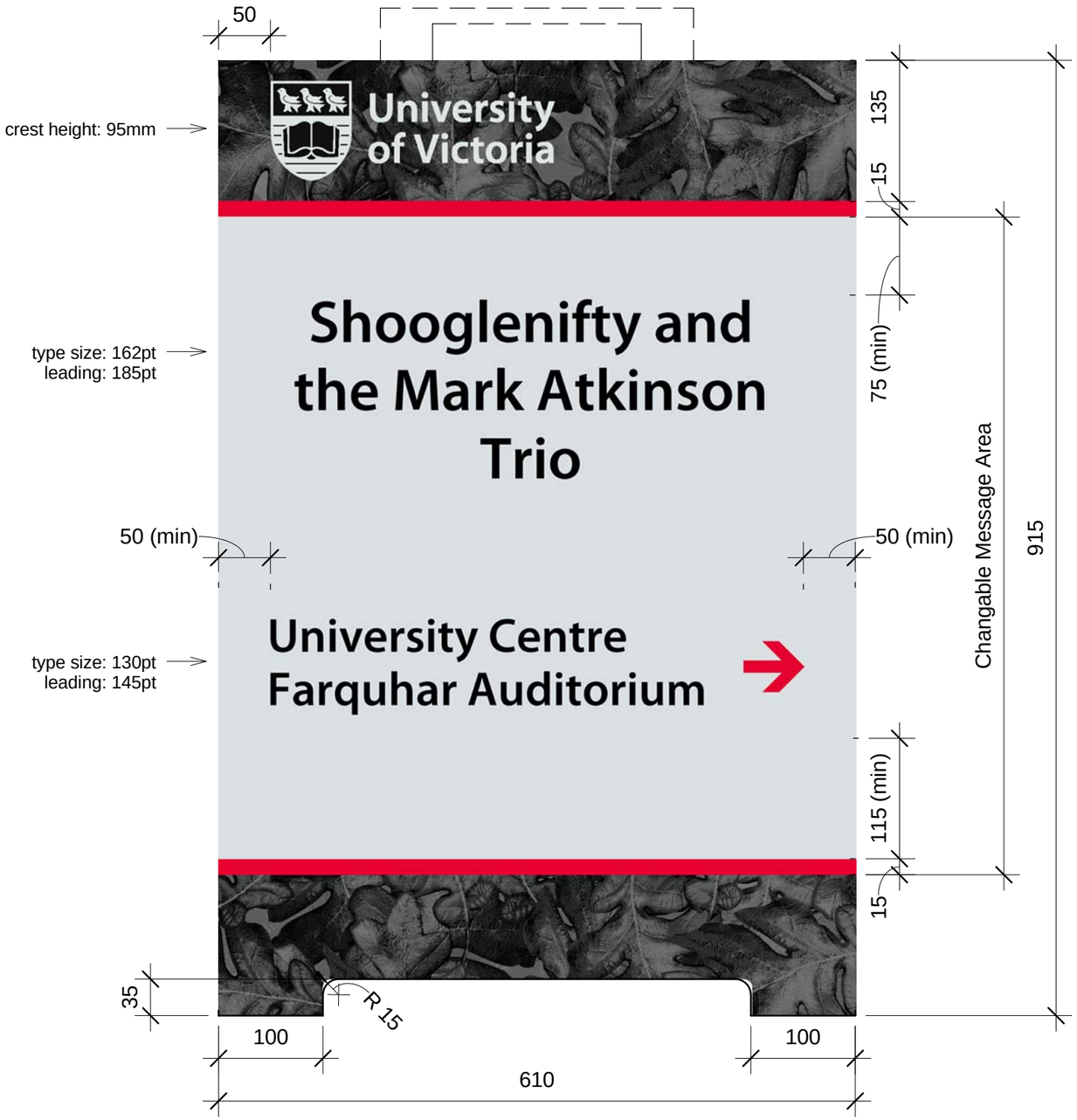
University of Victoria

University of Victoria

University of Victoria

project:	Campus Wayfinding	sign:	Sign No. 14 - Event Sign	sheet number:	02
number:	FM 09-8567	sheet name:	sign design/graphic design details		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria



Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate - vinyl and overlaminate to be applied on both sides of the panels.
D/S Crezon plywood sandwich board 610 x 915 mm by Proveer
3/16" thick clear Lexan protection panel

Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1) One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2) Use compatible UV inks and overlaminates as recommended by manufacturer
3) Wrap vinyl and overlaminate over the edges of the aluminum panel.
4) Message to be printed on changable graphic film by 3M or Avery or paper

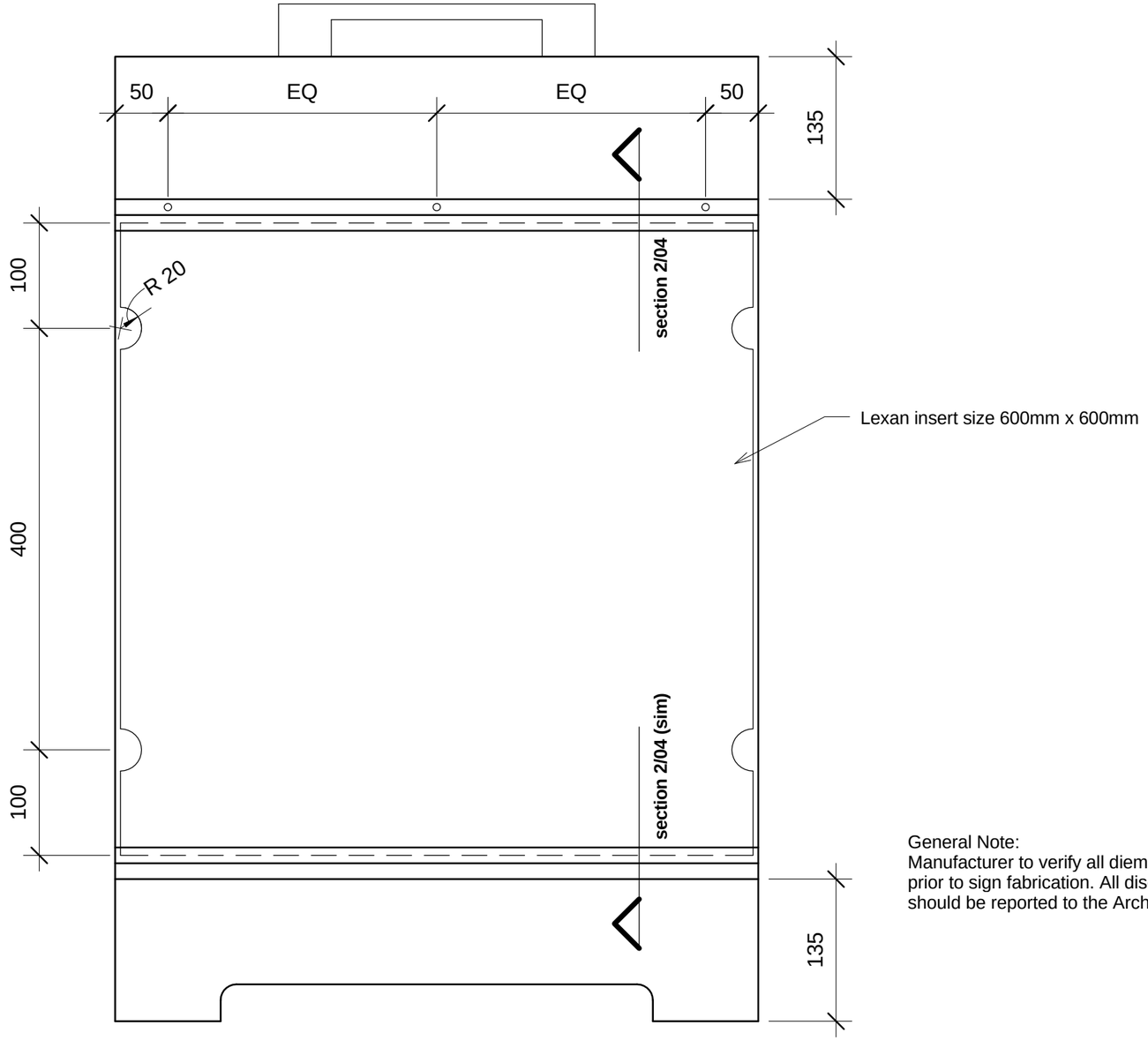
Refer to Adobe Photoshop files for detailed sample layout

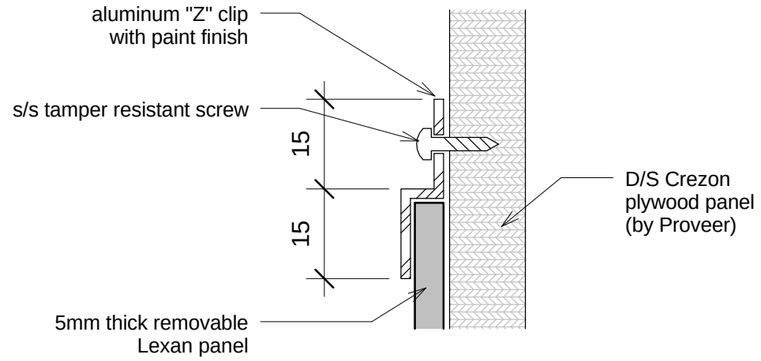
scale 1:5

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 14 - Event Sign
sheet name:	sign and graphic design
scale:	as noted

sheet number: 03

University of Victoria





2 aluminum retainer detail

1 : 1

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

scale 1:5

1 Sign Construction

1 : 5

project:	Campus Wayfinding	sign:	Sign No. 14 - Event Sign	sheet number:	04
number:	FM 09-8567	sheet name:	sign construction		
issue date:	Jan 31, 2012	scale:	as noted		

University of Victoria

Sheet List	
Sheet Number	Sheet Name
01	title sheet and drawing list
02	typography, colours and pictograms
03	sign design/graphic design details
04	sign construction - sections and details
05	general notes

Sign No. 15
Minor Pedestrian Map

project: Campus Wayfinding
number: FM 09-8567
issue date: Jan 31, 2012

sign: Sign No. 15 - Minor Pedestrian Map
sheet name: title sheet and drawing list
scale: as noted

sheet number: 01

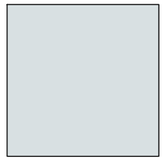
University of Victoria

core colours

clear anodized coating
application: sign structure

PANTONE 185 C
application:
pinstrip, arrows

PANTONE 426 C
application: text,
crest - monochromatic



PANTEONE 7541 C
application: background,
crest - reversed monochromatic

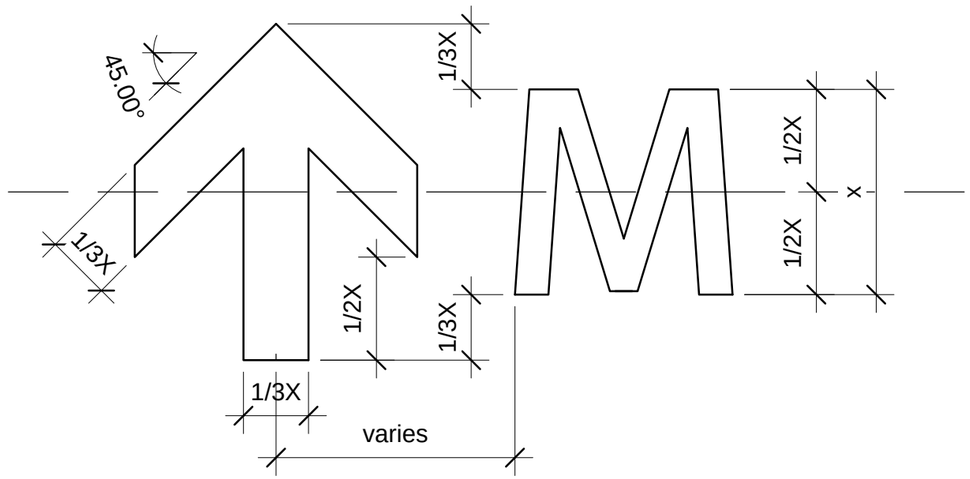
gary oak motif - digital file is to be delivered
by University of Victoria

samples of typeface family

Myriad Pro Semi Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

arrow style and arrow size in relation to text height



University of Victoria Logo, horizontal standard

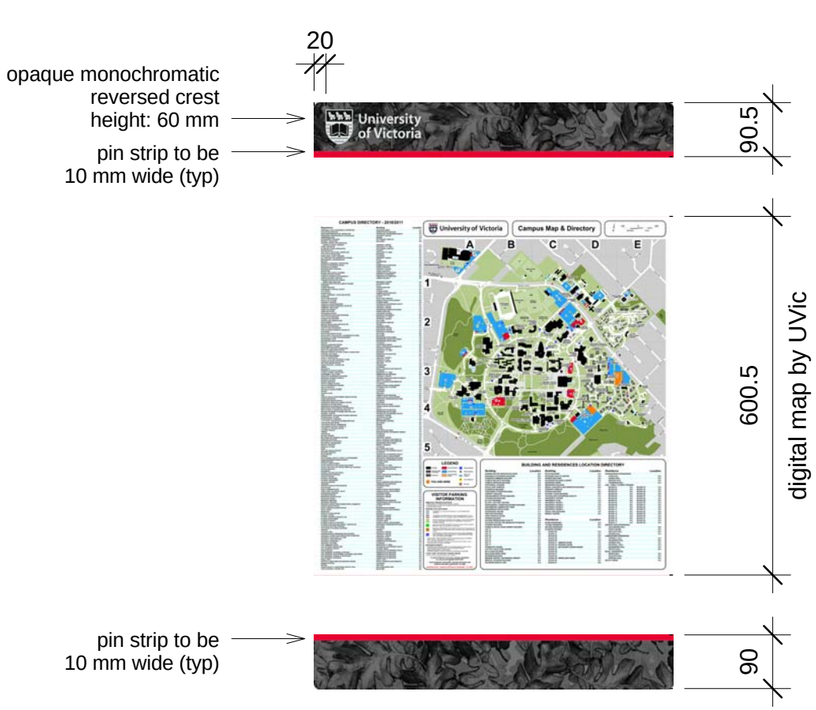
full colur

opaque monochromatic

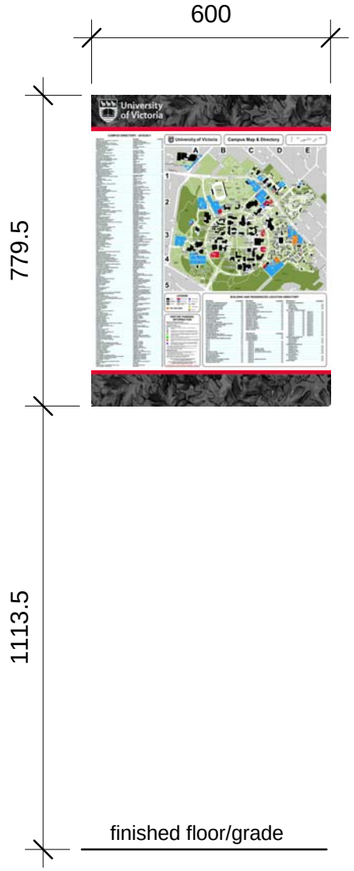
opaque monochromatic reversed

project:	Campus Wayfinding	sign:	Sign No. 15 - Minor Pedestrian Map	sheet number:	02
number:	FM 09-8567	sheet name:	typography, colours and pictograms		
issue date:	Jan 31, 2012	scale:	as noted		

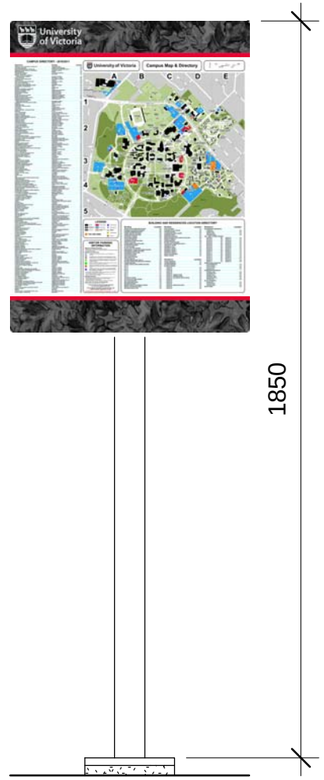
University of Victoria



panel front view scale 1:10



wall mounted option



post mounted option

scale 1:15

Description
Digitally printed vinyl protected with
anti-graffiti, optically clear overlaminate
on front and back of panel.
Edges of the panel to be spray painted with
Mathews, two part Acrylic Polyurethane or equivalent
Aluminum panel size: 780 mm x 600 mm x 6.4 mm

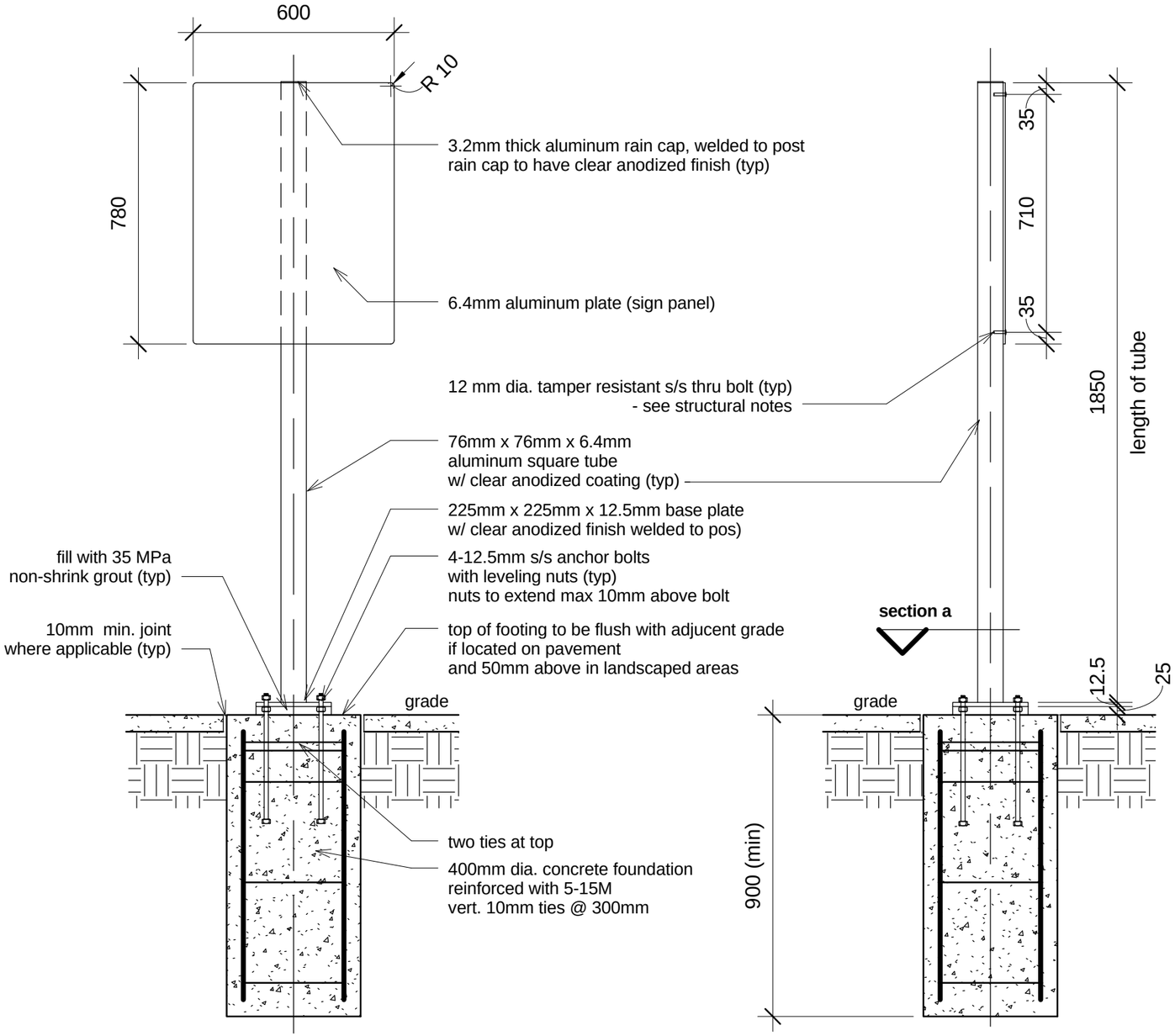
Vinyl:	3M IJ180, MPI 2005 or equivalent
Overlaminate:	3M 8914, Avery DOL 6060 or equivalent.

1)	One piece vinyl to be printed on, installed as per manufacturer's recommendations.
2)	Use compatible UV inks and overlaminates as recommended by manufacturer
3)	Edges of the aluminum panel to be spray painted with PANTEONE 7541 C colour
4)	Back of the panel to receive vinyl with printed PANTEONE 7541 C colour
4)	Digital file with Directory Map is to be delivered by University of Victoria

Refer to Adobe Photoshop files for detailed sample layout

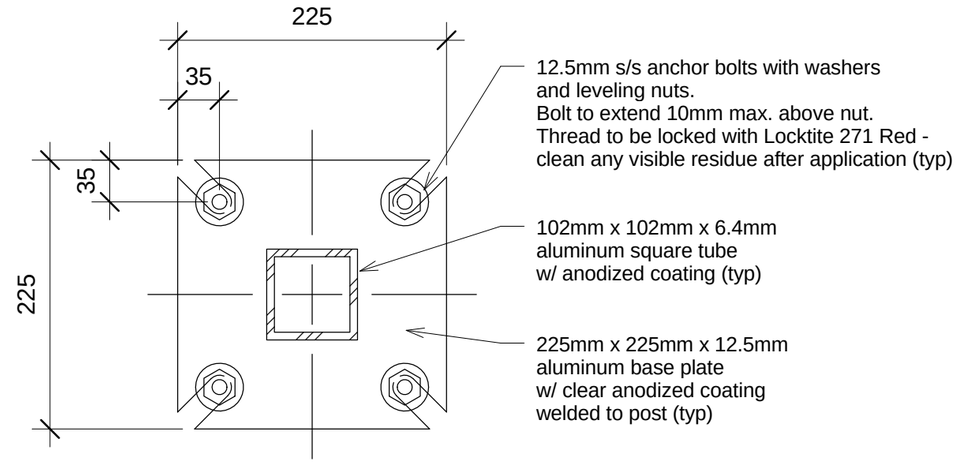
project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 15 - Minor Pedestrian Map
sheet name:	sign design/graphic design details
scale:	as noted
sheet number:	03

University of Victoria

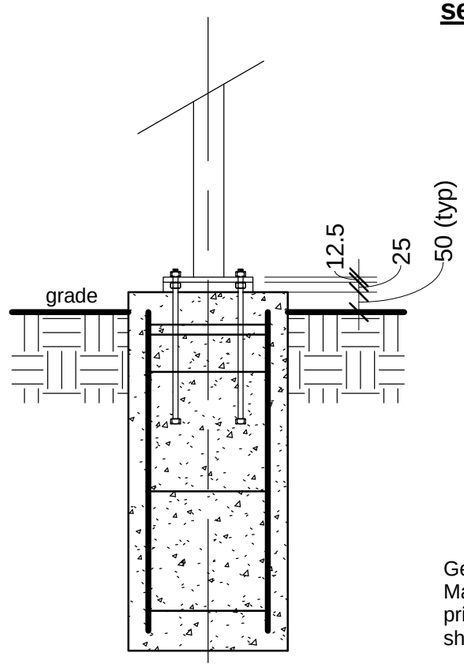


front view/section scale 1:15

side view/section scale 1:15



section a (slip base) scale 1:5



side view/section scale 1:15 (sign located in landscaped areas)

General Note:
Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies should be reported to the Architect.

project:	Campus Wayfinding
number:	FM 09-8567
issue date:	Jan 31, 2012
sign:	Sign No. 15 - Minor Pedestrian Map
sheet name:	sign construction - sections and details
scale:	as noted
sheet number:	04

University of Victoria

GENERAL NOTES

1. Provide self adhesive sign ID stickers. ID's should correspond with ID's shown on location plan
Form and placement of stickers on signs is to be coordinated with University of Victoria
2. Fasteners:
    foundation (anchor bolts):
    bolts: Fastenal part #47406 (1/2" s/s threaded rod)
    washers: Fastenal part #71021 (1/2" s/s washers)
    nuts: Fastenal part #70714 (1/2" s/s nuts)
    posts:
    thru bolts: Fastenal part #10630-04183 (1/2" s/s x 4" button Socket Cap Screw)
    thru bolt washers: Fastenal part #71021 (1/2" s/s washers)
    thru bolt nuts: 70714 (1/2" s/s nuts)

3. Threadlocker: Locktite 271 Red
4. Whenever anchor bolts are cut, contractor to ensure cut surfaces (terminated coating)
are protected against rusting.
5. Manufacturer to verify all diemnsions prior to sign fabrication. All discrepancies
should be reported to the Architect.

STRUCTURAL NOTES

DRAWINGS
1. These drawings show the completed project. The drawings do not show components that may
be necessary for construction safety, which is the responsibility of the contractor.
2. The use of these drawings is limited to that indicated in the revisions column.
3. The information on these drawings shall not be used for any other project or works.

DESIGN
1. The structures shown have been designed in substantial accordance with the British Columbia
Building Code 2006, which is based on the National Building Code of Canada 2005.
2. The following wind loads and factors were used: q50=0.63kPa, Iw=1.0-ULS, 0.75-SLS.

FIELD REVIEW BY STRUCTURAL ENGINEER
1. Structural Engineer provides field review only for the work shown on these structural drawings, and it is
conducted with such frequency as Structural Engineer deems appropriate to ascertain that the work is in
general conformance with the documents prepared by Structural Engineer.
Field review by Structural Engineer is not carried out for the Contractor's benefit, nor does it make
Structural Engineer guarantors of the Contractor's work. It remains the Contractor's responsibility
to build the work in conformance with the contract documents. Structural Engineer shall not be responsible
for the acts or omissions of the Contractor, Sub-Contractor, or any other persons performing any of the work
or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Provide 24 hours advance notice of each required field review. Field reviews shall be scheduled
to be carried out during normal business hours unless special arrangements are made with the Structural Engineer.
3. The work to be reviewed shall be generally complete.

STRUCTURAL NOTES (cont)

CONCRETE AND REINFORCING STEEL
1. Concrete work shall conform to CAN/CSA-A23.1, CAN/CSA -A23.2, CAN/CSA -A23.3 and
referenced documents.
2. Reinforcing shall conform to CAN/CSA-G30.18R – Grade 400MPa.
3. Cover to reinforcing steel to be 50mm uno.
4. Portland cement shall be type gu unless noted otherwise.
5. Concrete shall have a unit weight of 23±1 kn/m3/ (145±5 pcf) unless noted otherwise.
6. Concrete shall have a compressive strength of 35MPa at 28 days, and conform to exposure class
C-1 with a maximum water-cement ratio of 0.40 and air content of 5-8%. Maximum aggregate
size to be 19mm.
7. No calcium chloride is permitted, in any form, in any concrete mix. Curing and protection of
concrete for hot, cold or dry weather is to be as per clauses 7.4.1.8 and 7.4.2 of CAN/CSA.

STRUCTURAL ALUMINUM
1. Aluminum sections shall be new.
2. Aluminum alloys shall conform to the Aluminum Association publication Aluminum Standards
and Data ISO 6361-2 or ISO 6362-2.
3. Extruded shapes, Tubes, Bolts, and Plate to be 6061 alloy uno.
4. Aluminum in contact with concrete or grout shall be given a heavy coat of alkali-resistant
bituminous paint or other equivalent coating before installation.
5. Welding operators and procedures shall be qualified according to CSA W47.2.
6. Submit shop drawings for review prior to start of steel fabrication.
7. Fabrication practices and tolerances shall be in accordance with CAN/CSA-S16, except bolt holed
edge distance tolerance to be -0, +2mm.
8. Anchor and connection bolts to be ASTM A193 Stainless Steel. Anchors shall be embedded
300mm into concrete, complete with a nut and washer each end.
9. Unless noted otherwise, column base plates shall be 20 mm minimum thick. Anchor bolt holes
shall be punched undersize and reamed to size.
10. Provide 6 mm cap plates for all tube members uno.
11. Aluminum shall be connected with fillet welds all-around uno. Weld size shall match the wall
thickness of the thinnest part being connected uno. Welds to be ground smooth.

TAMPER RESISTANCE AND CONNECTIONS
1. Connection hardware to be stainless steel uno.
2. Aluminum panels to be connected to structure with 6.4mm diameter stainless steel self-tapping
screws at 450mm maximum centre to centre spacing.
3. Non-removable panels may be welded or glued by the manufacturer, as approved by Structural Engineer.
4. Panel connection screws to be tamper resistant "Torx-Pin" screws as supplied by O.E.M.
Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
5. Visible connection bolts shall be "Pentagon" tamper resistant bolts, with "Pentagon" nuts as
supplied by O.E.M. Hardware of Surrey BC, or equivalent as approved by Structural Engineer.
Anchor bolts to be secured with "Pentagon" security nuts.