Design standards: part one
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1 SAFETY ISSUES AND CONCERNS

One of the most important issues that the design professional must consider is the personal safety of the individuals that will be using and occupying the space in the future. A number of different elements must be reviewed and seriously considered to ensure that the design provides a safe and comfortable environment.

All planning and design development within the University must acknowledge the need to enhance the users' sense of personal safety and reduce design features which provide opportunities for intimidation, threat or assault. To assist consultants in the development of physical strategies which enhance personal safety, the University has amassed several important and relevant resources which should be consulted. The first 2 documents are attached for reference in Appendix One A and One B, and the last three are available upon request.

.1 the Campus Safety Audit Procedures;
.2 the City of Toronto Guidelines for Designing Safer Places; May 1997
.3 City standards for underground parking garages;
.4 the Green Spaces, Safer Places report;
.5 a slide library of designs that work to enhance safety.

In particular, consultants should pay attention to the following features.

1.2 Lighting and Visibility

In the design of lighting systems and in the selection of lighting fixtures, the electrical designer shall ensure that the lighting levels that will be provided meet the minimum requirements outlined in the Illumination Task Force Recommendations as noted below. In addition, the light fixtures shall be placed so as to eliminate entrapment spots and shall provide a uniform level of lighting minimizing the contrast between light and shadow. Light fixtures which can withstand vandalism and which can be easily maintained shall be provided. Perimeter wall surfaces should be light in colour, which would improve visibility in interior public spaces.

Areas of special attention:

.1 Washrooms

.1 There must be at least two lighting fixtures, of which one should be on at all times and connected to emergency power.

.2 The light switches for the washroom must be controlled. The switches shall either be secure key switches or shall be located within a locked controlled location. They may also be located in an electrical panel, however the breakers or the panel should be locked. This would prevent a person from closing the lights when someone else is still within the washroom.

.3 Natural light should be provided if at all possible.

.4 Motion sensors shall not be used to control the lighting.

.2 Stair Lighting

.1 General Lighting in stairways shall be connected to emergency power if
.3 Parking Areas (Surface and Underground)

.1 Lighting levels must be adequate to avoid contrast between light and shadow, to eliminate entrapment spots.

.2 Perimeter wall surfaces shall be light coloured so as to provide maximum reflection.

.3 The lighting level in underground parking garages shall be a minimum of 5 foot candles.

.4 Some lighting fixtures in underground parking garages shall be connected to emergency power.

.4 Pathways

.1 Lighting levels must be adequate to allow an individual to see and identify a person 50 feet ahead.

.2 Lighting levels shall be adequate to provide minimum contrast between light and shadow.

.3 Lighting levels shall be maintained along a pathway so that promise of safety at the beginning of the path is maintained along its length.

.4 Temporary lighting shall be provided on hoarding around construction sites.

.5 The designer shall consider providing low level lighting within the shrubbery and landscaping.

1.2 Illumination Task Force Recommendations

The complexities of our university are well known to us. It is impossible to come up with a lighting level standard for each type of room. The following recommendations are based on a practical approach to major types of groupings of occupied rooms.

.1 Rooms where reading and writing is required.

These areas are as follows:

Tutorial Rooms, Offices, Lecture Halls, Libraries and Laboratories should be grouped together. (There are some exceptions - like some Laser Rooms needing very minimal lighting, and most of the computer terminal rooms needing less than an office environment.)

Recommendation for these areas: 50 - 75 foot-candle

.2 Rooms where reading is not required

Common areas, corridors, stairways, washrooms, elevators, lobbies, lecture rooms are less illuminated due to the fact that no reading or writing is taking place. (There are places where bulletin boards are displayed in corridors but these areas could be "spot lit").

Recommendation for these areas: 10 - 20 foot-candle

.3 Sport facilities
Sport facilities need to be specifically designed and will not be part of this general lighting standard.

.4 Residences
Lighting in residences is a very subjective issue, requiring specific design. However corridors, washrooms and stairways shall comply with the general lighting standard.

1.3 Sightlines

All university buildings and surrounding areas must be designed so as to maximize lines of sight ahead, behind and to the sides. Consultants should utilize barrier materials which are visually permeable and use reflective surface at corners to improve visibility. Design shall maximize clear glazing in areas such as stairwells, elevator lobbies and entrances to offices and work areas. Landscape material should be selected and located so as not to impede long views. Building exterior design and placement should maximize overlook and casual surveillance of public spaces.

Areas of special attention:

.1 Corridors

.1 Hidden recesses in corridors shall be eliminated.
.2 In curved or angled corridors, mirrors or mirrored surfaces should be provided to allow a view further ahead.
.3 Wheelchair ramps are to be as open and transparent as possible. The sides of ramps shall not be constructed of a solid material. A transparent material or pickets providing views through and beyond the ramp shall be used. If the ramp is placed adjacent to a solid wall, the other side is to be transparent.

.2 Reception or Reference Areas

.1 Reception or reference areas shall not be isolated from other offices or areas. Sight lines shall be provided between reception areas and surrounding spaces providing casual surveillance.

.3 Computer laboratories (and other labs)

.1 In computer laboratories and other areas, it is important to be able to see into these spaces from the corridor, giving people passing by an unobstructed sight line into the spaces and vice versa. In an internal work station configuration, glass shall be provided in doors and in glazing panels beside doorways.
.2 The designer must find solutions which provide proper sight lines, and minimize noise and provide adequate acoustic privacy.

.4 Library stacks

.1 Stacks must be arranged so as to avoid people becoming trapped in the stack area.
.2 There must be an ability to see around edges and through stacks.
.3 Entrapment areas must be avoided and proper sight lines maintained.
.4 Moveable stacks must be designed so as to avoid people becoming trapped between them.

.5 Laundry rooms

.1 Laundry rooms shall be located adjacent to high activity areas such as stores,
lounges, recreation rooms etc. There shall be windows located in the walls, so that the other occupants and people passing by can see into the space, providing casual surveillance.

.6 Service areas
.1 As with laundry rooms, service areas, typically low traffic areas, shall be located adjacent to high volume, high traffic areas so that the people occupying that space are not completely isolated.

1.4 Entrapment and Movement Predictors
.1 Areas of entrapment are to be avoided. Such areas are single entrance/exit offices in areas of low traffic or vulnerable areas such as where student counselling takes place or areas where researchers work at night or during off hours. Other potential areas of entrapment are: unlit recesses, corners or alcoves; small structures (sheds, storage areas) which are unlit or unlocked. Washrooms which are located in low activity areas can be entrapment areas, especially if the entrance configuration is complicated and communication to a corridor is difficult. Single use washrooms are better choices. Quadrangles and courtyards must be so designed so that there are no entrapment areas.

.2 A designer should incorporate clear glass panels in all doors to stair wells, corridors and entrances. All unnecessary corners, planters, walls and fences which could produce entrapment spots shall be eliminated. In enclosed public spaces, columns, rather than shear walls, should be used as structural members. Alternative pedestrian routes, multiple exits and choices in direction should be provided wherever possible.

.3 Structures which create entrapment spots shall be avoided. These include: fixtures which line up flush with wall, abut walls directly (such as library stacks or locker rows) or create dead ends. In any area where entrapment is an issue, consideration must be given to communication needs, particularly for emergency assistance.

.4 Pathways which force users to go past entrapment areas shall be avoided. Paths shall be designed to allow users several alternate means of movement and a means of escape.

Areas of special attention:

.1 Corridors
.1 Corridors with unlit recess shall be avoided. Long corridors should have midway exit possibilities. There should be a choice for exiting or going back.

.2 External paths
.1 External paths shall be designed and located to avoid entrapment areas. Appropriate signage should be located so as to identify a choice in direction or route, and where each will lead.

.3 Edges of Buildings
.1 Recesses and unlit areas shall be avoided. Reflective surfaces should be provided at corners where appropriate. Proper lighting shall be provided to avoid dark entrapment areas.

.4 Construction zones with hoarding
.1 On construction sites, entrapment areas are created by hoarding which is not or cannot be properly secured. As well, inadequately signed or inappropriately signed sites can create entrapment areas. For example, when a construction area interferes with a well travelled path (formal or informal), a safe and usable alternate path must be clearly indicated and properly lit. Proper lighting must be provided on hoarding.

.5 Underpasses

.1 Underpasses should be avoided. However, where underpasses are required, they should be wide, well lit and provide an opportunity for a change in direction.

1.4 Isolation

.1 Isolated activities and those which occur during off hours, such as laundry facilities, shall be located next to high volume, randomly attended activities such as lounges, T.V. rooms etc.

.2 In areas of low pedestrian traffic, clear, concise and highly visible signage should be used. Clear directions to the nearest communication device must be given. Wherever it is deemed necessary, alert stations (emergency telephones) should be used to aid in emergency situations. Surface parking lots located behind or beside buildings must have sightlines to nearby assistance within the building.

.3 Clear, concise, diagrammatic building plans should be provided inside the building entrance identifying the location of washrooms, telephones, reception areas, public spaces, cafeterias and lecture halls. Sufficient information, identifying the nearest staffed area or exit should be provided at major decision points within the building.

1.5 Access Control

.1 The issue of access control is extremely critical on campuses. A number of buildings are occupied during normal working hours and are locked for the evening and during the night. However, in a large number of buildings, classes are held late into the evenings, and in some cases students work in libraries late into the night. Some of the items to be considered should include:

.1 Access control needs to be designed in a way that permits staff to maintain a separation between public, semi-public and private areas.

.2 A system shall have wide flexibility and the ability to accommodate immediate change, at relatively low cost.

.3 Main entrances should be designed to be barrier free and easily used by all.

.4 Special attention regarding access control shall be given to libraries, student residences and academic buildings used after normal building hours.

.5 Systems shall be designed for the long term and not become obsolete shortly after installation.

.6 The main lobby and entrance shall open onto a properly staffed reception / office area allowing casual surveillance of the entrance to the building.

1.6 Communication

.1 The need to communicate and to be able to call for assistance in cases of emergency is
extremely important. A means of communication shall be provided in areas of greatest vulnerability where confrontation may potentially occur such as:

.1 cash collection locations;
.2 library fine counters;
.3 reception counter areas;
.4 parking kiosk;
.5 other areas where confrontational discussions may occur.

.2 A number of design options could be considered, a final system selection being dictated by the specific situation following discussions with the clients / University representative during the design phase. Some of the design options include:

.1 providing an alert button at the library counter;
.2 providing an alert button at a porters station in residences;
.3 providing a network communication system through the computer local area network. A distress call could be punched in on the computer and come up on screens in adjacent offices;
.4 providing emergency phones in problematic areas or isolated areas and connecting to the Campus Police;
.5 providing a public address system in buildings to facilitate internal building communication;
.6 maintaining clear sightlines between these areas and adjacent offices.

1.7 Activity Generators / Activity Mix

.1 As noted in other sections, low activity areas should not be isolated but shall be located near or adjacent to high activity areas, e.g. laundry rooms adjacent to common rooms.

.2 In planning of a project, the concept of locating high risk or low volume activities next to high volume activities, should be implemented. This should be considered in the following situations:

.3 Within academic buildings, administrative staff should be located close to academic offices.

.4 There are situations where the office areas and reception areas are far removed from the main doors or entrances to the building. This allows for anyone to enter the building at anytime and leaves the reception area in a very isolated situation. This should be avoided.

.5 Child care facilities are sometimes situated in isolated locations. They should be located within high activity buildings.

.6 Special attention shall be paid to the location of pathways, entrances and exits for people with mobility difficulties.
END OF SECTION
The Design Team is required to read and comply with the full Design Standards as they apply to the project. A completed copy of this checklist must be submitted by the Design Team to the University's Project Manager when the Design Development Phase is 75% complete. In all cases, if a "does not comply" has been checked, please indicate why. Attach additional sheets if necessary.

2.A. BARRIER FREE ACCESSIBILITY – EXTERIOR

1 Parking Areas

.1 Number of Spaces
  .1 A minimum of one (1) space for every 100 vehicles should be provided for persons with a disability.
  
.2 Location, Surface
  .1 Accessible parking spaces for vehicles should be provided in a close and convenient location to ensure persons with a disability have convenient access to an accessible barrier-free entrance(s) without having to travel between parked cars or other obstacles.
  
.2 Underground/multi storey parking garages must have accessible parking spaces on at least one level, preferably adjacent to an elevator or a level, pedestrian route.
  
.3 If parking is not available in a close and convenient location, posted signs indicating the location of the closest accessible barrier-free entrance should be provided.
  
.4 The surface of parking spaces should be firm and fairly even. Surface drainage slopes should drain away from designated parking area.

.3 Space Size and Height
  .1 The width of accessible parking spaces should be a minimum 3700 mm (12 ft 0 in) wide with an adjacent accessible aisle a minimum of 1500 mm (5 ft 0 in) wide. The length should be 5500 mm (18 ft 0 in).

.4 Lighting Levels
  .1 The lighting level at accessible parking locations should be at least 30 lux. (3 fc) measured at grade level.
  
.2 The surrounding walls of enclosed parking areas should be painted in reflective, light colours.

.5 Signage
  .1 The parking spaces reserved for persons with disabilities shall have two International Symbols for Accessibility. One sign measuring 300 x 600 mm (12 x 24 in) shall be installed at the front on curb side at a height of 1500 mm (5 ft 0 in) from the ground to the centre of the sign. The second International Symbol for Accessibility measuring 1000 mm (3 ft 4 in) in length shall be
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painted/applied on the pavement of the parking space in a colour that contrasts sharply with the surrounding space.

2. Passenger Drop-off Area

.1 Location
   .1 Passenger drop-off/loading zones should be located as close as possible and at the same level of the main barrier-free accessible entrance.
   .2 Where differences in paving levels occur, suitable curb ramps should be provided.

.2 Size and Height
   .1 The area should be large enough to accommodate parking for a bus as well as cars and, if a canopy is included, it should have a minimum headroom clearance of 3550 mm (11 ft 8 in) for the bus loading zone and 2740 mm (9 ft 0 in) for the car-loading zone.
   .2 An access aisle 1500 mm (5 ft 0 in) wide should be provided adjacent and parallel to the vehicle loading area.

3. Exterior Pathways

.1 Exterior pathways designated as accessible, barrier-free passageways should be a minimum width of 1500 mm (5 ft 0 in).
.2 The surface shall be continuous, made of a firm, even, non-slip material
.3 The pathway must be clear of projecting objects/amenities such as planters, trash containers, trees/shrubs, signs, guy wires that may present an obstacle to people with visual and mobility impairment. When it is unavoidable to keep the pathway clear of such items, they should be located so that a person walking with long cane can detect them. Wherever possible, walkways should be separated from the objects/amenities by a colour contrasted and cane detectable border a minimum of 300 mm (12 in) wide.
.4 Seating areas alongside long routes should be provided. Seating should be constructed of weatherproof materials and be free of sharp edges.
.5 Wheel stops should be provided in parking lots wherever car bumpers may extend over and onto the pedestrian passageway. Wheel stops should be painted in a bright, contrasting colour.
.6 Grating and grilles should be set so that their long openings are perpendicular to the path of travel and the spacing of the openings should be 13 mm (⅓ in) or less, edge to edge.
.7 Lighting levels on exterior routes should be at least 30 lux (3 fc).

C= Complies  NC= Does not comply  NA= Not applicable
.8 Lighting standards or posts should be mounted to the side(s) of walkways so as not to present an obstacle to people in wheelchairs or with sight impairment. Overhead lighting should be mounted to allow a clear headroom of 2280 mm (7 ft 6 in) below fixtures.

.9 Where possible, walkways/sidewalks should have curb ramps with a maximum slope of 1:12 (where rise is higher than 180 mm (6 in) slope should be 1:15) and a curb ramp lip ranging from ½ to ¾ in (13 to 19 mm). The minimum width of curb ramps should be 1200 mm (4 ft 0 in) exclusive of the flared sides. The edge of the curb ramp closest to the road should be marked with a colour/brightness contrasted strip 15 mm (9/16 in) wide.

.10 Exterior pedestrian routes should have headroom clearance wherever possible, of at least 2280 mm (7 ft 6 in) across the entire width of the walkway.

4 Exterior Ramp

.1 Ramps should be a minimum width of 1500 mm (5 ft 0 in) with a maximum gradient of 1:18, and have a firm, even, non slip surface.

.2 Ramp surfaces and their approaches shall be designed so that water/ice will not accumulate. Whenever possible, consideration should be given to protecting ramps from difficult weather conditions.

.3 Ramps should have strip at least 300 mm (12 in) wide, in a contrasting colour and texture at the top and bottom to warn visually impaired persons.

.4 The side(s) of the ramp must be as transparent as possible for maximum visibility into the entire route so that users can be seen clearly even from a distance.

.5 Handrails must be provided in accordance with Ontario Building Code.

.6 Lighting level on exterior ramps should be a minimum of 100 lux (10 fc).

5 Sloping Sidewalk

.1 The University prefers that wherever possible, sloped sidewalks be provided instead of ramps.

.2 The maximum slope in a sloping sidewalk must be 1:20 with a minimum width of 1500 mm (5 ft 0 in).

.3 If grassed/landscaped/paved areas of a minimum 1500 mm (5ft 0 in) wide are provided at the same grade on both sides of the sloping sidewalk, then curbs or railings are not required. Where a grade variance is unavoidable, then handrails must be provided.

.4 The surface material must have a firm, non slip finish.

.5 The minimum illumination level on Sloping Sidewalks should be 100 lux (10 fc).
6 Exterior Steps

.1 Any landings situated on exterior stairs should be a minimum of 1200 mm (4 ft 0 in) deep by the width of the stair.

.2 A textured surface at the top and bottom landings of stairs should be provided as a tactile warning of an approaching change in level.

.3 Exit doors that open onto exterior stair landings should be avoided wherever they could present a hazard to visually impaired people. If such doors are necessary, the landing should be a minimum of 1500 mm (5 ft 0 in) deep and should have a minimum illumination level of 100 lux (10 fc) measured at grade level.

.4 Stair treads should be of a non-slip material.

7 Building Entrance

.1 Ideally, the main entrance to the building should be the accessible entrance. If this is not possible, proper signage shall be provided to indicate the location of the accessible entrance. At least one entrance to the building shall be an accessible entrance.

.2 The accessible barrier-free entrance should be reached by and connected to accessible routes.

.3 The accessible barrier-free entrance shall display the International Symbol for Accessibility in a way that will be visible to users when approaching the entrance.

.4 Ideally, exterior signs indicating the building name and address should have lettering in a material that is tactile and in a size that is legible by the visually impaired.

.5 Where possible, exterior signs should be positioned on the door latch side. Where this is not possible, the sign should be located within the landscaped area leading to the main entrance.

.6 Ideally, the wheelchair users' entrance should be protected from rain and snow. A canopy or other covering at least 915 mm (3 ft 0 in) wide with headroom clearance of at least 2280 mm (7 ft 6 in) across the entire width should be provided.

.7 The main accessible entrance shall be equipped with an automatic door opener that has the capability of being switched to 'On' or 'Off' positions. The interior control panel must also display a signal that indicates whether the door operator is activated or deactivated.

.8 Inside the main accessible entrance there should be sufficient space for at least two persons in wheelchairs. This space should have a clear view of the entrance and pick-up or drop off area for public and private vehicles.

.9 In public buildings, the main entrance should, if possible, be equipped with an accessible public telephone to give people with disabilities the possibility of calling for a taxi or ride.
.10 Entrances should not be placed close to or along to hazardous areas such as kitchens, mechanical or janitorial rooms, trash storage rooms, etc.

.11 Lighting levels at accessible entrances should be 100 lux (10 fc). Lighting fixtures should be mounted on the sides of the steps or ramp and should provide an even distribution of light to avoid casting of shadows.

.12 Lighting levels of 200 lux (20 fc) should be provided in vestibules and light fixture(s) should be mounted for an even distribution of light to avoid shadows.

8 Exterior Doors

.1 The main entrance should be the accessible barrier-free entrance. The main accessible door should be power operated and have a minimum opening time of 3 seconds.

.2 When the main entrance door is a single door, it must be 915 mm (3 ft 0 in) wide. When the main door consists of two panels, each panel must also be 915 mm (3 ft 0 in) wide and a centre mullion should be avoided.

.3 In the case where the front entrance consists of multiple doors, the doors farthest to the right (when approaching the building) should be the accessible entrance.

.4 In the case where the main entrance is a non accessible revolving door, an adjacent (to the right) accessible swing door should be provided.

.5 The main accessible barrier-free doorway should be recessed so that when the door is in an open position, it does not open into the line of cross traffic. When it is not possible to have a recessed accessible entranceway, a guardrail must be provided at the sides.

.6 The push button for power operated doors should be located opposite to the swing of the door and at 850 to 915 mm (2 ft 10 in to 3 ft 0 in) above the finished floor.

.7 Where a vestibule is incorporated in a front entrance, the inner set of doors should be power operated with a separate control device.

.8 Where possible, the vestibule of an accessible main entrance should be at least 2100 mm (7 ft 0 in) long, measured from the exterior to the inner doors, and have sufficient space beyond the inner doors for wheelchair manoeuvrability.

.9 A proximity type sensor system is preferred for power operated doors.

.10 The mechanism for door operator(s) must have the capability of being switched to ‘on’ or ‘off’ positions. More importantly, there must be a signal in the control panel that indicates whether a door operator is activated or deactivated.

.11 Door(s) should be glazed for maximum visibility to allow people to see into the building entrance. The minimum amount of glazing shall be defined by Ontario Building Code.

.12 The glazing on doors should be readily identifiable. Decals or other materials should be placed on the glass surface.

C= Complies          NC= Does not comply          NA= Not applicable
.13 Kick plates should be provided on doors and are to be from 250 mm (10 in) to a maximum 460 mm (18 in) in height.

.14 Thresholds should be a maximum of 10 mm (3/8 in) high with sloped edges. The preferred height is 6 mm (1/4 in).

2.B. BARRIER FREE ACCESSIBILITY – INTERIORS

9  Interior Corridors/Pathways

.1 The interior corridor system must be accessible. The interior corridor system shall branch out from the main accessible entrance and connect with all parts of a building.

.2 The interior corridor pathway should be arranged in a consistent, logical, pattern that is easy to follow. Directional signage should be provided along corridors to aid with orientation.

.3 Ideally, objects should not protrude into corridors. If an architectural element protrudes into the corridor, it should be limited to 100 mm (4 in). Elements such as fire hose cabinets, drinking fountains, etc., should be recessed. If this is not possible, the protruding elements should be detectable with a cane at floor level.

.4 The corridor floor should be of non-slip material.

.5 Where possible, corridors should be at least 1500 mm (5 ft 0 in) wide.

.6 When choosing surfaces colours, the needs of people with vision impairment should be taken into account.

.7 Lighting levels in corridors should be a minimum of 100 lux (10 fc).

10  Interior Stairs

.1 Interior stairs should be located along the main pedestrian route.

.2 Open risers should be avoided. Patterns on stair treads should be kept simple.

.3 All stairs should have a colour contrasting, tactile warning strip at the top and bottom of the stair run. This can be accomplished by using a different texture finish/colour toe from the floor leading to the staircase.

.4 Stair treads should be of a non-slip material.

.5 Lighting levels in staircases should be a minimum of 100 lux (10 fc).
11 Elevators

.1 General

.1 To facilitate accessibility between floors, elevators should be provided. Platform (handicapped) lifts should only be used where an elevator cannot be installed.

.2 Elevators should be designed to facilitate wheelchairs or scooters.

.3 Elevators and platform lifts must comply with CAN.CSA/B44-M97, "Safety Code for Elevators, including Appendix E, Elevator Requirements for Persons with Physical Disabilities. Freight Platform Lifts cannot be used to carry passengers.

.4 Passenger elevating devices must comply with CAN.CSA/B355-M, "Elevating Devices for the Handicapped".

.2 Elevator Lobby

.1 The main floor elevator lobby should be directly accessible from the main entrance of the building. On upper floors, the elevator lobby should be directly accessible from the main circulation route.

.2 The elevator lobby should be large enough to accommodate several wheelchairs.

.3 The design and placement of signage, call buttons, auditory cues and other wayfinding elements within the lobby should follow a similar pattern throughout the rest of the building/space.

.3 Elevator Lobby Call Buttons

.1 In lobbies with only one elevator, the call button panel should be placed to the right of the elevator door. In lobbies with two or more elevators, the call button panel should be located between the elevators to provide ample access by all users. The centre of the call button panel should be positioned 1070 mm (3 ft 6 in) from the finished floor of the elevator lobby.

.2 Lobby elevator call buttons should be located between 1045 to 1094 mm (3 ft 5 in to 3 ft 7 in) above the floor and should be similar to Dupar US91 Series.

.3 Elevator panels operated with a key by building personnel should be located separately from public call buttons so as not to confuse passengers with visual impairments.

.4 Call button panels should have visual/tactile symbols on them indicating up and down directions.

.5 Numerals, characters and other symbols should be on a colour/brightness contrasted background. This information should also be in Braille.

.4 Elevator Lobby Floor-Position Indicators

.1 Digital floor position indicators should be installed above the entrance doorframe in the main lobby and preferably in all elevator lobbies throughout the building. This indicator should have an audible cue to indicate the arrival of the elevator cab and the audible cue should indicate in which direction the
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5 Elevator Cab Size

1. Where possible, the minimum clear space inside the elevator cab, excluding return panels, should be approximately 2130 mm wide x 1650 mm deep (7 ft 0 in x 5 ft 6 in).

6 Elevator Doors

1. The minimum clear width of the elevator doorway when fully open should be 1065 mm (3 ft 6 in). The door should be located on the side with narrower wall dimension.

2. Elevators should be designed so that doors remain open at least four seconds when summoned. If the elevator is going to a floor because someone inside the elevator has pushed the floor button, the doors should stay open at least three seconds. Only the use of the “Close Door” button should reduce the time that the doors remain open.

3. The automatic sliding doors of the elevator cab shall have an electronic detector covering the height of the door that will stop and fully reopen the elevator cab and adjacent hoistway doors if the door is obstructed while closing.

4. The elevator door jambs on both sides of the elevator doorway should have signs indicating the floor number, with the centre of the sign at 1525 mm (5 ft 0 in) in height from the floor. We recommend tactile signage that is colour/brightness contrasted to the background and with numerals at least 50 mm (2 in) tall, raised at least 1 millimetre from the surface. Grade one Braille should be located below the tactile characters.

7 Elevator Control Panel

1. The control panel inside the elevator cab should be located to the right of the elevator doors when facing the doors from the inside of the elevator.

2. The floor call buttons, door operating buttons, and emergency buttons shall be located in the control panel.

3. Cab call buttons shall be similar to Dupar US91 Series.

4. Numerals, characters and other symbols should be on a colour/brightness contrasted background. This information should also be in Braille.

8 Elevator Cab Floor-Position Indicator

1. Floors should be identified both visually and audibly.

2. The panel should be positioned so that the centre is no more than 1830 mm (6 ft. 1 in) from the finished floor.

3. A tone should be emitted upon arrival at each floor — a minimum of 20 decibels, with a maximum frequency of 1500 hertz. A pre-recorded voice announcing the floor number is preferred.

9 Elevator Handrails

1. Handrails should be provided inside the elevator cab.
.10 Elevator Voice Communication

.1 A hands-free telephone with reprogrammable auto dialler should be installed inside the elevator cab. The auto dialler shall be suitable for ten digit dialling and connected to University of Toronto Police Services. Incoming calls shall not require in-car activation of unit in order to initiate communication.

.2 A mechanically activated push button to activate the telephone must be provided. The push button shall be distinct from cab-operating and floor call buttons and shall be identified with engraved signage reading “Press for Assistance” or similar message.

.3 The telephone unit shall be contained within the cab operating panel. Speaker grille, microphone and push button cutouts shall be made in the cab-operating panel. A separate faceplate for the telephone unit is not permitted. The telephone shall be located at the bottom of the panel.

.11 Elevator Lighting

.1 The lighting level inside the elevator cab should be approximately 100 lux (10 fc).

.12 Elevator Interior Finishes

.1 The elevator interior should be finished with non-glare materials.

.2 The elevator floor should have a firm and slip-resistant surface for easy movement of wheelchairs.

12 Fire Exits

.1 Fire extinguishers should be mounted not higher than 1200 mm (4 ft 0 in) from the floor to allow people in wheelchair access.

.2 Corridors, staircases and elevator lobbies should be equipped with an emergency lighting system that provides a lighting level between 10 to 30 lux (1 to 3 fc).

2.C. BARRIER FREE ACCESSIBILITY – FACILITIES

13 Lobbies

.1 The main lobby in a building should be of sufficient size to allow for at least several people in wheelchairs.

.2 Where a waiting area is provided, it should be located adjacent to the main lobby and along the main path of travel. Allow for several wheelchair patrons.

.3 As lobbies are usually located near a building entrance, there should be a gentle change in lighting level from the natural light outside to the artificial lighting of the lobby.
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.4 If a reception desk or counter is provided in a lobby area, the desk or counter should have a barrier free section with a continuous countertop measuring between 810 to 860 mm (2 ft 8 in to 2 ft 9 in) in height for full access by persons in wheelchairs.

.5 The knee space under the desk or counter should be accessible.

.6 If possible, a public telephone equipped with a telecommunication device for the deaf (TTY) should be provided near the reception counter.

.7 If an intercom is provided, the speaker should not be higher than 1100 mm (3 ft 6 in) above the floor.

14 Auditoria/Classrooms/Seminar Rooms

.1 Doors opening into classrooms, auditoria and seminar rooms must be 915 mm (3 ft 0 in).

.2 Large classrooms with a capacity of over 60 people should have at least one entrance door provided with an automatic door opener.

.3 Aisles in the classroom should allow sufficient passage for people in wheelchairs.

.4 At least 3% of the seating space in any classroom/Auditoria/Seminar Room should be accessible and reserved for persons in wheelchairs. These spaces should be close to a door.

.5 The minimum size of a wheelchair seating space should be at least 915 mm (3 ft 0 in) wide by 1525 mm (5 ft 0 in) deep.

.6 If the classroom includes a podium, the podium should be accessible.

.7 Coat hooks for wheelchair users should be provided at 1070 mm (3 ft 6 in) above the floor.

.8 Electrical outlets and computer drops for the wheelchair seating spaces should be provided within easy reach from a seated position.

.9 Lighting levels in classrooms should be a minimum of 500 lux ( 50 f) and 750 lux (75 fc) at the podium.

15 Libraries

.1 All doors into the library shall have a clear opening of at least 915 mm (3 ft 0 in). The main entrance doors to the library shall be equipped with an automatic opening device.

.2 Tables, study carrels and stacks should be arranged to allow for accessibility and manoeuvrability of wheelchairs.

.3 At least 3% of the fixed carrels and tables should be accessible.

.4 Library stacks should not be dead-ended.

.5 In new facilities, a clear width of 1070 mm (3 ft 6 in) between stacks should be provided.

C= Complies    NC= Does not comply    NA= Not applicable
2. BARRIER FREE ACCESSIBILITY

.6 A storage area for book carts should be provided so that they do not obstruct the path of travel when not in use.

7. Where appropriate, a queuing path in a different surface material and texture that is in a contrasting colour from the surrounding area should be created to facilitate visually impaired library patrons.

.8 Libraries with turnstiles or checkout counters shall have at least one gate wide enough to allow free passage of wheelchairs/scooters.

.9 The lighting level in libraries shall be a minimum of 300 lux (30 fc).

16 Dining Halls/Cafeterias

.1 Cafeterias shall be designed to accommodate people in wheelchairs.

.2 Tables and chairs should be arranged to allow for accessibility and manoeuvrability of wheelchairs.

.3 The principle path of travel shall be clear of obstacles such as waste receptacles, stands, signs etc.

.4 The minimum clear width of a food service line should be at least 915 mm (3 ft 0 in) wide, however 1100 mm (3 ft 6 in) would be preferred.

.5 The counter height of the service line should range between 810 to 860 mm (2 ft 8 in to 2 ft 10 in)

.6 Self-serve shelves, cutlery stands, etc. should be visible and easily reached by wheelchair users and have a maximum height of 1070 mm (3 ft 6 in).

.7 Tray slides should be continuous and not more than 865 mm (2 ft 10 in) high.

.8 The operating mechanisms on vending machines should be located at a height between 400 to 1070 mm (1 ft 3 in to 3 ft 6 in). The controls should be illuminated as well as colour contrasted.

.9 A clear area in front of counters and vending machines should be provided to accommodate for wheelchair manoeuvring.

.10 Lighting in cafeterias should be evenly distributed to prevent dark areas.

.11 Lighting levels in cafeterias and dining halls shall be a minimum of 100 lux (10 fc) in the dining area, 300 lux (30 fc) at the cashier’s area, 500 lux (50 fc) at the food display area, and 750 lux (75 fc) in the kitchen/food preparation area.

17 Washrooms

.1 General

.1 Accessible Men’s and Women’s washrooms must be located on the same level as the accessible entrance.

.2 Accessible washrooms should be identified with the international symbol of accessibility.
2. BARRIER FREE ACCESSIBILITY

.3 Accessible washrooms may be either for single occupant, unisex use or part of a multi-occupant facility for men or women.

.4 Doors to the main entrance of public washrooms must be 915 mm (3 ft 0 in) wide and be equipped with an automatic door opener.

.5 Lighting levels should be a minimum of 200 lux (20 fc).

2 Multi – Occupant Washrooms

.1 Vestibules should be avoided in multi-occupant public washrooms. However, privacy walls must be provided so that it is impossible to see inside the washroom.

.2 Where possible / space permitting, it is preferable that the entrance to public washrooms is not through a doorway but rather be configured in such a way as to provide complete privacy by way of angled or curved walls.

.3 Accessible toilet stalls, washbasins, mirrors and accessories must be provided and installed according to Ontario Building Code.

.4 Door pulls on toilet stalls should be a vertical D type and be at least 140 mm (5 ½ in) long.

.5 Locking devices on toilet stall doors should be easily operable with one hand.

.3 Single Occupant Unisex Washrooms

.1 The single occupant, unisex washroom must have an accessible toilet, washbasin and accessories provided and installed according to Ontario Building Code.

.2 A clear turning area of 1500 mm (5 ft 0 in) diameter must be provided in single occupant washrooms but an area of 1800 mm (6 ft 0 in) diameter for motorized scooters is preferred.

.3 The entrance doorway should be located so as to allow for maximum visual privacy in the washroom interior.

.4 An emergency call strip must be provided around the perimeter of the room on walls free of washroom fixtures, at 300 mm (12 in) above the finished floor. This call strip, when activated, will announce an “Assistance Required” sign located outside the washroom and will activate a sound signal in a suitable location.

.4 Washrooms Accessories

.1 Toilets

.1 Toilets should be supplied and installed according to Ontario Building Code.

.2 Flush controls should be located on the transfer side of the toilet and may be either electronically or automatically controlled. The preferred choice is the electronic type. The mounting height should be 1070 mm (3 ft 6 in) above the finished floor.

.2 Urinals

.1 One urinal shall be equipped with grab bars. Grab bars shall be provided
and installed according to Ontario Building Code.

.4 Washbasins and Lavatories

.1 Washbasins shall be provided and installed according to Ontario Building Code. ☐ ☐ ☐

.2 A continuous vanity in a contrasting colour to walls is preferred. ☐ ☐ ☐

.3 A clear floor space of 760 mm wide by 1200 mm deep (2 ft 6 in by 4 ft) should be provided in front of the vanity with the accessible basin. ☐ ☐ ☐

.5 Mirrors

.1 Mirrors should be installed as defined by the Ontario Building Code. ☐ ☐ ☐

.2 Ideally, a full-length mirror should be provided and mounted on a blank wall. ☐ ☐ ☐

.6 Coat Hooks

.1 Coat hooks should be provided at a maximum of 1200 mm (4 ft 0 in) above the finished floor and should not project more than 40 mm (1 1/2 in) from the wall. ☐ ☐ ☐

.7 Hand Dryers

.1 Automatic hand dryers should be provided and installed according to Ontario Building Code. ☐ ☐ ☐

.8 Toilet Paper Dispensers

.1 The toilet paper dispenser should be located within easy reach. ☐ ☐ ☐

.2 The preferred type of toilet paper dispenser is a jumbo roll by Bobrick (Model 817545), Watrous, Bradley, or pre-approved equal. ☐ ☐ ☐

.9 Towel Dispensers and Disposal

.1 The towel dispenser shall be mounted at a height to be within easy reach for a person in a wheelchair. ☐ ☐ ☐

.2 The preferred types are towel dispenser by Bradley (Model 2277), Watrous, Bobrick, Twin Cee, or pre-approved equal. ☐ ☐ ☐

.10 Sanitary Napkin Disposal

.1 A sanitary napkin disposal unit shall be provided in each unisex single occupant washroom and in each woman’s washroom. ☐ ☐ ☐

.2 The napkin disposal unit shall be mounted at a height to be within easy reach for a person in a wheelchair. ☐ ☐ ☐

.3 The preferred disposal units are Bradley (Model 4722-15), Bobrick, Twin Cee, Watrous or approved equal. ☐ ☐ ☐

.11 Soap Dispensers

.1 Soap dispensers shall be provided and installed according to Ontario Building Code. ☐ ☐ ☐

.2 The preferred soap dispenser units are Bradley (Model 6542-15), Bobrick, Twin Cee, Watrous or approved equal. ☐ ☐ ☐
18 Lighting

.1 The switches for lighting must be controlled. Switches should be key switches or must be located in a secure area with controlled access (i.e. caretaking room) to avoid lights being turned off when washrooms are occupied. Sensors are not to be used.

.2 Lighting should be evenly distributed, in particular where there are mirrors, to avoid glare.

19 Residence Suites

.1 Every residence shall have a certain number of suites and facilities (to be determined by the University) specifically dedicated as accessible.

.2 The main entrance door to the residence building must be accessible and be equipped with an automatic door opener that has the capability of being switched to ‘On’ or ‘Off’ positions. The interior control panel must also display a signal that indicates whether the door operator is activated or deactivated.

.3 The path of travel from the front door to the accessible suite(s) shall be an accessible route.

.4 The entrance door to the accessible suite shall have a door 915 mm (3 ft 0 in) wide. This door should have a lever type handle and come equipped with an automatic door opener.

.5 A clear turning radius of 1500 mm (5 ft) diameter for wheelchair manoeuvring shall be provided within the accessible suite entrance, but a radius of 1800 mm (6.0 ft) to accommodate motorized scooters is preferred.

.6 Closets should have a clear floor space of at least 915 x 1500 mm (2 ft 6 in x 5 ft 0 in) in front of the closet door. Closet rods should be a maximum of 1200 mm (4 ft 0 in) above the floor level.

.7 Kitchen counters should be at a height that allows a person in a wheelchair to work comfortably. Electrical outlets should be located at the front of the counter.

.8 Light switches and other controls should be located according to Ontario Building Code.

.9 The washroom door in the accessible suite shall have a clear opening of 810 mm (2 ft 8 in), swing outwards and have a lever type handle. A clear turning radius of 1500 mm (5 ft 0 in) for wheelchair manoeuvring shall be provided within the washroom, but a radius of 1800 mm (6 ft) for motorized scooters would be preferred.

.10 A clear area of at least 810 mm (2 ft 8 in) wide should be provided in front of the bathtub.

.11 Bathtub grab bars must be provided and installed according to Ontario Building Code or as required by the occupant. In order to accommodate future custom requirements, washroom walls must be fully reinforced to sustain...
2. BARRIER FREE ACCESSIBILITY

rearrangement of grab bars.

.12 If an accessible bathtub is not provided, an accessible shower can be substituted. The two types of accessible shower stalls are: roll-in showers or showers with a seat. Roll in showers should measure at least 1500 x 915 mm (5 x 3 ft), and the shower with a seat at least 1270 x 1270 mm (3 ft 6 in x 3 ft 6 in).

.13 A minimum clear floor space should be provided in front of the shower entrance. The area should measure 915 x 1200 mm (3 ft 0 in x 4 ft 0 in) with the 1200 mm (4 ft 0 in) dimension parallel to the shower entrance.

.14 Curbs for roll-in showers should be 13 mm (1/2 in) high, and rolled.

.15 Grab bars for roll-in showers should be L shaped and at least 610 x 915 mm (2 ft 0 in x 3 ft 0 in) with the 915 mm arm set horizontally between a height of 700 to 800 mm (2 ft 4 in to 2 ft 8 in), or as required by the occupant.

.16 Shower controls for roll-in shower stalls should be mounted on the long wall above the grab bar not more than 1200 mm (4 ft 0 in) from the floor.

.17 The showers with seat should have the seat on the wall opposite the controls. The seat should measure 460 mm (18 in) in width and extend the full length of the stall, with its top at a height of 430 to 480 mm (1 ft 5 in to 1 ft 7 in) from the floor.

.18 Showers with a seat should have a grab bar at least 760 mm (2ft 6 in) long installed horizontally on the back wall between 700–800 mm (2 ft 4 in–2 ft 8 in) in height from the floor. Another grab bar at least 760 mm (2 ft 6 in) long should be installed vertically at 80–120 mm (3 in–4 in) from the front edge starting between 700–800 mm (2 ft 4 in–2 ft 8 in) from the floor, or as required by the occupant.

.19 Curbs in shower stalls with seat should be no higher than 100 mm (4 in).

.20 The temperature of water supplied to the shower should be controlled by a pressure-equalizing or thermostatically-activated valve.

.21 A hand-held shower should be provided with a hose not less than 1500 mm (5 ft 0 in) long and the capability to remain in a fixed position.

.22 Shower floors shall be slip resistant.

.23 In washrooms with a shower, two drains, one inside and one outside of the shower enclosure, must be provided.

2.D. BARRIER FREE ACCESSIBILITY – SIGNAGE

20 Signage/ Wayfinding System

.1 Accessibility signs/directories should be located in areas such as main entrances, elevator lobbies and doors, where maximum visibility is assured. They should be placed in prominent, well lit locations free from obstructions
such as plants, other signage, etc.

.2 Accessibility signs/directories should be placed at a level that can be comfortably seen by persons in wheelchairs or scooters.

.3 Signs should have large, bold characters (preferably white on a dark blue background) and have a glare-free finish.

.4 Raised characters should be at least 0.75 mm.

.5 Interactive information systems should be mounted at an accessible height.

END OF BARRIER FREE ACCESSIBILITY SECTION
Barrier Free Accessibility Design Standards – Bulletin #1

The following revision has been made to the Barrier Free Accessibility Design Standards and is effective immediately. This will be incorporated into the Standard at its next general re-issue.

The U of T Project Manager must consult with the appropriate operating Division of Facilities & Services Department before giving approval for any deviations from this Standard.

Replace initial description (Page 1 of 16) to read:

The Design of Public Spaces

New or redeveloped exterior, and some interior (i.e. service counters, fixed queuing guides, and waiting areas), public space, must comply with Part IV.1, Design of Public Spaces Standards (Accessibility Standards for the Built Environment, Integrated Accessibility Standards of the Integrated Accessibility Standards, O.Reg. 191/11, http://aoda.hrändequity.utoronto.ca/buildings/). This would include approaches to new buildings. Maintenance, environmental mitigation, or environmental restoration is excluded from this requirement.

Public space projects affecting exterior paths of travel, recreational trails, outdoor play spaces, or accessible on-street parking must include consultation with the public and persons with disabilities pursuant to aforementioned standards.

For additional information contact the University of Toronto’s AODA Office http://aoda.hrändequity.utoronto.ca/

The Design Team is required to read and comply with the full Design Standards as they apply to the project. A completed copy of this checklist must be submitted by the Design Team to the University’s Project Manager when the Design Development Phase is 75% complete. In all cases, if a “does not comply” has been checked, please indicate why. Attach additional sheets if necessary.
F & S Caretaking Department Design Standards
For New or Renovated U of T Premises – February 2015

- Caretaking Department Space Requirements:
  
  Caretaking Manager must sign off on Caretaking space allocations.
  
  o Buildings over 9,500 Sq. Meters (100,000 Sq. Ft.) require:
    - An office – with electrical and data drops as described below
    - Male and Female change rooms with lockers (1 person per 25,000 square feet)
    - A Lunch room
  
  o Buildings under 9,500 Sq. Meters (100,000 Sq. Ft.) require:
    - A combination office, change/locker, lunch room – minimum 140 sq. ft. (1 person per 25,000 square feet) – with electrical and data drops as described below

  o All Buildings require:
    - Supply and Equipment Storage Room should be 200 sq. ft. minimum with electrical outlets, appropriate ventilation for charging equipment, shelving, and a floor mounted slop sink. The room should be close to the loading dock and an elevator.
    - Provide recycling and waste area near loading dock.
    - A minimum of one janitorial closet per floor, each approximately 80 square feet, containing a floor mounted mop sink with wall mounted mop holders and shelving. The door must swing outwards to maximize space to store mop bucket, polisher and a cleaning cart.
    - An ideal layout would be as per the attached floor plan. Contractor to supply/install adjustable shelving in each janitor closet.

- Washrooms:
  
  Caretaking Manager must sign off on washroom plans.
  
  Partition walls must not be stainless steel or similar surface. We recommend Bobrick Solid Phenolic, Duraline Series 1080/1180.
  
  - all washroom doors to swing outward on exit where possible – either with unlatched push-plates or easily operable hardware – lever handles or push paddles
  
  - Toilets must be wall mounted
  
  - Capacity: in high use areas, provide a sufficient number of fixtures for anticipated demand, based on the expected numbers of persons to use washroom within the break period between lectures, so as to prevent excessive line ups. This will almost certainly exceed the minimum requirements set out by OBC.
  
  - Separation: in large, high use washrooms, fixtures must be grouped to make it possible to gate off half of washroom for cleaning or maintenance in off-peak times but allowing the rest to remain in use.
  
  - Floor must be poured material or a seamless type of flooring, Terrazzo or epoxy
  
  - 30 Gallon capacity waste containers – not wall mounted (free standing).
  
  - NO, repeat NO, in wall mounted dispensers or waste receptacles are to be installed.
Washroom Dispensers:
- Toilet paper dispensers dispense from double roll dispensers such as Bobrick Model B2892
- Surface mounted paper towel dispensers must be hands free, centre pull to accommodate a 1000 foot roll, recommend (2 minimum) Merfin 1004 dispenser, it is 10” Wide, 13” high, 9.5” deep, side opening hinged dispenser, lockable, ADA compliant, and made of ABS plastic.
- Mount soap dispensers over the sink rather than between sinks. The models recommended are:
  - C100FDW - Foam Dispensers – White
  - C100FDB - Foam Dispensers – Black
    - Dispenser dimensions:
      - 5 3/8” wide
      - 11” high
      - 4” deep
    - They dispense “Certainty” clearly green foam soap #C16504
    - Available from Sanco Supplies Limited, Scarborough
- High velocity air hand dryers are mandatory in potentially high traffic areas. Paper towel dispensers will not be installed in washrooms where hand dryers are installed. The Dyson Airblade dB is the required hand dryer, and is available from Cannon Hygiene of Markham, Ontario
- Install one toilet seat cover dispenser in each washroom.
- Napkin/Tampon Vendor (female washrooms) $.25 coin mechanism, Hospeco Brand – Model MT1-C$1 (white enamel finish), or D1-25SS (stainless steel finish), either one with Locking Security Bar SB-D1 (which is white), and Replacement Coin Mechanism ($.25) Model CM-25.
- Baby Diaper Change Table – Rubbermaid “Sturdy Station 2” with disposable cloths. To be installed in ALL washrooms (male & female), BUT only on the main floor of any building.
- Adult Special Needs Change Table – Dolphin Stainless Steel Change Table – Model D100 SS - E. To be installed in the “special needs” washroom on the main floor of each new or renovated building.

Electrical:
- Install receptacles every 25 feet in corridors, stairwells, and entranceways
- Install receptacles in all caretaking/janitor closets
- Install a data drop in each Caretaking office for use with Biometric Scanner, and a receptacle in the area of scanner installation
- Install a “Secure” data drop adjacent to exterior of the Caretaking office door for use with the electronic key box, and a receptacle in the area at a 4.5 foot height for use with the key box.
- Install a suitably sized electronic key box – see Caretaking Manager to establish key box capacity/size.
• Flooring:
  o High profile, high traffic areas such as corridors, entrances, lobbies, auditoriums, student and staff lounges. Starting from the least expensive, working up to the most expensive, high profile areas could be highly honed/polished, and densified/sealed, concrete if under serious cost constraints. Add to that an epoxy finish should a higher gloss be desired, and the funds available. To improve both the aesthetics, upgrade to coloured poured/seamless flooring, next would be epoxy based terrazzo flooring with a Shultz Pro Waxnomor floor finish, and should even more funds be available, retro-plated concrete based terrazzo is extremely desirable. The ultimate choice for appearance/aesthetics, and wear-ability in this category would be Nora rubber based flooring. It is initially slightly less than the terrazzo to install, but makes up for that savings over time as it would require some rehabilitative maintenance in the very long term.
  o Heavy use, and high abuse areas, such as washrooms, storage rooms, labs, change rooms, coffee shops, kitchenettes, animal areas, classrooms, and washrooms have the same choices as mentioned for high profile/high traffic areas above.
  o Computer labs, classrooms, auditoriums, public/private offices, and seminar/conference rooms etc. have two possible choices, carpet tiles, or should the project be flush with funds, a product called Powerbond, which is a combination of the attributes of welded sheet vinyl flooring, and high quality carpet. The added plus is that it is recyclable.

In summary, all of the materials listed above for the various area types meet the “must have” criteria of wear-ability, sustainability, minimal daily and long term maintenance, and in most cases will virtually never increase the deferred maintenance costs to the university.

The following materials “do not” meet the materials criteria listed above on more than one count:
  o Cork flooring – very poor wear-ability, not stain resistant, requires considerable daily and long term maintenance (man hours), requires the use of cleaning chemicals and floor finish on an ongoing basis, and has an extremely short life cycle.
  o Wood flooring - poor wear-ability, requires considerable daily and long term maintenance (man hours), and requires the use of cleaning chemicals and floor finish on an ongoing basis.
  o Sheet vinyl - poor wear-ability, not totally stain resistant, requires considerable daily and long term maintenance (man hours), requires the use of cleaning chemicals and floor finish on an ongoing basis, and has a short life cycle.
  o Vinyl based tile squares of any size/type - not totally stain resistant, requires considerable daily and long term maintenance (man hours), requires the use of cleaning chemicals and floor finish on an ongoing basis, and has a life cycle which is shorter than the approved hard surface materials.
  o Ceramic tile - not stain resistant, requires considerable daily and long term maintenance (man hours), requires the use of cleaning chemicals, and has seams which cease to appear clean, or even the same colour for more than a short period of time.
o Wall-to-wall carpet - poor wear-ability, not stain resistant, requires considerable daily and long term maintenance (man hours), and has a relatively short life cycle. Cannot be easily repaired or replaced.

If you have any questions, or would like to meet to discuss the Caretaking position, please contact Wayne Shaw at 416-978-8970.

- **Painted Surfaces:**
  - All painted surfaces must be washable

**LAYOUT OF REQUIRED JANITOR CLOSET**
8.6' x 7.6'
= 64 sq. ft.

Cart
* Optional
Wax Mop
[Diagram]

Mop Sink

6'0''
2'6''

Elevation

4'6''

Shelving
4 x 4'6'' = 18 L.F.

Mop Vacuum
[Diagram]

Elevation

"Typical" Janitor Closet

Lawton 4 May '08
Mail Management

1. Consideration must be given when a new address is obtained, either as rental or construction, to the postal code and relationship with Canada Post.
   1.1 For a student residence, mailbox sorting by Canada Post personnel is possible if desired. Mailbox hardware complying with Canada Post requirements must be installed and approved before occupancy.
   1.2 Any new address requires consultation concerning the postal code to determine how incoming mail will be processed. When it is determined that a new address is to be occupied, Manager of Mail Services must be informed at the beginning of the project.

2. For a multi-department building space must be provided for a Mail Services receptacle for internal mail handling, in addition to the space for the department’s own mailboxes, preferably as close to the exterior door of the building as possible.

   The design, location and specifications must be approved by Manager, Mail Services.
1. **Compactors**
   - A sealed, self-contained combination compactor must be used for waste removal, preferably 30 cubic yards in capacity ($25,000 each, 2016)

2. **Recycling Depots**
   - Recycling depots, whether for use inside buildings or for outdoor use around buildings, must consist of 4 large compartments with space for proper signage.
   - Must be fire resistant.
   - Must be easy to maintain and remove graffiti.
   - Must be easy to check and service.
   - Must use standard UofT liners.
   - $1,200 each (2016)

   ![Outdoor Recycling Depot](image1)

   ![Indoor Metal Recycling Depot](image2)
   ![Indoor Fibreglass Recycling Depot](image3)
   - $800/$1,200 each (2016)

3. **Indoor Recycling Bins**
   - **Paper Toters**
     - University blue 64 gallon plastic toters
     - Solid rubber wheels
     - Space for proper signage
$80 each (2016)

3.2 Organic Waste Bin
- Kitchen and kitchenette units are green plastic
- Easy to check and service
- Must use standard UofT compostable liners

$20 each (2016)

3.3 Desk-side Bins
- Mixed paper recycling bin must be a blue 26 litre capacity plastic bin.
- Garbage bin must be black plastic and hang on the mixed paper bin and must use standard UofT liners.

$15 each (2016)

All items must be approved by the Manager, Grounds Services
PART ONE
SECTION 6
CASH HANDLING

(Revised October 1998)
6 CASH HANDLING

6.1 CASH HANDLING

The issue of cash handling at the University is quite important in terms so of personal safety, management procedures and the implication on physical spatial design. In order to review these and other items, a special task force on cash handling was formed and it submitted its final report in August 1994. This report deals with fairly sensitive issues regarding policy and procedures, therefore it is not attached in the appendix.

The report does deal with physical space and storage issues and the specific recommendation dealing with these items are listed below.

D. Physical Space and Storage Issues

Of the questionnaire respondents who identified personal safety concerns 33% associated those concerns with the storage facilities of cash; 19% associated those concerns with the physical space and storage facilities in their office or building. It is important that the physical space and storage facilities in the cash handling areas appropriately reflect the security requirements of this activity. Particular attention should be paid to areas of the campus where there is a large accumulation of cash or where cash transactions take place in the public setting.

Recommendation D.1

That each campus identify high risk areas in respect of cash collection to ensure that the physical space and storage facilities are appropriate.

Many of the questionnaires identified concerns from staff about their exposure during cash collection and deposit preparation activities. In some areas these activities are carried out when the person is alone in the office or in the evening hours when there are few other staff in the area. In some areas cash collection takes place in public areas or in areas where people are walking through to reach another area. Sometimes cash is left sitting exposed on a desk while the staff member helps someone at a counter.

Recommendation D.2

That access to cash handling and storage areas be physically restricted to authorized personnel. Deposit preparation areas should be physically and visually restricted. Physical arrangements should ensure that students or the general public do not have access to the immediate or surrounding area.

Improvements in the physical facilities may range from simple items, such as the installation of screens to block sight lines to a desk, to more costly renovations, for example to redirect traffic flow. During a period of budget constraints, physical improvements to the workplace are often not given a high priority in the competition for budget dollars. The Task Force feels that improvements in the physical facilities of cash handling areas are not frivolous and must continue to be made for the safety and the security of the University cash assets.

Recommendation D.3

That a fund be established on each campus and designated for assisting departments in renovation areas to meet the physical and safety standards for cash handling.
The questionnaire requested information on the amount of money stored overnight and whether or not it was locked. 61% of the responding depositors indicated that, on average, they stored $500 or less; 39% stored greater than $500 (during peak periods this increase to 47%). Although 89% stated that they lock their cash receipts at night, the Task Force was concerned about the 11% who did not lock their cash at night, and particular, there were four respondents in the 'large depositor' category who did not lock up at night. The members felt that there was a dual responsibility in this matter; that the department should provide proper facilities for the storage of money and the staff members must establish good cash handling procedures for locking up all cash at night.

Recommendation D.4

That in all areas handling cash there should be a location for secure, locked storage of cash. Areas accumulating large amounts (greater than $1,000 in coins and bills) between deposits should have access to a safe or vault.

Review of the facilities in cash handling areas must be an on-going operation and should become part of the regular process of the University. People tend to think of buildings or sections of building in terms of their primary use (e.g. library, academic offices etc.). It must be remembered that cash handling of some kind occurs in virtually every office of the University and the facilities required for these activities must be taken into consideration when designing, renovating or reviewing physical spaces.

Recommendation D.5

That the Campus Safety Audit procedure be amended to include review of any area of the campuses in which cash is collected, counted or stored.

Recommendation D.6

That the University of Toronto Design Standards be amended to include standards for design of all areas in which cash transactions occur or may occur in future, and that all capital projects (new buildings, major renovations) be reviewed at the design and drawing stage for adequacy and appropriateness in cash handling areas.

The final recommendation of the Task Force in this section is to ensure that staff are aware of the avenues available to assist them in addressing their concerns about the physical facilities of their workplace.

Recommendation D.7

That staff members who deem their work area inadequate for safe cash handling activities should, according to normal procedures, report deficiencies to their supervisor. If the situation is not resolved to their satisfaction, they may report deficiencies to the appropriate office for review:

St. George campus Facilities & Services Property
Scarborough campus Advisory Committee on Campus Safety and Security
Erindale campus Advisory Committee on Personal Safety
As noted in the preceding 2 pages, the Task Force makes 9 specific recommendations regarding physical space and storage issues. It notes that the University Design Standards be amended to include Standards for design of all areas in which cash transactions occur.

The following are more detail standards for areas in which cash transactions occur.

- In areas where collection of money will take place some method of achieving separation between the staff and public must be provided such as a counter.
- A line of sight and the possibility of eye contact must be provided and maintained between the area of cash handling and surrounding offices.
- The location where the cash is counted, stored and sorted should not be visible to the general public.
- Wherever money is handled, provision should be made for proper storage of money and receipts in safe or drop box.
- In cases where the receipts will be picked up by armed guards, the method and the route they will take must be considered and provided for. The route the guards would take should be short, specific and should not go through high volume, high activity areas such as cafeterias etc.
## CONTENTS

**PART ONE SECTION 5**

**ENVIRONMENT**

1.1 University Policy
1.2 Environment in the Design & Approval Process
1.3 Specific Requirements
   .1 Minimize Energy Use
   .2 Minimize Water Use
   .3 Material Choice
   .4 Effluents & Emissions
   .5 Outdoor Environment
   .6 Waste Management
   .7 Monitoring
   .8 Check List
ENVIRONMENT

1.1 UNIVERSITY POLICY

The University’s strongly expressed desire to institute and maintain exemplary strategies aimed at enhancing the campus and global environment is set out in its Environmental Protection Policy dated March 7, 1994. (attached, Part 1 Section 9 Environment Appendix A).

This policy has had, and will have, increasingly important ramifications for University construction on many levels, from siting policy to material selection. No one underestimates the difficulties of making the most effective environmental choices nor can the budget implications of such choices be ignored, but buildings represent the most important single element affecting our environment - not only by actually giving it its recognizable form but also by their consumption of natural resources in construction, servicing, maintenance and disposal, and all the building professions have a particular responsibility to foster good environmental practices.

One of the complicating factors in making optimum environmental decisions is that such decisions routinely involve a simultaneous assessment of a variety of factors dealt with by different consultants and trades, for example: the most effective energy saving strategy might easily involve siting, aspect, wall construction, window type and mechanical services. Under these conditions it is imperative that each of the consulting and trade sectors be prepared both to innovate in its own field and to seek optimum solutions through dialogue with other sectors. The architectural consultants will normally bear the overall responsibility for co-ordinating such efforts.

1.2 ENVIRONMENT IN THE DESIGN AND APPROVAL PROCESS

The University will be involved in decisions that have significant environmental implications. Selection of architects and other consultants for University of Toronto building projects will depend, in part, upon their understanding and experience of environmental issues.

Architects and other consultants will follow the following environmental design principles:

.1 When making decision about designs, processes and products that influence resource use (e.g. energy, water, materials) and other environmental impacts (e.g. indoor air, waste management), alternative choices, including innovative but proven alternatives, are to be considered.

.2 Change is a constant in University life, as elsewhere. Designs which facilitate future changes and which minimize the potential environmental impacts of demolition and renovation are preferable. (e.g. see Material Choice).

.3 Preference will normally to be given to choices which minimize the life-cycle costs but those which offer greater environmental benefits than those with the lowest life-cycle cost should also be presented for consideration by the University.

.4 Environmental impact must be assessed broadly - impact in one area must be assessed in relation to others so that the “system” as a whole can be seen to be effective.

Below are specific requirements concerning the environment that architects and other consultants are expected to follow. Through these the University hopes to achieve its
environmental objectives. Some, however, may present new challenges to architects and consultants and may not be possible for certain projects. As a way of informing the University about the degree to which these guidelines and requirements can be met on each project, the architect and other consultants must complete and submit the attached Environmental Design Standards check list with accompanying explanations.

1.3 SPECIFIC REQUIREMENTS

1.3.1 MINIMIZE ENERGY USE

.1 Selection:
Energy efficiency must be considered on a system basis. The most efficient energy production method - ideally non-polluting, using renewable resources and with long-term potential - should be used.

.2 University Systems:
The energy use of individual projects must be considered in the light of the University-wide heating and cooling systems and a decision to use them (or not) should be subject to the same scrutiny as noted above.

.3 Equipment:
High priority must be given to energy efficiency in the selection of all mechanical and electrical devices such as high-efficiency electric motors with minimum power factor.

.4 Heating, Cooling & Ventilating:
Building design should maximize the use of natural energy. This should include the use and control of sunlight: maximum solar access through well-located efficient windows in winter, shading by deciduous landscape materials or built shades in the summer.

Simple methods of personal control of indoor environment - e.g. opening windows, - should be applied wherever possible. This proposition should, like all others be evaluated in related contexts such as safety and security.

Mechanical devices should be used only where necessary and where the use of low energy or passive systems are impractical.

.5 Lighting:
Natural daylight should be utilized for task lighting whenever possible. Sizable, well-placed windows will be important. For additional artificial lighting, low energy fixtures should be used. Lighting should be of a comfortable level which discourages the use of artificial lighting. The aim being the lowest level of energy use in combination with comfort.

1.3.2 MINIMIZE WATER USE

Ultimately, minimizing water use will depend heavily on the responsibility of individual users. The building design, however, can influence this use in a number of ways:

.1 Water saving fixtures should be installed wherever possible.
.2 The re-use of water for useful purposes should be encouraged. For example, rain water and treated “grey” water can be used for some building and landscape purposes.

.3 The use of fresh water for cleaning purposes should also be minimized by the choice of material surfaces, or by water recycling systems.

.4 Water used to cool equipment including research equipment should be minimized through the use of close looped system.

1.3.3 MATERIAL CHOICE

.1 Products and building processes to be applied to University building projects should be benign. Assessment of such things is complex, but ideally the environmental consequences of all aspects of products’ life cycle need to be considered including:

- Extraction
- Transportation
- Manufacture
- Erection or Fabrication
- Use
- Maintenance
- Demolition
- ... Reuse
- ... Recycle
- ... Dump

The architect and other consultants involved in material specification must give a broad consideration to these aspects in order to choose environmentally benign materials.

.2 The same requirements for benign, emission-free products applies to the selection of furniture and furnishings. Selected carpet fabrics and other materials should meet the highest environmental standards.

1.3.4 EFFLUENTS & EMISSIONS

Every effort should be made to ensure that a new or renovated building has the lowest possible detrimental effect on the larger environment as well as on its interior spaces. Previous sections deal largely with the reduced use of resources. The University also seeks a reduction in the undesirable by-products of building.

.1 Air-Borne

Careful ventilation is required to reduce the harmful effects of toxic gases, odour and noise within a building, but these should not simply be exported to the outdoor environment. Where and how they are exhausted or dissipated requires special consideration to mitigate or, preferably, eliminate these exports.

.2 Water-Borne

Wastes which may appropriately be introduced into the sewage/waste water systems can be considered in three categories: Hazardous ... sewage ... “grey” water.
Known *hazardous* wastes must be reduced as much as possible and dealt with appropriately at source. *Grey water* is recyclable (see above) and there are biological systems which can deal with *sewage* to provide useful water. Any opportunity to introduce such systems to the campus should be exploited.

Designs that put wastes, either treated or untreated, into water borne system must consider the impacts of these wastes on their final destinations.

### 1.3.5 OUTDOOR ENVIRONMENT

#### 1 Building Location and Orientation

Where choice is possible, new buildings should be *sited* for maximum access to sun and ventilating air movement (but not to the detriment of these assets in existing neighbouring buildings).

Building *configuration* should be subject to the same consideration and, in addition, should increase the all-season habitability of adjacent outdoor spaces. Shading and cooling air movement for summer, as well as sun-trapping and wind shelter for winter must be considered.

#### 2 The Campus “Floor”

It is desirable for the surface of the campus to be as receptive as possible to water absorption. The area of paved surface should be reduced wherever possible. Where paving is required, water penetrable systems should be considered.

#### 3 Planting

Plant material is normally thought of as *decorative*. In addition to this quality, it can be used for many purposes, such as food, for educational purposes and as a reflection of history. In the context of environment some of these qualities should be capitalized upon.

#### 4 Habitat

The University Campus is a significant element of the city’s open space network. It provides habitat for birds and animals. This role should be maintained and enhanced.

#### 5 Climate

The vital contribution which plants make to general air quality is well known. At a local level planting can - sometimes in conjunction with buildings - improve micro climates. In the city, plants’ capacity for making places smell better cannot be ignored. Roofs can be plausible places for planting and this additional territory can be utilized. Planting policy of any individual project should, reinforce University-wide systems and also consider related policies such as safety and security.
**.6 Maintenance**

The University is continuing to seek ways of minimizing chemical use in campus maintenance and to find an economical and effective substitute for salt in snow clearance. Designs which can assist this policy - by material choice or other means - must be considered. Plant design should minimize the necessity for high maintenance wherever possible. *Naturalization* - the untrammeled use of local species - is encouraged.

1. All main building entrances and accessibility ramps must contain provision for the prevention of snow and ice accumulation.

2. The width and slope of the area requiring prevention of snow and ice accumulation must meet all requirements under AODA.

3. Snow and ice accumulation prevention must extend from the main University and/or municipal sidewalk to the doors of the building, excluding stairs, but including any other horizontal surfaces.

4. It is recommended that hydronic heating systems be installed to prevent snow and ice accumulation. The system must activate automatically at outdoor ambient temperatures below zero degrees Celsius when moisture is present and must remain active until temperatures rise above zero degrees Celsius.

5. It is recommended that dedicated electric-fired boilers be used as the source of heat for the snow/ice melt systems as they are low greenhouse gas content (when recovered heat from the Central Steam Plant is not available) The hydronic heating medium must be a fluid suitable to withstand ambient temperatures to -25C.

6. Proper slope and drainage must be provided adjacent to any hydronic heating system in order to remove meltwater.

7. Any hydronic heating system must provide ready access for repair to pumps and control systems.

8. Any hydronic heating system must be constructed in such a way as to allow for future extension of the system in the easiest and most cost effective manner possible.

9. Smaller systems with only one heat exchanger feeding a header must incorporate isolation capacity to each zone.

Larger systems with individual heat exchangers for each zone must incorporate the following requirements:

- Cushion tank required for each heat exchanger
- Air vents for each zone loop
- Flow meters for each zone loop
- Commissioning agent must ensure the design flow is met for each loop at the required system pressure.
10. The Grounds Manager must approve the type and extent of measures used to prevent snow and ice accumulation.

1.3.6 WASTE MANAGEMENT

All projects should minimize the amount of waste sent to landfill by following the 3R’s hierarchy - reduce, reuse and recycle, and assist the University in meeting the requirements of The Waste Management Act.

.1 Construction and Demolition

Design and planning of building renovations and/or new construction should ensure that, during the construction and demolition phases waste is avoided through the reuse of old materials, where practicable, either in the existing project or elsewhere. Scrap materials that cannot be reused, such as drywall, carpet, corrugated cardboard, wood or metal must be separated and recycled, where possible.

.2 Indoor Spaces

Designs for new or renovated spaces must consider placement of recycling containers. Public, lobby and lounge spaces require a system of depots for source-separation of waste that do not impede traffic flow. Offices and residence rooms require personal recycling and waste containers, as well as garbage/recycling rooms or centralized common disposal areas.

.3 Food Outlets

Any new food service areas require containers and space for the collection of source separated waste.

.4 Central Waste Facilities

New building construction requires sufficient space for the consolidation of and access to recycled materials and garbage.

.5 Outdoor Spaces

Outdoor public plazas, parkettes and corridors require a system of depots for source separation, the number of depots being dependent on the volume of pedestrian traffic.

1.3.7 MONITORING

It is increasingly necessary for Departments and Divisions of the University to take individual responsibility for maintaining good environmental standards within their purview. This will require an improved ability to measure performances and designers should consider effective methods of metering resource use and - in some cases - waste production in new and renovated premises.
ENVIRONMENTAL DESIGN STANDARDS CHECK LIST

A completed copy of this check list must be submitted by the design team to the University’s Project Manager at the end of the design development phase. In all cases, items that do not comply (NC), must indicate the reason why. Attach additional sheets if necessary.

1. Minimize Energy Use

   Life cycle assessments have been carried out on building equipment and operation.
   Explain process: _______________________________________________________________

   Were central University systems used to supply thermal energy/cooling.

   What energy efficient equipment was used:
   High efficiency motors
   Variable speed drives
   Thermal heat recovery (type: _________________________________)
   Presence sensor-activated light switching (type: _____________________________)
   Other energy efficient equipment (type: _________________________________)

   Was the use of natural energy maximized:
   List ways: _________________________________________________________________

   Does roofing design, type and colour minimize cooling requirements in summer.

   Thermal envelope equals or exceeds the energy provision of _______________.
   (i.e. R2000+, ASHRAE 90.1-1989, etc.)

   Can windows be opened by occupants to maximize cross ventilation.

   Use of natural daylight for illumination purposes has been maximized.
   List ways: _________________________________________________________________

   Low energy use fixtures have been used for artificial lighting.

2. **Minimize Water Use**

What water saving fixtures were used:

- Low flow toilets/showerheads
- Presence sensor-activated lavatories
- Presence sensor-activated urinals
- Other water saving fixtures (type: ____________________________

☐  ☐  ☐

☐  ☐  ☐

☐  ☐  ☐

☐  ☐  ☐
Is ‘grey’ water re-used.
List ways:________________________________________

Is rain water used for landscaping purposes.
List ways: ________________________________________

Has the use of city water to cool research equipment of building air conditioning been avoided. If not, list locations and explain why:
______________________________________________

3. Material Choice
Life cycle assessments have been carried out on products.
Itemize products:________________________________________
Are these products emission free.
  Carpets  NC  NA
  Furniture NC NA
  Fabrics  NC  NA
  Treated Wood NC NA
  Wall Coverings NC NA
  Paint  NC NA
  Adhesives NC NA

Have these products been selected to minimize the use of chemicals for cleaning.
  Carpets  NC  NA
  Furniture  NC  NA
  Fabrics  NC  NA
  Treated Wood NC NA
  Wall Coverings NC NA
  Paint  NC NA
  Adhesives NC NA

4. Effluents and Emissions
Have certificates of approval been obtained for emissions to the outside.

Has ventilation been provided specifically to reduce effects of gases and odours.
Where and how is exhaust dissipated:________________________________________
Have airborne emission dispersion studies been executed.  

Will hazardous wastes be dealt with at source.  

How:  

Will any wastes go into the water system.  

If yes, has the impact been considered. How:  

5. **Outdoor Environment**  
The positioning of the new building maximizes naturally occurring sunlight and air movement.  

A water-penetrating pavement system has been used.  

Does the design of paved areas minimize the use of salt for ice-clearing.  

How:  

The campus flora and habitat have been respected and the purpose of the planting materials have been addressed.  

The choice and location of trees provide building shade in summer and windbreaks in winter.  

If the roof used for planting.  

The use of local plant species has been encouraged.  

6. **Waste Management**  
Will demolition/construction waste be recycled/reused.  

How:  

Placement of indoor recycling containers has been addressed in the design.  

Placement of outdoor recycling containers has been addressed in the design.  

Food outlets have source-separated waste collection containers designed in the facility.  

Sufficient space has been allowed for consolidation of waste and recycling.
7. Monitoring

Environmental standards have to be monitored and measured. Indicate that this has been provided for each discipline and describe the proposed monitoring method.
<table>
<thead>
<tr>
<th>Category</th>
<th>C</th>
<th>NC</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal energy use:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical energy use:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Water use:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Effluent and emissions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste management:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

END OF PART ONE SECTION 9 - ENVIRONMENT SECTION
This Design Standard has not yet received approval through University governance. It is included here as a reference for planning new facilities to be built in the near future.

1. **New Construction**
   a. At a minimum, all new buildings* shall be designed to meet the Toronto Green Development Standard, Tier 1 and LEED Canada – NC Silver rating with at least 10 points achieved for “Optimizing Energy Performance”, 2 points achieved for “Enhanced Commissioning” and 4 points achieved for “Water Use Reduction”. This will significantly reduce the building’s operating costs over its lifetime. The attached chart indicates the University’s minimum point expectation in all categories.
   b. It is recommended that the building undergo full LEED Canada – NC Silver certification, not just be designed to be equivalent to LEED without certification. This will ensure that features planned at the beginning of the project to enhance the environmental sustainability of the building will still exist at the end of the construction, will be properly commissioned and will be monitored for performance after the construction is complete.
   c. It is recommended that glazing be limited to no more than 40% of the exterior wall area.
   d. Equipment and systems must be put in place so that the long term energy and water efficiency can be monitored and verified.

2. **Major Renovations**
   a. For major renovations requiring governance approval affecting 100% of the mechanical and electrical systems and 50% of the interiors, the re-constructed area shall be treated as “New Construction” above.

3. **Related Relevant Documents**
   a. Other University of Toronto Design Standards can be found at [http://www.fs.utoronto.ca/aboutus/design.htm](http://www.fs.utoronto.ca/aboutus/design.htm). Of particular relevance are the Mechanical and Electrical Design Standards.

* = Wet labs and data centre buildings will be considered on an individual basis.
### Sustainable Sites

<table>
<thead>
<tr>
<th>Credit</th>
<th>Possible LEED points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construction Activity Retention</td>
</tr>
<tr>
<td>2</td>
<td>Site Selection</td>
</tr>
<tr>
<td>3</td>
<td>Development Density and Community Connectivity</td>
</tr>
<tr>
<td>4</td>
<td>Ecological Habitat Management</td>
</tr>
<tr>
<td>4.1</td>
<td>Alternative Transportation - Public Transport Access</td>
</tr>
<tr>
<td>4.2</td>
<td>Alternative Transportation - Fixed-Service Transit</td>
</tr>
<tr>
<td>4.3</td>
<td>Alternative Transportation - Low Emission and Fuel Efficient Vehicles</td>
</tr>
<tr>
<td>4.4</td>
<td>Alternative Transportation - Parking Capacity</td>
</tr>
<tr>
<td>5</td>
<td>Reduced Site Obstruction</td>
</tr>
<tr>
<td>5.1</td>
<td>Reduced Site Obstruction - Inaccessible Habitat</td>
</tr>
<tr>
<td>5.2</td>
<td>Reduced Site Obstruction - Natural Open Space</td>
</tr>
<tr>
<td>6</td>
<td>Water Management - Quantity Control</td>
</tr>
<tr>
<td>7</td>
<td>Water Management - Quality Controls</td>
</tr>
<tr>
<td>7.1</td>
<td>Heat Island Effect - Non-Roof</td>
</tr>
<tr>
<td>8</td>
<td>Heat Island Effect - Roof</td>
</tr>
<tr>
<td>9</td>
<td>Light Pollution Reduction</td>
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</table>

**Total points: 25**

### Water Efficiency

<table>
<thead>
<tr>
<th>Credit</th>
<th>Possible LEED points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water Use Reduction</td>
</tr>
<tr>
<td>2</td>
<td>Water Efficient Landscaping</td>
</tr>
<tr>
<td>3</td>
<td>Innovative Water/Air Technologies</td>
</tr>
<tr>
<td>4</td>
<td>Water Use Reduction</td>
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</table>

**Total points: 21**

### Energy & Atmosphere

<table>
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<tr>
<th>Credit</th>
<th>Possible LEED points</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Commissioning of Existing Energy Systems</td>
</tr>
<tr>
<td>2</td>
<td>Minimum Energy Performance</td>
</tr>
<tr>
<td>3</td>
<td>Fundamental Commissioning</td>
</tr>
<tr>
<td>4</td>
<td>Optimal Energy Performance</td>
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<tr>
<td>5</td>
<td>On-Site Renewable Energy</td>
</tr>
<tr>
<td>6</td>
<td>Enhanced Commissioning</td>
</tr>
<tr>
<td>7</td>
<td>Enhanced Commissioning</td>
</tr>
<tr>
<td>8</td>
<td>Measurement and Verification</td>
</tr>
<tr>
<td>9</td>
<td>Green Power</td>
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**Total points: 16**

### Materials & Resources

<table>
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<tr>
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<th>Possible LEED points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Waste &amp; Collection of Residues</td>
</tr>
<tr>
<td>2</td>
<td>Building Materials: Non-Voc Materials, Non-Hazardous &amp; Non-Recycled</td>
</tr>
<tr>
<td>3</td>
<td>Construction Waste Management</td>
</tr>
<tr>
<td>4</td>
<td>Materials Resouces</td>
</tr>
<tr>
<td>5</td>
<td>Prefab/Modular</td>
</tr>
<tr>
<td>6</td>
<td>Regional Materials</td>
</tr>
<tr>
<td>7</td>
<td>Rapidly Renewable Materials</td>
</tr>
<tr>
<td>8</td>
<td>Certifed Wood</td>
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**Total points: 13**

### Indoor Environmental Quality

<table>
<thead>
<tr>
<th>Credit</th>
<th>Possible LEED points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minimizing IAQ Performance</td>
</tr>
<tr>
<td>2</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
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<tr>
<td>3</td>
<td>Outdoor Air Delivery</td>
</tr>
<tr>
<td>4</td>
<td>Natural Ventilation</td>
</tr>
<tr>
<td>5</td>
<td>Construction and Management Plan During Construction</td>
</tr>
<tr>
<td>6</td>
<td>Construction and Management Plan During Testing</td>
</tr>
<tr>
<td>7</td>
<td>Low-Emitting Materials: Adhesives &amp; Sealants</td>
</tr>
<tr>
<td>8</td>
<td>Low-Emitting Materials: Interior Finishes</td>
</tr>
<tr>
<td>9</td>
<td>Low-Emitting Materials: Flooring Systems</td>
</tr>
<tr>
<td>10</td>
<td>Low-Emitting Materials: Composite Wood &amp; Agrofibers Products</td>
</tr>
<tr>
<td>11</td>
<td>Indoor Chemical &amp; Pollutant Source Control</td>
</tr>
<tr>
<td>12</td>
<td>Controllability of Systems: Lighting</td>
</tr>
<tr>
<td>13</td>
<td>Controllability of Systems: Thermal Control</td>
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<td>14</td>
<td>Thermal Comfort: Design</td>
</tr>
<tr>
<td>15</td>
<td>Daylight &amp; View: Daylight</td>
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<td>16</td>
<td>Daylight &amp; View: Visual</td>
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**Total points: 15**

### Innovation & Design Process

<table>
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<tr>
<th>Credit</th>
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<tbody>
<tr>
<td>1</td>
<td>Innovation in Design</td>
</tr>
<tr>
<td>2</td>
<td>LEED Accredited Professional</td>
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**Total points: 8**

### Regional Priority

<table>
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<tr>
<th>Credit</th>
<th>Possible LEED points</th>
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<tr>
<td>1</td>
<td>Sustainable Building</td>
</tr>
<tr>
<td>2</td>
<td>Hospital Priority</td>
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**Total points: 3**

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**Note:**
- LEED Certification:
  - LEED Certified 40-49
  - LEED Silver 60-69
  - LEED Gold 70-79
  - LEED Platinum 80-110

- UoT Environmental Design Standard for New Construction
- Based on LEED Canada 2009
Landscape Design Standards

1 Introduction

.1 The following are the University of Toronto’s Landscape Design Standards. The information contained within these standards must be followed except in the following circumstances:

.1 If the standards cannot be applied due to existing physical limitations, the design consultant must present the information to the Manager of Design or the U of T designate and receive permission to implement an alternative solution.

.2 If an alternate product or system is available, the project consultant must request approval for such an alternate from the Manager of Design or the U of T designate.

.3 If there is a substantial cost savings to be realized by changing from a standard and the consultant is recommending such a saving, the Manager of Design or the U of T designate will consider such a request. The consultant must be requested to prove the cost savings.

.4 If there is a substantial life cycle cost saving, or environmental benefits to be realized by changing from a standard, the consultant must present it to the Manager of Design or the U of T designate who will consider such a request. The consultant must be requested to prove the cost savings.

.5 The consultant is encouraged to point out any problems with the standards, and to provide alternates that may have a significant cost savings or environmental benefits. The consultant is also encouraged to comment on the appropriateness of the standards as compared to general industrial standards.

.6 These standards are intended to be competitive standards. However, the consultant should understand that the University would like to lower the long term maintenance costs and achieve more permanence and environmental improvements in the products that are purchased and installed. Therefore, the University standard might be slightly higher than the normal commercial standard.

.7 When the design is 75% complete, the design consultant shall complete of the checklist found herein and submit it to the U of T project manager. The Categories “C” (complies) and “NC” (not complies) indicate whether or not the design is in compliance with the standard. If a “NC” is selected, the designer must indicate why in writing.
The Design Team is required to read and comply with the full Design Standard as they apply to the project. A completed copy of this checklist must be submitted by the Design Team to the University’s Project Manager when the Design Development Phase is 75% complete. In all cases, if a “does not comply” has been noted, please indicate why. Attach additional sheets as necessary.

2 General

.1 The architects and designers must follow the principles of the “University of Toronto St. George Campus, Open Space Master Plan 1999” which are incorporated into the Landscape Design Standards. The architects and designers must ensure that, in all projects, landscaping is designed and provided as part of the project.

.2 In undertaking new construction and renovations the designer must preserve existing mature trees. Any project that might have an impact on a University owned or maintained tree or trees must include a report completed by a certified arborist. This report will assess the condition of the tree(s) before the project begins. The report must identify the species, condition and physical dimensions of the tree(s). The report must include a plan for the protection of the tree(s) during the project. The report must be submitted and the plan approved by the Manager, Grounds Services before any work can begin. The plan will be used to assess any damage to the trees caused by the project.

.3 Gateway Sites, which are identified in the University of Toronto Open Space Master Plan 1999, should be enhanced to provide distinctive and high quality environments in order to accentuate entrances to the University.

.4 The design consultant must ensure that any free standing markers are integrated into the design of new buildings and landscape. These free standing markers must conform to the University design standards on signage. The markers should be illuminated if possible and be placed away from traffic so that they are not damaged.

.5 The architect, or landscape architect must ensure that bicycle storage is provided as part of all University projects (including New Buildings and Additions to Buildings) and be integrated into the building design. Bicycle storage should be provided around the perimeters of the primary open space, and at specific locations in the centre of the campus. The location should enhance the security of bicycles.

.6 The bicycle stands should consist of a secure post and ring model cast into a concrete bed. At least four stands should be provided for every 100 person population. Where space permits, this number should be increased for Student Residences.

.7 Handicapped accessibility, access to handicapped parking, service areas and walkways must be integrated into the design of the overall building, the pedestrian movement system and the landscaping, in order to provide an overall barrier free finished project.
3 **Plant Material and Ground Cover**

.1 Along with architecture, landscaping and plant material forms identify open space, modify the microclimate and through scale, texture and seasonal colour bring beauty to the University grounds. Primary plantings should be established within all the major open spaces to define the space, provide an appropriate sense of scale and bring a high scenic character to the campus. Major open spaces should be landscapes of landmark stature, distinct from plantings associated with specific buildings.

.2 The landscape design should emphasize and consist of large scale tree cover of deciduous hardwood species that provide variety in form, foliage and fall colour. In addition evergreens and plants with attractive winter appearance should be strategically located to enhance landscape quality throughout the year. Plant species should be selected with consideration for expanding biological diversity, hardiness and longevity.

.3 The location, layout and massing of the plants must have a regard for public and personal safety. Hedges should be avoided, or if they are to be provided, they should be low. Cedar hedges, Catoni Astor and Halls Honey Suckle must be avoided.

.4 The landscape designer should consider using mass plantings of hardy and prolific blooming perennials as bold accent plantings to create more permanent landscape features. Drought resistant or ornamental grasses should be used as accent plantings and as a low maintenance groundcover.

.5 The range of plant material used on campus should be expanded to include native tree species that were present at the time of the University’s original land grant. In addition, consideration should be given to plants that require minimum maintenance such as pesticide and water use and that provide habitats for native birds and animals.

.6 The landscape designer should choose planting materials that reflect the seasonal colour change, to take full advantage of the changing seasons. Guidelines regarding colour, and lighting, should be applied to new landscape design to take full advantage of the changing seasons.

.7 The plant material must conform to the horticultural standards of the Canadian Nursery Trades Association with respect to size and quality.

.8 Any selection of species for plantings of woody or herbaceous material must be approved by the Manager, Grounds Services.

4 **Trees and Shrubs**

.1 The trees and shrubs that are to be used must be No. 1 grade.

.2 The trees and shrubs that are to be used must have strong fibrous root system free of disease, insects, defect or injuries and structurally sounds. The trees must have straight stems well and characteristically branched for species. Plants must have been transplanted or root pruned regularly but not later than 9 months prior to arrival on site.
.3 Trees and shrubs must have been grown in containers for minimum one growing season but no longer than two. The root system must be able to “hold” soil when removed from container. Plants that have become root bound are not acceptable.

.4 In balled and burlapped trees, the size of the ball shall be proportional to the caliper of deciduous tree and to the height of the conifer. The caliper shall be measured at 150mm (6”) above ground level. A tree with 75mm (3”) caliper required root ball of 1m (40”) diameter. Increase diameter of root ball by 250mm (10”) with each increase of 25mm (1”) in caliper. Root balls of proper size must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure root balls with burlap, heavy twine and rope. Use hession burlap. Frozen root balls will be permitted provided root balls are sufficiently protected to prevent breakage. Protect root balls from sudden changes in temperature and exposure to heavy rainfall.

.5 Each newly planted tree must have 4 (four) root aeration tubes installed and spaced evenly just outside the planting hole.

Each tube must be 18” long by 3” in diameter, with a top cap 4” in diameter (installed flush to the ground) and a porous cylinder for the easy exchange of gases and water.

We recommend the Rootwell Pro-318 Deep Root system

https://www.rootwell.com/retail-store/shop/pro-318-case-green
.6 Imported plant material must be accompanied by the necessary permits and import licences. They must conform to federal and provincial regulations.

.7 Any selection of species for plantings of woody or herbaceous material must be approved by the Manager, Grounds Services.

5 **Planting Time**

.1 Plant material must be approved prior to planting. Planting locations must be approved prior to excavation of planting pits.

.2 Deciduous plants must be planted during a dormant period before buds have broken. Plant material imported from a region with warmer climatic conditions may only be planted in early spring.

6 **Excavation and Stakeouts**

.1 The locations of all below grade utilities must be verified prior to excavating. The locations of utilities must be staked out in areas where excavation will occur.

.2 For large trees and conifers, the depth of the excavation must be at least 200mm (8”) deeper than height of root ball, with width of 750mm (30”) greater than diameter of root ball. The size of the planting holes must be increased in heavy soils by 150mm (6”) for every 300mm (12”) of diameter root ball.

.3 The bottom of the excavations must be protected against freezing. All water which enters into the excavation must be removed prior to planting. All excavated material, excavated from the planting pots and beds, must be removed off site. The subgrades of the planting beds and tree pits must be scarified to 8”.

7 **Planting Procedures**

.1 Planting beds and tree pits are to be backfilled with a planting mixture. The backfilling and mixing planting mix shall be done under favourable weather conditions.
.2 Trees and shrubs must be planted vertically, in the centre of pits.
.3 All plant material shall be planted to allow for settlement, so that the final depth will be equal to the depth originally grown in the nursery.
.4 Trees that do not have a uniform head but are accepted by the University should be placed to give best appearance to the approval of the University.
.5 Ensure that root balls rest on a minimum of 200mm (8”) planting mix.
.6 Topsoil must be tamped around root system in layers of 150mm (6”) depth to eliminate air pockets. Frozen or saturated topsoil is unacceptable. When 2/3 of topsoil mixture has been placed, hole is to be filled with water. After water has completely penetrated the soil, complete backfill. Form a saucer around the root ball.

8 Irrigation

1. All flora & plant material must be properly irrigated according to industry standards. The proposed irrigation design must be reviewed & approved by the Manager, Grounds Services.
2. All new landscape installations and retrofits should include an irrigation component that incorporates the most recent technology in water conservation and efficient delivery methods.
3. Grey water and storm water run off should be used whenever possible for irrigation purposes.
4. All irrigation components shall be either Rainbird or Toro.

9 Sod

.1 The grass shall be nursery sod: specially sown weed-free, and cultivated in nursery field all in compliance with the specifications latest issue of the Nursery Sod Growers Association of Ontario (B) number one Kentucky Bluegrass-Fescue Sod.
.2 The sod is to be laid during the growing season. Sodding at freezing temperatures or on frozen ground is unacceptable. Sodding during dry weather should be avoided however, if there is no alternative it will be acceptable only if sufficient and continuous watering is assured.
.3 The sod is to be laid with joints butted even with adjoining areas and the rows shall have staggered joints. The sections are to be butted closely without over-lapping or leaving gaps between sections. Irregular or thin sections are to be cut out with a sharp tool.
.4 The sod is to be rolled with a light roller to ensure close contact between sod and soil. The sod is to be thoroughly watered.
10 **Soil and Additives**

.1 The soil used for landscaping must be screened, triple mix, weed-free, friable natural loam, free of stones roots, lumps and other solid material.

.2 Peat moss used for landscaping shall be decomposed plant material, fairly elastic and homogenous, free of decomposed colloidal residue, wood, sulphur and iron and of brown colour containing minimum 6% organic matter by weight and moisture content not exceeding 15%. Minimum pH value of peat 4.5, maximum 6.0.

.3 Bonemeal shall be raw commercial, finely ground and with a content of minimum 4% nitrogen and 20% phosphoric acid.

.4 Manure shall be well rotted, unleached cattle manure, free from harmful chemicals and other injurious substances, at least eight months old, but not more than two years old and with no more than 25% straw, leaves or other unacceptable materials for planting use.

.5 Limestone is to be used in all cases where the pH of the soil is less than 6.0. The lime that is to be used shall contain not less than 8% of calcium and magnesium carbonates combined, finely ground to pass a 10 mesh sieve with at least one half passing a 100 mesh sieve. Rate of application shall be determined after determining the pH of the topsoil.

.6 Anti-desiccant: Emulsion to form permeable film over plant surfaces and mixed according to manufacturer’s directions.

11 **Plant Accessories**

.1 The tree wrappings for trunks shall be first quality burlap.

.2 The anchors for the support of large shrubs and trees up to 65mm (2.5”) in caliper shall be new metal “T” bars 38mm x 5mm (1.5” x 1.5” x 3/16”) painted black.

.3 Eye Bolts and Turnbuckles shall be zinc coated. Turnbuckles shall be 10mm (3/8”) diameter bolts for trees for 75mm (3”) caliper and 76mm (0.25”) diameter bolts for under 75mm.

.4 Anchoring hoses shall be two-ply reinforced, new black rubber hose 12.7mm (0.5”) in diameter.

.5 The Mulch shall be shredded bark mulch.

.6 The tie back wires should be zinc coated pliable steel wire, #9 gauge.

.7 The stakes shall be T-rail iron stakes 37mm x 1.5 x 3/16”) primed with on brush coat of black zinc rich paint to CGSB 1-GP-181.

.8 Wound Dressing shall be horticulturally accepted non-toxic, non-hardening emulsion.

.9 Rodent Protection shall be round, metal or plastic extending 24” above grade.
12 Paving Materials

.1 In the design and future reconstruction of streets on the west campus, the designer should work with the University and the City of Toronto to establish a palette of materials. The sloped planter construction used on St. George Street should be avoided.

.2 In the landscape design of central open spaces and in special areas of the campus, natural stone paving in combination with poured in place concrete, should be used. The chosen natural material should be available in suitable quantities, over an extended period of time, and sourced locally.

.3 Asphalt should only be used for temporary repairs and should not be considered as a permanent material for pedestrian walkway systems.
.4 The paving stones should be made of porous material and should be properly graded and laid with a gap to prevent water from ponding and encourage the recharge of groundwater. The paving material should have sufficient surface texture that will help prevent slipping and will assist in reducing the need for salt and other chemicals used for snow and ice control. □ □ □

.5 The foundation should be 8” properly compacted screening. The sand must be clean, sharp and free of deleterious materials. A steel edge should be used around the perimeter of the paving stones. The steel edge should be 3 mil and pre-punched to accept a mechanical fastener. □ □ □

### 13 Seating and Furniture

.1 Outdoor seating and street furniture should be chosen based on both the long term availability of the product and the longest life cycle available within the budget parameters. It should be integrated into the general landscape and pedestrian movement system. □ □ □

.2 The seating and street furniture should make use of recycled materials where possible. □ □ □

.3 The street furniture and seating should be designed for the comfort of the users. □ □ □

.4 Appropriate waste collection and recycling containers should be provided. □ □ □

### 14 Walls and Fences

.1 New walls and edges should be attractive and durable material, preferably natural stone, and should specifically exclude timbers, logs or dry, set pre-cast blocks. Wherever possible walls should include integral seating to animate the spaces. Free standing walls should not obstruct visibility or create secluded corners that may compromise personal safety. Fences should not be installed as features in the redesign of major open spaces and a program to remove existing non-historic fences should be undertaken. □ □ □

### 15 Signage

.1 All new open space design projects utilize the new University signage system for any naming, information or directional signage. Non-compliant signage should not be used. □ □ □

.2 Signage should be a component of the landscape design and integrated into walls, structures and planting plans where possible. □ □ □
.3 Signage and their supporting structures should be graffiti resistant and be able to withstand graffiti removal products.

.4 Signs and posts should be designed in such a way that they can be removed for repairs.

16 Outdoor Lighting

.1 In the design of the exterior lighting the same pedestrian scale lighting fixtures should be used in both the street system and in the major open landscape spaces. The illumination levels should be consistent. The lighting levels should be maintained along a pathway, so that promise of safety and security at the beginning of a path, is maintained along its length.

.2 Indirect lighting of important building facades and landscape features should be used to enhance the general night-time illumination level required for safety, security and visual amenity of the campus.

.3 Site specific architectural and security lighting should be used for passageways, building entrances, courtyards and service locations. In order to maximize the use of energy, the design of the light fixtures should direct the light to the areas where it is needed.

.4 Energy efficient and long life lamps should be used.

.5 Illumination levels should be as recommended by IES (Illumination Engineering Society).

.6 The lights should be controlled by reliable sensors that would turn the lights on only when natural light is insufficient for safety and security.

END OF SECTION