

Amendment Notice: Operations and Maintenance Requirements - Station Services

This bulletin applies to and amends the following documents:

- DS-00 Front End
- DS-03 Wayfinding Design Standard
- DS-04 GO Station Architecture Design Standard
- DS-10 Site and Landscape Design Standard (to be published in the future)
- GO Design Requirements Manual (DRM)

The Operations and Maintenance Requirements (O&M) - Station Services standard adds the operations team's perspective to the DS-00 Front End, DS-03 Wayfinding Design Standard, DS-04 GO Station Architecture Design Standard, DS-10 Site and Landscape Design Standard, and the GO Design Requirements Manual (DRM). Upcoming revisions to the standards listed above will incorporate these O&M requirements by the end of this year, eliminating the need for a standalone O&M standard in the future.

Amendments to the DS-00 Front End, DS-03 Wayfinding Design Standard, DS-04 GO Station Architecture Design Standard, DS-10 Site and Landscape Design Standard (to be published in the future), and GO Design Requirements Manual are provided in the following attachment:

- Operations and Maintenance Requirements - Station Facilities, 2021

On MyLinx, the Bulletin is located on the [Go Manual](#) page and [Metrolinx Design Standards](#) page.

The Bulletin is also available for external users to download via the Metrolinx public download site (http://www.gosite.ca/engineering_public/).

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Destination for Content

Standard

Highlight Colour

DS-00 Front End



DS-03 Wayfinding Design Standard



DS-04 GO Station Architecture Standard



DS-10 Site and Landscape Design Standard (Pending)



DRM



Operations and Maintenance Requirements - Station Facilities

1. OBJECTIVE

Under the customer facilities asset category, Metrolinx (through Station Services & Customer Communications) operates and maintains 116 facilities ranging from large rail passenger stations to bus passenger terminals, carpool lots and other facilities, with an estimated total footprint of 3,232,423 gross square meters (GSM) or 323 hectares. This document provides an overview of the assets required and the requirements that shall be met to ensure those assets are serviceable.

Metrolinx is tasked with operating and maintaining facility assets from handover to decommissioning. As the end user, front line technicians are the most impacted by design and construction deficiencies and are uniquely qualified to provide guidance on elements that affect the operational integrity of the built environment. These requirements have been an incorporated throughout the design and construction phases:

Operational Attributes:

- A. Modularity, scalability and consistency of design elements, controls and assets;
- B. Design elements that are Reliable, Available, Maintainable and Safe (RAMS);
- C. Assets that are resilient, lifecycle cost efficient and are aligned with the Metrolinx Climate Adaptation Strategy and Sustainability Strategy;
- D. Site plans and room layouts that optimize operational efficiency and support ease of

maintenance access for front line technicians and service providers.

Metrolinx facilities are made up of complex and interconnected systems of infrastructure assets including architectural, structural, mechanical, electrical, civil and process systems. Metrolinx aims to make the best use of available funding to manage these assets at an optimal level of service. Key performance metrics, asset lifecycle costs as well as the RAMS principals noted above are significant factors which need to be considered when design and construction decisions are made. Often these decisions are made years or months ahead of installation and may have long term consequences if not adequately informed.

2. OPERATIONAL AND MAINTENANCE REQUIREMENTS

Prioritizing operational and maintenance requirements can help make better use of time spent on standard development, preliminary and detailed design as well as construction and handover processes. As station infrastructure expands to meet service and ridership demands, these requirements become more significant in ensuring that central performance metrics are met.

The following requirements and guiding principles shall apply to relevant key areas of a facility or an asset:

- i. Modularity: Provide consistency in material choices during design that can be used in different applications or systems to promote flexibility, interoperability, inventory management and an increase in maintenance efficiencies.

- ii. Reliability: Individual design elements and assets considered by the designer, developer or contractor shall be selected to reliably perform its specific function while minimizing the risk of failure or operational strain throughout its life-cycle.
- iii. Availability: 'As reliability and maintainability increases, so does availability'. Upon Substantial Completion and throughout the warranty term, an asset shall be fully functional.
- iv. Maintainability: Servicing an asset within an operational rail or bus facility requires a high degree of ease to maximize work efficiency and minimize access impacts. Careful planning shall be employed to ensure there are no interferences or impediments to serviceable assets. Full access to all required equipment and/or facility amenities shall be provided for maintainability.
- v. Safety Engineering: Functionality of a system and its components through its lifecycle will help eliminate hazards due to failure, reducing safety risk to the environment, customers, employees and the community.
- vi. Durability: All exterior and interior materials shall be selected to suit a high traffic, heavily serviced rail or bus facility. Material to remain functional, without requiring additional maintenance or repair beyond the design intention. Material 'toughness' shall be able to absorb wear and tear without deform or fracturing and be resilient when stressed.
- vii. Facility Inspections: Front line staff monitors and inspect the facilities throughout the service day. There shall be no visual obstructions or hidden areas throughout the site which prevents efficient and safe inspections. All spaces shall be designed to facilitate easy inspection of equipment and fixtures, with clear view of critical components and consumables.
- viii. Replacement Parts: As part of the overall 'Availability' principal, Metrolinx is also committed to ensure that assets which are out of service are quickly repaired. Common replacement parts shall be locally available and sourced to allow for less than 10% operational downtime.
- ix. Equipment Repairs: Keep building systems serviceable and well laid out to facilitate any repairs required within the space. An area where staff can access, use and lay down tools and equipment shall be provided. Any building systems shall be installed in such a way as to ensure full access to all consumable parts such as filters, belts, fittings etc.
- x. There shall be no exposed risers, or plumbing accessible within customer exposed areas. When possible (primarily in new facilities), exposed conduits should not be accessible in customer exposed areas. Pull/junction boxes should be accessible but not visible in back of house areas.
- xi. Interior Volumes: If equipment requires overhead interior access, this shall be designed to a maximum height of 8000mm. Any specialized equipment (excluding scissor lift) required to access building

systems shall be avoided to minimize downtime, safety risk and additional expenditures.

- a. Maintainable assets shall not be placed above main access doors to minimize customer impact with the exception of assets directly supporting the access doors.
- b. Any interior space with a height greater than 3500mm shall include a separate service door to accommodate a scissor lift.
- c. Access cover panels, equipment and boxes shall be located in areas outside of main travel paths and far enough away to allow ladders and lifts to service without creating an obstruction. This requirement also applies to exterior work.
- d. Adequate interior circulation shall be provided to accommodate safe operation of equipment.

xii. Exterior Volumes: If equipment or elements such as panels or glazing requires overhead exterior access, this shall be designed for easy, safe and convenient access. A max height of 13000mm shall be applied. Catwalks should be installed where possible. Any specialized equipment (excluding scissor lift) required to access building systems shall be avoided to minimize downtime, safety risk and additional expenditures, or as directed by MX.

- a. Maintainable assets shall not be placed above main access doors to minimize customer impact with the exception of assets directly supporting the access doors.

- b. For necessary structures taller than 13000mm, a roof installed (e.g., cranes or tie-offs) or wall mounted safety tie-off system for access to panels or glazing shall be provided.

- c. Access catwalks along with safety tie-off system and guardrails shall be provided as directed by MX. This is required to ensure safe and cost-effective access for staff when conducting work.

xiii. Staff Parking: Every facility requires a minimum of two (2) maintenance parking spaces strategically located to main service buildings. If a facility is staffed with Customer Service employees, a minimum of two (2) additional parking spaces shall be provided in close proximity to main station facility. Staff may be required to work in off hours (late or early) and CPTED solutions for employee safety shall be considered when laying out site.

xiv. Equipment Noise Control: All efforts shall be given to ensure all systems are quiet and do not impede staff's ability to communicate with customers at or within the facility. Acceptable ambient noise from all public facing areas shall be below 55 dB. Service rooms housing generators / pumps / boilers shall maintain levels as per DRM

xv. Staffed Areas: While other Metrolinx Standards provide direction for these spaces, additional consideration to other mitigating factors such as thermal comfort may be enhanced if the orientation of walls and windows help to shield the counter from direct sunlight and solar

heat gain. Automated blinds are to be incorporated within the Ambassador Office and service counter design. Conversely, configurations that minimize drafts and cold air infiltration directly into staff areas shall be employed.

- a. Thermal Comfort: It is important that the air temperature within Staff Office / back of house / waiting areas / climate controlled areas will be maintained at a comfortable level year round for comfort.
 - i. Summer Conditions: acceptable range - reference to DRM requirement in Table 57
 - ii. Winter Conditions: acceptable range - reference to DRM requirement in Table 57
 - iii. Maintain 50% relative humidity and average air speed of <0.15 m/s in public areas. Refer to MOL, CSA Z412-17 Office Ergonomics for further information.

xvi. Fixtures & Furnishings: Office shelving and storage cabinet units shall be floor to ceiling or shall be fixed to bulkheads to minimize dust collection and improve service efficiencies. In addition, all storage cabinets shall be lockable and secured.

- a. Millwork for storage or service areas shall be metal or high pressure laminate finishes.

xvii. Access & Service Doors: Door type, swing, size, and placement shall minimize conflict with pedestrian flow, promote ease of movement including customers who use wheelchairs, scooters, bikes, strollers and luggage. This shall also allow easy movement of maintenance tools and equipment.

- a. All exterior swing doors shall be equipped with extra heavy duty commercial grade frame hinges, locks, handles, push bars and exposed door closers.
- b. All interior swing doors shall be equipped with heavy duty commercial grade frame, hinges, locks, handles, push bars and exposed door closers.
- c. All swing doors shall be equipped with a 10" kick plate to improve durability
- d. Power door operators' controls shall be strategically placed to ensure visibility, accessible operability and comply with the DS-02 Universal Design Standard. Avoid placing on a stand-alone post at entrances as this will interfere with efficient snow and ice control operations or as a general obstacle to efficient pedestrian flow.
- e. All doors within the public path of travel shall have heavy duty commercial grade overhead door stops. All other doors shall be equipped with heavy duty commercial grade door stops. Where required, door guards are to be installed

and shall be of metal construction and comply with the DS-02 Universal Design Standard. Service room doors shall not swing into a pedestrian or driving routes.

f. All sliding doors shall be tested and approved for GGH climate based on conservative climate projections for the lifespan of the asset. Sliding doors shall be installed with no bottom threshold to ensure that they are winter operational including heat traced mechanical glides. Sliding doors shall also be equipped with deadbolt and magnetic lock with remote and key fob access.

g. Storage space, electrical and communication rooms shall be provided to accommodate a 47" x 95" x 80" scissor lift (with access for employee to operate it) in all facilities with an interior/exterior height of >3500mm.

h. Dedicated power receptacles shall be provided to charge equipment. All receptacles shall be labelled as per Metrolinx specifications (no exceptions).

xviii. Fare Devices: Shall be placed to facilitate easy access at key touch points within the facility.

a. Fare devices shall be easily identified and be placed immediately adjacent to the accessible path of travel to ensure quick access and shall include adequate queuing space. Every effort shall be made to avoid disruption of pedestrian

traffic flow by placing devices away from the main path of travel.

b. There shall be sufficient room around fare devices to ensure maintenance staff can access all aspects for cleaning, repair or replacement.

c. Placement of fare devices shall not interfere with customers accessing or congregating around other amenities/assets such as digital signage, elevators or retail spaces. Devices shall not be placed beside Railway Track or adjacent to an unprotected platform edge.

xix. Digital & Static Signage: In addition to the requirements within the DS-03 Wayfinding Design Standard, careful consideration shall be given to placement of digital and static signs to ensure there are minimal interferences on platforms and circulation routes. Snow removal equipment may cause damage to signage supports and, therefore, keeping them adjacent to rather than in the path of travel is preferred.

xx. HVAC Systems: All regularly accessed portions of HVAC equipment (ie. air filters) in dedicated service rooms (electric, mechanical, communications) shall be reachable without the need for specialized equipment. Spaces which house HVAC equipment shall not have any interference that prohibit or intrude on access to maintainable features of the equipment.

xxi. Ensure an adequate path of travel is provided at all service spaces (min, 915 mm wide by 2100 mm high) or

greater as required by authorities having jurisdiction. At areas that require access servicing (i.e. filter changes) a space 1.5 times larger than the space allocation recommendation identified by the equipment manufacture, shall be provided.

- xxii. Installation of equipment within mechanical rooms, services spaces or on facility roofs or yard to provide proper access (1.5 times the clearances recommended by the manufacturer's) for servicing and for removal and re-installation of individual items (coils, filters, fans, valves, operators, etc.) or equipment such as, boilers, generators, air handling units, etc. "
- xxiii. "All systems and equipment provided shall be easily accessible for maintenance & operation purposes. Equipment shall not be located and installed in such a manner that the maintenance, removal and replacement of the equipment is not physically possible or requires removal of other equipment and/or obstructions in the way or the use of specialized equipment. The maintenance, removal or replacement of equipment shall not hinder the flow of pedestrian movement and the operation of vertical circulation elements. Avoid locating equipment that requires maintenance higher than 10ft in elevation where possible. Where it is not possible, fixed ladders and or catwalks shall be provided for access and to be reviewed with MX station operations for approval.
- xxiv. Wall-mounted adjustable devices such as thermostats and sensors located in public areas shall be enclosed in

a clear lockable box with ventilation slots for proper environment measurement.

- xxv. In-floor heating manifolds or any wall recessed manifolds located in public areas shall be enclosed in vandal resistant lockable cabinet enclosures.
- xxvi. Lighting: Placement of light fixtures shall not provide glare to fare device screens, staff workspaces or provide discomfort to customers. Access to light fixtures for re-lamping shall be facilitated without the use of specialized equipment (excepting parking lot fixtures, which require a scissor lift. Consideration shall be given to allow re-lamping to be done without impacting primary or critical customer access points. Lighting fixtures to be assessed against insect or animal related matters such as nesting for birds.
 - a. All light fixtures shall have long lasting drivers to maximize reliability, be non-proprietary and have a 5 year warranty.
 - b. Light fixtures and luminaires shall be readily available, off the shelf versions. Custom lights are not desirable due to cost, maintenance and reliability issue and are only permissible if luminaires are easily accessed and readily available locally to replace.
 - c. Parking lot fixtures on high mast lighting will be lowered for maintenance.
 - d. Heat sinks are required to ensure consistent use throughout various weather conditions.

- e. Fixtures should be modular in design with easily replaceable boards, drivers, lenses etc. They shall not be placed in inaccessible environments such as over stairs or above fixtures or equipment. Luminaires shall be easily accessed for removal and replacement without the need for specialized tools, (excluding tamper resistant screws or scissor lifts).
 - f. Suspended light fixtures shall be strategically placed so that they provide even light and do not interfere with access to any services. Lighting shall not be an obstacle to ongoing maintenance.
 - g. Luminaires shall be operable/maintainable/replaceable by Metrolinx Technicians and provide toolless entry (when applicable) and not require a Certified Electrician for fixture maintenance.
 - h. Light covers shall be durable, easily removable and replaceable without tools (when above height level due to safety concerns).
- xxvii. Plumbing: Any plumbing planned for non-conditioned spaces shall be heat traced, with access to system valves, drains, cleanouts and other serviceable elements within areas that will not impede customer flow while servicing.
- a. Hose Bibbs
 - i. Interior hose bibbs shall be located at Platform Access Buildings, Station Buildings, all Tunnel entrances, all Stairway entrances, all Tunnels and rail/bus platforms. Bibbs should only be installed in areas where it is heated as they do not have non-freeze mechanism. Areas such as tunnel entrances and rail/bus platforms are susceptible to freezing and should have exterior hose bibbs installed.
 - ii. Exterior Hose bibbs shall be heat traced and self-draining (non-freeze) and shall be provided at all landscaping areas and within 30m spacing throughout the site for cleaning and maintenance requirements.
 - iii. Non-freeze wall mounted hose bibbs shall be provided at station buildings spaced no further than 30m apart along the perimeter of the station building. The location of the hose bibbs shall be placed such that the surrounding landscape around the station building (i.e. planters, pedestrian walkways etc.) can be serviced by a 18.3m hose. Where there are obstructions preventing a single hose bibb from meeting these criteria.

additional hose bibbs shall be provided as required.

- iv. Station buildings shall not be provided with less than two non-freeze hose-bibbs. For station buildings where two hose bibbs are sufficient to meet the above criteria, they shall be located on different exterior facing walls.
- v. Non-freeze wall mounted hose bibbs shall be provided at platforms and in pedestrian tunnels spaced no further than 30m apart along the length of the platform and pedestrian tunnel. The location of the hose bibbs shall be placed such that the entire platform and tunnel can be serviced by a 18.3m hose. Where there are obstructions preventing a single hose bibb from meeting this criteria, additional hose bibbs shall be provided as required.
- vi. Interior wall mounted hose bibbs shall be provided in any room which contains a sump pit.
- vii. Hose bibbs shall be integrated into structural elements instead of stand-alone units. Winterizing: Water lines shall have positive flow drainage to assist with winterizing activities and there shall be drains in lines to ensure all systems are

protected against potential ice damage.

b. Sanitary and Storm Management

- i. Catch basins and drains shall mitigate flooding areas of pedestrian movement during storm events.
- ii. Trench drains (where specified), shall be placed out of the main pedestrian path of travel. Careful consideration shall be given to ensure areas where passengers dwell will be clear of drains to minimize risk of ponding and slipping.
- iii. Snow storage shall include a dedicated catch basin/drain to assist with clearing effluent. Snow storage shall not block catch basins intended for draining surrounding area.
- iv. Water shall be kept out of travel routes (vehicular and pedestrian) to the greatest extent possible with a strategy for cold weather months included.
- v. Sump pumps and/or manifolds shall not be installed in the customer path of travel to ensure operational integrity during any sort of maintenance; specifically, no sumps or manifolds shall be placed within tunnels.

- vi. Sump pump manifolds shall be operational by a single person – i.e., gas assist lift arms with lockable hold opens and an access ladder installed where there are no means of utilizing a portable ladder (primarily required in small, tight areas).
 - vii. Sump pumps require mechanical means to lift out as part of their initial fit up and installation. See 22 30 00: Plumbing Equipment for details.
 - viii. Oil Separators shall be placed within bus loops and diesel generator fueling areas and as directed by other Metrolinx requirements.
- xxviii. Generators: Generators shall be placed within an enclosed area (a space with closed walls and ceiling) to ensure long term operation. Open generator rooms (not enclosed) will not be permitted within a building.
- a. Generators (shall be built with load banks) are tested on an ongoing schedule to ensure operation when required. Access shall be provided without interfering with customers at stations. Stations without load banks shall have easily accessible connection points and sufficient space to bring in a trailer. For larger generators, provide catwalks/platforms completing encircling the unit(s) for safe and ease of maintenance.
- b. Due to operational noise, the location of generators shall consider neighboring communities. Efforts including careful location placement, screening, installing a sound attenuating enclosure around the generator (including four walls and a roof), landscaping, etc. shall be employed to minimize effects of noise.
 - c. Fuel filling shall be located within easy access for drive aisle to facilitate delivery vehicle. Ramp approaches will not be acceptable.
 - d. Access shall be provided on ground level (adjacent to delivery route) of storage areas. Oil Separator shall be placed within diesel generator fueling area and as directed by other Metrolinx requirements.
- xxix. Washrooms: The staff washroom within the back of house shall not be in direct view from the access door separating the public space. Washrooms are frequently used as a changing area for staff and requires at least 2 clothes hangers and sufficient circulation space. Public washrooms shall be door-less multi-use or a universal washroom as per DS-04 GO Station Architecture Design Standard, DS-Universal Design Standards and DRM. The door-less washrooms require a robust and customer friendly retractable barrier to secure this space for servicing.
- a. Public washroom fixtures and finishes shall be durable to dissuade vandalism and abuse as well as strategically placed to promote linear

and efficient circulation. Anti-graffiti partitions shall be installed where needed.

xxx. Flooring: In order to eliminate staining and help remove bio-hazardous spills, floor finishes shall be durable, sealed and be rated for heavy foot traffic within a commercial environment including floors being treated with an anti-slip coating)

- a. Selection of grout color shall be considered to minimize discoloration over time.
- b. Floor drainage grates shall be provided at all public entrances and be non-slip, non-corrosive and integrated within drainage systems. As per the DRM, all drains within unconditioned spaces shall be heat traced to avoid ice build-up and promote resiliency.

xxxi. Walls: In addition to requirements within the DRM; Individual aluminum, metal, glass, or porcelain panel sizes shall be modules within its material family and standardized throughout the site to ensure ease of inventory management, replacement and repair. This includes service rooms (comm, electric, mechanical) and other non-public spaces.

- a. All exterior walls shall be equipped with a durable, impact resistant knee wall at a minimum 600mm above grade.
- b. Exterior wall panel systems used to support material choice shall be designed to avoid bird nesting and pest infiltration of any kind

c. All wall materials including painted surfaces shall be durable with simple and effective methods of cleaning to ensure longevity and minimize total life cycle costs.

d. Consideration shall be given to a materials ability to resist or deter graffiti, etching and markers within high risk areas such as washrooms, auxiliary buildings, noise walls and tunnels. Impervious finishes shall be employed to facilitate graffiti resistance. Surface applied graffiti resistance is not a viable solution – as this shall be reapplied after every cleaning/graffiti removal

xxxii. Roofing: Roofs and canopies shall be designed for long-term resiliency and energy performance. Additional consideration shall be given to minimize accumulation of ice and snow with adequately spaced snow-guards at public thoroughfares.

- a. Roofing membranes shall be high albedo to improve energy performance.
- b. Soffits shall be of prefinished metal and provide adequate ventilation and air flow through adjoining spaces, while blocking and deterring any/all pests.
- c. Colors shall be of standard offering, readily available and locally source.
- d. Gutters and Scuppers shall be designed to ensure that debris will not collect and that clean out is easily performed without the need for any specialized equipment.

- e. Careful consideration shall be given to the layout of gutters etc. to ensure overflow is not dripping onto customers in the path of travel to/from the regularly accessed areas of the facility.
- f. Drains, Downspouts and Rainwater Leaders shall be heat traced to ensure no buildup of ice in winter months.
- g. Downspouts in areas susceptible to damage from equipment shall be protected.
- h. Cleanouts shall be provided in areas that can easily be accessed by maintenance staff without impeding customer flow and without requiring staff to put them in harm's way within the corridor.

xxxiii. Ceilings: Ceiling panels shall be non-corrosive, non-staining and mounted using mechanical fasteners. Any ceiling access panels shall be subtly marked and hinged on one side to allow for safe and effective access to equipment (these panel requirements do not apply to service rooms).

- a. Ceiling Panels shall be of a size that can be managed by a single person using a lift (or ladder where reach permits): no dimension shall be greater than 1220mm and weigh more than 10kg (when expected maintenance is by a single individual).

xxxiv. Windows and Glazing: Glazing shall be the minimum required to facilitate passive wayfinding and CPTED solutions. In addition to an increase in operating costs, excessive glazing crates solar gain in summer and heat

loss in winter – placing additional pressure on HVAC equipment.

- a. Building systems shall take in to account all glazing and be adjusted accordingly to ensure minimal operational costs. Early energy modeling is requested to ensure operational and design efficiencies.
- b. All glazing used in safety sensitive areas such as the Station Building, Platform Access Buildings or Pedestrian Bridges as well as the Rail Platform shall be tempered and laminated glass. When stressed, glazing should shatter but remain in place as a safety requirement.
- c. Standardized and module glass sizes, will increase operational efficiencies and improve inventory management practices.
- d. 1220 x 1830mm (4 x 6 ft.) is the ideal size for Metrolinx Technicians to manage on site.
- e. Shallow frames/mullions are preferred to minimize dust shelves/collection and potential bird rests.
- f. Colors shall be selected that are fade tolerant and that are of standard offering to allow for ease of repair and maintenance.
- g. It is preferred that films are laminated within glazed panels to ensure clean-ability. If applies

externally, films shall be locally available to allow for replacement or repair.

- xxxv. Stairs: Shall be of durable, impervious and non-slip material. Well designed and planned stairs can help minimize slip & falls and encourage intuitive ascending/descending behaviors.
- a. Exterior stairs shall be weather protected (enclosed or canopied with heat-trace) to minimize safety risk and snow and ice control operations. All exposed staircases shall maintain snowmelting capabilities (electrical or mechanical depending on location and practicality)
 - b. Contrast nosing shall be installed such that the contrasting edge is visible in both the rise and run of the stair. The nosing shall be of a non-slip finish embedded within the run and shall *not* be surface applied and shall meet requirements under DS-02 Universal Design Standard.
 - c. Do not install large drains, grates, pits or any other potential obstruction at the top, mid or lower stair landings. Positive drainage towards the side drain channels shall be provided and shall flow towards a heat-traced sanitary drain at the bottom of the stairs.
- xxxvi. Ramps: Shall be of durable, impervious and non-slip material. Well designed and planned elevation changes could optimize pedestrian flow, encourage access and should minimize the number of 'zig-zags' to

provide succinct thoroughfare. Ramps shall meet requirements under DS-02 Universal Design Standard.

- a. Exterior ramps shall be weather protected (enclosed, provided with electrical or mechanical snowmelting services or canopied with heat-trace) to minimize safety risk to customers and reduce liability of snow and ice control operations.
 - b. Do not install large drains, grates, pits or any other potential obstruction at the top, mid or lower ramp landings. Positive drainage towards side drain channels shall be provided and shall flow towards a heat-traced sanitary drain at the bottom of the ramp.
- xxxvii. Guardrails & Handrails: Stainless steel or galvanized finishes are required to minimize ongoing maintenance costs and ensure ease of changing/ repairing. Typically, we prefer stainless steel utilized on interior while galvanized is predominately used on exterior. Lights utilized in handrails shall be modular and easily replaceable
- a. Shall be rust free throughout
 - b. Painted finishes are not acceptable. Ensure proper surface preparation is done with galvanized finishes.
 - c. Continuous tubular metal is preferred to ensure ease of repair. If metal is cut, welded, ground

and refinished on site, rusting of the finished or welded joint is not acceptable.

xxxviii. Elevators: Elevators shall comply with Metrolinx Standards ((DRM, DS-02 and DS-04)

a. HVAC controls for the elevator shaft shall be located outside of the shafts for ease of access.

xxxix. Escalators: Escalators shall comply with TSSA and Provincial regulations. Escalators are not to be used to access rail platforms with the exception of Union Stations.

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xl. Two-Way Communication: Two-way communication devices shall be provided at designated waiting areas, washrooms and at gates, bike shelters, easily accessed by staff and customers and shall not be in hidden from public view to ensure safe and legitimate use. (Refer to GO Design Requirements Manual Section 5.5.4).

xli. Hardscaping: Plazas at stations shall be sized for succinct pedestrian access and minimize plaza areas to reduce walking distances and time for customers. Functional plazas will also positively affect the overall operational costs at GO facilities.

a. Plaza and station access areas shall be constructed of durable materials that are weather tolerant, and capable of withstanding heavy maintenance equipment and service vehicles.

b. Materials and finishes shall be easily maintained, durable and non-slip.

c. Design shall discourage recreational skateboarding and loitering due to increases in property damage and safety risk associated with these activities.

d. Site furnishings shall be of the GO standard bench or similar design that does not encourage customers to lie down. This will optimize seating availability.

e. Concrete:

i. Sidewalks shall be finished flush with adjacent surfaces with a cross-slope to facilitate drainage.

ii. Curbs shall have chamfered edges to reduce risk of damage

iii. Multi-use paths, bicycle paths or active walkways shall not run parallel and directly adjacent to rail/bus platforms unless there are segregation/barriers. Potential cyclist/pedestrian interface increases liability and safety risk.

f. Asphalt:

i. Asphalt walks shall be installed with sufficient side run-off and sloped edges

that shall be no steeper than 1 in 2, and no higher than 150mm.

g. Pavers:

- i. Pavers shall be locally available, and it is preferred that they be a stock item to ensure ease of repair and replacement. Custom colors are not an acceptable solution.
- ii. Areas of pavers shall not be laid within door swings when doors swing to the exterior. There shall be concrete surface surrounding the facility to ensure weather suitability and to eliminate heave affecting doors.
- iii. Pavers may be used as accent surface treatment and not used in any area that is expected to sustain traffic, both vehicular and pedestrian. Drainage shall be designed to be passive, to ensure year round clean surfaces.
- iv. It is encouraged to use pavers around outside edge of parking lots for vehicle overhang. For locations to be operated under GO Transit, permeable paving shall not be permitted in areas of public vehicular parking and movement.

- v. Careful consideration shall be given to allow for space to pile snow and allow a clear, barrier free access.

xlii. Landscaping: Lighting in landscaping shall be Dark Sky compliant

- a. Drought resistant, local (where suitable), hearty varieties of all landscape materials are preferred to ensure survival.
- b. Sodded areas shall be kept to a minimum and generally in accordance with local requirements.
 - i. Sod shall not be located in areas where pedestrian traffic could wear away material. Curbs shall be added to the sides around sod beds to prevent rain-related erosion.
- c. Deciduous trees need to be carefully considered for distribution on site. Providing shade and reducing the heat island effect are of great importance but variety selection and placement can improve work efficiency within fall months.
- d. Trees shall be located away from areas designated or utilized as snow storage to ensure survival.
- e. All defoliating trees and plants shall be placed away from rail corridor. Leaves within the

corridor contribute to break slip and sensor impacts.

f. Fruit or nut bearing trees are not permitted.

xliii. Waste & Recycling Services:

- a. Waste enclosure locations shall consider customer comfort, staff access and commercial pick up/ delivery processes.
- b. Placement of waste bins shall be provided in a way that does not interfere with customer access to Station Services & Customer Communications. Turning circles, etc. shall easily accommodate commercial vehicles
- c. Provisions for waste receptacles shall be strategically determined based on site design, pedestrian flow and customer touch points throughout the facility.

xliv. Fencing: Fencing shall be of a standard, commercially available product that is locally sourced.

- a. Corridor fencing shall comply with rail operations requirements. Include CPTED Principles when locating fence and the type of fence.
- b. Decorative/architectural fencing is acceptable at stations to enhance the design. Materials shall be durable, sturdy, vandal resistant and repairable. Stainless steel or galvanized metal is the preferred finish.

- c. Careful consideration shall be given to design of fencing to ensure that it is easily maintained. Complicated filigree and similar finishes shall be avoided. Fences adjacent to roadways and drive aisles are susceptible to increased accumulation of dirt and debris from seasonal conditions. Where possible, place buffers at these locations and ensure fences are installed at least 1 meter (approximately 3 feet) from the facility of maintenance building.

xlv. Rail Platform Access: Corridor access shall be provided at all rail station facilities for platform maintenance and transferring of materials, tools and equipment.

- a. A dedicated, hatched and signed area shall be provided for platform access. Gates and removable bollards shall be provided to ensure area is always clear and available.
- b. Careful consideration shall be given to ensure corridor access requirements do not disrupt customer access to amenities etc.

xlvi. Winter Maintenance:

- a. Architectural, structural and furnishings shall be organized in such a way as to minimize areas of congestion to ensure snow clearing equipment has full access. A minimum of 6' wide clearance is required between obstacles.
- b. Snow storage areas shall be integrated into all landscape plans for each facility. It is required

to create a snow removal strategy (to be approved by Metrolinx Station Services) to ensure that:

i. Safe temporary storage of snow after a large snow event.

ii. That there is clear access to this location with minimal impact to traffic flow.

iii. That the accumulation storage area has a substrate compatible with the material – i.e., salt tolerant, positive drainage. Appropriately distanced from fencing / curbs to prevent plow damage.

c. Parking Lots (including bus loops & PUDO): Due to the need for expedience when clearing snow and ice, there shall be no raised walkways or boulevards which would hinder efficient and effective operations. For the raised curb locations please refer to the DRM.

d. Snow Melt Systems: Snow melt systems shall be provided within all rail platforms to ensure efficient and effective snow and ice control at high risk areas.

i. There shall be no splices used within glycol tubing or power wires for snowmelt sensors as outlined in Specification 23 21 18: Glycol Solution Snow Melting System.

ii. Controls and systems shall be maintainable by operational staff and shall not be of a proprietary nature. OEM parts list shall be locally available

iii. Snowmelt manifolds and other equipment that requires ongoing maintenance shall be designed to allow for access without interrupting the flow of customers to platforms and trains.

iv. All manifold covers to have lift assist and 'hold open' arms. Safe operation by a single staff member may be required, air shocks should be utilized when available.

v. There shall be no splices used within glycol tubing or power wires for snowmelt sensors. Snowmelt platform sensors are to be embedded within concrete to minimize movement and reduce water ponding.

Boiler rooms shall not be placed below grade and shall conform to Metrolinx Standards and be designed to comply with all electrical and plumbing codes. Large ancillary service rooms (i.e. boiler room(s), main electrical room(s), main communication room(s), mechanical room(s) located along side platforms shall be setback from the tracks such that flagging would not be required when maintenance and servicing work is occurring in these rooms (i.e. equipment removals and replacements). It is responsibility of the

designer/consultant to understand the flagging requirements per project basis and coordinate the location of the service rooms.