Preventive Maintenance Guidebook

BEST PRACTICES TO MAINTAIN EFFICIENT & SUSTAINABLE BUILDINGS

A BOMA PUBLICATION

BOMA Manitoba

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01 Acknowledgements

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02 Introduction

Maintenance Tip:

Rather than waiting for systems or components to fail, regular inspections and routine upkeep allow issues to be identified early, reducing costly emergency repairs and minimizing downtime.

Purpose:

The Preventive Maintenance Guidebook has been developed by BOMA Manitoba to serve as a practical resource for building owners, property managers, and service providers. The guide outlines key preventive maintenance practices that support the long-term performance, safety, and value of commercial and institutional buildings.

Drawing on the expertise of local BOMA member professionals across multiple disciplines, the guide offers a clear and comprehensive overview of essential building systems and components.

Importance of Preventive Maintenance:

Preventive maintenance is a proactive approach to building management. Rather than reacting to failures or unexpected breakdowns, regular inspections and routine upkeep help identify issues early, reducing costly emergency repairs, minimizing operational disruptions, and extending the lifecycle of building assets.

Effective maintenance also enhances occupant comfort, supports safety, and contributes to more efficient building performance. In Manitoba's climate, characterized by extreme temperature fluctuations, heavy snowfall, and frequent freeze-thaw cycles, preventive maintenance is especially critical to protect structures and ensure year-round performance.

How to Use the Guidebook:

This guidebook is organized by building systems and site elements, with each section written by expert BOMA members in their respective fields. Each section includes:

- Overview of the system and its role in building operations.
- Key Maintenance Tasks outlining what to look for and what to do.
- Recommended Frequency for inspections and service.
- Special Considerations for Manitoba's climate to address local challenges.
- Tips or Red Flags to help spot potential issues early.
- Visual Aids such as checklists, diagrams, or sample images where available.

We encourage you to use this guide as both a reference tool and a planning resource. It can be used to develop seasonal maintenance schedules, train staff, and support long-term asset management strategies.

While the guide offers general recommendations, always consult manufacturer guidelines and certified professionals for system-specific requirements.

03 Preventive Maintenance Overview

Preventive Maintenance is Proactive.

Maintenance keeps equipment in good condition, reduces the risk of sudden failures, and provides predictable costs over time.

What is Preventive Maintenance and Why is it Necessary?

Preventive Maintenance (PM) is the practice of regularly scheduled inspections, servicing, and repairs designed to keep building systems and equipment operating efficiently. Instead of waiting for failures or problems to occur, PM identifies and addresses potential issues early, extending the lifespan of equipment, reducing unplanned downtime, and improving safety for building occupants.

Preventive Maintenance vs. Reactive Maintenance:

Reactive Maintenance ("fixing it when it breaks") is costly, disruptive, and can lead to safety hazards, lost productivity, and tenant dissatisfaction.

Preventive Maintenance, on the other hand, is proactive. It keeps equipment in good condition, reduces the risk of sudden failures, and provides predictable costs over time.

Poor Maintenance Practices (Reactive):

- Only servicing equipment when breakdowns occur.
- Delaying inspections until major issues are visible.
- Ignoring seasonal risks (e.g., freeze-thaw cycles, snow load).
- Relying on emergency contractors rather than planned service.

Good Maintenance Practices (Preventive):

- Establishing seasonal and annual inspection schedules.
- Documenting service activities and keeping accessible records.
    - Training staff on red flags and early warning signs.
- Coordinating across disciplines (e.g., HVAC, roofing, electrical) for holistic care.

Preventive maintenance not only costs less in the long run but also safeguards building reputation and value.

Sample Preventive Maintenance Plan Template:

The following is a simple framework for developing a PM plan. It can be customized to fit the needs of any building:

1. System/Component: (e.g., Roofing, HVAC, Electrical)
2. Maintenance Tasks:
    - List of specific tasks (inspection, cleaning, lubrication, replacement, etc.)
3. Frequency:
    - Daily / Weekly / Monthly / Seasonally / Annually
4. Responsible Party:
    - In-house staff, external contractor, service provider
5. Documentation:
    - Record date, findings, and actions taken
6. Notes/Follow-up:
    - Observations, upcoming needs, or flagged concerns

Preventive Maintenance Overview

Equipment	Task	Frequency	Responsible Party	Documentation	Additional Notes
Elevators	Perform safety inspections, test emergency phones	Monthly	Elevator contractor	Service log maintained onsite	Track downtime for reporting

Sample Entry:

- **System/Component:** Roofing
- **Maintenance Tasks:** Inspect for leaks, check flashing, remove snow buildup over safe load limits
- **Frequency:** Semi-annually + after major weather events
- **Responsible Party:** Roofing contractor / Facility staff
- **Documentation:** Log inspection results, repairs completed
- **Notes/Follow-up:** Monitor for ice damming risk in spring thaw

04 Air Quality

Maintenance Tip:

Snow ingestion is common; ensure air intake hoods and louvers are properly shielded.

Overview

Maintaining proper indoor air quality (IAQ) is essential for both occupant health and equipment longevity. The effectiveness of an air filtration system depends on selecting filters suited to the building's specific needs, whether that involves removing particulates, controlling odours, or meeting sustainability goals.

Both single-stage and multi-stage filtration systems can be optimized through appropriate filter combinations and regular inspection. Seasonal factors such as poplar fluff, insects, or construction dust should also be managed through temporary filter adjustments or protective measures at air intakes.

Key Maintenance Tasks:

General Air Filtration

- Select filters based on application needs: particulate removal, odour control, or sustainability targets.
- Eliminate gaps between filters and frames; ensure gasketing is in place.
- Store overstock filters in clean, dry areas where they will not become wet or damaged.
- Maintain a filter log recording:
  - Filter types and sizes.
  - Last change date and inspection date.
  - Maintenance performed and by whom.

Single-Stage Units (Prefilters Only)

- Use MERV 8–9 filters for general equipment or non-critical process protection.
- Use MERV 13 filters for employee protection; note these must be changed frequently as they load quickly and decrease in efficiency.
- For mild or seasonal odours, use a combination particulate/odour filter.

Multi-Stage Units

- Standard configuration: MERV 8–9 prefilter with a minimum MERV 13 final filter for both equipment and occupant protection.
- Incorporate particulate and odour removal filters for longer life span and improved performance.

Seasonal and Environmental Adjustments

- For issues like poplar fluff, shad flies, or construction dust:
  - Add or substitute a low-efficiency prefilter until the issue subsides.
- For applications where snow or rain enters the intake:
  - Install a cover or hood to redirect airflow and reduce velocity at dampers/louvers.

Filter Change-Out Procedures

- Do not rely on visible dust as an indicator for replacement.
- Use portable or permanent pressure gauges to monitor filter loading.
- If gauges are unavailable:

Air Quality

Maintenance Tip:

Do not rely on visible dust as an indicator for filter replacement.

Figure 4A: Replace filters immediately if airflow complaints arise.

  - Request the filter supplier to test pressure and determine filter loading.
  - Perform at least two tests to estimate average lifespan.
- Filters should not be changed unless the following conditions are present:
  - Inadequate air flow complaints.
  - Filters bowing inward or blown out.
  - Deterioration due to high moisture.
  - Mold growth.
- Inspect filters every 3 months (minimum).

Prefiltration Options

- Pads and Rolls
  - Use auto-roll, synthetic, fiberglass, or washable media only in heavy particulate environments (wood dust, construction, etc.).
  - Medium efficiency media loads quickly and requires frequent changeouts.
  - Airflow: 300–500 FPM; Changeout pressure: 0.7–1.0" w.g.; Life: 1–3 months.
- Pleated Filters
  - For scheduled maintenance: low capacity (10 pleats/ft).
  - For sustainability: high capacity (15 pleats/ft, 4" thick) with gauges.
  - Changeout: approx. twice initial pressure; Max: 1.0" w.g.
  - Life: 3–6 months (up to 9–12 months available).
  - 20–30% airflow reduction can double filter life.
- Bag or Box Prefilters
  - Use MERV 9–11 where space allows.
  - Life: ~1 year; Changeout: twice initial pressure (max 1.0–1.5" w.g.).

Final Filtration

- Bag Filters
  - Use filters rated MERV 11+ with a MERV-A equivalent.
  - Avoid in high-moisture applications.
  - Bags should be fully inflated; sagging indicates reduced efficiency.
  - Increase pockets if fully inflated but short lifespan persists.
  - Velocity: ≤500 FPM; Changeout: twice initial pressure or max 1.0–1.5" w.g.; Life: 1–2 years.
- Box Filters
  - Types: Single header, double header, box style.
  - Media: High loft fiberglass or wet-laid glass (preferred for moisture).
  - Depths: 2", 4", 6", 12".
  - V-bank styles offer longest life and lowest pressure drop.
  - Velocity: 500 FPM (some up to 600 FPM); Changeout: twice initial pressure or 1.0–1.5" w.g.; Life: 2–3 years.
- Molecular Filters (Odour Removal)
  - Always pair with particulate prefiltration.
  - Carbon media: general odour control.
  - Potassium permanganate/blend: specific contaminants.
  - Carbon life depends on contaminant levels, media volume, and operating hours.
- HEPA Filters
  - Efficiency: ≥99.97% at 0.3 micron.

Air Quality

Maintenance Tip:

Seasonal particulates such as poplar fluff, road dust, and construction debris can significantly increase filter loading.

- Initial pressure: ~1.35" w.g. (higher than bag/box filters).
- Retrofits should involve an Engineer or Contractor and filter manufacturer representative.

Recommended Frequency:

Task	Frequency
Filter inspection	Every 3 months (minimum)
Filter change-out	Based on pressure readings or visible signs of degradation, not time alone
Prefilters	Every 1-3 months
Pleated filters	Every 3-6 months
Bag or box prefilters	Annually
Final bag filters	Every 1-2 years
Box filters	Every 2-3 years
Molecular filters	As determined by contaminant load and media type

Special Considerations for Manitoba:

- Seasonal particulates such as poplar fluff, road dust, and construction debris can significantly increase filter loading.
- Extreme cold can cause moisture buildup and filter freeze-up—monitor humidity and intake design.
- Snow ingestion is common; ensure air intake hoods and louvers are properly shielded.
- High pollen seasons and spring melt can require additional prefiltration or more frequent checks.

Tips & Red Flags:

- Tips:
  - Avoid using visible dust as a replacement indicator—use pressure readings.
  - Record all filter maintenance in a filter log.
  - Ensure no bypass gaps between filters and frames.
  - Store filters in clean, dry, covered areas.
  - For sustainability goals, use high-capacity filters with gauges to balance efficiency and energy savings.
- Red Flags:
  - Replace filters immediately if:
    - Airflow complaints arise.
    - Filters bow or collapse.
    - Mold or water damage is present.

Air Quality

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Filter inspection	Every 3 months (minimum)				
Filter change-out	Based on pressure readings or visible signs of degradation, not time alone				
Prefilters	Every 1 - 3 months				
Pleated filters	Every 3 - 6 months				
Bag or box prefilters	Annually				
Final bag filters	Every 1-2 years				
Box filters	Every 2-3 years				
Molecular filters	As determined by contaminant load and media type				

05 Building Envelope & Windows

Maintenance Tip:

After severe weather, conduct prompt visual inspections of the roof, exterior walls, and drainage systems to identify emerging issues early.

Overview

The main defense against weather and moisture infiltration is the building envelope, which consists of the roof, walls, windows, doors, and drainage systems. To avoid expensive repairs, energy loss, and occupant discomfort, these components must be inspected and maintained on a regular basis.

Rainwater management systems, windows, doors, cladding, and roofing systems—both flat and sloped—are important areas to pay attention to. Determining the frequency of inspections and spotting possible weaknesses can also be aided by tracking weather patterns like temperature and precipitation.

Key Maintenance Tasks:

Weather Conditions

- Note recent weather patterns, including temperature fluctuations, precipitation, and freeze–thaw cycles, and use this information to assess potential impacts on roofing, drainage systems, and building envelope materials.

Roofing – Flat

- Look for exposed membrane, asphalt balling, surface cracking (alligator cracking), and tenting near perimeters or rooftop units, and document any areas requiring repair.
- Review metal flashings, scuppers, and roof access devices.

Roofing – Sloped

- Inspect the roof for missing, weathered, or damaged shingles and check for ponding water after rainfall, ensuring roof drains are cleaned and functioning properly. Address areas of wear or deterioration promptly.

Cladding

- Inspect exterior cladding for water staining, cracking, or missing sections and/or impact damage, paying close attention to joints, sealants, and transition points where deterioration or water intrusion may occur.

Windows

- Check for air leakage or water infiltration around frames, verify that drainage holes (weep holes) are clear, and look for condensation or fogging between panes, which indicates seal failure.

Figure 5A: Condensation or fogging between window panes indicates seal failure.

Doors

- Inspect doors for air or water leakage around frames and thresholds, monitor for condensation or fogging on glass inserts, confirm that doors operate smoothly without sticking, and ensure power door operators, if present, are functioning correctly.

Rainwater Leaders and Drainage

- Keep gutters and downspouts clean and free-flowing, inspect for damage or disconnection, and verify that water is being directed away from the foundation.
- Confirm that surrounding landscaping is graded to slope away from the building and observe for ponding during rainfall events, addressing blockages or drainage deficiencies promptly.

Building Envelope & Windows

Maintenance Tip:

Regular photo documentation of inspections can help track deterioration over time.

Recommended Frequency:

Task	Frequency
General building envelope inspection	Semi-annually (spring and fall)
Roof inspections	Twice per year and after major weather events
Gutter and downspout cleaning	Bi-annually, more often during heavy leaf fall or storms
Window and door inspections	Annually, or as needed following complaints of drafts or leaks
Cladding inspections	Annually, and after severe storms or freeze–thaw cycles

Special Considerations for Manitoba:

- Freeze–thaw cycles can cause expansion and contraction of materials, leading to cracks in cladding, sealants, and roof membranes.
- Heavy snow loads can lead to ponding on flat roofs and ice dam formation on sloped roofs—inspect drainage paths frequently in winter.
- Wind-driven rain and snow drift can cause moisture penetration around doors and windows.
- Rapid temperature changes may stress building materials and increase condensation risk on windows and door frames.
- Seasonal precipitation patterns (melting snow in spring, heavy rains in summer) can challenge drainage systems—verify positive grading and extension of downspouts.

Figure 5B: Inspect cladding annually, and after severe storms or freeze–thaw cycles.

Tips & Red Flags:

- Tips:
  - Regular photo documentation of inspections can help track deterioration over time.
  - After severe weather, conduct prompt visual inspections of the roof, exterior walls, and drainage systems to identify emerging issues early.
  - Visible ponding water or stained ceiling tiles may indicate roof drainage issues.
  - Cracks or missing cladding should be sealed immediately to prevent water ingress.
- Red Flags:
  - Fogging between window panes signals failed glazing units requiring replacement.
  - Doors that stick or fail to close tightly may indicate shifting frames or weather stripping deterioration.
  - Overflowing gutters or downspout disconnections can lead to foundation moisture problems.

Building Envelope & Windows

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**					
Roofing – Sloped • **Missing Shingles** • **Weathered shingles**	Twice per year and after major weather events				
Roofing – Flat • **Ponding water** • **Roof drains cleaned** • **Exposed membrane** • **Alligator racking** • **Tenting at perimeters or roof top units** • **Asphalt balls collecting** • **Membrane tie into mechanical systems** • **Roof access devices (ladders, cages, hatch)** • **Vegetation**	Twice per year and after major weather events				
Cladding • **Water staining** • **Cracking** • **Missing sections** • **Impact damage**	Annually, and after severe storms or freeze–thaw cycles				
Windows • **Air leakage** • **Water leaks** • **Condensation and fogging**	Annually, or as needed following complaints of drafts or leaks				

Building Envelope & Windows

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**					
Doors • **Air / Water leakage** • **Condensation / fogging** • **Gaps around door** • **Difficulty operating** • **Power door operator working (if present)**	Annually, or as needed following complaints of drafts or leaks				
Rainwater Leaders • **Clean gutters** • **Gutters overflowing during rain** • **Damaged or disconnected downspouts / extensions** • **Water directed away from foundation** • **Landscape sloped away from building**	Bi-annually, more often during heavy leaf fall or storms				

06 Building Structure

Maintenance Tip:

Look out for newly formed cracks, noticeable changes in slab elevation, sudden wall or ceiling displacement, or water infiltration near structural elements.

Overview

Structural systems form the load-bearing backbone of a building and support the foundation, superstructure, walls, floors, and roof. Deterioration of concrete, steel, or wood structural elements can lead to settlement, deflection, instability, and loss of structural capacity. Preventive inspections help identify early signs of structural issues, water infiltration, corrosion, movement, and material degradation before they develop into costly structural repairs or safety hazards.

Manitoba buildings face some of the toughest environmental conditions in Canada. From deep-freeze winters with heavy snow to hot summers and unpredictable spring thaws, these temperature shifts place significant stress on roofs, walls, foundations, and parking structures.

Staying on top of preventive maintenance helps property managers avoid costly repairs, extend system life, and maintain occupant safety and comfort. Small issues caught early, such as a hairline wall crack or a blocked roof drain, can prevent much larger problems later on.

Key Risk Assessment Tasks:

Foundation

- Ensure water is directed away from the building by maintaining downspouts, extensions, splash pads, and proper grading, while keeping gutters and leaders clear to prevent ponding.
- Inspect concrete for spalling, remove loose material, seal cracks to limit water entry, address contributing moisture sources, and engage a contractor if reinforcement is exposed.
- Monitor interior finishes for bulging, cracks, or separation. Document locations of visual anomalies, inspect adjacent exterior walls for moisture intrusion, and escalate to a structural engineer if movement progresses.
- In Manitoba, inspect foundations each spring after thaw, as soil movement and frost heave are common causes of new cracks or uneven settlement.

Superstructure

- Inspect for corrosion, rot, or water damage, identifying and correcting moisture sources, cleaning affected areas, and applying protective coatings as needed.
- Investigate water damage at interior finishes encasing structural elements, locate leaks, remove wet finishes to allow drying, and stabilize any impact damage, referring to a structural engineer if load-bearing components are affected.
- Monitor for sagging or movement, track deflection season-to-season, and escalate if new or progressive sagging occurs.
- Track cracking or spalling concrete. Photograph and measure cracks, seal minor cracks, and engage professional repair if reinforcement is exposed.

Exposed Steel

- Remove loose coatings and rust scale, apply corrosion protection, and address ongoing moisture exposure to prevent further deterioration.
- In unheated or damp spaces (such as parkades or loading bays), inspect steel for rust or peeling coatings after winter when road salt and humidity can accelerate corrosion.

Building Structure

Figure 6A: Wood structural elements are at greater risk of rot when exposed to high moisture content from snow melt, wind-driven rain, or ice damming.

Exposed Concrete

- Monitor for cracking, surface delamination, and exposed reinforcement. Patch spalled areas as needed to maintain structural integrity.
- In Manitoba, rinse salt and sand from exposed concrete decks and ramps each spring to minimize corrosion and scaling.

Exposed Wood

- Inspect for coating failure, staining, or rot, repair protective coatings, and correct moisture exposure sources to prevent long-term damage.
- Pay particular attention after spring snowmelt or heavy rainfall when moisture exposure peaks.

Slab-on-Grade

- Monitor for heaving, cracking, and uneven surfaces, repair trip hazards through grinding or slab-jacking or crack filling, and restore any damaged flooring surfaces to maintain safety.
- Soil movement in spring may contribute to heaving or differential settlement—review interior and exterior slabs each spring and fall.

Attic Space

- Where access is permitted, inspect for visible moisture staining, structural deformation, and any conditions that could compromise integrity. Follow applicable access restrictions under provincial safety regulations.
- After winter, look for ice damming or snow melt infiltration near trusses and rafters.

Crawlspace

- Where access is permitted, ensure moisture barriers are intact, structural wood is free from soft spots or rot, and any water intrusion or damage is addressed promptly.
- Inspect more frequently during spring thaw or after heavy rainfall.

Recommended Frequency:

Task	Frequency
Roof - Snow buildup, blocked drains	Winter & Fall
Exterior Walls - Cracks, damaged sealant	Winter & Fall
Foundations - Cracks, water seepage	Spring
Parking Decks - Salt damage, flaking concrete	Late Winter/Spring
Steel Connections - Rust, peeling coatings	Every 2 years

Building Structure

Special Considerations for Manitoba:

- Extreme freeze-thaw cycling can accelerate cracking and spalling in concrete.
- Soil movement in spring can contribute to slab-on-grade heaving and differential settlement at foundations.
- Winter road salt can increase corrosion of exposed steel.
- Wood structural elements are at greater risk of rot when exposed to high moisture content from snow melt, wind-driven rain, or ice damming.

Figure 6B: In unheated or damp spaces (such as parkades or loading bays), inspect steel for rust or peeling coatings after winter when road salt and humidity can accelerate corrosion.

Tips & Red Flags:

- Tips:
  - Look out for newly formed cracks, noticeable changes in slab elevation, sudden wall or ceiling displacement, or water infiltration near structural elements.
  - When access is restricted by Provincial Legislation (attic and/or crawlspace), review regulatory requirements prior to entry and inspection.
- Red Flags:
  - Any visible corrosion, exposed reinforcing steel, or trip hazards should be addressed promptly.

Figure 6C & 6D: Cracking concrete; Figure 5E: Ground settling; Figure 5F: Exterior finish damage; Any visible corrosion, exposed reinforcing steel, or trip hazards should be addressed promptly.

Building Structure

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**					
Foundation • **Water collecting at foundation** • **Spalling concrete** • **Movement in building – bulging damaged interior finishes**	Every three months				
Superstructure • **Corrosion, water damage, or rot** • **Water damages at interior finishes encasing structural elements** • **Impact damages** • **Sagging / movement** • **Cracking / spalling concrete**	Every three months				
Exposed structural elements (Steel) • **Damaged flaking coatings** • **Corrosion**	Every three months				
Exposed Structural (Concrete) • **Cracked concrete** • **Spalling** • **Corrosion** • **Exposed steel**	Every three months				

Building Structure

	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**				
Exposed Structural (Wood) • **Damaged or flaking coatings** • **Water staining or wood rot**	Every three months			
Slab-on-Grade • **Cracking and heaving** • **Trip hazards** • **Damaged flooring** • **Sloped flooring**	Every three months			
Attic Space • **Access may be restricted by Provincial Legislation**	Every three months			
Crawlspace • **Access may be restricted by Provincial Legislation**	Every three months			

07 Electrical Systems

Maintenance Tip:

Inspect outdoor electrical systems (parking, signage, exterior panels) before winter and mid-season.

Overview

Electrical systems are critical to the safe and reliable operation of any building. They supply power to lighting, HVAC, elevators, communications, security systems, and life safety equipment. Failures can result in equipment damage, tenant disruption, safety hazards, and costly repairs.

Preventive maintenance helps reduce unplanned outages by addressing issues before they escalate. Regular inspections extend the lifespan of electrical components, improve energy efficiency, and support compliance with safety codes and arc flash requirements (CSA Z462).

In Manitoba, extreme cold, freeze–thaw cycles, and high winter electrical demand pose unique challenges, making consistent electrical maintenance essential for both safety and reliability.

Key Maintenance Tasks:

Thermal Imaging of Electrical Equipment

- Use infrared scanning to identify abnormal heat in panels, switchgear, transformers, and distribution boards.
- Focus on high-load areas such as HVAC feeds, elevator circuits, and parking receptacle panels.
- Document thermal images and compare results over time.
- Schedule repairs for components showing elevated temperatures.
- Thermal scanning should be performed during high/peak load.
- Ensure scanning is conducted by certified thermographers.
- Look for signs of corona tracking on insulators inside medium voltage equipment, typically white powder tracks on surface of insulators.

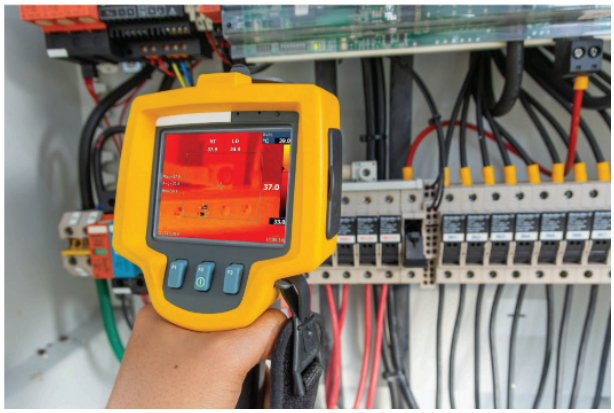

Figure 7A: Document thermal images and compare results over time.

Visual Inspections

- Look for discoloration, burn marks, or overheating at conductors and terminals.
- Check for corrosion or rust in panels, especially in damp or unheated areas.
- Inspect for water ingress or condensation inside enclosures.
- Remove dust or debris that could impede cooling.
- Confirm panel covers are intact and labels are legible.
- Only qualified personnel should open energized panels.

Service Entrance & Main Distribution Panels

- Inspect for loose or corroded connections.
- Confirm arc flash warning labels are visible and match the latest study.
- Torque-check main lugs and connections annually.

Electrical Systems

Maintenance Tip:

Perform a monthly load test on generators, checking fuel, fluids, and alarms.

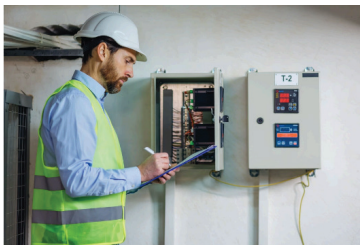

Figure 7B: Visual inspections should be performed twice yearly.

Breakers and Distribution Equipment

- Tighten all accessible connections to manufacturer torque specifications.
- Oil circuit breakers, check for oil leaks.
- Exercise breakers and disconnect switches to prevent seizing.
- Inspect insulation for damage and clean interior compartments.
- Ensure enclosure doors latch securely and labels are visible.

Dry type transformers

- Check connections, inspect insulation, windings, excessive sound, vacuum interior.

Oil Filled Transformers

- Transformer oil sampling and oil lab analyses. Check for oil leaks and rust.

Grounding and Bonding Systems

- Verify grounding continuity and check for corrosion.
- Inspect lightning protection system connections (if present).
- Confirm bonding jumpers are intact and secure.

Lighting and Emergency Systems

- Replace failed lamps and check sensor operation.
- Test emergency lights monthly using the built-in test button.
- Conduct a full-duration test annually (30–90 min per code).
- Check exit signs, replacing failed lamps or batteries.
- Test fire alarm panels and circuits annually (ULC S536).
- Schedule tests outside business hours to minimize disruption.

Backup Power Systems

- Generators:
  - Perform a monthly load test, checking fuel, fluids, and alarms.
- UPS Systems:
  - Inspect runtime capacity and test alarms quarterly.
- Confirm that backup systems are ready for winter outages and meet operational requirements.

Parking Receptacles (Block Heaters and Outdoor Outlets)

- Test receptacles with a plug-in tester before winter to confirm operation.
- Inspect covers, wiring, and GFCIs for damage or corrosion.
- Verify timers and controls function properly to optimize energy use.
- Replace damaged or worn receptacles promptly.

Specialty Systems

- Coordinate annual inspections for fire alarms, access control, and building management systems (BMS).
- Verify data wiring is intact, secured, and protected.

Electrical Systems

Maintenance Tip:

Maintain an up-to-date single-line diagram, short circuit, and arc flash study in the electrical room or safety file.

Arc Flash Study and Documentation

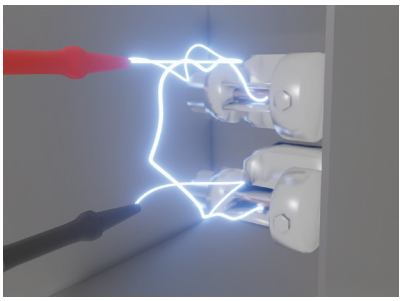

Figure 7C: Perform an arc flash risk assessment before commissioning or after major modifications.

- Perform an arc flash risk assessment before commissioning or after major modifications.
- Label all energized equipment above 50 V with CSA Z462-compliant hazard information.
- Review the arc flash study at least every 5 years, or sooner if:
  - Utility service or transformer capacity changes.
  - Equipment is reconfigured or relocated.
  - Load changes significantly alter fault current.
- Align arc flash boundaries with breaker coordination and protection settings.
- Maintain an up-to-date single-line diagram, short circuit, and arc flash study in the electrical room or safety file.
- Ensure all staff and contractors are trained in arc flash PPE and safe work zones.

Recommended Frequency:

Task	Frequency
Thermal imaging of panels and equipment	Annually (fall)
Visual inspection of panels and wiring	Semi-annually (spring/fall)
Tighten connections in distribution equipment	Annually
Clean distribution equipment	Annually
Exercise breakers and disconnects	Annually
Grounding and bonding inspection	Annually
Emergency lighting functional test	Annually
Full-duration emergency lighting test	Annually
Fire alarm testing (ULC S536)	Annually
Generator load test	Monthly
UPS inspection and test	Quarterly
Parking receptacle testing	Annually (before winter)
Verify timers and controls for parking	Annually (before winter)
Arc flash study review/update	Every 5 years or post-modification
Infrared scan of energized gear	Annually or post-modification

Electrical Systems

Maintenance Tip:

Report and investigate flickering lights, repeated breaker trips, or buzzing/humming panels promptly.

Special Considerations for Manitoba:

- Extreme cold causes metal contraction, loosening electrical connections.
- Freeze–thaw cycles can lead to condensation and corrosion in panels.
- Outdoor panels and receptacles are exposed to road salt and moisture—inspect frequently.
- Ground shifting during spring thaw can damage underground conduits or cables.
- High winter electrical demand (heating and parking circuits) requires early fall testing.
- Heating cable systems should be tested before winter.
- Harmonic distortion may increase in cold weather, especially with VFDs.
- Backup power and surge protection are essential during winter storms and outages.

Figure 7D: Check exit signs, replacing failed lamps or batteries.

Tips & Red Flags:

- Tips:
  - Maintain detailed maintenance records, including thermal scans, inspections, and repairs.
  - Inspect outdoor electrical systems (parking, signage, exterior panels) before winter and mid-season.
  - Report and investigate flickering lights, repeated breaker trips, or buzzing/humming panels promptly.
  - Address overheating, sparking, corrosion, or water ingress immediately.
  - Watch for rust, condensation, or signs of arcing—these signal unsafe operating conditions.
- Red Flags:
  - Missing or faded arc flash labels indicate non-compliance—update promptly.
  - Incomplete documentation or outdated single-line diagrams can delay emergency response and service.

Electrical Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Thermal imaging of panels and equipment	Annually (fall)				
Visual inspection of panels and wiring	Semi-annually (spring/fall)				
Tighten connections in distribution equipment	Annually				
Clean distribution equipment	Annually				
Exercise breakers and disconnects	Annually				
Grounding and bonding inspection	Annually				
Emergency lighting functional test	Annually				

Electrical Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Full-duration emergency lighting test	Annually				
Fire alarm testing (ULC S536)	Annually				
Generator load test	Monthly				
UPS inspection and test	Quarterly				
Parking receptacle testing	Annually (before winter)				
Verify timers and controls for parking	Annually (before winter)				
Arc flash study review/ update	Every 5 years or post-modification				
Infrared scan of energized gear	Annually or post-modification				

08 Elevators & Vertical Transportation

Maintenance Tip:

Manitoba winters are especially harsh, so use cold-weather-rated lubricants.

Overview

Preventative Maintenance (PM) ensures the safe, reliable, and efficient operation of elevators. For TK Elevator (Canada) Ltd., this program aligns with manufacturer standards, CSA B44-07 Code, B44-19 Code, and Manitoba-specific regulations under Inspections and Technical Services (ITS).

Regular preventive maintenance is designed to minimize downtime and costly emergency repairs, extend the overall lifespan of elevator equipment, and ensure full compliance with provincial safety standards. The program also enhances rider safety and comfort by maintaining smooth, consistent, and dependable elevator performance.

Key Maintenance Tasks:

- Visual Inspection:
  - Check hoistway, car top, pit, and machine room for wear, leaks or unusual noises.
- Lubrication:
  - Apply lubricants to moving parts (door tracks, rollers, etc.).
- Door Operation Check:
  - Test opening/closing speeds, interlocks, alignment, and reopening devices.
- Control System Test:
  - Verify relays, timers, and emergency systems.
- Safety Devices:
  - Test brakes, buffers, governors, overspeed switches.
- Cleaning:
  - Remove dust from machine room, pit, and control panels.
- Communication Systems:
  - Check two-way communication and emergency lighting.
- Ride Quality Check:
  - Check leveling, vibrations, and noise.
- Logs and Documentation:
  - Record maintenance actions and observations.

Figure 8A: Test door opening/closing speeds, interlocks, alignment, and reopening devices.

Elevators & Vertical Transportation

Figure 8B: Ride quality checks measure leveling, vibrations, and noise.

Recommended Frequency:

Task	Frequency
General visual inspection	Monthly
Lubrication and minor adjustments	Monthly
Detailed component check	Quarterly
Full system test and safety inspection	Semi-Annually
Emergency systems and fire recall	Annually
CSA B44, B44-19 Code compliance audit	Annually
Modernization review	Every 5 years

Special Considerations for Manitoba:

- Climate: Use cold-weather-rated lubricants.
- Regulatory: Follow Elevators and Lifts Act of Manitoba (ITS).
- Certification: Annual inspections by licensed mechanics.
- Remote Sites: Use remote monitoring tech where possible.

Tips & Red Flags:

- Tips:
  - Use IoT sensors for diagnostics.
  - Keep as-built drawings on-site.
  - Set up tenant reporting protocols.
- Red Flags:
  - Repeated door malfunctions.
  - Leveling issues.
  - Unusual noises or smells.
  - Overheating machine room.
  - Frequent entrapments.

Figure 8C: Preventive maintenance enhances rider safety and comfort by maintaining smooth, consistent, and dependable elevator performance.

Elevators & Vertical Transportation

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
General visual inspection	Monthly				
Lubrication & minor adjustments	Monthly				
Detailed component check	Quarterly				
Full system test & safety inspection	Semi-annually				
Emergency systems & fire recall	Annually				
CSA B44, B44-19 Code Compliance Audit	Annually				
Modernization review	Every 5 years				

09 Fire Protection Systems

Maintenance Tip:

Snow accumulation on roofs can damage sprinkler mains, impair access to fire department connections, or block standpipe outlets.

Overview

Fire protection systems safeguard life, property, and business continuity by detecting, containing, and suppressing fire events. Regular preventive maintenance ensures that systems perform correctly in an emergency, comply with codes, and reduce the risk of costly failures or liabilities.

Key Maintenance Tasks:

Sprinkler Systems

- Inspect control valves, gauges, and alarms.
- Check for leaks, corrosion, or obstructions in piping.
- Test flow and main drain annually.
- Winterize and monitor for freezing.

Fire Pumps

- Weekly churn tests (run without water flow).
- Monthly full-flow tests.
- Inspect suction/discharge piping, couplings, and lubrication.

Standpipes

- Inspect hose connections, caps, and valves.
- Conduct hydrostatic testing at prescribed intervals.

Backflow Preventers

- Inspect for leaks or damage.
- Conduct annual testing to prevent contamination of potable water.

Extinguishers

- Monthly inspection for accessibility and charge level.
- Annual servicing and hydrostatic testing at intervals.

Emergency Lighting / Exit Signs

- Monthly function test.
- Annual 30-minute discharge test.

Figure 9A: Fire extinguishers should be inspected monthly and serviced annually.

Fire Alarm System

- Weekly visual inspection of panels.
- Monthly test of manual pull stations, bells, and detectors (rotating schedule).
- Annual inspection and sensitivity testing.

Fire Protection Systems

Maintenance Tip:

Use the table on the next page to keep detailed written records of all inspections and tests (compliance requirement).

Kitchen Suppression Systems

- Semi-annual inspection by certified technician.
- Check nozzles, fusible links, and agent levels.

Recommended Frequency:

Task	Frequency
Fire pump churn tests, panel checks	Weekly
Extinguisher inspections, exit lights test, alarm function check	Monthly
Kitchen suppression inspection, fire alarm device testing	Every 6 months
Sprinkler main drain test, extinguisher servicing, backflow testing, 30-minute exit light test	Annually
Standpipe hydrostatic testing, sprinkler internal inspections	Every 5 years
Extinguisher hydrostatic testing (depending on type)	Every 12 years

Special Considerations for Manitoba:

- Freezing Temperatures: Dry-pipe and wet systems are vulnerable in unheated areas—ensure insulation and heat tracing.
- Heavy Snow Loads: Snow accumulation on roofs can damage sprinkler mains, impair access to fire department connections, or block standpipe outlets.
- Seasonal Power Outages/Storms: Backup power for alarms and pumps should be tested regularly.
- Remote/Industrial Sites: Accessibility for fire trucks and water supply testing is critical.

Tips & Red Flags:

- Tips
  - Keep detailed written records of all inspections and tests (compliance requirement).
  - Train staff on extinguisher use and recognizing alarm panel signals.
  - Partner with certified fire protection contractors for annual testing.
- Red Flags
  - Corroded sprinkler heads or painted-over heads.
  - Blocked or locked exits/fire department connections.
  - Extinguishers with missing tags, low pressure, or physical damage.
  - Frequent false alarms or unaddressed trouble signals on alarm panels.

Fire Protection Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Fire Protection companies inspect					
Fire Alarm	Daily - Check AC power Monthly - Test (one random alarm) Annually - Conduct annual inspection				
Fire Alarm Drill	Every 6 months - Conduct inspection				
Sprinkler	Weekly - Check valves open Monthly - Inspect all control valves Every 3 months - Test waterflow Every 6 months - Test supervisory control valves Annually - Conduct annual inspection Every 5 years - Test high temp heads - all gauges				
Dry Pipe Sprinkler	Weekly - Check pressure gauge Every 3 months - Test Annually - Conduct annual inspection Every 3 years - Test valve				
Pre-action Systems	Every 3 months - Test Every 6 months - Test, inspect, maintain Annually - Conduct annual inspection				

*The above information can be viewed in the '**Manitoba Fire Code Life-Safety Equipment Maintenance Requirements**' document on the City of Winnipeg website.*

Fire Protection Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Fire Protection companies inspect					
Fire Standpipe	Annually - Conduct annual inspection Every 5 years - Test flow/pressure/gauges				
Fire Dept Connections	Every 3 months - Inspect Annually - Conduct annual inspection				
Fire Hoses	Every 3 months - Inspect Annually - Conduct annual inspection				
Backflow	Annually - Conduct annual inspection				
Hydrants	Annually - Conduct annual inspection Every 5 years - Test underground flow				
Fire Pump	Daily - Check room Weekly - Check fuel & oil, operate Annually - Conduct annual inspection				
Special Hazard Systems	Every 6 months - Test, inspect, maintain Annually - Conduct annual inspection				

*The above information can be viewed in the '**Manitoba Fire Code Life-Safety Equipment Maintenance Requirements**' document on the City of Winnipeg website.*

Fire Protection Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Fire Protection companies inspect					
Extinguishers	Monthly - Inspect and sign tag Annually - Conduct annual inspection Every 5 years - Hydrotest due CO and water type Every 6 years - Replace agent Every 12 years - Hydrotest dry chem				
Emergency Lights/Exit Lights	Monthly - Inspect and test (quick test) Annually - Conduct annual inspection				
Exit Signs	Daily - Check				
Kitchen Suppression System	Every 6 months - Inspect and maintain Annually - Conduct annual inspection				
Fire Doors	Daily - Check if closed Monthly - Test doors are operable Annually - Test				

*The above information can be viewed in the '**Manitoba Fire Code Life-Safety Equipment Maintenance Requirements**' document on the City of Winnipeg website.*

Fire Protection Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Non-Fire Protection companies inspect					
Kitchen Hood Ducts & Vents	Weekly - check is closed Every 3 months - Clean Every 6 months - Clean				
Sliding Doors	Annually - Test				
Revolving Doors	Annually - Test				
Mechanical HVAC	Annually - Operate disconnect switches				
Fire Dampers/Fire Stop Flaps	Annually - Inspect				

*The above information can be viewed in the '**Manitoba Fire Code Life-Safety Equipment Maintenance Requirements**' document on the City of Winnipeg website.*

Fire Protection Systems

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Non-Fire Protection companies inspect					
Emergency Generator	Weekly - Inspect, test, maintain, table 2 Monthly - Inspect, test, maintain, table 3 Every 6 months - Inspect, test, maintain, table 4 Annually - Inspect, test, maintain, table 5 Every 5 years - Inspect, test, maintain, table 6				
Chimneys	Annually - Inspect				
Exhaust and MUA Units	Annually - Test and maintain				

*The above information can be viewed in the '**Manitoba Fire Code Life-Safety Equipment Maintenance Requirements**' document on the City of Winnipeg website.*

10 Flat Roofing

Maintenance Tip:

Watch for early indicators of roof distress—such as blistering, open seams, or surface cracking—and engage a qualified roofing contractor to address issues promptly. Once moisture is trapped within the roof system, the life expectancy of the roof is significantly reduced.

Overview

A commercial flat roofing system not only waterproofs and insulates your building—it also forms a vital part of the building envelope that protects your property from the elements. Proper maintenance of your roof system is essential to preserving this protection and ensuring long-term performance.

A proactive maintenance program safeguards your investment and extends the life of your roofing system. The goal is to address small maintenance needs before they develop into larger, more costly issues. With consistent care, a well-built flat roof can perform reliably for decades. Without it, even a minor leak can quickly escalate into a major (and expensive) problem.

Flat roofs are more vulnerable to pooling water, debris buildup, and membrane damage than sloped roofs. Routine inspections and preventative maintenance will:

- Extend the life of your roof.
- Prevent expensive interior damage due to leaks.
- Reduce costly emergency repairs.
- Keep your warranty valid (most require documented maintenance).

Figure 10A: A commercial flat roofing system waterproofs and insulates your building to protect your property from the elements.

Key Maintenance Tasks:

To preserve the performance and longevity of your roof system, the following maintenance activities should be performed at least annually:

Inspect

- Conduct a visual inspection of the roof twice per year (spring and fall) and after major weather events such as windstorms.
- Examine the membrane for damage and inspect sealants, flashings, and roof projections (e.g., mechanical curbs, vents, chimneys).
- Consider using infrared technology to detect moisture within the roof assembly.

Maintain:

- Promptly repair any identified deficiencies, including blisters, open laps, punctures, or ridges, to prevent further damage.

Clean

- Remove all organic materials and debris.
- Clear drains and scuppers to maintain proper drainage and prevent ponding water.
- In winter, remove snow accumulation that exceeds safe structural load limits—remember, one cubic foot of snow can weigh up to 30 pounds.

Protect

- Limit roof access to authorized personnel only and maintain a roof access log to track activity. This helps prevent unnecessary wear and damage.

Flat Roofing

Maintenance Tip:

Using improper tools or untrained personnel to remove rooftop snow can cause serious damage to the roof system and pose significant safety risks when working at heights.

Special Considerations for Manitoba:

Manitoba experiences extreme temperature fluctuations, ranging from +30°C in summer to –30°C in winter. These seasonal changes place significant stress on roofing materials and components. Proactive maintenance is essential to minimize damage caused by these extreme temperature cycles.

- In the summer, limit roof traffic during hot weather, as high surface temperatures can soften the membrane, making it more susceptible to scuffing or puncture damage—even from normal foot traffic.
- Improper drainage can lead to ice damming during the winter, especially during freeze–thaw cycles. Ensure drains and scuppers remain clear to allow proper water flow.
- Accumulated snow at high or low wall transitions can create uneven structural loads and potential damage. Monitor and remove snow buildup as needed to maintain safe conditions.

Tips & Red Flags:

- Tips:
  - Add traffic walkways in areas with frequent foot traffic to prevent premature wear and damage to the membrane.
  - Always hire a qualified roofing technician for rooftop snow removal. Using improper tools or untrained personnel can cause serious damage to the roof system and pose significant safety risks when working at heights.
  - Watch for early indicators of roof distress—such as blistering, open seams, or surface cracking—and engage a qualified roofing contractor to address issues promptly. Once moisture is trapped within the roof system, the life expectancy of the roof is significantly reduced.
  - During freeze–thaw cycles, drains and scuppers can become blocked, leading to water backup and potential damage to the roofing system. Regular inspection and clearing during spring melt are essential to maintain proper drainage.
  - All contractors and service personnel accessing the roof should communicate and work collaboratively to avoid unnecessary damage or interference with existing systems.

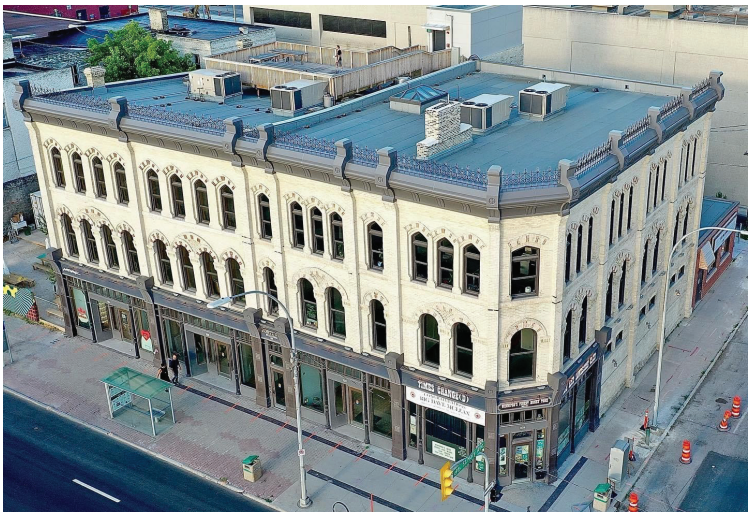

Figure 10B: Proactive maintenance is essential to minimize damage caused by Manitoba's extreme temperature cycles.

Flat Roofing

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Visual inspection of roof, examine membrane for damage and inspect sealants, flashings, and roof projections	Twice per year (spring and fall)				
Remove snow accumulation that exceeds safe structural load limits	Winter, as needed				
Inspect and clean drains and scuppers to ensure they are unblocked	Spring, during melt				
Check surface membrane during hot weather	Summer, as needed				
Clear any ice damming from drains and scuppers	Winter, especially during freeze-thaw cycles				

11 HVAC & Mechanical Systems: Air Handling Units (AHUs)

Maintenance Tip:

Building pressurization in extreme cold can impact envelope performance—ensure proper airflow balance.

Figure 11A: Preventive maintenance of AHUs helps ensure proper airflow, temperature control, humidity management, and indoor air quality.

Overview

Air Handling Units (AHUs) are a critical component of HVAC systems, responsible for circulating, conditioning, and delivering fresh air throughout a building. Preventive maintenance of AHUs helps ensure proper airflow, temperature control, humidity management, and indoor air quality. Regular inspections and servicing reduce energy consumption, prevent system failures, and extend equipment lifespan.

Key Maintenance Tasks:

General Inspection & Safety

- Verify electrical connections and inspect disconnects.
- Confirm that access doors and panels are secure and sealed.
- Check for unusual noise or vibration from fans and motors.

Filters & Airflow

- Inspect and replace filters (pleated, bag, HEPA, etc.).
- Check pressure drop across filters to assess loading.
- Clean or replace pre-filters if present.

Fans, Motors & Belts

- Inspect fan blades for dust buildup and imbalance.
- Lubricate bearings (if applicable).
- Check motor amperage and voltage.
- Inspect belts for wear, tension, and alignment.

Heating & Cooling Coils

- Inspect coils for debris, corrosion, or blockage.
- Clean coils with appropriate solution or compressed air.
- Check for fin damage or bent sections.

Dampers & Actuators

- Inspect damper operation for free movement.
- Calibrate actuators as needed.
- Test economizer dampers for functionality.

Drainage & Condensate System

- Flush condensate pans and lines to prevent blockage.
- Check for biological growth in pans (e.g., mold, algae).
- Confirm slope of drain lines for proper flow.

HVAC & Mechanical Systems: Air Handling Units (AHUs)

Maintenance Tip:

Spring and fall transitions require close attention to economizer and damper operation due to temperature swings.

Recommended Frequency:

Task	Frequency
Filter replacement	Monthly to quarterly (system dependent)
Coil inspection and cleaning	Annually (or bi-annually in high dust environments)
Fan/motor/belt check	Quarterly
Electrical and safety inspection	Bi-annually
Damper operation test	Annually
Condensate drain cleaning	Quarterly or as needed during cooling season

Special Considerations for Manitoba:

- Winter operation can lead to freezing condensate lines—ensure heat tracing or insulation is in place.
- Spring and fall transitions require close attention to economizer and damper operation due to temperature swings.
- Filter loading may be higher during spring melt and construction seasons — increase inspection frequency.
- Building pressurization in extreme cold can impact envelope performance—ensure proper airflow balance.

Tips & Red Flags:

- Tips:
  - Black staining around filters may indicate bypass airflow — ensure tight seals.
  - Loud belt squealing typically indicates misalignment or loss of tension.
- Red Flags:
  - Reduced airflow may point to coil fouling or damper failure.
  - Frequent condensate overflows are a red flag for clogged drain pans.
  - Inconsistent space temperatures may be caused by actuator failure or control issues.

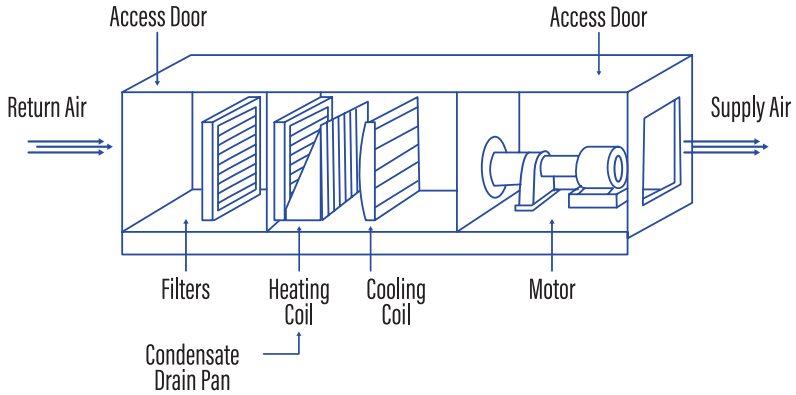

Figure 11B: Diagram of Typical AHU Components and Access Points

HVAC & Mechanical Systems: Air Handling Units (AHUs)

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Temperature, recent precipitation					
Filter Replacement	Monthly to quarterly (system dependent)				
Coil inspection and cleaning	Annually (or bi-annually in high dust environment)				
Fan/motor/belt check	Quarterly				
Electrical and safety inspection	Bi-annually				
Damper operation test	Annually				
Condensate drain cleaning	Quarterly or as needed during cooling season				

12 HVAC & Mechanical Systems: Air & Water Cooled Chiller

Maintenance Tip:

Regular logging of equipment helps identify issues or identify root causes when a failure occurs.

Overview

Chillers are a type of HVAC (Heating, Ventilation, and Air Conditioning) equipment used to cool fluids, typically water or a water-glycol mixture, which can then be used to cool air or equipment. They are commonly used in large buildings, industrial processes, and commercial facilities to provide air conditioning or process cooling.

There are two main types of chillers:
Air-Cooled Chillers: These chillers use ambient air to dissipate heat from the refrigerant. They are typically installed outdoors and are suitable for environments where water is scarce or where water-cooled systems are not feasible.

Water-Cooled Chillers: These chillers use water from a cooling tower to remove heat from the refrigerant. They are generally more efficient than air-cooled chillers and are used in larger installations where there is access to a reliable water source.

Key Maintenance Tasks:

Condenser Coils and Tubes

- Clean the condensers to remove dirt, debris, scale and other contaminants that can reduce heat transfer efficiency.

Cooling Tower Maintenance

- Inspect and Clean: Regularly inspect and clean the cooling tower to remove debris, scale, and biological growth.
- Check Fans and Motors: Inspect and maintain the fans and motors in the cooling tower to ensure proper operation.

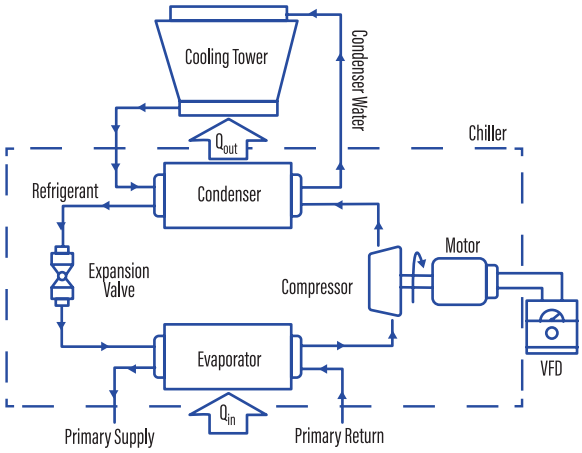

Figure 12A: Diagram of a Water Cooled Chiller

Water Quality

- Ensure that the water quality is within acceptable parameters to prevent scaling, corrosion, and biological growth.

Leak Detection

- Regularly check for refrigerant leaks and repair them promptly.

Check Refrigerant Levels

- Verify that the refrigerant levels are within the manufacturer's recommended range. Low refrigerant levels can reduce cooling efficiency and damage the compressor.

Oil Analysis

- Monitor the condition of lubricating oil and the machinery it lubricates. Involves the systematic sampling and laboratory analysis of oil to detect wear, contamination, and chemical composition.

HVAC & Mechanical Systems: Air & Water Cooled Chiller

Maintenance Tip:

Always refer to the manufacturer's maintenance guidelines for specific recommendations and procedures.

Vibration Analysis

- Key component of predictive maintenance and condition monitoring for rotating machinery and equipment. Measuring and analyzing the vibration levels of machinery to detect imbalances, misalignments, bearing failures, and other mechanical issues.

Inspect Electrical Connections

- Check all electrical connections for signs of wear, corrosion, or looseness. Tighten any loose connections.

Test Safety Controls

- Ensure that all safety controls and sensors are functioning correctly. This includes life safety equipment in mechanical room.

Calibrate Sensors and Controls

- Calibrate sensors, and control systems to ensure accurate readings and proper operation.

Energy Efficiency

- Track energy consumption and efficiency to identify any deviations from normal performance.

Eddy Current Testing Tube Bundles

- Non-destructive testing method used to detect surface and sub-surface flaws in conductive materials. It is widely used in various industries, including aerospace, automotive, power generation, and manufacturing, to inspect metal components and structures.

By performing these maintenance tasks regularly, you can help ensure that your chiller operates efficiently, reliably, and with a longer lifespan. Always refer to the manufacturer's maintenance guidelines for specific recommendations and procedures.

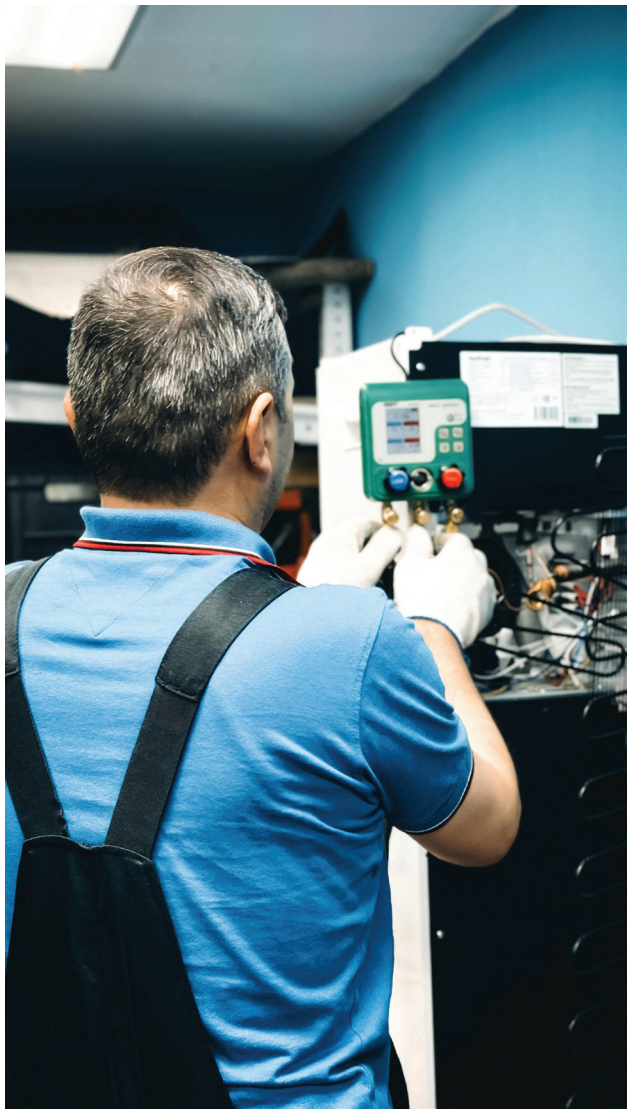

Figure 12B: Ensure that all safety controls and sensors are functioning correctly. This includes life safety equipment in mechanical room.

HVAC & Mechanical Systems: Air & Water Cooled Chiller

Maintenance Tip:

By performing maintenance tasks regularly, you can help ensure that your chiller operates efficiently, reliably, and with a longer lifespan.

Recommended Frequency:

Task	Frequency
Winterization: If the chiller is not used during the winter, follow proper shutdown procedures to protect it from freezing temperatures	Seasonally - Winter
Spring Startup: Perform a thorough inspection and maintenance before restarting the chiller in the spring	Seasonally - Spring
Regularly monitor temperature, pressure, and flow rates to ensure the chiller is operating within the specified range	Monthly
Oil and vibration analysis during running season	Annually
Leak testing	Annually
Test controls safeties and calibration	Annually
Condenser cleaning	Annually
Mechanical room gas monitoring calibration	Annually
Eddy Current testing	>=5 years
Pressure relief valves (check with local authority for more details)	>=5 years

Special Considerations:

Review B52 Code for more information on maintenance and inspection requirements for equipment and mechanical rooms.

Tips & Red Flags

- Tips:
  - Review Manufacturer service manuals for proper service requirements.
  - Regular logging of equipment helps identify issues or identify root causes when a failure occurs.
  - Connected Mechanical programs allow 24/7 monitoring of equipment, helps identify efficiency issues and preventative repairs before a failure occurs.

HVAC & Mechanical Systems: Air and Water Cooled Chiller

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Winterization of chiller, if not used during the winter	Seasonally - Winter				
Inspect chiller before re-starting in the Spring	Seasonally - Spring				
Monitor temperature, pressure, and flow rates	Monthly				
Analyze oil and vibration	Annually				
Test for leaks	Annually				
Tests controls, safeties, and calibration	Annually				
Clean the condenser	Annually				
Calibrate mechanical room gas monitor	Annually				
Test Eddy Current	>=5 years				
Pressure relief valves (check with local authority for more details)	>=5 years				

13 Landscaping

Maintenance Tip:

Rust at base plates of light poles or parking pedestals indicates accelerated corrosion and should be addressed quickly.

Overview

By diverting water away from the foundation, structural landscaping features safeguard the building and promote appropriate site drainage, parking, lighting, and barrier-free accessibility. Frequent maintenance protects external assemblies, lowers tripping hazards, promotes life safety, and delays premature deterioration.

Maintaining safe pedestrian and vehicle use, preserving drainage performance, and extending the service life of site infrastructure all depend on routine inspection and early repair of settlement, heaving, cracking, corrosion, and vegetation overgrowth.

Key Risk Assessment Tasks:

Drainage Around Building

- Maintain grading direction away from the foundation to keep water away.
- Check for ponding at foundation walls.

Pavements and Sidewalks

- Maintain clear and continuous barrier-free pathways; fix ponding depressions; repaint line markings for visibility; and keep an eye out for and fix settlement, heaving, or alligator cracking, and any potential trip hazards.

External Structures: Fencing, Bollards, and Parking Pedestals

- Check for rot or corrosion on steel and wood parts, leaning sections of fencing; keep paint and coatings in good condition; make sure IPLC plugs work; adjust leaning fence sections; and make sure gates run smoothly.

Site Lighting and Signage

- Verify that pole-mounted lighting stays plumb, that fixtures function as intended, and that there is enough illumination for a well-lit site. Verify that there are no barriers and that general signage is clear and readable.

Soft Landscaping

- Keep planting beds and lawns in good condition to stop soil erosion or displacement toward buildings; prune vegetation to keep it out of the way of lighting or signage.

Retaining Walls (Concrete/ Masonry)

- To preserve structural integrity and manage soil movement, keep an eye out for and fix any failing or cracking concrete or mortar.

Figure 13A: Keep planting beds and lawns in good condition to stop soil erosion or displacement toward buildings.

Landscaping

Maintenance Tip:

Keeping planting beds and lawns in good condition can help to stop soil erosion or displacement toward buildings.

Recommended Frequency:

Task	Frequency
General landscaping and hardscape visual review	Annually, ideally in late spring after thaw
Drainage and ponding review	Seasonal, particularly after heavy rain
Catch basin cleaning	Annually, more often is sediment accumulation is high
Line painting	Annually
Fencing and site lighting review	Annually
Monitor the retaining wall	Annually, also after and movement or cracking

Special Considerations for Manitoba:

- Significant freeze–thaw cycles cause slab heaving, settlement, and trip hazards, especially along sidewalks and parking pavements.
- Heavy snowfall and late-season melt intensify ponding at building perimeters.
- The possibility of corrosion on exposed posts, fencing, and pedestals is increased by sanding and de-icing materials.
- The best time to measure pavement or slab deflection is usually in the early spring, once frost lift has subsided.
- Deep winter frost movement can temporarily mask or exaggerate elevation changes, keeping record of this data from spring to fall is most reliable.

Figure 13B: Heavy snowfall and late-season melt intensify ponding at building perimeters.

Tips & Red Flags:

- Tips:
  - Repeat ponding in the same location throughout the seasons suggests drainage and grading correction is needed, not just maintenance, but to have a landscaping/grading review conducted.
  - If you notice that retaining walls are leaning or separating, escalate the problem to structural engineers.
  - Rust at base plates of light poles or parking pedestals indicates accelerated corrosion and should be addressed quickly.
- Red Flags:
  - Trip hazards > 6 mm (¼") are considered actionable for liability purposes in most property risk assessments.
  - Faded or unclear barrier-free signage is a compliance issue.

Landscaping

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**					
Drainage around building • **Grading directing water away from foundation** • **Ponding at foundation**	Seasonally				
Sidewalk • **Trip hazard** • **Barrier-free path clear (if applicable) and in usable condition**	Frequently, as needed				
Parking Pavement • **Line painting** • **Alligator cracking** • **Longitudinal cracking** • **Ponding**	Annually, or as needed				
Parking Pedestals and Fencing • **Wood rot/metal rust** • **Painting** • **IPLC plugs** • **Corrosion**	Annually, or as needed				
Drainage • **Catch basins clean** • **Ponding**	Annually, more often is sediment accumulation is high				

Landscaping

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Weather **Temperature, recent precipitation**					
Signage • **Barrier free signage clear and effective** • **General signage legible**	Frequently, as needed				
Pole - Site Lighting • **Poles vertical** • **Functioning as intended** • **Generally well-lit**	Frequently, as needed				
Soft Landscaping – grassed area • **Review for large depressions/sinkholes** • **Positive drainage**	Seasonally				
Soft Landscaping – Planting bed • **Review for adequate drainage**	Seasonally				
Fencing ▪ **Leaning** ▪ **Paint flaking** ▪ **Corrosion** ▪ **Gates operable**	Annually				
Retaining walls (Concrete / Masonry) • **Cracking** • **Failing concrete or mortar** • **Leaning, structural failure**	Annually, also after and movement or cracking				

14 Parking Management

Maintenance Tip:

Repeatedly malfunctioning parking equipment may indicate electrical or mechanical issues needing replacement.

Overview

Parking lots and parkades are an important part of any property as it is your customer or staff's first impression of your facility. Having individuals enter a clean and well-maintained parking facility improves the likelihood that they will continue to park there in the future and frequent your business.

Key Maintenance Tasks:

Cleaning & General Upkeep

- Daily or weekly patrols to remove litter, debris, and perform spot cleaning.
- Detailed cleaning checklists for handrails, doors, lobbies, stairwells, and parking equipment.
- Pressure washing, vacuuming of excess water, and cleaning overhead pipes as needed.
- Sweeping/scrubbing:
  - Surface lots: Spring sweep to remove gravel/debris.
  - Parkades: Monthly or quarterly scrubbing (increased frequency in winter).
- Line painting: Annually for surface lots; every 2 years for enclosed facilities depending on wear.

Life Safety & Systems

- Regular inspections of CO_2 sensors, fire extinguishers, sprinklers, elevators, and HVAC components.
- Coordination with third-party contractors for scheduled maintenance and repairs.

Parking Equipment

- Monthly inspection of gate arms, arming loops, pay stations, OH doors, and entry/exit points.

Electrical Systems

- Annual inspection and testing of plugins and conduit (especially before winter).
- Repair or replace damaged/vandalized electrical infrastructure to ensure block heater functionality.

Figure 14A: Parking lots and parkades are an important part of any property as it is your customer or staff's first impression of your facility.

Snow & Ice Management

- Plow and haul snow once accumulation exceeds 5 cm in surface lots.
- Patrol during winter for icy conditions and perform hand sanding at pedestrian areas and equipment.
- Sand surface lots after melt/refreeze cycles to restore traction.
- For parkades: clear snow from entry/exit points, ramps, and rooftop parking areas to reduce dead load and prevent spring flooding.

Parking Management

Maintenance Tip:

Rusting, spalling concrete, or visible cracking are signs of structural deterioration that require immediate professional review.

Annual Structural & Condition Review

- Inspect for trip hazards, broken infrastructure, drainage issues, and structural wear.
- Assess condition of parking membranes or surface lots.
- Document findings for budgeting and long-term planning.

Recommended Frequency:

Task	Frequency
Patrols for litter removal & spot cleaning	Daily
Cleaning handrails, doors, lobbies, stairwells, parking equipment	Daily / multiple times per week
Pressure washing, vacuuming excess water, cleaning overhead pipes	As needed / periodic
CO2 sensors, fire extinguishers, elevators, HVAC, sprinklers	Monthly to quarterly
Parking equipment: gate arms, arming loops, pay stations, OH doors	Monthly
Surface parking lots sweep, scrub, surface maintenance	Annually (Spring)
Line painting (surface lots)	Annually
Parkades / enclosed facilities scrubbing	Monthly or quarterly
Line painting (parkades)	Every 2 years or as needed
Electrical plug-ins and conduit inspection/testing	Annually (prior to winter)
Snow plowing / hauling (surface lots)	After 5 cm accumulation
Patrolling for snow, ice, and slippery conditions	Daily or as needed
Surface lot sanding after melt & refreeze	As needed
Snow removal from parkade entry/exit points & rooftop areas	As needed
Full site inspection & condition report	Annually

Parking Management

Maintenance Tip:

Frequent water pooling or slow drainage could signal clogged drains or failing membranes.

Special Considerations for Manitoba:

- Winter Weather: Heavy snowfall and frequent freeze–thaw cycles require proactive snow removal, sanding, and drainage management.
- Electrical Load: Block heater use creates high winter demand — all receptacles and circuits must be inspected before freezing temperatures set in.
- Road Salt & Sand: Corrosive buildup accelerates deterioration of concrete, steel, and electrical infrastructure.
- Spring Thaw: Risk of flooding in parkades if rooftop snow is not removed or drainage systems freeze.
- Temperature Swings: Expansion/contraction during winter/spring contributes to cracks in concrete and damage to membranes.

Figure 14B: Perform annual inspection and testing of plugins and conduit, especially before winter.

Tips & Red Flags:

- Tips:
  - Snow and slush buildup at entrances accelerates wear, creates hazards, and worsens interior cleanliness.
  - Repeatedly malfunctioning parking equipment may indicate electrical or mechanical issues needing replacement.
  - Inconsistent or missing inspection records reduces ability to track degradation and plan capital expenditures.
- Red Flags:
  - Frequent water pooling or slow drainage could signal clogged drains or failing membranes.
  - Faded or missing line painting reduces traffic flow efficiency and customer satisfaction.
  - Rusting, spalling concrete, or visible cracking are signs of structural deterioration that require immediate professional review.

Parking Management

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
General Cleaning • **Patrols for litter removal & spot cleaning** • **Cleaning handrails, doors, lobbies, stairwells, parking equipment** • **Pressure washing, vacuuming excess water, cleaning overhead pipes**	• Daily • Daily/multiple times per week/weekly (Class A checklist) • As needed/ periodic				
Life Safety & Facility Inspections • **CO2 sensors, fire extinguishers, elevators, HVAC, sprinklers** • **Parking equipment: gate arms, arming loops, pay stations, OH doors**	• Scheduled inspections (monthly to quarterly) • Monthly				
Sweeping / Scrubbing / Surface Maintenance • **Surface parking lots sweep** • **Line painting (surface lots)** • **Parkades / enclosed facilities scrubbing** • **Line painting (parkades)**	• Annually (Spring) • Annually • Monthly or quarterly • Every 2 years				
Electrical Systems • **Electrical plug-ins and conduit inspection/ testing**	• Annually (prior to winter)				

Parking Management

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Snow & Ice Management (Winter) ▪ **Snow plowing / hauling (surface lots)** ▪ **Patrolling for snow, ice, and slippery conditions** ▪ **Surface lot sanding after melt & refreeze** ▪ **Snow removal from parkade entry/exit points & rooftop areas**	▪ After 5 cm accumulation ▪ Daily or as needed ▪ As needed ▪ As needed				
Annual / Long-Term Inspections ▪ **Full site inspection & condition report**	▪ Annually				

15 Security Programs

Security Tip:

Modern cameras, sensors, and software are powerful tools, but they cannot replace human presence entirely. An over-reliance on cameras with too few or no on-site guards is risky.

Overview

A proactive, holistic security program is far more effective and cost-efficient than a reactive one. The foundation of this approach is a thorough risk assessment conducted before going out to tender or RFP for security services. By first identifying the key risks and vulnerabilities of a property, managers can ensure any security contract is tailored to real needs.

Skipping this assessment phase often leads to misaligned measures or wasted budget. An upfront assessment aligns the security program helps protect both property and people, with clear expectations providing transparency and accountability.

Example: Centrepoint Building (Epic Investments) utilized a 3rd-party security advisor to address the safety concerns as well as keeping the program to budget without impacting quality. Over the past 2 years incidents have greatly reduced with the approach and training recommended.

Key Risk Assessment Tasks:

Before drafting any RFP or security plan, ensure these key tasks are completed:

Comprehensive Site Survey:

- Inspect the property's physical layout and condition.
- Check for environmental vulnerabilities like dim areas or obstructed sightlines at entrances, and address any maintenance issues (e.g. broken lights, overgrown landscaping) that could be exploited.

Security Systems Audit:

- Inventory and test all existing security hardware and technology. Ensure alarms, access control systems, cameras, intercoms and lighting are in place where needed and function correctly.
- Establish a regular testing schedule for these tools (many failures go unnoticed until too late).

Policy and Protocol Review:

- Evaluate your current security policies, post orders, and emergency procedures. Confirm there are clear protocols for reporting incidents, responding to alarms, evacuations, and lockdowns.
- Training on these procedures so that the "human element" of security aligns with physical measures.

Figure 15A: Ensure alarms, access control systems, cameras, intercoms and lighting are in place where needed and function correctly.

Stakeholder Consultation:

- Involve key stakeholders in the assessment (tenants, on-site personnel, and even local police

Security Tip:

A good security firm will have up-to-date information on regional crime trends and can offer strategic advice.

or security consultants) These conversations can uncover concerns that a manager might overlook. Bringing in a qualified security advisor (with CPTED expertise) or a reputable security firm can greatly improve the quality of the assessment.

Document Risks and Requirements:

- Based on the assessment findings, identify what protective measures are needed. This forms the blueprint of your security program. Use these findings to craft a focused RFP if going to market – the RFP should spell out the exact needs and risk areas to address.

Recommended Frequency of Assessments:

Task	Frequency
Conduct a comprehensive security risk assessment	Annually to a minim of every 2 years
Post-Incident or Change Reviews	After major incidents (e.g. a significant theft or break-in) & after significant changes to the property
Inspect Cameras, Lights, Door Hardware	Monthly
Security Meetings with Security Provider	Quarterly
Review Incident Logs & Emerging Concerns	Quarterly

Example: Using data collection through reporting platforms such as TrackTik or HELIAUS allow clients to have historical trends and allow for measurable results and more effective use of budgetary spend.

Special Considerations for Manitoba:

Winnipeg's local climate and environment introduce unique security challenges that a program should address:

- Winters in Winnipeg are notoriously harsh. Such conditions demand winterization of your security plan. Ensure cameras and access systems are rated for cold weather and inspected for ice buildup.
    - In extreme cold, more individuals may seek shelter in building lobbies or parkades. Your team should have a protocol to handle this compassionately and safely (possibly coordinating with shelters or DCSP outreach programs during cold alerts).
    - Spring/Summer can bring its own issues (heatwaves, flooding or severe storms), so have seasonal risk plans as well.
- Properties in the downtown area may encounter loitering, vandalism, graffiti, or discarded needles on or around their premises. A security program must account for these realities: consider measures like enhanced lighting and CCTV coverage in alleys or parking areas, controlled access to lobby entrances, and frequent perimeter checks.
    - It's also wise to build relationships with community safety programs (Downtown BIZ patrols, Winnipeg Police foot patrols, DCSP) – coordination can help address issues with vulnerable persons through outreach rather than solely enforcement.
- Know the crime trends specific to your area of property. For example, a suburban office complex with an open parking lot might face a higher risk of car break-ins or auto theft and should invest in surveillance and patrols for that lot.

Security Programs

Security Tip:

Be wary of any security proposal that isn't based on a fresh assessment of your property.

Figure 15B: Buildings in areas with lower police presence or longer response times might consider additional private patrols or alarm monitoring to fill the gap.

- Meanwhile, buildings in areas with lower police presence or longer response times might consider additional private patrols or alarm monitoring to fill the gap.
  - Being aware of neighborhood issues – whether it's an increase in retail thefts, vandalism in industrial parks, or seasonal spikes in trespassing – will allow you to adjust your security resources proactively.
- Winnipeg's "tight-knit" communities mean reputation and tenant confidence are key: a well-secured property that tenants feel safe in will stand out in the market. Keep communication open with tenants about security efforts and encourage them to report concerns so you can address little problems before they grow.

Tips & Red Flags:

- Tips:
  - The best security programs use tech and people in complementary roles. Strive for a right-sized mix – for instance, cameras to extend your visibility, and well-trained guards who can respond and make judgment calls.
  - Set up channels for tenants and staff to voice concerns. Small issues like doors propped open, lights burning out in a stairwell, or a rash of minor thefts are early warning signs that should prompt adjustments – don't ignore them.
    - Regularly review incident reports for patterns.
  - Engage with local law enforcement programs and industry groups like BOMA. These networks can provide intel on emerging threats (e.g. an increase in nearby break-ins) and benchmarking on security best practices.
  - A good security firm will have up-to-date information on regional crime trends and can offer strategic advice.
  - Insist on a site-specific security plan – tailored assessments will focus resources where they're needed, rather than wasting money on irrelevant measures.
- Red Flags:
  - Be wary of any security proposal that isn't based on a fresh assessment of your property. Using a "one-size-fits-all" security plan or a decades-old RFP template is a mistake. If a plan still includes tasks or posts that no longer exist that's a clear sign the program is out of sync with reality.
  - If a contractor or decision-maker suggests skipping the risk assessment to "save time", consider it a major warning sign. Facilities that conduct proper assessments have saved thousands of dollars by eliminating unnecessary services.
    - Cutting corners at the planning stage will almost certainly cost more down the line – either through security gaps or wasted spend.

By following a holistic approach – plan first, then procure – property and facility managers can develop security programs that are both effective and efficient. The key is to start with knowledge: know your risks, environment, and needs before you spend on security contracts. In the end, thoughtful planning not only protects your assets but also contributes to a safer, more confident environment for all occupants. It's an investment in peace of mind that no responsible property manager should skip.

Security Programs

	Frequency	Winter DATE	Spring DATE	Summer DATE	Fall DATE
Regular Full Assessment	Annually - minimum every 2 years				
Post-Incident or Change Reviews	After major incidents (e.g. a significant theft or break-in) & after significant changes to the property				
Inspect Cameras, Lights, Door Hardware	Monthly				
Security Meetings with Security Provider	Quarterly				
Review Incident Logs & Emerging Concerns	Quarterly				
Fire Drill	Annually				
Lockdown Exercise	Annually				

16 Snow Management

Maintenance Tip:

Strong winds can cause snow to drift across the property, creating hazardous conditions, blocking access points, and making it difficult for both drivers and pedestrians to navigate safely.

Overview

Effective snow and ice management is essential to ensure business continuity, public safety, and liability protection throughout Manitoba's long and harsh winter season. Slippery surfaces, blocked access, and excessive snow loads can create serious safety risks and operational disruptions.

A proactive, well-documented snow and ice control plan helps to reduce liabilities and prevent accidents, property damage, and unplanned closures.

Key Risk Assessment Tasks:

Snow Removal

- Clear parking lots, sidewalks, entrances, loading docks, and fire routes promptly after each snowfall.
- Prioritize high-use areas: customer drop-offs, ramps, fire lanes and accessibility stalls.
- Establish designated snow pile sites—away from fences, trees, structures, utility boxes, and landscaping to avoid damage during melting, plowing or piling.
- Avoid snow accumulation near HVAC units, doors, or fire hydrants.
- Consider hauling snow off-site if storage space is limited.

Ice Control

- Apply granite/sand/de-icer after clearing and during freeze-thaw cycles.
- Focus on shaded areas, sloped zones, steps, and high traffic areas.
- Maintain granite/sand/de-icer bins at all primary entrances and exits.

Inspection & Documentation

- Perform visual inspections after each major snow or ice event. Note any damage that may have been caused by snow clearing equipment and discuss with contractor.
- Keep records of clearing, treatment, and contractor activity (date, time, location, materials/equipment used).
- Use updated site maps showing priority zones, snow storage areas, and granite/sand/de-icer barrel locations.

Figure 16A: Clear parking lots, sidewalks, entrances, loading docks, and fire routes promptly after each snowfall.

Snow Management

Figure 16B: Proper snow and ice management isn't just a seasonal task—it's a core part of operational risk management.

Recommended Frequency:

Task	Frequency
Clear snow from lots, sidewalks	After each snowfall (3-5 cm)
Apply granite/sand/de-icer	Post-clearing and during melt/freeze cycles
Refill granite, sand/salt bins	Weekly or as needed
Conduct site safety walk	Weekly, or post-storm
Review snow removal contractor logs	Monthly

Special Considerations for Manitoba:

- Heavy Snowfalls: Manitoba often sees over 100 cm of snow—plan for fast accumulation and snow hauling.
- Snow Drifting: Strong winds can cause snow to drift across the property, creating hazardous conditions, blocking access points, and making it difficult for both drivers and pedestrians to navigate safely.
- Extended Winter Season: October to April requires long-term readiness.
- Snow Storage Hazards: Snow piles near buildings, trees, fences, or landscaped areas can cause damage, flooding, and spring thaw erosion—use protective barriers or relocate piles.

Tips & Red Flags

- Tips:
  - Pre-treat surfaces with liquid de-icers or brine before snow events to prevent bonding.
  - Use calcium chloride or magnesium chloride for low-temp performance.
  - Review pile location plans with contractors before snow season.
  - Record pile locations to monitor spring runoff risk and landscape impact.
- Red Flags:
  - Snow piled against fencing, buildings, or landscaping.
  - Ice sheets forming at entrances.
  - Pooling water during melts (sign of blocked drains or low spots).
  - Unmarked or unmaintained snow piles that reduce visibility or access.

It's helpful to keep a property diagram readily available—both for contractors and internal records—that includes:

- Snow pile locations marked (avoid near trees, fences, buildings).
- Granite/sand/de-icer bin locations, high-risk ice zones.
- Plow/sanding routes and fire lanes.

Proper snow and ice management isn't just a seasonal task—it's a core part of operational risk management. Protect your property, people, and reputation by planning ahead, responding quickly, and keeping a detailed log of your winter maintenance actions.

Snow Management

Snow Management Log Book

Building/Address:_____

Contractor:_____Manager:_____Year:_____

Date	Conditions: (Snow, ice, drifting, etc.)	Work Performed: (Snow removal, hauling etc.)	Area(s) Serviced:	Notes / Incidents

Special Note: Legionella

Maintenance Tip:

Many water systems within a building are susceptible to Legionella bacteria especially those that may aerate water.

Legionella bacteria, when inhaled, can cause a severe form of pneumonia called Legionnaires disease that boasts a 9% mortality rate. This bacterium can exist within susceptible water systems within buildings making LBCMPs (Legionella Bacteria Control Management Programs), a crucial piece in reducing biological hazards and risks.

Many water systems within a building are susceptible to Legionella bacteria especially those that may aerate water, such as:

- Cooling towers.
- Domestic water systems.
- Decorative fountains and waterfalls.
- Humidifiers and misters.

There are also many factors that can increase the risks of susceptible water systems such as:

- Water temperatures in the ideal range for growth of 30°C to 42°C.
- Systems that allow for water to be stagnant for prolonged periods of time.
- The presence of nutrients for the bacteria including biofilms, amoebae and sludge.

The best way to mitigate risk and ensure safety to those within and surrounding your building is to establish a LBCMP in accordance with the Canada standard MD 15161. A LBCMP provides a program to monitor and assess the risk of Legionella as well as the documentation and tools to protect against it.