

Water damage control planning: A practical guide



Introduction

From burst pipes to ever-increasing heavy rain events, water damage to a building can result in costly cleanup, repairs, and interruption to operations. Furthermore, with increasing insurance premiums and deductibles, the total cost of water damage claims to property owners is increasing. Proper identification of building systems, testing and maintenance routines, and pre-planning are essential to reducing the likelihood of and mitigating the effects of water damage.

The following guidelines, maintenance suggestions, and checklists will help commercial and residential property managers develop programs to protect buildings against the risk of water damage. Reducing water damage incidents involves everyone that operates and occupies a building; however, the responsibility ultimately falls to the property management team.

Even the most carefully operated building will likely experience a water damage event sometime in its lifetime. Building staff should have a well-practiced emergency response plan that can help bring about a more rapid recovery. Often, the speed of response to a water-damage event is vital to limiting costs and returning quickly to normal day-to-day operations.

GUIDELINES FOR PROPERTY MANAGERS

Property managers and superintendents are in the best position to reduce the frequency and severity of water damage incidents through their day-to-day roles in managing the buildings.

The guidelines below focus primarily on practical maintenance and inspection activities proven to reduce this exposure, and are categorized in four broad areas:

1. Building envelope
2. Landscape and site issues
3. Plumbing and HVAC
4. Flood emergency preparedness





THE BUILDING ENVELOPE

The components of a building's envelope are as varied as its occupants and uses. All envelopes respond differently to the forces of wind, rain, snow, and ice. To minimize a building's risk of water damage, it's important to develop, maintain, and follow a systematic maintenance inspection routine that includes the envelope's main elements. Following are a few areas that require special attention.

At-grade and below-grade issues

Where the wall meets the ground is a notoriously high-risk area for water intrusion. Building components such as hose bibs, roof drains, and landscape irrigation systems can put a lot of water in the wrong place at the wrong time. Even a small leak can turn into a major headache, like a flooded basement or parking garage.

Basement walls and floors play crucial roles in protecting the building from water intrusion, and can provide important warnings of water problems above. Check for signs of efflorescence evidenced by flaking of mortar or concrete. A landscape irrigation line leak may first manifest as mould on the basement walls.

Heavy rain events can overwhelm municipal sewer systems, resulting in sewer back-ups. Consideration should be given to installing backflow valves (check-valves) on main sewer lines — make sure you check local by-laws.

Perform the following monthly:

- Check all at-grade plumbing systems.
- Check all at-grade drainage systems.
- Test basement flood control and sump systems.
- Replace any leaking fittings or drains immediately, even if the leak is small.
- Ensure that irrigation system spray patterns direct water away from foundation walls.
- Ensure that downspouts direct water away from the foundation.
- Check basement floor drains and drainage system.
- Check all basement walls for signs of water staining or damage. If found, track the source and repair immediately.

Roofs

Every roof is an at-risk location for unwanted water. Many commercial building roofs are laden with HVAC equipment, vent pipes, skylights, and other building system elements, which are all “holes” in the worst possible place — directly overhead. Many roofs are walked on, have tool boxes and test equipment placed on them, catch leaves and branches behind parapets, have sand and abrasives blown over them constantly, and/or carry billboards or occupant signage. Consider that even one clogged drain can result in thousands of dollars in damage from a rainstorm, and one windblown plastic bag can create an immediate clog. These rooftop elements conspire to make this an especially vulnerable zone for water intrusion.

You should regularly:

- Inspect rooftop penetrations, from inside and out.
- Ensure seals are intact around HVAC systems.
- Check that all HVAC condensation collection pans, drains, and pumps are operating effectively.
- Inspect the condition of flashings around skylights, stack vents, and other rooftop elements.
- Look for signs of water stain marks, including long-term ponding.
- Check the condition of exterior roofing elements, including membrane, gravel, and shingles.
- Make sure vegetative growth is absent.
- Clear roof drains of clogs, debris, and vegetation.



Wall systems

It's easy to forget how many openings commercial building walls require —plumbing and irrigation connections, lighting, HVAC system elements, exhaust vents, air intakes, joints around windows and doors, and fire alarms, and more. There are also unplanned holes — including aged brick joints that need re-pointing, sealants that vanished long ago, damage from acid rain, and settling cracks. Regular inspections (for example, quarterly) will help identify potential problems early and likely minimize costs for needed repairs. When conducting inspections, consider that window systems should be treated like every other element of the building envelope.

Include the following:

- Check all wall penetrations for proper flashing and sealant integrity.
- Check all major wall joints at windows, doors, electrical, and plumbing penetrations.
- Inspect window joints and flashings on the exterior for continuous seal integrity. If the windows are part of a drainable wall system, check to ensure that flashing openings and weep holes are not clogged.
- Inspect windows from the inside for glass and air seal integrity.
- Manually test all locks, cranks, and other mechanical elements.
- Check interior walls around windows for water damage.
- Listen to tenants. Occupant complaints are often indicators of impending building envelope problems — the human nose is very sensitive.
- Consider conducting an occupant survey to help identify potential water problem sources.

LANDSCAPE AND SITE ISSUES

Landscape

The basic rule of thumb for protecting commercial buildings against water damage is straightforward: Any water that hits or surrounds a building must have a well-planned and well-maintained escape route away from the building. When it comes to successful grounds maintenance and landscaping, gravity can work for you or against you. So can soil types.

What further complicates the challenges of grounds maintenance is that landscaping and outdoor elements are in a constant state of growth and change. Also, they are subject to nature's unpredictability, which can damage or destroy your water management systems in a matter of seconds.

A poorly designed or overly mature landscape can contribute significantly to a building's risk for water damage. Overgrown, misplaced, or high-maintenance plantings can inflate the cost of building overhead by requiring considerably more water than that of an environmentally friendly landscape plan.

Good grounds maintenance involves paying close attention to the interconnected drainage system of the entire property, not just the portions of it that are outdoors. In fact, the building and grounds should be viewed as a single, unified water management system, designed to direct all water away from the building as quickly as possible.

Since the drainage for the building and grounds was designed as a system, it follows that all building and grounds staff — including support crew such as lawn care and landscape subcontractors — should work as a team. Let them know whom to alert if they see developing or potential water problems.

Among the prevention tips to consider:

- Buildings settle, especially in the presence of excess moisture. Chronic foundation problems may warn of chronic soil and landscape problems. The connection should not be overlooked.
- Be alert to recurring runoff in specific areas. It can alter grading and lead to drainage problems.
- Identify any weaknesses of the building site. Develop both emergency and long-term plans that address site vulnerabilities.
- When planning a new building, consider how the foundation height, parking lot location, and plantings will affect water management.



Parking lots

Parking lots deliver, by design, great volumes of runoff water into a building's drainage system. Seasonal leaf litter, storm debris, or ice build-up during freeze-and-thaw cycles can quickly block drains and cause extensive damage. Windblown plastic grocery bags are a common culprit for sudden drain obstruction. It is essential to pay close attention to this part of the grounds.

Consider the following:

- Routinely inspect all drains that handle parking lot runoff.
- Keep an eye out for standing water.
- Watch for indications of damaged or broken curbs that are part of the water control system.
- After storms, inspect the parking lot for signs of drain blockage.
- Ensure that snow removal crews do not obstruct storm drains with piles of parking lot snow. Avoid plowing snow up against or close to foundation walls.

Irrigation systems

Sprinkler heads are easily damaged by mowers or landscape crews. Utility trucks or other heavy equipment can break supply lines below ground, where the damage cannot be seen. Most irrigation systems run after dark, when uncontrolled water release is likely to go unnoticed, and its source may not be readily traced during daylight hours.

Consider the following:

- Maintain an up-to-date irrigation system map and routinely inspect for damage.
- Regularly turn on the system during daylight hours for routine inspection.
- Adjust the watering schedule to respond to weather conditions or seasonal patterns.



PLUMBING AND HVAC SYSTEMS

Proper operation and maintenance of the plumbing and HVAC system is essential to reducing the risk of water damage. In larger buildings, the systems are often interconnected and move large amounts of water throughout the building.

Regular inspection of all key components can help avoid costly water damage.

Plumbing systems

According to the Institute for Business & Home Safety (IBHS), plumbing supply system failures are the leading source of residential water losses. Furthermore, frozen pipe related failures resulted in losses that were roughly twice as severe. Being aware of the potential problem and reviewing a few key items on a periodic basis will greatly reduce your risk.

You should:

- Check key connections, especially at water main supply lines, key circulating pumps, rooftop water elements, janitors' closets, and areas such as sprinkler systems.
- Repair even the smallest leak immediately.
- Check all water supply pipes and primary system joints.
- Check all public bathroom, washing machines, kitchen supply lines, and drain systems. Consider the use of metal, braided supply lines as opposed to rubber.
- Replace leaking fittings or drains promptly.
- Check rooftop plumbing lines.
- Test basement flood control and sump systems monthly.
- Check floor drains in kitchens, laundry rooms, and bathrooms.

In addition:

- Ensure isolation valves are clearly labelled and superintendents know their locations. Test these valves annually to ensure it is operating and has not become seized in the "open" position. (See Pre-Planning).
- Monitor water bills for signs of excessive usage.
- Pay attention to pipes that "bang" (water hammer) when faucets are turned off.
- Stay alert to rust stains inside the building.
- Be aware of any signs of moisture in the walls or in floor systems.
- During cold weather, remove garden hoses from the exterior hose bibs, drain the water line, and install a frost-free sillcock.
- Use reinforced steel braided water supply lines on washing machines.

HVAC systems

Cooling towers in large buildings move enormous amounts of water. Appropriate drainage and basic plumbing systems are critical to performance and risk reduction. Fan belts, motors, and other basic system components should be appropriately inspected, lubricated, and maintained. Make a monthly check of all rooftop systems, especially water distribution systems, and rooftop drainage elements.

Conduct regular audits of critical components of the system. How old is the water pump? Is the compressor on its last legs? Are all drains in good shape? Make a checklist that includes the known or estimated installation dates of each key HVAC component. Make an equipment inspection schedule, and a list of prioritized HVAC components to be replaced over time.

The following are a few key elements that should be considered as part of the maintenance program:

- Inspect air filters monthly, or as recommended in the operations and maintenance manual. If the filter is reusable, be sure it is completely clean and dry before reinstalling.
- Inspect condensate drains and drain pans monthly during the cooling season. If dirt, algae, or other contaminants are found, the drain line should be flushed and the drain pan carefully cleaned. If the condensate drain is located on the roof, check that the drain is not clogged. Rooftop drains should never drain directly onto the roof or over the side of the building.
- Air coils should be inspected annually, at minimum, to confirm that equipment is operating at maximum capacity. Coils should be cleaned of dust and debris, by careful brushing or vacuuming, to avoid damaging the coil fins.
- Keep outdoor condensing units clean from grass clippings and other debris.
- Fresh air supply ducts must be kept free of debris and, if necessary, filtered at the inlet. Any rust, condensation, or other signs of moisture on ductwork can be a sign of a serious water management problem.

Water heaters

A large number of water heater claims are due to a tank rupture or leakage. The rate of failure dramatically increases for water heaters between 5- and 12-years old. Some statistics indicate that nearly three quarters of water heaters have failed by age 12.

Consider the following:

- Water heater manufacturers install a “sacrificial” anode rod to deter corrosion of the steel tank, usually made of aluminum, magnesium, or zinc. Its purpose is to attract corrosion. Once this rod has corroded, it can no longer protect the steel tank. Have a plumbing professional inspect the anode rod annually once the warranty has expired. Replacing the worn anode rod will allow the new rod to continue to draw corrosion away from the tank and will add years to the life expectancy of the water heater.
- Preventive water heater maintenance should also include removing sediment by flushing the tank every six months. Sediment will build up faster in areas with hard water.
- The shut-off valve and piping should be thoroughly examined by a plumbing professional annually. Look for signs of failing plumbing, such as loose or wet joints and rust.
- Valves should be operated to ensure they open and close properly. Inoperable valves should be replaced immediately.

Water detection technology

Consider installing water detection technology that includes strategically located water sensors and remote monitoring so that water leak events are detected promptly, ultimately reducing the time required to shut off the valve. In some cases, the technology may even automatically shut off the water valves if a leak is detected.

Water leak pre-planning

A formal water damage emergency response plan should be developed and include the following elements:

1. List of persons and contact details with authority to shut off water supplies.
2. All water shutoff valves (including domestic, fire protection, and heating/cooling systems) should be clearly labelled to minimize the time required to shut off the affected area in the event of a leak.
3. A list of all valves and a single line schematic (map) should be kept in a central location, with brief instructions on how to respond to a water leak.
4. All shut off valves should be exercised annually to ensure they operate.
5. A spill response cart should be kept in a central location and should include a laminated single line diagram (map) and list of valves, absorbent materials, flashlights, tarp, and other items.
6. Periodic water leak scenario drills should be held for staff involved in responding to water leak incidents, keeping them aware of their responsibilities.

Water damage control plans should be developed by persons knowledgeable of the specific building's systems that are at risk of leaking.

For more information see Marsh's Water Leak Emergency Response Planning bulletin.

Flood emergency response plan

If the facility is prone to flooding, a basic flood emergency response plan should be established. A flood emergency response plan should include:

- A reliable flood warning method, including monitoring of weather forecasts.
- A person-in-charge who will initiate the intervention.
- A clear list of responsibilities, including a verification of drainage ditches and provision of sandbags and cleanup materials as needed.
- Proper de-energization and shutdown procedures for exposed electrical equipment.
- Actions to reduce the damages through the use of available resources and staff.
- A recovery and cleanup plan.

For more information See Marsh's Flood Emergency Response Planning Guide.





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