

MAINTENANCE MATTERS



Replacing Podium Waterproofing

Annual maintenance and inspections of podiums and perimeter drainage are important obligations for owners of multi-unit residential buildings. Learn how to find the signs of water leakage and best practices for planning podium water replacement.

This bulletin informs stratas, co-operative boards, and other types of building owners when to consider replacing podium waterproofing and what to plan for during the replacement process.

Many multi-unit residential buildings have some form of below-grade parking or storage areas. When these areas extend out beyond the building footprint, the area above them is referred to as a “podium” or “plaza.” These podiums are usually covered with landscaping, walkways, ponds or other features.



Failures of podium waterproofing regularly cause leaks and water damage. Similar to roofs, podiums must be waterproofed to prevent water exposure damage to the structure, interior finishes or property below.



Above the podium



Below the podium

Maintenance Matters

This series of bulletins and companion videos is designed to provide practical information on maintaining residential buildings. Produced by BC Housing, in collaboration with Polygon and the Condominium Home Owners' Association (CHOA), this bulletin was prepared by a consortium of building envelope experts.

How is water managed on podiums?

Podiums are exposed to water from rain, irrigation and other sources. Water management is mainly through two, simultaneous methods; drainage and waterproofing.

Drainage directs bulk water to drains throughout the podium area or to the perimeter boundary, away from the structure. Sloping the podium structure or other area components creates unobstructed paths for water to flow out.

Waterproofing resists water that remains on the podium structure while most of the water drains. This is typically accomplished by applying a membrane to the podium structure.

What are the components of a podium?

In general, the podium components (or “podium assembly”) consist of the following:

- **Structure:** typically concrete, sheathed metal decking
- **Membrane:** sheet applied, mop-on hot rubber
- **Insulation:** over conditioned space (where required)
- **Root barrier:** vegetation landscaping (where required)
- **Drainage layer:** loose gravel, drainage mat
- **Overburden:** landscaping, growing medium, pavers, decking

Depending on the construction approach, the number and arrangement of layers can be varied.

What maintenance needs to be performed?

Annual maintenance and inspections of the podium and perimeter drainage are important obligations for building owners. Regular inspections help prevent water leakage through a podium, which can lead to electrical or mechanical damage or even structural deterioration.

Any podium drainage or waterproofing issues should be monitored. This includes ponding water or significant efflorescence (the white powdery salt residue) from migrating water in the concrete, on the slab. A landscaping

service, building staff or owners themselves can undertake an inspection of the overburden and underside of the slab.

Keep drains clear and ensure that exposed membranes are protected by replacing worn flashings or topping up the dirt in planters that covers them.

What do you do when water leaks start?

Contact your warranty provider to find out what repairs are covered. Typically, the first step is to conduct targeted repairs from the underside of the podium. This avoids the expense of removing the overburden.

Targeted repairs can be completed by a contractor that specializes in concrete repair or roofing. Refer to Maintenance Matters No. 10: At-Grade and Below Grade Assemblies for a detailed overview of this topic. Often these types of repairs are only a temporary solution. The best approach to fix a water leak is to trace the leak and repair the waterproofing from above.

Spalling concrete — why it’s a big deal

If there are continuing leaks through the podium concrete, the reinforcing steel in the concrete can corrode and expand. This causes the concrete to flake off the structure, known as “spalling.” This damage exposes the reinforcing steel to greater corrosion and further spalling. Spalling concrete can cause serious damage to property, piping and fire safety equipment, all of which put people at risk. Any spalling concrete should be investigated. Take immediate action if rebar is exposed to determine the cause of the leak (such as a water-proofing failure). Make the appropriate repair promptly.



Spalling concrete

When is it time to renew the podium waterproofing?

Typically, a building's waterproofing renewal timeline is based on the standard service life for the type of membrane used in the podium membrane application. The recommended schedule of podium repair is included in the strata corporation's capital depreciation report, also referred to as a *Reserve Fund Study*, which is produced by an engineering consultant.

This official timeline of building repair is required by the province of British Columbia for multi-unit residential buildings owned by strata corporations. It provides a 30-year timeline for building repairs, and acts as a helpful financial planning tool for building owners. This is especially important for planning large-scale maintenance and repairs such as replacing podium waterproofing.

Depreciation report timelines may need to be updated as water leak incidences increase. If the report flags potential issues, the podium may need a more detailed investigation. Note that estimates only cover the cost of replacing the waterproofing membrane, not investigations and subsequent reports.

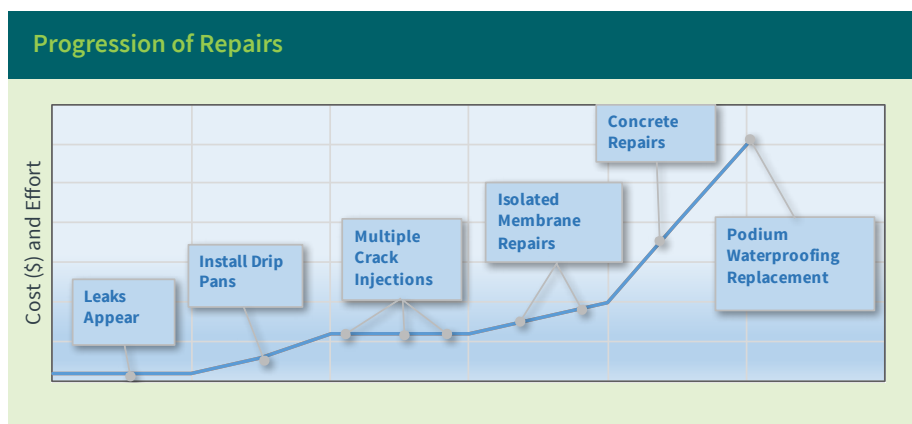
Once targeted repairs occur at an accelerated pace, costs associated with stopping leaks and repairing concrete can become more expensive than a podium waterproofing replacement. The figure below shows a typical progression for repairs versus cost.

Podium leaks are not the only reason for renewing the waterproofing. Sometimes upgrades to existing buried equipment, landscaping renewals or major at-grade alterations provide an opportunity to carry out the work. If the membrane is approaching the end of its service life, proactive owners may wish to perform waterproofing renewal at the same time to save additional costs.

How to determine the scope of work for podium waterproofing replacements

Engineering consultants conduct podium waterproofing assessments evaluating membrane and overall podium condition, including associated building damage caused from leaks. Assessments may involve removal of small portions of the landscaping, removal of interior finishes for test openings in ceilings, and gaining access to the podium membrane at multiple locations. Initial investigations often provide the information necessary to lay the groundwork for replacement of podium waterproofing.

As a general rule, a professional, such as an engineer or architect experienced with podium waterproofing, should be responsible for the design. These professionals can help owners undertake large-scale projects. Furthermore, a professional can review the work during construction to ensure it follows design intent, building code and industry best practices.



This process is critical to help avoid potential issues from inadequate design work or construction. There can be much more to a podium waterproofing renewal than just waterproofing. Additional consultants, such as a landscape architect, arborist, mechanical engineer or structural engineer may be needed to help determine overall scope.

What are the major considerations for building owners?

After determining the scope of work, the prime consultant should provide the building owners with an initial design brief. This brief includes a drawing of the general layout of the work and several critical anticipated aspects that the building owners must decide upon before carrying out further design work. Although professional consultants can provide guidance, it is the owner who makes the decision to proceed. Their decision is subject to code compliance and other recommendations.

The following sections highlight six key considerations:

1) How to remove materials

The first decision is to determine what amount of overburden — landscaping over the waterproofing — will be removed or relocated. This includes landscaping features, such as gazebos, playgrounds or other items.

If the amount of overburden is small or easily handled, such as pavers on pedestals, removal is straightforward. However, large, deep areas of dirt fill, vegetation or concrete toppings may require specialized equipment for efficient removal. It can be difficult to remove water features if these are cast in place with concrete with a sandwiched membrane. The concrete must be broken up and removed to access the membrane.

It's important to ensure good access for specialized equipment, and for large-scale movement of materials in and out of the replacement areas. Removal equipment can range in size from shovels and jackhammers to backhoes. For elevated podium

areas, this may include cranes. For podium spaces accessible directly off the street, this may not be an issue. Specialized equipment may be necessary in select areas, such as inner courtyards, where removing podium materials requires more time and effort.

2) Which replacement waterproofing design is best?

Next, building owners must consider the replacement waterproofing design. Key issues include:

- Membrane type and service life
- Interface detailing of the waterproofing
- Accounting for the podium features, such as planters, walls, upstands, or piping

The best approach is one that is tailored to each project. The engineering consultant can provide guidance where required. Where the waterproofing is above grade, the owner must make other aesthetic decisions on how to protect an exposed membrane, such as flashings, cladding, or concrete upstands.

3) Is this a good time for other site upgrades?

With landscaping removed, owners may want to upgrade or install other items for the building that could be too costly or impractical to upgrade later on. As well as upgrading electrical systems, this may include installing:



Walkway removal

- Emergency generators
- Gas lines
- Plumbing and irrigation lines
- Insulation
- Additional drainage

Some of these items may require specialized consultants or coordination with the local municipality or utility companies. For instance, new features that weigh more than the original overburden may require design work from a structural engineer or further reinforcement to support additional loads.

4) Are code upgrades necessary?

Some building features, such as stairs, piping or electrical systems, may no longer conform to current codes. Replacing any non-conforming features must be upgraded to current codes and standards. These upgrades can add significantly to the scope and costs of a project, and should be addressed in the pre-planning and design stages.

5) How to choose replacement landscaping and overburden:

The amount of material and level of complexity of the new landscaping design can have a big impact on cost. The new landscaping or overburden can affect:

- The amount of detailing for the waterproofing
- Site storage

- Required access
- Specialized installation or equipment

The most important consideration for building owners to decide on is what to put back on top of the podium. There are a number of options for replacement landscaping and overburden:

- **Return of previous overburden:** For many building owners, this may be the easiest option. Depending on the original material, putting it back may not be cheaper or even feasible if it requires large amounts of material storage during construction or negatively impacts the sequencing of the work.
- **Accessibility of membrane:** Considering the effort and cost it takes to remove the overburden, building owners may want to consider new soft or hard landscape assemblies that allow for easier access for future maintenance of the waterproofing assembly. This may include: a raised wooden deck, using void fill, or pavers on pedestals instead of dirt or backfill.
- **Improved podium functionality:** As with below-grade podium upgrades, this is also an opportunity to upgrade the use of the podium space itself. These upgrades can encourage greater community involvement, such as common barbecue areas, shared gardens, or play areas to provide safe locations for individuals, families and pets. Note that any modification of the original design may be subject to municipal planning approval.



Wood decking with accessible membrane



Stone pavers



Vegetation

- **Additional upgrades:** Besides space usage, other podium landscaping upgrades can help increase safety and decrease operational costs. These can include renewing podium lighting and increasing accessibility via new ramps and guardrails.
- **Aesthetics:** Renewing the appearance of landscaping can significantly improve property values. Before proceeding too far with any design work, strata owners should review the proposed scope of work. If any significant changes in use or appearance are planned, a three-quarter majority vote resolution must be approved at a strata general meeting. In many cases, engineering consultants will not proceed with design work drawings without a strata-approved landscaping plan.

6) What plants should you choose?

Avoid plants and trees, such as bamboo or hardwoods with invasive or penetrating root systems. Proper membrane root-barrier protection should be included in the waterproofing design. Trees that grow at a high rate or are too large for the space will require more maintenance and can pose a risk to property or resident safety under severe wind conditions. They may also add significant costs to building maintenance and landscape servicing.

For reduced costs and environmental impact, building owners should consider low maintenance plants. This includes drought-resistant or native plants that thrive with minimal care therefore reducing irrigation and pest control requirements. Plant selection may be subject to municipal approval because some municipalities, such as the City of Vancouver, have regulations governing the removal of trees.

What are the likely costs?

The costs for a podium waterproofing renewal can vary greatly. All the items outlined in this bulletin can impact final costs. Costs of assemblies range from \$50,000 for a small building with minimal podium footprint, to millions of dollars for extensively landscaped podiums and terraces. Cost depends on the size of the renewal, access for removal and installation, and the complexity of the replacement.

Pre-planning helps, however unexpected issues can arise after excavation has started, including:

- Unmarked irrigation, electrical or gas lines that must be moved or protected
- Poor condition of podium concrete slab that requires repairs before waterproofing can be installed
- Electrical systems in poor condition
- Unexpected podium layout where waterproofing areas differ from the available drawings

As a general rule, at least 10 percent of the total project costs should be set aside to cover any unexpected issues. A larger contingency fund may be needed depending on project size, or if the building has a history of major water leakage issues.

What are the costs and timelines for permits?

After the design work is complete, the project can go to tender to select contractors and sub-contractors. If a building permit is required, it's best to discuss the proposed design with the authority that has jurisdiction before proceeding to tender. This will ensure no major design changes are needed.

It can take at least 90 days to obtain a building permit. The costs of a building permit can vary and are often a percentage of the contract value. This can be anywhere from \$2,000 to \$10,000. Note that in many cases, consultants do not include the costs of the building permit process in their fee proposals. Instead, they proceed on a time-and-expense basis for liaising with the authority that has jurisdiction.

Action Plan Tips

- ❑ Conduct regular maintenance on membrane and landscaping drains around the site.
- ❑ Monitor the podium for flooding, and the underside of the podium slab for active leaks and excessive efflorescence.
- ❑ Once active leaks appear, contact the warranty provider prior to undertaking repairs.
- ❑ Conduct a reserve fund study or capital depreciation report for the building. Update as needed.
- ❑ Seek early legal advice if there are anticipated issues regarding coverage and responsibility for repairs.
- ❑ Conduct targeted repairs as needed.
- ❑ Conduct an envelope investigation through a professional engineer if target repairs become too costly, the repairs are ineffective, or there is spalling concrete.
- ❑ Engage a professional consultant to coordinate the renewal once the need for podium waterproofing replacement is confirmed.
- ❑ Review credentials and past project work of potential professional consultants before selecting one for your project. Ideally, choose one with extensive history with podium renewals.
- ❑ Consider supplementary construction management for large-scale projects.
- ❑ Gather all previous construction documentation, such as built drawings or previous site upgrades. Work with prime consultants and sub-consultants to determine the scope and design of new water-proofing, landscaping and site upgrades.
- ❑ Develop a landscaping plan and decide on replacement podium assemblies.
- ❑ Gain owner (strata) approval for significant landscaping or site use changes.
- ❑ Consider additional warranty coverage for new podium waterproofing.
- ❑ Develop waterproofing details in conjunction with the landscaping plan.
- ❑ Modify design as needed to accommodate site upgrades.
- ❑ Determine preliminary costs for the project with assistance from a consultant. Include a provisional fund of at least 10 percent.
- ❑ Determine how to fund the project.
- ❑ Apply for a building permit.
- ❑ Issue design for tender for contractors and sub-contractors to perform the work, with help and guidance from the prime consultant or construction manager. Contractors should have previous podium repair experience.
- ❑ Provide input for site logistics, including safety measures and material storage.
- ❑ Share construction updates or important information to other building owners once excavation begins, and on an as-needed basis.
- ❑ Expect delays in excavation and renewals based on project timing. Rainy fall and winter months can delay work, and summer months limit contractor availability.
- ❑ Prepare to make additional decisions based on unforeseen issues during excavation. Discovery of unmarked utility lines, poor condition of concrete or other items require new direction for contractors from owners.

More Information

- Maintenance Matters No. 10: At-Grade and Below-Grade Assemblies, available at www.bchousing.org
- Refer to your building's maintenance manual
- Subscribe to receive Maintenance Matters bulletins at www.bchousing.org

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provisions requiring owners to mitigate and restrict damage to their homes and permitting warranty providers to exclude coverage for damage caused or made worse by negligent or improper maintenance. These apply to both new and building envelope renovated homes covered by home warranty insurance. Failure to carry out proper maintenance or carrying out improper maintenance either yourself or through qualified or unqualified personnel may negatively affect your warranty coverage. It is important for the property owner to read and review their warranty documents to understand how to file any claims and correspondence in the proper written form directly with the warranty company. Refer to your home warranty insurance documentation or contact your warranty insurance provider for more information.