

A XEROX BUILDERS FIELD GUIDE

Basement & Foundation Waterproofing

From Damp-Proofing and Membranes to Drain Tile, Sump Systems and Backfill

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INTRODUCTION

The Only Part of the House Surrounded by Water

A foundation wall is unlike almost every other part of a home. Above grade, a wall mostly has to shed rain that hits it occasionally, from one direction. Below grade, a foundation wall can sit in contact with saturated soil, and sometimes standing groundwater, continuously — pushing against it from every direction, all year.

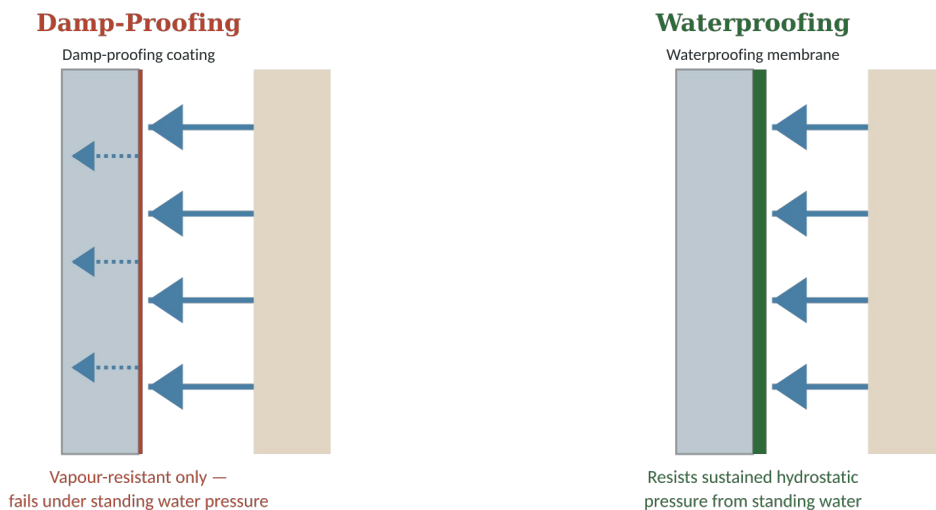
GUIDING PRINCIPLE

The water a foundation wall deals with is fundamentally different from the water a wall above grade deals with. That difference is exactly why foundation waterproofing is its own discipline, with its own materials and its own failure modes — not just "the rainscreen guide, but underground."

This guide covers the distinction between damp-proofing and true waterproofing, the assembly that protects a foundation wall, drain tile and sump systems, and the details — window wells, penetrations, backfill protection — that determine whether that assembly actually survives being buried.

1 Damp-Proofing vs. Waterproofing

These two terms are often used interchangeably on site, but they describe genuinely different levels of protection — confusing them is one of the most consequential mistakes in foundation construction.



Damp-proofing resists soil moisture vapour. Waterproofing resists standing, pressurized water.

Figure 1 — Damp-proofing resists vapour; waterproofing resists standing water under pressure.

CODE REQUIREMENT

Building codes generally distinguish between damp-proofing (a minimum requirement for foundation walls) and waterproofing (required where hydrostatic pressure is expected, such as high water tables or habitable space below grade). Confirm which standard applies to the specific site and design — do not assume damp-proofing is sufficient without checking.

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A thin bituminous damp-proofing coating is a vapour retarder, not a waterproofing system. It will not reliably hold back standing water under sustained pressure, and treating it as if it will is a common and expensive mistake.

2 The Foundation Wall Assembly

A complete below-grade wall assembly typically includes the structural foundation wall, a waterproofing membrane on the exterior face, a protection board to shield that membrane during backfill, and often insulation on the interior or exterior side, depending on the design.

Foundation Wall Waterproofing Assembly

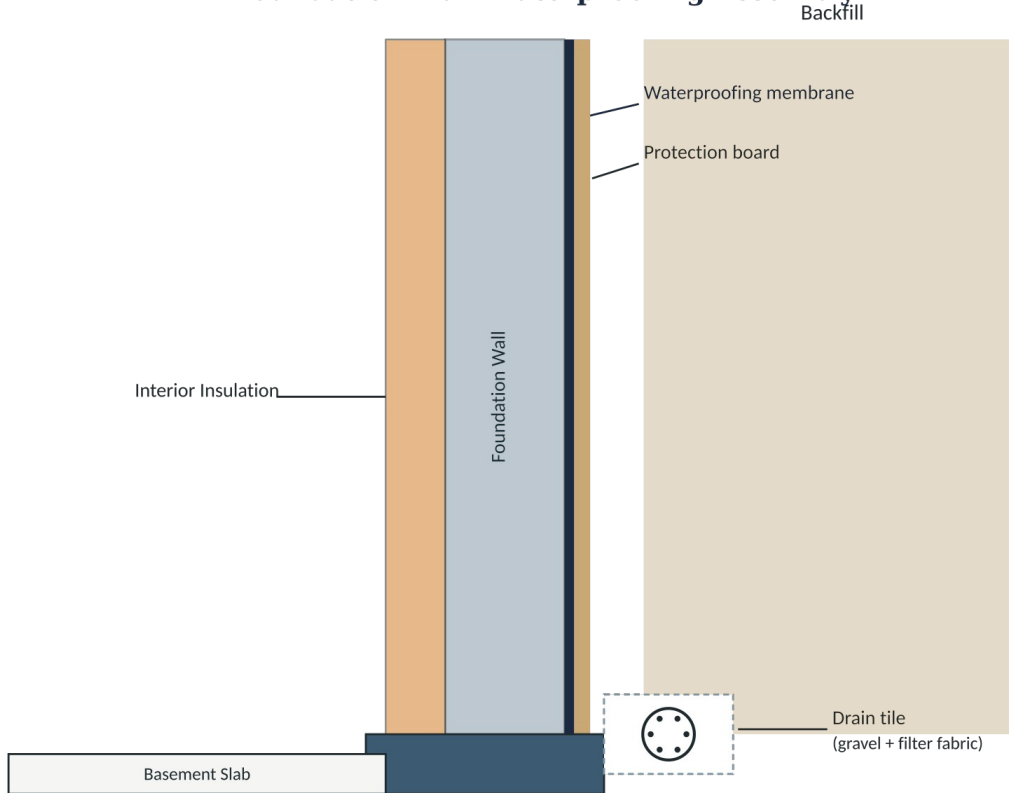


Figure 2 — A typical foundation wall waterproofing assembly, footing to grade.

BEST PRACTICE

The membrane needs to be continuous from the footing to at least the grade line, with particular attention at the footing-to-wall transition — a common location for gaps because it is where two different pours or forming stages meet.

3 Waterproofing Membrane Types

REF	Membrane Type	General Characteristics
A.01	Liquid-applied (rubberized asphalt)	Sprayed or rolled on, forms a seamless membrane, good for irregular surfaces
A.02	Self-adhered sheet membrane	Factory-controlled thickness, requires careful seaming and detailing at corners
A.03	Bentonite clay panels	Swells on contact with water to self-seal, needs

REF	Membrane Type	General Characteristics
		confinement to remain effective
A.04	Cementitious coating	Rigid, bonds well to concrete and masonry, less tolerant of movement or cracking

DESIGN OPTION

The right membrane depends on wall material, water table conditions, budget and site access — there is no single correct product for every foundation. Confirm the selected system's compatibility with the specific wall material and any insulation or protection board used with it.

4 Positive-Side vs. Negative-Side Waterproofing

Positive-side waterproofing is applied to the exterior face of the wall — the side water actually contacts first — and is strongly preferred wherever the wall is accessible during construction.

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Negative-side (interior) waterproofing treatments exist and have their place, particularly in renovation where the exterior is inaccessible, but they manage water after it has already reached the wall rather than stopping it from getting in. Positive-side waterproofing during new construction is the more reliable strategy, and the one to plan for by default.

5 Footing Drains and Drain Tile

A drain tile system — perforated pipe set in a bed of clean, free-draining gravel and wrapped in filter fabric — collects groundwater at the footing level before it can build up pressure against the foundation wall, and carries it away to a suitable outlet.

BEST PRACTICE

Filter fabric around the gravel bed keeps fine soil particles from migrating in and clogging the drain tile over time. Skipping the fabric is one of the more common reasons a drain tile system that worked when installed stops working within a few years.

Drain tile can discharge to daylight where the site slope allows it, or to a sump system where gravity discharge is not possible — the choice depends on site grading and the elevation of the foundation relative to the surrounding grade.

6 Foundation Wall Penetrations

Every plumbing, electrical, or mechanical penetration through a foundation wall interrupts the waterproofing membrane at exactly the depth where hydrostatic pressure is often highest.

GUIDING PRINCIPLE

Plan penetrations before the membrane goes on, not after. A penetration cut into a completed waterproofing membrane, and then patched, is a weaker detail than one that was designed and sealed as part of the original installation.

- ☐ Penetration locations confirmed before membrane installation
- ☐ Penetrations grouped where practical to minimize total count
- ☐ Manufacturer-specified boot or sealant used at each penetration
- ☐ Membrane patched and inspected around any late penetration

7 Window Wells

A below-grade window well needs its own drainage, independent of — but connected to — the foundation's drain tile system. A window well that fills with water is effectively a small reservoir pressed directly against the foundation wall and window.

BEST PRACTICE

Window wells should drain to the footing drain system, either through a dedicated connection or a gravel-filled sump beneath the well, rather than being left to rely on the surrounding soil to absorb water on its own.

A window well cover can reduce the volume of water entering the well in the first place, but it is a supplement to proper drainage, not a substitute for it.

8 Backfill Procedures

Backfilling is the single greatest physical threat to a completed waterproofing membrane. Sharp stones, construction debris, or careless equipment operation can tear or puncture a membrane that took real time and cost to install correctly.

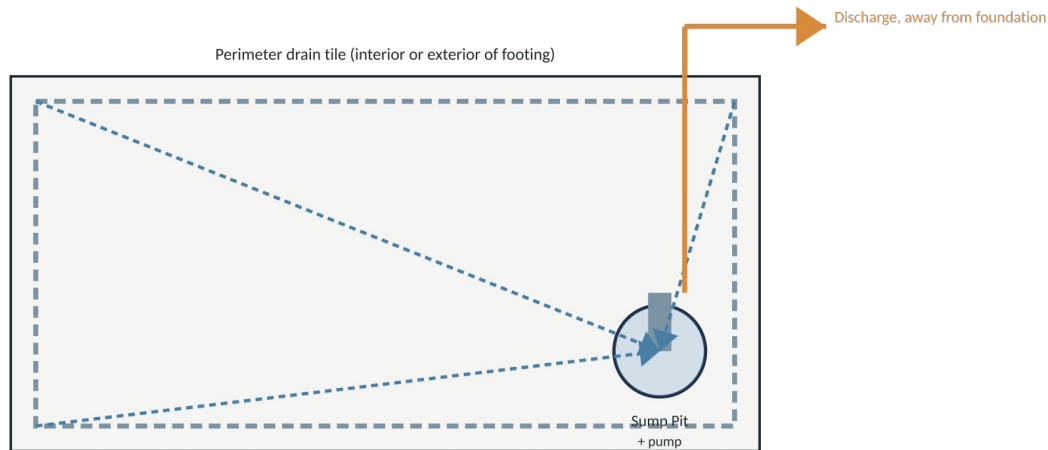
BUILDER'S STANDARD

I inspect the completed membrane and protection board immediately before backfill begins, and again as backfill proceeds in lifts — not just once at the very start. A membrane that was intact when covered by the first lift of backfill can still be damaged by careless placement of the second or third.

Backfill material should be free of large rocks, construction debris, and organic material, placed in controlled lifts, and compacted appropriately near the surface while remaining looser near the drain tile to preserve its drainage capacity.

9 Sump Pits and Sump Pumps

Where drain tile cannot discharge to daylight by gravity, a sump pit collects the water and a pump lifts it out and away from the foundation.



Water collected by the drain tile is routed to the sump pit and pumped well away from the house.

Figure 3 — Perimeter drain tile routed to a sump pit, discharged well away from the foundation.

CODE REQUIREMENT

Sump discharge must generally be directed well away from the foundation and in compliance with local stormwater and plumbing requirements — confirm the applicable discharge location and any connection restrictions with the local authority having jurisdiction.

BEST PRACTICE

A sump pump without battery backup is a single point of failure during exactly the kind of severe weather event most likely to cause a power outage and heavy water infiltration at the same time. Battery or water-powered backup systems address this gap.

10 Common Basement and Foundation Mistakes

Most foundation waterproofing failures trace back to a small set of repeated errors:

- ☐ Damp-proofing used where true waterproofing was required
- ☐ Window well drainage not connected to the footing drain system
- ☐ Membrane not continuous at the footing-to-wall transition
- ☐ Sump pump with no battery backup

- ☐ Filter fabric omitted around the drain tile gravel bed
- ☐ Penetrations cut into the membrane after installation, poorly patched
- ☐ Membrane damaged during backfill and not caught before covering
- ☐ Backfill material containing sharp debris placed against the membrane
- ☐ Sump discharge routed too close to the foundation, recirculating water

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A foundation waterproofing failure is rarely discovered quickly. By the time it shows up as a wet basement, the actual cause is usually buried under years of backfill — which is exactly why getting it right the first time matters so much here.

11 Pre-Backfill Inspection

Before backfill begins, this is the last practical opportunity to verify the entire waterproofing assembly without excavating it back out.

- ☐ Correct system selected for site conditions (damp-proofing vs. waterproofing)
- ☐ Membrane continuous from footing to grade line
- ☐ Footing-to-wall transition detailed and sealed
- ☐ Protection board installed over membrane
- ☐ Drain tile installed in clean gravel, wrapped in filter fabric
- ☐ Drain tile sloped correctly to outlet or sump
- ☐ Penetrations sealed with correct boots or sealant
- ☐ Window well drainage connected to footing drain system
- ☐ Sump pit and pump installed and tested, with backup power
- ☐ Photographs taken of the complete assembly before backfill

12 The Most Important Lessons to Remember

If a homeowner or builder remembers only a few principles from this guide, they should be these:

1. Damp-proofing and waterproofing are not the same thing

Confirm which one the site and design actually require.

2. Below-grade water pushes from every direction, continuously

That is why this is its own discipline, not just an underground rainscreen.



3. The footing-to-wall transition is a common weak point

Two different pours meeting is exactly where gaps happen.

4. Filter fabric protects the drain tile long-term

Skipping it leads to a system that clogs within a few years.

5. Plan penetrations before the membrane goes on

A planned detail beats a patched one.

6. Backfill is the biggest physical threat to the membrane

Inspect before backfill starts, and again as it proceeds.

7. Window wells need their own connected drainage

A cover helps, but drainage is what actually protects the wall.

8. A sump pump needs backup power

Power outages and heavy water infiltration often happen together.

9. Failures here surface late and buried

Getting it right the first time matters more than almost anywhere else in the house.

CLOSING

Conclusion

A foundation wall works harder, in a more hostile and less forgiving environment, than almost any other assembly in a home — and it does that work permanently buried, with no realistic opportunity for inspection or repair once backfill is complete.

That combination — high consequence, low visibility, and effectively no second chance — is what makes foundation waterproofing worth taking seriously as its own discipline. Select the right system for the actual site conditions, detail the transitions and penetrations deliberately, protect the membrane through backfill, and verify the whole assembly before it disappears underground for good.

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Most parts of a house can be opened up and corrected if something was missed. A foundation wall, once backfilled, generally cannot — which is exactly why this stage gets checked before it is covered, not after.

IMPORTANT NOTICE**Please Read Before Using This Guide**

This guide is an educational resource. It does not replace, and must not be treated as a substitute for:

- The current British Columbia Building Code, National Building Code of Canada, or any other applicable code in force at the time of construction.
- Municipal or regional-district bylaws, permit conditions, and inspection requirements.
- Site-specific geotechnical, structural, and building envelope design and engineering prepared by a licensed professional.
- Manufacturer installation instructions for any specific waterproofing membrane, drainage, or sump product.
- The professional and legal judgment of geotechnical engineers, structural engineers, building envelope consultants, and other registered professionals engaged on a specific project.

The technical details and examples in this guide are general construction information. Actual requirements vary according to soil and water table conditions, site grading, local code and bylaw requirements, manufacturer specifications and project-specific engineering.

Where a conflict exists, the applicable building code, geotechnical and engineering reports, manufacturer's installation instructions and qualified professionals take precedence over this guide.

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This guide reflects the author's own field research, training, and construction experience. It has not yet been reviewed by an independent geotechnical engineer, building envelope consultant, or legal professional. Readers must verify every technical statement against the current, authentic codes, standards, and manufacturer instructions applicable to their project before relying on it.

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