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Were here to help you take the hard out of hardscaping. Subscribe Most retaining walls are impervious, meaning water cannot pass through the wall itself. Efficient drainage is crucial to ensuring your wall will stay strong and upright. If there is not some drainage or release for water, rain, and irrigation or other water buildup will exert pressure against your wall and threaten its structure. Any wall taller than four feet will most likely cause catastrophic damage or injury if the wall fails. An insufficiently drained retaining wall is like a reservoir dam waiting to give way when enough pressure builds up. Collapses can lead to flooding and destroy essential areas of your property. You can read our article The Best Retaining Wall Drainage Options to get more information about why good drainage is necessary. Lets examine the steps you must follow to install a properly functioning wall drainage system. The first step is to excavate the space where you are building your retaining wall. This part of the process depends largely on how long, high, and wide your wall will be and the size of the retaining blocks you are using. Lay a substantial gravel base. This is the solid foundation upon which you will be laying the blocks. You will want to use a sturdy wheelbarrow to transport the gravel and then use a garden rake to ensure the gravel is smooth and compact. Lay the first two courses (rows) of blocks. You should use a string line to ensure each row is straight and a level to ensure the blocks are even with one another. Once in place, fill each block with gravel so that they will remain stable and steady on the gravel foundation. Install a Wall Drain Pro between your wall blocks. The Wall Drain Pro is a simple drain that is aesthetically pleasing and fits neatly between blocks. Wall Drain Pro also has a customizable height, making it simple to install in whatever location you prefer. Illustration fromsrwroducts.com Finish your wall by capping it off with decorative rock, laying bark dust, or planting a beautiful landscape to enhance its eye appeal. Do you want to learn more about how to install pavers by yourself? Check out our free How to Install Patio Pavers videos and learn how to confidently install a paver patio, driveway, or other hardscape. Water is the major cause of retaining wall failures. Below is a stone wall that failed due to improper drainage behind the wall. The combination of the ground sloping toward the wall, no drainage stone behind the wall, and no clear weep holes or drainage outlets lead to this wall failure. Due to the height of this wall, the pressure that built up behind the wall due to water sitting behind the stones caused this blow out. Every retaining wall should include drainage stone behind the wall. Though it is a good idea to install a drainage pipe on all walls, there are certain situations where a perforated drain pipe is absolutely necessary. Below are several scenarios that require a drainage pipe behind the wall: Walls with a height greater or equal to 4-ft as measured from the foundation to the top of the wall. The segmental blocks cannot hold the weight of that much water by themselves. Also, walls greater than 4-ft can cause catastrophic damage if the wall fails. All poured concrete or cinder block retaining walls. These walls do not have natural joints for water to drain through like segmental blocks and wood walls do. These walls need a drainage system regardless of the wall height. If there are poor draining soils such as clay behind the wall, there needs to be drainage incorporated the wall system. Clay when wet is very weak, so it is essential to provide a way for water to escape from behind the wall. Walls that have buried water sources within 50-ft of the wall site, such as irrigation, water main, or a hose line, requires a drainage system Groundwater is present. This can be a little more difficult to detect. If the area is wet when you excavate for your wall, or you notice water collects near your proposed wall location even in dry conditions, this is a good indicator of groundwater. The ground slopes toward the wall. Water will naturally drain downhill. A drain system will be required to remove that water. You are building a tiered or terraced wall. Surface water also needs to be accounted for. Check for any gutter downspouts nearby and check where water drains within your property to ensure water is diverted away from your wall. If there is a downspout behind your wall, plan to install an additional pipe to outlet water to the front of the wall. Do not use a perforated pipe to transport water from a downspout behind the retaining wall. Use swales or berms to redirect surface water away from the wall. When possible, place the swale or berm is at least two times the wall height (2H) away from the wall face. If a swale or pipe is impracticable, plan to install a drainage system behind the wall. A drainage system consists of several key components: drainage stone, filter fabric, perforated pipe, and outlets through the wall face. Before we dive into these components, remember NEVER use grout between the blocks on segmental block walls. Water should drain between the blocks, and grout blocks these gaps that would allow water to drain through the face. Proper segmental retaining wall blocks have a lip or pins to keep the blocks from shifting. Attach the top block and capstone to one another using construction adhesive* which keeps the wall system flexible. All walls should include drainage stone, even if they dont require a drain pipe. Install drainage stone at the back of the retaining wall and extend 12-in behind the blocks. Start the drainage stone near the base of the wall and extend up to within 6-inches of the top of the wall. To estimate the quantity of drainage stone, take the area of the wall in square feet and multiply by 1-ft to get the cubic feet of drainage stone. Divide the cubic feet by 21.6 to convert to tons or divide cubic feet by 27 to covert to cubic yards. #57 stone, the perfect drainage aggregate! The amount of fines (material passing through a No. 200 sieve) should be less than 10%. Do NOT use pea gravel or river rock as drainage stone. The smoothness of this material will make it difficult to retain at the end of the wall or if you ever need to remove a block. In addition, smooth material is difficult to compact and will settle over time. I recommend a well graded compactable aggregate that is angular. The size should be 0.25 1.25 ideally. This includes crushed rock, #57 stone, #67 stone, or Class I or II backfill. Using one of these materials will also allow you to use the same material for the drainage stone, base material and wall rock. Place filter fabric* or landscape fabric above the drainage stone and below the topsoil. This prevents fine material and organic matter from clogging up the drainage stone and staining the face of the wall. Filter fabric* being installed above the drainage stone. The filter fabric needs to be a minimum of 3-ft wide and non-woven. Provide 6-in of fabric up the back face of the retaining wall. Use construction adhesive* to attach the filter fabric to the back of the retaining wall. Install 6-in minimum of overhang past the end of the drainage stone. Overlap the ends of the fabric 4-in minimum along the length. For estimating the quantity needed, the length of fabric is simply the length of the wall plus 5% for waste and overlap. You may purchase 6-ft wide rolls and cut them in half. Note if the drainage stone is wider than 12-in, which is common when filling the entire excavation area with drainage stone, plan to supply a wider section of fabric to fully cover your drainage stone. You do not need filter fabric behind the drainage aggregate when a full 12-in of aggregate is installed behind the wall. If your site has clay or dark backfill, you may place filter fabric along the back of the retaining wall blocks to prevent the fine material from seeping through the blocks and staining your wall face. Slotted perforated pipe* The perforated pipe* should be slotted all around the pipe. Some corrugated pipes have holes on only one side, and you want to avoid this. The pipe will run the full length of your wall (L) and should be 3-in or 4-in in diameter. In all cases, the drain pipe needs to have positive drainage of at least 2%, meaning it slopes toward an outlet location. A good rule of thumb, if your outlet locations are spaced 30-ft apart, the pipe should slope 7-in from the high side to the outlet at the low side. There are three different options that I will go over to outlet your drainage pipe, with the third one being my favorite. No matter how you choose to outlet the drain pipe, place an outlet a minimum of every 30-ft to 50-ft along the wall. If your wall retains clay, or if there is ground water present, place outlets at 30-ft along the wall. Cut out for pipe through the wall. 1. Outlet a pipe through the wall face. This is ideal when the ground line in front of the wall is flat. Place impermeable material (soil that does not easily allow water to pass through) in front of the blocks, behind the blocks, and within the hollow core of the block (if applicable) up to the ground line at the front face. The impermeable material may be onsite fill that was excavated for the trench or fine grained sand, silt, or clay. Do not use any soft or organic matter. Lightly water then compact all the impermeable material with two passes of the plate compactor. Cut a hole in a block using a concrete saw just big enough for the pipe to extend through the wall. The hole in the wall may be in the second course of blocks. Place the pipe on top of the compacted impermeable material. Place filter fabric at the interface between the back of the block and the pipe to prevent backfill from migrating through the opening. You can also grout around the pipe at the front face of the block. Outlet the pipe through the wall face. You will need a tee connector* to connect the perforated drain pipe to the outlet pipe. I also recommend installing a grate* over the pipe outlet. This prevents rodents from getting into your drain pipe and building a nest. Optional end cap* for an outlet on a slope. 2. Outlet the pipe underneath the wall. This is ideal when there is a toe slope in front of the wall. This avoids cutting the blocks and allows the pipe to be placed lower on the wall. In this case, extend drainage stone all the way to the bottom of the wall. Where the pipe daylights, or exits the slope, you can install a sloped end cap* like the one to the left to help avoid a tripping hazard. Outlet the pipe at the ground line in front of the wall. Universal Wall Drain* 3. Use a Universal Wall Drain*. This is an innovative product that is not as widely known. Place the Universal Wall Drain vertically between segmental blocks so you avoid the need to cut the blocks. It then connects directly to the tee connector in the perforated drain pipe. The universal wall drain is an aesthetically pleasing option that avoids rough cut marks typical in pipe outlets. It also has a built in grate to keep rodents from crawling into your drain and building a nest. This outlet option helps reduce labor time and reduce the number of materials needed. Drainage is a critical part of any retaining wall system. It cannot be overstated how important managing water is for the long term performance of your wall. If you have questions about drainage design, or anything else related to your retaining wall project, leave a comment below or hit the email icon at the bottom of the page. *Amazon Affiliate If you use these links and make a purchase, I may be compensated. Retaining walls add form and function to your landscaping. They make a beautiful frame for flower beds, but also keep dirt from getting carried away by runoff. Be it a 3-foot brick structure or an 8-foot-tall stone wall, there's one detail that ensures it will be able to do its job of preventing erosion for years to come, and that's its weep holes and drainage pipe. Here's why your retaining wall needs a good drainage system and how you can add or enhance one yourself. A proper drainage system for a retaining wall is crucial for its structural integrity. Weep holes and drainage pipes are two retaining wall features that work together to allow water to move freely instead of accumulating behind the retaining wall. Weep holes are important for any type of retaining wall, but walls taller than four feet also need a drainage pipe. Weep holes can be any shape, but they are most often subtle vertical spaces between masonry work. They should be spaced about 4 feet apart horizontally, and also 4 feet apart vertically on taller walls. Drainage pipes run along the foundation of the retaining wall and actively help collect water and release it on the other side of the wall. These pipes contain small holes through which water seeps out and an outlet that directs water away from the wall. Want more gardening tips? Sign up for our free gardening newsletter for our best growing tips, troubleshooting hacks, and more! Proper drainage will extend a retaining wall's life. Without a proper retaining wall drainage system, water can create pressure that builds against the wall, leading to structural damage. Not only can the water itself create pressure, but it can also cause backfill and soil to accumulate against the side of the wall. If your retaining wall doesn't have a good drainage system in place, you may notice cracks starting to form. Moisture can also damage materials like bricks, causing them to crumble. If you do decide to plant a landscaping bed on the top layer of your retaining wall, proper drainage is also important for preventing fungal diseases and root rot in the plants. If you notice your plants struggling with these issues, it's a good sign that you need to add more drainage. Credit: DigiPub / Getty Images Adding drainage to a retaining wall can range from an easy weekend DIY to a multi-day project that requires renting tools. Here's a quick overview of both approaches. If you have an existing short retaining wall on your property that's lacking proper drainage, you can add weeping holes to tough materials like concrete using masonry drill bits on a hammer drill. Here's how to add weep holes to a retaining wall: Drill holes that are about 1 inch in diameter along the base of the retaining wall. Space them 4 feet apart from each other, running horizontally. Add another row of weep holes for every 4 feet of vertical height. If you're building a retaining wall from scratch, you can add weep holes during the building process. Simply leaving spacing in the masonry joints every four feet instead of filling them with mortar. Weep holes need covers to prevent dirt and debris from clogging them. Stainless steel versions can also keep pests like mice out of your retaining wall. Weep holes can enhance drainage on a short, well-constructed retaining wall. But if it doesn't contain the right backfill or is over four feet and doesn't contain a drainage pipe, you'll need to excavate it. You can rent a mini excavator from a home improvement store, and the amount of dirt you need to remove depends on the size of your retaining wall. If you're working with a big slope and a tall retaining wall, you may need to hire professional help. Adding these features to smaller retaining walls is a fairly achievable DIY project. Here's a quick summary of how to add backfill and a drainage pipe: Remove at least 2 feet of earth behind the retaining wall. Larger walls may require excavating more earth.Add a layer of landscape fabric over the slope to keep it contained.Install a perforated drain pipealong the base of the retaining wall. Dig a trench that is two times the size of the pipe and add a layer of gravel for the pipe to rest on.Install a pipe outlet every 30 feet across the bottom of the wall, and ensure the drainage pipe is connected.Add at least one foot of backfill material, like angular gravel, behind the retaining wall and top with soil and landscaping plants. FAQWeep holes should be about 4 feet apart horizontally in a retaining wall. For walls taller than 6 feet, add a weep hole every 4 feet vertically.A 2-foot retaining wall needs drainage in the form of weep holes spaced 4 feet apart horizontally.The best backfill material for a retaining wall is gravel, but make sure it's graded and shaped angularly. Backfill with rough, sharp edges is less prone to moving and settling against the wall. Round backfill with smooth edges, such as pea gravel, can shift and settle against the wall. Building a retaining wall without proper drainage is like constructing a dam thats destined to fail. Water pressure building up behind your wall can cause bulging, cracking, or complete structural failure problems that are expensive and frustrating to fix.You can save thousands in repair costs and extend your walls lifespan by implementing proper drainage techniques during construction. This DIY guide will walk you through essential drainage methods that professionals use, adapted for homeowners with basic tools and moderate skills.Disclosure: As an Amazon Associate, this site earns from qualifying purchases. Thanks!Water is the number one enemy of retaining walls. Without proper drainage, hydrostatic pressure builds up behind your wall, exerting forces that can reach several thousand pounds per square foot. This immense pressure will eventually cause even the sturdiest wall to fail. When soil becomes saturated, it can increase in weight by up to 60%. This dramatic weight gain puts excessive lateral pressure on your retaining wall, forcing it to work much harder than it was designed to. The freeze-thaw cycles in colder climates compound this problem, as expanding frozen water can crack and displace sections of your wall.Poor drainage doesnt just threaten structural integrityit accelerates material deterioration. Constant moisture exposure breaks down mortar in block walls, rusts steel reinforcements, and rots wooden components. These effects can reduce your walls lifespan by 50% or more.The consequences of inadequate drainage appear gradually but inevitably: bulging sections, horizontal cracks, leaning, and ultimately, complete failure. Installing proper drainage systems during construction costs a fraction of what youll spend on repairs or replacement later. The foundation of any effective retaining wall drainage system is proper aggregate selection. Use clean, crushed stone in 3/4 to 1-1/2 sizes (ASTM #57 stone) directly behind your wall, creating a drainage chimney at least 12 wide. Avoid rounded gravel as it doesnt lock together effectively. For the drainage layer base, consider using #2 stone (2-3 diameter) to prevent smaller materials from clogging your system and maximize water flow capacity.Select 4 perforated corrugated HDPE pipe for most residential retaining walls, as it offers flexibility for curved installations and sufficient flow capacity. Position pipes with holes facing down to prevent clogging, and maintain a minimum 1% slope (1 drop per 10 feet) toward the discharge point. For walls exceeding 4 feet, consider upgrading to 6 pipe or installing a secondary drainage system with schedule 40 PVC weep holes every 6 feet for redundancy. Invest in non-woven geotextile filter fabric with a minimum weight of 6 oz per square yard for lasting performance. This material prevents soil migration while allowing water to pass through, essentially creating a soil-aggregate barrier that maintains drainage function. Avoid lightweight landscape fabrics sold for weed control as theyll quickly clog or deteriorate. When installing, overlap seams by at least 12 and extend fabric up the entire height of the drainage aggregate column to prevent system failure. We earn a commission if you make a purchase, at no additional cost to you. Before breaking ground on your retaining wall, youll need to calculate the expected water volume your drainage system must handle. Start by assessing your propertys watershed areaevery 1,000 square feet of surface area can generate 620 gallons of water during a 1-inch rainfall. Factor in your regions maximum rainfall intensity (inches per hour) and soil permeability rates to determine pipe capacity needs. Clay soils require more robust drainage systems than sandy soils because they retain water longer and create higher hydrostatic pressure.Strategic mapping of drainage paths ensures water moves efficiently away from your retaining wall. Identify natural water flow directions on your property using a basic level tool during rainfall. Mark low points where water naturally collectsthese become critical drainage installation zones. Plan for discharge points at least 10 feet away from the walls base, preferably downslope. Remember that water always follows the path of least resistance, so design your system with gravity as your ally, maintaining a minimum slope of 1/4 inch per foot for all drainage pipes. Start your gravel placement from the bottom of the excavated area, directly behind your retaining wall. Layer the gravel in 6-inch lifts, compacting each layer with a plate compactor before adding the next. Always place larger stones (#2 stone) at the bottom, gradually transitioning to smaller aggregate (#57 stone) as you work upward. Keep the gravel zone at least 12 inches wide throughout the entire height of the wall to create an effective drainage chimney that prevents water pressure buildup.The thickness of your gravel drainage layer directly impacts your walls longevity. For walls under 4 feet tall, maintain a minimum 12-inch thick gravel zone behind the entire wall. For taller structures (4-8 feet), increase this to 18-24 inches to handle greater water volumes. In areas with heavy rainfall or clay soils, extend the thickness to at least 24 inches regardless of wall height. Remember that skimping on gravel thickness is false economyeach additional inch of proper drainage material can add years to your walls functional lifespan.Proper pipe placement is crucial for effective drainage behind retaining walls. Position your perforated pipe directly at the base of the wall, sitting on a 2-3 layer of drainage stone. The pipe should run the entire length of the wall with holes facing downward to prevent clogging. For walls longer than 50 feet, consider installing multiple drainage pipes with collection points every 25-30 feet to distribute water flow more efficiently and reduce the risk of overwhelmed sections.Maintaining the correct slope ensures water flows away from your retaining wall rather than pooling behind it. Install your drainage pipe with a minimum slope of 1/4 inch per foot (2% grade) to achieve optimal water movement. Use a laser level or string line during installation to verify consistent downward pitch throughout the entire run. For challenging terrain, incorporate stepped drainage with drop boxes at transition points to maintain proper flow while accommodating significant elevation changes across longer wall sections.Filter fabric is your retaining walls invisible guardian, preventing soil particles from migrating into your drainage system. When properly installed, this geotextile material creates a barrier that allows water to pass through while keeping soil particles at bay, extending your drainage systems effectiveness for decades.Start by placing filter fabric directly against the native soil before adding any drainage materials. Overlap seams by at least 12 inches to prevent soil infiltration at connection points. Secure the fabric with landscape pins every 2-3 feet along the top edge to prevent sagging. Extend the fabric at least 12 inches beyond the top of the wall to create a protective flap that can be folded over the gravel backfill. Never stretch the fabric too tightlyallow some slack to accommodate soil settlement without tearing.Inspect your filter fabric annually by checking exposed edges for tears or degradation, especially after heavy rainfall events. Replace damaged sections immediately to prevent system contamination. Avoid planting trees or deep-rooted plants directly above the drainage zone, as roots can penetrate and damage the fabric. For areas with extremely fine silt or clay soils, consider using a two-layer filter fabric system for additional protection. Keep drainage outlets clear and flush the system every 3-5 years to remove any accumulated sediment that may have bypassed the fabric.Weep holes provide a crucial escape route for water that accumulates behind retaining walls, offering an additional layer of protection against hydrostatic pressure. These small openings allow water to drain freely through the face of the wall, working in conjunction with your primary drainage system.Weep holes should be spaced 4-6 feet apart horizontally across your retaining wall, with additional holes placed 12-16 inches from the base. For optimal drainage, create holes 1-2 inches in diameter for masonry or concrete walls, while 3/4-inch diameter holes work best for mortared stone walls. In areas with heavy rainfall, decrease spacing to 3 feet to handle increased water volume and prevent pressure buildup.When installing weep holes in block walls, remove mortar from vertical joints during construction or drill through existing mortar with a masonry bit. For concrete walls, insert PVC pipes at a slight downward angle (5-10 degrees) during the pouring process. Always place a small section of filter fabric behind each weep hole, folded into a pocket shape to prevent soil migration while maintaining water flow. Follow each hole with a small amount of clean gravel to create mini drainage channels.Surface water management is crucial for protecting your retaining wall from excessive water pressure. These systems intercept water before it reaches the area behind your wall, dramatically reducing the load on your primary drainage system.Swales are shallow, gently sloped channels that redirect surface water away from your retaining wall. Create a swale at least 5 feet from the top of your wall with a minimum 2% slope to guide water toward a safe discharge point. Pair it with a berm (a small earthen ridge) on the downhill side to enhance water control. Line these features with erosion-resistant plants like switchgrass or river birch to stabilize the soil while improving effectiveness during heavy rainfall events. NDS 1200BKITRTL1PK Square Catch Basin Drain Kit with 2-Opening Catch Basin Drain, 2 Adapters, 1 Outlet Plug, and 1 Plastic Drain Grate, 12-Inch, for Lawns, Landscaped Areas, Black Prevent property damage by effectively managing stormwater runoff. This kit includes a 12-inch catch basin with adapters, a plug, and a grate, connecting easily to 3" and 4" drain pipes to direct water away from vulnerable areas. We earn a commission if you make a purchase, at no additional cost to you. Install catch basins at strategic low points to collect surface runoff before it reaches your wall. Use 99 basins for smaller walls and 1212 basins for walls exceeding 4 feet in height. Connect these basins to your main drainage pipe using 4 solid PVC pipe, maintaining a minimum 1% slope throughout the system. Ensure basin grates sit slightly below grade level to maximize water collection, and position basins at least 3 feet from the walls edge to prevent undermining your foundation.Different retaining wall materials require specific drainage approaches to maximize their longevity and performance. Each material interacts uniquely with water and pressure, necessitating tailored drainage solutions.Block and stone walls benefit from a comprehensive drainage system with multiple release points. Install weep holes every 4 feet along the base and place drainage pipe directly behind the first course of blocks. For mortared stone walls, incorporate dedicated drainage channels every 6-8 feet to prevent water accumulation in mortar joints. The drainage aggregate should extend at least 12 inches behind these walls to create an effective water pathway that prevents freeze-thaw damage and efflorescence.Concrete walls require strategic drainage planning due to their solid, impermeable nature. Install sleeve pipes through the concrete during construction, placing them every 5-6 feet along the base at a slight downward angle. Use geotextile-wrapped drainage cores against the back face of the wall to create vertical water channels. For poured concrete walls taller than 4 feet, consider integrating a drain mat system that covers the entire back surface to efficiently collect and channel water to the perforated pipe below.Timber walls demand additional drainage considerations to prevent premature rot and structural failure. Create a 2-inch gap between each timber at the base of the wall to allow for natural water escape. Install a continuous layer of gravel extending 18 inches behind the wall, using slightly larger aggregate (1-2 inches) than with other materials. Place a secondary drainage pipe 12 inches above the base drain in walls taller than 3 feet to intercept water before it reaches the lower timber courses, significantly extending the walls functional lifespan.Once youve installed your drainage components, its crucial to test the system before backfilling. A properly functioning drainage system is your retaining walls first line of defense against hydrostatic pressure. Heres how to verify your drainage system works correctly:Pour several gallons of water at the highest point of your drainage pipe to check for proper flow. The water should move smoothly through the system and exit at your designated discharge points. If water backs up or pools, youll need to adjust the pipes slope or check for obstructions before proceeding.Use a level to confirm your drainage pipe maintains the minimum 2% grade (1/4 inch per foot) throughout its length. Inadequate slope is the most common cause of drainage failure in DIY retaining walls. Place your level on the pipe at various points and look for consistent downward pitch toward the discharge point.Examine all filter fabric installations to ensure they completely separate the drainage aggregate from native soil. Look for any tears, gaps, or insufficient overlaps (less than 12 inches) that could allow soil migration. Proper fabric placement prevents clogging that can render your drainage system ineffective within a few years.If youve installed weep holes, verify each one is functioning by pouring water behind the wall near each opening. Water should flow freely through the holes without obstruction. Use a small wire to clear any blockages you find during testing, as obstructed weep holes can lead to pressure buildup.Take photos of your completed drainage system before backfilling. These visual records will prove invaluable for future maintenance or if problems arise. Include measurements showing the depth and width of your gravel layer and the location of drainage pipes for reference.Choosing the wrong gravel type is a common drainage mistake that undermines your entire system. Many DIYers opt for rounded pea gravel because its readily available and inexpensive. This material compacts over time, reducing drainage capacity by up to 60%. Always use angular, clean crushed stone (to 1) for drainage layers instead of rounded materials.Skimping on the drainage layer thickness is a critical error that leads to premature wall failure. DIYers often install just a few inches of gravel to save on material costs. A proper drainage layer should be at least 12 thick for walls under 4 feet and 18-24 for taller structures. Undersized drainage layers can reduce your walls lifespan by half.Drainage pipe mistakes can render your system useless despite other correct elements. Common errors include installing pipes with perforations facing upward (they should face downward), insufficient slope (less than per foot), or failing to extend pipes beyond the wall ends. These mistakes can trap water rather than remove it, increasing hydrostatic pressure by up to 300%.Forgetting or incorrectly installing filter fabric allows soil to migrate into your drainage aggregate. Many DIYers either skip this component entirely or use landscape fabric instead of proper geotextile filter fabric. Without proper filtration, your drainage system can become 90% clogged within just 2-3 years, especially in silty or clay soils.Rushing the backfilling process creates weak points in your drainage system. The proper sequence matters: install drainage stone first, then pipes, more stone, filter fabric, and finally soil. Many DIYers mix these steps or compact materials incorrectly. Always backfill in 6 lifts, compacting each layer properly before adding the next to prevent settlement that disrupts drainage.Focusing solely on subsurface drainage while ignoring surface water is a serious oversight. Without proper grading (minimum 2% slope away from the wall) or surface water diversion systems, rainwater flows directly behind your wall, overwhelming even well-designed drainage systems. Surface water can contribute up to 80% of the moisture problems affecting retaining walls.Creating a drainage system without proper outlets or discharge points defeats its purpose. Your drainage pipes need somewhere to release collected water at least 10 feet from the walls base. Many DIYers terminate pipes too close to the wall or dont account for outlet protection, causing erosion issues that can undermine the wall foundation within just a few seasons.Not testing your drainage system before completing backfill is a critical mistake thats difficult to remedy later. Pour water into the system and verify it flows correctly through all components before covering everything up. This simple test can identify blockages, improper slopes, or damaged components that would otherwise remain hidden until failure occurs.Proper drainage is the lifeline of your retaining walls structural integrity and longevity. By following the techniques outlined in this guide youve taken crucial steps toward preventing costly failures and extending your walls service life.Remember that drainage isnt a set-it-and-forget-it solution. Regular inspections checking for clogs clearing weep holes and maintaining proper water diversion will protect your investment for years to come.The time and effort you invest in planning and installing quality drainage components will pay dividends through avoided repairs and replacement costs. Your retaining wall can remain sturdy and functional for decades when you prioritize these drainage fundamentals.For particularly challenging sites or walls over 4 feet tall consider consulting with a professional to ensure your drainage system meets local building codes and engineering requirements.Drainage is critical because without it, water builds up behind the wall creating hydrostatic pressure that can exert thousands of pounds per square foot. This pressure causes bulging, cracking, and leaning, eventually leading to structural failure. Proper drainage prevents this pressure buildup, extends your walls lifespan by up to 50%, and protects your investment from costly repairs or complete replacement.Youll need clean, crushed stone (3/4 to 1-1/2 ASTM #57 stone) for the drainage chimney, larger #2 stone (2-3 diameter) for the base layer, 4 perforated corrugated HDPE pipe for water collection, and high-quality non-woven geotextile filter fabric to prevent soil migration. Avoid rounded gravel and lightweight fabrics as they wont perform effectively over time.For walls under 4 feet tall, use a minimum 12-inch thick gravel layer. For taller walls or those in areas with heavy rainfall or clay soils, increase thickness to 18-24 inches. The gravel layer should extend at least 12 inches behind the wall and be installed in 6-inch lifts, with each layer properly compacted before adding the next.Place the perforated pipe directly at the walls base on a 2-3 drainage stone layer with holes facing downward. The pipe should run the entire wall length with a minimum slope of 1/4 inch per foot (2% grade). For walls longer than 50 feet, install multiple drainage pipes with collection points every 25-30 feet. Use a laser level during installation to ensure consistent downward pitch.Weep holes are small openings that allow water to escape from behind retaining walls, reducing hydrostatic pressure. Place them 4-6 feet apart and 12-16 inches from the base of the wall. Their diameter should match your wall material (1-2 inches for block/stone walls, 2-3 inches for concrete). Always protect weep holes with filter fabric and gravel to prevent clogging while maintaining drainage efficiency.Create swales (shallow channels) or berms (raised ridges) that redirect water away from the wall with a minimum 2% slope. Install catch basins at strategic low points to collect runoff and connect them to your main drainage system. Use erosion-resistant plants to stabilize these features. Effective surface water management prevents excessive pressure on your wall and extends its lifespan.Perform a water flow test by running water through the system and checking that it exits properly. Verify proper slope using a level. Inspect filter fabric placement to ensure it fully wraps the drainage aggregate. Test weep holes by pouring water behind them to confirm theyre functioning. Document your completed system with photos for future reference or warranty purposes.Common mistakes include using incorrect gravel types, installing insufficient drainage layer depth, improper pipe placement, neglecting filter fabric, incorrect backfilling sequence, overlooking surface water management, failing to plan for drainage outlets, and skipping system testing. Each mistake can significantly compromise your walls structural integrity and longevity, leading to expensive repairs later.Yes. Block and stone walls need weep holes every 4 feet and 12+ inches of drainage aggregate behind them. Concrete walls require sleeve pipes every 5-6 feet and geotextile-wrapped drainage cores. Timber walls need 2-inch gaps between base timbers and 18 inches of gravel extending behind the wall. Always adapt your drainage strategy to your specific wall material for optimal performance.Perform annual inspections checking for damage, clogging, or erosion. Avoid planting deep-rooted vegetation above the drainage zone. Flush the system every 3-5 years to remove sediment buildup. After heavy rainfall events, verify that water is properly exiting through drainage outlets. Regular maintenance prevents small issues from becoming major structural problems. Water is the major cause of retaining wall failures. Below is a stone wall that failed due to improper drainage behind the wall. The combination of the ground sloping toward the wall, no drainage stone behind the wall, and no clear weep holes or drainage outlets lead to this wall failure. Due to the height of this wall, the pressure that built up behind the wall due to water sitting behind the stones caused this blow out. Every retaining wall should include drainage stone behind the wall. Though it is a good idea to install a drainage pipe on all walls, there are certain situations where a perforated drain pipe is absolutely necessary. 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If you have questions about drainage design, or anything else related to your retaining wall project, leave a comment below or hit the email icon at the bottom of the page. *Amazon Affiliate If you use these links and make a purchase, I may be compensated. Drainage is an incredibly important aspect to any retaining wall. The force that water can apply to any structure can cause significant and costly problems, and retaining walls are no different. Retaining walls hold back significant loads that can change. The wall needs to be constructed to be able to withstand those changing loads or dynamic loads. Water entering the system and putting pressure on the wall is a dynamic load, and when not properly handled in the retaining wall construction could cause the failure of the retaining wall. This is why drainage must be considered in the construction of a retaining wall. Retaining Wall Drainage There are two main aspects to a retaining wall drainage system: Drainage for a retaining wall relies on both of these aspects help to control the water that enters the system. Any water in behind the wall needs to be moved away and out of the retaining wall system. Failure to control the flow of water in behind the wall will cause hydrostatic pressure to add to the surcharge that the wall experiences. This built up dynamic load will eventually will eventually cause the wall to begin to lean forward, especially during freeze-thaw cycles. Drainage Systems for Retaining WallsDrainage behind a retaining wall requires both proper backfill and drainage pipe. Backfill consists of a 3/4 angular crushed clear stone (ASTM #57) at a minimum 12 behind the wall and continuing vertically up that wall. It is a clear stone meaning that it is a washed aggregate that is clear of fines. This allows for the water that enters the system to permeate through the backfill down to the base of the retaining wall.Once the water gets to the base of the retaining wall, it needs to be collected and exited out of the system. Some of the water may permeate through the subsoil, though heavier clay that your region may have will cause water build up.Pipe needs to be installed behind a retaining wall to collect that water build up at the base. This drainage pipe should be perforated, allowing the water to enter and exit the pipe on its way out of the system. The pipe should have a slope towards the lowest area or where water will be exited at a minimum slope of 1/8 per foot. Additionally, every 50 feet of retaining wall should have an exit point through the face of the wall.This is accomplished with a T in the drainage pipe with a pipe or other attachment to extend past the face of the wall at a distance that allows water to flow away from the face of the wall. The slope of the pavement or ground at the face of the wall also needs to slope away from the wall itself so that water does not flow back towards the retaining wall causing more issues.It is important to not that no two retaining walls are the same. Some may require engineered drawings such as those that are three feet in height or greater. Depending on the load that these retaining walls must support, there may be further engineering to provide the stability that the project requires. You can always refer to the manufacturers engineered drawings for their wall systems in order to build a suitable wall for your project or seek outside engineering help in order to build a retaining wall that will stand the test of time.There are also additional steps that can be taken to control the flow of the water before it is able to permeate into the backfill material and down to the base of the wall. This can include installing a low permeable soil on top of non-woven geotextile that will lay on top of the backfilled material at the top of the wall. On top of that soil would be a top soil where grass or sod can be installed to grow. This low permeability soil will allow for less water to enter the system through that backfilled clean stone.With adding this low permeability soil, you do not want to have water sitting behind the retaining wall causing issues with the build up of hydrostatic pressure. To prevent this, an appropriate slope must be made with that soil in behind the retaining wall to an appropriate area for the water to exit to. This can further be achieved with a swale moving away from the back of the wall.&nbps;Retaining Wall Drainage PipeThe proper drainage pipes for retaining walls would be a flexible corrugated and perforated pipe. This flexibility allows the pipe to bend around curves in the retaining wall while also resisting any freeze-thaw cycles. Water that sits in the pipe over these freeze-thaw cycles will expand in the pipe. Having a flexible pipe allows that water to expand with the pipe itself. However, a solid PVC pipe that has a high crush rating is rigid and the expanding of that water will cause cracks to appear and the ultimate failure of that pipe. Though areas without these freeze-thaw cycles that cause the expanding and contracting of water may see benefits in the high crush rating of a PVC Schedule 40 pipe. Ultimately the pipe needs to be perforated to allow for the collection of water that enters the system through the backfill and down to the base of the retaining wall. Retaining walls are all different. There are several aspects that must be considered when building a retaining wall, but drainage remains fairly consistent throughout as water must always be taken into consideration. Backfilling is an important aspect of that drainage design and construction, as is the installation of a drainage pipe. However, you can always refer to the manufacturers engineered drawings for the specific product that you are installing or consult with the manufacturer and / or engineer to create a plan for the drainage of your retaining wall. For the majority of walls that are three feet or less in height, this guide will help you with a drainage plan. Water is the major cause of retaining wall failures. Below is a stone wall that failed due to improper drainage behind the wall. The combination of the ground sloping toward the wall, no drainage stone behind the wall, and no clear weep holes or drainage outlets lead to this wall failure. Due to the height of this wall, the pressure that built up behind the wall due to water sitting behind the stones caused this blow out. Every retaining wall should include drainage stone behind the wall. Though it is a good idea to install a drainage pipe on all walls, there are certain situations where a perforated drain pipe is absolutely necessary. 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