



City of Alexandria Pilot Flood Mitigation Grant Program **APPROVED LIST OF PRACTICES**






alexandriavirginia.gov/floodaction







PRACTICE	DESCRIPTION	CITY REVIEW REQUIREMENTS	
Windows			
<p>Install permanent glass protection materials or floodproof windows</p>		<p>Permanent glass protection can prevent flood damage from flooding and other extreme weather events. Floodproof windows or those with glass protection are passive systems that protect from rising flood water and debris impact.</p>	<p>Board of Architectural Review Code Administration</p>
<p>Install basement window protection</p>		<p>Fixed, translucent, water-tight covers installed on near grade or below grade basement windows provide increased protection against surface flooding.</p>	<p>Board of Architectural Review Code Administration</p>
<p>Install custom ground floor or basement window wells</p>		<p>A ground floor or basement window well should have a central drain that is either connected to an interior or exterior drain tile system or to a line that runs to a stormwater drain or outside the property.</p> <p>Installing a new drain requires soil excavation and either reinstalling or replacing the window well liner. Also, for the best protection against flooding, a window well should be custom fit and made of steel-reinforced polycarbonate plastic.</p>	<p>Board of Architectural Review Code Administration</p>
Doorways			
<p>Install permanent doorway flood gate or panel</p>		<p>The quickest way for surface flooding to enter a structure is through open doorways.</p> <p>Permanent doorway flood gates or panels are physical barriers that attach to external doorframe and can be quickly deployed to prevent floodwaters from entering a structure. Permanent floodgates can be an easier and faster alternative to sandbags; however, they require installation and, in most cases, custom fitting.</p>	<p>Board of Architectural Review Code Administration</p>
<p>Install temporary doorway flood gate or panel</p>		<p>Temporary doorway flood gates and panels are similar to the permanent models described above; however, this type of flood gate is only deployed prior to flooding and does not require any pre-installation setup.</p> <p>Typically, these systems are not custom-made and can be installed in minutes. These systems are usually made of expandable steel tube frames that adjust to various sized doorways and while not completely water tight like permanent structures, they do offer excellent protection.</p>	<p>N/A</p>

General flood stoppage equipment

<p>Purchase flood socks</p>		<p>Flood socks are lightweight and flexible absorbent socks designed primarily for residential use. Using absorbent technology, flood socks absorb water and then bind together to create a flood protection system.</p> <p>If deployed at a basement or garage entrance, these socks can stop leaks and water seeps quickly and effectively. Because these socks absorb water on contact and are quick to deploy, they make an ideal sand bag equivalent.</p>	<p>N/A</p>
<p>Purchase Quick Dams™</p>		<p>Quick Dams™ are a proprietary product ideal for redirecting flowing water away from an area. The product's specialized cover lets water in, and an internal absorbent holds water to inflate the dam in just minutes. This technology acts as a replacement for sandbags and can be used repeatedly.</p>	<p>N/A</p>
<p>Purchase sandless sandbags</p>		<p>Sandless sandbags are compact, lightweight bags that expand when filled with water. Once filled, they act as a superior flood wall barrier. And because water is used as the main barrier, once they are no longer needed, the water can be let out and the bags stored until the next event.</p>	<p>N/A</p>

Basement

<p>Purchase and connect battery-backups for sump pumps</p>		<p>Many basement areas are equipped with sump pumps to divert groundwater away from basement areas. These pumps almost always run on electricity. Unfortunately, during extreme weather events, electricity can go out, leaving a basement unprotected against flooding just at the time it's needed most.</p> <p>A sump pump battery backup provides protection against power outages and ensures a sump pump will continue to work regardless of electric status.</p>	<p>N/A</p>
<p>Install drain tiles below basement floor</p>		<p>A drain tile is a sub-surface drain placed below a basement floor that alleviates ground water pressure build up. As water pressure builds, the drain tile carries it away.</p> <p>Drain tiles typically consist of perforated flexible plastic pipe buried in a bed of washed gravel that connects to a sump pit so that water that would otherwise end up on a basement floor is discharged from the basement by a sump pump.</p>	<p>Board of Architectural Review Code Administration</p>

PRACTICE		DESCRIPTION	CITY REVIEW REQUIREMENTS
Install flood vents		<p>Flood vents are small openings that allow flood waters to pass through and drain out of an enclosed area of the home (e.g., garage, crawlspace, etc.) reducing the risk of damage to the structure by releasing water pressures.</p> <p>In a flood situation, if the water pressure inside and outside a property may not be able to equalize quickly, resulting in the foundation of a home becoming compromised. If this occurs, a property could quickly become unsafe.</p> <p>And while at first glance, allowing flood waters into a home seems counterproductive to mitigating damage, the purpose of flood vents is to reduce expensive structural damage. These vents accomplish this objective by allowing water to pass into or out of a building's exterior foundation walls unobstructed.</p>	<p>Board of Architectural Review</p> <p>Code Administration</p>
Disconnect or plug internal floor drains		<p>Most stairwell drains are connected to either sanitary or storm sewer laterals external to the property.</p> <p>If these lines get clogged or back up, water flows backwards and discharges through the floor drain. Disconnecting or plugging these drains can reduce the chance of sewer backups occurring.</p>	<p>Code Administration</p>

Utility Protection

Purchase utility flood covers		<p>Fast-installing, plastic utility flood covers are designed to protect utilities from flood and water damage. Utility flood covers look like plastic protective sleeves that are pulled up and fastened above a utility if flooding is forecasted. These covers, which can be installed and pulled up in minutes, can also protect the surrounding area if a water heater malfunctions or leaks.</p> <p>By installing a waterproof flood cover underneath a furnace, boiler and/or hot water heater, a property owner can quickly provide up to six feet of flood water protection.</p>	<p>N/A</p>
Install interior concrete or masonry walls		<p>Elevating or enclosing large appliances in a basement or other areas vulnerable to flooding using concrete blocks, walls, or other masonry products can reduce the risk of water damage in a flood event.</p> <p>These interior floodwalls can provide utilities or other key areas with up to four feet of flood protection.</p>	<p>Board of Architectural Review</p> <p>Code Administration</p>
Elevate electrical outlets, switches, sockets and circuit breakers		<p>When flood water gets into electrical systems, they are either ruined or at the very least, cannot be used again until they have been dried out and inspected by an electrician. Therefore, having a licensed and qualified electrician elevate outlets, switches, sockets and circuit breakers to be at least one foot above expected flood levels is an excellent way to avoid significant electrical damage during flood events.</p>	<p>Code Administration</p>
Install flanged / Quick Connect system		<p>In homes provided with a flanged connection (often called a "Quick Connect") to connect a temporary generator to the main electrical panel, the flanged connection should be placed above the required flood elevation in a place that allows a generator to be brought onto the property, quickly connected to the property, and safely refueled when needed.</p> <p>Additionally, the generator should be located away from vents or windows to prevent exhaust gases from entering a property or otherwise pose a risk to occupants.</p>	<p>Code Administration</p>

PRACTICE

DESCRIPTION

Elevate utilities and service equipment



Elevating key components associated with a property's heating, ventilation, and air conditioning (HVAC) system, along with other major appliances such as washers, dryers, and hot water heaters from basement areas to a higher floor or the attic is the best way to mitigate against future flood damage.

If elevation through relocation is not possible, property owner can protect HVAC and appliances by elevating them in place. For external utilities such as heat pumps that lie within potential flood prone areas, consider elevating using riders and cement blocks.

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General protective equipment

Install a flood alert system



Flood alert systems can notify a property owner when water first enters an area, enabling them to take immediate response actions to avoid more extensive flood damage.

Current flood alert systems utilize existing home Wi-Fi networks, coupled with 20 to 30-foot water-sensing flood cables, to monitor for water intrusion. If water is detected, the flood alert system can notify a property owner via text, call or email.

N/A

Purchase portable submersible water pumps and hoses



Once flooding occurs, it can be difficult to clean up. Without working floor drains, water can remain in low lying areas until removed manually.

A submersible water pump and hose can be used to prevent accumulation of flood water entering a building, or remove water after a flood event, mitigating damage to the building or supplies and expedites the recovery process.

N/A

Incorporate flood-resistant building materials



After a flood event, replacing damaged building materials with flood resistant building materials, including cement board, vinyl and rubber flooring, concrete, lime plaster and decay-resistant wood can increase a home's resilience to flood events.

Flood Resistant building materials are defined by FEMA as any building product [material, component or system] capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. The term "prolonged contact" means at least 72 hours, and the term "significant damage" means any damage requiring more than cosmetic repair.

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Apply interior concrete sealers and waterproof paints








Water seepage through concrete basement walls is a common problem. Because of this, many companies have developed waterproofing sealers and paints. These products may be oil- or water-based, and they are heavier than conventional sealers and paints because they contain additives developed to create impermeable water barriers.

Waterproofing compounds such as polyurethane and thick rubberized liquids one can brush, roll, dip and pour and can be applied to interior concrete surfaces to decrease their water absorbency. This can prevent serious damage in flood events.

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Exterior

<p>Construct a protective flood wall</p>		<p>Although not common in urban residential areas, cinder block or similar materials formed into protective flood wall or similar barrier can prevent the intrusion of flood waters; especially for properties with subgrade, walk down basements.</p>	<p>Board of Architectural Review</p>
<p>Perform surface grading</p>		<p>Surface grading can prevent flood waters from reaching home by redirecting storm water away from a property. This is typically done by grading a slope away from a residential structure at a grade of at least 0.5 inch per foot for at least 10 feet.</p> <p>In addition, for surface grading to be effective, the graded soil must be mechanically compacted to prevent later settling.</p>	<p>Code Administration Department of Right of Way</p>
<p>Construct an earthen berm</p>		<p>An earthen berm is a small hill covered with grass or other plants that is built to divert runoff so that it will not affect a certain area. As opposed surface grading, this involves building "up" instead of grading "down."</p>	<p>Code Administration</p>
<p>Install impermeable (water resistant) material around foundations</p>		<p>In areas where standing water is a constant problem, property owner can reduce intrusion of surface flood waters to the below ground structure by installing impermeable materials around the property's foundation.</p> <p>These materials can include waterproof boards and rubber seals. Excavation surrounding a property's foundation is likely required to install impermeable linings.</p>	<p>Board of Architectural Review Code Administration</p>
<p>Install a French drain system around basement</p>		<p>The purpose of a French drain is to direct surface run off water and groundwater away from the home's foundation. These types of drains are ideal because they reduce pressure and remove excess moisture from the soil by collecting surface water and groundwater.</p> <p>French drains are normally installed below areas prone to flooding to serve as a channel for water to flow away from a home. French drains can be installed to alleviate water from pooling in low-lying areas such as a ditch or basement. If water has collected at the surface, a shallow French drain can be installed to mitigate against future trouble.</p>	<p>Code Administration</p>