West Stanwood and the 100-Year Floodplain: Exploring Costs and Options

Project Report
Center for Economic and Business Research

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About SCP

Western's SCP program focuses the energy and ideas of faculty and students upon the issues that communities face as our society transitions to a more sustainable future. SCP partners with communities each academic year, facilitating a program in which many Western courses complete community engaged learning projects that address problems identified by the partner.

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SCP Partner for Academic Year 2017 – 2018: The City of Stanwood, WA

SCP is proud to partner with the City of Stanwood, Washington, during the program's second year. Two Western courses, a student field team, a student intern, and a Western center will tackle five projects identified in collaboration with city staff.

Acknowledgement

The Association of Washington Cities (AWC) has provided invaluable assistance as SCP has grown and developed in its second year. AWC has provided advice on program development, and has assisted in promoting the program.

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PREFACE

In winter 2018, students at the Western Washington University Center for Economic and Business Research, investigated floodproofing costs and insurance rates for homeowners in West Stanwood. The goal of this research was to inform residents of options available to elevate and/or floodproof their homes. Information in the report includes research on searching for flood insurance, ways to prepare homes located in floodplains, and possibilities for lowering annual insurance premiums. Based on the research conducted, there are several recommendations that include conducting a new floodplain survey, creating useable maps for residents, connecting residents to Snohomish County flood emergency services, and developing a list of certified contractors who conduct floodproofing and provide elevation certificates. These home improvements ultimately bolster the community's application to the Community Rating System, an incentive program through the National Flood Insurance Program.

Director of the Center for Economic and Business Research: James McCafferty

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List of Acronyms

- BFE: Base Flood Elevation (also, Base Floor Elevation)
- CDBG: Community Development Block Grant
- CRS: Community Rating System
- FCAAP: Flood Control Assistance Account Program
- FEMA: Federal Emergency Management Agency
- FMAG: Flood Mitigation Assistance Grant Program
- HELOC: Home Equity Line of Credit
- HMG: Hazard Mitigation Grant Program
- HUD: Department of Housing and Urban Development
- ICC: Increased Cost of Compliance
- IHP: Individuals and Household Program
- NFIP: National Flood Insurance Program
- PAP: Personal Assistance Program
- PDMG: Pre-Disaster Mitigation Grant Program
- SBA: Small Business Administration
- SFHA: Special Flood Hazard Areas
- SRLG: Severe Repetitive Loss Grant Program
- WFPO: Watershed and Flood Prevention Operations Program
- WWU: Western Washington University

WEST STANWOOD AND THE 100-YEAR FLOODPLAIN: EXPLORING COSTS AND OPTIONS

By Claire Anderson and Joshua Grandbouche

Executive Summary

Background

West Stanwood is in a 100-year floodplain on the banks of the Stillaguamish River. The location of Stanwood puts the city at a 1% chance of flooding every year. Climate change induced sea level rise is increasing the risks Stanwood faces, making it imperative that residents know how they can best protect themselves in the event of a flood.

The National Flood Insurance Program was created in 1968 as a means of providing federal flood insurance to those living in communities at risk of flooding. Communities, like Stanwood, that participate in this program can acquire flood insurance through the government, or a private insurance company underwritten by the federal government. Annual flood insurance premiums vary depending on the underwriter, location in the floodplain, and design of the dwelling. Standalone private flood insurance may also be an option for homeowners, but contains more nuances than the federal program and must be discussed in depth with the specific private insurance company.

This report discusses important considerations when looking for flood insurance, ways to prepare a home for flooding, and how to potentially lower annual insurance premiums. This document is not meant to eliminate the need for further research, but instead guide the homeowner in the direction of a solution that would best fit their needs.

Floodproofing

Through a survey completed by students under the guidance of Dr. Rebekah Paci-Green, stub wall, slab on grade, and pier and skirt foundations were identified as the main foundation types of homes in West Stanwood. Foundation type is one of a plethora of factors that should be taken into consideration when contemplating floodproofing a home. The two overarching methods are dry and wet floodproofing. The options categorized under wet floodproofing, along with elevation of the home above base flood elevation (BFE), are the only pathways to a potential reduction in annual insurance premiums for those living in West Stanwood. Acquisition of a home by the government or the relocation of a home out of the floodplain are both guaranteed methods of protecting a home from flooding, but are incredibly costly and not likely to occur in Stanwood. Because of FEMA regulations, dry floodproofing cannot be used to bring new, substantially damaged or substantially improved buildings into compliance with local ordinance. Therefore, dryproofing will not be the focus on this report. Please contact the permit office at 360-629-2181 ext. 4511 before beginning construction.

Flood Insurance

The National Flood Insurance Program has been the main provider of flood insurance since its creation. This program also offers a "Write Your Own" policy which allows policy holders to obtain flood insurance through private insurance companies underwritten by FEMA. Recently, there has

been a push to make private flood insurance, not underwritten by the government, more widely available.

In 2012, legislation authorized lenders to accept private insurance but did not provide any guidelines in how to do so. There are pros and cons to both insurance providers. The National Flood Insurance Program must provide those participating in the program with flood insurance, but the program offers a limited amount of coverage and has accumulated large amounts of debt over the years. Private insurance companies offer a more personalized policy and are often able to cover more of a home or personal property, but are not strictly governed and therefore more unpredictable. Since the best option for each homeowner is dependent on multiple factors, flood insurance recommendations will vary from home to home. This report aims to explain the primary factors that each homeowner should consider in their decision-making process. It is also recommended that residents speak with professionals prior to making final decisions on flood insurance.

Cost-Benefit Analysis

The section "What Will This Cost Me? – Floodproofing in West Stanwood" provides an extensive look at the different costs associated with floodproofing a home in West Stanwood, ending with a cost-benefit list for residents to understand whether floodproofing is a viable option for them.

The results are mixed and highly dependent on the characteristics of the individual home. Floodproofing options, such as elevating a home, can vary based on square footage, foundation type, and current elevation of the home. Insurance rates are set by a complex system of tables. Due to the variability in all of these factors within West Stanwood, it does not make sense to generalize best solutions.

Because of the many factors associated with the cost of floodproofing, this report looks at a range of situations. The most generalizable results indicate that homes with a slab on grade foundation that are 2-3 feet below the BFE are the most likely to see enough benefit – in the form of reduced insurance premiums – to pursue elevation. Many homes may see benefit just from installing venting, as 72% of homes have a crawlspace or enclosure under the first floor. But homes that are already elevated on a crawlspace/enclosure and are close to the BFE, such as within 1-2 feet, will not see a large enough benefit in reduced premiums to cover the costs of elevation.

Through a literature review, this report also finds that floodproofing is not associated with increased home value in most situations. Therefore, this cannot generally be counted as a benefit of floodproofing.

One final note is that, while some residents have flood insurance, there is a subset who do not. The main benefit of floodproofing, besides protecting the home and belongings, is the reduced annual insurance premiums. If a homeowner is not paying for insurance, currently, they may not see it as a benefit to have reduced premiums. If a flood struck, they would realize the benefit of owning flood insurance. However, a significant flood has not hit West Stanwood since the 1950s, so many homeowners simply do not seem to be concerned about the issue.

Funding

The vast majority of outside funding for floodproofing comes from the federal government. Most of this funding is on a waitlist or offered only under very stringent conditions. Washington State has

a fund dedicated to flood mitigation, but it is currently unfunded. The City of Stanwood has the option of raising fees, creating taxes, or issuing bonds to create their own municipal general fund for floodproofing.

Under these conditions, the most immediate response strategy is to help homeowners figure out how to fund it themselves. At the end of the section "Funding in a Floodplain," we discuss Home Equity Lines of Credit (HELOCs), reverse mortgages, and other loans that residents of West Stanwood can access.

A City in the Floodplain

Stanwood rests on the land of the Coast Salish people of the Stillaguamish Tribe and adjacent to the waters of the Stillaguamish River. Originally established as Centerville in 1870, Stanwood was given its current name around 1887. To begin farming, dikes were built along the Stillaguamish River and the surrounding sloughs making the river far shallower and virtually impassable by boats. East Stanwood was established in 1914 and the two towns merged into the current City of Stanwood in 1960. State Route 532 was built to connect Stanwood and Camano Island around the same time (Prasse, 2008). SR 532 functions as a levee, protecting downtown Stanwood from high waters; however, when the water is at its highest, the highway loses this ability. Although this has worked in the past, the combination of high tides, rain, snowmelt, and rising sea levels threaten the effectiveness of this in the future.

Stanwood is located within a 100-year floodplain, which means there is a 1% chance of a flood occurring within this FEMA-defined Special Flood Hazard Area (SFHA) ever year. This designation may seem a nonissue to some people, considering the last major flood to affect Stanwood was in 1959. However, flooding is still a risk every year and can cause major devastation to homes, commercial buildings, and transportation at short notice. To put this in perspective, **there is a 26% chance that there will be a flood over the course of a 30-year mortgage.** Stanwood is located within Zone AE; an area considered to be at high risk of flooding according to the National Flood Insurance Program (FEMA (A), n.d.). There have been 18 floods that met requirements for a Presidentially Declared Disaster within Snohomish County since 1962 (Snohomish County, 2017).

Originally, coastal regions were an ideal location for a new town, like West Stanwood. Boat transportation and trade were huge benefits for the community members. However, with the establishment of road systems, boat travel is no longer as important for Stanwood. A resident of Stanwood that recently bought a home near downtown described the difficulty in finding a home in the region: citing low crime rates, affordable housing, cultural ties, and proximity to big cities like Everett or Seattle as draws to living in Stanwood despite its location in the floodplain.

In 2016 the EPA published their findings regarding the frequency of flooding in several cities across the United States during the 1950s and 2010s. Their research used readings from 27 flood gauges throughout the country. Between 1950 and 1959 the average number of flood days per year was 0.90 in Seattle, WA. In the 2010s, the average number of flood days per year was 3.33. This change may not seem significant, but other areas of the country are experiencing drastic increases in flooding and it is important that places like Stanwood are prepared for the effects of climate change now and in the future. Wilmington, NC has seen a rise in flooding from an average of 0.90 flood days per year in the 1950s to 49.17 days in the 2010s. Annapolis, MD has seen a rise from an average of 4 flood days per year in the 1950s to 46.33 (EPA, 2016). The research suggests that the Puget Sound region may be spared some of these effects for longer than other regions, due to factors such as cooler waters, tectonic activity, and the unknown nature of variables such as ice-sheet instability. A 2010 study of climate models focused on the Pacific Northwest illustrated how significant these "poorly-known" factors could change the results of the models. Estimates ranged from sea level rise similar to twentieth century values of 20 centimeters all the way up to 1.3 meters over the time period 2000-2100, the worst-case scenario (Mote & Salathé, 2010). These climate induced changes require the city of Stanwood to be proactive

Base Flood Elevation (BFE)

- BFE is defined as the height floodwater is expected to rise during a 100-year flood event.
- Stanwood's BFE is 13ft.

in protecting the community from the destruction caused by flooding. Adapting to the risks is likely the best option for the City of Stanwood now, but it is only a matter of time before Stanwood begins to see the effects of climate change like those on the East Coast and along the Gulf Coast are currently experiencing.

Stanwood & Snohomish County's Participation in the NFIP

The National Flood Insurance Program (NFIP) is a product of legislation from 1968 that aims to create a better way to deal with flood control and relief. Originally operated under the Federal Insurance Administration (FIA) in the Department of Housing and Urban Development, the NFIP and FIA were transferred to the new Federal Emergency Management Agency (FEMA) in the Department of Homeland Security in 1979. The goals of the program are to **transfer financial burden for flood losses from the taxpayer to property owners in the floodplain through insurance premiums, provide financial aid for smaller flood events, steer development away from floodplains, and demand flood resistant construction** for new, substantially improved, or substantially damaged buildings (FEMA (B), n.d.).

The NFIP consists of three parts: mapping, insurance, and regulations. Over the years FEMA has mapped communities throughout the country that reside in a floodplain like Stanwood. These maps help to regulate construction in flood prone areas, determine who needs flood insurance to receive loans, and how much flood insurance policies should cost a homeowner. Flood Insurance Rate Maps (FIRMs) contain hazard information that help guide new construction to prevent flood damage. Buildings built before these maps existed are known as "pre-FIRM" buildings. Their premium rates are subsidized by the NFIP so owners do not pay premiums reflecting the true risk of flood damage. Post-FIRM buildings premium costs are based on how protected they are from flooding (FEMA, 2009).

For many years the NFIP charged flood insurance premiums that did not reflect the true susceptibility to flooding of the homes it was insuring. This lack of efficiency and price signaling, as well as the devastation caused by Hurricane Katrina and Hurricane Sandy, caused the program to accumulate billions of dollars in debt. The Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) was an attempt to bring these premiums closer to **actuarial rates** but resulted in huge backlash as homeowners saw their premiums skyrocket. BW-12 also affirmed that lenders could accept private flood insurance but failed to provide guidelines that could make this a reality. The Homeowner's Flood Insurance Affordability Act of 2014 (HFIAA) modified BW-12 to lower policy premiums and prevent future rate increases.

Actuarial Rates
• Actuarial rates are flood insurance premium prices that reflect the risk of flooding a building is exposed to • Before the BW-12 policyholders were paying non-actuarial rates, which factored into the debt that the NFIP accrued

Snohomish County has been part of the NFIP since 1984. The NFIP is voluntary and a community must be a part of the NFIP for its citizens to have access to federal flood insurance. As a part of this program, communities agree to issue or deny development and building permits, inspect construction within the floodplain to ensure it is in compliance with local ordinances, keep records of development, help with floodplain maps, and assist residents in accessing information regarding living and building in a floodplain. Homeowners insurance does not include coverage for flooding, making flood insurance essential when living in a high-risk area (FEMA, 2017).

It is important for homeowners to understand how FEMA defines flooding, so that it is clear when they will be covered. FEMA defines flooding as a "Temporary partial or complete inundation of at least 2 acres of normally dry land or of at least the policy holder's property and one other property caused by:

- Overflow of inland or tidal waters; or
- Unusual and rapid accumulation or runoff of surface waters from any source; or
- Mudflow; or
- Collapse of land near a shore of a lake or similar body of water due to erosion or undermining by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above"

(FEMA, 2017)

Figure 1. FEMA's National Flood Hazard Layer (NFHL) Viewer allows those located in a floodplain to enter their address or city into the interactive online map to access flood data about the area. Stanwood's flood data have not been updated since 1999, so no digital data is available. Instead, the NFHL viewer allows a downloadable map of the Stanwood area (FEMA (A), 2018).

Appropriate Floodproofing for Your Home

There are several options for preparing a home for flooding, but not all options work for every home. Knowing the available options helps the homeowner determine the most economically feasible and structurally appropriate methods for floodproofing that could result in a reduction in insurance premiums and provide peace of mind. Since, according to FEMA, dryproofing is not allowable in the area of study, the methods in this report will focus on wetproofing. The following sections discuss several options for wet floodproofing depending on the home's foundation type. The most appropriate type of floodproofing is very specific to the home and impossible to fully cover in a report of this scope. Please **consult a licensed professional** before beginning construction to ensure you are picking the best option for your home, adhering to all state and local building codes, and have the proper permits.

		Most Appropriate Foundation Type	Relative Estimated Cost*	Potential Premium Reductions
Wet Floodproofing	Flood vents	Pier and beam	$	Yes
	Elevated/Floodproofed utilities	All	$	No
	Basement Infill	Pier and beam	$$	Yes
	Abandon lowest floor	All	$	Yes
	Elevation	All	$$$	Yes
	Acquisition/Relocation	N/A	$$$	N/A

*Costs vary based on condition of the building, size of the area, and quality of the product.

Table 1. Floodproofing methods that will be discussed in the report below. Some of the methods provide a reduction in premiums while others only attempt to prevent flood waters from coming into the home or reduce damage to the home but are not reflected in insurance premium reductions. Check with your insurance provider before beginning construction to confirm premium reductions.

Foundation Types

A foundation type survey, developed under the guidance of Western Washington University faculty member, Dr. Paci-Green, was implemented in West Stanwood. This survey determined that the three main types of foundations for residential buildings found in Stanwood are stub wall, slab on grade, and pier and skirt.

Stub Wall

A stub wall foundation, also known as a stem wall, is a raised slab or system of beams created by constructing walls around the perimeter of the foundation and then filling that in with dirt. The actual stub walls anchor the foundation of a home to the ground. Stub walls are typically cinder blocks reinforced with steel rods and concrete. Cinder blocks are laid in continuous rows covered in concrete to create a seamless connection between foundation and wall (Do It Yourself, n.d.). The home is then built on the slab or beams laid on top of the stub wall (Figure 2A).

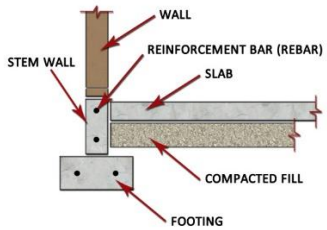
Slab on Grade

Concrete is poured on well-packed soil or crushed gravel and the home is built on top of this slab. Soil with a lot of clay in it, like Stanwood's Puget Silty Clay Loam, requires extra reinforcement to prevent the concrete from cracking as the soil moves beneath (NCSS, 2000). The concrete is strengthened using wire mesh, rebar, or steel and is most often used in areas where the ground does not freeze (Concrete Network, n.d.). These homes do not have basements or crawlspaces and are likely exempt from some of the floodproofing options listed below (Figure 2B).

Pier and Skirt

This foundation type is also known as post and beam. Piers are often made from pressure-treated wood, poured concrete, or bricks. The skirt around the piers is made from concrete, wood, or masonry. These piers are placed on footings to increase stability and support for the home. Homes with this type of foundation have a crawlspace under the home allowing access to utilities after the home is finished (Malcolm, 2017). Building a home with this type of foundation on Stanwood's clay rich soil likely required boring rebar deep into the ground until it hit bedrock to provide stability on the soft soil (Figure 2C).

A.



B.

C.

Figure 2. A diagram showing a stem wall (A) ("Stem Wall Foundation," n.d.), a slab on grade foundation before it has been built on (B) ([Concrete Slab Foundation], n.d.), and a pier and beam foundation partially covered by a skirt (C) (Green Building Advisors, n.d.).

Sandbagging

Sandbags, as the name would suggest, are burlap or plastic sacks filled with sand. Sandbagging is a temporary method of averting flood waters and requires human intervention. Stanwood has resorted to the use of sand or sandbags during past threats of flooding. When the city knows the water is going to be particularly high, sand has been brought in to the south side of SR 532 to create a berm to hold back waters and then removed when the waters receded. In 2010, residents of the town came together to fill sandbags in preparation for flooding that year. In this event, parts of Pioneer Highway, Marine Drive, Norman Road, and Larson Road were flooded, but downtown Stanwood was not. An emergency declaration

Human Intervention

- Floodproofing measures that require the homeowner or another party to deploy the flood mitigation measure i.e., closing or temporarily putting up flood gates when warned of a coming storm

was issued to free up federal funds and make resources available for the cleanup (Martin, 2009).

Sandbagging is a short-term fix and does not result in a discount on insurance premiums. Regardless, they are a useful aid in protecting your home at short notice. A 14"x 26" sandbag costs roughly $40 and is available online or at most hardware stores.

Wet Floodproofing

Wet floodproofing seeks to protect the contents and structure of a home by allowing water to move through the building in a controlled way. Wet floodproofing measures are permanent and do not require human intervention in the wake of a flood. This process usually includes flood vents, elevation, protecting utilities, and the use of flood resistant materials.

Flood Resistant Materials:

- Glazed brick, concrete or glass blocks
- Steel trusses, headers, beams, and panels
- Naturally decay resistant lumber or recycled plastic lumber
- Metal doors, cabinets, and window frames
- Sprayed polyurethane foam

Flood Vents

Installing flood vents in the crawlspace or basement of a home allows water to move in and out of the home during a flooding event. The NFIP requires that areas below the BFE and enclosed by solid walls have venting. These areas are unlivable and must remain that way to receive premium discounts. There must be one square inch of opening in the wall of the foundation for every square foot of the home. The number of flood vents required depends on the square footage of the home and the size of the vents. There must be a minimum of two openings in the outer walls, water must be able to flow uninhibited through the vents, and the bottom of the vent must be less than 1 foot above grade (FEMA (B), n.d.).

An 8"x16" FEMA compliant engineered flood vent found online costs approximately $85.

Elevated/Floodproofed Building Utilities

Elevating utilities includes moving utilities such as pipes, water heaters, meters and anything else electrical, mechanical, or plumbing-related above the BFE. Floodproofing building utilities entails encasing them in materials resistant to water damage. Flood resistant materials are able to withstand flood waters for at least 72 hours without resulting in significant damage. Significant damage is greater destruction than requires a small amount of cleaning or low cost outer repair. Utilities should be at least one foot above BFE and wires should be placed overhead if possible. Remember to adhere to any local and state building codes and obtain necessary permits when elevating utilities.

Basement Infill

Homes with basements have the option to fill a basement below the BFE up to grade. The remainder of the area above ground but below the BFE will require flood vents like those mentioned above. Downsides to this process include the loss of storage or useable space of the basement area. Infill usually lasts between 30-50 years and does not require any annual maintenance.

What does FEMA define as a basement?

- Part of a building where all sides of the floor are below ground level
- Still true, even if the area is living quarters

Filling a basement can be an expensive endeavor. One senior estimator at Holt Construction said that filling an 8-foot-tall, 1,500 square foot basement with a concrete mixture that includes gravel could cost approximately $50,000 (Upadhye, 2013).

Abandon Lowest Floor

Much like the option to fill in the basement of a home, abandoning the lowest floor also results in the loss of storage and livable space. This option does not include the cost of filling in an entire floor to bring it up to grade but does require the use of automatic flood openings. As with basement infill, the reduction of annual insurance premiums is decided on a case by case basis, but generally the higher the lowest floor is above the BFE, the greater the reduction in premium costs.

Please contact the Permit Specialist at 360-629-2181 ext. 4511 to determine the allowable actions and the necessary forms and permits before going forward with any type of floodproofing. Permit Applications can be found on the *Forms, Permits, and Applications* directory page at www.ci.stanwood.wa.us/forms.

Acquisition/Relocation

Local and state governments can initiate a program to buyout homes that are frequently flooded. FEMA will usually fund 75% of the cost of acquisition, with the state or city covering the rest of the bill. Programs have been established in areas within New Jersey where repeated flooding is an issue. Continuing to live in areas that are prone to flooding is dangerous for the home owner as well as those rescuing people from flooded homes. Floods and storms weaken homes and encourage the growth of mold that hold health risks for everyone, especially children and the elderly. Once these homes are bought, they are torn down and designated as open space. Stanwood does not currently see flooding on a scale that would make a program like this economically efficient.

Relocating a home is done by detaching the home from its foundation, placing it on a truck, and moving to a new lot. Understandably, this can be very costly as another lot is needed to relocate the home to as well as paying for moving professionals. Most homes in solid structural condition can be moved. Single- and multi-story homes, slab on grade, brick homes, and homes with crawlspaces or basements can all be moved (FEMA (A), 2008).

Elevation

Elevating a home is possible in areas with slower moving floodwaters. Stanwood's Puget Silty Clay Loam is low quality soil that drains poorly and has little to no bearing capacity, which makes it sub-optimal for an elevation project (NCSS, 2000). However, homes in Stanwood have been elevated so the option is available. The process of elevation requires professional home movers to disconnect utilities within the home, disconnect the home from the existing foundation, jack the home up, and create a temporary foundation for the home. If the home has been substantially damaged or substantially improved, then it is required by Stanwood's flood ordinance to elevate the home to or above the BFE.

The horizontal and vertical forces applied to the home by wind or water, soil conditions around the area, and other hazards need to be considered when determining the best approach to elevation. Homes with masonry walls are typically elevated in one of two ways: building the existing walls up and raising the first floor to above the BFE or forsaking the bottom floor completely and converting

it to a garage or storage space. Frame homes are typically elevated on extended walls or piers (FEMA (B), 2008).

A home that is elevated will need staircases built to the new height of the home. It will also need the services of plumbers, contractors, and electricians. Elevating a home is an extensive and expensive option, but incredibly effective. It also results in the reduction of insurance premiums and requires no action by the homeowners in the wake of a coming flood (FEMA (B), 2008). Although the home would be safe from water damage, flooded streets increase risk in performing daily tasks outside of the home and make it very difficult for emergency vehicles to get where they need. A home elevated above the BFE does not ensure safety in a flood event and all measures to increase safety should be taken.

Flood Insurance

Flooding is not covered under typical home insurance, meaning that a flooding event can leave a homeowner with thousands of dollars in damage and no coverage. This section provides a brief overview of the options for insuring a home and its contents. **Speaking with an insurance agent is the best method** to determine what policy and deductible is right for you.

National Flood Insurance Program

The NFIP is offered to anyone who lives in a community that participates in the program. This includes owners and renters of homes, owners of buildings under construction, owners of residential condominiums, and condominium associations. There are three types of Standard Flood Insurance Policy Forms offered to those looking for flood insurance under the NFIP; the Dwelling Policy Form, General Property Policy Form, and the Residential Condominium Building Association Policy (RCBAP) Form. RCBAP is not as relevant to Stanwood residents and will not be addressed further. Coverage for personal property within your home is available through the NFIP but must be purchased separately. To apply for flood insurance, you will need to know the flood zone your home is located in, complete an application form, and potentially provide an elevation certificate or photos (FEMA (C), n.d.).

There are several factors that determine the price of a flood insurance premium. Amount of coverage, deductible amount, flood zone, location, age of the home, number of stories, number of people living in the household, and the home's elevation relative to Stanwood's BFE of 13 feet.

The NFIP is currently going through a reauthorization process. The program expired September 30, 2017 and has since been in a period of limbo. The National Association of Insurance Commissioners (NAIC) offered several suggestions for the reauthorization of the program to try and remedy some of the weaker parts of the NFIP. Their suggestions included:

- Reauthorizing the program for a minimum of ten years to reduce uncertainty around the insurance and housing markets
- Supporting a gamut of legislation that would help private insurance become more available for customers
- Increasing transparency between FEMA and its policyholders regarding the decision-making process for creating and updating flood maps
- Considering affordability impacts on policyholders when altering the NFIP policy (NAIC, 2017)

Insured under Building Property Coverage	Insured under Personal Property Coverage
Building and its foundation	Clothing, furniture, electronic equipment
Electrical and plumbing systems	Curtains
AC equipment, furnaces, and water heater	Portable and window air conditioners
Refrigerators, cooking stove, dishwasher	Carpets not included in building coverage
Permanent carpeting over unfinished floor	Clothes washers and dryers

Table 2. National Flood Insurance Program Summary of Coverage - Refer to your policy for a complete list of what is and is not covered; there are different limitations for areas below the lowest elevated floor and basements.

Mandatory Purchase Requirement

Generally, there is no minimum coverage requirement for flood insurance that the homeowner is choosing to purchase. If a lender requirement, such as taking out a loan, is the reason flood insurance must be purchased, then there are guidelines.

In most cases, the amount of flood insurance required is at least the lesser of the three options:

- The balance of the loan
- Maximum amount available under the NFIP
- Total insurable value of the property

(FEMA (B), n.d.)

Dwelling Policy Form

This is the most commonly used policy to insure homes and single-family dwelling units in condominium buildings. This policy is available to those who own homes, renters and condominium unit owners, as well as those who own residential buildings with two to four units. This policy covers home and additions or extensions attached to the main home by a rigid exterior wall. It also covers detached garages, but not those used for living, business, or farming purposes. The Dwelling Form Policy provides coverage for building property up to $250,000 and building contents up to $100,000. Meeting with an insurance agent is the best way to get a clear idea of what is covered under this policy (FEMA (A), 2015).

General Property Policy Form

This policy insures non-residential buildings and five or more family residential buildings that are uninsurable under the RCBAP. This policy insures residences that include hotels or motels, apartment buildings, dormitories, and assisted-living facilities. This policy also insures non-residential buildings such as shops, restaurants, farm buildings, factories, warehouses, schools, and places of worship (FEMA, 2012).

Write Your Own Program

The Write Your Own (WYO) Program is a service of the National Flood Insurance Program and allows private insurance companies to create and provide insurance for homeowners while the federal government has responsibility for underwriting losses. Policies provided by the insurance companies that are part of the WYO program all offer the same coverage (FEMA (B) 2018).

Private Flood Insurance

When considering private flood insurance rather than that which is offered by FEMA, it is very important to know exactly what is included within the policy. As mentioned above, anyone can apply for flood insurance through the NFIP if they live in a participating community like Stanwood. Private insurers do not always provide flood insurance for homes if the risk is too high and mortgage lenders are sometimes hesitant to accept private flood insurance.

Just like with the NFIP, private insurance usually has some length of waiting period before going into effect. Waiting periods for private insurance may vary anywhere between 15 to 30 days. Private

insurers may be able to offer a higher level of coverage than the NFIP by exceeding $250,000 without an Excess Flood Insurance Policy. They may cover more losses as well as temporary living space, such as a hotel, if the home is unlivable after a flood. The NFIP does not cover such things. Lloyds of London is a private insurer that currently operates in the United States providing coverage to those with homes that exceed the worth of the $250,000 base coverage the NFIP offers (CBS News, 2017).

Private insurers are more likely to charge actuarial rates that reflect the true risk of flood damage to a home. This can be a positive effect as it discourages building in a floodplain, but for those already living in West Stanwood this can mean very expensive premiums. Some worry that private insurance companies will only agree to insure those that are not in as much risk and leave the precarious properties to the NFIP, further pushing it into debt. Those with private insurance also run the risk of being dropped after a major storm without paying their claims, leaving homeowners without assistance when it is desperately needed.

As mentioned above, the Biggert Waters Act mandated that mortgage lenders accept Private Flood Insurance. Since 2012 when the act was passed, there have not been any regulations released that outline when private insurance is acceptable. According to representatives of a local bank in Stanwood, at this point, financial institutions accept private policy if it is as broad as the NFIP policy in terms of cancellation, coverage, loss payee, portability, lawsuit time frames and more. The policy is reviewed by the institutions external insurance resources in addition to an internal review before it is accepted by the bank and documented for their files.

Community Rating System

The Community Rating System (CRS) is a program that incentivizes participating communities to prepare their buildings for potential flooding. A community must be a part of the NFIP to apply for the CRS. Communities participating in the CRS are put into classes between 1 and 10 representing the lengths to which they go above and beyond the NFIP's minimum requirements of flood preparedness. Communities that are a class 9 receive a 5% discount on insurance premiums, receiving 5% more as they move down in class number, maxing out at class 1 with a 45% discount.

The CRS discounts are based on 18 activities where communities can earn credits that better their class standing. These credits fall under the four categories of public information, mapping and regulations, flood damage reduction, and flood preparedness. Snohomish County has operated under the NFIP guidelines since 1984 and has been a part of the CRS since 2006. Snohomish County is a class 5 and receives 30% reduction in flood premiums each year for properties within the Special Flood Hazard Areas and a 10% discount for those that are not.

A consultant was hired in January of 2013 to help Stanwood apply for the CRS by October 2014. During this process it was determined that flooding concerns regarding the police station and city hall would need to be addressed before applying for the CRS. Plans are currently in the works for addressing these needs as Stanwood has still not been accepted in to the program.

What Will This Cost Me? Floodproofing Costs in West Stanwood

The big question in floodproofing is the cost. There are many different ways to protect property from flooding: dry and wet floodproofing, elevation, acquisition and relocation, to name a few. The costs for these vary depending on what is being done, the current state of the home, its location in the floodplain, and a myriad of localized factors. While we cannot account for every variable that goes into floodproofing, using data on the homes in West Stanwood, we can create a general impression of what can be done to a home there. **Talking to a local contractor is the best bet to understand what it takes to protect a home**, but this guide will help to lay out some options.

The Sustainable Communities Partnership program at WWU worked with the City of Stanwood and West Stanwood homeowners during the summer of 2017 to collect elevation and other data related to homes in the floodplain. 44% of homes that were measured for elevation had residents who filled out surveys to provide additional information, as seen below. Assuming responses from the 44% are relatively representative of the broader group, we are able to provide some general recommendations for homeowners in West Stanwood. We have identified the most important things for homeowners to consider when thinking about floodproofing their home.

Important Things to Consider When Floodproofing

Square Footage of Homes:

- Avg: 1170 ft²
- Max: 2250 ft²
- Min: 468 ft²

There are many factors relevant to determining the cost of floodproofing a home, but square footage of a home is one of the most important. The square footage of a home plays a large part in determining the cost of elevation, one of the methods of floodproofing that will reduce insurance premiums. The larger the home, the more it is likely to cost. Luckily, most homes in Stanwood's floodplain are not too large, with an average size of 1170 square feet. Compared to the average size of homes nationwide, 1867 square feet, West Stanwood homes are smaller (Census Bureau, 2011). This will help keep costs down and make floodproofing more affordable.

Front Door Height (Above Sea Level):

- Avg: 10.48 feet
- Max: 17.74 feet
- Min: 7.34 feet
- 92% of surveyed homes are below BFE

Next, the home's elevation relative to sea level determines how deep the home is in the floodplain. The farther you get away from the flood level, the lower insurance premiums become and the less damage faced during a flood. This is where the most cost savings can be seen – reduced flood insurance premiums can offset the cost of floodproofing, especially if the homeowner plans to stay there for a while.

Unfortunately, the average front door height in Stanwood is 10.48 feet above sea level. The 100-year flood level is roughly 13 feet, at least for insurance purposes, and 92% of homes are below the BFE in West Stanwood. Costs to raise these homes out of the floodplain vary depending on the depth of the home. Raising a home seven feet is more expensive than raising it four feet.

There may be some confusion about the BFE. Through conversations with both FEMA representatives and those involved with floodproofing/flood insurance in the city, a variety of numbers were given on BFE. These ranged from 10 feet to 13 feet. In trying to resolve this, it was discovered that the number varied depending on which vertical datum (what level is considered sea level) was being used to calculate flood depths. Essentially, the 10 feet and the 13 feet are the same

number – just depending on how you view sea level. For the purposes of this report and for the measurements taken of homes in Stanwood, the BFE is 13 ft.

One possibly quick and easy way for homeowners to reduce their flood insurance premiums is to get an elevation certificate for their property. The majority of surveyed homeowners were unsure if they had an elevation certificate for their property, while only 15% of those surveyed said that they knew they had one. There are two methods available to Stanwood homeowners if they are unsure, or do not have an elevation certificate:

1. If a property required an elevation certificate for the building permit from the city, Stanwood may have the certificate on file. More information on the Public Records request process can be found at http://www.ci.stanwood.wa.us/cd/page/elevation-certificates.
2. A homeowner can purchase a new certificate through a local surveying company. Prices range nationwide on survey work, from a couple hundred dollars to several thousand and depend on a variety of factors. After researching the rates of some local surveyors, it appears that a certificate would cost roughly $780 (BT Surveys Inc., 2016).

Elevation Certificates:

- 51% don't know
- 15% said yes
- 32% said no

Many homes in Stanwood may not have elevation certificates due to their place in the floodplain. Currently, two of the homeowners surveyed have a home above the BFE with insurance but no elevation certificate. One individual had a home above the BFE and had insurance but was unsure about an elevation certificate. This is lost savings. The reason most homes do not have elevation certificates is most likely due to the fact that 92% of households are below the BFE. However, there may be some misunderstanding here – obtaining an elevation certificate does not automatically raise or lower one's rates, only reporting the certificate to FEMA will do that. In fact, the path to floodproofing often begins with an elevation certificate, as it will help to identify what steps can be taken and what cost to protect a home.

How the home is anchored to the ground controls which options a homeowner has to protect their property. For example, if the home is directly on top of the foundation (slab on grade), wet floodproofing would not be an option without some sort of elevation. This is due to the need to have a crawlspace under the home to install the vents for wet floodproofing. Dry floodproofing and elevation are potential options for slab on grade buildings, although dry floodproofing may depend on what is allowable under Stanwood's housing ordinances and where the home sits in relation to the BFE, as usually only three feet of property can be dry floodproofed.

Foundation Type:

- 20% have Slab on Grade
- 47% have Stub Wall
- 25% have Pier with Skirt
- 8% are undetermined

All forms of floodproofing may be available to homes with stub walls or resting on piers, as this easily allows venting to be installed. However, the home may still need to be elevated to raise it over the BFE. Wet floodproofing reduces premiums, but not by as much as elevation.

Renting can present larger barriers to flood mitigation. Since tenants do not own the building, they are unlikely to accept a raised rent to cover floodproofing costs. However, landlords only pay for building flood insurance– tenants pay for property flood insurance – so landlords would not see as

many benefits from reduced premiums. These are disincentives for action on flood protection. Since just under half of the surveyed residents rent their living situation, this can be a major barrier for the city in helping mitigate flood damages, especially to those of lower income who are renting. Landlords may need to be contacted directly to determine what would create a situation where they implement flood protection measures.

Renting vs. Owning:

- 42% rent
- 54% own
- 4% listed for sale

Rate Insured:

- 16% don't know
- 71% said yes
- 13% said no

Although every home surveyed was in the floodplain, only 71% reported having flood insurance. This could be due to a variety of factors. FEMA's map (Figure 1) indicates that all of West Stanwood is in the floodplain zone AE, which requires that homes have flood insurance. From conversations with local mortgage lenders and banks, the banks require flood insurance when FEMA indicates that a home is in the floodplain. This can be through the NFIP or a private insurer, but it is still required. Therefore, homeowners may be purchasing the homes outright, or avoiding the requirement in some other way. This is an area where Stanwood can improve its flood protection relatively cheaply – if more homes are covered by flood insurance, funds will be more readily available to them after a disaster. Also, maintaining flood insurance in town will improve Stanwood's application to be in the CRS program, which will reduce premiums for all.

Does Floodproofing Increase Home Value?

The short answer is that we're not really sure. Oftentimes, in the literature on floodproofing, an increase in a home's resale value will be listed as a benefit of undertaking the cost of floodproofing. Unfortunately, studies on the relationship between home values and floodplain location have been relatively inconclusive. An Army Corps of Engineers literature review found that occasionally there is a discount for being in the floodplain, especially for homes that are already low value (below $50,000). However, in other case studies the Army Corps found **that there is no noticeable discount**. One study even found a larger discount for being in the 150-year floodplain over the 100-year floodplain, at odds with what logic would suggest (Chao, 1998).

Homes that have flood insurance or some method of floodproofing have already taken into account the expected primary damages from flooding (what is damaged by the flood, not including lost income and other economic costs), and therefore **are more likely to be discounted** according to what those damages are worth. Yet many have short-term memories when it comes to flooding: one study uncovered an increase in flood insurance in a community immediately after flooding that quickly faded as the flood became distant in people's memories. On average, **it took 9 years for the effect of the flood to decrease to nothing, in terms of new insurance policies**.

This is consistent with the problems encountered by economists looking to find the economic value of environmental services, such as clean air and water. Economists use a research method called contingent valuation, where people are offered intensive surveys that try to pin down how they would price the benefit from a clean river, for example. However, people's unfamiliarity with the "market" for a clean river leads them to over- or under-value these goods that they are not used to "buying." This same phenomenon seems to be applying to floods – since floods happen relatively infrequently in people's lives, they have a hard time understanding the actual costs of them.

All of these issues extend to elevating or floodproofing a home. **Small increases in home value may be seen, but no data consistently suggests that taking actions to protect a home from floods does anything except lead to reduced premiums.**

In terms of a cost-benefit analysis, home value is not a factor when deciding whether or not to floodproof a home. **One thing that may be worth considering is the effect on the neighborhood**. Limited reporting from Stanwood residents has revealed that rising flood insurance rates, due to the home's placement in the floodplain, have been increasing rentals and decreasing homeownership due to the ability to defray costs to renters**. While this is a correlation at best and homeownership has been declining significantly since the recession in 2008 nationwide**, one possible outcome of floodproofing would be a stabilization of the homeownership/rental ratio in West Stanwood as insurance rates would be reduced.

Is it Worth it to Floodproof?

While floodproofing a structure does cost money up front, it often pays for itself in reduced flood damages and flood insurance premiums. For residential buildings, both elevation and wet floodproofing leads to reduced premiums under the current structure of the NFIP. FEMA has a rate schedule designed around how a home's elevation relates to the BFE of the designated area, and significant savings can be seen from elevation of only a foot or two. Most homes in West Stanwood need to be raised at least four feet, which increases elevation cost but there is also an insurance premium reduction.

Combining this coverage information with the rates, a single family, one story home with no basement that is one foot below BFE would pay a total of $4,311 annually for basic and additional building and contents coverage ($350,000 total coverage). An identical building raised one foot above BFE would pay $981.50 annually for the same amount of coverage. The difference between these two payments on a monthly basis is $277.46 saved, from a monthly premium of $359.25 to a monthly premium of $81.79. This is a savings of 339% under the original value.

	1 Foot Below BFE	1 Foot Above BFE
Building Premium	$3,631	$769
Contents Premium	$680	$212.50
Total Annual Premium	**$4311**	**$981.50**

Table 3. A breakdown of annual premium costs based on BFE

Do not be too alarmed by the size of these premiums – most do not need full coverage, and the average annual premium nationwide is usually under $1,000. What's important to take away is the savings that come from elevating a home only a few feet, and the number of variables at play. What amount of coverage is chosen, the elevation of the home, the size of the home, whether or not there is a basement/crawlspace, and other factors can all influence premiums. If your community is part of the CRS program offered by FEMA – which Stanwood currently is not – premiums become even lower.

The real question, though, is whether or not the savings on premiums can make up for the cost of elevation. Again, each home is different, and the answer depends on a variety of factors. However, knowing the reduction in insurance premiums received after elevating as well as the cost of the elevation will easily allow one to determine if elevating their home can save money over a certain time period. The following tables (4-6) summarize the information on insurance premiums.

Elevation of Lowest Floor (BFE = 0)	Rate for 1 Floor, 1 Family (No Basement/Crawlspace) [Basic/Additional]	Rate for 1+ Floor, 1 Family (No Basement/Crawlspace) [Basic/Additional]	Rate for 1+ Floor, 1 Family [Basic/Additional]	Rate for 1 Family Mobile Home [Basic/Additional]
+4 ft.	$0.28 / $0.08	$0.24 / $0.08	$0.24 / $0.08	$0.30 / $0.16
+3 ft.	$0.32 / $0.08	$0.27 / $0.08	$0.27 / $0.08	$0.35 / $0.18
+2 ft.	$0.47 / $0.09	$0.38 / $0.08	$0.32 / $0.08	$0.51 / $0.23
+1 ft.	$0.87 / $0.13	$0.69 / $0.08	$0.46 / $0.08	$0.96 / $0.38
0 ft.	$2.02 / $0.20	$1.54 / $0.08	$0.68 / $0.08	$2.22 / $0.67
-1 ft.	$5.26 / $0.25	$3.89 / $0.10	$1.15 / $0.08	$5.62 / $1.07
-2 ft.	$7.51 / $0.52	$5.07 / $0.38	***	$6.20 / $2.27
-3 ft.	$9.25 / $0.91	$7.56 / $0.15	***	$8.17 / $3.04

Table 4. Building Coverage (Regular Program, Post-FIRM Construction Rates, Zone AE)

Note: Rates are per $100 of coverage, in dollars, annual, and current as of October 2017 ("NFIP Flood Insurance Manual"). Information on how to interpret these tables can be found below Table 6.
***rates are calculated using Specific Rating Guide and vary based on many factors

Elevation of Lowest Floor (BFE = 0)	Rate for Lowest Floor Only Above Ground Level (No Basement/Crawlspace) [Basic/Additional]	Rate for Lowest Floor Above Ground Level + Higher Floors (No Basement/Crawlspace) [Basic/Additional]	Rate for More Than 1 Floor [Basic/Additional]	Rate for 1 Family Mobile Home [Basic/Additional]
+4 ft.	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.12
+3 ft.	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.12
+2 ft.	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.12	$0.38 / $0.16
+1 ft.	$0.49 / $0.12	$0.38 / $0.12	$0.38 / $0.12	$0.64 / $0.25
0 ft.	$0.96 / $0.12	$0.70 / $0.12	$0.38 / $0.12	$1.24 / $0.39
-1 ft.	$1.64 / $0.36	$1.25 / $0.22	$0.51 / $0.12	$3.12 / $0.67
-2 ft.	$3.36 / $0.38	$2.66 / $0.16	***	$5.45 / $0.95
-3 ft.	$5.00 / $0.31	$4.05 / $0.14	***	$7.19 / $1.67

Table 5. Contents Coverage (Regular Program, Post-FIRM Construction Rates, Zone AE)

Note: Rates are per $100 of coverage, in dollars, annual, and current as of October 2017 ("NFIP Flood Insurance Manual"). Information on how to interpret these tables can be found below Table 6.
***rates are calculated using Specific Rating Guide and vary based on many factors

Coverage also does not usually extend to the entire value of the home or contents. Additional value can be covered by taking out multiple policies. For the average home, a homeowner can take out a total of $250,000 in coverage for their building and $100,000 for contents.

Coverage	Basic Insurance Limits	Additional Insurance Limits	Total Limits (Basic + Additional)
Single Family Building	$60,000	$190,000	$250,000
2-4 Family Building	$60,000	$190,000	$250,000
Other Residential Building	$175,000	$325,000	$500,000
Residential Contents/Property	$25,000	$75,000	$100,000

Table 6. Insurance limits by dwelling type ("NFIP Flood Insurance Manual")

Note: to read Tables 4 and 5, the numbers in the leftmost column indicate elevation relative to BFE. Therefore, all dollar amounts in the row "4+" indicate insurance rates for a home whose front door height is 4 feet above BFE. Of course, different types of homes require different rates, and the remaining columns separate rates by home type. The ones mentioned above are in this order: rates for a single-story home with no basement, a multi-story home with no basement, a multi-story home with a basement, and a mobile home. Table 4 covers rate information for building coverage – the physical structure of the home – and Table 5 provides rate information for personal property in the home. Furthermore, there are two rates for each combination of home type and BFE elevation – the left rate in a cell is for basic coverage and the right rate in a cell is for additional coverage (the differences in coverage are discussed in Table 6). All rates are per $100 of coverage and collected annually. The coverage amounts available for both a residential building and the personal property inside/around it are provided in Table 6. The rate information in these tables is not comprehensive with respect to all of the factors FEMA looks at and this report recommends speaking to an insurance professional when discussing options for a specific home.

Elevation costs can be even trickier to pin down due to the number of factors. Unfortunately, it was difficult to get a quote from local contractors. HomeAdvisor.com offers a range of elevation costs based on real projects in the greater Seattle area, and this range can serve as a proxy for Stanwood.

	Average	Typical Range	Low End	High End
Cost	$16,061	$5,857 - $29,666	$2,100	$30,000

Table 7. Home Elevation Costs in Seattle, WA ("Learn How Much It Costs to Raise a Foundation", n.d)

Using these cost ranges, **several scenarios are developed that illustrate what a typical Stanwood homeowner might face when looking to elevate their home**. The average American spends 13 years in their home, so any investment made in a home should reasonably pay for itself within that 13-year window (Corbett). The way a project pays for itself is through reduced premiums, considering there is no definite or consistent correlation between home value and floodproofing. When looking at the insurance savings from raising a home and the elevation, we see that for the most part, raising a home can be an expensive project that may not pay itself back in the allotted timeframe.

At the low end ($2100 to raise the home), raising a multi-floor home with some sort of basement from one foot below BFE to one foot above BFE would result in annual savings of $446.50 on insurance premiums. In just under five years, the savings on insurance would pay for the project.

However, the lowest part of the average cost range is $5,857. Those predetermined annual savings would not pay off that project for just over 13 years. Now, if that same home was raised three feet above BFE, the savings would be significant enough to compensate for the elevation cost in 10.5 years. Note that none of these calculations take into account inflation in the economy or discounting

– the idea that an amount of money in the future is worth less than that same amount of money right now. If those were included as part of the calculation, the repayment period would be lengthened, possibly considerably. If elevation projects exceed this amount ($5,857) – and that is quite possible – projects become less possible to justify.

Raising a home from significantly below the BFE to above the BFE may create significant cost-savings though. A single-story home with no basement (a slab on grade foundation) raised from three feet below BFE to one foot above BFE would see annual premium savings of nearly $6,500. Even a $30,000 project would see net positive returns on that investment in under five years.

Of course, this is an exaggerated scenario and it is unlikely that current owners are paying nearly $7,000 annually on flood insurance. What this does indicate is that the only way this may be economically feasible for most homeowners in Stanwood is if they raise their home from at least two or three feet below BFE to one or three feet over BFE. Homes that are close to the BFE already will not see significant enough savings to justify elevation in a cost-benefit analysis, especially if they have a crawlspace. Most homes in Stanwood have some sort of separation between their bottom floor and the foundation (~72%), and therefore already receive reduced premiums, especially if they have proper venting around their foundation.

Homes that do not currently have flood insurance will not find this economically or financially appealing at all – in those instances, it is a case of incentivizing the uptake of flood insurance so residents are protected and take proper precautions, such as home elevation. Getting an elevation certificate is often the first step in a homeowner's journey toward protecting their property and is relatively affordable.

Elevation Cost Estimates →		**$2,100**	**$5,857**	**$30,000**
Payback Period (4 Ft. Raised)	N/A	0.33 Years	0.91 Years	4.67 Years
Payback Period (2 Ft. Raised)	N/A	0.72 Years	2.00 Years	10.27 Years
Insurance Cost - 3 Ft. Below BFE	$6,800 spent annually			
Insurance Cost - 1 Ft. Below BFE	$3,566 spent annually			
Insurance Cost - 1 Ft. Above BFE	$371 spent annually			
Insurance Savings (4 Ft. Raised)	$6,429 saved annually			
Insurance Savings (2 Ft. Raised)	$2,921.50 saved annually			

Table 8. Single Story Home with No Basement (Slab on Grade Foundation) and full Basic Coverage

Elevation Cost Estimates →		$2,100	$5,857	$30,000
Payback Period (4 Ft. Raised)	N/A	0.54 Years	1.51 Years	7.74 Years
Payback Period (2 Ft. Raised)	N/A	4.70 Years	13.12 Years	67.19 Years
Insurance Cost - 3 Ft. Below BFE	$4,247.50 spent annually			
Insurance Cost - 1 Ft. Below BFE	$817.50 spent annually			
Insurance Cost - 1 Ft. Above BFE	$371 spent annually			
Insurance Savings (4 Ft. Raised)	$3876.50 saved annually			
Insurance Savings (2 Ft. Raised)	$446.50 saved annually			

Table 9. 1+ Story Home with a Basement/Crawlspace (Stub Wall or Pier Foundation) and full Basic Coverage

As the average height of a West Stanwood home's front door, relative to sea level, is 10.48 feet, there is a chance this is feasible. With a BFE of 13 feet, homes have the upward room to be elevated and receive significant cost-savings. However, the **lack of complete insurance coverage in West Stanwood** (only 71% of those surveyed reported having insurance) is a **barrier to incentivizing home floodproofing**. Another barrier is that many homes have a crawlspace or space underneath their home, which has already lowered their premiums significantly. Raising the home further will increase protection from floodwater, but not bring down premiums enough to cover projected elevation costs.

A final significant barrier is the cost of floodproofing itself, and where the money comes from in a city where, according to the 2010 census, the average household income is $60,000 (WNYC Data News).

Funding in a Floodplain

One of the most challenging issues of addressing flood hazards is the funding – where will the money come from? For many communities in a floodplain, this can be a contentious process, since federal and state money are often tight. However, numerous public and private resources exist for communities to tap into, and the correct management of funds can help them go a long way in protecting homes and people from the dangers of flooding.

The following sources of funds will be explored in detail throughout this section:

- Direct Government Programs
- Private-Public Partnerships

Direct Government Programs

The federal government has a variety of programs created to assist those in the floodplain. Many are organized under **FEMA, the Federal Emergency Management Agency,** but some funding can be found in other departments. The programs available to West Stanwood will be addressed in detail here.

	When are funds unlocked?		**Who can access funds?**		
Programs	Pre-Disaster	Post-Disaster	Individuals	State, Local, Territorial, or Tribal Governments	Private Nonprofit
IHP		X	X		
PAP		X		X	X
HMG	X		X	X	
FMAG	X		X	X	
PDMG	X		X	X	
SRLG		X		X	
ICC		X	X		
CDBG		X		X	
WFPO	X	X		X	
SBA		X	X		X
FCAAP	X			X	

Table 10. Government programs that provide funds for relief from flooding

FEMA

Assistance for Individuals and Households Program (IHP)

> This program is for **those who are affected by a disaster** that have needs that are uninsured or underinsured**. It does not replace insurance, nor does it cover all losses suffered**; it is meant to help survivors meet their basic needs. Aid is available to citizens, non-citizen nationals, and qualified documented and undocumented immigrants.

The types of aid offered are varied, covering the following: **financial and/or direct housing** assistance (rental, repair, and replacement), **transportation/moving/storage** assistance, **funeral** assistance, **medical and dental** assistance, and **child care** assistance.

Aid is not taxable and is received via check or electronic transfer of money. Assistance is limited to 18 months post-disaster (Individuals and Households Program Fact Sheet, n.d.).

Public Assistance Program (PAP)

Grants are provided to the **local, state, tribal, or territorial governments**. They can also be provided to specific private nonprofit organizations (PNPs). These grants can be used for **debris removal, life-saving emergency protective measures, and repair/replacement/restoration of publicly-owned (or PNP-owned) facilities** that are damaged by the disaster in question. Federal assistance is rarely below 75% of cost (Public Assistance Program Fact Sheet, n.d.).

Hazard Mitigation Grant Program (HMG)

This program is available to **individuals, and state, local, and tribal governments**. Individuals can not apply directly but can be sponsored by someone in state/local/tribal government, or a PNP. HMGP funds flow through governmental entities. The funds can be used for many different flood mitigation measures:

- Acquisition, demolition, and relocation of properties that flood often
- Dry floodproofing of historic residential structures
- Home elevation: raise existing home or demolish and rebuild higher
- Structural flood protection: aquifer storage, stream restoration, flood diversion, etc.
- Retrofitting buildings to improve flood, fire, and wind protection
- Construction of "Safe Rooms" to protect from high-intensity storms

Funds are limited for this program and are given out based on priority (Hazard Mitigation Grant Program, n.d.).

Flood Mitigation Assistance Grant Program (FMAG)

This grant program is similar to the HMGP in its organization. Individuals can apply but must be sponsored by a corresponding state, territorial, local, or tribal government. Funds are available to any community participating in the NFIP, which Stanwood is. A hazard mitigation plan (HMP) must be developed by local authorities to be eligible for funds. Projects that lead to reduced NFIP claims are applicable for funding.

Funds are limited for this program and are given out based on priority (Flood Mitigation Grant Program, n.d.).

Pre-Disaster Mitigation Grant Program (PDMG)

These grants are available to states, territories, tribes, and local government. Like the Flood Mitigation Program, the Pre-Disaster program requires the creation of a hazard mitigation plan. Aid from this fund is meant to help implement the plan, reduce risk to population and structures, and reduce reliance on federal funding in future disasters.

Sub-applicants for the program must be consistent with the FEMA-approved HMP. Individuals may apply but must be sponsored by a governmental or tribal authority. All applications are approved by FEMA.

Funds are limited for this program and are given out based on priority (Pre-Disaster Mitigation Grant Program, n.d.).

Severe Repetitive Loss Grant Program (SRLG)

This program is designed to deal with properties that see repeated occurrences of flood damages. These properties must either have **4 or more separate claims** that are each over $5,000 (building and contents combined payments), or **2 payments that together exceed the property's current value**.

Grants are provided to **states, tribes, or territories**, who then pass the money down to local communities. This money can be used for the following: **acquisition, relocation, elevation, or dry floodproofing** (for historic properties). States and local officials decide priorities for SRLG funds. Participation is voluntary for severe repetitive loss properties, but insurance premiums will be increased if the property owner does not successfully appeal the designation.

Funds are limited for this program and are given out based on priority (Repetitive Flood Claims Grant Program Fact Sheet, n.d.).

Increased Cost of Compliance (ICC) coverage

ICC coverage is designed for **current policyholders with the NFIP**. In the event of a disaster, affected homes that need rebuilding may also be required to meet more stringent flood protection standards. These added construction costs may exceed the value of the insurance, and therefore **ICC coverage exists to provide relief in these situations**.

Payouts can be **as much as $30,000** to flood insurance policyholders in high-risk areas (also known as special flood hazard areas) (Increased Cost of Compliance Coverage, n.d.).

HUD

Community Development Block Grant Program (CDBG)

These grants are only available to communities who will use **at least 70% of the funds** to benefit low- or moderate-income persons. The activities these funds are put towards must address community development needs having a particular urgency – in this case, flood hazards that pose a risk to the health of residents in West Stanwood. Cities, counties, and states may apply.

The money from these grants may be used to **help low-income homeowners pay flood insurance premiums**, pursuant to the Flood Protection Act of 1973. Since West Stanwood is in a Special Flood Hazard Area (Zone AE), these grants would be available to Stanwood.

Grants can also be used to help pay for **the reconstruction of homes**, including any additional safety measures that must be taken. This would allow the option of rebuilding after a flood in such a way as to mitigate future flood hazards to the building and its occupants.

Funds are limited for this program and are given out on based on priority (Community Development Block Grant Program – CDBG, n.d.).

Department of Agriculture

Watershed and Flood Prevention Operations Program (WFPO)

The Natural Resource Conservation Service (under the USDA) offers **financial and technical assistance to aid in the restoration of watersheds**. Among the activities that can be funded by this are flood prevention programs. States, local government, and tribal government can take advantage of these funds. The only stipulations are that **at least 20% of total benefits flow to agriculture or rural communities**, it is a public sponsorship (the project is cost-shared between the community and the USDA), and that the Watershed Projects do not exceed 250,000 acres. **It is unclear if Stanwood would qualify for these funds**, but if possible, they could be used for structural flood prevention – especially in the more rural portions of the city limits (Watershed and Flood Prevention Operations Program, n.d.).

Small Business Administration

SBA Disaster Loan

SBA loans are available to a **wide variety of recipients** that have limited financial assistance options for flood protection: homeowners, renters, businesses of all sizes, and private nonprofits. These funds can be used to **repair or replace** real estate, personal property, machinery, equipment, and inventory/business assets **after being damaged by a declared disaster** (Wessell, 2018).

Miscellaneous Federal Funding

While the government funding sources included above does cover the vast majority of funding related to flood disasters, there may be more programs in the future. All currently available government grants can be found at https://www.grants.gov.

State Funding

Flood Control Assistance Account Program (FCAAP)

Washington is one of a few states in the country that has a state-managed fund to deal with flooding. Managed by the Department of Ecology, the fund is awarded $4 million every two years. Unfortunately, due to budgetary restrictions there is no money available in 2017-2019 biennium but that may change going forward into 2019 and 2020. The most recent budget proposal passed in 2018 does not seem to have added any money to this fund. Communities can apply to the fund, as long as they can pay 25% of the overall cost of any floodproofing measure (Flood control assistance account program, n.d.).

Public-Private Partnerships

Although there are a variety of government grant programs available to help pay the costs of floodproofing, much of that funding is in great demand and short supply. If any action is to be taken with urgency, communities will have to use creative measures to mitigate potential flood damages in a cost-effective way. There are a variety of methods available to government at the local and county

levels, as well as to the individual homeowner, to make funds available. A combination of the two – cost-sharing between homeowners and government – can help achieve the greatest cost-efficiency. This also gives homeowners a stake in the outcome of the floodproofing, which leads to increased quality and homeowner engagement, providing further opportunities to lower costs.

Local Government	Homeowner
Taxes	**HELOC**
Bonds	**Reverse Mortgage**
Fees	**Conventional Loan**

Table 11. Non-Federal/State Funding Sources

Options for Local and County Governments

New or Existing Taxes

A traditional fundraising method for communities is through levies or taxes. These have the benefit of being direct and easily quantifiable, although they can affect lower-income residents disproportionately if not carefully implemented. For example, a sales tax levy is considered a regressive tax, as the burden of payment falls more on those with lower incomes. Communities may also be resistant to tax increases. One way to combat this is to have absolute transparency about how the tax revenue is being used in the community and open discussion about the best way to implement the tax.

Bonds

One way some large projects are funded is through the creation of bonds sold specifically to pay for the project. This idea could extend to residential relief for flood mitigation, and some communities around the nation have used them to raise funds for such projects.

Fees

Fees can be a targeted way to raise funds. For example, if Stanwood was concerned with sewer backup during a flood, a small surcharge could be placed on the utility bill of all who connect to the storm water system. This fee would go into a fund set up to build and maintain flood-resistant sewer and storm water systems.

Developers can be made to pay impact fees for building in a floodplain. If a new development in Stanwood would cause a certain level of damages, those damages can be paid by the developer as a fee for being allowed to build there.

Options for Property Owners

Home Equity Line of Credit (HELOC)

This is a method for homeowners to turn the equity in their home into a fund to help protect it from floods. Essentially, individuals can borrow against the value of their home,

excluding what they still owe to the bank. This is a way for homeowners to access funds to pay the costs of floodproofing, and then pay back the HELOC using the money saved on premiums and, in the case of a disaster, flood damages.

Homeowners who do this should watch interest rates – if rates go up, the equity of their home may go down and reduce the amount that can be borrowed through a HELOC. Essentially, increased interest rates can drive down the market value of their home due to the way investors value property. This reduces the amount of equity available in their home to develop a line of credit from. If the line of credit currently in use by a homeowner would exceed their loan-to-value ratio (line of credit as compared to home value), then that discrepancy would have to be managed with their bank and would result in a reduced amount that could be borrowed against the home.

In Snohomish County, average home price increased year-over-year by 18.8% since this time last year. The average home price for February 2018 was $375,000, according to the Northwest Multiple Listing Service (Caldwell, n.d.). Stanwood is generally a less expensive community than others in Snohomish County, such as Lynnwood, so keep in mind that this data is most likely on the high end. However, Zillow's data on recent sales in Stanwood indicate that home values are high: the median home sale price for January 2018 in Stanwood was $372,200 (Zillow, Inc., n.d.). With this kind of equity at their disposal – caused by markets squeezed of almost all their inventory – homeowners in West Stanwood may have the equity in their home to make elevation financially feasible.

Reverse Mortgage

This is similar to a HELOC, in that the funds come from the home. However, reverse mortgages come with more conditions as well. The bank buys the home from the owner in installments, so the owner receives monthly payments. However, this means that the owner can lose ownership of the home, and any debt owed from a reverse mortgage can be passed on through the owner's family. However, this is an available option for those looking for funds.

Conventional Loans

Finally, homeowners can borrow funds through their bank or local lending firm. The interest rates on these loans can vary. One way to make these more palatable for homeowners and banks alike is to have the banks offer the money as a home improvement loan alongside the mortgage when an individual first purchases the property. These loans would last the length of the mortgage. Not only does this help the new owner realize the true cost of the property, adjusted for flood risk, but this helps the bank protect their asset. Owners will see savings in reduced premiums as well.

Banks can play another role, here, by requiring flood insurance on any mortgage in the floodplain in Stanwood. When looking at the data gathered earlier in this project, there are some homes in the floodplain that do not have insurance (although they are not in the majority). This is a gap that banks could fill and would help those external flood costs be internalized in the property values. However, this only works if homes are purchased through a bank and not paid for outright with cash.

Fund Management

Collecting the funds is one task; putting them to good use is another. FEMA only usually covers 75% of the cost of any flood proofing measure, so even in the instance where a community does receive federal funds the remaining 25% can present a hurdle. However, there are a few ways to distribute the funds that can help incentivize homeowners to begin flood proofing their properties.

Tax Rebates and Waivers

One effective way to incentivize individuals to take action against flooding is to offer tax rebates. Homeowners may be worried about floodproofing increasing their property value, and then raising their property taxes. Offering a rebate can be an extremely cost-effective way to incentivize mitigation. If homeowners have reassessment of their property value for tax purposes suspended in cases of floodproofing, then they are more likely to undertake the mitigation. The lost revenue to the government is more than likely made up for by the reduction in disaster relief they would have been expected to pay out (Kunreuther, 2006).

The same logic applies to waived technical fees – if the city pays for an assessment of the property, or offers free inspections, this can increase likelihood of floodproofing. Once the property is protected, the costs in terms of disaster relief are greatly reduced for the cities.

Low-Interest Loans

The gathered funds can also be offered as low-interest loans. These may be appealing to communities, as the money is not a grant and therefore will be repaid. However, research into the uptake of these loans suggests that people often do not take them before disasters, even though they're available and cheap compared to the interest rates they would receive from a bank. Most of the funds have not been used in the case studies (Local flood proofing programs, n.d.).

However, after a disaster the money is quickly used. The issue is not of availability or price, but rather the owner's own economic rationalization at the time.

Cost-Sharing and Soft Matches

As mentioned previously, most projects that FEMA funds are only funded 75% through a grant, with the remaining 25% borne by the community or individual. The other funds can come from a different federal grant, but oftentimes the community must use the money raised through taxes, fees, bonds, or individual loans.

One creative method is to match the 25% with an equivalent offering of services and goods that are assigned a dollar value. These "soft matches" can be free labor in planning or construction, donated supplies or equipment, or a waiver of fees. Not every grant allows the entire 25% to be met this way and is dependent on the program.

Fully Funding

If they wish, communities can fully fund a private property's floodproofing with the funds as well. This does not leverage any potential funds from the property owner, which may decrease the overall efficiency of the fund management, but it is an option. Oftentimes, communities will do this when it is the same cost, or less, as a structural solution and offers similar flood protection benefits.

Suggestions for the City of Stanwood

Throughout the research process we uncovered multiple gaps in the data and services available to the residents who may be affected by flooding in West Stanwood. These represent items that we suggest Stanwood could address first which could provide the foundation for larger actions.

1. **Creation of a new floodplain survey:**
    a. As Houston's example in 2017 indicated, the maps FEMA currently uses to assess flood risk may be outdated. Neighborhoods in Houston that were not supposed to flood, according to the old maps, received flood waters. Updating Stanwood's maps could lead to more efficient allocation of limited funds for flood protection, or perhaps the discovery of a structural solution (reservoir, pump system, etc.) that would preclude any need for residential floodproofing.
2. **Creation of usable maps for residents:**
    a. Students and faculty who are a part of the Sustainable Communities Partnership program at Western Washington University are currently involved in the creation of maps for homeowners and renters to assess the flood risk of their property downtown. Any additions to this would help the average resident become more informed, as the current flood maps offered by FEMA are technical and difficult to read. Once these projects are completed, these maps should be readily accessible by residents.
3. **Connecting residents to Snohomish emergency services:**
    a. Snohomish County has many available resources in the case of an emergency such as a flood. However, these resources are not always easy to locate. Providing links in a clear, easy-to-find location on Stanwood's website, or alongside the maps provided by Sustainable Communities Partnership, would bridge this knowledge gap for residents.
    b. Some examples of services to link:
        i. Snohomish County's Voluntary Floodplain Elevation Program - https://snohomishcountywa.gov/DocumentCenter/View/6346
        ii. Current Flood Insurance Rate Maps (FIRMs) for Snohomish County - https://snohomishcountywa.gov/893/DFIRM-Floodplain-Maps
4. **Creating a list of (or choosing a singular) certified contractor (s):**
    a. Throughout our research, we discovered communities who worked with either a single contractor or a small group of them to provide floodproofing and elevation certificate services to all residents in the floodplain. This monopoly had two benefits: the city could be sure that all work being done was up to code and would reduce premiums as well as increase the community's standing in the CRS program; and residents could receive discounts on construction work as the contractor was guaranteed a certain number of projects. Stanwood could follow this model to provide floodproofing services to their residents.
    b. Another example of this could include the city creating a task force or list of specialists that homeowners could meet with if they need further information. This could include insurance specialists, FEMA representatives, mortgage brokers, and contractors.

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