



HELPING RESIDENTS TO ASSESS AND ADDRESS THEIR BASEMENT FLOOD RISKS:

FINAL REPORT OF THE SASKATOON HOME FLOOD
PROTECTION PROGRAM

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ABOUT THE INTACT CENTRE ON CLIMATE ADAPTATION

The Intact Centre on Climate Adaptation (Intact Centre) is an applied research centre at the University of Waterloo. The Intact Centre was founded in 2015 with a gift from Intact Financial Corporation, Canada's largest property and casualty insurer. The Intact Centre helps homeowners, communities and businesses to identify and reduce risks associated with climate change and extreme weather events. For additional information, visit: www.intactcentreclimateadaptation.ca.

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ABOUT AET GROUP

AET Group is an employee-owned multi-disciplinary environmental consulting, auditing and scientific services company that has been serving Canadians since 1998. With over 1,000 projects completed in Ontario and across Canada, AET offers extensive experience, capabilities and a proven track record that, among other benefits, assures that our clients receive value-added services, credible results and effective solutions. AET Group has been contracted by the University of Waterloo to provide delivery of the Home Flood Protection Program assessments across Canada.



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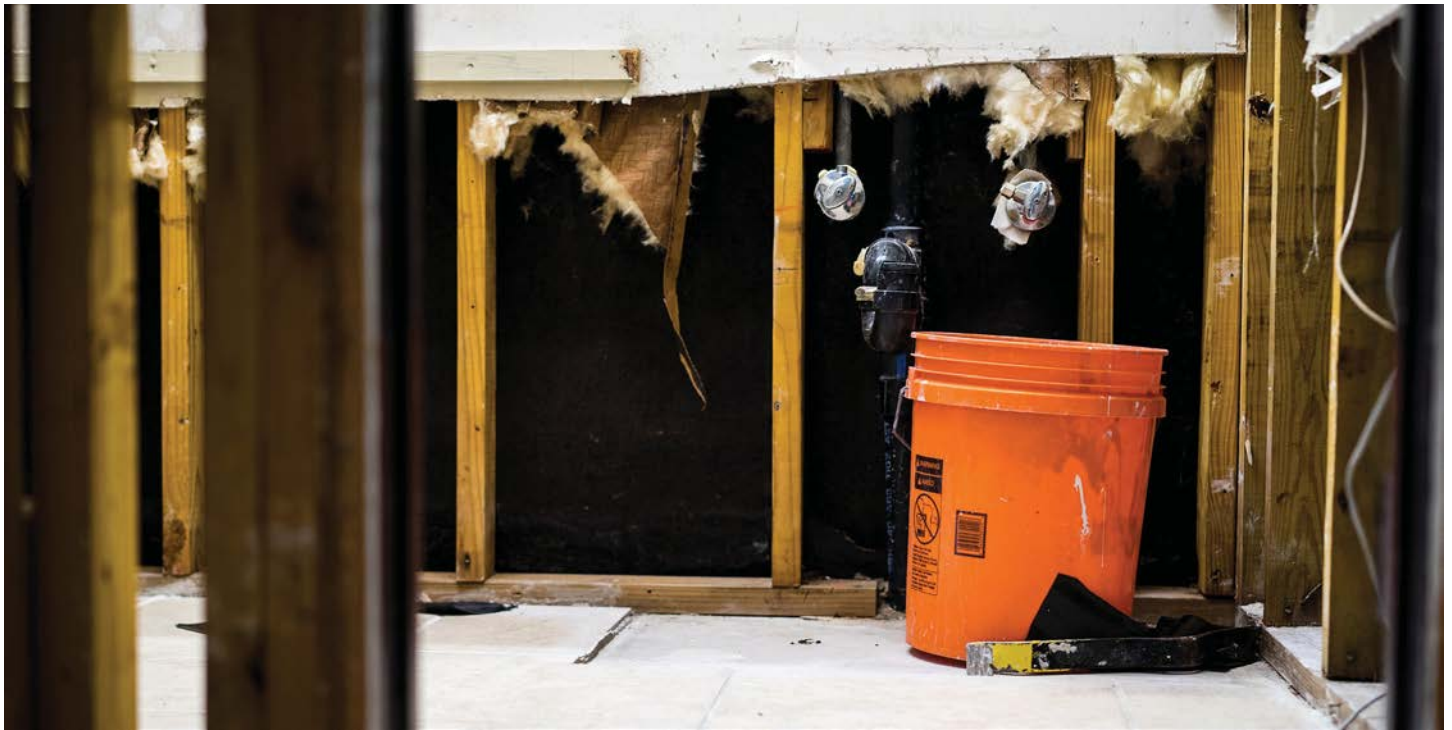
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EXECUTIVE SUMMARY

Home Flood Protection Program Summary

Residential basement flooding is on the rise in Canada. Intense rainfall events combined with aging infrastructure, increased urbanization and a lack of flood protection measures at the household level have resulted in losses in the billions of dollars for the nation's insurance companies, governments, homeowners, landlords and tenants over the past decade. Residents are increasingly seeking site-specific guidance to help them achieve practical, cost-effective means to reduce their flood risk.

From 2016 to 2018 the Intact Centre on Climate Adaptation, at the University of Waterloo, developed and tested a flood risk reduction education program designed to provide residents with the practical information they need to take action to address flood risk at their individual homes. The Home Flood Protection Program was piloted in Burlington and Toronto, Ontario as well as Saskatoon, Saskatchewan. Program support was provided by the province of Ontario, the Insurance Bureau of Canada, Intact Financial, the Cities of Burlington and Toronto, Ontario, the City of Saskatoon and SGI Canada. Assessments were completed by AET Group Inc.

The main components of the Home Flood Protection Program included providing free online how-to resources to all interested residents through the program's webpage www.homefloodprotect.ca and providing a confidential 60-90 minute flood risk assessment service for owners of detached, semi-detached and town homes. Depending on the resources available within each pilot community, the assessment service was available to homeowners for a subsidized fee ranging from \$0 to \$125 (full cost was \$450). Assessments included a visual assessment (not including investigation inside of pipes, behind walls etc.) of 45 physical features inside and outside the home and asking the homeowner to report on 35 maintenance activities related to reducing flood risk. A final written report was provided to the homeowner that provided a score of each feature assessed and highlighted top opportunities to reduce flood risk.

The Home Flood Protection Program delivery resulted in the development and testing of a nationally applicable electronic flood risk assessment tool (that reflects the requirements of the Canadian Standards Association Guideline on Basement Flood Protection and Risk Reduction Z800-18). It also resulted in the development and testing of a comprehensive training program for flood risk assessors, the delivery of 510 home flood risk assessments and the development of user-friendly online how-to resources for residents, government officials and service providers.

Saskatoon Home Flood Protection Program Summary

The Home Flood Protection Program was piloted in Saskatoon, Saskatchewan from March to October of 2018. The City of Saskatoon engaged the Intact Centre on Climate Adaptation at the University of Waterloo to deliver the Home Flood Protection Program to augment their ongoing efforts to provide flood protection resources for residents. These efforts were in response to two concentrated overland flooding events in 2017. The City and SGI CANADA provided funding support. The City of Saskatoon lead outreach efforts, with the support of the Intact Centre and SGI CANADA.

Outreach Program and Results

The design, promotion and delivery of the Home Flood Protection Program in Saskatoon was based on internationally recognized program pillars for motivating residents to take action to reduce flood risk. These are necessity, responsibility, trust, ability, and return on investment. Targeted and broad-based marketing campaigns, adapted from the Home Flood Protection Program delivery in Burlington, Ontario in 2017, were developed to meet the specific goals, timelines and resources as defined by the City of Saskatoon. The City of Saskatoon lead promotional delivery with the support of SGI and the Intact Centre.

Program promotions resulted in 633 unique website visits by Saskatoon residents to access free flood protection how-to information. It also resulted in the 186 requests for assessment registration and the completion of 113 Home Flood Protection Assessments across the City. Fifty-eight assessments with a full value of \$450 were

completed at no cost to residents in areas designated by the City as being at higher risk of overland flooding. A total of 55 assessments were completed at a subsidized cost of \$125 in areas designated by the City as being at lower risk of overland flooding.

Home Flood Protection Study Results

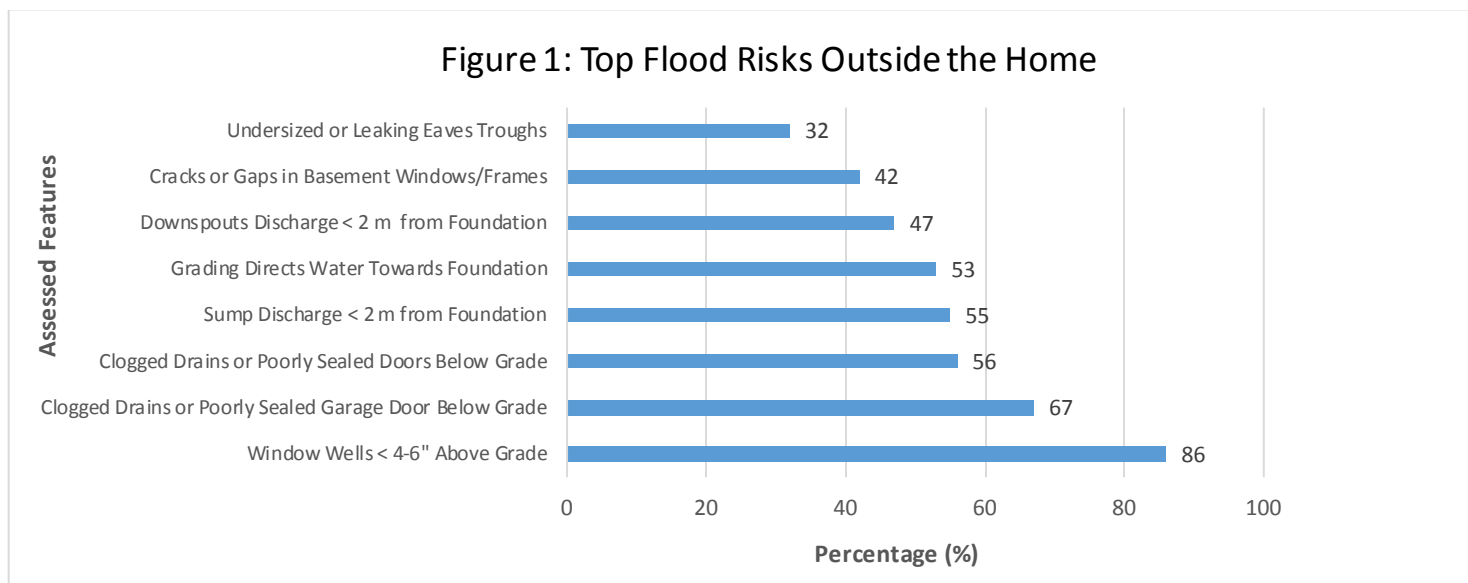
The delivery of the Home Flood Protection Program facilitated the confidential collection of lot-level flood risk information through the Home Flood Protection Study. A total of 79 (70%) Home Flood Protection Assessment participants agreed to participate in the Study. Participation included sharing the results of Home Flood Protection Assessment Reports (minus personal identifying information) and completing follow-up surveys at 3 and 6 months.

Data analyzed from the Saskatoon assessments indicates that the majority of participants are already completing a wide variety of simple and low cost actions to reduce flood risks at their homes. For example, 68% of homes have eaves troughs that are in good condition, 100% of homeowners reported cleaning out their eaves troughs at least twice per year, 100% of homes with backup power systems for their sump pumps reported maintaining them at least twice per year and 88% of homes stored valuables in their basements in sealed containers or up on shelves to reduce their risk of water damage during a flood.

Research findings pinpointed areas where additional educational efforts, support for accessing financial subsidies and access to contractor installation and maintenance services will help residents further reduce their flood risk.

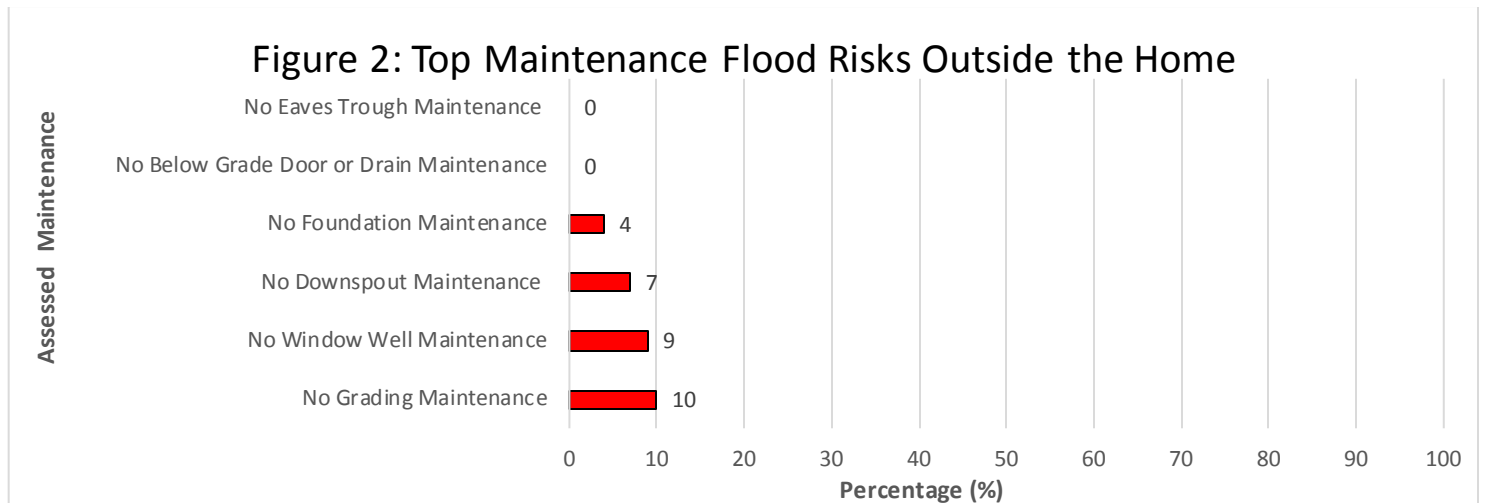
Most Common Flood Risks Outside the Home

The most common flood risks identified outside the home put homes at increased risk of overland flooding (water entering the home above ground through gaps and cracks around windows and doors) and seepage (water entering the home below ground through cracks or seeping through foundation walls). For example, 86% of assessed homes had inadequately installed window wells, meaning that they were not 4-6” above the surface of the ground or sealed at the home’s foundation. Sixty-seven percent of homes with reverse slope driveways had drains and garage doors that were not in good condition and 56% of homes had below grade entry doors and drains that were not in good condition. Fifty-five percent of homes with sump pumps had discharge pipes that deposited water less than the recommended 2m from the foundation. Forty-seven percent of homes had downspouts that were shorter than the recommended 2m. Fifty-three percent of homes did not have grading that directed water away from the foundation. Forty-two percent had basement windows or frames with cracks or gaps and 32% had eaves troughs that were undersized or leaking. Please see Figure 1 below.



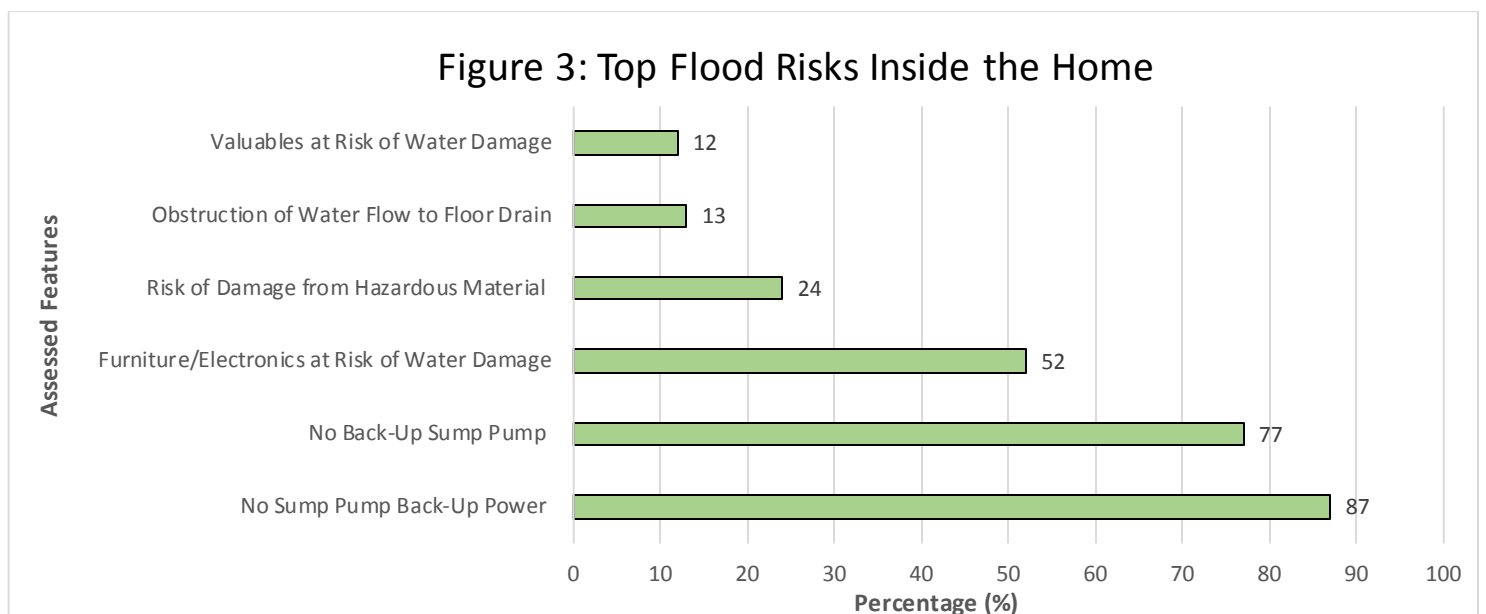
Most Common Maintenance Flood Risks Outside the Home

Participating homeowners overwhelmingly reported that they were completing key flood prevention maintenance activities outside of their homes at least twice per year. For those not maintaining grading (10%), downspouts (7%), window wells (9%), and foundations (4%), their homes are at increased risk of seepage flooding. The main reasons cited for not completing these activities include a lack of personal physical ability or personal expertise to complete these tasks. Please see Figure 2 below.



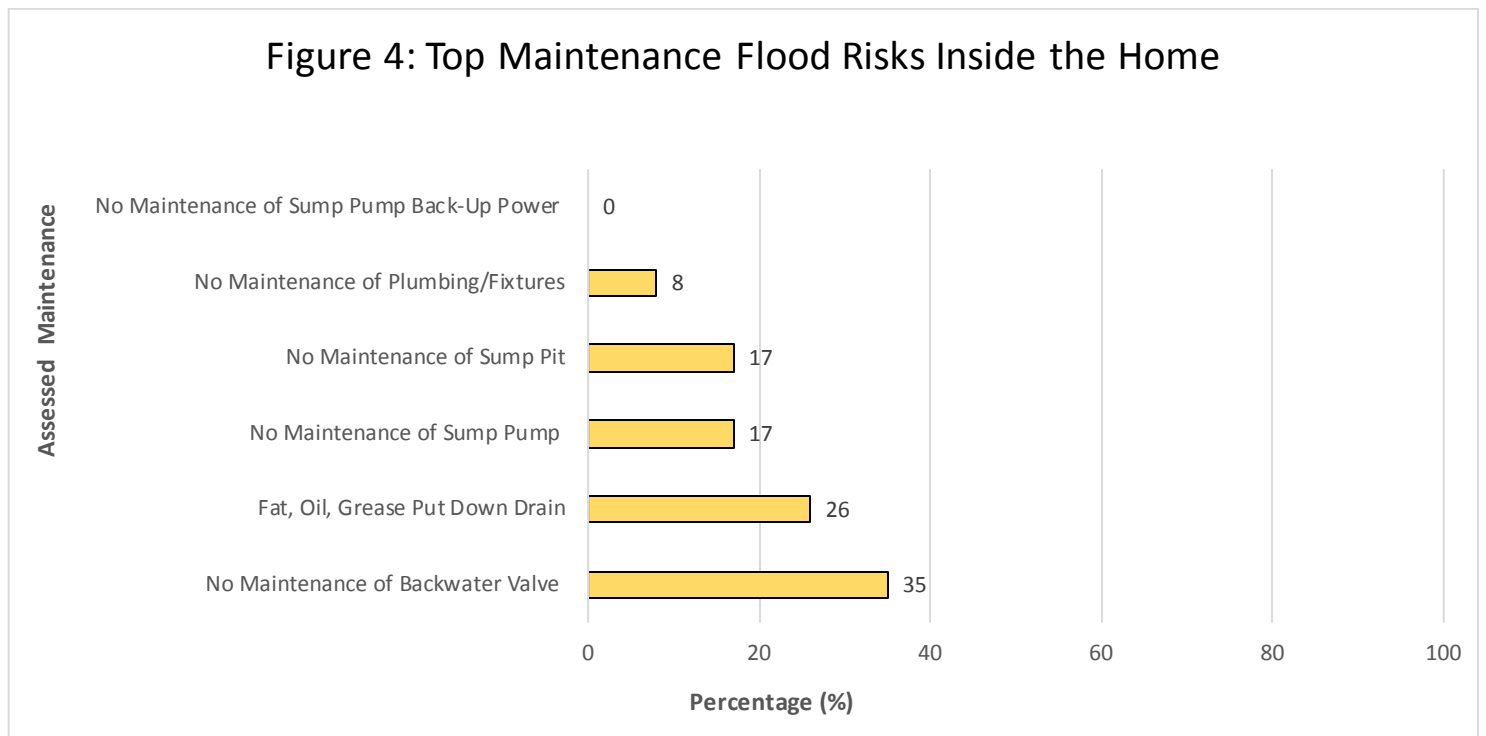
Most Common Flood Risks Inside the Home

The most common flood risks inside the home put residences at increased risk of sump pit overflow, sewer backup and of damage to the basement's structure and contents during a flood. Of those homes with sump pumps, 77% did not have backup sump pumps and 87% did not have a backup power supply, putting their homes at risk if the primary pump seized or if there was a power outage. Fifty-two percent of homes had furniture and electronics in their basements that were at risk of damage during a flood. A total of 24% of homes had hazardous materials (such as paints and pesticides) stored in their basements that were at risk of contaminating the basement during a flood event. Fortunately, only 13% of homes had obstructions to the basement floor drain which would increase damage to structure and contents during a flood and only 12% of homes had stored valuables at risk of water damage during a flood event. Please see Figure 3 below.



Most Common Maintenance Flood Risks Inside the Home

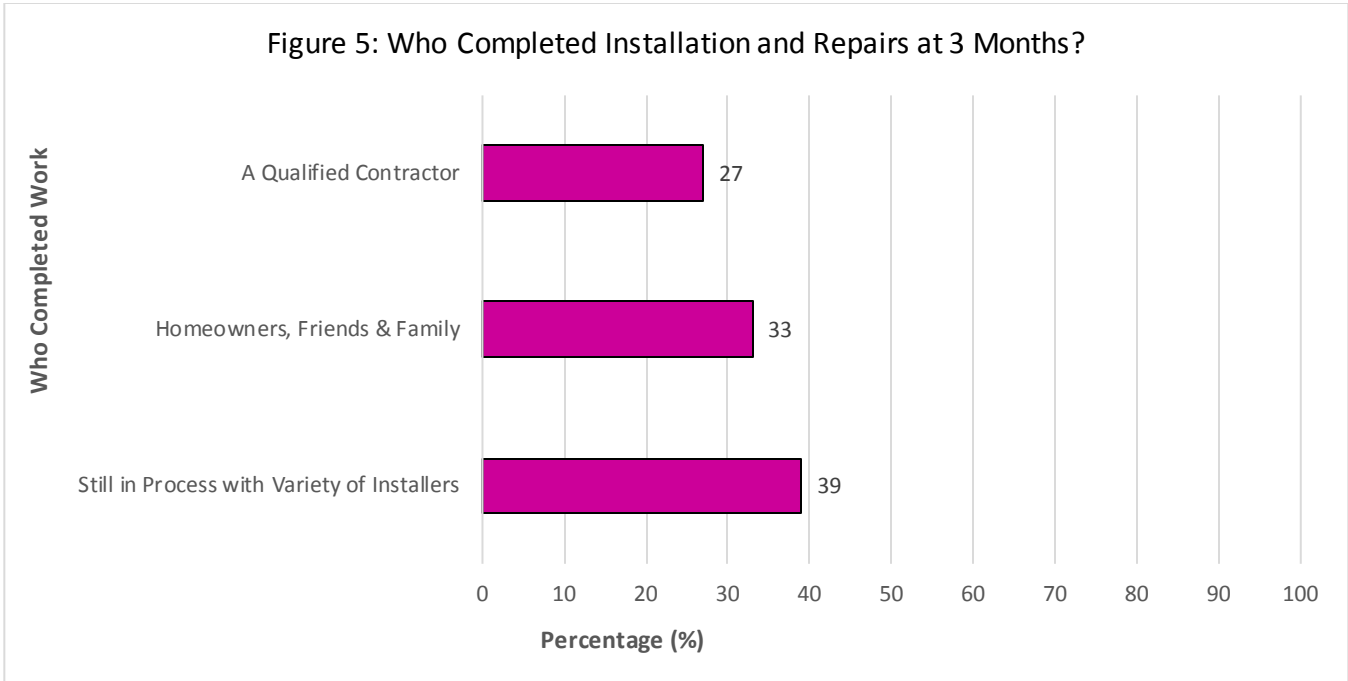
The most common maintenance flood risks inside the home increased the residence's risk of sewer backup and damage to the basement's structure and contents during a flood. Of the homes with backwater valves, 35% did not maintain them, increasing their risk of sewer backup into the home from the municipal sewer or from internal sources. A total of 26% of participants used poor practices for maintaining their sewer lateral, meaning that they regularly put fat, oil, grease and/or baby wipes down their drains. This practice increased their risk of sewer backup at their own homes and increased the risk to nearby homes that share the municipal sewer system. Of those homes with sump pumps, 17% did not maintain their sump pump and 17% did not maintain their sump pit, putting them at increased risk of water damage related to sump pump failure or a leaking sump pit. Fortunately, all residents that had backup power for their sump pumps were maintaining them twice per year, thereby reducing their risk of sump pump failure during a power outage. Please see Figure 4 below.



Key Actions Taken to Reduce Flood Risk

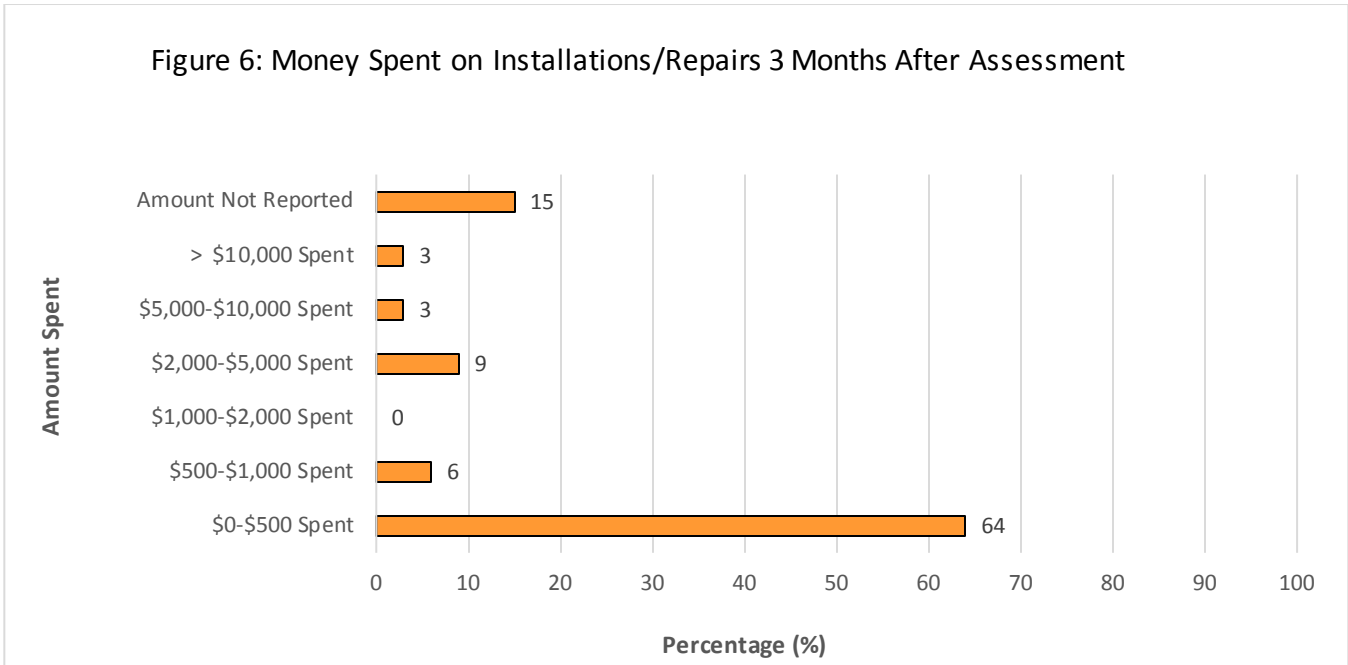
Each assessment report identified physical features and maintenance practices that were ranked as “poor/need further investigation” and identified customized opportunities to reduce these risks. Study participants were asked to report at 3 and 6 months which actions they had taken to reduce the specific flood risks identified at their homes. At 3 months, a total of 58% of Saskatoon program participants noted completing at least one new action to address flood risk and at 6 months a total of 78% of participants noted completing at least one additional action to reduce flood risk. At three months 39% of respondents were still in the process of completing the work with the help of a mix of contractors, homeowners, and family, 33% of actions had been completed by the homeowner, family or friends, and 27% had been completed by a contractor. Please see Figure 5 below.

Figure 5: Who Completed Installation and Repairs at 3 Months?

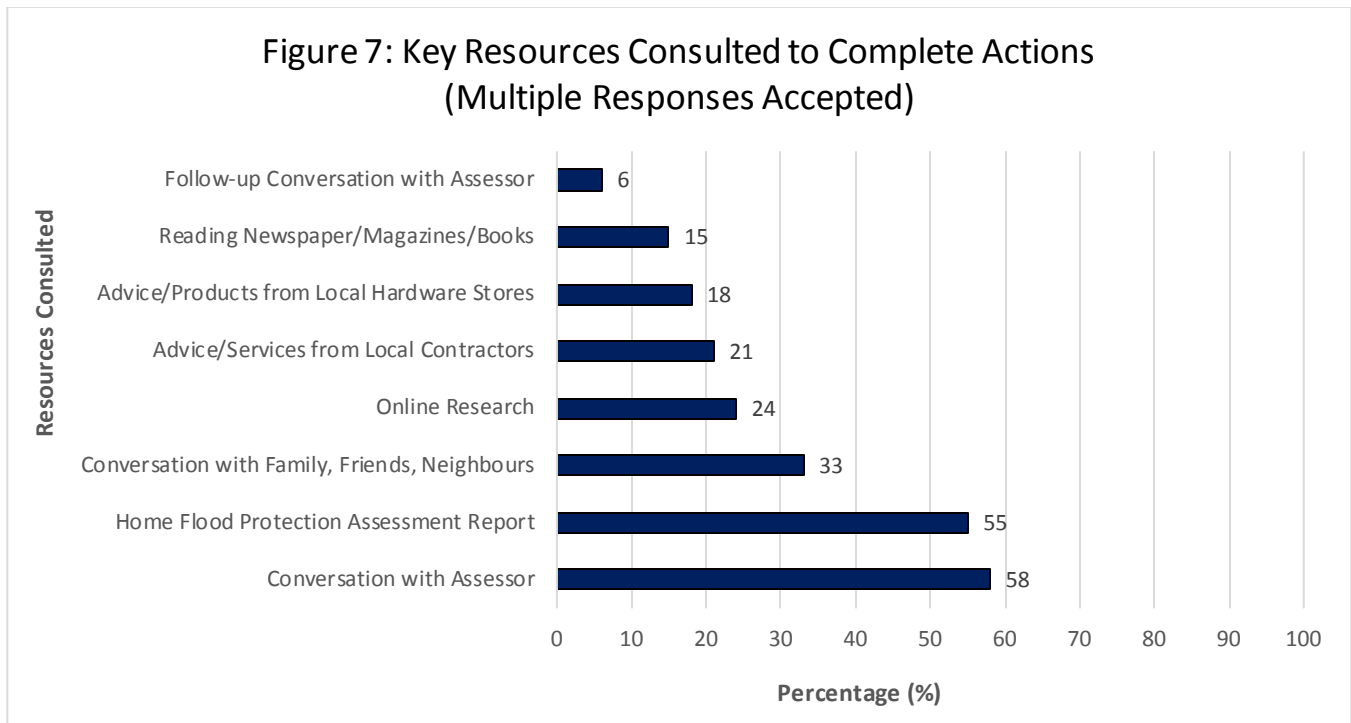


The majority of actions (64%) were simple, cost under \$500 to complete and could be completed by a capable homeowner themselves within a few hours. Examples include properly storing and removing valuables and toxic materials from the basement, and extending downspouts and sump pump discharge pipes to 2m. The other 36% of actions were more complex, expensive and often required the support of qualified contractors to complete. The costs of these actions ranged widely from \$500 to over \$10,000. Some of these more expensive actions items included installing a backup sump pump and backup battery, installing a backwater valve, repairing a sewer lateral, replacing basement windows, replacing eaves troughs, replacing a crumbling driveway, installing windows wells and installing a sewer lateral cleanout. Please see Figure 6 below.

Figure 6: Money Spent on Installations/Repairs 3 Months After Assessment



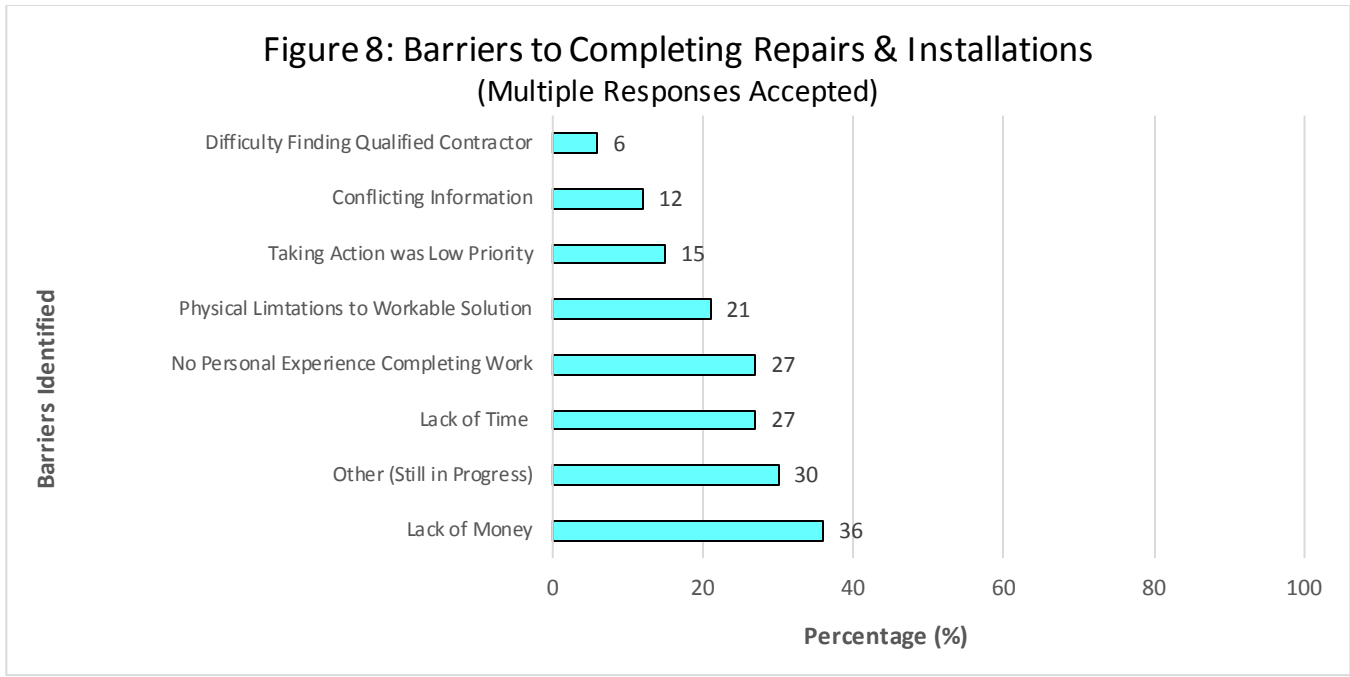
When asked which resources homeowners used to support their decision-making and actions to reduce flood risk, personal conversations stand out as the major driver. The conversation with the flood risk assessor was the top ranked resource (58%), followed by the assessment report (55%), which in fact is a written record of the conversation between the homeowner and the assessor during the onsite visit. Conversations with family, friends and neighbours (33%), the advice and services of contractors (21%) and the advice and products of hardware stores (18%) also figured prominently. Online (24%) and printed (15%) flood risk, subsidy and how-to information were also cited by homeowners as key resources consulted. Please see Figure 7 below.



Barriers to Taking Action to Reducing Flood Risk

The main barriers to taking action reported by homeowners were divided into two main categories: those who wished to engage a contractor to complete more complex and higher cost work and those who wished to complete simpler, low cost actions themselves. For those wishing to engage a contractor 36% of surveyed participants noted that lack of money was a barrier to action, 27% noted that there was a lack of time (many noted they were still waiting for a contractor to get to their job) and ten percent noted difficulty finding a qualified contractor to complete the work. For those wishing to complete the work themselves a lack of personal experience to complete the work (27%) and physical limitations to finding a workable solution (e.g. being unsure how to install a downspout extension because it would become a tripping hazard) (21%) were noted barriers. Additional top ranked barriers related to the perceived lack of urgency for completing the work. For example 15% noted that taking action was a low priority. A total of 12% of participants noted that conflicting information was a barrier to taking action. Residents explained that if the advice they received from several sources conflicted they often did not complete the work because they were not sure how to proceed. Please see Figure 8 below.

**Figure 8: Barriers to Completing Repairs & Installations
(Multiple Responses Accepted)**



Key Supports Needed To Take Additional Action

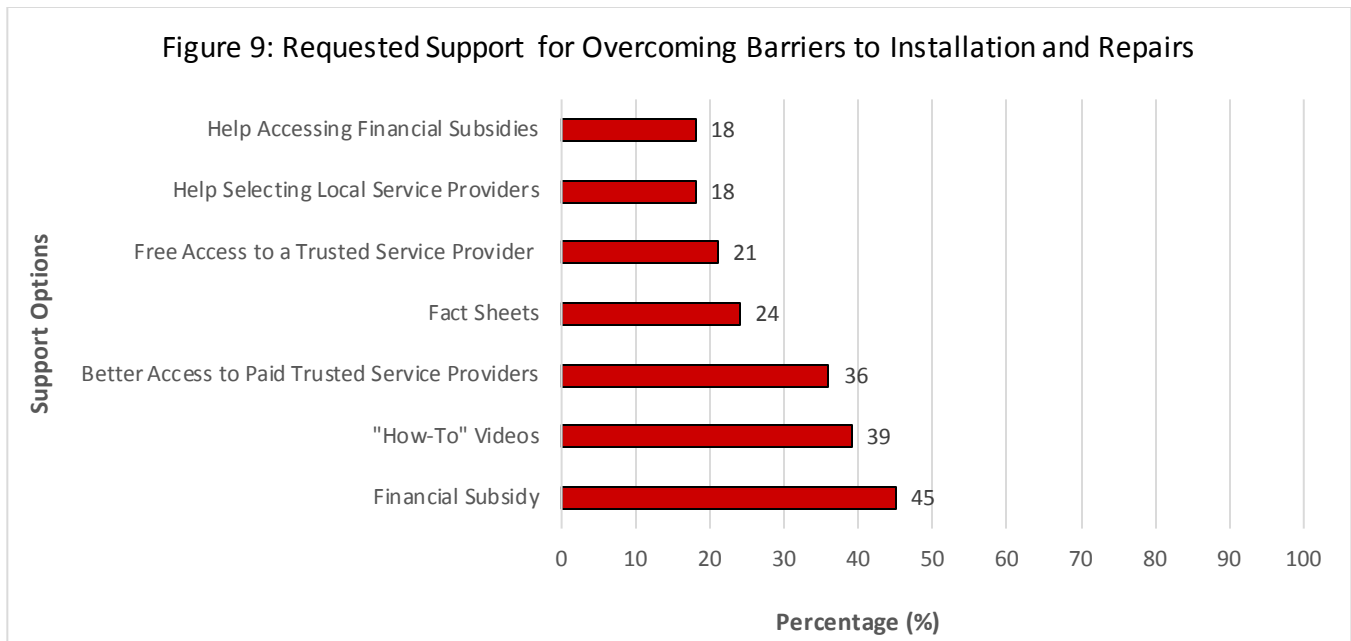
Participants identified the following key supports that they need to help them take additional action: improved access to funding, improved access to qualified contractors, and increased access to trustworthy, third-party information resources.

Forty-five percent of participants noted they would like to have a financial subsidy to help them take action, 21% noted they would like financial support to get access to qualified contractors for free, and 18% said they would like help accessing subsidies.

Fifty-four percent of participants noted that they would like increased access to trusted service providers and 41% noted they would like help selecting qualified contractors. Presently residents are experiencing challenges finding qualified contractors who can do the work for them in a timely manner. Many noted long delays waiting for contractors and difficulties getting contractors to respond to requests for smaller jobs that they need done.

For residents who wish to complete actions on their own, greater access to third party information resources has been identified as a need. By “third-party” they noted that they wanted trustworthy information from a source that is not trying to sell any one particular product or service. Information sources include those produced by government, institutional and non-governmental organizations. Thirty percent of participants noted that they wanted greater access to third party how-to videos and 24% noted that they wanted greater access to third party fact sheets. Please see Figure 9 below.

Figure 9: Requested Support for Overcoming Barriers to Installation and Repairs



Considerations for Increasing Uptake of Actions to Reduce Flood Risk in 2019

In order to increase the uptake of actions to reduce residential flood risk in 2019, the following program components may be considered by the City of Saskatoon.

Increased Access to Funding Support

Participants support the provision of municipal flood protection subsidies to help reduce flood risk, including subsidies to complete flood risk assessments. They also note that accessing subsidies can often be complicated, time consuming and inconvenient, as it requires them to navigate complex application systems, pay for work upfront and then wait for reimbursement. Minor adaptations to how municipal flood protection subsidies are delivered could potentially increase uptake of more expensive actions to reduce flood risk. For example, providing point of sale rebates for contractors and homeowners for items such as backwater valves, downspout extensions, sump pumps, backup sump pumps and batteries may be considered to reduce the barriers to accessing subsidies. Minimizing paperwork and streamlining approval processes may also increase uptake.

Increased Access to Qualified Contractors

A business opportunity exists in Saskatoon for qualified contractors to provide assessment, installation and maintenance services to residents to meet identified demand. Additionally, there is an opportunity to provide general contracting services to oversee the completion of all work, including any available subsidy applications on behalf of homeowners. Making contractors aware that this opportunity exists is very important to help drive greater entry into the market for new contractors. In addition, if qualified contractors understand the direct benefits to their businesses they will be highly motivated to promote flood risk reduction best practices and any available local subsidy programs to their clients. These informal "promotional partnerships" with the private sector will help to increase public awareness and drive homeowner action.

Increased Access to Trustworthy, Third Party Information Resources

Fortunately, a wide variety of third-party resources already exist on residential flood protection topics. Cost-effective opportunities exist for a wide variety of agencies to share clear and consistent third-party information with their networks. Opportunities also exist for training industry professionals (home inspectors, realtors, insurance brokers, retailers and mortgage brokers), government, and non-governmental organization staff about residential flood risk reduction and encouraging them to share key third party resources with their networks to increase residential action to reduce risk.

HOME FLOOD PROTECTION PROGRAM FINAL REPORT

1 PROGRAM OVERVIEW

1.1 Introduction to the Saskatoon Home Flood Protection Program

The Intact Centre on Climate Adaptation at the University of Waterloo was engaged by the City of Saskatoon (City) to deliver the Home Flood Protection Program from March to October 2018 to residents within City limits. The City engaged the Intact Centre to augment their ongoing efforts to provide flood protection resources for residents in response to two concentrated overland flooding events in the City in 2017.

The City and SGI CANADA provided funding assistance to support program delivery. The City of Saskatoon took the lead on developing and carrying out the program promotions plan. The Intact Centre provided promotions guidance and support based on their promotional experience gained from rolling out the program in Burlington, Ontario. SGI CANADA provided promotional support. AET Group recruited local Home Flood Protection Trainees. The University of Waterloo provided training and the AET supervised the successful program graduates. The University of Waterloo also provided quality assurance on all reports submitted.

The program had two main components:

- Provide free flood protection educational resources to all Saskatoon residents
- Provide subsidized Home Flood Protection Assessments to residents in detached, semi-detached and townhomes for:
 - Up to 100 fully subsidized assessments to homes including Montgomery Place neighbourhood, which has a unique culvert and ditch drainage system, and 30 other areas identified by the City of Saskatoon as being at higher risk of flooding (\$0 cost to residents)
 - Up to 300 partly subsidized assessments to homes in all other areas (\$125 cost to residents)

1.2 Saskatoon Home Flood Protection Program Goals

The City of Saskatoon's primary objective in becoming involved in the project was to equip citizens, particularly those in areas that more frequently experience flooding, with the knowledge they needed to take actions to mitigate their risk of flooding. Other project research goals were to:

- Test a variety of outreach approaches to encourage downloading of free web resources and registrations for Home Flood Protection Assessments
- Identify the main flood risks in Saskatoon homes
- Identify the key opportunities to reduce flood risk
- Identify key actions taken by residents to reduce flood risk
- Identify the key barriers to taking action to reducing risk
- Compare the Saskatoon results to National results
- Identify future opportunities to encourage residents to take action to reduce flood risk

2 PROGRAM OUTREACH

2.1 Outreach Program Summary

The Intact Centre on Climate Adaptation provided an outreach best practices guidance document to Saskatoon in March of 2018 based on lessons learned from engaging residents in the City of Burlington in 2017. Considering this information, the City of Saskatoon took the lead on developing a two-pronged promotions plan for the program that employed both broad-based and targeted marketing approaches.

The broad-based promotions approach carried out from April to September let all residents know that the City and SGI CANADA were supporting the rollout of a flood risk reduction education program provided by the University of Waterloo. It highlighted the fact that free online resources were available to all residents and that fully confidential flood risk assessments, which had a full value of \$450, were available at a subsidized cost to residents until the end of October, 2018. It noted that areas at higher risk of overland flooding would have access to up to 100 free assessments on a first-come-first-served basis and that all other areas in the City would have access to up to 300 assessments for \$125 on a first-come-first-served basis.

2.11 Broad-Based Promotions Tactics

The broad-based promotions tactics employed included the following:

- March – early teaser in press release about flood protection during National Water Week
- April and June – circulation of press releases at program launch and at the end of June, that resulted in media coverage (See Appendix A)
- April – creation of a program video that was circulated on social media at program launch
- April – radio and newspaper ads promoting the program
- April to May – public service announcements, radio ads and social media posts for National Emergency Preparedness week, in partnership with the Canadian Red Cross
- April – creation of a flyer for City Councillors to share at their Town Hall meetings in affected areas, also provided to the Montgomery Community Association
- May – program promotion in City of Saskatoon employee newsletter and information provided to City Councillors for their newsletters
- June to July – Community Associations posted information to their Facebook page
- April to September – circulation of public service announcements linked to heavy rainfall warnings (See Appendix B)
- July – circulation of 70,000 utility bill inserts (electronic promotions for e-bill customers) to all homes (See Appendix C)
- July – posters displayed at 30 City public facilities (See Appendix D)
- April to September – creation of a program pop-up banner that was posted at City Hall and several public events throughout the season
- April to September – posting of program information and several ads on social media throughout the season
- April to September – sharing of social media posts created by the Intact Centre on Climate Adaptation throughout the season (See Appendix E)

2.12 Targeted Promotions Tactics

The targeted promotions approach carried out from April to September was directed at residents in areas designated as being at higher risk of overland flooding by the City of Saskatoon. These promotions highlighted key program details and noted to these targeted residents that their assessments would be free of cost. In May, the Montgomery Place Neighbourhood was also offered free assessments because of its unique culvert and ditch drainage, and history of flooding.

The promotional tactics targeted to the higher flood risk areas included the following:

- April – dropping off of 1,000 door hangers to homes that were designated as being at higher risk of overland flooding (See Appendix F)
- April – email to 70 residents in higher risk neighbourhoods who subscribed for flood control updates.
- June to October – creation and posting of neighbourhood billboard (See Appendix G) within higher risk neighbourhoods

- June – information provided at two community meetings with residents in Montgomery Place neighbourhood
- June – dropping off of 900 door hangers to homes in Montgomery Place neighbourhood
- April to September – printing and distribution of program signs for residents to post on their front lawns
- July to September – door-to-door outreach completed by a Home Flood Protection Assessor at 258 homes (out of a total of 1,800) with door knocking and door hangers; produced postcards with a home checklist and contact information for City
- July – City Councillor newsletter (See Appendix H)

2.2 Outreach Program Results

The goals of the home flood protection outreach program were to drive residents to the website to download free, self-help resources and to drive registration for the Home Flood Protection Assessments. Saskatoon took the lead on developing a two-level marketing approach, consisting of a broad-based approach that would reach all Saskatoon residents and a targeted approach that would reach only homes identified by the City of Saskatoon as being at higher risk of flooding. The City used a wide variety of outreach channels, conveyed consistent messages, repeated messages on a regular basis, and took advantage of storm events to increase promotions in order to maximize interest in the program.

2.21 Website Activity

A total number of 633 unique visits to the homefloodprotect.ca website came from Saskatoon residents from April to September. The highest number of unique website visits (211) were realized in April when a wide variety of broad-based and targeted outreach approaches were used to launch the program, including media releases resulting in press coverage, a social media launch campaign, and door hanger drops at 1,000 homes designated as being at higher risk of flooding. Website visits remained consistent throughout the summer (in the 80s), dipped in August (47) and received an upswing when messages were conveyed via social media about the program winding-up at the end of September. Please see the Table 1 below for additional details.

Table 1: Program Website Visits

Description	April	May	June	July	August	September	# Cumulative
HomeFloodProtect.ca Unique Website Visits by Saskatoon Residents	211	89	87	83	47	116	633
HomeFloodProtect.ca Total Website Hits by Saskatoon Residents	202	99	93	85	52	121	652

2.22 Outreach Strategy Type and Conversion Rate

Broad-based marketing techniques, such as advertising through utility bill inserts or through social media, were able to reach very high volumes of people and were relatively simple to carry out. Although they had the lowest conversion rates they resulted in the highest numbers of registration because of the sheer volume of people they were able to reach. Fifty residents making registration requests cited general City promo and 34 cited social media as their primary info source. Targeted marketing techniques, such as door-to-door communications and conversations at community events, were able to reach much lower volumes of people due to the high level of effort required to carry out these approaches. Even though they had significantly higher conversion rates they still resulted in fewer overall registration requests due to their lower reach. Eleven residents cited door-to-door conversations and 7 cited conversations at community events as their primary info source. Please see Table 2 for more information.

Table 2: Request for Registration Request Conversion Rate by Outreach Type

Request for Registration Request Conversion Rate by Outreach Type (Multiple Responses Accepted)							
Description (186 Total Registration Requests)	Registration Info Source	Percentage of Requests	Reach to Eligible Households	Conversion Rate	Assessment Price Offered	Category	Group or Personal
Door to Door	11	6%	258	4.3%	0	Targeted	Personal
Contractor/Hardware Store	4	2%	100	4.0%	125	Targeted	Personal
Community Events	7	4%	250	2.8%	0	Targeted	Personal
Word Of Mouth (Neighbour)	6	3%	250	2.4%	0	Targeted	Personal
Door Hangers	27	15%	1900	1.4%	0	Targeted	Group
City Councillor	2	1%	2000	0.1%	0	Targeted	Group
Billboards	10	5%	2500	0.4%	0	Targeted	Group
Social Media	34	18%	10000	0.3%	125	Broad-Based	Group
General City Promo	58	31%	70,000	0.1%	125	Broad-Based	Group
Traditional Media	27	15%	70,000	0.04%	125	Broad-Based	Group
Bill Inserts	22	12%	70,000	0.03%	125	Broad-Based	Group
Realtor	2	1%	10000	0.02%	125	Broad-Based	Group
Total	197	106%					

Targeted marketing approaches (that typically offered free visits to homes at higher risk of flooding) had significantly higher conversion rates to registration requests than those of the broad-based marketing strategies that promoted a \$125 fee for assessments. In addition, targeted marketing strategies that employed personal conversations (noted in Table 2 as “Personal”), far outperformed targeted marketing approaches that used group outreach strategies (noted in Table 2 as “Group”) such as door hangers or group emails from City Councillors. For example, a small door-to-door campaign had the highest conversation rate of 4.3%. It featured a Home Flood Protection Assessor engaging residents in conversations at their doors. Next, at 4%, were conversations participants had with contractors or hardware store employees. Next at 2.8% were conversations between residents and City staff at community events. Finally, word of mouth (2.4%), typically featuring program participants having conversations with their family and friends about the program, also ranked well with a 2.4% conversion rate. Billboards that were placed in higher flood risk areas yielded a 0.4% conversion rate. Broad-based marketing techniques yielded lower conversion rates with the highest being 0.31% for utility bill inserts, followed by 0.01% traditional media and 0.034% by social media. Please see Table 2 for more information.

2.23 Rate of Registration Completion

A total of 186 requests for registration were received in 2018. One hundred and thirteen (113) assessments were completed. A total of 29 people who completed a registration request did not respond to follow-up calls for registration so there is no information about why they did not complete their registrations. Of those who responded to follow-up calls but decided not to register, the top reasons noted for not completing registrations include the following:

- (11) decided they didn’t want the service once they had more information about what it entailed
- (23) were not willing to pay the subsidized price

It is interesting to note that broad-based marketing techniques yielded higher levels of registration requests but they yielded much lower conversion rates to actual registrations for assessments. The residents who registered as a result of the targeted marketing campaigns (in areas where residents were offered free assessments) had often had detailed personal conversations with people about what the program entailed and were more certain that the assessment was a good fit for them before they requested registration. Price was also not a barrier to registration for those who qualified for free assessments.

Broad-based marketing techniques such as radio and television coverage reached a lot of people but they often provided only quick, high level summaries about programs and any related costs. They are not ideal for conveying messages with any kind of complexity. In Saskatoon assessments were offered at two different price points. When many of the residents who had learned about the assessments via broad-based techniques, many of them decided not to register because they decided the service was not for them or because there was a \$125 fee and they had misunderstood and thought the assessment would be free. Many also never returned calls for registration for confirmation so it is difficult to determine what their reasons were for not registering. Please see Table 3 below.

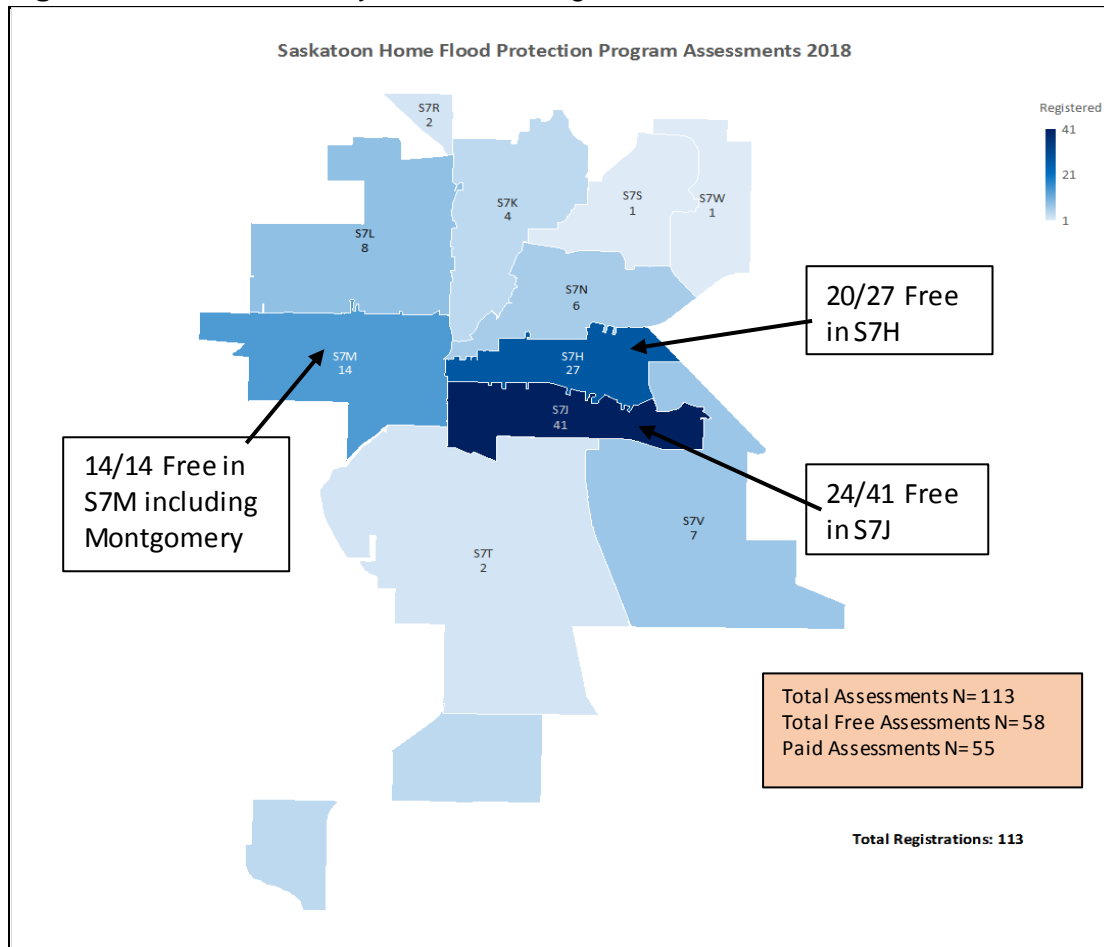
Table 3: Assessment Booking Conversion Rate by Price

Assessment Booking Conversion Rate by Price					
Year	Location	Registration Requests Total	Registrations Total	Total Conversion Rate	Ranking of Conversion Rate
2018	Saskatoon Free	62	58	94%	1
2018	Saskatoon \$125	116	55	47%	2

2.24 Registration Map by Forward Sorting Postal Code

The assessments were dispersed widely across the City with a higher concentration in the areas that received targeted marketing (which included the availability of assessments at no cost), as noted in forward sorting postal codes S7M (including Montgomery Place), S7H and S7J. Please see figure 10 below.

Figure 10: Assessments by Forward Sorting Postal Code



2.3 Promotional Considerations for 2019

In order to increase the effectiveness of the promotional campaign in 2019, the following program components may be considered.

- **Consistent messaging** – Provide clear and consistent messaging to the public, as well as to contractors and suppliers, about best practices for reducing flood risk (including maintenance best practices) If applicable, include information about any available subsidy programs and how to access them. This will improve consistency in messaging and reduce the number of projects that stall due to “conflicting information.”
- **Smaller number of fully subsidized assessments available to all residents** – Consideration should be given to providing fully subsidized assessments on a first-come-first-served basis in 2019 to any residents who are interested, with a promotional focus being put on those in the areas identified by the City as being at higher risk of flooding. Eliminating fees for all assessments, while also limiting the total number of assessments available, will ensure that the City stays within budget for supporting assessments. Creating a first-come-first-served offering will create a sense of registration urgency. Changing the cost to \$0 for participation will eliminate all financial barriers to participation. It will also eliminate any possible confusion about the cost of assessments, which can hamper the conversion from registration request to registration. All of these factors will have the potential to increase registration requests and to lead to higher conversion rates for assessment registrations.
- **Councillor supported promotions** – City councillor newsletters were cited as the primary information source for 48% of Burlington, Ontario residents in 2017. Moving forward, garnering additional support

from Saskatoon City Mayor and Councillors to encourage uptake of actions to reduce flood risk may be considered as a low cost and highly effective option for encouraging action. Information can cost-effectively be conveyed by the Mayor and City Councillors through media interviews, Ward Newsletters, City-wide newsletters, at community meetings and through social media channels. If a subsidy program is introduced this will be of great interest to their constituents and will help to drive uptake of actions to reduce risk.

- **Door-to-door campaign** – In view of the high conversion rate demonstrated by the limited door-to-door campaign, it may be useful to consider expanding a door-to-door campaign to areas where the City would like to focus on encouraging uptake of actions in 2019. If, for example, the City decides to support a subsidy program, consider launching it to target areas with a door-to-door campaign, and ensure that it is done during times when residents are most likely to be at home.
- **Program signs** – Continuing to provide program signs to allow citizens to demonstrate their support for the program and encourage problem-solving conversations may also prove to be effective. Twenty percent of program participants who said that they shared information about the program noted that they also posted a program sign.
- **Promotional support from suppliers and contractors** – Conversion rates have been demonstrated to be high when contractors and suppliers engage residents in discussions about taking action to reduce their flood risk. Consideration should be given to increasing informal promotional partnerships with contractors and suppliers to increase uptake of actions to reduce flood risk by promoting the program directly to them. If subsidies are available to residents, those businesses who may benefit directly by providing products or services will be highly motivated to promote these subsidies to help drive company sales. These groups have great potential to increase the profile of the program at no cost to the City.
- **Supporting higher value subsidies for higher flood risk areas** – Many people in the higher risk flood areas have already taken multiple actions to reduce flood risk. Several of these people would benefit from invasive investigation to deal with the root cause of their flooding issues. Additional subsidies may be considered on a case-by-case basis for homes at very high risk that have already completed all standard measures available to them. Examples may include subsidies for installing water-resistant windows, installing foundation waterproofing and upgrades and installation of foundation drains.

3 HOME FLOOD PROTECTION STUDY RESULTS

3.1 Introduction to the Home Flood Protection Study

A total of 70% of program participants agreed to participate in the Home Flood Protection Study. A total number of 79 participants agreed to share the results of their Home Flood Protection Assessment Report (with personal identifying information removed) and to share feedback about actions taken, barriers to taking action and supports needed to help take further action. A total of 33 households participating in the 3 month survey and 9 households participated in the 6 month survey. See Appendix I for a sample Home Flood Protection Study Waiver.

Data analyzed from the Saskatoon assessments indicates that the majority of participants are already completing a wide variety of simple and low cost actions to reduce flood risks at their homes. For example, 68% of homes have eaves troughs that are in good condition, 100% of homeowners reported cleaning out their eaves troughs at least twice per year, 100% of homes with backup power systems for their sump pumps are maintaining them at least twice per year and 88% of homes had valuables stored in their basements in sealed containers or up on shelves to reduce their risk of water damage during a flood.

The actions already taken by most participants may be attributed to the considerable ongoing efforts of municipal governments, not-for-profits and insurance companies to raise awareness of flood risk and support practical actions that homeowners can take to reduce risks. It may also be related to the fact that many of the study participants had experienced flooding in the past (55 out of 79 study participants or 69%).

Research findings pinpointed areas where additional educational efforts, support for accessing financial subsidies and access to contractor installation and maintenance services will help residents further reduce their flood risk.

3.11 Limits to Consistency of Data Collected

- All flood risk assessors engaged in program delivery received the same flood risk assessment training from the University of Waterloo and their assessment reports were reviewed by the same quality assurance team. The reliability of the two different types of data varies however. For example, data collected about the condition of flood risk features involved simple measuring tools and received visual verification and involved photographic evidence collection. Maintenance data was collected by asking homeowners to report on the frequency of their completion of specific maintenance activities. There is the possibility the residents may have overestimated the frequency of their actions related to flood protection maintenance activities and there is no way to verify this data.
- The study did not contain a “control group” of those who were not participating in the program. The self-selected participants represented in the study may be more vigilant than the average resident, therefore making the results difficult to extrapolate more broadly.

3.2 Flood Risk Assessment Background Information

3.21 Introduction to Assessing Flood Risks in Saskatoon

Lot-level flood risks were evaluated by visual assessment at all 113 homes that participated in a Home Flood Protection Assessment. Physical features were assessed by simple, non-invasive means (not removing or pulling apart physical features) using measuring tapes, moisture meters, flashlights, etc. The performance of each feature of the home was scored according to the nationally recognized best practices for reducing flood risk that are reflected in the Home Flood Protection Assessment Reporting Tool. Residents were also asked about the frequency of maintenance activities that they completed at their homes to reduce flood risk and to manage indoor humidity (that can lead to increased risk of mold and mildew developing). These responses were also scored based on the nationally recognized best practices reflected in the Tool. See Appendix J for a sample Home Flood Protection Program Participation Waiver and Appendix K for a sample Home Flood Protection Assessment Report.

3.22 Scoring and Analysis of Assessed Features and Maintenance Practices Inside and Outside the Home

Lot-level flood risks were evaluated by visual assessment at all homes that participated in a Home Flood Protection Assessment. Physical features were assessed by simple, non-invasive means (not removing or pulling apart physical features) using measuring tapes, moisture meters, flashlights, etc. The performance of each feature of the home was scored according to the nationally recognized best practices for reducing flood risk that are reflected in the Home Flood Protection Assessment Reporting Tool. A “green” score indicated that they had met the nationally recognized best practice, “yellow” meant that they had some minor deficiencies that needed correction and “red” meant that they had major deficiencies that needed correcting in order to reduce flood risk or that further investigation was required. Physical features had visually verifiable and photo-documentable results, leading to a greater confidence in the data. The charts below indicate all features that did not score “green” and require action to address deficiencies to reduce flood risk.

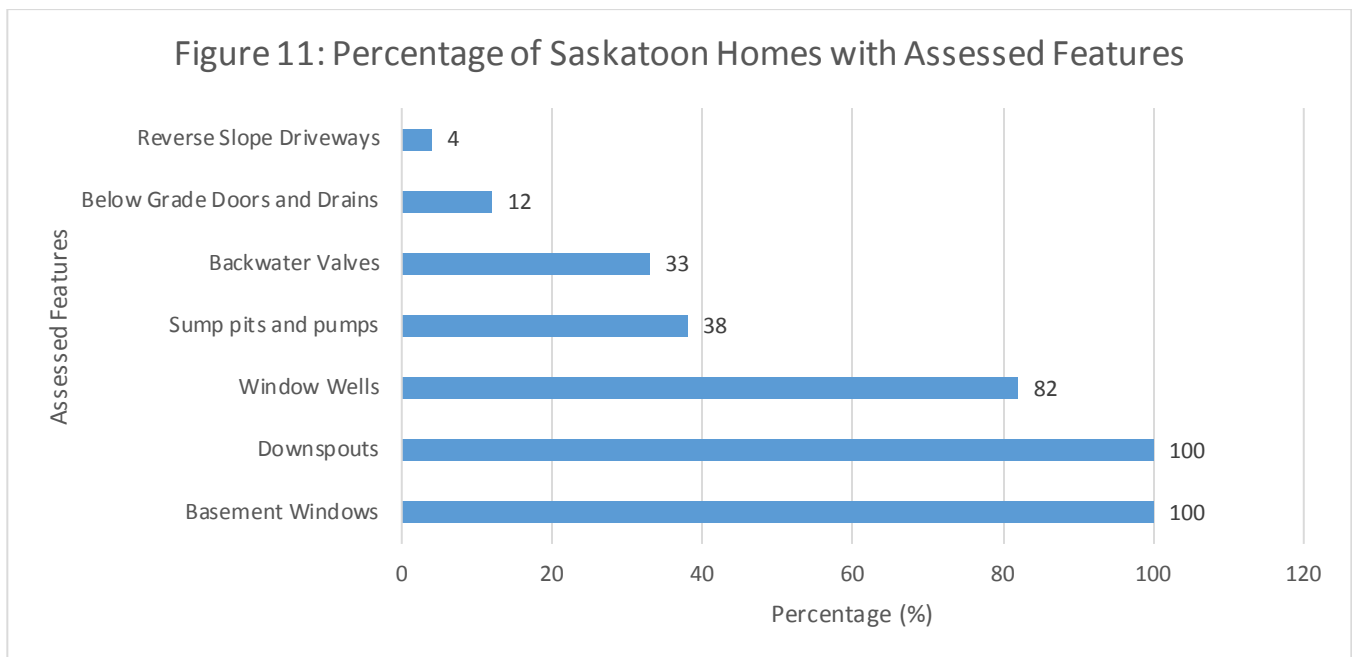
Residents were also asked about the frequency of maintenance activities that they completed at their homes to reduce flood risk. These responses were also scored based on the nationally recognized best practices reflected in the Tool. Generally speaking, “green” indicated that they completed maintenance each season, “yellow” indicated that they completed maintenance at least twice per year and “red” indicated that they never completed a particular maintenance activity. Since answers were self-reported there is no way to verify this data and it may

be considered less reliable. The charts below reflect those households that did not meet a minimum standard of completing maintenance activities at least twice per year.

Please see Appendix L for a list of all best practices used to indicate a score of “green” in the Home Flood Protection Assessment Tool.

3.23 Assessed Features

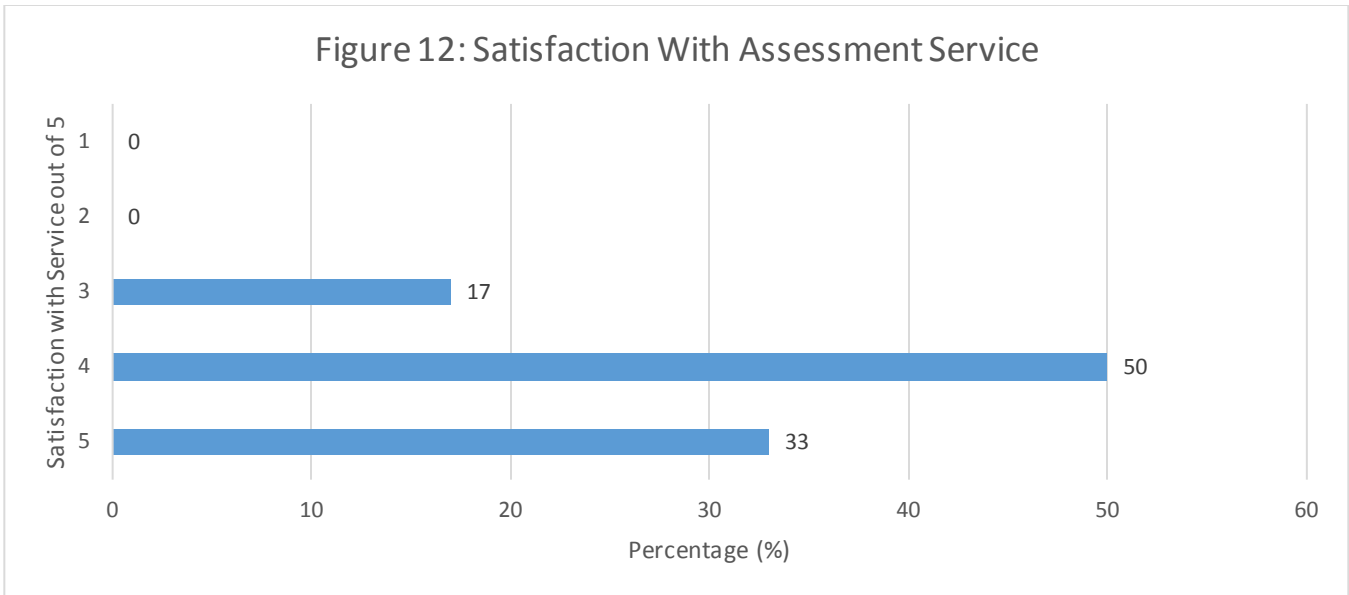
The assessed features at each home varied based on what was present at their homes. For example, 100% of assessed homes had basement windows, whereas only 82% of homes had windows less than 4” above the ground that required window wells, 100% of homes had disconnected downspouts (that deposited water onto the surface of the ground), 38% of homes had sump pits and pumps and 33% of homes had backwater valves. Percentages for flood risks were calculated by dividing the number of a particular item (e.g. sump pumps) that did not score “green” or best practice by the total number of responses related to that particular item. Percentages for flood maintenance risks were calculated by dividing the number of a particular maintenance item (e.g. sump pump maintenance) that scored “red” or poor because maintenance was never completed by the participant. Please see Figure 11 below.



3.24 Satisfaction with the Service

Of the 6 people who responded to the customer service survey 100% (6) said that they would recommend the service to others. One person (17%) percent ranked their satisfaction with the service as 3/6, three people (50%) ranked their satisfaction as 4/5 and two people (33%) ranked their satisfactions as 5/5. No scores of 1/5 or 2/5 were received. Please see Figure 12 below.

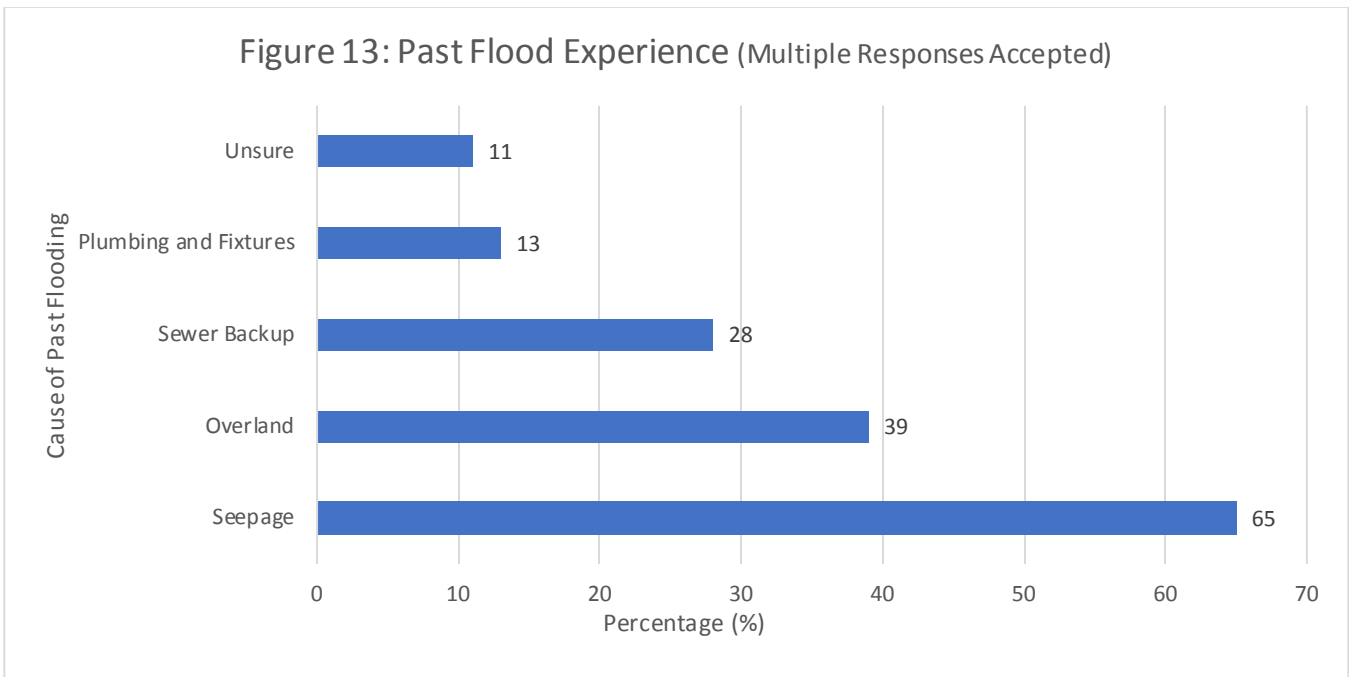
Figure 12: Satisfaction With Assessment Service



3.25 Past Flood Experience

A total of 69% of Saskatoon program participants noted that they had experienced flooding in the past. This was defined as the sudden and accidental escape of any amount of water into their basement. The most common past flood experience of participants was seepage through the foundation (65%) followed overland flooding through gaps or cracks in windows, doors and foundation cracks above ground (39%), sewer backup (28%), and leaks from plumbing and fixtures (13%). Please see Figure 13 below.

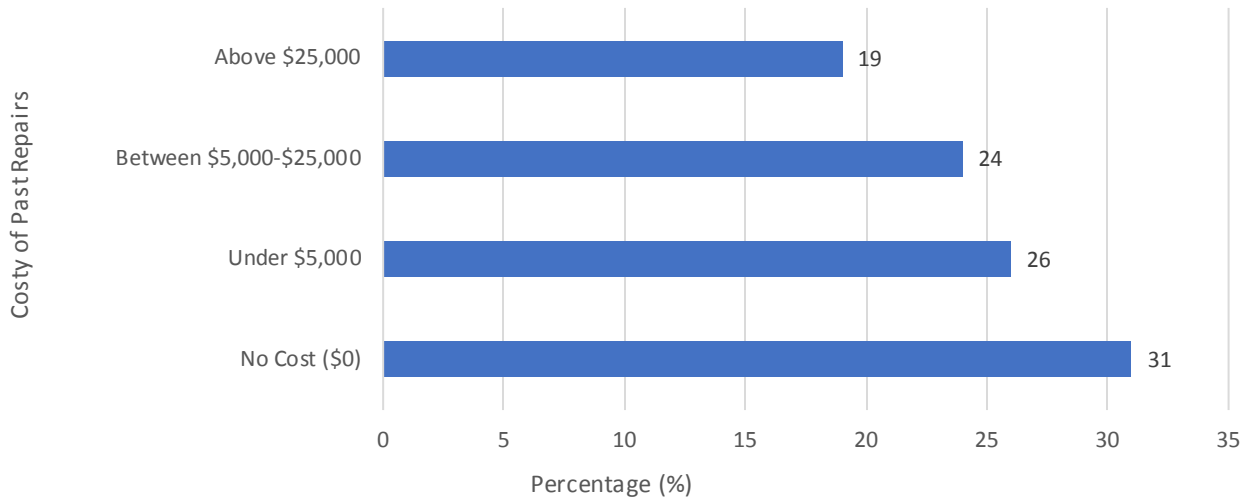
Figure 13: Past Flood Experience (Multiple Responses Accepted)



3.26 Cost of Repairing Past Flood Damage

The cost of completing flood repairs varied greatly with 31% costing \$0 to repair, 26% costing from \$1-\$5,000 to repair and the remaining 43% costing over \$5,000 to repair. Please see Figure 14 below.

Figure 14: Money Spent to Repair Past Water Damage



3.27 Uptake by Ownership Type

All participants in the Program were homeowners. For reasons related to confidentiality, tenants had the opportunity to participate in the program but they had to have written permission from homeowners. In many communities, affordable rental units are located in basements. The Home Flood Protection Program research did not collect information about rental units. Future educational efforts will need to be made to reach landlords and tenants to ensure that they understand their flood risks and understand which actions they can take to reduce their flood risk. Working with this group will help to ensure access to safe and affordable basement rental units.

3.28 Ownership Type

The vast majority of participants in the Study were owners of freehold units (99%). Only 1% were owners of condo units. The type of ownership determines which decisions you are authorized to make regarding reducing flood risk and messaging must be adapted to target the level of control that the target audience has in their homes. For example, owners of freehold homes can decide to make changes to any areas of their property or physical buildings as long as they follow the required bi-laws of the municipality. Condo owners most often can control changes to the inside of their units but the building structure and the grounds are usually under the control of the condo association. Tenants rarely have any control other than over their personal belongings. Communications campaigns and promotional materials must be adapted to address the risks of the target audience and focus on actions that they have the ability to act upon.

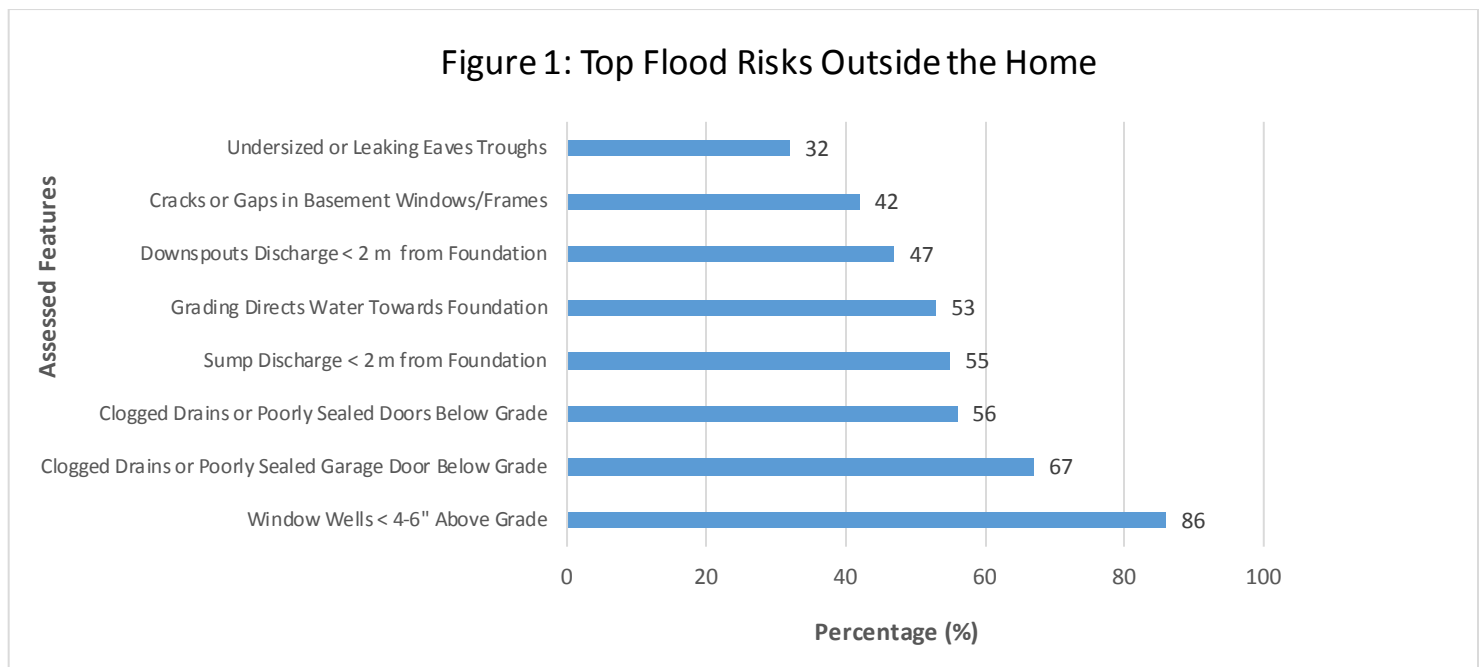
3.29 Amount of Money Willing to Pay for Assessments

The full cost to deliver Home Flood Protection Assessments was \$450. The average maximum cost participants said they would be willing to pay for this service varied from \$50 to \$750. The average amount residents were willing to pay was \$150. Therefore, a subsidy will be required to keep assessments in demand with the public in the future. We also know that the lower the cost per assessment, the lower the financial barrier to participating. In the future, potential subsidies to support the program in its present form may come from willing municipalities and insurance companies. In order to reduce the cost of delivery, the key components of the Home Flood Protection Assessment may also be integrated into a traditional home inspection, where it will make a negligible impact on the cost of delivery of the home inspection.

3.3 Most Common Flood Risks Inside and Outside the Home

3.31 Most Common Flood Risks Outside the Home

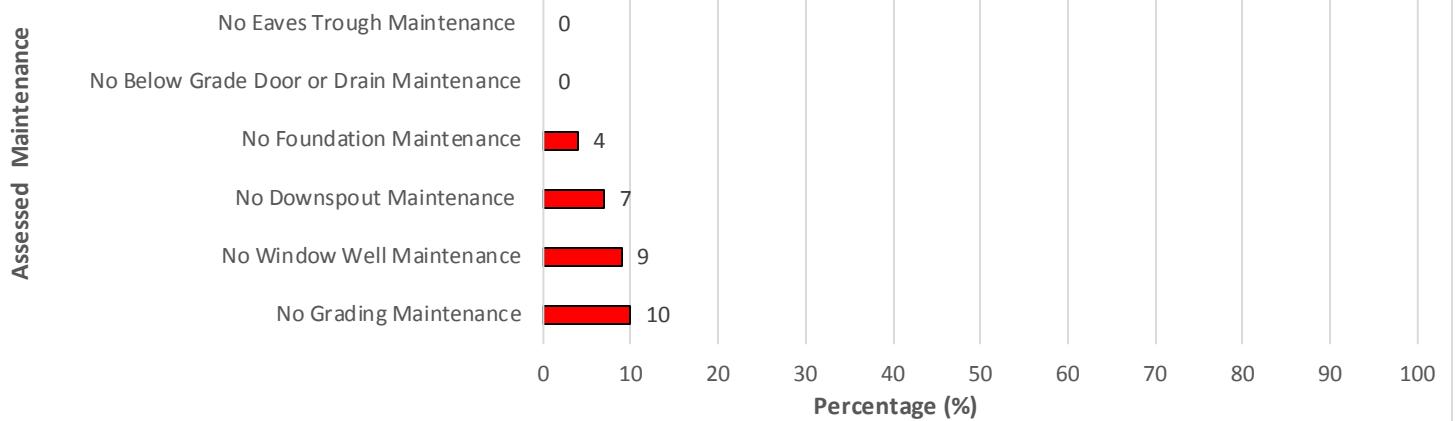
The most common flood risks identified outside the home put homes at increased risk of overland flooding (water entering the home above ground) and seepage (water entering the home below ground through cracks or seeping through foundation walls). For example, 86% of assessed homes had inadequately installed window wells, meaning that they were not 4-6" above the surface of the ground or sealed at the home's foundation. Sixty-seven percent of homes with reverse slope driveways had drains and garage doors that were not in good condition and 56% of homes that had below grade entry doors and drains that were not in good condition. Fifty-five percent of homes with sump pumps had sump pump discharge pipes that deposited water less than the recommended 2m from the foundation. Forty-seven percent of homes had downspouts that were less than the recommended 2m. Fifty-three percent of homes that did not direct water away from the foundation. Forty-two percent had basement windows or frames with cracks or gaps and 32% had eaves troughs that were undersized or leaking. Please see Figure 1 below. See Appendix M for the scoring of all flood risks features outside the home.



3.32 Most Common Maintenance Flood Risks Outside the Home

Participating homeowners overwhelmingly reported that they were completing key flood prevention seasonal maintenance activities outside of their homes at least twice per year. For those not maintaining grading (10%), downspouts (7%), window wells (9%), and their foundations (4%), their homes are at increased risk of seepage flooding. The main reasons cited for not completing these activities include a lack of physical ability or personal expertise to complete these tasks. Please see Figure 2 below. See Appendix N for the scoring of all flood maintenance risks outside the home.

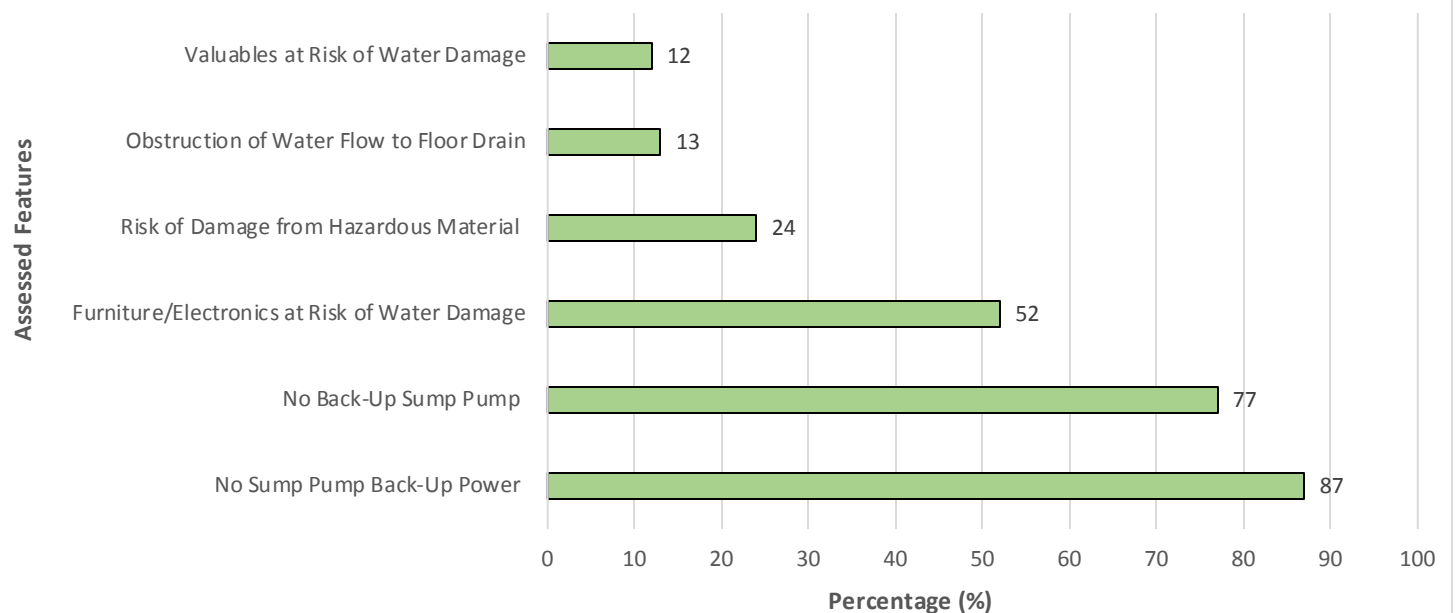
Figure 2: Top Maintenance Flood Risks Outside the Home



3.33 Most Common Flood Risks Inside the Home

The most common flood risks inside the home put residences at increased risk of sewer backup (water entering the home through the sump pit or drains) and of damage to the basement’s structure and contents during a flood. Of those homes with sump pumps, 77% did not have backup sump pumps and 87% did not have a backup power supply, putting their homes at risk during a power outage. Fifty-two percent of homes had furniture and electronics in their basements that were at risk of damage during a flood. A total of 24% of homes had hazardous materials (such as paints and pesticides) stored in their basements that were at risk of contaminating the basement during a flood event. Fortunately only 13% of homes had obstructions to the basement floor drain which would increase damage to structure and contents during a flood and only 12% of homes had stored valuables at risk of water damage during a flood event. Please see Figure 3 below. See Appendix O for the scoring of all flood risks features inside the home.

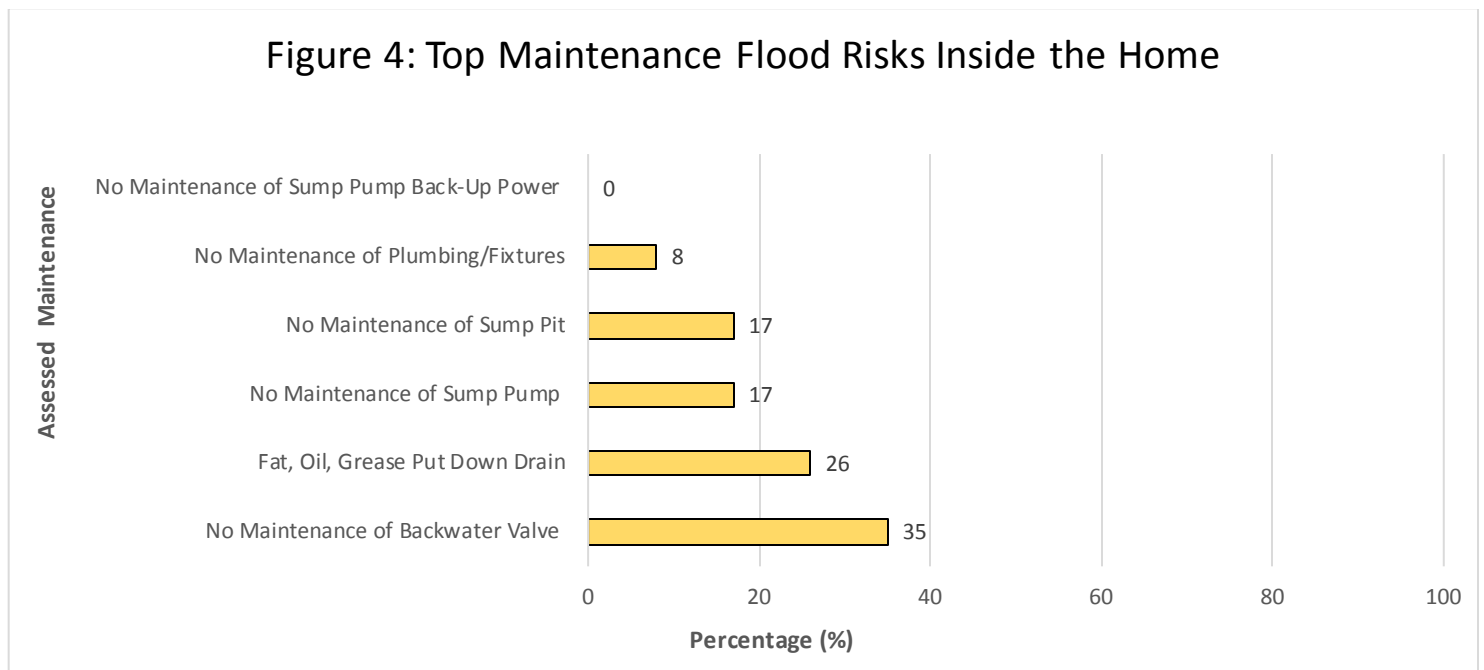
Figure 3: Top Flood Risks Inside the Home



3.34 Most Common Maintenance Flood Risks Inside the Home

The most common maintenance flood risks inside the home increased the residence’s risk of sewer backup and damage to the basement’s structure and contents during a flood. Of the homes with backwater valves, 35% did not maintain them, increasing their risk of sewer backup into the home from the municipal sewer or from internal sources. A total of 26% of participants used poor practices for maintaining their sewer lateral, meaning that they regularly put fat, oil, grease and/or baby wipes down their drains, increasing their risk of sewer backup at their own homes and increasing the risk to nearby homes that share the municipal sewer system. Of those homes with sump pumps, 17% did not maintain their sump pump and 17% did not maintain their sump pit, putting them at increased risk of water damage related to a faulty sump pump or leaking sump pit. Fortunately, all residents that had backup power for their sump pumps were maintaining them twice per year, thereby reducing their risk of sump pump failure during a power outage. Please see Figure 4 below. See Appendix P for the scoring of all flood maintenance risks inside the home.

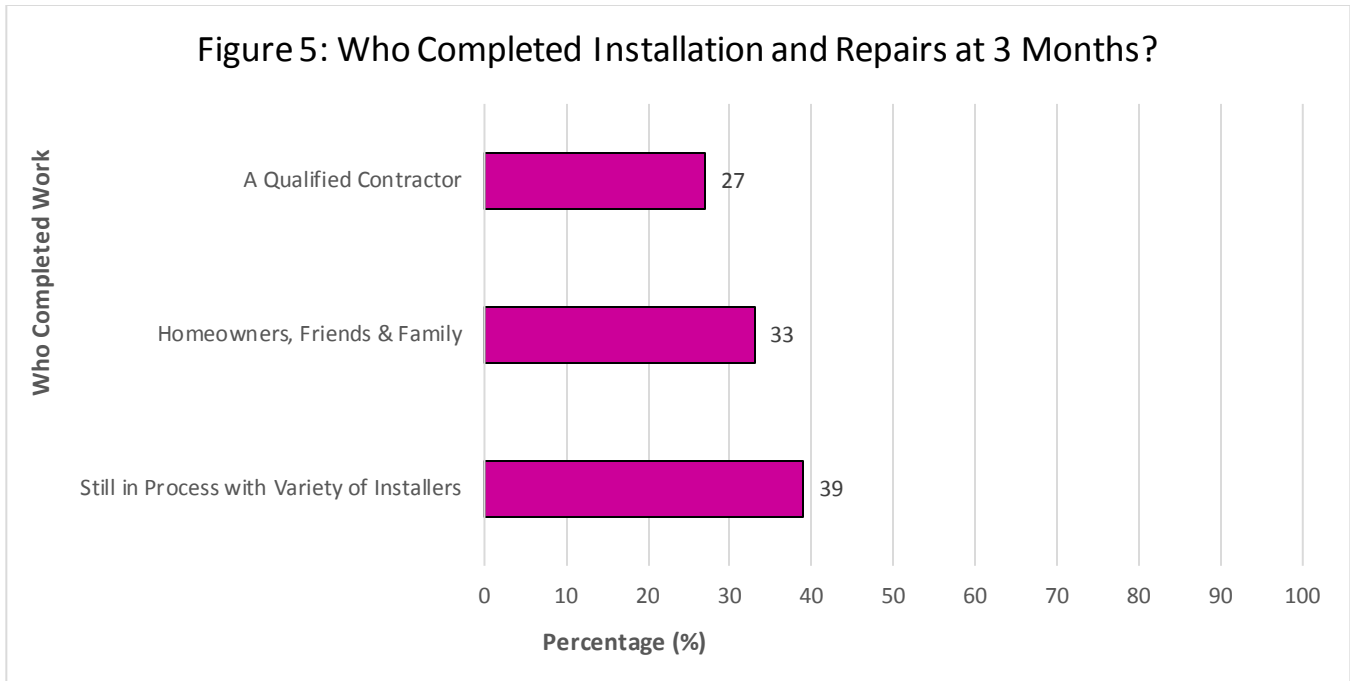
Figure 4: Top Maintenance Flood Risks Inside the Home



3.4 Key Actions Taken to Reduce Flood Risk

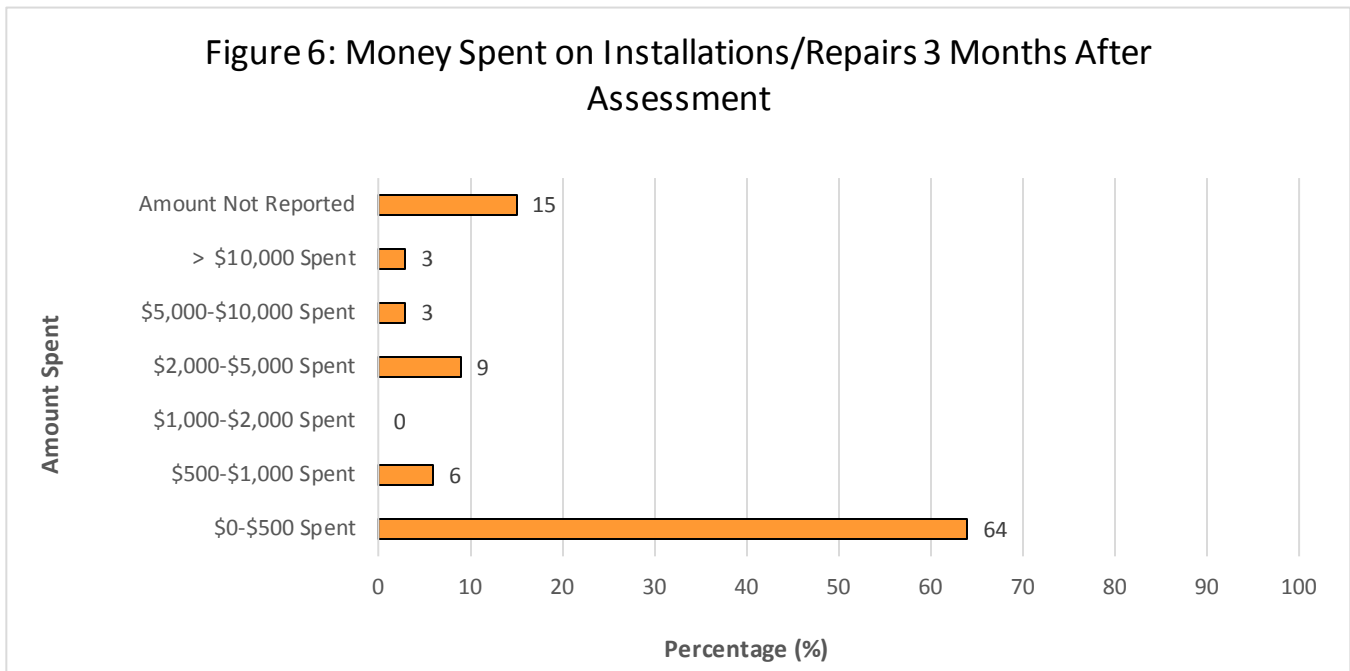
Each assessment report identified physical features and maintenance practices that were ranked as “poor/ need further investigation” and identified customized opportunities to reduce these risks. Study participants were asked to report at 3 and 6 months which actions they had taken to reduce the specific flood risks identified at their homes. At 3 months, a total of 58% of Saskatoon program participants noted completing at least one new action to address flood risk and at 6 months a total of 78% of participants noted completing at least one additional action to reduce flood risk. At three months 39% of respondents were still in the process of completing the work with the help of a mix of contractors, homeowners, family, 33% of actions had been completed by the homeowner, family or friends and 27% had been completed by a contractor. Please see Figure 5 below.

Figure 5: Who Completed Installation and Repairs at 3 Months?



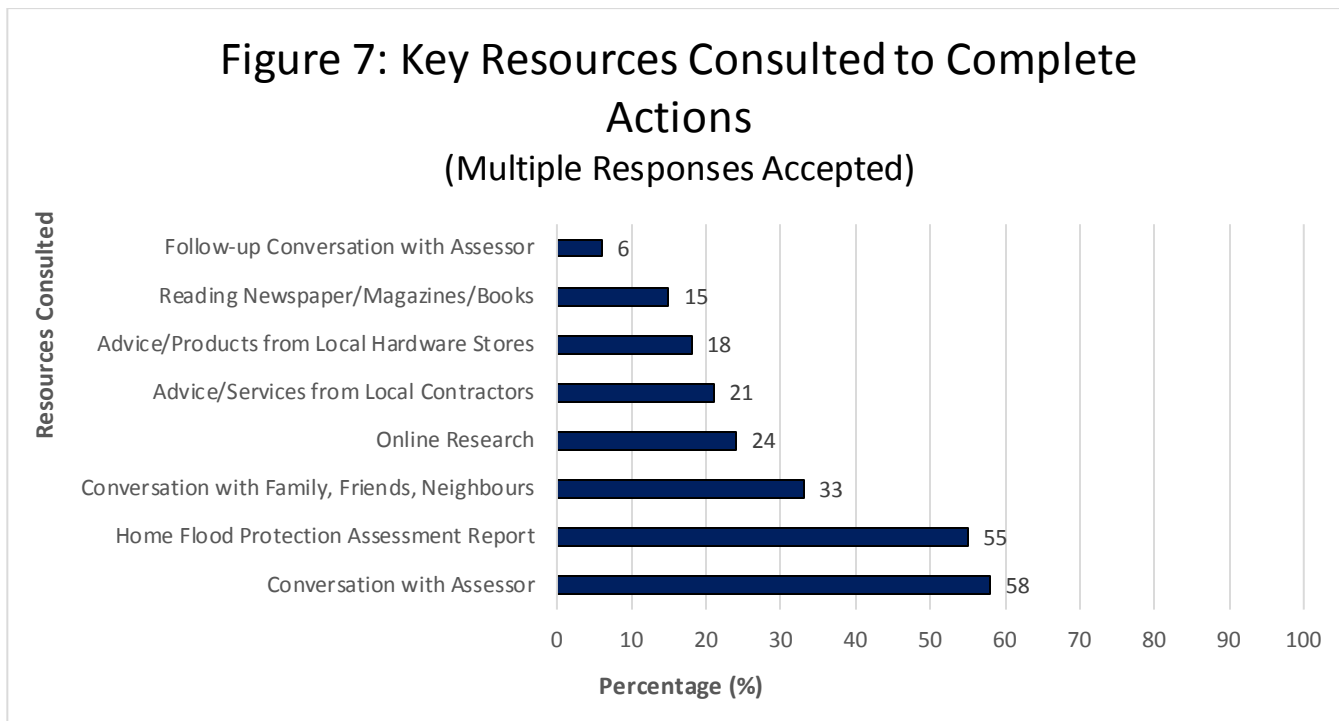
The majority of actions (64%) were simple, cost under \$500 to complete and could be completed by a capable homeowner themselves in a short period of time. Examples include properly storing and removing valuables and toxic materials from the basement, cleaning out eaves troughs and extending downspouts and sump pump discharge pipes to 2m. The other 36% of actions were more complex and expensive and often required the support of qualified contractors to complete. The costs of these actions ranged widely from \$500 to over \$10,000. Some of these more expensive action items included installing a backup sump pump and backup battery, installing a backwater valve, repairing a sewer lateral, replacing basement windows, replacing eaves troughs, replacing a driveway, installing window wells and installing a sewer lateral cleanout. Please see Figure 6 below.

Figure 6: Money Spent on Installations/Repairs 3 Months After Assessment



When asked which resources homeowners used to support their decision-making and actions to reduce flood risk, personal conversations stand out as the major driver. The conversation with the flood risk assessor was the top ranked resource (58%), followed by the assessment report (55%), which in fact is a written record of the conversation between the homeowner and the assessor during the onsite visit. Conversations with family, friends and neighbours (33%), advice and services of contractors (21%) and advice and products of hardware stores

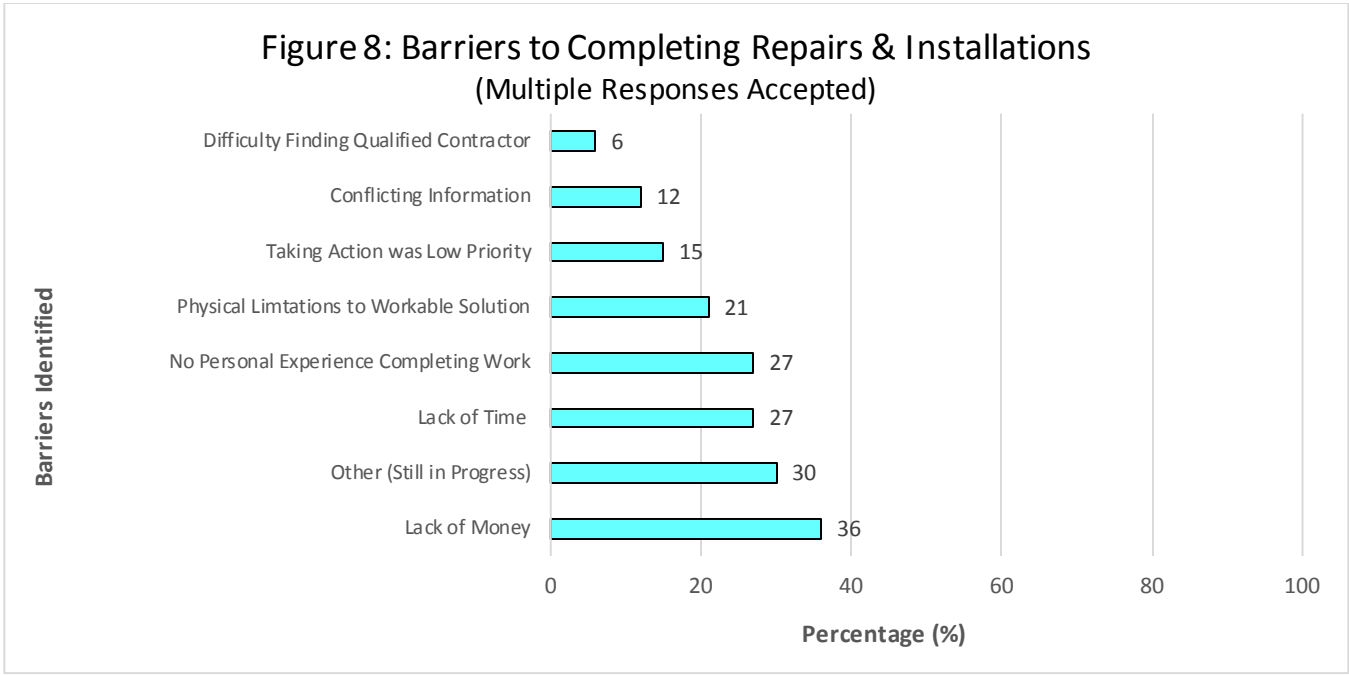
(18%) also figured prominently. Online (24%) and printed (15%) flood risk, subsidy and how-to information were also cited by homeowners as key resources consulted. Please see Figure 7 below.



3.41 Barriers to Taking Action to Reducing Flood Risk

The main barriers to taking action reported by homeowners are divided into two main categories: those who wish to engage a contractor to complete more complex and higher cost work and those who wish to complete simpler, low cost actions themselves. For those wishing to engage a contractor 36% of surveyed participants noted that a lack of money was a barrier to action, 27% noted that there was a lack of time (many noted they were still waiting for a contractor to get to their job) and 10% noted difficulty finding a qualified contractor to complete the work. For those wishing to complete the work themselves a lack of personal experience to complete the work (27%) and physical limitations to doing the work (21%) were noted barriers. Additional top ranked barriers relate to the perceived lack of urgency for completing the work. For example 27% reported having a lack of time and 15% noted that taking action was a low priority. A total of 12% of participants noted that conflicting information was a barrier to taking action. If the information or advice homeowners received from several sources conflicted they often did not complete the work because they were not sure how to proceed. Please see Figure 8 below.

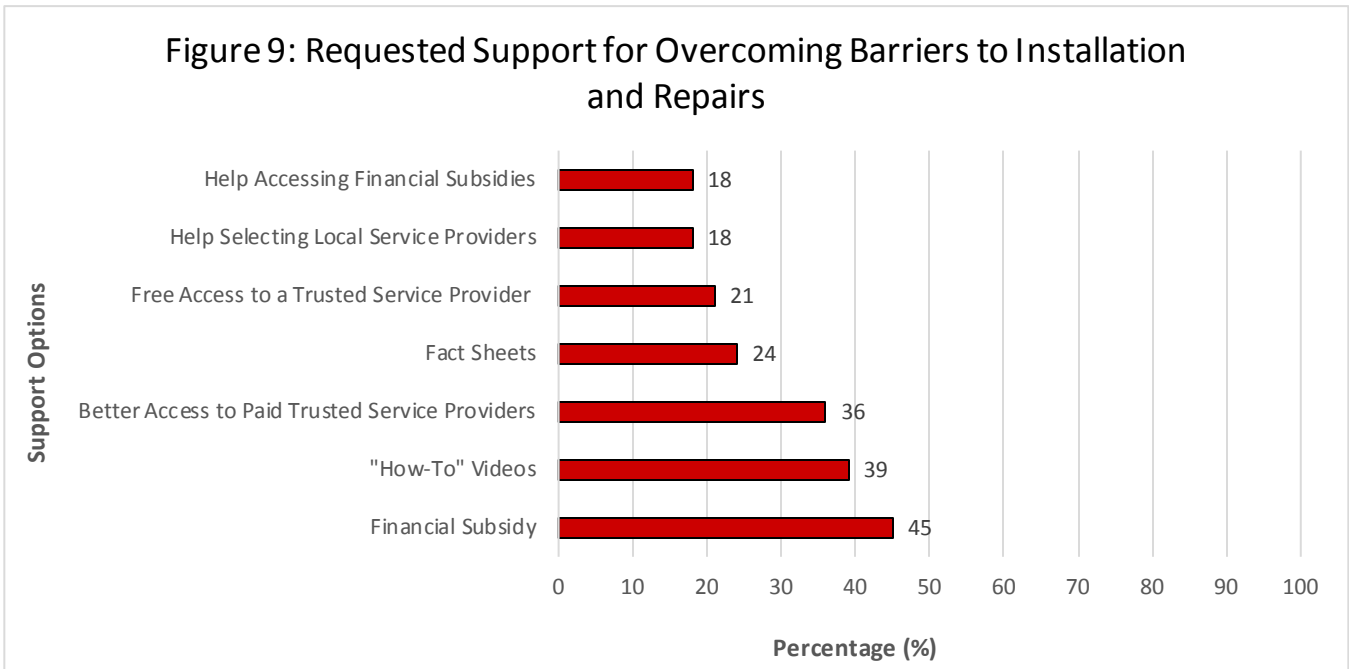
**Figure 8: Barriers to Completing Repairs & Installations
(Multiple Responses Accepted)**



3.42 Key Supports Needed To Take Additional Action

Participants identified the following key supports that are needed to take additional action: improved access to funding, improved access to qualified contractors, and increased access to trustworthy, third party information resources. Please see Figure 9 below.

Figure 9: Requested Support for Overcoming Barriers to Installation and Repairs



Increased Access to Funding Support

Forty five percent (45%) of participants noted they would like to have a financial subsidy to help them take action, 21% noted they would like financial support to get access to qualified contractors for free, 18% said they would like help accessing any available subsidies.

Participants support the provision of municipal flood protection subsidies to help reduce flood risk, including subsidies to complete flood risk assessments. They also note that accessing subsidies can often be complicated, time consuming and inconvenient as it requires them to navigate complex application systems, pay for work upfront and then wait for reimbursement. Minor adaptations to how municipal flood protection subsidies are delivered could potentially increase uptake of more expensive actions to reduce flood risk. For example, providing point of sale rebates for contractors and homeowners for items such as backwater valves, downspout extensions, sump pumps, backup sump pumps and batteries may be considered to reduce the barriers to accessing subsidies. Minimizing paperwork and streamlining approvals processes may also reduce barriers.

Increased Access to Qualified Contractors

Fifty-four percent (54%) of participants noted that they would like increased access to trusted service providers and 41% noted they would like help selecting qualified contractors.

Presently residents are experiencing challenges finding qualified contractors who can do the work for them in a timely manner. Many noted long delays waiting for contractors and difficulties getting contractors to respond for smaller jobs that they needed done. A business opportunity exists in Saskatoon for qualified contractors to provide assessment, installation and maintenance services to residents to meet identified demand. Additionally, there is an opportunity to provide general contracting services to oversee the completion of all work, including any available subsidy applications on behalf of homeowners. Making contractors aware that this opportunity exists is very important to help drive greater entry into the market. In addition, if qualified contractors understand the direct benefits to their businesses they will be highly motivated to promote flood risk reduction best practices and local subsidy programs to their clients.

Increased Access to Trustworthy, Third Party Information Resources

For residents who wish to complete actions on their own greater access to third party information resources has been identified. By “third-party” they noted that they wanted trustworthy information from a source that was not trying to sell any one particular product or service. Information sources include those produced by government, institutional and non-governmental organizations. Thirty percent (39%) of participants noted that they wanted greater access to third party how-to videos and 24% noted that they wanted greater access to third party fact sheets. Fortunately, a wide variety of third-party resources already exist on these topics. Cost-effective opportunities exist for a wide variety of agencies to share clear and consistent third-party information with their networks. Opportunities also exist for training industry professionals (home inspectors, realtors, insurance brokers, mortgage brokers) and government and non-governmental organization staff about residential flood risk reduction and encouraging them to share key third party resources with their networks to drive action to reduce flood risk.

3.5 Future Saskatoon Program Considerations to Drive Action to Reduce Flood Risk

Based on the lessons learned from the pilot program rollout in Saskatoon in 2018, the following program elements should be considered to drive future action in the City of Saskatoon to reduce flood risk:

- Create financial subsidies to reduce financial barriers to taking action
- Utilize existing third-party information resources to share how-to information with residents
- Maximize the use of Mayor and City councillor personal communications and face-to-face discussions to encourage people to share information and support each other in taking action
- Provide consistent messaging from the City to contractors, suppliers and insurance companies about the key actions to take to reduce flood risk (including maintenance activities), subsidies available for residents and how to access them
- Maximize promotional support from contractors and suppliers who stand to personally benefit from the success of the programs

4 COMPARING SASKATOON RESULTS TO ONTARIO RESULTS

4.1 Introduction to Comparing Study Results

Assessments were delivered in three pilot communities using a variety of outreach methods, designed to suit the identified needs, timelines and resources of each community. Each location also had a different flood history and various different municipal educational programs and financial incentives available to help homeowners take action. Despite the diversity of communications approaches, some strong trends can be seen related to the effectiveness of various outreach approaches. Many common themes also emerged related to flood risks at the household level, actions taken to reduce flood risk, barriers to taking action and opportunities to increase uptake of actions. These lessons learned can be used to inform the rollout of nationally applied flood risk reduction education programs that can be tailored to meet the needs of individual jurisdictions.

4.2 Comparing Effectiveness of Outreach Approaches

Broad-based promotional methods that reach out to the entire community (such as social and traditional media and utility bill inserts) resulted in higher numbers of requests for registrations in all Cities because of their ability to reach very high numbers of people. These methods accounted for between 64% of registration requests in Toronto to as high as 74% of registration requests in Saskatoon. Targeted methods that focused on engaging one particular group of people accounted for lower numbers of registration requests because of the lower numbers of residents that they reached, ranging from 26% in Saskatoon to 36% in Toronto. Of the targeted methods employed, those methods that featured personal conversations between individuals (such as during door to door campaigns, at community events, at hardware stores) account for significantly higher conversion rates than those using impersonal, group outreach methods. These methods include mass emails to a specific target group or door hangers. In Burlington and Saskatoon the conversion rate for personal versus group engagement methods was 9 times higher. In Toronto the rate was roughly 4 to 1. Please see Table 5 below for further information.

Table 5: Comparing Registration Requests by Outreach Method

Comparing Registration Requests by Outreach Method						
Year	Location	Broad- Based Methods	Targeted Methods	Targeted Methods Breakdown		Requests Total
				Targeted by Group Outreach	Targeted by Personal Conversation	
2017	Burlington	81	31	3	28	112
		72%	28%	10%	90%	
2018	Burlington	27	11	1	10	38
		71%	29%	10%	90%	
2018	Toronto	151	86	23	63	237
		64%	36%	27%	73%	
2018	Saskatoon	131	47	5	42	178
		74%	26%	11%	89%	

When comparing conversions from requests for registrations to registration confirmations, free assessments show consistently higher conversion rates ranging from 83% in Burlington in 2017 to 94% in Saskatoon in 2018. The assessments that carry a price tag for the homeowner demonstrate a lower conversion rate ranging from 76% in Burlington in 2017 to 47% in Saskatoon in 2018. Clear and consistent communications about which price is charged based on location is very important. If at all possible, it is best to have one price that is charged to all residents to minimize any confusion, thereby increasing the conversion rates of paid assessments. Please see Table 6 below.

Table 6: Request to Assessment Booking Conversion Rate by Price and Location

Request to Assessment Booking Conversion Rate by Price and Location					
Year	Location	Registration Requests Total	Registrations Total	Total Conversion Rate	Ranking of Conversion Rate
2018	Saskatoon Free	62	58	94%	1
2018	Burlington Free	38	34	89%	2
2017	Burlington Free	12	10	83%	3
2017	Burlington \$125	100	76	76%	4
2018	Toronto \$95	237	168	71%	5
2018	Saskatoon \$125	116	55	47%	6

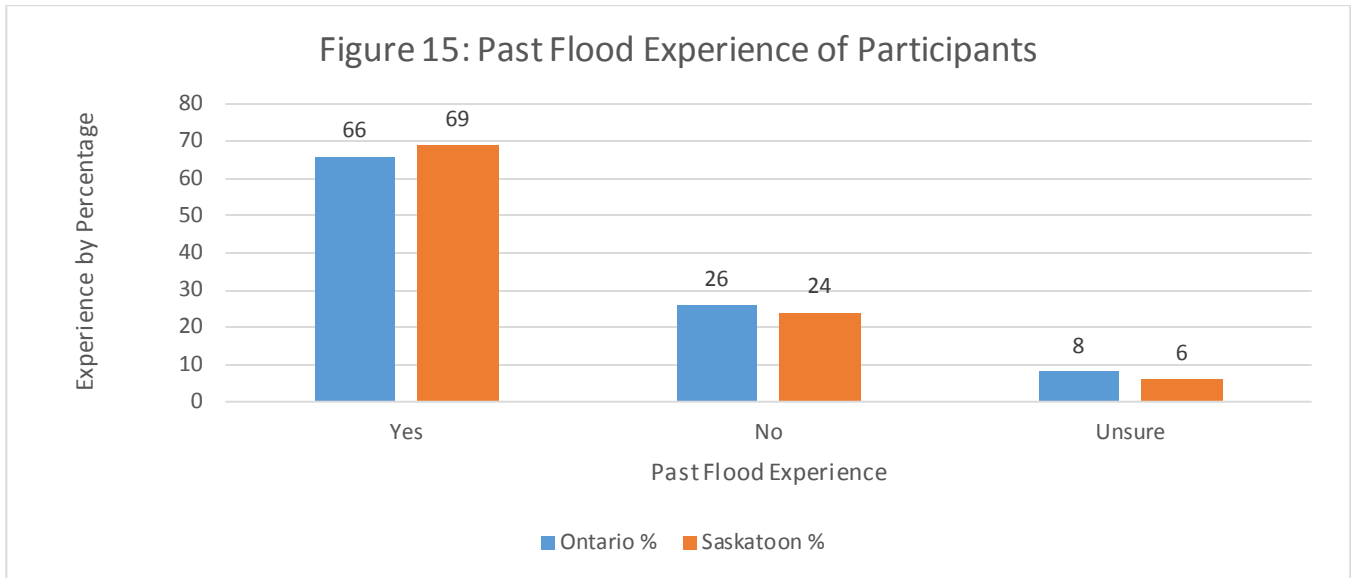
4.3 Comparing Flood Risks

When comparing flood risks it is important to first look at the areas that were targeted by the promotions campaigns in Ontario versus in Saskatoon. In Ontario, the two major pilot project areas were Burlington and Toronto. Promotions in Burlington were focused on those homes that had not experienced previous flooding, since significant flood risk reduction education efforts had already made to these areas by Halton Region. In Toronto, no particular locations were targeted for outreach and instead, the main focus of outreach was a direct email campaign to City Staff and to members of sustainability groups. In Saskatoon, targeted marketing was focused on areas that the City deemed as being at higher risk of overland flooding, with many of these residents experiencing two overland flooding events in their homes in 2017.

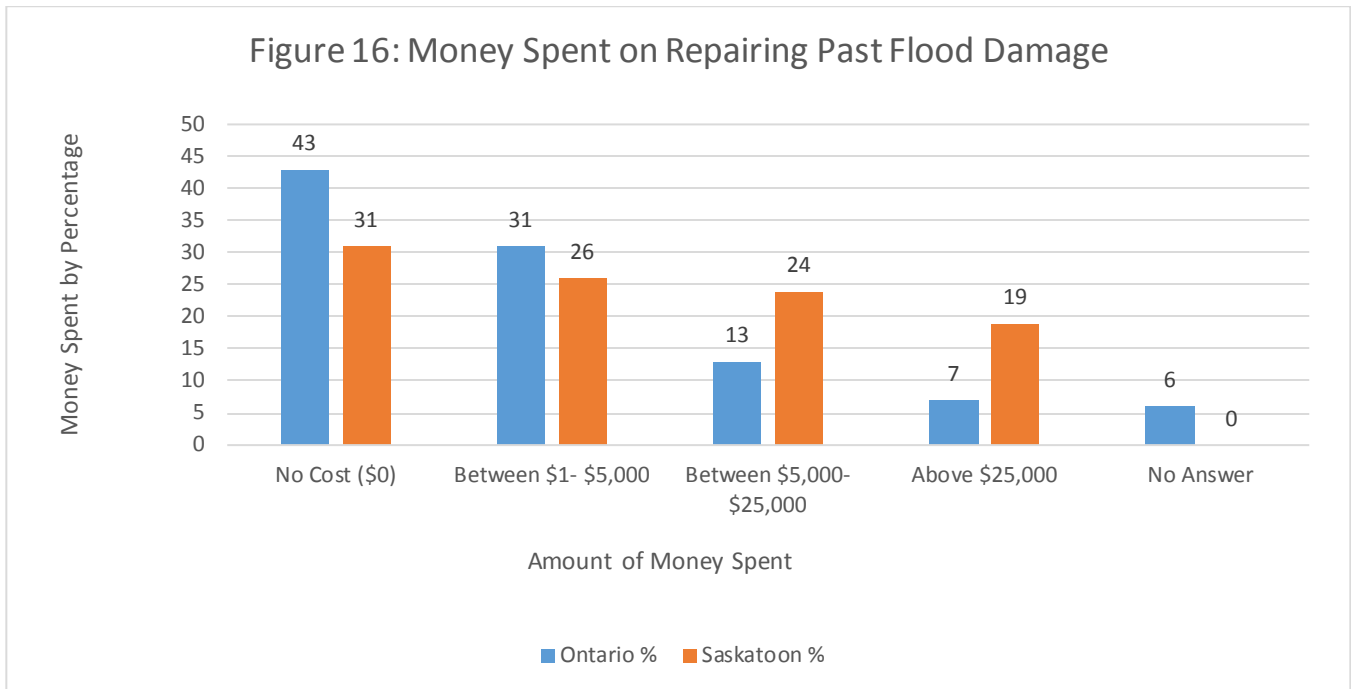
Overall, Saskatoon homes performed on par or better than their counterparts in Ontario regarding taking action to reduce flood risk, with some minor exceptions. This may possibly be explained by the fact that the promotions campaigns in Saskatoon focused on those areas with recent flood experience whereas the Ontario campaigns did not. In Saskatoon, higher numbers of participants had recent flood experience with more expensive repairs due to flood damage. It is possible that these factors as well as recent flood risk reduction education campaigns by the City of Saskatoon had increased the levels of flood protection vigilance in Saskatoon compared to Ontario.

4.31 Background Information

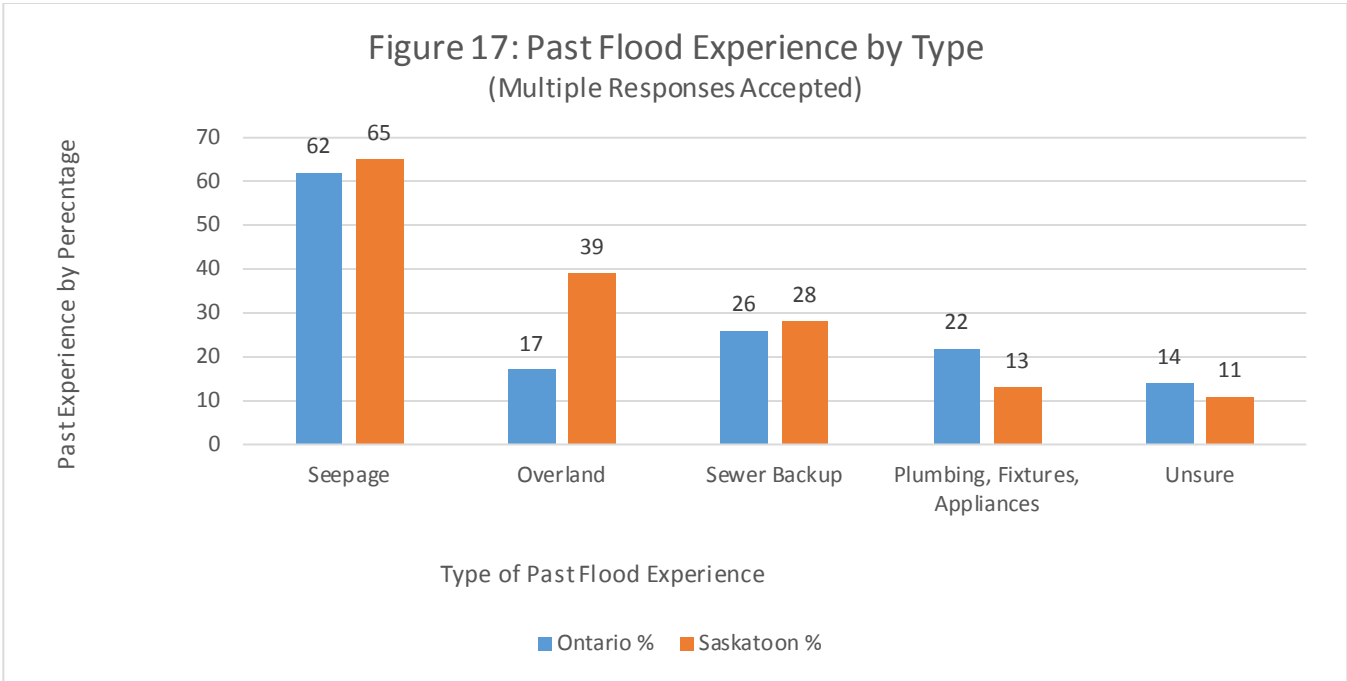
When participants were asked whether they had experienced flooding in the past, flooding was defined as any amount of water that escaped into their basement and that cost any dollar amount to fix. In Ontario and Saskatoon, the response rates were almost identical with 66% of participants in Ontario and 69% of participants in Saskatoon noting that they had experienced past flooding. Please see Figure 15 below.



Upon closer examination it is evident that higher percentages of Saskatoon participants experienced significant flood events that required large amounts of money to repair. For example, in Ontario 13% of participants reported spending \$5,000-\$25,000 to repair flood damages compared to 24% in Saskatoon and 7% of Ontario residents reported spending above \$25,000 to repair flood damages compared to 19% in Saskatoon. Please see Figure 16 below.

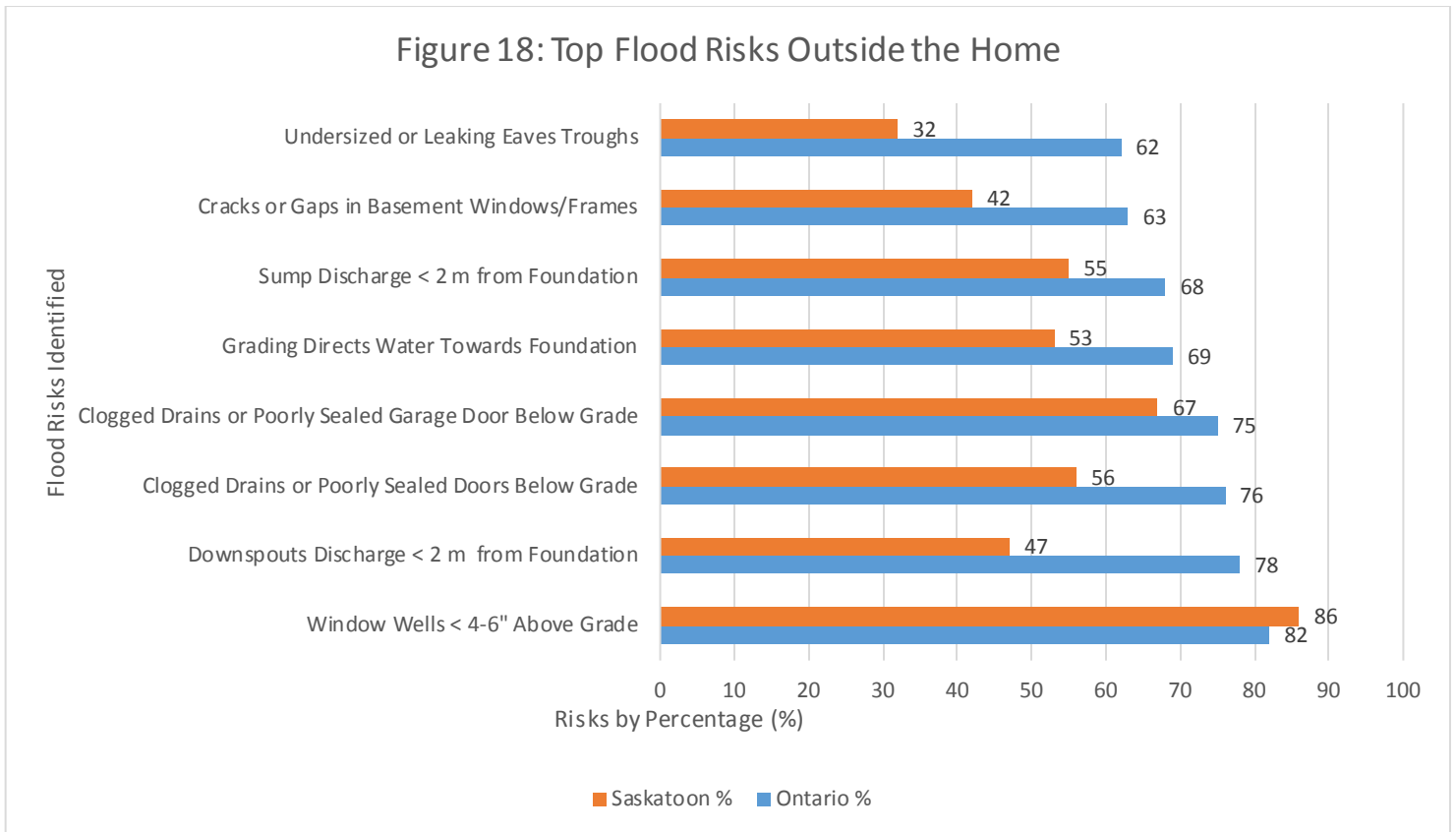


The other significant different in past flood damage was that 39% of Saskatoon homes had experienced overland flooding compared to 17% in Ontario. This corresponds with the fact that residents at higher risk of overland flooding were targeted by the Saskatoon promotions campaigns and consequently registered for the program. Please see Figure 17 below.

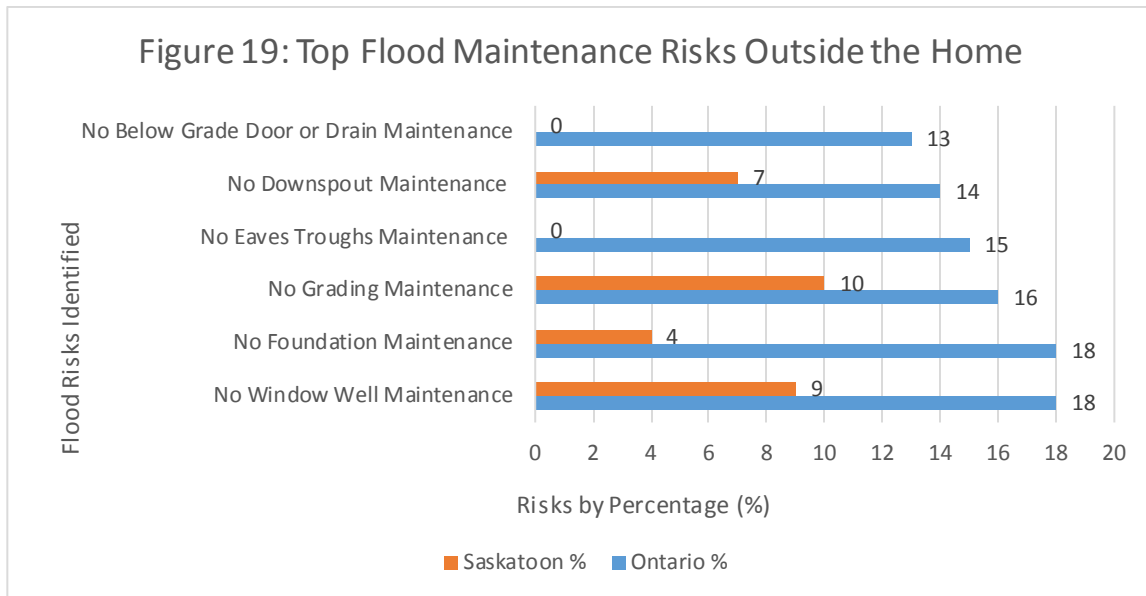


4.32 Comparing Flood Risks Outside the Home

Saskatoon residents had a lower percentage of flood risks outside of the home with the exception of window wells. Eighty six percent (86%) of Saskatoon homes had poorly installed window wells whereas 82% of Ontario homes had poorly installed window wells. When considering all other flood risk factors outside the home, Saskatoon homes fared better than Ontario homes participating in the study. Please see table Figure 18 below.

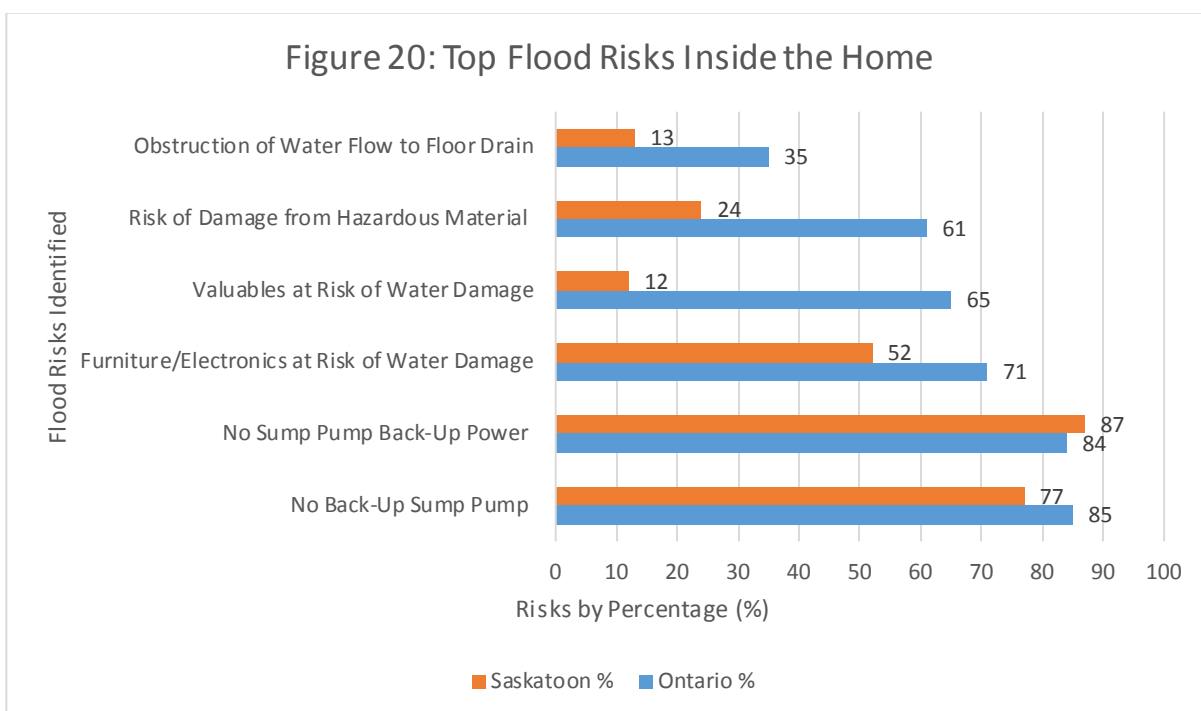


Saskatoon residents reported higher levels of maintenance activities inside and outside their homes to reduce flood risk than their Ontario counterparts. Although overall, residents in both provinces reported overwhelmingly that they were completing all outdoor flood risk reduction maintenance activities at least twice per year. See Figure 19 below.

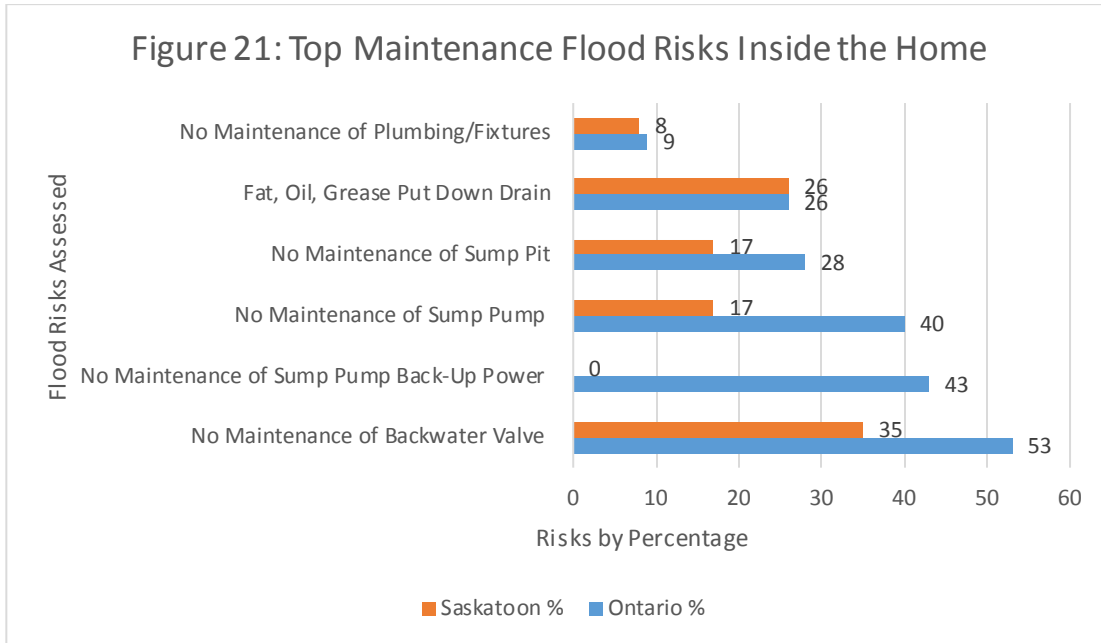


4.33 Comparing Flood Risks Inside the Home

Ontario and Saskatoon homes demonstrated similar flood risks inside the home with several important exceptions. Saskatoon homes had far fewer valuables stored in their basements that were at risk of water damage during a flood (12% in Saskatoon compared to 61% in Ontario), far fewer hazardous materials that were stored in basements that were at risk of contaminating the basement during a flood event (24% in Saskatoon compared to 61% in Ontario) and far fewer obstructions of water flow to the floor drain (13% in Saskatoon compared to 35% in Ontario). These higher levels of vigilance may possibly be correlated with Saskatoon’s higher numbers of participants with significant and recent flood experience. Please see Figure 20 below.



Inside the home, Saskatoon residents reported lower levels of flood maintenance risks but there were some risks that were similar to Ontario residences. For example, relatively high percentages of residents reported not maintaining their backwater valves at least twice per year (35% in Saskatoon and 53% in Ontario), not maintaining their sump pumps (17% in Saskatoon and 40% in Ontario), and 26% of households in Ontario and Saskatoon did not use best practices for maintaining their sewer laterals. This means that they reported putting fats, oil, grease and/or baby wipes down their drains, increasing the risk of sewer backup in their homes and in their neighbourhoods. Please see Figure 21 below.



4.4 Comparing Uptake of Actions

Study participants were asked to report on only the new actions they had taken to reduce flood risk that were highlighted as opportunities to reduce risk in their assessment report. In Ontario, 78% of participants noted that they had taken at least one action to reduce their flood risk at 3 months after they had participated in an assessment compared to 58% of participants in Saskatoon. In Ontario 71% noted that they had taken additional action 6 months after they had participated in an assessment compared to 78% of Saskatoon residents. This may be explained by the fact that Ontario residents had higher numbers of simple, inexpensive actions that they could take to address risks. These action items include cleaning out eaves troughs as well as storing valuables and hazardous materials in waterproof boxes or removing them from the basement. Saskatoon residents had a greater number of more expensive actions that required more money, time and often the assistance of qualified contractors to complete. This may explain the slower rates of uptake initially but the stronger rates showing at 6 months, when residents had adequate time to gather the resources needed to make required changes. Please see Table 7 below.

Table 7: Reported Actions Taken		
Location	3 Months	6 months
Ontario	78%	71%
Saskatoon	58%	78%

5 Reducing Residential Basement Flood Risk Across Canada

5.1 Summary of Essential Components of a National Flood Risk Reduction Education Program

Reducing residential basement flood risk at a national scale is a complex challenge that will involve the continuation of the successful work underway by governments, not-for-profits, academia, retailers and insurance companies to educate residents. Providing financial incentives and seasonal reminders, where possible, will help to maximize uptake of residential action to reduce flood risks. The following outreach guiding principles and means of minimizing barriers to uptake of actions have been identified to maximize awareness and uptake of actions to reduce risk.

5.11 Outreach Guiding Principles

1. Develop communications campaigns and communications materials based on the internationally recognized program pillars for motivating residents to take action to reduce flood risk. These are necessity, responsibility, trust, ability, and return on investment.
2. Utilize broad-based outreach tactics such as media, social media, mass emails, and mass flyers to raise awareness about flood risks and practical actions that can be taken to reduce risk.
3. Ensure that the broad-based messages are delivered by a variety of trusted sources such as government, insurance companies, businesses and retailers in a way that is consistent, clear and simple.
4. Focus communications on the top actions to reduce flood risk and upon seasonal maintenance reminders, minimally in the spring and fall, to continue to build strong maintenance habits.
5. Where budget and resources permit, utilize targeted outreach tactics to increase uptake of actions to reduce risk in flood-prone areas.
6. Adapt broad-based messaging to make communications relevant to what residents in a particular location care about, utilizing language that they most effectively receive information in, that mentions specific actions that they have the power to change (e.g. owners can make decisions about installing sump pumps and backwater valves but tenants cannot, tenants will primarily be responsible for storing valuables in their basement apartments but landlords will not).
7. Engage trusted local people such as local City Councillors, neighbourhood leaders, local not-for-profit or community group leaders to personally be involved in promotions campaigns.
8. Maximize opportunities for one-on-one communications about taking action to reduce flood risk with actions that are identified as being most effective in the community such as door-to-door campaigns, community meetings and community events.

5.12 Minimizing Barriers to Uptake of Actions

1. Provide financial subsidies to residents to help them take action to reduce risk. Streamline the subsidy process to minimize paperwork, process delays and requirement for up-front cash payment by residents.
2. Provide residents with accurate and trustworthy information (e.g. from a government body) about their neighbourhood level flood risks (flood risk mapping) so that they can use this information to make informed decisions about the level of urgency for taking action to reduce risk. Convey information in a clear and consistent manner and have it delivered by trusted local individuals.
3. Provide access to lot-level flood risk assessments so that residents can understand the specific risks at their homes and the top actions they can take to reduce risk.
4. Provide access to third-party information about how to assess and address flood risks and make the same information available through a variety of trusted channels such as through governments, non-profits, community groups, retailers, contractors, insurance companies, realtors, mortgage lenders etc.
5. Increase community engagement efforts to include those groups who are presently not targeted on a regular basis to increase actions by vulnerable populations. For example, concerted efforts must be made to engage landlords and tenants, to ensure that flood protection information and support and is

being provided to them. This will help to ensure the availability of a safe and affordable basement apartment rental market in Canada.

6. Increase the number of qualified contractors who are available to complete flood risk assessment, installation and maintenance services.

5.2 The Intact Centre's Contribution to a National Flood Risk Reduction Education Program

The Home Flood Protection Program's made-in-Ontario and Saskatoon flood risk reduction educational innovations are now driving action to reduce residential flood risk on the national stage. Two Intact-Centre developed training programs are now creating a skilled work force to assess residential flood risks and training industry professionals, government and non-governmental organization staff to provide the third-party educational materials that residents need to help them take action to reduce flood risk. In addition to these training programs, a wide variety of third party educational resources available on the Home Flood Protection program's webpage that provides residents with third-party resources developed by the Intact Centre and a wealth of third party resources created by institutions and not-for-profits from across the country.

5.21 Home Flood Risk Assessor Training

In 2018 the Intact Centre partnered with Seneca and Fleming Colleges to develop a 42-hour College level Home Flood Risk Assessment Training (HFRAT) course for home flood risk assessors. In September, 2018, the first course was offered in class at the Newnham Campus of Seneca College in Toronto. In March, 2019, the course will be offered online nationally through the Ontario College's online training portal, OnLearn. Course graduates who achieve a mark of 75% or higher are granted access to the program's nationally applicable electronic residential flood risk assessment tool so that they can complete flood risk across Canada. They also have access to a wide variety of third-party information resources that they can share with their clients to help them take action.

5.22 Home Flood Risk Educator Training and Materials

In October 2018, a one-hour in-class flood risk education training program was developed and accredited for registered insurance brokers in Ontario. This training program is now being adapted for in-person and online deployment to insurance brokers nationally. It is also being adapted to facilitate the training of additional groups nation-wide that provide front line flood risk reduction and educational support to homeowners. These groups include realtors, mortgage brokers, emergency service workers, municipal and conservation authority staff, not-for profits and landlord and tenant associations. The course provides learners with a wide variety of easily shareable and adaptable third party resources, including seasonal maintenance reminders, social media posts, and content for newsletters.

5.23 Third Party Information for Residents

A wide variety of free, third-party how-to resources are also available to any interested resident across Canada through the Home Flood Protection Program web page at www.homefloodprotect.ca . See sample third-party information resources created by the Intact Centre by visiting Appendix Q for Top Action to Reduce Flood Risk and Appendix R, Understanding Water Damage Insurance Coverages.

APPENDICES

Appendix A: Traditional Media Samples

County 105, April 2018. [Pilot program can help Saskatoon homeowners identify flood risks](#)

Global News, April 2018. [Pilot program can help Saskatoon Identify flood risks](#)

CTV News Saskatoon, April 2018. [Saskatoon's Home Flood Protection Plan](#)

The Brent Loucks Show, April 2018. [Flood Prevention](#)

Appendix B: Public Service Announcement



SUMMER FLOOD PROTECTION TIPS



- Extend downspouts at least 6' (2m) away from foundation
- Test your sump pump and backup battery
- Clean and test your backwater valve

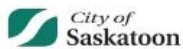
HomeFloodProtect.ca

Heavy rain in the forecast today. Please take precautions to protect your home from #flooding. Visit www.homefloodprotect.ca for more prevention tips and resources.



**REDUCE
YOUR RISK
OF HOME
FLOODING**

**GET A HOME FLOOD
PROTECTION ASSESSMENT**



**GET A CONFIDENTIAL
50-POINT HOME FLOOD
PROTECTION ASSESSMENT**

The City of Saskatoon and SGI CANADA are sponsoring an innovative new program to help homeowners understand their flood risk and take measures to protect their property.

When you register with the Home Flood Protection Program, a confidential 50-point home assessment will be completed by a national environmental consulting agency.

**The first 300 homes
registered pay only \$125**

Home inspection valued at \$450

Some homes in higher risk neighbourhoods may be eligible for fully subsidized inspections.

To access **free online resources** and to register for a Home Flood Protection Assessment, call toll-free **1-877-876-9235** or visit:

HomeFloodProtect.ca



GENEROUSLY SUPPORTED BY:





HOME FLOOD PROTECTION PROGRAM



**REDUCE
YOUR RISK
OF HOME
FLOODING**

**GET A PERSONALIZED 50-POINT
HOME FLOOD PROTECTION ASSESSMENT**

Learn your home's flood risks and how to take measures to protect your property from flooding. *A \$450 value!*

**FREE for first 100 high-risk homes registered
\$125 for first 300 homes registered**

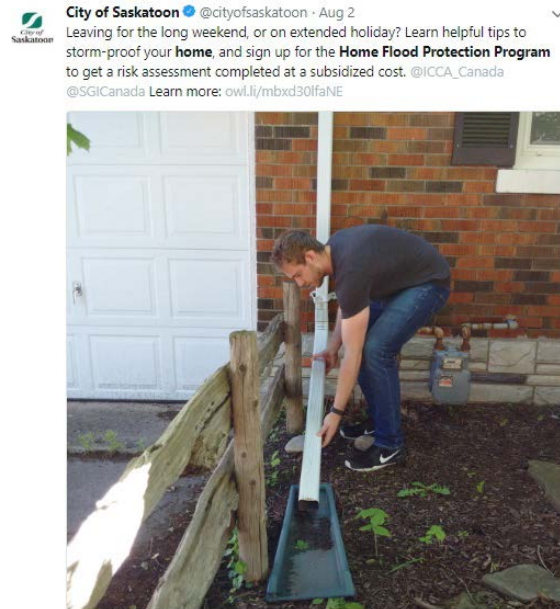
To access free online resources and to register for a Home Flood Protection Assessment, call toll-free 1-877-876-9235 or visit:

HomeFloodProtect.ca



Appendix E: Social Media Samples

Twitter Sample



Facebook Sample



Appendix F: Door Hanger



FOR PLACEMENT ONLY
ADDRESS LABEL

The first 100 assessments are free to residents in high risk flood areas as determined by City of Saskatoon.

Assessments are a \$450 value. Offer is non-transferable.

For details on eligibility, visit : Saskatoon.ca/HomeFlood

REGISTER TODAY! FREE HOME FLOOD PROTECTION ASSESSMENT



You **CAN'T** control the weather
but you **CAN** protect your home
from basement flooding!



REGISTER TODAY AND RECEIVE:

- ✓ A problem-solving conversation with a trained assessor
- ✓ A 50-point visual assessment of flood risks
- ✓ A confidential report identifying top actions to reduce risk
- ✓ Comprehensive resources including how-to guides and tips for finding contractors
- ✓ Follow-up support from your assessor and a live customer service agent



The Home Flood Protection Program is a community-based education program that helps homeowners reduce their risk of basement flooding and minimize damage if flooding occurs.

To access free online resources and to register for a Home Flood Protection Assessment, call or visit

HomeFloodProtect.ca

1-877-876-9235 (TOLL FREE)



The Program operates independently of all funders, and does not promote the sale of any products or services.

HomeFloodProtect.ca

1-877-876-9235 (TOLL FREE)

Appendix G: Neighbourhood Billboard



Appendix H: Councilor Newsletter

Sarina Gersher **Ward 8**
building community for all generations


Contact Home

Home > Issues > Home Flood Protection Program

Home Flood Protection Program

by Sarina Gersher
189sc
on May 08, 2018

Every home has some risk for flooding during spring snow melt and rain storms. The City of Saskatoon and SGI CANADA are sponsoring a national pilot program to help Saskatoon homeowners understand their flood risk and take measures to protect their property from flooding.



Saskatoon homeowners can register now for a free or partially-subsidized professional Home Flood Protection Program home assessment – valued at \$450 – to help identify their flood risks. The subsidized Home Flood Protection Program inspections will be available to the first 400 Saskatoon homeowners to register in 2018. Up to 100 homes that meet the criteria for high flood risk areas are eligible for a free home assessment. Other homeowners are eligible for a subsidized rate of \$125. (Homes that qualify for free assessments will have already received a notice from the City of Saskatoon indicating their eligibility)

Early action can help homeowners take back control after experiencing loss due to flood damage, and provide some peace of mind for those who are unsure if their home is protected. Register today at HomeFloodProtect.ca or call toll free 1-877-876-9235. View the brochure [here](#).

Appendix I: Study Waiver

Home Flood Protection Study Participation Consent Form

Purpose of this Document

The purpose of this document is to ensure that the participating Homeowner (for the purposes of this document meaning the Homeowner **or** their designated representative) understand and agree to the terms of participating in the Home Flood Protection Study before participation begins.

Introduction to the Home Flood Protection Program

The Home Flood Protection Program is a community-based basement flood risk reduction program developed by the Intact Centre on Climate Adaptation, an applied research centre at the University of Waterloo. AET Group Inc. (AET), an environmental consulting firm, has been contracted by the University of Waterloo to manage the delivery of the program.

The goal of the program is to help homeowners reduce their risk of basement flooding and minimize damage if flooding occurs. The program provides free online self-help resources to homeowners and a custom, on-site assessment service for participating homeowners, known as the “Home Flood Protection Assessment.”

What is the Home Flood Protection Study?

The Home Flood Protection Study (Study) is a confidential analysis of home flood risks identified at the time of the Home Flood Protection Assessment and action taken to reduce flood risk as reported in follow-up surveys and noted during follow-up assessments. Data is collected and analyzed **ONLY** from homeowners (or their designated representatives) who have voluntarily consented to share the results of their Home Flood Protection Assessment Reports and follow-up surveys by completing this form. All information that is gathered as part of the Study is stripped of its personal identifying information (name, all elements of address, contact information), stored in an encrypted, secure online database and is analyzed in aggregate form. Information gathered as part of this Study is used only for the express purposes laid out in this agreement.

What are the goals of the study?

The goals of the Study are to improve program delivery and to report the findings and impacts of our work to program funders and partners.

Data analysis will determine:

- Most common flood risks identified at different ages of homes;
- The degree to which participation in the program influenced practical action to reduce flood risk;
- The degree to which participation in the program impacted knowledge levels about home flood risks; and
- Participant level of satisfaction with the program.

Is there compensation for participating in the study?

Each household that completes the initial and follow-up surveys will be entered to win one of four (4) \$250 coupons to be used at a local hardware store.

What is involved?

Consent to participate in the study means that a Homeowner agrees to **complete** and **share the results** of their:

- Home Flood Protection Assessment Report
- Two 10-15 minute follow-up surveys at roughly 3 and 6 months after report completion
- One 15-minute on-site follow-up assessment to verify reported results (voluntary request of 10% of consenting participants)

How do homeowners complete the follow-up surveys?

For those who consent to participate by email, an email link to access the surveys through the secure database will be sent at roughly 3 and 6 months after the Assessment Report is sent to the Homeowner. For those participants who consent to participate by phone, a confidential phone survey will be conducted by a Home Flood Protection Customer Service Agent at the same time intervals. Each survey takes approximately 10-15 minutes to complete.

A voluntary and confidential 15-minute on-site assessment will be requested and conducted by a Home Flood Protection Assessor with 10% of participants to confirm reported actions taken to reduce flood risk. This enables verification of the accuracy of self-reported results.

How is the homeowner information going to be protected?

Upon consenting to participate in the Home Flood Protection Study, all personally identifying information is stripped from the Home Flood Protection Report and it is assigned a participant number. All follow-up survey forms and follow-up on-site assessments will use only this same participant number. All information will be stored in an encrypted, secure online database with confidential access granted only to authorized University of Waterloo and AET Team members including: University of Waterloo research students, the University of Waterloo's Home Flood Protection Program Director, AET's Home Flood Protection Assessors who complete the follow-up on-site assessments and AET's Customer Service Team members who enter data directly into the secure database from participants who complete follow-up surveys by telephone.

Statement of consent

My signature below acknowledges that I have read and understood the terms of participating in the Home Flood Protection Study as written above. I agree to participate in the Study by sharing the results of my Home Flood Protection Assessment. I also consent to participate in a 3 and 6 month follow up survey and share these results and that I have the option to participate in a 6 month on-site follow-up assessment and share these results. I understand that my personal information is protected as confidential and that all personal identifying information (name, all address information, contact information) will be removed from the information that I share before it is used for analysis. The final report will be shared with project funders and partners.

I understand that participation is completely voluntary and I may opt to withdraw my consent at any time.

Email and Phone Contact Consent

By signing below, I provide my express consent to the following:

If I am participating in the program by email: I consent to receive a 3 and 6 month follow-up survey reminder by email that will include a link to a secure portal where the survey will be completed. I also consent to receiving an email requesting my voluntary participation in an on-site follow-up survey, if I am one of 10% of participants randomly selected to participate.

Unsubscribe mechanism: My signature acknowledges that I understand that if I would like to opt-out and withdraw my consent to participate in the Home Flood Protection Assessment Study that I should contact **Janet Szydlowski at 519-888-4567 x 84022 or email at floodprotect.info@uwaterloo.ca at any time and include “Unsubscribe” in the subject heading.**

If I am participating in the program using the phone: I consent to receive a 3 and 6 month follow-up call from a customer service representative to request the completion on the surveys by phone. I also consent to receiving a call requesting my voluntary participation in an on-site follow-up survey, if I am one of 10% of participants randomly selected to participate.

Opting out: If I would like to opt out of the study I may do this at any time by informing the customer service representative on the phone. I may also contact **Janet Szydlowski at 519-888-4567 x 84022 or email at floodprotect.info@uwaterloo.ca at any time.**

Questions about collection, storage and analysis of data:

My signature acknowledges that I understand that if I have any questions about the collection, storage or analysis of information that I may contact **Cheryl Evans, Program Director at any time at c8evans@uwaterloo.ca.**

A SIGNED ACCEPTANCE OF THIS AGREEMENT MUST BE RECEIVED BEFORE THE PARTICIPATION IN THE HOME FLOOD PROTECTION STUDY CAN BEGIN

Homeowner’s Name: _____

Homeowner’s Signature: _____

Name of Designated Representative (if applicable): _____

Signature of Designated Representative (if applicable): _____

Home Address: _____

Date: _____

Participation method preference

(Please check one box and provide required contact information):

Please check one of the boxes below to identify if you would prefer to participate in follow-up surveys and to be contacted about your interest in voluntary participation in a follow-up assessment by **email or by phone**. Please provide the requested related contact information so that we may contact you using your preferred method.

Email Please provide email: _____

Phone Please provide phone number: _____

Appendix J: Sample Home Flood Protection Program Waiver

Home Flood Protection Assessment Homeowner Participation Waiver

Purpose of this Document

The purpose of this participation waiver is to ensure that participating Homeowner(s) (for the purposes of this document meaning the Homeowner **or** their designated representative(s)) understand and agree to the terms of the Assessment before the on-site portion of the Assessment begins.

Terms of Home Flood Protection Assessment Homeowner Participation

The Home Flood Protection Assessment is available to owners of single-detached, semi-detached and town homes for a subsidized fee. Fees are paid directly to AET Group.

In roughly one hour, a trained Flood Protection Assessor from AET Group works with the homeowner to complete a 50-point visual assessment of potential sources of water entry into the home. A concise, easy to read report identifies top ranked action to:

- ✓ Reduce sewer backup and overland flood risks
- ✓ Reduce moisture levels that cause mold and mildew growth
- ✓ Reduce damage risks to contents and valuables
- ✓ Wisely manage water onsite
- ✓ Understand risks as they relate to insurance coverage

A live customer service helpline, personal follow-up from the Assessor, and seasonal maintenance reminders provide additional support to homeowners as they work to protect their homes from future flooding events.

What is the Home Flood Protection Program?

The Home Flood Protection Program is a community-based basement flood risk reduction program developed by the Intact Centre on Climate Adaptation (Intact Centre), an applied research centre at the University of Waterloo. The goal of the program is to help Homeowners reduce their risk of basement flooding and minimize damage if flooding occurs. The program provides free online self-help resources to Homeowners and a custom, on-site assessment service for participating homeowners, known as the “Home Flood Protection Assessment.”

Background of the Assessors

The Home Flood Protection Assessors are managed by AET Group Inc. (AET), an environmental consulting firm that has been contracted by the University of Waterloo to deliver the program. Each Assessor possesses a clear criminal records check and has demonstrated competencies in relevant areas including but not limited to home construction, home inspection, environmental assessments/inspections, water resources management and/or environmental engineering. Assessors have successfully completed the Home Flood Protection Assessment Training Program overseen by the University of Waterloo. Assessors have a variety of professional experience and the Intact Centre makes no guarantee that they will be certified home inspectors, building inspectors or building engineers.

Do Homeowners Have to Be Present for a Home Flood Protection Assessment?

The Homeowner or a person that they designate in writing to be their representative, must be present during the Assessment. Where a designated representative will be present a signature from both parties on this form is required.

How are Flood Risks at the House Assessed?

Flood risks are assessed by examining the physical condition of a variety of features inside and outside the home, as well as by completing a preventative maintenance questionnaire with the homeowner. In order to complete this work, the Assessor uses the following tools: a standardized preventative maintenance questionnaire, a standardized home assessment scoring system, a moisture meter, humidity gage, camera, and measuring tape. Collected information is entered into an electronic form (on a tablet) that assigns a general category of performance or preventative maintenance activity ranging from “good, intermediate or poor/ needs further investigation.”

What Does the Assessment Report Include/ Exclude?

The report includes an easy to read summary of items that receive a “poor/ needs further investigation score”, a record of all gathered information, and additional resources to help the homeowner take action to reduce risk.

The assessed features and preventative maintenance activities that score a “poor or needs further investigation” grade are listed in a summary page of items that lists the type of flood risk they represent, their condition and high level opportunities for the homeowner to further explore to take action to reduce flood risk. Links to practical how-to resources from reputable sources are included in the report, as well as links to local subsidy programs and tips for selecting qualified contractors and questions to ask insurers to make sure that you have the water-damage related coverage you need.

What Does the Report Not Include?

Beyond summarizing the report findings related to assessed items that received a score of “poor/ needs further investigation”, the report does not formally state a prioritized approach for addressing deficiencies. It is up to the Homeowner to decide which actions they will take and in what order.

In order to ensure program impartiality the report does not recommend specific contractors, suppliers or products. The report also does not provide in-depth drawings or tailored step-by-step instructions to complete projects at the home to address deficiencies.

What Follow-up Support is Available to the Homeowner?

After the on-site visit is complete, an electronic copy of the report is available typically within 48 hours. Requested hard copy reports should arrive at the participant’s home within 1 week. Questions that homeowners have about the reports can be accommodated with a short email follow-up or up to a 15-minute phone follow-up with the Assessor. Additional online resources are available through the website at www.HomeFloodProtect.ca. Additional assistance may be provided by the customer service email at Rkirby@aet98.com or at phone 1-877-876-9235.

Who Has Access to My Home Flood Protection Assessment Report?

Assessment Reports are **available exclusively to registered Homeowners** and are not shared with funders or program partners.

Assessment Reports are made available to Homeowners through a secure database with access provided only to those who enter a valid user name and password. Printed reports, when requested, are sent via Canada Post directly to the participating homeowner or their official designate.

The only Home Flood Protection Assessment team members that have strictly confidential access to individual assessment reports are: the AET Home Flood Protection Assessor assigned to the individual household, the Home Flood Protection Assessment Quality Assurance Manager, AET's Home Flood Protection Assessment Customer Service Staff and the University of Waterloo's Director of the Home Flood Protection Program. Confidential access to this information is granted exclusively to register and assist Homeowners and to ensure program quality assurance.

Can My Information Be Used to Contribute to the Home Flood Protection Assessment Study Carried out by the University of Waterloo?

Yes, the completion of a separate *OPTIONAL and VOLUNTARY* document entitled "Home Flood Protection Study Waiver Form" is required to participate in this study. All information shared will be stripped of its personal identifying information (address, contact information) and will be analyzed at a community-wide scale **ONLY** to share the results of the work with funders and partners.

Statement of Acknowledgement:

a) **Observations on Day of Assessment Only:** The Homeowner acknowledges that the Assessment and Assessment Report are based on the Assessor's observations of the conditions that existed and the preventative maintenance activities reported by the homeowner at the time of the assessment only;

b) **Participation:** The Homeowner acknowledges that they have been encouraged to participate in the Assessment and accept responsibility for incomplete information should they not participate in the Assessment.

The homeowner signature below acknowledges the agreement between the homeowner, The Intact Centre on Climate Adaptation and AET Group Inc. to perform a visual assessment of the inside and outside of my home that identifies flood risks and identifies opportunities to reduce risk. The homeowner understands that University of Waterloo and AET Group Inc. does not warranty that completing actions identified in the report to reduce flood risk will prevent any and all water damage in the future. The homeowner assumes all risk for problems noted in this report that may include concealed damage which is revealed during the course of repair or through further investigation by a qualified specialist. The decision to pursue opportunities for action to reduce flood risk identified in the report is at the homeowner's sole discretion.

Disclaimer: The University of Waterloo, AET Group Inc., and their respective agents, administrators, officers, directors, governors, senators, employees, independent contractors, students, representatives, successors, and assigns (the "Releasees") shall not be responsible for any harm, loss or injury, including death, suffered by me or any other person, at any time for any reason whatsoever, whether reasonably foreseeable or not, including, but without limitation, any risks, harm, loss, or injury, including death, caused in connection any related activity, including the visual assessment of the property and conversation with the homeowner during the assessment ("Related Activities") while enrolled in this Home Flood Protection Program.

Release: I, on my behalf and behalf of my heirs, next of kin, executors, administrators, assigns and personal representatives (the "Releasers"), hereby release and forever discharge the University of Waterloo, AET Group Inc., and their respective agents, administrators, officers, directors, governors, senators, employees, independent contractors, students, representatives, successors, and assigns, from any and all suits, actions, causes of action, claims or demands of whatsoever kind and howsoever arising in relation to participating in any Related Activities, whether known or unknown, whether reasonably foreseeable or not and which the Releasers now have or at any time hereafter may have from any cause, matter, or thing whatsoever relating to this Home Flood Protection Program.

Indemnity: I release and hold harmless Releasees from any and all liability for any loss, damage, injury, or expense that I or my next of kin may suffer, whether reasonably foreseeable or not, whether arising from the negligence of the Releasees or otherwise, which may be made or brought against the Releasees in any way as a result of my participation in any Related Activities while enrolled in the Home Flood Protection Program, on a substantial indemnity basis.

This waiver is effective for the period of time that I will be participating in the Home Flood Protection Program and projects related thereto. I understand that this agreement cannot be modified or interpreted except in writing by the University of Waterloo and AET Group Inc., in cooperation and acting reasonably, and that no oral modification or interpretation shall be valid. This agreement shall be effective and binding upon my heirs, next of kin, executors, administrators, assigns, and personal representatives in the event of death.

I have read and understand this agreement and I sign this document voluntarily and without inducement.

A SIGNED ACCEPTANCE OF THIS AGREEMENT MUST BE RECEIVED BEFORE THE ASSESSMENT CAN BEGIN

Homeowner's Name: _____

Homeowner's Signature: _____

Name of Designated Representative (if applicable):_____

Signature of Designated Representative (if applicable): _____

Property Address: _____

Date: _____

Witness Name: _____

Witness Signature: _____

Appendix K: Sample Home Flood Protection Assessment Report



Prepared for
Sally Homeowner
113 Lucky Lane, Kitchener, ON



Date Completed: November 15, 2018
Assessor Name: Sample Assessor
Assessor Email: sample@aetgroup.ca
A1-519-123-4567

Prepared on behalf of AET Group
www.aet98.com

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INTRODUCTION TO REPORT

What Does This Report Include?

This report includes an easy to read summary of top ranked items for priority action that have received a “poor/ needs further investigation” score or require specific mention based on questions asked by the homeowner. It also provides a record of all gathered information and provides additional helpful resources to help homeowners take action to reduce flood risk.

How Are Assessed Features Scored?

Assessors use the standardized assessment tool provided to guide them through a visual assessment of the property and to ask a list of preventative maintenance questions to homeowners. The information gathered is then compared to the tool’s scoring definitions, developed by the University in Waterloo in concert with a wide variety of national experts in the area of basement flood risk reduction. Assessed Features are assigned scores of “Good- Best Practice”, “Intermediate” or “Poor/ Needs Further Investigation” based on where they fall within these definitions. Any Assessed Features not accessible for observation and any preventative maintenance questions that are not completed by the homeowner are marked “Not Recorded.”

What Does This Report Not Include?

Beyond summarizing the report findings related to assessed items that received a score of “poor/needs further investigation” or require specific mention based on questions asked by the homeowner the report does not formally state a prioritized approach for addressing deficiencies. It is up to Homeowner to decide which actions they will take and in what order.

To ensure program impartiality the report does not recommend specific contractors, suppliers or products. The report also does not provide in-depth drawings or tailored step-by-step instructions to complete projects at the home to address deficiencies.

How Was Information for this Report Gathered?

The contents of this report have been gathered by examining the physical condition of a variety of features inside and outside the home using simple tools such as a moisture meter, humidity gauge, flashlight and measuring tape. A verbal preventative maintenance questionnaire has also been completed with the homeowner or their designate.

Reporting Time Frame

This report documents the observed condition of physical features of the home and the preventative maintenance information gathered from the Homeowner on the day of the Assessment only.

Follow-Up Support Provided

Your assessment fee includes the equivalent of a 15 minute email follow-up conversation with your Assessor. Our customer service team can also answer your basic questions at 1-877-876-9235. For ongoing support, visit homefloodprotect.ca to register for our e-newsletter that includes important preventative maintenance reminders. For do-it-yourself tips and Homeowner Success stories, like us on Facebook@HomeFloodProtect.

What is Included in the Additional Resources Section?

A list of easy to read, highly practical, online links is provided to help Homeowners take action to reduce flood risk. These include how-to fact sheets and videos, local subsidy information, questions to ask your insurance provider and tips about hiring contractors.



DEFINITION OF TERMS

Scoring of Assessment

Each assessed item is assigned a score based on the standardized criteria laid out in the Home Flood Protection Assessment ranking system.

Score	Description
Good – Best practice	Observed or reported in good condition or reported maintenance practice
Intermediate	Observed or reported in intermediate condition or reported maintenance practice
Poor/ Needs Further Investigation	Observed or reported in poor condition or reported maintenance practice or needs further investigation
Not Reported	Unobserved or unreported observed condition or reported maintenance practice
Out of Scope	Out of scope for this assessment but worthy of further consideration

UNDERSTANDING DIFFERENT TYPES OF WATER DAMAGE RISKS AT YOUR HOME

The diagram and the definitions below are provided to help you understand the types of water damage that may affect any home due to deterioration of physical features, lack of preventative maintenance or water backup from municipal sewer systems during extreme weather events.

These water damage types are referenced in your Home Flood Protection Assessment Report to help you understand the types of water damage risks that have been identified at your home and your opportunities to reduce risk. Please see the customized list of maintenance best practices listed in your report to help you develop your preventative maintenance routine.

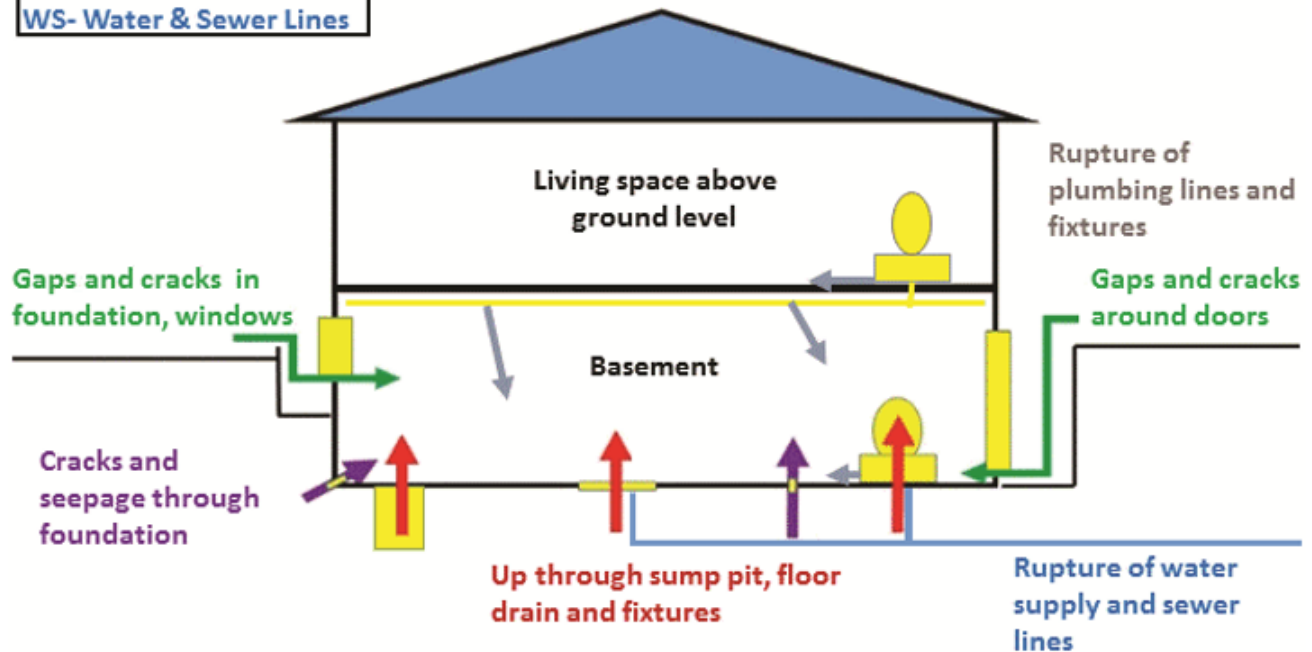
Insurance Coverage Considerations:

Sudden and accidental water damage is typically covered by insurers, however damage due to slow leaks or lack of preventative maintenance is typically not covered. Since there is no industry-wide, standard language used to define water damage types you may find using the terms and descriptions in this document helpful when working with your insurer to determine which coverage is best for you. Please note that not all insurance companies provide all types of coverages for all homes. See the “Questions for Your Insurance Provider” document in the Additional Resources section of the report for additional information.



Type of Water Damage:
 PF- Plumbing and Fixtures
 SB- Sewer Back-Up
 OW- Overland Water
 GS- Groundwater Seepage
 WS- Water & Sewer Lines

✓ **Typically Covered by Insurance:**
 Sudden and accidental damage
 X **Typically Not Covered by Insurance:**
 Damage from chronic leaks or poor maintenance

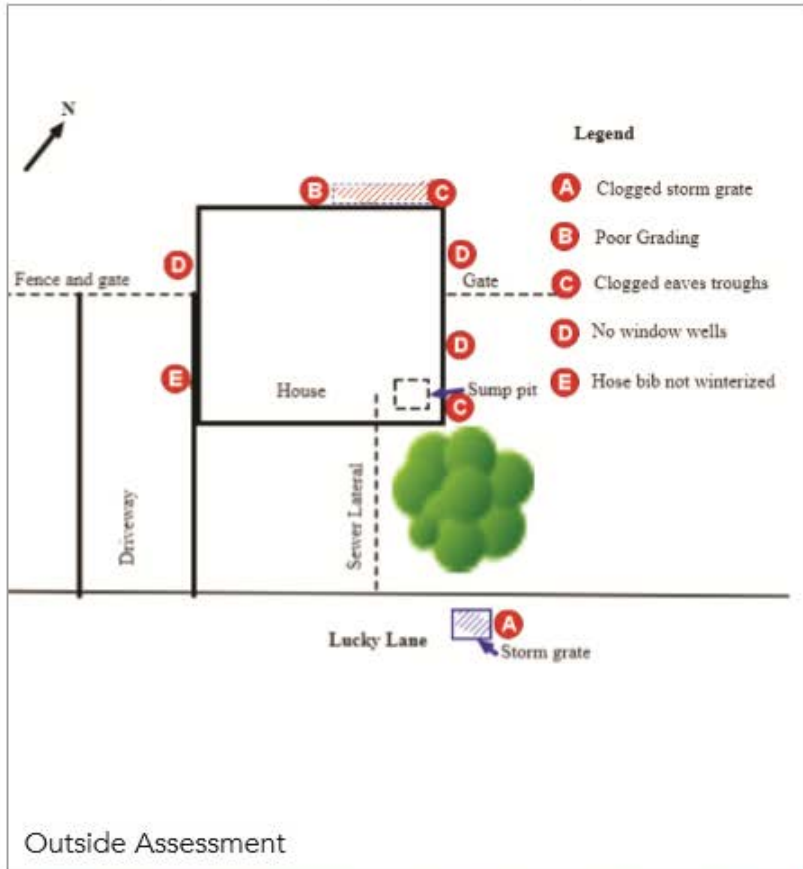


Typical Insurance Policy Coverage for Sudden and Accidental Damage	Code	Type of Water Damage	Simple Definition
Included	PF	Plumbing and Fixtures	Water that enters your home from a tear or rupture of plumbing pipes or fixtures (e.g. toilets, hot water heaters, dish washers)
Optional	SB	Sewer Back-Up	Water that flows from the sanitary or storm sewer or your home's foundation drains and backs up into your home through the sump pit, toilets and drains
Optional	OW	Overland Water	Water that flows from a lake or river, heavy rain or rapid snow melt and enters through cracks and gaps in your home's exterior from a point at or above ground level
Optional	GS	Ground Water	Water that has saturated the ground and enters your home below ground level through gaps, cracks and seepage through your home's foundation
Optional	WS	Water and Sewer Lines	Water that enters your home due a tear or rupture of a water supply and/or sewer lines



OUTSIDE ASSESSMENT SUMMARY TOP-RANKED OPPORTUNITIES TO REDUCE FLOOD RISK

All features and maintenance practices that were assessed as "poor/ needs further investigation", require specific mention based on questions asked by the homeowner or are marked as "out of scope" but deserve further consideration, have been compiled into this summary.



ASSESSED FEATURES

Fig	Assessed Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
B	<p>Grading at foundation- After a heavy rain, does the grading within 1.8m (6') of your foundation walls direct water away or do you see water pooling?</p> <p>The grading within 1.8 m (6') of the foundation walls slopes a minimum of 5% to direct water away from the foundation. The foundation surface does not easily soak up water.</p>	OW, GS	The grading is flat or slopes toward the foundation OR The foundation surface is highly water absorbent OR Needs further investigation.	<p>See B on Outside Assessment diagram.</p> <p>The grading beside your home directs water toward the foundation. The line in the soil indicates eaves troughs are overflowing and adding additional risk. Correct grading to achieve at least a 5% slope away from the foundation. Consider replacing the surface with non-water absorbent material. See comments related to eaves trough maintenance.</p>
D	<p>Window wells - Are window wells installed in such a way that they reduce flood risk?</p> <p>For each window that is less than 10-15cm (4-6") above the ground surface, a window well is present and sits at least 10-15cm (4-6") above grade. The window well is sealed at the foundation and the grading adjacent to wells slopes away from the home at a minimum of 5%. Consider installing window wells covers to further reduce risk.</p>	OW	For each window that is less than 10-15cm (4-6") above the ground surface, a window well is not present. OR Window wells sit less than 10-15cm (4-6") above grade or are not sealed at foundation or grading at the window wells does not slope away from home at a minimum of 5%. Window well covers are not present OR Requires further investigation.	<p>See D on Outside Assessment diagram.</p> <p>The windows are only 2.5 cm above grade and there is no formal window well, placing windows at higher risk of water inflow during heavy rains and spring melts. Work with a qualified professional to install a window well with adequate drainage. Correct grading adjacent to the window wells to slope 5% away from home. Consider installing window well covers to further reduce risk.</p>

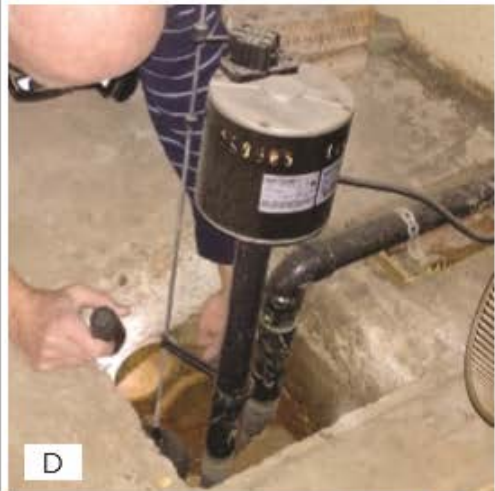
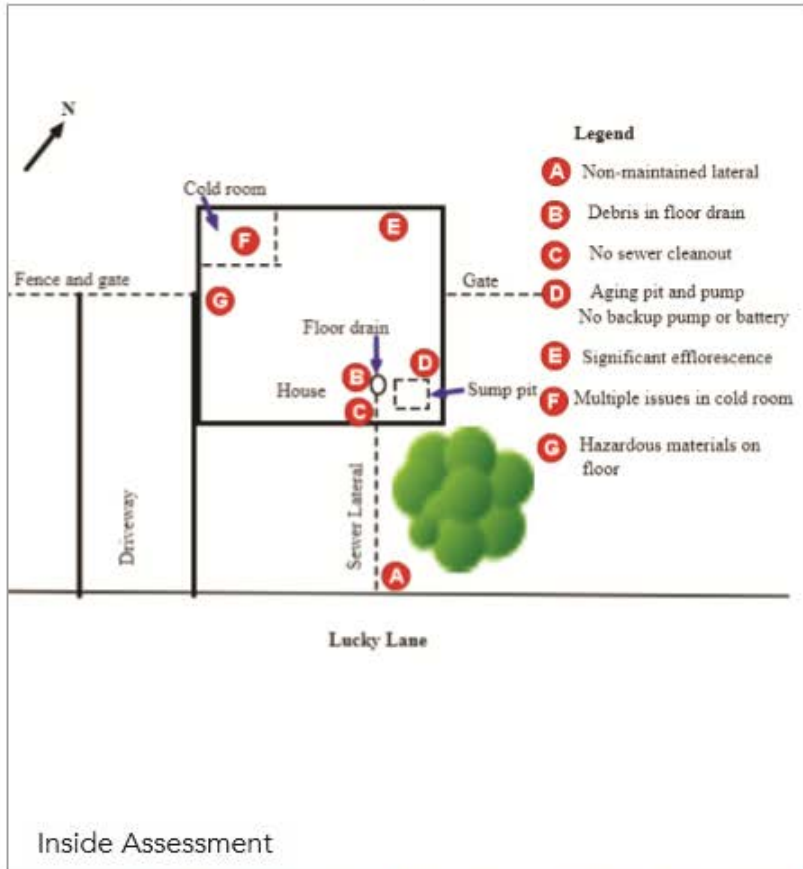
ASSESSED MAINTENANCE

Fig	Maintenance Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
A	<p>Overland drainage maintenance –</p> <p>Once per season or when major storm events are predicted, the homeowner checks for and removes debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches.</p>	OW	The homeowner never checks for or removes debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches.	<p>See A on Outside Assessment diagram.</p> <p>Once per season or when major storm events are predicted, check for and remove debris and obstructions from the water flow paths including swales and nearby storm drains. If nearby storm drains are free of debris but are still not draining within 24 hours, contact the government department with jurisdictional authority.</p>
	<p>Grading at foundation maintenance –</p> <p>Each season the homeowner checks for signs of water pooling or ice formation and corrects grading to achieve at least 5% slope away from the foundation</p>	OW, GS	The homeowner never checks for signs of water pooling or ice formation nor corrects grading to achieve at least 5% slope away from the foundation.	Each season, check for signs of water pooling or ice formation at foundation. Correct grading to achieve at least 5% slope away from foundation.

C	Eaves trough maintenance – Each season during heavy rainfalls, the homeowner checks the eaves troughs for leaks, debris and blockage. Repairs and debris removal are completed as needed.	GS	The homeowner never checks the eaves troughs for leaks, debris and blockage. Repairs and debris removals are not completed as needed.	See C on Outside Assessment diagram. Each season during heavy rainfalls, check for leaks, debris and blockage. Repair, replace and clean out as needed.
	Downspout maintenance – Once per season the homeowner checks to make sure the downspout extensions are secured, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties	GS	The homeowner never checks to make sure the downspout extensions are secure, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties.	Once per season check to make sure the downspout extensions are secure, free of leaks, deposit water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties.
	Window maintenance – Once per season the homeowner checks the condition of the frames, glass and seals, and completes repairs as necessary.	OW	The homeowner never checks the condition of the frames, glass and seals, or completes repairs as necessary.	Once per season check the condition of the frames, glass and seals. Repair as necessary.
	Hose bib maintenance – Spring, summer and fall the homeowner checks for leaks and completes repairs as necessary. Before winter, the outdoor water supply is shut off and the water line is drained. The hose is drained and removed.	OW, GS	The homeowner never checks for leaks or completes repairs as necessary. They never shut off the exterior water supply, drains the line or remove the hose.	See E on Outside Assessment diagram. Spring, summer and fall check for leaks and complete repairs as needed. Before winter freeze up shut off the outdoor water supply and drain the water line. Drain and remove the hose.

INSIDE ASSESSMENT SUMMARY TOP-RANKED OPPORTUNITIES TO REDUCE FLOOD RISK

All features and maintenance practices that were assessed as "poor/ needs further investigation", require specific mention based on questions asked by the homeowner or are marked as "out of scope" but deserve further consideration, have been compiled into this summary.



ASSESSED FEATURES

Fig	Assessed Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
	<p>Sanitary sewer lateral- Is your sanitary sewer lateral in good condition and is it free of blockages?</p> <p>Inspection of sanitary sewer lateral with a closed circuit television (CCTV) is best practice if a home is over 25 years old, if the home has experienced sewer backup or if the home experiences chronic drain backup. Note: Determining the condition of the sewer lateral is outside the scope of this assessment. Consult a qualified professional.</p>	SB, WS	Note: Only a qualified professional can formally identify the condition and the connection status of this item. Note: Work with a qualified professional and check with the government department having jurisdictional authority to determine the availability and your eligibility for any subsidies.	You have noted that you sometimes get drain backups when you do laundry. This indicates restricted flow through your lateral. Consider a closed circuit television (CCTV) inspection by a qualified professional for assessment and repair or replacement to address this issue.
	<p>Basement sanitary sewer lateral cleanout – A basement sanitary sewer lateral cleanout is present and easily accessible.</p>	SB	A basement sanitary sewer lateral cleanout is not accessible OR not present OR Needs further investigation.	<p>See C on Inside Assessment diagram.</p> <p>Consider working with a plumber to install an easily accessible hatch to improve inspection and maintenance access. This will make it more cost-effective for regular inspection, maintenance and repair.</p>
	<p>Backwater valve- Is a backwater valve appropriate for use in your home or if it is in place, is it in good condition?</p> <p>Consider working with a qualified professional to determine if a backwater valve is suitable for your home or to evaluate the condition of your backwater valve.</p> <p>If you have a backwater valve or install one, consider installing an alarm to let you know when the valve is closed to prevent flooding from in-home sources. Note: This item is outside of scope of this assessment. Consult a qualified professional.</p>	SB	Note: Only a qualified professional can formally identify if a backwater valve would be right for your home and the condition of an existing unit. Note: Check with the government department having jurisdictional authority to determine the availability of a subsidy for installation and your eligibility.	<p>Consider working with a qualified professional to determine if a backwater valve is suitable for your home. If you install a backwater valve remember to complete seasonal maintenance and consider installing a backwater valve alarm to let you know when the valve is closed to prevent flooding from in-home sources. Check with your insurance provider regarding eligibility for premium discounts for installing a backwater valve and/or an alarm.</p>

	<p>Foundation drain- Is a foundation drain (weepers) present? Is foundation drain functioning properly to drain water away from your foundation?</p> <p>Note: Foundation drains are not common before 1960. Depending on the age of your house it may or may not have a foundation drain or it may have a drain that is old and in poor condition. Missing or clogged drains increase the risk of basement infiltration flooding. Foundation drains that are connected to sanitary or storm sewers increase the risk of sewer backup related flooding.</p> <p>Note: Determining the condition and the plumbing connection of the foundation drain is outside the scope of this assessment. Consult a qualified professional</p>	GS, OW, SB	<p>Note: Only a qualified professional can formally identify the condition of this item or recommend if one would be right for your home. Note: Check with the check with the government department having jurisdictional authority to determine the availability of a subsidy and your eligibility.</p>	<p>The foundation weepers that enter your sump pit are made of clay. It is likely that these are over 50 years old. Symptoms such as dampness where the basement wall meets the floor are common when these are in poor condition so please monitor these areas regularly. Consider working with a qualified professional to inspect and/or repair your foundation drains to improve the rate of removal of water from your foundation. Check with the government department having jurisdictional authority to determine the availability of subsidy and your eligibility.</p>
D	<p>Sump pit- Does your sump pit have a sealed cover and is it in good repair?</p> <p>The sump pit has a sealed cap, is in good condition (free of cracks and holes) and is free of debris.</p>	SB	<p>The sump pit is in poor condition (cracks, holes greater than 6mm (1/4") present), there is no sealed cap, a large amount of debris is evident OR Needs further investigation.</p>	<p>See D on Inside Assessment diagram.</p> <p>You have an older sump pit without plastic walls and without a sealed plastic lid. Consider upgrading your sump pit to improve storage capacity and to decrease humidity levels in the basement by installing a unit with a sealable lid. Work with a qualified professional to complete this work.</p>
	<p>Sump pump- Is your sump pump in good condition and does it run infrequently?</p> <p>A sump pump is present and the homeowner reports it is functioning well and runs a maximum of 5 times per year. Consider installing an alarm to reduce flood risk.</p>	SB	<p>A sump pump is present and the homeowner reports it is not functioning well. AND/ OR The sump pump runs more than 10 times per year OR Needs further investigation.</p>	<p>Your sump pump is over 20 years old and you report that it does not always function well. Consider replacing your sump pump. Consider installing a ground fault interrupter (GFI) outlet to reduce the risk of electric shock. Hire a qualified professional for installation. Consider installing and maintaining alarms to reduce flood risk. Note: Check with the government department with jurisdictional authority regarding availability and eligibility for subsidy. Also check regarding plumbing permits requirements. Check with your insurance provider about discounts for installing alarm systems.</p>

	<p>Back-up sump pump- Is there a backup sump pump and is it in good condition?</p> <p>A back-up sump pump is present and the homeowner reports it is functioning well.</p>	SB	A back-up sump pump is NOT present OR Back-up sump pump is present but the homeowner reports it is not functioning well OR Needs further investigation.	Purchase a back-up sump pump. Consider hiring a qualified professional for installation.
	<p>Back-up power source –</p> <p>A back-up battery or generator is present, can generate electricity for a minimum of 72 hours and is reported by the homeowner to be functioning properly. A backup power source is elevated above anticipated flood levels. Consider installing an alarm to further reduce risk.</p>	SB	There is no back-up power supply. OR A back-up battery or generator is present and is reported by homeowner to be functioning poorly AND/OR it is not elevated above the anticipated flood level OR Needs further investigation.	Purchase and install a 72 hour back-up power supply and maintain it each season. Raise the power source above the anticipated flood level. Consider installing and maintaining an alarm to reduce flood risk. Check with your insurance professional about discounts for installing sump pump backup batteries and alarm systems.
E	<p>Unfinished wall efflorescence- Is there evidence of efflorescence on your walls, indicating water movement through the foundation?</p> <p>Foundation walls are free of efflorescence.</p>	GS	There is significant evidence of efflorescence (large areas of solid coverage of white flakes) OR Needs further investigation.	<p>See E on Inside Assessment diagram.</p> <p>Significant evidence of efflorescence was noted at the rear of the house where the grading is poor. Correct drainage, clean out eaves troughs and remove snow in winter. Remove efflorescence and seal the surface with masonry waterproofing paint.</p>
F	<p>Cold Rooms- Are cold rooms properly ventilated, with all surfaces maintaining consistent temperature to reduce mold and mildew risk?</p> <p>The door, frame and seals are all in good condition and there is no evidence of water entry. The door is adequately insulated. The air circulation level is good with adequate venting and all items are off the floor and away from walls by at least 15cm (6"). Space is unheated.</p>	OW	Door, frame and seals are in poor condition, evidence of significant water entry and/or door is not insulated, air circulation is poor with restricted venting and items are stored against the walls or on the floor OR Needs further investigation.	<p>See F on Inside Assessment diagram.</p> <p>Seal cracks in the door, frame and repair/replace seals. Improve insulation of the door or consider replacing them. Improve ventilation and raise items off of floor and away from walls by a minimum 15cm (6"). Consider working with a qualified contractor to remove plywood from the walls, to examine and address sources of water infiltration.</p>

	<p>Finished walls- Are water stains or high moisture levels indicating source of water infiltration?</p> <p>Walls are free of water stains. There is no evidence of mold (smell or visual evidence). The audible moisture meter indicates no concerns</p>	GS	Walls show major evidence of water entry, clear evidence of mold (smell or visual evidence), moisture meter indicates higher concern OR Needs further investigation.	Major evidence of moisture has been noted on plywood walls inside cold room. Remove the source of water buildup at the foundation as needed (correct drainage, repair eaves troughs and/or remove snow in winter, seal foundation from outside in extreme cases). Remove and replace damaged materials. Consult a professional if you are concerned about mold. If you are considering refinishing your basement, refer to Water-Resistant Building Materials fact sheet.
	<p>Furniture and electronics- Are furniture and electronics at risk of damage in the event of a flood?</p> <p>Furniture items have non-absorbent surfaces up to 30cm (12") and electronics are stored at least 30cm (12") off the floor (or to exceed anticipated flood levels).</p>	N/A	Furniture items have absorbent surfaces in contact with the floor and electronics are stored on the floor OR Needs further investigation.	Carpet on floors, couches with absorbent legs and electronics on the floor are at risk of damage in the event of a flood. Select furniture items that have non-absorbent surfaces up to 30cm (12") and store electronics at least 30cm (12") off the floor (or to exceed anticipated flood levels).
	<p>Relative humidity, air movement and temperature - Are the moisture, humidity and temperature levels in your basement optimum to reduce mold and mildew risk? A 30-50% relative humidity reading is taken in the basement. Air circulation is good. A minimum regular temperature above 15C (60F) is maintained.</p>	N/A	Over 60% relative humidity reading is taken in basement OR Air movement is highly restricted OR The temperature is kept below 10C (50F) OR Needs further investigation.	The relative humidity reading is 65. This exceeds the recommended maximum of 50%. Reduce sources of moisture and run one or more dehumidifiers to maintain 30-50% relative humidity. Improve air circulation. Maintain minimum temperature of 15C (60F).
G	<p>Hazardous materials- Are hazardous materials stored in a way that represents a contamination risk during a flood?</p> <p>No hazardous materials are stored in the basement and/or materials are stored in waterproof containers at least 30 cm (12") off the floor (or to exceed anticipated flood levels). Heating fuel tanks are secured to the floor.</p>	N/A	Hazardous materials are not sealed in waterproof containers and/or are stored on the floor and/or heating fuel tanks are not secured to the floor OR Needs further investigation.	See G on Inside Assessment diagram. Remove paint, chemicals and other hazardous material from basement or seal hazardous materials in waterproof containers and store at least 30 cm (12") off the floor (or to exceed anticipated flood levels).

ASSESSED MAINTENANCE

Fig	Maintenance Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
	Sanitary sewer lateral maintenance – If the home is over 25 years of age, has experienced sewer backup or has experienced chronic drainage issues, the homeowner has completed closed circuit television (CCTV) inspection of the sanitary sewer lateral. Based on recommendations of a qualified professional, the homeowner has cleaned out, lined or replaced damaged lateral as needed. The homeowner prevents clogging by preventing fats, oils, flushable wipes and grease from going down the drain.	SB, WS	Homeowner has a sanitary sewer lateral that is over 25 years old AND/ OR has experienced sewer lateral backup but has not completed a camera inspection or related repairs and upgrades. OR Needs further investigation. The homeowner regularly puts fats, oils, flushable wipes and grease down the drain.	See A on Inside Assessment diagram. Once a home has reached 25 years of age, a camera inspection of the sanitary sewer lateral is recommended every 5-10 years as a preventative measure. Based on the recommendations of a qualified professional, clean out, line or replace a damaged lateral as needed. Prevent clogging by preventing fats, oils, flushable wipes and grease from going down the drain.
B	Floor drain maintenance – Each season the homeowner removes obstacles to water flowing freely to the drain, tops up standing water in the trap and removes any debris from the drain. In case of blockage, strange smell, lack of water in trap, the homeowner contacts a licensed plumber.	SB	The homeowner never removes obstacles to water flowing freely to the drain, tops up standing water in trap or removes any debris from the drain. In case of blockage, strange smell, lack of water in trap, they do not contact a licensed plumber.	See B on Inside Assessment diagram. Each season remove obstacles that prevent water from flowing freely to the drain, top up standing water in the trap and remove any debris from the drain. In case of blockage, strange smell and/or lack of water in trap, contact a licensed plumber.
	Sump pit maintenance – Each season the homeowner checks the sump pit, repairs cracks or damage, and removes debris.	SB	The homeowner never checks the sump pit, repairs cracks or damage or removes debris.	Each season check the sump pit, repair cracks or damage and remove debris.

<p>Sump pump(s) maintenance – Each season, before vacation and when an extreme rain or melt event predicted, sump pump(s) and alarms are tested, repaired or replaced as required.</p>	SB	<p>Sump pump(s) are never tested, repaired or replaced as required.</p>	<p>Each season, before vacation and when an extreme rain or melt event is predicted, test the sump pump(s). Clean, repair or replace these items as required. Consider installing and maintaining an alarm each season to further reduce risk.</p>
<p>Unfinished wall efflorescence maintenance – Once per season the homeowner checks for evidence of efflorescence, addresses sources of water buildup at foundation, and cleans and repaints with masonry waterproofing paint as required.</p>	GS	<p>The homeowner never checks for evidence of efflorescence, addresses the sources of water buildup at the foundation, cleans and repaints the surface with masonry waterproofing paint as required.</p>	<p>Once per season check for evidence of efflorescence. Address sources of water buildup at the foundation. Clean and repaint the surface with masonry waterproofing paint as required.</p>
<p>Finished wall maintenance – Each season homeowner checks for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, consults a professional for remediation. Monitor during heavy downpours and spring melts for signs of dampness.</p>	GS	<p>The homeowner never checks for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, they do not consult a professional for remediation. The homeowner does not monitor for signs of dampness during heavy downpours and spring melts.</p>	<p>Each season check for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, consult a professional for remediation. Monitor for signs of dampness during heavy downpours and spring melts.</p>
<p>Indoor plumbing and fixtures maintenance – Each season toilets, taps, pipes and water heaters are inspected by the homeowner and are repaired by a plumber as needed. Consider installing and maintaining flood alarms.</p>	PF	<p>Toilets, taps, pipes and water heaters are not inspected by the homeowner or repaired by a plumber as needed.</p>	<p>Each season inspect toilets, taps, pipes and water heaters for leaks and signs of wear. Repair or replace items with the assistance of a plumber as needed. Consider installing and maintaining flood alarms to reduce flood risk. Check with your insurance professional about discounts for installing alarm systems.</p>

ADDITIONAL FLOOD PROTECTION RESOURCES

Regional Resources

[Saskatoon Key Flood Protection Resources](#)

[Saskatoon Contractor List](#)

[Burlington Key Flood Protection Resources](#)

[Burlington Contractor List](#)

[Toronto Key Flood Protection Resources](#)

[Get Emergency Ready Guide- City of Toronto](#)

[Toronto Contractor List](#)

[Oakville Key Flood Protection Resources](#)

[Hamilton Key Flood Protection Resources](#)

[Waterloo Region Flood Protection Resources](#)

National Resources

[Self-Help Resources for Outside and Inside the Home](#)

[Seasonal Maintenance Checklist](#)

[Infographic- Top Tips For Reducing Flood Risk](#)

[Infographic- Understanding Flood Insurance Coverage](#)

[Questions to Ask Your Insurance Providers](#)

[Estimated Cost Ranges for Completing Flood Protection Projects](#)

[Water Resistant Building Materials for Your Basement](#)

[Temporary Flood Barriers for Your Home](#)

[CMHC Guide for Understanding and Fixing Interior Moisture Problems](#)

[Emergency Preparedness Resources](#)



APPENDICES

Appendix A. Client Information Summary

Type of Home	Single Detached
Ownership	Owner
Type of Ownership	Freehold
Consents To Study	No
Length of Time in Home	0-5 years
Plan to Stay in Home	Over 10 years
Year Home Was Built	1950
Era of Neighbourhood development	Between 1940 and 1970
Home Layout	1.5 Storey
Home Size	Between 1000 to 2000 sq ft
Lot Size	Between 1/4 acre and 1/2 acre
Basement Type	Partly finished
Foundation Type	Rubble
Soil Type	Sand
Property within CA Regulated Area	No
Water Supply	Municipal
Sewage Service	Municipal
Weather Conditions	Clear and 5C



Appendix B. Reported Past Water Damage Summary

Past Water Damage to Your Lot and Exterior Structures	
Have you experienced any type of water damage to your lot and/or exterior structures (decks, garages, sheds) in the past?	No
What was the cause of the water damage?	
What category would the water damage fit into (total damage to structures or content)	\$0
What actions did you take to reduce your risk of future water damage outside your home?	
What is your level of concern about experiencing water damage to your lot or exterior structures in the future?	Low
Please list your top 2 water damage-related questions you have about your lot or exterior structures	Is there anything I should do to protect my windows from leaking? How often should I clean out my eaves troughs?
Past Water Damage To Your Home	
Have you experienced water in your basement or any type of water damage inside your home in the past?	Yes
What was the cause of the water damage?	Leaking pipes or appliances, Sewer backup through toilet or drains, Sump pump failure, High humidity causing mould or mildew growth.
What category would the water damage fit into (Total damage to structures or content)	Under \$5,000
What actions did you take to reduce your future risk of indoor water damage?	Completing maintenance activities.
What is your level of concern about experiencing water damage to your home is in the future?	Medium
Please list top 2 water-damage related questions you have about your home	How do I keep water from backing up through my floor drain? How do I make sure my sump pump will work when I need it in the spring?



Appendix C. Outside Assessment Form

Assessed Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
Overland Drainage of Property			
Overland drainage of property – Twenty four hours after a heavy rain do you see ponding or pooling on your property or in nearby storm drains or drainage ditches? Twenty four hours after a heavy rain, water does not pool on the subject property or in nearby storm drains or drainage ditches. If drainage swales are present on the property they are unblocked and are at least 15cm (6”) deep.	OW	Twenty four hours after a heavy rain, some water pooling is seen on the subject property or in nearby storm drains or drainage ditches. If drainage swales are present on the property, they are unblocked and are at least 15cm (6”) deep.	Homeowner reports water pooling near the storm drain for several hours after a heavy rain. Contact the government department with jurisdictional authority if storm drain is not emptying within 24 hours. Please see preventative maintenance comment below.
Overland drainage maintenance – Once per season or when major storm events are predicted, the homeowner checks for and removes debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches.	OW	The homeowner never checks for or removes debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches.	See A on Outside Assessment diagram. Once per season or when major storm events are predicted, check for and remove debris and obstructions from the water flow paths including swales and nearby storm drains. If nearby storm drains are free of debris but are still not draining within 24 hours, contact the government department with jurisdictional authority.

Landscaping			
Condition and location of trees – Would falling limbs due to strong winds or ice accumulation pose any risk of property damage to the home or hydro lines? Does their location pose potential risk to the home's foundation or sewer lateral? Trees appear to be in good condition. Their limbs do not hang over the home, driveway or hydro lines. Trees are in a position where the risk of root damage to the home's foundation or sewer lateral is unlikely.	SB, WS, GS	Trees appear to be in good condition. Their limbs do not hang over the home, driveway or hydro lines. Trees are in a position where they likely do not pose a root damage risk to the home's foundation or sewer lateral.	No action is required.
Tree maintenance – Once per season, the homeowner checks the condition of trees, prunes as required and waters during drought periods.	SB, WS, GS	Once per season the homeowner checks the condition of trees, prunes as required and waters during drought periods.	Once per season, check the condition of trees and prune as required. Water during drought periods. If concerned about a tree on public property, contact the government department with jurisdictional authority for assistance. If concerned about a tree on your property, contact a certified arborist for help.
Garden beds adjacent to home – Do garden beds leave a minimum of 20 cm (8") of your foundation exposed? Do foundation plantings provide adequate light exposure and air movement to foundation? Foundation plantings provide good light and air circulation between the plantings and the foundation. A minimum 20 cm (8") of foundation remains exposed. Trees that will reach a height of 10m (30') or more are a minimum of 5m (15') from the foundation and shrubs are a minimum of 1.8m (6') from the foundation. Water drains freely away from the foundation.	GS	Foundation plantings allow for good light and air circulation between the plantings and the foundation. A minimum 20cm (8") of foundation remains exposed. Trees that will reach a height of 10m (30') or more are minimum of 5m (15') from the foundation and shrubs are minimum of 1.8m (6') from the foundation. Water drains freely away from the foundation.	No action required

Landscaping maintenance – Once per year the homeowner removes barriers which impede water flowing away from the foundation. Consider applying mulch to garden beds and aerating the lawn to improve the ability of the soil to soak up water.	GS	Once per year homeowner removes barriers which impede water flowing away from foundation.	Once per year remove barriers which impede water from flowing away from the foundation. Consider applying mulch to garden beds and aerating lawns to improve the ability of the soil to soak up water.
Driveways, Walkways and Patios			
Impermeable (waterproof surface such as asphalt and interlocking pavers) driveway – Is your driveway free of cracks and does it slope away from your home at a minimum of 1-2%? The driveway is sloped away from the foundation walls at a slope of 1-2% and is free of cracks and gaps.	GS	The impermeable driveway directs water away from the foundation (1-2% slope) and is free of cracks and gaps.	No action is required.
Impermeable (waterproof) driveway maintenance – Once per season the homeowner checks for evidence of pooling and ice buildup, repairs grading, seals cracks, fills gaps and removes weeds.	GS	Once per season the homeowner checks for evidence of pooling and ice buildup, repairs grading, seals cracks, fills gaps, and removes weeds.	Once per season check for evidence of pooling and/or ice buildup. Repair grading, seal cracks, fill gaps and remove weeds.
Walkways and patios – Do your walkways and patios slope a minimum of 1-2% away from foundation walls? Are they free of cracks and gaps? The walkway slopes a minimum of 1-2% to direct water away from foundation and is free of cracks and gaps.	OW, GS	Walkway slopes a minimum 1-2% to direct water away from the foundation and is free of cracks and gaps.	No action is required.
Walkways and patios maintenance – Once per season the homeowner checks for evidence of pooling and ice buildup. Grading is repaired, cracks and gaps are sealed, and weeds are removed.	OW, GS	Once per season the homeowner checks for evidence of pooling and ice buildup. They repair grading, seal cracks, fill gaps and remove weeds.	Once per season check for evidence of pooling and/or ice buildup. Repair grading, seal cracks, fill gaps and remove weeds. Replace if the surface is in very poor condition.

Grading at Foundation			
Grading at foundation – After a heavy rain, does the grading within 1.8m (6') of your foundation walls direct water away or do you see water pooling? The grading within 1.8 m (6') of the foundation walls slopes a minimum of 5% to direct water away from the foundation. The foundation surface does not easily soak up water.	OW, GS	The grading is flat or slopes toward the foundation OR The foundation surface is highly water absorbent OR Needs further investigation.	See B on Outside Assessment diagram. The grading beside your home directs water toward the foundation. The line in the soil indicates eaves troughs are overflowing and adding additional risk. Correct grading to achieve at least a 5% slope away from the foundation. Consider replacing the surface with non-water absorbent material. See comments related to eaves trough maintenance.
Grading at foundation maintenance – Each season the homeowner checks for signs of water pooling or ice formation and corrects grading to achieve at least 5% slope away from the foundation.	OW, GS	The homeowner never checks for signs of water pooling or ice formation nor corrects grading to achieve at least 5% slope away from the foundation.	Each season, check for signs of water pooling or ice formation at foundation. Correct grading to achieve at least 5% slope away from foundation.
Eaves Troughs and Downspouts			
Eaves troughs – Are eaves troughs adequately sized and in adequate condition to reduce flood risk? Eaves troughs wrap around the entire building, are in good repair and have downspouts placed a minimum of 9-12m (30-40'). Eaves trough of 13cm (5") are present for asphalt shingles or 15cm (6") for a metal roof.	GS	Eaves troughs wrap around the entire building, are in good repair, and have downspouts placed a minimum of every 9-12m (30-40'). Eaves trough of 13cm (5") is present for asphalt shingles or 15cm (6") for metal roof.	No action is required.
Eaves trough maintenance – Each season during heavy rainfalls, the homeowner checks the eaves troughs for leaks, debris and blockage. Repairs and debris removal are completed as needed.	GS	The homeowner never checks the eaves troughs for leaks, debris and blockage. Repairs and debris removals are not completed as needed.	See C on Outside Assessment diagram. Each season during heavy rainfalls, check for leaks, debris and blockage. Repair, replace and clean out as needed.

<p>Disconnected downspouts – Are downspouts (that are not presently connected into underground pipes) directing water at least 1.8m (6') away from your home or the nearest drainage swale? For downspouts that have been disconnected, caps are securely in place to block the movement of water into underground pipes. The downspouts extend at least 1.8m (6') away from the foundation or to a drainage swale. Water is not directed onto hard surfaces or adjacent properties.</p>	GS	<p>For downspouts that have been disconnected, caps are securely in place to block the movement of water into underground pipes. Downspouts extend at least 1.8m (6') away from the foundation or to a drainage swale. Water is not directed onto hard surfaces or adjacent properties.</p>	<p>Consider connecting downspouts to a French drain, rain garden, bioswales or infiltration gallery to soak up water at least 5m (15') away from foundation. Check with government department with jurisdictional authority about drainage by-laws if any significant change to grading or drainage of property is being considered.</p>
<p>Downspout maintenance – Once per season the homeowner checks to make sure the downspout extensions are secured, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties.</p>	GS	<p>The homeowner never checks to make sure the downspout extensions are secure, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties.</p>	<p>Once per season check to make sure the downspout extensions are secure, free of leaks, deposit water at least 1.8m (6') from the foundation or to a drainage swale and that water is not flowing onto adjacent properties.</p>
<p>Foundation</p>			
<p>Foundation structure – Is your foundation free of cracks and gaps? The foundation appears to be in good condition and is free of cracks and finishing gaps (e.g. missing parging). Foundation penetrations are well sealed and sit above anticipated flood levels.</p>	GS	<p>The foundation appears to be in good condition and is free of cracks and finishing gaps (e.g. no missing parging). The foundation penetrations are well sealed and sit above anticipated flood levels.</p>	<p>No action is required.</p>
<p>Foundation structure maintenance – Once per season the homeowner checks for cracks and gaps, and completes repairs as required.</p>	GS	<p>Once per season the homeowner checks for cracks and gaps, and completes repairs as required.</p>	<p>Once per season check for cracks and gaps, complete repairs as required. Contact a qualified foundation repair contractor to repair cracks greater than 6mm (1/4").</p>

Foundation clearance maintenance – Stored items are kept at least 15cm (6”) from the foundation. As dictated by snow storm events, the homeowner clears snow 1m (3’6”) away from the foundation, keeps window openings clear of snow and ensures that vents are clear.	GS	Stored items are kept at least 15cm (6”) from the foundation. As dictated by snow storm events, the homeowner clears snow 1m (3’6”) away from the foundation, keeps window openings clear of snow piles and ensures that vents are clear.	Store item at least 6” from foundation. At intervals dictated by snow storms, regularly keep snow piles 3’ (1m) away from foundation and keep window openings clear of snow piles. Ensure vents are clear.
Foundation efflorescence – Are there signs of efflorescence on the foundation that could indicate moisture problems? Efflorescence (mineral deposits) indicate water moving through masonry, evaporating and leaving minerals behind. The presence of efflorescence can indicate water issues that can lead to spalling or structural damage.	GS	There is minor evidence of efflorescence.	Reduce the flow of water to the masonry by correcting the grading, maintaining eaves troughs, repairing foundation drains, sealing cracks on driveway, shoveling snow away from the walls in the winter, and minimizing salt use.
Efflorescence maintenance – Once per season the homeowner checks for evidence of efflorescence, addresses the sources of water buildup at foundation, and cleans and repaints the surface with masonry waterproofing paint as required.	GS	Once per year the homeowner checks for evidence of efflorescence, addresses the sources of water buildup at the foundation, and cleans and repaints the surface with masonry waterproofing paint as required.	Once per season check for evidence of efflorescence. Address the sources of water buildup at the foundation. Clean and repaint the surface with masonry waterproofing paint as required.
Foundation moisture content – Is your foundation showing high levels of water retention? Low levels of moisture at the surface are indicated.	GS	Moderate levels of moisture at the surface are indicated.	Reduce the flow of water to masonry by correcting the grading, maintaining eaves troughs, repairing foundation drains, sealing cracks on driveway, and shoveling snow away from walls in the winter. Improve drying of the foundation by referring to the landscaping best practices. Contact a qualified foundation repair contractor if the problem persists.
Windows			
Condition of windows – Are windows in adequate condition to help reduce risk of basement flooding? Frames, glass and seals are all in good condition.	OW	Frames, glass and seals are all in good condition.	No action is required.

Window maintenance – Once per season the homeowner checks the condition of the frames, glass and seals, and completes repairs as necessary.	OW	The homeowner never checks the condition of the frames, glass and seals, or completes repairs as necessary.	Once per season check the condition of the frames, glass and seals. Repair as necessary.
Window wells – Are window wells installed in such a way that they reduce flood risk? For each window that is less than 10-15cm (4-6”) above the ground surface, a window well is present and sits at least 10-15cm (4-6”) above grade. The window well is sealed at the foundation and the grading adjacent to wells slopes away from the home at a minimum of 5%. Consider installing window wells covers to further reduce risk.	OW	For each window that is less than 10-15cm (4-6”) above the ground surface, a window well is not present. OR Window wells sit less than 10-15cm (4-6”) above grade or are not sealed at foundation or grading at the window wells does not slope away from home at a minimum of 5%. Window well covers are not present OR Requires further investigation.	See D on Outside Assessment diagram. The windows are only 2.5 cm above grade and there is no formal window well, placing windows at higher risk of water inflow during heavy rains and spring melts. Work with a qualified professional to install a window well with adequate drainage. Correct grading adjacent to the window wells to slope 5% away from home. Consider installing window well covers to further reduce risk.
Exterior Water Sources			
Hose bib maintenance – Spring, summer and fall the homeowner checks for leaks and completes repairs as necessary. Before winter, the outdoor water supply is shut off and the water line is drained. The hose is drained and removed.	OW, GS	The homeowner never checks for leaks or completes repairs as necessary. They never shut off the exterior water supply, drains the line or remove the hose.	See E on Outside Assessment diagram. Spring, summer and fall check for leaks and complete repairs as needed. Before winter freeze up shut off the outdoor water supply and drain the water line. Drain and remove the hose.
Sump pump discharge – Does your sump pump drain pipe deposit water at least 1.8m (6’) from foundation or to the nearest drainage swale? Does pipe exit the home’s exterior above anticipated flood levels? Sump pump drain pipe is present and deposits water at least 1.8m (6’) from foundation or to drainage swale. It does not direct water onto a hard surface or onto adjacent property. The discharge pipe’s exit point through the home’s exterior is above anticipated flood levels.	OW, GS	Sump pump drain pipe is present and deposits water at least 1.8m (6’) from foundation or to drainage swale and is not directing water onto a hard surface or adjacent property. The discharge pipe’s exit point through the home’s exterior is above anticipated flood levels.	No action is required.

Appendix D. Inside Assessment Form

Assessed Feature and Best Practice	Type of Water Damage	Assessment	Opportunity to Reduce Risk
Sewer and Storm Lateral			
Sanitary sewer lateral – Is your sanitary sewer lateral in good condition and is it free of blockages? Inspection of sanitary sewer lateral with a closed circuit television (CCTV) is best practice if a home is over 25 years old, if the home has experienced sewer backup or if the home experiences chronic drain backup. Note: Determining the condition of the sewer lateral is outside the scope of this assessment. Consult a qualified professional.	SB, WS	Note: Only a qualified professional can formally identify the condition and the connection status of this item. Note: Work with a qualified professional and check with the government department having jurisdictional authority to determine the availability and your eligibility for any subsidies.	You have noted that you sometimes get drain backups when you do laundry. This indicates restricted flow through your lateral. Consider a closed circuit television (CCTV) inspection by a qualified professional for assessment and repair or replacement to address this issue.
Sanitary sewer lateral maintenance – If the home is over 25 years of age, has experienced sewer backup or has experienced chronic drainage issues, the homeowner has completed closed circuit television (CCTV) inspection of the sanitary sewer lateral. Based on recommendations of a qualified professional, the homeowner has cleaned out, lined or replaced damaged lateral as needed. The homeowner prevents clogging by preventing fats, oils, flushable wipes and grease from going down the drain.	SB, WS	Homeowner has a sanitary sewer lateral that is over 25 years old AND/OR has experienced sewer lateral backup but has not completed a camera inspection or related repairs and upgrades. OR Needs further investigation. The homeowner regularly puts fats, oils, flushable wipes and grease down the drain.	See A on Inside Assessment diagram. Once a home has reached 25 years of age, a camera inspection of the sanitary sewer lateral is recommended every 5-10 years as a preventative measure. Based on the recommendations of a qualified professional, clean out, line or replace a damaged lateral as needed. Prevent clogging by preventing fats, oils, flushable wipes and grease from going down the drain.

Floor Drain			
Floor drain – Is your floor drain clear of physical barriers to water flow and in adequate condition to reduce flood risk? Note: Some homes built before 1950 do not have a floor drain. A floor drain is present and demonstrates a clear flow path of water to the drain. The drain is in good condition, free of debris and standing water is present in trap.	SB	A floor drain is present but demonstrates a partly blocked water flow path to the drain. The drain appears to be in moderate condition, minor debris is evident, and standing water is present in the trap.	Some minor debris was seen in the floor drain and an oily film water noted on the surface of the water. Remove stored boxes blocking path of water flow to drain, clean out debris in trap. Repair the drain as needed.
Floor drain maintenance – Each season the homeowner removes obstacles to water flowing freely to the drain, tops up standing water in the trap and removes any debris from the drain. In case of blockage, strange smell, lack of water in trap, the homeowner contacts a licensed plumber.	SB	The homeowner never removes obstacles to water flowing freely to the drain, tops up standing water in trap or removes any debris from the drain. In case of blockage, strange smell, lack of water in trap, they do not contact a licensed plumber.	See B on Inside Assessment diagram. Each season remove obstacles that prevent water from flowing freely to the drain, top up standing water in the trap and remove any debris from the drain. In case of blockage, strange smell and/or lack of water in trap, contact a licensed plumber.
Basement sanitary sewer lateral cleanout – A basement sanitary sewer lateral cleanout is present and easily accessible.	SB	A basement sanitary sewer lateral cleanout is not accessible OR not present OR Needs further investigation.	See C on Inside Assessment diagram. Consider working with a plumber to install an easily accessible hatch to improve inspection and maintenance access. This will make it more cost-effective for regular inspection, maintenance and repair.
Backwater Valve			
Backwater valve – Is a backwater valve appropriate for use in your home or if it is in place, is it in good condition? Consider working with a qualified professional to determine if a backwater valve is suitable for your home or to evaluate the condition of your backwater valve. If you have a backwater valve or install one, consider installing an alarm to let you know when the valve is closed to prevent flooding from in-home sources. Note: This item is outside of scope of this assessment. Consult a qualified professional.	SB	Note: Only a qualified professional can formally identify if a backwater valve would be right for your home and the condition of an existing unit. Note: Check with the government department having jurisdictional authority to determine the availability of a subsidy for installation and your eligibility.	Consider working with a qualified professional to determine if a backwater valve is suitable for your home. If you install a backwater valve remember to complete seasonal maintenance and consider installing a backwater valve alarm to let you know when the valve is closed to prevent flooding from in-home sources. Check with your insurance provider regarding eligibility for premium discounts for installing a backwater valve and/or an alarm.

Foundation Drain (Weepers)			
<p>Foundation drain – Is a foundation drain (weepers) present? Is foundation drain functioning properly to drain water away from your foundation? Note: Foundation drains are not common before 1960. Depending on the age of your house it may or may not have a foundation drain or it may have a drain that is old and in poor condition. Missing or clogged drains increase the risk of basement infiltration flooding. Foundation drains that are connected to sanitary or storm sewers increase the risk of sewer backup related flooding. Note: Determining the condition and the plumbing connection of the foundation drain is outside the scope of this assessment. Consult a qualified professional.</p>	GS, OW, SB	<p>Note: Only a qualified professional can formally identify the condition of this item or recommend if one would be right for your home. Note: Check with the check with the government department having jurisdictional authority to determine the availability of a subsidy and your eligibility.</p>	<p>The foundation weepers that enter your sump pit are made of clay. It is likely that these are over 50 years old. Symptoms such as dampness where the basement wall meets the floor are common when these are in poor condition so please monitor these areas regularly. Consider working with a qualified professional to inspect and/or repair your foundation drains to improve the rate of removal of water from your foundation. Check with the government department having jurisdictional authority to determine the availability of subsidy and your eligibility.</p>
Sump Pit and Pump			
<p>Sump pit – Does your sump pit have a sealed cover and is it in good repair? The sump pit has a sealed cap, is in good condition (free of cracks and holes) and is free of debris.</p>	SB	<p>The sump pit is in poor condition (cracks, holes greater than 6mm (1/4") present), there is no sealed cap, a large amount of debris is evident OR Needs further investigation.</p>	<p>See D on Inside Assessment diagram. You have an older sump pit without plastic walls and without a sealed plastic lid. Consider upgrading your sump pit to improve storage capacity and to decrease humidity levels in the basement by installing a unit with a sealable lid. Work with a qualified professional to complete this work.</p>
<p>Sump pit maintenance – Each season the homeowner checks the sump pit, repairs cracks or damage, and removes debris.</p>	SB	<p>The homeowner never checks the sump pit, repairs cracks or damage or removes debris.</p>	<p>Each season check the sump pit, repair cracks or damage and remove debris.</p>
<p>Sump pump connection – Does your sump pump discharge water to the surface of your property and does it have a backflow valve? The sump pump discharges water to the lot surface and has a backflow preventer installed.</p>	OW, GS	<p>The sump pump discharges water to the lot surface and has a backflow preventer installed.</p>	<p>No action required.</p>

<p>Sump pump – Is your sump pump in good condition and does it run infrequently? A sump pump is present and the homeowner reports it is functioning well and runs a maximum of 5 times per year. Consider installing an alarm to reduce flood risk.</p>	SB	A sump pump is present and the homeowner reports it is not functioning well. AND/ OR The sump pump runs more than 10 times per year OR Needs further investigation.	Your sump pump is over 20 years old and you report that it does not always function well. Consider replacing your sump pump. Consider installing a ground fault interrupter (GFI) outlet to reduce the risk of electric shock. Hire a qualified professional for installation. Consider installing and maintaining alarms to reduce flood risk. Note: Check with the government department with jurisdictional authority regarding availability and eligibility for subsidy. Also check regarding plumbing permits requirements. Check with your insurance provider about discounts for installing alarm systems.
<p>Back-up sump pump – Is there a backup sump pump and is it in good condition? A back-up sump pump is present and the homeowner reports it is functioning well.</p>	SB	A back-up sump pump is NOT present OR Back-up sump pump is present but the homeowner reports it is not functioning well OR Needs further investigation.	Purchase a back-up sump pump. Consider hiring a qualified professional for installation.
<p>Sump pump(s) maintenance – Each season, before vacation and when an extreme rain or melt event predicted, sump pump(s) and alarms are tested, repaired or replaced as required.</p>	SB	Sump pump(s) are never tested, repaired or replaced as required.	Each season, before vacation and when an extreme rain or melt event is predicted, test the sump pump(s). Clean, repair or replace these items as required. Consider installing and maintaining an alarm each season to further reduce risk.
<p>Back-up power source – A back-up battery or generator is present, can generate electricity for a minimum of 72 hours and is reported by the homeowner to be functioning properly. A backup power source is elevated above anticipated flood levels. Consider installing an alarm to further reduce risk.</p>	SB	There is no back-up power supply. OR A back-up battery or generator is present and is reported by homeowner to be functioning poorly AND/OR it is not elevated above the anticipated flood level OR Needs further investigation.	Purchase and install a 72 hour back-up power supply and maintain it each season. Raise the power source above the anticipated flood level. Consider installing and maintaining an alarm to reduce flood risk. Check with your insurance professional about discounts for installing sump pump backup batteries and alarm systems.
Exposed Foundation Walls, Floors and Cold Rooms			
<p>Unfinished wall cracks – Are your foundation walls free of cracks and stains? Foundation walls are free of cracks and water stains.</p>	GS	The foundation walls are free of cracks and water stains.	No action is required.

<p>Unfinished wall crack maintenance – The homeowner checks for cracks once per season, fills cracks and removes sources of water buildup at the foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, seals foundation from outside in extreme cases). The homeowner consults with a qualified professional in case of major problems.</p>	GS	<p>Once per year the homeowner checks for cracks, fills cracks and removes the sources of water buildup at the foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, seals foundation from outside in extreme cases). The homeowner consults with a professional in case of major problems.</p>	<p>Once per season, check for cracks, fill cracks and remove sources of water buildup at the foundation as needed (correct drainage, repair eaves troughs and/or remove snow in winter, seal foundation from outside in extreme cases). Consult with a qualified professional in case of major problems.</p>
<p>Unfinished wall efflorescence – Is there evidence of efflorescence on your walls, indicating water movement through the foundation? Foundation walls are free of efflorescence.</p>	GS	<p>There is significant evidence of efflorescence (large areas of solid coverage of white flakes) OR Needs further investigation.</p>	<p>See E on Inside Assessment diagram. Significant evidence of efflorescence was noted at the rear of the house where the grading is poor. Correct drainage, clean out eaves troughs and remove snow in winter. Remove efflorescence and seal the surface with masonry waterproofing paint.</p>
<p>Unfinished wall efflorescence maintenance – Once per season the homeowner checks for evidence of efflorescence, addresses sources of water buildup at foundation, and cleans and repaints with masonry waterproofing paint as required.</p>	GS	<p>The homeowner never checks for evidence of efflorescence, addresses the sources of water buildup at the foundation, cleans and repaints the surface with masonry waterproofing paint as required.</p>	<p>Once per season check for evidence of efflorescence. Address sources of water buildup at the foundation. Clean and repaint the surface with masonry waterproofing paint as required.</p>
<p>Unfinished wall moisture – Are there high levels of moisture on the surface of your walls below windows, near cracks and where walls meet floor? Low moisture levels are indicated on all tested areas of the wall surface. Monitor for signs of dampness during heavy downpours and spring melts.</p>	GS	<p>Moderate moisture levels are present on noted areas of the wall surface.</p>	<p>Moderate moisture levels were noted where the wall meets the floor at the rear of the home. Examine sources of moisture from inside and outside the home. Hire a qualified professional as needed to diagnose and repair moisture or mold problems. Monitor for signs of dampness during heavy downpours or spring melts.</p>
<p>Unfinished floor cracks – Are there cracks in your floor that provide potential water entry sites to your basement? Unfinished floors are free of cracks and water stains.</p>	GS	<p>Unfinished floors are free of cracks and water stains.</p>	<p>No action is required.</p>

<p>Unfinished floor crack maintenance – Once per season homeowner checks for cracks, fills cracks, removes source of water buildup at foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, seals foundation from outside in extreme cases). Homeowner consults with professional regarding major concerns.</p>	GS	<p>The homeowner checks for cracks once per season, fills cracks and removes source of water buildup at the foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, seals foundation from outside in extreme cases). The homeowner consults with a qualified professional regarding major concerns.</p>	<p>Check for cracks once per season, fill cracks, and remove the source of water buildup at the foundation as needed (correct drainage, repair eaves troughs and/or remove snow in winter, seal foundation from outside in extreme cases). Check with a qualified professional regarding major concerns.</p>
<p>Unfinished floor efflorescence – Is there evidence of efflorescence on floors, indicating water movement through the foundation? Floors are free of efflorescence.</p>	GS	<p>Floors are free of efflorescence.</p>	<p>No action is required.</p>
<p>Unfinished floor efflorescence maintenance – Once per season the homeowner checks for evidence of efflorescence, addresses sources of water buildup at foundation, and cleans and repaints with masonry waterproofing paint as required.</p>	GS	<p>Once per year the homeowner checks for evidence of efflorescence, addresses sources of water buildup at foundation, cleans and repaints with masonry waterproofing paint as required.</p>	<p>Once per season check for evidence of efflorescence. Address sources of water buildup at the foundation. Clean and repaint with masonry waterproofing paint as required.</p>
<p>Unfinished floor moisture – Are there high levels of moisture, indicating water entry into the basement? Low moisture levels are present on the floor surface. Monitor for signs of dampness during heavy downpours and spring melts.</p>	GS	<p>Low moisture levels are present on the floor surface.</p>	<p>Monitor for signs of dampness during heavy downpours and spring melts.</p>
<p>Cold Rooms – Are cold rooms properly ventilated, with all surfaces maintaining consistent temperature to reduce mold and mildew risk? The door, frame and seals are all in good condition and there is no evidence of water entry. The door is adequately insulated. The air circulation level is good with adequate venting and all items are off the floor and away from walls by at least 15cm (6"). Space is unheated.</p>	OW	<p>Door, frame and seals are in poor condition, evidence of significant water entry and/or door is not insulated, air circulation is poor with restricted venting and items are stored against the walls or on the floor OR Needs further investigation.</p>	<p>See F on Inside Assessment diagram. Seal cracks in the door, frame and repair/replace seals. Improve insulation of the door or consider replacing them. Improve ventilation and raise items off of floor and away from walls by a minimum 15cm (6"). Consider working with a qualified contractor to remove plywood from the walls, to examine and address sources of water infiltration.</p>

Finished Walls and Floors			
Finished walls – Are water stains or high moisture levels indicating source of water infiltration? Walls are free of water stains. There is no evidence of mold (smell or visual evidence). The audible moisture meter indicates no concerns.	GS	Walls show major evidence of water entry, clear evidence of mold (smell or visual evidence), moisture meter indicates higher concern OR Needs further investigation.	Major evidence of moisture has been noted on plywood walls inside cold room. Remove the source of water buildup at the foundation as needed (correct drainage, repair eaves troughs and/or remove snow in winter, seal foundation from outside in extreme cases). Remove and replace damaged materials. Consult a professional if you are concerned about mold. If you are considering refinishing your basement, refer to Water-Resistant Building Materials fact sheet.
Finished wall maintenance – Each season homeowner checks for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, consults a professional for remediation. Monitor during heavy downpours and spring melts for signs of dampness.	GS	The homeowner never checks for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, they do not consult a professional for remediation. The homeowner does not monitor for signs of dampness during heavy downpours and spring melts.	Each season check for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, consult a professional for remediation. Monitor for signs of dampness during heavy downpours and spring melts.
Finished floors – Are there high levels of moisture, indicating water entry into basement? Low levels of moisture are present, there is no evidence of mold or mildew and no musty smell is present.	GS	Low levels of moisture are present on floors, no evidence of mold or mildew present and no musty smell is present.	No action is required. If you are considering refinishing your basement, refer to Water-Resistant Building Materials fact sheet.
Finished floor maintenance – Each season homeowner the checks for water damage and signs of mold growth. If water damage and/or mold is evident, the homeowner consults with a professional for remediation.	GS	Each season the homeowner checks for water damage and signs of mold growth. If water damage and/or mold is evident, they consult a professional for remediation.	Each season check for water damage and signs of mold growth. If water damage and/or mold are evident, consult a professional for remediation.
Windows			
Basement windows – Are windows in adequate condition to reduce risk of overland flooding? Glass, frames and seals are all in good condition and there is no evidence of water entry.	OW	Glass, frames and seals are all in good condition. There is no evidence of water entry.	No action is required.

Basement window maintenance – The homeowner checks once per season for cracked glass, broken seals and rotting frames. They repairs and/or replaces these as required.	OW	The homeowner checks once per year for cracked glass, broken seals and rotting frames, repairs AND/OR replaces these as required.	Once per season check for cracked glass, broken seals and rotting frames. Repair AND/OR replace these as required.
Plumbing Fixtures			
Indoor plumbing and fixtures maintenance – Each season toilets, taps, pipes and water heaters are inspected by the homeowner and are repaired by a plumber as needed. Consider installing and maintaining flood alarms.	PF	Toilets, taps, pipes and water heaters are not inspected by the homeowner or repaired by a plumber as needed.	Each season inspect toilets, taps, pipes and water heaters for leaks and signs of wear. Repair or replace items with the assistance of a plumber as needed. Consider installing and maintaining flood alarms to reduce flood risk. Check with your insurance professional about discounts for installing alarm systems.
Additional Considerations for Limiting Risk of Water Damage, Mold and Mildew Growth			
Furniture and electronics – Are furniture and electronics at risk of damage in the event of a flood? Furniture items have non-absorbent surfaces up to 30cm (12”) and electronics are stored at least 30cm (12”) off the floor (or to exceed anticipated flood levels).	N/A	Furniture items have absorbent surfaces in contact with the floor and electronics are stored on the floor OR Needs further investigation.	Carpet on floors, couches with absorbent legs and electronics on the floor are at risk of damage in the event of a flood. Select furniture items that have non-absorbent surfaces up to 30cm (12”) and store electronics at least 30cm (12”) off the floor (or to exceed anticipated flood levels).
Stored valuables – Are your valuables at risk of damage during a flood or at risk of mold and mildew growth? Valuables are stored in sealed, non-absorbent containers at least 30cm (12”) off the floor (or to exceed anticipated flood levels), at least 15cm (6”) away from walls to provide good air circulation OR no valuables are stored in the basement.	N/A	Valuables are stored in sealed, non-absorbent containers at least 15cm (6”) off the floor, at least 10cm (3”) away from walls that provide moderate air circulation.	Store items in sealed, non-absorbent containers at least 30 cm (12”) off the floor (or to exceed anticipated flood levels) and 15 cm (6”) away from walls. Consider moving most valuable items above the basement.
Relative humidity, air movement and temperature – Are the moisture, humidity and temperature levels in your basement optimum to reduce mold and mildew risk? A 30-50% relative humidity reading is taken in the basement. Air circulation is good. A minimum regular temperature above 15C (60F) is maintained.	N/A	Over 60% relative humidity reading is taken in basement OR Air movement is highly restricted OR The temperature is kept below 10C (50F) OR Needs further investigation.	The relative humidity reading is 65. This exceeds the recommended maximum of 50%. Reduce sources of moisture and run one or more dehumidifiers to maintain 30-50% relative humidity. Improve air circulation. Maintain minimum temperature of 15C (60F).

<p>Indoor Sources of Moisture– Are indoor sources of moisture limited to reduce mold and mildew risk? If a bathroom with a shower is present, a fan is present and when it is running it is strong enough to hold a piece of tissue. Fan is run for 30-60 minutes after a bath or shower. Furnace humidifiers do not operate in the summer. Wood is not stored, laundry is not hung, boots are not dried etc. in the basement.</p>	N/A	<p>If a bathroom with a shower is present, a fan is present and when running it is strong enough to hold a piece of tissue. The fan is run for 30-60 minutes after bath or shower use. Furnace humidifiers do not operate in the summer. Wood is not stored, laundry is not hung, boots are not dried etc. in the basement.</p>	No action required.
Hazardous Materials			
<p>Hazardous materials – Are hazardous materials stored in a way that represents a contamination risk during a flood? No hazardous materials are stored in the basement and/or materials are stored in waterproof containers at least 30 cm (12”) off the floor (or to exceed anticipated flood levels). Heating fuel tanks are secured to the floor.</p>	N/A	<p>Hazardous materials are not sealed in waterproof containers and/or are stored on the floor and/or heating fuel tanks are not secured to the floor OR Needs further investigation.</p>	<p>See G on Inside Assessment diagram. Remove paint, chemicals and other hazardous material from basement or seal hazardous materials in waterproof containers and store at least 30 cm (12”) off the floor (or to exceed anticipated flood levels).</p>

Appendix L: Summary of Residential Basement Flood Risk Reduction Best Practices

Water Damage Risk Type Glossary:

SB - Sewer Backup;

OW - Overland Water;

GS - Groundwater Seepage;

WS - Water and Sewer Line Rupture;

PF - Plumbing Fixtures

Outside Assessment Best Practices

A) Overland Drainage of Property

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW	#1. Overland drainage of property Twenty-four hours after a heavy rain do you see ponding or pooling on your property or in nearby storm drains or drainage ditches?	Twenty-four hours after a heavy rain, water does not pool on the subject property or in nearby storm drains or drainage ditches. If drainage swales are present on the property, they are unblocked and are at least 15cm (6") deep.
Assessed Maintenance	OW	#2. Overland drainage maintenance How often do you remove debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches?	Once per season or when major storm events are predicted, the participant checks for and removes debris and obstructions from the water flow paths including swales, nearby storm drains, culverts and drainage ditches.

B) Landscaping

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB, WS, GS	#3. Condition and location of trees Would falling limbs due to strong winds or ice accumulation pose any risk of property damage to the home or hydro lines? Does their location pose potential risk to the home's foundation or sewer lateral?	Trees appear to be in good condition. Their limbs do not hang over the home, driveway or hydro lines. Trees are in a position where they likely do not pose a root damage risk to the home's foundation or sewer lateral.
Assessed Maintenance	SB, WS, GS	#4. Tree maintenance How often do you check the condition of your trees? Do you prune trees as required and water during drought periods?	Once per season the participant checks the condition of trees, prunes as required and waters during drought periods.

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#5. Garden beds adjacent to home Do your garden beds leave a minimum of 20 cm (8") of your foundation exposed? Do foundation plantings provide adequate light exposure and air movement to foundation?	Foundation plantings allow for good light and air circulation between the plantings and the foundation. A minimum 20cm (8") of foundation remains exposed. Trees that will reach a height of 10m (30') or more are minimum of 5m (15') from the foundation and shrubs are minimum of 1.8m (6') from the foundation. Water drains freely away from the foundation.
Assessed Maintenance	GS	#6. Landscaping maintenance How often do you remove barriers which impede water flowing away from the foundation?	Once per year participant removes barriers which impede water flowing away from foundation. Consider applying mulch to garden beds and aerating the lawn to improve the ability of the soil to soak up water.

C) Driveways, Walkways, and Patios

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB, OW	#7. Reverse slope driveway and garage door(s) below grade Is your below-grade garage door and accompanying drain in adequate condition to reduce flood risk?	The garage door, frame and weather stripping are in good condition. A drain is located on landing and is clear of debris. Water drains in less than 1 hour. The drain does not connect to the sanitary sewer.
Assessed Maintenance	SB, OW	#8. Reverse slope driveway and garage door(s) below grade maintenance How often do you inspect and repair the garage door, frame, weather stripping and drain?	Each season the participant inspects and repairs the garage door, frame and weather stripping. They also repair and clean out the drain as needed.
Assessed Feature	GS	#9. Impermeable (waterproof surface such as asphalt and interlocking pavers) driveway Is your driveway free of cracks and does it slope away from your home at a minimum of 1-2%?	The impermeable driveway directs water away from the foundation (1-2% slope) and is free of cracks and gaps.
Assessed Maintenance	GS	#10. Impermeable (waterproof) driveway maintenance How often do you check for evidence of pooling and ice buildup, repair grading, seal cracks, fill gaps and remove weeds?	Once per season the participant checks for evidence of pooling and ice buildup, repairs grading, seals cracks, fills gaps, and removes weeds.
Assessed Feature	GS	#11. Permeable (water absorbing) driveway Is your driveway functioning adequately to absorb water and direct it away from your foundation?	The permeable driveway directs water away from the foundation and all water drains within 24 hours.
Assessed Maintenance	GS	#12. Permeable (water absorbing) driveway maintenance How often do you check for evidence of pooling, ice buildup, and the growth of weeds?	Once per season the participant checks for evidence of pooling, ice buildup, and the growth of weeds. The participant identifies and addresses the reason for clogging. Weeds and debris are removed as needed.

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW, GS	#13. Walkways and patios Do your walkways and patios slope a minimum of 1-2% away from foundation walls? Are they free of cracks and gaps?	Walkway slopes a minimum 1-2% to direct water away from the foundation and is free of cracks and gaps.
Assessed Maintenance	OW, GS	#14. Walkways and patios maintenance How often do you check for evidence of pooling and ice buildup? Is grading repaired, cracks and gaps sealed, and weeds removed?	Once per season the participant checks for evidence of pooling and ice buildup. They repair grading, seal cracks, fill gaps and remove weeds.

D) Grading at Foundation

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW, GS	#15. Grading at foundation After a heavy rain, does the grading within 1.8m (6') of your foundation walls direct water away or do you see water pooling? Does the foundation surface easily soak up water?	The grading within 1.8m (6') of the foundation slopes a minimum of 5% to direct water away from the foundation. The foundation surface does not easily soak up water.
Assessed Maintenance	OW, GS	#16. Grading at foundation maintenance How often do you check for signs of water pooling or ice formation and correct grading to achieve at least a 5% slope away from the foundation?	Each season the participant checks for signs of water pooling or ice formation and corrects grading to achieve at least a 5% slope away from the foundation.

E) Eaves Troughs and Downspouts

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#17. Eaves troughs Are eaves troughs adequately sized and in adequate condition to reduce flood risk?	Eaves troughs wrap around the entire building, are in good repair, and have downspouts placed a minimum of every 9-12m (30-40'). Eaves trough of 13cm (5") is present for asphalt shingles or 15cm (6") for metal roof.
Assessed Maintenance	GS	#18. Eaves trough maintenance How often do you check the eaves troughs for leaks, debris and blockages? Are repairs and debris removal completed as needed?	Each season during heavy rainfalls, the participant checks the eaves troughs for leaks, debris and blockage. Repairs and debris removal are completed as needed.

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature-	SB	#19. Connected downspouts Are downspouts connected to SANITARY OR STORM sewers?	Where approved by government department having jurisdictional authority, downspouts should be disconnected from foundation drains, caps should be installed over underground pipe connections and downspouts should be extended to at least 1.8-3m (6-10') from the foundation or to the nearest drainage swale. Water should not drain onto hard surfaces or onto adjacent properties. Note: Check with the government department having jurisdictional authority to determine eligibility for downspout disconnection and any available subsidy.
Assessed Feature	GS	#20. Disconnected downspouts Are downspouts (that are not presently connected into underground pipes) directing water at least 1.8m (6') away from your home or the nearest drainage swale? Is water directed onto hard surfaces or adjacent properties?	For downspouts that have been disconnected, caps are securely in place to block the movement of water into underground pipes. Downspouts extend at least 1.8m (6') away from the foundation or to a drainage swale. Water is not directed onto hard surfaces or adjacent properties.
Assessed Maintenance	GS	#21. Downspout maintenance How often do you check to make sure the downspout extensions are secured, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale, and that water is not flowing onto adjacent properties?	Once per season the participant checks to make sure that the downspout extensions are secure, free of leaks, depositing water at least 1.8m (6') from the foundation or to a drainage swale, and that water is not flowing onto adjacent properties.

F) Rain Barrels

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#22. Rain barrels Are rain barrels installed to prevent overflow?	The rain barrel has a diverter and overflow discharge pipe that delivers water at least 1.8m (6') from the foundation or to a drainage swale.
Assessed Maintenance	GS	#23. Rain barrel maintenance How often do you check the rain barrel for leaks, check that the diverter is kept free of debris, and that the overflow pipe extends away from foundation and/or to a drainage swale?	Once per week during the growing season, the rain barrel is checked for leaks, the diverter is kept free of debris, and the overflow pipe is checked to make sure it extends away from foundation and/or to a drainage swale. Before winter, the barrel is drained and the downspout extensions are reinstalled (if applicable).

G) Foundation

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#24. Foundation structure Is your foundation free of cracks and gaps? Are the foundation penetrations well sealed and do they sit above anticipated flood levels?	The foundation appears to be in good condition and is free of cracks and finishing gaps (e.g. no missing parge coat). The foundation penetrations are well sealed and sit above anticipated flood levels.
Assessed Maintenance	GS	#25. Foundation structure maintenance How often do you check for cracks and gaps in the foundation?	Once per season the participant checks for cracks and gaps, and completes repairs as required.
Assessed Maintenance	GS	#26. Foundation clearance maintenance How far from the foundation are stored items kept? Is snow cleared from the foundation? Are window openings and vents kept clear?	Stored items are kept at least 15cm (6") from the foundation. As dictated by snow storm events, the participant clears snow 1m (3'6") away from the foundation, keeps window openings clear of snow piles and ensures that vents are clear.
Assessed Feature	GS	#27. Foundation efflorescence Are there signs of efflorescence on the foundation that could indicate moisture problems? Efflorescence (mineral deposits) indicate water moving through masonry, evaporating and leaving minerals behind. The presence of efflorescence can indicate water issues that can lead to spalling or structural damage.	There is no evidence of efflorescence.
Assessed Maintenance	GS	#28. Efflorescence maintenance How often do you check for evidence of efflorescence, address the sources of water buildup at foundation, and clean and repaint the surface with masonry waterproofing paint as required?	Once per season the participant checks for evidence of efflorescence, addresses the sources of water buildup at the foundation, cleans and repaints the surface with masonry waterproofing paint as required.
Assessed Feature-	GS	#29. Foundation moisture content Is your foundation showing high levels of water retention?	Low levels of moisture at the surface are indicated.

H) Windows

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW	#30. Condition of windows Are windows in adequate condition to help reduce risk of basement flooding?	Frames, glass and seals are all in good condition.
Assessed Maintenance	OW	#31. Window maintenance How often do you check the condition of the frames, glass and seals, and complete repairs as necessary?	Once per season the participant checks the condition of the frames, glass and seals, and completes repairs as necessary.
Assessed Feature	OW	#32. Window wells Are window wells installed in such a way that they reduce flood risk?	For each window that is less than 10-15cm (4-6") above the ground surface, a window well is present, sits at least 10-15cm (4-6") above grade, is sealed at the foundation, and grading adjacent to wells slopes away from the home at a minimum of 5%. Consider installing window wells covers to further reduce risk.

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Maintenance	OW	#33. Window well maintenance How often do you remove debris, check and repair seals and drains, check and correct grading and ensure the window well covers are in good condition?	Once per season the participant removes debris, checks and repairs seals and drains, checks and corrects grading, and ensures the window well covers are in good condition. The window well should be empty within one hour.

I) Doors

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW	#34. Doors below grade, stairwells and accompanying drains Are doors below grade, stairwells and accompanying drains in a adequate condition to reduce flood risk?	The frame, door, weather stripping and/or water barrier is in good condition. The door sill is 10-15cm (4-6") above grade, the stairs are free of gaps and cracks and a drain on the landing is present. The drain is not connected to sanitary sewer. Consider a stairwell sill that sits 10-15cm (4-6") above grade to further reduce flood risk.
Assessed Maintenance	OW	#35. Door below grade maintenance How often do you check the condition of the seals, barriers, sills, stairs and drains and complete repairs as needed?	Once per season the participant checks the condition of the seals, barriers, sills, stairs and drains and completes repairs as needed. The stairwell should drain within 1 hour.

J) Exterior Water Sources

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Maintenance	OW, GS	#36. Hose bib maintenance How often do you check for leaks and complete repairs as necessary? Is the outdoor water supply shut off, the water line drained, and the hose drained and removed before winter?	Spring, summer and fall the participant checks for leaks, and repairs as necessary. Before winter, the outdoor water supply is shut off and the water line is drained. The hose is drained and removed.
Assessed Feature	OW, GS	#37. Sump pump discharge Does your sump pump drain pipe deposit water at least 1.8m (6') from foundation or to the nearest drainage swale? Does your discharge pipe exit the home's exterior above anticipated flood levels?	Sump pump drain pipe is present and deposits water at least 1.8m (6') from foundation or to drainage swale and is not directing water onto a hard surface or adjacent property. The discharge pipe's exit point through the home's exterior is above anticipated flood levels.

Inside Assessment Best Practices

A) Sewer and Storm Lateral

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB, WS	#38. Sanitary sewer lateral Is your sanitary sewer lateral in good condition and is it free of blockages?	Inspection of sanitary sewer lateral with a closed circuit television (CCTV) is the best practice if a home is over 25 years old, if the home has experienced sewer backup or if the home experiences chronic drain backup. Note: Only a qualified professional can formally identify the condition and the connection status of this item. Note: Work with a qualified professional and check with the government department having jurisdictional authority to determine the availability and your eligibility for any subsidies.
Assessed Maintenance	SB, WS	#39. Sanitary sewer lateral maintenance Is the home over 25 years of age? Is there a history of sewer backup or chronic drainage issues? Have you completed closed circuit television (CCTV) inspection of the sanitary sewer lateral? Have you cleaned out, lined or replaced damaged lateral as needed? Do you prevent fats, oils, flushable wipes and grease from going down the drain?	If the home is over 25 years of age, has experienced sewer backup or has experienced chronic drainage issues, the participant has completed a closed circuit television (CCTV) inspection of the sanitary sewer lateral. Based on the recommendations of a qualified professional, the participant has cleaned out, lined or replaced the damaged lateral as needed. The participant prevents clogging by preventing any of fats, oils, flushable wipes and grease from going down the drain.
Assessed Feature	SB	#40. Storm lateral Do you have a storm lateral? Is it in good condition and free of blockages? <i>Note: Storm laterals are rare before 1990.</i>	Homes may have foundation drains directly connected to storm laterals or sump pump discharge pipes directly connected to storm lateral. The presence or absence of a storm lateral in your location can be formally confirmed by a plumber. If your storm lateral is over 25 years old or if storm water is not draining freely, an inspection by a qualified professional with a closed circuit television (CCTV) will help identify your best course of action. Note: Only a qualified professional can formally identify the condition of this item, its connection status and if it is best to disconnect it. Note: Work with qualified professional. Check with the government department having jurisdictional authority to determine the availability of a subsidy and your eligibility.
Assessed Maintenance	SB, WS	#41. Storm lateral maintenance How often do you complete a storm lateral camera inspection?	The participant completes a storm lateral camera inspection if storm water backup occurs, once the lateral is 25 years old and every 5-10 years after that as a preventative measure. Based on the advice of qualified professional the lateral is repaired, replaced or disconnected.

B) Floor Drain

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB	#42. Floor drain Is your floor drain clear of physical barriers to water flow and in adequate condition to reduce flood risk? <i>Note: Some homes built before 1950 do not have a floor drain.</i>	A floor drain is present and demonstrates a clear flow path of water to the drain. The drain appears to be in good condition, is free of debris and standing water is present in trap.
Assessed Maintenance	SB	#43. Floor drain maintenance How often do you remove obstacles to water flowing freely to the drain, top up standing water in the trap and remove any debris from the drain?	Each season the participant removes obstacles to water flowing freely to the drain, tops up standing water in the trap and removes any debris from the drain. In case of blockage, strange smell, or lack of water in trap, they contact a licensed plumber.
Assessed Feature	SB	#44. Basement sanitary sewer lateral cleanout Is a basement sanitary sewer lateral cleanout present and easily accessible?	A basement sanitary sewer lateral cleanout is present and is easily accessible.

C) Backwater Valve

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB	#45. Backwater valve Is a backwater valve appropriate for use in your home or if it is in place, is it in good condition?	Consider working with a qualified professional to determine if a backwater valve is suitable for your home or to evaluate the condition of your backwater valve. If you have a backwater valve or install one, consider installing an alarm to let you know when the valve is closed to prevent flooding from in-home sources. <i>Note: Only a qualified professional can formally identify if a backwater valve would be right for your home and the condition of an existing unit.</i> <i>Note: Check with the government department having jurisdictional authority to determine the availability of a subsidy for installation and your eligibility.</i>
Assessed Maintenance	SB	#46. Backwater valve maintenance How often do you, according to manufacturer's instructions, remove cap, ensure the flapper moves freely, ensure that the gasket is in good condition and remove debris?	Once per season, according to manufacturer's instructions, the participant removes the cap, ensures the flapper moves freely, ensures the gasket is in good condition and removes debris. For repairs, a licensed plumber is contacted. Participant puts NO fats, oil, grease, or flushable wipes down the drain. Consider installing and maintaining a flood alarm to reduce sewer back-up risk from in-home sources.

D) Foundation Drain (Weepers)

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS, OW, SB	<p>#47. Foundation drain</p> <p>Are foundation drain (weepers) present? Is foundation drain functioning properly to drain water away from your foundation?</p> <p><i>Note: Foundation drains are not common before 1960.</i> Depending on the age of your house it may or may not have a foundation drain or it may have a drain that is old and in poor condition.</p>	<p>Missing or clogged drains increase the risk of basement infiltration flooding. Foundation drains that are connected to sanitary or storm sewers increase the risk of sewer backup related flooding.</p> <p>Note: Only a qualified professional can formally identify the condition of this item or recommend if one would be right for your home.</p> <p>Note: Check with the government department having jurisdictional authority to determine the availability of a subsidy and your eligibility.</p>

E) Sump Pit and Pump

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	SB	<p>#48. Sump pit</p> <p>Does your sump pit have a sealed cover and is it in good repair?</p>	The sump pit has a sealed cap, is in good condition (free of cracks and holes) and is free of debris.
Assessed Maintenance	SB	<p>#49. Sump pit maintenance</p> <p>How often do you check the sump pit, repair cracks or damage, and remove debris?</p>	Each season the participant checks the sump pit, repairs cracks or damage, and removes debris.
Assessed Feature	OW, GS	<p>#50. Sump pump connection</p> <p>Does your sump pump discharge water to the surface of your property and does it have a backflow valve?</p>	The sump pump discharges water to the lot surface and has a backflow preventer installed.
Assessed Feature	SB	<p>#51. Sump pump</p> <p>Is your sump pump in good condition and does it run infrequently?</p>	A sump pump is present, the participant reports it is functioning well, and runs a maximum of 5 times per year. Consider installing an alarm to reduce flood risk.
Assessed Feature	SB	<p>#52. Back-up sump pump</p> <p>Do you have a backup sump pump and is it in good condition?</p>	A back-up sump pump is present and the participant reports it is functioning well.
Assessed Maintenance	SB	<p>#53. Sump pump(s) maintenance</p> <p>How often are sump pump(s) and alarms tested, repaired or replaced?</p>	Each season, before vacation, and when an extreme rain or melt event is predicted, the participant tests the sump pump(s). They repair or replace these as required.
Assessed Feature	SB	<p>#54. Back-up power source</p> <p>Is a back-up battery or generator is present and functioning properly? Is the backup power source elevated above anticipated flood levels?</p>	A back-up battery or generator is present, can generate electricity for a minimum of 72 hours and is reported by participant to be functioning properly. A backup battery or generator is elevated above anticipated flood levels. Consider installing an alarm to further reduce risk.
Assessed Maintenance	SB	<p>#55. Back-up power source maintenance</p> <p>How often do you test the backup power sources?</p>	Each season, before vacation, and when an extreme rain or melt event is predicted, the participant tests the backup power sources

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
			and repairs or replaces the units as required. Consider installing and maintaining an alarm to further reduce risk.

F) Exposed Foundation Walls, Floors and Cold Rooms

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#56. Unfinished wall cracks Are your foundation walls free of cracks and stains?	The foundation walls are free of cracks and water stains.
Assessed Maintenance	GS	#57. Unfinished wall crack maintenance How often do you check for cracks, fill cracks and remove sources of water buildup at the foundation?	Once per season the participant checks for cracks, fills cracks and removes the sources of water buildup at the foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, and seals foundation from outside in extreme cases). The participant consults with a professional in case of major problems.
Assessed Feature	GS	#58. Unfinished wall efflorescence Is there evidence of efflorescence on your walls, indicating water movement through the foundation?	The foundation walls are free of efflorescence.
Assessed Maintenance	GS	#59. Unfinished wall efflorescence maintenance How often do you check for evidence of efflorescence, address sources of water buildup at foundation, and clean and repaint with masonry waterproofing paint?	Once per season the participant checks for evidence of efflorescence, addresses the sources of water buildup at the foundation, cleans and repaints the surface with masonry waterproofing paint as required.
Assessed Feature-	GS	#60. Unfinished wall moisture Are there high levels of moisture on the surface of your walls below windows, near cracks and where walls meet floor?	Low moisture levels are present on all tested areas of wall surface. Monitor for signs of dampness during heavy downpours and spring melts.
Assessed Feature	GS	#61. Unfinished floor cracks Are there cracks in your floor that provide potential water entry sites to your basement?	Unfinished floors are free of cracks and water stains.
Assessed Maintenance	GS	#62. Unfinished floor crack maintenance How often do you check for cracks, fill cracks, remove source of water buildup at foundation?	The participant checks for cracks once per season, fills cracks and removes source of water buildup at the foundation as needed (corrects drainage, repairs eaves troughs and/or removes snow in winter, seals foundation from outside in extreme cases). The participant consults with a qualified professional regarding major concerns.
Assessed Feature	GS	#63. Unfinished floor efflorescence Is there evidence of efflorescence on floors, indicating water movement through the foundation?	Floors are free of efflorescence.
Assessed Maintenance	GS	#64. Unfinished floor efflorescence maintenance How often do you check for evidence of efflorescence, address sources of water buildup at foundation, and clean and repaint with masonry waterproofing paint?	Once per season the participant checks for evidence of efflorescence, addresses sources of water buildup at foundation, cleans and repaints with masonry waterproofing paint as required.

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#65. Unfinished floor moisture Are there high levels of moisture, indicating water entry into the basement?	Low moisture levels are present on the floor surface. Monitor for signs of dampness during heavy downpours and spring melts.
Assessed Feature	GS	#66. Earth floors Are earth floors adequately sealed to reduce risk of flood, moisture buildup and mold growth?	Earth floors are covered with an adequate moisture barrier. At minimum a 6 mil poly moisture barrier covers over the earth with all seams sealed and edges sealed to the walls.
Assessed Maintenance	GS	#67. Earth floor maintenance How often do you inspect the 6 mil poly moisture barrier for punctures and seam failures and repair or replace materials as needed?	Each year the participant inspects the 6 mil poly moisture barrier for punctures and seam failures. They repair or replace materials as needed. The participant monitors for signs of dampness during heavy downpours and spring melts.
Assessed Feature	OW	#68. Cold Rooms Are cold rooms properly ventilated, with all surfaces maintaining consistent temperature to reduce mold and mildew risk?	The door, frame and seals are all in good condition and there is no evidence of water entry. Door is adequately insulated. Air circulation level is good with adequate venting and with items off of floor and away from walls by at least 15cm (6"). Space is unheated.

G) Finished Walls and Floors

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	GS	#69. Finished walls Are water stains or high moisture levels indicating sources of water infiltration?	Walls are free of water stains, no evidence of mold (smell or visual evidence), audible moisture meter indicates no concern.
Assessed Maintenance	GS	#70. Finished wall maintenance How often do you check for high levels of moisture and water stains?	Each season the participant checks for high levels of moisture and water stains. If high levels of moisture or water damage and/or mold is evident, they consult a professional for remediation. The participant monitors for signs of dampness during heavy downpours and spring melts.
Assessed Feature	GS	#71. Finished floors Are there high levels of moisture, indicating water entry into the basement?	Low levels of moisture are present on floors, no evidence of mold or mildew are present and no musty smell is present.
Assessed Maintenance	GS	#72. Finished floor maintenance How often do you the check for water damage and signs of mold growth?	Each season the participant checks for water damage and signs of mold growth. If water damage and/or mold is evident, they consult a professional for remediation.

H) Windows

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	OW	#73. Basement windows Are windows in adequate condition to reduce risk of overland flooding?	Glass, frames and seals are all in good condition. There is no evidence of water entry.
Assessed Maintenance	OW	#74. Basement window maintenance How often do you check for cracked glass, broken seals and rotting frames?	The participant checks once per season for cracked glass, broken seals and rotting frames, repairs AND/OR replaces these as required.

I) Plumbing Fixtures

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Maintenance	PF	#75. Indoor plumbing and fixtures maintenance How often do you inspect toilets, taps, pipes and water heaters, and have repaired by a plumber as needed?	Each season toilets, taps, pipes and water heaters are inspected by the participant and are repaired by a plumber as needed. Consider installing and maintaining flood alarms.

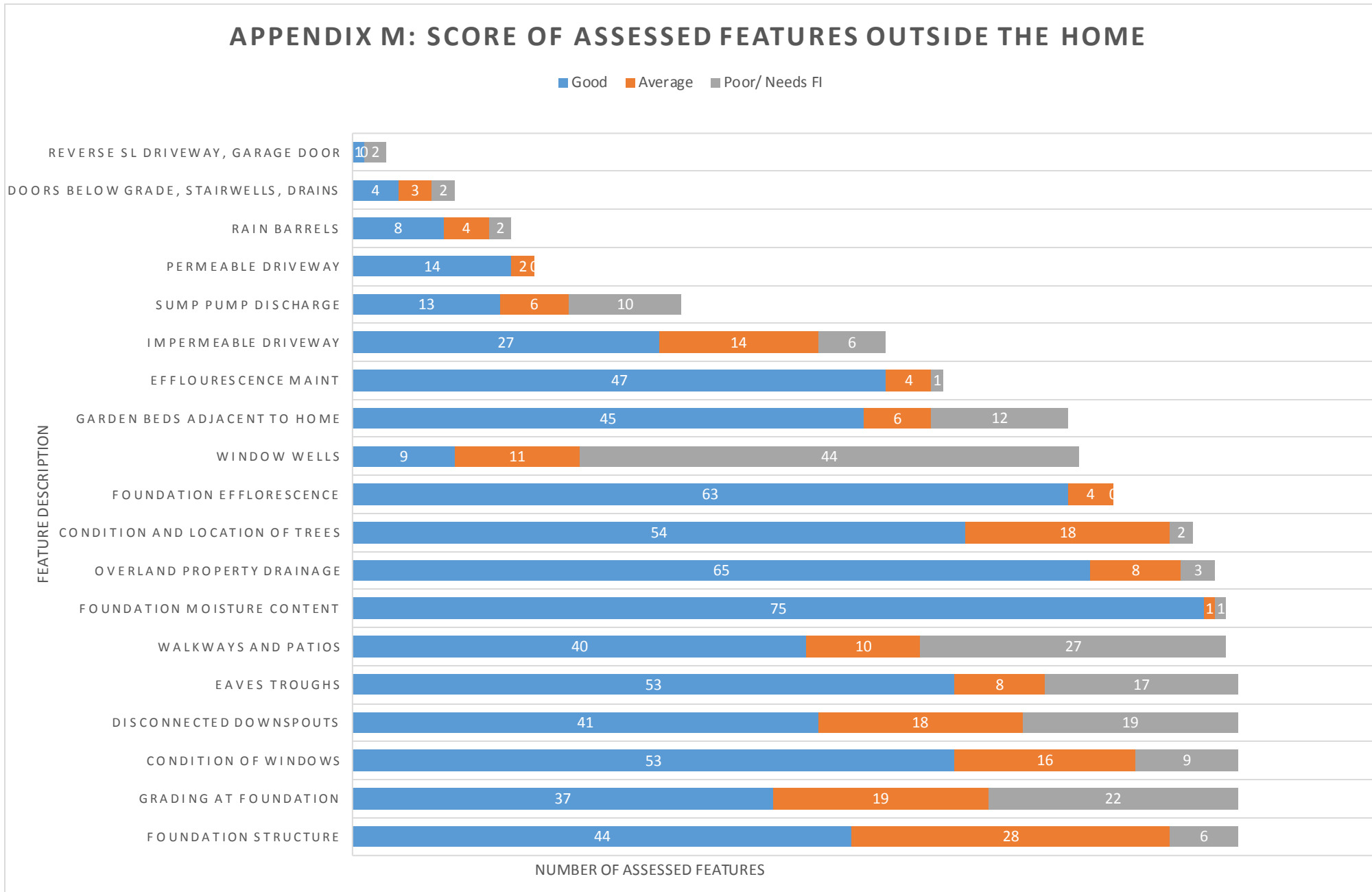
J) Additional Considerations for Limiting Risk of Water Damage, Mold and Mildew Growth

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	N/A	#76. Furniture and electronics Are furniture and electronics at risk of damage in the event of a flood?	Furniture items have non-absorbent surfaces up to 30cm (12") and electronics are stored at least 30cm (12") off the floor (or to exceed anticipated flood levels).
Assessed Feature	N/A	#77. Stored valuables Are your valuables at risk of damage during a flood or at risk of mold and mildew growth?	Valuables are stored in sealed, non-absorbent containers at least 30cm (12") off the floor (or to exceed anticipated flood levels), at least 15cm (6") away from walls that provide good air circulation OR no valuables are stored in the basement.
Assessed Feature	N/A	#78. Relative humidity, air movement and temperature Are the moisture, humidity and temperature levels in your basement optimum to reduce mold and mildew risk?	A 30-50% relative humidity reading is taken in the basement. Air circulation is good. Minimum regular temperature above 15C (60F) is maintained.
Assessed Feature	N/A	#79. Indoor Sources of Moisture Are indoor sources of moisture limited to reduce mold and mildew risk?	If a bathroom with a shower is present, a fan is present and when running it is strong enough to hold a piece of tissue. The fan is run for 30-60 minutes after bath or shower use. Furnace humidifiers do not operate in the summer. Wood is not stored, laundry is not hung, and boots are not dried etc. in the basement.

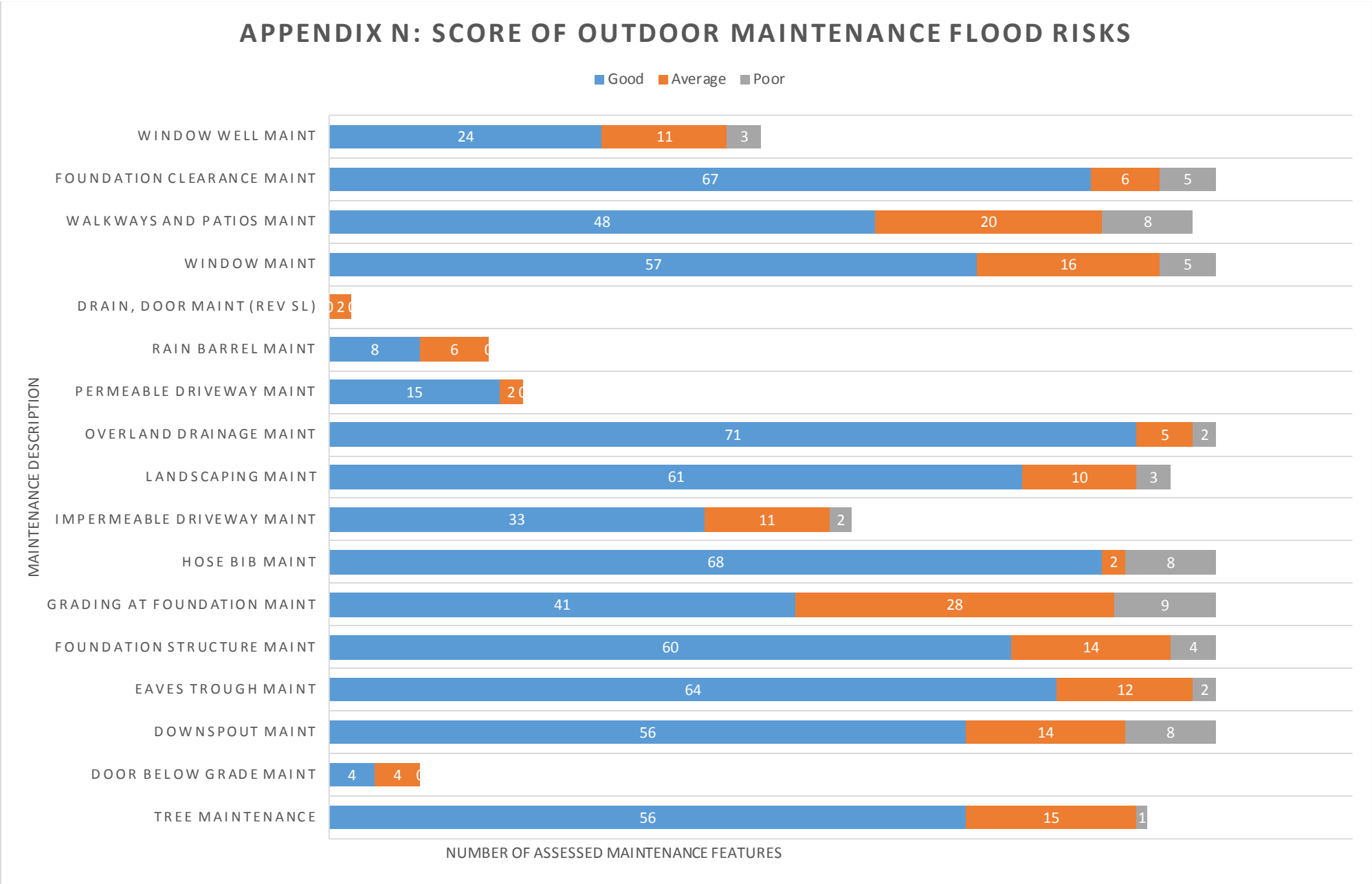
K) Hazardous Materials

Category	Water Damage Risk Type	Assessed Feature Name and Key Questions to Ask	Best Practice
Assessed Feature	N/A	#80. Hazardous materials Are hazardous materials stored in a way that represents a contamination risk during a flood?	No hazardous materials are stored in the basement OR materials are stored in waterproof containers at least 30cm (12") off the floor (or to exceed anticipated flood levels) and/or heating fuel tanks are secured to the floor.

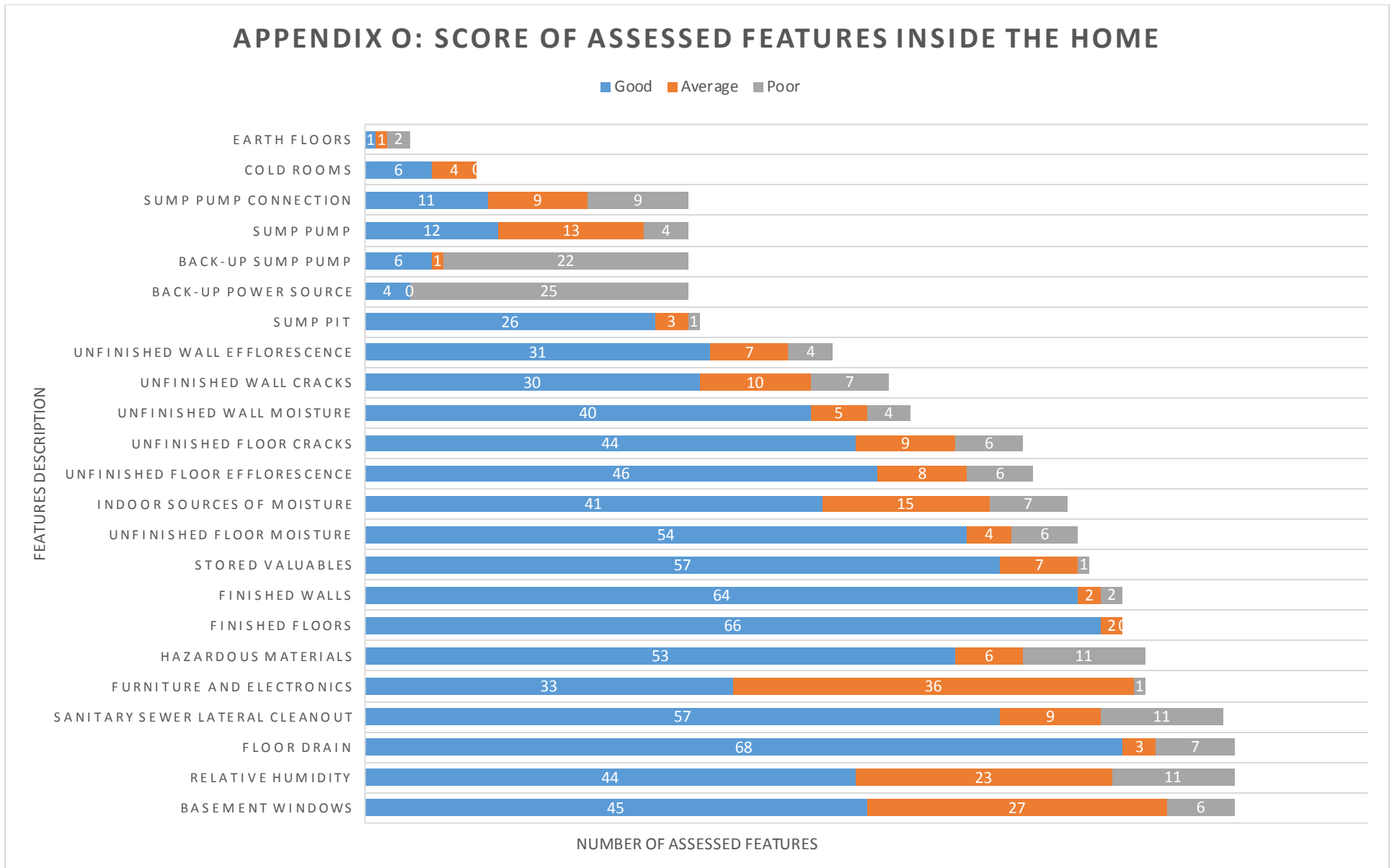
Appendix M: Score of All Assessed Features Outside the Home



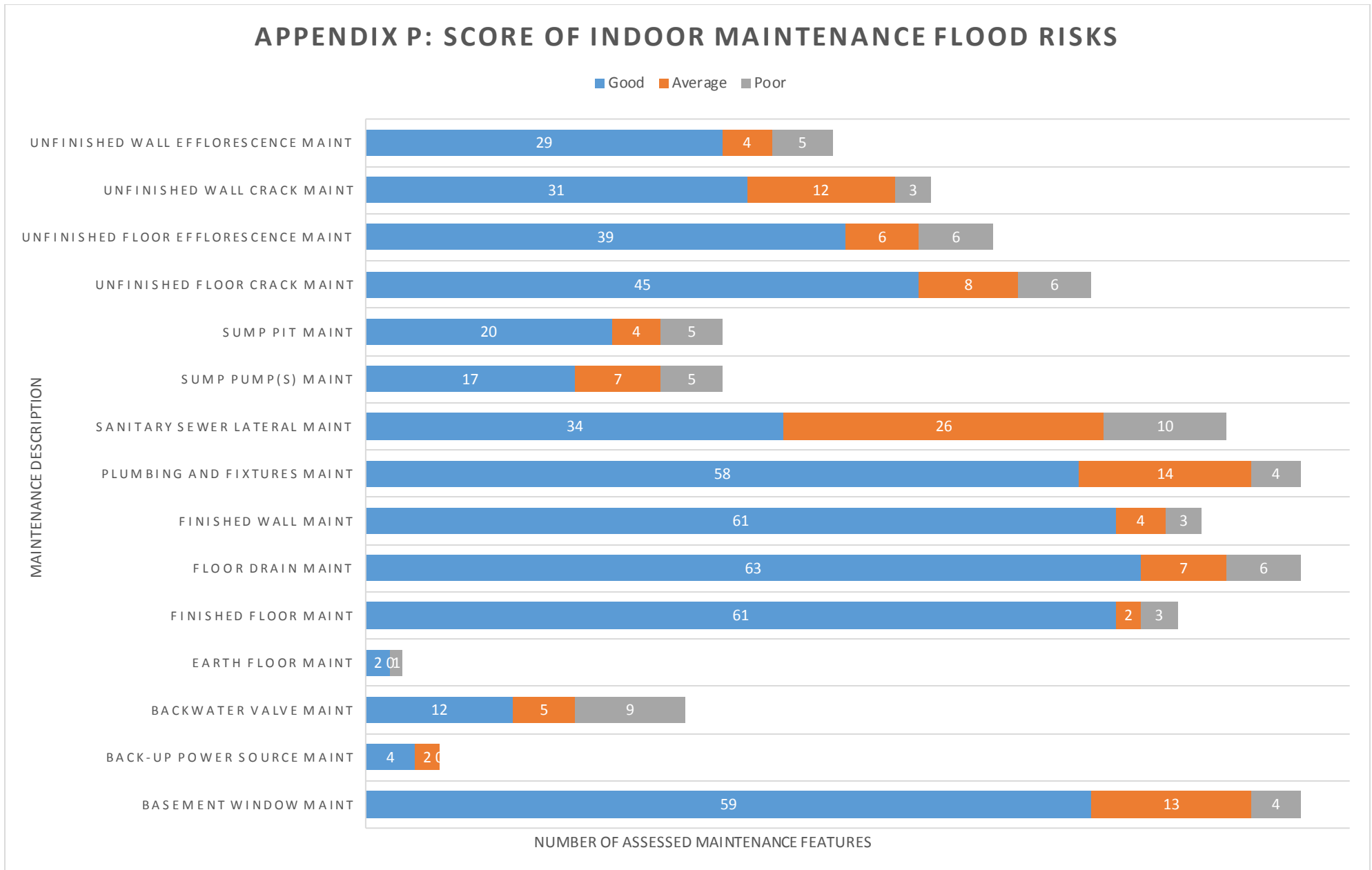
Appendix N: Score of All Outside Maintenance Flood Risks



Appendix O: Score of All Assessed Features Inside the Home



Appendix P: Score of All Indoor Maintenance Flood Risks



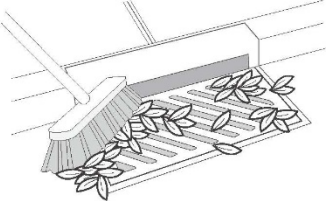
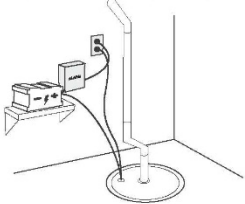
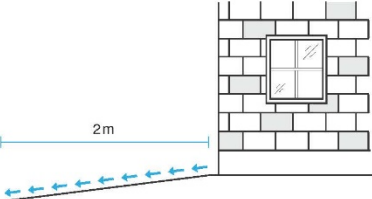
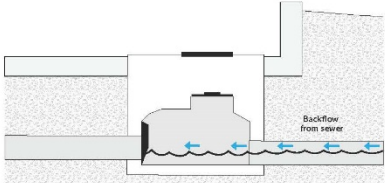
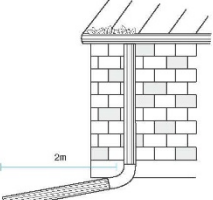
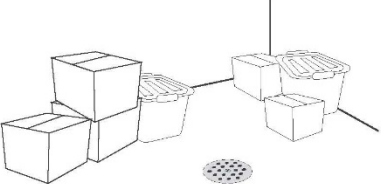
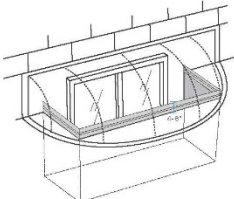

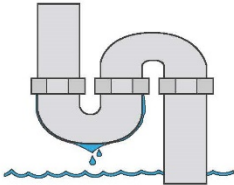
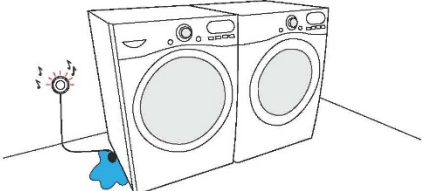
Appendix Q: Top Ten Actions to Reduce Basement Flood Risk



Top Ten Actions to Reduce Basement Flood Risk

Reduce your risk of basement flooding by completing these important home upgrades and simple seasonal maintenance activities.

Note: Each home is unique and not all actions will be applicable at each home. Consult with your municipality about available subsidies. Work with a qualified professional to determine which actions are right for your home and to complete work where necessary.

<p>Remove Debris From Nearest Storm Drain</p> 	<p>Test Sump Pump, Install Backup Pump & Power Supply</p> 
<p>Correct Grading Around Foundation</p> 	<p>Install & Maintain a Backwater Valve</p> 
<p>Clean Eaves Troughs & Extend Downspouts</p> 	<p>Keep Floor Drains Clear</p> 
<p>Install Window Wells & Covers</p> 	<p>Store Valuables in Watertight Containers</p> 
<p>Maintain Plumbing, Fixtures and Appliances</p> 	<p>Install and Maintain Flood Alarms</p> 

Appendix R: Understanding Water Damage Insurance Coverages

