



Meadowbrook Pond:

A Stormwater Detention
and Flood-Control Facility

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INTRODUCTION

This brochure is designed to provide the Meadowbrook community and others with a basic understanding of:

1. How Meadowbrook Pond operates,
2. Its function as a stormwater detention and flood-control facility and,
3. Seattle Public Utilities' (SPU's) role in safely securing and maintaining this critical drainage infrastructure and system.

This information piece also addresses questions that residents may have about what they can do to help mitigate and manage property damage due to flooding.

ABOUT MEADOWBROOK POND

Meadowbrook Pond, a Seattle Public Utilities (SPU) site, is located at 35th Avenue NE, between NE 105th and 110th streets, in the heart of northeast Seattle. Completed in 1998, Meadowbrook Pond was constructed as one element in a comprehensive program to reduce flooding in Thornton Creek. Adjacent to the main stem and approximately one mile upstream of the mouth of Thornton Creek, the pond serves as a stormwater detention and flood-control facility.

Meadowbrook Pond, as designed, also reduces pollutants and enhances water quality by allowing sediments and debris to drop out of the water before entering Lake Washington at Matthew's Beach. The facility provides additional benefits, as well, such as wildlife habitat, refuge and viewing.

The public can cross Meadowbrook Pond via a footbridge and several paths. The footbridge serves two other functions: It holds a 42-inch sewer pipe and divides the pond into three smaller ponds.

Meadowbrook Pond has a surface area of about two acres. The volume of water in the pond ranges from about 350,000 cubic feet during dry summer months to about 650,000 cubic feet during the most extreme storm events. The pond has a permanent pool of water generally three to five feet deep.

HOW THE POND OPERATES

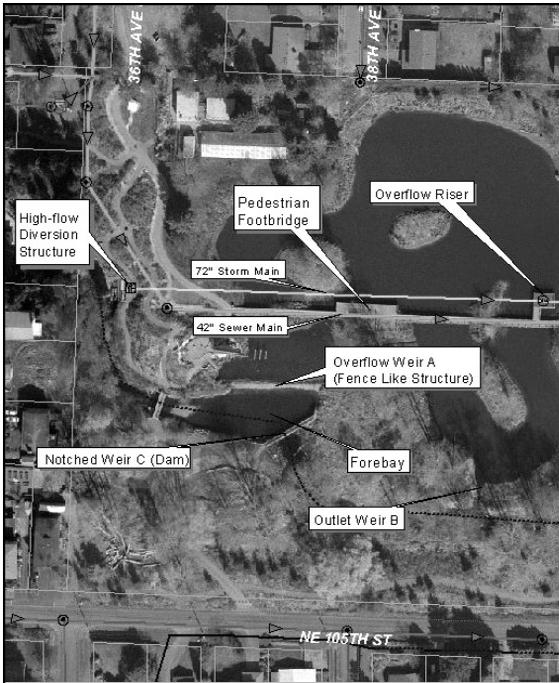
When the water level in Thornton Creek exceeds the normal flow at the dam, the water backs up in the pond's forebay (a holding area for water). This causes the water to flow over the weir (a fence-like structure – see Overflow Weir A in graphic on page 6) and into the treatment pond. A notch in the dam allows a normal flow of water to remain in the channel and facilitates fish migration. The weir is about 100 feet in length and up to 6 feet wide. The original dam (built in the late 1940s) was reconstructed in 1998.

The forebay acts as a holding area where coarse sediments are deposited and much of the litter and wood debris is captured. Large woody material is retained on a bar screen that crosses the stream about 150 feet upstream of the dam. Resident beavers periodically alter the conditions of the pond by constructing a series of dams in the stream below the forebay.



*Dam on forebay
– Notched Weir
C in graphic on
page 6.*

POND'S FUNCTION DURING STORMS



Overlooking Meadowbrook Pond. Key structures are identified.

Stormwater flow from Meadowbrook Pond enters a 72-inch bypass pipeline from two locations at the pond: 1) the Overflow Riser and 2) High-Flow Diversion Structure. (Seen in photos.)

The 72-inch pipe transitions to a 90-inch bypass pipeline just east of the pond. The 90-inch trunk from Meadowbrook enters a concrete outlet control structure near 105th Street and Rivera Place NE. At this location, the pipe splits into two parallel outfall pipes (42 and 48 inches in diameter) that discharge into Lake Washington.



Overflow riser – close-up of drop intake with pond overflow into bypass.

Overflow Riser: The overflow riser, connected to the bypass, is located on the east side of Meadowbrook Pond near 39th Ave. NE This structure is ten feet in diameter with a debris rack attached to the walkway around and over the structure. The overflow riser, in conjunction with the high-flow diversion structure, controls peak stages during high flows.

High-Flow Diversion Structure: The high-flow diversion structure is located on the west side of Meadowbrook Pond on Thornton Creek. It consists of a 24-foot-wide concrete weir with heavy-duty debris racks and slide gates. The high-flow diversion structure, along with the overflow riser, serves to relieve high flows by providing the primary inlet to the bypass pipeline which discharges into Lake Washington.

The Meadowbrook facility is designed to maintain a stable flow of water to Thornton Creek. During higher flows, the notched weir (Notched Weir C in graphic on page 6) in the dam across Thornton Creek serves to control flow and divert water into the pond. A second notched weir is located in the southeast corner of the pond and connects the pond back to Thornton Creek. This outlet weir (Outlet Weir B in graphic on the right) is designed to maintain the pond depth at approximately 3 1/2 feet.



Meadowbrook Pond outlet and flow control weir (Outlet Weir B), with the main stem of Thornton creek in the background.

During low-intensity storms, creek flows are diverted to the pond, detained and eventually returned to Thornton Creek. For medium-intensity storms, high flows are diverted from the creek into the pond. The pond detains a portion of the flows allowing for some sediment to settle out. Another portion of storm flow enters the bypass riser leading to the 72-inch bypass pipeline and to the Lake Washington outfall. For high-intensity storms, high-creek flows are diverted to the pond. The pond detains a portion of the flow, while excess flow enters the overflow riser with additional flow capacity supplemented by the high-flow diversion structure.



High-flow diversion structure.

ONSITE ALARMS AND MONITORING



Monitoring devices installed at the overflow riser provide staff with the pond depth and the depth of water in the pipe.

Alarms and monitoring devices staged at Meadowbrook Pond help provide SPU staff with important information on activity occurring at the site and how the pond is operating.

In the summer of 2009, a new depth-monitoring device was installed at the overflow riser. Information from this equipment provides SPU staff with the depth of the pond at the overflow riser and the depth of flow entering the bypass line at the overflow riser. As the

elevation of the pond increases, an alarm is sent to staff that the pond level has reached a level that requires response.

Along with the depth monitoring equipment, a new staff gage was installed on the walkway near the overflow riser. This staff gage will provide a visual aide to citizens and SPU for verification of pond depth at this location.

OPERATIONS AND RESPONSE DURING STORMS



About 90 SPU field workers and more than 60 vehicles are dedicated to drainage and wastewater maintenance and storm response. Crews relieve sewer back-ups, clear inlets, jet drainage lines, pump catch basins and investigates lines using closed-circuit TV.

SPU is committed to providing the appropriate level of service and emergency response during adverse weather conditions. This includes safely and securely maintaining the city's critical drainage systems. It also means helping to mitigate and manage property damage that may occur in flood-prone communities during an extreme rain event.

When a storm is forecasted, SPU monitors reports from the National Weather Service and other sources,

and prepares for flood watches, warnings, and advisories. Before a storm hits, SPU field crews begin storm maintenance by inspecting and clearing debris as needed at critical structures in the Meadowbrook facility and culverts along Thornton Creek. Storm Observers (staff with expertise in assessing onsite conditions) report to trouble sites to visually inspect affected areas and drainage infrastructure. Standby field crews are assigned to serve as first responders, and are deployed to sites that are reportedly experiencing problems.

During a storm, crews are dispatched by SPU's Operations Response Center. The Center responds to customers that call in to report water ponding on streets, clogged drains, flooding of properties and drainage or sewer-backups. In large storms, the numbers of crews are increased and more operators are available to answer calls. They work around the clock in difficult conditions to protect your safety and property. Life-threatening situations are their first priority.

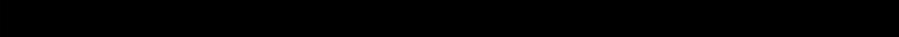
REPORTING PROBLEMS



SPU's Operations Response Center is open around-the-clock to take customer calls and dispatch field crews.

If you experience flooding, drainage or sewer-backups, or witness significant ponding on the street, call **SPU's Operations Response Center (ORC) at 206-386-1800**, 24-hours a day, seven days a week. For emergencies, call 911.

When contacting SPU's ORC, the operator will ask for your address or the intersection, your name and contact number. The operator will also ask you a series of questions to help discern the likely source of the problem and determine the appropriate priority code to assign to the work order. Life-threatening, public health and



safety, property damage and critical equipment failure incidents receive the highest priority and are responded to immediately.

During heavy storms, please be aware that you may not be contacted directly by or see the SPU field crews who are working on the problem. Crews move quickly through the drainage system clearing inlets of debris and going to the next problem location.

POND INSPECTIONS AND MAINTENANCE

Scheduled inspections and maintenance are conducted year-round at Meadowbrook Pond. Seattle Public Utilities (SPU) maintenance crews visit the site weekly to check for and remove debris at trash racks and diversions structures. SPU ground crews monitor the site every other week to maintain vegetation along walking paths, prune trees and shrubs, check for invasive and noxious weeds and remove garbage.

During the wet season (October through April), crews visit the site more frequently to perform necessary maintenance, including the removal of dams that have been built up by the resident beavers. Beaver dams are left in place in the dry season to allow a continuous inflow of fresh stream water into the pond.

Inspections are also performed during and after moderate to large storms to ensure the facility receives the appropriate level of maintenance and remains operational. Storm inspections include observations of flow levels, sediment deposition and debris accumulation.

Dredging (the removal of silt) of the forebay at Meadowbrook Pond occurs every three to five years. Full-pond dredging of the facility is on a ten-year cycle. Annual sediment measurements track accumulation rates and determine maintenance frequency. Monthly sediment measurements are taken at key locations where flow is key for flood control and water treatment.

EXERCISING CAUTION WHEN YOU LIVE CREEKSIDE

Be prepared! Storms can happen all year long, and flooding can affect you no matter where you live, but especially if your home is in a low-lying area, below street level or near a river or creek.

During storms, urban creeks can be unpredictable. Detention ponds, designed to fill with floodwaters, often very quickly, can be dangerous. To protect your safety, stay out of creeks and ponds until the storm passes through, even if you see debris building up. Instead of trying to remove or dislodge debris yourself, report concerns to the ORC: (206) 386-1800. It is also important that you do not operate any valves or open any chambers or boxes. Stay out of traffic, as well, and please don't try to lift heavy metal grates or maintenance (man) hole lids. Remember, not all blockages can be cleared during the storm – often crews need to wait until the floodwaters recede.



Thornton Creek main stem at high-flow diversion structure. Residents should take extra precautions to guard against flooding, if their home is near a creek.

SAFETY AND POND SECURITY

Meadowbrook Pond is a part of the City of Seattle's vital infrastructure for stormwater detention and flood control. Due to its critical nature and function, it is essential that SPU incorporate security controls during storms to ensure that only SPU employees interact with pond operations.

Unauthorized alterations to the pond and its infrastructure could negatively impact the safety and security of residents and result in property damage in the surrounding neighborhoods.

Community members should report any tampering of infrastructure or suspicious activity they witness at Meadowbrook Pond to SPU's Operations Response Center at 206-386-1800 immediately. These matters will be taken seriously and followed up with the appropriate authorities.

During storms, when it is deemed unsafe, Meadowbrook Pond will be closed to the public. Please adhere to the closure until you receive further notification from SPU that it is safe to return to the pond.

Thank you for doing your part to help SPU maintain a safe, secure and properly performing facility at Meadowbrook Pond.

TIPS TO REDUCE FLOODING



Keep leaves and other items out of drains, culverts and creeks.

- Anything that enters the creek can result in blocking downstream culverts and causing local flooding. Do not store furniture or other items like firewood, fuel tanks, containers and loose items in flood-prone areas or near stream channels, as high flows can wash these items into the creek.

SPU's Adopt-A-Drain program supports a dedicated group of volunteers to clear out the most flood-prone of the city's street drains. Talk to your neighbors and homeowners association about adopting storm drains in your neighborhood.

- Even leaves and branches washed into creeks, culverts and street drains increase the risk of flooding. Don't put grass clippings, leaves or other debris into any of the drains, ditches, creeks, culverts, gutters or ravines in the city. Avoid piling yard waste in your yard, where it could wash away. Instead, store your yard waste and debris in secure bins or bags for curbside pickup.
- Use a rake or a broom to remove leaves and debris from the tops of neighborhood storm drains, and then place the material in your yard waste cart to be turned into compost. If the drain is still clogged after you've removed the debris, call our drainage problem hotline at (206) 386-1800 to report it. SPU's Adopt-A-Drain program supports a dedicated group of volunteers to clear out the most flood-prone of the city's street drains. Talk to your neighbors and homeowners' association about adopting storm drains in your neighborhood. Find out more: Call (206) 233-7187 or visit www.seattle.gov/util/adoptadrain.



Maintain your gutters and downspouts

- Clean the gutters and drainage downspouts attached to your roof twice a year. Just one wind or rainstorm can clog a well-flowing drainage system.
- Inspect rain gutters for leaks or damage that could cause a flat roof to flood.
- Direct flows from downspouts away from your foundation, without discharging flows to adjacent properties.
- Never discharge water over the edge of a steep hill.
- Maintain the drainage system on your property. This is especially important on commercial properties that have catch basins or other drainage systems.
- The best way to find out what's in your pipes is to ask a professional to "video inspect" your underground drainage system.
- If you have a driveway that leads down from the street, be sure to clear the drain at the bottom of the slope.
- If you live at the base of a hill or on a cliff, ensure that drainage and retaining walls are properly functioning.

Assess your yard

- Water is the most common cause of unstable slopes, mud slides and erosion. Check your property for signs of earth movement, such as leaning trees, or cracks in the soil or sidewalks. If you have a problem, contact a soils engineer (see the Yellow Pages, under "Engineers-Geotechnical-Soils") to evaluate the situation.
- Preventative planting can also help reduce the chance of a mud slide or flooding. However, avoid planting over side sewers that could create problems from plant roots in the future.

Reduce runoff from your property that causes flooding

- Collect water in rain barrels and cisterns. Learn more about rain water harvesting.

- Create rain gardens. A rain garden acts like a native forest by collecting, absorbing, and filtering stormwater runoff from rooftops, driveways, patios, and other areas that don't allow water to soak in.
- Use permeable pavement in place of concrete or asphalt.
- Grow a green roof. Green roofs extend the life of roofing materials by blocking ultraviolet radiation and moderating temperature extremes. They can also slow stormwater runoff, reduce building heating and cooling costs, cool and clean the air, and provide habitat and attractive greenery in urban environments.

WAYS TO MANAGE FLOODING

If possible, use your yard as a temporary floodplain

In areas where urban streams flow through private property, it may be possible to utilize your yard as a temporary floodplain. For this to be effective, there must be sufficient space between structures (house, garage, etc.). The structures you are trying to protect must be at a higher elevation than the stream channel. It is critical that you design your projects so that floodwaters are not sent to your neighbors' homes.

Create a temporary flood barrier using sandbags

Sandbags are a temporary and shallow-flow barrier - they do not seal out water, but can help redirect the flow of water and protect your property from debris. They should be used with caution because placing sandbags could create problems for your neighbors. Work together with your neighbors whenever possible.

Elevate items that shouldn't get wet

Move your valuables and/or anything irreplaceable out of your basements to the upper areas of your home.

For more information about ways to reduce and manage flooding, please contact Seattle Public Utilities at SPUfloodquestions@seattle.gov or call (206) 386-4195. You may also visit www.seattle.gov/util or www.takewinterbystorm.org.

Seattle
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Utilities

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