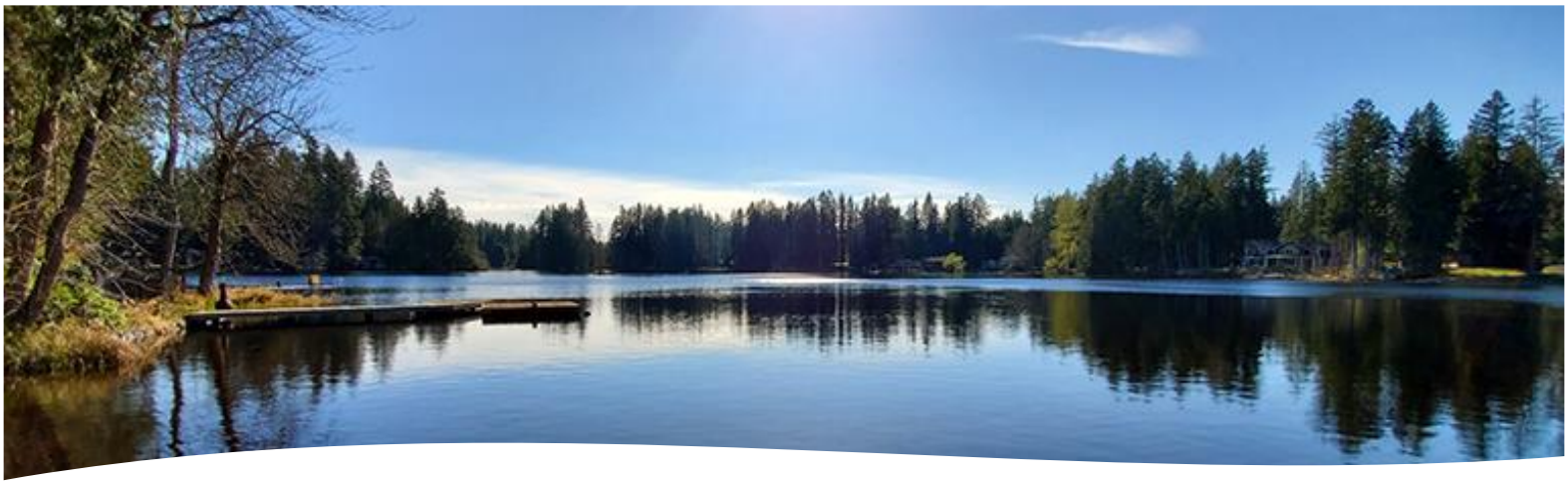
Stormwater Regulations in Sammamish

By: Danika Globokar, Senior Stormwater Program Manager

November 2020



Key Points to Understand:

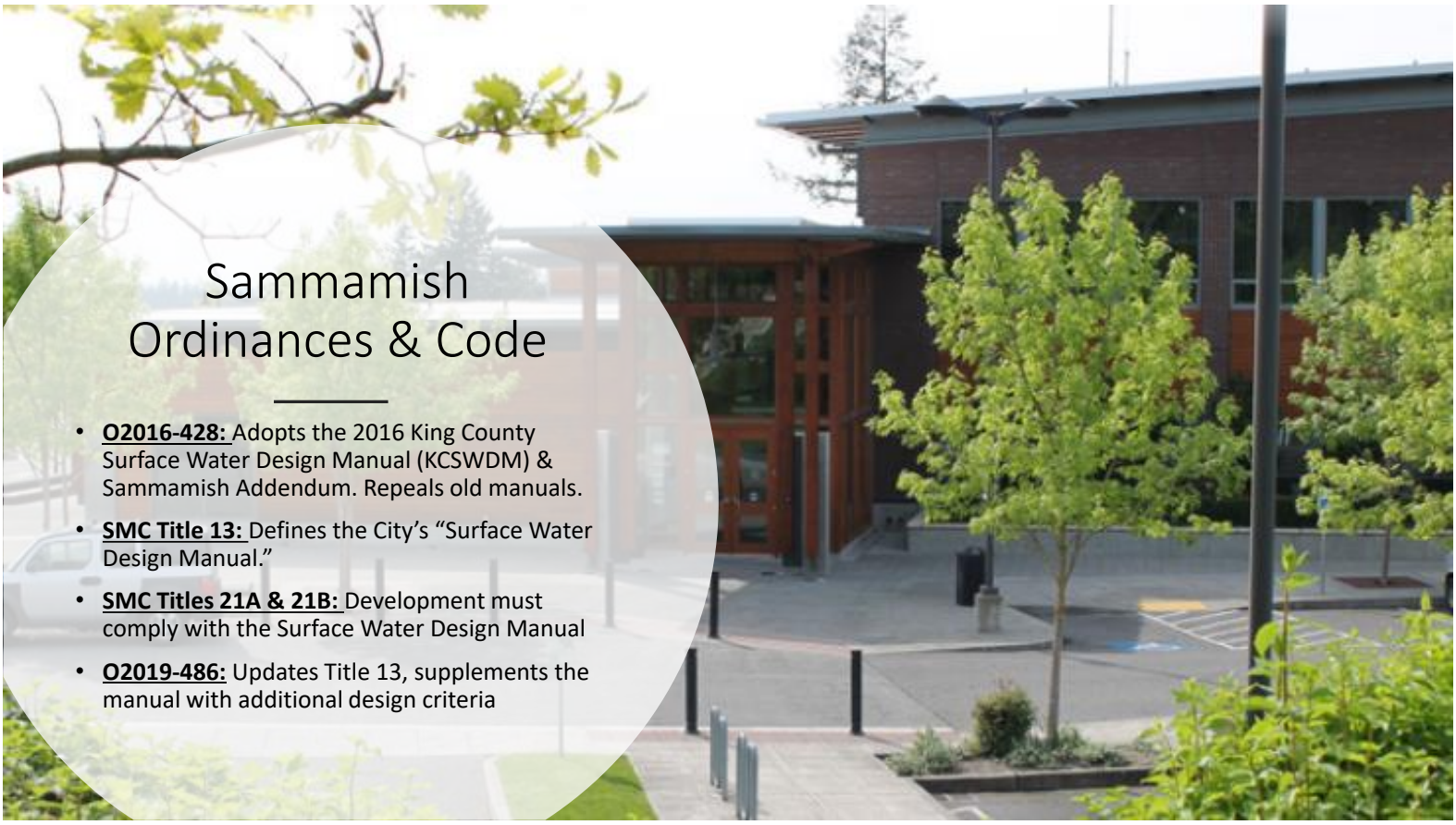
- Stormwater rules originate at the top
- How Sammamish adopted the rules
- What the rules are
  - Drainage Review
  - Core Requirements
  - Adjustments/Exemptions

Regulatory Context

Environmental Protection Agency (EPA) gives States authority to manage NPDES Permit program

NPDES Municipal Permit Program

- Manage and control stormwater runoff so that it does not pollute surface water
- Program Components (i.e., stormwater utility mapping, Operations and maintenance, Controlling runoff from development)
- Adopt stormwater manual

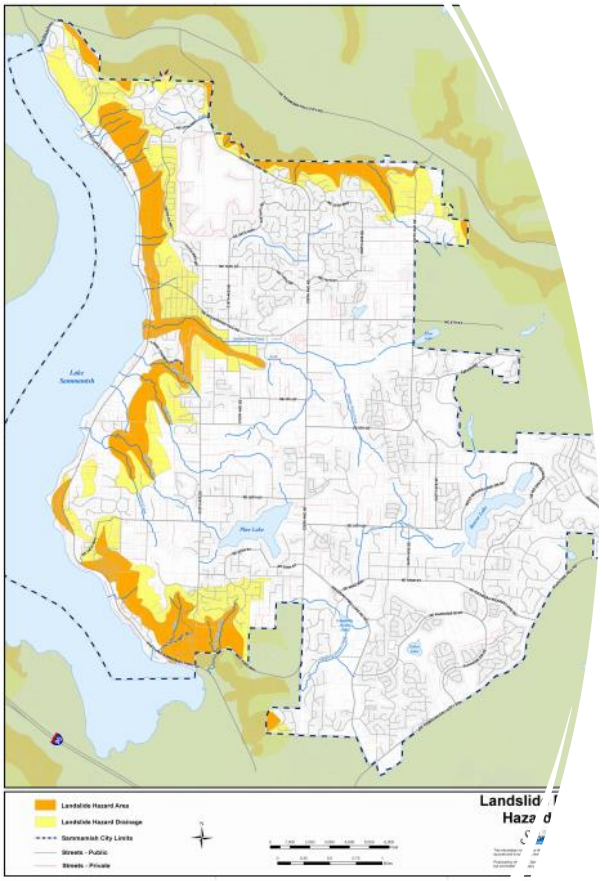


Sammamish Ordinances & Code

- **O2016-428:** Adopts the 2016 King County Surface Water Design Manual (KCSWDM) & Sammamish Addendum. Repeals old manuals.
- **SMC Title 13:** Defines the City's "Surface Water Design Manual."
- **SMC Titles 21A & 21B:** Development must comply with the Surface Water Design Manual
- **O2019-486:** Updates Title 13, supplements the manual with additional design criteria

Surface Water Design Manual

- AKA
  - “Stormwater Manual,”
  - “Drainage Manual,”
  - “2016 Manual”
- 1,000+ pages
- Technical guide for engineers to manage development’s stormwater



Sammamish Addendum

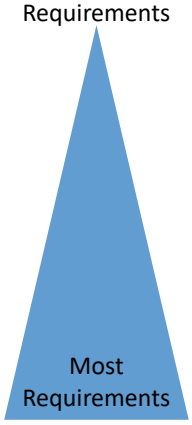
- Slightly modifies the 2016 Surface Water Design Manual
  - Sammamish-specific forms
  - Reducing retaining walls in ponds
- Adopts area-specific maps
- No substantive changes from the 2016 Manual

Applying the Surface Water Design Manual to Development

Drainage Review

- Staff evaluates proposed project's compliance with drainage (stormwater) requirements.
- Project's size and location determine:
  - Drainage review type
  - Core requirements
- If developer meets stormwater requirements, staff issue permit.

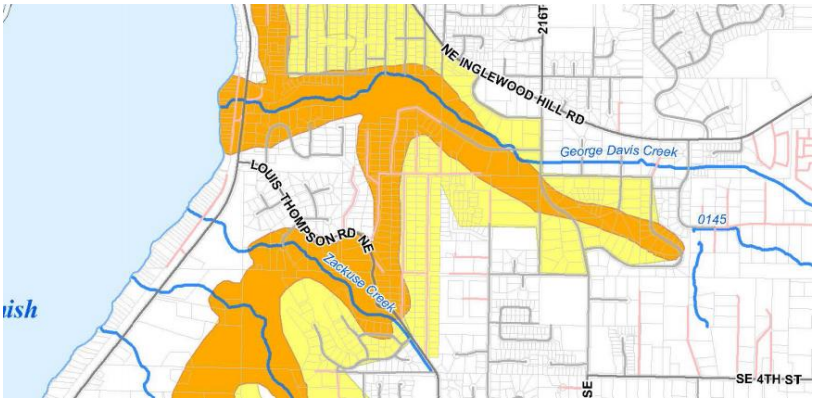
Common Drainage Review Types



Drainage Review Type	Example Project(s)
No drainage review	Small addition, new deck
Simplified Drainage Review	A new single family home
Targeted Drainage Review, Category 1	Most projects in Critical Drainage Areas
Full Drainage Review	Short plat adding 2+ houses
Large Project Drainage Review	Large, master-planned community

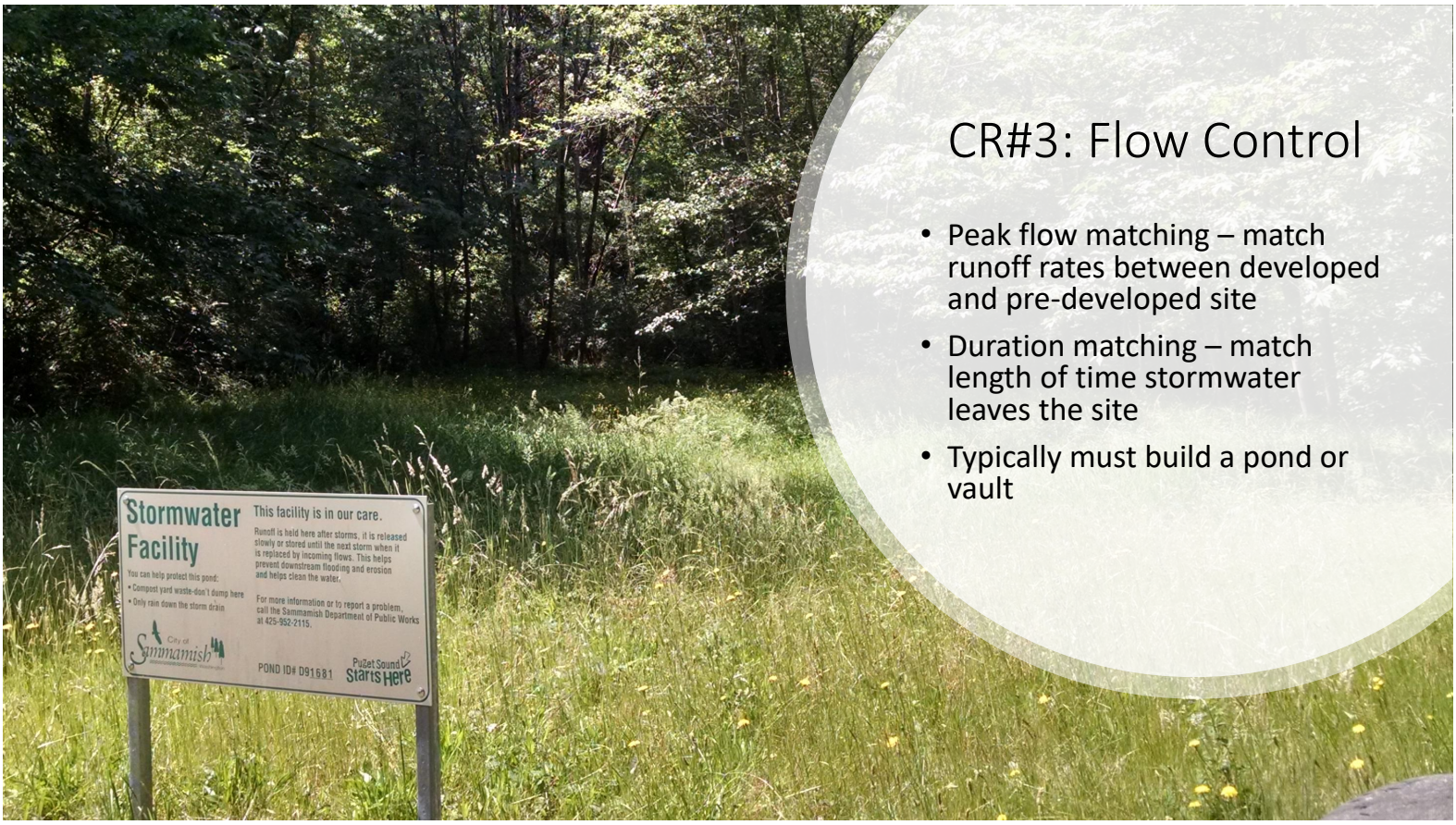
Core Requirements

1. Discharge at the Natural Location
2. Offsite Analysis
3. Flow Control
4. Conveyance System
5. Erosion and Sediment Control
6. Maintenance and Operations
7. Financial Guarantee and Liability
8. Water Quality
9. Flow Control BMPs (Best Management Practices)



CR#1: Discharge at the Natural Location

- Water must leave the site at the same location, pre- and post-development
- Tightline past Landslide Hazard Areas



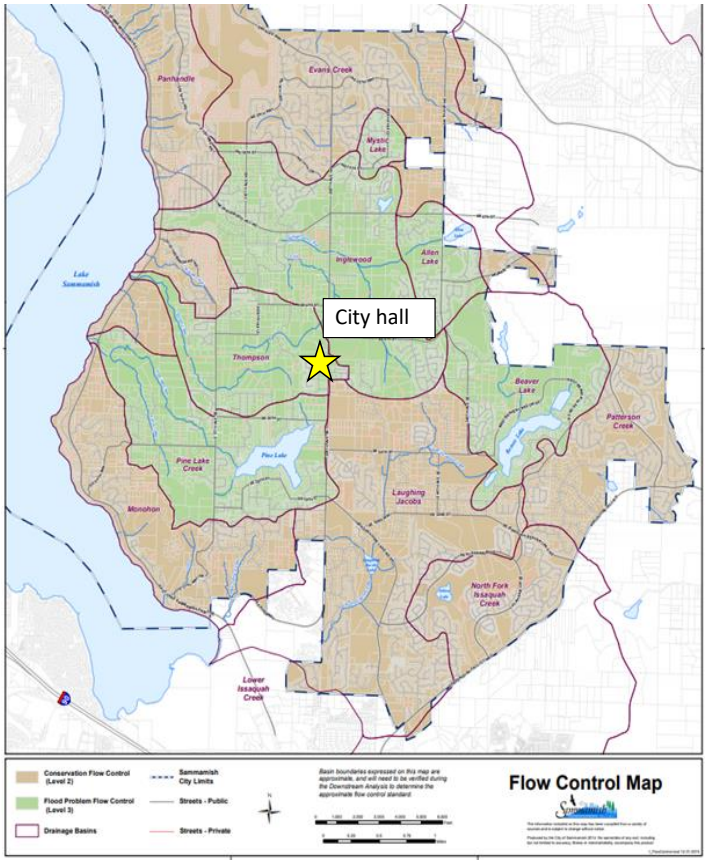
CR#3: Flow Control

- Peak flow matching – match runoff rates between developed and pre-developed site
- Duration matching – match length of time stormwater leaves the site
- Typically must build a pond or vault

CR#3: Flow Control (continued)

- Existing site – what existed on the site prior to 1979 (when King County first required flow control)
- Historic site (aka, Forested) – what existed in Puget Sound prior to any regional development

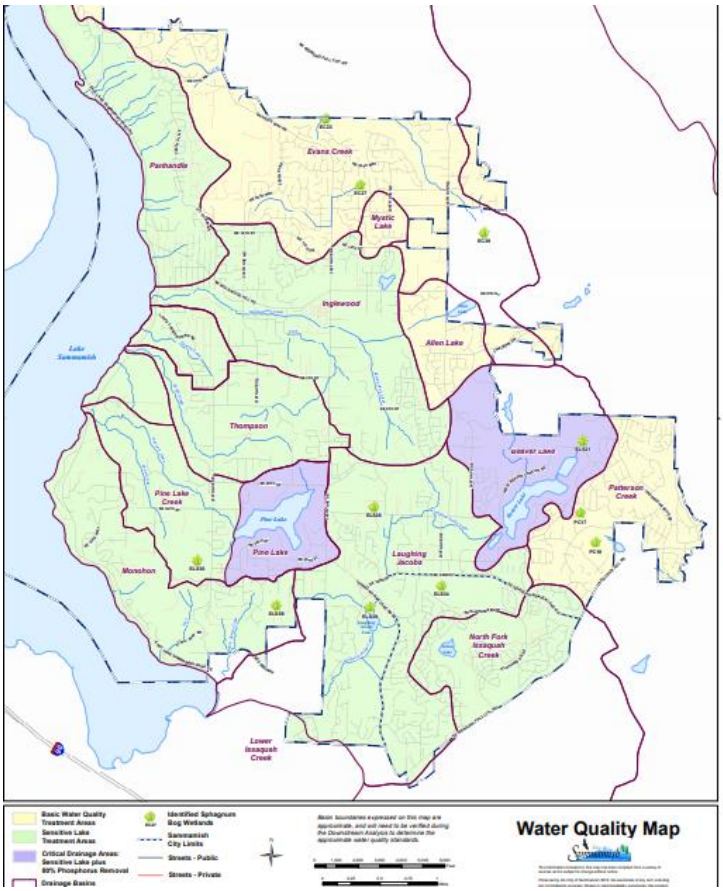
Flow control Level	Peak Flow (Rate) Matching	Duration Matching
Level 1 (Basic)	Existing site's 2- and 10-year peaks	None
Level 2 (Conservation)	Historic site's 2- and 10-year peaks	Match historic durations for 50% of the 2-year through 50-year
Level 3 (Flood Problem)	Historic site's 2- and 10-year peaks, and existing site's 100-year peaks	Match historic durations for 50% of the 2-year through 50-year



CR#8: Water Quality Treatment

- Treat stormwater that runs off pollution-generating surfaces
- Goal is to remove pollutants before they enter surface water

Water Quality Treatment Type	Removal of Soil (TSS)*	Removal of Total Phosphorous (TP)
Basic	80%	n/a
Sensitive Lake	80%	50%
*Pine and Beaver Lakes	80%	80%
Sphagnum Bog – also restricts nitrates, pH, and alkalinity		50%



CR#9: Flow Control BMPs

- Stormwater infrastructure that mimics natural hydrologic processes to reduce the amount of stormwater leaving a site.
  - Dispersion
  - Infiltration
  - Rain gardens
  - Permeable Pavement

Adjustments & Exemptions

Exemptions

- Conditions that exempt projects from having to meet certain Core Requirements
- Example: CR#3, Flow Control, exempts projects that create less than 5,000 square feet of new plus replaced impervious surface

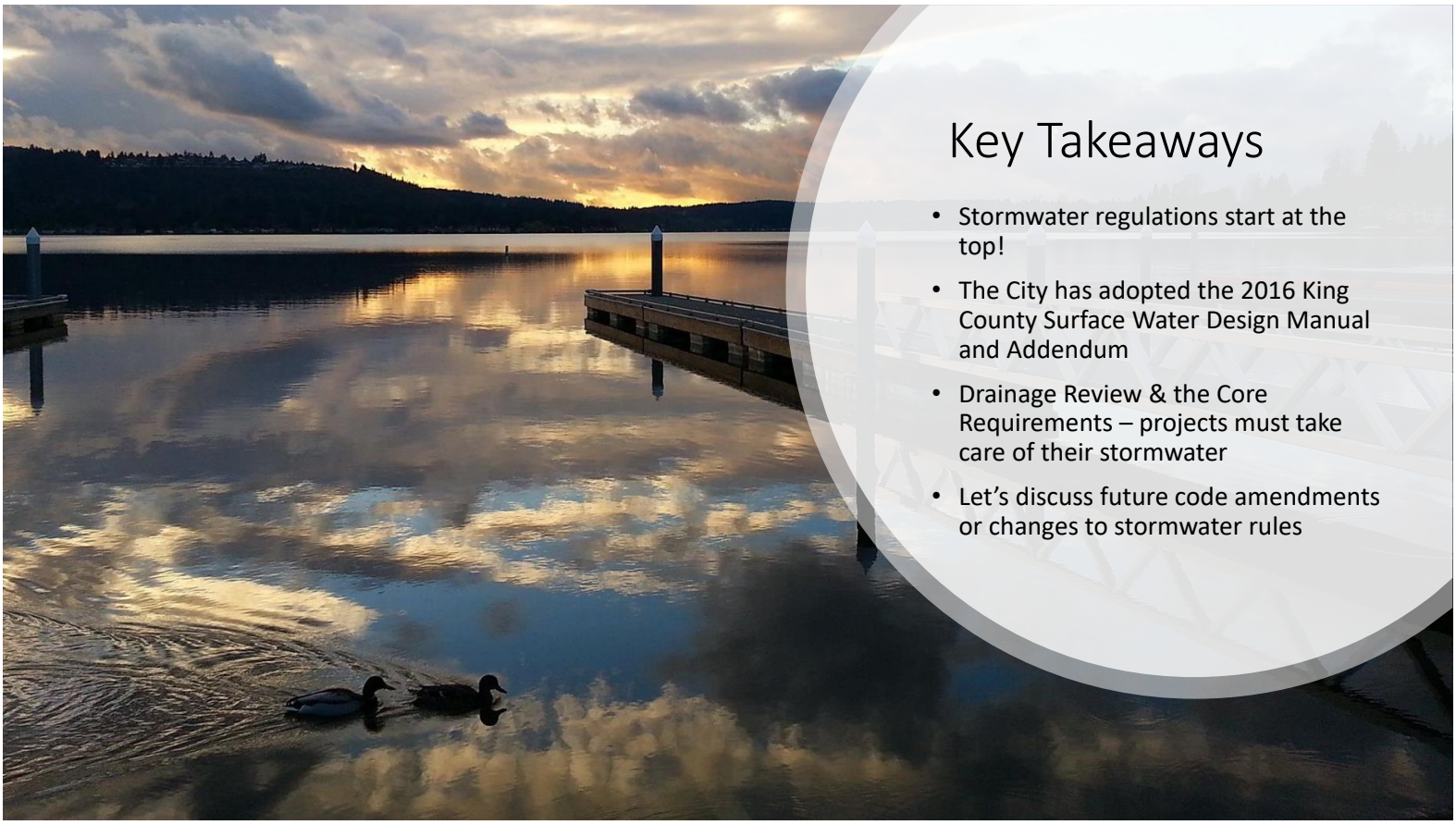
- **2019 Code Amendments (O2019-486)**
  - Prohibits exemptions in Critical Drainage Areas
  - Can be authorized by director for CR# 1, 3, 8
  - Criteria for granting exemptions are in SMC 13.20.040

Drainage Adjustments

- Request by the applicant to vary from a core requirement and propose an alternate system.
  - “Must produce a compensating and comparable result”
  - Consider safety, function, appearance, environmental protection, and maintainability
- Approval lies at Director level
- Example: Adjustment from CR#8, Water Quality. Applicant proposing different method to treat water quality that isn’t in the manual.

Council Can Amend Stormwater Rules

- O2019-486: City Council has already adopted different rules in critical drainage areas. Also set guidance for staff to grant exemptions to core requirements.
- Volume-matching requirement for Town Center: adopted in 2010, relaxed in 2013, eliminated in 2016 with the adoption of the 2016 Manual.
- Staff will work with Council to discuss possible future directions for code amendments



Key Takeaways

- Stormwater regulations start at the top!
- The City has adopted the 2016 King County Surface Water Design Manual and Addendum
- Drainage Review & the Core Requirements – projects must take care of their stormwater
- Let's discuss future code amendments or changes to stormwater rules

Changes Council May Consider

Change design requirements

Possible Change	Feedback
a) Require volume matching	Staff do not recommend. 100% volume matching is infeasible in clay-rich soil
b) Change CR#3, Flow Control: Change 100-yr matching requirement from existing to historic site conditions	Staff could do. Requires more analysis. May not have a big impact on facility sizes.
c) Prohibit all adjustments to CR#3 for projects subject to full drainage review	Staff could do, easily.

Change process requirements

Possible Change	Feedback
d) Require the adjustment request process to go through a public notification or hearing examiner process – avoids "late in the game" changes to stormwater design.	Staff can do, PW would work with DCD.
e) Pull all exemption and adjustment discretion from staff, give to Council or Hearing Examiner	Staff do not recommend.

Script for Stormwater Video #2:

2020.11.15

SLIDE 1 – Intro

Hello, my name is Danika Globokar and I'm the Senior Stormwater Program Manager at the City of Sammamish. In a previous stormwater educational video I discussed stormwater runoff, how uncontrolled runoff negatively impacts watersheds and creeks, and I introduced some of the requirements we have to control runoff and reduce erosion, flooding, and pollutants. In this video, we'll use that knowledge as a jumping off point to discuss stormwater regulations in Sammamish and what development projects must do to control their stormwater.

SLIDE 2 –

Some of the key points I hope you understand after this video are where stormwater rules originate and how Sammamish has adopted the rules. I also want to introduce you to Drainage Review, the Core Requirements, and adjustments and exemptions. A strong grasp of these concepts will help Council make future stormwater policy decisions.

SLIDE 3 –

Regulation of stormwater originates at the national level. The federal government's Environmental Protection Agency (EPA) passed the Clean Water Act in 1972 to regulate pollutants entering surface waters of the United States, such as rivers, lakes, and streams. The Clean Water Act created the National Pollutant Discharge Elimination System (NPDES) permit program, which enacts rules, or regulations, to control discharge of pollutants to surface water.

The EPA authorizes states to manage the NPDES Permit Program. Washington State's Department of Ecology manages the NPDES Permit Program within the state. Ecology issues NPDES permits to municipalities, like Sammamish.

SLIDE 4

Sammamish holds an NPDES Permit, issued by the Department of Ecology. The intent of the permit is to help Cities manage and control stormwater runoff and reduce pollutants entering our surface water.

The City complies with our permit by incorporating specific components into our stormwater program. Some examples of these components are mapping our stormwater pipes and catch

basins, inspecting and maintaining our stormwater ponds and vaults, and enforcing stormwater rules on new development. There are several other components of the permit, but for the sake of brevity, I've only highlighted three.

The focus of today's video is on a specific NPDES program component; setting stormwater rules on new development. The NPDES Permit program requires that Cities adopt a stormwater manual, which sets stormwater rules for new development.

SLIDE 5

I'll briefly touch upon some of ordinances and code Sammamish has adopted related to stormwater.

In 2016, City Council adopted the 2016 King County Surface Water Design Manual and Sammamish Addendum. By adopting and following the 2016 Manual, the City remains in compliance with our NPDES Permit.

Sammamish Municipal Code, Title 13, is our stormwater code. Title 13 defines the 2016 King County Manual and Addendum, together, as our "Surface Water Design Manual."

SMC Title 21A and 21B, the City's development code, specify that new development must follow the Surface Water Design Manual. In this way, new development must build stormwater infrastructure to control and manage their stormwater.

In 2019, City Council amended Title 13 code to add additional stormwater criteria. I'll review those amendments later in this presentation.

SLIDE 6

The City has adopted, and requires development to adhere to, the 2016 King County Surface Water Design Manual, sometimes called the "Stormwater Manual," "Drainage Manual," or even just "The 2016 Manual." All of these names mean the same thing. This is our adopted Stormwater Manual. Whenever I refer to the "Manual" from here on out, this green book is what I'm referring to.

The Manual is over 1,000 pages in length and is recognized as one of the most comprehensive guides for stormwater design in the nation.

It gives engineers and stormwater professionals technical guidance on how to manage and control stormwater from development. The Manual prescribes how to construct right-sized pipes, vaults, and ponds, and how to design water quality treatment facilities, among many other topics. City staff apply the Manual to all permits that come into the City.

SLIDE 7

The Sammamish Addendum was adopted at the same time as the 2016 Manual. The Addendum tailors the 2016 Manual to meet the unique conditions within the City. Some examples include using Sammamish-specific forms, and reducing the amount of allowed retaining walls in ponds. The Addendum also contains Area-Specific Stormwater Maps for Sammamish, such as the one shown here which depicts the Landslide Hazard and Landslide Hazard Drainage areas in the City.

Most of the changes made by the Addendum are minor and were driven by aesthetic desires of the community. The Addendum does not alter the fundamental design requirements in the 2016 Manual. If the City deviated too far from the 2016 Manual, we could risk being out of compliance with our NPDES permit, or invite legal risk.

SLIDE 8

Federal and state stormwater regulations have required us to adopt the 2016 surface water design manual. Now we'll discuss the rules within the Manual and how they're applied to development projects. I've done my best to condense and generalize very technical, nuanced concepts. For each powerpoint slide here, there are dozens of pages in the Manual that go into more detail.

SLIDE 9

When a new permit application is submitted to the City, the first step in the Surface Water Design Manual is to start the Drainage Review process. In the Drainage Review process, staff review a project's stormwater plan and determine if it meets the stormwater requirements in the manual. For example, they review the stormwater pond design and make sure the engineer has designed it correctly, to hold the right amount of stormwater.

Staff evaluate the project's drainage review type, which depends on the project's size and location. Staff also review the stormwater core requirements the project must meet, which is based on the drainage review type.

If the developer meets their stormwater requirements, staff can issue a permit.

SLIDE 10

As I said earlier, the size and location of the project determine a projects drainage review type. This chart shows the more common drainage review types in the 2016 Surface Water Design Manual; for brevity, I've excluded some of the less common types. The top drainage review type on the chart, which is "no drainage review" has the fewest stormwater requirements. The amount of stormwater requirements increases as projects increase in size and complexity, as you go down on this list.

I've included some examples of projects for each of the types of drainage review. Most small projects, like small additions or adding a deck, do not require drainage review. Simplified drainage review applies to most new single family homes. Targeted drainage review is unique, and applies to most projects in the City's critical drainage areas. Critical Drainage Areas are landslide hazard and landslide hazard drainage areas as well as areas that drain to Pine and Beaver Lake. Even very small projects in these areas must go through Targeted Drainage Review.

Full Drainage review applies to a project adding two or more homes, like many subdivision projects. Large project drainage review applies to master-planned communities, that propose to add more than 50 acres of impervious surface; this is not applicable to Sammamish.

SLIDE 11

The Surface Water Design Manual also has the nine "Core Requirements," listed here. The Core Requirements are stormwater design measures a project must meet, based on its type of drainage review. The project's drainage review type determines which Core Requirements it must meet.

I've underlined the four Core Requirements that can be the most challenging for applicants to meet. We reviewed three of them in our last video: flow control, water quality, and flow control BMPs, and we'll go more into depth on these requirements now.

SLIDE 12

Core Requirement #1 requires projects to direct their stormwater so it leaves the site (or discharges) at it's normal – or natural - location. An applicant can't direct the water into a different drainage basin – or watershed. The purpose of this rule is to keep water flow the same in a drainage basin both before and after development, and not alter our surface water features.

An additional rule within Core Requirement #1 is that projects must build a pipe to carry stormwater from the top of a hill to the bottom, past areas where landslides may occur, as shown in the photo. This is called "tightlining." It reduces erosion and landslide risks. Hillsides in Sammamish are Landslide hazard areas and an example of the western edge of the City is shown here. This map was adopted in our Sammamish Addendum; it shows, in orange, the landslide hazard areas.

SLIDE 13

CR #3 – Flow Control

Core Requirement #3 is the flow control requirement. From the last stormwater education video, we reviewed that "flow control" includes peak flow and duration matching. Peak flow matching means that runoff rates from the developed and pre-developed sites must match for various sized storm events. Duration matching means the developed site must match the pre-developed site for the length of time that stormwater leaves the site, for various sizes of storm events.

To match peak flows and durations, development often must build a stormwater pond or vault to hold water on site and then release it slowly.

SLIDE 14 – Flow Control - continued

I'm going to deep dive into the regulations here because this is where Council has indicated they may be interested in making changes to the rules.

The 2016 Surface Water Design Manual has three levels of flow control: Level 1, or Basic, Level 2, or Conservation, and Level 3, or Flood Problem. This map, adopted in the Sammamish Addendum, shows the level of flow control required in each of Sammamish's watersheds, or drainage basins. Flow control levels are determined based on downstream impacts for flooding. As you can see, no areas of Sammamish require Level 1 flow control. Development in brown areas must meet Level 2 flow control. Green areas require level 3 flow control. The yellow star marks the location of City Hall, within Thompson Basin which drains to Ebright Creek. Development in this drainage basin must meet Level 3 flow control.

Level 3 flow control means that a project must hold its extra stormwater on site and release it at the same rate as the historic (or forested) site for 2-yr and 10-yr storms. It must match flow rates off the site for the 100-year storm, as well, but for existing site conditions, rather than forested.

The project must also hold back stormwater and release it over the same length of time (or duration) that the historic site did for various sized storm events, between 50% of the 2-year storm, up to the 50-year storm.

Typically, matching "historic" site conditions results in having to build larger stormwater vaults and ponds compared to matching "existing."

SLIDE 15

Last week we also reviewed what pollution generating surfaces are and how pollutants enter our storm and surface water. To reduce the amount of pollutants entering our surface water, Core Requirement 8 makes projects treat stormwater that comes from pollution-generating surfaces, such as roads.

There are three levels of water quality treatment specified by the 2016 King County Surface Water Design manual:

Basic, Sensitive Lake, and Sphagnum bog. Sammamish also has additional requirements for areas that drain to Pine and Beaver Lake.

This map, adopted in the Sammamish Addendum, shows the water quality treatment level required in each of Sammamish's drainage basins.

Basic WQ Treatment, required in the northeast basins of Sammamish, requires sites to remove suspended solids, like soil and dirt, from stormwater runoff.

All basins draining to Lake Sammamish require Sensitive Lake WQ Treatment, which requires sites to remove solids, and also reduce phosphorus, which contributes to unhealthy algae blooms in surface water. Development projects around Pine and Beaver Lake, in purple, must remove additional Phosphorus to protect lake health.

Sphagnum bog treatment requires unique treatment of stormwater to preserve the health of the bogs.

SLIDE 16

Last week, we also reviewed flow control BMPs, also referred to as low impact development (or LID) BMPs. Flow control BMPs are stormwater infrastructure that mimic natural hydrologic processes: dispersing, infiltrating, or otherwise reducing the amount of stormwater runoff from a developed site.

Depending on the project size, type, and location, sites must direct a certain percentage of their stormwater to flow control BMPs, thereby reducing the amount of stormwater leaving the site as runoff.

SLIDE 17

Most projects in Sammamish go through drainage review and have to show how their project meets the nine Core Requirements. Sometimes however, projects qualify for exemptions to

the Core Requirements, or request adjustments to change their drainage design. I'll discuss both.

SLIDE 18

In some cases, particularly for smaller projects, the Manual will exempt a project from having to meet a core requirement, typically because of financial reasons or because meeting the Core Requirement is not possible. The manual sets conditions that must be met to get an exemption.

One example is with Core Requirement #3, the flow control requirement. If a project creates less than 5,000 square feet of new impervious (about the amount of a large single family home plus its driveway) it does not have to meet the flow control requirement. This makes sense, as you don't often have entire stormwater ponds for single properties.

In 2019, City Council amended SMC Title 13 to give no exemptions in Critical Drainage Areas; these are our landslide hazard drainage areas on slopes, as well as areas that drain to Pine and Beaver Lake. The code gives the Public Works director authority to approve exemption requests only in specific circumstances; when large trees would have to be removed or slopes would be destabilized in order to build a stormwater facility.

In this way, the 2019 code amendments protect our land and surface water from extra stormwater, and set transparent criteria for granting exemptions on a case-by-case basis.

SLIDE 19

Sometimes it's not possible for applicants to completely meet a Core Requirement in the Surface Water Design Manual, even with exemptions. When this happens, applicants submit an "Adjustment," which is a request to vary from the manual. They also submit an alternate plan to meet the intent of the Core Requirement. The alternate plan must produce a compensating and comparable result to the Manual, and must consider safety, functionality, and other criteria. Only the Director can approve adjustments. For context, only about 15 adjustments have been approved in the last four years.

An example of an adjustment request might be from an applicant who might request an adjustment from Core Requirement #8 – water quality treatment. Instead of building a treatment facility approved in the Manual, the applicant might request to build an alternate facility; not approved in the manual, but still able to remove pollutants.

SLIDE 20

City Council has the power to adopt new stormwater rules. City Council has already adopted different rules in critical drainage areas, in 2019, as I noted before. The 2019 code amendments also set guidance for staff to grant exemptions to core requirements.

Another example of Council-adopted stormwater rules is the volume-matching requirement for Town Center that was adopted in 2010, relaxed in 2013, and then eliminated in 2016 with the adoption of the 2016 King County Surface Water Design Manual.

Staff will work with Councilmembers to discuss possible future directions for code amendments, based on Council's desires.

SLIDE 21

In conclusion, this video covered where stormwater rules originate- at the federal and state level. It explained how the 2016 king County Surface Water Design Manual and the Sammamish Addendum were adopted, how they comply with state stormwater rules, and what's in both of those documents. We also covered some of the key rules in the Surface Water Design Manual, including drainage review and the nine core requirements, as well as exemptions and adjustments to core requirements.

This video prepares Council and staff to work together to discuss directions for future code amendments and changes to stormwater rules.