



INFORMATIONAL MEMORANDUM

TO: Transportation and Infrastructure Services Committee
FROM: Hari Ponnekanti, Public Works Director/ City Engineer
BY: Sherry Edquid, Project Manager
CC: Mayor Allan Ekberg
DATE: April 15, 2022
SUBJECT: Tukwila 205 Levee Certification Project
Project No. 91341203
Introduction to Levees

ISSUE

Provide the Council with a general overview of levees within the City and an introduction to the Tukwila 205 Levee Certification Project.

BACKGROUND

Levees are manmade structures typically built parallel to a river designed to contain, control and/or divert floodwaters thereby reducing the risk from temporary flooding on the landward side. However, they do not eliminate flood risk altogether.

In the Green-Duwamish watershed, an integral part in minimizing flood risk is the Howard A. Hanson Dam, which is located in the upper watershed, 21 miles upstream from the City of Auburn. The dam's primary purpose is to provide flood risk reduction in the winter and provide additional flow for fish in the summer and early fall. Flood risk reduction is accomplished by capturing water runoff from the upper watershed and releasing it under controlled conditions. Both the dam and the levee system work in conjunction to reduce flooding in the lower Green River to a fraction of what it once was. The dam was formerly thought to control water up to a 500-year flood event but recently the Army Corps of Engineers (Corps) revised the dam capacity to just 140-year flood event.

DISCUSSION

There are several levees along the Green River and within the City that provide various levels of flood protection. The King County Flood Control District (District), as a special purpose government, assists the City in managing, maintaining, funding, and oversight of these levees.

The levee certification process is expected to lead to additional levee repair projects that are required to meet the certification criteria. Certification is valid for a 10-year period. A levee assessment has been completed for the Tukwila 205 Levee. The study found approximately 80% of the levee could not be certified in its current condition and will require repair or reconstruction. The City and the District are working jointly to maintain Federal Emergency Management Agency (FEMA) certification along with making levee improvements to withstand 500-year flood events, all while integrating habitat restoration, flood storage, and recreation.

The City has petitioned the King County Flood Control District to make levee improvements to upgrade the 205 Levee to provide a minimum of 100-year level of protection, and where construction is needed, construct to a 500-year level of protection. KCFCD has agreed to begin design of several projects in 2020, which will take approximately 15 years to complete and will require extensive work with the City of Tukwila and property owners.

FINANCIAL IMPACT

The overall construction costs of the Tukwila 205 Levee is estimated to be around \$200 million and the majority of that is funded by the King County Flood Control District (KCFCD).

RECOMMENDATION

Discussion only.

Attachments: 2021 CIP pg. 86
Levees Presentation
Tukwila Levees

CITY OF TUKWILA CAPITAL PROJECT SUMMARY

2021 to 2026

PROJECT: Tukwila 205 Levee Certification

Project No. 91341203

DESCRIPTION: Reconstruct the Tukwila 205 Levee to provide 500-year level of flood protection and obtain levee certification.

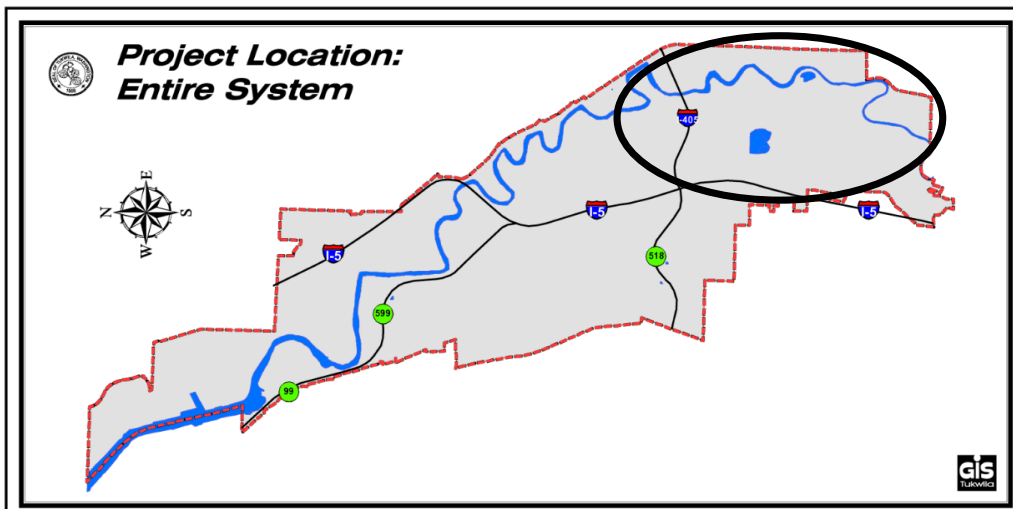
JUSTIFICATION: The US Army Corps of Engineers no longer provides levee certification services to federally authorized levees. The existing certification expired in August 2013. Certification is required for the Federal Emergency Management Agency to accreditate the levee system as providing a 100-year level of flood protection. A study of the Tukwila 205 Levee found approximately 80% of the levee could not be certified in its current condition and will require repair or reconstruction.

STATUS: A levee assessment has been completed.

MAINT. IMPACT: Certification process is expected to lead to additional levee repair projects that are required to meet the certification criteria. Certification is valid for a 10-year period.

COMMENT: The City has petitioned the King County Flood Control District to make levee improvements to upgrade the 205 Levee to provide a minimum of 100-year level of protection, and where construction is needed, construct to a 500-year level of protection. KCFCD has agreed to begin design of several projects in 2020, which will take approximately 15 years to complete and will require extensive work with the City of Tukwila and property owners. A full time employee to monitor this project will be required and listed in 2021 through 2026.

FINANCIAL (in \$000's)	Through 2019	Estimated 2020	2021	2022	2023	2024	2025	2026	BEYOND	TOTAL
EXPENSES										
Certification Phase I	350									350
Certification Phase II	229		500	500	500	500	500	500		3,229
Design										0
Const. Mgmt.					150	150	150	150		600
Construction										0
TOTAL EXPENSES	579	0	500	500	650	650	650	650	0	4,179
FUND SOURCES										
KC Flood Control	236				150	150	150	150		836
Proposed Grants										0
Mitigation Actual										0
Mitigation Expected										0
Utility Revenue	343	0	500	500	500	500	500	500	0	3,343
TOTAL SOURCES	579	0	500	500	650	650	650	650	0	4,179





Introduction to Levees

Presentation

April 18, 2022

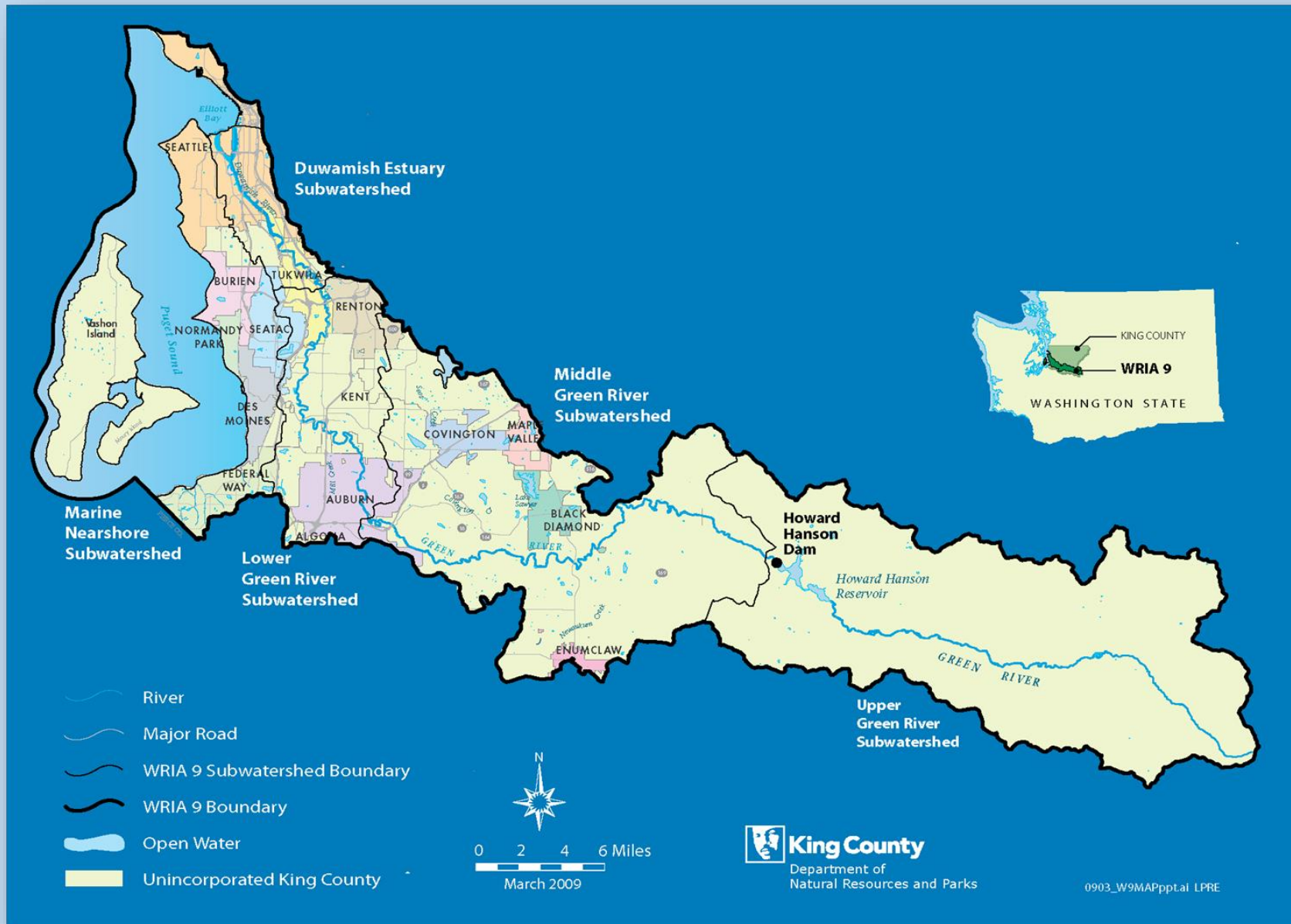


Agenda

- Watershed Overview
- History
- Howard A. Hanson Dam
- Levee Vocabulary
- Flood Hazard Management
- Flood Control Basics
- Levees in Tukwila
- Future Floodplain Management
- Flooding Notification



Green-Duwamish River Watershed





Historical Flooding

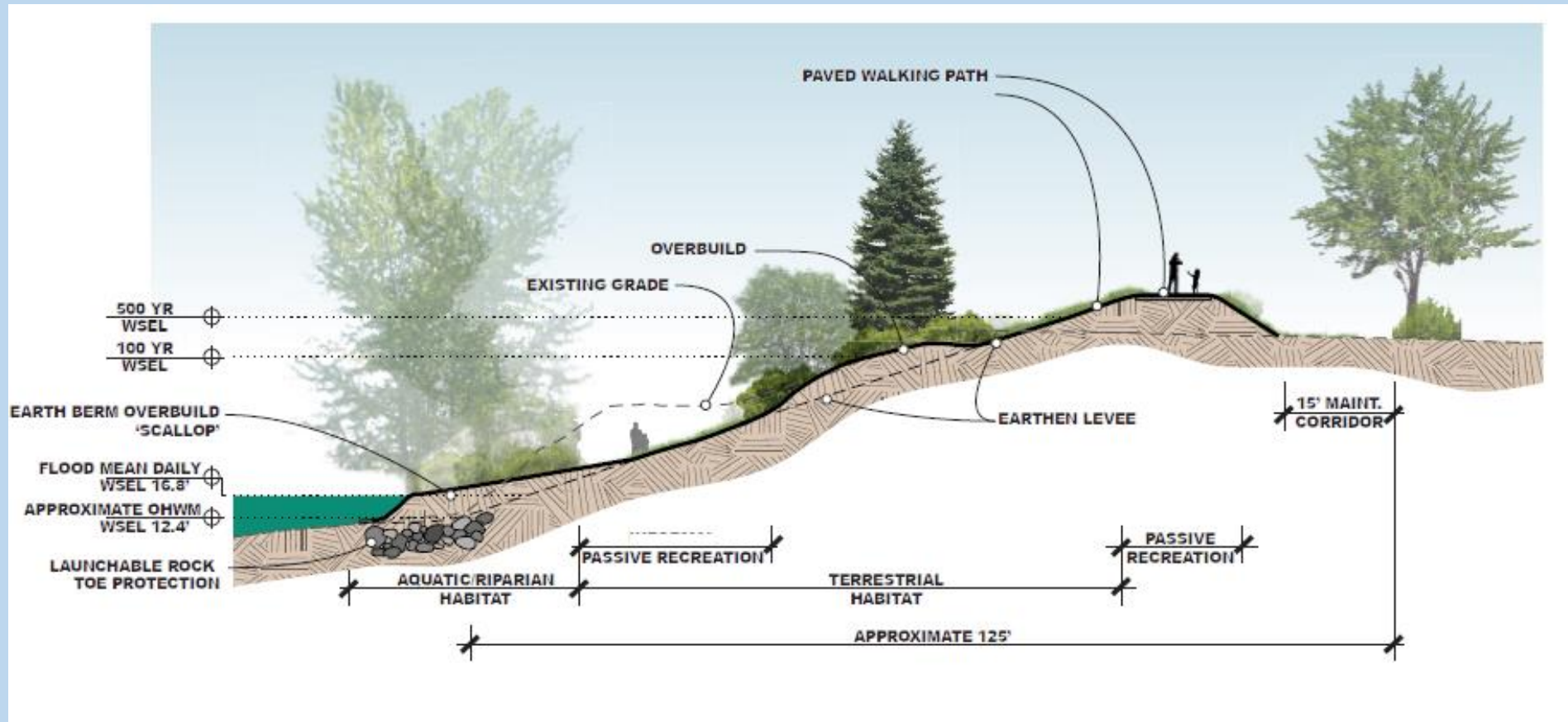
November 22 & 23, 1959
Flood Event

Howard A. Hanson Dam



Definition of a Levee

Manmade structure(s) typically built parallel to a river designed to contain, control and/or divert floodwaters thereby reducing the risk from temporary flooding on the landward side. However, they do not eliminate flood risk altogether.



How do we measure floods on the Green River?

Flood Phase Thresholds for Green River

Phase	Green River at Auburn Gage (RM 32) *	Flood Frequency
1	5,000 cfs	Routine wet season high flow
2**	7,000 cfs	Peak flow exceeded 15 of last 20 years
3	9,000 cfs	Median estimate of 2-year flood
4	12,000 cfs	10- to 100-year flood (2006 and 2009 floods)

* Auburn - US Geological Services Gauge <https://waterdata.usgs.gov/monitoring-location/12113000/#parameterCode=00060&period=P7D>

** King County Flood Warning Center Opens

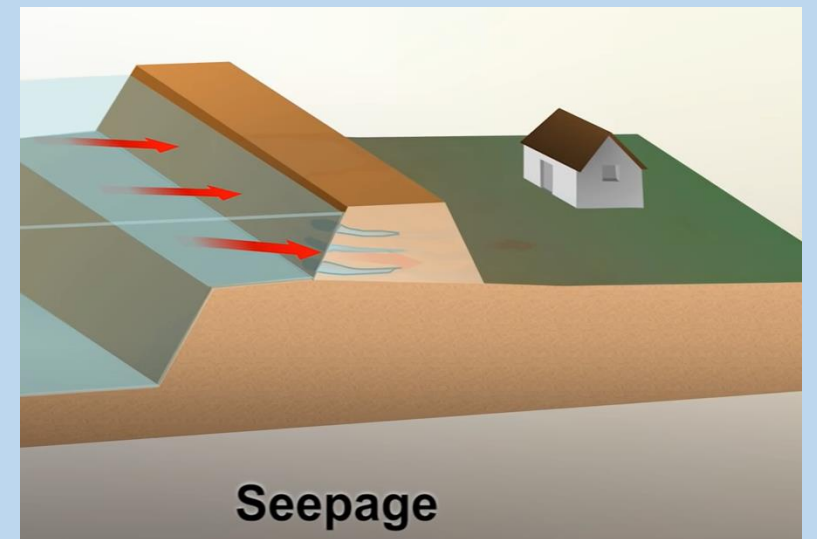
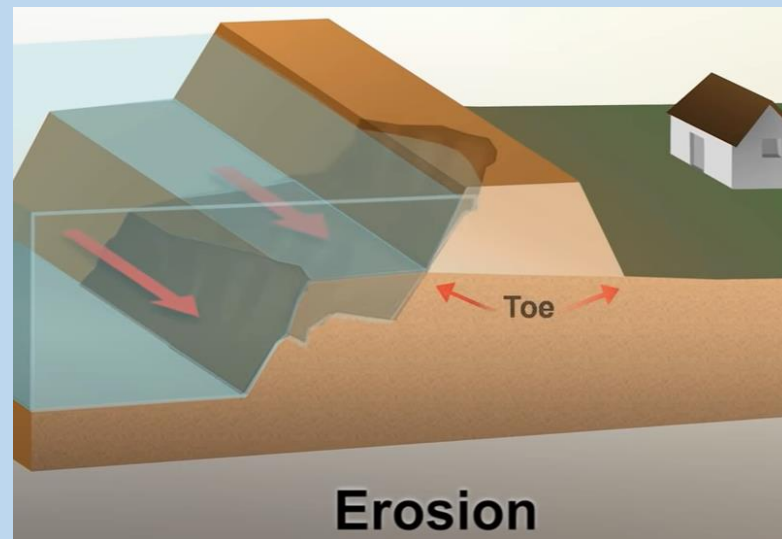
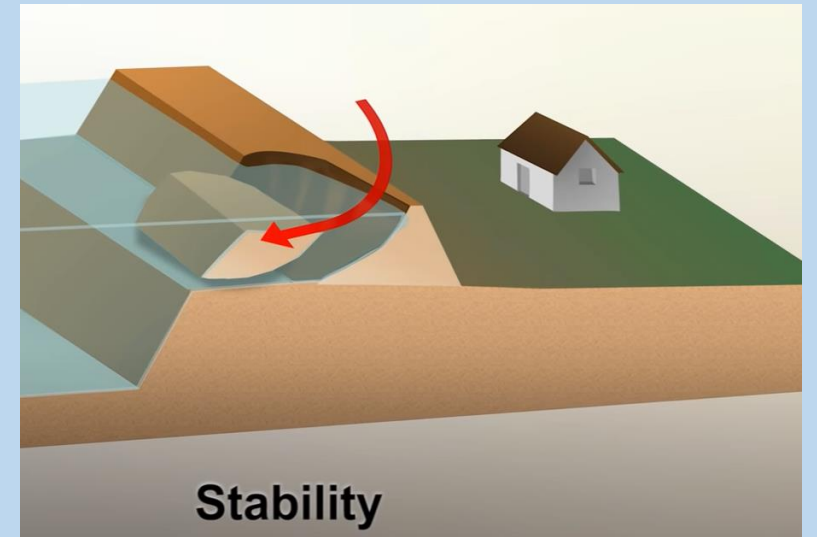
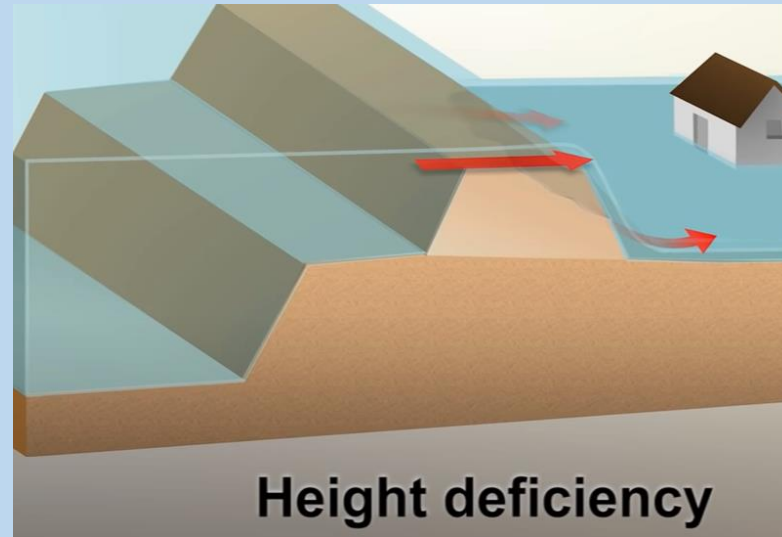
Levee Failure Rates

Over 30-Year Period



Figure 1. Likelihood of flooding from a 100 to 500 year-flood event during a 30-year period. (From the National Committee on Levee Safety).

Why do levees fail?

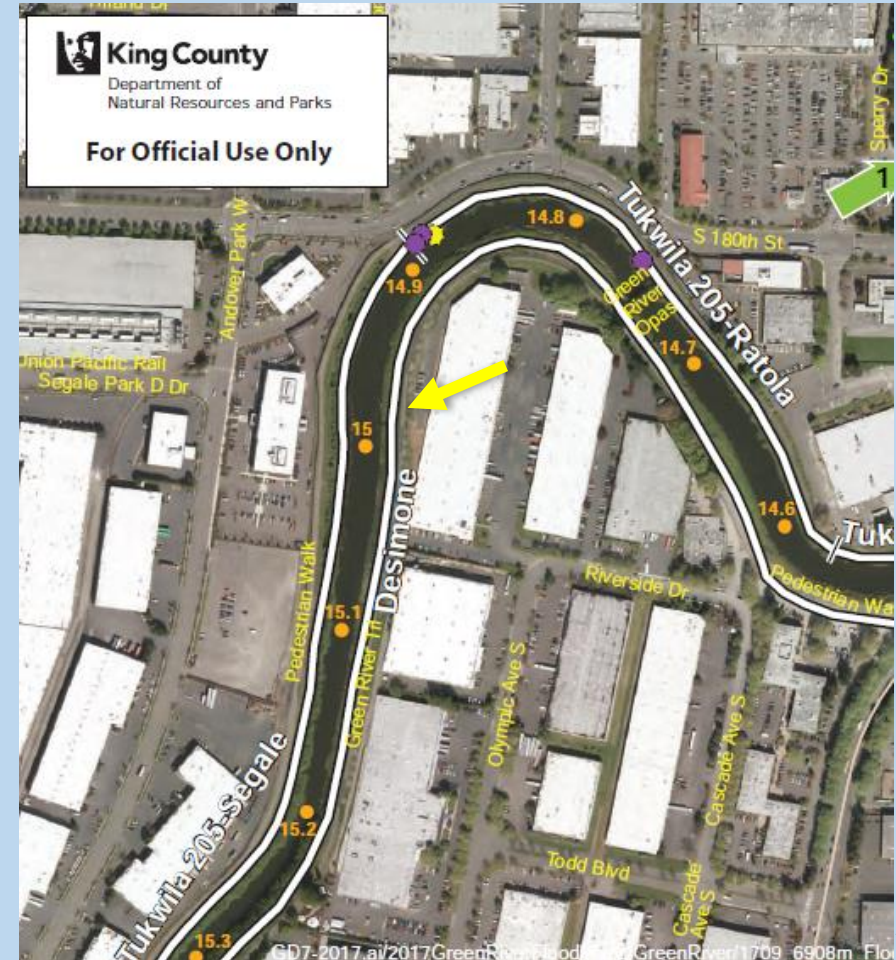


Desimone Levee

February 7, 2020 Damage Occurred – 11,700 CFS



Seepage occurring and water pooling on landward side of the levee.



Tukwila 205 Levee

- Levee last built/modified in 1964
- Levee is currently not certified nor accredited by FEMA due to:
 - Embankment and foundation stability
 - Steep riverward slopes
 - Not meeting freeboard elevation



Lower Green River Corridor Flood Hazard Management Plan



22,000 people living in the Valley and floodplain



Over 100,000 jobs



Over \$37 million in income from businesses of all sizes, including companies like Boeing, Starbucks, REI, IKEA, and Blue Origin



The 2nd-largest industrial park on the West Coast and the 3rd-largest warehouse and distribution center in the country



Major transportation routes and public facilities, including hospitals and schools



Threatened salmon and other aquatic animals



Farming



Parks, trails, and natural areas

Be
Prepared

The logo consists of a white square with an orange border. Inside, the text "King County" is in blue, "FLOOD" is in large blue letters on a white background, and "ALERT" is in white letters on a blue background.

King County
FLOOD
ALERT

<https://green2.kingcounty.gov/floodalertsystm/>
or download the Flood Warning App

The logo features the text "BE FLOOD READY" in large, bold letters. "BE" and "READY" are white, while "FLOOD" is cyan. Below it, the subtitle "YOUR GUIDE TO FLOOD PREPAREDNESS IN KING COUNTY" is written in smaller cyan letters.





BE **FLOOD** READY
YOUR GUIDE TO FLOOD PREPAREDNESS IN KING COUNTY

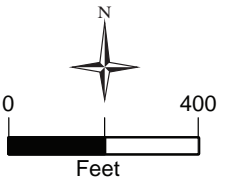
https://your.kingcounty.gov/dnrp/library/water-and-land/flooding/Flood-Brochures/2021-2022-flood-brochures/KCFCD_Mailer2021_County_Final.pdf



King County Flood Warning Center and Information Line: Connect to a representative during a flood and year-round access to automated flood phase information, river gage readings, and emergency sandbag distribution locations.
206-296-8200 or **800-945-9263**

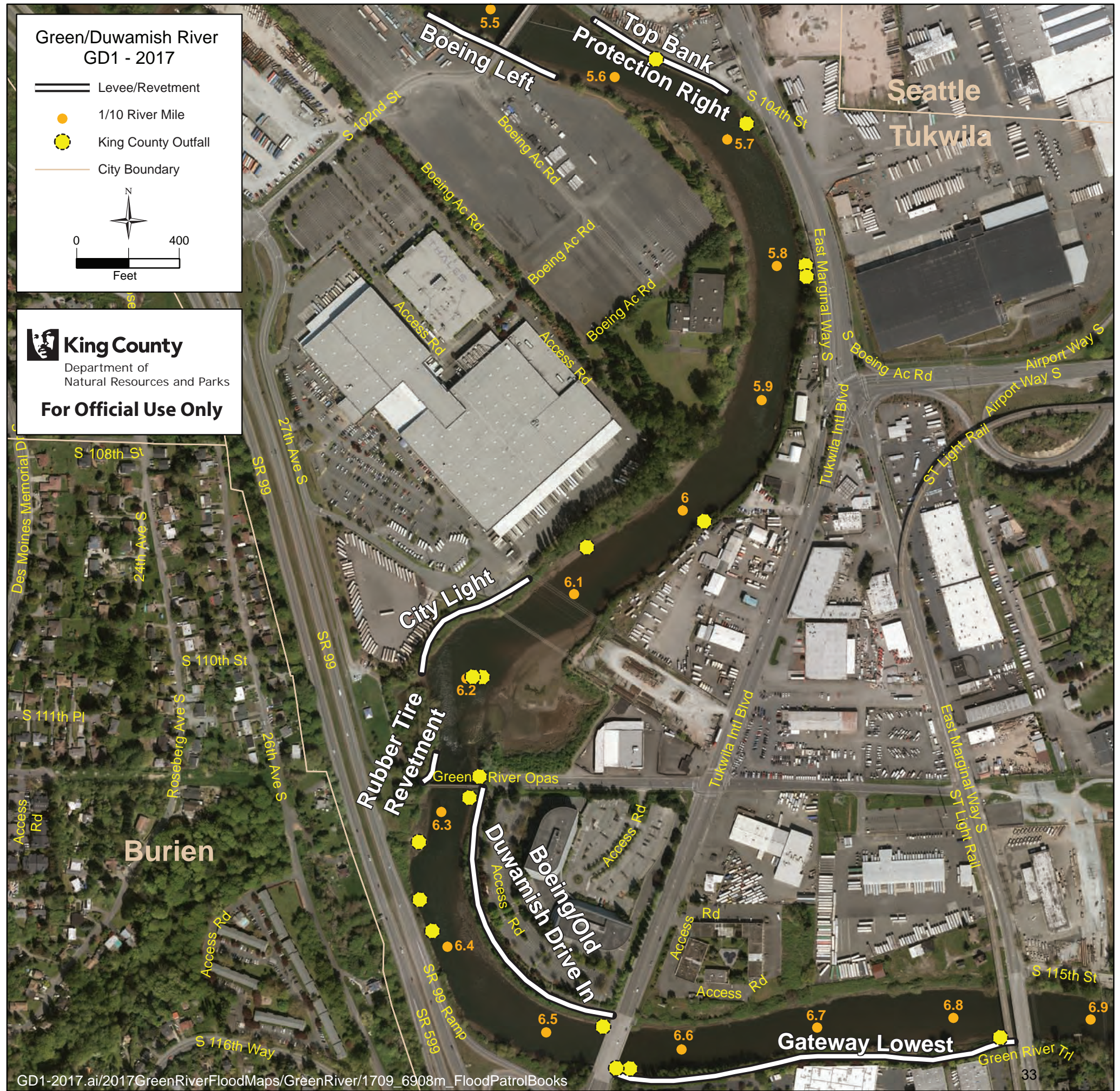
**Green/Duwamish River
GD1 - 2017**

-  Levee/Revetment
-  1/10 River Mile
-  King County Outfall
-  City Boundary





King County
Department of
Natural Resources and Parks

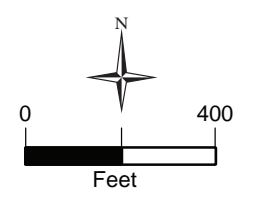
For Official Use Only



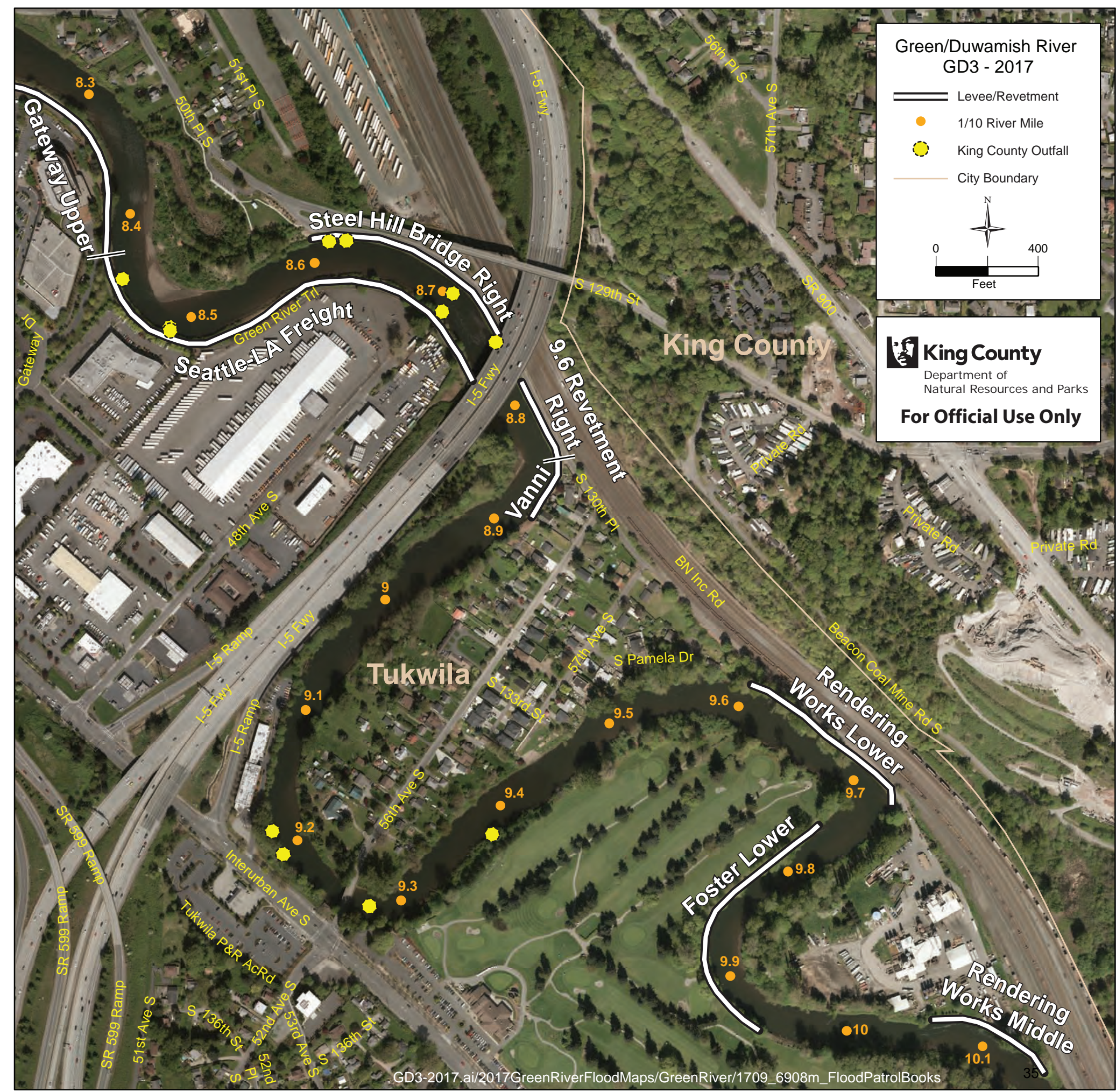


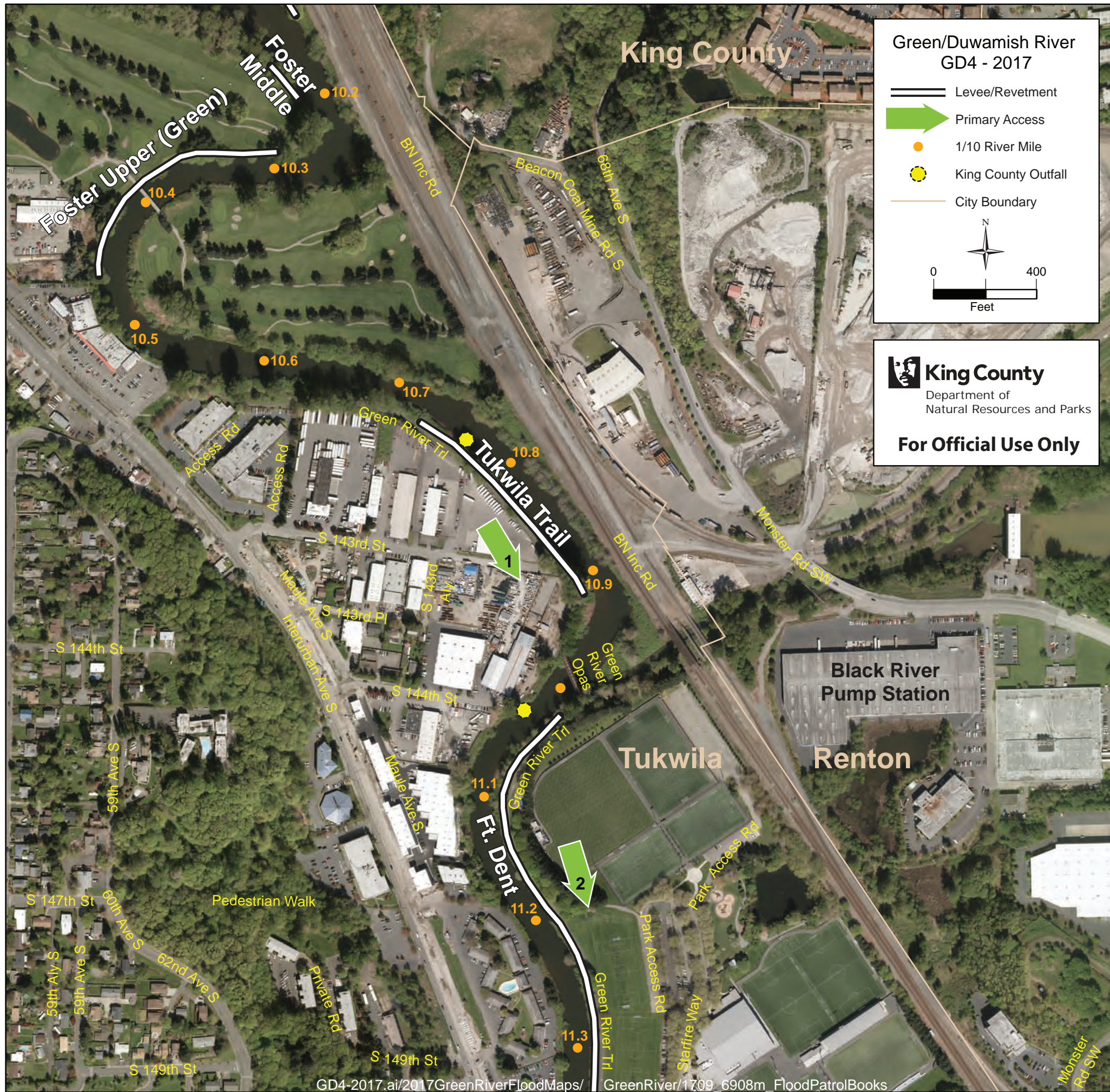
Green/Duwamish River
GD3 - 2017

-  Levee/Revetment
-  1/10 River Mile
-  King County Outfall
-  City Boundary



 **King County**
Department of
Natural Resources and Parks
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**Green/Duwamish River
GD4 - 2017**

- Levee/Revetment
- Primary Access
- 1/10 River Mile
- King County Outfall
- City Boundary

N

0 400
Feet

King County
Department of
Natural Resources and Parks

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**Green/Duwamish River
GD5 - 2017**

- Levee/Revetment
- Primary Access Point
- 1/10 River Mile
- Tukwila Outfall
- King County Outfall
- Evacuation Route
- City Boundary

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Feet

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**Green/Duwamish River
GD7 - 2017**

- Levee/Revetment
- Primary Access Point
- 1/10 River Mile
- Tukwila Outfall
- King County Outfall
- Evacuation Route
- City Boundary

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Feet

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**Green/Duwamish River
GD8 - 2017**







- Levee/Revetment
- Primary Access Point
- Secondary Access Point
- 1/10 River Mile
- Kent Outfall
- King County Outfall
- City Boundary

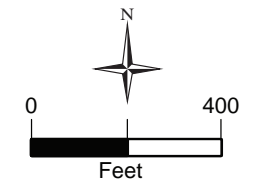
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Feet

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**Green/Duwamish River
GD9 - 2017**

-  Levee/Revetment
-  Primary Access Point
-  1/10 River Mile
-  Kent Outfall
-  King County Outfall
-  City Boundary



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