CONTENTS
Stormwater in the Schoolyard – Lesson 3
Local Stormwater Systems – Lesson 5
Stormwater in Our Community – Lesson 6

How to Use This Guide
This guide supports the Community Waters Science Unit Teacher Manual with information, maps, and images specific to your school and neighborhood. It is written for teachers; its goal is to provide a better understanding of what is happening with stormwater in and around your school. The points of interest and walking field trip route are suggestions and should be adapted as desired.

If you have any questions about these maps, accompanying lessons, or stormwater around your school, contact IslandWood staff at communitywaters@IslandWood.org.
Stormwater Schoolyard – Lesson 3

This map and points of interest (photos and info) can be used to guide your class’ exploration of the schoolyard. You will find the student worksheet for this lesson following the teacher guide version. Please use the extra space on the pages to add your own notes and questions!

A. (and G) Gutters Drains, and Downspouts
(Later in the walk see (G) a view of the roof drain system from the 3rd floor)

This gutter system seems to work a little differently than the typical building system. Can water be seen below next to the building? Do the drains above ever overflow? Are they any other downspouts on the building? – look for them as you walk. Later in the walk go to (G) up to the 3rd floor to look at the roof draining system)
B. Stormdrain

Have students notice where water can enter the storm drain, and how the slope has been adjusted to drain better. The new pavement has sunk a little, due to settling, is the new slope helping? What happens if the drain fills up? Pour water on the ground by the tree roots, and also around the drain, see if water drains or is absorbed. What surfaces help with stormwater?

C. Slopes and surfaces

Test out the brick, pavement, chips and grass by pouring some water on each. Where does the water go on these surfaces? Are the bricks helping the water soak in or redirecting the water somewhere else? Are the chips soaking up the rain water? Why are these bricks here – to make a flat surface. Does this help with stormwater when it rains a lot?

D. Gardens and surfaces

Can gardens help with storm water? How might these garden beds help with storm water in this place? What can plants do for stormwater? Compare the compacted soil behind the bench to the soil in the garden by pouring water on them.
E1 and E2. Stormdrains in the field and Trees

Like a giant stormdrain, with a giant cistern underground – most stormwater vaults are designed to hold onto water during heavy rain and release it later into underground pipes.

Trees are planted along the walkway and around the field. How do trees help with stormwater? They can help catch rainwater in their leaves, and reduce the amount of rain that falls on the ground. Tree roots hold the soil, and absorb water.

F. Stormdrains clogged

Which way does the ground slope here? Where does the debris come from that is clogging the stormdrain? Why is this second storm drain placed here? Does water ever run down the hill and end up overflowing this basketball court?

G. Stormdrains on roof (Go to Third Floor)

Like a giant stormdrain, – most stormwater roof systems are designed to drain water during heavy rain and redirect it into underground pipes. Gutters are not used for most of this roof. Which way is the water draining?
Mapping Your Schoolyard – Lowell

Include on your map:

- Symbols from the Key including flow of water, surfaces, and storm drains.
- Partially pervious surfaces can be shown with less dots.
- Label locations of litter, pollution and places where puddles form.
- Sketch any specific stormwater problems you see or are aware of.

Map Key

- Direction of water flow
- Pervious Surface
- Impervious Surface
- Storm Drain
Local Stormwater Systems – Lesson 5

Student Maps
Color maps have been created for use with your students (provided and/or available on communitywaters.org). We suggest students work through them in the following order:

1. Lowell Elementary Storm Drains Map – To locate storm drains and see they are connected to combined pipes.
2. Lowell Neighborhood Pipes Map – To figure out where the combined pipes empty into larger treatment plant pipes.
3. Treatment Plant Pipes and Overflows Map – To see where water goes once it enters the big pipes and identify locations combined sewer overflows could occur.
4. OPTIONAL: South Capitol Hill Stormwater Only Pipes Map – Could be used if you want to look at stormwater south of Lowell Elementary (see next page for why it is on a separate map).

Teacher Overview
What happens to the Stormwater around your school?
• Storm drains north of East Mercer Street (including your schoolgrounds) drain into wastewater pipes that end up in combined stormwater and wastewater pipes (orange on maps). The water flows south in the combined pipes under 10th Avenue East south to East Denny Way and then west to a treatment plant pipe south of Lake Union.
• Stormwater that falls south of East Mercer Street goes into stormwater only pipes that end up in Lake Union (see below).

Where does your stormwater runoff end up?
• On a regular day, the combined stormwater and wastewater pipes transport stormwater to the West Point Treatment Plant to be treated before entering Puget Sound offshore from Discovery Park. Unfortunately, when there is a really big rainstorm, too much stormwater enters the combined pipes. In that case the combined water is diverted to the Elliot West Wet Weather Treatment Facility (blue dot) to be partially treated before entering Puget Sound near Myrtle Edwards Park. In a really big storm it can also contribute to combined sewage overflows (CSOs) that dump untreated water directly into Lake Union (yellow circles)

Video: Since the stormwater from your school could end up in Lake Union and Puget Sound we suggest watching the “Drained: Urban Stormwater Pollution” video (OPTION B) from 0:00 to 2:11 during Lesson 5. Point out to your students that the CSOs during a big storm would have everything described, PLUS everything from the sewers (including human waste). You can find this video linked on communitywaters.org or at https://vimeo.com/51603152.
Lesson 5: Stormwater Runoff Destination Map

This map provides another perspective on what happens to Seattle stormwater runoff.

The area colored brown is where stormwater goes into combined pipes that lead to West Point Treatment Plant as described previously.

The water that goes into storm drains in the pink area is not combined with wastewater. It is carried by stormwater only pipes to South Lake Union where it empties into the lake near the Hampton Yacht Club (Ward St & Fairview Ave N). It isn’t treated before going into the lake but being kept separate means it doesn’t contribute to combined sewer overflows during big storms (described above).

To keep the Lowell Elementary Neighborhood Pipes Map simple, we left off the stormwater dedicated pipes south of Lowell Elementary. It is not critical to this unit, but we provided a separate “South Capitol Hill Stormwater Pipes Only Map” in case you want to tell that story also. If you do use those maps, you can also reference them when watching the Drained video.

Please Note: The pipes information reflects our best estimate of the stormwater flow in your community based on the information we have currently. If you encounter more information in the course of your investigation please let us know so we can update future versions of this document.
Stormwater in Our Community – Lesson 6

Please use this map and points of interest as suggestions for your walking field trip, recognizing there may be other things of importance to note in other areas. It may be useful to bring the stormwater pipes map with you for reference. Questions posed are intended to be posed to students as desired.

**Suggested Route**: Walk LEFT going north on 11th Ave to the parking lot (end of playground), turn RIGHT and go west to Federal Ave E. Walk along the sidewalk and observe on both sides of the street, crossing once opposite the corner of the playground, and then back again at E Roy Street. Continue along Federal Ave E TURN LEFT and go east up Republican Street to 11th, then RIGHT up Mercer, RIGHT on 12th RIGHT again at 11th to circle back to school.

Oct-17
Points of Interest

A. Oil/chemical stains in parking lot and drain
Looking at the parking spots outside the church, can students see dark marks left there by cars? How might we know this is from cars and not just water? Where could these chemicals/oil end up?

B1 and B2. Slopes and surfaces
How well is this working as a solution to keep stormwater from going to the neighbors below? It looks like an old staircase, but compare this to other sections of the slope by pouring water at the top of the slope near these features. Are the bars helping retain soil? How do tree roots and other plantings do this as well? Compare this to the sight at the far end of this slope (B2).

C. Permeable Pavers*
Pavers are tiles made from brick, stone or concrete, which are arranged with spaces in between that allow water to soak through. What happens when water hits the surface of the pavers? Where will the water go from here? Why are these pavers here? What would happen if they weren't?
D. Slopes and surfaces and walls
Where does/would water come from that enters this slope? Can students recall what happens to steep slopes in heavy rain (erosion)? What happens once it gets to the street? Look for signs of erosion. Notice that during heavy rains the street forms a large puddle at the bottom of this slope. Why is this happening?

E. Stormwater slopes and Terraces
Where does/would water come from that enters this slope? Why are there different kinds of plants here than in the gardens at the top of this slope? How can gardens help with stormwater? Have students pour water to test the surfaces here and compare it to the sidewalk and grass.

Terraces
Consider how stormwater flows from the gardens above down to the street here. Do these rocks and walls help keep the ground in place? What do you see that will help slow and sink stormwater? What might speed it up? Can you find the storm drains on the street on each side?

F1 and F2. Disconnected Downspout
This downspout has been “disconnected” from the underground pipes so that the roof water drains into ground instead of into sewer system. Where is the water being directed? How does this help with stormwater runoff problems? See more on the walk at (F2)
G. Garden slopes and erosion

Look how water has created its own path in this bank. Where is this water draining from? Is this a “problem”, and if so, to whom? Why might the water not soak into the grass in this area? What is happening to the slope over time?

H. Sloped driveways

Notice several driveways along this street slope down toward the houses. What issues could this cause for the people who live there? What have you seen in the area that might help with these problems, and what might make them worse? What is the surface of this driveway made of? Will it help with the stormwater?