

HAMMOND AREA PLAN

RAINWATER MANAGEMENT



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Rainwater Management

Rainwater management facilities provide for the protection of property and the natural environment. The drainage system in Hammond can be grouped into two distinct regions, Upper and Lower Hammond (Figure 1). Upper Hammond stormwater runoff is conveyed primarily through the underground storm sewer system. The Lower system carries rainwater through open roadside ditches, road crossing culverts, and short segments of storm sewers. Furthermore, there is a pump station at the end of Princess Street that helps drain a southern section of the Lower Hammond neighbourhood by discharging rainwater directly into the Fraser River at the location displayed in the figure.



Figure 1: Simplified Drainage Areas of Hammond

Rainfall runoff is diverted west from Hammond to Pitt Meadows via the Golden Ears Bridge interchange drainage system and Katzie Slough. Once rainwater flows into Pitt Meadows from Hammond, it continues to drain west along the Airport Way ditch to the Baynes Road Pump station where it is discharged into the Fraser River. The approximate catchment area that collects rainfall runoff to the Baynes pump is displayed in Figure 2.



Figure 2: Baynes Pump Station Rainwater Catchment Area

The hydraulics of the downstream open channels is known to affect the efficiency of the system in Lower Hammond. Historically, Lower Hammond has experienced localized flooding during high intensity

and long duration rainfall events. In the winter of 2006 and spring of 2007, long duration and heavy rainfalls resulted in significant flooding in the northwest area of Lower Hammond. As a result of the flooding, the District is considering the installation of a replacement pump station in the area.

Rainwater Runoff

Runoff is generated from dispersed land surfaces such as pavements, yards, driveways, and roofs. As the percentage of impervious area in a region increases, the quantity of runoff also increases.



Figure 3: Generalized Runoff Rates vs. Percent Impervious Surfaces

Source: http://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcs143_024824.jpg

Traditional drainage systems are designed to transport flow as quickly as possible without allowing for infiltration or pollutant removal. In these systems runoff arrives at the receiving waters much faster and in greater volume than under natural conditions. This causes channel erosion, flooding, loss of aquatic habitat, and water quality degradation.

Areas in Lower Hammond drain into drainage ditches. These vegetated ditches help to prevent erosion by reducing peak flows, decrease pumping energy requirements by infiltrating water into the ground, and improve water quality by trapping sediment and other pollutants.



Figure 4: Ospring Street Outflow Channel

Runoff Quality

When rainwater flows into catch basins or drainage ditches in Hammond, the water is not formally treated as it is conveyed into the Katzie Slough and eventually pumped into the Fraser River. Runoff may become contaminated and cause pollution of the receiving water bodies. Substances such as petroleum, herbicide, and fertilizer are common runoff pollutants that have adverse effects to the environment.

Innovation in rainwater management is leading to drainage facilities that filter pollutants and better imitate pre-developed conditions. These designs include features such as grassed swales, rain gardens, and infiltration trenches as opposed to concrete curb and gutter systems. In addition to providing adequate drainage these features can aesthetically improve streetscapes.

Controlling rainwater pollution starts with managing individual behaviours. These common activities have the potential to contaminate receiving waters:

- littering
- disposing of trash and recyclables
- disposing of pet-waste
- applying lawn-chemicals
- washing cars
- changing motor-oil on impervious driveways
- improper disposal of leftover paint and household chemicals

By ensuring proper material and chemical disposal techniques are adhered to in our community, the environmental sustainability of the receiving water body can be improved. Additional information on the disposal of household items in Maple Ridge, please visit www.rmrecycling.org.

Many public groups perform various activities that improve watershed health and raise environmental awareness such as storm drain marking (Figure 5). For more information on rainwater management in Maple Ridge as well as current Federal, Provincial, and Regional standards visit the links below:

- Maple Ridge Stormwater and Rainwater Management
<http://www.mapleridge.ca/347/Stormwater-Rainwater-Management>
- Ministry of Environment Best Management Practises (BMPs)
http://www.env.gov.bc.ca/wld/BMP/bmpintro.html#first_



Figure 5: Catch Basin Marking

Source: [http://www.meetup.com/The-Lower-Mainland-Green-Team/pages/Green_Team_at_Hunter_Park_\(April_26_2014\)](http://www.meetup.com/The-Lower-Mainland-Green-Team/pages/Green_Team_at_Hunter_Park_(April_26_2014))

The District of Maple Ridge is developing Integrated Stormwater Management Plans (ISMPs) as required in each the District’s watersheds. The District’s ISMPs will “link the health of urban streams to land use decisions and will seek to protect the health of urban streams by better managing rainwater where it falls”ⁱ.

Fraser River Floodplain

Over 95% of Pitt Meadows and a section of Maple Ridge lie within the floodplain for the Fraser River. “To minimize the impact to the community from floods on these river systems, there is an extensive dyking system in place with 31.5 kilometers of agricultural dykes ... and 32.6 km of standard dykes. The City of Pitt Meadows serves as the local dyking authority for Pitt Meadows with responsibilities extending into Maple Ridge along Wharf Street to Princess Street in Lower Hammond”ⁱⁱ.

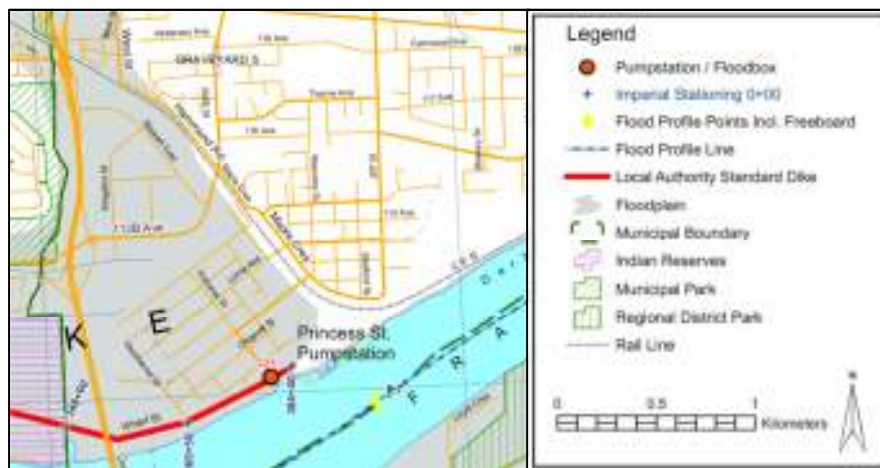


Figure 6: Hammond Area and the Fraser River Floodplain

Source: http://www.env.gov.bc.ca/wsd/public_safety/flood/maps/pitt_me_s_14.pdf

The figure above is an excerpt from the Lower Mainland Dike Inventory maps (updated June 1, 2011) showing the Hammond area and the Fraser River floodplain (grey). These “maps show the flood protection infrastructure regulated under the Dike Maintenance Act”ⁱⁱⁱ. The above stationing originates at the CPR rail crossing of the Pitt River.

For residents in or near flood risk areas the following websites provide information and links on flood preparedness and safety:

- Maple Ridge Flooding General Information
<http://www.mapleridge.ca/458/Flooding-General-Information>
- Pitt Meadows River Watch
<http://www.pittmeadows.bc.ca/EN/main/residents/49118/683/9807.html>

ⁱ Metro Vancouver (2010). Integrated Liquid Waste and Resource Management Plan

ⁱⁱ <http://www.pittmeadows.bc.ca/EN/main/residents/49118/683/9807.html>

ⁱⁱⁱ http://www.env.gov.bc.ca/wsd/public_safety/flood/fhm-2012/maps.html#imd_dikemaps