From: "Mochrie, Paul" <Paul.Mochrie@vancouver.ca>
To: "Direct to Mayor and Council - DL"
Date: 11/7/2024 5:10:22 PM
Subject: ENG - Council Memo - Infrastructure performance during the recent atmospheric river (October 18 to 20, 2024) - RTS 17627
Attachments: ENG - Council Memo - Infrastructure performance during the recent atmospheric river (October 18 to 20, 2024) - RTS 17627 - 2024-11-06.pdf

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Dear Mayor and Council,

Please see the attached memo from Lon LaClaire. A short summary of the memo is as follows:

- A strong atmospheric river between October 18 and 20, 2024 resulted in significant rainfall in Vancouver. The highest accumulations were in Hastings Sunrise and Olympic Village areas and correlated with a 1-in-200 year event.
- Infrastructure impacts vary depending on the area of the City, storm intensity, infrastructure condition, and operational factors and the City has prioritized investment and response plans to minimize those impacts.
- The intensity and duration of this event resulted in combined sewer overflows at all 28 outfalls and 400 Van311 reports of surface flooding on the street network.
- All pump stations remained operational, drinking water quality was maintained, and green rainwater infrastructure performed very well with 3 locations measured as treating more than double the design standard.

If you have any questions, please feel free to contact Lon LaClaire at 604-873-7336 or lon.laclaire@vancouver.ca.

Best,
Paul

Paul Mochrie (he/him)
City Manager
City of Vancouver
paul.mochrie@vancouver.ca

The City of Vancouver acknowledges that it is situated on the unceded traditional territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations.

CITY OF VANCOUVER

ENGINEERING SERVICES
Lon LaClaire, M.Eng., P.Eng.
City Engineer/General Manager

MEMORANDUM

November 6, 2024

TO: Mayor and Council

CC: Paul Mochrie, City Manager
Armin Amrolia, Deputy City Manager
Karen Levitt, Deputy City Manager
Sandra Singh, Deputy City Manager
Katrina Leckovic, City Clerk
Maria Pontikis, Chief Communications Officer, CEC
Teresa Jong, Administration Services Manager, City Manager's Office
Mellisa Morphy, Director of Policy, Mayor's Office
Trevor Ford, Chief of Staff, Mayor's Office

FROM: Lon LaClaire
General Manager, Engineering Services

SUBJECT: Infrastructure performance during the recent atmospheric river (October 18 to 20, 2024)

RTS #: 17627

Between October 18 and 20, 2024 a strong atmospheric river[1] brought significant rainfall to Vancouver with varying impacts to our infrastructure assets. The primary City infrastructure that is vulnerable during an atmospheric river is the sewage and drainage system due to its largely combined nature (combining wastewater and rainwater in the same pipe), deteriorating condition, and capacity constraints which can result in the system being overwhelmed or the need for emergency repairs. The potable water system is also vulnerable because of increased sediments and turbidity in Metro Vancouver drinking water reservoirs and raw water entering their treatment plants. Every rainfall event is different as well, with different rainfall intensities, wind conditions, and tidal impacts. Vancouver generally has favourable topographical conditions, with limited low lying and flat areas which aids natural drainage.

To mitigate the impacts of significant rainfall events, which are forecast to increase in intensity 30% by 2100, Vancouver is increasing investment in separating the combined sewer system, constructing new green rainwater infrastructure, implementing rainwater management tools on private property, and enhancing monitoring and maintenance of the system. Additionally, when significant rainfalls are forecast, the City has a comprehensive Severe Weather Response Plan that includes communications to the public, 24/7 system monitoring, street sweeping, catch

[1] Atmospheric rivers are meteorological events carrying water vapor in a relatively narrow band. Multiple atmospheric rivers, varying in severity, reach Vancouver each year.

basin clearing, and other reactive repair and response crews. The public also plays a role in keeping catch basins clear by clearing leaves and debris from around catch basins and participating in the Adopt a Catch Basin program.

The City's event preparedness and response followed the Severe Weather Incident Response Guideline. A VEMA coordination call was held with departments across the City and Park Board. Engineering Services led the operational response coordinated from the Weather Response Centre at National Yard for the event duration.

Below is a summary of key observations and metrics from the event:

Weather and Environmental Conditions:

- Rainfall accumulations varied across Vancouver with Hastings Sunrise (211 mm) and Olympic Village (206 mm) receiving the highest accumulations (See Appendix A).
- Statistically, the highest accumulations correlate with a 1-in-200 year event (0.5% likelihood of occurring per year)[2].
- There were favourable tides during the event and less rainfall accumulations in the Fraser River Floodplain (see Appendix A).
- Since it is early in the leaf-falling season, there were less fallen leaves to block catch basins.

Infrastructure Outcomes:

- Combined sewer overflows (CSOs) occurred at all 28 CSO outfalls in Vancouver (13 owned by the City and 15 owned by Metro Vancouver).
- 380 green rainwater infrastructure facilities across Vancouver performed well, with 3 locations measured as treating approximately 200 mm of rainfall, which is more than double the design standard.
- All 24 City owned sewer pump stations remained operational. One station temporarily lost power during the event but remained operational with a reserve power generator.
- Drinking water quality and safety were maintained.
- Jericho Yard experienced flooding primarily due to its low-lying location and tidal influence on the Metro Vancouver CSO outfall that it drains to.

Van311 Reports:

- 400 surface flooding reports (severity of calls ranged from minor ponding to deeper flood depths warranting temporary road closures).
- 34 sewer backups (may be underreported as 311 recorded messaging directs residents to work with plumbers directly if the backup is on private property).
- 1 drinking water quality inquiry related to Metro Vancouver's increased chlorination levels.

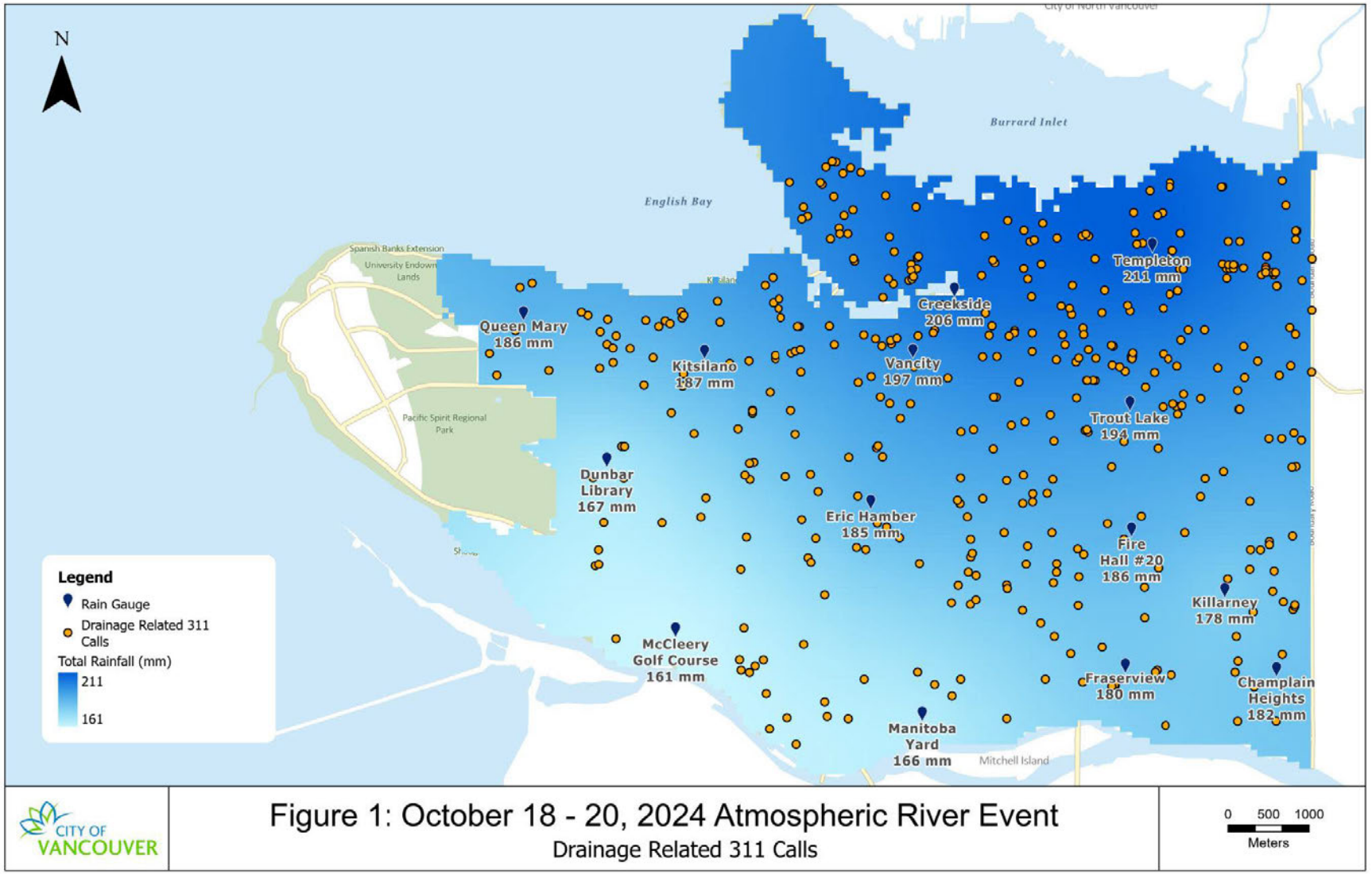
Please contact me directly if you have any questions.

Lon LaClaire, M.Eng., P.Eng.
General Manager, Engineering Services

604.873.7336 | lon.laclaire@vancouver.ca

[2] This does not mean that the event only occurs once per 200 years. Additionally, increased rainfall intensities with climate change add uncertainty to the use of statistics based on historical rainfall data.

Appendix A


N
Burrard Inlet
English Bay
Spanish Banks Extension
University Endowment Lands
Pacific Spirit Regional Park
Mitchell Island
Templeton
211 mm
Creekside
206 mm
Queen Mary
186 mm
Kitsilano
187 mm
Vancity
197 mm
Trout Lake
194 mm
Dunbar
Library
167 mm
Eric Hamber
185 mm
Fire
Hall #20
186 mm
Killarney
178 mm
McCleery
Golf Course
161 mm
Fraserview
180 mm
Champlain
Heights
182 mm
Manitoba
Yard
166 mm
Legend
Rain Gauge
Drainage Related 311 Calls
Total Rainfall (mm)
211
161
CITY OF VANCOUVER
Figure 1: October 18 - 20, 2024 Atmospheric River Event
Drainage Related 311 Calls
0 500 1000
Meters