WELCOME

Lowland Dyking Stakeholder Annual Meeting

January 23, 2024

Agenda

- Meeting History
- Special Guests
- Staff Introductions
- Posters
- Staff Presentations

  -Flood Control Video

  -Operations Updates, Q&A

  -Drainage Planning Updates, Q&A

  -Coastal Flood Adaptation and DMAF Project Updates, Q&A
- Staff available for individual questions after meeting
- Presentation slides will be available at

www.surrey.ca/services-payments/water-drainage-sewer/flood-control-prevention

Lowland Flood Control Overview Video

Lowland Diking Stakeholder Annual Meeting
January 23, 2024

2023 Works

- Mowing Program
- Flood Box Program
- Sea Dam Maintenance
- Ditch Maintenance
- Dyke Biannual Survey
- Cleaning of Silt Traps
- Construction (Dyke Upgrades)
- Irrigation
- River/Dike Inspections

2024 Works

- Mowing Program
- Flood Box Program
- Sea Dam Maintenance
- Ditch Maintenance
- Cleaning of Silt Traps
- Construction (Dyke Upgrades)
- Irrigation
- Dyke Biannual Survey
- River/Dike Inspections

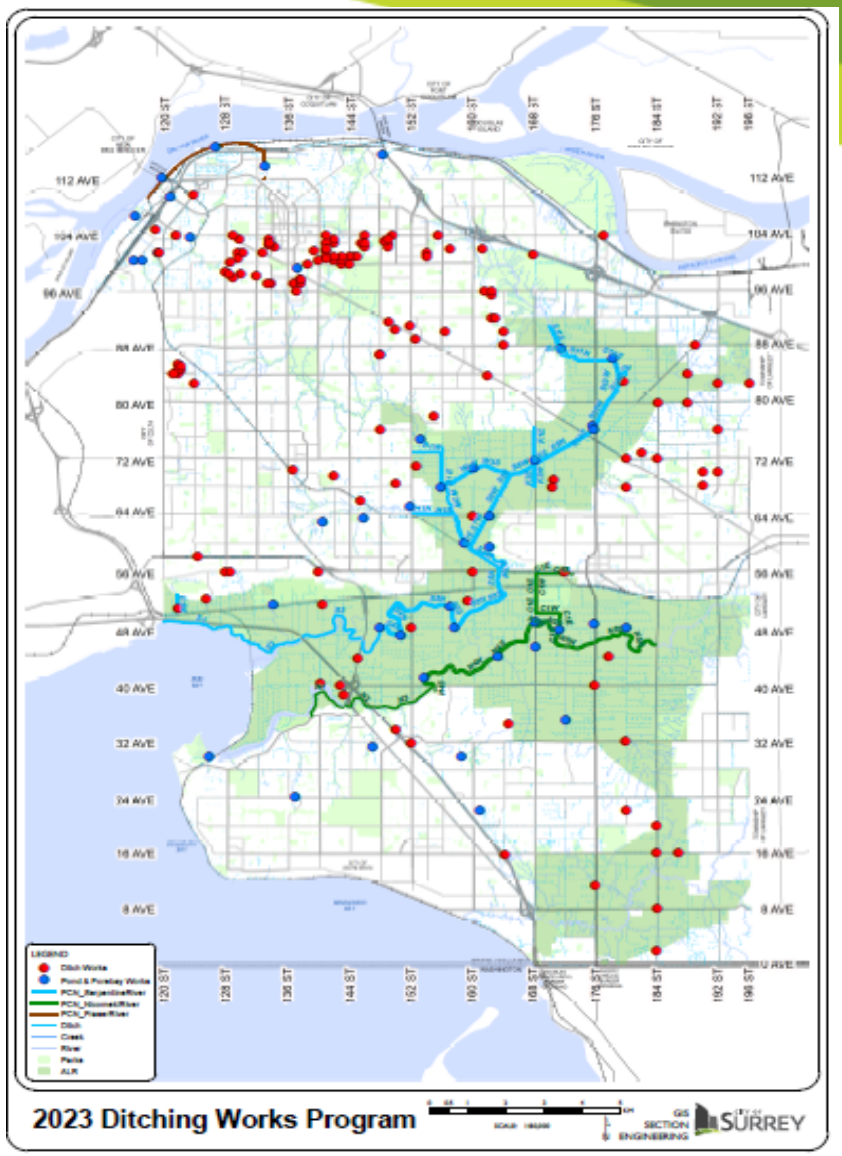
2023 Ditch Maintenance

- 12,000 metric tonnes,(2,000 truck loads) of ditch material disposed offsite

  Cleaning of Ditches

- 20,000 metres completed

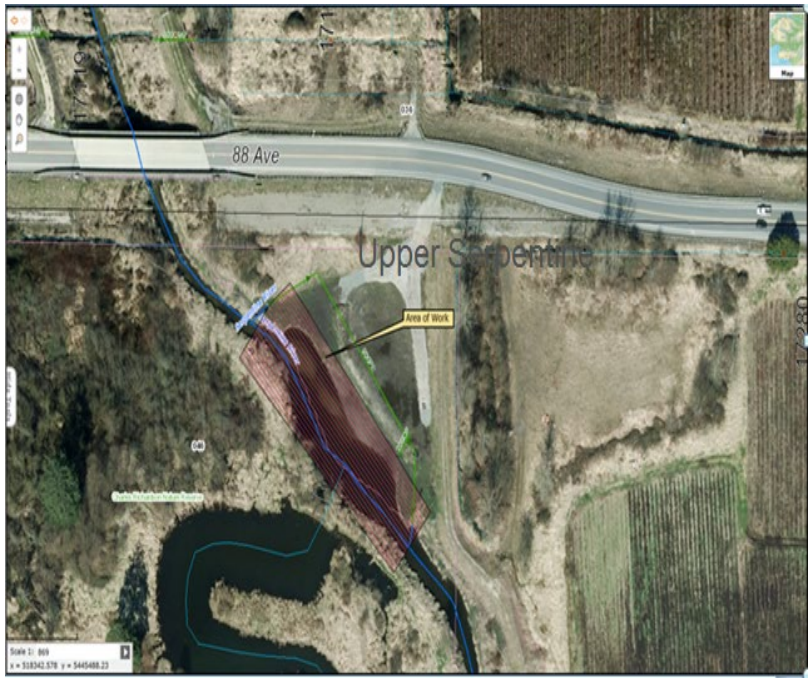
  Cleaning of Forebays (13 completed) and Detention Ponds (8 completed)



2023 Silt Removal

As part of our inspection efforts, the south end of Surrey Lake silt trap and the Upper Serpentine silt trap were identified as requiring cleaning. We subsequently cleaned by end of September.

Upper Serpentine



Surrey Lake

2023 Construction Program

Flood Box Replacements

- Completed 7 Flood Box Installations
- Emergency Repairs/Blockages

Dike Construction

- Mound Farm Stockpile
- Dike Upgrades

2023 Construction Program

Dike Construction

- Upper Serpentine Dike Improvements (88 Avenue and 176 Street) Completed
- Serpentine Dike North of Hwy 10 Completed
- Lower Nicomekl Dike (40 Avenue and 152 Street)

Annual winter Rainfall Accumulations

Year	Winter Rainfall Nov 1 – Mar 31 (mm)
2007/8	1,132
2008/9	968
2009/10	1,321
2010/11	1,170
2011/12	1,117
2012/13	1,310
2013/14	924
2014/15	1,130
2015/16	1,270
2016/17	1,319
2017/18	1,322
2018/19	1,099
2019/20	1,200
2020/21	815
2021/22	1,425
2022/24	931
2023/24	1,677 (prorated from 673 to date)
15 Year Average	1,153

Estimated Spillway Activation Hours

2008-2009 = 127

2021-2022 = 36

2022-2023 = 6

2023-2024 = 5 (to date)

Proposed 2024 Flood Box Program

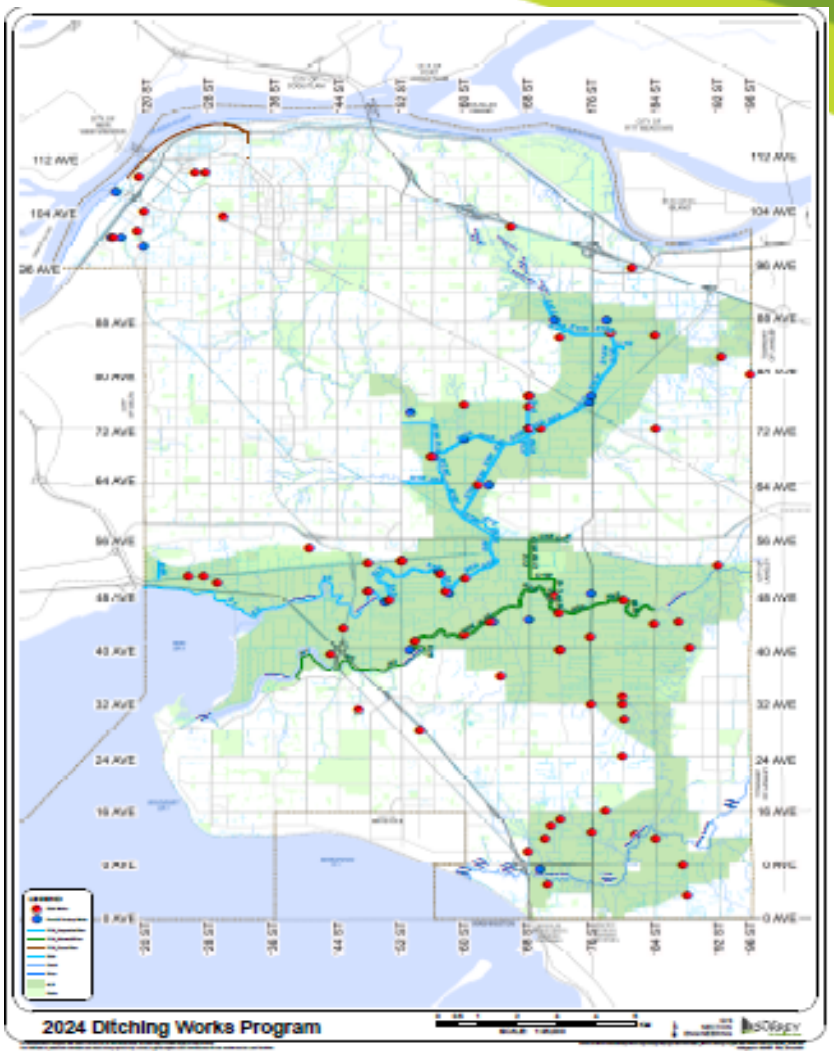
For our 2024 Flood box program:

- Continue our maintenance program;
- Improve access to flood boxes using step structures;
- Continue flood box marking program;
- Boat inspection and further assets will be inventoried;
- Continue to build inventory of replacement parts;
- Continue flood box replacement program.

Proposed 2024 Ditch Maintenance

Important part of our program is side casting.

- Cleaning of Ditches
- Cleaning of Forebays and Detention Ponds



Dyke Biannual Survey

We will complete a survey of all dyke crests, excluding private dykes.

2024 Goals: Summary

- Mowing approximately 100 kms of dykes and tree removal;
- Continue flood box improvements;
- Construction Upgrades on the dikes;
- Complete ditching;
- Monitor Upper Serpentine silt trap and Surrey lake silt trap;
- Complete Irrigation Activities as required;
- Maintenance program along dikes;
- River/Dike Inspections

2023 Pump Station Operation

The Pumps and Controls department looks after maintenance for all Drainage pump stations. For drainage pump station, our two main concerns are drainage and irrigation.

Vic Liu, Manager Pumps and Controls
vwliu@surrey.ca
(604) 590-7214

2023 Pump Station Operation Updates

Typical yearly maintenance includes:

- Rebuilt pumps and motors
- Inspected and performed preventative maintenance on all gearboxes (Procured 2 new gearboxes for screw pumps)
- Completed thorough preventative maintenance checks at all stations 2x/year (once in summer, once in winter)
- Performed monthly inspections at all drainage stations; check the following:
  - Oil and grease levels
  - Building and site for deficiencies
  - Flap gate functionality
  - Safety hazards
  - Forebay/log boom/grating
  - Proper station functionality including Level, flow and pressure instruments
- Performed grounds maintenance and general housekeeping at all stations
- Cleaned and maintained irrigation pump cage due to excessive algae bloom buildup
- Forebay cleaning and maintenance
- Station access road grading and maintenance
- Repair and maintain fish ladder system
- Purchase and install stairs for improved access to dike and station components such as flap gates and log booms
- Assisted BC Hydro on their conversion to 25kva at Manson and Pattullo

2023 Pump Station Operation Updates

2023 Pump work includes:

1. Erickson Irrigation pump station
2. Logging Ditch Irrigation pump station
3. Hookbrook pump station
4. East Newton pump station
5. Hall's Prairie pump station
6. Manson pump station
7. 64 Ave pump station
8. Burrows II irrigation pump station

2024 Pump Station Operation Goals

Drainage

Regular drainage maintenance

Irrigation – with increasing hot weather and low river levels

1. Work with farmers to increase storage level in ditch by raising level as much as possible without flooding any fields.
2. Fine tune irrigation stop levels to maximize pumping time.
3. Proactive maintenance using sensors to alert when cage needs cleaning.
4. Create new procedures or use rain gauges to prevent issues with higher irrigation levels and rain events.

Drainage Planning

- Drainage Servicing in the Lowlands
- Lowlands Studies
- Fill Impacts on Floodplain Storage

City's Drainage Policy

Convey Minor System Flows
(5-Year Event)

Convey Major System Flows
(100-Year Event)

Provide Stormwater Detention

Follow ARDSA Criteria (Lowlands)

ARDSA Criteria

Dormant Period (November 1 – February 28)	**Growing Period** (March 1 – October 31)	**Between Storm Events**
• Remove runoff from the 10-year, 5-day storm within 5 days	• Remove runoff from the 10-year, 2-day storm within 2 days	• Maintain base flow in channels at 1.2m below field elevation

Recent Storm Events

- December 4/5 2023 – 75 mm of rainfall
  - No major issues reported in lowlands
  - Good low tide cycles
- January 8/9 2024 – 37mm of rainfall
  - Elevated ocean level (storm surge) warning issued by ECCC; poor low tide cycles
  - Some pump station high level lock outs on Nicomekl
  - Debris accumulation at sea dams
- City reviewing opportunities to adjust high level lock out settings at select pump stations to enable longer periods of pumping before lock out occurs

Summary:

ARDSA Winter Event (10-year, 5-day):	143 mm
Dec 1-5 2023 (5-day) Rain Event:	108 mm
Jan 5-9 2024 (5-day) Rain Event:	37 mm

Lowlands Studies

- Pump Station Condition Assessment – COMPLETED
  - 28 drainage and irrigation pump station sites assessed
  - Structural, electrical, geotechnical, mechanical, pump condition and pumping capacity, etc.
  - 96% of assets ranked as being in excellent, good or fair condition
  - Short, medium and long-term upgrades identified
  - 64 Ave (drainage) and Burrows II (irrigation) pump station upgrades proceeding to design

Lowlands Studies

- Erickson Burrows Functional Plan Update – ONGOING
  - Reported drainage issues during 2021 Atmospheric River event
  - Review of uplands development and safe conveyance to Erickson PS
  - Anticipate completion in late spring 2024

- Lowland Strategic Plan Refresh – PENDING
  - Update of 1997 Strategic Plan for the Serpentine-Nicomekl lowlands
  - Refresh was paused to allow for rainfall data updates, including climate change considerations
  - Will report on status of Functional Plan implementation, works still required, potential irrigation improvements within City's control
  - Anticipate re-starting plan in late 2024 once rainfall updates are complete

Filling in the Floodplain

- Lowlands drainage system relies on floodplain storage activation during times of high river flow
- Spillways along the dyke activate at a 15-year rainfall event
- Filling activities within the floodplain reduces the storage capacity of the floodplain area and can lead to more frequent and severe flooding in the lowlands
- Staff continue to see unpermitted soil deposit activities in the floodplain

Filling in the Floodplain

- Soil removals and deposits are regulated under Surrey's Soil Conservation and Protection By-law No. 16389
- Soil removals and deposits require a Soil Permit before the work is done
- Some exemptions apply (see bylaw on City's website for details)
- Moving to online submission process

Soil Bylaw questions? Want to report a Soil Violation? Contact Lance Thompson, LGThompson@surrey.ca or (604) 591-4736

Coastal Flood Adaptation Strategy Implementation

STUDY AREAS

- Proactive process started in 2016 to reduce climate change-driven coastal flood risk now and into the future (1 metre of sea level by 2100)
- Range of strategic actions were developed to help the City's coastal communities become more resilient to the challenges
- Council endorsed final strategy on November 4, 2019 (Corporate Report No. R212)
- First phase of implementation underway through a $77M grant in 2019 to implement priority projects set out in CFAS through the federal Disaster Mitigation and Adaptation Fund (DMAF)

DMAF Status Update

DMAF Projects Under Construction:

1) Living Dyke (in phases, partially completed)
2) Colebrook Dyke (in phases, partially completed)
3) Nicomekl and Serpentine Dykes (in phases, partially completed)
4) 152 St Upgrades
5) Colebrook Pump Station

DMAF Projects Completed:

1) King George Blvd Nicomekl Bridge (2023)

2) Burrows Pump Station Upgrades (2022)

3) Stewart Farm Pump Station Upgrades (2022)

4) Southern Railway of BC Serpentine Bridge (2020)

Project: King George Boulevard Bridge Upgrades
Addition of thru lanes over Hwy 99
Partnership between Provincial-Federal-Translink
Status: Complete

Project: Living Dyke

Work Description: construction of new salt-march by adding sediments and planting he new salt-marsh

Drone image Copyright Ducks Unlimited, https://arcg.is/1Ov85a

Project: Colebrook Dyke Upgrades – Setback Dyke constructed in Mud Bay Park

Work Description: removing existing soils and preparing the grade for placement of new dyke material

Project: Colebrook Dyke Upgrades - 200 Series

Work Description: Excavating permanent drainage ditch along the toe of new dyke

Status: Underway

Project: Colebrook Pump Station Replacement

Work Description: Setting up temporary by-pass to manage flows in Peacock Brook

Status: Underway

Project: 152 Street Upgrades & Nicomekl Bridge Twinning

Work Description: preparing grades on the south abutment for bridge piles and temporary crane pad area for installing piles

Status: Underway

DMAF Questions?

General Enquiries

coastal@surrey.ca

(604)591-4146

DMAF Enquiry	Project Supervisor Contact
Pump Station Construction, Dyking, Bridges and Roadworks	Tindi Sekhon thsekhon@surrey.ca (604) 591-4765
Sea Dam Replacements	Akber Pabani akber.pabani@surrey.ca (604) 591-4401
Nicomekl Riverfront Project	Mickey Sjoquist mickella.sjoquist@surrey.ca (604) 592-7033

Thank You for Attending!

Troy Jeklin, Superintendent, Diking, Ditching and Irrigation Operations TWJeklin@surrey.ca (604) 590-7245

Matt Brown, Roads and Drainage Operations Central Manager
MKBrown@surrey.ca (604) 591-4847

Matt Osler, Senior Project Engineer, DMAF Lead
MFOsler@surrey.ca (604) 591-4657

Amir Shirazian, Lowlands Project Engineer
Amir.Shirazian@surrey.ca (604) 591-4223

Samantha Ward, Drainage Planning Manager
SWard@surrey.ca (604) 591-4326

Presentation will be posted:
www.surrey.ca/services-payments/water-drainage-sewer/flood-control/lowlands-floodplains/lowland-dyking-stakeholder-committee