



City of Richmond

Report to Committee

To:	General Purposes Committee	Date:	April 18, 2019
From:	Peter Russell Senior Manager, Sustainability and District Energy	File:	10-6125-01/2019-Vol 01
Re:	2018 Climate Action Revenue Incentive Program and Corporate Carbon Neutral Progress Report		

Staff Recommendation

That, in accordance with Provincial requirements, the Climate Action Revenue Incentive Program Report and Carbon Neutral Progress Report be posted on the City's website for public information.

Peter Russell
Senior Manager, Sustainability and District Energy
(604-276-4130)

Att. 3

REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Communications Finance Department	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: 	APPROVED BY CAO

Staff Report

Origin

The City of Richmond is committed to maintaining carbon neutral corporate operations, first achieved in 2013. The purpose of this report is to update Council on the 2018 corporate greenhouse gas (GHG) emissions and on the City's carbon neutrality strategy and activities.

Background

In September 2008, Council signed the BC Climate Action Charter, voluntarily committing the City to annual corporate GHG emissions reporting and to achieving carbon neutral operations. In 2013, Richmond City Council adopted the *"Towards Carbon Neutrality: Implementation Strategy,"* which put in place an effective framework, defined by four key steps, for meeting carbon neutrality commitments: measure, reduce, compensate (or offset) and report.

Key mechanisms identified in the 2013 strategy to address the need for compensation included assessing and quantifying beyond "business as usual" corporate activities that reduce GHG emissions and the implementation of the Richmond Carbon Market (RCM) program to purchase offsets from Richmond-based projects.

The City is reducing GHG emissions through the implementation of the 2013 Green Fleet Action Plan, Energy Management Program (for buildings and infrastructure), and other initiatives. To meet the City's community commitment of 33% reduction from 2007 levels by 2020, Council has endorsed a 20% GHG emissions reduction target for Fleet by 2020 from 2011 levels and a 65% reduction for corporate buildings by 2020 from 2007 levels.

Analysis

The City has achieved carbon neutral operations for the past five reporting years (2013-2017). Based on this year's review and findings, the City will be eligible to achieve carbon neutral corporate operations for the 2018 calendar year. Due to the City's completion of several emissions reduction projects since 2013, the City is carrying forward a surplus of verified emission credits. As per Provincial reporting protocol, this surplus has been allocated to future reporting years. Based on the continued work to reduce fleet and corporate building related emissions, the continued diversion of community organics from the waste stream, and the ongoing accumulation and preservation of select verified emission credits, staff are projecting that carbon neutral operations will be maintained indefinitely.

2018 Corporate Carbon Emissions and Offsets

For 2018, staff anticipate that the City will again be eligible for a "Level 3 Achievement of Carbon Neutrality" through the Climate Action Recognition Program. A formal announcement is expected from the Province at the Union of British Columbia Municipalities' annual conference later this year. It is estimated that the City will carry forward approximately 7,566 tonnes of GHG (tCO₂e) emission offsets for use in future reporting years.

The reported corporate emissions adhere to the BC Ministry of Environment's reporting methodology, and include GHG reductions resulting from the City's purchase of renewable natural gas. The 2018 total includes GHG emissions associated with traditional municipal

services, including those that are contracted out (e.g. community recycling collection). Corporate emissions in 2018 were approximately 17% lower than in 2007. This reduction was achieved despite an increase in population of approximately 20% and corresponding increases in corporate services that are associated with this growth.

Through the replacement of aging facilities with less GHG emission intensive infrastructure and the continued operational improvements at key facilities, it is anticipated that emissions at corporate buildings will continue to be reduced as planned projects are implemented over the coming few years.

Table 1: 2018 Corporate Emission Sources

	Tonnes CO₂e	Quantification Method
Emissions from services delivered directly by the City	6,713	Derived from metered energy consumption and associated GHG emissions from stationary sources (buildings, lighting, and pumps – except police services energy use) and corporate mobile sources (fleet – except construction related fuel use) used directly by the City
Emissions from contracted services delivering services on the City's behalf	1938	The BC government standard methodology and guidance for estimated contracted emissions. Fuel usage values and Option 3 (Vehicle/Equipment Type and Hours of Usage) were used to determine the contracted emissions value.
TOTAL	8651	

2018 Corporate and Community Carbon Credits (Offset Projects)

In accordance with BC Government Carbon Neutral protocols, the City completed the necessary reporting, quantification and verification of one corporate project outside of the City's traditional services boundary.

- **Diverted Organics Credits:** Emission credits from diverted household organic waste contributed significantly to offsetting the City's corporate emissions footprint in 2018. The estimated total diverted organics for 2018 corresponds to 6,267 tonnes of avoided GHG emissions, which represents 72% of the City's 2018 total corporate emissions.
- **Sun Hor Lum Conservation Area Credits:** The City will also be achieving emissions credits for the 2011 purchase and preservation of the Sun Hor Lum Conservation Area in Northeast Richmond. Preserving this natural habitat and ensuring that the land was not developed for agricultural purposes preserves the carbon stored in the peat soil. By completing required analysis and quantification of the carbon storage and sequestration benefits that the Sun Hor Lum Conservation Area provides the City and region, the City of Richmond will be claiming 3,244 tonnes of avoided GHG emissions for the period of time the City has owned the site, between 2012 and 2018. The carbon storage and sequestration benefits that were quantified as part of the City's due diligence and conservation management planning are in addition to the ecological benefits that the City and region enjoy from the preservation of this ecosystem. It is believed that this work will

help to inform other jurisdictions in the region on the importance of conserving and enhancing this type of ecosystem. After 2018 the City will be able to claim emissions credit for the carbon sequestration that the Sun Hor Lum Conservation provides, if the area is preserved and maintained in its natural state.

Richmond Carbon Market

Council endorsed the Richmond Carbon Market (RCM) program in 2017. The program is designed to reduce GHG emissions and build community resilience by re-investing Climate Action Revenue Incentive Program funds in Richmond-based emissions reduction projects.

After quantifying the first project with Pacific Gateway Hotel in 2017, the City of Richmond solicited project plan submissions for a second time from local businesses. Three proponents submitted project plans for Council consideration in early 2018; Pacific Gateway Hotel for its building energy efficiency project completed in 2015, Lafarge Canada for its asphalt recycling operations at Mitchell Island, Richmond in 2016, and Panevo Services for upcoming energy efficiency and equipment upgrade projects in Richmond. Council approved the execution of purchase and transfer agreements with each of the proponents, and transfer and purchase agreements were completed with Pacific Gateway Hotel and Lafarge Canada. These credits were used by the City to offset corporate emissions for the 2017 reporting year. Panevo Services remains a potential participant in the RCM program, but has yet to complete the necessary project identification and development work to execute a transfer and purchase agreement due to implementation delays.

The City remains committed to identifying potential community partners with quantifiable GHG emissions reduction projects through the RCM program as it has been an effective tool.

Table 2: Anticipated Emission Credits (Offsets)

Offsets	Tonnes CO₂e	Quantification Method
Household Organic Waste Composting – Municipally Collected	6,267*	BC Government Option 1 GHG Reduction Projects reporting method.
Sun Hor Lum Conservation Area preservation (2012-2018)	3,244	BC Government Option 2 GHG Reduction Projects reporting methods
Surplus GHG emission credits from 2017 Reporting Year	6,705	As per BC Government reporting protocol.
Total projected credits	16,216*	
Estimated surplus carry forward for 2019	7,566	

* Current estimates, project data to be confirmed by Metro Vancouver

Public Reporting

Staff will carry out public reporting on the City's website (Climate Action Charter related reports Attachments 1-3) and highlight the report through social media and public engagement activities throughout the year. Staff will continue to use the City's Richmond Carbon Market as a means to engage Richmond business to develop potential credits, and promote its general objectives to the business community to encourage greater awareness and focus on overall community GHG emissions reductions.

Financial Impact

None.

Conclusion

The City of Richmond is a leader amongst BC municipalities through its innovative corporate projects and programs to reduce community and corporate GHG emissions. Through the continued and strategic implementation of the *Towards Carbon Neutrality – Implementation Strategy*, the City has focused on completing projects that maximize the reduction of natural gas and fuel use by City operations. The City is well positioned to maximize corporate and community benefits of transitioning towards a low carbon community and maintain carbon neutral corporate operations in the long term.



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MD:md

- Att. 1: Carbon Emissions Provincial Reporting Worksheet - 2018
- Att. 2: Climate Action Revenue Incentive Public Report - 2018
- Att. 3: Contracted Emissions Estimates (Hired Equipment and Cascade) - 2018

Local Government Name:	The City of Richmond
Year:	2018
Contact Information:	
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Stationary Emission Sources:			
Building and Infrastructure Fuel	Unit of Measure	Quantity	Emissions (tCO2e)
Electricity	KWH	39,161,338.53	417.85
Natural Gas	GJ	77,761.15	3,877.95

Mobile Emission Sources: Estimated				
Vehicle Class	Vehicle Fuel	Unit of Measure	Quantity	Emissions (tCO2e)
Light Duty Vehicle	Gasoline	L	34,138	76.13
Light Duty Vehicle	Diesel	L	441	1.16
Light Duty Truck	Gasoline	L	216,229	489.33
Light Duty Truck	Diesel	L	7,743	20.31
Heavy Duty Truck	Gasoline	L	246,695	529.41
Heavy Duty Truck	Diesel	L	353,092	919.10
Off Road Vehicle	Gasoline	L	18,232	39.51
Off Road Vehicle	Diesel	L	107,642	310.44
Off Road Vehicle	Propane	L	20,523	31.58
Marine	Gasoline	L	32	0.07
Light Duty Truck - Contractor	Gasoline	L	10,724	24.27
Heavy Duty Truck - Contractor	Diesel	L	533,289	1,388.15
Heavy Duty Truck - Contractor	Natural Gas	GJ	38	1.90
Estimated Contractor	Diesel/Gas	L	-	523.20

Total Emissions (all Sources)	8,650.34
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Credits: Estimated			
Organic Waste Diversion	Baseline	Estimated tonnes	Estimated credits
Diverted Household Organic	7,783	20,466	6,267
Diverted Organic Waste (Waste Drop off Service)	4,709	4,500	0
2017 Surplus Carbon Credits			6,705
NE Bog Forest Conservation (Cumulative savings 2012-2018)			3,244
Total Estimated Credits			16,216.30

Total Estimated Balance	7,565.97
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Climate Action Revenue Incentive (CARIP) Public Report for 2018

Local Government:

City of Richmond

Report Submitted by:

Peter Russell

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The City of Richmond has completed the 2018 Climate Action Revenue Incentive Program (CARIP) Public Report as required by the Province of BC. The CARIP report summarizes actions taken in 2018 and proposed for 2019 to reduce corporate and community-wide energy consumption and greenhouse gas emissions (GHG), as well as general sustainability related initiatives.

April 18, 2019

General Information

Name of Local Government	City of Richmond
Member of Regional District (RD)	Metro Vancouver
Regional Growth Strategy (RGS) in region	Yes
Population	219,000

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1. GENERAL REPORT INFORMATION

This 2018 Climate Action Revenue Incentive Program (CARIP) Public Report documents the actions that the City of Richmond has taken corporately and in the community to support the reduction of greenhouse gas (GHG) emissions and energy use, as well as other sustainability related initiatives. The actions are separated into seven main categories; Broad Planning, Buildings and Lighting, Energy Generation, Greenspace/Natural Resource Protection, Solid Waste, Transportation, Water and Wastewater, and Climate Adaptation. There is also an Innovative Actions category, which the City has inputted items. The categories are further divided into community and corporate related actions, with general climate action questions at the beginning of each category.

This report encompasses a majority of the action items that the City is involved in support of GHG emissions and energy use reduction, but does not cover all sustainability related initiatives that the City conducts or supports. The report represents a “snapshot” of City activities in the past year, and proposed actions for 2019.

2. BROAD PLANNING ACTIONS

Broad Planning refers to high level planning that sets the stage for GHG emissions reductions, including plans such as Official Community Plans, Integrated Community Sustainability Plans, Climate Action Plans or Community Energy Emissions Plans. Land use planning that focuses on Smart Growth principles (compact, complete, connected, and centred) plays an especially important role in energy and GHG reduction. Summarized below are the City of Richmond’s responses to the Provincial inquiries regarding broad planning issues, and summary of initiatives conducted in 2018 and planned in 2019.

General Questions - Broad Planning	
What is (are) your current GHG reduction target(s)?	GHG reduction targets of 33% by 2020, and 80% by 2050, below 2007 levels. Reduce energy use by 10%.
Are you familiar with your local government's community energy and emissions inventory (e.g. CEEI or another inventory)?	Yes
What plans, policies or guidelines govern the implementation of climate mitigation in your community? <ul style="list-style-type: none"> Community Energy and Emissions Plan Integrated Community Sustainability Plan Community-Wide Climate Action Plan Official Community Plan Regional Growth Strategy Other: Ecological Network Management Plan, Riparian Response Strategy, Invasive Species Action Plan 	Yes Yes Yes Yes Yes Yes
Does your local government have a corporate GHG reduction plan?	Yes

Community-Wide Broad Planning Actions Taken in 2018	
	Council approved amendments to both the OCP and Zoning Bylaw to allow and regulate secondary suites in zones that allow two-unit dwellings (duplexes).
	OCP policies were updated to encourage zero emissions development and identify planned future Step Code considerations.
	The OCP and Area Plans were revised to reference the BC Energy Step Code as requirements in the Building Regulation Bylaw to help reduce community GHG emissions.
	The Zoning Bylaw was amended to include floor area exemptions for green building systems installed within the principal building, to encourage more renewable energy system development.
	Council adopted bylaw amendments to limit the maximum size of a dwelling on land in the ALR and limit the number of dwellings to 1 per parcel, to help preserve land for agriculture.
	Continued to implement OCP and CCAP policies as new development applications are processed which direct the majority of Richmond's urban growth to the City Centre, near major transit stations, and along arterial roads.
Community-Wide Broad Planning Actions Proposed for 2019	
	Investigate the City's single-family lot size policy to explore other multi-family ground oriented housing forms (e.g., duplex, triplex, row housing), and tools that could be used to address affordability in Richmond's single family neighbourhoods.
	Work with YVR's proposed Airport Zoning Regulations (AZR) to ensure consideration is given to maximizing energy efficiency through increased density in the City Centre area.
	Continue to implement OCP and CCAP policies as new development applications are processed which direct the majority of Richmond's urban growth to the City Centre, near major transit stations, and along arterial roads.
Corporate Broad Planning Actions Taken in 2018	
	Continued to advance District Energy Utility ready and connected development in the West Cambie, City Centre, and Oval Village neighbourhoods.
	Consulted regularly with Richmond's Small Home Builders Group and the Urban Development Institute when preparing new community building related sustainability initiatives.
Corporate Broad Planning Actions Proposed for 2019	
	Continue to regularly review and monitor the OCP and various Area Plans, and work with Sustainability staff to incorporate policies that target community GHG emissions reductions.
	Continue to consult with Richmond's Small Home Builders Group and the Urban Development Institute when preparing new community building related sustainability initiatives.

3. BUILDINGS AND LIGHTING ACTIONS

Low-carbon buildings use the minimum amount of energy needed to provide comfort and safety for their inhabitants and tap into renewable energy sources for heating, cooling and power. These buildings can save money, especially when calculated over the long term. This category also includes reductions realized from energy efficient street lights and lights in parks or other public spaces. Below are the City of Richmond's responses to the Provincial inquiries regarding building and lighting initiatives conducted in 2018 and planned for 2019.

General Questions - Building and Lighting	
The Province has committed to taking incremental steps to increase energy-efficiency requirements in the BC Building Code to make buildings net-zero energy ready by 2032. The BC Energy Step Code--a part of the BC Building Code--supports that effort	
Is your local government aware of the BC Energy Step Code ?	Yes
Is your local government implementing the BC Energy Step Code ?	Yes

Community-Wide Building and Lighting Actions Taken in 2018	
	Adopted parking standards for new residential buildings requiring 100% of new residential parking spaces to be supplied with EV charging infrastructure, a first in North America.
	Continued consultation with the City's construction sector stakeholders regarding local implementation of the BC Energy Step Code Policy for Part 3 and 9 buildings. Bylaws were adopted in September 2018 to enact the Step Code in Richmond.
	Continued with the following EnergySave Richmond suite of programs. <ul style="list-style-type: none"> Richmond Carbon Market program, which supports community based GHG emissions reduction projects through facilitation and funding; Mailing incentives to residents with property tax letters.
	Supported implementation of the Cool It! Climate education program in 20 Richmond Grades 4-7 classrooms.
Community-Wide Building and Lighting Actions Proposed for 2019	
	Update the City's implementation of the BC Energy Step Code, with the application of the step code to hotels and potentially increasing the requirements to step 3 for single family homes.
	Continue to implement EnergySave Richmond suite of programs. <ul style="list-style-type: none"> Climate Smart program for businesses. Water and energy saving programs. Richmond Carbon Market program to Richmond businesses as needed.
	Implement electric vehicle direct current fast charging stations in the City and EV residential parking standard requirements for new buildings, to further encourage the use of electrical vehicles.

Corporate Building and Lighting Actions Taken in 2018	
	Completed the upgrade of the building automation systems at Fire Hall No.4 and No.5 to reduce energy use, improve building performance monitoring, improve overall occupant comfort, and better manage equipment schedules.
	Secured funding for Phase 3 of the City of Richmond street lighting conversion project, with the replacement of approximately 1,000 less energy efficient street light fixtures with new more efficient LED technology.
	Continued to work towards achieving key targets in the City's High Performance Building Policy for new and existing facilities, with focus on energy efficiency, reduced resource use, and environmental sustainability.
Corporate Building and Lighting Actions Proposed for 2019	
	Complete major mechanical upgrades at Richmond Ice Centre and Library Cultural Centre.
	Complete lighting retrofits at Watermania Aquatic Centre and Thompson Community Centre.
	Complete recreational lighting improvements at Hugh Boyd and Steveston Park North tennis courts.
	Complete Phase 3 of the street lighting conversion project, replacing approximately 1,000 inefficient street light fixtures with more efficient LED fixtures.
	Complete the upgrade of the building automation systems at the Community Safety Building to reduce energy use, improve building performance monitoring, improve overall occupant comfort, and better manage equipment schedules.
	Continued to work towards achieving key targets in the City's High Performance Building Policy for new and existing facilities, with focus on energy efficiency, reduced resource use, and environmental sustainability.

4. ENERGY GENERATION ACTIONS

A transition to renewable or low-emission energy sources for heating, cooling and power supports large, long-term GHG emissions reductions. Renewable energy including waste heat recovery (e.g. from biogas and biomass), geo-exchange, micro hydroelectric, solar thermal and solar photovoltaic, heat pumps, tidal, wave, and wind energy can be implemented at different scales, e.g. in individual homes, or integrated across neighbourhoods through district energy or co-generation systems. Below are the City of Richmond's responses to the Provincial inquiries regarding energy generation, and summary of initiatives conducted in 2018 and planned in 2019.

General Questions - Energy Generation	
Is your local government developing, or constructing a <ul style="list-style-type: none"> • district energy system • renewable energy system • none of the above 	Yes Yes
Is your local government operating a <ul style="list-style-type: none"> • district energy system • renewable energy system • none of the above 	Yes Yes
Is your local government connected to a district energy system that is operated by another energy provider?	No
Are you familiar with the 2018 List of Funding Opportunities for Clean Energy Projects Led by First Nations and Local Governments?	Yes

Community-Wide Energy Generation Actions Taken in 2018 + Additional Actions	
	Continued to expand and connect the Alexandra District Energy Utility (ADEU) to new customers in the West Cambie neighbourhood. In 2018, 260 meters of new distribution piping were installed, and 240,000 ft ² of residential floor space were connected to the system. Total space now connected to ADEU = over 1,400,000 ft ² of residential space and over 335,000 ft ² non-residential space.
	Completed the design of the next phase of ADEU's geoexchange capacity expansion. Once in operation, this will almost double the existing renewable heating and cooling capacity to the West Cambie neighbourhood.
	Continued to develop and operate the Oval Village District Energy Utility (OVDEU) in the Oval Village area. Through-out 2018, the OVDEU had 8 connected buildings receiving energy. This totals 1,892,000 ft ² and over 1,600 apartment units.
	Worked with a private utility partner to develop plans and complete due diligence, feasibility analysis, and implementation plan for the design, finance, construction and operation of a City Centre District Energy Utility (CCDEU) which would encompass the entire city centre core.
	Created an interim servicing strategy in the City Centre area requiring developments to provide on-site low carbon energy generation plants designed for interconnection with the future City Centre District Energy Utility (CCDEU). To-date, six developments have been committed, totalling approximately 4,451,000 ft ² . These developments are currently working through various stages of the development process and are estimated to obtain occupancy between 2021-2023.
	Continued to implement DEU infrastructure and developments using dedicated DEU operating funds and capital program, financed through ratepayer funds.

Community-Wide Energy Generation Actions Proposed for 2019	
	Continue to connect buildings and expand the ADEU distribution system as development requires. Three new residential buildings (480,000 ft ²) are scheduled for connection in 2019-2020.
	The pipes and vault connections that will allow for the future installation of the new geoexchange fields at ADEU will be installed.
	Continue Oval Village District Energy Utility construction and planning in partnership with a private utility partner, with continuous operational improvement and the design for a third interim energy centre.
	Design and planning for the upcoming connection of four new developments with a total of over 1,000,000 ft ² of building gross floor area to the OVDEU system.
	Continue securing on-site low carbon energy generation plants designed for interconnection with the future CCDEU system. Development schedules indicate that seven applicable developments in the City Centre will go through rezoning in 2019. The seven developments are estimated to total approximately 1,910,000 ft ² .

Corporate Energy Generation Actions Taken in 2018	
	Secured funding to complete major equipment replacement and upgrades at Thompson Community Centre, including the revitalization of the geo-exchange field on-site.
Corporate Energy Generation Actions Proposed for 2019	
	Continue to target renewable energy integration, a key component of the City's High Performance Building Policy, during design and development of new corporate facilities.
	Complete the installation of photovoltaic system at the new Fire Hall No.1 to offset electrical demand.
	Complete the mechanical upgrades at the Cultural Centre, which includes the integration of highly efficient heat pump technology.

5. GREENSPACE/NATURAL RESOURCE PROTECTION ACTIONS

Greenspace/Natural Resource Protection refers to the creation of parks and greenways, boulevards, community forests, urban agriculture, riparian areas, gardens, recreation/school sites, and other green spaces, such as remediated brownfield/contaminated sites as well as the protection of wetlands, waterways and other naturally occurring features. Below are the City of Richmond responses to the Provincial inquiry regarding "greenspace" management in the City, and summary of community initiatives conducted in 2018 and planned in 2019.

General Questions - Greenspace	
Does your local government have urban forest policies, plans or programs?	Yes
Does your local government have policies, plans or programs to support local food production?	Yes

Community-Wide Greenspace Actions Taken in 2018	
	Planted 518 trees on City streets as a result of urban redevelopment agreements.
	Partnership with Tree Canada to secure grant funding from local businesses. Volunteer tree planting events included: TD Tree Days <ul style="list-style-type: none"> • Terra Nova Rural Park • 171 Volunteers • 790 trees and shrubs planted IKEA Tree Plant <ul style="list-style-type: none"> • Garden City Lands • 20 volunteers • 900 shrubs Siemens Tree Plant <ul style="list-style-type: none"> • Garden City Lands • 9 volunteers • 300 trees BC Hydro Community Tree Plant <ul style="list-style-type: none"> • Richmond Nature park, Rideau Neighbourhood Park, Paulik Park • 37 large trees
	Updated the City's Riparian Response Strategy, which has formalized the City's designated Riparian Management Areas in the Zoning Bylaw.
	Updated the City's Watercourse Protection and Crossing Bylaw and other related Bylaws, which have streamlined reviews of single family development applications based on a City lead stewardship approach. These updates have bolstered the mechanisms for City staff to better address non-compliance activities within riparian areas.
	Enhanced approximately 1.0 ha (10,000 m ²) of disturbed riparian habitat with native plantings through residential, commercial and industrial development approvals.
Community-Wide Greenspace Actions Proposed for 2019	
	Continue work on Phase 2 updates of the Riparian Response Strategy to better address multifamily, commercial and industrial development impacts adjacent to riparian areas.
	Complete the initial development of Wildlife Sensitive Design Guidelines aimed at achieving partnerships in the agricultural and development communities with the goal of achieving more wildlife friendly development throughout both urban and rural areas of the City.

Corporate Greenspace Actions Taken in 2018	
	Completed the GIS inventory of parks assets including trees in parks and other City-owned lands and road right-of ways.
	Planted 1,756 trees in City parks.
	Completed the Middle Arm Waterfront Park Brownfield Remediation Study to identify Areas of Concern on 28 acres of industrial properties that will be developed as the Lulu Island Waterfront Park beginning in 2024.
	Opened the 4 acre Aberdeen Neighbourhood Park, which includes a large number of trees, a pollinator meadow, native planting and a rain garden.
	Completed the upgrades to a 100 metre section of the Middle Arm Waterfront Greenway that includes native, riparian planting along the dike face and dike crest, and separated cycling and pedestrian paths.
	Completed a 250 metre section of the Gilbert Road Greenway that includes a mixed use trail and tree planting.
Corporate Greenspace Actions Proposed for 2019	
	Complete the City Tree Management Strategy that will set direction for the Canopy Growth Model, for implementation of new urban street tree standards and for a preventative maintenance program for all trees on City-owned land.
	Begin implementation of the Canopy Growth Model for tree planting in parks that were identified in the 2017 Lidar data as being low in canopy coverage.
	Complete Phase 1 of the 1.5 acre Capstan Village Park.
	Complete the construction of Phase 1 of the 6 acre Alexandra Neighbourhood Park that will include a wetland, a 2 acre meadow and 82 trees.
	Complete the improvements to 6 acres of London Steveston Park including the planting of 285 trees.
	Complete the initial development of a habitat banking strategy to address habitat offsets required as part of the City's climate adaptation/flood mitigation strategies.

6. SOLID WASTE ACTIONS

Reducing, reusing, recycling, recovering and managing the disposal of the residual solid waste minimizes environmental impacts and supports sustainable environmental management, greenhouse gas reductions, and improved air and water quality. Below are the City of Richmond responses to the Provincial inquiries regarding solid waste management in the City, and summary of initiatives conducted in 2018 and planned in 2019.

General Questions - Solid Waste	
Does your local government have construction and demolition waste reduction policies, plans or programs?	Yes
Does your local government have organics reduction/diversion policies, plans or programs?	Yes

Community-Wide Solid Waste Actions Taken in 2018 + Additional Actions	
	Served over 165,000 residents at the Richmond Recycling Depot, providing drop off recycling for materials such as small & large appliances, batteries, lights, cell phones, paint and solvents, Styrofoam, plastic bags and added flexible plastic packaging as a new item.
	Installed 22 new public space recycling containers that are of newer design and implemented standard signage guidelines.
	Completed approximately 90 community engagement activities, including Recycling Depot tours, information sessions, workshops and outreach displays at community events.
	Developed outreach materials for the Green Ambassadors to increase recognition of the program at community events.
	Promoted recycling and environmental initiatives through the Green Ambassadors program and participating in 24 special events, and volunteering 3,210 hours.
	Introduced the Recycling Challenge Game and online supply ordering tool to provide residents with access to more tools to improve recycling efforts.
	Provided over 250 recycling stations at 76 special events to improve waste diversion.
	Published user-friendly commercial and multi-family development guidelines to assist in design of garbage and recycling spaces to support increased diversion.
	Completed the "Let's Recycle Correctly" campaign to engage with residents directly to increase awareness of the importance of proper recycling.
	Introduced the House Moving and Salvage Program to promote opportunities for moving or salvage of the home rather than demolition.

Community-Wide Solid Waste Actions Proposed for 2019	
	Expand items at the Recycling Depot to include upholstered furniture, electronics, propane tanks, butane cylinders, tires, smoke and CO alarms, fire extinguishers, motor oil and antifreeze and lead acid batteries.
	Extend days of operation at the Recycling Depot from five to six days per week.
	Expand the Large Item Pick Up program from four to six items per year and add tires as an eligible item.
	Develop and implement a communication plan and campaign to achieve 80% waste diversion.
	Design and implement a one month awareness campaign in partnership with the Richmond School District for recycling and collection of flexible plastic packaging from participating schools.
	Raise awareness on the issues of marine plastics and how to reduce plastic litter in Richmond. Research and stay current on policies and actions around the world.
	Incorporate Green Ambassador program information on the City's website to increase program recognition.

Corporate Solid Waste Actions Taken in 2018 + Additional Actions	
	Supported Community Services department with their Annual Purge Event to properly recycle paper, small appliances, batteries, electronics and hazardous materials.
	Updated signage on existing recycling containers and installed recycling stations at new City facilities to represent the materials accepted in the recycling program.
	Increased awareness of recycling options and provided tips for staff through the We Recycle campaign on the intranet.
Corporate Solid Waste Actions Proposed for 2019	
	Develop a series of reduce, reuse, recycle workshops to provide staff with information on opportunities to reduce their carbon footprint.
	Continue to install recycling containers with standard signage to ensure consistency for staff at all City facilities.
	Conduct visual audits at all major City facilities and provide feedback relating to their recycling and waste management.
	Participate in review of purchasing policies in relation to enhancing circular economy concepts.

7. TRANSPORTATION ACTIONS

Transportation actions that increase transportation system efficiency emphasize the movement of people and goods, and give priority to more efficient modes, e.g. walking, cycling and public transit, can contribute to reductions in GHG emissions and more livable communities. Below are the City of Richmond responses to the Provincial inquiries regarding transportation system management in the City, and summary of initiatives conducted in 2018 and planned in 2019.

General Questions - Transportation	
Does your local government have policies, plans or programs to support: <ul style="list-style-type: none"> • Walking • Cycling • Transit Use • Electric Vehicle Use • Other (please specify) 	Yes Yes Yes Yes Yes
Does your local government have a Transportation Demand Management (TDM) strategy (e.g. to reduce single-vehicle occupancy trips, increase travel options, provide incentives to encourage individuals to modify travel behaviour)?	Yes
Does your local government integrate its transportation and land use planning?	Yes

Community-Wide Transportation Actions Taken in 2018	
	Facilitated expansion of car-sharing services in Richmond.
	Facilitated two workshops and several electric vehicle outreach displays to provide information of electric vehicles and charging infrastructure for residents.
Community-Wide Transportation Actions Proposed for 2019	
	Continue to facilitate additional car-sharing service hubs in other areas of Richmond.
	Increase workshops and outreach displays for staff and the public to provide information of electric vehicles and charging infrastructure. Develop volunteers and train the trainer sessions to be able to offer more outreach support.

Corporate Transportation Actions Taken in 2018	
	Initiated a capital project to expand public electric vehicle charging stations, including level III charging stations that are owned and operated by the City.
	Completed feasibility study at four major City sites to determine electrical capacity for all parking stall to be potentially electrified to support EV expansion.
	Increased membership of car-sharing services for corporate use by 33 users.
	Installed seven EV charging stations for Fleet and public use.
	Replaced 7 Internal combustion type vehicles with 4 fully Electric Chevy Bolt and 3 plug in Hybrid Volts as part of Fleet replacement plan.
	Purchased smaller more fuel-efficient pick up trucks for fleet replacements.
	Installed 42 dedicated shore power trickle chargers in the Works Yard to charge onboard batteries on Fleet vehicles, helping to avoid unnecessary idling or the use of diesel generators.
	Prepared Auntie Idle newsletters for Staff to promote new technologies, programs and tips on anti-idling techniques and the operation of City of Richmond's Vehicle Procedures, Policies and Expectations.

Corporate Transportation - Actions Proposed for 2019	
	Expand electric vehicles charging stations for fleet vehicles at City facilities using current infrastructure and explore future expansion requirements.
	Support technical aspects of new installations for DC Fast charge and Level 2 dual port electric vehicle charging stations.
	Explore and install an automatic stop and start idle timer on Fleet vehicles so units can be automatically triggered by low battery voltage, applying the service brake or user restart requests to reduce idling, fuel consumption and wear on engine and vehicle components.
	Upgrade and install the infrastructure to support up to 32 ports total (Level 2) on a power share basis at the City Hall annex location.
	Complete installation of approximately 10 propane conversion kits on high use City trucks and a propane fuelling station at Works yard as part of the Propane Pilot program to reduce GHG emissions and increased fuel savings.
	Continue to expand on-going training of operational staff and new hires in fuel efficient and safe driving techniques to reduce idling, fuel consumption and care of the City's Fleet.
	Install a Solar EV ARC for electric vehicle charging.
	Promote and expand membership for Car-sharing program for corporate use.
	Install solar panels on larger work vehicles to charge auxiliary batteries used for lighting.
	Continue to replace gas combustion engines with plug-in, Hybrid or 100% electric passenger vehicles as technology and charging infrastructure become available.
	Start to explore electric and hybrid trucks as replacements for the City's pickup truck Fleet.

8. WATER AND WASTEWATER ACTIONS

Managing and reducing water consumption and wastewater is an important aspect of developing a sustainable built environment that supports healthy communities, protects ecological integrity, and reduces GHG emissions. Below are the City of Richmond responses to the Provincial inquiry regarding water and wastewater management in the City, and summary of initiatives conducted in 2018 and planned in 2019.

General Questions - Water Conservation	
Does your local government have water conservation policies, plans or programs?	Yes

Community-Wide Water and Wastewater Actions Taken in 2018 + Additional Actions	
	Issued 728 toilet rebates to homeowners that replaced old toilets with a low-flush toilet to reduce residential water use. The total incentive paid to homeowners through this program in 2018 was \$72,800.
	Partnered with BC Hydro in spring and fall 2018 to provide a clothes washer rebate program to reduce home water use and electricity. To date, 914 rebates have been issued to homeowners who replace their less efficient (water and electricity) washer for a new efficient model at a total cost of \$66,300 to the City. It is estimated that this program achieved annual savings in water and energy of 3,442,000 litres per year and 88,110 kilowatt hours per year, respectively.
	Installed usage meters under the Volunteer Multi-Family Water Meter Program in 146 complexes (comprising 9,119 multi-family dwelling units) including 61 apartment complexes (6,577 units) and 85 townhouse complexes (2,542 units). It is mandatory for new multi-family residences to have a water meter. A total of 46% of multi-family units in Richmond are water metered.
	Assessed and helped to reduce water waste at single-family homes by providing notification on properties with consumption greater than 250 m3 quarterly.
	Reduced water pressure during from October to May to reduce the volume of leakage and extend the life of our water infrastructure. In 2017, the City introduced a new timer-based pressure management program during off-peak hours in the summer months, further reducing leakage volume and extending the life of water infrastructure.
	Sold 108 rain barrels through the City's Rain Barrel Program to Richmond residents, to help promote the use of rain water for gardening purposes and reduce the use of potable water in gardens.
	Hosted a series of Works on Wheels bus tours for the public to learn about water and wastewater infrastructure maintained by the City.

Community-Wide Water and Wastewater Actions Proposed for 2019	
	Continue the volunteer Multi-Family water meter program.
	Continue the toilet rebate program (\$100,000 in funding for 2018).
	Continue offering the water saving kits to homeowners with a newly installed water meter.
	Continue to participate in the clothes washer rebate joint program in May/June and October/November with BC Hydro in 2018 (pending Council approval).
	Continue the City's Rain Barrel Program and promote the use of rain water for gardening and irrigation purposes.
	Distribute, if necessary, educational brochures on water restrictions, describing the stages and what they entail.
	Maintain updated water conservation information on the City's website for public use.
	Continue to organize and host the Public Works Open House for the public to learn about all of Richmond's operations and sustainable programs.
	Continue to host Project WET, an interactive elementary school program that teaches classes about water consumption, conservation, quality and supply.
	Continue to provide community events with the portable drinking fountains to encourage tap water consumption.
	Deploy a universal Fixed Based Network for water meter reading in order for leaks to be identified earlier and to decrease manual reading of water meters.

Corporate Water and Wastewater Actions Taken in 2018 + Additional Actions	
	Participated in the Metro Vancouver Regional Engineers Advisory Committees. The meetings revolve around networking with other municipalities and discussing initiatives, progresses, updates in policies and results.
	Implemented a timer-based pressure management program to decrease system pressures during off-peak hours in the summer months to reduce water loss to system leakage.
	Initiated grease management pilot projects to combat fats, oils, and grease buildup in the sanitary system.
	Participated in Metro Vancouver's local government working group in the Regional Assessment of Residential Water Metering project to assess the costs and benefits of water metering and share Richmond's experience and expertise with regards to successes in water metering.
Corporate Water and Wastewater Actions Proposed for 2019	
	Continue to take part in the Metro Vancouver Regional Engineers Advisory Committees.
	Coordinate with the Metro Vancouver Residential Indoor and Outdoor Uses of Water Monitoring Study.

9. CLIMATE ADAPTION ACTIONS

This section of the CARIP survey is designed to collect information related to the types of climate impacts local governments are experiencing and how they are being addressed. Below are the City of Richmond responses to the Provincial inquiries regarding climate change adaption, and summary of initiatives conducted in 2018 and planned in 2019.

Please identify the THREE climate impacts that are most relevant to your Local Government.	
<ul style="list-style-type: none"> • Warmer winter temperatures reducing snowpack • Changing temperatures influencing species migration and ecosystem shifts • Sea level rise and storms causing coastal flooding and/or erosion 	
In 2018 has your local government addressed the impacts of a changing climate using any of the following?	
Risk and Vulnerability Assessments	Yes
Risk Reduction Strategies	Yes
Emergency Response Planning	Yes
Asset Management	Yes
Natural/Eco Asset Management Strategies	Yes
Infrastructure Upgrades (e.g. stormwater system upgrades)	Yes
Beach Nourishment Projects	No
Economic Diversification Initiatives	Yes
Strategic and Financial Planning	Yes
Cross-Department Working Groups	Yes
Official Community Plan Policy Changes	Yes
Changes to Zoning and other Bylaws and Regulations	Yes
Incentives for Property Owners (e.g. reducing storm water run-off)	Yes
Public Education and Awareness	Yes
Research	Yes
Mapping	Yes
Partnerships	Yes

Climate Change Adaptation Actions Taken in 2018

Please elaborate on key actions and/or partnerships your local government has engaged in to prepare for, and adapt to a changing climate. Add links to key documents and information where appropriate.

	Continued work on Dike Master Plan Phases 3, 4, and 5 which provide the long term planning strategies for dike improvements.
	Continued detailed design of the South dike raising project from Gilbert Rd to No.3 Rd.
	Initiated detailed design of the South dike raising project from No.3 Rd to Finn Slough excluding the frontage of 13911 Garden City Road.
	Initiated work on the Flood Protection Management Strategy 2019.
	Initiated the Drainage Pump Station Condition Assessment.
	Initiated evaluation of soil densification strategies for flood protection infrastructure.
	Completed Dike Master Plan Phase 2.
	Completed a drainage pump station upgrade.
	Raised 125m of dike.

Climate Change Adaptation Actions Proposed for 2019

	Complete the Steveston Island Flood Protection Investigation to evaluate flood protection alignments and options for the South Dike.
	Complete the Flood Protection Management Strategy 2019.
	Complete Dike Master Plan Phases 3, 4, and 5.
	Complete the Drainage Pump Station Condition Assessment.
	Commence construction of the South Dike raising from Gilbert Rd to No 3 Rd.
	Commence testing for soil densification technologies.
	Upgrade 5 drainage pump stations and re-construct 1 drainage pump station.
	Complete construction of the South dike raising project from Gilbert Rd to No.3 Rd.

The following are key resources that may be helpful to your local government in identifying climate impacts, as well as, strategies, actions and funding to deal with them. For those resources that you have used, please indicate whether they were useful in advancing your work in climate change adaptation?

Indicators of Climate Change for British Columbia	Haven't Used
Plan2Adapt	Haven't Used
Climate Projections for Metro Vancouver	Useful
Climate Projections for the Capital Region	Haven't Used
Climate Projections for the Cowichan Valley Regional District	Haven't Used
Province of BC's BC Adapts Video Series	Haven't Used
Preparing for Climate Change: Implementation Guide for Local Governments	Haven't Used
Public Infrastructure and Engineering Vulnerability Committee's (PIEVC)	Haven't Used
Sea Level Rise Adaptation Primer	Haven't Used
BC Regional Adaptation Collaborative Webinars	Haven't Used
Retooling for Climate Change	Haven't Used
Water Balance Model	Haven't Used
Water Conservation Calculator	Haven't Used
Funding:	
National Disaster Mitigation Program (NDMP)	Haven't Used
Community Emergency Preparedness Fund (CEPF)	Haven't Used
Municipalities for Climate Innovation Program (MCIP)	Useful
Climate Adaptation Partner Grants (FCM)	Haven't Used
Infrastructure Planning Grants (MAH)	Haven't Used
Federal Gas Tax Fund	Useful

10. INNOVATIVE ACTIONS

This section provides the opportunity to showcase an innovative *Corporate and/or Community-Wide* GHG reduction and/or climate change adaptation activity that your local government has undertaken. Below is summary of two of the innovated initiatives that the City implemented in 2018.

Community-Wide Innovation Action

- The Dike Master Plan sets a goal of increasing the height of Richmond's 49 km long dike system to 4.7m in order to adequately prepare and adapt for future conditions caused by climate change. The 4.7m dike elevation is derived from a 200-year flood elevation of 2.9m, a freeboard of 0.6m above the 200-year flood standard, a 1m allowance for sea level rise, and a 0.2m allowance for geologic subsidence through the year 2100. The Dike Master Plan further requires that the structural design of the upgraded diking system be able to accommodate a further lift to 5.5m to accommodate possible additional sea level rise in future years. The City will be considering habitat offset and enhancement opportunities through the works associated with the Dike Master Plan.

Corporate Innovation Action

- All new staff orientation sessions also include a session on Green Fleet Driving techniques and our Green Fleet Policy.
- All new drivers are assessed by our Fleet training officer and are required to study and sign off on the requirements defined in our Driver's program, which includes everything outlined in the course materials before they can operate a City owned vehicle.
- Monthly analytic reports are produced to identify idling levels of vehicles and these figures are used to educate and also to find innovative methods of reducing idling on high idling units, for instance solar panels, LED Lighting and auxiliary power.

11. PROGRAMS, PARTNERSHIPS AND FUNDING OPPORTUNITIES

Local governments often rely on programs, partnerships and funding opportunities to achieve their climate action goals. Please share the names of programs and organizations that have supported your local government's climate actions by listing each entry in the box below separated by a forward slash (e.g. program1/program2).

Mitigation

Mitigation Programs, Partnerships and Funding

- The City received \$750,000 from the Federation of Canadian Municipalities' to complete the Cultural Center equipment renewal and GHG emissions reduction project.
- The City entered into a \$100,000 funding agreement with BC Hydro to support the new Building Energy Specialist position following the implementation of the BC Energy Step Code.
- The City received \$19,800 from BC Hydro in 2018 as a part of an ongoing partnership to provide Air Tightness Training and Blower Door Testing programs for builders as they adapt to the new BC Energy Step Code requirements.
- The Provincial organization Trans Link: provides funding support towards cycling education and promotion initiatives including Bike to Work/School Week, cycling education courses for elementary students, cycling education courses for adults, and community bike ride.
- The Provincial organization Trans Link: provides capital funding on a 50-50 cost-share basis for the construction of pedestrian and cycling-related infrastructure including way finding, and for the upgrade of existing bus stops to become fully accessible.
- BikeBC (Ministry of Transportation & Infrastructure): provides capital funding on a 50-50 costshare basis for the construction of cycling-related infrastructure.
- ICBC: provides funding support towards the construction of pedestrian-related infrastructure including pathways and crosswalks.

Adaptation

Adaptation Programs, Partnerships and Funding

- Partnered with Emily Carr University to establish a new 2,500 m² pollinator meadow at Terra Nova Rural Park.
- Worked with the Richmond Butterflyway Rangers who are responsible for planting pollinator patches in 21 locations throughout Richmond, including City Hall.
- The City received federal and provincial funding from the National Disaster Mitigation Program for the Flood Mitigation Strategy Update, which consists of three projects: Dike Master Plan Phase 3, Flood Management Strategy Update and Pump Station Condition Assessment.
- The City received federal and provincial funding from the National Disaster Mitigation Program for the Steveston Island Flood Risk Investigation Project.
- The City received funding from UBCM for Dike Master Plan Phase 5.

12. CONCLUSION

This report highlights a wide range of initiatives that the City is undertaking to continue to advance sustainability corporately and in the community, with focus on reducing greenhouse gas emissions, and energy and resource use. This report does not encompass all of the sustainability related initiatives and actions that the City is involved in, but simply provides a “snapshot” of some of the key areas and work that the City has completed and is planning on completing. These efforts help to position the City as a leader in our region and beyond. The City has set aggressive sustainability targets on a range of fronts, including for greenhouse gas emissions reduction and waste diversion. The City will continue to pursue best practices and innovation to achieve its sustainability related goals, which are recognized as critical to Richmond’s Vision of “being the most appealing, livable and well-managed community in Canada”.

CARIP/Carbon Neutral Progress Report Reporting Year 2018

Supporting Documentation Contracted Emissions Template

LOCAL GOVERNMENT
City of Richmond 6911 No. 3 Road Richmond, BC V6Y 2C1
PROJECT DESIGNATE
Levi Higgs, Principal Consultant, Agile Energy Management Direct 604-788-4538 LeviHiggs@AgileEM.ca
RATIONALE
<p>An estimation methodology for hired equipment contractor emissions is being utilized for 2018, as actual emissions for some contracts over \$25,000 have not provided fuel usage values.</p> <p>The City has identified four main contract areas that deliver traditional municipal services:</p> <ol style="list-style-type: none"> 1. Cascades Recovery Inc. and Supersave Disposal provide recycling depot container collection and recycling services; 2. Sierra Waste Services provide residential solid waste and recycling services; 3. Maple Leaf Disposal provides waste and recycling collection services at City facilities; 4. Smithrite (GFL) provides waste collection services at the Public Works Yard; 5. Waste Connections provide waste and recycling collection services for special events; and 6. Individual Hired Equipment. <p>Contractor emissions associated with the delivery of traditional municipal services by Sierra Waste Services, Supersave Disposal, Maple Leaf, Waste Connections, and Smithrite have been included in our mobile fleet emissions reporting spreadsheet, as fuel usage and vehicle type information was provided for 2018. Contractor emissions associated with the delivery of services by Cascades Recovery and Hired Equipment were estimated by from total kilometers and hours driven, respectively.</p> <p>The hired equipment contracted emissions, with the exception of equipment used outside of the defined traditional service boundaries or for construction rather than maintenance activities, is listed in the table below by traditional service area.</p> <p>Option 3 is the estimation methodology used:</p> <ol style="list-style-type: none"> 1. Hired equipment records sorted to exclude out of scope contracts; 2. City equipment operating records assessed to determine average consumption factors in litres per charge hour or kilometers driven for each equipment family; 3. Consumption factors used to estimated fuel consumption for contractor or hired equipment; 4. BC GHG emissions factors applied to calculate GHG emissions.

CONTRACTED EMISSIONS	
Option 3: Vehicle/Equipment Type and Kilometers or Hours of Usage	
Traditional Service Area	Estimated Annual GHGs (tonnes)
Drinking, Storm and Wastewater	409
Solid Waste Collection, Transportation and Diversion	7.3
Roads and Traffic Operations	85.5
Parks, Recreation, Arts, and Cultural Services	16.9
Corporate Operations	4.5
Total	523.2