

Agenda

General Purposes Committee

Anderson Room, City Hall 6911 No. 3 Road Monday, May 16, 2016 4:00 p.m.

Pg. # ITEM

MINUTES

GP-3 Motion to adopt the minutes of the meeting of the Special General Purposes Committee held on May 9, 2016.

ENGINEERING AND PUBLIC WORKS DIVISION

1. CLIMATE ACTION REVENUE INCENTIVE PROGRAM AND CARBON NEUTRAL PROGRESS – UPDATE (File Ref. No. 10-6000-01) (REDMS No. 4991774 v. 17)

GP-7

See Page GP-7 for full report

Designated Speaker: Levi Higgs

STAFF RECOMMENDATION

- (1) That the 2015 Climate Change Action Charter information, identified in the Climate Action Revenue Incentive Program (CARIP) and Carbon Neutral Progress Report from the Director, Engineering dated April 27, 2016, be received for information; and
- (2) That, in accordance with Provincial requirements, the CARIP Report and Carbon Neutral Progress Report be posted on the City's website for public access.

Pg. # ITEN

ADJOURNMENT



Special General Purposes Committee

Date: Monday, May 9, 2016

Place: Anderson Room Richmond City Hall

Present:

Mayor Malcolm D. Brodie, Chair Councillor Chak Au Councillor Derek Dang Councillor Carol Day Councillor Ken Johnston Councillor Alexa Loo Councillor Bill McNulty Councillor Linda McPhail Councillor Harold Steves

Call to Order: The Chair called the meeting to order at 4:02 p.m.

MINUTES

It was moved and seconded That the minutes of the meeting of the General Purposes Committee held on April 18, 2016, be adopted as circulated.

CARRIED

AGENDA ADDITION

It was moved and seconded *That Assistance to Fort McMurray be added to the agenda as Item No. 3.*

CARRIED

PLANNING AND DEVELOPMENT DIVISION

1.

Minutes

1. RICHMOND SISTER CITY ADVISORY COMMITTEE 2015 YEAR IN REVIEW

(File Ref. No. 01-0005-01) (REDMS No. 4969647 v. 2)

It was moved and seconded

That the staff report titled, "Richmond Sister City Advisory Committee 2015 Year in Review" dated April 6, 2016 from the Director, Intergovernmental Relations and Protocol Unit, be received for information.

CARRIED

ENGINEERING AND PUBLIC WORKS DIVISION

2. VANCOUVER AIRPORT FUEL DELIVERY PROJECT ENVIRONMENTAL ASSESSMENT CERTIFICATE AMENDMENT (File Ref. No. 10-6060-01) (REDMS No. 4991314 v. 2)

Lloyd Bie, Manager, Engineering Planning and John Irving, Director, Engineering responded to queries and comments from Committee regarding the following:

- Whether the proposed expansion in the diameter of pipeline could be accommodated by an increase in the storage capacity on Sea Island;
- That the proponent has not provided information on alternative fuels being considered by the Vancouver Airport, although there has not been any indication that there will be materials other than jet fuel delivered;
- That the current Environmental Assessment Certificate (EAC) would not impede any future applications for expansion;
- That the EAC does not preclude the sale of fuel delivered to the Vancouver Airport Fuel Facility to other airports; and
- That the current Environmental Assessment Process only requires the proponent to provide one option for the proposal whereas previously several options were required.

As a result of the discussion, the following **motion** was introduced: It was moved and seconded *PART 1*

That the comments regarding the Vancouver Airport Fuel Facility Corporation's application for amendment to the approved Vancouver Airport Fuel Delivery project's Environmental Assessment Certificate, identified in the staff report titled "Vancouver Airport Fuel Delivery Project Environmental Assessment Certificate Amendment" dated April 26, 2016 from the Director, Engineering, be endorsed for submission to the BC Environmental Assessment Office, with the addition of the following comment as part 5:

"(5) Request that the Federal and Provincial governments change the process to include more than one option during the environmental assessment process."

<u>PART 2</u>

That staff investigate and report back on the options on issuing building permits and ESA (Environmentally Sensitive Area) development permits.

PART 3

Whereas the Vancouver Airport Fuel Facilities Corporation's proposed amendments for the Vancouver Airport Fuel Delivery project make the project materially different from that identified in the Environmental Assessment Certificate:

- (1) That the BC Environmental Assessment Office require that the Vancouver Airport Fuel Delivery project undergo a new Environmental Assessment review including a full public consultation process inclusive of alternatives;
- (2) That the Federal Canadian Environmental Assessment Office require that the Vancouver Airport Fuel Delivery project undergo a new Environmental Assessment review including a full public consultation process and review of alternatives; and
- (3) That the Prime Minister, Federal Minister of Environment, Premier of British Columbia, Provincial Minister of Environment, Leaders of the Federal and Provincial Opposition and Richmond's MPs and MLAs be advised of the City's comments and resolutions on this matter.

CARRIED Opposed: Cllr. Loo

3. ASSISTANCE TO FORT MCMURRAY

In response to queries from Committee, Phyllis Carlyle, General Manager, Law and Community Safety stated that City involvement to date has included some members of the Lower Mainland District Integrated Tactical Troop, which has been called out to Fort McMurray. Ms. Carlyle also stated that there has not been a request for firefighters and the City will wait for direction from the Province.

It was noted that monetary donations to the Canadian Red Cross are being matched by the Federal and Provincial governments.

As a result of the discussion, the following **referral** was introduced: It was moved and seconded That staff, surface how the City of **B**ishmond our land effective again

That staff explore how the City of Richmond can lend effective assistance to Fort McMurray and report back.

CARRIED

ADJOURNMENT

It was moved and seconded *That the meeting adjourn (4:18 p.m.).*

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the General Purposes Committee of the Council of the City of Richmond held on Monday, May 9, 2016.

Mayor Malcolm D. Brodie Chair Amanda Welby Acting Legislative Services Coordinator



Report to Committee

То:	General Purpose Committee	Date:	April 27, 2016
From:	John Irving, P .Eng., MPA Director, Engineering	File:	10-6000-01/2014-Vol 01
Re:	e: Climate Action Revenue Incentive Program and Carbon Neutral Progress Report – Update		Neutral Progress

Staff Recommendation

- 1. That the 2015 Climate Change Action Charter information, identified in the Climate Action Revenue Incentive Program (CARIP) and Carbon Neutral Progress Report from the Director, Engineering dated April 27, 2016, be received for information.
- 2. That, in accordance with Provincial requirements, the CARIP Report and Carbon Neutral Progress Report be posted on the City's website for public access.

John Irving, P.Eng. MPA Director, Engineering (604-276-4140)

Att. 3

REPORT CONCURRENCE	
CONCURRENCE OF GENERAL MANAGER	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	
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 2015 corporate greenhouse gas (GHG) emissions and on the City's carbon neutrality strategy and activities.

This report supports Council's 2014-2018 Term Goal #4 Leadership in Sustainability:

- 4.1. Continued implementation of the Sustainability Framework.
- 4.2. Innovative projects and initiatives to advance sustainability.

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 pilot program to purchase offsets from Richmond-based projects.

Analysis

Reducing corporate GHG emissions in the City's fleet vehicles and corporate buildings are key areas of focus for staff. Guided by the City's 2013 Green Fleet Action Plan and Energy Management Program for buildings and infrastructure, the City is constantly working on reducing its corporate GHG emissions footprint and energy use.

2015 Corporate Carbon Emissions

The summary table below (Table 1) outlines GHG emissions associated with corporate operations in City buildings, civic infrastructure and fleet activities for 2015. The reported figures adhere to the BC Ministry of Environment's methodology, and include GHG reductions resulting from the City's purchase of renewable natural gas. The 2015 total includes GHG emissions associated with "traditional municipal services," including those that are contracted out, such as community waste collection. Reported corporate emissions in 2015 were slightly higher than the City's 2014 corporate GHG emissions value (8,189 tCO₂e). This is mostly due to increased organics collection activity by municipal contractors, which is offset by greater amounts of carbon credits from community organics diversion.

TOTAL

	Tonnes carbon dioxide equivalent	Quantification Method
Emissions from services delivered directly by the City	6,464	Derived from actual energy consumption and associated GHG emissions from stationary sources (buildings, lighting, and pumps) and mobile sources (fleet, except construction related fuel use) used directly by the City
Emissions from contracted services delivering services on the City's behalf	1,740	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.

8,204

Table 1: 2015 Emission Sources

2015 Carbon Credits (Offsets)

Table 2 below outlines anticipated GHG offsets that the City expects to achieve for the 2015 reporting year. Offsets from diverted household organic waste contributed significantly to offsetting the City's corporate carbon footprint. As compared to 2014, the total amount of diverted organic waste from the City's community collection program increased by approximately 2,181 tonnes to 18,495 tonnes in 2015, equal to a 13.4% increase. The total diverted organics for 2015 corresponds to avoided GHG emissions of 5,667 tonnes of CO_2e , which represents 67% of the City's 2015 total corporate emissions value.

The City's other 2015 GHG offsetting activity relates to the City's participation in the Vancouver Landfill Gas Capture Optimization project. The GHG emission offsets for this project are derived from the methane gas capture system at the Vancouver Landfill that was installed ahead of the BC regulations that came into effect January 1, 2016. The new BC landfill regulation mandates that landfills achieve a 75% methane gas capture rate for their site. Credits in 2015 will be the final year that credits will be able to be claimed for this project. The City's allocation has yet to be confirmed for 2015 and for this reason the 2014 allocation value was used as an estimate at this time.

Along with the offsets defined above, the City is also carrying forward surplus offsets accumulated in 2014 (5,332 t CO_2e).

Offsets	Tonnes CO2e	Quantification Method
Household Organic Waste	5,677	As quantified per Option 1 GHG Reduction
Composting – Municipally		Projects reporting methods.
Collected		
Regional Vancouver Landfill	3,199	Richmond's credit allocation or credits earned
Methane Gas Capture Credits		from the capture of landfill gas (methane) at the
		Vancouver Landfill in Delta, prior to the
		implementation of January 1, 2016 regulations.
Surplus GHG emission credits	5,332	As per BC Government reporting protocol.
from 2014 Reporting Year		· · · · · · · · · · · · · · · · · · ·
TOTAL	14,208	

Table 2: Anticipated 2014 Emission Credits (Offsets)

April 27, 2016

Based on the above figures, staff anticipate that the City will again be eligible for a "Level 3: Achievement of Carbon Neutrality" in 2015 through the Climate Action Recognition Program typically announced at the Union of British Columbia Municipalities' annual conference. It is estimated that the City will carry forward approximately 6,004 tonnes of GHG emission offsets for use in future years.

Due to the accumulated surplus that the City has achieved and the anticipated growth of the City's organics diversion program, it is projected that the City will be able to achieve carbon neutrality for 2016 and 2017 without other sources of offsets. However, as the estimated surplus in 2017 is expected to be small (with only a 5-10% contingency) and carbon neutral operations is a priority for the City of Richmond, staff have been working on developing GHG emission reduction offsets through eligible corporate projects (e.g. "non-traditional" services like district energy), and through purchasing verified community GHG emission offsets through the Richmond Carbon Market pilot program.

"Non-Traditional" Corporate GHG Emissions Reduction Projects

Three non-traditional municipal services provided by the City that are "beyond business as usual" are eligible as GHG emission offsets are listed in Table 3. Staff quantifying and verifying GHG offsets associated with each project.

			Est. Annual
		Status	GHG (tCO ₂ e)
1. Sidaway Yard Concrete Recycling	Concrete and asphalt recycling to displace virgin/mined road base material	Assessment of baseline production emissions have been completed – final verification is expected to be completed in June 2016	200-300*
2. Alexandra District Energy Utility	Renewable energy transfer for community housing, displacing natural gas and electricity	Verification engineering consultant has been chosen, quantification project is in initial stages of implementation and final verification is expected to be completed in September 2016	500-700*
3. Northeast Bog	Conservation purchase and enhancement of a bog ecosystem to maintain its carbon storage capacity	Undergoing final scope of work negotiations with a carbon storage and natural ecosystem consultant – quantification project is in initial stages of implementation and final verification is expected to be completed in June 2017	Over 1,000
*Credits from cor	porate actions prior to 2015	Total	1 700-2 000

Table 3: Corporate GHG Emissions Reduction Quantification Projects

*Credits from corporate actions prior to 2015 will be claimed in addition to 2015 credits

The GHG emission offsets associated with the Northeast Bog are being achieved through the action of conserving the land and maintaining the carbon storage capacity of the property. The carbon storage amount of the Northeast Bog compared to the scenario where the land is developed for agricultural purposes, will be quantified and is expected to result in significant GHG emission reduction credits. This quantification project is very unique, in terms of the type of ecosystem being assessed, the focus on carbon storage capacity of the Site, and the development of a carbon quantification methodology. It is believed that this work will help to inform the City and the region on the importance of conserving and enhancing this type of ecosystem.

Richmond Carbon Market

The Council endorsed Richmond Carbon Market is a program designed to reduce GHG emissions and build community resilience by re-investing Climate Action Revenue Incentive Program funds in Richmond-based emissions reduction projects. The RCM pilot program is currently being implemented through the following phases:

- Phase 1: Determine the Potential for Local GHG Reduction Projects (through outreach)
- Phase 2: Identify Potential Local GHG Reduction / Offset Projects, and complete prefeasibility assessments
- Phase 3: Complete final assessments and quantify the RCM submissions, and enter into agreements with proponents to offset corporate GHG emissions
- Phase 4: Maintain corporate carbon neutrality
- Phase 5: Continue to help grow the City's low carbon economy

Staff have completed Phase 1 and Phase 2 of this pilot project, and are currently working on completing Phase 3.

In November 2015, Council authorized the City to establish GHG emissions reduction agreements with select community organizations, listed in Table 4, as part of the Richmond Carbon Market pilot program. The total approved maximum funding for this Phase of the RCM pilot program was \$80,000, to be used to acquire a maximum of 3,200 tonnes of GHG emissions reduction credits. The City has been in active discussion with each of the proponents to assist them in verifying and quantifying their GHG emissions reduction projects and developing a contract template that will form the basis of the planned agreements.

			Est. GHGs	Funding
		Status	(tCO ₂ e)	(\$25/tCO2e)
EcoWaste	Enhanced	Project quantification and verification is on	200-400	\$10,000
Industries	landfill re-	hold as the landfill reclamation project has		
	vegetation and	been altered in size and the program has been		
	carbon	disrupted. The quantification of the associated		
	sequestration	GHG offsets will be finalized in 2017		
Harvest	Non-municipal	Initial quantification and verification has been	1,500-2,000	\$50,000
Power	diverted organic	scompleted. The third party report is under		
	and recycling	review. Quantification and verification is		
		expected to be completed by Fall 2016		
Pacific	Building energy	The City is reviewing energy use data to	200	\$5,000
Gateway	efficiency	finalize the quantification and verification, to		
Hotels	retrofits	be completed this year.		
RDH	Building energy	RDH is in discussions with multi-residential	500-600	\$15,000
Building	renewal and	building owners in Richmond, who are in need		
Engineering	retrofits in	of energy upgrades. RDH is encouraging		
	Richmond	owners to consider energy efficiency at the		
		same time to save on money and reduce GHG		
		emissions.		
			2 100 2 200	600.000

 Table 4: Community Projects Participating in the Richmond Carbon Marketplace

Total 2,400-3,200 \$80,000

The funding for the pilot program, allocated from the Provincial Climate Action Revenue Incentive Program grant, was previously approved in the 2014 operating budget process and remains in place to fulfill the completion of funding agreements. The execution of the funding agreements with the above listed proponents is dependent on the completion of the projects and submission of all necessary documentation. It is expected that this will be completed in late 2016 to early 2017. Once the community projects are completed, it is envisioned that the City will recognize the pilot program participants for their commitment to sustainability and community GHG emission reductions. Staff believe the Richmond Carbon Market is a viable tool for encouraging community-based carbon offset. Staff intend to continue issuing calls for proposals of offset projects as a key strategy for increasing awareness over time and growing the list of active projects in the program.

Public Reporting

Another tool to build community awareness regarding the importance of GHG emissions reduction is through public reporting. The City will complete the mandatory public reporting on the City's website (Climate Action Charter related reports Attachments 1-3), as well as look for other ways to promote and inform the community of the City's actions. Once the Richmond Carbon Market projects have been completed and executed agreements are in place, staff will promote this unique program in the business community to encourage greater awareness and focus on overall community GHG emissions reductions.

Financial Impact

None at this time.

Conclusion

The City of Richmond continues to show leadership amongst BC municipalities as a signatory of the BC Climate Action Charter through its innovative programs to achieve carbon neutrality with corporate and local investments. City staff will continue to work towards Council's objective of maintaining the City of Richmond's carbon neutral status in the long term and support corporate and community-based GHG emission reduction projects. Through the continued strategic implementation of the *Towards Carbon Neutrality – Implementation Strategy*, the City is well positioned to maximize corporate and community benefits of transitioning towards a low carbon community.

Levi Higgs Corporate Energy Manager (604-244-1239)

Peter Russell

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

LH:lh

- Att. 1: Carbon Emissions Provincial Reporting Worksheet 2015
- Att. 2: Climate Action Revenue Incentive Public Report 2015
- Att. 3: Contracted Emissions Estimates (Hired Equipment and Cascade) 2015

Attachment 1

2015 Carbon Neutral Progress Report



Emissions/Offsets	Tonnes CO2e
Annual City of Richmond corporate emissions (as per Provincial reporting protocol)	8,204
Emissions from services delivered directly by the local government	6,464
Emissions from contracted services	1,740
Less: GHG reductions being claimed for this reporting year from Option 1 - GHG reduction project	5,677
Household Organic Waste Composting	5,677
Solar Thermal	
Energy Efficient Building Retrofits and Fuel Switching	
Low Emissions Vehicles	
Forest Conservation	
Less: <i>GHG reductions</i> being claimed for this reporting year from Option 2 - GHG reduction projects	8,531
Option 2 Project A –Metro Vancouver, Vancouver Landfill Gas Capture Optimization Project - Allocation	3,199*
Option 2 Project B – Surplus Carbon Credits from 2014 Reporting Year	5,332
<i>Less:</i> Offsets purchased for this reporting year (Option 3). Please identify your offset provider in the offset provider information section below.	n/a
Total GHG emissions reductions claimed for 2015	14,208
Balance of corporate emissions for this reporting year.	-6,004
(If the corporate emissions balance is zero or negative, your local government is carbon neutral for this reporting year)	

*Credit allocation amount has not been finalized, 2014 value used as an estimate

Climate Action Revenue Incentive Program (CARIP) Public Report

Climate Action Revenue Incentive (CARIP) Public Report for YEAR 2015

City of Richmond



Richmond

Report Submitted by Levi Higgs Energy Manager lhiggs@richmond.ca 604-244-1239

The City of Richmond has completed the 2015 Climate Action Revenue Incentive Program (CARIP) Public Report as required by the Province of BC. The CARIP report summarizes actions taken in 2015 and proposed for 2016 to reduce corporate and community-wide energy consumption and greenhouse gas emissions (GHG), as well as general sustainability related initiatives.

April 27, 2016

General Information

Name of Local Government	City of Richmond	
Member of Regional District (RD)	Metro Vancouver	
Regional Growth Strategy (RGS) in region	Yes	
Population	214,000	
	Pag	e 1
	*	

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1. GENERAL REPORT INFORMATION

This 2015 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 eight main categories; Broad Planning, Buildings and Lighting, Energy Generation, Greenspace, Solid Waste, Transportation, Water and Wastewater, and Climate Adaptation. There are also is an Innovation category, which the City has inputted action items. The categories are further divided into corporate and community 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 to support GHG and energy reduction, but does not cover all sustainability related initiatives that the City conducts or supports. The report represents a "snapshot" of City activities over the past year, and proposed actions for 2016.

2. BROAD PLANNING

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, centred). Broad Planning 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 2015 and planned in 2016.

General Climate Action Questions		
Yes		
Yes		
GHG reduction targets of 33% by 2020, and 80% by 2050, below 2007 levels. Reduce energy use by 10%.		
Yes		
Yes Yes Yes		

2.1. Community Actions

Coi	mmunity-Wide Actions Taken in 2015	
1	Official Community Plan (OCP) amendment was completed, which revised the policy to	
4 12	improve townhouse energy efficiency and incorporate more renewable energy systems in new	
	developments	
	The City worked closely with Translink in developing the Southwest Area Transport Plan,	
96	which defines Richmond's long-term transportation network goals and priorities.	
	Continued to implement the OCP and City Centre Area Plan (CCAP) directives, which directs the	
	majority of Richmond's urban growth to the City Centre and near major transit stations.	
	Continued to ensure new developments within the City Centre Area were "District Energy	
	Utility (DEU) Ready" for future connection to a district energy system, as per the City by-law.	

Сол	mmunity-Wide Actions Proposed for 2016	
	Update development permit guidelines to require electrical vehicle charging stations at multi-	
	family residential and non-residential locations throughout the City.	
	Revise arterial road and coach house policies to encourage more energy efficient buildings and	
	more compact communities.	
	Continue to implement OCP and CCAP policies as new development applications are processed.	
	Continue to meet with Richmond's Small Home Builders and Urban Development Institute	
	when preparing new community building related sustainability initiatives.	
	Revise the Steveston Area Plan and include measures that promote a more compact,	
	sustainable, energy efficient, and pedestrian friendly built environment	
	Continue to follow City by-law requirements and implement "DEU" ready development in the	
	City Centre and West Cambie neighborhood areas	

2.2. Corporate Actions

Corporate Actions Taken in 2015				
		Continued to implement the corporate High Performance Building Sustainability Policy. This		
		policy sets targets for the construction of energy efficient new corporate buildings and sets in		
	43.4	place processes to ensure that energy and resources are used efficiently in existing buildings.		
	1 - 50	Continued to implement action items from the City's Green Fleet Action Plan, to reduce GHG		
	12	emissions associated with the City's vehicle and equipment use.		
		Completed the internal Corporate Building, Equipment, Monitoring, and Integration		
		Requirements document, which sets out guidelines for equipment energy efficiency, energy and		
		GHG emissions monitoring requirements, and the integration of buildings and equipment into		
		the City's network. This document will help streamline building and equipment operation.		

Со	Corporate Actions Proposed for 2016		
	Continue to implement the corporate High Performance Building Sustainability Policy.		
	Continue to implement action items from the City's Green Fleet Action Plan		
	Continue to implement Corporate Building, Equipment, Monitoring, and Integration		
	Requirements		

3. BUILDINGS AND LIGHTING

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 initiatives conducted in 2015 and planned in 2016.

General Climate Action Questions	
Does your local government have green building/construction policies, plans or	Yes
programs?	

3.1. Community Actions

Coi	mmunity-Wide Actions Taken in 2015
	Continued to implement building and district energy policies. Secured commitments from new
	development in the City Centre to achieve LEED Silver, and townhome developments city-wide
	to build to EnerGuide 82 standard.
	Participated in Provincial Energy Efficiency Working Group, to inform draft "Stretch Code"
	energy efficiency standard for new developments.
	Implemented the following EnergySave Richmond suite of programs.
	• Building Energy Challenge, a friendly competition to save energy use over the course of
	the year, engaged 5.6 million square feet of property.
	Richmond Carbon Marketplace pilot program, which supports community based GHG
	emissions reduction projects through facilitation and funding
	 Smart Thermostat Pilot Program involved 150 participants, providing a \$125 rebate on
	a smart thermostat.
	Coordinated with regional local governments and utilities on benchmarking and disclosure
	policy development.
	Identified opportunities to remove barriers to renewable energy and energy efficiency as part
	of development regulations and permitting processes.

Community-Wide Actions Proposed for 2016

Develop revised electric vehicle charging infrastructure policy for new developments for City of Richmond Council's consideration.

Develop energy efficiency policy for new developments for City Council consideration

Explore the implementation of a benchmarking and disclosure policy, in coordination with the Province, utilities, and other local governments.

Continue to implement EnergySave Richmond suite of programs.

- Host Year 2 of Building Energy Challenge.
- Evaluate case to expand Smart Thermostat Program.
- Host Climate Smart program for businesses.
- Implement water and energy saving programs for businesses and residences.
- Develop energy program for multifamily condominiums, coordinating with other regional local governments and utility stakeholders.
- Consider expansion of the Richmond Carbon Marketplace pilot program.

Implement renewed development regulations and/or permitting processes to better accommodate renewable energy and energy efficiency.

3.2. Corporate Actions

Corporate Actions Taken in 2015		
	Completed energy efficiency upgrades at Watermania Aquatic Centre, Steveston Community	
	Centre, and other corporate recreational facilities that will reduce energy use by approximately	
	1.8 GWh, and GHG emissions by over 300 tonnes of CO2e (equal to removing 90 Richmond cars	
	off of the roads)	
	Completed the upgrade and replacement of less energy efficient street lighting with more	
	energy efficient LED street lighting fixtures at Mang and Chatterton Roads, and Miller and	
	Garden City Roads)	
	Initiated a pilot project with BC Hydro to replace less energy efficient leased street lighting with	
	more efficient LED street lighting fixtures. This pilot project will help lead to further upgrades	
1.4	of City of Richmond leased street lights to LED	
	Completed the upgrade of the mechanical building automation system at City Hall to help	
	improve overall occupant comfort and equipment scheduling and monitoring	

Corporate Actions Proposed for 2016

Complete energy efficiency upgrades at various City facilities and Fire Halls, as per the 2016 capital Energy Management Program work plan

Complete the upgrade of the building automation systems at Thompson Community Centre, Gateway Theatre, and Library Cultural Centre to improve overall occupant comfort and improve equipment scheduling and monitoring

Complete Phase 1 of the City of Richmond street lighting conversion project, with the replacement of approximately 950 less energy efficient street light fixtures with new more efficient LED technology

Initiate the internal Energy Statement reporting functionality to further engage City staff in corporate energy reduction initiatives.

Continue 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

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, geoexchange, 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 2015 and planned in 2016.

General Climate Action Questions	
Is your local government currently developing or constructing new district energy projects?	Yes
Is your local government currently developing or constructing a new renewable energy system?	Yes
Is your local government operating a district energy centre?	Yes
Is your local government operating a renewable energy system?	Yes
Is your local government connected to a district energy system that is operated by another energy provider?	Yes
Are you aware of the integrated resource recovery (IRR) guidance page on the BC Climate Action Toolkit?	Yes

4.1. Community Actions

Community-Wide Actions Taken in 2015

Completed Phase 3 of the Alexandra District Energy Utility (ADEU), which included expansion of the energy centre to add a second geo-exchange field, associated equipment, and 1,150 m of distribution piping. A total of 1,200 residential units and 30,000 ft² non-residential space are now connected to this ADEU system.

Constructed Phase 1 of the Oval Village District Energy Utility (OVDEU), in partnership with a private utility. Phase 1 consisted of two interim energy centres and 550 m of distribution piping. Two developments with a total of 505 units and 571,000 ft² of building gross floor area were connected to the OVDEU system.

Supported the completion of a feasibility study of the effluent heat recovery potential for Lulu Island Wastewater Treatment Plant and the potential for connecting this energy source to a City Centre District Energy system.

Issued a request for an expression of interest (RFEOI) to find a partner to design, finance, build and operate City Centre North District Energy Utility (CCNDEU).

Community-Wide Actions Proposed for 2016

Implement Phase 4 expansion of the ADEU. This consists of a satellite energy plant to service the demands of a new 200,000 ft² commercial development, and the connection of two more residential buildings (additional 400,000 ft2).The satellite energy plant will use high efficient air source heat pumps to provide heating and cooling energy.

Continue OVDEU Phase 1 construction in partnership with private utility partner. Install additional distribution piping and connect four new developments with a total of 884,000 ft² of building gross floor area. Phase 2 of this project will include implementation of sewer heat recovery technology as an energy source for the DEU.

Complete extension test and feasibility study to expand the current OVDEU service area from 5 million ft^2 to 20 million ft^2

Select a district energy utility operations partner for the CCNDEU, complete a due diligence review, and execute a partnership agreement to design, finance, build and operate CCNDEU

4.2. Corporate Actions

Co	Corporate Actions Taken in 2015		
	Completed the detailed design for the new Fire Hall No.3 to connect to the City's Alexandra		
	District Energy utility centre		
	Secured external grant funding to complete a solar photovoltaic system/renewable energy		
	feasibility study for the new Minoru Complex		
	Secured funding for the installation of a solar photovoltaic array at City Hall, to displace		
	electricity and reduced peak demand load		

Corporate Actions Proposed for 2016

Complete a feasibility study on the installation of solar photovoltaic array at the new Minoru Complex

Continue to target renewable energy integration, a key component of the City's High Performance Building Policy, during design development for new corporate facilities.

Install solar photovoltaic array at City Hall to offset electrical demand.

Complete the connection of the new Fire Hall No.3 to the corporate Alexandra District Energy Utility Centre, which provides heating and cooling to residential and commercial customers in the area through a renewable geoexchange system.

5. GREENSPACE

Greenspace refers to parks and greenways, boulevards, community forests, urban agriculture, riparian areas, gardens, recreation/school sites, and other green spaces, such as remediated brownfield/contaminated sites. Greenspaces support climate change mitigation (reducing emissions by absorbing and sequestering GHG) and adaptation (providing shade, cooling, deflecting strong wind, and improving air quality). Below are the City of Richmond responses to the Provincial inquiry regarding "greenspace" management in the City, and summary of community initiatives conducted in 2015 and planned in 2016.

General Climate Action Questions

Does your local government have urban forest policies, plans or programs?

Yes

5.1. Community Actions

Community-Wide Actions Taken in 2015	
	Continued mapping of key invasive species locations in the Community, including the
	installation of signage aimed at reducing the spread of knotweed.
	Adopted the Ecological Network Management Strategy. A first of a kind ecological strategy with
	ecological protection, enhancement and connectivity of all natural lands, throughout the city,
建 第4	regardless of ownership.
	Planted 1,067 trees on City streets and parks, as per the City's Tree Management Plan
	Continued to partner with the Province of BC to detect new invasive species, develop rapid
	response plans, and conduct coordinated response efforts.

Community-Wide Actions Proposed for 2016		
	Adopt an Invasive Species Action Plan	
	Implement the partnership agreement with Metro Vancouver for the Go Green program aimed	
	at backyard naturalization as a component of the newly adopted Ecological Network	
	Management Strategy.	
3	Continue to plant new trees on City streets and parks, and update the Urban Forest	
	Management Strategy.	
	Promote the Bridgeport Industrial Park/Bath Slough Pollinator Pasture, through Richmond	
	Doors Open event, with tours, information booths and interpretive opportunities for learning	
	more about the importance of native pollinators and their habitat in the City.	

5.2. Corporate Actions

COI	orporate-Wide Actions Taken in 2015		
141	Conducted a hydrogeological study of the Garden City Lands site, and modelled the implications		
	of the potential proposed park and local agricultural development. This study work included		
AF.	identifying ways that the bog ecosystem of the site could be enhanced, and will inform the		

Garden City Lands Water and Ecological Resource Management Strategy

Continued Parrot feather control trials with geotextile on City property

Designed and planted of pollinator pasture in Bridgeport Industrial Park through a collaboration with Public Art. This ecological enhancement project encompasses community involvement, native pollinator habitat and interpretive pollinator features in Bridgeport Industrial Park located along Bath Slough.

Corporate-Wide Actions Proposed for 2016

Complete a carbon and hydrological assessment of the City's Northeast Bog conservation area
 Complete the development of the Garden City Lands Water and Ecological Resource
 Management Strategy including recommendations for construction and management practices and long-term monitoring of the bog ecosystem.

Continue to detect and respond to invasive species encroachment on City property effectively

6. SOLID WASTE

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 2015 and planned in 2016.

General Climate Action Questions	
Does your local government have construction and demolition waste reduction policies, plans or programs?	No
Does your local government have organics reduction/diversion policies, plans or programs?	Yes

6.1. Community Actions

Community-Wide Actions Taken in 2015		
	Expanded food scraps collection from just single family residential, to 489 multi-family housing	
	sites with approximately 26,295 units. Collected and diverted 18,495 tonnes of organic	
	materials in 2015.	
-	Enhanced Richmond Recycling Depot signage and made site improvements to increase	
	awareness of how and where to recycle materials, and introduced traffic counters to measure	
	public use in July 2015. The total traffic count from July to December 2015 was 68,474 visits.	
	Delivered 32 workshops with 599 community participants on waste reduction, recycling and	
	avoiding food wastage.	
1	Hosted 400 information sessions as part of the implementation of food scraps recycling for 489	
	multi-family complexes	
	Made recycling stations available at over 40 community events and achieved more than 80%	
	waste diversion at Ships to Shore, Salmon Festival, World Festival and Maritime Festival.	

Co	Community-Wide Actions Proposed for 2016		
1300	Accept an expanded range of materials for recycling in public spaces and enhance the recycling		
6	container replacement and maintenance program.		
Shire	Explore options for expanded Recycling Depot service (i.e. Eco Centre).		
	Introduce a bylaw to require 70% waste diversion from the demolition of single-family and		
	duplex homes.		
	Implement a bi-weekly garbage cart collection program for single-family homes and		
1974	townhomes to encourage greater waste diversion.		
	Increase awareness of the expanded range of materials accepted in the Blue Box and Blue Cart		
	recycling programs, including proper recycling practices under the MMBC partnership, to		
	reduce contamination and increase recycling levels.		

6.2. Corporate Actions

	Corporate Actions Taken in 2015			
THE A		Expanded in-house recycling under the City's WeRecycle program to include organics collection		
		and expanded the range of materials accepted for recycling.		
	-IS	Implemented enhanced communication strategy to increase awareness and encourage greater		
		participation in corporate waste diversion.		
	1	Assisted with the introduction of the Corporate Sustainable Event, 7-Step Quick Guide Toolkit		
		and website		

Co	Corporate Actions Proposed for 2016			
	Conduct corporate site and visual audits of the garbage and recycling stations to ensure that			
18 - A	staff are disposing of materials in the correct receptacles			
	Host a corporate sustainable event solutions conference to raise awareness and educate			
24	organizers of different tactics they could implement to make their event more sustainable			
	Continue promoting the corporate WeRecycle program, to encourage staff to increase			
	corporate waste diversion			

7. TRANSPORTATION

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, ridesharing, and public transit, can contribute to reductions in greenhouse gas 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 2015 and planned in 2016.

General Climate Action Questions			
Does your local government have policies, plans or programs to support:			
• Walking	Yes		
• Cycling	Yes		
Transit Use	Yes		
Electric Vehicle Use	Yes		
Other: car-sharing, carpooling	Yes		
Does your local government have a transportation demand management (TDM) Yes			
strategy (e.g. to reduce single-vehicle occupancy trips, increase travel options,			
provide incentives to encourage individuals to modify travel behavior)?	も調整していた。		
Does your local government have policies, plans or programs to support local food Yes			
production (thus reducing transportation emissions)?	目標的原語為中		

7.1. Community Actions

Community-Wide Actions Taken in 2015

Completed multiple projects to improve transit, biking, and pedestrian accessibility including

- Constructing a bikeway/multi-use path connection in Blundell Park as part of the development of the Crosstown local street bikeway.
- Substantially completed the widening of Westminster Highway between Nelson Road and McMillan Way(1.3 km), which includes an off-street multi-use path.
- Upgrading 21 bus stops to become accessible,
- Installing two new transit shelters
- Upgrading eight arterial road crosswalks to include overhead downward lighting, pedestrian-actuated flashing beacons and verbal wayfinding message
- Upgrading 16 signalized intersections to include accessible pedestrian signal features

Continued development of TransLink's Southwest Area Transport Plan encompassing Richmond, South Delta and Tsawwassen First Nation.

Staged 15th annual "Island City, by Bike" tour for the community to encourage cycling as a mode of transportation.

Expanded reserved on-street parking spaces for car-share vehicles.

Initiated partnership with TransLink to identify and encourage alternative travel modes to decrease single occupant vehicles trips to/from business parks and industrial areas in Richmond

Community-Wide Actions Proposed for 2016

As part of the approved Transportation Capital Budget, the following improvements and enhancements are planned to be completed in 2016:

- Eight new special crosswalks and six new pedestrian signals (including four pedestrian signals that are part of existing or planned bike routes)
- Three pedestrian walkways and two multi-use pathways for both cyclists and pedestrians
- Initiation of two roadway improvement projects (No. 2 Road south of Steveston Highway and Lansdowne Road between Minoru Blvd and Alderbridge Way) that will each include a multi-use pathway
- Install new transit shelters

Develop streetscape options for key streets in Steveston Village that accommodate active transportation in support of Official Community Plan goals and objectives with respect to mobility and access.

Continue development of TransLink's Southwest Area Transport Plan.

Stage 16th annual "Island City, by Bike" tour for the community to encourage cycling as a mode of transportation.

Continue to support education and encouragement programs for cycling and walking (e.g., Bike to Work/School Week, cycling education courses for students and adults, Walk Richmond program).

7.2. Corporate Actions

Co	Corporate Actions Taken in 2015		
7 - 11	Continued the City's vehicle replacement program to replace older, less fuel-efficient vehicles		
	with newer, more fuel- efficient vehicles and with best in class fuel efficiency, where possible.		
	In 2015, 46 units were replaced and 13 more units were ordered for 2016.		
	Enhanced the corporate fleet driver training program to include emphasis on fuel efficient		
	driving techniques and anti-idling		
	Continued other operational improvements as described in the Green Fleet Action Plan,		
	including reducing growth and downsizing the Fleet, incorporation of more electric and hybrid		
	vehicles where possible, and right sizing of existing and new assets. The Green Fleet Action Plan		
	target is to reduce the City's overall Fleet emissions by 20% in 2020 from 2011 levels.		
	Completed analysis and review of City Employee Carpool Program, including best practices		
	research and options for expansion to include other sustainable modes (transit, cycling,		
ET al	walking).		
	Undertook a compressed natural gas (CNG) study to establish the feasibility of CNG as a		
	potential alternative fuel for reducing GHG emissions. Results indicated that the City's fleet		
See. 1	does not travel sufficient distances to makes this financially viable at this time.		

Co	Corporate Actions Proposed for 2016			
	Continue replacing older less efficient City fleet vehicles with newer, more fuel- efficient			
	vehicles, where possible.			
	Complete a GPS tracking pilot project involving 60 vehicles to evaluate routing efficiency and			
Contra 1	reduce Fleet vehicle trip times			
	Update City Employee Carpool Program based on results of the 2015 analysis and raise			
	awareness of any improvements to the Program to encourage greater use.			
	Complete an analysis of converting some medium and light duty trucks to propane, which has			
	been indicated to potentially reduce emissions in the vehicles by 26%.			
	Continue to support use of alternative modes of transportation for work related travel,			
	including cycling, providing transit passes for work trips, and carpooling.			

8. WATER AND WASTEWATER

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 greenhouse gas 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 2015 and planned in 2016.

General Climate Action Questions

Does your local government have water conservation policies, plans or programs?

Yes

8.1. Community Actions

Coi	mmunity-Wide Actions Taken in 2015
	Installed 1,500 water meters at single-family residences (approximately 88% of single-family
	homes in the City of Richmond are now metered)
	Issued 902 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
	2015 was \$90,200.
	Partnered with BC Hydro to provide a clothes washer rebate program to reduce home water
	use and electricity. In 2015, 294 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 \$20,200
11	to the City resulting in an estimated annual savings in water and energy of 1,655,600 liters per
1 40	year and 53,800 kilowatt hours per year, respectively.
1	Installed meters for 141 existing multi-family residential complexes (comprising 8,585
	dwelling units) through the volunteer water meter program. It is mandatory for new multi-
	family residences to have a water meter. A total of 40% of multi-family units in Richmond now
	have a water meter.
	Provided 150 free water saving kits to Richmond households that included a low-flow
	showerhead, kitchen and bathroom tap aerators and a pop-flush device for toilets.

Co	Community-Wide Actions Proposed for 2016			
	Continue the single family and multi-family water meter installation programs			
	Continue the toilet rebate program (\$100,000 in funding for 2016)			
	Continue offering the water saving kits and free leak audits 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 2016.			
	Continue the City's Rain Barrel Program and promote the use of rain water for gardening and			
	irrigation purposes.			

8.2. Corporate Actions

Co	Corporate Actions Taken in 2015			
No gi	Continued to participate in the Metro Vancouver Municipal Water Conservation Coordinator			
1.14	Committee. The meetings revolve around networking with other municipalities and discussing			
	initiatives, progresses, updates in policies and results through group communication.			
	Conducted a corporate water wise workshop, with over 30 staff attending the information			
	session			
	Installed some of the recommended conservation measures at ten water audited buildings,			
	such as; replace constant flush urinals, turn down flush cycle times, replace old toilets with low			
	flush toilets and install aerators			
	Installed bottle water re-filling stations at the Works Yard			
	2			

Corpo	rate Actions	Proposed	for 2016	
and the second se				

Continue to take part in the Metro Vancouver Municipal Water Conservation Coordinator Committee.

Continue to follow the City's landscaping best practices, which emphasize planting grasses and plants at corporate facilities that require little or no irrigation water.

Install further bottle water re-filling stations at various corporate facilities

9. CLIMATE ADAPTION

For local governments, adaptation to a changing climate can take the form of changes in policy, management, technology and behaviour that minimize negative impacts or exploit opportunities. It can involve both "hard" and "soft" solutions, including: changes in infrastructure engineering, planning, zoning, bylaws and public education. Below are the City of Richmond responses to the Provincial inquiries regarding climate change adaption, and summary of initiatives conducted in 2015 and planned in 2016.

General Climate Action Questions	
Are you familiar with the Plan2Adapt guidance located on the Climate Action Toolkit Website?	Yes
Are you familiar with "Preparing for Climate Change - An Implementation Guide for Local Governments in BC?	Yes
Have you visited the climate change adaptation guidance page on the BC Climate Action Toolkit?	Yes

9.1. Community Actions

Co	Community-Wide Actions Taken in 2015			
	Began implementing Phase 2 of the Dike Master Plan, which includes improvements to the			
	North West Dike and the Middle Arm Dike west of No. 6 Road.			
	Raised numerous dikes, to elevations between 4.0m and 4.7 m geodectic, which is higher than			
	the current Provincial flood protection standard, and will help to protect the City from medium			
	and long term sea level rise.			
	Received approval from the Province to begin surveying and investigating the construction of a			
	dike on Steveston Island. The investigation is required to further develop the feasibility, impact			
	and cost assessment associated with building the Steveston Island Dike recommended in the			
	Lulu Island Dike Master Plan- Phase 1.			
Net o	Continued implementing the 2008-2031 Richmond Flood Protection Strategy			

Community-Wide Actions Proposed for 20	16
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Update Council on the progress of the Dike Master Plan- Phase 2.

Complete initial investigations of potential dike construction on Steveston Island, conduct further investigation as needed.

Continue implementing the 2008-2031 Richmond Flood Protection Strategy

10.INNOVATION

This section is intended to give the opportunity to describe any energy and GHG emission reduction activities that have been undertaken over the past year(s) that your local government is particularly proud of and would like to share with other local governments. Below is summary of the innovated initiative that the City is currently supporting.

Community-Wide Actions Taken in 2015

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Plan is being implemented to upgrade of all City-owned traffic signals to include accessible pedestrian signal (APS) features by 2020. The program was initiated in 2011 and signals are retrofitted at a rate of approximately 15 per year to meet the 2020 completion target. To the City's knowledge, Richmond is the only municipality in Canada to commit to equipping all special crosswalks and signals with APS as opposed to selected sites based on demand/requests.

The City executed a 30 year concession agreement with the private utility partner and started implementation to design, finance, build, and operate Oval Village DEU. Within the agreement, private utility partner will design, finance, build and operate the OVDEU, while Lulu Island Energy Company (fully owned City corporation) will own the utility, and the City Council will be the utility regulator and setting the customer rates.

The City coordinated and delivered an interactive elementary school water education program aimed at teaching students about the importance of water conservation, called Project WET.

11.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, liveable and well-managed community in Canada".

CARIP/Carbon Neutral Progress Report Reporting Year 2015

Supporting Documentation Contracted Emissions Template

LOCAL GOVERNMENT

City of Richmond 6911 No. 3 Road Richmond, BC V6Y 2C1

PROJECT DESIGNATE

Levi Higgs, Corporate Energy Manager, Sustainability & District Energy Direct 604-244-1239 Ihiggs@richmond.ca

RATIONALE

An estimation methodology for hired equipment contractor emissions is being utilized for 2015 since actual emissions for some contracts over \$25,000 have not provided fuel usage values.

The City has identified four main contract areas that deliver traditional municipal services:

- 1. Cascades Recovery Inc. and BFI provide recycling depot container collection and recycling services
- 2. Sierra Waste Services provide residential solid waste and recycling services;
- 3. Progressive Waste Solutions provides waste and recycling collection services at City facilities.
- 4. Individual Hired Equipment.

Contractor emissions associated with the delivery of traditional municipal services by Sierra Waste Services and Progressive Waste Solutions have been included in our mobile fleet emissions reporting spreadsheet, as fuel usage and vehicle type information was provided for 2015. Contractor emissions associated with the delivery of services by Cascades Recovery and Hired Equipment were estimated by from total kilometers and hours driven, respectively.

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.

Option 3 is the estimation methodology used:

- 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	92.1	
Solid Waste Collection, Transportation and Diversion	9.42	
Roads and Traffic Operations	172.5	
Parks, Recreation, Arts, and Cultural Services	9.12	
Corporate Operations	77.1	
Total	360.2	