12.0 Sustainable Infrastructure and Resources

12.0 Sustainable Infrastructure and Resources

OVERVIEW:

Providing sustainable infrastructure is a core municipal responsibility that is essential to the health, safety, mobility and quality of life for the City's existing and future residents, businesses and visitors.

Guiding Principles

- **Meet the Demands of a Growing City**—determine the infrastructure improvements required to meet the needs of a growing population and develop successive implementation plans that maintain capacities that are ahead of demand.

  The City's population will grow by 80,000 people and 40,000 jobs by 2041. This increase in population will result in higher demands on City infrastructure that will exceed the capacity of some infrastructure elements. It is important to identify those elements and improve them ahead of demand.

- **Adapt to Climate Change**—build climate change resilient infrastructure to meet climate change challenges that include rising sea levels, wetter winters and drier summers.

  Climate change will impact Richmond in two critical ways:

  - **sea level rise due to global warming.** Locally, sea level is predicted to rise 1.2 m (3.94 ft.) over the next 100 years. As the City is dependant on its diking system for protection from the waters of the Straight of Georgia and the Fraser River, diking improvements that stay ahead of rising sea levels are critical;

  - **the intensity and duration of rainfall.** Climate change experts believe that, in the long run, rainfall intensity and duration will increase during the winter months. Drainage infrastructure must be improved to meet longer and more intense storm events to maintain the City's current level of flood protection.

- **Utilize Local Energy Sources**—reduce the City's dependence on external power supplies by reducing energy consumption and capturing waste energy and increasing geothermal and solar energy production.

  Every year Richmond businesses and residents consume 24 Gigajoules of energy to heat their homes, and transport goods and people. This is equivalent to the chemical energy in approximately 4 million barrels of oil. As we are dependent on outside suppliers for our energy, our 'energy dollars' will continue to flow beyond our city boundaries until we develop local energy sources. There are opportunities for local companies to develop markets for geothermal and solar energy, as well as waste heat capture and re-use. This will in turn strengthen the local economy, make the city less dependent on foreign energy sources, help achieve our greenhouse gas emissions reduction targets of 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050, and take us closer to meeting the City's community-wide energy reduction target of 10% below 2007 levels by 2020.

- **Efficient Infrastructure**—achieve greater infrastructure efficiency through the proactive planning of infrastructure upgrades and replacements, the use of new technologies, and educating the public on demand side management. Plan infrastructure with minimum life cycle costs and deliver projects on time and within budget.

  Demand management has the potential to defer, reduce or eliminate the need for infrastructure capacity upgrading. Water demand can be reduced through water metering, low flow fixtures, leak reduction, pressure management, and reduction in discretionary uses such as lawn irrigation. Most water use reductions also generate sewer flow reductions. Sewer flows can also be reduced through inflow and infiltration (extraneous rainwater and groundwater) management. Education and technology can play critical roles in demand side management. Rainwater has the potential to be harvested and utilized in place of drinking water for uses such as irrigation. Life cycle management can extend the life of assets and reduce their over all cost. As some infrastructure decisions that appear cost effective in the short-term can have excessive operational costs that make them more expensive in the long run, infrastructure choices should always favour the long view.

12.1 Sanitary Sewers

OVERVIEW:

Wastewater management is a core municipal responsibility that plays a critically important role in maintaining community health. The municipal sanitary sewer carries liquid waste from individual homes and businesses to Metro Vancouver treatment facilities via Metro Vancouver trunk sewers. At the treatment facilities, the wastewater undergoes primary and secondary treatments before being discharged to the Fraser River.

The City's sanitary sewer system includes a well developed network of gravity mains, pump stations and forcemains. Proactive maintenance of sewer infrastructure reduces sewer deterioration and facilitates deferring expensive sewer rehabilitation work, thereby reducing overall costs and customer inconvenience.

Richmond has endorsed Metro Vancouver's May 2010 *Integrated Liquid Waste Resource Management Plan*, which outlines an overall objective to manage wastewater in a manner that enhances the environment. Three key strategies in the plan that support this objective are:

- conserve resources;
- maintain infrastructure and stretch capacity;
- focus effort to maximize the environmental benefit per dollar spent.

The City's population is predicted to grow by 80,000 people in the next 30 years. This increase in population will result in higher demands on the City sanitary sewer infrastructure which in turn will exceed the capacity of some of its elements. To protect public health and safety, it is important to identify those elements and upgrade them through re-development activities (City and private) to maintain livability while facilitating growth.

OBJECTIVE 1:

Maintain an efficient sewage system to protect public health and safety.

POLICIES:

a) maintain and improve the existing sanitary sewer system through a proactive maintenance program, the use of quality materials and applying best-management practices that minimize life cycle costs;

b) improve the efficiency of the sewer system by:

- maintaining low inflow and infiltration levels;
- reducing waste volume through water conservation;
- continuing to participate in the Metro Vancouver sanitary sewer source control program by supporting the Metro Vancouver Waste Water Discharge Permit process;

c) focus on detecting and reducing fat, oil and grease (FOG) in the sewer system;

d) develop public education programs to:

- reduce FOG discharges into the sewer system;
- reduce per capita water use which will, in turn, reduce sanitary sewer flows;

e) continue to work with Metro Vancouver on sanitary trunk and treatment plant capacity improvement projects;

f) participate in the on-going implementation of the May 2010 Metro Vancouver Integrated Liquid Waste Resource Management Plan.

OBJECTIVE 2:

Proactive planning of infrastructure upgrades and replacements due to age and growth.

POLICIES:

a) budget and plan to replace aging infrastructure in alignment with the City's Aging Infrastructure Replacement Plan;

b) coordinate the replacement of aging sewer infrastructure with other City infrastructure replacement projects;

c) ensure that sewered areas of the City maintain service levels in alignment with the needs of present and future land uses;

d) ensure that development related sanitary system upgrades are funded through Servicing Agreements, sewer DCC's, and senior government funding;

e) require all new developments to be connected to sanitary sewer where sanitary system is available;

f) discourage the development of private on-site sewage disposal systems, except in those areas where sanitary sewer is not available.

12.2 Irrigation and Drainage

OVERVIEW:

The City of Richmond has diverse drainage and irrigation needs due to its flat topography and unique farming community.

The City's drainage system includes a well developed network of closed pipe systems, box culverts, open ditches, sloughs, floodboxes and pump stations. The primary purpose of this system is to drain surface water into the Fraser River and prevent flooding on private and public property across the municipality. However, in the Agricultural Land Reserve (ALR), the drainage system also serves as a supply of irrigation water from the Fraser River for use by farmers.

Storm drainage effectiveness in Richmond is closely monitored to ensure that individual neighbourhood's needs are met. Annual maintenance and capital programs are used to replace aging infrastructure and overcome drainage challenges created by land development and climate change.

OBJECTIVE 1:

Maintain and improve urban drainage systems to meet the public's needs and regional requirements.

POLICIES:

a) maintain and improve drainage systems to service existing and future development;

b) ensure that development related drainage system upgrades are funded through development Servicing Agreements, drainage DCC's, and senior government funding;

c) budget and plan to replace aging infrastructure in alignment with the City's Aging Infrastructure Replacement Plan;

d) prepare for the effects that climate change may bring to the region, such as increased rainfall intensities which may require higher drainage capacity (for example by participating in regional climate change initiatives, researching issues and options and implementing City Climate Change policies as practical and funding becomes available);

e) encourage the use of collection and drainage systems that harvest rainwater for non-potable water uses, temporarily store rainwater during major storm events and reduce surface water contaminants from entering drainage systems;

f) integrate rainwater management master planning with other city initiatives, such as shopping centre and arterial road densification, to meet drainage needs while minimizing pollution and soil erosion;

g) upgrade drainage systems in established neighborhoods via redevelopment requirements and Local Area Service Plans;

h) wherever practical, retain open watercourses to provide drainage, and ensure that the watercourse permitting process is followed;

i) integrate drainage with the Ecological Network;

j) ensure that single family developments built to elevated flood plain construction levels do not negatively impact local drainage systems;

k) use drainage infrastructure upgrades as opportunities to create appealing public amenities, such as the award winning Cambie Drainage Pump Station.

OBJECTIVE 2:

Maintain and improve Agricultural Land Reserve drainage and irrigation systems to support agriculture.

POLICIES:

a) maintain and refurbish pump stations and watercourses that are critical to field drainage and agricultural water use;

b) monitor Fraser River salinity levels to help farmers understand how river water salinity impacts irrigation water availability;

c) work with farmers to understand and address the effects that climate change may have on the Fraser River as a source of irrigation water;

d) minimize the impact of development on field drainage and agricultural water use;

e) minimize the impact of new roads, drainage works and utilities on agricultural lands, farm holdings and operating activities;

f) facilitate the improvement of agricultural irrigation and drainage infrastructure that support the agricultural sector (e.g., request senior government funding, participate in joint government initiatives).

12.3 Water Supply and Distribution

OVERVIEW:

Water supply is a core municipal responsibility that is essential to community health and safety. The City works with Metro Vancouver to supply adequate quantities of high quality drinking water to Richmond residents and businesses. Metro Vancouver delivers bulk water to the City and the City is responsible for distributing water to individual customers within the municipal boundary. The City has endorsed Metro Vancouver's 2011 Drinking Water Management Plan (DWMP) which includes three primary goals:

- provide clean, safe drinking water;
- ensure the sustainable use of water resources;
- ensure the efficient supply of water.

The City's population will grow by 80,000 people in the next 30 years and will result in higher demands on both the City's water distribution infrastructure and Metro Vancouver water supply system. To accommodate this growth, it is important to identify water system improvements and implementation plans that maintain adequate water service in the short, medium and long-term. Additionally, water demand management or conservation can reduce the impact of growth and extend the life of existing infrastructure.

OBJECTIVE 1:

Provide sufficient quantities of high-quality drinking water at adequate pressure to meet present and future needs of the community.

POLICIES:

a) provide adequate system capacity to meet the community's drinking water demand;

b) maintain adequate fire fighting capacity;

c) continue to monitor water quality through water sampling;

d) use quality materials and best-management practices to maintain and construct water system elements that maximize service life and reduce overall costs;

e) investigate the potential impacts of pressure management on water leakage and the service life of aging pipelines;

f) minimize water system leakages by identifying leakage sources and maintaining a leakage level below the economic level of leakage;

g) continue to work with Metro Vancouver on water supply capacity improvement projects;

h) continue City to support the Metro Vancouver Drinking Water Management Plan.

OBJECTIVE 2:

Proactive planning and implementation of infrastructure upgrades and replacements due to age and growth.

POLICIES:

a) continue to replace and upgrade aging water infrastructure on an annual basis in alignment with the City's Aging Infrastructure Program;

b) coordinate the replacement of aging water infrastructure with other City road and utility replacement projects;

c) upgrade the water distribution system in coordination with new developments to accommodate growth;

d) ensure that development related water system upgrades are funded through development Servicing Agreements, water DCC's, and senior government funding.

OBJECTIVE 3:

Pursue demand management strategies and continue water conservation initiatives.

POLICIES:

a) continue to raise public awareness regarding the benefits of water conservation;

b) continue to move toward water metering through development, capital replacement and volunteer metering programs;

c) promote the use of rain water retention systems for irrigation purposes;

d) continue toilet rebate programs to reduce indoor water use;

e) continue to implement lawn sprinkling regulations to reduce seasonal water use.

12.4 Energy

OVERVIEW: *Bylaw 9771 2018/07/16*

The City has adopted greenhouse gas reduction targets of 33% below 2007 levels by 2020 and 80% by 2050. On July 26, 2010, Council endorsed the Corporate Sustainability Framework, Energy Strategic Program, which called for the development of a Community Energy and Emissions Plan (CEEP), and included a target "to reduce energy consumption in the Richmond community by at least 10% from 2007 levels by 2020". On January 27, 2014, Council approved Richmond's CEEP.

The CEEP includes a range of strategies and actions to reduce emissions from Richmond's community's buildings, transportation, and waste sectors. The CEEP also identifies "Breakthrough Opportunities", which can drive the deeper emissions reductions needed to achieve the City's 2050 emissions reduction goal. These "Breakthroughs" include a wide-spread switch to zero emissions vehicles by the 2040s; all new buildings achieving zero carbon emissions by 2025; and deep energy upgrades to most of Richmond's existing building stock. Richmond cannot achieve these breakthroughs alone. All levels of government, the private sector, and members of Richmond's community will need to act together to realize these reductions.

The objectives and policies below focus on reducing energy use and emissions from buildings, while those relating to transportation and waste management are located in other sections of the Official Community Plan.

The City of Richmond is a leader in corporate energy management of its own facilities. The City has been recognized by BC Hydro as a Municipal Power Smart Leader (the highest recognition BC Hydro gives to organizations) several years in a row due to its outstanding efforts to

incorporate new and alternative technologies into its energy system, and improve its corporate energy management program. The experience and knowledge which the City has gained through its energy management initiatives informs its community-wide energy use and emissions reduction efforts.

Nearly two-thirds of energy consumed in Richmond occurs in commercial buildings and residences. The BC Energy Step Code was established in 2017 by the province of British Columbia; it is a standard that local governments can choose to reference that requires improved energy performance from new construction over and above what is required by the BC Building Code. There is a need to improve the performance of new buildings using tools such as the BC Energy Step Code, as well as speed the adoption of energy upgrades and renovations to existing buildings. Doing so will not only help the City achieve its emissions goals, but can also improve indoor environmental quality, health, productivity, and foster economic opportunity and jobs.

OBJECTIVE 1:

Achieve corporate leadership in energy reduction through the application of the Council endorsed Corporate Sustainability Framework-Energy Sustainability Strategic Program.

POLICIES:

a) continue to build corporate awareness and capacity through on-going work place conservation awareness programs, customized information and targeted training to key work areas to improve energy management performance;

b) reduce overall corporate energy consumption through conservation and efficiency by continuing the development of effective corporate programs, initiatives and policies to contribute to the Council endorsed targets;

c) develop a Corporate Energy and Emissions Plan by 2013;

d) incorporate energy management best practices, efficient equipment and monitoring systems into new civic buildings and community amenities and infrastructure (e.g., energy efficient pumps and energy saving features when updating or constructing new pump stations);

e) continue to implement the City's High Performance Building Policy (#2306) to improve energy efficiency in new and renovated municipal buildings;

f) accelerate transition to locally supplied renewable and clean energy sources for new capital projects and through retrofit of existing civic buildings and infrastructure;

g) consider updating waterworks pressure reducing stations to include energy recovery;

h) incorporate energy efficient lighting for City facilities, parks open space and roads through retrofits and during new construction.

OBJECTIVE 2:

Work towards achieving Council endorsed community energy reduction target, with emphasis on actions that reduce GHG emission, in recognition that these actions will have positive effects on climate change mitigation.

POLICIES:

a) advocate to senior levels of governments and utility providers to provide funding and incentives for retrofitting existing buildings to improve energy performance and reduce GHG emissions;

b) retain consultant to develop recommendations for a retrofit strategy for existing building, including but not limited to their potential to reduce GHG emissions and improve energy efficiencies from 2007 level;

c) implement viable retrofit strategy recommendations with appropriate regulatory instruments;

d) promote an energy smart future where energy needs are met through sustainable energy practices throughout the community and by affordable, efficient, reliant and environmentally responsible energy systems;

e) continue to pursue locally supplied renewable energy systems and technologies for space heating and cooling, domestic hot water supply as well as electricity production (e.g., renewable energy, district energy systems, solar thermal, geothermal, sewer heat recovery, river heat recovery and wind power systems);

f) support regulatory changes in the utility sector to encourage more investments in energy efficiency;

g) raise community energy conservation awareness through education, partnership and incentive programs;

h) explore regulatory instruments (e.g., energy auditing, energy rating labelling, performance-based standards, prescriptive standards, equipment certification/inspection, etc.) that best achieve the Council endorsed energy and GHG reduction targets.

OBJECTIVE 3: *Bylaw 9771 2018/07/16*

Improve the energy efficiency and greenhouse gas emissions performance of new construction.

POLICIES:

a) incrementally increase energy efficiency and greenhouse gas emissions performance requirements for new construction over time;

b) use the BC Energy Step Code, district energy utility connection, and other tools, to demonstrate Richmond's leadership on construction of energy-efficient, low-carbon buildings. The BC Energy Step Code is anticipated to be implemented according to the schedule in the table below:

Building Type	Building Permit Application			
	Estimated Timetable for Future Consideration			
Smaller Part 9 Residential	**September 1, 2018**	**January 2020**	**January 2022**	**January 2025**
Townhomes and Apartments	Step 3	Same as 2018	Step 4	Step 4 or Step 5
Single Family, Duplex and Other Residential	Step 1	Step 3	Step 3 or Step 4	Step 4 or Step 5
Larger Part 3 Developments				
Residential Concrete Towers	Step 3 or Step 2 for buildings with low carbon energy system	Same as 2018	Step 3	Step 4
Residential Woodframe Low/Mid-Rise	Step 3	Same as 2018	Step 4	Step 4
Office & Retail Buildings	Step 2	Same as 2018	Step 3	Step 3

c) all new construction is encouraged to achieve zero GHG emissions from operations;

d) the City will explore strategies to enable development of energy efficient, zero GHG new buildings, including low carbon district energy utility system development.

12.5 Recycling and Waste Management

OVERVIEW:

Safe and responsible solid waste management is a core responsibility for the City and with it comes challenges related to limited landfill space and effective disposal options. Richmond has endorsed Metro Vancouver's 2010 *Integrated Solid Waste and Resource Management Plan*, which outlines goals and objectives as the foundation for future waste reduction. The City has established targets for waste diversion and related objectives to support this Plan, and its programs and services are designed to align with the City's 2010 Corporate Sustainability Policy.

Waste diversion targets are supported by a comprehensive and diverse range of waste reduction and recycling services for Richmond residents, along with policies, bylaws and guidelines to provide for responsible solid waste management throughout the community. The City's garbage collection services are designed to strike a realistic balance between meeting recycling goals while enabling residents to have reasonable means to dispose of garbage. Recycling services for residents provide convenient options to recycle paper, plastic, aluminum, metal and glass, as well as food scraps and yard trimmings through recycling collection or home composting. The City's public spaces recycling and litter management programs enhance community beautification while addressing waste diversion, and its community outreach programs increase recycling, reuse and reduction of waste through education and awareness. The City also supports provincial and regional initiatives relating to banned or restricted items and household hazardous products disposal through drop-off recycling services at the City's Recycling Depot, and through support to product stewardship programs and other community services (e.g., producers and volunteer groups).

The successful diversion of waste from disposal and overall waste reduction are joint efforts. They involve all community members taking responsibility for recycling and waste reduction.

OBJECTIVE 1:

Provide for effective and responsible solid waste and recycling management through programs, services, policies, guidelines and alignment with the regional 2010 ***Integrated Solid Waste and Resource Management Plan*** and Richmond's 2010 Corporate Sustainability Policy.

POLICIES:

a) continue to improve how solid waste will be managed, including updating bylaws, building guidelines, as well as fee structures and service levels for solid waste collection so that the City provides residents with an acceptable basic level of service at reasonable cost, while encouraging users to reduce unnecessary waste generation;

b) provide information and education on options to better reduce waste;

c) request senior governments to transfer additional waste management responsibilities to producers and consumers, including actions to limit the manufacturing of non-recyclable products and better promote manufacturer accountability for product handling, recycling and/or safe disposal;

d) consider City bylaws that support regional disposal bans and work to implement programs, either in partnership with others or independently, to reduce materials from the waste stream that have detrimental environmental impacts;

e) consider establishing policies for non-residential sectors to provide for safe and responsible solid waste management and increased recycling;

f) continue to monitor waste disposal and recycling rates to measure progress toward established City targets, waste diversion and waste reduction objectives;

g) continue to set good examples of waste reduction in the City's procurement practices by emphasizing reusable packaged products, minimizing the procurement of over-packaged products and promoting products that do not contain recycled materials.

OBJECTIVE 2:

Divert waste through improved multi-faceted recycling services, composting programs and education initiatives, by supporting community programs to reuse products and reduce consumption.

POLICIES:

a) achieve a community-wide waste diversion rate of 70% by 2015 by increasing recycling and decreasing waste;

b) increase the effectiveness of existing recycling programs by exploring options to expand recycling into public streetscapes and parks, broaden services for residents, developing more options for business/commercial sectors, and providing opportunities to increase private sector recycling;

c) work with appropriate government partners to change to existing regulatory barriers that discourage the reuse of materials, promote material exchange networks and the re-engineering of recycled materials;

d) target new recycling opportunities such as organics recycling and composting, FOG recycling, wood reuse and recycling and reuse and recycling in the demolition, land clearing and construction (DLC) sectors;

e) increase public awareness to overcome barriers to recycling, reuse and waste reduction through City outreach programs and community partnerships.

OBJECTIVE 3:

Support regional requirements for banned and restricted materials including hazardous waste management, through improved City bylaws, enforcement, community awareness and drop-off programs, and partnerships with product stewardship/take back programs.

POLICIES:

a) support regional initiatives to develop alternative programs to reduce waste and pollution, such as waste audits on construction sites, processes for tracking construction waste, and alternatives to traditional building material, recycling programs and improved commercial building design guidelines;

b) encourage additional opportunities for the safe and convenient disposal of household hazardous waste through drop-off collection at the Richmond Recycling Depot, partnerships with community product stewardship/take back programs, and coordination with responsible disposal services in the community;

c) develop and enforce bylaws that better align with regional waste disposal bans and/or restrictions;

d) increase public awareness and education on disposal restrictions and bans.

12.6 Flood Protection

OVERVIEW:

Located in the Fraser River delta, the City of Richmond is naturally low lying and would be subject to flooding from high tides, storm surges and freshets without diking. As a Local Diking Authority, the City manages dikes on Lulu, Sea and Mitchell Islands that protect against sea and river floods.

The City strives to meet Provincial Diking Inspector guidelines and requirements that address issues such as climate induced sea level rise, seismic design and dike alignment. The 2008-2031 Richmond Flood Protection Strategy forms a framework for understanding and meeting Richmond's flood protection needs and directs spending strategies.

Ongoing Fraser River and Steveston Harbour dredging is required to minimize the risk of flooding during the annual freshet season.

The Flood Plain Designation and Protection Bylaw No. 8204 regulates building construction levels and ensures that new building developments are set back an appropriate distance from the dike. These controls are essential for the protection of public safety, public property and enabling dike upgrades.

OBJECTIVE 1:

Maintain and improve flood protection measures throughout Richmond.

POLICIES:

a) enforce the setback requirements of Flood Plain Designation and Protection Bylaw 8204 to facilitate future dike raising to accommodate climate change induced sea level rise;

b) maintain and upgrade the perimeter dike systems on Lulu, Sea and Mitchell Islands while striving to meet Provincial Diking Inspector guidelines and requirements;

c) develop Dike Master Plans to identify future perimeter dike and internal dike upgrade requirements and construction schedules;

d) request senior government funding to maintain and upgrade Richmond's dike systems;

e) work with stakeholder groups to ensure that future dike upgrades are appropriate and respect local community values;

f) continue to request ongoing senior government funding to dredge the Fraser River and Steveston Harbour.

12.7 Building, Fire and Seismic Protection

OVERVIEW:

Building, fire and seismic protection, like flood protection, are "Life Safety" matters which Richmond takes very seriously. Richmond takes a proactive and scientific approach to protecting City-owned, public and private buildings, structures, dikes and infrastructure against building, fire and seismic damage. Dike maintenance, height increases and seismic protection are addressed in the City's Flood Protection Strategy, related policies and Provincial Legislation. The City co-operates with the Federal and Provincial governments, and others in conducting scientific research and updating Building Code requirements.

The provincial Dike Safety Program is delivered through the Deputy Inspector of Dikes. Activities include: administering the Provincial Dike Maintenance Act, approving construction works on and adjacent to dikes, auditing dike owner's dike management programs, and issuing orders to protect public safety.

Federally, the Government of Canada supports the National Research Council (NRC) Institute for Research in Construction (NRC-IRC) which is the leading construction research agency in Canada. It also supports, for example, the Canadian Codes Centre, Canadian Construction Material Centre, building envelope technologies, and fire research to advance fire safety and design.

The BC Ministry of Energy and Mines, Office of Housing and Construction Standards, Building and Safety Policy Branch is responsible for developing and implementing a modern legislative framework for regulating safety in the design, construction and occupancy of buildings. The Province enacts

the BC Building Code and regulations under the Local Government Act. The Code is based on the model National Building Code of Canada that provides minimum standards for topics such as: safety, health, accessibility, fire and structural protection of buildings; water and sewer damage; energy and water efficiency; and the alteration and demolition of existing buildings.

The Building Approvals Division aims to ensure public health, fire protection, life safety, and structural sufficiency by providing two main services:

1. "Permits" which reviews drawings for compliance with the BC Building Code, including plumbing and mechanical systems for large buildings;
2. "Inspections" which is responsible for on the site construction of the building, and the associated plumbing and gas work.

The Engineering Department provides sustainable infrastructure including dike maintenance and upgrading.

OBJECTIVE 1:

To provide and advance effective building, fire and seismic protection to ensure that Richmond is a safe place to live, work and play.

POLICIES:

a) base building, fire and seismic protection initiatives on the following proactive principles:
   - Scientific Research;
   - Public Safety;
   - Risk Prevention;
   - Partnerships;
   - Standards;
   - Cost Effectiveness;

b) co-operate with senior governments and others (e.g., institutions, developers) to advance building, fire and seismic protection research and best practices (e.g., geotechnical studies, site preparation), codes and regulations;

c) continue to monitor, raise and seismically improve the City's dike system, as appropriate;

d) update building bylaws and regulations, as appropriate;

e) continue educational initiatives to inform developers, builders and the public of recent advances in building, fire and seismic protection.

12.8 Roads

OVERVIEW:

While the City's Transportation Division plans roads and access, the Engineering Division manages them. The City's road infrastructure includes a well developed network of arterial roads, collector roads, local roads, lanes, bike lanes and pedestrian walkways that constitute approximately 20% of the developed land base in Richmond.

To meet the demands of a growing City, the existing roads and sidewalks must be maintained and improved to support transportation and pedestrian activities and minimize negative social and environmental impacts. New road development and improvements need to make the best use of the City's limited street capacity and balance competing user-demands and interests.

City streets are important public places that enhance the City's identity by linking people, community and nature, and promote a vibrant and 'distinctly Richmond' urban realm.

OBJECTIVE 1:

Protect the City's capital investment in road infrastructure.

POLICIES:

a) continue maintenance and improvement programs in accordance with identified needs balanced with resources consistent with the City's Pavement Management Strategy;

b) coordinate the improvements of aging road infrastructure with City utility replacement projects (e.g., perform street and pipeline renewal coincidentally in locations where both infrastructure elements have reached the end of their useful life);

c) place a high priority on the maintenance of streets that function as transit corridors (e.g., No. 3 Road);

d) give high priority to road and sidewalk network improvements that service higher-density areas and link higher-density commercial and residential areas;

e) use quality materials and best management practices to maintain and construct road infrastructure elements that maximize service life and minimize overall costs;

f) continue to work with Translink on Major Road Network Improvement projects.

OBJECTIVE 2:

Support safe transportation and pedestrian, cycling and rolling (wheel chairs, scooters) activities, vibrant public places and linkages among all City uses.

POLICIES:

a) ensure that street designs promote efficient vehicle and pedestrian movements and do not compromise a safe, convenient, and aesthetically pleasing environment for pedestrians, cyclists, and transit-users;

b) design streets in accordance with planned land use patterns and accepted engineering standards, including the provision of sidewalks on most streets;

c) ensure wheel chair access at road intersections in pedestrian-oriented areas and at intersections with arterial roads where feasible;

d) design sidewalks and trails to ensure rolling accessibility and safety;

e) investigate the development of alternative street design and construction standards that will result in greater environmental benefits to the community (e.g., finer grids, right of passage).

12.9 Roadway Lighting

OVERVIEW:

Most roadways in Richmond's urban areas include roadway lighting which is designed to provide accurate and comfortable visibility at night on roadways, laneways, walkways, and bikeways. This lighting reduces night time accidents, improves traffic flow, and promotes business and use of public facilities at night. It also enhances the public's sense of personal security and assists police efforts to reduce crime and economic loss.

City standards include high-pressure sodium lights in residential, commercial and industrial areas, with metal halide (white light) for the City Center and other special areas. Innovative street lighting that enhances a local area or creates a sense of "place" and safety will be considered for new developments such as commercial and shopping areas.

OBJECTIVE 1:

Maintain a system of roadway lighting that supports safety, visibility and security on the City's urban roadways, laneways, walkways and bikeways.

POLICIES:

a) maintain standardized lighting levels and uniform light distribution along urban roadways;

b) ensure that new developments include underground lighting systems that comply with current roadway lighting standards;

c) ensure that lighting improvements are primarily funded through redevelopment (service agreements) or through local area service programs;

d) pursue initiatives and follow best practices to install, replace, and maintain roadway lighting on City streets;

e) improve the resistance of roadway lighting systems to copper theft. (e.g., tamper proof access covers).

OBJECTIVE 2:

Achieve greater roadway lighting efficiency through the use of evolving energy saving technologies.

POLICIES:

a) research and promote the use of energy saving lighting technologies and design energy-efficient roadway lighting systems;

b) continue to convert existing roadway lights to more energy-efficient lights;

c) research and identify options for synergy between roadway lighting systems and other utility systems. (e.g., cellular antennas).

OBJECTIVE 3:

Use a system of roadway lighting to encourage the development of a safe, appealing, lively and distinctive character on the City's urban roadways, laneways, and walkways.

POLICIES:

a) investigate roadway lighting and pole designs to enhance distinctive area character;

b) promote and continue the use of banners, flower pot holders and decorative receptacles on roadway lighting systems for beautification purposes.

12.10 Street Trees

OVERVIEW:

Richmond's urban forest is a valuable community asset. The trees within it have many life affirming qualities, and their influence on the Ecological Network and environment enhances the well-being of all living things. The ecological service benefits of trees include absorbing carbon dioxide, replenishing oxygen, filtering particulate pollutants, preventing soil erosion, creating shade from the sun's rays, and providing food and habitat for wildlife (e.g., bird nests).

Trees are planted within all areas of the City: in parks and open spaces; along trails and in natural areas; and as integral parts of the built environment.

Tree planting is a fundamental part of new road construction and many trees have been and will continue to be planted along major city streets. Trees are important elements in making positive and well defined human scaled places.

Street tree planting is a positive initiative but creates challenges for development projects, existing building upgrades, and the accommodation of infrastructure located within City owned road allowances and rights-of-way.

OBJECTIVE 1:

Develop a comprehensive Street Tree Master Plan to provide a detailed, long-term policy framework for maintaining and funding City street trees.

POLICY:

a) the Street Tree Master Plan will be integrated with the City's overall Urban Forest Strategy, and coordinated with other City master plans and strategies.

OBJECTIVE 2:

Continue tree planting as part of the City's road capital works program, and development related off-site works.

POLICIES:

a) ensure that the planning and design of street trees is coordinated with other City and privately owned overhead and underground utilities and services;

b) ensure that the planning, design and planting of street trees is done in accordance with the tree planting details and growing medium specifications outlined in the most recent City Engineering Department Supplementary Specifications and Detail Drawings;

c) maximize the soil volume available to support tree root development;

d) ensure that street tree selection contributes toward a healthy diversity of tree varieties;

e) continue to research best practices to optimize tree health and longevity of trees on Richmond's streets.

OBJECTIVE 3:

Protect and retain the City's existing street trees, particularly in areas of new development within the City.

POLICIES:

a) ensure that existing street trees are only removed in accordance with the criteria established by the City's Urban Forest Strategy;

b) ensure that planning of new developments takes into account the location and condition of existing street trees, and where necessary their replacement;

c) ensure that street trees are protected from disturbance during installation or maintenance activities of other public or private utilities.