City of Richmond

Agenda

Public Works and Transportation Committee

Anderson Room, City Hall
6911 No. 3 Road

Wednesday, January 20, 2016
4:00 p.m.

Pg. # ITEM

MINUTES

PWT-5 ***Motion to adopt the minutes of the meeting of the Public Works and Transportation Committee held on November 18, 2015.***

NEXT COMMITTEE MEETING DATE

February 17, 2016, (tentative date) at 4:00 p.m. in the Anderson Room

PLANNING AND DEVELOPMENT DIVISION

1. **RICHMOND ACTIVE TRANSPORTATION COMMITTEE – PROPOSED 2016 INITIATIVES**
(File Ref. No. 01-0100-20-RCYC1) (REDMS No. 4817866)

PWT-10 See Page **PWT-10** for full report

Designated Speaker: Victor Wei

STAFF RECOMMENDATION

(1) That the proposed 2016 initiatives of the Richmond Active Transportation Committee, as outlined in the staff report titled "Richmond Active Transportation Committee - Proposed 2016 Initiatives," dated December 18, 2015, from the Director, Transportation, be endorsed; and

(2) That a copy of the above report be forwarded to the Richmond Council-School Board Liaison Committee for information.

2. **TRAFFIC SAFETY ADVISORY COMMITTEE – PROPOSED 2016 INITIATIVES**
(File Ref. No. 01-0100-30-TSAD1-01) (REDMS No. 4816624)

PWT-21 See Page **PWT-21** for full report

Designated Speaker: Victor Wei

STAFF RECOMMENDATION

(1) That the proposed 2016 initiatives for the Traffic Safety Advisory Committee, as outlined in the staff report titled "Traffic Safety Advisory Committee - Proposed 2016 Initiatives," dated December 21, 2015, from the Director, Transportation, be endorsed; and

(2) That a copy of the above report be forwarded to the Richmond Council-School Board Liaison Committee for information.

ENGINEERING AND PUBLIC WORKS DIVISION

3. **RICHMOND'S INVASIVE SPECIES ACTION PLAN**
(File Ref. No. 10-6160-07-01) (REDMS No. 4759687 v. 2)

PWT-26 See Page **PWT-26** for full report

Designated Speaker: Lesley Douglas

STAFF RECOMMENDATION

That the Invasive Species Action Plan, as described in the staff report titled "Richmond's Invasive Species Action Plan," dated December 7, 2015, from the Director, Engineering, be adopted.

4. **WORKS AND SERVICES COST RECOVERY BYLAW AMENDMENT**
(File Ref. No. 12-8060-20-008752; 10-6060-01) (REDMS No. 4677246 v. 4)

PWT-74 See Page **PWT-74** for full report

Designated Speaker: Lloyd Bie

STAFF RECOMMENDATION

That Works and Services Cost Recovery Bylaw No. 8752 be amended and given first, second, and third readings.

5. **LOCAL AREA SERVICES – NORTH SIDE DONALD ROAD FROM AND INCLUDING 6991 DONALD ROAD TO AND INCLUDING 7480 GRANDY ROAD AND SOUTH SIDE DONALD ROAD FROM GILBERT ROAD TO AND INCLUDING 6760 DONALD ROAD - BYLAW NO. 9277**
(File Ref. No. 12-8060-20-009277; 10-6000-01) (REDMS No. 4726637)

PWT-82 See Page **PWT-82** for full report

Designated Speaker: Lloyd Bie

STAFF RECOMMENDATION

(1) That the Local Area Services Program for roadway development to widen pavement, install curb, gutter, sidewalk, street lights and boulevard trees (where ditch has previously been eliminated on Donald Road), be adopted in accordance with Section 211 and 212 of the Community Charter; and

(2) That Bylaw No. 9277, which authorizes local area services construction at Donald Road, be introduced and given first, second and third readings.

6. **CONSTRUCTION MANAGEMENT SERVICES FOR UTILITY CAPITAL PROJECTS STUART OLSON CONSTRUCTION LTD.**
(File Ref. No. 10-6000-01) (REDMS No. 4873315)

PWT-90 See Page **PWT-90** for full report

Designated Speaker: Milton Chan

STAFF RECOMMENDATION

That the staff report titled "Construction Management Services for Utility Capital Projects – Stuart Olson Construction Ltd.," dated January 4, 2016, from the Director, Engineering, be received for information.

7. **MANAGER'S REPORT**

ADJOURNMENT

City of Richmond

Minutes

Public Works and Transportation Committee

Date:	Wednesday, November 18, 2015
Place:	Anderson Room Richmond City Hall
Present:	Councillor Chak Au, Chair Councillor Derek Dang Councillor Ken Johnston Councillor Alexa Loo
Absent:	Councillor Harold Steves
Also Present:	Councillor Carol Day
Call to Order:	The Chair called the meeting to order at 4:00 p.m.

MINUTES

It was moved and seconded
That the minutes of the meeting of the Public Works and Transportation Committee held on October 21, 2015, be adopted as circulated.

CARRIED

NEXT COMMITTEE MEETING DATE

January 20, 2016, (tentative date) at 4:00 p.m. in the Anderson Room

ENGINEERING AND PUBLIC WORKS DIVISION

1. **UPDATE ON 2015/2016 SNOW AND ICE RESPONSE PREPARATIONS**
(File Ref. No.) (REDMS No. 4757418)

It was moved and seconded
That the staff report titled "Update on 2015/2016 Snow and Ice Response Preparations," dated October 23, 2015, from the Director, Public Works Operations be received for information.

CARRIED

2. **2016 PAVING PROGRAM**
(File Ref. No. 10-6340-01) (REDMS No. 4757078)

It was moved and seconded
That the staff report titled, "2016 Paving Program," dated October 28, 2015, from the Director, Engineering be received for information.

CARRIED

3. **COMMUNITY ENERGY AND EMISSIONS PLAN – 2015 UPDATE**
(File Ref. No. 10-6125-07-02) (REDMS No. 4748952 v. 4)

In reply to queries from Committee, Brendan McEwen, Manager, Sustainability, and Victor Wei, Director, Transportation, provided the following information:

- the competitiveness of solar electricity systems to that of other energy systems is estimated to be reached in approximately 5 to 10 years; however, some analysts predict that this will be achieved sooner;
- staff are continually evaluating green building standards such as Passive House, and would report to Committee with any proposed recommendations;
- rapid transit stations have been identified as ideal locations for various improvements such as bicycle parking and better sidewalks in an effort to encourage active transportation; and
- complementary parking for low emitting modes of transportation such as scooters has not been examined.

Discussion took place on the potential to lobby other levels of government to provide incentives for developers to build "solar hot water ready" homes, and Mr. McEwen advised that there are a number of other avenues in which action on such an initiative can be pursued.

In reply to a query from the Chair, Mr. Russell provided background information regarding discussions with the Ministry of Environment, noting that staff provided comments to the Climate Action Secretariat on the provincial "Climate Leadership Plan Discussion Paper" in September 2015; a draft Plan is anticipated to be released by the Ministry of Environment in the near future.

Discussion took place on electric vehicle usage in the city and Robert Gonzalez, General Manager, Engineering and Public Works, advised that statistical information regarding the use of such vehicles throughout the city would be provided to Council.

Discussion then ensued regarding the City's district energy utilities and in particular how the City compares to other regional municipalities and the level of customer satisfaction with the City's service. Mr. Russell commented on district energy utilities operated by other municipalities, and highlighted that the City is the regional leader in relation to the scale and number of connections for district energy use.

John Irving, Director, Engineering, advised that the City's district energy utilities currently service approximately 2,500 customers, noting that the City has not yet achieved a steady state in service delivery. Mr. Irving remarked that as service grows and matures, customer satisfaction data would be valuable in understanding how the service is performing.

The Chair requested that staff continue to monitor the progress of the City's district energy utilities and advise Council when it is appropriate to survey users on its performance.

It was moved and seconded
That the staff report titled "Community Energy and Emissions Plan – 2015 Update," dated October 24, 2015, from the Director, Engineering, be received for information.

CARRIED

4. **CARBON NEUTRALITY AND RICHMOND CARBON MARKETPLACE UPDATE**
(File Ref. No. 10-6000-01) (REDMS No. 4758152 v. 19)

Levi Higgs, Corporate Energy Manager, provided background information, and in reply to a query from Committee, advised that submitted projects are verified and confirmed as eligible by a third party based on the provincial framework, which utilizes international protocols.

In reply to comments regarding the notion of purchasing carbon credits from other organizations to achieve carbon neutrality for the City, Mr. Irving advised that the Richmond Carbon Marketplace program was envisioned as a means to reduce greenhouse gas (GHG) emissions and invest in Richmond organizations through the purchase of carbon reduction credits for completing GHG emissions reducing projects.

It was moved and seconded

(1) That the staff report titled, "Carbon Neutrality and Richmond Carbon Marketplace Update," from the Director of Engineering, dated October 30, 2015 be received for information; and

(2) That the Chief Administrative Officer and the General Manager, Engineering and Public Works be authorized to negotiate and execute agreements with each of the five prospective Richmond-based business organizations to support community greenhouse gas emissions reductions and to ensure that the City of Richmond corporate carbon neutrality is maintained.

CARRIED

5. **MANAGER'S REPORT**

(i) Appreciation for Public Works Crew

On behalf of a Seniors Advisory Committee member, Councillor Johnston thanked the City's Public Works staff for repairing an uneven sidewalk with expediency.

(ii) George Massey Tunnel Replacement Project

Discussion took place on the potential to examine connecting Rice Mill Road to the east side of Highway 99 at Steveston Highway in light of the proposed timeline for completion of the George Massey Tunnel replacement project.

Mr. Wei spoke to the need of a business case for such a project, noting that a technical analysis would be critical in determining its feasibility and whether or not it is required should the Highway 99 interchange at Steveston Highway be completely rebuilt.

ADJOURNMENT

It was moved and seconded
That the meeting adjourn (4:40 p.m.).

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the Public Works and Transportation Committee of the Council of the City of Richmond held on Wednesday, November 18, 2015.

Councillor Chak Au
Chair

Hanieh Berg
Legislative Services Coordinator

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	December 18, 2015
From:	Victor Wei, P. Eng. Director, Transportation	**File:**	01-0100-20- RCYC1/2015-Vol 01
Re:	**Richmond Active Transportation Committee – Proposed 2016 Initiatives**		

Staff Recommendation

1. That the proposed 2016 initiatives of the Richmond Active Transportation Committee, as outlined in the staff report titled "Richmond Active Transportation Committee - Proposed 2016 Initiatives" dated December 18, 2015 from the Director, Transportation, be endorsed.

2. That a copy of the above report be forwarded to the Richmond Council-School Board Liaison Committee for information.

Victor Wei, P. Eng.
Director, Transportation
(604-276-4131)

Att. 2

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Parks Services Recreation Services Sustainability	☑ ☑ ☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

The Richmond Community Cycling Committee was formed in 1993 to allow City staff to work in partnership with the community to promote commuter and recreational cycling in Richmond. In 2013, Council approved the evolution of the Committee into the Richmond Active Transportation Committee (RATC) to reflect a broader mandate that includes skateboarding, in-line skating and low-speed scooters. The Committee provides input and feedback to the City on infrastructure projects designed for these modes and undertakes various activities in co-operation with the City that encourage, educate and raise awareness of active transportation.

This report reviews the 2015 activities of the RATC and identifies a number of initiatives for 2016 that would support its mandate to provide input and advice to the City on issues in the planning, development, improvement, and promotion of an active transportation network that supports a greater number of trips by cycling, walking and rolling.

Analysis

The RATC undertook and participated in a number of activities in 2015 that contributed to enhanced cycling and rolling opportunities, and increased education and awareness of active transportation in Richmond.

Expansion and Improvement of Active Transportation Network in 2015

The City continued to add to the active transportation network in 2015, which now comprises 68 km of on- and off-street bike and rolling routes. The Committee provided feedback on the planning, design, construction, and/or improvement of the following facilities.

- *Crosstown Neighbourhood Link*: Construction of a paved multi-use pathway to safely accommodate two-way cycling, rolling and walking through the south end of Blundell Park between Dorval Road and Lucas Road (see Figure 1). The connection forms part of the east-west Crosstown Neighbourhood Bike Route currently under development that is aligned between Blundell Road and Francis Road and will link the Railway Greenway to the Parkside Neighbourhood Bike Route on Ash Street.

Figure 1: Off-Street Path in Blundell Park

- *Green Surface Treatment in Bike Lanes*: Addition of green-coloured anti-skid surface complete with bike stencils within bike lanes at strategic locations where there is a higher potential for conflicts between cyclists travelling straight through and motorists needing to cross the bike lane in order to merge or make a turn. The vibrant colour is the approved national standard that is intended to highlight and raise awareness to both cyclists and motorists to watch out for each other and use caution when in the area. The green treatment

was added within the bike lane at the following two locations: westbound Granville Avenue west of Cooney Road and westbound Westminster Highway west of No. 5 Road.

- *Railway Avenue Greenway*: Refinement of the intersection treatments and signage for this major north-south pedestrian, cycling and rolling greenway that connects Steveston with the Middle Arm Greenway. Enhancements undertaken in 2015 include the installation of additional pavement markings and signage for southbound cyclists approaching Blundell Road (see Figure 2), which will be expanded to all intersections, and the upgrade of the Railway Avenue-Steveston Highway intersection to its ultimate design (i.e., curb, gutter, sidewalk, ramps, and relocated signal poles).

Figure 2: Railway Greenway Signage & Pavement Markings

- *Westbound Granville Avenue (Minoru Blvd-Gilbert Road)*: The Committee provided feedback on potential concepts that would relocate the on-street bike lane in this roadway section to an off-street facility in order to accommodate on-street parking as part of the new buildings being constructed within the Minoru Civic Precinct. The Committee indicated a preference for a protected on-street cycling facility, which would preserve the existing mature trees and minimize conflicts between motorists, cyclists and pedestrians.

- *No. 2 Road Upgrade (Steveston Highway-Dyke Road)*: The Committee provided feedback on the functional design for this planned roadway improvement project that includes the provision of a two-way paved multi-use pathway on the east side.

- *Westminster Highway Widening (Nelson Road-McMillan Way)*: The Committee provided on-going feedback during the construction phase that helped staff ensure that cyclists were safely accommodated.

- *Spot Improvements*: Throughout the year, the Committee identified a number of minor improvements to enhance the convenience of cycling and rolling in the city. Projects completed in 2015 include:
  - Ramps: construction of three ramps to facilitate cycling and rolling access between the roadway and an off-street pathway.
  - Off-Set Gates: removal of gates from an off-street pathway to better accommodate the passage of cyclists and other users of wheeled devices.

Promotion of Active Transportation Network in 2015

The Committee participated in the following activities in 2015 to promote cycling and other active transportation modes in Richmond.

- *Bike to Work Week (May and October 2015)*: The Committee worked with organizers of this region-wide annual initiative to continue to successfully stage these events in Richmond. Region-wide, the two events again broke year-over-year records for the number of people registered online (a combined total of over 17,200 cyclists, which is a 44 per cent increase over the number of participants in 2014). A total of 543 riders who work in Richmond registered on-line for both events (up from 457 participants in 2014), and collectively logged 6,506 trips for a total distance of nearly 97,000 kilometres thereby avoiding the emission of 21 tonnes of greenhouse gases (see Figure 3). Within this group were four teams from the City of Richmond comprising 41 cyclists. Together, the City teams logged 359 trips for a total distance of 3,535 kilometres, thus avoiding the emission of 767 kilograms of greenhouse gases.

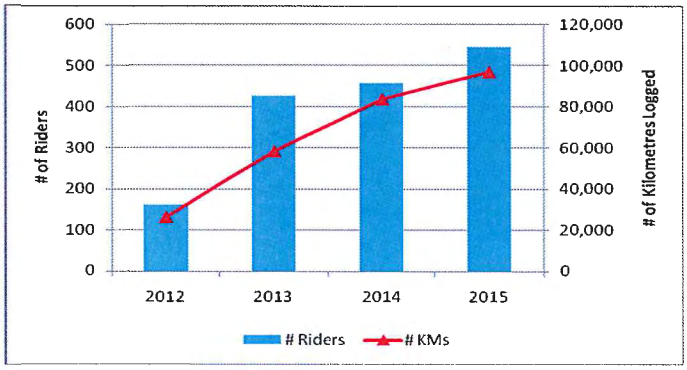


Figure 3: Participation of Cyclists who work in Richmond in Bike to Work Week

Celebration stations for cyclists were held at the Canada Line Bridge and Flight Path Park on Russ Baker Way for both the Spring and Fall events plus at Richmond General Hospital during the Fall event. Collectively, these celebration stations also logged record numbers (see Figure 4).

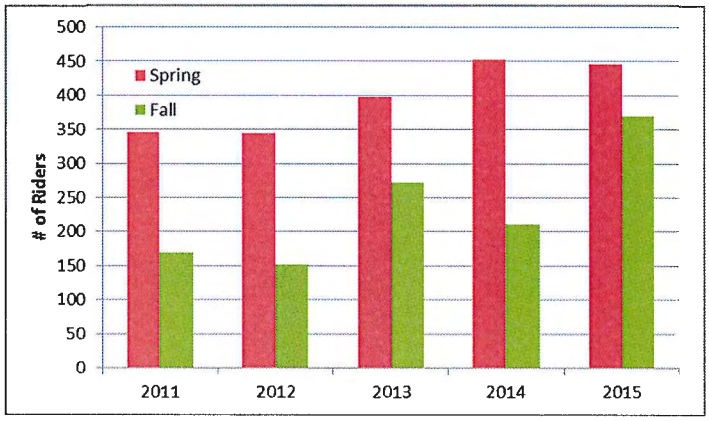


Figure 4: Cyclists Counted at Celebration Stations

- *15th Annual "Island City, by Bike" Tour (June 14, 2015)*: Each year in June, as part of regional Bike Month activities and the City's Environment Week events, the Committee and the City jointly stage guided tours for the community of some of the city's cycling routes. The 15th annual "Island City, by Bike" tour was based at South Arm Community Centre and offered short (7-km) and long (20-km) rides with escorts provided by volunteer members of the Richmond RCMP bike squad. The loops featured the nearly completed Parkside Neighbourhood Bike Route along Ash Street between Williams Road and Garden City Park. Activities included a bike and helmet safety check prior to the ride plus a barbecue lunch and raffle prize draw at the finish. The event attracted 75 cyclists of all ages and ability. Attendance at the event over the past five years has averaged 105 participants.

- *All Aboard! (August 8, 2015)*: The Committee participated in this annual event held at the Steveston Interurban Tram Building, which celebrated the history of transportation in Richmond. Members provided information on how to get around Richmond in fun, safe and environmentally friendly ways.

Active Transportation Education in 2015

The City provided funding to *HUB: Your Cycling Connection*, a non-profit organization focused on making cycling better through education and events, to operate the following cycling education courses for local residents with input from the Committee. The City's support for cycling education generates multiple benefits including increased safety, encouragement of a life-long healthy activity and sustainable mode of travel, and potential to reduce traffic congestion around schools as more students choose to ride a bike, all of which align with the City's OCP goals. Beginning in 2015, the City is eligible for a 30 per cent discount off program costs as a result of Council's endorsement in October 2014 of the City becoming a TravelSmart partner municipality with TransLink.

- *Bike to School Education for Students*: A total of 220 Grades 4 and 5 students at Quilchena Elementary School (four classes of 110 students) and Bridge Elementary School (four classes of 110 students) and a total of 220 Grades 6 and 7 students at James Whiteside Elementary School (four classes of 110 students) and Errington Elementary School (four classes of 110 students) participated in five-day bike education courses, held in co-operation with Richmond School District. The courses include in-class lessons, on-bike playground cycling safety training for younger students and neighbourhood road ride education for older youth. The courses were well received and enjoyed the enthusiastic participation of all students. Attachment 1 provides a summary of the outcomes and feedback.

- *Learn to Ride Education for Adults*: Four beginner's courses targeted to recent immigrants were held in co-operation with Immigrant Services Society of BC. A total of 43 new riders of varied immigrant backgrounds, who live in Richmond, took to the classroom, an empty parking lot, and eventually to the road to learn to ride safely and confidently on Richmond streets. Attachment 2 provides a summary of the outcomes and feedback.

Proposed Active Transportation Network Initiatives in 2016

The Committee will provide input at the earliest conceptual stage on the prioritization, planning, design, and implementation of the following projects that expand and/or improve the network of infrastructure that can be used by active transportation modes.

- *Prioritization of Future Active Transportation Network Projects*: Following development of a preliminary list of potential initiatives, the next steps are to rank and prioritize the projects for future implementation through the City's annual capital and operating budget process.

- *Planned Active Transportation Network Expansion*: Projects include the completion of the Parkside Neighbourhood Link with the upgrade of the special crosswalk on Blundell Road at Ash Street to a pedestrian signal, further progress on the Crosstown Neighbourhood Link and additional improvements to the Railway Avenue Greenway (e.g., upgrade of the special crosswalk on Westminster Highway at McCallan Road to a pedestrian signal).

- *Cycling Network Improvement Projects*: Potential projects include localized improvements to existing on-street cycling facilities such as improved pavement markings (e.g., green painted bike lanes at potential conflict areas), additional signage, new ramps to facilitate access to off-street pathways, and installation of delineators to prevent motorists from encroaching into bike lanes.

- *Planned Park, Road and Development Projects*: The Committee will review additional City and external agency projects that impact existing or would incorporate new active transportation infrastructure as part of the overall project such as the George Massey Tunnel Replacement, No. 2 Road upgrade (Steveston Highway-Dyke Road), interim Lansdowne Road extension (Minoru Blvd-Alderbridge Way), Dyke Road trail and new civic facilities at Minoru Park.

Proposed Education and Promotion of Active Transportation in 2016

The Committee will encourage and promote active transportation as sustainable travel modes that also have significant health benefits via the following activities.

- *Update of Cycling & Trails Map*: Provide input into the update of the 2013 edition of the Richmond cycling and trails map that will incorporate recent improvements to the local cycling and trails network including the Westminster Highway paved off-street path between Nelson Road and McMillan Way. The new map will be distributed in early 2016 to community centres, libraries and other civic facilities as well as handed out at various City events.

- *16th Annual "Island City, by Bike" Tour*: Assist in the planning, promotion and staging of the fifteenth annual bike tour of Richmond during Bike Month in June 2016, which is set for Sunday, June 12th at Cambie Community Centre. Both the long and short routes will utilize portions of the Bath Slough Trail and the on-street bike lanes on Jacombs Road to raise community awareness of the neighbourhood facilities that support walking, cycling and rolling activities.

- *Bike to Work & School*: Assist in the planning, promotion and staging of this region-wide event during May and October 2016, which includes the provision of celebration stations for cyclists.

- *Bicycle Education for Students and Adults*: In co-operation with HUB, the Richmond School District and a variety of community agencies to expand the delivery of safe cycling education courses to additional elementary schools and recent immigrants in Richmond.

- *Promotion of Active Transportation Network*: Continue to participate in City events related to health and transportation to raise the awareness of new active transportation facilities both locally and regionally. Continue to provide education and awareness notices regarding active transportation in the City Page and continue to update, revise and enhance related information on the City's website and Facebook site.

Financial Impact

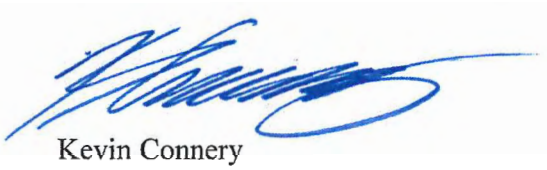
None.

Conclusion

The Richmond Active Transportation Committee continues to build its diversity of users' experience to support its broader mandate that includes other rolling transportation modes and now has the participation of members who have a specific perspective on wheelchair/scooter

users and in-line skating. The Committee's proposed 2016 initiatives would continue efforts to further encourage greater and safer use of active transportation modes in Richmond, which in turn will support progress towards meeting the City's target for the reduction of greenhouse gas emissions as well as the travel mode share targets of the City's Official Community Plan.

Joan Caravan
Transportation Planner
Staff Liaison to Richmond Active
Transportation Committee
(604-276-4035)



Kevin Connery
Park Planner
Staff Liaison to Richmond Active
Transportation Committee
(604-247-4452)

Att. 1: Summary of 2015 Bike to School Program Results
Att. 2: Summary of 2015 Learn to Ride Bike Education Program Results

Your Cycling Connection

2015 Bike to School Program in Richmond

The City of Richmond's Sustainability Group matched Richmond Engineering's funding for HUB Bike to School courses in 2015, so we were able to deliver two Learn2Ride courses and two Ride the Road courses, providing positive impact for approximately 110 students in each of four schools.

Richmond Bike to School Outcomes

- **448 Richmond students** completed a HUB cycling course in 2015
- Student cycling **increased from 11-20 to 20+** daily at Quilchena Elementary
- Bridge Elementary reported an **increase from 0-2 to 3-5** students cycling daily

Learn2Ride Courses:

- **Bridge Elementary**: delivered to four classes of grade 4 and 5 students. May 5, May 11.
- **Quilchena Elementary**: delivered to four classes of 4 and 5 students. June 2, June 9.

Ride the Road Courses:

- **Errington Elementary**: instruction to four classes of grade 6 and 7 students. April 13-14, April 21-23.
- **James Whiteside Elementary**: instruction to four classes of grade 6 and 7 students. June 1-3, June 8, June 10.

Ride the Road Course Teacher Feedback

"Well done for creating and running such an educational and valuable program for students; we'd like to run it at our school every year! Thanks to the instructors for going out of their way to fix bikes and help students gain more confidence about their bike riding skills. Please note that the teachers have seen many more students ride their bicycles to school since having the program here." – Errington Elementary

"We received lots of positive comments from the parents and they were happy that the students were learning how to ride their bikes safely, as well as that they learned about the rules of the road, in addition to bike maintenance" – Errington Elementary

"Our school has a goal of increasing health both through exercise and nutrition. HUB goals of getting kids on bikes was right along the same lines as we have been trying to teach." - James Whiteside Elementary

Your Cycling Connection

Richmond Ride the Road Student Survey Results

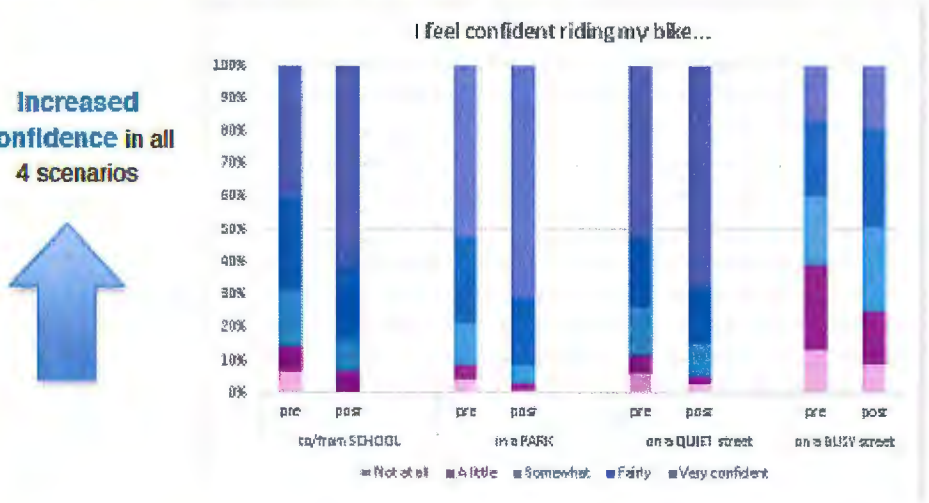
56% of students said they were more likely to ride a bike after the course

75% of students said the course was effective in teaching them bike safety skills

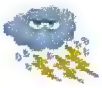
4% of students say they have never ridden a bike prior to the course – on par with the regional average of 3%

Students reported a **24%** increase in riding after the course

Increased confidence in all 4 scenarios



What stops you from riding a bike?
Students' top 5 responses


57% Bad weather

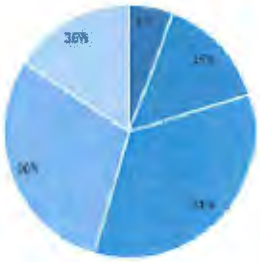

55% Travel mostly by car


48% Not enough time

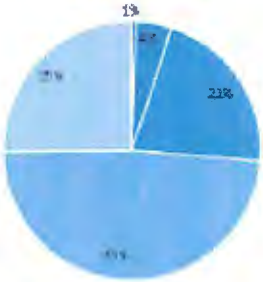

39% Traffic dangers


28% Parents won't let me

How would you rate your cycling knowledge?
Pre-course



Post-course



- Very little knowledge
- Little knowledge
- Somewhat knowledgeable
- Fairly knowledgeable
- Very knowledgeable

7

Your Cycling Connection

HIGHLIGHTS: HUB 2015 Bike Education results in Richmond

43 immigrant newcomers to Richmond completed a HUB Cycling Immigrant Learn to Ride course during August and September 2015.

ISSofBC, SUCCESS and Richmond Multicultural Community Services referred settlement service clients who would benefit from the course.

ISSofBC staff stepped forward to coordinate course recruitment, provide classroom space, and assist with course delivery.

HUB organized courses for groups of newcomers who have never ridden before (Level 1), and groups who have prior cycling experience (Level 2).

All immigrant newcomer course participants (Levels 1 and 2):

- Developed their ability to balance, pedal, steer and brake on a bicycle
- Built their basic cycling skills including straight-line riding, turning, braking, shoulder checks, and hand signals

Immigrant newcomers with prior cycling experience (Level 2):

- Learned about the Canadian road use context, specific traffic law (BC Motor Vehicle Act) and how insurance applies to cycling
- Gained knowledge about urban cycling infrastructure and safety equipment
- Became familiar with various types of cycling gear including clothing, helmets, lights and reflectors, cargo carriers, tools and rain gear
- Understood the dynamics of bike storage, security, and theft prevention
- Learned how to assess their bike's condition, and make basic adjustments to keep their bike operating well
- Built practical urban cycling and collision avoidance skills in a group ride setting
- Found out about the most useful Metro Vancouver cycle route planning resources and how to use them
- Assessed their individual course learning outcomes through applied road and written tests.

Your Cycling Connection

Feedback from ISSofBC Staff and Course Participants

Hello Scout and HUB team

Thank you very much for the wonderful Cycling workshops that you conducted in August and September for our clients. It was extremely useful and we are getting very positive feedback from participants. For ISSofBC's clients it was not only workshop but it was also wonderful networking opportunity and learning about Canadian culture.

Your team is very knowledgeable, approachable and have very positive attitude which is very important for clients. Many commented that there was good interaction between the participants and HUB staff, who were receptive to all questions and able to adapt to different English levels. Here are some quotes from survey that we did:

"My fear of driving on roads with heavy traffic is disappeared"

"Thanks for giving me this opportunity. Everybody in Canada needs to learn cycling and be able to cycle safely in beautiful places of BC and be integrated into Canadian culture. "

"I learned so many practical tips that helps me to bike and enjoy",

"HUB's professional staff did a good job teaching biking skills. I tried to learn for months on my own some years back, but I got nowhere near I am now. I truly appreciate the autonomous approach in learning how to cycle. I was allowed to learn at my own pace, and challenged in a specific way that I challenged myself too. I was not asked to do more than what I was willing to do; this actually helped settle my apprehensions and fears."

Congratulations HUB team! WELL DONE AND WELL ORGANIZED!!

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	December 21, 2015
From:	Victor Wei, P. Eng. Director, Transportation	**File:**	01-0100-30-TSAD1-01/2015-Vol 01
Re:	**Traffic Safety Advisory Committee – Proposed 2016 Initiatives**		

Staff Recommendation

1. That the proposed 2016 initiatives for the Traffic Safety Advisory Committee, as outlined in the staff report titled "Traffic Safety Advisory Committee - Proposed 2016 Initiatives" dated December 21, 2015 from the Director, Transportation, be endorsed.

2. That a copy of the above report be forwarded to the Richmond Council-School Board Liaison Committee for information.

Victor Wei, P. Eng.
Director, Transportation
(604-276-4131)

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Community Bylaws Fire Rescue RCMP	☑ ☑ ☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

Council endorsed the establishment of the Traffic Safety Advisory Committee (TSAC) in 1997, in order to create a co-operative partnership between City staff, community groups and other agencies that seek to enhance traffic and pedestrian safety in Richmond. The Committee provides input and feedback on a wide range of traffic safety issues such as school zone concerns, neighbourhood traffic calming requests and traffic-related education initiatives. TSAC currently has representation from the following groups: Insurance Corporation of BC (ICBC), Richmond School District, Richmond RCMP, Richmond Fire-Rescue, and the City's Transportation and Community Bylaws Divisions.[1] This report summarizes the Committee's activities in 2015 and identifies proposed initiatives for 2016.

Analysis

The Committee's major activities and accomplishments in 2015 are summarized below.

Road and School Zone Safety Initiatives in 2015

The Committee provided input on and/or participated in the following measures aimed at improving the safety of Richmond roads for all users, particularly in school zones.

- *Pedestrian Zone Markers – School Zones*: Last year's report on TSAC activities in 2014 noted that street-mounted vehicle speed limit signs or "pedestrian zone markers" were installed on a pilot basis at the following school zones to encourage drivers to slow down through visually narrowing the roadway: (1) Tweedsmuir Avenue in the vicinity of Maple Lane Elementary School; and (2) Albert Road in the vicinity of Anderson Elementary School.

  The results of post-installation traffic studies undertaken in 2015 indicate that both installations were effective in achieving a reduction in vehicle speeding. The signs also garnered the local support of school administrative staff and residents. Given these positive results, the installation of pedestrian zone markers will be considered for other school zone locations where traffic studies confirm a speeding issue. Potential sites include: Azure Road (Brighouse Elementary School), Lassam Road (McKinney Elementary School), Cook Road (Cook Elementary School), and Westminster Highway (Choice School).

- *Pedestrian Zone Markers – Other Sites*: Given the effectiveness of the pedestrian zone markers in school zones, a further pilot application outside of a school zone was undertaken on westbound Saunders Road approaching Garden City Road. The intersection has recorded vehicle crashes that may be attributable to drivers on Saunders Road not being aware of the stop control due to the curve in roadway as it approaches Garden City Road. The sign (Figure 1) provides additional notice to motorists of a stop sign ahead. There have been no recorded vehicle crashes at the intersection since the installation of the sign in August 2015.

[1] The Committee has been without a representative of the Richmond District Parents Association (RDPA) since July 2009. As staff recognize that a volunteer parent may find it challenging to attend TSAC meetings, staff have advised the RDPA that individual Parent Advisory Committee (PAC) members are welcome to attend TSAC meetings to discuss any school-related traffic safety issues.

- *School Travel Planning*: Participation in a pilot program with the Richmond School District, TravelSmart (part of TransLink) and HASTe (Hub for Active School Travel, contractor to TravelSmart) to develop a customized School Travel Plan (STP) for three elementary schools: Garden City, AB Dixon and Walter Lee. The STPs aim to create an environment that encourages healthy and active transportation to and from school, improves the journey for those who use vehicles or take school busses, and improves transportation safety for everyone.

Figure 1: Pedestrian Zone Marker on Saunders Road

- *Traffic Calming in Burkeville*: In 2014, the Committee discussed potential measures for the Burkeville area in light of residents' concerns regarding motorist speeds and clarity of right-of-way at uncontrolled intersections. As a result, a number of stop signs were installed at T-intersections in 2014 and, as approved by residents via a survey, two speed humps each were installed in 2015 on Catalina Crescent (fronting the playground) and on Wellington Crescent (fronting Sea Island School).

Traffic Radar Data Collection Units

The Community Safety Division funded the purchase in 2015 of two radar traffic data collection units for the Transportation Department in collaboration with the Richmond RCMP's Traffic Section. The radar units, which are temporarily mounted to existing streetlights, are capable of recording two lanes of vehicle traffic 24 hours a day for up to one week. The vehicle data collected by these radar units includes vehicle speed, length of vehicle, time, date, etc and the software can calculate the percentage of speeding motorists at varying thresholds above the posted speed limit (e.g., 10, 15 or 20 km/h over the posted speed limit).

Table 1: Initial Locations for Traffic Radar Data Collectors

	Location
1	Steveston Hwy (Gilbert Road-No. 2 Road): *completed*
2	Saunders Road at Garden City Road
3	21,000-block River Road
4	8500-block Cook Road (Cook Elementary School)
5	No. 5 Road (Steveston Hwy-Westminster Hwy)
6	14,000-block Westminster Hwy (east of No. 6 Road)
7	Sidaway Road (Steveston Hwy-Blundell Road)

With the data collected by the detectors, Transportation staff will be able to provide Richmond RCMP with detailed vehicle speed reports that can be used to identify optimal times to carry out speed enforcement and help guide deployment of Richmond RCMP staffing resources. Richmond RCMP has provided the City's Transportation Department with an initial list of key corridors for deployment (see Table 1), of which the study of Steveston Highway has been completed. This data indicated that motorists exceed the speed limit of 50 km/h typically during the morning and afternoon peak periods during the week and during the afternoon peak period on weekends. The recorded 85th percentile (i.e., 85 per cent of vehicles are travelling at or below that speed), which is typically used to determine the prevailing travel speed of a particular roadway, was 68 km/h. This information will now enable RCMP to target their enforcement times accordingly.

Formation of Pedestrian Safety Sub-Committee

Pedestrian safety remains one of Richmond RCMP's key Community Objectives within its 2015-2016 Annual Performance Plan as, despite success in reducing pedestrian fatalities and injuries in past years, the majority of recent traffic fatalities in Richmond are still pedestrian-related. To this end, a Pedestrian Safety Sub-Committee of TSAC was formed in August 2015 with a specific focus on enhancing pedestrian safety through education and enforcement initiatives as well as improvements to the built environment. Initially, the Sub-Committee will be identifying successful pedestrian safety measures from other jurisdictions that have the potential for application in Richmond.

Traffic and Pedestrian Safety Campaigns in 2015

Committee members participated in the following ICBC- and Richmond RCMP-led road and pedestrian safety campaigns.

- *Pedestrian Safety*: Richmond RCMP in partnership with ICBC conducted a number of pedestrian safety education and enforcement campaigns (e.g., distribution of reflective arm bands and proactive engagement with pedestrians) in Richmond that targeted the following locations:
    - January: vicinity of Richmond-Brighouse Canada Line station;
    - July and November: six locations along No. 3 Road within the City Centre;
    - October: vicinity of three schools (General Currie Elementary School, Kingswood Elementary School and Cook Elementary School) with a focus on interacting with students; and
    - November: civic precinct (Minoru Library, Aquatics-Arenas, Seniors Centre) with a focus on interacting with seniors.

- "*Project Swoop*": During this event Speed Watch volunteers set up a speed reader board at a high incident crash location and those drivers who choose to continue to speed even after being clocked by the Speed Watch volunteers will receive a speeding ticket from an RCMP officer a few blocks down the road. Richmond RCMP in partnership with ICBC conducted two Project Swoop events in May and September 2015 during which 10 locations throughout Richmond were targeted for an entire day with the participation of 45 volunteers and nine RCMP traffic officers at the May event and 40 volunteers and 12 RCMP traffic officers at the September event.

- *Distracted Driving*: as part of this campaign that is conducted year-round, community police volunteers conducted three "Cell Watch" blitz days in March and September.

- *Auto Crime Awareness*: as part of this annual campaign each April, community police volunteers conducted four "Lock Out Auto Crime" blitz days. Lock Out Crime audits are also conducted year-round by community police volunteers.

Proposed Traffic Safety Activities for 2016

In addition to developing and providing input on corrective measures to address identified traffic safety concerns, the Committee will undertake a number of proactive initiatives to enhance traffic safety in 2016.

- *Traffic Calming*: the assessment, implementation and monitoring of road safety and traffic calming measures where warranted in local neighbourhoods, together with consultation with Richmond RCMP and Richmond Fire-Rescue prior to the implementation of any traffic calming measures.
- *School Zone Traffic Safety*: continued participation in the pilot School Travel Planning project, on-going review and improvement of traffic and pedestrian safety in school zones through improving vehicle parking and circulation layout at schools, supporting the enforcement of school zone traffic violations, and introducing new walkways and crosswalks as well as upgraded crosswalks to improve pedestrian safety.
- *Pedestrian & Traffic Safety Campaigns*: continue to support and participate in on-going multi-agency efforts to increase the level of pedestrian and traffic safety, such as annual campaigns held by ICBC and Richmond RCMP.
- *Discouraging Vehicle Speeding*: the member agencies of the Committee will continue to jointly work on initiatives to curb vehicle speeding in the community, such as the targeted enforcement program of Richmond RCMP.
- *Special Events*: provide comment and input from a traffic safety perspective on the development and implementation of traffic management plans to support special events.
- *Richmond Parking Advisory Committee*: provide input to this Committee as required, as some items may have traffic safety implications (e.g., changes to on-street parking regulations).

Financial Impact

None. Costs associated with the installation of traffic control devices, walkway construction and other road and traffic safety improvements are normally accommodated in the City's annual capital budget and considered as part of the annual budget review process. Some of these projects are eligible for financial contribution from external agencies (e.g., ICBC and TransLink). If successful, staff will report back on the amount of financial contribution obtained from these external agencies through the annual staff reports on ICBC and TransLink cost-sharing programs respectively.

Conclusion

The Traffic Safety Advisory Committee is one of the few multi-agency forums in the region dedicated to enhancing pedestrian and traffic safety within its home municipality. Since its inception in 1997, the Committee has provided input on and support of various traffic safety improvements and programs and initiated a range of successful measures encompassing engineering, education and enforcement activities. Staff recommend that the proposed 2016 initiatives of the Committee be endorsed and this staff report forwarded to the Richmond Council-School Board Liaison Committee for information.

Joan Caravan
Transportation Planner
(604-276-4035)
(on behalf of the Traffic Safety Advisory Committee)

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	December 7, 2015
From:	John Irving, P.Eng. MPA Director, Engineering	**File:**	10-6160-07-01/2015-Vol 01
Re:	**Richmond's Invasive Species Action Plan**		

Staff Recommendation

That the Invasive Species Action Plan, as described in the staff report titled "Richmond's Invasive Species Action Plan," dated December 7, 2015 from the Director, Engineering, be adopted.

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

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Parks Services Engineering - Planning Sewerage & Drainage	☑ ☑ ☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

This report summarizes invasive species management in the City of Richmond to date, and presents the Invasive Species Action Plan. Chapter 9 of the OCP, entitled "Island Natural Environment" provides direct support within its policies to "establish an Invasive Species Management Program which includes community and institutional partners, to reduce the spread of invasive species and consequent risk to City infrastructure and loss of biodiversity." The development of the Invasive Species Action Plan is also supported by the recently adopted Ecological Network Management Strategy, which contains a priority action to develop a plan to guide management of invasive plants and other species.

To mitigate the significant infrastructure, ecological and economic implications of invasive species, the City has been proactively addressing emergent invasive species issues on City and privately-owned lands. The City is a demonstrated leader in invasive species response within the region, and the Invasive Species Action Plan formalizes a strategic and risk-based approach to guide and prioritize invasive species management into the future. The Plan provides guidance on setting priorities, establishing a consistent approach, and delivering public outreach and engagement.

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

4.2. Innovative projects and initiatives to advance sustainability.

Background

Invasive Species in Richmond

Invasive species are plants, animals, and insects that occur outside of their natural range and have significant infrastructure, ecological, and economic impacts once established. A number of introduced species are considered 'invasive' because they flourish and spread rapidly in the absence of natural predators and other controls.

As an island municipality, Richmond faces unique challenges. The city's floodplain, drainage network and transportation hubs create high susceptibility to invasive species. In particular, Richmond's wetlands, watercourses, and foreshore facilitate the introduction and spread of aquatic and riparian invasive plants. The City's drainage infrastructure is particularly affected by aquatic invasives (e.g. Parrot's feather, Brazilian elodea) which trap sediment, limit drainage capacity and conveyance, and increase ditch maintenance costs. Dike infrastructure and pump stations can be undermined by the extensive root systems of invasive knotweed species. These invaders also significantly impact biodiversity, as they out-compete native vegetation, reduce suitable habitat for wildlife, and alter food webs.

Invasive Species Management to Date

Since the adoption of Invasive Species Management in 2009 through the Enhanced Pesticide Management Program (EPMP), the City has been able to address a burgeoning need. Invasives

Species Management first emerged in response to media campaigns and the discovery of Giant hogweed in 2010. Management continued to advance when the City identified the first known regional infestations of the Common Reed, Parrot's Feather, and Brazilian Elodea, all high-risk aquatic invasive plants. As a result, invasive species control and eradication measures have quickly expanded within the EPMP, and new initiatives and resources for management has become an increasingly larger component of the program over time. The City has undertaken a broad range of initiatives in recent years, positioning itself as a leader in the region for invasive species response, including:

- Establishment of a reporting phone line and email for residents;
- Internal education across City departments, including staff training;
- Inventory, monitoring and mapping of high-risk invasive species;
- Delivery of pilot trials for determining containment and control options;
- Partnership with the Province for early detection and rapid response (EDRR) programs, targeting new and aggressive invasive species;
- Annual provincial funding for invasive species management ($7,000)
- Collaboration with regional and provincial organizations to develop best management practices and response protocols;
- Collaboration with YVR for inter-jurisdictional management of invasive species; and
- Community education and outreach, including invasive species removal events in City parks (e.g. Garden City Community Park).

Despite the many achievements to date with invasive species response, the lack of a comprehensive approach to invasive species in the City has resulted in an ad hoc approach to management. There is a clear need to formalize an overarching approach to guide the management of invasive species, and to ensure greater consistency and efficiencies for City-wide risk reduction.

Analysis

Invasive Species Action Plan – Management Strategies

The management strategies presented within the Invasive Species Action Plan focus primarily on eight priority invasive species that pose serious impacts to infrastructure, ecology, and human health, and are summarized below:

Priority Invasive Species in Richmond

Common Name	Area of Impact		
	Infrastructure	*Ecological*	*Human health & safety*
Brazilian Elodea	✓	✓	
Eurasian Milfoil	✓	✓	
Parrot's Feather	✓	✓	
Giant Hogweed		✓	✓
Common Reed	✓	✓	
Knotweed species	✓	✓	
Wild Chervil		✓	✓
European fire ants		✓	✓

The management strategies outline the implementation approach of the Invasive Species Action Plan, targeting different areas of application for Invasive Species Management within the City. The management strategies are:

- Monitoring and mapping to determine species distribution and abundance;
- Early detection and rapid response (EDRR) for new introduced species;
- Control methods for knotweed, aquatic species, giant hogweed, and fire ants;
- Integration of best management practices into City operations;
- Development and delivery of control trials;
- Community education, outreach, and stewardship; and
- Collaboration and partnerships.

Each management strategy is supported by a number of recommended short, medium, and long-term actions that build off the unique issues and opportunities facing priority invasive species. Some short-term priorities include:

- Develop inventory and mapping protocol for priority aquatic (Parrot's Feather) and terrestrial (Knotweed, Giant Hogweed) species;
- Develop best management practices for controlling Knotweed near shoreline and water bodies;
- Deliver internal education and training for City staff;
- Deliver City's EDRR program for public and private lands; and
- Develop online, social media tools, and public workshops to educate residents about invasive species management.

As Invasive Species Management is an evolving field, priorities may change over time as new information and research becomes available, or new high risk invasive species emerge.

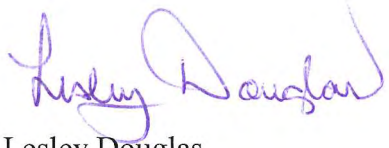
Financial Impact

None at this time. Staff resources for Invasive Species Management are currently funded through the EPMP, while existing departmental operating budgets support ongoing management activities. Additional funds received through annual capital budget requests further augment the capacity for staff to manage and deliver invasive species initiatives. As implementation proceeds, any additional funding needs (capital and/or operating) will be brought forward for Council consideration.

Conclusion

Since the inception of Richmond's Enhanced Pesticide Management Program (EPMP), the City has actively demonstrated leadership in Invasive Species Management through a variety of control, containment, EDRR, and outreach initiatives. There is an increasing need for a comprehensive framework to guide management and prioritization of invasive species response. The Invasive Species Action Plan builds on the City's accomplishments to date and provides clear direction for the management and control of invasive plants and other species within Richmond over time. While the establishment and spread of invasive species will continue to be

an ongoing challenge, articulating priorities and pursuing early detection and rapid response initiatives can ultimately decrease the ecological impact and economic cost of control measures in the long term.



Lesley Douglas
Manager, Environmental Sustainability
(604-247-4672)

LD:hst

Att. 1: Invasive Species Action Plan

City of Richmond
Invasive Species Action Plan

December 2015

Acknowledgements

This document was prepared by the City of Richmond Engineering and Public Works Division – Sustainability and District Energy Section. We would like to acknowledge the contribution of Diamond Head Consulting and Raincoast Applied Ecology in the development of this report.

DIAMOND HEAD

Raincoast Applied Ecology

PWT - 33

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Executive Summary

Wild chervil found along Richmond's popular West Dike trail

Invasive species are plants, animals which occur outside their natural range and can have significant ecological, social and/or economic impacts once established. As an island municipality with extensive shoreline, inland watercourses, and significant people and goods movement hubs, Richmond is particularly vulnerable to the introduction and spread of invasive species.

Over two dozen invasive plants, animals and insects have been detected in Richmond. This includes several high risk species such as knotweed (which can grow through asphalt), parrot's feather (which impacts the storm drain system), fire ants (whose painful sting renders infested turf impassable) and giant hogweed (which can cause severe skin burns).

The City of Richmond (the City) has taken a pragmatic approach to managing invasive species and continues to be at the forefront of efforts to detect and rapidly respond to newly arrived invasive species. Under the City's Enhanced Pesticide Management Program invasive species management in Richmond has produced many noteworthy accomplishments including:

- **Identification** and control of all known giant hogweed and common reed occurrences;
- **Inventory** of high risk species, including Brazilian elodea and parrot's feather in watercourses, and knotweed on dike infrastructure;
- **Treatment trials and research** for parrot's feather, knotweed and wild chervil control;
- **Partnerships** with regional and provincial organizations and agencies;
- **Control and monitoring** of invasive species in City parks and trails;
- **Awareness and education** initiatives for the community; and
- Providing invasive species **training to City staff**; and
- Active collaboration on the management of invasive species with Metro Vancouver, Invasive Species Council of Metro Vancouver (ISCMV), Invasive Species Council of BC (ISCBC), Ministry of Forests, Lands and Natural Resources (FLNRO), and Inter-Ministry Invasive Species Working Group (IMISWG).

The development of the 2015 ***Invasive Species Action Plan*** is intended to build upon these accomplishments and to provide a clear direction regarding the City's management of invasive species over the short, medium and long-term. The three overarching goals that guide the development of the Invasive Species Action Plan are:

1. To reduce the economic and environmental risks of invasive species in Richmond by establishing a comprehensive approach to invasive species management;
2. To establish and implement monitoring and control procedures to reduce the risk and impacts of invasive species in the city; and
3. To increase awareness of invasive species within the community and the importance of prompt management.

The spread of knotweed creates local and regional challenges, and requires both partnerships and local action

To achieve these goals, the Invasive Species Action Plan recommends 11 overarching management strategies to guide the City. The management strategies are summarized below:

1. **Monitor and Map Invasive Species** to understand distribution and abundance;
2. **Establish an Early Detection and Rapid Response** as an overarching approach to identify, track and control emerging invasive species in their early stages;
3. **Manage and Control Knotweed** on dikes, shorelines, vulnerable sites, and areas of high ecological value;
4. **Manage and Control Aquatic Weeds**, within the city's watercourses;
5. **Manage and Control Giant Hogweed** through building on ongoing initiatives;
6. **Monitor and Control Fire Ants**, in collaboration with external agencies, specialists, and organizations;
7. **Integrate Invasive Species Management into City Processes** to internalize effective approaches to prevent spread and control infestations;
8. **Research Control Methods** and implement trials, in order to identify viable control solutions;
9. **Provide Invasive Species Education and Awareness** for staff, residents, and stakeholders;
10. **Support Community Stewardship** to control invasive species on public and private lands, and restoration with native plantings; and
11. **Collaboration and Partnerships** to address invasive species management across boundaries.

Each management strategy is supported by a number of recommended action items, assigned as either short-term (1 to 2 years), medium-term (3 to 5 years), or long-term (5 years onwards) priorities. Some of the recommended short-term actions include:

- Develop inventory surveys and mapping protocol focused on priority aquatic (parrot's feather) and terrestrial (knotweed, giant hogweed) species;
- Develop best management practices for controlling knotweed near shoreline and watercourses;
- Promote internal education and training for City staff on invasive species management;
- Delivery of City's early detection and rapid response program for public and private lands; and
- Active utilization of tools such as the City's webpage, social media, and workshops to inform and update residents about invasive species management.

1.0 Introduction

1.1 What are Invasive Species?

Invasive species are plants, animals and insects that occur outside of their natural range and have significant ecological, social and/or economic impacts once established. Introduced (i.e. exotic) species are common in our landscapes. Most non-native species are either unable to adapt to local conditions or, if they do establish, do not cause significant impacts. However, a small number of introduced species are considered "invasive" because they are able to flourish and spread rapidly in the absence of natural predators and other controls. Invasive species that flourish tend to out-compete native vegetation and reduce local ecosystem biodiversity. Climate change and resulting ecological shifts also increase the city and region's vulnerability to the arrival and spread of new invasive species.

Social Impacts	Ecological Impacts	Economic Impacts
• Health and safety risks for humans and domestic animals • Alter and degrade valued landscapes and view corridors • Impede recreation access	• Reduce biodiversity and alter ecosystem function • Reduce wildlife habitat and forage • Increase vulnerability of species at risk • Outcompete native plants • De-stabilize riparian areas	• Degradation and loss of productive agricultural land • Damage to critical infrastructure (drainage systems, dikes, roads, building foundations, etc.) • Reduce property values • Increase maintenance costs

Invasive species spread by a variety of means including farming, gardening, improper disposal of garden waste, dumping of unwanted pets and aquariums, soil transfer, water and wind movement, and by 'hitching a ride' on vehicles, cargo ships, people, animals and birds. Once established, invasive species are difficult and costly to control because they are very effective at establishing, reproducing, and spreading.

Successful invasive species management requires a long-term approach. Some invasive plants have long-lived seeds or deep roots that require monitoring and treatment over many years to ensure they are eradicated. In addition, new species are introduced and new infestations develop or expand. This strategy addresses both short- and long-term actions for managing invasive species in Richmond.

Himalayan Knotweed

Parrot's feather spreads prolifically, impeding drainage and water flow, making consistent management necessary

1.2 Why Develop an Action Plan?

The establishment and spread of invasive species will continue to be an ongoing challenge within the City of Richmond, however early action and prevention measures can decrease the impact and cost of control measures in the long term.

The ***Invasive Species Action Plan*** provides a strategic, risk-based approach to guide and prioritize invasive species management in Richmond. The Plan provides guidance on setting management priorities, establishing a consistent approach to invasive species management for City staff and departments, and coordinating public outreach and engagement.

1.3 Goals

There are three overarching goals that guide the development of the ***Invasive Species Action Plan***:

- To reduce the economic and environmental risks of invasive species in Richmond by establishing a comprehensive approach to invasive species management;
- To establish and implement monitoring and control procedures to reduce the risk and impacts of invasive species in the city;
- To increase awareness of invasive species within the community and the importance of prompt management.

1.4 Regulatory Context

Invasive species are regulated at the federal, provincial and municipal level, each with regulatory tools that influence how invasive plants and pests are managed. Most federal and provincial regulations are focused on invasive species with potential economic harm (agricultural or forest pests) and have limited effect on urban areas. The following section summarizes the key regulations supporting invasive species management.

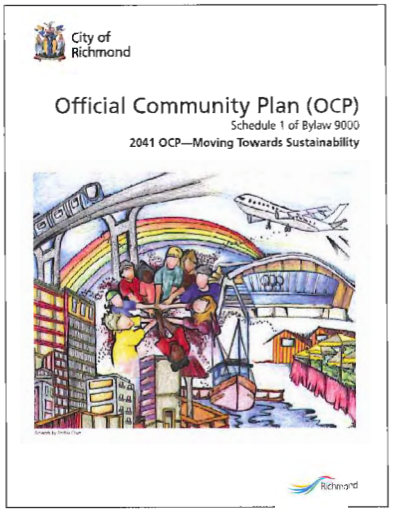
- The **federal** *Plant Protection Act* and *Seeds Act* restrict the entry of regulated pests into Canada.
- The **provincial** *Weed Control Act and Community Charter Act* enable the City to manage the invasive plant problem through legislation and bylaws. The *Weed Control Act* is considered to be the key invasive plant legislation that offers municipalities the greatest ability to encourage and seek action of private property owners. The Act only applies to listed Noxious Weeds.
- In the **municipal** setting, historically the City of Richmond has relied on the authority provided by its *Unsightly Premises Bylaw* and the BC *Weed Control Act* to compel private landowners to control noxious weeds as well as comply with its own duties as a land owner. In the case of giant hogweed, this has proven an effective means of obliging private property owners to treat their own infestations. The use of chemical treatments to control invasive species is regulated under the City's *Pesticide Use Control Bylaw*.

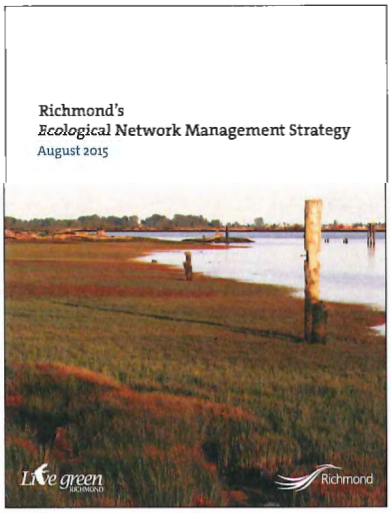
Summary of existing federal, provincial and municipal regulations related to invasive plant management.

Jurisdiction	Regulation/Bylaw	Relevance
Federal	*Plant Protection Act* S.C. 1990, c.22	Identifies a list of species[1] that are considered *pests* in Canada. Regulates the distribution of these species. Species include diseases, insects, plants, nematodes, etc.
	Seeds Act, R.S.C. 1985, c. S-8	Regulates the distribution of the seeds of species that are designated as *Prohibited Noxious Weeds*.
	Fisheries Act – Proposed Aquatic Invasive Species Regulations[2]	Purpose of proposed regulations is to manage the threat of aquatic invasive species. Species will be classified into three categories which will dictate risk level and prohibitions.
Provincial	*Weed Control Act* [RSBC 1996] CHAPTER 487	Identifies plants that are classified as noxious weed species in BC. Places a duty on all land owners to control these species. This does not apply to federal lands.
	Community Charter Act	Authorizes municipalities to regulate invasive plants on private property through the use of bylaws. Regulatory powers depend on the threat posed (environmental, nuisance or public health concern).
	Integrated Pesticide Management Act	The Integrated Pest Management (IPM) Act and regulation are the primary regulatory tools governing the sale and use of pesticides in BC. These tools establish conditions for the sale and use of pesticides in the province through a classification system and regulatory provisions for licences, certification, permits, Pest Management Plans and ministry responsibilities. The regulation also contains public notification, consultation, reporting and record keeping provisions – as well as standards for IPM programs and use of pesticides aimed to ensure protection of human health and the environment
	Wildlife Act	Purpose of regulation is to preserve habitats critical to wildlife species particularly those that are at risk.
City of Richmond	*Unsightly Premises Bylaw* No. 7162, 2001	Requires that private property does not accumulate noxious matter or substances and be kept clear of weeds.
	Solid Waste and Recycling Bylaw No. 6803, 1999	Prohibits dumping garbage or other discarded material on any road, park or public place.
	Pesticide Use Control Bylaw No. 8514, 2009	Regulates the use of pesticides. Prohibits use for the purpose of maintaining outdoor trees, shrubs, flowers, other ornamental plants or turf on private residential property or City land. There are several exceptions including use of pesticide in response to a human or animal health issue.
	Boulevard Maintenance Regulation No. 7174, 2001	Requires that property owners keep boulevards free of noxious weeds.

[1] Pests regulated by Canada under the *Plant Protection Act* www.inspection.gc.ca/plants/plant-protection/pests/regulated-pests/eng/1363317115207/1363317187811

[2] Aquatic Invasive Species Regulations. www.dfo-mpo.gc.ca/acts-lois/rules-reglements/rule-reglement01-eng.htm





1.5 Municipal Policy Context

The ***Invasive Species Action Plan*** is congruent with the mandates of several Richmond policies, plans and objectives, including the:

- **2041 Official Community Plan**, updated in 2012, serves as the City of Richmond's overarching framework that lays out the community vision for the social, economic, land use, design, transportation and environmental future, with supportive guidelines and policies to achieve this vision. Chapter 9 *Island Natural Environment* of the OCP recognizes issues facing Richmond's natural environment such as loss of biodiversity due to climate change impacts, urbanization and proliferation of invasive species. Supportive policies are included within the OCP to reinforce the need to address invasive species issues. This includes a policy to establish an Invasive Species Management Program that includes community and institutional partners to reduce the spread of invasive species and consequent loss of biodiversity. Another policy speaks to the need for collaboration with partner agencies to reduce the impacts of invasive species expansion.
- **Ecological Network Management Strategy**, adopted by Council in 2015, provides the framework for managing and guiding decisions regarding the city-wide system of natural areas and the ecosystem services they provide. The strategy details out the ecological issues and opportunities that are unique to the distinct geographies within Richmond, and the issue of invasive species is identified as a challenge for many of Richmond's different landscapes. Reduction of invasive species is seen as critical to maintain public safety, preserve biodiversity and protect lands of high ecological value. Implementation of the strategy includes an action targeting the development of a plan to guide invasive species management.
- **2022 Parks and Open Space Strategy** was adopted in 2013 to guide the City's delivery of services in parks and open spaces. The strategy outlines the trends and challenges affecting the delivery of these services and defines the priorities for sustaining and expanding the system over time. The strategy recognizes the need for control of invasive plant species for reasons of public safety and parks with high ecological value, and one of the priority actions listed within the Green Network focus area is to develop a systematic approach to addressing invasive plant species.

1.6 Origins of Invasive Species Management in Richmond

Invasive species management in Richmond emerged out of the **Enhanced Pesticide Management Program (EPMP)**, adopted by Richmond City Council in 2009 as a response to community interest for a bylaw banning the use of pesticides for cosmetic purposes. The comprehensive EPMP contains a municipal bylaw (the *Pesticide Use Control Bylaw*) that restricts the use of pesticides for cosmetic purposes, and supportive outreach and educational resources to inform residents how to switch to pesticide-free practices. Richmond's *Pesticide Use Control Bylaw* is considered one of the most progressive in Metro Vancouver, and having an EPMP in place represents a pro-active municipal approach to regulating cosmetic pesticide use in the absence of a provincial ban on the use of pesticides for cosmetic purposes.

The EPMP facilitates the City to take a sustainable approach to reflect the Provincial's Integrated Pest Management Regulation and *Weed Control Act*, and City policies regarding the use of pesticides under the City's *Pesticide Use Control Bylaw*. As part of this approach, invasive species control is an integral part of the EPMP. The treatment of

Canada thistle is primarily an agricultural invasive, and can disperse widely due to its lightweight seeds

invasive species addresses issues affecting ecological integrity, economic disturbances and health and safety. The control of invasive species with chemical treatments for biodiversity or infrastructure risks is exempt from the City's *Pesticide Use Control Bylaw* as it is not for cosmetic purposes.

Since its inception, the scope of the EPMP has been broadened to enable the City to comprehensively manage and respond to the proliferation of invasive species. Under the EPMP, invasive species awareness grew dramatically from 2010 onwards as a direct result of media coverage for new invaders to the region such as giant hogweed and European fire ants. In addition, the City discovered the first known regional infestation of a new high-risk invasive plant species in 2011, the common reed. As a result, control and eradication measures for invasive species have expanded within the EPMP, with new initiatives and resources for invasive species management becoming an increasingly larger component of the program over time.

As Richmond experiences climate change and associated ecological shifts that influence the proliferation of invasive species, the EPMP enables Richmond to adapt and respond to these shifts, as well as to evolving senior and local government priorities. Under the umbrella of the EPMP, the City is able to identify, control, and monitor invasive species, with the aim of reducing exposure to costs and risks over time.

1.7 Richmond's Leadership in Invasive Species Management

Under the umbrella of the EPMP, the City has undertaken a broad range of initiatives in recent years to address invasive species on both public and private lands, positioning the City as a leader in the region for several aspects of invasive species response. Significant programs and initiatives that have contributed extensively to developing Richmond as a leader in its approach to invasive species are summarized below:

The City of Richmond identified the first infestation of common reed (Phragmites) and annual control has been in collaboration with the Province

A. **Identification** is a prominent part of keeping an accurate inventory of invasive species in the environment, and is critical to determine management practices within the community. Timely and accurate identification relies on experts, City staff, and residents having up-to-date knowledge on invasive species characteristics, with a proper channel to report and verify the findings. The City's achievements in early identification include:

   - **Identification of Brazilian elodea**, a new aquatic invasive plant in Richmond, and subsequent establishment of a provincial partnership to guide early detection and rapid response to work towards treatment;
   - **Identification, treatment and control of the common reed** in Richmond, and partnership with the Province to treat and monitor the infestation site. City staff discovered and successfully identified the first known provincial infestation;
   - Identification and control of **all known giant hogweed sites** on City and private lands.

B. **Inventory & Monitoring** is critical to understand the evolving abundance and distribution of invasive species. By doing so, inventory and monitoring provide staff with tools to plan for and identify priorities over time. City activities to date include:

   - Undertaking of **GIS inventory and mapping for distribution of invasive knotweeds** (around the Lulu Island dike perimeter) and **parrot's feather** (within the storm drainage system);

Parrot's feather roots extend into the substrate up to two feet, making control challenging and monitoring critical

Successful frost treatment trial for tackling parrot's feather in a riparian area on Kartner Road

Giant hogweed has been addressed through the City's EDRR response

- Initiation of **GIS inventory and mapping of purple loosestrife** (Terra Nova Rural Park, Garden City Community Park);
- **Identification and annual monitoring of known giant hogweed** infestations on private properties. The City has had a high success rate with this eradication program through collaboration with the Community Bylaws Department (i.e. Unsightly Premises Regulation);
- Ongoing monitoring and control of **invasives in City parks and trails**, including in Bath Slough, Richmond Nature Park, Terra Nova Park, Garden City Community Park, and King George Park;
- Ongoing monitoring of **Canada thistle**.

C. **Ongoing Testing and Research Trials for Control Methods** provide the opportunity to test out and modify innovative solutions targeting the containment and control of invasives that are actively impacting City-owned lands and infrastructure. To date, the City has undertaken various tests and trials including:

- Parrot's feather **control trials** within City watercourses to determine viable containment and control options;
- **Manual and chemical treatment trials** for knotweed infestations impacting the dike;
- **Wild chervil management** trials at Terra Nova Rural Park;
- Establishment of a **new City standard for the removal of knotweed** roots and stems for all dike upgrade projects.

D. **Early Detection & Rapid Response (EDRR)** is a proactive and cost-effective approach to managing invasive species that prevents establishment. Early detection of newly arrived invasive species, followed by a well-coordinated rapid response increases the likelihood of eradication or containment of new incursions. The Province administers the EDRR, and the City has an active partnership with the Province to guide EDRR best management practices for new and aggressive invasive species such as Brazilian elodea and common reed. The City has established its own EDRR program for giant hogweed, even though giant hogweed is not considered a provincial EDRR species.

E. **Partnerships** are a crucial step for information sharing in an ever-evolving field, and to improve coordination of invasive species response. In addition, invasive species spread regardless of jurisdictional boundaries, and partnerships can result in more effective and collaborative solutions. The City has extensively partnered with many local, regional, and provincial agencies to supplement invasive species management, including:

- Collaboration with the **Ministry of Forest, Lands and Natural Resource Operations** (FLNRO) to implement Richmond's EDRR Program, and to support pesticide applications when and if necessary. Richmond is one of three Metro Vancouver municipalities to receive annual funding from the Ministry for invasive species control;
- Collaboration with the provincial **Inter-Ministry Invasive Species Working Group** (IMISWG) to develop consistent European fire ant communication materials and protocols;
- Active participation on the **Invasive Species Council of Metro Vancouver** (ISCMV) and the **Invasive Species Council of British Columbia** (ISCBC);

Public notification sign at McDonald Beach, cautioning the public of the fire ant infestation

Volunteers contribute to a City-led invasives removal event as part of Earth Day festivities

- Member of the **BC Spartina Working Group**;
- Collaboration with **Thompson River University** specialists to confirm fire ant identification and to provide support for private landowners with fire ant infestations;
- Collaboration with a variety of provincial, regional and local partners to develop a **regional and local response plan** for European fire ant infestations;
- Collaboration with **local artists and the Richmond Weavers Guild to harvest invasive plant materials** from City parks to be utilized for community weaving projects. These efforts build community awareness regarding the risks and threats associated with invasive species as well using public art as the catalyst for the process;
- Ongoing **work with invasive plant specialists**, integrated pest management practitioners and horticultural specialists to inform prevention practices.

F. Education & Awareness must also be in place to spread information community-wide about invasive species and to promote practices that prevent their spread. Education is a considered a softer measure for invasive species response, is cost-effective, and is critical to supplement the City's efforts. The City has undertaken a broad range of education and awareness initiatives, including:

- Creation of a **reporting phone line and email** for residents to report invasive species;
- Dedicated **City webpage on invasive species** focused on identification and response for European fire ants, European chafer beetle, and giant hogweed;
- Internal **education and awareness initiatives** amongst City departments, including staff training on identification and management of invasive species;
- Delivery of ISCMV **best management practices training** for staff, held every two to three years;
- Establishment of a City **24-hour response program** for reporting of giant hogweed and European fire ants from the general public;
- **Engagement with landowners** to support the eradication of giant hogweed and knotweed species on private property;
- City-led **community invasive plant removal events** (i.e. King George Park, Terra Nova, Garden City Community Park);
- Development and presentation of **new EPMP 2014 and 2015 information sessions** for newcomer invasive pests to Richmond: the European chafer beetle (community workshop) and the European fire ant (staff workshop);
- Delivery of **presentations to Professional Pest Managers of BC** (*Challenges of Managing Invasive Species for Local Governments*) and Master Gardeners of BC (*European fire ants*);
- Earth Day and other public events for invasive plant removal (including Garden City Park, King George environmentally sensitive areas, west dike etc.).

2.0 Background Context

Terra Nova Rural Park, the foreshore, and the West Dike area all contain susceptible pathways for the introduction and spread of invasive species

Agricultural areas are affected by a distinct group of invasive species

This section provides an overview of the geographic vulnerabilities that make Richmond particularly susceptible to the introduction and spread of invasive species. A risk assessment of the invasive species currently present in the City is provided. The interaction of invasive species risk and stage of invasion is explained in the context of determining the appropriate level of response.

2.1 Geographical Vulnerabilities

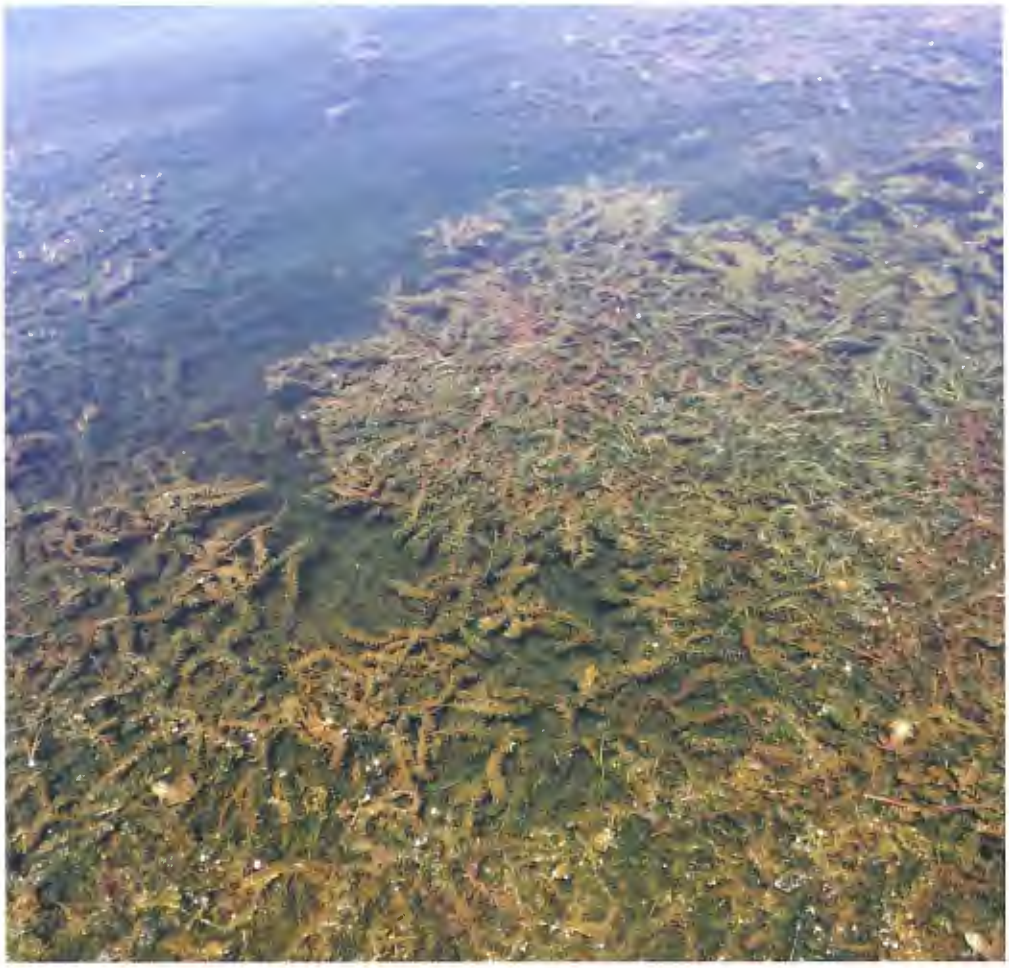
There are a number of factors that put Richmond at higher risk from invasive species compared to other areas of Metro Vancouver:

- **Wetlands, Watercourses, and Foreshore Areas are at Risk in Richmond**: Richmond is a city of islands surrounded by the channels and intertidal wetlands of the Fraser River estuary. Lowland aquatic habitats such as watercourses, canals and raised bog ecosystems within and around Richmond are susceptible to the introduction and spread of a suite of species associated with these habitats. For example, aquatic weeds such as parrot's feather, common reed, and Brazilian elodea, as well as American bullfrog, non-native fish (carp, bluegill, etc.) are present in Richmond. Spartina, a highly invasive marsh plant found in Boundary Bay, may also colonize Richmond's intertidal wetlands in the future.
- **Agricultural Lands are Hotspots for Invasive Plants**: Richmond has a higher proportion of agricultural land than any other urban municipality in Metro Vancouver. Agricultural lands are affected by a distinct group of invasive species such as wild chervil and bull thistle which can degrade pasture or forage quality. Cranberry and blueberry fields also support a distinct group of invasive plants that were introduced from eastern Canada or Europe and have now spread to natural bogs and fens in the region.
- **Non-forested Habitats are Susceptible to Invasive Plants**: Forests generally have fewer invasive species than open areas because of the lack of available light, soil, and moisture prevents new species from thriving. The predominance of open areas such as old fields, wetlands, ditches, watercourses and mowed dikes make Richmond more susceptible to invasive species establishment and spread compared to other areas of Metro Vancouver.
- **Urban Areas Contribute to Invasive Species Introduction**: Backyard gardens are also a source of invasive species and are an important dispersal route into some parks and riparian areas. For example, many infestations of yellow lamium and English ivy originated from dumping of garden waste, and parrot's feather was likely introduced from backyard ponds and home aquariums.
- **Higher Risks and Costs to City Infrastructure**: Dikes, ditches, and pump stations are an essential part of Richmond's drainage and flood protection infrastructure. Trails on the dikes provide recreation access to the city's shoreline. Aquatic weeds reduce the capacity of ditches and watercourses to drain water during winter storms, and the extensive root system of knotweed species can affect dike stability. Dense thickets of Himalayan blackberry also impede access to foreshore parks or trails. Operation activities to control invasive species through mowing, excavation, and other control methods are an increasing cost to the City.

2.2 Invasive Species Risk Assessment

Over two dozen invasive species are known to occur in Richmond, and all of these species have the potential to cause varying degrees of harmful ecological impacts (e.g. out-competing native species, reducing habitat value etc.). Eight of these species have the added potential to pose other serious impacts to infrastructure and/or human health, and are therefore considered **high risk** to the City of Richmond and priority species for management.

The eight **priority species** and their unique risk profiles are described in the table below.



Brazilian elodea, a submerged aquatic plant, spreads by fragmentation, impacting drainage systems and ecological integrity of watercourses

Risk profiles of priority invasive species in Richmond.

Common Name	Risk Profile
AQUATIC PLANTS	
Brazilian elodea** Eurasian water-milfoil Parrot's feather	• **Infrastructure**: impedes flood control, storm drain systems and irrigation works; restricts water movement; traps sediment; increases municipal maintenance costs • **Recreation**: hinders activities (e.g. fishing, swimming, boating) • **Ecological**: spreads rapidly and displaces native aquatic vegetation and decreases biodiversity; alters aquatic habitats and food webs; reduces suitable habitat for wildlife; blocks passage of juvenile salmon and other fish
TERRESTRIAL PLANTS	
Giant hogweed*	• **Human health**: sap on skin can cause severe burns and blindness in humans and animals when exposed to sunlight • **Ecological**: displaces native vegetation; reduces suitable habitat for wildlife and decreases biodiversity
Common reed* & **	• **Infrastructure**: obstructs driver sight lines; alters hydrology; increases municipal maintenance costs • **Recreation**: impedes access • **Ecological**: displaces native vegetation; reduces suitable habitat for wildlife in wetlands and decreases biodiversity
Knotweed species*: Bohemian, giant, Himalayan and Japanese	• **Infrastructure**: destabilize infrastructure, including dike system; increases erosion potential and impedes storm drain system; able to penetrate cement, asphalt, house foundations and walls (e.g. pump stations); obstructs driver sight lines; increases municipal maintenance costs • **Ecological**: displaces native vegetation; reduces suitable habitat for wildlife and fish and decreases biodiversity
Wild chervil*	• **Human health**: sap on skin can cause severe burns in humans and animals when exposed to sunlight • **Agricultural**: reduces forage for grazing; contaminates crops (poor quality forage)
Fire ant (European and Impressive)	• **Human health**: colonies swarm when disturbed and cause painful stings • **Recreation**: impedes access • **Ecological**: Potential to outcompete and displace native ant colonies

* Noxious weed regulated under the *BC Weed Control Act*.
** Proposed prohibited weed in BC.

Other invasive species present within Richmond have been classified as non-priority or moderate species for management; however they still have the potential to pose ecological risk. Many of these moderate risk species warrant control in specific circumstances, such as ecosystem restoration projects or volunteer stewardship events in parks. Residents and landscape contractors can help prevent their spread into parks and native ecosystems by avoiding planting these species in gardens and landscapes and by properly disposing of green waste. Refer to Appendix 1 for more information on the moderate risk invasive species in Richmond.

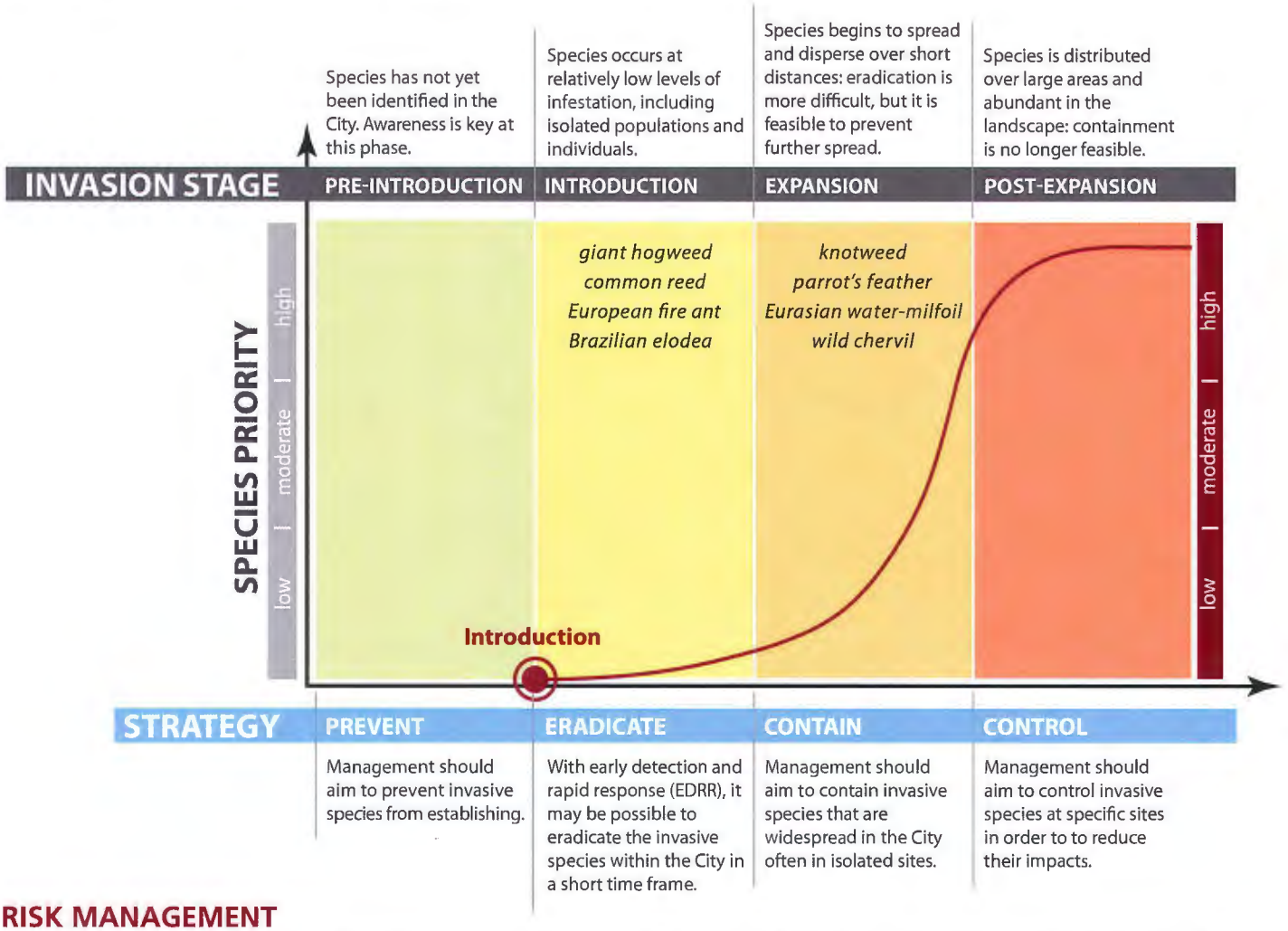
2.3 Stage of Invasion and Risk Management

The risk associated with an invasive species combined with its stage of invasion (current distribution and abundance) in the City provides a quantifiable way to determine the most appropriate and cost effective response.

There is only a small window of time after an invasive species is first introduced where eradication may be possible before the species actively spreads. Once invasive species have established and are actively spreading, the cost of treatment increases exponentially and the likelihood of eradication decreases. In comparison, the cost of preventing their establishment is low, hence the emphasis on prevention in this plan.

The risk management diagram, shown on the facing page, illustrates the relationship between stage of invasion and appropriate management strategy over time. Richmond's eight priority invasive species have been positioned on the graph based on their risk profiles and stage of invasion. The moderate risk species in Richmond (not shown) fall predominately within the expansion and post-expansion stages of invasion.

Risk management overview for priority species in the City of Richmond.



RISK MANAGEMENT

The risk of significant ecological, social and economic impacts grow with increased distribution and abundance of invasive species. That being said, it is not possible or necessarily desirable to eradicate all invasive species. A risk management approach forms the basis for setting priorities for operational activities in order to maximize the cost efficiency of efforts.

3.0 Management Strategies

To guide invasive species management in the City of Richmond, a series of management strategies are recommended as the approach to meet the Invasive Species Action Plan's goals. A number of actions further serve to describe how certain projects or initiatives can support the management strategies. The actions also seek to establish an implementation approach that integrates with current City processes, to build on and enhance existing practices, and to develop best management practices.

As invasive species management is an evolving field: recommended management strategies and actions may also change over time as new information and research becomes available, or new high risk invasive species emerge.

Strategy #1 Monitor and Map Invasive Species

In order to make informed, strategic decisions about which invasive species need to be treated in which locations, the City must have an understanding of species distribution and abundance. The data can be used to identify problematic locations for invasive plant introduction, prioritize control efforts, direct operations and monitor change over time to measure success.

ACTIONS:

1. Continue ongoing coordination and development of survey and mapping initiatives for infestations of aquatic (i.e. parrot's feather and Brazilian elodea) and terrestrial (i.e. knotweed and giant hogweed) invasive species.
2. Continue efforts to develop a standardized GIS field mapping platform and protocol for City staff.
3. Provide mapping/inventory training to City operations staff who are able to integrate the mapping of invasive species into their regular maintenance work (e.g. ditch and dike maintenance, park development and restoration, etc.).
4. Devise a monitoring protocol and schedule for treatment sites to ensure consistent records are kept and that appropriate follow-up treatment and maintenance occurs.

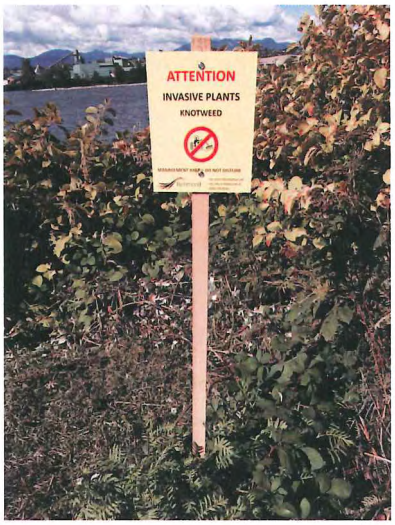
Strategy #2 Early Detection and Rapid Response

Once introduced, the most effective and efficient control of invasive species is to treat when still in the introduction phase by using an approach called "Early Detection and Rapid Response" (EDRR). The cost of implementing EDRR is very small compared to the cost of controlling an invasive species that has already established and spread. The Province has an EDRR Plan which outlines how new invasive plant incursions that are of risk to BC can be quickly and effectively addressed. EDRR relies on reports by citizens, staff, or professionals to detect and identify invasive species when they are first introduced; this can be a challenge given the complexity of taxonomic identification of many species.

Early detection of the common reed in Richmond in 2011, and the subsequent rapid response by the City is a noteworthy example of how quick response led to prompt treatment of a new invader, preventing spread and averting the need for a costly control program.

ACTIONS:

5. Continue to work in collaboration with the Province on delivery and protocol for the EDRR Program.
6. Provide education to residents on emerging invasive species to bolster identification and reporting on emerging species.
7. Provide immediate response to reports of emerging invasive species in Richmond.
8. Continue delivery of City's successful EDRR program for giant hogweed on both public and privately owned lands.



Dikes and pump stations on the perimeter of Richmond are essential for local flood protection, yet are susceptible to a multitude of aquatic and terrestrial invasives

Strategy #3 Manage and Control Knotweed

Knotweed forms extensive root systems which can penetrate asphalt and destabilize infrastructure. As an island municipality, Richmond is particularly at risk to the threat of knotweed species ability to weaken dike infrastructure, impede water flow in the storm drain system and destabilize watercourse banks. It also poses an ecological risk by out-competing native vegetation and degrading riparian habitat.

Knotweed is known to occur throughout the City on both public and private lands; in the dike and watercourse system, in streams and wetlands, along roadsides, disturbed sites, and in landscaped areas.

Knotweed spreads prolifically by root and stem fragments. Movement of knotweed contaminated soil, improper disposal of plant material, seasonal mowing and construction activities all contribute to spread across the City and region.

Priority Areas for Management:

1. Dike and pump stations
2. Watercourse system
3. Ecologically sensitive habitats
4. Construction sites (public and private)
5. City Parks and trails
6. Roadside rights-of-way which are mowed to maintain sight lines

ACTIONS:

9. Continue to develop a city-wide knotweed control program in collaboration with other City departments and staff.
10. Continue the use of City staff resources or contractors to continue knotweed control on priority sites using herbicide (stem injection or foliar application) or excavation (for small infestations and new dikes).
11. Develop best management practices for controlling knotweed near shorelines and watercourses.
12. Incorporate knotweed control and soil management and disposal guidelines into development permits and servicing agreements when knotweed is present.
13. Collaborate with FLNRO, ISCMV and ISCBC regarding up-to-date approaches for knotweed control, disposal, treatment, standards and practices.
14. Explore provincial permitting options for knotweed management in unique conditions.
15. Develop guidelines or protocol for disposal of excavated knotweed materials.

Japanese knotweed along Airport Road in Burkeville

Strategy #4 Manage and Control Aquatic Weeds

Richmond's inland watercourses are susceptible to the establishment and spread of aquatic weeds. Many watercourses do not have tree cover which increases the amount of light and raises water temperatures for plant growth; nutrients from runoff also promote growth. Floating, submerged, or emergent invasive plants are common in many of the city's watercourses. Priority aquatic species are parrot's feather, Brazilian elodea, Eurasian water-milfoil, and common reed.

City crews place a shading frame over a ditch to discourage growth of Parrot's feather, a sun-loving aquatic weed

Routine maintenance and dredging of the City's watercourses may inadvertently also contribute to the spread of some aquatic weeds, by fragmenting and dispersing plant roots and stems either by water or by the movement of plant material on maintenance vehicles. In addition, dumping of aquatic invasive plants from aquariums may also contribute to the rapid proliferation of aquatic weeds.

Priority Areas for Management:

1. Watercourse and drainage network
2. Ecologically sensitive habitats

ACTIONS:

16. Continue to enhance and modify ongoing trials for shading and excavation to control parrot's feather and Brazilian elodea at known infestation sites in the City.
17. Develop BMPs for the containment of aquatic weeds including a designated disposal site away from watercourses.
18. Implement best management practices to avoid dispersal of aquatic weeds during excavation or disposal.
19. Work with ISCBC *Don't Let it Loose* campaign focusing on the commercial sale and distribution of aquatic plants by retail nurseries and aquarium suppliers; provide information to reduce or eliminate their sale.

Giant hogweed can grow up to 5 m, and spreads prolifically via seed if not controlled and monitored

Strategy #5 Manage and Control Giant Hogweed

Giant hogweed is a very large invasive plant (reaching up to 5 meters in height) posing safety risks to human and animal health. Its sap can cause severe burns and blindness when exposed to sunlight. In addition, giant hogweed produces copious seeds which can persist in the soil for several years.

Through an engagement program with landowners and a public reporting line to report sightings, giant hogweed is a likely candidate for eradication within the next 5 years from both City and private property. Ongoing monitoring is critical to detect new occurrences sprouting from the existing seed bank or spreading from neighbouring jurisdictions.

Priority Areas for Management:

1. City wide

ACTIONS:

20. Support the efforts of private landowners to control and treat giant hogweed via manual digging or herbicide application.
21. Maintain dedication of staff resources through the EPMP and Community Bylaws department for the EDRR program.
22. Continue to actively monitor for giant hogweed and map its distribution.

European fire ants are aggressive when their territory is disturbed

Strategy #6 Monitor and Control Fire Ants

Fire ants, both European and Impressive, are a combative ant that will swarm humans or animals that invade their territory. They can establish multiple nests within a small area, making their territories very dense and in some cases impassable.

There is currently no proven, effective treatment for fire ants. Work is underway by the BC Inter-Ministry Invasive Species Working Group to test control methods through collaboration with Thompson Rivers University. Until there is an effective treatment for fire ants, best management practices are required to contain known colony infestations and to provide education or notification to the public or residents.

Priority Areas for Detection:

1. High value ecological areas (e.g. wildlife management areas, Northeast Bog, Terra Nova Rural Park, McDonald Beach)
2. City parks and trails
3. City Works Yard and soil storage areas
4. Lawn (i.e. turf) surfaces

ACTIONS:

23 Prevent spread of fire ants by avoiding movement of infested materials, using a combination of approaches including best management practices, web-based information, and education and outreach.

24. Maintain accurate inventory information on colony extent on City lands.
25. Continue to collaborate with Thompson Rivers University and the BC IMISWG to stay informed of the latest scientific research and BMP developments.
26. Continue to support property owners when fire ants are detected through education and awareness, site visits, and sampling.
27. Follow emerging science regarding confirmation and spread of the Impressive fire ant (*Myrmica specioides*).

City crews apply best management practices for parrot's feather control, while maintaining a City watercourse

Strategy #7 Integrate Invasive Species Management into City Processes

Many capital and operational projects, as well as development activities have the potential to introduce and spread invasive species (e.g. mowing, soil movement, ditch dredging, dike maintenance, and construction, etc.). A consistent City wide approach to prevention and control of invasive species is critical to ensure efficient use of resources, prevent avoidable introduction and spread and increase the opportunity for successful outcomes. Knowledge and awareness of City operations staff and contractors leads to a greater likelihood of early detection and control of invasive species.

ACTIONS:

28. Continue to work collaboratively across City departments (including Drainage Operations, Parks, and Community Bylaws) to ensure effective delivery of invasive species management.
29. Ensure consistent delivery of up-to-date invasive species management training for City staff, including prevention and maintenance techniques.
30. Maintain up-to-date and accessible City resources on BMPs or all priority invasive species including web based materials for City Hall and the public.
31. Create an invasive species 'management calendar' to identify recommended timelines for invasive species removal and control methods.
32. Work with external organizations and agencies to stay current on recent technology advancements and testing related to invasive species management.
33. Integrate invasive species management into the City development process.
34. Investigate local government authority opportunities under the Province's Weed Control Act.

Strategy #8 Research Control Methods

One of the challenges of emerging invasive species is that effective control methods have not been determined, or rely on methods such as herbicides that are not approved for use in sensitive ecosystems. Parrot's feather and Brazilian elodea, for example, are new arrivals in BC and therefore there is limited local knowledge or experience with their management.

ACTIONS:

35. Continue to test control methods that are suitable for Richmond's conditions.
36. Develop partnerships with other jurisdictions across North America which already have control programs in place in order to learn from their successes and fill gaps in local knowledge.
37. Support research by academic institutions on the ecology and control of invasive species including providing access to city sites, resources, or small-scale funding.
38. Collaborate with the ISCMV, ISCBC the Province, other local governments, and the stewardship community to test control strategies and methods.
39. When possible, share the results of research, test projects, and other technical experience using the internet and other forums. Specifically, publish or present the results of treatment trials when possible.

Strategy #9 Promote Invasive Species Education and Awareness

Public education and awareness are important components of a successful invasive species management program. Residents can contribute to the detection of priority species, prevent introduction and spread by responsibly disposing green waste (including aquarium plants) in green waste collection bins and joining control efforts by volunteering at stewardship events. Citizens need to be aware of safety risks posed by some invasive species (e.g. giant hogweed and European fire ants) and need access to information on how to properly manage invasive species problems on their land.

ACTIONS:

40. Continue to actively utilize tools such as the City's invasive species webpage and social media platforms to regularly inform residents about information, guidelines, and City initiatives focused on invasive species.
41. Continually educate and inform City staff on emerging information and protocols around invasive species in Richmond.
42. Continue to deliver Environmental Sustainability public workshops with topics such as backyard naturalization and invasive species management for landowners.
43. Continue to actively promote the Enhanced Pesticide Management Program, *Pesticide Use Control Bylaw*, the invasive species reporting phone line, and other available City and regional resources at local community events.
44. Incorporate key messages into communications about invasive species:
    a) Awareness, detection, and identification of priority species;
    b) Individual and community involvement opportunities;
    c) Ecological impacts of illegal dumping of invasive species.
45. Monitor and provide necessary updates to City staff and the public regarding the provincial Integrated Pest Management Act.

Strategy #10 Support Community Stewardship

Many effective projects for invasive species control have involved volunteers organized formally or informally by stewardship groups across City lands. Volunteers are the "boots on the ground" for a variety of invasive stewardship activities, including pulling ivy, removing blackberry, and restoration through planting native species.

Stewardship activities can also include "citizen science": the involvement of citizens in the collection of data for surveys, assessment, or monitoring. Citizen science initiatives can be particularly effective for EDRR where more observers greatly increase the change of detecting invasive species when they are rare and sparse.

Participants at the Richmond Earth Day Youth Summit learn about invasive species in Richmond

ACTIONS:

46. Work with City partners and local stewardship groups (e.g. Green Ambassadors, Parks department programs, Richmond School District, etc.) to expand the delivery of invasive species related stewardship initiatives (e.g. invasive species pulls, restoration projects etc.).
47. Provide information, guidance, and other resources to local stewardship groups for invasive species related initiatives within City parks and other City-owned lands.
48. Review opportunities to support citizen science initiatives for EDRR species and other invasive related opportunities.
49. Explore recognition programs for community groups who have undertaken invasive species control initiatives through the Parks Department *Partners for Beautification* program.
50. Promote community engagement and stewardship through the Bath Slough Revitalization Initiative and other supportive projects within the City's Ecological Network.
51. Continue to support stewardship and invasive species awareness through community events including Earth Day, Rivers Day, Richmond Earth Day Youth (REaDY) Summit.

Strategy #11 Collaboration and Partnerships

Invasive species cross municipal and jurisdictional boundaries making collaboration between all levels of government in the management of invasive species essential. Collaboration at a regional level disseminates technical experience, shares the successes and failures of control projects, and increases public awareness through media coverage. Collaboration can also occur at the international level as local and state governments in Washington and Oregon work on many of the same invasive species that occur in Richmond.

ACTIONS:

52. Encourage staff to participate in regional working groups, committees, and other organizations that contribute to invasive species management (e.g. Metro Vancouver).
53. Collaborate with municipalities which share similar environmental conditions to Richmond (i.e. Delta, Surrey, and New Westminster) to exchange invasive species related information.
54. Participate in ISCMV and ISCBC forums and conferences.
55. Establish an Invasive Species corporate interdepartmental team to coordinate invasive species control among City of Richmond departments.

4.0 Implementation Plan

The implementation plan serves to guide the management and control of invasive plants and pests within the City over time. The implementation plan is articulated through a series of recommended actions, each tailored to a particular strategy, building off the unique issues and opportunities facing each high priority invasive species. Each action within the implementation plan has been assigned a time-frame for implementation, within a short, medium, or long term horizon based on their priority level.

Timeframe:

- **Short-term:** 1–2 years
- **Medium-term:** 3–5 years
- **Long-term:** 5 years +
- **Ongoing** (refers to initiatives regularly undertaken within City processes)

An annual review of the implementation plan and priority actions will be undertaken to address emerging needs and issues, and to measure progress toward achieving the plan's outcomes.

Currently, City of Richmond staff resourcing for invasive species management is funded through the Enhanced Pesticide Management Program. An additional $150,000, secured through annual capital requests in 2015 and 2016, have augmented the capacity for City staff to manage and deliver invasive species initiatives. Additional funding (capital and/or operating) from various City departments is anticipated in the future to meet the needs of invasive species management.

As information and management guidance on invasive species is constantly evolving, recommended management strategies and priority actions may also change over time—particularly as new information and research becomes available, or new high risk invasive species emerge.

Strategy	Actions / Programs / Initiatives	Timeframe
Strategy #1 Monitor and Map Invasive Species	1. Continue ongoing coordination and development of survey and mapping initiatives for infestations of aquatic (i.e. parrot's feather and Brazilian elodea) and terrestrial (i.e. knotweed and giant hogweed) invasive species.	Ongoing
	2. Continue efforts to develop a standardized GIS field mapping program and protocol for City staff.	Short-term
	3. Provide mapping/inventory training to City operations staff to integrate the mapping of invasive species into their regular maintenance work (e.g. ditch and dike maintenance, park development and restoration, etc.).	Medium-term
	4. Devise a monitoring protocol, linked to the GIS mapping and schedule treatment of sites to ensure consistent records are kept and that appropriate follow-up treatment and maintenance occurs.	Medium-term

Strategy	Actions / Programs / Initiatives	Timeframe
Strategy #2 Early Detection and Rapid Response	5. Continue to work in collaboration with the Province on delivery and protocol for the EDRR program.	Ongoing
	6. Provide education to residents on emerging invasive species to bolster identification and reporting on emerging species.	Ongoing
	7. Provide immediate response to reports of emerging invasive species in Richmond.	Ongoing
	8. Continue delivery of City's successful EDRR program for giant hogweed on both public and privately owned lands.	Ongoing
Strategy #3 Manage and Control Knotweed	9. Continue to develop a city-wide knotweed control program in collaboration with other City departments and staff.	Medium-term
	10. Continue the use of City staff resources or contractors to continue knotweed control on priority sites using herbicide (stem injection or foliar application) or excavation (for small infestations and new dikes).	Short-term
	11. Develop BMPs for controlling knotweed near shorelines and watercourses.	Short-term
	12. Incorporate knotweed control and soil management and disposal guidelines into development permits and servicing agreements when knotweed is present.	Long-term
	13. Collaborate with FLNRO, ISCMV, and ISCBC regarding up-to-date approaches for knotweed control, disposal, treatment, standards and practices.	Ongoing
	14. Explore provincial permitting options for knotweed management in unique conditions.	Short-term
	15. Develop guidelines or protocol for disposal of excavated knotweed materials.	Ongoing
Strategy #4 Manage and Control Aquatic Weeds	16. Continue to enhance and modify ongoing trials for shading and excavation to control parrot's feather and Brazilian elodea at known infestation sites in the City.	Ongoing
	17. Develop BMPs for the containment of aquatic weeds including a designated disposal site away from watercourses.	Ongoing
	18. Implement BMPs to avoid dispersal of aquatic weeds during excavation or disposal.	Short-term
	19. Work with ISCBC Don't Let it Loose campaign focusing on the commercial sale and distribution of aquatic plants by retail nurseries and aquarium suppliers; provide information to reduce or eliminate their sale.	Ongoing
Strategy #5 Manage and Control Giant Hogweed	20. Support the efforts of private landowners to identify, control and treat giant hogweed via manual digging or herbicide application.	Ongoing
	21. Maintain dedication of staff resources through the EPMP and Community Bylaws department for the EDRR program.	Ongoing
	22. Continue to actively monitor and map giant hogweed distribution.	Short-term
Strategy #6 Monitor and Contain Fire Ants	23. Prevent spread of fire ants by avoiding movement of infested materials, using a combination of approaches including BMPs, web-based information, and education and outreach.	Ongoing
	24. Maintain accurate inventory information on colony extent on City lands.	Long-term
	25. Continue to collaborate with Thompson Rivers University and the BC IMISWG to stay informed of the latest scientific research and BMP developments.	Long-term
	26. Continue to support property owners when fire ants are detected through education and awareness, site visits, and sampling.	Ongoing
	27. Follow emerging science regarding confirmation and spread of the Impressive fire ant (*Myrmica specioides*).	Medium-term

Strategy	Actions / Programs / Initiatives	Timeframe
Strategy #7 Integrate Invasive Species Management into City Processes	28. Continue to work collaboratively across City departments (including Drainage Operations, Parks, and Community Bylaws) to ensure effective delivery of invasive species management.	Ongoing
	29. Ensure consistent delivery of up-to-date invasive species management training for City staff, including prevention and maintenance techniques.	Ongoing
	30. Maintain up-to-date and accessible City resources on BMPs for all priority invasive species, including web-based materials for City staff and the public.	Long-term
	31. Create an invasive species 'management calendar' to identify recommended timelines for invasive species removal and control methods.	Short-term
	32. Work with external organizations and agencies to stay current on recent technological advancements, scientific research and practices related to invasive species management.	Short-term
	33 Integrate invasive species management into the City development process.	Long-term
	34. Investigate local government authority opportunities under the Province's Weed Control Act.	Short-term
Strategy #8 Research Control Methods	35. Continue to test invasive species control methods suitable to Richmond's conditions.	Long-term
	36. Develop partnerships with other jurisdictions across North America with control programs in place in order to learn from their successes and fill gaps in local knowledge.	Long-term
	37. Support research by academic institutions on the ecology and control of invasive species including providing access to city sites, resources, or small-scale funding.	Long-term
	38. Collaborate with the ISCMV, ISCBC, Province of BC, other local governments, and the stewardship community to test control strategies and methods.	Ongoing
	39. When possible, share the results of research, test projects, and other technical experience using the internet and other forums. Specifically, publish or present the results of treatment trials, when possible.	Long-term
Strategy #9 Promote Invasive Species Education and Awareness	40. Continue to actively utilize tools such as the City's invasive species webpage and social media platforms to regularly inform residents regarding information, guidelines, and City initiatives focused on invasive species.	Ongoing
	41. Continually educate and inform City staff on emerging information and protocols around invasive species in Richmond.	Ongoing
	42. Continue to deliver Environmental Sustainability public workshops with topics such as backyard naturalization and invasive species management for landowners.	Long-term
	43. Continue to actively promote the Enhanced Pesticide Management Program, Pesticide Use Control Bylaw, the invasive species reporting phone line, and other available City and regional resources at local community events.	Long-term
	44. Incorporate key messages into communications about invasive species: a) Awareness, detection, and identification of priority species; b) Individual and community involvement opportunities; c) Ecological impacts of illegal dumping of invasive species.	Short-term
	45. Monitor and provide necessary updates to Council, City staff and the public regarding the provincial Integrated Pest Management Act.	Ongoing

Strategy	Actions / Programs / Initiatives	Timeframe
Strategy #10 Support Community Stewardship	46. Work with City partners and local stewardship groups (e.g. Green Ambassadors, Parks department programs, Richmond School District) to deliver invasive species related stewardship initiatives (e.g. invasive species pulls, etc.).	Ongoing
	47. Provide information, guidance, and other resources to local stewardship groups for invasive species related initiatives within City parks and other City-owned lands.	Short-term
	48. Review opportunities to support citizen science initiatives for EDRR species and other invasive related opportunities.	Medium-term
	49. Explore recognition programs for community groups who have undertaken invasive species control initiatives through the Partners for Beautification programming in the City's Parks Department.	Long-term
	50. Promote community engagement and stewardship through the Bath Slough Revitalization Initiative and other supportive projects within the City's Ecological Network.	Ongoing
	51. Continue to support stewardship and invasive species awareness through community events including Earth Day, Farmers Market, Richmond Earth Day Youth (REaDY) Summit.	Ongoing
Strategy #11 Collaboration and Partnerships	52. Encourage staff to participate in regional working groups, committees, and other organizations that contribute to invasive species management (e.g. Metro Vancouver).	Long-term
	53. Collaborate with municipalities which share similar environmental conditions to Richmond (i.e. Delta, Surrey, and New Westminster) to exchange invasive species related information.	Ongoing
	54. Participate in ISCMV and ISCBC forums and conferences.	Long-term
	55. Establish an Invasive Species corporate interdepartmental team to coordinate invasive species control among City of Richmond departments.	Short-term

Appendix 1 | Moderate Risk Invasive Species in the City of Richmond

Moderate risk species which are currently not priority species for management in the City of Richmond are listed in the table below. Although they are non-priority species, they still have the potential to pose ecological risk. Many of these species are controlled in specific circumstances such as ecosystem restoration projects or volunteer stewardship events in parks. Residents and landscape contractors can help prevent their spread into parks and native ecosystems by avoiding planting these species in gardens and by properly disposing of green waste.

Moderate risk invasive species in the City of Richmond.

Common Name	Scientific Name
INVASIVE PLANTS	
Blueberry (non-native, cultivated)	*Vaccinium corymbosum*
Butterfly bush	*Buddleja davidii*
Canada thistle	*Cirsium arvense*
Cherry laurel (English laurel)	*Prunus laurocerasus*
English holly	*Ilex aquifolium*
English ivy	*Hedera helix*
Himalayan balsam (policeman's helmet)	*Impatiens glandulifera*
Himalayan blackberry	*Rubus armeniacus*
Lamium (yellow archangel)	*Lamium galeobdolon*
Periwinkle	*Vinca minor*
Purple loosestrife	*Lythrum salicaria*
Reed canarygrass	*Phalaris arundinacea*
Scotch broom	*Cytisus sciparius*
Spurge laurel (daphne laurel)	*Daphne laureola*
Yellow flag-iris	*Iris pseudacorus*
INVASIVE ANIMALS & INSECTS	
American bullfrog	*Rana catesbeiana*
Eastern gray squirrel	*Sciurus carolinensis*
European chafer beetle	*Rhizotrogus majalis*
European rabbit	*Oryctolagus cuniculus*
Eastern cottontail rabbit	*Sylvilagus floridanus*

Appendix 2 | Invasive Species Resources

Topic	Resource
Agricultural Weed Identification	Ministry of Agriculture-Weeds BC www.weedsbc.ca/
Best Practice Guides	Invasive Species Council of BC bcinvasives.ca/resources/publications/
Cordgrass/Spartina	BC Spartina Working Group www.cmnbc.ca/atlas_gallery/invasive-species-spartinaca
Ecosystem Restoration	The South Coast Conservation Program is currently developing restoration guidelines for forest, wetland, and stream and riparian restoration. Check their website for this and other guides: www.sccp.ca/south-coast-bc-guidelines
EDRR Candidate Species Profiles	BC Inter-Ministry Invasive Species Working Group www.for.gov.bc.ca/hra/invasive-species/candidate.htm
Fire ants (European and Impressive)	BC Inter-Ministry Invasive Species Working Group www.for.gov.bc.ca/hra/invasive-species/fire_ants.htm#FAQ Thompson Rivers University Research www.faculty.tru.ca/rhiggins/myrmica_rubra_index.htm
Pesticide Regulation	Ministry of Environment – Integrated Pest Management Act and Regulations: www.env.gov.bc.ca/epd/ipmp/regs/pdf/leg_summary.pdf
Pesticide Use	A Citizen's Guide to Pesticide Use and the Law in BC (West Coast Environmental Law publication) www.dnv.org/upload/documents/A%20Citizen's%20Guide%20to%20Pesticides%20and%20BC%20Law.pdf
TIPS Factsheets	Invasive Species Council of BC bcinvasives.ca/resources/tips/

Appendix 3 | Glossary

Best Management Practice (BMP): Approach based on known science which results in the most effective outcome for application of maintenance procedures and management practices to prevent the spread of invasive species and disturbance.

Dike: An embankment or any other structure that is constructed to prevent the flooding of land. The City of Richmond maintains a 49 kilometre dike network, and the City's dikes are managed in accordance with the Provincial Diking Authority requirements.

Early Detection Rapid Response (EDRR): A proactive response to newly arrived invasive species which prevents their establishment and proliferation.

Enhanced Pesticide Management Program (EPMP): The City of Richmond adopted the EPMP in 2009, as a response to community interest for a bylaw banning the use of cosmetic pesticides. The EPMP is modeled upon reporting by the Canadian Centre for Pollution Prevention that placed emphasis upon regulatory cosmetic pesticide bylaws that are coupled with strong education and community outreach programs.

Inter Ministry Invasive Species Working Group (IMISWG): A provincial government working group founded in 2004 to employ science-based, innovative strategies to protect the health and diversity of BC ecosystems and minimize negative impacts of invasive species.

Invasive Species: Non-native organisms (including plants, animals, and insects) introduced to areas outside of their natural range which cause negative health, ecological and/or economic impacts.

Invasive Species Council of British Columbia (ISCBC): A registered charity and provincial non-profit society that helps co-ordinate and unite a range of concerned stakeholders in the management of invasive species in BC. ISCBC targets all aspects of invasive species management and works with a variety of partners, with the goal to reduce the spread and impact of non-native species in BC. ISCBC targets education for behaviour change in gardeners, outdoor recreation enthusiasts, and resource industry and horticultural professionals.

Invasive Species Council of Metro Vancouver (ISCMV): Formerly known as the Greater Vancouver Invasive Plant Council, ISCMV is a regional non-profit society founded in 2006. The Council works closely with the public, land managers, and decision-makers throughout Metro Vancouver on invasive species issues. The ISCMV raises the profile for invasive species in the region, and provides a broad range of educational materials on specific species of interest in the region, control methods, ISCMV services, and invasive species updates. The ISCMV is one of 13 regional invasive species committees across BC.

Inventory: A spatial record (map) of an invasive species which shows its distribution and abundance (size of infestation).

Ministry of Forests, Lands and Natural Resources (FLNRO): BC government ministry which administers the provincial Invasive Plant Program.

Monitoring: Activities and practices required to determine environmental quality and identify changes over time (e.g. monitoring for re-growth of an invasive plant after it has been removed or chemically treated).

Restoration: The act of returning a damaged ecological system back to its former state. It is recommended to remove invasive plants, replant with native species, and monitor the site for at least 3 years

Riparian Area: The transition zone between aquatic and upland ecosystems.

Watercourse: Natural streams and rivers, as well as ditches, canals, lakes, creeks, wetlands, springs, ravines, swamps or gulch.

Appendix 4 | Priority Species – Best Management Practices Factsheets

This appendix provides species specific Best Management Practices (BMPs) for priority invasive species in Richmond. It is recommended that regular updates take place for the BMPs as new knowledge is acquired or best management practices change. Invasive species are in alphabetical order by common name. Information has been compiled from the sources cited on each factsheet.

The management of invasive species on City land must adhere to the Province's Integrated Pest Management Act, the City's Pesticide Use Control Bylaw No. 8514 and all other applicable acts and regulations (refer to page 6). All methods of control (i.e. mechanical, biological and cultural methods) are to be explored before chemical treatments. Notification and consultation in advance with City of Richmond Environmental Sustainability staff is essential to ensure successful management of the priority invasive species within Richmond.

Brazilian elodea

Egeria densa

R. Videcki

Identification

Growth form: Aquatic plant which forms dense mats up to 4 meters deep.

Leaves: Bright green, 2 cm long; 4 leaves per whorl (arranged around the stem).

Mistaken Identity: Looks similar to Hydrilla (another freshwater invasive plant) which has leaves in whorls of 5. Native elodeas have only 2 to 3 leaves per whorl. Report if leaves are in whorls of more than three.

Habitat

Freshwater streams, ditches, canals, sloughs, ponds, lakes and watercourses.

Risk/Impact

Infrastructure: Impedes flood control, storm drain systems and irrigation works; restricts water movement; traps sediment; increases municipal maintenance costs.

Recreation: Hinders activities which require access to water (e.g. fishing, swimming, boating).

Ecological: Displaces native aquatic vegetation; alters aquatic habitat food webs; reduces suitable habitat for wildlife; blocks passage of fish.

How it Spreads

Reproduces by plant fragments.

Grown in home aquariums and garden ponds. Likely introduced to Richmond by improper disposal of aquariums and green waste in watercourses.

Dredging and maintenance of Richmond's watercourses may inadvertently contribute to spread by fragmenting and dispersing plant roots and stems either by water or being carried on maintenance equipment.

Prevention

Purchase alternative non-invasive aquarium or pond plants (e.g. native Canadian elodea).

Dispose of unwanted plants in green waste collection bins. Never dump aquarium contents into any type of watercourse.

Minimize disturbance near infested areas.

Remove plant material from boats, anchors, trailers, fishing gear etc. before leaving the watercourse.

Ensure equipment used in water infested with Brazilian elodea is thoroughly cleaned and inspected before moving to a new location.

How to Remove/Control

Harvesting has been found to be ineffective and typically leads to further spread. The City is currently working in partnership with the Province to determine an effective control method.

More Information

State of Washington Department of Ecology

General Info:
www.ecy. wa.gov/programs

Technical Info:
www.ecy.wa.gov/programs/wq/plants/weeds/aqua002.html

Common reed

Phragmites australis subsp. australis

B. Klinkenberg

N. Page

Identification

Size: Erect, perennial grass, 2-5 m tall.

Flowers: Feathery, plume-like flower clusters, 15-35 cm long.

Mistaken Identity: Easily confused with native subspecies (Phragmites australis ssp. americanus) which is found in the lower Fraser Valley. Identity must be confirmed by an expert. Samples can be sent to Provincial EDRR coordinator.

Habitat

Freshwater and brackish tidal wetlands, coastal shorelines, wetlands, sloughs, canals, ponds, ditches and watercourses.

Risk/Impact

Infrastructure: Alters hydrology including ditch flows; obstructs driver sight lines; increases municipal maintenance costs.

Recreation: Impedes access and obstructs slight lines.

Ecological: Displaces native vegetation; reduces suitable habitat for wildlife in wetlands; alters wetland hydrology, reducing the amount of shallow open water.

How it Spreads

Reproduces by seed and root fragments.

Seeds and plant fragments may be carried in water, contaminated soil and on vehicles and equipment.

Mowing/roadside maintenance will lead to spread.

How to Remove/Control

Mechanical: Can be treated by excavation or cover treatments (mulching with black plastic);

Chemical: Has been successfully controlled using both imazapyr (Arsenal), and glyphosate (Roundup and related formulations); glyphosate-based VisionMAX (Monsanto) is now registered for common reed treatment in non-wetted areas in Canada. A small infestation in Richmond was treated successfully with herbicide in 2011.

Disposal: Treated plants are left on site to decompose; seed heads should be removed when treating small infestations.

Monitoring/Follow-up: In the first year, inspect every two month following initial treatment. Inspect annually in subsequent years for remnant plants and new seedlings.

More Information

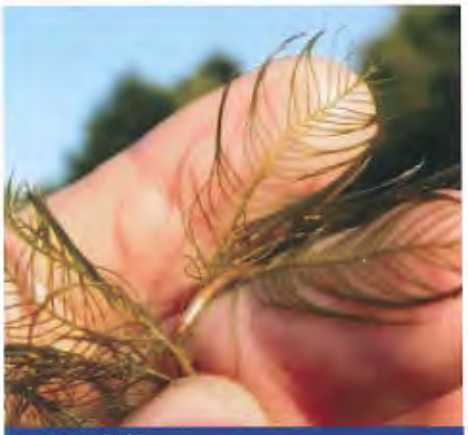
BC EDRR Status Report

www.for.gov.bc.ca/HRA/invasivespecies/Publications/EDRR_statusreport_Phragmites.pdf

Eurasian water-milfoil

Myriophyllum spicatum

A. Fox



Dr. Richard Old

Identification

Size: Usually 1-4 m but up to 10 m long.

Flowers: Reddish spikes with small yellow flowers, 5-10 cm above water

Leaves: Bright green feathery leaves, 3 cm long; whorls of 3 or 4.

Stem: Reddish brown, long, slender, branching and hairless; leafless toward plant base.

Mistaken Identity: Parrot's feather has white flowers and longer petioles. Native Northern water-milfoil has 11 or fewer leaf segment on each axis whereas Eurasian milfoil has 12 or more segments.

Habitat

Still or slow moving freshwater streams, canals, ponds, lakes.

Risk/Impact

Infrastructure: Impedes flood control, storm drain systems and irrigation works; restricts water movement; traps sediment; increases municipal maintenance costs.

Recreation: Hinders activities which require access to water (e.g. fishing, swimming, boating).

Ecological: Displaces native aquatic vegetation; alters aquatic habitat food webs; reduces suitable habitat for wildlife; blocks passage of juvenile salmon and other fish.

How it Spreads

Reproduces by seed, root and plant fragments.

Seeds and plant fragments may be carried in water, animals, boats, trailers and fishing gear and on vehicles and equipment.

Dredging and maintenance of Richmond's watercourses may inadvertently contribute to spread by fragmenting and dispersing plant roots and stems either by water or being carried on maintenance equipment.

Prevention

Minimize disturbance near infested areas.

Remove plant material from boats, anchors, trailers, fishing gear etc. before leaving the watercourse.

Ensure equipment used in water contaminated with water-milfoil is thoroughly cleaned and inspected before moving to a new location.

How to Remove/Control

Mechanical removal (by hand, raking, or mechanical harvesters and chopping machines) is only recommended if all plant fragments can be removed.

Cover treatments and root removal by rototilling have also been used in BC.

More Information

ISCBC TIPS Factsheet
bcinvasives.ca/documents/Eurasian_Watermilfoil_TIPS_Final_02_18_2015.pdf

BC Ministry of Environment brochure
www.env.gov.bc.ca/wat/wq/brochures/milfoil.html

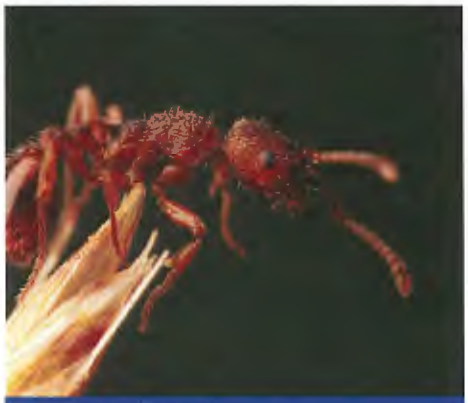
European fire ant (EFA)

Myrmica rubra

Impressive fire ant (IFA)

Myrmica speciodes

European fire ant
Rob Higgins



Impressive fire ant
Sean McCann

Identification

Colonies: EFAs can have up to four nests per square metre. IFAs nests are less dense.

Mistaken Identity: Both are easily confused with native ant species and look very similar to each other. Collect a sample and send in for confirmation (refer to BC IMISWG link provided below).

Habitat

Moist environments; irrigated lawns and gardens are ideal.

Risk/Impact

Human health: Colonies swarm when disturbed and cause painful stings. Occasionally stings cause allergic reactions requiring medical treatment.

Recreation: Impedes access.

Ecological: Displaces native ant species. Full impact as yet undetermined.

How it Spreads

Movement and spread is through infested garden and landscape material (e.g. soil, mulch, potted plants, etc.).

Prevention

Minimize disturbance near infested areas. Do not move soil, mulch, plants or other materials from infested areas.

Make conditions less favourable by avoiding or minimizing lawn and garden watering, and removing objects that trap heat and moisture. Control is more difficult for IFAs since they undergo mating flights.

How to Remove/Control

The BC IMISWG is currently working with experts and local government and non-government organizations to determine the best options for prevention and control.

More Information

BC Inter-Ministry Invasive Species Working Group – European Fire Ant Information
www.for.gov.bc.ca/hra/invasive-species/fire_ants.htm

Thompson Rivers University, Dr. Robert Higgins Research
faculty.tru.ca/rhiggins/myrmica_rubra_index.htm

Giant hogweed

Heracleum mantegazzianum

F. Steele

F. Steele

Identification

Size: Very large, up to 5 m tall.

Flowers: White flowers; produced in umbrella-like clusters called umbels at top of plant; up to 1.5 m in diameter; blooms as early as May.

Leaves: Large with coarse, jagged edges, cut into 3 large segments; stiff, dense hairs on underside.

Stem: Hollow, dark reddish spots, and stiff bristly hairs.

Mistaken Identity: Often confused with native cow parsnip which is smaller to 1.5-2.5 m tall, does not have reddish-purple spots on stems and leaves are not as sharply toothed.

Habitat

Riparian areas, roadsides, agricultural land, disturbed areas.

Risk/Impact

Human health: Leaves and stem contains toxic sap that causes extreme skin dermatitis in the presence of sunlight. Contact can lead to welts, rashes, blistering, and scarring. If sap gets into the eyes, it can lead to temporary or permanent blindness.

Ecological: Displaces native vegetation; reduces suitable habitat for wildlife.

How it Spreads

Perennial herb that produces copious winged seeds (100,000 seeds per plant) viable for up to 15 years. Dense taproot will keep producing re-growth for 2 to 4 years until a flower stem is produced. Plant usually dies after flowering.

Prevention

Do not grow giant hogweed in gardens. Bag or tarp plants to avoid spread and contact during transport to disposal site.

How to Remove/Control

Due to health risk, giant hogweed is best removed by a professional. Wear protective water resistant clothing, gloves and eye protection leaving no exposed skin.

Mechanical Control: Bag the flower head to avoid seed dispersal. Cutting the root crown 8-12 cm below soil with a sharp blade is an effective control method for small infestations

Chemical Control: Pesticides may be used in situations where mechanical control methods are not effective, feasible or are considered to be more harmful to the environment than the use of pesticides. Treat in spring using foliar application or stem injection of glyphosate (Roundup). Treat re-growth in summer.

Disposal: Do not compost or dispose in green waste bin. Bag and dispose in landfill. Cut material or chemically treated plants can be left on site to decompose if there is no risk of contact with plant for three weeks AND there are no seeds.

Follow-up: Monitor twice annually (spring and summer) until no re-growth or new seedlings appear (seed lasts up to 15 years).

More Information

ISCBC TIPS Factsheet
bcinvasives.ca/documents/Giant_Hogweed_TIPS_Final_08_06_2014.pdf

Work Safe BC Toxic Plant Warning
www.worksafebc.com/publications/health_and_safety/bulletins/toxic_plants/assets/pdf/tp0602.pdf

Knotweed species

Japanese, bohemian, giant, and Himalayan knotweed

Fallopia japonica
Fallopia x bohemica
Fallopia sachalinensis
Polygonum polystachyum

Japanese knotweed
F. Steele

Himalayan knotweed
F. Steele

Identification

Size: Large, woody bamboo-like shrubs, 1-5 m tall.

Flowers: Small, white/green in plume-like clusters.

Leaves: Heart to spade-shaped for all except Himalayan which are lance-shaped, pointy. 8-10 cm wide and 15-20 cm long except giant which are double the size.

Stem: Hollow, reddish-brown speckles.

Habitat

Riparian areas, roadsides, disturbed sites, landscapes. Will grow almost anywhere.

Risk/Impact

Infrastructure: Destabilizes infrastructure, including dike system; increases erosion potential and impedes storm drain system; able to penetrate cement, asphalt, house foundations and walls; obstructs driver sight lines; increases municipal maintenance costs.

Ecological: Forms dense, impenetrable thickets which displace native vegetation; reduces suitable habitat for wildlife and fish; dominates stream banks, increasing erosion and sedimentation potential.

Recreation: Reduces access for recreation; obstructs sight lines along roadways and trails.

How it Spreads

Spreads by seed, root and stem fragments carried in water, contaminated soil and on vehicles and equipment. Bohemian knotweed produces seeds viable up to 25 years.

Extensive root system capable of re-sprouting even after many years of treatment.

Mowing will lead to spread.

Prevention

Minimize soil disturbance near infested areas.

Avoid movement of contaminated soil, gravel or other fill materials.

Remove plant material from tools, vehicles and equipment before leaving infestation area.

How to Remove/Control

Mechanical: Manual removal via mowing or cutting is not recommended due to increased risk of spread and poor results. Excavation is possible (particularly for Himalayan) however great care must be taken to remove the full extent of roots. Soil must be disposed at an approved disposal site or quarantined on site and treated with herbicide. Deep burial under compact fill is also an option however long-term monitoring for re-growth would still be necessary.

Chemical: Herbicide can be applied via stem injection or foliar application. Glyphosate (Roundup) is most commonly used. Stem injection with glyphosate is permitted to within 1 meter of the high water mark of any watercourse, wetland, or shoreline. Initial treatment should occur in July or August, with a follow-up treatment 6 or more weeks later.

Disposal: Pesticide killed material can be left on site to decompose. Cut material can be dried completely then disposed in regional green waste bins. Do not compost in home compost bin. Due to the high risk of spread, if possible avoid cutting or transporting live knotweed.

Follow-up: Monitor at least twice annually. Continue monitoring for several years even after no re-growth appears.

More Information

ISCBC TIPS Factsheet
bcinvasives.ca/documents/Knotweeds_TIPS_Final_08_06_2014.pdf

Parrot's feather

Myriophyllum aquaticum

F. Steele

N. Loewenstein

Identification

Size: Up to 1.5 m long.

Flowers: Pinkish-white flowers, 1.6 mm long.

Leaves: Submerged leaves are 1.5-3.5 cm long, 20-30 divisions per leaf; often limp and appear to be decaying. Emergent leaves are bright green, 2-5 cm long, 6-9 divisions per leaf; resemble small fir trees.

Stem: Submerged, brownish stems create dense mats.

Mistaken Identity: Often confused with Eurasian water-milfoil which has yellow flowers and shorter petioles (<2 mm long or absent).

Habitat

Freshwater streams, ditches, canals, sloughs, ponds, lakes.

Risk/Impact

Infrastructure: Impedes flood control, storm drain systems and irrigation works; restricts water movement; traps sediment; increases municipal maintenance costs.

Recreation: Hinders activities which require access to water (e.g. fishing, swimming, boating).

Ecological: Displaces native aquatic vegetation; alters aquatic habitat food webs; reduces suitable habitat for wildlife; blocks passage of juvenile salmon and other fish.

How it Spreads

Reproduces by plant fragments.

Grown in home aquariums and garden ponds. Likely introduced to Richmond by improper disposal of aquariums and green waste in watercourses.

Dredging and maintenance of Richmond's watercourses may inadvertently contribute to spread by fragmenting and dispersing plant roots and stems either by water or being carried on maintenance equipment.

Prevention

Purchase alternative non-invasive aquarium or pond plants (e.g. native Canadian elodea).

Dispose of unwanted plants in green waste collection bins. Never dump aquarium contents into any type of watercourse.

Minimize disturbance near infested areas.

Remove plant material from boats, anchors, trailers, fishing gear etc. before leaving the watercourse.

Ensure equipment used in water contaminated with Parrot's feather is thoroughly cleaned and inspected before moving to a new location.

How to Remove/Control

Mechanical removal (by hand, raking, or mechanical harvesters and chopping machines) is only recommended if all plant fragments can be removed. The City of Richmond is conducting trials for shading and excavation at known infestation sites.

More Information

ISCBC TIPS Factsheet
bcinvasives.ca/documents/Parrots_Feather_TIPS_Final_02_18_2015.pdf

Wild chervil

Anthriscus sylvestris

Identification

Size: 0.3–1.8 m tall

Flowers: White flowers; produced in umbrella-like clusters called umbels at the top of the plant.

Leaves: Leaves are fern-like, triangular in outline, finely divided and smooth to softly hairy.

Stem: Branched, hollow and furrowed; soft-hairy below, smooth above; fringe of hairs at stem nodes; deep taproot.

Mistaken Identity: Wild carrot or Queen Anne's lace (Daucus carota); Bur chervil (Anthriscus caucalis); Salad chervil (Anthriscus cerefolium); poison-hemlock (Conium maculatum)

Habitat

Wild chervil grows under a variety of conditions but prefers moderately-disturbed moist or mesic sites, and thrives in rich soils. It is found exclusively in open habitats and is not found under forest canopy. Often found along roadsides, ditches, fencelines, on forest edges, waste areas, abandoned hay fields and some pastures.

Risk/Impact

Human health: Sap on skin can cause severe burns to humans and animals when exposed to sunlight.

Agricultural: Reduces forage for grazing; contaminates crops (poor hay and forage quality).

How it Spreads

Dispersed by both seed and plant fragments. Each plant produces between 800 and 10,000 seeds. Vegetative growth occurs from the root buds and largely responsible for the local expansion of existing patches.

How to Remove/Control

Mechanical: Tillage works to control wild chervil by bringing the taproots to the surface where they dry out and no longer sprout. Some studies have reported population decreases from mowing while others have found population increases or little effect. Digging can be effective for small populations, although care must be taken to remove most of the taproot and prevent re-sprouting the following year.

Chemical: Herbicides achieved between 50% and 95% control in trials in Washington State. The most effective herbicides were imazapyr (Habitat, Arsenal) at 95% efficacy and glyphosate (Roundup, Aquamaster), at 64–83% efficacy.

More Information

BC Wild Chervil Weed Alert
www.agf.gov.bc.ca/cropprot/chervil

King County Noxious Weeds – Wild Chervil
www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/wild-chervil.aspx

Weeds BC
www.weedsbc.ca/weed_desc/wld_chervil.html

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	December 9, 2015
From:	John Irving, P.Eng. MPA Director, Engineering	**File:**	10-6060-01/2015-Vol 01
Re:	**Works and Services Cost Recovery Bylaw Amendment**		

Staff Recommendation

That Works and Services Cost Recovery Bylaw No. 8752 be amended and given first, second, and third readings.

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

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Finance Department	☑	
Roads & Construction	☑	
Sewerage & Drainage	☑	
Law	☑	
Development Applications	☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

Section 938 of the *Local Government Act* (LGA) provides the authority for local governments to regulate and require the provision of works and services with respect to subdivision of land by bylaw.

Section 194 of the *Community Charter* (Charter) permits the City to charge fees for City Services, and as a City Service the City provides and operates highways service, including infrastructure works.

The Works and Services Cost Recovery Bylaw No. 8752 adopted by Council on June 27, 2011 facilitates the recovery of costs associated with projects constructed and financed by the City that would normally be secured through the development process. This report requests authorization to add schedules to Bylaw No. 8752.

Analysis

Through the development process and Subdivision and Development Bylaw No. 8751, the City requires developers to pay for infrastructure required to service development projects. At times, the City identifies a need to install or upgrade infrastructure that benefits properties that have subdivision potential. This construction is financed by the City and, if available, existing developer contributions. To maintain equity, the City uses Works and Services Cost Recovery Bylaw No. 8752 to charge benefitting developers in lieu of providing such infrastructure, which provides equity to Richmond's taxpayers. Existing property owners will not incur costs, only those who benefit in the future should they subdivide.

Bylaw No. 8752 contains three schedules identifying lane infrastructure that has been constructed by the City and properties that have benefitted from this and also have the potential to subdivide. Each property is assigned a lane construction cost based on frontage length and these costs will be recovered from the property owner upon subdivision.

Staff propose that Bylaw No. 8752 be amended to attach four additional schedules that identify subdividable properties benefiting from lane upgrade projects funded by the City and assign costs recoverable upon subdivision; the proposed amendment to Bylaw No. 8752 is attached as Attachment 1 to this report. These lane upgrade projects meet the following criteria:

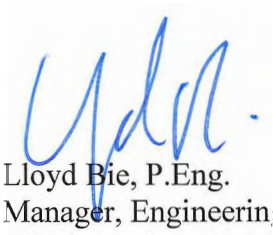
- the project was completed less than 15 years ago;
- the project was funded by the City and where available by developer cash-in-lieu contributions (for the design and construction of works in keeping with the Subdivision and Development Bylaw No. 8751); and
- there are properties identified as benefitting lands that have not previously paid for the improvement project. Note that current property owners will not incur any cost.

Financial Impact

None. Infrastructure construction costs will be recovered from benefitting properties when they redevelop.

Conclusion

The proposed amendment to Works and Services Cost Recovery Bylaw No. 8752 is in alignment with the current legislation and meets the needs of the City and development community with respect to current and anticipated development.



Lloyd Bie, P.Eng.
Manager, Engineering Planning
(604-276-4075)

LB:cl

Att. 1: Works and Services Cost Recovery Bylaw No. 8752, Amendment Bylaw No. 9512

City of Richmond

Bylaw 9512

Works and Services Cost Recovery Bylaw No. 8752, Amendment Bylaw No. 9512

The Council of the City of Richmond enacts as follows:

1. The **Works and Services Cost Recovery Bylaw No. 8752** is amended by adding Schedules 4 through 7 attached to and forming part of this Bylaw.

2. This Bylaw comes into force and effect immediately.

3. This Bylaw is cited as **"Works and Services Cost Recovery Bylaw No. 8752, Amendment Bylaw No. 9512".**

FIRST READING	
SECOND READING	
THIRD READING	
ADOPTED	

CITY OF RICHMOND
APPROVED for content by originating dept.
APPROVED for legality by Solicitor

MAYOR

CORPORATE OFFICER

SCHEDULE 4 to BYLAW NO. 8752

1. NAME OF IMPROVEMENT PROJECT: Laneway Upgrade South of Williams Road between Aragon Road and Shell Road

2. CERTIFIED COST OF PROJECT: $ 725,615.00

3. COMPLETION DATE OF PROJECT: November 5th, 2012

4. COST PREPAID UNDER WORKS AND SERVICES BYLAW: $ 205,360.93

5. NET COST FOR RECOVERY UNDER BYLAW No. 8752: $ 386,152.26

6. TOTAL FRONTAGE OF BENEFITING LAND IN METRES: 621.21

7. COST FOR RECOVERY PER METRE OF FRONTAGE: $ 1,168.07

8. BENEFITING LAND AND FRONTAGE IN METRES:

LEGAL DESCRIPTION OF PARCEL	FRONTAGE OF BENEFITTING LAND ON PROJECT (m)	COST FOR RECOVERY
Lot: 42 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 47 Sec:36-4-6 PL:28788	20.12	$23,501.57
Lot: 48 Sec:36-4-6 PL:28788	20.12	$23,501.57
Lot: 49 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 50 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 51 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 52 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 54 Sec:36-4-6 PL:28788	18.29	$21,364.00
Lot: 55 Sec:36-4-6 PL:28788	21.83	$25,498.97
Lot: 295 Sec:36-4-6 PL:35779	19.52	$22,800.73
Lot: 296 Sec:36-4-6 PL:35779	24.85	$29,026.54
Lot: 17 Sec:35-4-6 PL:18551	24.08	$28,127.13
Lot: 18 Sec:35-4-6 PL:18551	24.44	$28,547.63
Lot: 19 Sec:35-4-6 PL:18551	24.44	$28,547.63
Lot: 22 Sec:35-4-6 PL:18551	20.42	$23,851.99
Lot: 27 Sec:35-4-6 PL:18551	21.03	$24,564.51

SCHEDULE 5 to BYLAW NO. 8752

1. NAME OF IMPROVEMENT PROJECT: 10000 Block Williams Road Laneway (South of Williams Road)

2. CERTIFIED COST OF PROJECT: $ 424,470.00

3. COMPLETION DATE OF PROJECT: September 19th 2012

4. COST PREPAID UNDER WORKS AND SERVICES BYLAW: $ 132,229.72

5. NET COST FOR RECOVERY UNDER BYLAW No. 8752: $ 105,238.15

6. TOTAL FRONTAGE OF BENEFITING LAND IN METRES: 329.45

7. COST FOR RECOVERY PER METRE OF FRONTAGE: $ 1,288.42

8. BENEFITING LAND AND FRONTAGE IN METRES:

LEGAL DESCRIPTION OF PARCEL	FRONTAGE OF BENEFITTING LAND ON PROJECT (m)	COST FOR RECOVERY
Lot: 28 Sec:35-4-6 PL:18549	20.42	$26,309.54
Lot: 26 Sec:35-4-6 PL:18549	20.42	$26,309.54
Lot: 25 Sec:35-4-6 PL:18549	20.42	$26,309.54
Lot: 19 Sec:35-4-6 PL:18549	20.42	$26,309.54

SCHEDULE 6 to BYLAW NO. 8752

1. NAME OF IMPROVEMENT PROJECT: Seaton Road Laneway Upgrade (Laneway south of Seaton Road)

2. CERTIFIED COST OF PROJECT: $ 568,560.00

3. COMPLETION DATE OF PROJECT: October 15th, 2012

4. COST PREPAID UNDER WORKS AND SERVICES BYLAW: $ 209,284.67

5. NET COST FOR RECOVERY UNDER BYLAW No. 8752: $ 118,024.50

6. TOTAL FRONTAGE OF BENEFITING LAND IN METRES: 649.18

7. COST FOR RECOVERY PER METRE OF FRONTAGE: $ 875.81

8. BENEFITING LAND AND FRONTAGE IN METRES:

LEGAL DESCRIPTION OF PARCEL	FRONTAGE OF BENEFITTING LAND ON PROJECT (m)	COST FOR RECOVERY
Lot: 1 Sec: 25-4-6 PL:18935	38.64	$33,841.30
Lot: 14 Sec: 25-4-6 PL:18935	20.15	$17,647.57
Lot: 10 Sec: 25-4-6 PL:18935	20.15	$17,647.57
Lot: 8 Sec: 25-4-6 PL:18935	20.15	$17,647.57
Lot: 345 Sec: 25-4-6 PL:44475	35.67	$31,240.14

SCHEDULE 7 to BYLAW NO. 8752

1. NAME OF IMPROVEMENT PROJECT: 11000 Block Williams Road (From 11020 to Seacote)

2. CERTIFIED COST OF PROJECT: $ 238,697.00

3. COMPLETION DATE OF PROJECT: April 15th, 2015

4. COST PREPAID UNDER WORKS AND SERVICES BYLAW: $ 33,721.14

5. NET COST FOR RECOVERY UNDER BYLAW No. 8752: $ 175,467.67

6. TOTAL FRONTAGE OF BENEFITING LAND IN METRES: 151.91

7. COST FOR RECOVERY PER METRE OF FRONTAGE: $ 1,571.31

8. BENEFITING LAND AND FRONTAGE IN METRES:

LEGAL DESCRIPTION OF PARCEL	FRONTAGE OF BENEFITTING LAND ON PROJECT (m)	COST FOR RECOVERY
Lot: 31 Sec: 36-4-6 PL:25887	24.69	$38,795.53
Lot: 33 Sec: 36-4-6 PL:25887	20.12	$31,614.66
Lot: 34 Sec: 36-4-6 PL:25887	20.12	$31,614.66
Lot: 35 Sec: 36-4-6 PL:25887	20.12	$31,614.66
Lot: 12 Sec: 36-4-6 PL:23314	26.62	$41,828.15

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	December 21, 2015
From:	John Irving, P.Eng. MPA Director, Engineering	**File:**	10-6000-01/2015-Vol 01
Re:	**Local Area Services – North Side Donald Road from and including 6991 Donald Road to and including 7480 Grandy Road and South Side Donald Road from Gilbert Road to and including 6760 Donald Road - Bylaw No. 9277**		

Staff Recommendation

1. That the Local Area Services Program for roadway development to widen pavement, install curb, gutter, sidewalk, street lights and boulevard trees (where ditch has previously been eliminated on Donald Road), be adopted in accordance with Section 211 and 212 of the *Community Charter*; and

2. That Bylaw No. 9277, which authorizes local area services construction at Donald Road, be introduced and given first, second and third readings.

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

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Finance Department	☐	
Law	☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

The *Community Charter* requires that Council adopt a Bylaw to establish a Local Area Service after a LAS petition is successfully circulated and certified.

A Local Area Services Program petition was successfully circulated and certified as sufficient and valid on June 25, 2015 for roadway development to widen pavement, install curb, gutter, sidewalk, street lights and boulevard trees (where ditch has previously been eliminated) along the specific areas of Donald Road – Gilbert Road to Grandy Road as shown in attached Bylaw No. 9277 Plan to Schedule "A".

Analysis

The Local Area Services Program petition has support of 64% of the subject properties. The minimum threshold requirement for public support according to the *Community Charter* is 50%.

In support of the Local Area Service Bylaw, this report confirms that:

1. The estimated cost of the work is $ 1,011,000.00;
2. The estimated share (100%) of the total cost which will be specially charged against the parcels benefiting from or abutting on the work is $1,011,000.00 as a parcel tax based on taxable frontage through general taxation. A detailed listing of the cost per property is attached in Bylaw No. 9277;
3. The charge per taxable front metre against the various parcels is estimated to be $1,729.21;
4. The number of instalments by which the special charges shall be made payable are 15.

Financial Impact

The 2016 Capital Plan includes, for Council consideration, financial funding of $1,011,000.00 for the Local Area Services Program projects funded from the Local Improvement Reserve. If approved, this project will fund the Donald Road Local Area Services Program. This value will be recovered from benefiting property owners over 15 years through a parcel tax identified in the proposed Bylaw No. 9277 included with this report.

Conclusion

It is recommended that this project proceed as financing is in place and the benefiting residents have approved the work by petition in accordance with the *Community Charter*.

Lloyd Bie
Manager, Engineering Planning
(604-276-4075)

Att. 1: Local Area Service Bylaw No. 9277

City of Richmond **Bylaw 9277**

LOCAL AREA SERVICE BYLAW NO. 9277

WHEREAS:

A. Section 211 of the ***Community Charter*** authorizes **Council** to, by bylaw, establish a local area service;

B. **Council** has received a **Petition** requesting provision of the **Service**;

C. The **Corporate Officer** has certified the sufficiency of the **Petition**; and

D. Section 216 of the ***Community Charter*** provides that the costs of a **Service** may be recovered by a **Tax**.

The **Council** of the **City** enacts as follows:

PART ONE: LOCAL AREA SERVICE

1. Service Cost

1.1.1 The cost of the **Service** shall be the actual costs of construction of the **Service**.

1.2. Service Recovery Cost

1.1.2 The full cost of the **Service** shall be recovered by the **Tax**.

1.3. Tax Allocation

1.1.3 The **Tax** shall, as more particularly set-out in schedule A of this bylaw, be allocated amongst the **Parcels** on the basis of **Parcel** frontage area.

1.4 Tax Repayment

1.1.4 The **Tax** shall be imposed on the **Parcels** for a period of 15 years commencing the year after completion of the construction of the **Service**.

PART TWO: INTERPREATION

2.1 In this bylaw, unless the context requires otherwise:

CITY	means the City of Richmond
COMMUNITY CHARTER	means *Community Charter*, SBC 2003, c. 26, as amended or replaced from time to time

CORPORATE OFFICER	means the person appointed by **Council** pursuant to section 148 of the ***Community Charter*** as the Corporate Officer of the **City**, or his or her designate
COUNCIL	means the council of the **City**
LOCAL SERVICE AREA	means the area described in schedule A of this bylaw
PARCELS	means the parcels of land within the **Local Service Area**
PETITION	means a petition made pursuant to section 212 of the ***Community Charter***
SERVICE	means the roadway development to widen pavement, install curb, gutter, sidewalk, street lights, and boulevard trees (where ditch has previously been eliminated) to be constructed within the **Local Service Area**
TAX	means the parcel tax to be imposed on the **Local Service Area** in accordance with this bylaw

PART THREE: SEVERABILITY AND CITATION

3.1. If any part, section, subsection, clause, or sub clause of this bylaw is, for any reason, held to be invalid by the decision of a court of competent jurisdiction, such decision does not affect the validity of the remaining portions of this bylaw.

This bylaw is cited as **"Local Area Service Bylaw No. 9277"**

FIRST READING _____

SECOND READING _____

THIRD READING _____

ADOPTED _____

CITY OF RICHMOND
APPROVED for content by originating dept.
APPROVED for legality by Solicitor

_____ MAYOR

_____ CITY CLERK

SCHEDULE "A"

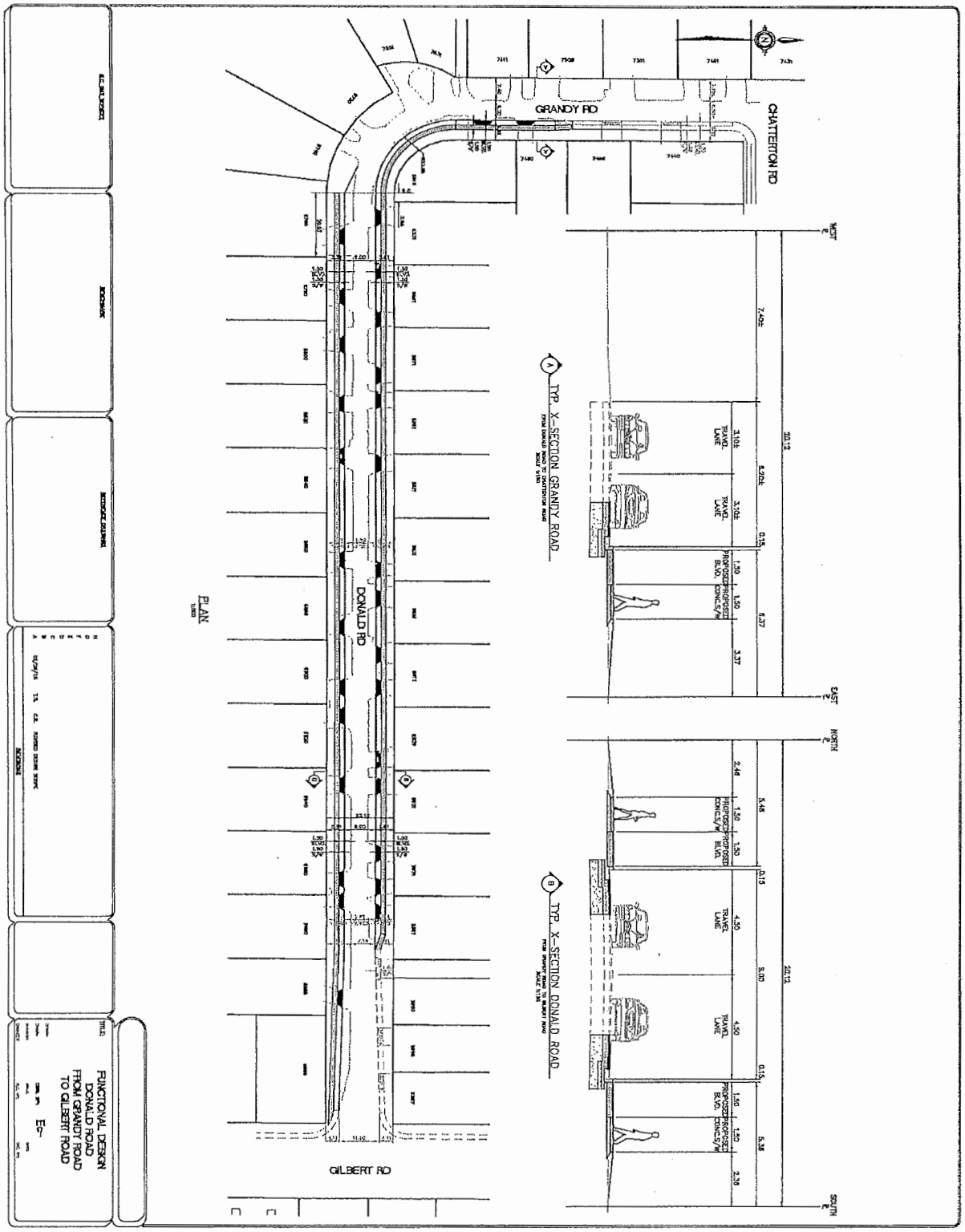
Parcel Description and Tax Allocation

Civic Address/ Legal Description of Property	Estimated Taxable frontage (metres)	Estimated Annual Charge for 15-Year Period	Estimated Single Lump Sum Payment
6988 DONALD RD LOT 233 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 61355	25.48	4,243.94	44,060.28
6986 DONALD RD LOT 235 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 61355	18.29	3,046.38	31,627.30
7480 GRANDY RD LOT 217 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 53364	15.24	2,538.37	26,353.17
6519 DONALD RD LOT 218 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 53364	25.92	4,317.23	44,821.17
6531 DONALD RD LOT 219 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 53364	20.42	3,401.15	35,310.49
6551 DONALD RD LOT 109 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6571 DONALD RD LOT 110 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6591 DONALD RD LOT 111 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6611 DONALD RD LOT 112 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49

Civic Address/ Legal Description of Property	Estimated Taxable frontage (metres)	Estimated Annual Charge for 15-Year Period	Estimated Single Lump Sum Payment
6631 DONALD RD LOT 113 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6651 DONALD RD LOT 114 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6911 DONALD RD LOT 115 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6939 DONALD RD LOT 116 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6951 DONALD RD LOT 117 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6971 DONALD RD LOT 118 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6991 DONALD RD LOT 119 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.42	3,401.15	35,310.49
6980 DONALD RD LOT 120 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6960 DONALD RD LOT 121 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6940 DONALD RD LOT 122 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32

Civic Address/ Legal Description of Property	Estimated Taxable frontage (metres)	Estimated Annual Charge for 15-Year Period	Estimated Single Lump Sum Payment
6920 DONALD RD LOT 123 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6900 DONALD RD LOT 124 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6880 DONALD RD LOT 125 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6860 DONALD RD LOT 126 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6840 DONALD RD LOT 127 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6820 DONALD RD LOT 128 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6800 DONALD RD LOT 129 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6780 DONALD RD LOT 130 SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 14617	20.62	3,434.46	35,656.32
6760 DONALD RD LOT B SECTION 18 BLOCK 4N RANGE 6W NEW WESTMINSTER DISTRICT PLAN 21351	27.87	4,642.02	48,193.12

PLAN TO SCHEDULE "A"



City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	January 4, 2016
From:	John Irving, P.Eng. MPA Director, Engineering	**File:**	10-6000-01/2015-Vol 01
Re:	**Construction Management Services for Utility Capital Projects Stuart Olson Construction Ltd.**		

Staff Recommendation

That the staff report titled, "Construction Management Services for Utility Capital Projects – Stuart Olson Construction Ltd.," dated January 4, 2016, from the Director, Engineering be received for information.

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

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Purchasing	☑	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	**INITIALS:**	**APPROVED BY CAO**

4873315

Staff Report

Origin

In October 2011, staff issued a Request for Expressions of Interest (EOI) to invite submissions from qualified construction management (CM) firms to provide CM services on selected city capital projects. Competitive responses were received from 13 companies. Following an extensive review process, Council approved the award of Contract 4609EOI (Construction Manager for Richmond) to Stuart Olson Dominion (now known as Stuart Olson Construction Ltd.) at the June 23, 2013 Regular Council Meeting. The Contract extends for 5 years, with options for two additional one year extensions at the City's discretion.

Stuart Olson is currently acting as the Construction Manager for Richmond on a number of facility capital projects, including the Minoru Complex and Fire Halls #1 and #3.

The City's utility infrastructure capital projects pose many of the same challenges as the facility capital projects, and would benefit from a Construction Manager in a similar manner. Some of the benefits would include reduced procurement cycle time that would allow the City to deliver projects quicker, increased opportunities for value engineering that could reduce construction costs, and the provision of early cost management tools to identify potential budget issues.

Analysis

Currently, staff are performing the majority of the project management and administrative duties on the City's utility infrastructure capital projects. Over the past few years, the amount of time required to complete these duties has increased due to a number of factors such as:

- Increased frequency and complexity of projects requiring deep excavation in City Centre,
- Increased number of projects requiring approvals from senior levels of government,
- Creation and delivery of the initial stages of the City's district energy utility, and
- Addressing conflicts arising from changes to the provincial diking guidelines.

From time to time, additional resources are required to deliver the utility infrastructure capital program in a timely manner. Past strategies that have been implemented include the secondment of a Project Manager from an external consultant, and procurement of project management services from an outside vendor.

Both of these strategies have met with limited success, primarily because these strategies do not provide the full range of services that a Construction Manager would provide, including on-site staff and estimating services. Retaining a Construction Manager for multiple projects would also provide the continuity required to gain administrative efficiencies. It will also allow staff to focus less on day to day site issues and more on pre-planning and value engineering solutions with an aim to reduce schedule and cost while delivering a superior result.

Based on their performance to date on the facility capital projects, staff believe that Stuart Olson is capable of successfully providing CM services for selected utility infrastructure capital projects.

The Master CM Agreement in place with Stuart Olson is based on a value of $150 million of capital projects over the life of the contract. Adding utility infrastructure projects to this contract will help to ensure that this target value is met by the City.

When the existing contract with Stuart Olson approaches completion, staff will initiate a new competitive EOI process for future construction management services.

Financial Impact

None. The Council approved Capital Budget includes the funds necessary to deliver the utility infrastructure projects.

Conclusion

Stuart Olson Construction Ltd. is currently providing long term construction management services to the City for facility capital projects. Adding selected utility infrastructure capital projects to their scope of work will assist the City in delivering the utility capital program in a timely manner.

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