

Staff Report to Council

Planning and Development

FILE: 11-5280-14/21

REPORT DATE: January 26, 2021

MEETING DATE: February 23, 2021

TO: Mayor and Council

FROM: Anne Berry, Director of Planning and Development

SUBJECT: Waterfront Commons and Shoreline Parks Fraser River Edge
Remediation Plan

CHIEF ADMINISTRATIVE OFFICER REVIEW/APPROVAL:



RECOMMENDATION(S): THAT Council:

- A. Receive for information the staff report titled "Waterfront Commons and Shoreline Parks Fraser River Edge Remediation Plan" dated January 26, 2021; OR
- B. Other.

PURPOSE

To update Council on plans for improvements and habitat remediation along the Waterfront Commons and Shoreline Park portions of the Fraser River foreshore.

☒ Information Report

☐ Decision Report

☐ Direction Report

DISCUSSION

Background:

On November 24, 2020, during the 2021 departmental business plan presentations, Council supported the Parks, Recreation, and Culture Department's proposed capital improvements at Waterfront Commons and Shoreline Park. The project scope included working with Green Teams Canada to remove invasive plants along the Fraser River edge of Waterfront Commons and Shoreline Parks and replant the cleared areas with native species.

Instead, Onni Group (Onni) offered to undertake this same vegetation remediation work in 2021 and maintain it for 2.5 years as part of their provincial requirement to off-set habitat impacts of enclosing ditches along Harris Road. By working with Onni, Parks staff can partner with Green Teams Canada on another priority project and expedite the planned work at Waterfront Commons and Shoreline Parks.

Review of habitat off-setting proposals are managed by staff as an operational matter; however, staff felt Council and the public should be informed about the work plan change given the high profile of Waterfront Commons and Shoreline Parks.

Relevant Policy, Bylaw or Legislation:

The City of Pitt Meadows Official Community Plan encourages protection of foreshore habitat.

The City of Pitt Meadows Strategic Plan 2019-2022 promotes environmental conservation and enhancement.

The City of Pitt Meadows Drainage System Protection Bylaw No. 2266, 2007 requires developers and landowners to apply for a permit to make changes to the City's drainage system. In this case, Onni will need a City permit to culvert sections of the ditches along Harris Road.

The provincial *Water Sustainability Act* requires applications to the province from proponents who wish to make changes in and about a stream. For projects where development cannot avoid or mitigate impacts to on-site riparian habitat, the proponent can apply to enhance or rehabilitate riparian habitat elsewhere (i.e., off-set the habitat).

Analysis:

The development plans for Golden Ears Business Park (GEBP) Phases 3 and 4 include enclosing several ditches with culverts. Several of these ditches support riparian habitat; therefore, the provincial *Water Sustainability Act* requires the developer to undertake riparian habitat rehabilitation or enhancement elsewhere as environmental compensation (i.e., habitat off-setting). Developers must apply to the province for permission to alter habitat areas and include details of their proposed habitat off-setting for review. City approval is only required for environmental compensation on municipal properties.

For GEBP Phase 3 habitat off-setting, Onni has coordinated with City staff and the Katzie First Nation (KFN) to undertake fish habitat enhancement along the North Alouette River that complements KFN's previous work in that area. Onni will also undertake riparian enhancement along Katzie Slough between Airport Way and Hammond Road that builds on previous remediation work. To meet the off-setting requirement for GEBP Phase 4, Onni will remove invasive plants and replant native plants along the Fraser River edge of Waterfront Commons and Shoreline Parks. As well as remediate additional areas along the North Alouette River to provide more high-quality fish habitat.

The attached scope of work (Attachment A) is generally the same invasive plant management work planned by the Parks team and Green Teams Canada. However, the Onni project identifies approximately four times the amount of native plants than what was originally planned, and also includes 2.5 years of maintenance of the replanted area and invasive plants' management. Onni will replace any new plants that do not survive, and a final inspection is required before the City receives the area.

According to Onni's environmental consultant, 2.5 years of maintenance and invasive plant management should provide enough time for the specified native species to become established to the point that invasive plants will not be competitive in the rehabilitated area.

COUNCIL STRATEGIC PLAN ALIGNMENT

- ☐ Principled Governance ☐ Balanced Economic Prosperity ☐ Corporate Excellence
☒ Community Spirit & Wellbeing ☐ Transportation & Infrastructure Initiatives
☐ Not Applicable

Natural Environment. Promote the conservation and enhancement of our natural environment for the benefit of current and future generations.

FINANCIAL IMPLICATIONS

- ☐ None ☒ Budget Previously Approved ☐ Referral to Business Planning
☐ Other

The 2021 Business Plan – PRC – Parks Division, approved by Council at the November 24, 2020 Regular Council Meeting, included a decision package for Waterfront Commons and Shoreline Park Aesthetic Improvements. The decision package proposal identified a budget of \$25,000 annually for 10 years to support a number of improvements to Waterfront Commons and Shoreline Parks. Removal of invasive species and replanting with native plants were identified as a portion of the work plan over multiple years.

A high level staff estimate of the value of the works proposed by Onni totals \$63,200:

Removal of invasive plants			Planting new plants		
2021	10 days	\$20,000	3,840 plants	\$5 each on average	\$19,200

2022	5 days	\$10,000
2023	3 days	\$6,000

4 staff and equipment	10 days	\$8,000
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PUBLIC PARTICIPATION

☒ Inform ☐ Consult ☐ Involve ☐ Collaborate ☐ Empower

Comment(s):

KATZIE FIRST NATION CONSIDERATIONS

Referral ☐ Yes ☒ No

SIGN-OFFS

Written by:

Colin O'Byrne,
Project Manager of Community
Development

Reviewed by:

Alex Wallace,
Manager of Community Development

Diane Chamberlain,
Director of Parks, Recreation and Culture

ATTACHMENT(S):

- A. *Fraser Foreshore Offsetting Planting Plan*, February 17, 2021, prepared by RME Environmental.

FRASER FORESHORE OFFSETTING PLANTING PLAN

Prepared for:



0968778 B.C. Ltd.
200 - 1010 Seymour Street
Vancouver | BC | V6B 3M6

Prepared by:



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February 17, 2021

RME Environmental (RME) has prepared this document in a manner consistent with the normal standard of care exercised by members of the biological and technical professions currently practicing in B.C., subject to the time limits and physical constraints applicable to the Project.

This Document has been prepared for the specific project, site, objective, and purpose described to RME Environmental by Onni Group (0968778 B.C. Ltd). Therefore, the factual data, interpretations, findings, conclusions, and recommendations documented in this report have been prepared for the specific application to this Project only. RME Environmental makes no warranty, expressed or implied, and assumes no liability with respect to the use of the information contained in this report at the subject site, or at any other site, for anything other than its intended purpose.

Unless otherwise stated, the suggestions, recommendations, and opinions given in this report are intended only for the purposes of submission for this specific Project. No other party may use or rely on this report or any portion thereof without express written consent from RME Environmental. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. RME Environmental accepts no responsibility for damages, if any suffered, by any third party as a result of decisions made or actions based on this document.

In order to properly understand the suggestions, and opinions expressed in this report, reference must be made to the whole of the report.

If new information is discovered during the planning or construction phase, including excavations or other investigations, RME Environmental should be requested to re-evaluate this submission and to provide amendments, as required. Our opinions may change if new information is available, or if information we have relied on has been altered.

RME ENVIRONMENTAL

February 17, 2021

Our file: 131_01_15

Darragh Ryan

Project Manager

Onni Group

200 - 1010 Seymour Street

Vancouver | BC | V6B 3M6

Attention: Mr. Ryan

Reference: Riparian Offsetting Planting Plan Fraser Foreshore, B.C. FLNROD Approval File No.: 2008154

1.0 INTRODUCTION

RME Environmental (RME) provides the following Riparian Offsetting Planting Plan (the Plan) in relation to offsetting requirements associated with the piping works at 11208 Harris Road, Pitt Meadows, B.C.

This plan has been prepared to fulfill a portion of the offsetting requirements for the works including the piping of Central and Harris Ditch and riparian removal activities as per requirements by the Ministry of Forests, Lands, and Natural Resource Operations & Rural Development (FLNRO) approval 2008154. In order to meet offsetting requirements, Onni Group (0968778 B.C. Ltd) has been working with RME.

2.0 LOCATION

This Plan has been prepared for riparian offsetting planting on the Fraser River foreshore within the City of Pitt Meadows.

A qualified planting contractor should follow strategies outlined in this document; and guarantee the planted vegetation and maintenance of invasive species for a period of 28 months from completion of planting. The re-planting strategy is presented in the following Appendices:

Appendix I: Suggested Plant Species

Appendix II: Example of Signage to Indicate Environmental Sensitivity of Location

3.0 REPLANTING STRATEGY OVERVIEW

RME has prepared this plan in order to enhance Streamside Protection and Enhancement Areas (SPEAs) where there is a lack of riparian vegetation within important fish habitat within the city of Pitt Meadows (Figure 1). The proposed planting strategy identified two sites (Figure 2) and will include removal of invasive species, ground preparation, planting of riparian vegetation, and installation of posts with protective signs indicating sensitive habitat and no trespassing.

Proposed riparian restoration works will occur within two sites along the Fraser foreshore. Site A has an area of 3,840 m² and will entail removal of invasive reed canary grass and Himalayan blackberries, ground preparation, and riparian planting from the top of bank, north to the Trans Canada Trail. Only shrub species will be planted in the area, as it is a priority of the City to maintain views of the Fraser River from the foot trail. Shrub species will be planted following modified Ministry guidelines.

Site B has an area of 805 m², and is located directly west of Site A. The site is heavily inundated with invasive Himalayan blackberries. The goal for Site B is to remove invasive Himalayan blackberries and help support existing deciduous tree growth. The works will involve mechanically removing blackberry plants and maintenance over a 28-month period, so that existing native seedlings can establish. The growth of deciduous trees from existing seedlings will also help shade and prevent regrowth of blackberries.

The RME planting strategy will aim to restore areas inundated with blackberries and reed canary grass within the SPEA, and will take in consideration the Ministry of Environmental, Lands and Parks information bulletin (March 2008) as a guide.

The considerations to the planting plan are as follows:

- It is the responsibility of the contractor installing the plants to confirm the acceptability of planting adjacent to any service or utility corridors.
- The planting plan outlines species suitable for the location based on existing native stock at the site, or suitability of the species for the two sites.
- The contractor must consider conditions and plant the appropriate species to match the microsite conditions. If the planting specialist is unclear about species suitability, they should advise the Environmental Monitor (EM) in writing prior to commencing with plant installation.
- All plant species must be indigenous, and from the planting list provided in Appendix I.
- Substitutions may be accepted by the EM based on written request and recommendation of the planting contractor's planting specialist.
- All revegetation planting will be completed in the spring period of March 15 to April 15 or the fall during 2021.

- Shrubs will be generally planted on 1 m centres and in clusters (cluster planting on 0.5 m centres is acceptable), provided the overall number of shrubs set out in the revegetation strategy are planted and function as intended.

4.0 PLANTING LOCATIONS

The re-planting strategy shows the approximate areas where specific planting is required within Sites (Figures 1&2) for both sites. Representative photographs of each site are shown in Figures 3&4.

Polygons have been plotted on using Google Earth Maps showing areas for planting (Figure 2). Planting in a grid formation is not visually appealing nor does it represent natural structure. Planting in clusters using preferred microsites produces a more natural appearance and is recommended. Shrubs should be clustered by species or natural species associations and spaced randomly.

The contractor is to meet with the Environmental Monitor (EM), Onni Group, and City representative prior to the commencement of the works, so that the planting contractor can be correctly oriented to the site and understands the expectations for the project as well as risks to the environment while working near a stream.

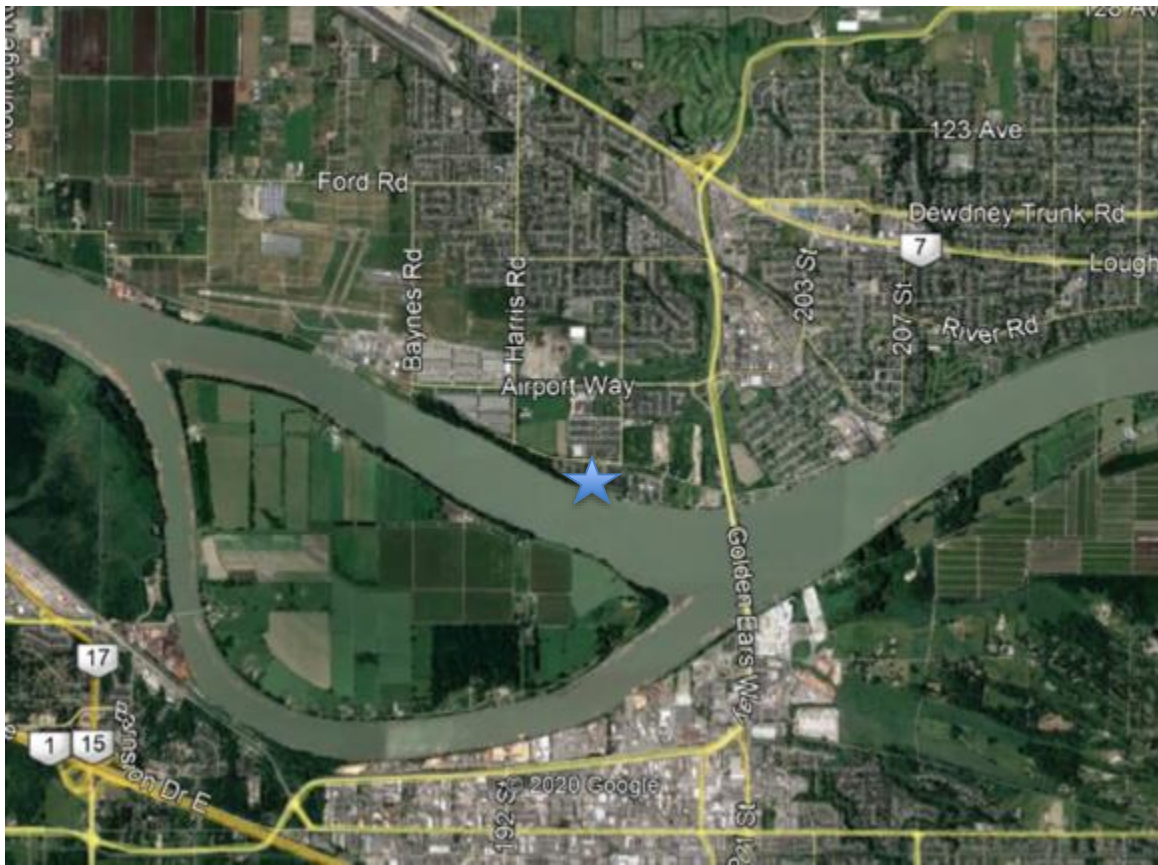


Figure 1. General Location of the proposed riparian offsetting works along the Fraser Foreshore (blue star).



Figure 2. Proposed riparian planting and restoration locations along the Fraser Foreshore: Site A (red polygon) and Site B (blue polygon).



Figure 3. Site A; East End of site.



Figure 4. Site A; West end of site.



Figure 5. Site B.

5.0 SITE PREPERATION AND MAINTENANCE

5.1 Removal of invasive plant species

Both Reed Canary Grass (*Phalaris arundinacea*) and Himalayan Blackberry are present within Site A, while Himalayan Blackberry has inundated Site B. Removal and control of these invasive plant species and any other invasive plants that may become further established in the future is required prior to, during and after the planting is completed to promote suitable growing conditions for installed plants.

5.2 Himalayan Blackberry

- For Himalayan Blackberry, mechanical removal (including hand operation of power tools) is the preferred method of invasive plant control. It is anticipated that the contractor will require the use of machinery (i.e. weed-eaters, mechanical scythes) to effectively and adequately prepare the site.
- All invasive material should be hauled to a disposal facility that accepts the invasive plant.

- Given the persistence of invasive plant species it is recommended that the roots and runners of these plants be grubbed out of the soil.
- It is an offence under the Fisheries Act to introduce any material into water that may be harmful to fish or fish habitat. To protect these waters, herbicide spray is only permitted in areas that are located 10 meters away of any watercourse. All re-vegetation areas on the site are within 10 m of the watercourse; therefore, herbicide is not a viable option for these plants.

5.3 Reed Canary Grass

Reed Canary Grass is an invasive species that can out-compete native grasses within 5 to 6 months of introduction (Ontario Invasive Plant Council, 2012). Reed Canary Grass is found in many streams and ditches within the lower mainland, along with any saturated, abundant, semi-open to open habitat provides good conditions for this species. Options for control measures typically include mechanical control, cultural control, and chemical control (Ontario Invasive Plant Council, 2012). The following provides Best Management Practices (BMPs) and Guidelines derived from the Ontario Invasive Plant Council:

5.3.1 Mechanical Control

- **Pulling** - Pulling can be effective for small populations. If considering pulling as a control method, it must be done at least 2 or 3 times a year for up to 28 months.
- **Mowing/Cutting** - If the stems are not underwater, early (prior to April 1st) and repeated mowing will prevent seed head production or remove panicles before they produce seed. It is not likely to eradicate Reed Canary Grass; however, mowing also exposes the ground to light which will promote growth of native species in the seedbank. Mowing at least twice a year (in early spring and late fall) has been shown to increase the number of native species present and will reduce the density of Reed Canary Grass. Mowing up to 5 times per year may provide better control of Reed Canary Grass. Always avoid mowing near wetlands during the spring and summer (i.e. between April 1st and July 31st), as wildlife is breeding at this time and may be adversely affected.
- **Digging** - If the populations are small or have just moved into an area, digging may eradicate Reed Canary Grass. Care must be taken to ensure that the entire root mass and rhizomes are removed, or it will re-sprout. Take care to clean equipment after digging out Reed Canary Grass and bag all plant material for removal and disposal (see disposal section).
- **Grazing** - Some older cultivars of Reed Canary Grass are high in alkaloids (chemicals which make plants poisonous or unpalatable for grazing). Newer varieties of Reed Canary Grass have been developed which are lower in alkaloids. Dependent on the species, which is being controlled, grazing is an option to reduce the density and weaken stands of Reed Canary Grass (similarly to mowing) which will allow native species to grow amongst it. Grazing is not suggested in wetland habitats.

- **Tarping** - Tarping refers to covering an invasive plant population with a dark material to block sunlight and “cook” the root system. Tarping is not recommended in low light areas. Tarping is most effective when started in late spring and continued through the growing season and is a viable control method for medium to larger infestations. To tarp an area, first cut Reed Canary Grass stems, taking care not to spread any plant pieces to new areas. Next, cover the infested area with a dark coloured tarp or heavy material. Leave some room to allow for growth as the stems may break through the tarp if it is too tight. Weed barriers used by landscapers or heavy tarps are good options. Take care to weigh down the tarp material so it doesn’t blow away but be sure it is still receiving adequate sun exposure. Tent pegs work well as long as the ground isn’t too rocky. The tarp may need to be left in place for more than one growing season to ensure effective control. Monitor for plants growing out from under the edges of the tarp (or through the tarp). As with many of the control measures listed in this document, re-planting the area with native vegetation will help to suppress re-sprouting and assist in preventing new invaders from establishing. Since tarping essentially “cooks” the soil, mycorrhizae (beneficial soil fungi) may need to be added when re-planting. Tarping will have an impact on any native species that are present, so it is best used in areas where Reed Canary Grass has created a dense monoculture.

5.3.2 Cultural Control

- **Shading** - Reed Canary Grass cannot grow in full shade. Planting native shrub cuttings (called live-staking) in infested areas can provide enough canopy cover in the second growing season to suppress Reed Canary Grass. Another option is to plant conifers or other native shrubs which will provide full shade. While the canopy is becoming established, other control measures should be implemented to prevent Reed Canary Grass from competing with the newly planted shrubs. The additional benefit of restoring native shrub cover is that it will in turn lead to a healthier riparian area which will be more resilient to future invasion.
- **Burning** - Where appropriate, prescribed burns can be effective. Especially in locations where there is an existing native species seedbank or native species nearby which can seed into the burnt area. If you are considering burning as a control option, remember to always follow safe burning practices and municipal bylaws.
- **Create Uneven Ground** - Reed Canary Grass dominates more easily on flat sites. Create furrows and humps to diversify the substrate and native plant species will have a better chance of finding conditions that they can compete in.
- **Sawdust** - Application of sawdust mulch around desirable native wetland plants can create conditions that suppress Reed Canary Grass by removing excess nitrogen from the soil, favouring native plants that can survive on lower soil nitrogen levels. The effect is temporary but may allow native plants to mature and resist further invasion by Reed Canary Grass.

5.3.3 Chemical Control

Herbicide Application - Anyone using a pesticide is responsible for complying with all federal and provincial legislation. Most non-domestic (i.e. commercial, restricted etc.) herbicides can only be applied by licensed exterminators. If chemical control is undertaken for Reed Canary Grass, application of herbicide early in the growing season may increase its effectiveness.

5.3.4 Disposal

- Do Not Compost.
- Any plant materials should be placed in black plastic bags. Seal the bags tightly and leave them in direct sunlight for about a week.
- Allow stems and rhizomes/roots to dry out thoroughly before disposing of them.
- The best disposal for Reed Canary Grass plant pieces after drying is to burn them or send them to the landfill.

5.3.5 Restoration of Reed Canary Grass

Upon removal of any invasive reed canary grass, it is important to consider the proper native plant species that will discourage reed canary grass growth within the immediate areas.

- Species such as native Willow and Red Osier Dogwood (*Cornus stolonifera*) can be live-staked and have had success in shading out Reed Canary Grass by their second growing season.
- Re-planting after Reed Canary Grass control should be a high priority in areas where there is no native species seedbank or there are nearby seed source populations of Reed Canary Grass.

5.4 Japanese Knotweed

No Japanese Knotweed was observed within the proposed planting site. However; prevention should be the first plan in dealing with Japanese Knotweed. Per the Invasive Species Council's "Japanese Knotweed Tips", knotweeds reproduce through root and stems. Management options must be carefully evaluated on a site-by-site basis to avoid further spread. Treatment of Japanese Knotweed can require many years. Identification of knotweed species is critical to determine the appropriate response and best practices to prevent accidental spread while conducting control activities. Follow up monitoring and treatments are required with all treatment options. The ISC recommends the following:

- Report infestations toll free: 1-888-933-3722
- Report Online: www.gov.bc.ca/invasive-species
- Do not purchase, trade, or grow knotweed. Instead, grow regional native plants as they are naturally adapted to the local environment and are non-invasive. For non-invasive alternatives, see ISCBC's Grow Me Instead booklet (bcinvasives.ca).

- Maintain or establish healthy plant communities that are resistant to invasion by invasive plants.
- Avoid unloading, parking, or storing equipment and vehicles in infested areas.
- Remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment before leaving the infested area.
- Wash vehicles, including tires and undercarriage, and equipment at designated cleaning sites before leaving infested areas.
- Ensure soil, gravel, and other fill material are not contaminated with knotweed material before moving. If possible, leave all contaminated materials on site during construction activities and follow up with a treatment program; OR carefully transfer contaminated material to a suitable location where it can be treated.
- Minimize soil disturbance during activities and re-vegetate exposed soil as soon as possible. Avoid cutting or mowing knotweed stems as disturbance will encourage spread.
- Take special care when controlling knotweed near streams, or ditch lines, to prevent spread downstream.
- Bag or tarp plants, plant parts, and seeds before transporting to a designated disposal site (e.g. landfill).

5.4.1 Japanese Knotweed Management (Treatment) Options

Japanese Knotweed treatment should occur immediately prior to construction works and plant/soil disturbance in order to reduce transport of seeds and rhizomes. The treatment crew should be appropriately certified to apply pesticides. Per the ISC, treatment can include the following:

5.4.2 Japanese Knotweed Chemical Control

- Herbicide use must first consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels must be followed at all times and all applicators must follow all requirements in the BC Integrated Pest Management Act and Regulation as well as any relevant local bylaws. On public and private lands, follow all herbicide labels and applicable laws. It is recommended to hire experienced professional certified applicators.
- Chemical treatment is a management strategy that requires monitoring and follow up treatments as long as there is re-growth. Generally, knotweed sites can be controlled with herbicide within 3 years. Chemical treatment is most effective between bud formation and when the plant begins to die back after the first frost.
- Herbicides must be systemic for control of knotweed species and may be applied using a variety of application methods depending on the site and product being used including hand spraying, backpack spraying, wipe-on and painting.

- Stem injections have proven to be a highly successful chemical treatment option however currently in Canada, there are no herbicide labels, that permit stem injection for knotweeds.
- Effective herbicides include: imazapyr, glyphosate, triclopyr, aminopyralid. Follow all application rates, site restrictions and setbacks from sensitive areas and water on the labels and in Provincial legislation.

5.4.3 Japanese Knotweed Onsite Disposal

- Treated knotweed canes can be left on site to compost.
- Elevate cut or mowed stems until they are completely desiccated and no longer viable, and not permitted to touch soil or water during the desiccation process. Once completely brown and dry, they may be safely composted, as long as seeds are not present particularly on Bohemian knotweed stems.
- Manually removed knotweed plants, plant parts and seeds must be bagged or tarped before transporting to a designated disposal site (e.g. landfill or transfer station). Note: It is recommended that transfer stations provide disposal bins intended solely for invasive plants. This will ensure the plant matter within the container is transported in a sealed unit and properly disposed of at the landfill.
- Deep burial (5 meters or more in depth below fill) under compact fill is also an option, however, long-term monitoring for re-growth would still be necessary. The following methods outlined in Section 5.4 of the United Kingdom's Managing Japanese Knotweed on development Sites (Version 3, amended in 2013) the knotweed code of practice outline methods for burial of Japanese knotweed at 5 meters depth.
 - Soil containing Japanese knotweed material and burnt remains of Japanese knotweed may be buried on the site where it is produced to ensure that you completely kill it.
 - It is advisable to apply a non-persistent herbicide at least once to reduce the growth of infective material. It is important that a non-persistent herbicide is used, such as glyphosate, because persistent chemicals will contaminate the material for a while. The period of time during which the herbicide is 'active' is described on the product label. Material cannot be buried during that period of activity. Burying material treated with a persistent herbicide may contaminate groundwater. If you are in doubt whether the herbicide is still active, you should consult with the supplier of the product or the contractor who applied it.
 - Bury material on-site at least 5m deep, unless burial will occur in accordance with section 4.1 of the United Kingdoms Knotweed Code of Practice (not anticipated for this project).
 - On-site burial location should be accurately mapped to prevent potential disturbance and re infestation, and that you advise any future owners of its position.
 - Japanese knotweed is likely to survive for many years, depending on how effective the treatment was before it was buried. It is essential that you do not

- bury it where landscaping, installing services, erosion from a watercourse or subsequent development will disturb it.
 - It is only acceptable to bury Japanese knotweed material if the soil is otherwise uncontaminated. Any other waste, such as rubble or discarded household items, must be separated and removed during excavation. If contaminants cannot be separated, it cannot be buried.
- Soil contaminated with knotweed plant material or seed should be handled carefully and either undergo deep burial or disposed of at a suitable disposal site.
 - Disposal sites should be far enough away from water and drinking wells to enable herbicide treatment. Disposal sites should be monitored and treated as needed.
 - Excavation is possible however great care must be taken to remove the full extent of roots. Soil must be disposed at a contaminated materials site (very expensive) or quarantined on site and treated with pesticide.
 - Disposal options for knotweed root/rhizome material are limited and should be left on site wherever possible.
 - Burning and composting at the original site is not recommended as extreme temperatures are required.

5.4.4 Japanese Knotweed Off Site Disposal

Invasive plant material removed from the soil must be disposed of off-site at an approved landfill or incinerator that accepts invasive species. The “approved” facility must be informed of what species is being transported. Invasive plant material should be placed in black garbage bags before transportation to the approved disposal location.

A receipt for the disposal of invasive plant material will be required for record of disposal. There are three disposal locations on the Lower Mainland that will accept Japanese Knotweed (costs vary):

- Harvest Power in Richmond, B.C.;
- Net Zero Waste in Abbotsford, B.C.;
- Vancouver Landfill, 5400 72nd Street, Delta, BC. Accepts knotweeds and soil for deep burial only (additional charge). A Waste Assessment Form must be completed; and,
- B&B’s Deep Burial Pit located at 1080 Bradner Road, Abbotsford.

5.4.5 Equipment

- All equipment used to remove knotweed; including personal gear, clothing, machinery and vehicles should be clean and free of knotweed foliage and seeds (ISCBC, 2014).

Equipment should be cleaned at designated cleaning sites prior to demobilization from sites contaminated with Japanese Knotweed (ISCBC, 2014).

- Soil disturbance should be minimized as much as possible during construction in areas containing Japanese Knotweed, or that have been treated for Japanese Knotweed.
- Exposed soil where construction will not occur, should be covered with mulch or re-vegetated as soon as possible with native species that will out-compete Japanese Knotweed (ISCBC, 2014). Suggested native species include (ISCBC, 2013) Red elderberry (*Sambucus racemosa*); Oceanspray (*Holodiscus discolor*); Red-osier Dogwood (*Cornus sericea*); and, Saskatoon berry (*Amelanchier alnifolia*).

5.4.6 Contact the Facilities Beforehand to Confirm They Can Accept And Properly Handle The Material

All soils disturbed within 20 m of any Japanese Knotweed must remain within the area of contamination. All contaminated soils that cannot be stored within the contaminated area must be removed and disposed of off-site. If soil contaminated with invasive plant material must be removed from site for disposal the following measures shall be taken:

- Transportation measures and disposal site locations for contaminated soils may require approval from the City of Surrey, prior to the transport of material;
- An approved disposal site will be established prior to transportation;
- All contaminated soil will be covered with a tarp during transportation; and,
- Receipt for the disposal of all contaminated soils will be required for record of disposal.

5.4.7 Japanese Knotweed Follow-up After Removal

Post construction monitoring of the site should be completed to confirm that the spread of Japanese Knotweed has been eradicated. All disturbed and undisturbed areas within the identified sites should be monitored post-construction for signs of re-growth (ISCBC, 2014).

If Japanese Knotweed is observed at the site during post-construction monitoring, it should be manually removed from infested sites following the above noted procedures every six months for the period required in order to determine that the plant has been eradicated at this location.

5.4.8 Japanese Knotweed Post Monitoring Requirements

The following Environmental Monitoring Requirements should be implemented:

- the Contractor will notify the EM of works at least seven days prior to commencement of works;
- the EM will perform monitoring as required to ensure that the removal and disposal of Japanese Knotweed is being completed in accordance with the plan; and,

- a copy of this Japanese Knotweed Management Plan must be kept onsite at all times for the works.

A preconstruction meeting will be held between the Contractor and EM to review the Japanese Knotweed Management Plan and environmental expectations.

5.5 Soil Preparations

The following soil preparations are recommended:

- Remove or maintain Reed Canary Grass and Himalayan Blackberry using the suggested protocols for each specific invasive species above.
- Any large mature deciduous and coniferous trees along a streambank provide a future source of large organic debris in the aquatic environment and must remain within the SPEA. Fallen dead trees and snags, eroded root structures and logs are the large organic debris (LOD) that provides stream bed stability, cover and habitat for young fish and should not be removed from the SPEA.
- The ground must be prepared prior to planting to promote survival of installed plants.
- Addition of compost or topsoil may be required to enhance planting conditions. Compost can be added in a volume: volume ratio of approximately 25-30% if soil amendment is required. Compost must be thoroughly worked into the soil by scarifying the boundary layer between the subsoil and topsoil.
- Compost used to amend soils should have an organic matter content between 35% and 65% with a carbon: nitrogen ratio below 25:1.
- The planting contractor is to determine the appropriate planting depth and microsite conditions for each species planted (i.e. dry, moist or wet).

5.6 Maintenance Schedule

- To ensure maximum survival rates a watering schedule and twice annual invasive plant removal should be established and included in the planting contractors' contract to increase the probability of plant survival.
- Maintain invasive species per protocols noted above.
- RME recommends that the project owner retain the services of a planting contractor who will provide ongoing maintenance (watering and invasive species control) and will guarantee plant survival over the recommended 28-month monitoring period.
- Control of all invasive plant species will be required. The contractor may have to conduct twice annual control inspections, using mechanical methods (by hand or hand operated power tools).

- The contractor is to institute a watering program through the dry summer months (May to September) for the first- and second-year following plant installation.

6.0 Plant Species Suitability and Plant Locations

6.1 Planting Specifications

- All riparian plantings should be based on one shrub per 1 square meter density.
- Shrubs must be at least 1-gallon pot size.
- All plants must be of guaranteed nursery stock and comply with the B.C. Landscape and Nursery Association standards for container grown plants.
- The botanical name should be used when ordering stock to ensure that the desired native species is being purchased.
- **Each specimen should be tagged with the botanical name and the tag should be left attached after planting.**
- All native plants must have been propagated in a nursery and not taken from wild sites.
- The contractor shall provide the EM with a list of plants and corresponding pot sizes purchased from the plant supplier, and have this list approved by the EM prior to delivery of the material to the site.
- All materials that have been specified for individual areas shall be healthy, with well-developed root systems and top growth.
- All plants grown in a container must have been grown for a length of time necessary to permit the roots to fill and hold the soil within the container, as required by Canadian Nursery and Landscape Association Standards for nursery stock.
- All plant materials shall be free of disease and insect infestation and the following defects at all times:
 - broken tops
 - torn roots
 - abrasions of bark on trunk and branches
 - dried out root systems
 - prematurely opened or damaged buds
 - dry, loose or broken ball of earth
 - evidence of heating, moulding, or freezing
 - thin, poor root or top systems
 - abnormal leaf colour

6.2 Soil Stabilization Seed Mix Application

Immediately, upon completion of riparian planting:

- Following the installation of the riparian plants, a "grass" seed mix, favouring *legumaceous* (i.e. clover) seeds and low growing grass seed shall be applied to all disturbed areas. A seed mix similar to the following is recommended:
 - 30 % alsike clover, 25% creeping red fescue, 15% white clover, 15% red clover and 15% birdsfoot trefoil.
 - Seed mix is to be applied at a rate of 25 kg/ha (1500 to 3000 live pure seeds per square meter).
- The seed mix is to be delivered through hydraulic application, and the hydraulically applied mixture must include a tackifier and fertilizer.
- Hydraulic application must not introduce fertilizer, seed or tackifier into the wetted perimeter of the Fraser River.
- The area with seed mix applied will be watered weekly by the contractor in the period of August 1-September 30 within the first-year construction period.
- The contractor will provide the EM with a receipt from the seed supplier identifying the species and % species composition of the stabilization seed mix, for approval, prior to application of the hydraulic seed mix, tackifier and fertilizer.

6.3 Planting Species

Planting will occur in Site A, which will include species chosen based off existing native species composition along the Fraser Foreshore, adjacent to the site.

The list identifies suggested species for the site and is included in Appendix I.

7.0 PROTECTIVE SIGNAGE

Requiring City approval, standard signage indicating that the area is environmentally sensitive (Appendix II) should be installed on posts along the SPEAs within the site at a minimum of either one sign per 10-15 m spacing, or as determined by the City's park department.

8.0 SURVIVAL RATES AND POST-CONSTRUCTION SITE INSPECTIONS

To ensure compliance with this plan, the Ministry requires follow-up planting inspections be undertaken for a period of 28 months after planting has been completed to ensure survival.

Plant survival of 100% for shrubs is required. Should this survival rate not be achieved, the project owner or its planting contractor would be responsible for the costs of replacement planting prior to the next planting season (i.e. the spring or fall after the most recent inspection). Contractual

responsibility for planting survival lies with the planting contractor /specialist, per their agreement with the project owner.

Bi-annual inspections over a 28-month warranty must be undertaken by a qualified environmental professional. An annual report outlining plant survival and any requirements for replanting will be completed, as well as a final report 28 months after planting has been completed to confirm plant survival and completion of the project.

8.1 Revegetation maintenance and plant survival guarantee

- The contractor is to retain the services of a planting specialist to assist in procuring appropriate stock and to plant the vegetative material and maintain the vegetation in a professional manner. Responsibility for achieving planting survival targets lies with the contractor and their planting specialist.
- The contractor will guarantee plant survival for a 28-month monitoring period after plant installation.
- The number of planted shrubs includes a 10% contingency for potential survival attrition.
- During this 28-month warranty period the contractor will be responsible for maintaining plant survival of 100% for shrubs shown in this plan.
- The following maintenance activities are required in the 28-month period after plant installation:
 - Retain a QEP to complete post-construction plant maintenance inspections
 - Complete inspections twice per annum by May 1 and September 1.
 - Report results of the inspections by May 15 and September 15.
 - Control competing vegetation (ie. Himalayan blackberry and reed canary grass etc. twice per year.)
 - Watering plants weekly June 15 to September 15 in the first summer after plant installation.
 - Maintain survival rates of 100% for shrubs.
 - Replace of dead or missing shrub stock in the spring and fall season.
- Should plant survivorship targets not be achieved, the contractor is required to bear the costs of replacement planting and whatever maintenance efforts (control of competing plants, watering, soil preparation, etc.).
- Survivorship targets are to be met not later than the growing season after the contractor receives the plant survivorship report from their QEP.
- Contractor claims for extra work based on plant mortality, species composition, soil type, soil-moisture conditions, competition from invasive species, or planting density will be not be accepted.

9.0 AMENDMENTS TO THE PLANTING STRATEGY

This re-planting strategy has been prepared for the purposes of improving riparian fish habitat. RME does not assume any responsibility for plant survival. RME advises that a planting specialist experienced in native plant supply and installation carefully review this document and site to confirm the suitability of the recommended re-planting strategy (plants, soil conditions, topography, substrate, clay layers etc.) before planting.

Site specific recommendations may not be deemed appropriate by a planting or vegetation specialist. Alternate plant species are acceptable provided they are native species. Amendments to this re-planting strategy are acceptable based on-site specific conditions encountered onsite, plant species availability and/or recommendations from the planting specialist. The planting contractor must notify RME before amending the re-planting strategy. Amendments will be considered provided that RME and Onni Group are consulted prior to any proposed change to the plan.

10.0 MITIGATIVE PROCEDURES WHILE WORKING IN THE PLANTING AREA

The following is a list of mitigative procedures to protect fish and fish habitat and environmentally sensitive areas (SPEAs). All mitigative measures must be followed by the contractor(s) when working in the planting area. It is the responsibility of the contractor to ensure the following construction mitigation terms and conditions for this project are followed and kept onsite throughout the project.

10.1 Mitigative items related to sediment control

- Use of heavy machinery to prepare the site will only be permitted under direction of the EM. Machinery must use environmentally sound fluids.
- Any work involving use of machinery that results in a disturbance to soils must be suspended during substantial rainfall (substantial rainfall will be determined by the EM).
- Exposed soils with gradients in excess of 20% (soil piles or ground surfaces that are immediately adjacent to a watercourse) must be covered with straw mulch or biodegradable erosion control blanketing (ECB). ECB must be well anchored during the entire project.
- Work will be undertaken and completed in such a manner as to prevent the release of hydrocarbons, herbicides, silt, sediment or sediment laden water, or any other deleterious substances into any ditch, watercourse, ravine or storm sewer system.
- The planting contractor will be responsible for procuring and installing all erosion control measures necessary to prevent sediment transport to fish habitat during the works. The standards for sediment and erosion control outlined in the "Land Development Guidelines

for the Protection of Aquatic Habitat" and the Ministry of Environment's "Best Practices for Urban and Rural Land Development" will be followed.

- The EM will ensure that appropriate sediment and erosion control measures are in place and functioning as intended during construction to prevent such incidences from occurring.
- All park spaces outside of that described in Site A and B (including lawns, foot paths and accessways) should be restored to the original state if they are disturbed by machine use and access.

10.2 Mitigative items related to machine use

- All construction equipment and machinery used in preparing the planting area must be mechanically sound, clean, and free of leaks or excessive oil and grease.
- A spill containment kit will be on-board each operating machine.
- Operators will be held responsible to ensure that no potential exists for oil, grease or other deleterious substances to enter any environmentally sensitive areas.
- No re-fueling or servicing of any machinery is to take place within 30 m of any ditch, watercourse, ravine or storm sewer system.

10.3 Mitigative items related to the management of other deleterious substances

- Use of treated municipal water is not recommended where this water can discharge to storm sewers, creeks, or ditches as compounds such as chloramine are extremely toxic to fish if it enters their habitat.
- It is the responsibility of the contractor to confirm whether water to be used onsite has been chemically treated.
- No fuels, lubricants, construction wastes or other deleterious substances may enter any ditch, watercourse, ravine or storm sewer system. Any special wastes must be disposed of in accordance with the provisions of the BC Waste Management Act.
- A spill containment kit will be readily accessible on-site in the event a deleterious substance is released into the environment. Any spill of a substance toxic to aquatic life of reportable quantities will be immediately reported to the Provincial Emergency Program 24-hour phone line at 1-800-663-3456.
- Material excavated by contractors and any overburden or invasive plant material remaining after site preparation will be moved off-site and disposed of at an approved and legal dump site. These materials will be disposed of in such a manner as to prevent its entry into any watercourse, floodplain, ravine, or storm sewer system.

11.0 CLOSURE

I trust this information is satisfactory for your purposes at this time.

Best Regards,

RME ENVIRONMENTAL

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Senior Aquatic Specialist



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Environmental Technician



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APPENDIX I SUGGESTED PLANT SPECIES

SITE A PLANTING SPECIES

Location	Area (m²)	
Site A - Open grass vegetation area	3,840	
Plant type	Required Plant Numbers	Description
Shrubs	3,840	Plants are shrubs at 1 per 1 m²
Total No. Plants	3,840	

Common Name	Scientific Name	No. Species
Hardhack	<i>Spiraea douglasii</i>	400
Oregon Grape	<i>Mahonia aquifolium</i>	450
Pacific Nine-Bark	<i>Physocarpus capitatus</i>	450
Red Elderberry	<i>Sambucus racemosa</i>	100
Red Osier Dogwood	<i>Cornus sericea</i>	450
Salmonberry	<i>Rubus spectabilis</i>	590
Sitka Willow	<i>Salix sitcchensis</i>	800
Thimble Berry	<i>Rubus parviflorus</i>	300
Snowberry	<i>Acer circinatum</i>	300
TOTAL		3,840

APPENDIX II

STREAMSIDE PROTECTION & ENHANCEMENT AREAS SIGNAGE EXAMPLE

The following is recommended for environmentally sensitive signage for a Streamside Protection and Enhancement Area (SPEA). The signs use the following criteria unless otherwise agreed to by the municipality:

1. Dimensions of 27.0 cm x 12.5 cm and the format and information must be as shown on the next page.
2. Must be made from sign grade aluminium with a white reflective surface or a white enamel surface.
3. Dark black lettering using either premium 7-year 2 mil vinyl lettering, or screen-printed lettering.
4. Holes at the corners, or as otherwise required, so that they can be wired or nailed onto posts.
5. Altered to eliminate sharp corners.
6. One sign must be posted along a post every 10-15 meters, or as directed by the City's park department.
7. Signs must be readily visible to the users of the affected property.

Environmentally Sensitive Area

DO NOT DISTURB

This **Environmentally Sensitive Area** is protected by municipal, provincial, and federal legislation. Please help protect it.

- Do not disturb native vegetation
- Keep pets out
- Do not dispose of yard waste or litter
- Do not place structures or play equipment

For more information call 604-465-5454