OIPC File No: F23-94642
COV File No.: 04-1000-20-2023-432

June 9, 2025

s.22(1)

Dear s.22(1)

Re: **Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")**

Further to our initial response letter dated June 7, 2024, I am responding to your request of July 19, 2023 under the ***Freedom of Information and Protection of Privacy Act*** for:

Records relating to PS20220050-ENG-RFP – Supply & Delivery of Soil Cell and Deeproot/Silva Cell tender documents, specifically:

1. **"Quality Control Process" as per Addendum #2;**
2. **"Commercial Proposal" submitted as part of this tender;**
3. **"Declaration of Supplier" Tables 1, 2, and 3;**
4. **"Code of Conduct" compliance document;**
5. **"Proponent References Questions" as indicated in Group 1.1 through Group 11.1.1;**
6. **"Environmental Sustainability" document;**
7. **"Social Sustainability" document; and**
8. **"Technical Proposal" sections 1.1.1 thru to 1.1.12.**

Date range: August 1, 2022 to April 15, 2023.

All responsive records are attached*. Some information in the records has been severed (blacked out) under s.15(1)(l), s.21(1), and s.22(3)(d) of the Act. You can read or download these sections here: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96165_00.

*Please note: the City was informed by the OIPC that mediation with a third party is now complete.

Under Part 5 of the Act, you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your FOI request by writing to: Office of the Information

& Privacy Commissioner, info@oipc.bc.ca or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number (2023-432); 2) a copy of this letter; 3) a copy of your original request; and 4) detailed reasons why you are seeking the review.

Yours truly,

[Signed by Cobi Falconer]

Cobi Falconer, MAS, MLIS, CIPP/C
Director, Access to Information & Privacy

If you have any questions, please email us at foi@vancouver.ca and we will respond to you as soon as possible. You may also contact 3-1-1 (604-873-7000) if you require accommodation or do not have access to email.

Encl. (Response Package)

:kt

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1.1.1
Provide a brief executive summary of your Proposal

DeepRoot develops solutions to enhance urban forests and surrounding watersheds in city streets, parking lots, campuses, and other heavily paved areas. Silva Cell, our flagship product, is an underground framework for containing lightly compacted soil that supports large trees and absorbs runoff from rain, improving air and water quality, reducing energy loads, mitigating heat island effect and nurturing trees for a long life in their communities. Based in San Francisco, with a technical design office in Minneapolis and satellite locations in Vancouver, and London, we have decades of experience helping trees thrive in cities, from the Olympic Village in Vancouver to Wembley Stadium in London and more than 25 countries around the world.

DeepRoot pioneered the use of suspended paving systems to integrate trees, soil and stormwater with the introduction of the patented Silva Cell system in 2007. DeepRoot Canada believes that we have the best combination of Made in Canada product, price, design services, construction training, project support and experience to meet and exceed the Soil Cell RFP requirements.

DeepRoot's Canadian and USA manufacturing facilities are ISO 9001 quality rated, s.21(1) [redacted]

DeepRoot Canada has supplied Silva Cells to more than 1,000 projects throughout Canada since 2007. We have extensive experience supporting large, complex multi-year projects, such as the Waterfront Toronto redevelopment, Vancouver's 2010 Olympic Village, and the ongoing redevelopment of the Seattle Waterfront Alaskan Way viaduct. Additionally, DeepRoot Canada has worked closely with the City of Vancouver's Green Infrastructure Group on the 2nd Avenue and Richards Street Green Infrastructure projects. Our local Vancouver office staff can provide immediate response to any issues that may arise during the delivery and installation process.

DeepRoot Canada and the Silva Cell provide the strongest combination of quality, value, and customer service to ensure success for the City of Vancouver projects and deliver meaningful green infrastructure that pays ecological dividends for years to come.

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1.1.2 Work Plan:
Detail the sequential process by which the Proponent proposes to undertake the work. The Proponent's work plan should make reference to the Scope of Work as appropriate. Describe how your Proposal is responsive to the Scope of Work.

Work Plan

If the City of Vancouver (client) awards the Soil Cell supply contract to DeepRoot, we will implement the following work plan.

1. Negotiate a delivery schedule for the Soil Cells referenced in the RFP for the 40 trees.
2. Work with the Client to deliver the Silva Cells as per the agreed upon delivery schedule, to the project site or City storage facility as needed.
3. Provide design assistance and installation training support to the Client's staff for Silva Cell projects. DeepRoot design team has extensive experience integrating the Silva Cells into Green Infrastructure projects around the world, especially stormwater.
4. Schedule Pre-Construction Meetings and Installation Training to the Client's staff to facilitate the installation of the Silva Cells.
5. Schedule site visits during the installation of the Silva Cells for documentation and Quality Control purposes as well as troubleshooting any issues that may arise.

The above Work Plan meets the Scope of Work by providing all the critical steps to ensure a sucsseful project, from initial communication to final project sign-off. Our process, local staff, Made in Canada product and deep technical experience have trained us to be able to provide the highest quality experience from start to finish.

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Innovation: 1.1.3

Notwithstanding any other provision hereof, the City welcomes Proposals respecting innovative or novel approaches to the City's objectives and requirements and may consider value-creating Proposals that derogate from the Scope of Work. Provide details on any proposed innovative approaches to meeting the City's requirements.

Design Assistance

As outlined in our Proponent Experience submission, DeepRoot has a team of experienced designers and technical staff who have worked on thousands of Silva Cell projects over the past ten years. If DeepRoot is the successful proponent, we would encourage collaboration between our Technical Team and the City of Vancouver Green Infrastructure Group (or other design departments) to assist with the design and optimizations of the Silva Cells within the LID projects.

The significant project and technical experience of the DeepRoot Technical Team can translate into significant savings in both design time and construction productivity. We have successfully worked with City staff on both the 2nd Ave. Green Infrastructure Demonstration site and the Richards Street LID project, assisting the Green Infrastructure Group with the design and optimization of the Silva Cells in these projects.

Financial Terms

DeepRoot's standard payment terms for customers require a 50% deposit prior to shipping with Net 30 Days payment requirements. If DeepRoot is the successful proponent, we will waive the 50% deposit requirement. All invoices will be Net 30 days.

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1.1.4 Proponent Experience:

Describe the type of entity (for example, individual, corporation, partnership, sole proprietorship) and if a joint venture, clearly state this and state who the joint venture parties are and identify who is acting as the lead.

(i) Describe the company/entity history, business locations, size, and number of employees.

Since 1992 family owned and operated DeepRoot has been providing innovative solutions to critical urban landscape issues including climate change mitigation, stormwater management and urban heat island effect. By harnessing the power of trees, soil and stormwater we are able to provide green infrastructure at scale. DeepRoot is headquartered in San Francisco, California with technical staff in Minneapolis, Minnesota. DeepRoot Canada is located in Vancouver with additional staff in Ontario. Finally, our London location service UK and European sales.

DeepRoot Corporate Structure:
DeepRoot Green Infrastructure, LLC. (USA) Limited Liability Company, registered in California, USA.
Office Locations: San Francisco, CA, and Minneapolis, MN.
Employees: 19

DeepRoot Urban Solutions, Ltd. (UK) Limited Liability Company, registered in UK. Wholly owned subsidiary of DeepRoot Green Infrastructure.
Office Locations: London
Employees: 3

DeepRoot Canada Corp. Registered in Nova Scotia and extraprovincially registered in BC. Wholly owned subsidiary of DeepRoot Urban Solutions.
Office Locations: Vancouver
Employees: 4

(ii) Provide key personnel (and their qualifications) that will be performing the work on this project.

Michael James – General Manager DeepRoot Canada – Project Lead

s.22(3)(d)

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Aileen Ocampo - Canada Sales and Operations Coordinator

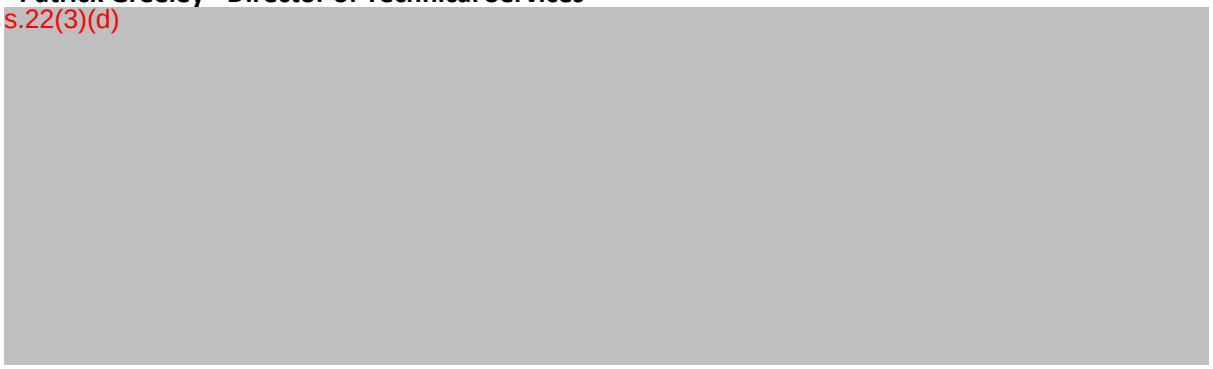
s.22(3)(d)

DeepRoot Technical Services: Minneapolis, MN

DeepRoot's Minneapolis office provide technical design, review, training, and pricing support to the entire DeepRoot organization and our clients.

Patrick Greeley - Director of Technical Services

s.22(3)(d)



Nicole Peterson - RLA, Technical Services Manager

s.22(3)(d)

Tony Slusser - Landscape Architecture and Engineering Technician

s.22(3)(d)

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Livia Twohig - Landscape Architecture and Engineering Technician
s.22(3)(d)

Truman Ingersoll - Project Coordinator
s.22(3)(d)

Rebecca Stevens: Director of Operations
s.22(3)(d)

Katie Webb: **Operations Manager**
s.22(3)(d)

(iii) Provide details, where available, of Proponent's experience with:

- Environmental Compliance
- Construction Deadlines
- Operational Safety

- Environmental Compliance – N/A

- Construction Deadlines.

  DeepRoot has worked closely with construction clients and supplied products in more than 25 countries around the world to ensure that we deliver product on time and provide the necessary support for contractors to meet construction deadlines. s.21(1)

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s.21(1)

DeepRoot has the manufacturing and operational flexibility to supply projects on-time and on-budget.

- Operational Safety

  Safety is a priority for DeepRoot in all facets of our work. This particularly applies to our staff who go to construction sites. They always have the proper PPE and familiarize themselves with the project safety protocols.

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1.1.5 Reference Projects:
Provide information on reference projects to demonstrate the Proponent's experience and capabilities. Information may be provided on up to three (3) projects, and should focus on projects with similar supply agreements as described in the Scope of Work). For each reference project, provide the following information, including additional information as necessary, within the submission: (i) Project name, location, and client; (ii) The scale of the project (e.g. demonstration, commercial); (iii) Unit size and number of units; (iv) Maintenance and warranties provided; (v) Status of facility (e.g. operating, under construction); (vi) Major problems, market adaptations and lessons learned.

Waterfront Toronto Bulk Buy Agreement

Project Name(s): Multiple projects including Queens Quay and East Bayfront to Bonnycastle Street. See following for more details Waterfront Toronto Silva Cell projects

Project Locations: Multiple locations in Waterfront Toronto Redevelopment

Client: Waterfront Revitalization Corporation (Waterfront Toronto)

Project Scale/Type: Commercial

Unit Size/Quantity: Variable sizes used. Approximately 5,400 total Silva Cell systems providing more than 15,200 cubic meters of soil volume for tree root growth and stormwater management.

Maintenance/Warranty: No maintenance requirements. Standard warranty provided.

Status of facility: Complete and operating with multiple awards for the project.

Major problems, market adaptations and lessons learned: See below narrative.

In December of 2012 Waterfront Toronto (WFT) requested that DeepRoot Canada enter into a Bulk Buy agreement for the purchase of Silva Cells to be used on several of their development projects. WFT took possession of the Silva Cells in 2013 and warehoused them in their own facility, providing them to the commercial contractors that were selected for the various projects and phases. We provided technical support, design review and installation training and problem solving during the seven years from the initial product supply to the final project installations in 2020. There were no major problems reported. Market adaptions and lessons learned from the installation helped to evolve the Silva Cell design to eliminate the beams on multiple level installations and increase the amount of spacing from 75mm to 150 with the release of the Silva Cell 2. This evolution enables a wider utility corridor and more flexibility in design and field fitting to work around obstacles and irregularly shaped design features.

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City of Calgary: 2nd Ave NW

Project Name(s): 2nd Ave NW See 2nd Ave NW Calgary Demonstration for more project details

Project Locations: 2nd Avenue, Calgary, AB

Client: City of Calgary

Project Scale/Type: Demonstration

Unit Size/Quantity: Silva Cell 2x. Approximately 270 Silva Cell systems for seven trees, providing more than 153 cubic meters of soil volume for tree root growth and stormwater management.

Maintenance/Warranty: No maintenance requirements. Standard warranty provided.

Status of facility: Complete and operating

Major problems, market adaptations and lessons learned: See below narrative.

In 2013, the Calgary Water Dept. engaged DeepRoot to design and provide Silva Cells for a stormwater proof of concept demonstration project on 2nd Ave NW. The project demonstrated how street and sidewalk water could be captured in the city's tree pits and then into the Silva Cells under the sidewalk, providing Green Infrastructure services. There were several lessons learned and future process adaptions made primarily due to the nature of the design and supply contract, primarily around communication with the local utility company, and specific location of the light pole foundations and project drawing revisions. In addition to design and stormwater modeling we provided installation training and oversight to the City's contractor for the installation of the Silva Cells. This project is still functioning as designed.

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City of Calgary: Calgary Water Centre

Project Name(s): Calgary Water Centre

Project Locations: Manchester Yard, Spiller Road SE, Calgary, AB

Client: City of Calgary

Project Scale/Type: Demonstration

Unit Size/Quantity: Silva Cell 3x. Approximately 330 Silva Cell systems, providing more than 280 cubic meters of soil volume for tree root growth and stormwater management.

Maintenance/Warranty: No maintenance requirements. Standard warranty provided.

Status of facility: Complete and operating

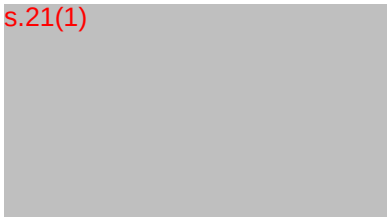
Major problems, market adaptations and lessons learned: See below narrative.

In 2014, the Calgary Water Dept. engaged DeepRoot to design and provide Silva Cells for a stormwater demonstration project at the Calgary Water Center. The Water Center is not only the headquarters for the Water Dept., it is also used as a demonstration facility for both city and private consultant staff to showcase Green Infrastructure applications.

The project demonstrated how street and sidewalk water can be captured in the city's catch basins and tree pits and then directed into the Silva Cells under the sidewalk, providing Green Infrastructure services. DeepRoot designed the complete project, including stormwater modeling, Silva Cell design and monitoring systems. DeepRoot also provided installation training and oversite to the city's contractor for the installation of the Silva Cells.

This project is still functioning as designed. There were two different stormwater collection applications used on this project. Lessons learned were that it is better to capture stormwater in the CB than in the tree pits. It is easier to manage the TSS in the CB.

s.21(1)



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1.1.6 Delivery Lead Time & Local Storage:
The proponent shall provide the typical lead-time from the order date, as well as any special offers being made to the City as part of this contract. Please provide the source of the upstream material being used in the product including the polymer resin source. Ensure that all special conditions of current market condition are included (i.e. supply chain delays, international transit delays, etc.). The proponent shall indicate whether there is a local warehouse or fulfillment center in the Metro Vancouver area. Please indicate the three closest storage locations, their capacities, and their average delivery time to the Vancouver area. Required

s.21(1) Canadian manufacturing enables us to eliminate any transit or border delays that may arise. Upstream resin materials for Canadian production are sourced in s.21(1). With a fully Canadian production capacity we can bypass most supply chain and transit issues and meet product needs for all of our Canadian customers.

We maintain two Canadian warehouses, in s.21(1). The s.21(1) facility is the primary fulfillment centre, and the s.21(1) s.21(1). Lead times from the s.21(1)

Our third warehouse is in s.21(1) and s.21(1)

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1.1.7
Product Specifications: The proponent shall provide full specifications concerning the soil cells and any additional product(s) required for the complete solution that will be provided to the City. Please see item 7.0 Soil Cell Specifications and 8.0 Additional Product Specifications in the Scope of Work for details.Required

7.0 SOIL CELL SPECIFICATIONS
7.1 The proponent shall provide full specifications concerning the soil cells that will be provided to the City.

See 329451-SOIL-CELL-(SILVA-CELL)V01.01

7.2 These specifications shall include but are not limited to:
(a) Variability of sizes
See 329451-SOIL-CELL-(SILVA-CELL)V01.01 Section 2.03 1,2,3

(b) Recycled content / Product sustainability

Silva Cell	Recycled Material % of System
1x	55%
2x	66%
3x	73%

(c) Recyclability at end-of-life
Silva Cells are 100% recyclable at the end of their design life

(d) Structural capacity
See Silva Cell 2 Ultimate Load (CANADA)

(e) Methods for repair
See Silva Cell 1&2 Operations and Maintenance Manual

(f) Installation methods
See Contractor Install Guide - Master Metric

(g) Void Space
Approximately 90% void available for soil

(h) Strength Tests, Load Tests, & Quality Benchmarks
See Silva Cell 2 Engineering Report and Testing Conclusions (Canada)

(i) MSDS for all components of the design :
s.21(1)

(j) Maximum installation slope allowable
10% See Silva Cell 2 Engineering Report and Testing Conclusions (Canada)

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(k) Manufacturer tree type recommendations

No restrictions. All tree types can be used with Silva Cells

(l) Soil Cell Material:

- Base and Posts: 100% recycled homopolymer polypropylene.
- Deck: Fiberglass reinforced, chemically coupled, impact modified polypropylene.

8.0 ADDITIONAL PRODUCT SPECIFICATIONS

The proponent shall provide full specifications concerning all other materials necessary for the installation of the soil cells. These specifications shall include but are not limited to:

(a) Soil - All soil types can be used with Silva Cells

(b) Geogrid – Supplied by client* – See 329451-SOIL-CELL-(SILVA-CELL)V01.01 Section 2.04 B

(c) Geotextile – Supplied by client* - See 329451-SOIL-CELL-(SILVA-CELL)V01.01 Section 2.04 C

(d) Filter Fabric – N/A

(e) Setback or backfill material requirements for Utilities including but not limited to Water, Sewer, Electrical or street light pole bases – Silva Cells do not need any setbacks for installation. Any required setbacks or specific backfill material requirements would be at the request of the relevant utility.
See: SK-152 - Silva cell Toronto Hydro.

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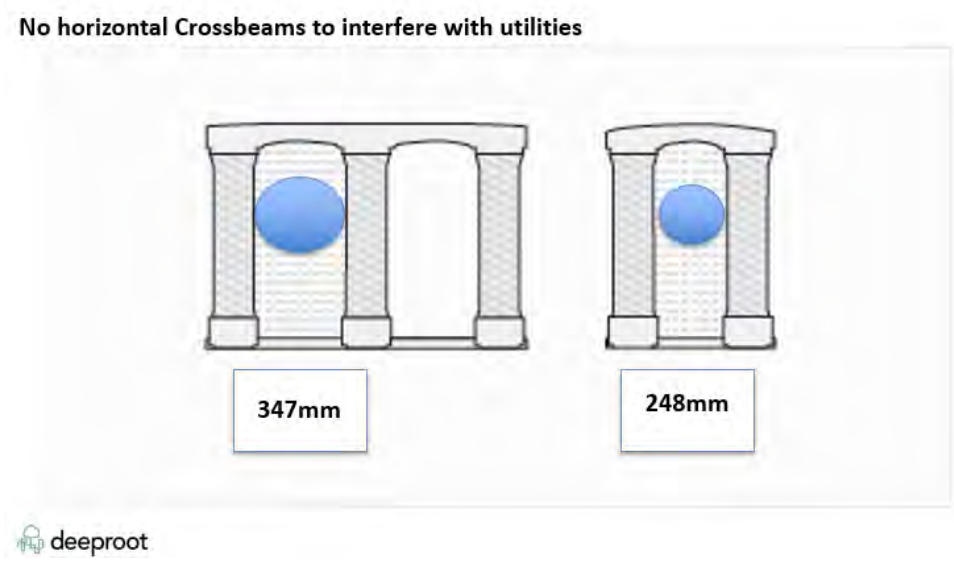
Most utilities in conduit can run through the Silva Cells and are built into the system.

Silva Cells has the largest contiguous soil volume of any soil cell with no crossbeams to interfere with utilities.



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DeepRoot has a detailed Utility design and installation package that provides Gap Details to work around utilities that need setbacks while keeping a continuous soil volume for the trees. The utility package also covers future access and repair procedures for utilities. See: Silva Cells and Utilities SC2

Silva Cell's unique unconnected design allows them to be field fitted to accommodate utilities or other obstructions that were not planned for.

(f) Aggregate base materials: See 329451-SOIL-CELL-(SILVA-CELL)V01.01 Section 2.05 C

(g) Root Barrier: See Root Barrier tech sheet - all sizes

(h) Aeration Pipes – See: Silva Cell Pipe Dimensions
Dimension of Aeration/Water distribution pipes that can fit through the Silva Cells. DeepRoot does not specify the type of pipe to be used.

(i) Underdrain – All sizes and types of Underdrains can be used with the Silva Cells. DeepRoot does not specify the Underdrain

(J) W+A Ports: See 329451-SOIL-CELL-(SILVA-CELL)V01.01 Section 2.04 B

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* Note on Geogrids and Geotextiles:

DeepRoot does not manufacture Geogrids or Geotextiles. These are readily available products that can typically be purchased by our clients at competitive prices directly. We provide a list of "Approved" Geogrids and Geotextiles which can be purchased from local Vancouver distributors such as Nilex or Brock White. DeepRoot can provide project quantity take offs for geogrids and geotextiles as part of our Design Service.
See: Silva Cell 2 Approved Geogrid and Geotextile_Canada

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1.1.8 Design Integration:
The proponent shall include the ability of their product to integrate with commonly used Green Infrastructure materials such as liners (impermeable and permeable), as well as the possibility of integrating into irregularly shaped designs (i.e. not square or rectangular). The proponent shall also provide specifications on the ease of construction of their product. Please see item 10.0 Constructability in the Scope of Work for details.Required

Design Integration:

DeepRoot has been integrating Silva Cells into Green Infrastructure projects since 2007.
Silva Cells can:

- be installed in conjunction with impermeable or permeable liners

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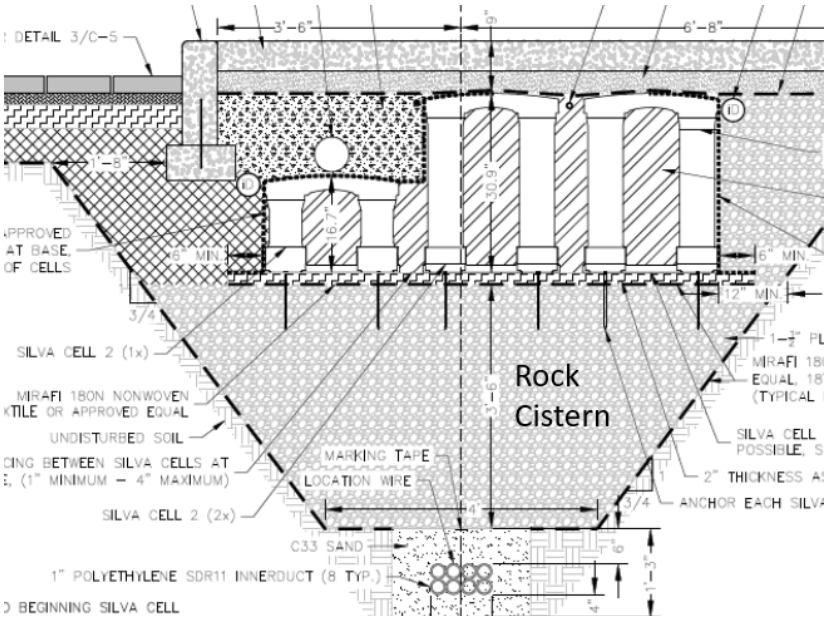
- Replace day-lighted bioretention swales
- Add capacity to day-lighted bioretention swales

- be installed in conjunction with cisterns



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Irregular Shaped Designs:

One of the design advantages of the Silva Cells is that it is not a connected system. Each Silva Cell stack is independent of the adjacent stacks. There is a 25 – 150mm space between each Silva Cell. This allows designers to use the Silva Cells to fit irregular spaces. This also allows contractors/installers to field fit the Silva Cells around unforeseen obstructions such as utilities that drift.

Examples: See: Irregular Silva Cell Layout Examples

- Curved or Fan Layouts
- Round Tree Pits
- Parking Lots irregular spaces

10.0 CONSTRUCTABILITY

The proponent shall provide specifications on the ease of construction of their product. The specifications shall include but are not limited to:

(a) Sub-base preparation – see 329451-SOIL-CELL-(SILVA-CELL) V01.01 Section 3.07
The Sub-base preparation follows standard construction protocols and will be familiar to anyone who has experience excavating and compacting soils.

(b) Geogrid wrapping – see 329451-SOIL-CELL-(SILVA-CELL)_V01.01 Section 3.10 A,B,C
The Geogrid is easily wrapped around the perimeter of the Silva Cell installation.
The Geogrid is attached to the Silva Cells with Zip Ties and hangs like a curtain from the Silva Cells.

(c) Soil & compaction - See 329451-SOIL-CELL-(SILVA-CELL)_V01.01 Section 3.10 E, H
The large openings in the StrongBacks allow for easy installation of any type of planting soil into the Silva Cell frames, especially planting soils with PEDs or structure which is preferred.
The large openings in the StrongBacks also allows for easy "walk thru compactions" of the planting soils that are installed in lifts to prevent air gaps and unwanted soil settlement after installation.

(d) Install decks – See 329451-SOIL-CELL-(SILVA-CELL)_V01.01 Section 3.12 B,C
The Silva Cell decks clip onto the Silva Cell posts to ensure an exact fit.
The Silva Cell decks also can clip off the posts easily for future access.

(e) Tree Pit Specifications
There are no restrictions on Tree Pit specifications.
Silva Cells can be installed with any tree pit or planter configuration.

(f) Soil Requirements
There are no planting soil restrictions when using Silva Cells. Any type of soil can be installed in the Silva Cells.

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(g) Sequencing and Scheduling Requirements

- The Silva Cells will need to be installed prior to hardscape (sidewalk, plaza, parking lot etc.) construction above the Silva Cell area.
- Until the final hardscape is installed, the Silva Cell area will need to be cordoned off so that no vehicles drive over this area until the hardscape has been installed.

(h) Weather Limitations for Installation

- Silva Cells can be installed in most weather conditions, rain or shine.
- When installing during winter, if the temperatures are below freezing, typical winter construction standards will apply to preparation of the base below the Silva Cells.

(i) Unconnected Design:

- The independent, unconnected Silva Cell advantage allows installers to field fit the Silva Cells around unforeseen obstructions by increasing or decreasing the spacing to fit a number of field conditions including:
    - A utility crossing through the Silva Cell pit that was not on the drawings
    - Utilities that drift
    - Emergency Access and Repair

The unconnected design also has advantages when emergency repairs are needed in an area where there are Silva Cells. Crews can excavate the Silva Cells without pulling on the adjacent stacks, which would damage and compromise the integrity of a connected system. (See: Silva Cell 1&2 Operations and Maintenance Manual)

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1.1.9 Training and Installation:
The proponent shall provide a sample of the training materials necessary for construction crews to familiarize themselves with before beginning construction. Please see item 11.0 Training and Installation in the Scope of Work for details. Required

11.0 TRAINING AND INSTALLATION
The proponent shall provide a sample of the training materials necessary for construction crews to familiarize themselves with before beginning construction. Please provide answers to the following:

(a) How many hours does it take for someone to be considered an expert in installing this product?

Once a crew has installed a complete Silva Cell section (mockup) successfully, they will have all of the skills necessary to complete the project. The rest of the project is just repeating the steps they learned during the training mockup. This might be ½ a day or a day depending on the depth of the Silva Cell system and the complexity of the stormwater integration. Michel James, who resides in Vancouver, will be the city's lead contact to do training sessions with city crews and/or contractors.
There are over 10 commercial landscape contractors in the lower mainland who have extensive experience installing Silva Cell over many years.

(b) Provide past experience on how simple and effective is the installation training process.

The installation training process has proven to be very successful and effective. We have over 3,000 Silva Cell installations world-wide over the last 15+ years. Many of those installations are done by new contractors who take our virtual Pre-Construction meeting and training session prior to successfully installing the Silva Cells.
Michael James, from DeepRoot, has done Silva Cell installation training with city crews successfully on the 2nd Ave project and the Richards St. project.

(c) Does the proponent assist with oversight of installation to ensure compliance with design?

DeepRoot has trained staff in Vancouver who can schedule site visits to review and assist with oversight of the installation at various stages. Michael James, who lives in Vancouver, will be the lead contact for the city. Additionally our technical office is located in Minneapolis, Minnesota with a fulltime staff of four that provides design review and technical assistance.

(d) Provide lessons learned from previous projects if applicable. What are common installation failures that have occurred?

DeepRoot has not had installation failures when used within the Silva Cells design parameters.

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f 604 684 6744

There are common installation mistakes that we proactively cover in our Pre-Construction meetings and Installation Training.

- DeepRoot has Training Staff in our Vancouver office with additional technical support in our Minneapolis office.
- DeepRoot can provide Pre-Construction meetings and Installation training onsite for the City of Vancouver staff. DeepRoot has successfully provided installation training and site visits to City staff for prior Silva Cell installations done in collaboration with the Green Infrastructure Group, including Richards Street and 2nd Avenue.
- If the City chooses to use commercial contractors to install the Silva Cells that the City has purchased, DeepRoot will provide Pre-Construction and Installation training to the commercial contractor. There are more than 10 commercial landscape contractors that have experience installing Silva Cells in the Vancouver area.

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1.1.10 Quality Control: Required
No File Attached
Upload

Addendum 2 revised text:

The proponent shall provide details on their quality control process.

All DeepRoot's Silva Cells are made in ISO certified manufacturing facilities.
See: s.21(1)
See: s.21(1)

DeepRoot has a strict Quality Assurance Program in both of our manufacturing facilities.
See: Quality Assurance Policy

Why ISO Compliance is important

Injection molded plastics are used in many products, across many industries and in countries all over the world. Manufacturers can become certified by the International Organization for Standardization (ISO). This organization develops voluntary standards that are used globally to help make industries more efficient and effective. Since the criteria are applied internationally, they are helpful in breaking down trade barriers in situations where requirements set by individual countries may not match up and ensuring products from one country will work with products from another country.

Ratings provide assurance that the manufacturing company complies with these established procedures during their production process. It is difficult to obtain certification and many manufacturers choose not to pursue certification since it is voluntary. Partnering with a company who has ISO certification is an important way to safeguard that your product will be made to international standards of quality and shows a commitment by DeepRoot to hold themselves to higher standards.

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1.1.11 Warranty:

Provide the City with the minimum and maximum warranty offered on each delivered product. Please reference to the attached Form of Agreement section 3.7 Warranty for more information associated with warranty. The proponent shall also include their integration plan for future product updates. (ie. are older product models on hand for future repairs and/or replacements? How will new models integrate with the old models?) Required

See: DeepRoot Silva Cell Warranty

Integrated Plan for Past and Future Product Updates:

DeepRoot is currently selling Silva Cell 2, which is designed to replace any Silva Cell 1 module for future access and repair work. All future Silva Cell modules will be designed with backwards compatibility to replace a prior model for future operations and maintenance work.

The City of Vancouver has both Silva Cell 1 and Silva Cell 2 modules installed in multiple locations in the City.

Date of Preparation: 08-29-2017

Section 1 Chemical Product and Company Identification

Product/Chemical Name: **PRC25GF3-Black**

Chemical Formula: Polypropylene Based Compound

Other Designations: Polymer Preparation, Mixture

Manufacturer:

	Global Contact	**Europe Contact**
	Washington Penn Plastic Co. Inc. 450 Racetrack Road Washington, PA 15301	Audia Plastics, s.r.o. Voderady 426 919 42 Voderady Slovakia
Contact:	Scott C. Ward	Radoslav Margetin
Email:	scottc.ward@audiagroup.com	msds-sk@washpenn.com
Phone:	(001) 724.206.4372	00421.33.323.8001
Fax:	(001) 724.228.7112	00421.33.323.8054

******** EMERGENCY OVERVIEW ********

Emergency Telephone: 1-800-424-9300

Outside U.S.: 1-703-527-3887

Do not allow material to enter streams or waterways per 40 CFR 122.26, "Significant Material".

Cover any exposed body areas where skin contact with molten material is possible.

Section 2 Hazard(s) Identification

Physical Hazards Not classified

Health Hazards Not classified

Environmental Hazards Not classified

OSHA Defined Hazards Combustible dust

Label Elements

Hazard Symbol None

Signal Word Warning

Hazard Statement If small particles are generated during further processing, handling or by other means, this may form combustible dust concentrations in air.

Precautionary Statement

Prevention Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Prevent dust accumulation to minimize explosion hazard. Observe good industrial hygiene practices.

Response Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) Not Otherwise Classified (HNOC) None known

Supplemental Information No ingredient(s) of unknown acute toxicity is intentionally used in this product.

Date of Preparation: 08-29-2017

Section 3 Composition / Information on Ingredients

Reportable Hazardous Substances

Chemical Name	*Common Name*	*CAS Number*	*%*
No Reportable Hazardous Substances*			

Base Component(s) of Mixture

Chemical Name	*Common Name*	*CAS Number*	*%*
1-propene, homopolymer	homopolymer polypropylene	9003-07-0	**
Other components below reportable levels**	n/a	n/a	**

* There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

** Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

Section 4 First-Aid Measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin Contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye Contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most Important Symptoms/ Effects, Acute and Delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of Immediate Medical Attention and Special Treatment Needed	Treat symptomatically.
General Information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Section 5 Fire-Fighting Measures

Suitable Extinguishing Media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable Extinguishing Media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific Hazards Arising from the Chemical	Explosion hazard: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard. During fire, gases hazardous to health may be formed.
Special Protective Equipment and Precautions for Firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-Fighting Equipment/Instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific Methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General Fire Hazards	May form combustible dust concentrations in air.

Section 6 Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Use only non-sparking tools. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take

precautionary measures against static discharge. Use only non-sparking tools. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental Precautions

Avoid discharge into drains, water courses, or onto the ground.

Section 7 Handling and Storage

Precautions for Safe Handling

Minimize dust generation and accumulation. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Explosion-proof general and local exhaust ventilation. Do not breathe dust. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for Safe Storage, Including Any Incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

Section 8 Exposure Controls/Personal Protection

Occupational Exposure Limits

U.S. OSHA (29 CFR 1910.1000)

Components	*Type*	*Value*	*Form*
Nothing to report			

U.S. ACGIH Threshold Limit Values

Components	*Type*	*Value*	*Form*
Nothing to report			

U.S. NIOSH: Pocket Guide to Chemical Hazards

Components	*Type*	*Value*	*Form*
Nothing to report			

Biological Limit Values	No biological exposure limits noted for the ingredient(s).
Exposure Guidelines	Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.
Appropriate Engineering Controls	Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual Protection Measures, Such as Personal Protective Equipment

Eye/Face Protection	Wear safety glasses with side shields (or goggles).
Skin Protection	
Hand Protection	For prolonged or repeated skin contact use suitable protective gloves.
Other	Wear suitable protective clothing.
Respiratory Protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal Hazards	Wear appropriate thermal protective clothing, when necessary.
General Hygiene Considerations	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Section 9 Physical and Chemical Properties

Appearance	
Physical State	Solid
Form	Solid, pellets, granulars
Color	Varies based on colorants
Odor	Odorless; mild odor
Odor Threshold	Not available
Ph	Not available
Melting Point/Freezing Point	155-170°C (310-340°F)
Initial Boiling Point and Boiling Range	Not available
Flash Point	above 300°C (570°F) decomposition occurs and flash of fumes may occur.
Evaporation Rate	Not available
Flammability (Solid, Gas)	Not available
Upper/Lower Flammability Or Explosive Limits	
Flammability Limit – Lower (%)	Not available
Flammability Limit – Upper (%)	Not available

Explosive Limit – Lower (%)	Not available
Explosive Limit – Upper (%)	Not available
Vapor Pressure	Neglible
Vapor Density	Not available
Relative Density	0.9-1.8 g/cm³
Solubility(Ies)	
Solubility (Water)	Neglible
Partition Coefficient (N-Octanol/Water)	Not available
Auto-Ignition Temperature	> 360°C (> 680°F)
Decomposition Temperature	> 300°C (> 570°F)
Viscosity	Not available
Other Information	
Explosive Properties	Not explosive
Oxidizing Properties	Not oxidizing

Section 10 Stability and Reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport
Chemical Stability	Material is stable under normal conditions
Possibility of Hazardous Reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Keep away from heat, sparks and open flame. Minimize dust generation and accumulation. Contact with incompatible materials.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	No hazardous decomposition products are known

Section 11 Toxicological Information

Information on Likely Routes of Exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin Contact	No adverse effects due to skin contact are expected.
Eye Contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms Related to the Physical, Chemical and Toxicological Characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on Toxicological Effects

Acute Toxicity

Components	*Speices*	*Test Results*
Not classified		

Skin Corrosion/Irritation	Prolonged skin contact may cause temporary irritation.
Serious Eye Damage/Eye Irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or Skin Sensitization	
Respiratory Sensitization	Not a respiratory sensitizer.
Skin Sensitization	This product is not expected to cause skin sensitization.
Germ Cell Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Iarc Monographs. Overall Evaluation Of Carcinogenicity

polypropylene (CAS 9003-07-0)	3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed

Reproductive Toxicity	This product is not expected to cause reproductive or developmental effects.
Specific Target Organ Toxicity - Single Exposure	Not classified
Specific Target Organ Toxicity - Repeated Exposure	Not classified
Aspiration Hazard	Not an aspiration hazard

Section 12 Ecological Information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	*Species*	*Test Results*
Nothing to report		

Persistence and Degradability	No data is available on the degradability of this product.
Bioaccumulative Potential	No data available.
Mobility in Soil	No data available.
Other Adverse Effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

Section 13 Disposal Considerations

Disposal Instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local Disposal Regulations	Dispose in accordance with all applicable regulations.
Hazardous Waste Code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste From Residues / Unused Products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated Packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

Section 14 Transportation Information

DOT	Not regulated as dangerous goods
IATA	Not regulated as dangerous goods
IMDG	Not regulated as dangerous goods
Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code	Not applicable

Section 15 Regulatory Information

US Federal Regulations

OSHA	When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.
TSCA	Listed on the United States TSCA (Toxic Substances Control Act) inventory.
CERCLA	This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.
EPCRA	This material contains no extremely hazardous substances.
SARA Section 311/312 Hazard Classes	Acute Health Hazard: No Chronic Health Hazard: No Fire Hazard: No Sudden Release of Pressure Hazard: No Reactive Hazard: No
SARA Section 313 Toxic Release Inventory	This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.
Conflict Minerals (Dodd-Frank Wall Street Reform and Consumer Protection Act, 2010)	Conflict minerals, which include columbite-tantalite (coltan) [source for tantalum], cassiterite [source for tin], wolframite [source for tungsten], gold ore, or their derivatives, are not intentionally used in the manufacture of or formulation of this product.
Clean Water Act (CWA/OPA)	Plastic pellets are defined by the US EPA under the Clean Water Act (40CFR122.26) as a "significant material" which requires any industrial plant that may expose pellets to storm water to secure a storm water permit. Violations of the rule carry the same penalties as other Clean Water Act violations. Pellets found in storm water runoff are subject to EPA regulations with the potential for substantial fines and penalties.
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List	Not regulated
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)	Not regulated
Safe Drinking Water Act (SDWA)	Not regulated.

CPSIA (Consumer Product Safety Improvement Act, 2008)	The following substances, lead [CAS# 7439-92-1] and phthalates, are not intentionally used in the manufacture of or formulation of this product. The Toy Safety Standard, ASTM F 963-07, which was made a mandatory CPSC standard by the CPSIA, also states migration limits for seven heavy metals that may be in toy materials. These metals and their respective migration limits are: Antimony (Sb) [CSA# 7440-36-0] <60 mg/kg, Arsenic (As) [CSA# 7440-38-2] <25 mg/kg, Barium (Ba) [CSA# 7440-39-3] <1000 mg/kg, Cadmium (Cd) [CSA# 7440-43-9] <75 mg/kg, Chromium (Cr) [CSA# 7440-47-3] <60 mg/kg, Mercury (Hg) [CSA# 7439-97-6] <60 mg/kg, and Selenium (Se) [CSA# 7782-49-2] <60 mg/kg. These heavy metals are not intentionally used in the manufacture of or formulation of this product.
Latex	"Natural rubber latex", "dry natural rubber", "synthetic latex", or "rubber that contains natural rubber" are not used in the manufacture of or the formulation of this product.
Ozone-Depleting Substances (ODSs)	Class I and Class II ODSs listed in the U.S. Clean Air Act and U.S. EPA regulation 40 CFR Part 82: “Protection of Stratospheric Ozone” are not used in the manufacture of or formulation of this product. ODSs listed in “The Montreal Protocol on Substances that Deplete the Ozone Layer” (2000) are not used in the manufacture of or formulation of this product. ODSs listed in Regulation (EC) No 1005/2009 “Substances that Deplete the Ozone Layer” are not used in the manufacture of or formulation of this product.

U.S. State Regulations

California	Not listed
Massachusetts	Not regulated
New Jersey	Not listed
Pennsylvania	Not listed
Rhode Island	Not regulated
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)	Substances and chemicals which are known to the State of California to cause cancer and/or reproductive toxicity under California Proposition 65 are not intentionally added in the manufacture of or formulation of this product.
CONEG (Coalition of Northeastern Governors)	The following substances, cadmium [CAS# 7440-43-9], hexavalent chromium [CAS# 1333-82-0], lead [CAS# 7439-92-1], and mercury [CAS# 7439-97-6], are not intentionally used in the manufacture of or formulation of this product as set forth by the Toxics in Packaging Clearinghouse (TPCH).

Canada Regulations

Prohibition of Certain Toxic Substances Regulations, 2012	Substances and chemicals which have been classified as toxic substances by the Candadian Environmental Protection Act, Prohibition of Certain Toxic Substances Regulations are not intentionally added in the manufacture of or formulation of this product.
WHMIS 2015	Not regulated
Controlled Drugs and Substances Act	Not regulated
Export Control List (CEPA 1999, Schedule 3)	Not listed
Greenhouse Gases	Not listed
Precursor Control Regulations	Not regulated

International Regulations

REACH (Regulation (EC) No 1907/2006)	Substances and chemicals sold into Europe, or produced in Europe, individually or as part of preparations will be regulated according to the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) legislation (please visit http://ec.europa.eu/ enterprise/reach/index_en.htm for further information). We sell thermoplastic compound preparations into the European market, or produced in Europe, and as such we confirm that all substances of this preparation are compliant with the pre-registration requirements of REACH, and that we have the intentions to proceed with the registration of these substances, or to procure substances only from suppliers from which confirmation has been received that the suppliers are aware of their REACH requirements, that they have preregistered and/or will timely register their substances. *Substances of Very High Concern (SVHC)*: This product does not contain any of the candidate chemicals proposed to be Substances of Very High Concern (list as of July, 2017) as stated in REACH (Article 57, Regulation No 1907/2006) determined either through (i) non-use of the substance, (ii) mass balance calculation, or (iii) specific testing.

RoHS 3 (Directive 2015/863/EU) and ELV (End-Of Life Vehicles, Directive 2016/774/EC)

The following chemicals and substances are not intentionally used in the manufacture of or formulation of this product as set forth in RoHS 3, “restriction of the use of certain hazardous substances in electrical and electronic equipment”, and determined either through (i) non-use of the substance, (ii) mass balance calculation, or (iii) specific testing.

cadmium	[CAS# 7440-43-9]
hexavalent chromium	[CAS# 1333-82-0]
lead	[CAS# 7439-92-1]
mercury	[CAS# 7439-97-6]
polybrominated biphenyls (PBB)	[CAS# 59536-65-1]
polybrominated diphenyl ethers (PBDE)	*
Bis(2-ethylhexyl) phthalate (DEHP)	[CAS# 117-81-7]
Butyl benzyl phthalate (BBP)	[CAS# 85-68-7]
Dibutyl phthalate (DBP)	[CAS# 84-74-2]
Diisobutyl phthalate (DIBP)	[CAS# 84-69-5]

*PBDE includes the following ethers; bromodiphenyl ether [CAS# 101-55-3], dibromodiphenyl ether [CAS# 205-47-7], tribromodiphenyl ether [CAS# 49690-94-0], tetrabromodiphenyl ether [CAS# 40088-47-9], pentabromodiphenyl ether [CAS# 32534-81-9], hexabromodiphenyl ether [CAS# 36483-60-0], heptabromodiphenyl ether [CAS# 68928-80-3], octabromodiphenyl ether [CAS# 32536-52-0], nonabromodiphenyl ether [CAS# 63936-56-1], decabromodiphenyl ether [CAS# 1163-19-5].

Packaging and Packaging Waste - EU Directive 94/62/EC (as amended)

Cadmium, chromium (VI), lead and mercury are not intentionally used in the manufacture of or the formulation of this product. In addition, this product has the potential to be recycled according to these requirements.

GADSL (Global Automotive Declarable Substance List)

This material, as supplied, does not contain any substances listed on the GADSL.

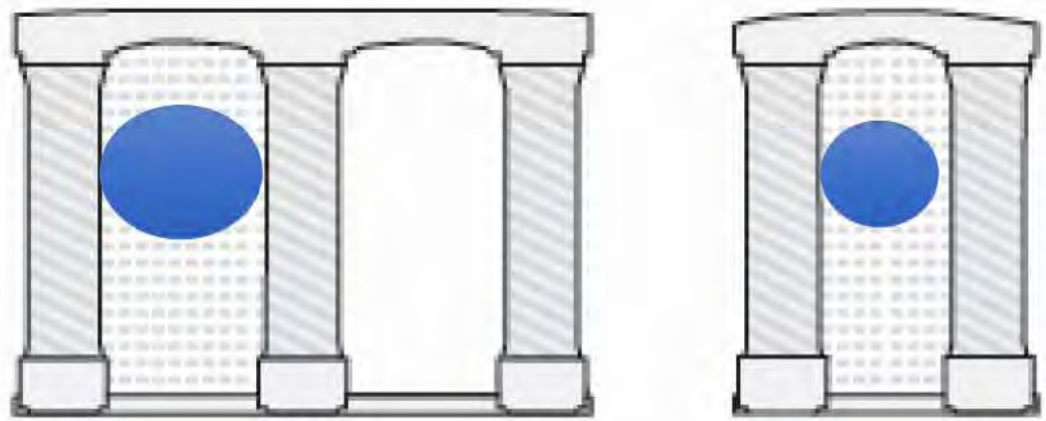
Section 16 Other Information

Prepared By	Safety and Technology Departments
Revision Notes	Any questions call 724-206-4282
Further Information	This Safety Data Sheet conforms to regulation 1907/2006/EC (REACH). This product has been classified in accordance with European CLP Regulations (1272/2008/EC) and the U.S. Hazard Communication Standard (29 CFR 1910.1200). Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.
HMIS® Rating	Health: 0 - Minimal Hazard - No significant risk to health Flammability: 1 - Slight Hazard Physical hazard: 0 - Minimal Hazard Personal protection: X
NFPA Rating	Health: 0 - Exposure could cause irritation but only minor residual injury even if no treatment is given. Flammability: 1 - Must be preheated before ignition can occur. Instability: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
Disclaimer	WPP cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information given is based on data available for the material, the components of the material, and similar materials.

Maximum pipe dimensions running through Silva Cells

The most commonly used option is to run utilities through Silva Cells. Due to the open design of the frames, they can accommodate pipes, conduits, and other underground utilities up to 347mm in diameter.

No horizontal Crossbeams to interfere with utilities



347mm

248mm

This guide specification was prepared utilizing 3-part format recommended by the Construction Specifications Institute (CSI), and generally incorporates recommendations from their SectionFormat™/Page Format™, and MasterFormat®, latest Editions, insofar as practicable.

Carefully review and edit the text to meet the Project requirements and coordinate this Section with the remainder of the Specifications and the Drawings.

Where bracketed text is indicated, e.g. [text], make appropriate selection and delete the remainder of text within additional brackets, highlighting, and bold face type, if any.

This specification defines material and performance requirements for the "Silva Cell System". The Specifier should adapt these specifications to reflect specific project requirements.

Consult the manufacturer for assistance in editing this guide specification for specific Project applications where necessary, including conventional applications, and for assistance evaluating and sizing design elements for Silva Cell stormwater applications.

This Specification was current at the time of publication but is subject to change. Please confirm the accuracy of these specifications with the manufacturer prior to use.

Some elements in these specifications require coordination with Project drawings; these items are noted "as indicated on plans or drawings" or similar phrases.

Refer to the DeepRoot website, www.deeproot.com for additional information.

SECTION 32 94 51
SOIL CELLS
("SILVA CELL SYSTEM")

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Silva Cell system for planting and paving, including Silva Cell assemblies and related accessories.
   2. Other materials including, but not limited to, geotextile, geogrid, aggregate, subbase material, backfill, root barrier, Water + Air System, and planting soil.

SPECIFIER: Delete paragraph below if planting soils will be installed under a separate contract.

B. Materials Installed But Not Furnished Under This Section:
   1. Planting soils are furnished in Section 32 94 56 - Planting Soil for Silva Cells.

C. Related Requirements:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

SPECIFIER: Revise Section numbers and titles in subparagraphs below per CSI MasterFormat and Project requirements.

2. Section 01 33 00 - Submittal Procedures: For administrative and procedural requirements for processing of submittals during the construction phase.
3. Section 01 77 00 - Closeout Procedures: For administrative and procedural requirements for completion of the Work.

SPECIFIER: Sections listed below are examples only; revise Section numbers and titles in subparagraphs below to suit Project requirements.

4. Section 32 12 16 - Asphalt Paving
5. Section 32 13 13 - Concrete Paving
6. Section 32 14 00 - Unit Paving
7. Section 32 84 00 - Planting Irrigation
8. Section 32 93 00 - Plants

1.02 REFERENCES

A. Definitions:
1. AGGREGATE BASE COURSE: Aggregate material between the paving and the top of the Silva Cell deck below, designed to distribute loads across the top of the deck.

SPECIFIER: Delete subparagraph below if pavers are not a part of the Project.

2. AGGREGATE SETTING BED FOR PAVERS: Aggregate material between the aggregate base course and unit surface pavers, designed to act as a setting bed for the pavers.
3. AGGREGATE SUBBASE: Aggregate material between the bottom of the Silva Cell base and the compacted subgrade below, designed to distribute loads from the Silva Cell bases to the subgrade.
4. BACKFILL: The earth used to replace or the act of replacing earth in an excavation beside the Silva Cell system to the excavation extents.
5. FINISH GRADE: Elevation of finished surface of planting soil or paving.
6. PLANTING SOIL: Soil as defined in Division 32, Section 32 94 56 - Planting Soil for Silva Cells, intended to fill the Silva Cell system and other planting spaces.
7. SILVA CELL SYSTEM:
   a. Silva Cell: One assembled unit made up of 1 base, 6 post assemblies, and 1 Silva Cell deck.
   b. Silva Cell System: Two or more Silva Cells used in combination with each other and with required accessories.
8. SUBGRADE: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill.
9. WALK-THROUGH COMPACTION: A process for light compaction of soils by walking through the soil following placement.
   a. Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

B. Reference Standards:

SPECIFIER: Use care when indicating the edition date of the referenced standards; these standards are subject to regular review, and updated accordingly.

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO H-20

2. ASTM International (ASTM):

a. ASTM D448-12, Standard Classification for Sizes of Aggregate for Road and Bridge Construction
b. ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 [600 kN-m/m^3])
c. ASTM D1241-07, Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
d. ASTM D3786/D3786M-13, Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
e. ASTM D4491-99a(2014)e1, Standard Test Methods for Water Permeability of Geotextiles by Permittivity
f. ASTM D4533-D4533M-15, Standard Test Method for Trapezoid Tearing Strength of Geotextiles
g. ASTM D4632-D4632M-15, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
h. ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile
i. ASTM D4833/D4833M-07(2013)e1, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
j. ASTM D5262-07(2012), Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics
k. ASTM D6241-14, Standard Test Method for Static Puncture Strength of Geotextile and Geotextile-Related Products Using a 50mm Probe
l. ASTM D6637-11, Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

SPECIFIER: Delete reference below if Project is not located in Canada.

3. Ontario Provincial Standard Specification (OPSS)

1.03 ADMINISTRATIVE REQUIREMENTS

SPECIFIER: Select either "Landscape Architect", "Architect" or "Engineer" in paragraph below as applicable.

A. Preinstallation Conference: Prior to installation of the Silva Cell system and associated Work, meet with the Contractor, Silva Cell system installer and their field supervisor, manufacturer's technical representative, the [**Landscape Architect**] [**Architect**] [**Engineer**], the Owner at the Owner's discretion, and other entities concerned with the Silva Cell system performance.
   1. Provide at least 72 hours advance notice to participants prior to convening preinstallation conference.
   2. Introduce and provide a roster of individuals in attendance with contact information.
   3. The preinstallation conference agenda will include, but is not limited to the review of:
      a. Required submittals both completed and yet to be completed.
      b. The sequence of installation and the construction schedule.
      c. Coordination with other trades.
      d. Details, materials and methods of installation.
         1) Review requirements for substrate conditions, special details, if any, installation procedures.
         2) Installation layout, procedures, means and methods.
      e. Mock-up requirements.

B. Sequencing and Scheduling:
   1. General: Prior to beginning Work of this Section, prepare a detailed schedule of the Work involved for coordination with other trades.
   2. Schedule utility installations prior to beginning Work of this Section.
   3. Where possible, schedule the installation of the Silva Cell system after the area is no longer required for use by other trades and Work. Where necessary to prevent damage, protect installed system if Work must occur over or adjacent to the installed Silva Cell system.

1.04 SUBMITTALS

A. Action Submittals: Submit in accordance with Section **[01 33 00] [other]**:

SPECIFIER: Select paragraph A above if detailed submittal requirements are specified in Division 01 and revise Section number if necessary to match that used in the Project Manual, or; select paragraph A below if Division 01 is not a part of the Project Manual; keep subparagraphs 1 through 5 with either paragraph A selected.

Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

A. Action Submittals: Submit these to the [**Landscape Architect**] [**Architect**] [**Engineer**] for review and acceptance not less than 45 days prior to start of installation of materials and products specified in this Section.
   1. Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these specifications.
   2. Test and Evaluation Reports:
      a. Submit results of compaction testing required by the Specifications for approval.
      b. Include analysis of bulk materials including soils and aggregates, by a recognized laboratory that demonstrates that the materials meet the Specification requirements.

   3. Samples:
      a. One full size sample of an assembled Silva Cell (copy of manufacturers brochure with images of product may be accepted in lieu of product sample).
      b. Manufacturer's product data/specification sheet for geogrid.
      c. Manufacturer's product data/specification sheet for geotextile.
      d. Manufacturer's product data/specification sheet for Water+Air System components (when specified as part of the system)

   4. Manufacturer's Report: Submit Silva Cell system manufacturer's letter of review and approval of the Project, including Drawings and Specifications, Addenda, Clarifications and Modifications, and for compliance with product installation requirements.
   5. Qualification Statements:
      a. Manufacturer:
         1) Submit list of completed projects demonstrating durability and longevity of in-place systems.
            a) Include project name, location, and date of completion.

SPECIFIER: Delete subparagraph below if system is not being designed for stormwater management.

         2) Submit list of third party approval for stormwater management projects.

      b. Installer:
         1) Submit documentation of the qualifications of the Silva Cell system installer and their field supervisor, sufficient to demonstrate that both meet the requirements specified in Article 1.05 QUALITY ASSURANCE.
         2) Submit list of completed projects of similar scope and scale demonstrating capabilities and experience.

B. Closeout Submittals: Submit in accordance with Section **[01 33 00] [other]**:

SPECIFIER: Select paragraph B above if detailed submittal requirements are specified in Division 01 and revise Section number if necessary to match that used in the Project Manual, or; select paragraph B below if Division 01 is not a part of the Project Manual.

Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

B. Closeout Submittals: Submit these to the [**Landscape Architect**] [**Architect**] [**Engineer**] at completion of installation.
   1. Warranty: Submit manufacturer's warranty, fully executed.

1.05 QUALITY ASSURANCE

A. Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary permits/approvals from these authorities.
B. Manufacturer Qualifications:
   1. A manufacturer whose product is manufactured in an ISO/TS 16949 compliant and ISO 9001 - 2008 registered factory.
   2. A manufacturer with not less than 100 Silva Cell systems in-place, each system in use for not less than 7 years, confirming durability and longevity of the system.
   3. A manufacturer with documented written approval of their product for use as a stormwater treatment device by a minimum of 3 governmental jurisdictions.
   4. A manufacturer with an established and demonstrated utility service and repair process, including written procedure and photographs demonstrating work.
   5. A manufacturer with a published operating and maintenance manual

C. Installer Qualifications: A qualified installer with not less than 5 years of successful experience installing Silva Cell systems or related products and materials, and whose work has resulted in successful installation of underground piping, chambers and vault structures, planting soils, and planter drainage systems of a similar scope and scale in dense urban areas.

SPECIFIER: Select either "Landscape Architect", "Architect" or "Engineer" in paragraph below as applicable.

D. Installer's Field Supervisor: A full-time supervisor employed by the installer with not less than 5 years of successful experience similar to that of the installer and present at the Project site when Work is in progress. Utilize the same field supervisor throughout the Project, unless a substitution is submitted to and approved in writing by the [**Landscape Architect**] [**Architect**] [**Engineer**].
E. Mock-Up: Prior to the installation of the Silva Cell system, construct a mock-up of the complete installation at the Project site in the presence of the Landscape Architect.
   1. Size and Extent: Minimum of 100 sq. ft. (10 sq. m.) in area and including the complete Silva Cell system installation with subbase, aggregate subbase, drainage installation, Silva Cell decks, posts, and bases, base course aggregate, geotextile, geogrid, backfill, planting soil, and necessary accessories.
   2. The mock-up area may remain as part of the installed Work at the end of the Project provided that it remains undamaged and meets the requirements of the Drawings and Specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Silva Cell System: Protect Silva Cell system components from damage during delivery, storage and handling.
   1. Store components on smooth surfaces, free from dirt, mud and debris. Store under tarp to protect from sunlight when time from delivery to installation exceeds one week.
   2. Perform handling with equipment appropriate to the size (height) of Silva Cells and site conditions; equipment may include, hand, handcart, forklifts, extension lifts, or small cranes, with care given to minimize damage to Silva Cell bases, posts, decks and adjacent assembled Silva Cells.

B. Packaged Materials: Deliver packaged materials in original, unopened containers indicating weight, certified analysis, name and address of manufacturer, and indication of conformance with State and Federal laws, if applicable. Protect materials from deterioration during delivery and while on the Project site.

1. Do not deliver or place backfill, soils, or soil amendments in frozen, wet, or muddy conditions.
2. Provide protection including tarps, plastic and/or matting between bulk materials and finished surfaces sufficient to protect the finish material.
3. Bring planting soil to the site using equipment and methods that do not overly mix and further damage soil peds within the soil mix.

D. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated material, backfill, soil amendments and planting mix within the Project limits as needed.

1.07 FIELD CONDITIONS

A. Existing Conditions: Do not proceed with Work when subgrades, soils and planting soils are in a wet, muddy or frozen condition.

1.08 WARRANTY

SPECIFIER: This Warranty gives the Owner specific legal rights, and the Owner may also have other legal rights, which vary from state to state, or in Canada, from province to province. Some states do not allow the exclusion of incidental or consequential damages, so the stated limitations and exclusions may not apply.

A. The Contractor shall warrant the Silva Cell system to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by manufacturer's written warranty against defects in materials and workmanship as follows:
   1. DeepRoot® warrants to the original purchaser of its Silva Cell™ product that such product will be free from defects in materials and workmanship, and perform to DeepRoot's written specifications for the warranted product, when installed and used as specifically provided in the product's installation guidelines for a period of 20 years from the date of purchase. This warranty does not cover wear from normal use, or damage caused by abuse, mishandling, alterations, improper installation and/or assembly, accident, misuse, or lack of reasonable care of the product. This warranty does not apply to events and conditions beyond DeepRoot's control, such as ground subsidence or settlement, earthquakes and other natural events, acts of third parties, and/or Acts of God. If this warranty is breached, DeepRoot® will provide a replacement product. Incurred costs, such as labor for removal of the original product, installation of replacement product, and the cost of incidental or other materials or expenses are not covered under this warranty.
   2. Deeproot® makes no other warranties, express or implied, and specifically disclaims the warranty of merchantability or fitness for a particular purpose. Deeproot® shall not be liable either in tort or in contract for any direct, incidental or consequential damages, lost profits, lost revenues, loss of use, or any breach of any express or implied warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturers:

DeepRoot Green Infrastructure, LLC
101 Montgomery Street, Suite 2850
San Francisco, CA, 94104

Phone: 415.781.9700
Toll Free: 800.458.7668
Fax: 415.781.0191
www.deeproot.com

B. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual.

SPECIFIER: Select paragraph B above or below as applicable, if substitutions will be allowed during the bidding process.

If using paragraph B below, select either "Landscape Architect", "Architect", or "Engineer", and adjust the length of time in subparagraph 1 for prior approval according to your practice.

B. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual. If such instructions are not included in Division 00 or Division 01, submit requests as specified herein.
   1. Submit proposed substitutions to the [**Landscape Architect**] [**Architect**] [**Engineer**] not less than [**7**] [**other**] days prior to the date for receipt of Bids.

SPECIFIER: Select paragraph B below for a specification when substitutions are NOT allowed and delete the 2 paragraphs above.

B. No substitutions are allowed.

2.02 DESCRIPTION

SPECIFIER: The Silva Cell System is designed to support AASHTO H-20 loading (United States) CSA-S6 87.5 (Canada). The entire assembly as described in this specification is necessary in order to meet this loading performance. Alternative assemblies may void Silva Cell warranty.

Contact DeepRoot Green Infrastructure, LLC for approval of alternative assemblies.

A. The term Silva Cell shall be used to refer to a single Silva Cell.
B. Silva Cells shall be designed for the purpose of growing healthy trees and providing stormwater management.
C. Silva Cells shall be modular, structural systems.
D. Each Silva Cell shall be structurally-independent from all adjacent Silva Cells for incorporating utilities and other site features as well as for future repairs.
E. Silva Cells shall be capable of supporting loads up to and including AASHTO H-20 (United States) or CSA-S6 87.5 kN (Canada) when used in conjunction with approved pavement profiles.
F. Silva Cells shall be open on all vertical faces and horizontal planes and shall have no interior walls or diaphragms.
G. Silva Cells shall be capable of providing a large, contiguous, continuous volume of planting soil that does not inhibit or prevent the following:
   1. Placement of planting soil
   2. Walk through compaction
   3. Compaction testing of planting soil, once in place
   4. Movement and growth of roots
   5. Movement of water within the provided soil volume, including lateral capillary movement
   6. Installation and maintenance of utilities placed within, adjacent to, or below the Silva Cell.

H. Silva Cells shall be able capable of being filled with a variety of soil types and soils that include peds 2 inches (50 mm) or larger in diameter as is appropriate for the application, location of the installation, and tree species.

2.03 SILVA CELL MATERIALS AND ACCESSORIES

A. Silva Cell System Components: Each "Silva Cell" soil cell module (hereafter Silva Cell or "cell") is composed of one base, 6 post assemblies, and one deck.

SPECIFIER: Select one or more of the Silva Cell assemblies specified below as applicable to your Project design.

[1. 1x Silva Cell System:
a. Components: One base, six 1x posts, and one deck.
b. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 16.7 inches high (1200 mm long by 600 mm wide by 424 mm high).]

[2. 2x Silva Cell System:
a. Components: One base, six 2x posts, and one deck.
b. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 30.9 inches high (1200 mm long by 600 mm wide by 784 mm high).]

[3. 3x Silva Cell System:
a. Components: One base, six 3x posts (a combination of six 1x posts and six 2x posts), and one deck.
b. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 43 inches high (1200 mm long by 600 mm wide by 1092.2 mm high).]

B. Silva Cell Materials and Fabrication:
1. Bases and Posts: Homopolymer polypropylene.
2. Decks: Fiberglass reinforced, chemically-coupled, impact modified polypropylene.

C. Manufacturer's Related Silva Cell Installation Accessories:
1. Strongbacks: An accessory designed to stabilize the Silva Cell posts temporarily, during soil placement, and removed for reuse prior to placing decks.
2. Anchoring Spikes: 10” landscape spike for securing assembled Silva Cells to subbase.

2.04 RELATED PRODUCTS

A. Root Barrier: Recyclable, black, injection molded panels manufactured with a minimum 50 percent post-consumer recycled polypropylene plastic with UV inhibitors, and integrated zipper joining system which allows instant assembly by sliding one panel into another; for redirecting tree roots down and away from hardscapes.
1. Panel Sizes:
a. No. UB12-2: 24 inches long by 12 inches deep by 0.080 inches thick (61 cm long by 30 cm deep by 2.03 mm thick); for use with 1x systems and for pavement profiles less than 12 inches (30 cm) deep.
b. No. UB18-2: 24 inches long by 18 inches deep by 0.080 inches thick (61 cm long by 46 cm deep by 2.03 mm thick); for use with 2x and 3x systems, and for pavement profiles 12 inches or more in depth.

2. Products meeting this specification:
a. DeepRoot Tree Root Barrier (DeepRoot Green Infrastructure, LLC)

SPECIFIER: Select one or more of the Water+Air System assemblies specified below as applicable to your Project design.

B. Water+Air System: Used as a standalone system or in conjunction with the Silva Cell, the Water+Air System enables water and air to be directly added to tree roots and the surrounding soil system.

[1. Water+Air System 01:
a. Cast aluminum body
b. Stainless steel grate
c. Height -3 ¾” (85mm)
d. Compatible with 3” and 4” (80mm and 100mm) pipe

[2. Water+Air System 02:
a. Cast aluminum body
b. Stainless steel gate
c. Threaded for adjustable height

d. Height- adjustable 3 ½" (89mm) – 10 ½" (267mm)
e. Compatible with 3" and 4" (80mm and 100mm) diameter pipe

SPECIFIER: The Following pipe is an optional component of Water+Air System 01 and 02 assemblies specified above.

[f. Pipe
1. High density polyethylene corrugated pipe
2. Compliant with ASTM F405 and F667, SCS 606 and AASHTO M252
3. Knife cut perforations

[3. Water+Air System (Root Ball)
a. 3" diameter pipe (length per size of tree opening), compatible tee, flexible transition, and heavy-duty plastic grate

5. Products meeting this specification:
   a. DeepRoot Water+Air System (DeepRoot Green Infrastructure, LLC)

SPECIFIER: The following products may be provided by DeepRoot Green Infrastructure, LLC, or by other sources.

B. Geogrid: Net-shaped woven polyester fabric with PVC coating, uniaxial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids; used to provide a stabilizing force within soil structure as the fill interlocks with the grid.
   1. Tensile strength at ultimate (ASTM D6637):
      a. 1850 lbs/ft (27.0 kN/m) minimum
   2. Creep reduced strength (ASTM D5262):
      a. 1000 lbs/ft (14.6 kN/m) minimum
   3. Long term allowable design load (GRI GG-4):
      a. 950 lbs/ft (13.9 kN/m) minimum
   4. Grid aperture size (MD):
      a. 0.8 inch (20 mm) minimum
   5. Grid aperture size (CD):
      a. 1.28 inch (32 mm) maximum
   6. Roll size: 6-foot (1.8-m) width is preferred, up to 18-foot (5.4-m).
   7. Products meeting this specification:
      a. Stratagrid SG 150; http://www.geogrid.com
      b. Miragrid 2XT; http://www.tencate.com
      c. Fortrac 35 Geogrid; (http://www.hueskerinc.com
      d. SF 20 Biaxial Geogrid; http://www.synteen.com

C. Geotextile: composed of high tenacity polypropylene yarns which are woven into a network such that the yarns retain their relative position and is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

   1. Tensile strength at ultimate (ASTM D4595):
      a. 4800 lbs/ft (70.0 KN/m) MD minimum
      b. 4800 lbs/ft (70.0 KN/m) CD minimum
   2. Tensile strength at 5% strain (ASTM D4595)
      a. 2400 lbs/ft (35.0 KN/m) MD minimum
      b. 3000 lbs/ft (43.8 KN/m) CD minimum
   3. Flow rate (ASTM D4491):
      a. 30 gal/min/ft2 (2648 l/min/m2) minimum
   4. Apparent opening size (ASTM D4751):
      a. 30 sieve (0.60 mm)
   5. UV Resistance (at 500 hours):
      a. 80 percent strength retained
   6. Products meeting this specification:
      a. Mirafi HP570; http://www.tencate.com

b. Geolon PP40; http://www.tencate.com
c. Nilex Woven 2044 (Nilex); http://www.nilex.com

D. Plastic Cable Ties: A tensioning device or tool used to tie similar or different materials together with a specific degree of tension.

2.05 OTHER RELATED MATERIALS

A. Wood Blocking: Nominal dimensioned untreated lumber used for spacing assembled Silva Cells.
B. Drain and Distribution Pipes:

SPECIFIER: Consult with Project Engineer for proper selection and add information below or refer to their Specification Section.

1. [**Insert applicable drain pipe selection**] [**Refer to Section 32 84 00**] [**insert other Section title**]

C. Aggregate Subbase (Below Silva Cell Base):
1. Aggregate meeting one of the following specifications:

SPECIFIER: Consult with Project Engineer for proper selection and edit accordingly.

a. Complying ASTM D1241, Type I, Gradation B; Type I mixtures shall consist of stone, gravel, or slag with natural or crushed sand and fine mineral particles passing a No. 200 sieve.

Sieve	Percent Passing
1-1/2 inches (37.5 mm)	100
1 inch (25 mm)	75 to 95
3/8 inch (9.5 mm)	40 to75
No 4 (4.75 mm)	30 to 60
No 10 (2 mm)	20 to 45
No 40 (425 µm)	15 to 30
No 200 (75 µm)	5 to 15

b. Local Department of Transportation (DOT) virgin aggregate that most closely meets the gradation of ASTM D1241.
c. Ontario Provincial Standard Specification (OPSS) 1010 Granular A. Dense graded aggregates intended for use as granular base within the pavement structure, granular shouldering, and backfill.

Sieve	Percent Passing
26.5 mm	100
19 mm	85 to100
13.2 mm	65 to90
9.5 mm	50 to73
4.75 mm	35 to55
1.18 mm	15 to 40
300 µm	5 to 22
75 µm	2 to 8

D. Aggregate Base Course (Above Silva Cell Deck):
1. Same as aggregate subbase specified above.

E. Aggregate Base Course for Porous Pavement (Above Silva Cell Deck):
1. Aggregate complying with ASTM D448, No. 57.

Sieve	Percent Passing
1-1/2 inches (37.5 mm)	100
1 inch (25 mm)	95 to 100
1/2 inch (12.5 mm)	25 to 60
No 4 (4.75 mm)	0 to 10
No 8 (2.36 mm)	0 to 5

F. Setting Bed for Unit Pavers (Above Silva Cell Deck):
   1. Aggregate complying with ASTM D448, No. 8.

Sieve	Percent Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85 to 100
No 4 (4.75 mm)	10 to 30
No 8 (2.36 mm)	0 to 10
No 16 (1.18 mm)	0 to 5

G. Backfill Material (Adjacent to Silva Cells): Clean, compactable, coarse grained fill soil free of organic material, trash and other debris, and free of toxic material injurious to plant growth.
H. Planting Soil: Refer to Section 32 94 56 - Planting Soil for Silva Cells.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the conditions under which the Silva Cells are to be installed.
   1. Carefully check and verify dimensions, quantities, and grade elevations.
   2. Carefully examine the Drawings to become familiar with the existing underground conditions before digging. Verify the location of aboveground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system.

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the subparagraph below as applicable.

   3. Notify the Contractor and the [**Landscape Architect**] [**Architect**] [**Engineer**] in writing in the event of conflict between existing and new improvements, of discrepancies, and other conditions detrimental to proper and timely completion of the installation.
   4. Obtain written approval of changes to the Work prior to proceeding. Proceed with installation only after changes have been made and unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Take proper precautions as necessary to avoid damage to existing improvements and plantings.
B. Prior to the start of Work, layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the complete Silva Cell system.
C. Coordinate installation with other trades that may impact the completion of the Work.

3.03 TEMPORARY PROTECTION

A. Protect open excavations and Silva Cell system from access and damage both when Work is in progress and following completion, with highly visible construction tape, fencing, or other means until related construction is complete.
B. Do not drive vehicles or operate equipment over the Silva Cell system until the final surface material has been installed.

3.04 EXCAVATION

A. General: Excavate to the depths and shapes indicated on the Drawings. Provide smooth and level excavation base free of lumps and debris.
B. Confirm that the depth of the excavation is accurate and includes the full section of materials required to place the subbase aggregate, Silva Cell, and pavement profile as indicated on the Drawings.
C. Over-excavate beyond the perimeter of the Silva Cell to allow for:
    1. The extension of aggregate subbase beyond the Silva Cell layout as shown on the Drawings.
    2. Adequate space for proper compaction of backfill around the Silva Cell system.

D. If unsuitable subgrade soils are encountered, consult the Owner's geotechnical consultants for directions on how to proceed.

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

E. If conflicts arise during excavation, notify the [**Landscape Architect**] [**Architect**] [**Engineer**] in writing and make recommendations for action. Proceed with Work only when action is approved in writing.

3.05 SUBGRADE COMPACTION

A. Compact subgrade to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method, or as approved by the Owner’s geotechnical representative.
B. Do not exceed 10 percent slope for subgrade profile in any one direction. If the 10 percent slope is exceeded, contact manufacturer's representative for directions on how to proceed.

3.06 INSTALLATION OF GEOTEXTILE OVER SUBGRADE

A. Install geotextile over compacted subgrade.
    1. Lay geotextile flat with no folds or creases.
    2. Install the geotextile with a minimum joint overlap of 18 inches (450 mm).

3.07 INSTALLATION OF AGGREGATE SUBBASE BELOW SILVA CELL BASES

A. Install aggregate subbase to the depths indicated on the Drawings.
B. Extend subbase aggregate a minimum of 6 inches (150 mm) beyond the base of the Silva Cell layout.
C. Compact aggregate subbase to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method.
D. Do not exceed 10 percent slope on the surface of the subbase. Where proposed grades are greater than 10 percent, step the Silva Cells to maintain proper relation to the finished grade.

3.08 INSTALLATION OF SILVA CELL BASE

A. Install the Silva Cell system in strict accordance with manufacturer's instructions and as specified herein; where requirements conflict or are contradictory, follow the more stringent requirements.
B. Layout and Elevation Control:
    1. Provide layout and elevation control during installation of the Silva Cell system to ensure that layout and elevations are in accordance with the Drawings.

C. Establish the location of the tree openings in accordance with the Drawings. Once the trees are located, mark the inside dimensions of the tree openings on the prepared subbase.
D. Locate and mark other Project features located within the Silva Cell layout (e.g. light pole bases, utility pipes). Apply marking to identify the extent of the Silva Cell layout around these features.

Follow the layout as shown on the Drawings to ensure proper spacing of the Silva Cell bases. Refer to the Drawings for offsets between these features and the Silva Cells.

E. Check each Silva Cell component for damage prior to placement. Reject cracked or chipped units.

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

F. Place the Silva Cell bases on the compacted aggregate subbase. Start at the tree opening and place Silva Cell bases around the tree openings as shown on the Drawings.

G. Working from tree opening to tree opening, place Silva Cell bases to fill in the area between tree openings.
   1. Maintain spacing no less than 1 inch (25 mm) and no more than 6 inches (150 mm) apart, assuming geotextile covering the decks meets the specifications in section 2.04 paragraph C.

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

H. Follow the Silva Cell layout plan as shown on the Drawings.

I. Install Silva Cell bases around, over, or under existing or proposed utility lines, as indicated on the Drawings.

J. Level each Silva Cell base as needed to provide full contact with subbase. Adjust subbase material, including larger pieces of aggregate, so each base sits solidly on the surface of the subbase. Silva Cell bases that rock or bend over any stone or other obstruction protruding above the surface of the subbase material are not allowed. Silva Cell bases which bend into dips in the subbase material are not allowed. The maximum tolerance for deviations in the plane of the subbase material under the bottom of the horizontal beams of each Silva Cell base is 1/4 inch in 4 feet (6 mm in 1200 mm).

K. Anchor Silva Cell base with 2 anchoring spikes per base.
   1. For applications where Silva Cells are installed over waterproofed structures, use wood blocking or similar spacing system consistent with requirements of the waterproofing system to maintain required spacing.

3.09 INSTALLATION OF SILVA CELL POSTS

SPECIFIER: Select either "1x", "2x", or "3x" or a combination of "1x", "2x", or "3x" in the paragraphs below as applicable.

A. [**1x Silva Cell System:**
   1. Attach 1x posts to the installed Silva Cell base. Each base will receive six 1x posts. Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.]

A. [**2x Silva Cell System:**
   1. Attach 2x posts to the installed Silva Cell base. Each base will receive six 2x posts. Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.]

A. [**3x Silva Cell System:**
   1. Attach 2x posts to the installed Silva Cell base. Each base will receive six 2x posts. Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.
   2. Following the placement of backfill and planting soil within the 2x posts, add a 1x post extension as described herein. A 2x post, used in combination with a 1x post is considered a 3x post assembly.]

3.10 INSTALLATION OF STRONGBACKS, GEOGRID, BACKFILL AND PLANTING SOIL

SPECIFIER: Delete the first paragraph below if there are no drain lines within the system.

A. For Silva Cell systems that have a perforated drain line located inside or adjacent to the system, consult Drawings for layout and details for requirements.
B. Install strongbacks on top of the Silva Cell posts by snapping into place over installed posts prior to installing planting soil and backfill.
    1. Strongbacks are required only during the placement and compaction of the planting soil and backfill.
    2. Move strongbacks as the Work progresses across the installation.
    3. Remove strongbacks prior to the installation of the Silva Cell decks.

C. Install geogrid around the perimeter of the Silva Cell system where the compacted backfill and planting soil interface.
    1. Do not place geogrid between the edge of the Silva Cells and adjacent planting areas.
    2. Cut the geogrid to allow for a 6-inch (150-mm) overlap at the Silva Cell base and a 12-inch (300-mm) overlap at the Silva Cell deck.
    3. Provide a minimum 12-inch (300-mm) overlap between adjacent sheets of geogrid.
    4. Secure geogrid with cable ties below the top of the posts, along the post ridges.

D. Place the first lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation. Place backfill to approximately the midpoint of the Silva Cell post. Do not compact.
E. Place the first lift of planting soil in the Silva Cell system to approximately the midpoint of the Silva Cell post.
    1. Level the planting soil throughout the system.
    2. Walk-through the placed planting soil to remove air pockets and settle the soil.
        a. Lightly compact soils by walking through the soil following placement.
        b. Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

F. Compact the first lift of backfill material, previously spread, to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method or in accordance with Project Specifications for hardscape areas, whichever is greater.
G. Add and compact additional backfill material so that the final finished elevation is at approximately the same level of the placed planting soil within the Silva Cells.
    1. Maintain the geogrid between the Silva Cell system and the backfill material at all times.

H. Place the second lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation so that the material is 2 to 3 inches below the top of the posts. Do not compact.
I. Place the second lift of planting soil inside of the Silva Cell to the bottom of the strongbacks. Walk through compact.

SPECIFIER: For 1x or 2x System, skip to Article 3.11 - INSTALLATION OF IRRIGATION AND WATER HARVESTING SYSTEM.

SPECIFIER: For 3x System, continue below.

J. Remove strongbacks, place one 1x posts into each of the previously-installed 2x posts. Rotate clockwise to snap in place, forming a 3x post assembly.
K. Immediately reinstall strongbacks on top of the post assembly.
L. Repeat process of alternately placing backfill and planting soil so that elevation of the compacted backfill and the walked-through compacted planting soil are just below the level of the strongbacks.

3.11 INSTALLATION OF IRRIGATION AND WATER HARVESTING SYSTEM (including but not limited to Deeproot Water+Air System components)

SPECIFIER: Water is critical to the success of the Silva Cell system; trees planted in the Silva Cell system must receive adequate water to ensure survival of the living system during periods of drier weather. Harvest of natural rainwater or supplemental water must be a part of the system, either through pressurized or non-pressurized systems, within the soil of the Silva Cell system. Coordinate with required irrigation installations. Irrigation should be installed within the entire soil system, not only at the tree openings.

A. Install irrigation and water harvesting system in accordance with the Drawings and Specifications. Remove only the minimum number of strongbacks needed to accommodate the Work and reinstall them immediately upon completion to maintain alignment of posts.

3.12 INSTALLATION OF SILVA CELL DECK

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

A. Obtain final approval by the [**Landscape Architect**] [**Architect**] [**Engineer**] of planting soil installation prior to installation of the Silva Cell decks.
B. Remove strongbacks, level out the planting soil, and immediately install decks over the posts below. Place deck over the top of the posts. Push decks down until the deck clips lock into the posts, snapping the deck into place.
C. Fold the 12 inches (300 mm) of geogrid onto the top of the decks.

3.13 FINAL BACKFILL PLACEMENT AND COMPACTION

A. Place and compact final lift of backfill material to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method, such that the backfill is flush with the top of the installed deck. Do not allow compacting equipment to come in contact with the decks.

3.14 INSTALLATION OF GEOTEXTILE AND AGGREGATE BASE COURSE OVER THE DECK

A. Ensure geotextile meets the specifications in section 2.04 paragraph C.
B. Place geotextile over the top of the deck and extend to the edge of the excavation. Overlap joints a minimum of 18 inches (450 mm). Leave enough slack in the geotextile for the aggregate base course to push the geotextile down in the gaps in between the decks.
C. Install the aggregate base course (including aggregate setting bed if installing unit pavers) over the geotextile immediately after completing the installation of the fabrics. Work the aggregate from one side of the layout to the other so that the fabric and aggregate conform to the Silva Cell deck contours.
D. Maintain equipment used to place aggregate base course completely outside the limits of the Silva Cell excavation area to prevent damage to the installed system.
E. For large or confined areas, where aggregate cannot easily be placed from the edges of the excavated area, obtain approval for the installation procedure and types of equipment to be used in the installation from the Silva Cell manufacturer.
F. Compact aggregate base course(s) to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Utilize a vibration or plate compactor with a maximum weight of 800 lbs (362.87 kg).
G Do not drive vehicles or operate equipment over the completed aggregate base course.

3.15 INSTALLATION OF CONCRETE CURBS AT TREE OPENINGS, AGGREGATE SUBBASE AND PAVEMENT ABOVE THE SILVA CELL SYSTEM

A. Place concrete curbs along planting areas and tree openings as shown on the Drawings to retain the aggregate base course from migrating into the planting soil.

B. When staking concrete forms (e.g. curbs around the tree openings), prevent stakes from penetrating the Silva Cell decks.
C. Turn down edge of concrete paving to the Silva Cell deck along the edges of tree openings or planting areas to retain the aggregate base course material.
D. When paving type is a unit paver or other flexible material, provide a concrete curb under the paving at the edge of the Silva Cell deck to retain the aggregate base course material at the tree opening.
E. Place paving material over Silva Cell system in accordance with the Drawings.
   1. The Silva Cell system does not fully meet loading strength until the final paving is installed. Do not operate construction equipment on top of the Silva Cell system until paving installation has been completed.

F. Use care when placing paving or other backfill on top of Silva Cell system to prevent damage to the Silva Cell system or its components.

3.16 INSTALLATION OF ROOT BARRIERS

A. Install root barrier in accordance with manufacturer's installation instructions.

3.17 INSTALLATION OF PLANTING SOIL WITHIN THE TREE PLANTING AREA

A. Remove rubble, debris, dust and silt from the top of the planting soil within the tree opening that may have accumulated after the initial installation of the planting soil within the Silva Cells.
B. Install additional planting soil within the tree openings, to the depths indicated on the Drawings.
   1. Use the same soil used within the Silva Cells for planting soil within the tree openings.

C. Compact planting soil under the tree root ball as needed to prevent settlement of the root ball.
D. Place trees in accordance with the Drawings.

3.18 PROTECTION

A. Keep construction traffic away from the limits of the Silva Cells until the final pavement profile is in place. The Silva Cell system does not fully meet loading strength until the final paving is installed.
   1. Do not operate equipment directly on top of the Silva Cell system until paving installation has been completed.
   2. Provide fencing and other barriers to prevent vehicles from entering into the Silva Cell area.

B. When the Silva Cell installation is completed and the permanent pavement is in place, limit traffic and construction related activities to only loads less than the design loads.

3.19 CLEAN UP

A. Perform clean up during installation and upon completion of the Work. Maintain the site free of soil, sediment, trash and debris. Remove excess soil materials, debris, and equipment from the site following completion of the Work of this Section.
B. Repair damage to adjacent materials and surfaces resulting from installation of this Work using mechanics skilled in remedial work of the construction type and trades affected.

END OF SECTION

Event Summary - Supply and Delivery of Soil Cells

Type	Request for Proposal	**Number**	PS20220050-ENG-RFP
Stage Title	-	**Organization**	CityofVancouver
Currency	Canadian Dollar	**Event Status**	Awarded
Work Group	Engineering Services	**Exported on**	01/08/2023
Exported by	Abrar Khan	**Estimated Value**	350,000.00 CAD
Payment Terms	-		

Custom Data

Additional Data

Category	Operational Purchases (OPS)
SCM Manager	Susan Jing Su
Purchase Requisition (P.Req.) Number	21036091
Requestor (from P.Req.)	HALLKR

Bid and Evaluation

Respond by Proxy	Disallow	**Use Panel Questionnaire**	Yes
Best Value	Yes	**CPQP**	No
Best Value Price%	35%	**Best Value Score%**	65%
Sealed Bid	Yes	**Auto Score**	No
		Cost Analysis	No
Alternate Items	No	**Confidential Pricing**	Yes

Visibility and Communication

Visible to Public Yes

Enter a short description for this public event

Supply and Delivery of Soil Cell require to support 40 trees .

Commodity Codes

Commodity Code	Description
40201736	OPSUPPLIES - Dirt and Soil
10111216	CONSTR - Pedestrian Walkways & Sidewalks

Event Dates

Time Zone	PDT/PST - Pacific Standard Time (US/Pacific)
Released	-
Open	12/08/2022 5:30 PM PDT
Close	16/09/2022 3:00 PM PDT
Sealed Until	16/09/2022 3:00 PM
	Show Sealed Bid Open Date to Supplier
Q&A Close	09/09/2022 3:00 PM PDT

Description

A. KEY INFORMATION

1.0 SUMMARY OF OPPORTUNITY

The proponent shall provide all specification related to the supply and delivery of soil cells to the City of Vancouver. This supply contract will be non-exclusive and guarantee only one large capital infrastructure project, of which 20 m^3 to 30 m^3 of soil volume per tree will be required to support 40 trees in the engineering right of way. Additional product may be requested on an as-needed basis for a variety of other projects within the contract's term. For the purpose of this RFP, please use an estimate of 30 m^3 per tree.

2.0 THIS RFP

1. The City of Vancouver (the "**City**") is issuing this Request for Proposals, as may be amended from time to time (the "**RFP**") to invite interested parties that are not, by the terms hereof, barred from participating in this RFP (each, a "**Proponent**") to submit a proposal to the City (a "**Proposal**") for the opportunity described in Section 1.1 above in accordance with the terms of this RFP.
2. The City intends to select a Proponent with the capability and experience to efficiently and cost-effectively meet the objectives and requirements described in the RFP. The City then anticipates entering into negotiations with that Proponent, which will conclude in the execution of a contract between the Proponent and the City (an "**Agreement**"). Notwithstanding the foregoing, the City may, in its discretion: (i) decline to select any Proponent; (ii) decline to enter into any Agreement; (iii) select multiple Proponents for negotiation; or (iv) enter into one or more Agreements respecting the subject matter of the RFP with one or more Proponents or other entities at any time. The City may also terminate the RFP at any time.
3. This RFP consists of the following components:
    1. SUMMARY: Sets out key information and dates and includes Instructions to Proponents for the RFP process.
    2. PREREQUISITES: Includes the RFP Legal Terms and Conditions, which the Proponent must agree to as a prerequisite to the submission of a Proposal.
    3. BUYER ATTACHMENTS: Includes the scope of work contemplated under the RFP (the "**Scope of Work**"), the City's form of agreement for the RFP that will be the basis of any Agreement entered into pursuant to the RFP process (the "**Form of Agreement**") as well as other applicable documents and forms.
    4. SUPPLIER ATTACHMENTS: Location where the Proponent may upload additional attachments for its Proposal, including any attachments or documents expressly requested under the terms of this RFP. Proponents should note that the City invites Proposals that are concise and responsive to requests for information in the RFP. The City is not inviting lengthy, generalized submissions with respect to the Proponent's services or the issues referenced in the RFP.
    5. QUESTIONS: Includes questionnaires to be completed by the Proponent as part of its Proposal (each, a "**Questionnaire**"), in accordance with the instructions provided in the applicable questionnaire.
    6. ITEMS: Includes the pricing sheet for the Work which the Proponent is required to complete as part of its Proposal.
4. The RFP will be administered through this website (JAGGAER) that is the City's electronic procurement portal (the "**Supplier Portal**"). Proposals may only be submitted via the Supplier Portal in the format requested by the City. Each Proponent is solely responsible for reviewing and complying with any Supplier Portal terms and conditions which apply to and govern the use of the Supplier Portal. If there is any inconsistency or conflict between the provisions of this RFP and the Supplier Portal terms and conditions, then the provisions of this RFP will govern.

3.0 PROPOSED TERM OF ENGAGEMENT

1. The term of any Agreement is expected to be a three (3)-year period, with three (3) possible two (2)-year extensions, for a maximum total term of nine (9) years.

4.0 PRICING

1. All prices quoted in any Proposal are to be exclusive of applicable sales taxes calculated upon such prices, but inclusive of all other costs.
2. Prices must be quoted in Canadian currency and fixed prices must be quoted for the full term of the Proponent's proposed agreement.
3. Prices are to be quoted CIP, destination (Incoterms, 2010). For the avoidance of doubt, freight, insurance, unloading at the destination designated by the City, import duties, brokerage, royalties, handling, overhead, profit and all other similar costs are to be included in quoted prices.

5.0 EVALUATION OF PROPOSALS

1. The City currently intends that all Proposals submitted to it in accordance with the RFP will be evaluated by City representatives, using quantitative and qualitative tools and assessments, as appropriate, to determine which Proposal or Proposals offer the overall best value to the City. In so doing, the City expects to examine not only financial terms, but also:

   (a) ability to deliver the Requirements (as defined in Part B) as and when required;

   (b) design process, fabrication methodology and product life cycle;

   (c) proven skills, knowledge and experience in delivering a similar scope of work;

   (d) proposed streamlined order process and strategic delivery capabilities;

   (e) financial offering, including, but not limited to, prices, customer support, value-added services, and discounts;

   (f) product quality and satisfaction of current industry standards;

   (g) product delivery lead-time and warranty;

   (h) business reputations and capabilities;

   (i) proponent’s historic performance in delivering the defined services and honoring the defined terms and conditions of prior executed Agreement(s) with the City;

   (j) Sustainability Engagement;

   (k) creative and innovative ideas to execute the objectives;

   (l) ability to meet the City’s insurance requirement; and

Evaluation Criteria	Evaluation Weighting
Technical	40%
Financial	45%
Sustainability	15%
Total	100%

B. INSTRUCTIONS TO PROPONENTS

1.0 RFP PROCESS - GENERAL

1. Except where expressly stated otherwise in Appendix 1 - Legal Terms and Conditions of this RFP: (i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City.
2. No bid security is required from Proponents in connection with the submission of Proposals because no Proposal will be deemed to be an irrevocable or otherwise binding legal offer by a Proponent to the City. The legal obligations of a Proponent that will arise upon the submission of its Proposal will be limited to the terms and conditions stated under the heading "Legal Terms and Conditions" in Appendix 1 - Legal Terms and Conditions of RFP.
3. The execution of an Agreement may be contingent on funding being approved, and the relevant Proposal being approved, by the Vancouver City Council.
4. IF A POTENTIAL PROPONENT BELIEVES THAT THE CITY MAY BE UNABLE TO SELECT IT DUE TO A CONFLICT OF INTEREST, BUT IS UNCERTAIN ABOUT THIS, THE POTENTIAL PROPONENT IS URGED TO CONTACT THE ABOVE-MENTIONED INDIVIDUAL AS SOON AS POSSIBLE WITH THE RELEVANT INFORMATION SO THAT THE CITY MAY ADVISE THE POTENTIAL PROPONENT REGARDING THE MATTER.

2.0 SUBMISSION OF PROPOSALS

1. Proponents should submit their Proposals on or before the time and date specified as the “Event Close Date” in the Summary section of this RFP (the “**Closing Time**”).
2. To be considered by the City, a Proposal must be submitted to the City via the Supplier Portal, in the format expressly requested pursuant to this RFP.
3. Any submitted Proposal may be amended or withdrawn prior to the Closing Time via the Supplier Portal. Proposal amendments or requests for withdrawal submitted by any other means will not be accepted.
4. All costs associated with the preparation and submission of a Proposal, including any costs incurred by a Proponent after the Closing Time, will be borne solely by the Proponent.
5. Unnecessarily elaborate Proposals are discouraged. Proposals should be limited to the items expressly requested by the City pursuant to this RFP.
6. The City is willing to consider any Proposal from two or more Proponents that wish to form a consortium for the purpose of responding to the RFP, provided that they disclose the names of all members of the consortium. Nonetheless, the City has a strong preference for Proposals submitted by a single Proponent, including a Proponent that would act as a general contractor and use subcontractors as required.
7. Proposals that do not comply in full with the terms hereof may or may not be considered by the City, in the City’s sole discretion.

3.0 CHANGES TO THE RFP AND FURTHER INFORMATION

1. The City may amend the RFP or make additions to it at any time.
2. It is the sole responsibility of Proponents to check the City’s Supplier Portal regularly for amendments, addenda, and questions and answers in relation to the RFP.
3. Proponents must not rely on any information purported to be given on behalf of the City that contradicts the RFP, as amended or supplemented in accordance with the foregoing Section 3.2.
4. All enquiries regarding this RFP must be made through the Q & A Board on the Supplier Portal. In-person or telephone enquiries are not permitted. Any communication from potential Proponents to City staff outside of the Supplier Portal regarding the content of this RFP may lead to disqualification of the Proponent from this RFP process, at the City’s sole discretion.

4.0 EVALUATION PROCESS

1. The City may open or decline to open Proposals in such manner and at such times and places as are determined by the City.
2. The City will retain complete control over the RFP process at all times until the execution and delivery of an Agreement or Agreements, if any. The City is not legally obligated to review, consider or evaluate Proposals, or any particular Proposal, and need not necessarily review, consider or evaluate Proposals, or any particular Proposal in accordance with the procedures set out in the RFP. The City may continue, interrupt, cease or modify its review, evaluation and negotiation process in respect of any or all Proposals at any time without further explanation or notification to any Proponents.
3. The City may, at any time prior to signing an Agreement, discuss or negotiate changes to the scope of the RFP with any one or more of the Proponents without having any duty or obligation to advise the other Proponents or to allow the other Proponents to vary their Proposals as a result of such discussions or negotiations.
4. The City may elect to short-list Proponents and evaluate Proposals in stages. Short-listed Proponents may be asked to provide additional information or details for clarification, including by attending interviews, making presentations, supplying samples, performing demonstrations, furnishing technical data or proposing amendments to the Form of Agreement. The City will be at liberty to negotiate in parallel with one or more short-listed Proponents, or in sequence, or in any combination, and may at any time terminate any or all negotiations.
5. The City may also require that any proposed subcontractors undergo evaluation by the City.
6. For the avoidance of doubt, notwithstanding any other provision in the RFP, the City has in its sole discretion, the unfettered right to: (a) accept any Proposal; (b) reject any Proposal; (c) reject all Proposals; (d) accept a Proposal which is not the lowest-price proposal; (e) accept a Proposal that deviates from the requirements or the conditions specified in the RFP; (f) reject a Proposal even if it is the only Proposal received by the City; (g) accept all or any part of a Proposal; (h) split the scope of work between one or more Proponents; and (i) enter into one or more agreements respecting the subject matter of the RFP with any entity or entities at any time. Without limiting the foregoing, the City may reject any Proposal by a Proponent that has a conflict of interest, has engaged in collusion with another Proponent or has otherwise attempted to influence the outcome of the RFP other than through the submission of its Proposal.
7. The City currently intends that Proposals will be evaluated by the City in relation to their overall value, which will be assessed in the City's sole and absolute discretion. In assessing value, the City expects to consider the factors described in Section A.6. and Section B.4. above, among others.

5.0 CERTAIN APPLICABLE LEGISLATION

1. Proponents should note that the City of Vancouver is subject to the *Freedom of Information and Protection of Privacy Act* (British Columbia), which imposes significant obligations on the City's consultants or contractors to protect all personal information acquired from the City in the course of providing any service to the City.
2. Proponents should note that the *Income Tax Act* (Canada) requires that certain payments to non-residents be subject to tax withholding. Proponents are responsible for informing themselves regarding the requirements of the *Income Tax Act* (Canada), including the requirements to qualify for any available exemptions from withholding.

6.0 CITY POLICIES

1. The City's Procurement Policy, Ethical Purchasing Policy and related Supplier Code of Conduct align the City's approach to procurement with its corporate social, environmental and economic sustainability values and goals. They evidence the City's commitment to maximize benefits to the environment and

the community through product and service selection, and to ensure safe and healthy workplaces, where human and civil rights are respected. Each Proponent is expected to adhere to the supplier performance standards set forth in the Supplier Code of Conduct. The Ethical Purchasing Policy shall be referred to in the evaluation of Proposals, to the extent applicable.

2. The City's Alcohol, Controlled Drugs and Medications Policy applies to all contractors doing work on behalf of the City. The policy is intended to set expectations regarding the use of alcohol, medication and controlled drugs that may render an employee unfit for work, impair performance or cause risk of harm to health and safety. The successful Proponent will be required to ensure compliance with the policy by its employees when doing work for the City.

7.0 LIVING WAGE EMPLOYER

1. The City of Vancouver is a "Living Wage Employer". As such, the City requires all firms that are contracted by the City to provide services on City-owned and leased properties to pay employees who perform those services on City property a Living Wage as calculated by the Living Wage for Families Campaign.
2. The Living Wage includes the value of any non-mandatory benefits such as paid sick leave, employer-paid Medical Services Plan premiums and extended health benefits. Please visit the Living Wage for Families Campaign website for current Living Wage rates.
3. Proponents should refer to the Form of Agreement for the specific requirements related to the Living Wage, which include:
    1. paying the Living Wage to all employees who perform services pursuant to the Agreement on City property during the term of the Agreement; and,
    2. ensuring that all subcontractors pay the Living Wage to their employees who perform services on City property during the term of the Agreement.
4. Failure to comply with the Living Wage requirement will entitle the City to terminate the Agreement.

8.0 SCOPE OF WORK

1. The Scope of Work is current as of the date of open date of this RFP indicated in the Summary, but may change or be refined in the course of the evaluation of Proposals or otherwise.
2. Unless otherwise stated, if, and wherever, the Scope of Work states a brand name, a make, the name of a manufacturer, a trade name or a vendor catalogue number, it is for the purpose of establishing a grade or quality of materials, goods or equipment only. It is not intended to rule out the use of other equivalent materials, goods or equipment. If, however, products other than those specified are proposed in any Proposal, the Proposal must explicitly include under the heading "Alternative Solutions" the names of such products and their manufacturers, any trade names and any applicable vendor catalogue numbers, and the City may request that the Proponent provide specific evidence of equivalency. Evidence of quality in the form of samples may also be requested.
3. To the extent that the Scope of Work expresses estimates of quantities or volumes of goods or services expected to be required by the City, the City cannot offer any assurances that such quantities or volumes will in fact be required.

9.0 FORM OF AGREEMENT

1. The Form of Agreement sets out the City's proposed commercial terms for the Agreement. The City prefers that the commercial terms for the Agreement not vary from the commercial terms set out in the Form of Agreement. However, if any such terms are unacceptable to a Proponent, then the Proponent may include proposed amendments to the Form of Agreement with its Proposal in the manner indicated in the applicable Questionnaire. If a Proponent elects to include a proposed amendment, then the Proponent should indicate the rationale for the proposed amendment, the applicable change to the

language of the Form of Agreement, and the benefit to the City (such as amount of cost-savings), if any, applicable to the proposed amendment. A Proponent will be deemed to fully accept all the commercial terms for the Agreement as set out in the Form of Agreement, except as may be expressly indicated otherwise in its Proposal.

10.0 INSURANCE

1. A Certificate of Insurance is to be duly completed and signed by the Proponent's insurance agent or broker as evidence of its existing insurance, along with a letter from its insurance broker or agent indicating whether or not (and, if not, then to what extent) it will be able to comply with the insurance requirements set out in the Form of Agreement, should the Proponent be selected as a successful Proponent. (Any successful Proponent will also be required to provide proof of the satisfaction of all insurance requirements prior to or concurrently with the City entering into any Agreement.)

Stage Description

No description available.

Prerequisites

★ Required to Enter Bid

1 ★ **Instructions To Supplier :**

Acceptance of the Legal Terms and Conditions is required prior to proposal submission.

Certification

The Proponent acknowledges that it has reviewed and agrees to the Legal Terms and Conditions of RFP as attached.

Supplier Must Also Upload a File:

No

Prerequisite Content:

LEGAL TERMS AND CONDITIONS

1. The legal obligations of a Proponent that will arise upon the submission of its Proposal are stated in Appendix 1 - Legal Terms and Conditions of RFP. Except where expressly stated in these Legal Terms and Conditions: (i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City.
2. POTENTIAL PROPONENTS MUST REVIEW THESE LEGAL TERMS AND CONDITIONS CAREFULLY BEFORE SUBMITTING A PROPOSAL.

Buyer Attachments

Appendix 1 - Terms and Conditions RFP Process.pdf	Appendix 1 - Terms and Conditions RFP Process.pdf	../Attachments/Appendix 1 - Terms and Conditions RFP Process.pdf
PS20220050 - ENG - RFP - SOW.pdf	PS20220050 - ENG - RFP - SOW.pdf	../Attachments/PS20220050 - ENG - RFP - SOW.pdf
PS20220050-ENG-RFP_Soil Cell - Sample Form of Agreement_Aug 12 22.pdf	PS20220050-ENG-RFP_Soil Cell - Form of Agreement_Aug 12 22.pdf	../Attachments/PS20220050-ENG-RFP_Soil Cell - Form of Agreement_Aug 12 22.pdf
PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf	PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf	../Attachments/PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf
PS20220050-ENG-RFP - AMD1.pdf	PS20220050-ENG-RFP - AMD1.pdf	../Attachments/PS20220050-ENG-RFP - AMD1.pdf
PS20220050-ENG-RFP - AMD2.pdf	PS20220050-ENG-RFP - AMD2.pdf	../Attachments/PS20220050-ENG-RFP - AMD2.pdf

★ Supplier Response Is Required

Supplier Profile Content

Confidential Mode Enabled

Questions

Technical Proposal

Group 1.1

1.1.1	Provide a brief executive summary of your Proposal. File Upload	
1.1.2	Work Plan: Detail the sequential process by which the Proponent proposes to undertake the work. The Proponent's work plan should make reference to the Scope of Work as appropriate. Describe how your Proposal is responsive to the Scope of Work. File Upload	★
1.1.3	Notwithstanding any other provision hereof, the City welcomes Proposals respecting innovative or novel approaches to the City's objectives and requirements and may consider value-creating Proposals that derogate from the Scope ow Work. Provide details on any proposed innovative approaches to meeting the City's requirements. File Upload	★
1.1.4	Proponent Experience: Describe the type of entity (for example, individual, corporation, partnership, sole proprietorship) and if a joint venture, clearly state this and state who the joint venture parties are and identify who is acting as the lead. (i)Describe the company/entity history, business locations, size, and number of employees. (ii)Provide key personnel (and their qualifications) that will be performing the work on this project. (iii)Provide details, where available, of Proponent's experience with: •Environmental Compliance; •Construction Deadlines; •Operational Safety File Upload	★
1.1.5	Reference Projects: Provide information on reference projects to demonstrate the Proponent's experience and capabilities. Information may be provided on up to three (3) projects, and should focus on projects with similar supply agreements as described in the Scope of Work). For each reference project, provide the following information, including additional information as necessary, within the submission: (i)Project name, location, and client; (ii)The scale of the project (e.g. demonstration, commercial); (iii)Unit size and number of units; (iv)Maintenance and warranties provided; (v)Status of facility (e.g. operating, under construction); (vi)Major problems, market adaptations and lessons learned. File Upload	★
1.1.6	Delivery Lead Time & Local Storage: The proponent shall provide the typical lead-time from the order date, as well as any special offers being made to the City as part of this contract. Please provide the source of the upstream material being used in the product including the polymer resin source. Ensure that all special conditions of current market condition are included (i.e. supply chain delays, international transit delays, etc.). The proponent shall indicate whether there is a local warehouse or fulfillment center in the Metro Vancouver area. Please indicate the three closest storage locations, their capacities, and their average delivery time to the Vancouver area. File Upload	★
1.1.7	Product Specifications: The proponent shall provide full specifications concerning the soil cells and any additional product(s) required for the complete solution that will be provided to the City. Please see item 7.0 Soil Cell Specifications and 8.0 Additional Product Specifications in the Scope of Work for details. File Upload	★

1.1.8	Design Integration: The proponent shall include the ability of their product to integrate with commonly used Green Infrastructure materials such as liners (impermeable and permeable), as well as the possibility of integrating into irregularly shaped designs (i.e. not square or rectangular). The proponent shall also provide specifications on the ease of construction of their product. Please see item 10.0 Constructability in the Scope of Work for details. File Upload	★
1.1.9	Training and Installation: The proponent shall provide a sample of the training materials necessary for construction crews to familiarize themselves with before beginning construction. Please see item 11.0 Training and Installation in the Scope of Work for details. File Upload	★
1.1.10	Quality Control: The proponent shall provide details on their quality control process and plan for the successful installation and implementation of the product. File Upload	★
1.1.11	Warranty: Provide the City with the minimum and maximum warranty offered on each delivered product. Please reference to the attached Form of Agreement section 3.7 Warranty for more information associated with warranty The proponent shall also include their integration plan for future product updates. (I.e. Are older product models on hand for future repairs and/or replacements? How will new models integrate with the old models?) File Upload	★

Sustainability

Group 2.1

2.1.1	Majority owned/controlled by Multiple Select (Pick Many) Women Indigenous People Non-Profit/Charity (Soc. Ent.) Co-Op Community Contribution Corporation Ethno-Cultural LGBTQ2+ People with Disabilities Veteran Small Business	★
2.1.2	Environmental Sustainability Questions File Upload Environmental Sustainability Questions - ../Attachments/QuestionAttachments/PS20220050 - ENG-RFP - Environmental Sustainability Questions.doc	★
2.1.3	General SEPP Questions File Upload SEPP General Questions - ../Attachments/QuestionAttachments/PS20220050-ENG-RFP - SEPP -	★

Commercial Proposal - Pricing Schedule

Group 3.1

3.1.1	Complete & submit Commercial Proposal & Pricing Schedule in Excel format File Upload Commercial Proposal - Pricing Schedule - ../Attachments/QuestionAttachments/PS20220050 - ENG - RFP - Soil Cell - Commercial Proposal.xlsx	★

Form of Proposal

Group 4.1

4.1.1	Please complete the attached form. File Upload	★

Proponent's References

Group 5.1: Client Reference

5.1.1 Client Name
Text (Single Line)

5.1.2 Address (City and Country)
Text (Single Line)

5.1.3 Contact Name
Text (Single Line)

5.1.4 Title of Contact
Text (Single Line)

5.1.5 Telephone No.
Text (Single Line)

5.1.6 E-mail Address
Text (Single Line)

5.1.7 Length of Relationship
Text (Single Line)

5.1.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Group 5.2: Client Reference

5.2.1 Client Name
Text (Single Line)

5.2.2 Address (City and Country)
Text (Single Line)

5.2.3 Contact Name
Text (Single Line)

5.2.4 Title of Contact
Text (Single Line)

5.2.5 Telephone No.
Text (Single Line)

5.2.6 E-mail Address
Text (Single Line)

5.2.7 Length of Relationship
Text (Single Line)

5.2.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Group 5.3: Client Reference

5.3.1 Client Name
Text (Single Line)

5.3.2 Address (City and Country)
Text (Single Line)

5.3.3 Contact Name
Text (Single Line)

5.3.4 Title of Contact
Text (Single Line)

5.3.5 Telephone No.
Text (Single Line)

5.3.6 E-mail Address
Text (Single Line)

5.3.7 Length of Relationship
Text (Single Line)

5.3.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Certificate of Existing Insurance

Group 6.1

6.1.1 A Certificate of Existing Insurance is to be duly completed and signed by the Proponent's insurance agent or broker as evidence of its existing insurance, along with a letter from its insurance broker or agent indicating whether or not (and, if not, then to what extent) it will be able to comply with the insurance requirements set out in the Form of Agreement, should the Proponent be selected as a successful Proponent. (Any successful Proponent will also be required to provide proof of the satisfaction of all insurance requirements prior to or concurrently with the City entering into any Agreement.) ★

File Upload

Existing Insurance - ../Attachments/QuestionAttachments/Existing Insurance formatted.docx

Declaration of Supplier Code of Conduct Compliance

Group 7.1

7.1.1 All proposed suppliers are to complete and submit this Declaration of Supplier Code of Conduct Compliance form to certify compliance with the supplier performance standards set out in the Supplier Code of Conduct. ★

File Upload

Declaration of Supplier Code of Conduct Compliance - ../Attachments/QuestionAttachments/Declaration of Supplier Code of Conduct Compliance.docx

Subcontractors

Group 8.1

8.1.1 Do you propose to use any subcontractors?
Yes/No

8.1.2 Complete the attached form and upload.

File Upload

Subcontractors - ../Attachments/QuestionAttachments/Subcontractors.docx

Proposed Amendments to Form of Agreement

Group 9.1

9.1.1 Do you have any proposed amendments to Form of Agreement?
Yes/No

9.1.2 Complete the attached form and upload.

File Upload

Proposed Amendments to Form of Agreement - ../Attachments/QuestionAttachments/Proposed+Amendments+to+Form+of+Agreement.docx

Conflicts; Collusion; Lobbying

Group 10.1

10.1.1 Do you have any exceptions to Declaration as to no Conflict of Interest in RFP Process (Section 9.1 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.2 Provide details of your exceptions.

Text (Multi-Line)

10.1.3 Do you have any exceptions to Declaration as to No Conflict of Interest Respecting Proposed Supply (Section 9.2 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.4 Provide details of your exceptions.

Text (Multi-Line)

10.1.5 Do you have any exceptions to Declaration as to No Collusion (Section 9.3 of Appendix 1 - Legal Terms and Conditions of RFP)

Yes/No

10.1.6 Provide details of your exceptions.

Text (Multi-Line)

10.1.7 Do you have any exceptions to Declarations as to No Lobbying (Section 9.4 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.8 Provide details of your exceptions.

Text (Multi-Line)

Proof of WorkSafeBC Registration

Group 11.1

11.1.1 Attached proof of valid WorkSafeBC registration.

File Upload

Product Line Items

Group P1

#	Item Name, Commodity Code, Description	Qty.	UOM	Target Price	Allow Alternates	Requested Delivery
P1.1	TOTAL PRICE Supply and Delivery of Soil Cell	1	EA - Each	-		-

Service Line Items

There are no Items added to this event.

Price Components

There are no Price Components added to this event.

Suppliers

Onvia

Progress Intention Not Declared

Source Management
sourcemanagement@deltek.com

Cedar Crest Lands BC Ltd. (Cedar Crest Lands BC Ltd.)

Progress Intention Not Declared

Nathan Dickhof
nathan@cedarcrest.bc.ca

Prototype Integrated Solutions Inc.

Progress Intention Not Declared

Usman Anwar
usman.anwar@prototype.ca

DEEPROOT GREEN INFRASTRUCTURE, LLC (DeepRoot Canada Corp.)

Progress Awarded
Total Bid s.21(1)
Total Awarded 314,048.28 CAD

mjames@deeproot.com

GreenBlue Urban

Progress Invitation Unaccepted

inquiries@greenblue.com

Norwood Waterworks

Progress Response In Progress

Eric Keller
ekeller@norwoodwaterworks.com

EMCO Corporation (EMCO Corporation Waterworks)

Progress Submitted
Total Bid s.21(1)

Tyler Brown
tybrown@emcoltd.com

Pontarolo Engineering Inc.

Progress Invitation Unaccepted

Engineering@cupolex.ca

Landesign Landscape Construction (Landesign Landscape)

Progress Intention Not Declared

Moacyr Basto
moa@landesign.co

CityGreen

Progress Invitation Unaccepted

Stephen Lovering
stephen.lovering@citygreen.com

GreenBlue Infrastructure Solutions

Progress	Submitted
Total Bid	s.21(1)

Craig Melvin
craig.melvin@greenblue.com

Internal Notes & Attachments

Contract signed

Added By Donna Lee at 09/03/2023 2:53 PM

OA4600009224
PO4500623305

Contract Approval Summary

Added By Donna Lee at 17/10/2022 1:51 PM

PS20220050 - Supply and Delivery of Soil Cell

PS20220050-ENG-RFP - CAS - Final.pdf	../Attachments/NotesAttachments/PS20220050-ENG-RFP - CAS - Final.pdf

Q&A Board

Subject = Commercial Proposal		Public Thread
Q: I would like to clarify the different pricing between Table 1,2 and 3 Table 1 is for the first year (40 trees,30m3 of soil per tree) Table 2 is for volume discounts in the first 3 years of the contract - what quantities give a volume discount and what the price breaks are? Table 3 is for year 2 and 3 of the contract term - show how the price might increase if there is a price increase Please confirm or clarify.	Question added by: Donna Lee	12/09/2022 6:03 PM PDT
A: Table 1 is current pricing for the proposed volume that will likely be required for an upcoming project. Table 2 is optional – Please input in this table if there is a certain volume of product at which a discount can be applied. Table 3 should outline how your company adjusts costs with changes in the market, or with time, or with raw material prices, etc. Table 3 is meant to show what factors are used in calculating your product cost so that we can see what factors will affect said price in the future.	Answered by: Donna Lee	12/09/2022 6:03 PM PDT

Subject = Commercial Proposal (DEEPROOT GREEN INFRASTRUCTURE, LLC)		Private Thread
Q: I would like to clarify the different pricing between Table 1,2 and 3 Table 1 is for the first year (40 trees,30m3 of soil per tree) Table 2 is for volume discounts in the first 3 years of the contract - what quantities give a volume discount and what the price breaks are? Table 3 is for year 2 and 3 of the contract term - show how the price might increase if there is a price increase Please confirm or clarify.	Question added by: Michael James	09/09/2022 1:32 PM PDT
A: This questions has been answered in the Public Q&A	Answered by: Donna Lee	12/09/2022 6:04 PM PDT

Subject = Commercial Proposal - excel document		Public Thread
Q: Table 3 Do we base the pricing adjustments on the same quantity of Soil Cells as required in the first year of the contract?	Question added by: Donna Lee	08/09/2022 11:54 AM PDT
A: Yes, base the pricing adjustments on the same quantity of Soil Cells as Required in the first year of contract.	Answered by: Donna Lee	08/09/2022 11:54 AM PDT

Subject = Commercial Proposal - excel document		Public Thread
Q: Re: Table 2 - Volume Discounts. Does this pricing refer to the first year of the agreement. ie - volume discount for Soil Cells delivered in the 1st year of the contract.	Question added by: Donna Lee	08/09/2022 11:49 AM PDT
A: The contract is for 3 years but we want the pricing to be held firm for one year. If the pricing will change on the 2nd & 3rd year, please show the pricing increase for the 2nd & 3rd year.	Answered by: Donna Lee	08/09/2022 11:49 AM PDT

Subject = Commercial Proposal - excel document (DEEPROOT GREEN INFRASTRUCTURE, LLC)		Private Thread
Q: Table 3 Do we base the pricing adjustments on the same quantity of Soil Cells as required in the first year of the contract?	Question added by: Michael James	08/09/2022 11:21 AM PDT
A: This questions has been answered in Public Q&A section	Answered by: Donna Lee	08/09/2022 11:55 AM PDT

Subject = Commercial Proposal - excel document (DEEPROOT GREEN INFRASTRUCTURE, LLC)		Private Thread
Q: Re: Table 2 - Volume Discounts. Does this pricing refer to the first year of the agreement. ie - volume discount for Soil Cells delivered in the 1st year of the contract.	Question added by: Michael James	08/09/2022 11:19 AM PDT

A: This questions has been answered in Public Q&A section	Answered by: Donna Lee	08/09/2022 11:56 AM PDT

Subject = References (DEEPROOT GREEN INFRASTRUCTURE, LLC)		**Private Thread**
Q: Under the Technical Proposal, there is a Project References section 1.1.5 Is this separate from the Proponents References section?	Question added by: Michael James	07/09/2022 7:31 PM PDT
A: For Section 1.1.5 listed out in details regarding the projects as outlined in that section. For Proponents References, we need the contact information to check references. We will contact the references.	Answered by: Donna Lee	08/09/2022 9:24 AM PDT

Subject = Supply and Delivery of Soil Cells		**Public Thread**
Q: The RFP is asking for pricing of 30m3 of soil per tree using Soil Cells. In your sample drawing you are showing a one frame deep Soil Cell. This is the most expensive way to supply the soil volume. All Soil Cells come in different depths 1X, 2X and 3X. Do you want us to quote the most economical soil cell for the 30m3 of soil or 3 different quotes, one for each depth of Soil Cell?	Question added by: Donna Lee	06/09/2022 11:02 AM PDT
A: The most economical option would be best. The cross-section was just for reference and can be edited for a better solution. To clarify, the total depth including the paving assembly on top will be 1.5m, final depth is TBD based on the solution provided.	Answered by: Donna Lee	06/09/2022 11:02 AM PDT

Subject = ITEMS (DEEPROOT GREEN INFRASTRUCTURE, LLC)		**Private Thread**
Q: Under Group P1: Does the Quantity (1) refer to the number of Soil Cells to provide the city with 30m3 of soil per tree for 40 trees? How is Group P1 different from the Commercial Proposal?	Question added by: Michael James	01/09/2022 11:27 AM PDT
A: Please provide exactly which section you are referring to.	Answered by: Donna Lee	08/09/2022 10:21 AM PDT
Q: The Group P1 reference is under the ITEMS tab on the RFP web site.	Question added by: Michael James	08/09/2022 10:45 AM PDT
A: Group P1 is to enter the total bid price. You still need to fill out the commercial proposal - pricing schedule in details, breakdown of the costs/fees.	Answered by: Donna Lee	08/09/2022 10:52 AM PDT

Subject = Technical Proposal: Quality Control request (DEEPROOT GREEN INFRASTRUCTURE, LLC)		**Private Thread**
Q: Re: Quality Control: The proponent shall provide details on their quality control process and plan for the successful installation and implementation of the product As this is a Supply Only RFP, can we change the above text to read...? Quality Control: The proponent shall provide details on their quality control process.	Question added by: Michael James	30/08/2022 4:07 PM PDT
A: Will do an amendment to take out the 2nd part of the sentence.	Answered by: Donna Lee	08/09/2022 10:22 AM PDT

Subject = Supply and Delivery of Soil Cells		**Public Thread**
Q: The RFP is asking for pricing of 30m3 of soil per tree using Soil Cells. In your sample drawing you are showing a one frame deep Soil Cell. This is the most expensive way to supply the soil volume. All Soil Cells come in different depths 1X, 2X and 3X. Do you want us to quote the most economical soil cell for the 30m3 of soil or 3 different quotes, one for each depth of Soil Cell?	Question added by: Donna Lee	24/08/2022 9:45 AM PDT
A: The most economical option would be best. The cross-section was just for reference and can be edited for a better solution. To clarify, the total depth including the paving assembly on top will be 1.5m, final depth is TBD based on the solution provided.	Answered by: Donna Lee	24/08/2022 9:45 AM PDT

Subject = Supply and Delivery of Soil Cells (DEEPROOT GREEN INFRASTRUCTURE, LLC)		**Private Thread**
Q: The RFP is asking for pricing of 30m3 of soil per tree using Soil Cells. In your sample drawing you are showing a one frame deep Soil Cell. This is the most expensive way to supply the soil volume. All Soil Cells come in different depths 1X, 2X and 3X. Do you want us to quote the most economical soil cell for the 30m3 of soil or 3 different quotes, one for each depth of Soil Cell?	Question added by: Michael James	21/08/2022 7:26 AM PDT
Silva Cell 2 Tech sheet.pdf - ../Attachments/QABoardAttachments/Silva Cell 2 Tech sheet.pdf		
A: This question has been answered in Public Q&A section	Answered by: Donna Lee	07/09/2022 11:19 AM PDT

Subject = Supply and Deliver Soil Cells - RFP		**Public Thread**
Q: The summary document for the RFP, Section 4 Pricing, says that "1. Pricing should be "exclusive" of all sales taxes" However, the Pricing Schedule says under Instructions: Section 3 "Prices are to be "inclusive" of Prov. Sales Taxes". Please advise if sales tax are to be included in the price or not. Part B - Scope of Work Section 9 Design Integration Section 9 notes that "A standard tree trench drawing has been provided for reference." We have not been able to find the Standard Tree Trench drawing on the Supplier Portal. Please advise where the drawing can be found and/or please post the drawing to the portal.	Question added by: Donna Lee	18/08/2022 9:38 AM PDT
A: Prices are to be "exclusive" of all sales taxes. Amendment No. 1 has been issued with drawings.	Answered by: Donna Lee	18/08/2022 9:38 AM PDT

Subject = Supply and Deliver Soil Cells - RFP (DEEPROOT GREEN INFRASTRUCTURE, LLC)		**Private Thread**
Q: The summary document for the RFP, Section 4 Pricing, says that "1. Pricing should be "exclusive" of all sales taxes" However, the Pricing Schedule says under Instructions: Section 3 "Prices are to be "inclusive" of Prov. Sales Taxes". Please advise if sales tax are to be included in the price or not. Part B - Scope of Work Section 9 Design Integration Section 9 notes that "A standard tree trench drawing has been provided for reference." We have not been able to find the Standard Tree Trench drawing on the Supplier Portal. Please advise where the drawing can be found and/or please post the drawing to the portal.	Question added by: Michael James	16/08/2022 8:06 PM PDT
A: This Question has been answered in Public Q&A section	Answered by: Donna Lee	07/09/2022 11:19 AM PDT

Antek Madison Plastics Corp
100 Finchdene Sq
Scarborough, Ontario M1X 1C1
Phone: (416) 321-1170
Fax: (416) 321-2809

June 6 2022

Material Data Sheet

PP Blk 15 to 20M Homo Repro

Property	Test Method	English	SI
Melt Flow Rate @ 230°C	ASTM D1238	g/10min	15 - 22
Density	ASTM D792	g/cc	0.91 – 0.93
Tensile Strength at Yield (50 mm/min)	ASTM D638	psi	N/A
Elongation at Yield (50 mm/min)	ASTM D638	%	%
Flexural Modulus (1.3 mm/min), 1% Secant	ASTM D790	psi	180 – 190K
Notched Izod Impact Strength @ 73°F	ASTM D256	ft.-lbs/in	0.5 – 0.8
Heat Deflection Temperature @ 66psi	ASTM D648	255 °F	N/A °C

Antek Madison Plastics Corp.

Laboratory Department

BUREAU VERITAS

Bureau Veritas Certification

Baytech Plastics Inc.

320 Elizabeth Street Midland, ON L4R 4L6 Canada

This is a multi-site certificate, additional site(s) are listed on the next page(s)

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2015

Scope of certification

PLASTIC INJECTION MOULDING AND ASSEMBLY

Original cycle start date:	**24-October-1994**
Expiry date of previous cycle:	**12-September-2021**
Certification / Recertification Audit date:	**30-June-2021**
Certification/Recertification Cycle Start Date:	**21-September-2021**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**12-September-2024**

Certificate No.: **US015965** Version: **1** Issue Date: **21-September-2021**

Brian Sanders

UKAS MANAGEMENT SYSTEMS

0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: 16800 Greenspoint Park Drive, Suite 300S, Houston, TX 77060, USA

Further clarifications regarding the scope and validity of this certificate, and the applicability of the management system requirements, please call: +(800) 937-9311

BUREAU VERITAS

Bureau Veritas Certification

Baytech Plastics Inc.

ISO 9001:2015

Scope of certification

Site Name/Location	Site Address	Site Scope
Baytech Plastics Inc. - HQ	320 Elizabeth Street Midland, ON L4R 4L6 Canada	Plastic injection moulding and assembly
Baytech Plastics Inc. - Building 2	16403 Highway 12 Midland, ON L4R 4L6 Canada	
Baytech Plastics Inc. - Building 3	1000 Wye Valley Road Midland, ON L4R 4L6 Canada	Storage and Shipping

Certificate No.: **US015965** Version: **1** Issue Date: **21-September-2021**

Brian Sanders

UKAS MANAGEMENT SYSTEMS 0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: 16800 Greenspoint Park Drive, Suite 300S, Houston, TX 77060, USA

Further clarifications regarding the scope and validity of this certificate, and the applicability of the management system requirements, please call: +(800) 937-9311

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Silva Cell
Installation Guidelines

Silva Cell

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Silva Cell Base (Bottom Piece)

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Silva Cell Post Sizes

1X

2X

3X
(1X + 2X)

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Silva Cell Deck (Top Piece)

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1X Silva Cell - Complete

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2X Silva Cell - Complete

deeproot

3X Silva Cell - Complete

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Silva Cell Strongback

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Anchoring Spike

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Geogrid, Geotextile Fabric, and Cable Ties

Geogrid

Geotextile Fabric

Plastic Cable Ties

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DeepRoot Root Barrier

deeproot

Materials needed to Install Silva Cell Systems

Materials Supplied by DeepRoot

- Silva Cell Bases
- Silva Cell Decks
- Silva Cell Posts
- Silva Cell Anchoring Spikes
- Strongbacks
- Root Barrier

Other Material Needed

- Geogrid
- Geotextile
- Plastic Cable Ties
- Compactable Fill
  - Outside Silva Cells
- Aggregate Base
  - Below Silva Cells
  - Above Silva Cells
- Planting Soil
  - Inside Silva Cells

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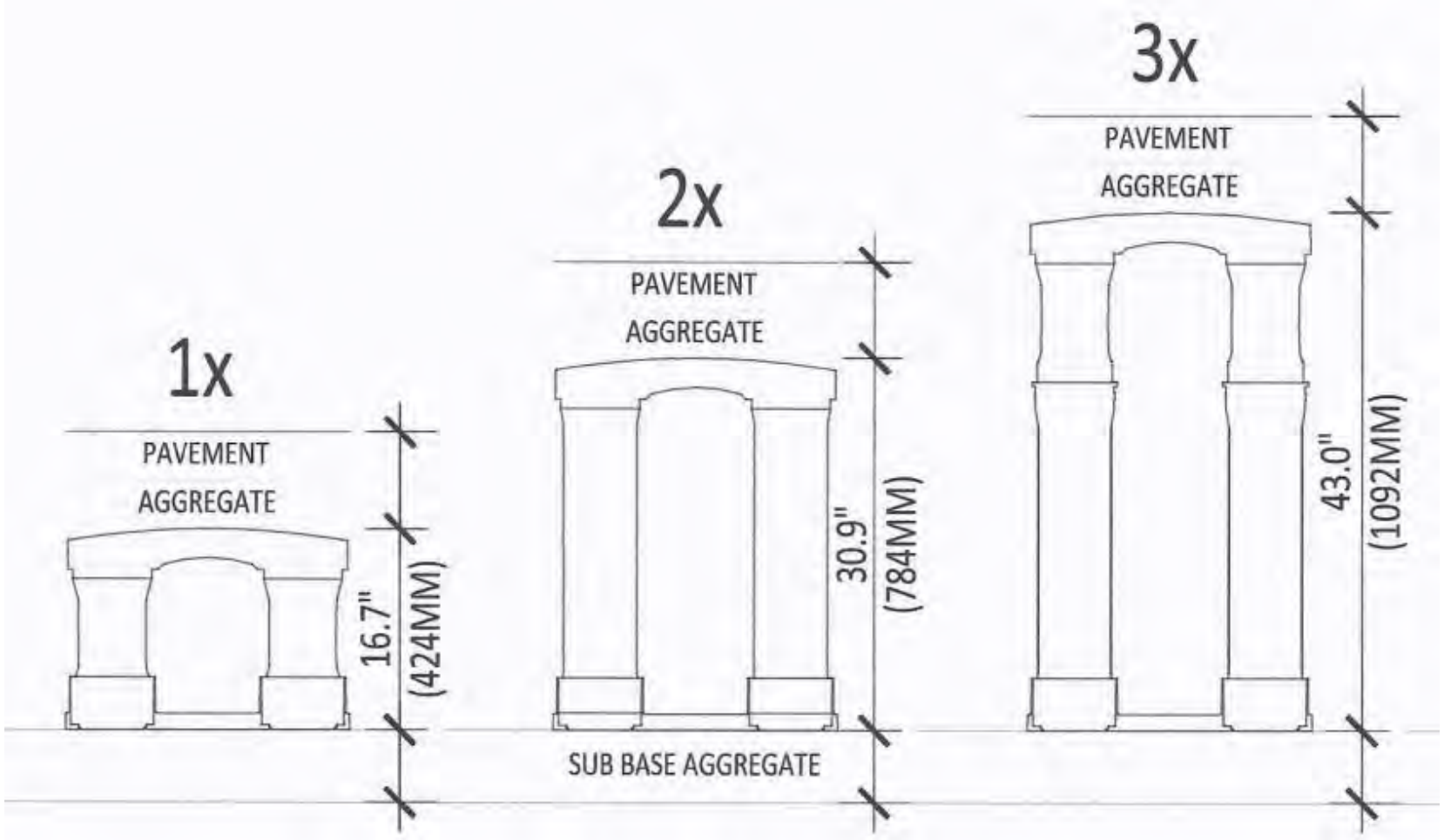
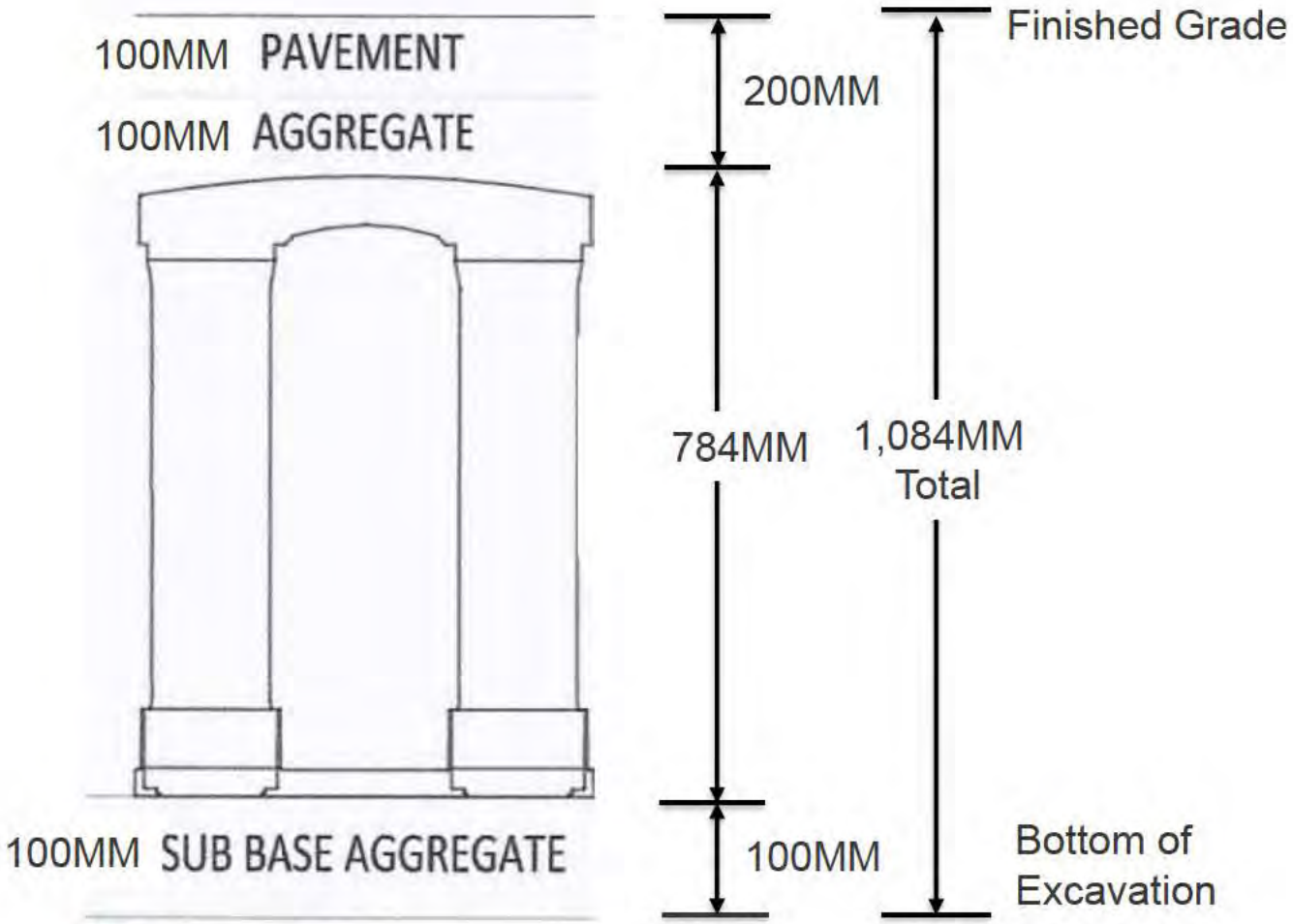
Calculating Excavation Depths



deeproot

Example: 2X Silva Cell + Standard Concrete Pavement Section



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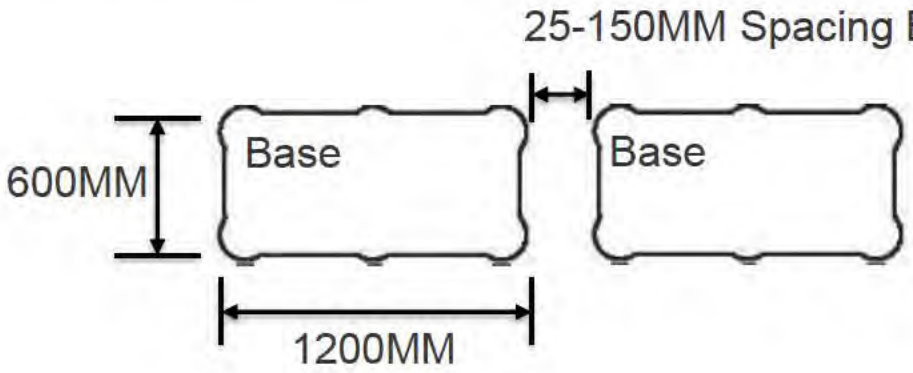
Determine the Dimensions of the Silva Cell Area

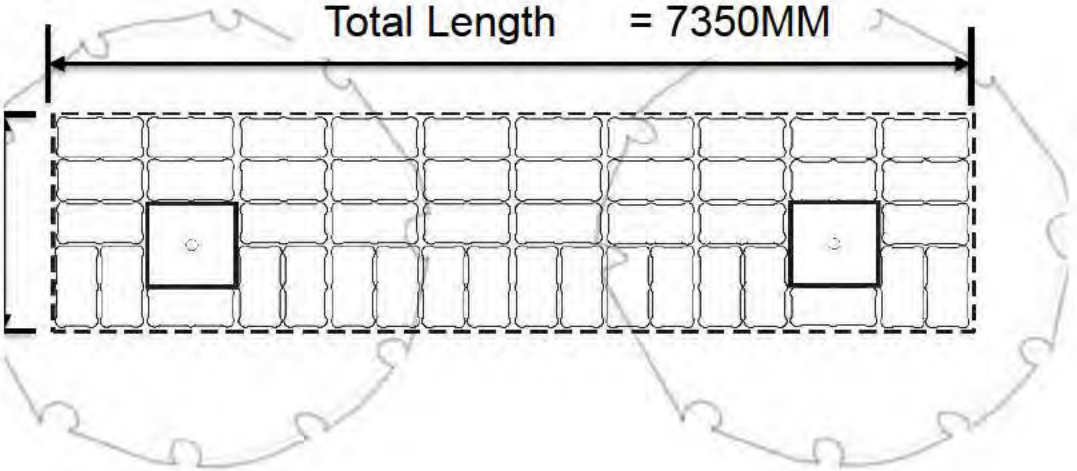


10 Bases x 600 = 6000MM
9 Spaces x 150 = 1350MM

Total Length = 7350MM

3 Bases x 600 = 1800MM
1 Base x 1200 = 1200MM
3 Spaces x 150 = 450MM

Total Length = 3450MM



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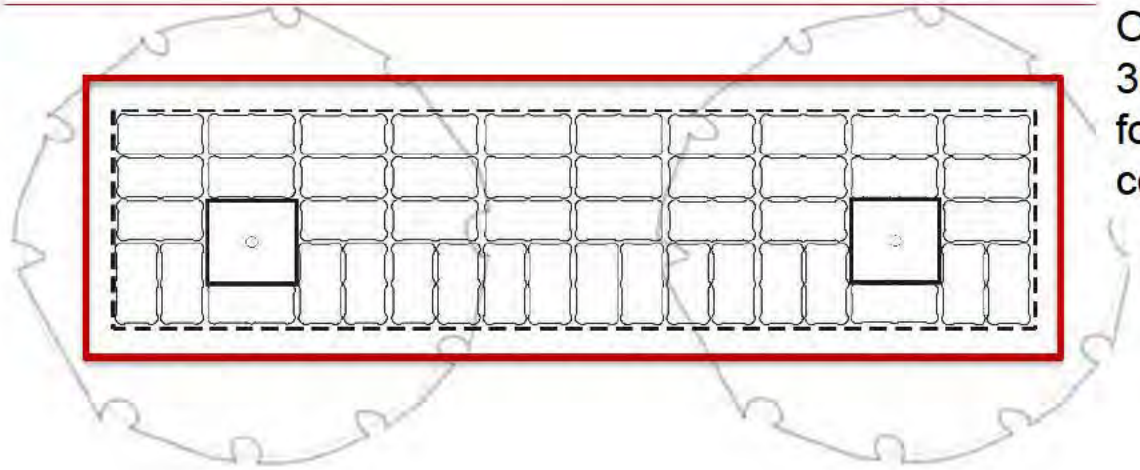
Over Excavate Silva Cell Area – 12” On All Sides



Over excavate a minimum of 300MM on all sides to allow for working room and proper compaction.

deeproot

Excavate Silva Cell Area – Including 300MM Beyond

Excavation depth must accommodate:

- Sub Base Aggregate
- Silva Cells
- Pavement Section

Compact bottom of excavation (sub grade) before placing fabric and sub base aggregate.

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Install Geotextile Fabric

Place a layer of geotextile fabric over the compacted subgrade before placing the sub base aggregate.

Geotextile fabric is an important component of the overall Silva Cell System. It is essential for establishing a uniformly stable sub base.

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Place + Prepare Sub Base Aggregate

Fine grade the aggregate sub base to a uniform elevation or slope.

Properly preparing the sub base aggregate is a critical step in the installation.

If the Silva Cell Bases do not sit level the Posts will become misaligned making it difficult or impossible to attach the decks.

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Place + Compact Aggregate Sub Base

Place the required thickness of sub base aggregate over the geotextile fabric.

Water and compact the sub base aggregate to 95% standard proctor density or as specified.

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Lay Out the Silva Cell Bases

Mark inner dimensions of the tree opening.

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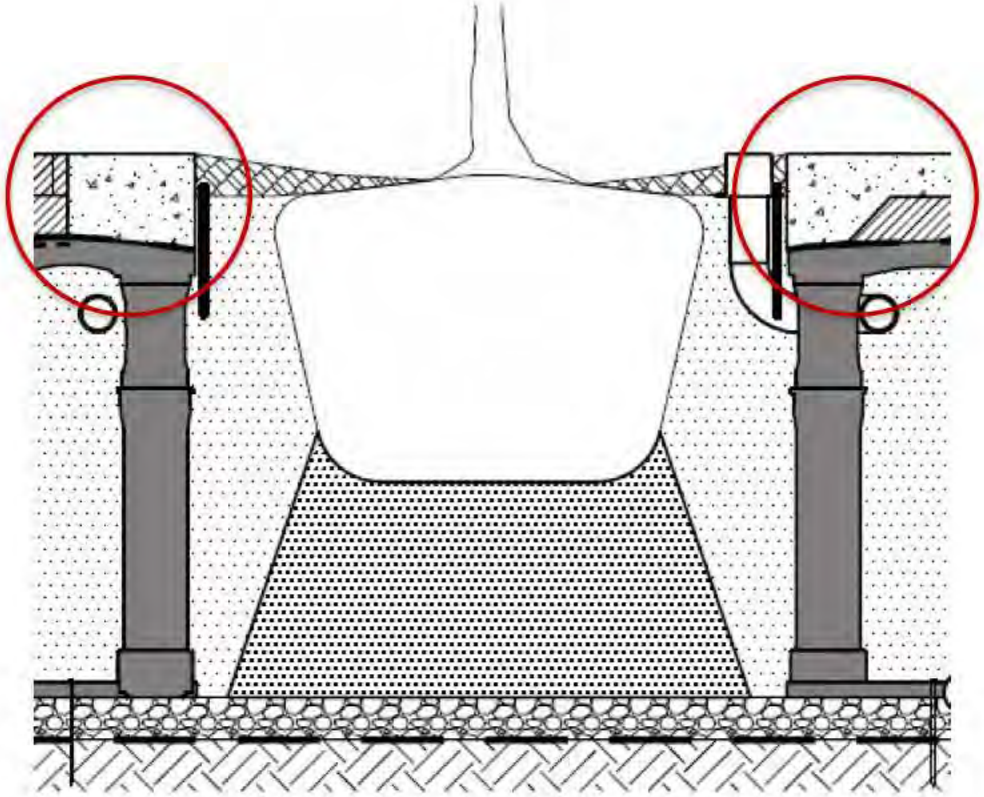
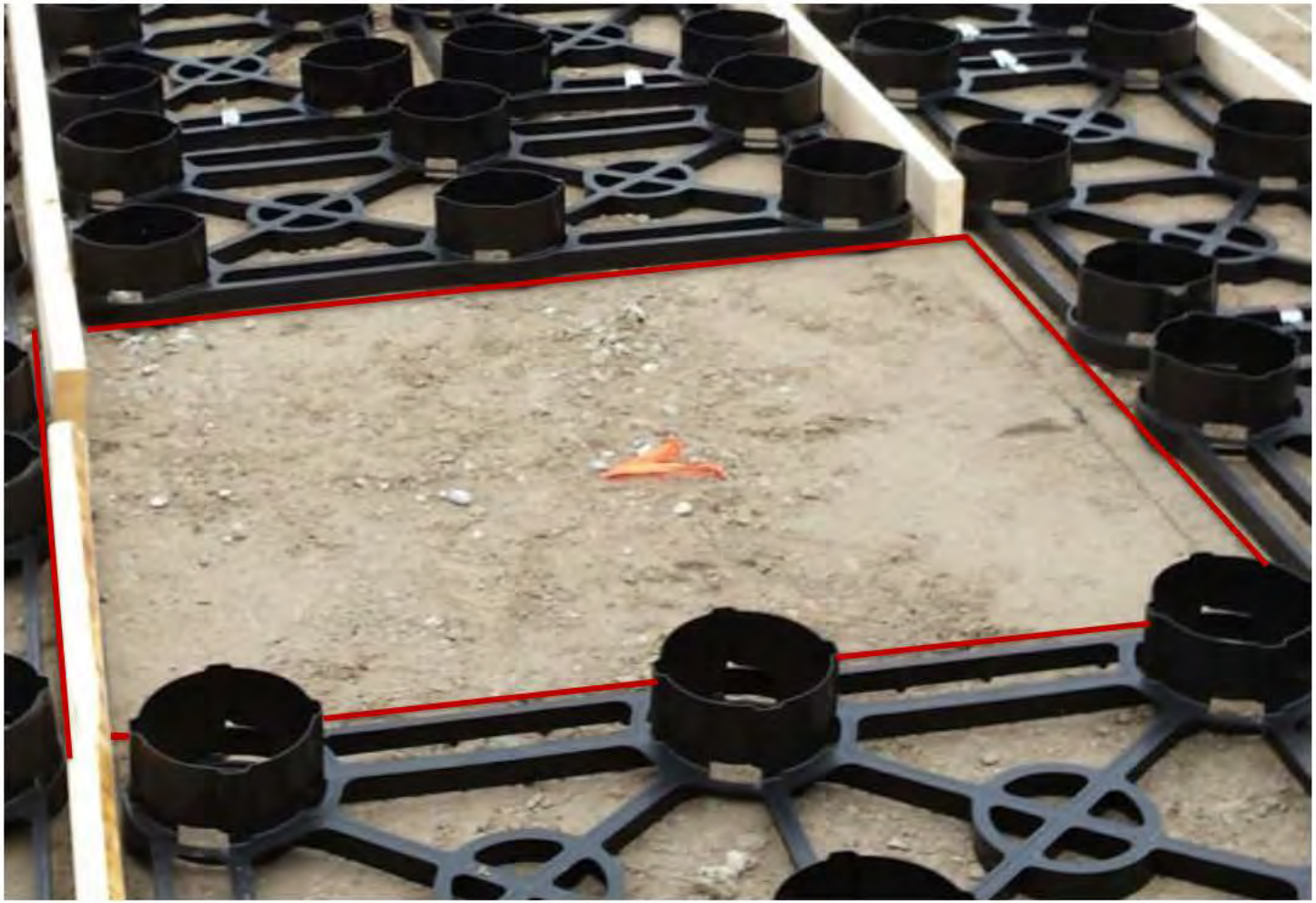
Lay Out Silva Cell Bases



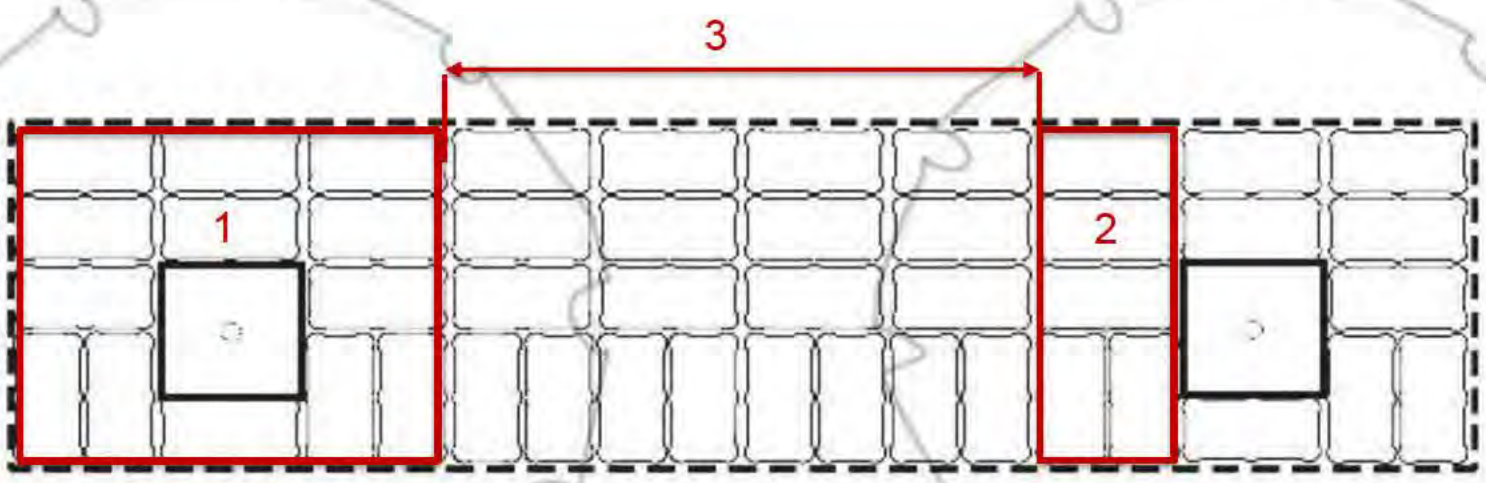
Fully-support curb or thickened pavement edge at tree opening with Silva Cells.

Lay Out Silva Cell Bases



deeproot

Lay Out Silva Cell Bases



1 Place Silva Cell Bases around the perimeter of the tree opening.

Leave a 25-150MM gap between the Silva Cell Bases.

3 Place Silva Cell Bases to fill the remaining area and space 25-150MM as the layout allows.

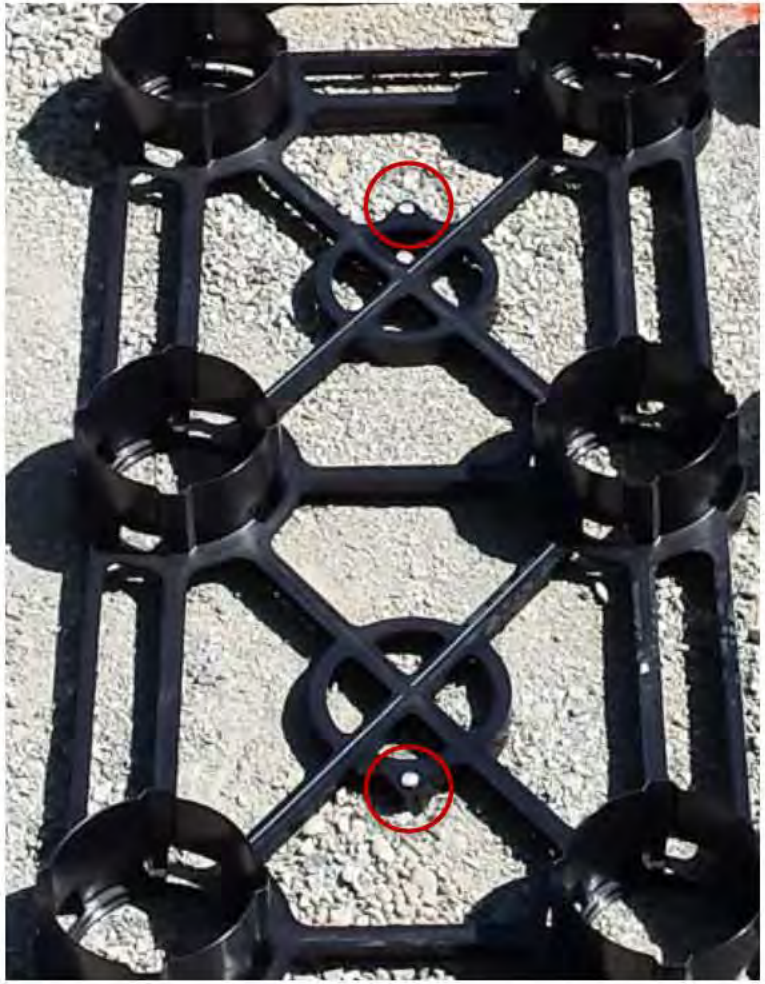
2 Place Silva Cell Bases at the perimeter of the next tree opening.

deeproot

Lay Out Silva Cell Bases

deeproot

Anchor Silva Cell Bases



Anchor Silva Cell in place with 2 anchoring spikes per Base.

deeproot

Attach Silva Cell Posts

Insert Silva Cell Posts into Base and twist into place

deeproot

Attach Silva Cell Posts

Locking mechanism snaps Silva Cell Post into place.

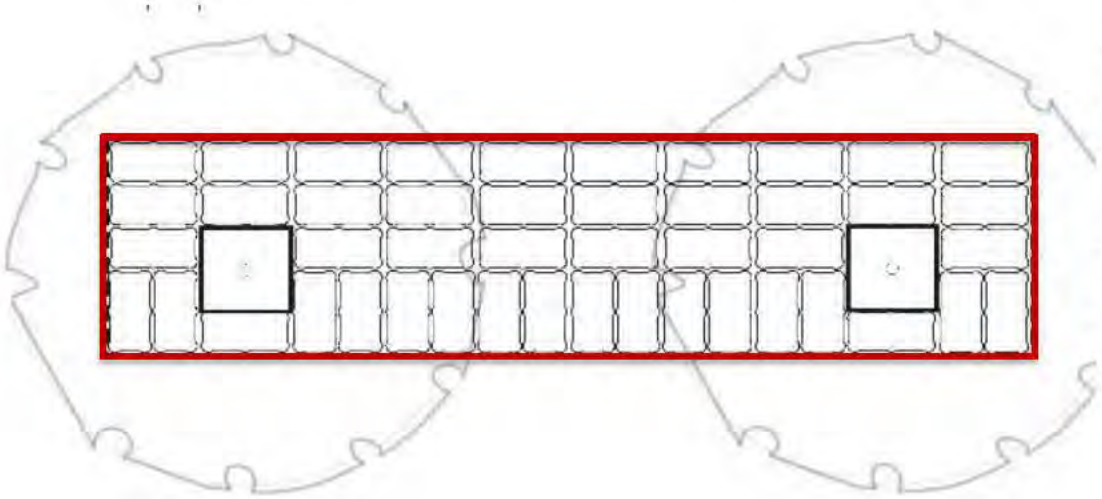
deeproot

Install Strongbacks

Strongbacks keep the posts aligned during the installation process

deeproot

Install Geogrid around Perimeter of Silva Cell Layout

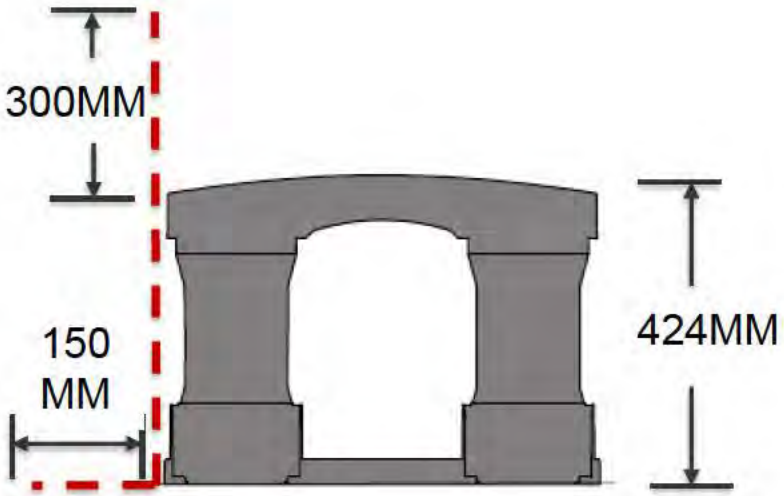


Wrap the geogrid around the outside perimeter of the Silva Cell System like a fence.

The geogrid keeps the soil contained within the Silva Cell System as it is filled.

deeproot

Install Geogrid on a 1X Silva Cell System



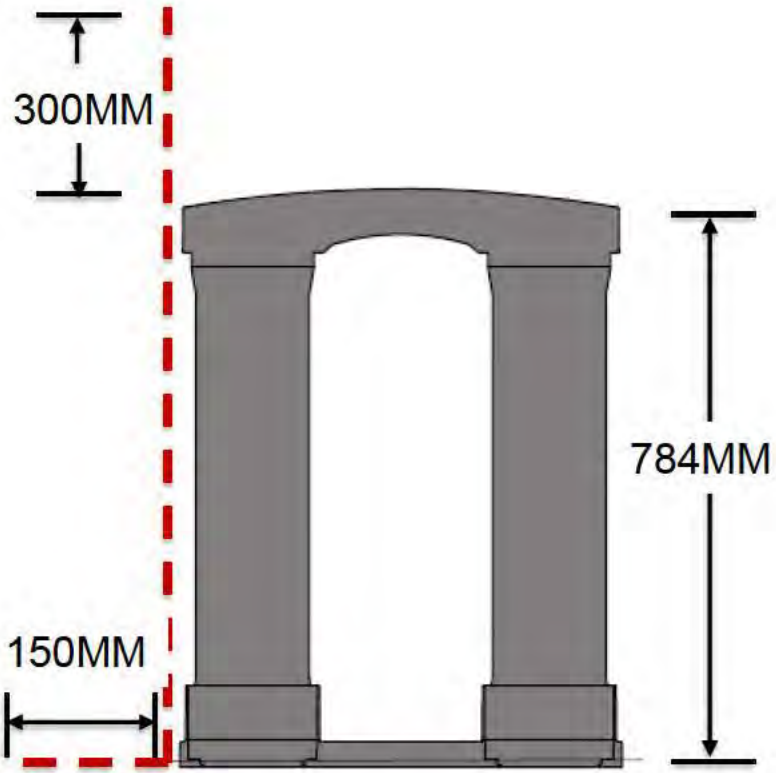
deeproot

Allow for a 150MM extension at the bottom and a 300MM extension at the top of the Silva Cell System.

300MM
424MM
150MM

874MM Total Depth (minimum)

Install Geogrid on a 2X Silva Cell System



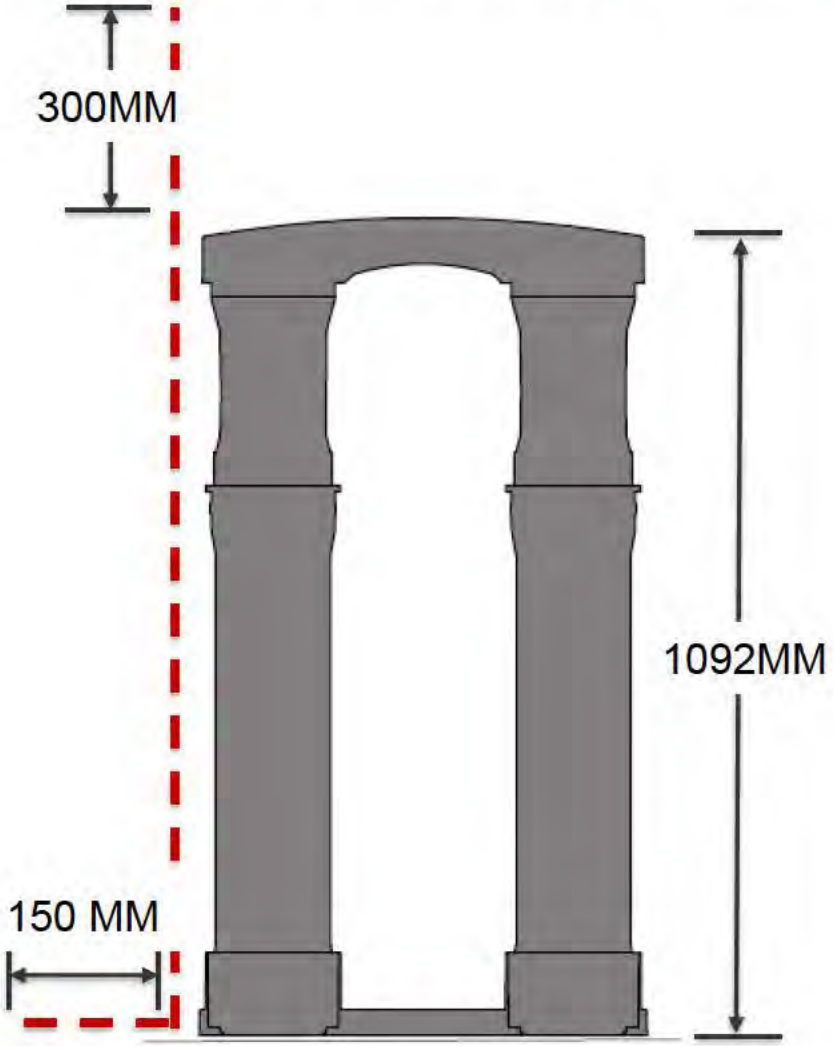
Allow for a 150MM extension of geogrid at the bottom and 300MM extension at the top of the Silva Cell System.

300MM
784MM
150MM

1234MM Total Depth (minimum)

deeproot

Install Geogrid on a 3X Silva Cell System



Allow for a 150MM extension of geogrid at the bottom and 300MM extension at the top of the Silva Cell System.

300MM
1092MM
150MM

1542MMTotal Depth (minimum)

deeproot

Install Geogrid

deeproot

Attach Geogrid

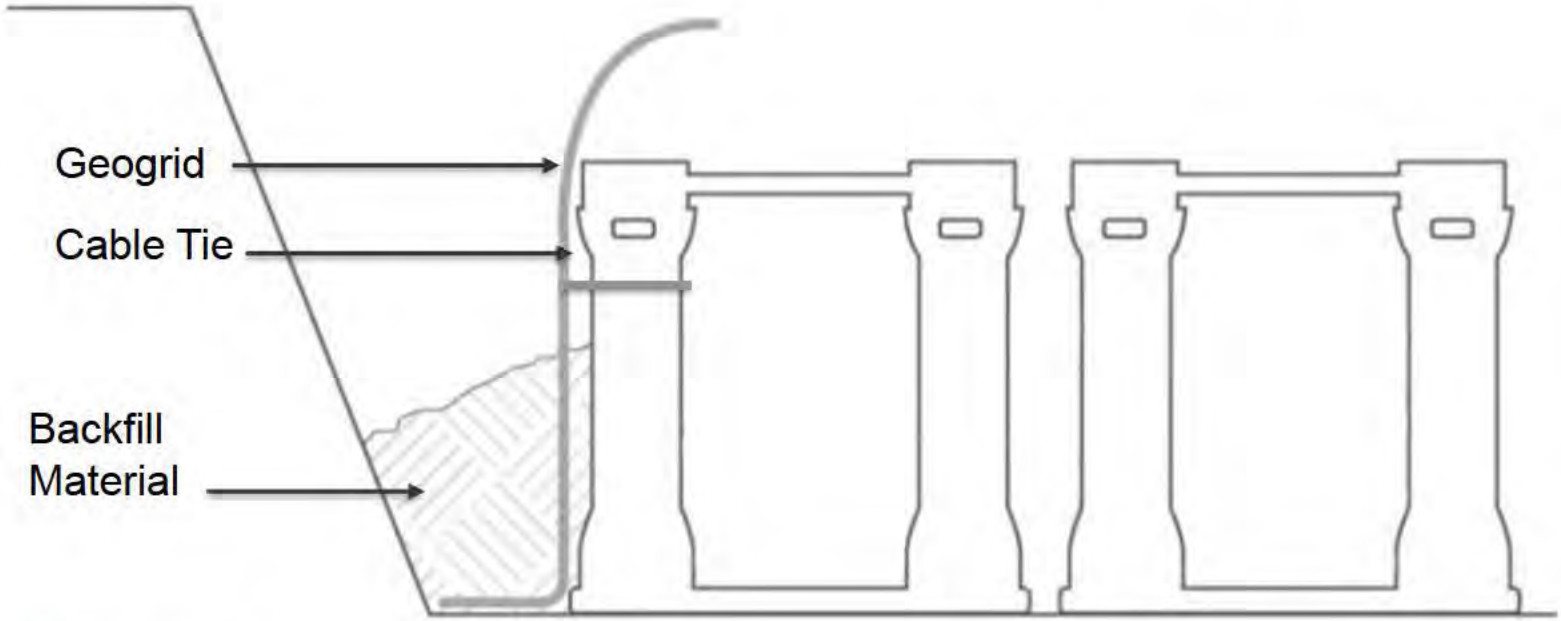
Attach geogrid with a cable tie at the top of each Silva Cell Post.

This keeps the geogrid in place while backfilling around the Silva Cell System.

Install First Lift of Backfill Material

Anchor the toe of the geogrid by placing backfill material to approximately the mid-point of the Silva Cell Post.

Do not compact.



deeproot

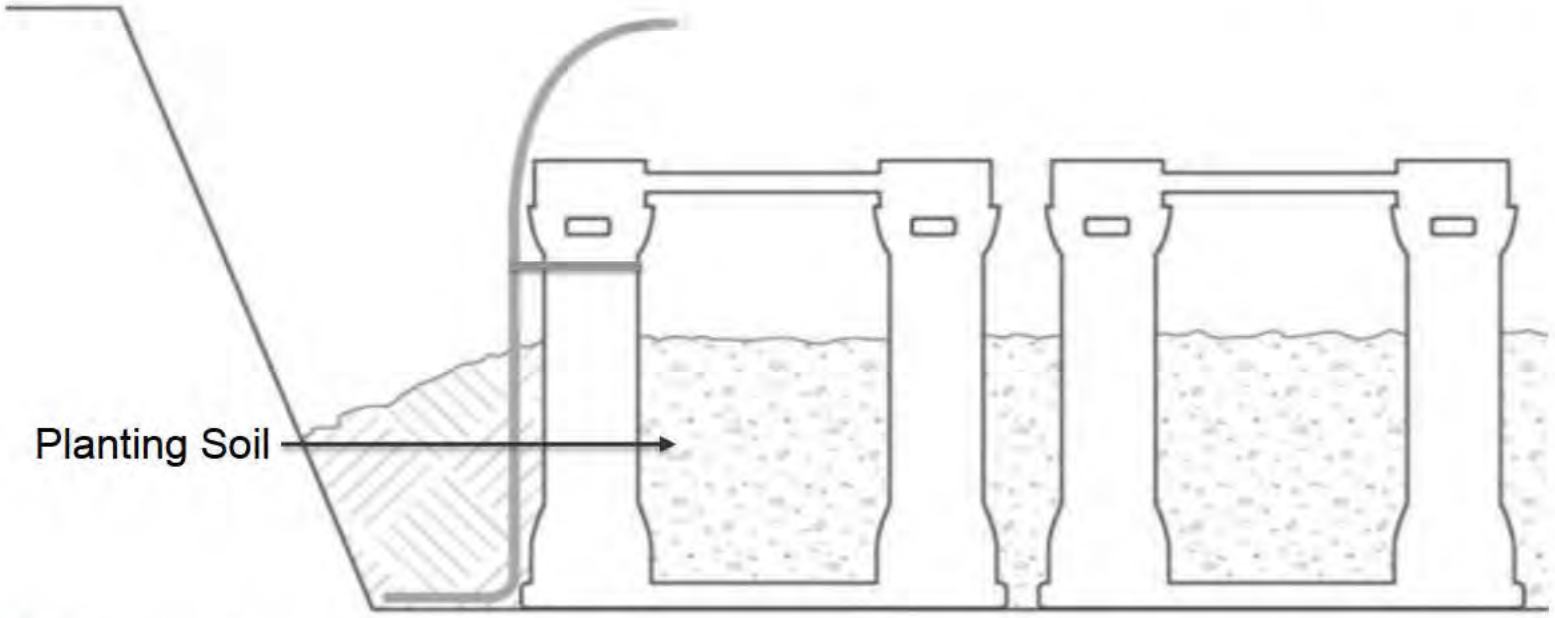
Install First Lift of Backfill Material

deeproot

Install First Lift of Planting Soil

Install planting soil mix to approximately mid point of the Silva Cell Posts.

Level the planting soil and walk-through compact.



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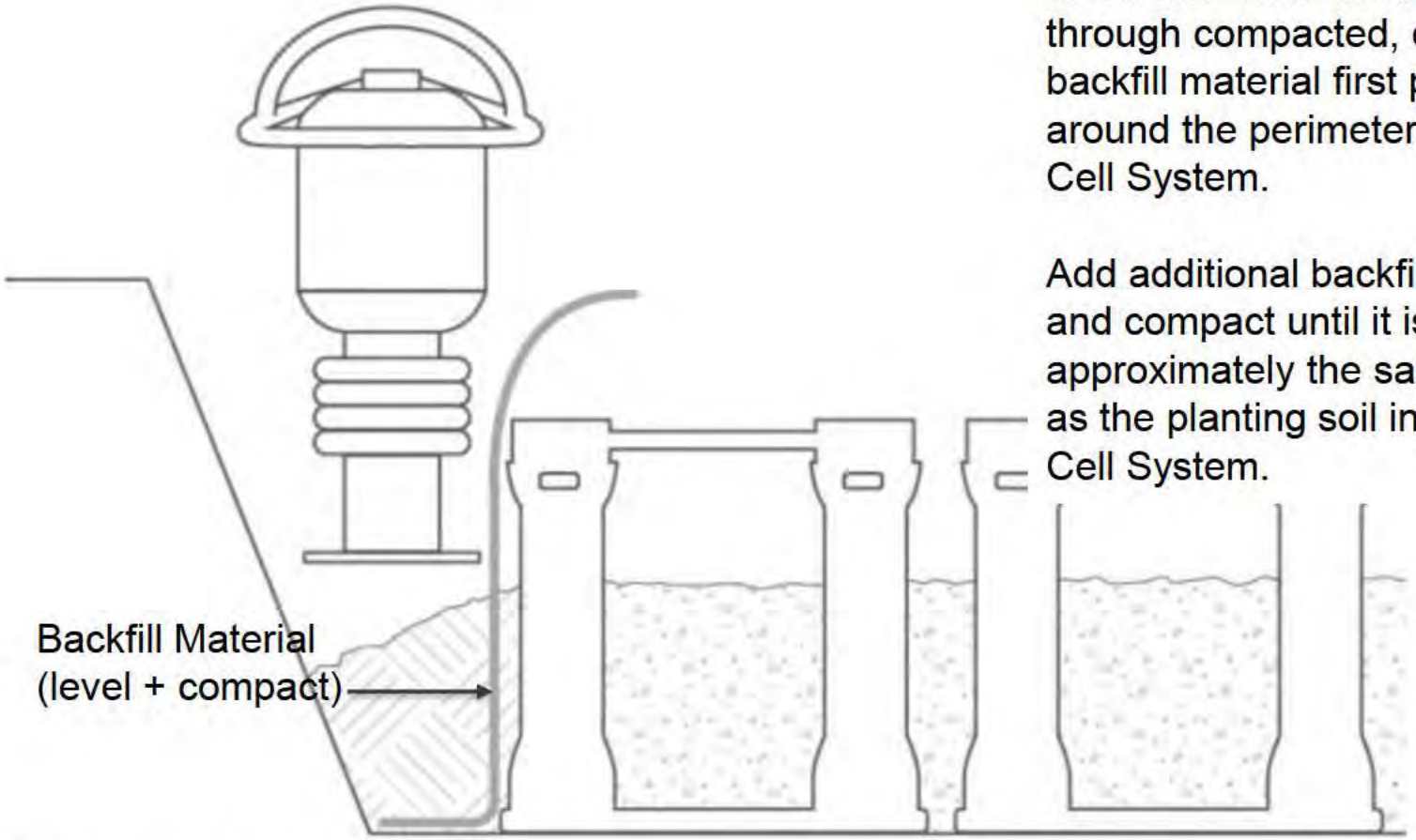
Install First Lift of Planting Soil

deeproot

Walk-Through Compact Planting Soil

deeproot

Compact First Lift of Backfill Material



After the first lift of planting soil has been installed and walk-through compacted, compact the backfill material first placed around the perimeter of the Silva Cell System.

Add additional backfill material and compact until it is approximately the same height as the planting soil in the Silva Cell System.

deeproot

Compact First Lift of Backfill Material

Prevent compaction equipment from coming into direct contact with Silva Cell Posts to avoid potential damage.

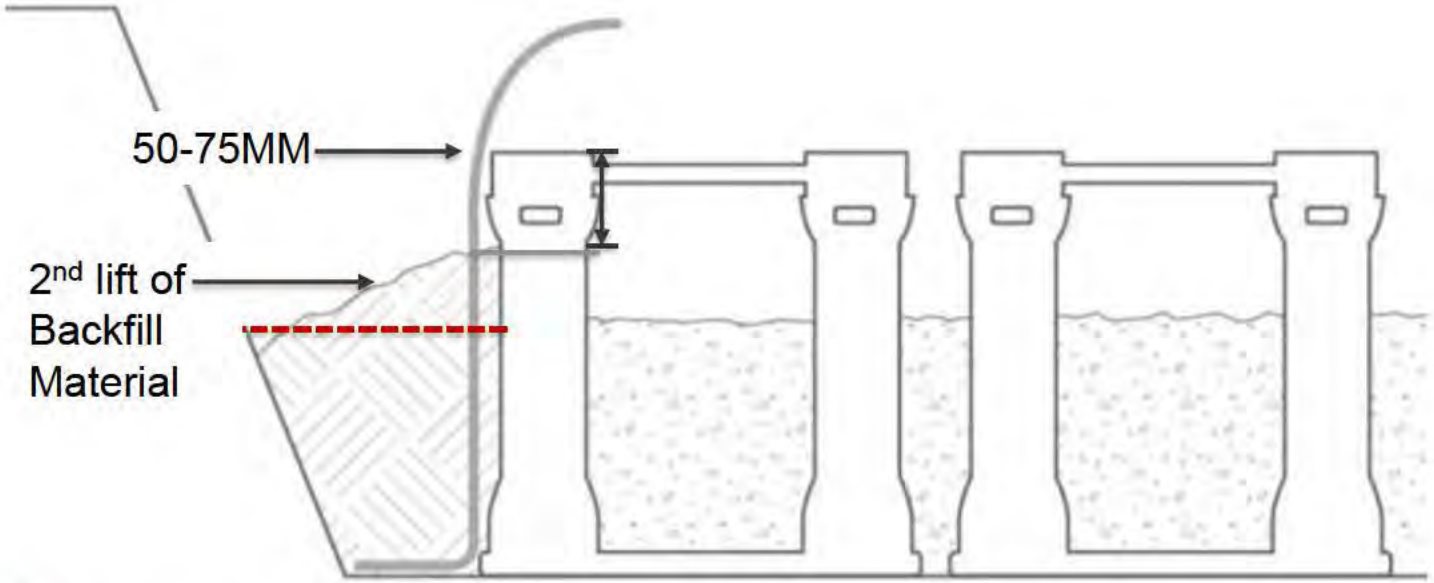
deeproot

Repeat Process-Install Additional Lose Backfill Around Perimeter

After backfill material has been placed and compacted to the height of the planting soil inside the Silva Cell System, repeat the process of adding backfill material around perimeter and planting soil within the Silva Cell System.

Leave the backfill material 50-75MM inches down from the top of the Posts.

Do not compact.



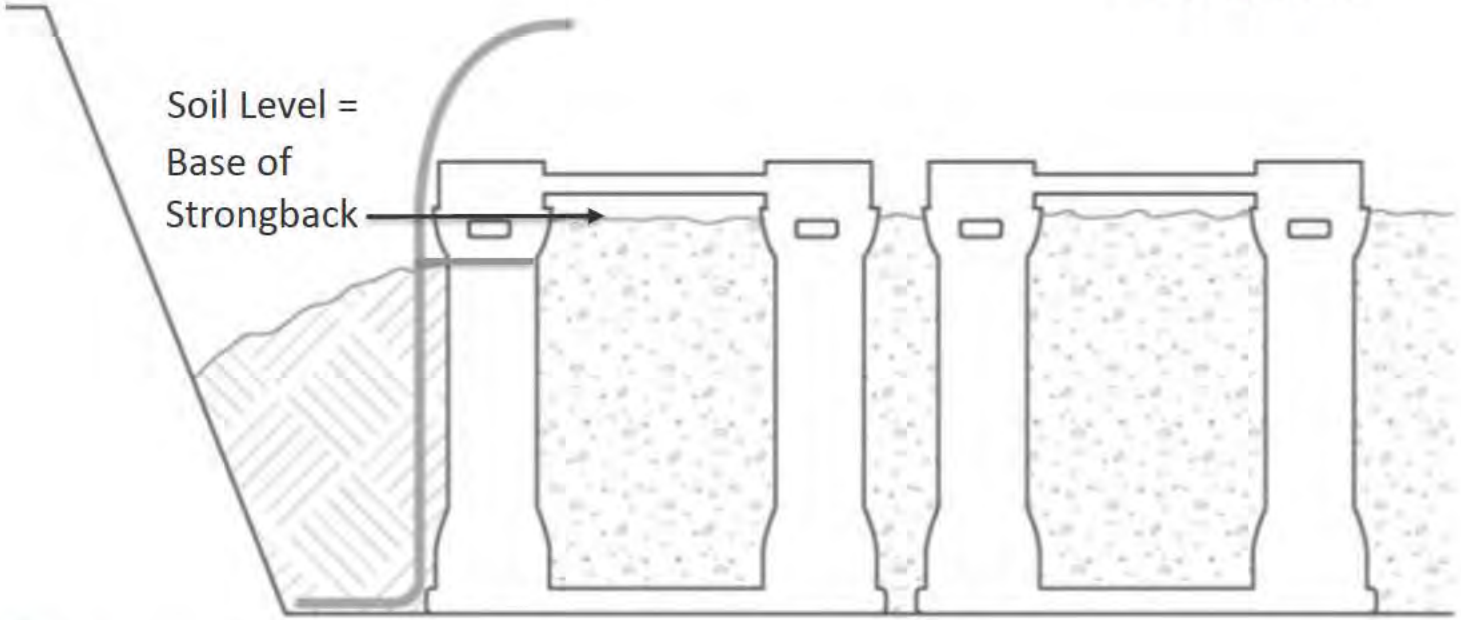
deeproot

Repeat Process-Install Additional Lose Backfill Around Perimeter

deeproot

Place Second Lift of Planting Soil

Place second lift of planting soil within the Silva Cell System and walk-through compact until the planting soil inside the System is level with the base of the Strongbacks.



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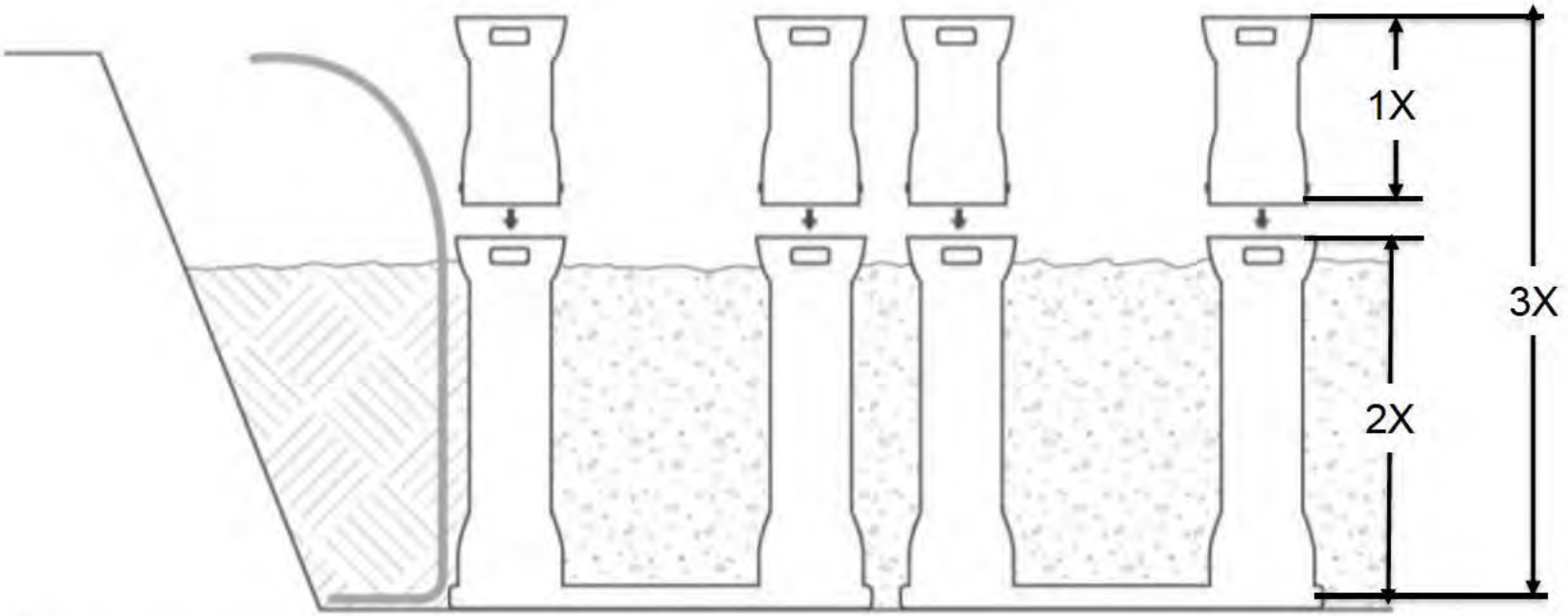
3X Silva Cell System-Add 1x Post Extensions

For a 3X Silva Cell System, carefully remove the Strongbacks and add 1X Post extensions.

Repeat the process of placing backfill material around the perimeter and then filling the Silva Cell System with planting soil one additional time.



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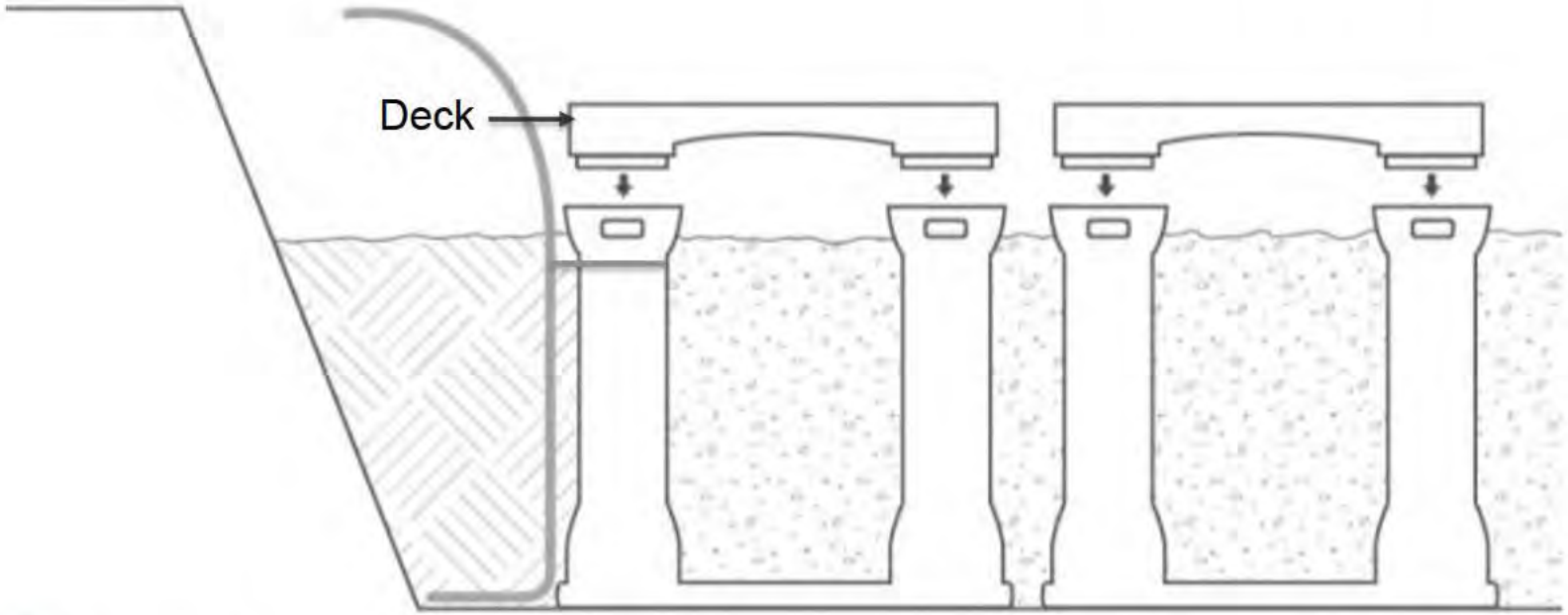
3X Silva Cell System-Add 1x Post Extensions

deeproot

Remove Strongbacks + Install Silva Cell Decks

When finished installing and walk-through compacting the planting soil, carefully remove the Strongbacks, level the soil, and attach the Silva Cell Decks.



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Install Silva Cell Decks

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Install Silva Cell Decks

deeproot

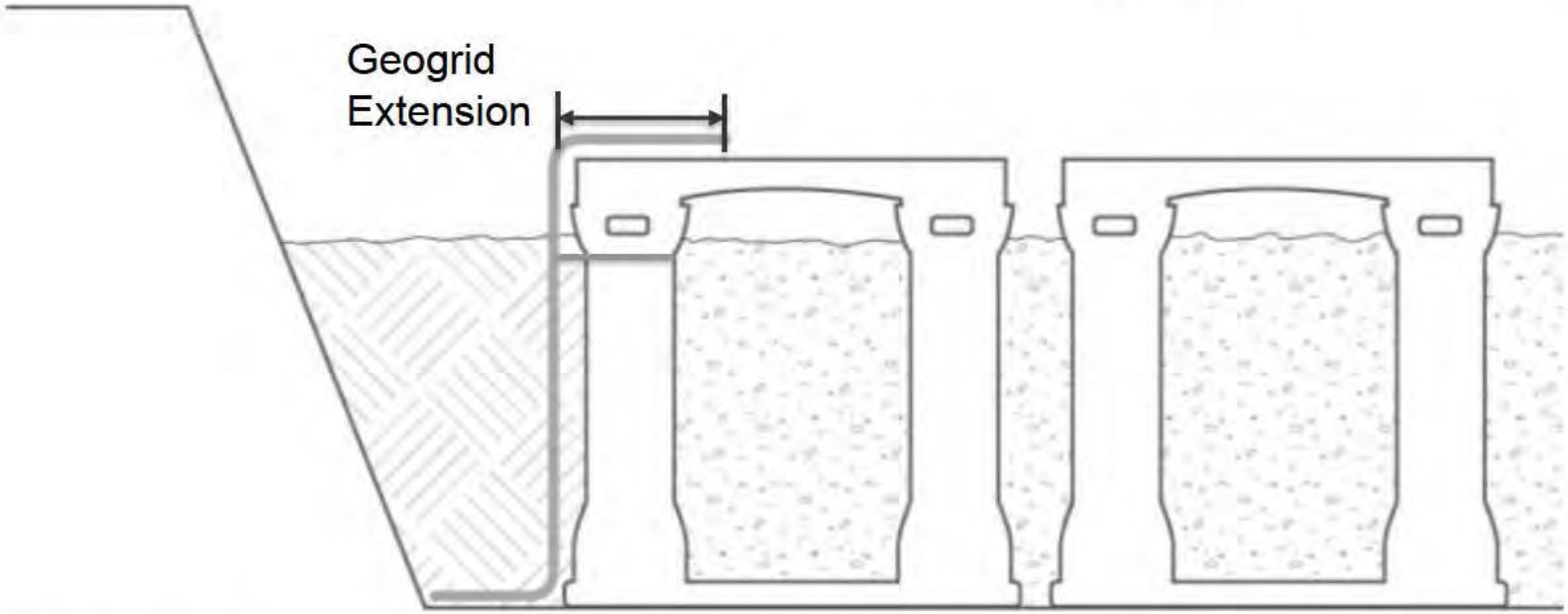
Install Silva Cell Decks

deeproot

Fold Over Geogrid Extension

After installation of the Silva Cell Decks, fold the geogrid extension over onto the top of the Decks.

Hold down with cable ties as needed.



deeproot

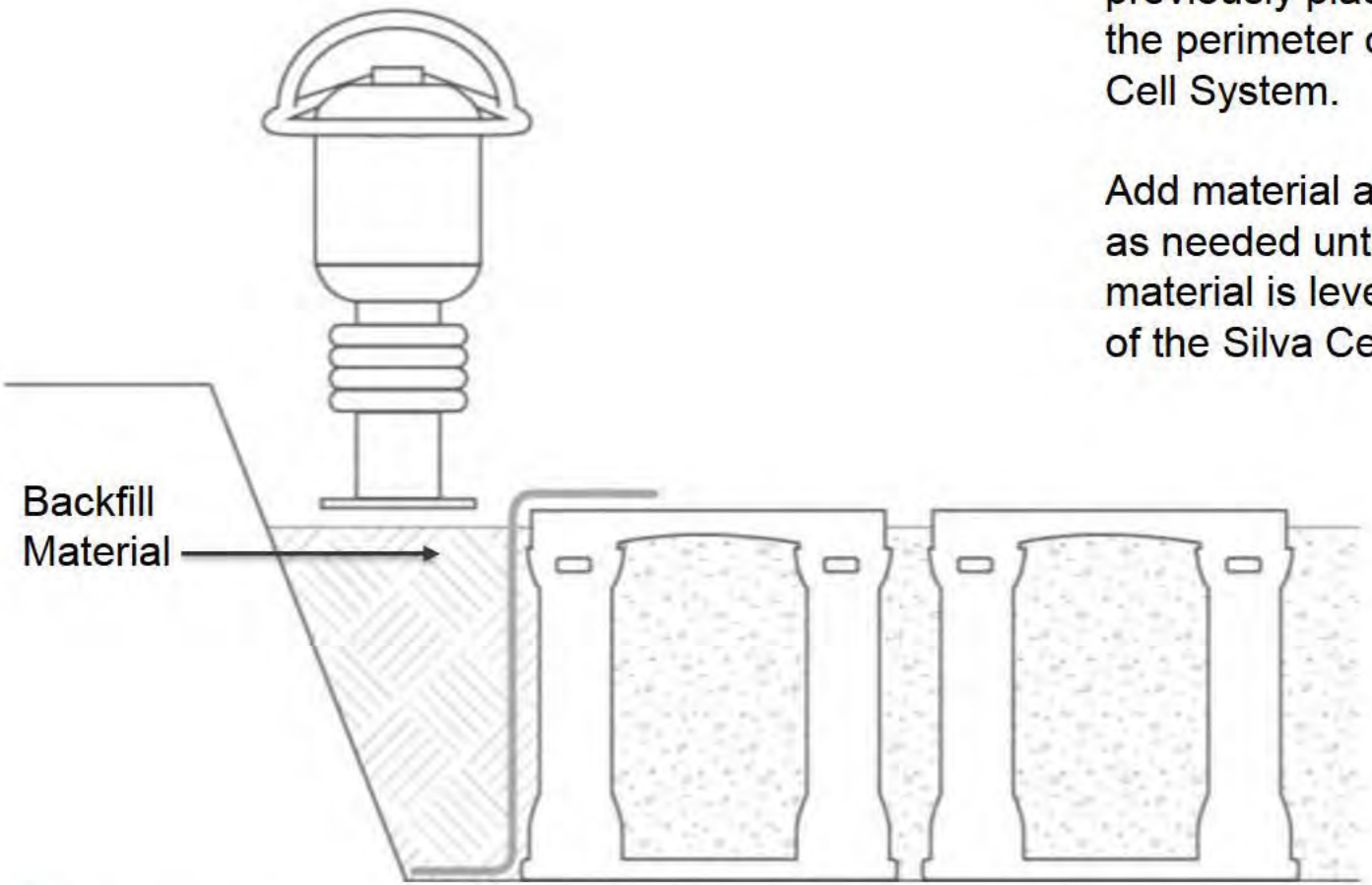
Fold Over Geogrid Extension

deeproot

Compact Backfill Around Perimeter of Silva Cell System

Compact backfill material previously placed around the perimeter of the Silva Cell System.

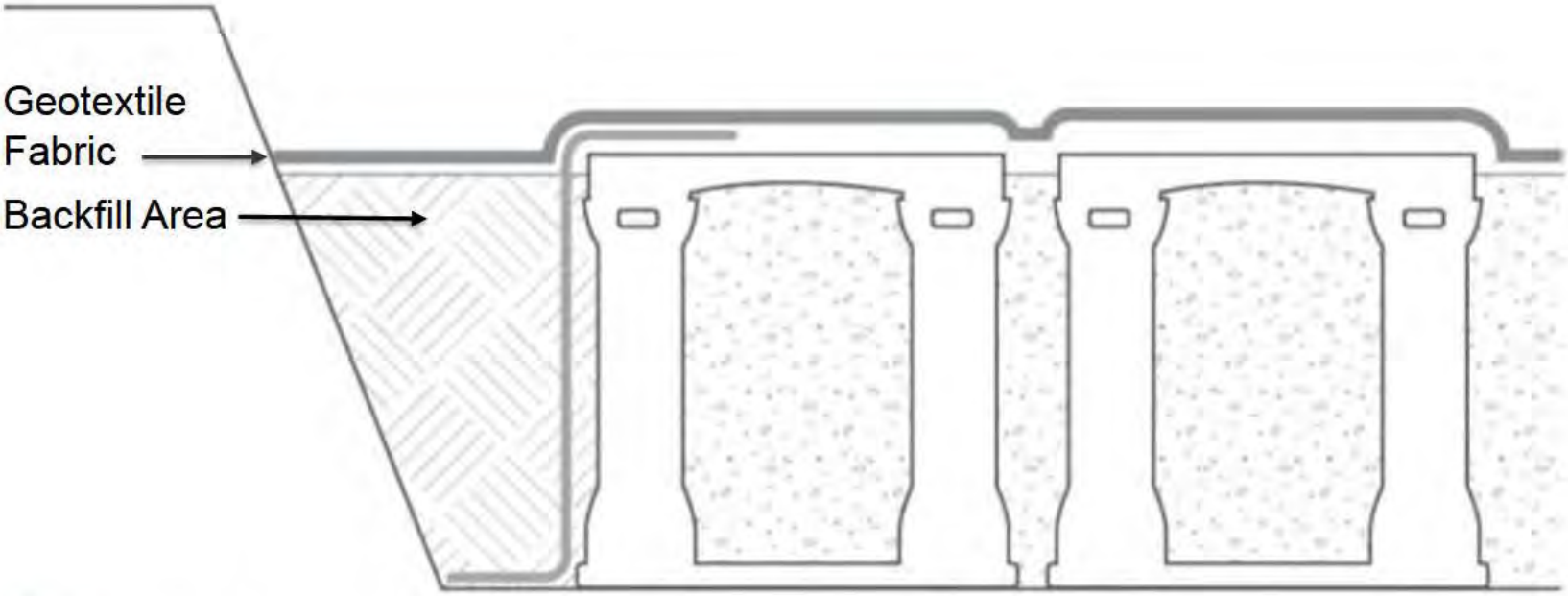
Add material and compact as needed until the backfill material is level with the top of the Silva Cell Decks.



deeproot

Install Geotextile Fabric Over Silva Cell System

Cover the Silva Cell System with geotextile fabric. Extend geotextile fabric to cover the backfill area.



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Install Geotextile Fabric Over Silva Cell System

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Install Aggregate Base Course Over Silva Cell System

Do not operate machinery over the Silva Cell System.

The Silva Cell System does not attain its load-bearing capacity until final pavement surface is in place.

Place aggregate from outside of Silva Cell System.

Start placing aggregate at one end of the Silva Cell System and work continuously toward the other end.

This keeps the geotextile fabric loose and allows it to be pulled down into the openings in the Silva Cell Decks.

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Compact Aggregate Base Course

Compact the aggregate base course, as specified.

Equipment must weigh less than 453KG.

Install Concrete Curbing

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Install Final Paved Surface

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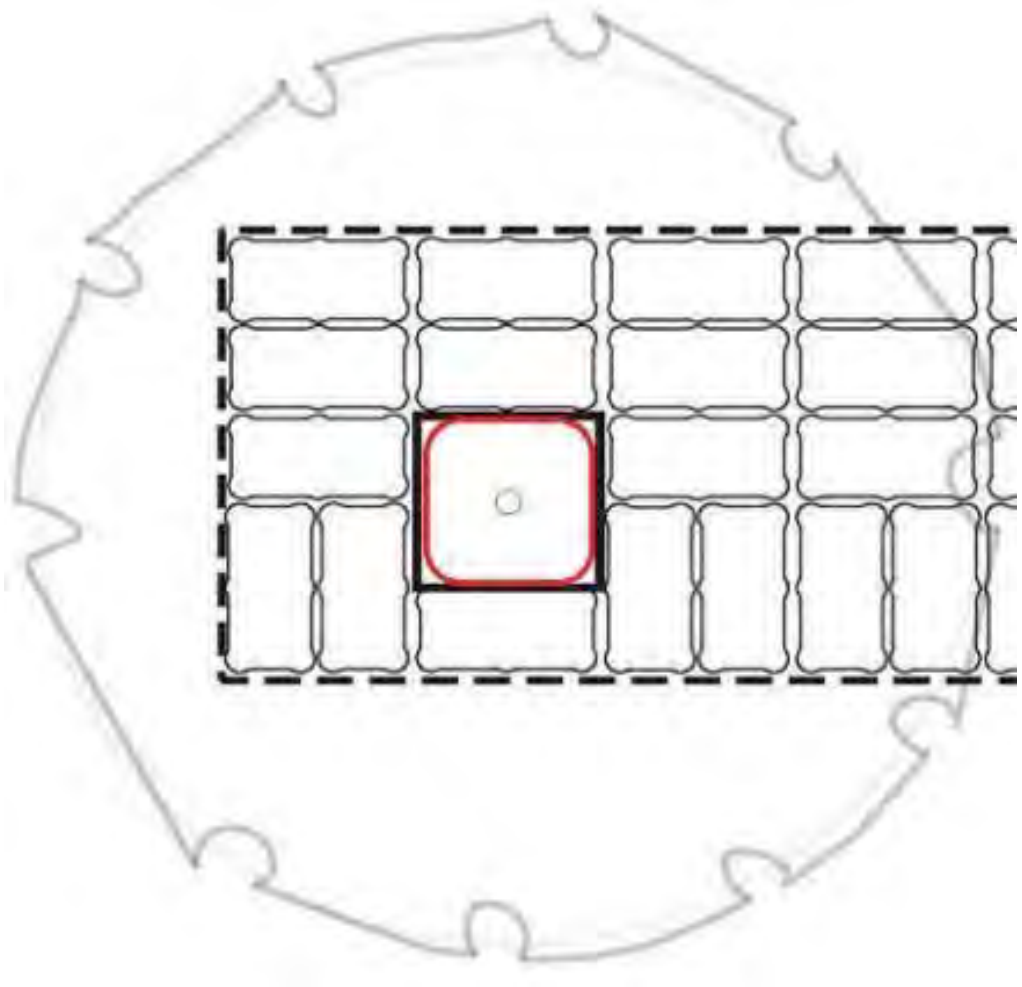
Install Root Barrier



Install Root Barrier inside the tree opening to help guide tree roots into the Silva Cell System.

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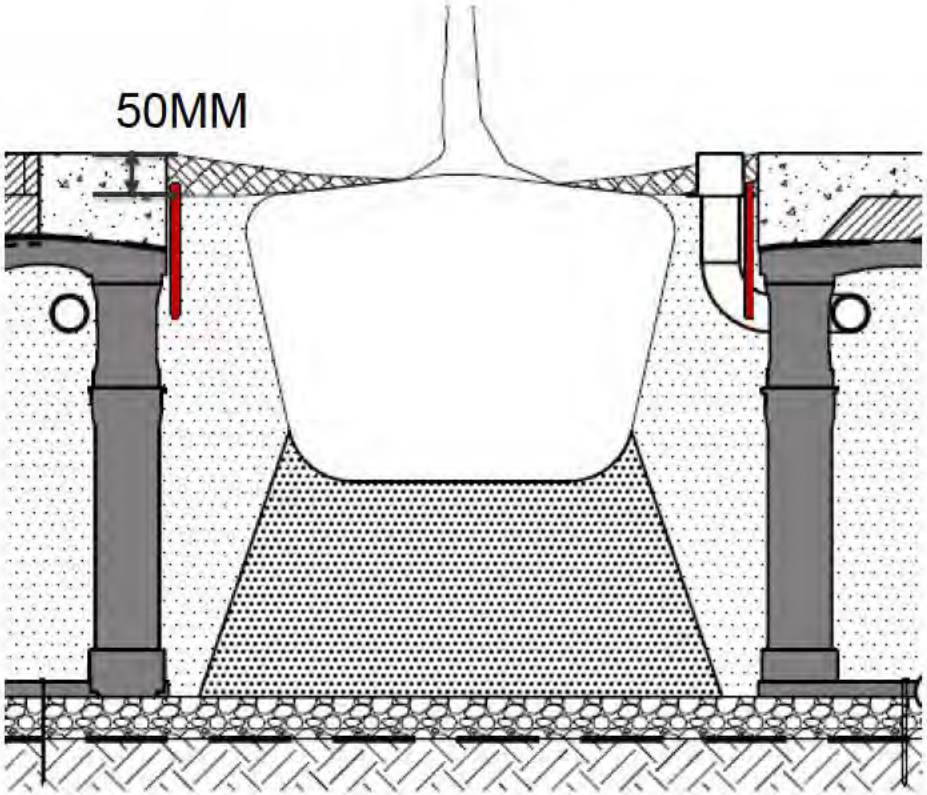
Install Root Barrier



Install root barrier so that the top is roughly 50MM below the elevation of the finished pavement or curb.

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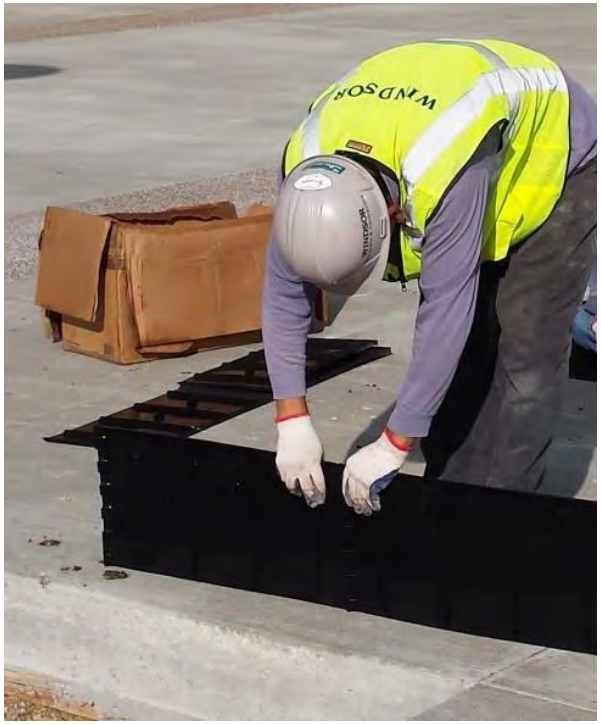
Install Root Barrier



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DeepRoot Contact Information

deeproot

Thank You

DECLARATION OF SUPPLIER CODE OF CONDUCT COMPLIANCE

Complete this Declaration of Supplier Code of Conduct Compliance in the form set out below.

All proposed suppliers are to complete and submit this form to certify compliance with the supplier performance standards set out in the Supplier Code of Conduct.

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct (SCC) <https://policy.vancouver.ca/AF01401P1.pdf>. The SCC defines minimum labour and environmental standards for City suppliers and their subcontractors.

Suppliers are expected to comply with the aforementioned standards upon submitting a tender, proposal, application, expression of interest or quotation to the City, or have a plan in place to comply within a specific period of time. The City reserves the right to determine an appropriate timeframe in which suppliers must come into compliance with these standards. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration and include this declaration with its submission:

As an authorized signatory of _____*(vendor name),* I declare that I have reviewed the SCC and to the best of my knowledge, _____ *(vendor name)* and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted in the table below *(include all violations/convictions that have occurred in the past three years as well as plans for corrective action).*

Section of SCC / title of law	Date of violation /conviction	Description of violation / conviction	Regulatory / adjudication body and document file number	Corrective action plan

I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of _____ *(vendor name).*

Signature: _____

Name and Title: _____

DECLARATION OF SUPPLIER CODE OF CONDUCT COMPLIANCE

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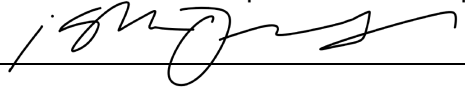
Suppliers are expected to comply with the aforementioned standards upon submitting a tender, proposal, application, expression of interest or quotation to the City, or have a plan in place to comply within a specific period of time. The City reserves the right to determine an appropriate timeframe in which suppliers must come into compliance with these standards. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration and include this declaration with its submission:

As an authorized signatory of _DeepRoot Canada Corp, I declare that I have reviewed the SCC and to the best of my knowledge, DeepRoot Canada Corp and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted in the table below *(include all violations/convictions that have occurred in the past three years as well as plans for corrective action).*

Section of SCC / title of law	Date of violation /conviction	Description of violation / conviction	Regulatory / adjudication body and document file number	Corrective action plan

I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of DeepRoot Canada Corp.

Signature: 

Name and Title: J Shawn Freedberg, Dir of Business Development

CITY OF VANCOUVER

CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.

2. **NAMED INSURED** ***(must be the same name as the Proponent/bidder and is either an individual or a legally incorporated company)***
Deep Root Canada Corporation
BUSINESS TRADE NAME or DOING BUSINESS AS
341-550 West Broadway, Vancouver, BC V5Z 0E9
BUSINESS ADDRESS
DESCRIPTION OF OPERATION

3. **PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)**
INSURER Chubb
TYPE OF COVERAGE Property (does not include EQ/FI)
POLICY NUMBER s.15(1)(l)
POLICY PERIOD From 11/1/2021 to 11/1/2022

Insured Values (Replacement Cost) -
Building and Tenants' Improvements $ N/A
Contents and Equipment $ 958,850
Deductible Per Loss $ 6,659

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**
Including the following extensions:
√ Personal Injury
√ Property Damage including Loss of Use
√ Products and Completed Operations
√ Cross Liability or Severability of Interest
√ Employees as Additional Insureds
√ Blanket Contractual Liability
√ Non-Owned Auto Liability

INSURER Chubb
POLICY NUMBER s.15(1)(l)
POLICY PERIOD From 11/1/2021 to 11/1/2022
Limits of Liability (Bodily Injury and Property Damage Inclusive) -
Per Occurrence $ 1,331,850
Aggregate $ 2,663,710
All Risk Tenants' Legal Liability $ 250,000
Deductible Per Occurrence $ 1,000

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles
INSURER N/A
POLICY NUMBER N/A
POLICY PERIOD From N/A to N/A

Limits of Liability -
Combined Single Limit $ N/A
If vehicles are insured by ICBC, complete and provide Form APV-47.

6. X☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE** **Limits of Liability (Bodily Injury and Property Damage Inclusive)**
INSURER-N/A
POLICY NUMBER N/A
POLICY PERIOD From N/A

Per Occurrence $ N/A
Aggregate $ N/A
Self-Insured Retention $ N/A

7. **PROFESSIONAL LIABILITY INSURANCE** **Limits of Liability**
INSURER N/A
POLICY NUMBER N/A
POLICY PERIOD From N/A to N/A

Per Occurrence/Claim $ N/A
Aggregate $ N/A
Deductible Per Occurrence/Claim $ N/A

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date:

8. **OTHER INSURANCE**
TYPE OF INSURANCE N/A
INSURER N/A
POLICY NUMBER N/A
POLICY PERIOD From N/A to N/A

Limits of Liability
Per Occurrence $ N/A
Aggregate $ N/A
Deductible Per Loss $ N/A

TYPE OF INSURANCE
INSURER N/A
POLICY NUMBER N/A
POLICY PERIOD From N/A to N/A

Limits of Liability
Per Occurrence $ N/A
Aggregate $ N/A
Deductible Per Loss $ N/A

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE Reesha Grewal
Reesha Grewal Dated 9/12/22
PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

deeproot

DeepRoot Canada Corp.
Suite 341
550 West Broadway
Vancouver, BC V5Z 0E9

www.deeproot.com
t 604 687 0899
f 604 684 6744

Warranty

DeepRoot® warrants to the original purchaser of its Silva Cell® product that such product will be free from defects in materials and workmanship, and perform to DeepRoot's written specifications for the warranted product, when installed and used as specifically provided in the product's installation guidelines for a period of 20 years from the date of purchase. This warranty does not cover wear from normal use, or damage caused by abuse, mis-handling, alterations, improper installation and/or assembly, accident, misuse, or lack of reasonable care of the product. This warranty does not apply to events and conditions beyond DeepRoot's control, such as ground subsidence or settlement, earthquakes and other natural events, acts of third parties, and/or Acts of God. If this warranty is breached, DeepRoot will provide a replacement product. Incurred costs, such as labor for removal of the original product, installation of replacement product, and the cost of incidental or other materials or expenses are not covered under this warranty. DEEPROOT® MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS THE WARRANTY OF MERCHANT-ABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DEEPROOT® SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY DI-RECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOST PROFITS, LOST REVENUES, LOSS OF USE, OR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.

Some provinces do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other legal rights, which vary from province to province in Canada.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 09/12/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	**CONTACT NAME:** Jaya Singh
Sequoia Benefits & Insurance Services, LLC	**PHONE (A/C, No, Ext):** (650) 369-0200 **FAX (A/C, No):** (650) 369-0201
1850 Gateway Drive, Suite 700	**E-MAIL ADDRESS:** jaya@sequoia.com
San Mateo CA 94404	**INSURER(S) AFFORDING COVERAGE** / **NAIC #**
INSURED	**INSURER A :** Federal Insurance Company 20281
DeepRoot Green Infrastructure, LLC	**INSURER B :**
101 Montgomery St.	**INSURER C :**
Suite 2850	**INSURER D :**
San Francisco CA 94104	**INSURER E :**
	INSURER F :

COVERAGES **CERTIFICATE NUMBER:** 21-22 LIAB **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
A	☒ UMBRELLA LIAB ☒ OCCUR			78189102	11/01/2021	11/01/2022	EACH OCCURRENCE	$ 4,000,000
	EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$ 4,000,000
	DED ☒ RETENTION $ 0							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ (Mandatory in NH)	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Evidence of Insurance.

CERTIFICATE HOLDER

City of Vancouver
453 W 12th Avenue
Vancouver BC V5Y 1V4

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

deeproot

DeepRoot Canada Corp.
Suite 341
550 West Broadway
Vancouver, BC V5Z 0E9

www.deeproot.com
t 604 687 0899
f 604 684 6744

PS20220050-ENG-RFP Certificate of Insurance:

Please find attached the Insurance form that City of Vancouver requested, which is also signed by our agent in Canada, plus the umbrella coverage COI from our US Insurer. Combined this meets the minimum requirement of CN$5M.

Please See: Deep Root Canada COI - City of Vancouver

Deeproot- City of Vancouver COI

deeproot

DeepRoot Canada Corp.
Suite 341
550 West Broadway
Vancouver, BC V5Z 0E9

www.deeproot.com
t 604 687 0899
f 604 684 6744

DeepRoot Supply Agreement – City of Vancouver relating to : PS20220050–ENG-RFP

DeepRoot has the following comments/concerns with the below clauses in the in the draft Supply Agreement.

Article 3.7 (d)

(d) All costs associated with warranty replacements or repairs shall be the responsibility of the Supplier, including repair, adjustment, and shipping costs, and replacements of goods or materials.

DeepRoot Response:
DeepRoot's warranty does not cover repairs, only replacement of the Silva Cells.
See DeepRoot Warranty in the Warranty section of the RFP

Article 7.1 a (i)

7.1 Progress Reports
(i) information and statistics relating to health, safety, environmental and community relations aspects of the Supply;

DeepRoot comment:
7.1 a(i) is not applicable to the supplier of manufactured products and should be removed from the agreement.

Article 10.1 Covenants of Indemnification by the Supplier
(a) The Supplier shall indemnify and keep indemnified and hold the City, the Other City Entities and their respective officials, officers, employees and agents harmless against all losses, liabilities, claims, demands, costs and expenses (including legal fees), fines, penalties and charges (including those imposed by statute or otherwise imposed), arising out of or in connection with, or consisting

DeepRoot's Response:
DeepRoot cannot indemnify the city if the city's crew, employees… cause damage or loss on site.

CITY OF VANCOUVER

CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.
2. **NAMED INSURED** ***(must be the same name as the Proponent/bidder and is either an individual or a legally incorporated company)***

BUSINESS TRADE NAME or DOING BUSINESS AS

BUSINESS ADDRESS

DESCRIPTION OF OPERATION

3. **PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)**

INSURER_____ **Insured Values (Replacement Cost) -**
TYPE OF COVERAGE_____ Building and Tenants' Improvements $ _____
POLICY NUMBER_____ Contents and Equipment $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**

Including the following extensions:
√ Personal Injury
√ Property Damage including Loss of Use
√ Products and Completed Operations
√ Cross Liability or Severability of Interest
√ Employees as Additional Insureds
√ Blanket Contractual Liability
√ Non-Owned Auto Liability

INSURER _____
POLICY NUMBER _____
POLICY PERIOD From _____ to _____
Limits of Liability (Bodily Injury and Property Damage Inclusive) -
Per Occurrence $ _____
Aggregate $ _____
All Risk Tenants' Legal Liability $ _____
Deductible Per Occurrence $ _____

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles

INSURER_____ **Limits of Liability -**
POLICY NUMBER_____ Combined Single Limit $ _____
POLICY PERIOD From_____ to _____ ***If vehicles are insured by ICBC, complete and provide Form APV-47.***

6. ☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE** **Limits of Liability (Bodily Injury and Property Damage Inclusive)**

INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Self-Insured Retention $ _____

7. **PROFESSIONAL LIABILITY INSURANCE** **Limits of Liability**

INSURER_____ Per Occurrence/Claim $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Occurrence/Claim $ _____

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date: _____

8. **OTHER INSURANCE**

TYPE OF INSURANCE_____ **Limits of Liability**
INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____
TYPE OF INSURANCE_____ **Limits of Liability**
INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

_____ Dated _____

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

PROPOSED AMENDMENTS TO FORM OF AGREEMENT

Outline your Proposed Amendments to Form of Agreement in the form set out below by detailing any proposed amendments to the Form of Agreement in the Buyer Attachments section. It is at the City's sole discretion whether or not these proposed amendments will be considered for the Form of Agreement.

Section / General Condition	Proposed Amendment	Rationale and Benefit

REQUEST FOR PROPOSALS NO. PS20220050-ENG-RFP
SUPPLY AND DELIVERY OF SOIL CELLS
COMMERCIAL PROPOSAL - PRICING SCHEDULE

INSTRUCTIONS:

1) Pricing should be held firm for a period of one (1) year.
2) Prices are to be quoted CIP, destination (Incoterms, 2010). For the avoidance of doubt, freight, insurance, unloading at the destination designated by the City, import duties, brokerage, royalties, handling, operational cost, overhead, profit and all other similar costs are to be included in quoted prices.
3) Prices are to inclusive of provincial sales tax
4) Prices are to be quoted in Canadian Currency.
5) Proponents to complete Table 3 to propose a pricing adjustment mechanism for the subsequent years beyond 1-year pricing fixed term.
6) Quantities stated herein is the City's best estimation of its requirements. actual quantities may vary.

TABLE 1 - PRODUCT PRICING INFORMATION

PRODUCT DESCRIPTION	PRODUCT DIMENSIONS/SPECIFICATIONS	UNIT PRICE (A)	QUANTITY OF PRODUCT REQUIRED FOR ONE TREE (30m^3) (B)	PRODUCT PRICE PER TREE (30m^3) (C) (C = A*B)	TOTAL PRICE FOR 40 TREES (C*40)
Soil Cell		$		$	$
			TOTAL:	$	$

TABLE 2 - VOLUME DISCOUNT

QUANTITY THRESHOLD	DISCOUNT %

TABLE 3 - PROPOSED PRICING ADJUSTMENT MECHANISM		
Cost Elements	**Percentage in The Cost Structure**	**Supportive Associated Indices to Calculate the Adjustment**

ENVIRONMENTAL SUSTAINABILITY

ENVIRONMENTAL OPERATIONS

City of Vancouver is committed to being the Greenest City and values the environmental impact and sustainability of proponents in addition to the goods or services offered with regards to Healthy Ecosystems (minimizing pollution/toxicity, conserving natural resources, and regenerating ecological; local food; clean water / water consumption), Zero Waste (reducing and/or diverting), Zero Carbon (reducing/eliminating greenhouse gases)

1. For the following, please indicate those you track and/or report

	Track	Report
GHG Emissions	☐	☐
Energy usage	☐	☐
Water usage	☐	☐
Any hazardous/toxic air or water emissions	☐	☐
Generation/recycling/reduction of solid waste	☐	☐
Generation/recycling/reduction of hazardous	☐	☐
Other	☐	☐

   a. If reporting, please indicate to whom or where
      - ☐ Government(s)/Agencies
      - ☐ Industry Association(s) ie. "industry-wide environmental product declaration"
      - ☐ CDP
      - ☐ Global certification system ie. World Business Council for Sustainable Development
      - ☐ Other(s) ie. Concrete Sustainability Council

b. Do you request/require your supply chain to track and report any of the above? Y/N, explain.

2. *Has your company achieved (or is it committed to) any of the following activities? Check all that apply and provide details/targets/goals*
   - ☐ Increase renewable energy sources and/or reduce the company's overall energy usage
   - ☐ Reduced carbon use, GHG emissions or use of ozone depleting substances
   - ☐ Implemented initiatives to reduce waste at the source or divert the waste from landfills/incineration
   - ☐ Recycled water or other water recovery systems to reduce the use of potable water
   - ☐ Responsibly dispose of all hazardous waste generated from production.
   - ☐ 2030 Sustainable Development Goals of the United Nations
   - ☐ Other: include an explanation of any on-going efforts or plans that the vendors has, or has taken to address climate change and their environmental impact.

Please provide details:

Do you engage with your supply chain on any above noted issues? Y/N, explain

RECYCLED/POST-CONSUMER MATERIALS AND 'END OF LIFE' REUSE/REFURBISH/RECYCLING:

Sustainability: Materiality

Please provide details regarding the inclusion of recycled and/or post-consumer content within materials or proposed alternative materials.

Sustainability: Circularity

Please provide details regarding the durability and life-span of material, including end of life decommissioning with regards to options for reuse/refurbishing and/or recycling.

FORM OF PROPOSAL

PS20220050 – ENG – RFP - SUPPLY AND DELIVERY OF SOIL CELL (the "RFP")

Proponent Full Legal Name: _____
"**Proponent**"

Address: _____

_____

Jurisdiction of Legal Organization: _____

Key Contact Person: _____

Telephone: _____

E-mail: _____

The Proponent, having carefully examined and read the RFP, including all amendments and addenda thereto, if any, and all other related information published on the City's sourcing system (Jaggaer), hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to Appendix 1 - Legal Terms & Conditions.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

_____ _____

Signature of Authorized Signatory for the Proponent Date

_____

Name and Title

_____ _____

Signature of Authorized Signatory for the Proponent Date

_____

Name and Title

deeproot

DeepRoot Canada Corp.
Suite 341
550 West Broadway
Vancouver, BC V5Z 0E9

www.deeproot.com
t 604 687 0899
f 604 684 6744

ENVIRONMENTAL SUSTAINABILITY

ENVIRONMENTAL OPERATIONS

City of Vancouver is committed to being the Greenest City and values the environmental impact and sustainability of proponents in addition to the goods or services offered with regards to Healthy Ecosystems (minimizing pollution/toxicity, conserving natural resources, and regenerating ecological; local food; clean water / water consumption), Zero Waste (reducing and/or diverting), Zero Carbon (reducing/eliminating greenhouse gases)

1. For the following, please indicate those you track and/or report

	Track	Report
GHG Emissions	☐	☐
Energy usage	☐ Y	☐
Water usage	☐ Y	☐
Any hazardous/toxic air or water emissions	☐ Y	☐ Y
Generation/recycling/reduction of solid waste	☐ Y	☐
Generation/recycling/reduction of hazardous	☐ Y	☐
Other	☐	☐

   a. If reporting, please indicate to whom or where
      - ☐ Yes - Government(s)/Agencies
      - ☐ Industry Association(s) ie. "industry-wide environmental product declaration"
      - ☐ Yes CDP
      - ☐ Global certification system ie. World Business Council for Sustainable Development
      - ☐ Other(s) ie. Concrete Sustainability Council

b. Do you request/require your supply chain to track and report any of the above? Y/N, explain.
No

2. *Has your company achieved (or is it committed to) any of the following activities? Check all that apply and provide details/targets/goals*
   - ☐ Yes Increase renewable energy sources and/or reduce the company's overall energy usage
   - ☐ Yes Reduced carbon use, GHG emissions or use of ozone depleting substances
   - ☐ Yes Implemented initiatives to reduce waste at the source or divert the waste from landfills/incineration
   - ☐ Recycled water or other water recovery systems to reduce the use of potable water
   - ☐ Yes Responsibly dispose of all hazardous waste generated from production.
   - ☐ 2030 Sustainable Development Goals of the United Nations
   - ☐ Other: include an explanation of any on-going efforts or plans that the vendors has, or has taken to address climate change and their environmental impact.

deeproot

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Please provide details:

Our Canadian Manufacturer is…

- Converting several injection machines to sero drives (60% reduction in electricity usage)
- Planning a window replacement/insulation program
- Has recently enrolled in a GHG emissions program

Do you engage with your supply chain on any above noted issues? Y/N, explain
Yes – We work with the Manufacturer to support their climate change and their environmental impact policies while maintaining our high production quality requirements.

RECYCLED/POST-CONSUMER MATERIALS AND 'END OF LIFE' REUSE/REFURBISH/RECYCLING:

Sustainability: Materiality

Please provide details regarding the inclusion of recycled and/or post-consumer content within materials or proposed alternative materials.

Varies per system depth:

System	Recycled Material % of System
1x	55%
2x	66%
3x	73%

Sustainability: Circularity

Please provide details regarding the durability and life-span of material, including end of life decommissioning with regards to options for reuse/refurbishing and/or recycling.

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As the material is buried and not exposed to UV for extended periods of time, it may be re-used. The fatigue life analysis demonstrates useable life span between 50-100 years depending on the application.

FORM OF PROPOSAL

PS20220050 – ENG – RFP - SUPPLY AND DELIVERY OF SOIL CELL (the "RFP")

Proponent Full Legal Name: DeepRoot Canada Corp.
"**Proponent**"

Address: 341- 550 W. Broadway, Vancouver, BC V5Z)E9

Jurisdiction of Legal Organization: Canada

Key Contact Person: Michael James - General Manager

Telephone: 604 687 0899 office / 604 220 9521 cell

E-mail: mjames@deeproot.com

The Proponent, having carefully examined and read the RFP, including all amendments and addenda thereto, if any, and all other related information published on the City's sourcing system (Jaggaer), hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to Appendix 1 - Legal Terms & Conditions.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

Signature of Authorized Signatory for the Proponent — Date: 8 September, 2022

J Shawn Freedberg

Name and Title

Signature of Authorized Signatory for the Proponent — Date: 8 September, 2022

Ida Pai/ CFO

Name and Title

SOCIAL SUSTAINABILITY

SUPPLIER DIVERSITY

INDIGENOUS PARTICIPATION

Do you have any business relationships, partnerships or joint-ventures with First Nations and/or Indigenous peoples or organizations? Y/N a. If yes, please describe in detail:
Do you have a Supplier Diversity program to include/consider equity-seeking businesses as your vendors/suppliers/sub-contractors? Y/N b. Please provide information on how you invest in economic development of small/social/diverse businesses as your suppliers or sub-contractors

What % or $ of work from this contract will be directed to sub-contractors that identify as social/diverse based on certification and/or ownership/control by equity seeking demographic?)

Category of Social Value Businesses (Majority owned/controlled/certified by)	# of Businesses	$/% of contract	Name of the Businesses being Sub-contracted
Indigenous Peoples			
Women			
Ethno-cultural			
People with Disabilities			
LGBTQ2+			
Non-Profit/Charity (Social Enterprise)			
3C/CCC; Coop; BCorp			
Other			

EMPLOYMENT EQUITY & WORKFORCE DIVERSITY

EMPLOYMENT EQUITY

1. In addition to being an equal opportunity employer, please describe any policies/programs or how you advance employee equity, diversity and inclusion for under-represented populations (such as Women, Indigenous People, People with Disabilities)

2. Do you regularly conduct an employee equity "survey" or similar information/data collection on workforce diversity? Y/N a. Please describe how you track/monitor your workforce diversity including frequency .

3. Do you source/hire from Workforce Development and/or Skill Training programs, including pre-employment support, apprenticeships or ongoing employment support, for people who are under-represented and/or face barriers to traditional employment (such as Indigenous persons, Women, youth, Minorities, People with Disabilities including mental health)? Y/N

a. Please describe and/or use the table below:

Category of Partnership Organizations	Name of the Partnership Organization(s)	# of staff (optional if makes sense)
Indigenous Peoples		
Women		
Ethno-Cultural Peoples		
People with Disabilities		
LGBTQ2+		
Youth/Seniors		
Other		

4. Do you support training for career advancement and/or skills development? a. If yes, please describe.

5. Do you compensate at or above a Living Wage (currently $20.91/hr) Y/N

6. Do you provide non-mandatory benefits (i.e. extended health) to your employees? Y/N, if yes, please describe.

WORKFORCE DIVERSITY

Vendors' are required to answer to the following question, which is for information gathering purposes only, and will be kept confidential in accordance with the Legal Terms and Conditions.

As best known, in the space below, indicate the vendor's company profile with regards to economic inclusion supporting employment equity, diversity, inclusion and reconciliation by an equity-seeking demographic (including but not limited to Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ2+ people). *Confidential & for information only*

Overall Workforce Diversity:	**Leadership/Management/Executive Workforce Diversity:**
_____ % Women	_____ % Women
_____ % Indigenous Peoples	_____ % Indigenous Peoples
_____ % Ethno-cultural People	_____ % Ethno-cultural People
_____ % People with Disabilities	_____ % People with Disabilities
_____ % LGBTQ2+	_____ % LGBTQ2+

_____ % Other: please indicate	_____ % Other: please indicate
If you choose not to respond please indicate why: ☐ **Do not track this information** ☐ **Do not want to share this information**	

September 9, 2022

REQUEST FOR PROPOSAL "RFP" No. PS20220050-ENG-RFP
SUPPLY AND DELIVERY OF SOIL CELLS
AMENDMENT No. 2

RE: TECHNICAL PROPOSAL - 1.1.10 – QUALITY CONTROL

CURRENTLY READS:

The proponent shall provide details on their quality control process and plan for the successful installation and implementation of the product.

REPLACE WITH:

The proponent shall provide details on their quality control process.

All other conditions and specifications remain unchanged.

This amendment must be completed, and attached to your Proposal.

City of Vancouver, Finance, Risk and Supply Chain Management
Supply Chain Management
453 West 12th Avenue
Vancouver, British Columbia V5Y 1V4 Canada
604-873-7263
vancouver.ca

This completed amendment shall be submitted prior to the Closing Time of 3:00 pm (Local Vancouver Time) on September 16, 2022.

J Shawn Freedberg, DeepRoot Canada Corp

NAME OF VENDOR

SIGNATURE OF AUTHORIZED SIGNATORY

September 15, 2022

DATE

deeproot

DeepRoot Canada Corp.
Suite 341
550 West Broadway
Vancouver, BC V5Z 0E9

www.deeproot.com
t 604 687 0899
f 604 684 6744

SOCIAL SUSTAINABILITY

SUPPLIER DIVERSITY

INDIGENOUS PARTICIPATION

Do you have any business relationships, partnerships or joint-ventures with First Nations and/or Indigenous peoples or organizations? Y/N a. If yes, please describe in detail:
Do you have a Supplier Diversity program to include/consider equity-seeking businesses as your vendors/suppliers/sub-contractors? Y/N b. Please provide information on how you invest in economic development of small/social/diverse businesses as your suppliers or sub-contractors

What % or $ of work from this contract will be directed to sub-contractors that identify as social/diverse based on certification and/or ownership/control by equity seeking demographic?) None

Category of Social Value Businesses (Majority owned/controlled/certified by)	# of Businesses	$/% of contract	Name of the Businesses being Sub-contracted
Indigenous Peoples			
Women			
Ethno-cultural			
People with Disabilities			
LGBTQ2+			
Non-Profit/Charity (Social Enterprise)			
3C/CCC; Coop; BCorp			
Other			

EMPLOYMENT EQUITY & WORKFORCE DIVERSITY

EMPLOYMENT EQUITY

1. In addition to being an equal opportunity employer, please describe any policies/programs or how you advance employee equity, diversity and inclusion for under-represented populations (such as Women, Indigenous People, People with Disabilities)

deeproot

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2. Do you regularly conduct an employee equity "survey" or similar information/data collection on workforce diversity? Y/N a. Please describe how you track/monitor your workforce diversity including frequency .

3. Do you source/hire from Workforce Development and/or Skill Training programs, including pre-employment support, apprenticeships or ongoing employment support, for people who are under-represented and/or face barriers to traditional employment (such as Indigenous persons, Women, youth, Minorities, People with Disabilities including mental health)? Y/N

a. Please describe and/or use the table below:

Category of Partnership Organizations	Name of the Partnership Organization(s)	# of staff (optional if makes sense)
Indigenous Peoples		
Women		
Ethno-Cultural Peoples		
People with Disabilities		
LGBTQ2+		
Youth/Seniors		
Other		

4. Do you support training for career advancement and/or skills development? a. If yes, please describe.
Yes, we have a professional development budget per person

5. Do you compensate at or above a Living Wage (currently $20.91/hr) Y/N
Above the Living Wage

6. Do you provide non-mandatory benefits (i.e. extended health) to your employees? Y/N, if yes, please describe.
We provide extended health coverage and RRSP up to 3% of total income

WORKFORCE DIVERSITY

Vendors' are required to answer to the following question, which is for information gathering purposes only, and will be kept confidential in accordance with the Legal Terms and Conditions.

As best known, in the space below, indicate the vendor's company profile with regards to economic inclusion supporting employment equity, diversity, inclusion and reconciliation by an equity-seeking demographic

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(including but not limited to Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ2+ people). *Confidential & for information only*	
Overall Workforce Diversity: __56_ % Women _____ % Indigenous Peoples _32__ % Ethno-cultural People _____% People with Disabilities _____ % LGBTQ2+ _____ % Other: please indicate	**Leadership/Management/Executive Workforce Diversity:** __75_ % Women _____ % Indigenous Peoples _37.5_ % Ethno-cultural People _____ % People with Disabilities _____ % LGBTQ2+ _____ % Other: please indicate
If you choose not to respond please indicate why: ☐ **Do not track this information** ☐ **Do not want to share this information**	

August 18, 2022

REQUEST FOR PROPOSAL "RFP" No. PS20220050
SUPPLY AND DELIVERY OF SOIL CELLS
AMENDMENT No. 1

RE: COMMERCIAL PROPOSAL - PRICING SCHEDULE

CURRENTLY READS:

3) Prices are to inclusive of provincial sales tax.

REPLACE WITH:

3) Prices are ***exclusive*** of all sales taxes.

RE: PART B - SCOPE OF WORK - SECTION 9 - DESIGN INTEGRATION

Standard tree trench drawing is on page 33 in Attachment A - GI Design Guidance Manual.

Additional tree trench drawing for reference, please see attached drawing to this amendment.

All other conditions and specifications remain unchanged.

This amendment must be completed, and attached to your Proposal.

City of Vancouver, Finance, Risk and Supply Chain Management
Supply Chain Management
453 West 12th Avenue
Vancouver, British Columbia V5Y 1V4 Canada
604-873-7263
vancouver.ca

This completed amendment shall be submitted along with your Proposal prior to the Closing Time of 3:00 pm (Local Vancouver Time) on September 9, 2022.

DeepRoot Canada Corp

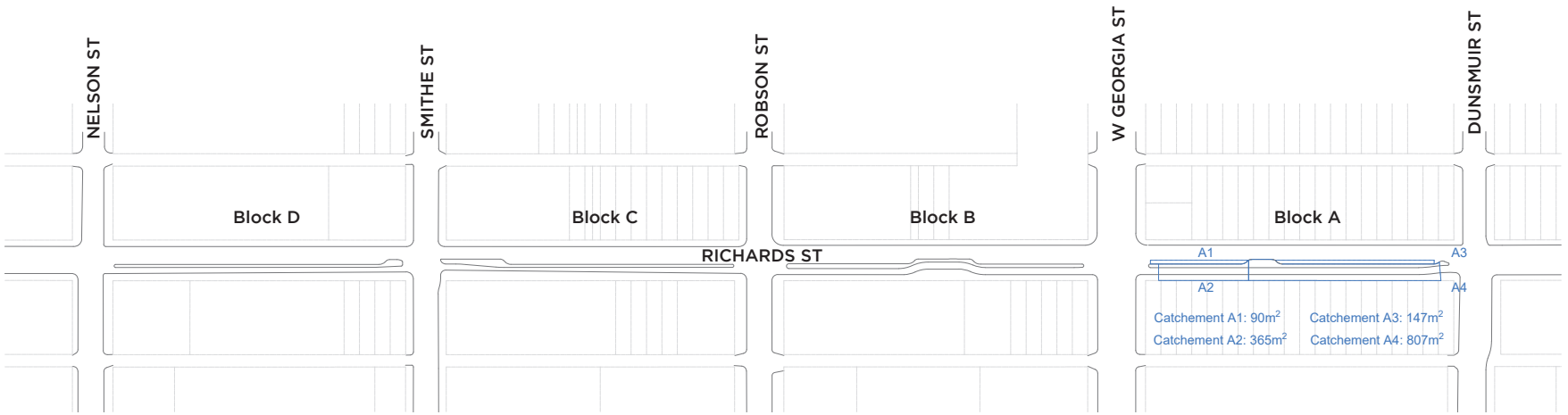
J. Shawn Freedberg

NAME OF VENDOR

SIGNATURE OF AUTHORIZED SIGNATORY

8 September, 2022

DATE



NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.

Drawing Index

Drawing Number	Drawing Title	Rev	Date
2019-14-D-GI-00A	Cover Sheet & Index		05/13/2020
2019-14-D-GI-01A	Site Plan Block A	2	05/13/2020
2019-14-D-GI-02A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-03A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-04A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-05A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-06A	Details Block A	2	05/13/2020
2019-14-D-GI-07A	Details Block A	2	05/13/2020

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

ATTENTION

THE CITY OF VANCOUVER ASSUMES NO RESPONSIBILITY FOR THE CORRECTNESS OF THE INFORMATION SHOWN.

ALL DIMENSIONS ON THIS DRAWING ARE AS DESIGNED AND NOT AS CONSTRUCTED, AND SHOULD BE FIELD CHECKED BY APPLICANT OR THEIR AGENT.

ELEVATIONS & COORDINATES SHOWN ON THIS DRAWING ARE IN METRES BASED ON G.V.R.D. NAD83 DATUM (ISSUED MARCH 31, 2005).

CITY OF VANCOUVER

	REVISIONS	BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

ENGINEER

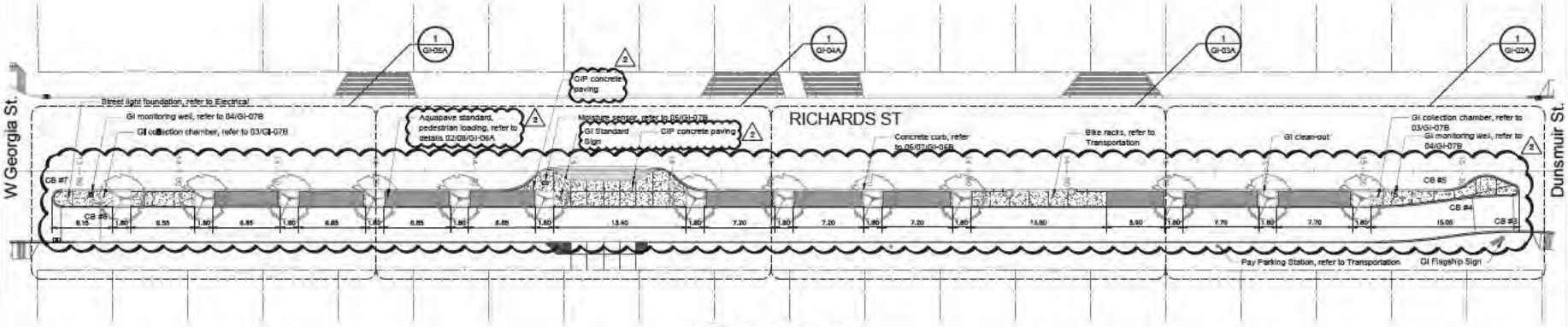
ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Cover Page & Index Block A: Dunsmuir St. to W Georgia St.

SCALE:	N/A
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-00A
REV. N0.	2
SHEET:	1 OF 8

2 GI-01A Location Map
Scale: 1:2000



1 GI-01A Site Plan - Block A
Scale: 1:200

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1199179
GI Tree Pit Install	CEV1199180
GI Paver Install	CEV1199181
GI Traffic Control (50% Transportation, 50% GI)	CEV1199182
GI Site Safety (50% Transportation, 50% GI)	CEV1199183
Streets-sourced GI Materials	CEV1199184
GI Externally-sourced Materials	CER1144539

ATTENTION

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Legend (Block A)

Structural Soil & Growing Medium

Proposed Tree	13	
Structural Soil	30	m^3
Tree Pit 0.90m Deep Growing Medium		
Silva cells: 130 frames, 130 decks Growing Medium	56	m^3

Paving

80mm AquaPave Standard Colour: Charcoal, Running Bond pattern accounted for 5% paver wastage	50	m^2 / 52.5 m^2
Colour: Natural, Running Bond pattern accounted for 5% paver wastage	50	m^2 / 52.5 m^2
C.I.P. Concrete Paving, Light Broom Finish with 25mm Deep Sawcut Joints		
Bedding Material: ¾" clear crush	≤	m^2
CoV #15 clear crush	63	m^3
Joint stabilizer	3	m^3

PVC (SDR 28) Pipes

150mm Ø PVC (solid)	20	m approx.
150mm Ø PVC (perforated)	55	m approx.
50mm Ø PVC (solid)	9	m
Flexible rubber coupling	21	
Bends (⅛)	1	
Bends (¼)	9	
Bends (⅛)	17	
Inserta tee	5	
Straight Coupling	20	

Blue Brute C900 Pipes

150mm Ø pipe (solid)	4.2	m approx.
High deflection coupler	2	
Bends (¼)	2	

Geotextiles

Nilex 4551 (non-woven)	524	m^2
Nilex 2440HF (woven)	108	m^2
Nilex 30mil LLDPE	179	m^2
Stratagrid SG150	340	m^2
NuDrain GRS	8	m^3

GI Miscellaneous

Inspection chamber	2
Clean-out	4
Monitoring well	2
Moisture sensor	1
Flagship Sign	1
Standard Sign	1
Zip Ties	122

REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

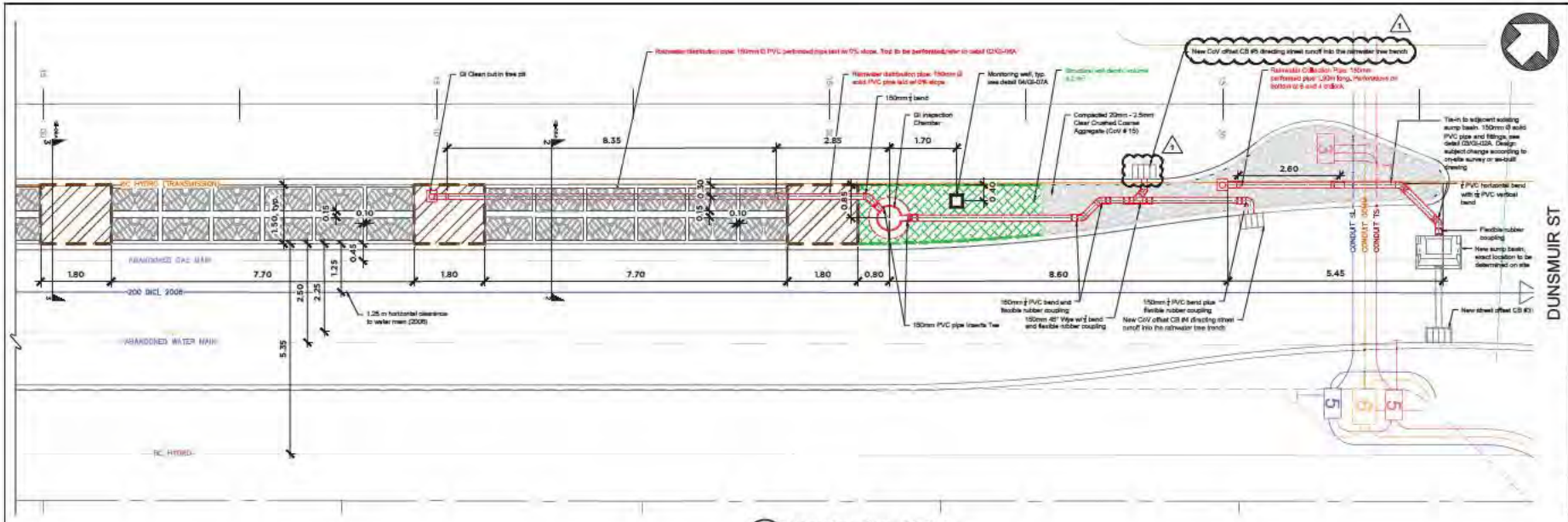
LANDSCAPE ARCHITECT | ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

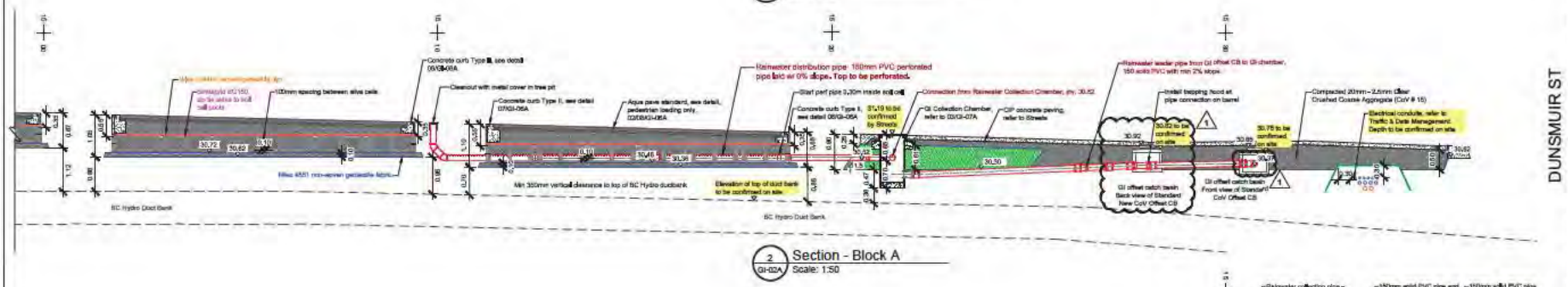
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Site Plan Block A: Dunsmuir St. to W Georgia St.

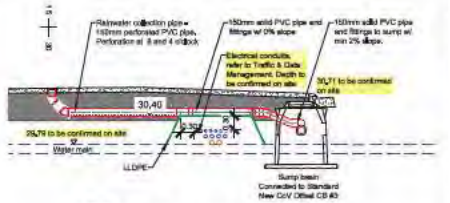
SCALE:	As noted
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-01A
REV. NO.	2
SHEET:	2 OF 8



1 GI-02A Subsurface Plan - Block A
Scale: 1:50



2 GI-02A Section - Block A
Scale: 1:50



3 GI-02A Section - North Subdrain
Scale: 1:50

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.
4. Top of electrical conduit elevation is to be surveyed by Street Ops before collection pipe can be laid. Maintain minimum 0.3m vertical clearance from electrical conduits.
5. Rainwater collection pipe connection to CB #3 subject to change with on-site survey, or As-Built drawings from Sewer Ops .

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

ATTENTION

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272

FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg

LANDSCAPE ARCHITECT

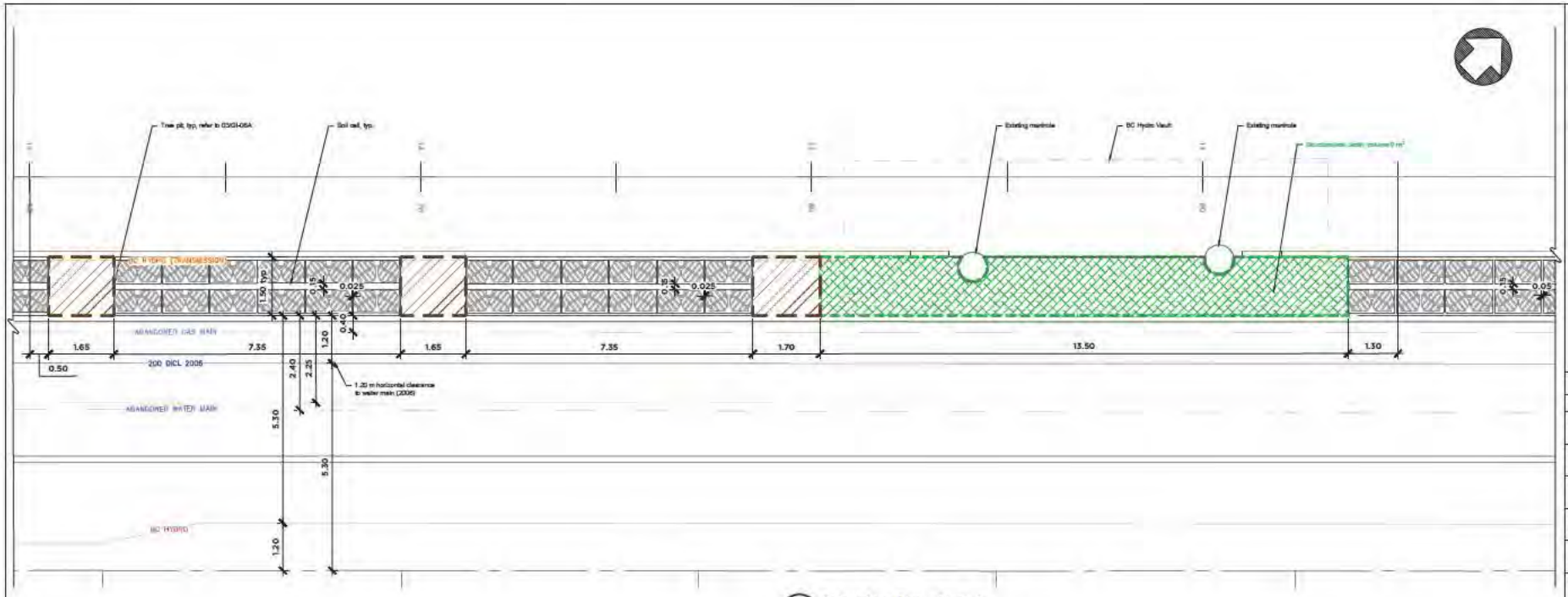
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

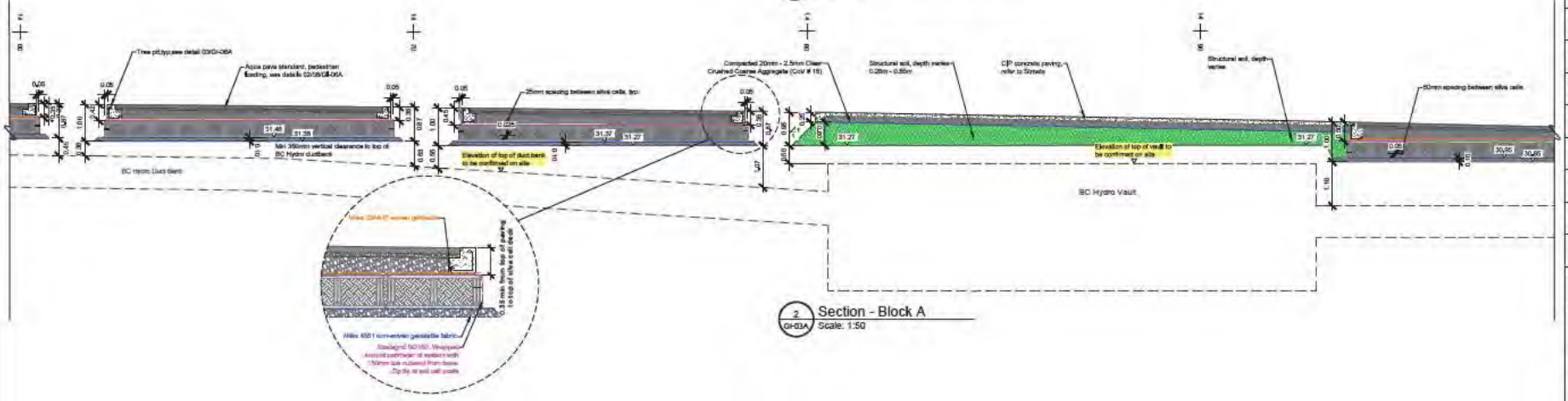
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-02A
REV. NO.	2
SHEET:	3 OF 8



1 GI-03A Subsurface Plan - Block A
Scale: 1:50



2 GI-03A Section - Block A
Scale: 1:50

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
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NETWORK NUMBERS

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GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1199179
GI Tree Pit Install	CEV1199180
GI Paver Install	CEV1199181
GI Traffic Control (50% Transportation, 50% GI)	CEV1199182
GI Site Safety (50% Transportation, 50% GI)	CEV1199183
Streets-sourced GI Materials	CEV1199184
GI Externally-sourced Materials	CER1144539

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272

FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg

LANDSCAPE ARCHITECT

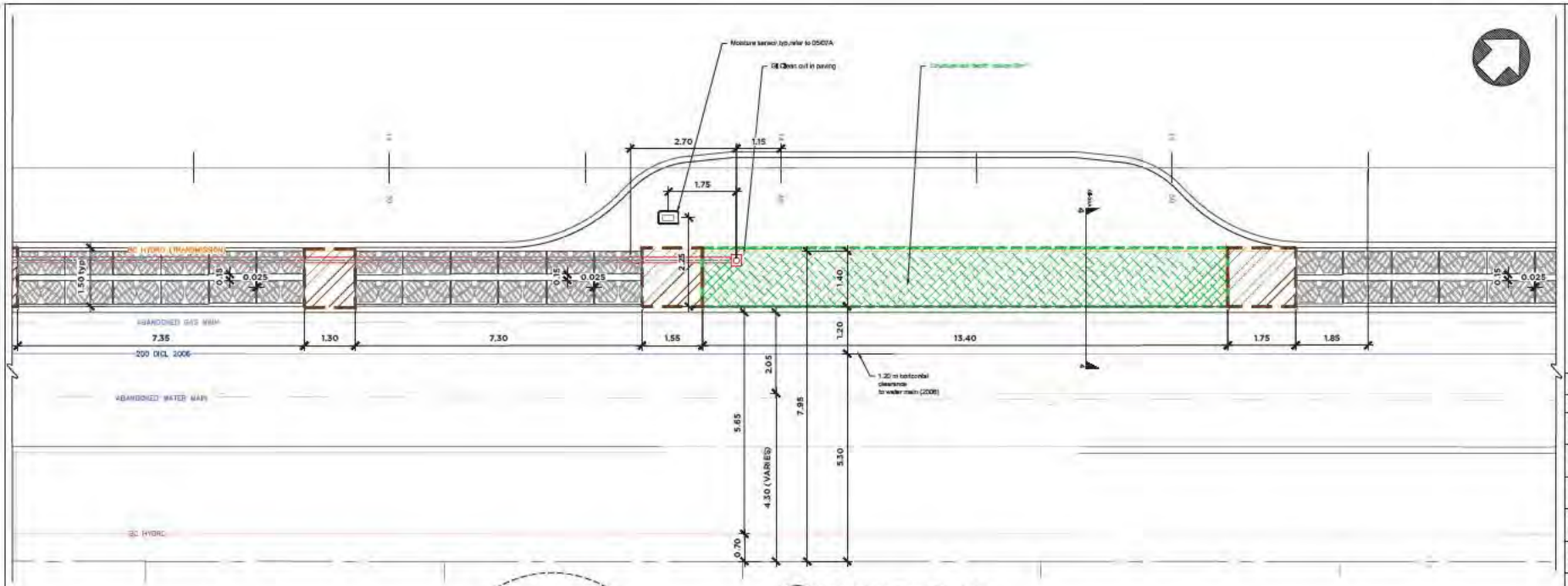
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

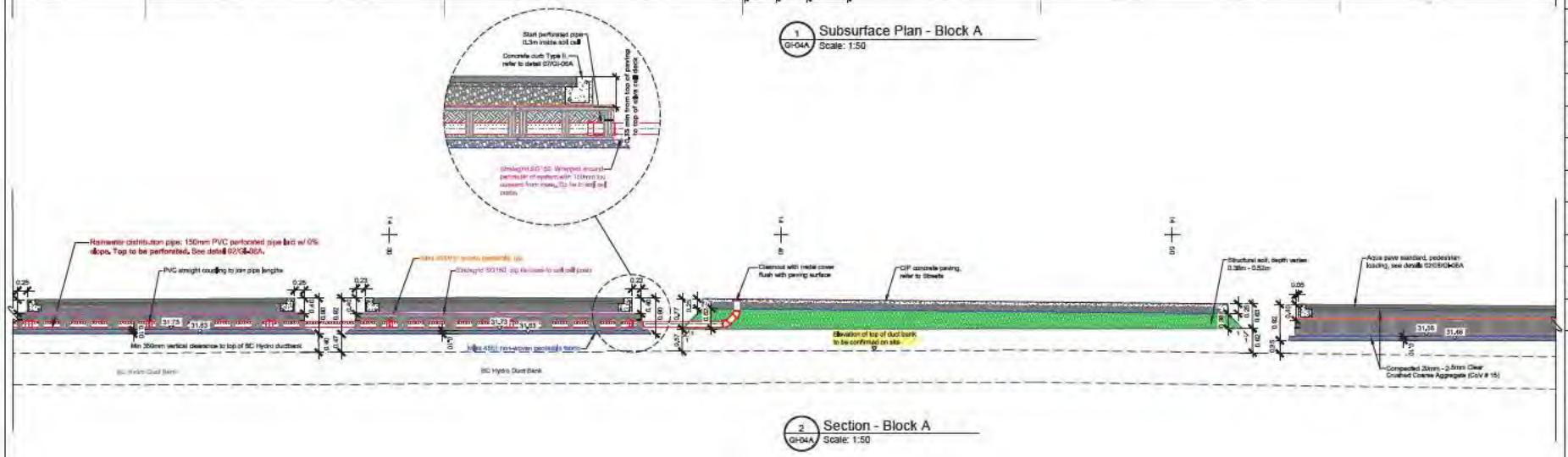
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-03A
REV. NO.	2
SHEET:	4 OF 8



1 GI-04A Subsurface Plan - Block A
Scale: 1:50



2 GI-04A Section - Block A
Scale: 1:50

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GI Sub Base install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

ENGINEER

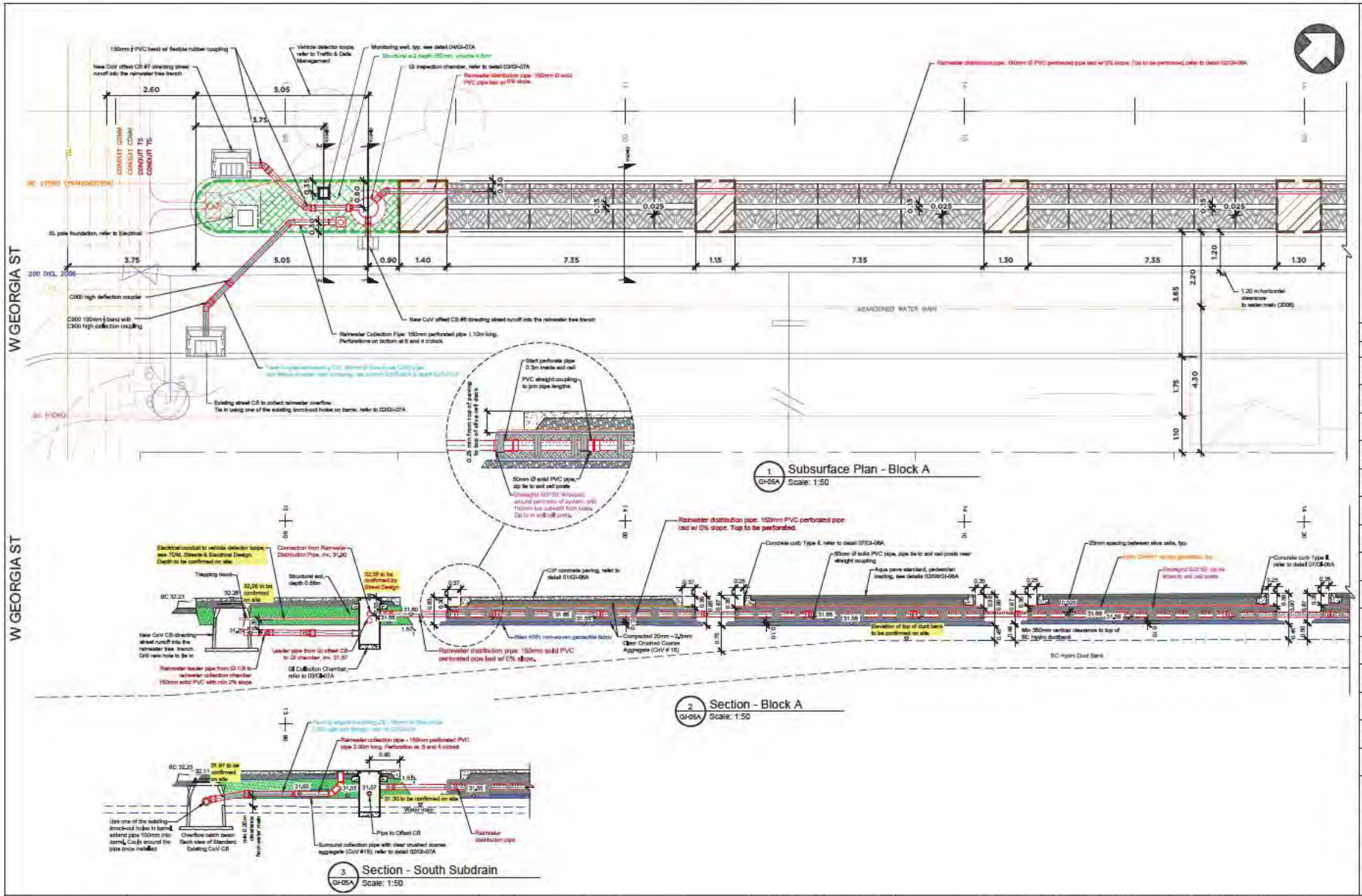
ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-04A
REV. NO.	2
SHEET:	5 OF 8

FILE: I:\GREEN INFRASTRUCTURE\13-6106-40 - Street Infrastructure Case Files\EXD - GI - Richards St Bike Lane - Dunsmuir to Pender\11 - Design\EXD - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg DATE:May 13, 2020 - 9:04pm USER:HSP38



NOTES:

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GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

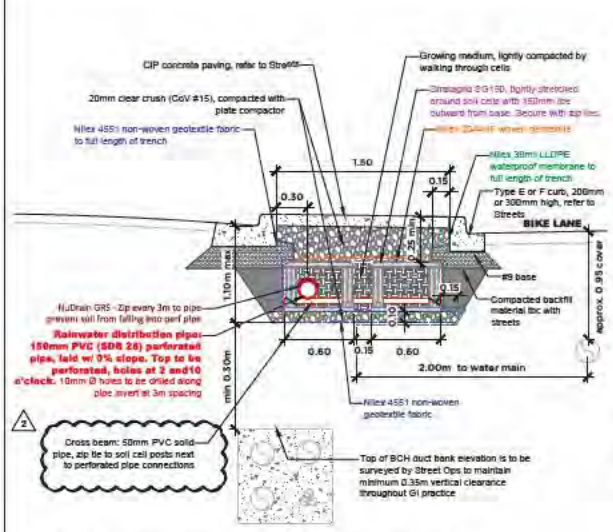
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

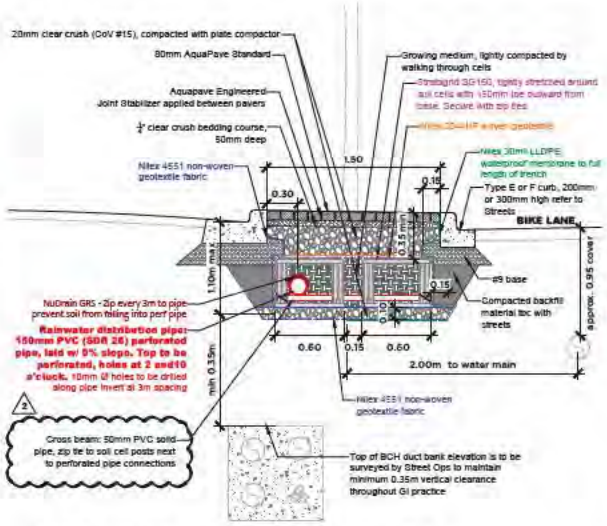
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

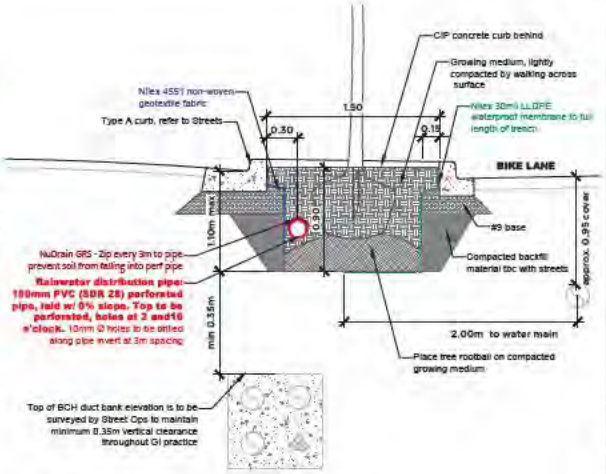
SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-05A
REV. NO.	2
SHEET:	6 OF 8



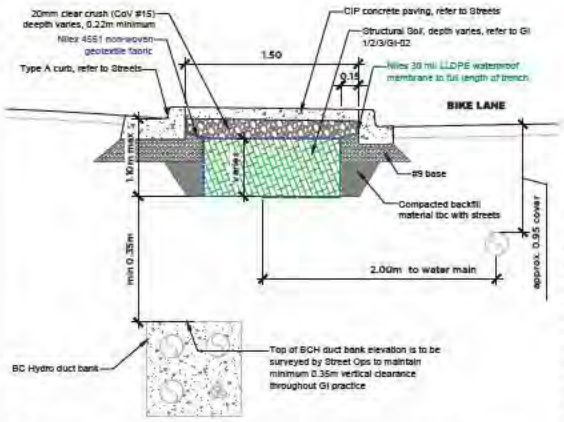
1 GI-06A Typical GI Section - Concrete Surface on Silva Cell
Scale: 1:20



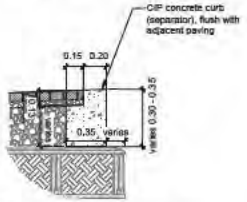
2 GI-06A Typical GI Section - Paver Surface on Silva Cell
Scale: 1:20



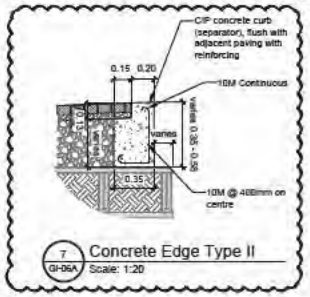
3 GI-06A Typical GI Section - Tree Pit
Scale: 1:20



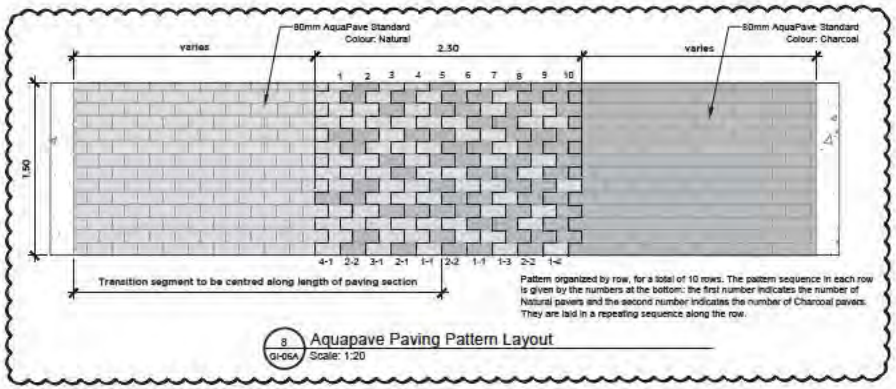
4 GI-06A Typical GI Section - Concrete Surface on Structural Soil
Scale: 1:20



6 GI-06A Concrete Edge Type I
Scale: 1:20



7 GI-06A Concrete Edge Type II
Scale: 1:20



8 GI-06A Aquapave Paving Pattern Layout
Scale: 1:20

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
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NETWORK NUMBERS

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GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
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GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272

FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV02.dwg

LANDSCAPE ARCHITECT

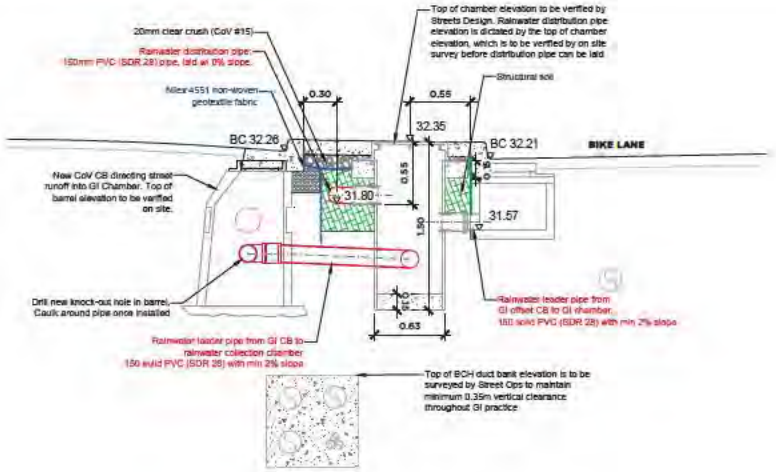
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

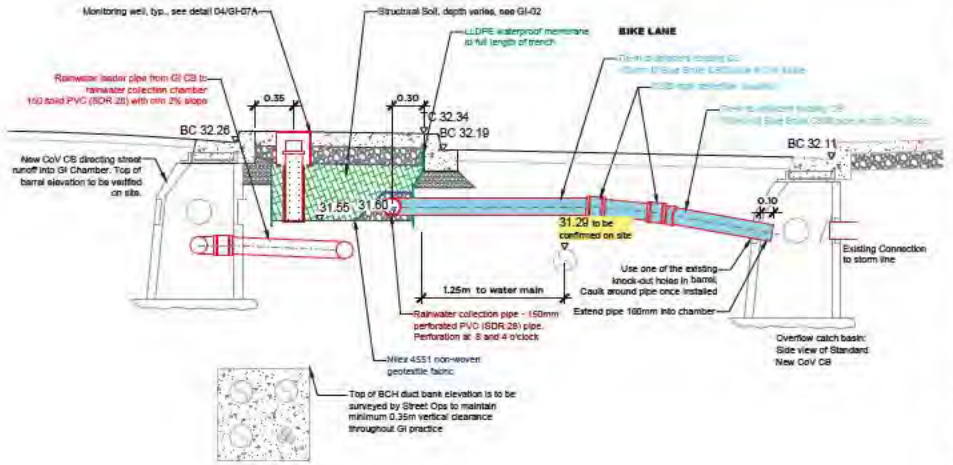
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Details Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:20
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-06A
REV. NO.	2
SHEET:	7 OF 8



1 GI-07A New CB and Offset CB Connection to Inspection Chamber STA 13+92.5
Scale: 1:20



2 GI-07A Subdrain Connection to CB STA 13+91
Scale: 1:20

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
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NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199690
GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199406
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GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1199179
GI Tree Pit Install	CEV1199180
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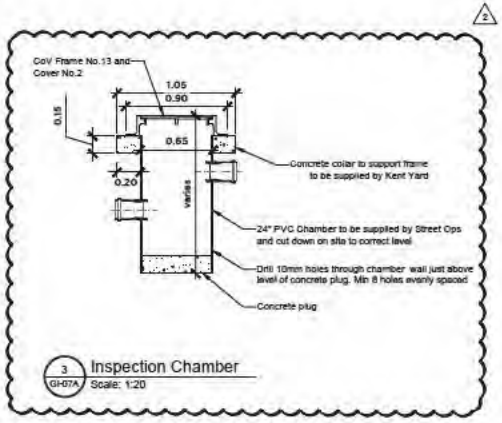
GI Traffic Control (50% Transportation, 50% GI)	CEV1199182
GI Site Safety (50% Transportation, 50% GI)	CEV1199183
Streets-sourced GI Materials	CEV1199184
GI Externally-sourced Materials	CER1144539

ATTENTION

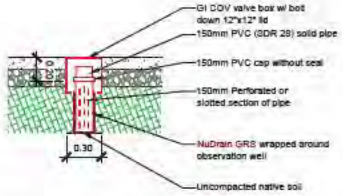
THE CITY OF VANCOUVER ASSUMES NO RESPONSIBILITY FOR THE CORRECTNESS OF THE INFORMATION SHOWN.

ALL DIMENSIONS ON THIS DRAWING ARE AS DESIGNED AND NOT AS CONSTRUCTED, AND SHOULD BE FIELD CHECKED BY APPLICANT OR THEIR AGENT

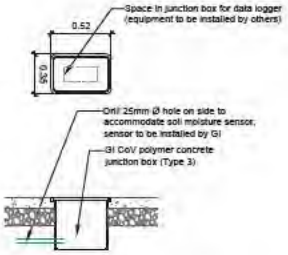
ELEVATIONS & COORDINATES SHOWN ON THIS DRAWING ARE IN METRES BASED ON G.V.R.D. NAD83 DATUM (ISSUED MARCH 31, 2005).



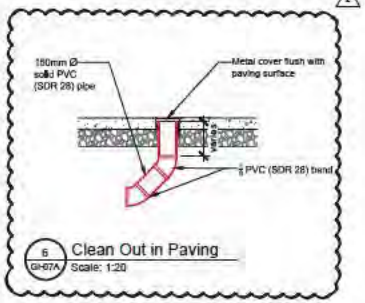
3 GI-07A Inspection Chamber
Scale: 1:20



4 GI-07A Monitoring Well
Scale: 1:20



5 GI-07A Moisture Sensor
Scale: 1:20



6 GI-07A Clean Out in Paving
Scale: 1:20

7 GI-07A Clean Out in Tree Pit
Scale: 1:20

REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
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LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV02.dwg		

LANDSCAPE ARCHITECT | ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Details Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:20
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-07A
REV. NO.	2
SHEET:	8 OF 8

deeproot

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DeepRoot Quality Assurance Policy

a. Product Quality Assurance

The Silva Cell system is manufactured under a quality management system that is ISO/TS 16949 compliant and ISO 9001:2008 registered. All parts adhere to a strict control plan.

s.21(1)

s.21(1)

s.21(1)

REQUEST FOR PROPOSALS NO. PS20220050-ENG-RFP
SUPPLY AND DELIVERY OF SOIL CELLS
COMMERCIAL PROPOSAL - PRICING SCHEDULE

INSTRUCTIONS:

1) Pricing should be held firm for a period of one (1) year.

2) Prices are to be quoted CIP, destination (Incoterms, 2010). For the avoidance of doubt, freight, insurance, unloading at the destination designated by the City, import duties, brokerag operational cost, overhead, profit and all other similar costs are to be included in quoted prices.

3) Prices are to inclusive of provincial sales tax See Q&A - Prices to be exclusive of Prov. Tax

4) Prices are to be quoted in Canadian Currency.

5) Proponents to complete Table 3 to propose a pricing adjustment mechanism for the subsequent years beyond 1-year pricing fixed term.

6) Quantities stated herein is the City's best estimation of its requirements. actual quantities may vary.

TABLE 1 - PRODUCT PRICING INFORMATION

PRODUCT DESCRIPTION	PRODUCT DIMENSIONS/SPECIFICATIONS	UNIT PRICE (A)	QUANTITY OF PRODUCT REQUIRED FOR ONE TREE (30m^3) (B)	PRODUCT PRICE PER TREE (30m^3) (C) (C = A*B)	TOTAL PRICE FOR 40 TREES (C*40)
Silva Cell 3X	600mm x 1200mm x 1092mm + allowable	s.21(1)	s.21(1)	s.21(1)	s.21(1)
	spacing between units				
Unit pricing assumes shipping in full truckload quantities			TOTAL:	s.21(1)	s.21(1)

TABLE 2 - VOLUME DISCOUNT

QUANTITY THRESHOLD	DISCOUNT %
1092 units shipped complete	s.21(1)
prior to 3/31/2023	
Unit pricing assumes shipping in full truckload quantities	

TABLE 3 - PROPOSED PRICING ADJUSTMENT MECHANISM		
Cost Elements	**Percentage in The Cost Structure**	**Supportive Associated Indices to Calculate the Adjustment**
To be negotiated. There are no indices that accurately track and reflect the multiple components that make up the Silva Cell product cost.		

ge, royalties, handling,

TREE ROOT BARRIERS

Patented mechanical barriers effectively manage root expansion and protect surrounding hardscapes without compromising tree health or growth, and can be used both on new plantings and on existing trees.

Tree Root Barrier

SPECIFICATIONS + FEATURES

APPLICATIONS

Redirect tree roots down and away from hardscapes.

MATERIALS

UB 12-2, UB 18-2, and UB 24-2: High-quality 90% post-industrial recycled injection molded co-polymer polypropylene. Manufactured in ISO 9002 certified factories.

UB 36-2 and UB 48-2: High-quality homopolymer extruded polyethylene.

SIZES

UB 12-2: 12" (30 cm) x 24" (61 cm)
UB 18-2: 18" (45 cm) x 24" (61 cm)
UB 24-2: 24" (61 cm) x 24" (61 cm)
UB 36-2: 36" (91 cm) x 24" (61 cm)
UB 48-2: 48" (122 cm) x 24" (61 cm)

FEATURES

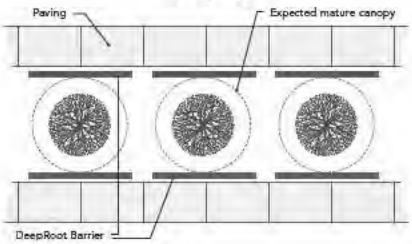
- 90° ribs redirect root growth down and underneath the barrier
- Patented reinforced double-top edge withstands repeated foot traffic
- Added UV inhibitors prevent breakdown from sun exposure
- Patented anti-lift ground lock tabs secure the panel in the ground
- Made in the USA

UB 36-2 and UB 48-2:

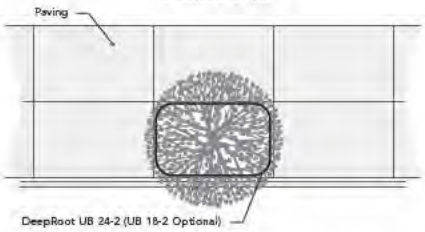
- 90° ribs redirect root growth down and underneath the barrier
- Sizing adjustable in 1 ft. (.3 m) modules adaptable to any site
- Combine with UB 18-2 or UB 24-2 where terrain is of varying depth
- Made in the USA

APPLICATIONS

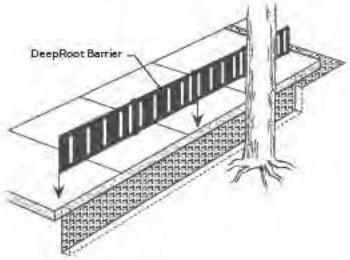
LINEAR



SURROUND



ROOT PRUNING



LINEAR

Provide maximum hardscape protection while utilizing all available rooting space for improved tree health by placing guides in a straight line directly along the hardscape to be protected.

SURROUND

Protect hardscapes that surround a planting on all four sides. Plan to line the perimeter of the planting area with the panels—this provides the maximum available uncompacted soil volume for immediate root growth.

ROOT PRUNING

Root pruning can help save existing trees and prevent future damage to paving. Disruptive roots are cleanly cut and removed; linear Root Barrier is then installed. There are limitations to root pruning and an ISA Certified Arborist should be consulted.

SPECIALTY APPLICATIONS

Help protect sites with unusual requirements—like tennis courts, slopes, cemeteries and retaining walls—from root damage. DeepRoot Tree Root Barriers of different sizes can be used in combination in areas of variable depth.

ROOT BLOCK

In some circumstances it may be more desirable to prevent root intrusion by blocking roots, not redirecting them. Please see our Geomembrane catalog for details.

APPLICATION STYLES

Product #	Linear	Surround	Root Pruning	Specialty
UB 12-2	•		•	
UB 18-2	•	•	•	
UB 24-2	•	•	•	•
UB 36-2	•		•	•
UB 48-2	•		•	•

PRODUCT USES

Product #	Sidewalks	Curbs & Gutters	Paths	Medians	Patios	Specialty
UB 12-2			•			
UB 18-2	•		•		•	
UB 24-2	•	•	•	•	•	•
UB 36-2						•
UB 48-2						•

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deeproot

SILVA CELL
OPERATIONS AND MAINTENANCE MANUAL

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LIST OF APPENDICES

1.0 Acknowledgments

There are many dedicated, brilliant people working on the challenge of creating healthier, more sustainable, and more efficient cities. We believe the most successful of these places will be those grounded in the principle that nature and engineering can coexist successfully. Soil, urban trees, and sustainable stormwater management are at the core of this effort. We wish to express our tremendous appreciation and gratitude to the many researchers and practitioners whose work we have relied on to inform the guidelines contained in this manual. Thank you to the following people for their specific contributions.

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Dr. Jessica Sanders, Casey Trees
Nathalie Shanstrom, Kestrel Design Group
James Urban, Urban Trees + Soils

2.0 Introduction

Silva Cells are a modular suspended pavement system that provides soil volume to support large tree growth and provides stormwater management through interception, storage, evapotranspiration, and pollutant uptake. When filled with soil media of suitable depth and quality, Silva Cells also promote filtration of stormwater runoff through the soil media and infiltration of treated runoff into native site soils, making them a versatile Low Impact Development (LID) Best Management Practice (BMP).

In March 2013, the Washington State Department of Ecology approved Silva Cells as functionally equivalent to bioretention (Ecology 2013a). This approval allows designers in Washington State to design Silva Cells to fully or partially satisfy minimum stormwater requirements for LID, water quality treatment, and flow control in accordance with the National Pollutant Discharge Elimination System (NPDES) Municipal Separated Storm Sewer System (MS4) permit (NPDES stormwater permit). Similar approvals are in place in Montgomery County, Maryland; St. Louis, Missouri; Calgary, Alberta; and North Vancouver, British Columbia. Additional approvals are currently pending in other areas across the United States and Canada as of the date of this manual.

When Silva Cells are installed as part of a permanent stormwater management system to meet stormwater permit requirements, they should be maintained as required by the local jurisdiction for maintenance of stormwater and LID BMPs.

The remainder of this section discusses the purpose of this document, applicable permit requirements, how this manual is intended to be used, and important definitions. Section 3 presents key maintenance considerations, maintenance guidelines, equipment and materials lists, and skills and staffing needs to accomplish the recommended maintenance. Section 4 discusses the repair of Silva Cell facilities. Section 5 discusses programmatic and administrative guidance, while Section 6 provides a list of additional resources relating to LID BMP design, inspection, operation, and maintenance and Section 7 provides a list of additional resources with relevant information on stormwater and LID BMP maintenance.

2.1 Purpose

This document provides guidance to assist owners and operators of Silva Cell facilities with planning and implementation of maintenance to promote long-term system performance in accordance with the design intent. These recommendations should be considered as general guidelines, not requirements, and they should be reviewed and adapted as appropriate to develop site-specific maintenance plans based on the specific design configuration of a given site.

2.2 Permit Requirements

Silva Cells may be designed and installed as LID BMPs that fully or partially satisfy applicable soil and/or stormwater requirements for new or redevelopment projects. Check the local permit requirements to determine whether such requirements apply to your project.

While Silva Cells can be designed as LID BMPs, they can also be used to promote large, healthy trees in dense urban environments, without the intent of formally managing stormwater runoff. In such cases, stormwater permit requirements would not apply.

2.3 How to Use this Manual

Operations and maintenance guidelines are provided in Section 3.0, organized in three subsections, as follows:

- Subsection 3.1 Key Maintenance Considerations - Provides details regarding maintenance activities that should be considered to maintain function of the facility.
- Subsection 3.2 Key Operations to Preserve Facility Function - Discusses the functions of the BMP that need to be preserved to maintain the intended performance.
- Subsection 3.3 Maintenance Guidelines - Provides information that can be used to develop a site specific maintenance plan.

Successful use of this manual requires understanding of the design intent, site and as-built conditions, and knowledge of applicable permit requirements (Section 2.2).

2.4 Definitions

Definitions for important terms used throughout this manual are as follows:

- Best management practices (BMPs) - Activities, practices, procedures, structural features, or products that are designed to reduce the risk of causing adverse impacts to downstream water bodies.
- Drawdown Time - The time it takes water from a given runoff event to completely drain through an infiltration BMP, typically measured from the end of the event to the time the water level in the system returns to baseflow conditions.
- Infiltration – Percolation of stormwater runoff into soil media or native site soils.
- Low Impact Development (LID) - A development approach that manages stormwater by working with nature and the existing site conditions in a manner that will reduce or prevent adverse impacts to the site or downstream environment.
- Macropores – Large, free-draining soil pores, oftentimes found between aggregates or near tree roots.

3.0 Maintaining Silva Cells

This section identifies key component design functions and maintenance considerations, provides guidance on inspection and maintenance activities and recommended frequencies, lists needed equipment and materials, and discusses skills and staff needed to perform the recommended maintenance.

3.1 Key Component Design Function and Maintenance Considerations

Key components of the Silva Cell system include the inlet structures, distribution pipes, the modular Silva Cell units and frames, fill soils, underdrain pipe, flow control structures, trees/vegetation, and surface treatments. Intended general design functions and maintenance considerations for each of these key components are discussed below.

3.1.1 Inlet system

Silva Cell inlet systems can be designed to allow stormwater runoff to flow into the facility in a number of ways. Water can sheet flow from adjacent hardened surfaces, infiltrate via overlying or adjacent permeable surfaces, flow through curb cuts, or be piped from a catch basin, roof drains, or yard drains.

However the inlet system(s) are configured, they must be properly sized and maintained to allow stormwater runoff from the intended contributing drainage area to enter the facility. Key maintenance considerations include providing pre-treatment through temporary erosion and sedimentation control measures in the tributary drainage basin during construction and long-term pre-treatment through stabilization of open soil areas in the tributary basin with plants or mulch and maintenance of inlet capacity by removing sediment, trash, and debris from inlets and the contributing drainage area.

3.1.2 Distribution Pipe

Some installations may include a distribution pipe to distribute inflows across the surface of the facility. Distribution pipes are typically 4- to 8-inch-diameter (100- to 200-millimeter-diameter) perforated or slotted pipes installed on top of or within the soil media. Maintenance activities should preserve the ability of the pipe to distribute the water effectively by removing clogs and repairing or replacing cracked or broken pipes as needed.

3.1.3 Irrigation Systems

If the Silva Cells have been designed to include irrigation, follow the manufacturer instructions for operating and maintaining your chosen irrigation system. Also see the section above (3.1.2) if the irrigation system is passive and includes distribution pipes.

3.1.4 Silva Cell Modular Units

Silva Cell modular units are made from fiberglass-reinforced, chemically-coupled, impact-modified polypropylene with galvanized steel tubes. DeepRoot provides a 20-year warranty for the Silva Cell product, which is included for reference in Appendix A. Each module provides a 92% void volume, which is backfilled with a specified type and depth of soil media (Section 3.1.5) to support tree growth and promote stormwater management.

When used in a typical pedestrian application, the Silva Cell system has an estimated design life of approximately 100 years (DeepRoot 2014). The units themselves are not expected to require maintenance within that design life duration when properly designed and installed.

3.1.5 Soil Media

The soil media filled within the Silva Cell units (Section 3.1.4) performs critical functions of supporting tree growth and managing stormwater runoff. Organic matter in the soil media is important for both of these functions; because it helps trees build soil structure, provides a nutrient reservoir, and increases soil water holding capacity. In order to preserve a healthy balance of soil organic matter and soil biology, excess soil compaction must be prevented and proper drainage through the system must be maintained.

Silva Cells protect soils under pavement from excessive compaction by providing a post and beam structure that supports the pavement, allowing the soil media backfill to be lightly compacted. The lightly compacted soil media creates a healthy rooting environment for trees, which deliver increasing amounts of organic content to the soil system as the roots grow and decay. Stormwater inputs also deliver nutrients, such as nitrogen and phosphorus, helping to maintain soil organic matter over time.

Routine maintenance of the soil media is generally not needed provided the installation process of the cell and soil has been carried out correctly and the inlet (Section 3.1.1) and distribution (Section 3.1.2) systems are properly designed, installed, and maintained.

3.1.6 Underdrain Pipe and Flow Control Devices

Silva Cells may include underdrains when infiltration of treated stormwater runoff into native soil is not feasible or not desirable. Underdrains may be located at the bottom of the facility, or may be elevated to promote nitrogen removal and peak flow detention, depending on the design intent.

Typically, underdrain systems consist of 6- or 8-inch-diameter (100- to 200-millimeter-diameter) perforated or slotted pipe. The pipe may be installed in an aggregate filter blanket layer or may be wrapped with a geotextile liner for separation. Proper design and specification of the aggregate filter blanket or geotextile liner is critical to minimizing or preventing fines from the soil media or the native site soils from clogging the pipe.

Some underdrains may be designed with flow control devices (e.g., orifii or upturned elbows) to enhance nitrogen removal, detain peak flows, increase infiltration, or some combination thereof. These flow control devices should be maintained to prevent clogging and allow treated flows to discharge to the downstream conveyance system or receiving water as intended by design.

3.1.7 Trees / Vegetation

Silva Cells fundamentally promote tree growth, and are typically designed with one or more trees that are planted either in the facility or next to the facility in a way that allows the roots to grow into the soil media. Properly designed Silva Cells provide the needed soil volume and quality, water flow, and air flow to allow the trees to reach their true mature size.

As healthy trees grow, their canopies provide increasing capacity over time for interception, storage, and evapotranspiration. As the roots grow, they increase the trees' ability to uptake stormwater and associated pollutants and enhance infiltration by maintaining macropores in the soil column. Maintaining the trees as part of the Silva Cell system is therefore important to the overall performance of the facility over time. See Table 1 for recommended maintenance activities and schedule.

Trees and vegetation adapted to site conditions, such as climate, hydrology, and soil type, should be selected wherever possible to reduce chemical inputs and reduce or eliminate the need for watering. Proper design, installation, and maintenance of the inlet system (Section 3.1.2) and distribution system (Section 3.1.3) are also important to maintaining trees and vegetation properly watered. Similarly, proper design, installation, and maintenance of the underdrain pipe and flow control devices are important to maintaining desired watering regimes and draw-down rates.

3.1.8 Surface Treatment

Silva Cells can be designed to provide structural support for a variety of surface treatment types, including hard surfaces (e.g., permeable or impermeable asphalt, concrete, pavers, etc.) or natural surfaces (e.g., soil, lawn, vegetation). Surface treatments should be maintained in accordance with manufacturer recommendations and local jurisdiction requirements (i.e., pertaining to sidewalks, roadways, etc.), as applicable.

3.2 Maintenance Guidelines

The following table provides a breakdown of recommended routine inspection and maintenance activities and frequencies, conditions that trigger non-routine maintenance, and the associated recommended non-routine (triggered) maintenance activities for key Silva Cell components.

Table 1: Silva Cell Maintenance Guidelines

Component	Recommended Frequency		Inspection Activity	Condition when Maintenance is Triggered	Recommended Maintenance Actions
	Inspection	Routine Maintenance			
Silva Cell Units					
Frames (or base and posts) and Deck	As needed	None	Not Applicable	Facility shows signs of damage from external source (i.e., excessive loading from the surface, nearby construction, or similar)	Repair damaged component (refer to the Protection and Maintenance section of the Silva Cell Operations Manual included in Appendix B, pages 9-11).
Tree Opening	Spring, Fall, and after major storms	As needed	Check for clogging, standing water, sediment, trash, and debris	Evidence of clogging, standing water, accumulation of sediment, debris, or trash	As needed.
Inlets/Outlets/Pipes					
Inlet/outlet structures	Annually	After major storms	Check that the structures are operating properly	Water is not being directed properly to or out of the Silva Cell facility	Remove any blockages and clean pipe as needed.
Energy dissipation component at inlet (if applicable)	Annually	After major storms	Check that the energy dissipation is working correctly	Where applicable – Energy dissipation (i.e., splash block, rock, or cobbles) is removed or missing and concentrated flows are being directed into the facility improperly	Replace or restore the energy dissipation component of the facility to the original design.
Flow restrictor (if applicable)	Annually	After major storms	Check that the flow restrictor is operating properly	Water is not passing through the flow restrictor per the design flow rate	Remove material causing the blockage and repair component as needed.
Distribution pipes	Annually	Annually	Check that the distribution pipes are allowing water to distribute properly	Water is not being distributed within the facility per design	Remove blockages from pipes (e.g., jet clean, rotary cut roots/debris).
Underdrain pipes	Annually	Annually	Check that the underdrain pipes are clear	Water is not being drained through the underdrain pipes per design	Remove blockages from pipes (e.g., jet clean, rotary cut roots/debris).

Component	Recommended Frequency		Inspection Activity	Condition when Maintenance is Triggered	Recommended Maintenance Actions
	Inspection	Routine Maintenance			
Trees/Vegetation					
Tree	Biannually	As needed	Check need for pruning	Tree requires pruning for safety reasons, to promote healthy growth or to prevent the tree from growing in an undesirable manner.	Prune tree as needed for safety to promote healthy growth and to avoid conflicts with adjacent features (i.e., power lines, clearances from buildings or sidewalk, or similar). Pruning should be performed by a landscape professional that has experience pruning trees and per the guidance of an arborist certified by the International Society of Arboriculture.
	Spring, Fall, and after major storms	As needed	Check tree safety	Signs of potential danger include broken, dead, or hanging branches, cracks, fungi, cavities, weak trunk or branch unions	Remove components of the facility above the frames and decks in a manner that minimizes damage to the facility. Use HydroVac and hand tools to remove soil if soil removal is needed. Cut and remove roots as directed by an arborist. Do not cut or damage frames. Install new tree and Silva Cell components as needed to restore the facility to its designed configuration.
	Spring and Fall	As needed	Check tree health	Check tree for mower and weed whip damage, vandal damage, and animal damage. Inspect leaves, branches, crown and trunk for signs of insect or disease problems	Diagnose cause of problem: e.g. mower and weed whip damage, vandal damage, animal damage, over- or under-watering, pest or disease, soil problems, etc., and remedy.
	Every 4-5 years	As needed	Check for girdling roots	Girdling roots are found	Remove girdling roots.
	Annually	As needed	Check for soil or mulch on root collar	There is soil or mulch on the root collar	Clean soil or mulch off root collar until the first set of roots is found, take care not to harm roots.
	Annually	As needed	Check safety	Tree is dying, dead, diseased, or has become a safety hazard	Remove components of the facility above the frames and decks in a manner that minimized damage to the facility. Use HydroVac and hand tools to remove soil. Cut and remove roots as directed by an arborist. Do not cut or damage frames (or base and posts). Install new tree and Silva Cell components as needed to restore the facility to its designed configuration. Refer to the Protection and Maintenance section of the Silva Cell Operations Manual included in Appendix B.

Component	Recommended Frequency		Inspection Activity	Condition when Maintenance is Triggered	Recommended Maintenance Actions
	Inspection	Routine Maintenance			
Tree					
Vegetation	Biannually	As needed	Check tree health	Dying, dead, or unhealthy plants	Remove and replace dying, dead or unhealthy plants.
Weeds	Monthly	Monthly	Check for weeds	Weeds present in the facility	Remove weeds as necessary. Noxious weeds should be removed in accordance with local standards. Avoid using herbicides and pesticides in an effort to protect water quality.
Mulch	Monthly	After weeding	Check mulch coverage	Mulch layer has bare spots or a depth less than two inches (50 mm).	Cover bare spots and replenish mulch as required.
Watering		As needed	Not applicable	Tree/vegetation shows signs of being deprived of water or watering is anticipated during prolonged dry periods	Water frequency will vary depending on species, climate, and site conditions. Water appropriately to maintain a health of the tree or vegetation. Ensure water is reaching the entire soil column and perimeter, not just the tree opening.
Pest Control					
Nuisance Animals	Biannually	As needed	Check for signs of damage from animals	Damage or erosion caused by animals	Remove/reduce the item that is attracting the nuisance animals. Consider placing decoy predator species or pet waste bag stations to promote responsible activities.
Insects	Biannually or as needed	As needed	Check the presence of insects and or insect nests	Tree/vegetation shows signs of wilting, chewing of bark, spotting, or other indicators appropriate for the region.	Remove diseased or dead plants. Remove or reduce the source attracting the insects if possible. Follow the pest management procedures appropriate for the region.
Surface Treatment					
Hard Surfaces (i.e., permeable or impermeable concrete, asphalt, pavers, or grid systems)	Annually	As needed	See applicable manufacturer recommendations.		
Permeable Surfaces (i.e., vegetated areas)					

3.3 Equipment and Materials

The text box to the right provides a list of equipment and materials that may be needed to perform maintenance and inspection activities. The list should be reviewed and approved by the Silva Cell owner or operator and should be modified as appropriate for the specific installation. For instance, if the installation does not have a planter strip area, weeding equipment may not be needed. Similarly, if underdrains are not included, vactor, water jets, and pressure washing equipment may not be needed, etc.

3.4 Skills and Staffing

The skills and staff required to inspect and maintain Silva Cells will vary depending on the size of the installation, complexity of the system, surface treatment, and site constraints. Routine maintenance and inspection activities for the above-ground features will generally be similar to that of a street tree, planter strip, or sidewalk. Routine maintenance for the below-ground features will generally be similar to that of an underdrain or footing drain system.

The Table 2 summarizes the staffing resources that may be required for routine maintenance and inspection activities:

- **Safety Equipment** – As appropriate for the site (i.e., high visibility vest, gloves, long pants, boots, traffic control equipment, etc.)
- **Inspection Equipment**
  - Camera
  - Tape measure
  - Manhole key and lifter to open manhole, cleanout, or inspection port lids
  - Flashlight
  - Field report sheet
  - Inspection records and photos from previous inspections
  - As-built information
  - Manufacturers' product information
  - Method of inspecting pipes and structure without entering them (i.e., camera or mirror on an extendable pole)
  - Equipment to measure drawdown time (i.e., stopwatch, measuring stick, water source, and hose)
- **Maintenance Equipment**
  - Broom, rake, and shovel
  - Weeding equipment
  - Bucket, wheelbarrow, garbage/leaf bags, and tarp
  - Tree trimming and pruning equipment
  - Hand tools
  - Plumbing snake
  - Vactor truck
  - Water jet
  - Pressure washer
- **Maintenance Material**
  - Pipe repair material
  - Replacement pipe material per the original design
  - Replacement surface material (i.e., pavers, asphalt, concrete, or natural material)

Equipment and materials that may be needed to perform typical maintenance and inspection activities. Adapted from the Western Washington Low Impact Development (LID) Operation and Maintenance (O&M) Guidance Document (Ecology 2013b).

Table 2: Skills and Staffing Table

Maintenance Activity	Staff Skills
Landscaping	Staff must have appropriate landscaping skills, including plant care, watering, and weeding, based on the trees/vegetation present; staff must have the ability to identify plants, weeds, and invasive weed species and have knowledge of the timing of weed seeding and growing periods.
Pruning and tree care	Staff conducting pruning and tree care activates should be a certified arborist or have equivalent training.
Pest Management	Staff conducting pest management activities must be able to identify pests applicable to the region and be familiar with methods to address those issues.
Erosion Control	Staff must have general knowledge of identifying sources of erosion, prevention methods, and removal methods.
Drainage System Maintenance	Staff inspecting drainage system must have general knowledge of the drainage system components included in the facility, specific knowledge of how the facility was built and its intended to function, and maintenance history. Staff preforming maintenance activities must be trained to operate the specialized equipment to conduct those activities (i.e., jet cleaning, root cutting, vactoring, CCTV inspection).

4.0 Repairing Silva Cells

As the Silva Cell is a system that interacts with other infrastructure, repairs to adjacent elements, such as paving surfaces or utilities and services, must be undertaken with an understanding of the site-specific installation. Repairs to all system components and adjacent or nearby elements should be done per local guidelines and individual manufacturer directions, as applicable.

Each Silva Cell stack is independent of the Silva Cell stack adjacent to it. Therefore, if an individual stack is disturbed, the entire system is generally not expected to be compromised.

Examples of repair processes are provided in the Tree Planting Solutions for Hard Boulevard Surfaces Best Practices Manual, included in Appendix B. This manual documents two demonstration projects conducted by the City of Toronto, in which they field-tested a water main break scenario and a gas lateral and riser installed through Silva Cells. In both cases, the Silva Cells were found to pose no significant hindrance to their utility work.

Section IV of the Silva Cell Operations Manual (DeepRoot 2011), included in Appendix C, provides general information on how to protect installed Silva Cell systems, manage utilities in the vicinity of installed systems, repair or replace overlying pavement, and remove or replace Silva Cells and trees as needed.

5.0 Programmatic and Administrative Guidance

This section discusses regulatory requirements for LID BMP maintenance (if applicable) and the available programs and tools to help with implementation.

5.1 Regulatory Requirements for LID BMP Maintenance Programs

As discussed above, this manual provides general maintenance guidelines that can be adapted to site specific maintenance plans based on given site conditions. If Silva Cells are installed as part of a permanent stormwater management plan to meet minimum stormwater requirements for new or redevelopment, local requirements for maintaining LID BMPs would apply. Consult the local standards and requirements to determine the maintenance requirements that will need to be addressed.

5.2 Tools for Implementing an LID Maintenance Program

A range of administrative tools can be used to assist jurisdictions in implementing required maintenance activities for stormwater BMPs, such as Silva Cells. The tools vary depending on jurisdiction requirements, but may include (Ecology 2013b):

- Stormwater requirements (i.e., Code, manual, ordinance)
- Legal agreements between private or public owners and the regulatory agency (i.e. access easements, property maintenance covenants, or transfer of ownership)
- Maintenance requirements specified as part of the design process
- Financial liability measures
- Record keeping and tracking requirements
- Inspection and maintenance checklists
- Inspection and maintenance schedules
- Mapping
- Owner education (public or private)

6.0 Additional Resources

The following resources provide additional information on maintenance of LID facilities applicable to Silva Cells.

- Western Washington Low Impact Development Operations and Maintenance Guidance Document http://www.ecy.wa.gov/programs/wq/stormwater/municipal/LID/TRAINING/OperationsAndMaintenance.html
- LID Technical Guidance Manual for Puget Sound http://www.wastormwatercenter.org/files/library/lid-manual-2012-final-secure.pdf
- International Society of Arboriculture http://www.isa-arbor.com/education/publications/index.aspx

- EPA's Integrated Pest Management (IPM) principles site http://www.epa.gov/pesticides/factsheets/ipm.htm
- Water Environment Research Foundation (WERF) BMP and LID Whole Life Cost Tool http://www.werf.org/c/KnowledgeAreas/Stormwater/ProductsToolsnonWERF/BMP_and_LID_Whole_Li.aspx
- Chesapeake Stormwater Network http://chesapeakestormwater.net/training-library/stormwater-bmps/
- Los Angeles County Department of Public Works, Stormwater BMP Design and Maintenance Manual http://dpw.lacounty.gov/ldd/publications/Stormwater%20BMP%20Design%20and%20Maintenance%20Manual.pdf
- Low Impact Development Center http://www.lowimpactdevelopment.org/links.htm

7.0 References

- DeepRoot 2011. Silva Cell Operations Manual, prepared by DeepRoot Green Infrastructure LLC (DeepRoot), 2011.
- DeepRoot 2014. Personal communications between Graham Ray, President of DeepRoot, and Robin Kirschbaum, Senior Engineer of HDR, regarding expected design life of Silva Cells in typical pedestrian application. September 2, 2014.
- Ecology 2013a. Washington State Department of Ecology (Ecology) Equivalent Technology Website (http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html), accessed on June 9, 2014.
- Ecology 2013b. Western Washington Low Impact Development (LID) Operation and Maintenance (O&M) Guidance Document, prepared for Washington State Department of Ecology Water Quality Program, July 8, 2013.
- EPA 2014. Incorporating LID Website (http://www.epa.gov/region1/npdes/stormwater/assets/pdfs/IncorporatingLID.pdf), accessed on June 9, 2014.

Appendix A

DeepRoot Warranty

DeepRoot® warrants to the original purchaser of its Silva CellTM product that such product will be free from defects in materials and workmanship, and perform to DeepRoot's written specifications for the warranted product, when installed and used as specifically provided in the product's installation guidelines for a period of 20 years from the date of purchase. This warranty does not cover wear from normal use, or damage caused by abuse, mishandling, alterations, improper installation and/or assembly, accident, misuse, or lack of reasonable care of the product. This warranty does not apply to events and conditions beyond DeepRoot's control, such as ground subsidence or settlement, earthquakes and other natural events, acts of third parties, and/or Acts of God. If this warranty is breached, DeepRoot® will provide a replacement product. Incurred costs, such as labor for removal of the original product, installation of replacement product, and the cost of incidental or other materials or expenses are not covered under this warranty.

DEEPROOT® MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DEEPROOT® SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOST PROFITS, LOST REVENUES, LOSS OF USE, OR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other legal rights, which vary from state to state, or in Canada, from province to province.

Appendix B

City of Toronto Tree Planting Solutions in Hard Boulevard Surfaces; Best Practices Manual

Project # A21065
Date February 8, 2013
Recipient City of Toronto
Submitted by DTAH, Lead Consultant
ARUP, Engineering
James Urban, Urban Trees + Soils

dtah | ARUP | James Urban | Urban Trees + Soils | Urban Forest Innovations Inc.

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Acknowledgments

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Toronto Public Utilities Coordinating Committee (Cogeco Data Services) Patricia Ritchie

DeepRoot Canada Mike James

Citygreen Jeremy Bailey

ACO Steven Tonaj

Gro-bark

Earthco Soil Mixtures

TABLE OF CONTENTS*

* Please note: Appendix B contains excerpts from the City of Toronto's Tree Planting Solutions in Hard Boulevard Surfaces Best Practices Manual. For full document with all content please contact the Urban Forestry Department at 311@toronto.ca

Executive Summary

The City of Toronto has established a goal to increase both the number and size of its street trees (*Toronto Street Trees: Guide to Standard Planting Options*, April 2010). The City aims to grow large-canopy trees in hard boulevard surfaces that have a complete 40+ year life span and are 40 cm in diameter at breast height.

This manual examines and provides cost-efficient options to reach this goal.

Downtown streetscapes are harsh environments for trees, and many do not survive or never grow to a large canopy size. Large-canopy trees provide enormous climatic, environmental, health, aesthetic and psychological benefits. There is room for considerable improvement in the quality of the urban forest in downtown streetscapes and this report examines how this can be done.

Section 1 of this report, the Introduction, defines 'criteria for success' for urban tree planting in Toronto, and sets the tone for the manual and its future implementation.

Section 2 provides fundamental principles for growing large trees. At minimum, trees require 20 to 30 m3 of soil each in order to grow to maturity. In order to achieve this, integration of soil/root zones with utilities is proposed to reach the target soil volume under urban sidewalks. Larger openings in the pavement also help to increase longevity. Cost savings are achieved by eliminating unnecessary hardware and designing structural concrete to withstand the load of occasional snowploughs and service vehicles, but not firetrucks.

Sections 3 and 4 provide various technical solutions that have been developed as part of this manual. They address both new and retrofit construction and repair techniques to respond to a variety of site-specific requirements such as sidewalk width, public realm condition, and infrastructure arrangement for a range of budgets.

Section 5 evaluates essential material components that are required for successful tree growth in an urban streetscape. These are tree opening area materials such as mulch; flexible plastic mesh bark protectors; passive rainwater harvesting and distribution; and root zone ID markers to prevent construction damage.

Sidewalk trees on Yorkville Ave.

Section 6 offers insightful information to ensure that each planted tree has the best opportunity to thrive. Horticultural topics such as tree preservation, installation and maintenance, tree species suitability, nursery stock quality and soil specific requirements are discussed.

Lastly, Section 7 documents two demonstration projects where the City of Toronto and consultants field-tested a number of the tree planting construction methods. A water main break scenario was recreated and a gas lateral and riser were installed through soil cells. In both cases, the soil cells posed no significant hindrance to utility work.

The Appendices include construction drawings, specifications, cost estimates, letters of product availability, responses to City comments and the street tree precedents review.

Section 3 Types

Section 4 Arrangements	3.5m min. sidewalk width			5.7m min. sidewalk width
	TYPE 1: Pavement Bridge		TYPE 2: On-Grade Pavement Over Soil Cells	TYPE 3: Open Planter
	1A	1B		
Growing Medium Trench	X	X	X	
Open Planter with Curb Edge				X

Compatibility between types identified in Section 3 and arrangements identified in Section 4.

3.0 Construction Methods & Repair Regimes

Three different systems for tree planting in sidewalks are laid out in this section. They form the basis for the proposed City of Toronto tree planting details that accompany this report in the Appendices. In addition, this section makes recommendations for hybrid solutions and retrofits and dealing with sub-standard sidewalk conditions.

3.1 Type-1: Pavement bridge system

A structural pavement surface or subsurface spans between supporting ends over the growing medium trench. Reinforced precast and cast-in-place concrete panels provide the 'bridge'. Refer to the T-1A and T-1B Construction Drawings in Appendix A.

3.2 Type-2: Soil cells system

Modular rigid soil cells support a pavement system above the growing medium. The pavement surface and base can be built directly on top of the hard deck of the soil cells. Refer to T-2 Construction Drawings in Appendix A.

3.3 Type-3: Open planter system

There is no paving around the tree base. Where there is space for this system on the sidewalk, it is the most cost-efficient option available for growing large urban trees. Refer to T-3 Construction Drawings in Appendix A.

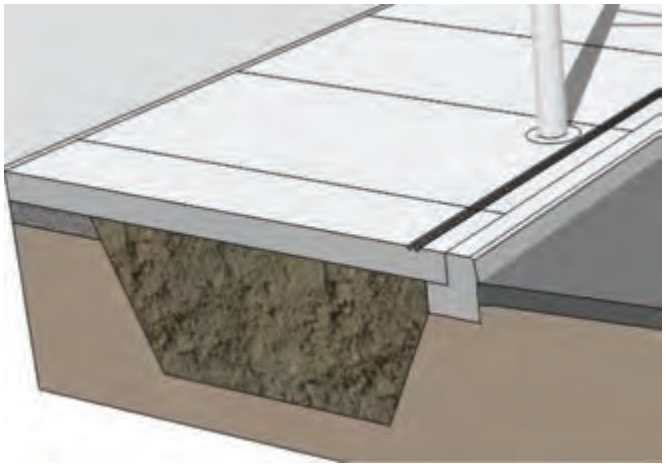
3.4 Hybrid solution and retrofits

The street is not rebuilt wholesale, just one or two trees in a block may be affected.

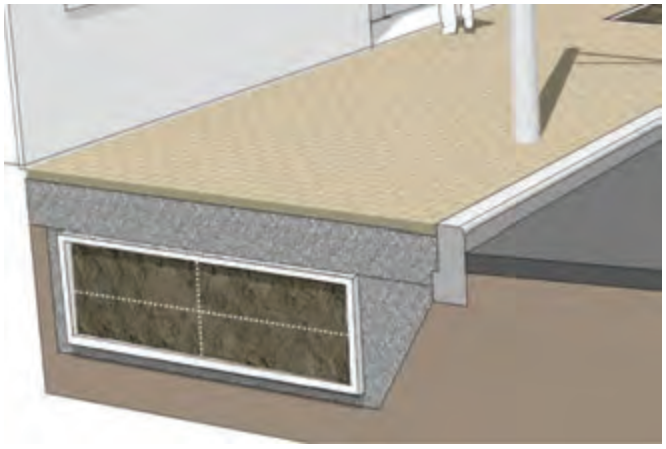
3.5 Sub-standard sidewalk conditions

Conditions where the existing space or utility constraints are such that the standards advocated in this report are not achievable.

Note: In the following descriptions for utility compatibility with various construction methods, review is based upon the general feasibility of working with such utilities and repairs. Ultimately, individual utility companies and City departments will have to reach an agreement for the access and repair of the various conditions generated, and the responsibility thereof. The recommendations in this report are intended to provide a framework for these policy decisions to be made.



3.1 Type 1: Pavement bridge system



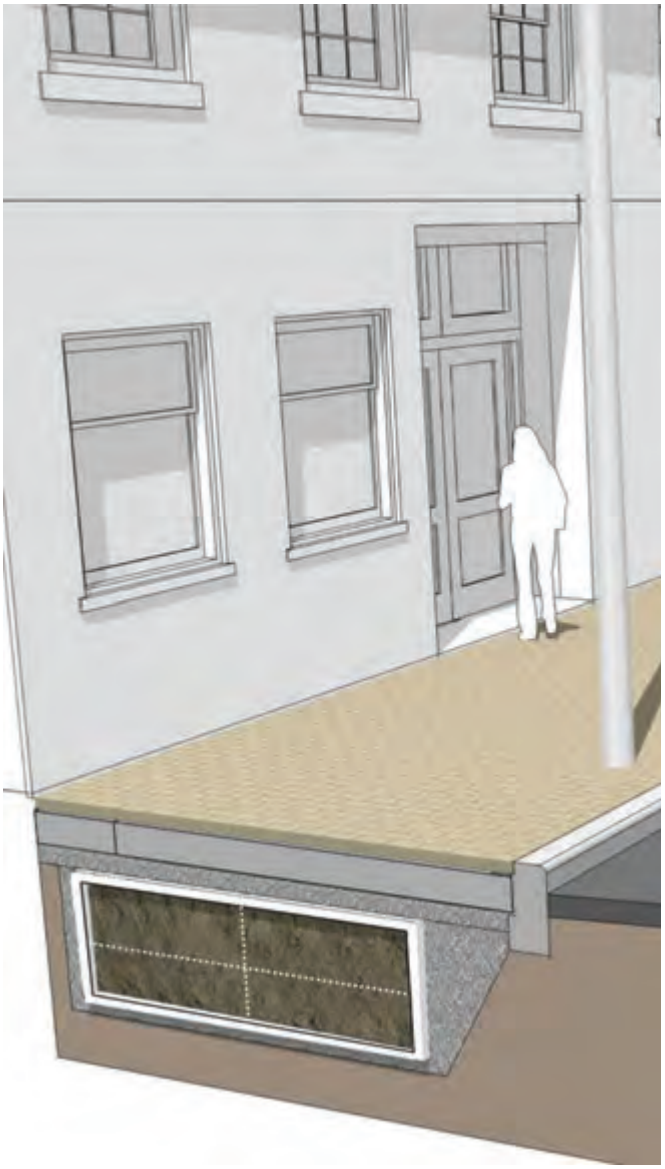
3.2 Type 2: Soil cells system

3.3 Type 3: Open planter system

3.2 Type-2: Soil Cell System

On-grade pavement over soil cells allows for traditional pavement on-grade on top of the soil cell assembly and has been used in a number of pilot projects in Toronto and other North American cities. This system requires utility companies and City agencies to become comfortable with the concept of a modular support system, and will require a new protocol to include removal and replacement of the soil cells.

Construction Drawings T-2 in Appendix A provides details on this system.



Type 2: On-grade pavement over soil cells

Construction

Space allotted for root zone and foundation are excavated out, and a compacted granular base is installed for the soil cells. Soil cells are installed per manufacturer's instructions. The pavement system is installed with granular base above the soil cells. The new paving can be installed in a similar way to any on-grade pavement system.

Utility access

Where there is concrete, the pavement is sawcut. Where there is unit paving, the pavers are removed. Filter fabric is peeled back, and soil cells are removed and set aside. In frozen conditions, the soil cells may be removed forcibly with an excavator, requiring them to be replaced with new soil cells prior to repairing surface paving. Once soil cells are removed, the utility is accessed via excavation of planting soil or granular below.

Repair

After the utility is backfilled with granular to the underside of the root zone and compacted, soil cells are reinstalled per manufacturer's instructions. Filter fabric is laid down on top of replaced soil cells, then pavement system is made good either temporarily or permanently.

Recommended utilities compatible with root zone

On-grade pavement over soil cells is generally compatible with utilities below the root zone, ideally where frequent access is not anticipated. Some shallower utilities may be compatible for placement within root zone/soil cell zone depending on agreement with the utility company concerned such as gas or hydro laterals.

- Utilities below root zones:
- New generation storm line (concrete)
- New generation sanitary line (concrete)
- Concrete-encased hydro duct, combined data
- District energy
- Pressurized water main
- Gas (main or lateral)
- Bare conduit (street lighting, telephone, etc.)

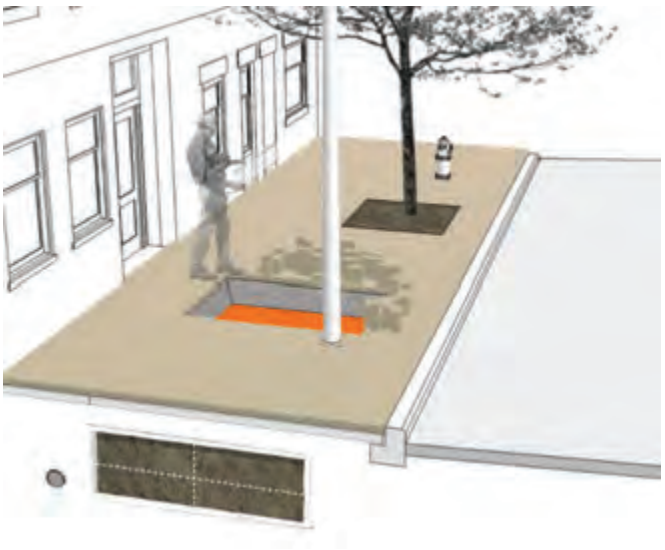
Surface finish

Since the structural support is provided by the soil cells, the pavement system can be any type or finish such as concrete or unit paving over concrete.

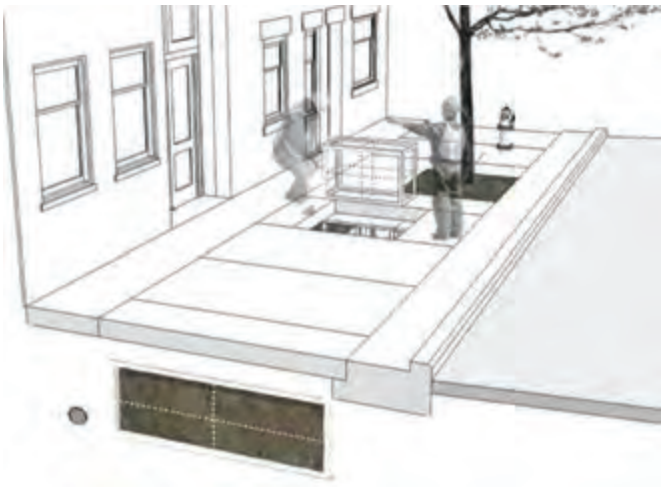
Pros / cons

If the work crew is comfortable removing and replacing soil cells, the access and repair procedure is similar to current practices. The pavement system is equivalent to an on-grade construction. It can be repaired as a permanent repair or a temporary two-stage repair.

Utility access, step 1

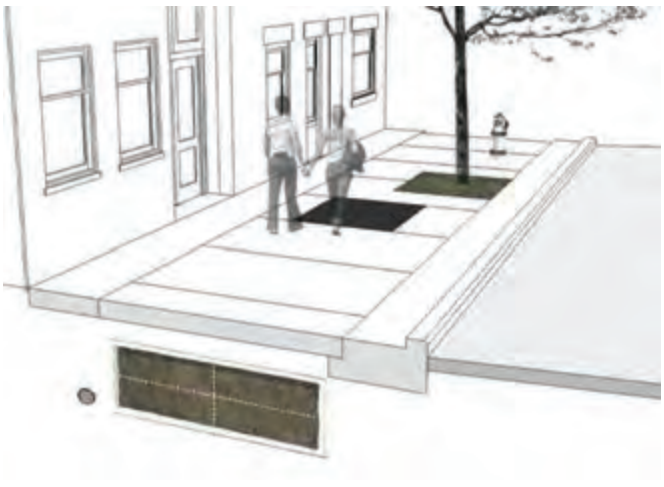


Utility access with pavers, step 1



Utility access, step 2

Utility access with pavers, step 2



Utility access, step 3

7.0 Demonstration Projects

The consultants and the City organized a soil cell testing exercise at the City of Toronto's Nashdene Yard in Scarborough with utility stakeholders Toronto Water and Enbridge Gas. New utility installation and repair of existing utilities under soil cells was recreated at the Yard:

7.1 Toronto Water utility access exercise

Toronto Water recreated an "emergency scenario" in the middle of winter (Feb. 24, 2012). The scenario involved bursting a water main and testing the effects of water leaking on the soil cell system.

7.2 Enbridge Gas lateral line and riser installation

Enbridge Gas tested access through soil cells to install a gas lateral line.

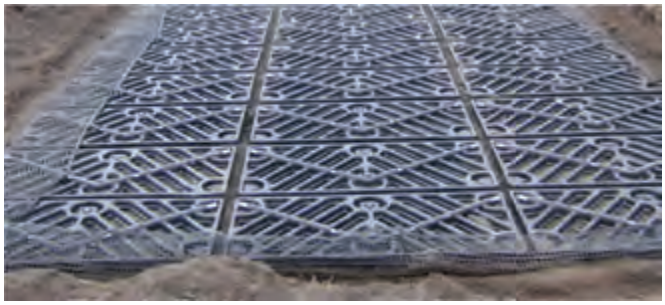
7.3 Bloor St. W. at Dovercourt Rd. and Concord Ave. demonstration project

A further on-site demonstration project was proposed. However, it was decided not to be implemented as part of this study, due to a larger upcoming resurfacing project in the area.

Note: The soil cell product used at Nashdene Yard was Silva Cells, manufactured by DeepRoot Green Infrastructure, LLC.

Nashdene Yard location, Scarborough.

Soil cell trench filled with soil.



Soil cell decking system.

Backfill installation on top of deck.

Finished installation.

7.1 Toronto Water Utility Access Exercise

Description of the exercise

The cold weather conditions, at -4°C (-10°C with wind chill) provided Toronto Water field personnel a good test for working with soil cells in adverse conditions.

The exercise began at 8:00 am with an on-site briefing where the demonstration project coordinators and Toronto Water personnel discussed the different activities and the order of execution. Water was then turned on into the installed water pipe which was capped on both ends and pre-cut during its installation under the soil cell system. Water fed from a hydrant at 414 kPa ran for approximately three minutes before it started to come out through the already saturated soil adjacent to the demonstration sidewalk. After the water valve was shut off, the following activities took place:

Concrete sidewalk pavement was removed

- Concrete pavement was saw cut into blocks that could later be removed by a backhoe.
- Removal of concrete and granular 'A' base below concrete paving.
- Crew located a geotextile layer that was installed below the granular 'A' and on top of the soil cell top frame deck; the geotextile was cut to expose the soil cell deck.
- Manual removal of two of six soil cell top decks were set aside for re-installation.

Water pipe cut.

Sawcutting concrete pavement.

Water introduced - water bursting out of saturated soil adjacent to installation.

Mechanical removal of pavement to expose soil cell decking system.

Manual removal of two decks, unscrewed and set aside for future re-installation.

Excavation below bottom of soil cells to daylight water pipe.

Mechanical removal of soil cells.

Excavation below bottom of soil cells to daylight water pipe.

Mechanical removal of soil cells, soil and sub-base

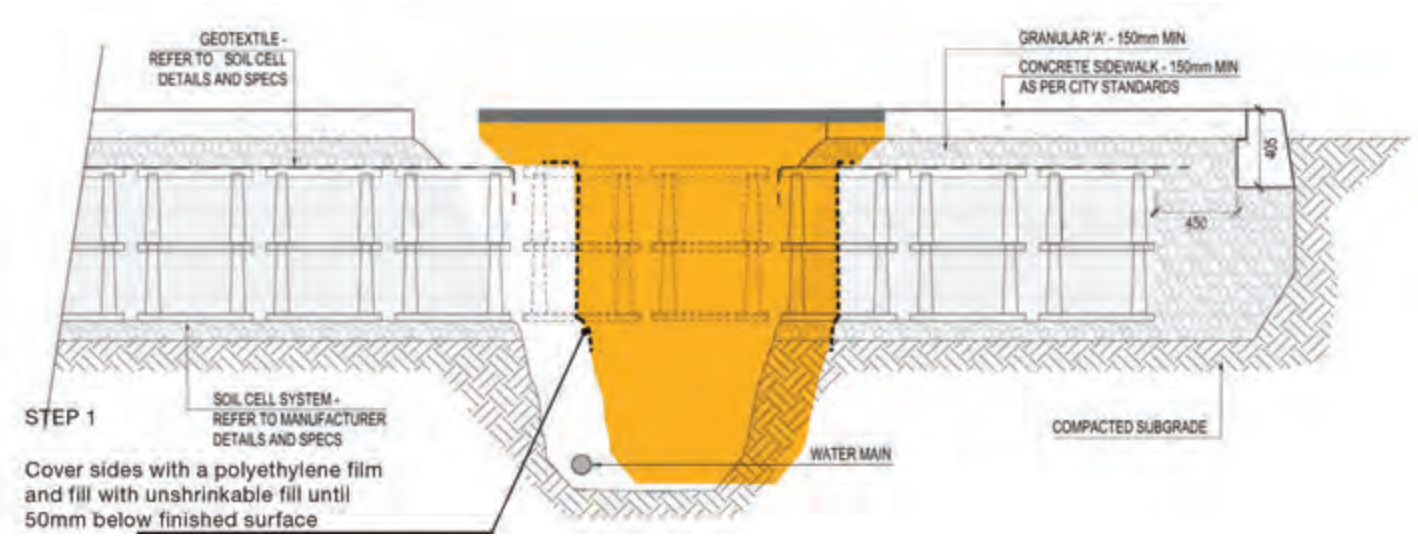
- Backhoe was used to dig out and through soil cells and soil.
- Water pipe was daylighted.

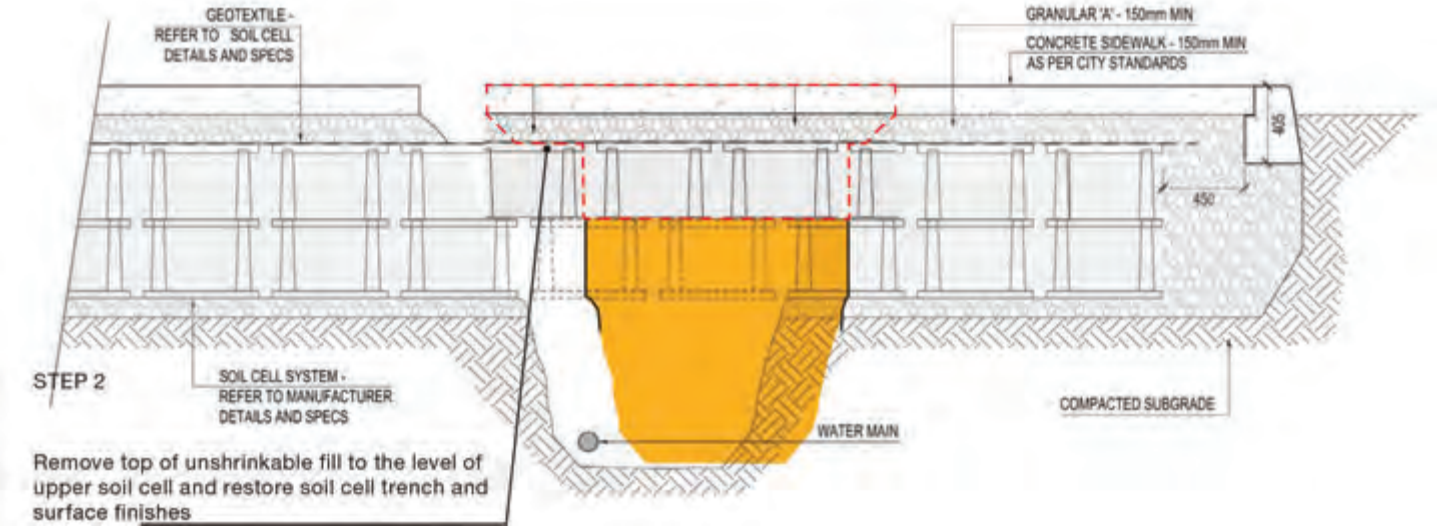
Repair

- The dug trench was temporarily repaired afterwards with unshrinkable fill up to finished grade.
- Weeks later, unshrinkable fill was broken up to the bottom of the first layer of soil cells to restore the cells and surface finishes to the original condition.

Conclusions of the Toronto Water exercise

Once the soil cells were removed, the stakeholders discussed the outcome and lessons learned from the exercise. It was concluded that Toronto Water can easily access its infrastructure through the soil cell system under extreme conditions using the same methods they currently have in place in either a planned or emergency situation. The exercise allayed their concerns that the soil cells would be a hindrance in their field work. Further discussions of a vertical minimum clearance between the utility and the bottom of the soil cells are expected.





7.2 Enbridge Gas Lateral Line and Riser Installation

Description of the exercise

The exercise began at 9:00 am at Nashdene Yard in Scarborough on a late-May day that was partly cloudy and warm. A gas lateral with a long riser was installed under a sidewalk cross-section of unit paving and soil cells. Using a mole with the shortest torpedo hammerhead at 1 .0 m length, the 25 mm gas line was bored through the growing medium and adjacent subgrade. Excavation was only necessary at each end of the gas lateral. For longer horizontal drilling, a directional drill is used which has greater directional control. Enbridge usually uses a torpedo mole for downtown work, which requires less excavation and can be used for horizontal drilling through sidewalk cross-sections. It can drill through tree roots and is only blocked by large rocks. The following took place:

Setting the direction and starting point of the horizontal boring

- Mock building and road sides of the sidewalk were designated for the purposes of this exercise.
- Unit pavers and granular base were removed to locate and confirm the cell deck edge. The torpedo was set to drill horizontally between the soil cell frame legs from the side.
- The crew dug down two cells deep between the building side and the cell, until there was enough room to slide the riser through. Where there is not enough room to dig behind the cell, the cell can be removed to install the riser.
- In alignment with the pit dug at the building end, another pit was dug down approximately 1.2m deep at the road end of the lateral.

Directional boring

- The torpedo was first set to begin at the building side where the riser would be placed. The torpedo did not make it out at the road side because it had great difficulty going from soft material to hard material (i.e.. growing medium to hard clay subgrade) as it does not have enough friction to propel it forward.
- The torpedo was reset to begin on the road side. It bored through the road subgrade then through the soft growing medium and came out at the building side.

Removal of pavers and granular base.

Geotextile is cut through centre of cell deck.

Digging down approximately two cells deep at both lateral ends.

Pulling the lateral through, attaching and setting the riser

- The torpedo was removed and the lateral pipe was attached to the hose end and pulled through.
- The riser was fused to the pipe end and pulled through and set at the correct elevation.
- Granular was backfilled into the cavity.

Torpedo set to begin at the imaginary building end of the lateral line.

Torpedo and hose are pulled up and out of the pit.

Torpedo emerges through growing medium and cell decks on the imaginary building side.

After false start on imaginary building end, torpedo is reset at road end.

Pulling the lateral through the cells and growing medium.

End of lateral at building end.

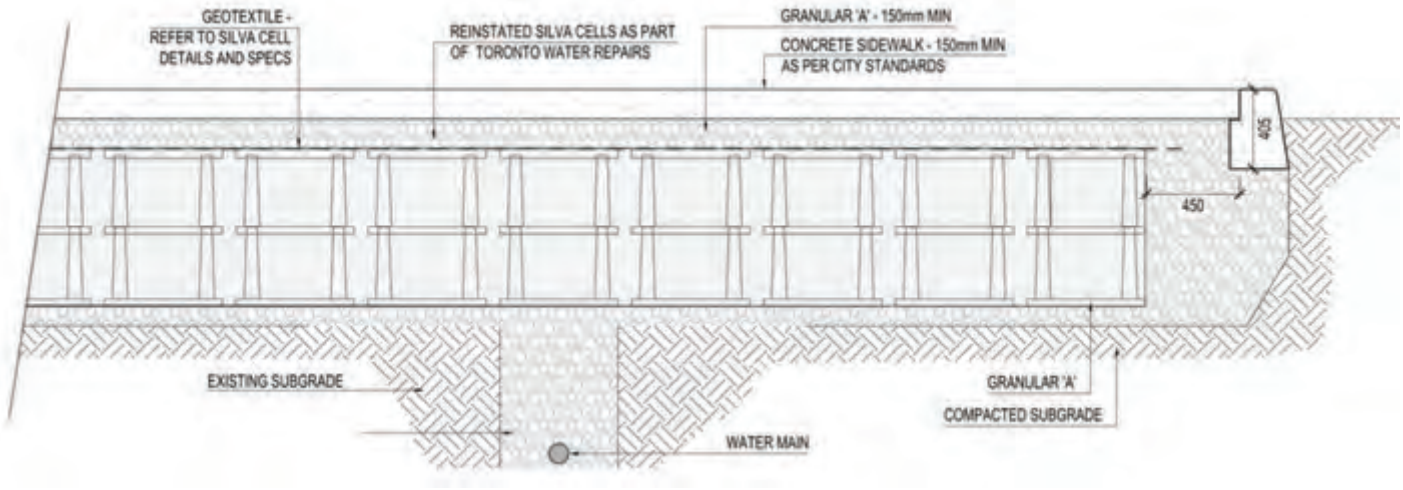
Cover over the cell deck with the cut geotextile and add an overlapping layer of geotextile on top.

Riser is attached and pulled through.

Backfill and ensure riser is set correctly. Conclusions of the Enbridge Gas exercise

Conclusions of the Enbridge Gas exercise

It was concluded that the soil cells pose no obstruction to the installation of a gas lateral and riser. The work is essentially the same as current sidewalk conditions with a few extra considerations. The crew must locate the boundary of the cell frame to set the torpedo to go between the cell deck legs and not collide into them. The crew must be mindful that the growing medium is easily permeable and that the torpedo bores move easily from hard to soft matter and not the other way around. Paving removal need only be limited to where the riser needs to go and the area needed to slide it into place. Where there is enough room between the soil cells and building face to excavate and install the riser, paving on top of the cells could stay intact.



Appendix: C Silva Cell 1 and 2

Emergency Access:

(Access Utilities below the Silva Cells in an emergency eg: Watermain break)

- Locate existing utilities in compliance with all applicable laws and regulations
- Try to determine if the Silva Cells being impacted receive stormwater from adjacent catch basins, roof leaders, trench drains, or other inlet structures. If so, temporarily bypass or bulkhead the lines to prevent water from being conveyed into the system
- Following all applicable rules and regulations, remove the surfacing over the work area.
- Excavate through the aggregate sub-base until the geotextile fabric covering the Silva Cells is exposed.
- Cut and remove the geotextile fabric to the limits of the work area.
- Excavate as required to expose and make repairs without regard for the Silva Cells (excavate as through the Silva Cells were just soil). Keep equipment on the surrounding paved surface
- Keep watch for unmarked public or any private utility lines
- Complete repair
- Begin restoration by removing any damaged or partially damaged Silva Cells. Silva Cells do not connect to each other. There is a space between each unit so it is easy to establish a clean edge
- If restoring temporarily, wrap geogrid, geotextile fabric or polyethylene film (poly) around the perimeter of the disturbed area and fill the void with clear crushed stone or unshrinkable fill. Temporarily patch the pavement surfacing as required.
- For permanent restoration see Permanent Repair Options.

See Appendix D – Silva Cell 1
See Appendix E – Silva Cell 2

Appendix D - Silva Cell 1

Protection and Maintenance

DeepRoot Green Infrastructure, LLC
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San Francisco, CA 94104
info@deeproot.com
Tel: 800 458 7668 or 415 781 9700
Fax: 800 277 7668 or 415 781 0191

Notes: Each Silva Cell stack is independent of the Silva Cell stack adjacent to it – therefore if individual Silva Cells are disturbed, the entire system is not compromised.

Silva Cell frames (or base and posts) and decks should at no time be cut, drilled into, or otherwise structurally modified during any installaion, inspection or maintenance procedure. Any damaged Silva Cell frames (or base and posts) or decks shall be replaced.

1.0 Protection of The Silva Cell System

To help avoid future disturbance of the Silva Cell system the location of the system should be accurately recorded at the time of construction and incorporated into an as-built drawing.

If possible register the location of the Silva Cell system with the local One-Call utility locating program.

Accurately locate the limits of the Silva Cell system prior to any future excavation in the area. (Some types of underground utility locating equipment, such as ground penetrating radar, are capable of detecting Silva Cells and may be used to locate the limits of the system. Contact a professional utility locating contractor for more information).

Utility warning tape/ribbon and locating wires can also be incorporated into the system and are recommended.

2.0 Utility Installation, Maintenance, Relocation or Replacement within Silva Cell System

If the Silva Cell system is accidentally unearthed by future excavation in the area, cease the excavation immediately and consult the as-built drawings to determine the limits of the system.

Using hand tools only, expose the impacted portion of the Silva Cell system and carefully inspect the Silva Cell frames (or base and posts) and decks for any signs of damage or cracking.

Replace any damaged Silva Cell frames (or base and posts) or decks and reconstruct any disturbed portion of the system as per DeepRoot's installation Guidelines.

The Silva Cell system supports vehicle loading equal to 32,000 lbs (14,500 kg) per axle, which allows use in areas that accommodate 3 - 4 axle vehicles such as those used for emergency, delivery, and maintenance. Generally meets AASHTO HS-20 (USA), CSA-S6, 87.5 and OBC 54KN (Canada), and BS EN 1991-1-1:2002 and BS EN 1991-1-2:2003 (UK) loading standards when used with standard paving profiles.

Throughout this document, where H-20 loading is referred to, this is shorthand for the loading standards described above.

To prevent damage to underlying Silva Cells, ensure that machinery operated on the paving above does not exceed loading as described above. Do not operate any machinery over the Silva Cell system without paving being in place.

3.0 Utilities and Accessing The Silva Cell System

The Silva Cell system can be easily accessed for utility installation, maintenance, relocation, replacement, etc. using the following procedure.

First, locate the limits of the Silva Cell system.

Carefully remove the existing pavement. Take care to not operate machinery exceeding H-20 loading on any of the surrounding pavement supported by the system. Do not operate any machinery over the Silva Cell system once the pavement has been removed.

Using hand tools remove the aggregate base course and expose the underlying geotextile fabric. If working near the perimeter of the system there will be also be approximately 12" (30.5 cm) of geogrid that is folded over and attached to the cell decks. Cut the geotextile fabric as needed to allow for the removal of Cell decks. If Geogrid is encountered, detach it from cell decks and fold it back as well. Do not cut the Silva Cell frames (or base and posts) or decks. Remove the Silva Cell decks by removing the four corner screws and set it aside. Remove the soil from inside the frames using hand tools only or a HydroVac. (If the existing soil is to be reused, store it separately to ensure that it does not become contaminated with other spoil material. Otherwise dispose of the soil and replace it with soil meeting the requirements specified for the project. All soil must be inspected and approved prior to reinstallation.) Carefully remove any of the frames (or base and posts) needed to complete utility work. Upon completion of the utility work visually inspect the surrounding exposed Silva Cell parts and remove any of those showing signs of damage or cracking. Restore the disturbed portion of the system using one of the two following methods:

Method 1:

Replace the Silva Cell frames (or base and posts), soil and decks as required per Silva Cell installation details and specifications. Re-wrap geogrid over decks with an overlap at cut seam. Restore the aggregate base course and pavement. Re-use only Silva Cell frames (or base and posts) and decks that have been thoroughly inspected and found to be free of damage or cracking. Replace any parts showing signs of damage or cracking with new.

Method 2:

Structurally bridge the gap with 1 1⁄2" (3.8 cm) clear stone. Install geogrid around the perimeter of the area from which the Silva Cells were removed per DeepRoot's construction guidelines. Fill inside void area with 1 1⁄2" (3.8 cm) clear stone up to the level of the adjacent Silva Cell decks. Cover the stone with geotextile fabric making sure to overlap the existing geotextile fabric by a minimum of 2 feet on all sides. Restore the aggregate base course and pavement.

4.0 Pavement Repair or Replacement over Silva Cell System

When the existing pavement over a Silva Cell system is to be replaced by a different type of pavement, refer to the Silva Cell standard details and specifications. A change in surface materials may require a change in the depth of the underlying aggregate base course.

5.0 Adding Silva Cells to The System/Removing Silva Cells from The System

To make changes to the size of the Silva Cell system, locate the limits of the system. Carefully remove the pavement taking care to ensure that no machinery which exceeds H-20 loading is operated on pavement supported by the Silva Cells and that no machinery is operated over the Silva Cells once the pavement has been removed. Using hand tools remove the aggregate base and expose the underlying geotextile fabric. Cut the geotextile fabric as needed to visually confirm the limits of the Silva Cells. Excavate to no closer than 1' (30.5 cm) of the limits of the Silva Cells. Using hand tools, expose the geogrid which wraps the perimeter of the system. Cut and fold back the geogrid as needed to add or remove cells. If adding to the system, install the new Cells per Silva Cell specifications. Ensure that the gap between the existing Silva Cell frames (or base and posts) and

the new Silva Cell frames does not exceed the 3" (7.6 cm) maximum. If removing frames (or base and posts) or decks, re-install the geogrid along the new perimeter of the Silva Cell system and backfill along the new limits of excavation per Silva Cell specifications.

6.0 Tree Replacement

Tree replacement may be necessary based upon unforeseen or severe site, climate or circumstantial conditions. Limit disturbance area as possible. Ensure all equipment meets H-20 loading requirements.

Remove any structure at the tree opening (tree grate, etc.) Remove mulch and any excess soil from above tree root package. Do not damage Silva Cell frames (or base and posts) or decks. Remove soil using hand tools only or HydroVac and set aside. If hand dug, ensure clean storage of soil material by excavating into contained/isolated location and cover during utility work. Soil must be inspected and approved prior to reinstallation.

Consult a certified arborist to remove tree. If necessary to cut tree roots from main root package, do not cut Silva Cell frames (or base and posts) or decks. Remove tree root package from planting bed. If using construction equipment to remove tree, ensure meeting of H-20 loading requirements.

Prior to planting new tree, install additional planting soil, to the depths indicated, within the tree opening adjacent to paving supported by Silva Cells. Assure that the planting soil under the tree root package is compacted to approximately 85-90% to prevent settlement of the root package. The planting soil within the tree opening shall be the same soil as in the adjacent Silva Cells. See Silva Cell specifications for further detail. Replace root barrier.

Plant tree according to owner specifications or at the direction of consulting arborist. Cover the planting soil finished grade with 2" (5cm) of mulch per Silva Cell specifications.

When a large portion of a Silva Cell installation is to be removed, first locate the area of disturbance. Limit disturbance area as possible. Ensure all equipment meets H-20 loading requirements.

Remove paving and aggregate base course. Carefully cut geotextile to allow for removal of Cell decks. Ensure at least 18" (45.7 cm) overlap into new limits of excavation. Do not cut Silva Cell frames or decks. Unfold geogrid from Cell decks and carefully fold away from Silva Cell frames (or base and posts). Remove Silva Cell decks by removing screws and set aside. Remove soil using hand tools only or HydroVac and set aside. If hand dug, ensure clean storage of soil material by excavating into contained/isolated location and cover during utility work. Soil must be inspected and approved prior to reinstallation Remove anchoring spikes from Cell base and set aside. If geotextile is at base of system, carefully cut geotextile at least 6" (15.2 cm) within new limits of excavation.

Install aggregate base course and paving, ensuring no damage to Silva Cells or other installation components.

7.0 Additional Silva Cells to be Installed Adjacent to Existing Installation

When additional Silva Cells are to be installed adjacent to an existing Silva Cell system, first locate the area of disturbance. Limit disturbance area as possible. Ensure all equipment meets H-20 loading requirements.

Excavate up to 12" (30.5 cm) from existing Silva Cells. Excavated remaining 12" (30.5 cm) by hand. Cut geogrid from face of existing Silva Cell system. Do not cut Silva Cell frames (or base and posts) or decks.

Appendix E - Silva Cell 2

Protection and Maintenance

DeepRoot Green Infrastructure, LLC
USA-Head Office
101 Montgomery Street, Suite 2850
San Francisco, CA 94104
info@deeproot.com
Tel: 800 458 7668 or 415 781 9700
Fax: 800 277 7668 or 415 781 0191

Notes: Each Silva Cell is independent and not connected to any adjacent cells. This allows for Individual Silva Cells to be easily added, removed, or replaced without impacting the structural integrity of adjacent cells or of the system of cells.

Silva Cell components (base, posts, and decks) - should at no time be cut, drilled into, or otherwise structurally modified during installation, or maintenance procedures. Any damaged Silva Cell components shall be replaced.

1.0 Protection of The Silva Cell System

To help avoid future disturbance of Silva Cell systems, the location of the system should be accurately recorded at the time of construction and incorporated into an as-built drawing.

If possible, register the location of Silva Cell systems with the local One-Call utility locating program. Accurately locate the limits of the Silva Cell systems prior to any future excavation in the area. (Some types of underground utility locating equipment, such as ground penetrating radar, are capable of detecting Silva Cells and may be used to locate the limits of the system. Contact a professional utility locating contractor for more information).

Utility warning tape/ribbon and locating wires can also be incorporated into the system and are recommended.

2.0 Utility Installation, Maintenance, Relocation or Replacement within Silva Cell System

If the Silva Cell system is accidentally unearthed by future excavation in the area, cease the excavation immediately and consult the as-built drawings to determine the limits of the system.

Using hand tools only, expose the impacted portion of the Silva Cell system, and carefully inspect the Silva Cell decks and posts for any signs of damage or cracking.

Replace any damaged Silva Cell decks and/or posts, and reconstruct any disturbed portion of the system per Deep Root's Silva Cell installation Guidelines.

Silva Cell supports vehicle loading equal to 32,000 lbs (14,500 kg) per axle, which allows use in areas that accommodate –three- to four-axle vehicles such as those used for emergency, delivery, and maintenance. Generally, Silva Cell meets AASHTO HS-20 (USA), CSA-S6, 87.5 and OBC 54KN (Canada), and BS EN 1991-1-1:2002 and BS EN 1991-1-2:2003 (UK) loading standards when used with standard paving profiles.

Throughout this document, where H-20 loading is referred to, this is shorthand for the loading standards described above.

To prevent damage to underlying Silva Cells, ensure that machinery operated on the paving above does not exceed loading as described above. Do not operate any machinery over the Silva Cell system without paving being in place.

3.0 Utilities and Accessing The Silva Cell System

Silva Cell systems can be easily accessed for utility installation, maintenance, relocation, replacement, etc. using the following procedure.

First, locate the limits of the Silva Cell system. Carefully remove the existing pavement. Take care to not operate machinery exceeding H-20 loading on any of the surrounding pavement supported by the system. Do not operate any machinery over the Silva Cell system once the pavement has been removed.

Using hand tools remove the aggregate base course and expose the underlying geotextile fabric. If working near the perimeter of the system, there will be also be approximately 12" (30.5 cm) of geogrid that is folded over and attached to the cell decks. Cut the geotextile fabric as needed to allow for the removal of Cell decks. If Geogrid is encountered, detach it from cell decks and fold it back as well. Do not cut the Silva Cell decks or posts. Remove the Silva Cell decks by loosening the plastic clips at each post and set it aside for re-use.

Remove the soil from inside the frames using hand tools only or a HydroVac. If the existing soil is to be reused, store it separately to ensure that it does not become contaminated with other spoil material. Otherwise dispose of the soil and replace it with soil meeting the requirements specified for the project. All soil must be inspected and approved prior to reinstallation.

Carefully remove any of the posts needed to complete utility work. Remove posts by turning them counter clockwise until they lift out of the base If you are excavating below the elevation of the bases, remove the two anchoring spikes in the Silva Cell base and lift the base out of the excavation.

Expect that there will be 100mm (4") of compacted road base below the Silva Cell bases and then a layer of geotextile fabric.

Upon completion of the utility work, visually inspect the perimeter exposed Silva Cell bases, posts, and decks, and remove any components showing signs of damage or compromise such as cracking.

Restore the disturbed portion of the system using one of the two following methods:

Method 1:

Replace the Silva Cell bases, posts, soil, and decks as required, per Silva Cell installation guidelines and specifications. Reconnect any stormwater distribution, drainage, irrigation, or aeration pipes and alike. Wrap geotextile fabric over all exposed decks per Silva Cell manufacturer's specifications. Restore the aggregate base course and pavement above the Silva Cells. Re-use only Silva Cell bases, posts and decks that have been thoroughly inspected and found to be free of damage or signs of compromise such as cracking. Replace any parts showing signs of damage or compromise with new parts.

Method 2:

Structurally bridge the gap with 1 1⁄2" (3.8 cm) clear stone. Install geogrid around the perimeter of the area from which the Silva Cell(s) were removed per Silva Cell installation guidelines and supplemental details. Fill the void area with 1 1⁄2" (3.8 cm) clear stone up to the level of the adjacent Silva Cell decks. Cover the stone with geotextile fabric, making sure to overlap the existing geotextile fabric by a minimum of two feet on all sides. Restore the aggregate base course and pavement.

4.0 Pavement Repair or Replacement over Silva Cell System

When the existing pavement over a Silva Cell system is replaced by a different type of pavement, refer to the Silva Cell standard details and specifications. A change in surface materials may require a change in the depth of the underlying aggregate base course.

5.0 Adding Silva Cells to The System/Removing Silva Cells from The System

To make changes to the size of the Silva Cell system, locate the limits of the system. Carefully remove the pavement taking care to ensure that no machinery which exceeds H-20 loading is operated on pavement supported by Silva Cells, and that no machinery is operated over the Silva Cells once the pavement has been removed.

Using hand tools remove the aggregate base and expose the underlying geotextile fabric. Cut the limits of the Silva Cells. Excavate to no closer than 1' (30.5 cm) of the limits of the Silva Cells. Using hand tools, expose the geogrid which wraps the perimeter of the system and fold back the geogrid as needed to add or remove cells. If adding to the system, install the new Cells per Silva Cell specifications. Ensure that the gap between the existing Silva Cell Bases and the new Silva Cell Bases does not exceed the 6" (150mm) maximum.

If removing Silva Cells, re-install the geogrid along the new perimeter of the Silva Cell system and backfill along the new limits of excavation per Silva Cell installation guidelines.

6.0 Tree Replacement

Tree replacement may be necessary based upon unforeseen or severe site, climate or circumstantial conditions. Limit disturbance area as possible. Ensure all equipment meets H-20 loading requirements.

Remove any structure at the tree opening (tree grate, etc.) Remove mulch and any excess soil from above tree root package. Do not damage Silva Cell components (bases, posts and decks). Remove soil using hand tools only or HydroVac and set aside. If hand dug, ensure clean storage of soil material by excavating into contained/ isolated location and cover during utility work. Soil must be inspected and approved prior to reinstallation.

Consult a certified arborist to remove tree. If it is necessary to cut tree roots from main root package, do not cut Silva Cell decks or posts. Remove tree root package from planting bed. If using construction equipment to remove tree, ensure meeting of H-20 loading requirements.

Prior to planting new tree, install additional planting soil, to the depths indicated, within the tree opening adjacent to paving supported by Silva Cells. Assure that the planting soil under the tree root package is compacted to approximately 85-90% to prevent settlement of the root package. The planting soil within the tree opening shall be the same soil as in the adjacent Silva Cells. See Silva Cell specifications for further detail. Replace root barrier.

Plant tree according to owner specifications or at the direction of consulting arborist. Cover the planting soil finished grade with 2" (5cm) of mulch per Silva Cell specifications.

deeproot

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DeepRoot Green Infrastructure, LLC
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800 ILV ROOT (458.7668) 800.277.7668

Canada:
Deep Root Canada Corp
#201 2425 Quebec Street. Vancouver, BC V5T 4L6
604.687.0899 604.684.6744

United Kingdom:
DeepRoot Urban Solutions, Ltd.
43-45 Portman Square, London W1H 6HN, United Kingdom
+44.207.969.2739 +44.207.969.2800

www.deeproot.com

Geogrid and Geotextile shall be selected from the following list of pre-approved products:

GEOGRID:

A. Miragrid 2XT
http://www.tencate.com

C. Fortrac 35 Geogrid as manufactured by Huesker, Charlotte, NC,
http://www.hueskerinc.com/

D. SF 20 Biaxial Geogrid, as manufactured by Synteen, Lancaster, SC,
http://www.synteen.com

E. Stratagrid SG 150, by Strata, Cumming, GA, http://www.geogrid.com

f. Stratagrid SGB 30 by Strata, Cumming, GA http://www.geogrid.com

F.TBX 300 geogrid - Terrafix

GEOTEXTILE:

Woven:

Nilex: Nilex Woven 2044

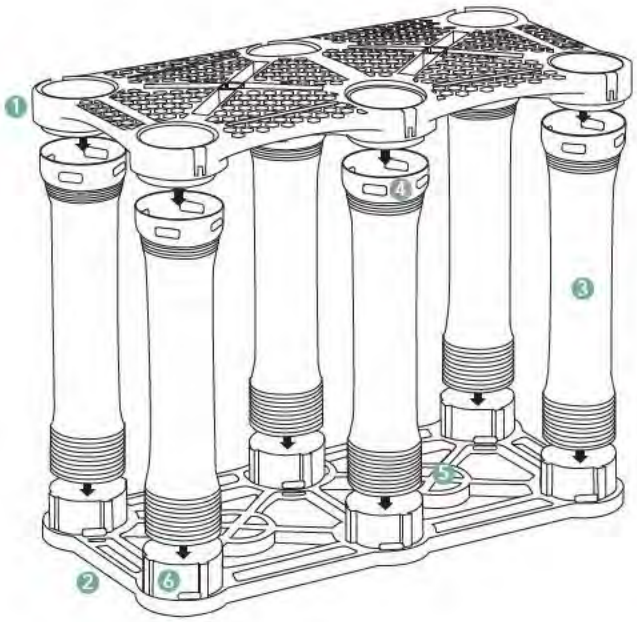
Tencate or Mirafi HP570 Woven

Geolon PP40; http://www.tencate.com

SILVA CELL 2 TECHNICAL SHEET

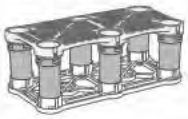
DeepRoot's Silva Cell 2 supports traffic loads while providing uncompacted soil volumes for large tree growth and on-site stormwater management. The modular framework provides unlimited access to healthy soil — a critical component of tree growth in urban environments — allowing them to manage stormwater, reduce heat-island effect, and improve air quality.

Silva Cells can be used to create underground bioretention systems; they are easily sized to absorb stormwater on-site through soil storage, interception, and evapotranspiration. Trees and soil also offer many water quality benefits, including removal of dissolved nutrients, hydrocarbons, and total suspended solids (TSS).



1. **Deck**
   The top piece of the assembly. The deck is permeable, with wide openings that allow water to easily pass through to soil below. High fit tolerance; removable and reusable.
2. **Base**
   The bottom portion of the Silva Cell 2 assembly.
3. **Post**
   The posts transfer paving loads vertically downward to a compacted sub-base. They are available in two sizes - 1x and 2x - that snap together to form 3x, the tallest.
4. **Secure Connections**
   Different post sizes snap together to form different heights based on the needs of your site.
5. **Footpad**
   Footpad offers a safe and convenient way to walk through the system during installation.
6. **Base Cup**
   Posts snap into base cups with a quarter turn.

1x Stack



2x Stack

3x Stack

Loading: Supports vehicle loading equal to 32,000 lbs (14,500 kg) per axle, which allows use in areas that accommodate 3 - 4 axle vehicles such as those used for emergency, delivery, and maintenance. Generally meets AASHTO HS-20 (USA), CSA-S6, 87.5 and OBC 54KN (Canada), and BS EN 1991-1-1:2002 and BS EN 1991-1-2:2003 (UK) loading standards when used with standard paving profiles.

Utilities: 14" (355 mm) apertures easily accommodate new or existing utilities.

Stormwater in/out: Totally open interior allows for easy movement of water into and out of the system.

Installation: All parts snap or twist together; no additional pieces required.

Spacing: Up to 6" (152.4 mm) spacing delivers soil as efficiently as possible.

Structurally independent: Each stack stands alone; affected area of system easily isolated if utility (service) repairs are necessary.

MATERIAL SPECIFICATIONS & TESTING

Deck: fiberglass reinforced, chemically-coupled, impact modified polypropylene.

Post and base: homopolymer polypropylene.

Proof-load tested and FEA analysis completed at an independent facility. Contact us for a detailed engineering report.

BASE DIMENSIONS

Length: 48" (1200 mm)
Width: 24" (600 mm)

DECK DIMENSIONS

Length: 48" (1200 mm)
Width: 24" (600 mm)

SYSTEM HEIGHTS

1x: 16.7" (424 mm)
2x: 30.9" (784 mm)
3x: 43.0" (1092 mm)

SOIL CAPACITY

1x: approx. 15.27 ft³ (0.430 m³)
2x: approx. 28.21 ft³ (0.795 m³)
3x: approx. 39.28 ft³ (1.107 m³)

ASSEMBLED WEIGHTS

1x: 23.8 lbs (10.80 kg)
2x: 31 lbs (14.06 kg)
3x: 39.4 lbs (17.87 kg)

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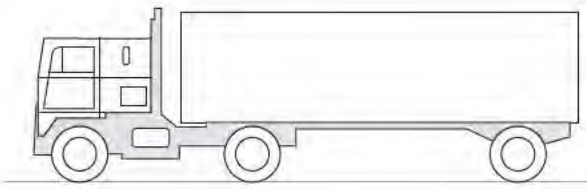
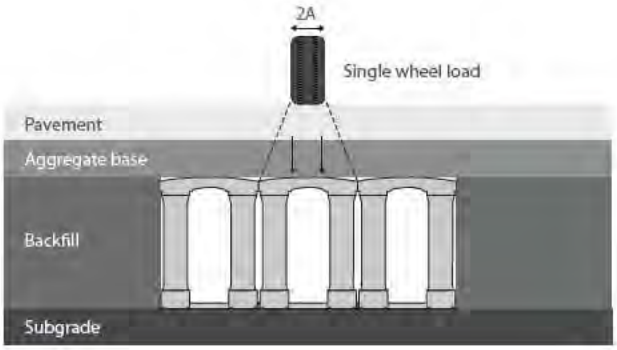
SILVA CELL 2 SUMMARY OF ULTIMATE LOAD CAPACITY

Independent lab testing and engineering analysis of Silva Cell 2 shows that, when installed per manufacturer's specifications, it meets or exceeds most loading requirements and safety factor, CSA-S6 87.5kN and standards for tire contact surface area equal to 250 mm x 600 mm.



- 175 kN maximum per axle
- 87.5 kN maximum per wheel
- Tire contact surface area is 250 x 600 mm



ULIMATE WHEEL LOAD BY STANDARD PAVEMENT TYPE

The table below provides the maximum load that can be on any single wheel (tire), or per axle, for a given pavement section, assuming tires have a contact area equal to 250 mm x 600 mm. For more details, including information about lateral loading, please refer to the Silva Cell 2 Engineering Report and Testing Conclusions.

Silva Cell 2 System Type	Pavers		Asphalt		Concrete		Pavers with Concrete	
	8 cm pavers 2.5 cm sand base 30 cm of aggregate		10 cm of asphalt 30 cm of aggregate		10 cm of concrete 10 cm of aggregate		6 cm pavers 12.7 cm concrete	
	Wheel	Axle	Wheel	Axle	Wheel	Axle	Wheel	Axle
1X	147 kN	294 kN	225 kN	450 kN	165 kN	330 kN	184 kN	368 kN
	33,100 lbs	66,200 lbs	50,500 lbs	101,000 lbs	37,000 lbs	74,000 lbs	41,400 lbs	82,800 lbs
2X	162 kN	324 kN	247 kN	494 kN	181 kN	362 kN	202 kN	404 kN
	36,400 lbs	72,800 lbs	55,500 lbs	111,000 lbs	40,700 lbs	81,400 lbs	45,500 lbs	91,000 lbs
3X	137 kN	274 kN	210 kN	420 kN	154 kN	308 kN	172 kN	344 kN
	30,900 lbs	61,800 lbs	47,200 lbs	94,400 lbs	34,600 lbs	69,200 lbs	38,700 lbs	77,400 lbs

Loading capacity can be adjusted based on section profile changes; the typical applications shown in the table above are the most commonly used. For custom details and a review of your site-specific loading requirements, please contact DeepRoot.

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341-550 West Broadway, Vancouver, BCV5Z 0B9
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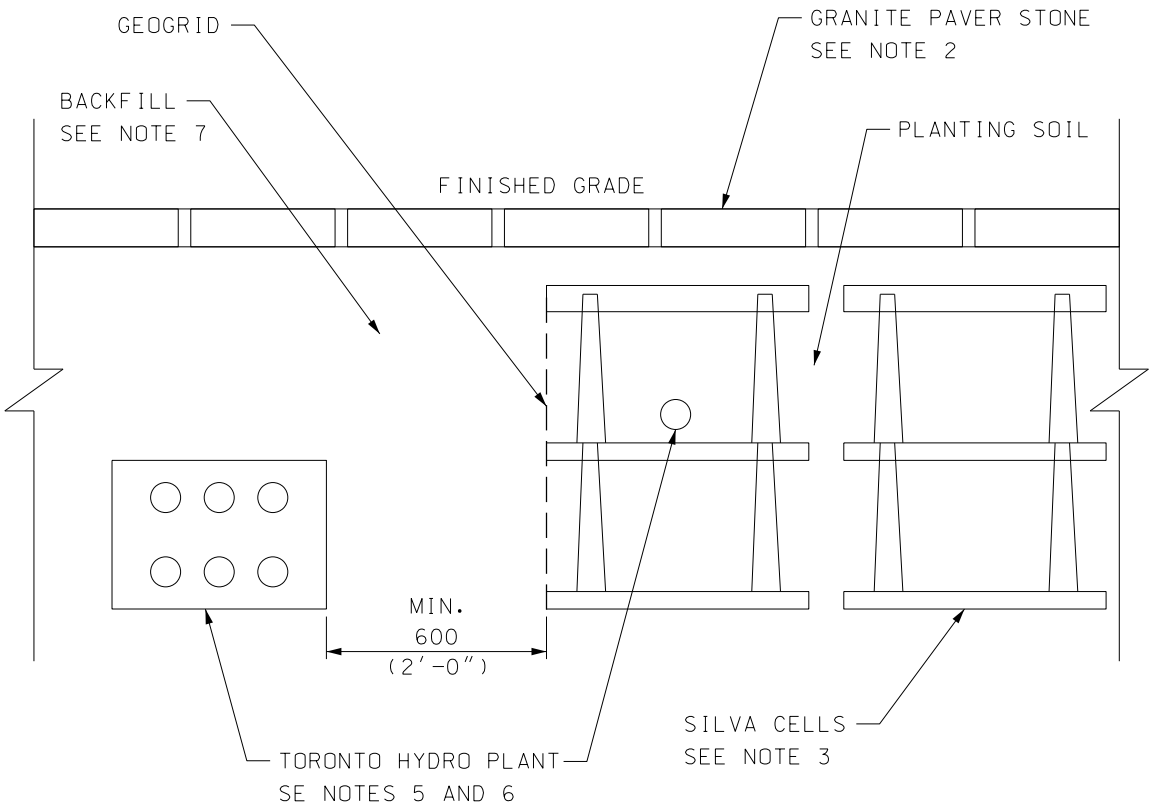

NOTES:

1) TORONTO HYDRO CONTRACTOR IS RESPONSIBLE FOR TEMPORARY REPAIRS ON HARD SURFACES. CITY OF TORONTO CONTRACTOR IS RESPONSIBLE FOR PERMANENT REPAIRS.
2) CONTRACTOR SHALL FOLLOW REQUIREMENTS FOR GRANITE/STONE PAVERS REMOVAL, STORAGE, AND INSTALLATION AS PER TORONTO HYDRO CIVIL SPECIFICATION "CV-CON-01" AND CITY OF TORONTO DOCUMENTS OR BIA DOCUMENT "BLOOR STREET GRANITE UTILITY CUT REMOVAL".
3) FOR SILVA CELLS REMOVAL, STORAGE, AND INSTALLATION REQUIREMENTS, CONTRACTOR SHALL CONTACT "DEEP ROOT CANADA CORP" AT 604-687-0899.
4) SILVA CELLS SHALL BE INSTALLED AT A MINIMUM OF 300 mm (1'-0") FROM TORONTO HYDRO PLANT.
5) SILVA CELLS SHALL NOT BE INSTALLED ON TOP OF DIRECT BURIED OR CONCRETE ENCASED DUCT BANK CARRYING PRIMARY/FEEDER CABLES.
6) SILVA CELLS CAN BE INSTALLED ON TOP OF DIRECT BURIED STREET LIGHTING OR SECONDARY CABLE DUCT BANK.
7) FOR TORONTO HYDRO PLANT INSTALLATION, EXCAVATION SHALL BE BACKFILLED TO FINISHED GRADE AS PER TORONTO HYDRO SPECIFICATION "CV-CON-01" CLAUSE 5.1.17 AND/OR CITY OF TORONTO LATEST BACKFILLING REQUIREMENTS.
8) REFER TO STANDARD 31-0300 FOR MINIMUM DEPTH OF COVER.

DISTRIBUTION CONSTRUCTION SKETCH SK/SKE			GRANITE/STONE PAVERS AND SILVA CELLS CONSTRUCTION REQUIREMENTS				
TORONTO HYDRO	Approved By:						
	Drafted By: F.K.	Designed By: J.D.	Original Issue:	Scale: N.T.S.	Rev: 0	SK-152	1/1

SUBCONTRACTORS

Provide details on Subcontractors in the form set out below by listing all of the subcontractors that the Proponent proposes to use in carrying out its work under an Agreement.

If selected to enter into an Agreement with the City, the Proponent may be limited to using subcontractors listed in its Proposal. If the City objects to a subcontractor listed in a Proposal, the City may permit a Proponent to propose a substitute Subcontractor acceptable to the City.

Subcontracted Scope		
Subcontractor		
Contact (name, title, email, telephone no.)		
Approximate Percent of the Work to be Subcontracted		
Social Value Business - shall mean a business that has a recognized environmental or social certification and/or is majority owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).	In the space below, detail the Proponent's proposed use of Social Value Businesses as sub-contractors/consultants (if any) and provide brief company profiles of those Social Value Businesses and descriptions of how they qualify as Social Value Businesses.	
The Subcontractor's Relevant Experience (identify at least three similar projects within the last five years, including the client)	1. Project Name:	
	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	
	2. Project Name:	

	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	
	3. Project Name:	
	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	

Certificate of Registration

This is to certify that the Quality Management System of

UPM

13245 Los Angeles St.
Baldwin Park, CA 91706

has been assessed for conformance with the provisions set forth by

ISO 9001:2015

Scope of Registration

Manufacturer of custom injection molding.

Certificate No. 1715
Issue Date: 08/20/2022
Expiration Date: 08/19/2025
Certified since August 20, 2007

The conditions for maintaining this certificate of registration are set forth in ISA's Registration Policies 5.1. This registration is granted subject to the organization maintaining compliance to the noted standard. The validity of this certificate is dependent upon ongoing surveillance audits.

ACCREDITED
ISO/IEC 17021
MANAGEMENT SYSTEMS CERTIFICATION BODY

President

International Standards Authority, Inc.
www.isaregistrar.com
525 Queensland Cir.
Corona, CA 92879. USA
Tel: 951-736-0035

WORK SAFE BC
WORKING TO MAKE A DIFFERENCE

Assessment Department
Mailing Address
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Richmond BC
V7C 1C6
www.worksafebc.com

Clearance Section
Telephone 604 244 6380
Toll Free within Canada
1 888 922 2768
Fax 604 244 6390

DeepRoot Canada Corp
Suite 341, 550 West Broadway
VANCOUVER, BC V5Z 0E9

August 18, 2022

Person/Business : DEEPROOT CANADA CORPORATION
Account number : 847771

This letter provides clearance information for the purposes of Section 258 of the Workers Compensation Act.

We confirm that the above-referenced firm is active, in good standing, and has met WorkSafeBC's criteria for advance clearance. Accordingly, if the addressee on this letter is the prime contractor, the addressee will not be held liable for the amount of any assessment payable for work undertaken by the above-referenced firm to January 01, 2023.

This firm has had continuous coverage with us since May 01, 2010.

Employer Service Centre
Assessment Department

Clearance Reference # : C133341559
CLRAAA

CITY OF VANCOUVER

CITY CLERK'S DEPARTMENT
Access to Information & Privacy Division

File No.: 04-1000-20-2023-432

June 7, 2024

s.22(1)

Dear s.22(1)

Re: **Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")**

I am responding to your request of July 19, 2023 under the ***Freedom of Information and Protection of Privacy Act*** for:

> **Records relating to PS20220050-ENG-RFP – Supply & Delivery of Soil Cell and Deeproot/Silva Cell tender documents, specifically:**
> 1. **"Quality Control Process" as per Addendum #2;**
> 2. **"Commercial Proposal" submitted as part of this tender;**
> 3. **"Declaration of Supplier" Tables 1, 2, and 3;**
> 4. **"Code of Conduct" compliance document;**
> 5. **"Proponent References Questions" as indicated in Group 1.1 through Group 11.1.1;**
> 6. **"Environmental Sustainability" document;**
> 7. **"Social Sustainability" document; and**
> 8. **"Technical Proposal" sections 1.1.1 thru to 1.1.12.**
>
> **Date range: August 1, 2022 to April 15, 2023.**

Some of the responsive records are attached. Please note that the remainder of the records are currently subject to an OIPC review and have not been included in the attached records. The remaining records will be disclosed once the OIPC review has been completed and our office has been informed of the decision.

Under section 52 of the Act, and within 30 business days of receipt of this letter, you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your FOI request by writing to: Office of the Information & Privacy Commissioner, info@oipc.bc.ca or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number (#04-1000-20-2023-432); 2) a copy of this letter; 3) a copy of your original request; and 4) detailed reasons why you are seeking the review.

Yours truly,

Kevin Tuerlings, FOI Case Manager, for

[Signed by Kevin Tuerlings]

Cobi Falconer, MAS, MLIS, CIPP/C
Director, Access to Information & Privacy
cobi.falconer@vancouver.ca
453 W. 12th Avenue Vancouver BC V5Y 1V4

If you have any questions, please email us at foi@vancouver.ca and we will respond to you as soon as possible. Alternatively, you can call the FOI Case Manager at 604-871-6584.

Encl. (Response Package – Phased Release)

:kt

Date of Preparation: 08-29-2017

Section 1 Chemical Product and Company Identification

Product/Chemical Name: **PRC25GF3-Black**

Chemical Formula: Polypropylene Based Compound

Other Designations: Polymer Preparation, Mixture

Manufacturer:

	Global Contact	**Europe Contact**
	Washington Penn Plastic Co. Inc. 450 Racetrack Road Washington, PA 15301	Audia Plastics, s.r.o. Voderady 426 919 42 Voderady Slovakia
Contact:	Scott C. Ward	Radoslav Margetin
Email:	scottc.ward@audiagroup.com	msds-sk@washpenn.com
Phone:	(001) 724.206.4372	00421.33.323.8001
Fax:	(001) 724.228.7112	00421.33.323.8054

******** EMERGENCY OVERVIEW ********

Emergency Telephone: 1-800-424-9300

Outside U.S.: 1-703-527-3887

Do not allow material to enter streams or waterways per 40 CFR 122.26, "Significant Material".

Cover any exposed body areas where skin contact with molten material is possible.

Section 2 Hazard(s) Identification

Physical Hazards Not classified

Health Hazards Not classified

Environmental Hazards Not classified

OSHA Defined Hazards Combustible dust

Label Elements

Hazard Symbol None

Signal Word Warning

Hazard Statement If small particles are generated during further processing, handling or by other means, this may form combustible dust concentrations in air.

Precautionary Statement

Prevention Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Prevent dust accumulation to minimize explosion hazard. Observe good industrial hygiene practices.

Response Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) Not Otherwise Classified (HNOC) None known

Supplemental Information No ingredient(s) of unknown acute toxicity is intentionally used in this product.

Date of Preparation: 08-29-2017

Section 3 Composition / Information on Ingredients

Reportable Hazardous Substances

Chemical Name	*Common Name*	*CAS Number*	*%*
No Reportable Hazardous Substances*			

Base Component(s) of Mixture

Chemical Name	*Common Name*	*CAS Number*	*%*
1-propene, homopolymer	homopolymer polypropylene	9003-07-0	**
Other components below reportable levels**	n/a	n/a	**

* There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

** Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

Section 4 First-Aid Measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin Contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye Contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most Important Symptoms/ Effects, Acute and Delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of Immediate Medical Attention and Special Treatment Needed	Treat symptomatically.
General Information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Section 5 Fire-Fighting Measures

Suitable Extinguishing Media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable Extinguishing Media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific Hazards Arising from the Chemical	Explosion hazard: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard. During fire, gases hazardous to health may be formed.
Special Protective Equipment and Precautions for Firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-Fighting Equipment/Instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific Methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General Fire Hazards	May form combustible dust concentrations in air.

Section 6 Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Use only non-sparking tools. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take

precautionary measures against static discharge. Use only non-sparking tools. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental Precautions

Avoid discharge into drains, water courses, or onto the ground.

Section 7 Handling and Storage

Precautions for Safe Handling

Minimize dust generation and accumulation. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Explosion-proof general and local exhaust ventilation. Do not breathe dust. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for Safe Storage, Including Any Incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

Section 8 Exposure Controls/Personal Protection

Occupational Exposure Limits

U.S. OSHA (29 CFR 1910.1000)

Components	*Type*	*Value*	*Form*
Nothing to report			

U.S. ACGIH Threshold Limit Values

Components	*Type*	*Value*	*Form*
Nothing to report			

U.S. NIOSH: Pocket Guide to Chemical Hazards

Components	*Type*	*Value*	*Form*
Nothing to report			

Biological Limit Values	No biological exposure limits noted for the ingredient(s).
Exposure Guidelines	Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.
Appropriate Engineering Controls	Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual Protection Measures, Such as Personal Protective Equipment

Eye/Face Protection	Wear safety glasses with side shields (or goggles).
Skin Protection	
Hand Protection	For prolonged or repeated skin contact use suitable protective gloves.
Other	Wear suitable protective clothing.
Respiratory Protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal Hazards	Wear appropriate thermal protective clothing, when necessary.
General Hygiene Considerations	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Section 9 Physical and Chemical Properties

Appearance	
Physical State	Solid
Form	Solid, pellets, granulars
Color	Varies based on colorants
Odor	Odorless; mild odor
Odor Threshold	Not available
Ph	Not available
Melting Point/Freezing Point	155-170°C (310-340°F)
Initial Boiling Point and Boiling Range	Not available
Flash Point	above 300°C (570°F) decomposition occurs and flash of fumes may occur.
Evaporation Rate	Not available
Flammability (Solid, Gas)	Not available
Upper/Lower Flammability Or Explosive Limits	
Flammability Limit – Lower (%)	Not available
Flammability Limit – Upper (%)	Not available

Explosive Limit – Lower (%)	Not available
Explosive Limit – Upper (%)	Not available
Vapor Pressure	Neglible
Vapor Density	Not available
Relative Density	0.9-1.8 g/cm³
Solubility(Ies)	
Solubility (Water)	Neglible
Partition Coefficient (N-Octanol/Water)	Not available
Auto-Ignition Temperature	> 360°C (> 680°F)
Decomposition Temperature	> 300°C (> 570°F)
Viscosity	Not available
Other Information	
Explosive Properties	Not explosive
Oxidizing Properties	Not oxidizing

Section 10 Stability and Reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport
Chemical Stability	Material is stable under normal conditions
Possibility of Hazardous Reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Keep away from heat, sparks and open flame. Minimize dust generation and accumulation. Contact with incompatible materials.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	No hazardous decomposition products are known

Section 11 Toxicological Information

Information on Likely Routes of Exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin Contact	No adverse effects due to skin contact are expected.
Eye Contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms Related to the Physical, Chemical and Toxicological Characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on Toxicological Effects

Acute Toxicity

Components	*Speices*	*Test Results*
Not classified		

Skin Corrosion/Irritation	Prolonged skin contact may cause temporary irritation.
Serious Eye Damage/Eye Irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or Skin Sensitization	
Respiratory Sensitization	Not a respiratory sensitizer.
Skin Sensitization	This product is not expected to cause skin sensitization.
Germ Cell Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Iarc Monographs. Overall Evaluation Of Carcinogenicity

polypropylene (CAS 9003-07-0)	3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed

Reproductive Toxicity	This product is not expected to cause reproductive or developmental effects.
Specific Target Organ Toxicity - Single Exposure	Not classified
Specific Target Organ Toxicity - Repeated Exposure	Not classified
Aspiration Hazard	Not an aspiration hazard

Section 12 Ecological Information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	*Species*	*Test Results*
Nothing to report		

Persistence and Degradability	No data is available on the degradability of this product.
Bioaccumulative Potential	No data available.
Mobility in Soil	No data available.
Other Adverse Effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

Section 13 Disposal Considerations

Disposal Instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local Disposal Regulations	Dispose in accordance with all applicable regulations.
Hazardous Waste Code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste From Residues / Unused Products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated Packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

Section 14 Transportation Information

DOT	Not regulated as dangerous goods
IATA	Not regulated as dangerous goods
IMDG	Not regulated as dangerous goods
Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code	Not applicable

Section 15 Regulatory Information

US Federal Regulations

OSHA	When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.
TSCA	Listed on the United States TSCA (Toxic Substances Control Act) inventory.
CERCLA	This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.
EPCRA	This material contains no extremely hazardous substances.
SARA Section 311/312 Hazard Classes	Acute Health Hazard: No Chronic Health Hazard: No Fire Hazard: No Sudden Release of Pressure Hazard: No Reactive Hazard: No
SARA Section 313 Toxic Release Inventory	This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.
Conflict Minerals (Dodd-Frank Wall Street Reform and Consumer Protection Act, 2010)	Conflict minerals, which include columbite-tantalite (coltan) [source for tantalum], cassiterite [source for tin], wolframite [source for tungsten], gold ore, or their derivatives, are not intentionally used in the manufacture of or formulation of this product.
Clean Water Act (CWA/OPA)	Plastic pellets are defined by the US EPA under the Clean Water Act (40CFR122.26) as a "significant material" which requires any industrial plant that may expose pellets to storm water to secure a storm water permit. Violations of the rule carry the same penalties as other Clean Water Act violations. Pellets found in storm water runoff are subject to EPA regulations with the potential for substantial fines and penalties.
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List	Not regulated
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)	Not regulated
Safe Drinking Water Act (SDWA)	Not regulated.

CPSIA (Consumer Product Safety Improvement Act, 2008)	The following substances, lead [CAS# 7439-92-1] and phthalates, are not intentionally used in the manufacture of or formulation of this product. The Toy Safety Standard, ASTM F 963-07, which was made a mandatory CPSC standard by the CPSIA, also states migration limits for seven heavy metals that may be in toy materials. These metals and their respective migration limits are: Antimony (Sb) [CSA# 7440-36-0] <60 mg/kg, Arsenic (As) [CSA# 7440-38-2] <25 mg/kg, Barium (Ba) [CSA# 7440-39-3] <1000 mg/kg, Cadmium (Cd) [CSA# 7440-43-9] <75 mg/kg, Chromium (Cr) [CSA# 7440-47-3] <60 mg/kg, Mercury (Hg) [CSA# 7439-97-6] <60 mg/kg, and Selenium (Se) [CSA# 7782-49-2] <60 mg/kg. These heavy metals are not intentionally used in the manufacture of or formulation of this product.
Latex	"Natural rubber latex", "dry natural rubber", "synthetic latex", or "rubber that contains natural rubber" are not used in the manufacture of or the formulation of this product.
Ozone-Depleting Substances (ODSs)	Class I and Class II ODSs listed in the U.S. Clean Air Act and U.S. EPA regulation 40 CFR Part 82: “Protection of Stratospheric Ozone” are not used in the manufacture of or formulation of this product. ODSs listed in “The Montreal Protocol on Substances that Deplete the Ozone Layer” (2000) are not used in the manufacture of or formulation of this product. ODSs listed in Regulation (EC) No 1005/2009 “Substances that Deplete the Ozone Layer” are not used in the manufacture of or formulation of this product.

U.S. State Regulations

California	Not listed
Massachusetts	Not regulated
New Jersey	Not listed
Pennsylvania	Not listed
Rhode Island	Not regulated
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)	Substances and chemicals which are known to the State of California to cause cancer and/or reproductive toxicity under California Proposition 65 are not intentionally added in the manufacture of or formulation of this product.
CONEG (Coalition of Northeastern Governors)	The following substances, cadmium [CAS# 7440-43-9], hexavalent chromium [CAS# 1333-82-0], lead [CAS# 7439-92-1], and mercury [CAS# 7439-97-6], are not intentionally used in the manufacture of or formulation of this product as set forth by the Toxics in Packaging Clearinghouse (TPCH).

Canada Regulations

Prohibition of Certain Toxic Substances Regulations, 2012	Substances and chemicals which have been classified as toxic substances by the Candadian Environmental Protection Act, Prohibition of Certain Toxic Substances Regulations are not intentionally added in the manufacture of or formulation of this product.
WHMIS 2015	Not regulated
Controlled Drugs and Substances Act	Not regulated
Export Control List (CEPA 1999, Schedule 3)	Not listed
Greenhouse Gases	Not listed
Precursor Control Regulations	Not regulated

International Regulations

REACH (Regulation (EC) No 1907/2006)	Substances and chemicals sold into Europe, or produced in Europe, individually or as part of preparations will be regulated according to the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) legislation (please visit http://ec.europa.eu/ enterprise/reach/index_en.htm for further information). We sell thermoplastic compound preparations into the European market, or produced in Europe, and as such we confirm that all substances of this preparation are compliant with the pre-registration requirements of REACH, and that we have the intentions to proceed with the registration of these substances, or to procure substances only from suppliers from which confirmation has been received that the suppliers are aware of their REACH requirements, that they have preregistered and/or will timely register their substances. *Substances of Very High Concern (SVHC)*: This product does not contain any of the candidate chemicals proposed to be Substances of Very High Concern (list as of July, 2017) as stated in REACH (Article 57, Regulation No 1907/2006) determined either through (i) non-use of the substance, (ii) mass balance calculation, or (iii) specific testing.

RoHS 3 (Directive 2015/863/EU) and ELV (End-Of Life Vehicles, Directive 2016/774/EC)

The following chemicals and substances are not intentionally used in the manufacture of or formulation of this product as set forth in RoHS 3, “restriction of the use of certain hazardous substances in electrical and electronic equipment”, and determined either through (i) non-use of the substance, (ii) mass balance calculation, or (iii) specific testing.

cadmium	[CAS# 7440-43-9]
hexavalent chromium	[CAS# 1333-82-0]
lead	[CAS# 7439-92-1]
mercury	[CAS# 7439-97-6]
polybrominated biphenyls (PBB)	[CAS# 59536-65-1]
polybrominated diphenyl ethers (PBDE)	*
Bis(2-ethylhexyl) phthalate (DEHP)	[CAS# 117-81-7]
Butyl benzyl phthalate (BBP)	[CAS# 85-68-7]
Dibutyl phthalate (DBP)	[CAS# 84-74-2]
Diisobutyl phthalate (DIBP)	[CAS# 84-69-5]

*PBDE includes the following ethers; bromodiphenyl ether [CAS# 101-55-3], dibromodiphenyl ether [CAS# 205-47-7], tribromodiphenyl ether [CAS# 49690-94-0], tetrabromodiphenyl ether [CAS# 40088-47-9], pentabromodiphenyl ether [CAS# 32534-81-9], hexabromodiphenyl ether [CAS# 36483-60-0], heptabromodiphenyl ether [CAS# 68928-80-3], octabromodiphenyl ether [CAS# 32536-52-0], nonabromodiphenyl ether [CAS# 63936-56-1], decabromodiphenyl ether [CAS# 1163-19-5].

Packaging and Packaging Waste - EU Directive 94/62/EC (as amended)

Cadmium, chromium (VI), lead and mercury are not intentionally used in the manufacture of or the formulation of this product. In addition, this product has the potential to be recycled according to these requirements.

GADSL (Global Automotive Declarable Substance List)

This material, as supplied, does not contain any substances listed on the GADSL.

Section 16 Other Information

Prepared By	Safety and Technology Departments
Revision Notes	Any questions call 724-206-4282
Further Information	This Safety Data Sheet conforms to regulation 1907/2006/EC (REACH). This product has been classified in accordance with European CLP Regulations (1272/2008/EC) and the U.S. Hazard Communication Standard (29 CFR 1910.1200). Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.
HMIS® Rating	Health: 0 - Minimal Hazard - No significant risk to health Flammability: 1 - Slight Hazard Physical hazard: 0 - Minimal Hazard Personal protection: X
NFPA Rating	Health: 0 - Exposure could cause irritation but only minor residual injury even if no treatment is given. Flammability: 1 - Must be preheated before ignition can occur. Instability: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
Disclaimer	WPP cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information given is based on data available for the material, the components of the material, and similar materials.

Description

A. KEY INFORMATION

1.0 SUMMARY OF OPPORTUNITY

The proponent shall provide all specification related to the supply and delivery of soil cells to the City of Vancouver. This supply contract will be non-exclusive and guarantee only one large capital infrastructure project, of which 20 m^3 to 30 m^3 of soil volume per tree will be required to support 40 trees in the engineering right of way. Additional product may be requested on an as-needed basis for a variety of other projects within the contract's term. For the purpose of this RFP, please use an estimate of 30 m^3 per tree.

2.0 THIS RFP

1. The City of Vancouver (the "**City**") is issuing this Request for Proposals, as may be amended from time to time (the "**RFP**") to invite interested parties that are not, by the terms hereof, barred from participating in this RFP (each, a "**Proponent**") to submit a proposal to the City (a "**Proposal**") for the opportunity described in Section 1.1 above in accordance with the terms of this RFP.
2. The City intends to select a Proponent with the capability and experience to efficiently and cost-effectively meet the objectives and requirements described in the RFP. The City then anticipates entering into negotiations with that Proponent, which will conclude in the execution of a contract between the Proponent and the City (an "**Agreement**"). Notwithstanding the foregoing, the City may, in its discretion: (i) decline to select any Proponent; (ii) decline to enter into any Agreement; (iii) select multiple Proponents for negotiation; or (iv) enter into one or more Agreements respecting the subject matter of the RFP with one or more Proponents or other entities at any time. The City may also terminate the RFP at any time.
3. This RFP consists of the following components:
    1. SUMMARY: Sets out key information and dates and includes Instructions to Proponents for the RFP process.
    2. PREREQUISITES: Includes the RFP Legal Terms and Conditions, which the Proponent must agree to as a prerequisite to the submission of a Proposal.
    3. BUYER ATTACHMENTS: Includes the scope of work contemplated under the RFP (the "**Scope of Work**"), the City's form of agreement for the RFP that will be the basis of any Agreement entered into pursuant to the RFP process (the "**Form of Agreement**") as well as other applicable documents and forms.
    4. SUPPLIER ATTACHMENTS: Location where the Proponent may upload additional attachments for its Proposal, including any attachments or documents expressly requested under the terms of this RFP. Proponents should note that the City invites Proposals that are concise and responsive to requests for information in the RFP. The City is not inviting lengthy, generalized submissions with respect to the Proponent's services or the issues referenced in the RFP.
    5. QUESTIONS: Includes questionnaires to be completed by the Proponent as part of its Proposal (each, a "**Questionnaire**"), in accordance with the instructions provided in the applicable questionnaire.
    6. ITEMS: Includes the pricing sheet for the Work which the Proponent is required to complete as part of its Proposal.
4. The RFP will be administered through this website (JAGGAER) that is the City's electronic procurement portal (the "**Supplier Portal**"). Proposals may only be submitted via the Supplier Portal in the format requested by the City. Each Proponent is solely responsible for reviewing and complying with any Supplier Portal terms and conditions which apply to and govern the use of the Supplier Portal. If there is any inconsistency or conflict between the provisions of this RFP and the Supplier Portal terms and conditions, then the provisions of this RFP will govern.

3.0 PROPOSED TERM OF ENGAGEMENT

1. The term of any Agreement is expected to be a three (3)-year period, with three (3) possible two (2)-year extensions, for a maximum total term of nine (9) years.

4.0 PRICING

1. All prices quoted in any Proposal are to be exclusive of applicable sales taxes calculated upon such prices, but inclusive of all other costs.
2. Prices must be quoted in Canadian currency and fixed prices must be quoted for the full term of the Proponent's proposed agreement.
3. Prices are to be quoted CIP, destination (Incoterms, 2010). For the avoidance of doubt, freight, insurance, unloading at the destination designated by the City, import duties, brokerage, royalties, handling, overhead, profit and all other similar costs are to be included in quoted prices.

5.0 EVALUATION OF PROPOSALS

1. The City currently intends that all Proposals submitted to it in accordance with the RFP will be evaluated by City representatives, using quantitative and qualitative tools and assessments, as appropriate, to determine which Proposal or Proposals offer the overall best value to the City. In so doing, the City expects to examine not only financial terms, but also:

   (a) ability to deliver the Requirements (as defined in Part B) as and when required;

   (b) design process, fabrication methodology and product life cycle;

   (c) proven skills, knowledge and experience in delivering a similar scope of work;

   (d) proposed streamlined order process and strategic delivery capabilities;

   (e) financial offering, including, but not limited to, prices, customer support, value-added services, and discounts;

   (f) product quality and satisfaction of current industry standards;

   (g) product delivery lead-time and warranty;

   (h) business reputations and capabilities;

   (i) proponent’s historic performance in delivering the defined services and honoring the defined terms and conditions of prior executed Agreement(s) with the City;

   (j) Sustainability Engagement;

   (k) creative and innovative ideas to execute the objectives;

   (l) ability to meet the City’s insurance requirement; and

Evaluation Criteria	Evaluation Weighting
Technical	40%
Financial	45%
Sustainability	15%
Total	100%

B. INSTRUCTIONS TO PROPONENTS

1.0 RFP PROCESS - GENERAL

1. Except where expressly stated otherwise in Appendix 1 - Legal Terms and Conditions of this RFP: (i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City.
2. No bid security is required from Proponents in connection with the submission of Proposals because no Proposal will be deemed to be an irrevocable or otherwise binding legal offer by a Proponent to the City. The legal obligations of a Proponent that will arise upon the submission of its Proposal will be limited to the terms and conditions stated under the heading "Legal Terms and Conditions" in Appendix 1 - Legal Terms and Conditions of RFP.
3. The execution of an Agreement may be contingent on funding being approved, and the relevant Proposal being approved, by the Vancouver City Council.
4. IF A POTENTIAL PROPONENT BELIEVES THAT THE CITY MAY BE UNABLE TO SELECT IT DUE TO A CONFLICT OF INTEREST, BUT IS UNCERTAIN ABOUT THIS, THE POTENTIAL PROPONENT IS URGED TO CONTACT THE ABOVE-MENTIONED INDIVIDUAL AS SOON AS POSSIBLE WITH THE RELEVANT INFORMATION SO THAT THE CITY MAY ADVISE THE POTENTIAL PROPONENT REGARDING THE MATTER.

2.0 SUBMISSION OF PROPOSALS

1. Proponents should submit their Proposals on or before the time and date specified as the “Event Close Date” in the Summary section of this RFP (the “**Closing Time**”).
2. To be considered by the City, a Proposal must be submitted to the City via the Supplier Portal, in the format expressly requested pursuant to this RFP.
3. Any submitted Proposal may be amended or withdrawn prior to the Closing Time via the Supplier Portal. Proposal amendments or requests for withdrawal submitted by any other means will not be accepted.
4. All costs associated with the preparation and submission of a Proposal, including any costs incurred by a Proponent after the Closing Time, will be borne solely by the Proponent.
5. Unnecessarily elaborate Proposals are discouraged. Proposals should be limited to the items expressly requested by the City pursuant to this RFP.
6. The City is willing to consider any Proposal from two or more Proponents that wish to form a consortium for the purpose of responding to the RFP, provided that they disclose the names of all members of the consortium. Nonetheless, the City has a strong preference for Proposals submitted by a single Proponent, including a Proponent that would act as a general contractor and use subcontractors as required.
7. Proposals that do not comply in full with the terms hereof may or may not be considered by the City, in the City’s sole discretion.

3.0 CHANGES TO THE RFP AND FURTHER INFORMATION

1. The City may amend the RFP or make additions to it at any time.
2. It is the sole responsibility of Proponents to check the City’s Supplier Portal regularly for amendments, addenda, and questions and answers in relation to the RFP.
3. Proponents must not rely on any information purported to be given on behalf of the City that contradicts the RFP, as amended or supplemented in accordance with the foregoing Section 3.2.
4. All enquiries regarding this RFP must be made through the Q & A Board on the Supplier Portal. In-person or telephone enquiries are not permitted. Any communication from potential Proponents to City staff outside of the Supplier Portal regarding the content of this RFP may lead to disqualification of the Proponent from this RFP process, at the City’s sole discretion.

4.0 EVALUATION PROCESS

1. The City may open or decline to open Proposals in such manner and at such times and places as are determined by the City.
2. The City will retain complete control over the RFP process at all times until the execution and delivery of an Agreement or Agreements, if any. The City is not legally obligated to review, consider or evaluate Proposals, or any particular Proposal, and need not necessarily review, consider or evaluate Proposals, or any particular Proposal in accordance with the procedures set out in the RFP. The City may continue, interrupt, cease or modify its review, evaluation and negotiation process in respect of any or all Proposals at any time without further explanation or notification to any Proponents.
3. The City may, at any time prior to signing an Agreement, discuss or negotiate changes to the scope of the RFP with any one or more of the Proponents without having any duty or obligation to advise the other Proponents or to allow the other Proponents to vary their Proposals as a result of such discussions or negotiations.
4. The City may elect to short-list Proponents and evaluate Proposals in stages. Short-listed Proponents may be asked to provide additional information or details for clarification, including by attending interviews, making presentations, supplying samples, performing demonstrations, furnishing technical data or proposing amendments to the Form of Agreement. The City will be at liberty to negotiate in parallel with one or more short-listed Proponents, or in sequence, or in any combination, and may at any time terminate any or all negotiations.
5. The City may also require that any proposed subcontractors undergo evaluation by the City.
6. For the avoidance of doubt, notwithstanding any other provision in the RFP, the City has in its sole discretion, the unfettered right to: (a) accept any Proposal; (b) reject any Proposal; (c) reject all Proposals; (d) accept a Proposal which is not the lowest-price proposal; (e) accept a Proposal that deviates from the requirements or the conditions specified in the RFP; (f) reject a Proposal even if it is the only Proposal received by the City; (g) accept all or any part of a Proposal; (h) split the scope of work between one or more Proponents; and (i) enter into one or more agreements respecting the subject matter of the RFP with any entity or entities at any time. Without limiting the foregoing, the City may reject any Proposal by a Proponent that has a conflict of interest, has engaged in collusion with another Proponent or has otherwise attempted to influence the outcome of the RFP other than through the submission of its Proposal.
7. The City currently intends that Proposals will be evaluated by the City in relation to their overall value, which will be assessed in the City's sole and absolute discretion. In assessing value, the City expects to consider the factors described in Section A.6. and Section B.4. above, among others.

5.0 CERTAIN APPLICABLE LEGISLATION

1. Proponents should note that the City of Vancouver is subject to the *Freedom of Information and Protection of Privacy Act* (British Columbia), which imposes significant obligations on the City's consultants or contractors to protect all personal information acquired from the City in the course of providing any service to the City.
2. Proponents should note that the *Income Tax Act* (Canada) requires that certain payments to non-residents be subject to tax withholding. Proponents are responsible for informing themselves regarding the requirements of the *Income Tax Act* (Canada), including the requirements to qualify for any available exemptions from withholding.

6.0 CITY POLICIES

1. The City's Procurement Policy, Ethical Purchasing Policy and related Supplier Code of Conduct align the City's approach to procurement with its corporate social, environmental and economic sustainability values and goals. They evidence the City's commitment to maximize benefits to the environment and

the community through product and service selection, and to ensure safe and healthy workplaces, where human and civil rights are respected. Each Proponent is expected to adhere to the supplier performance standards set forth in the Supplier Code of Conduct. The Ethical Purchasing Policy shall be referred to in the evaluation of Proposals, to the extent applicable.

2. The City's Alcohol, Controlled Drugs and Medications Policy applies to all contractors doing work on behalf of the City. The policy is intended to set expectations regarding the use of alcohol, medication and controlled drugs that may render an employee unfit for work, impair performance or cause risk of harm to health and safety. The successful Proponent will be required to ensure compliance with the policy by its employees when doing work for the City.

7.0 LIVING WAGE EMPLOYER

1. The City of Vancouver is a "Living Wage Employer". As such, the City requires all firms that are contracted by the City to provide services on City-owned and leased properties to pay employees who perform those services on City property a Living Wage as calculated by the Living Wage for Families Campaign.
2. The Living Wage includes the value of any non-mandatory benefits such as paid sick leave, employer-paid Medical Services Plan premiums and extended health benefits. Please visit the Living Wage for Families Campaign website for current Living Wage rates.
3. Proponents should refer to the Form of Agreement for the specific requirements related to the Living Wage, which include:
    1. paying the Living Wage to all employees who perform services pursuant to the Agreement on City property during the term of the Agreement; and,
    2. ensuring that all subcontractors pay the Living Wage to their employees who perform services on City property during the term of the Agreement.
4. Failure to comply with the Living Wage requirement will entitle the City to terminate the Agreement.

8.0 SCOPE OF WORK

1. The Scope of Work is current as of the date of open date of this RFP indicated in the Summary, but may change or be refined in the course of the evaluation of Proposals or otherwise.
2. Unless otherwise stated, if, and wherever, the Scope of Work states a brand name, a make, the name of a manufacturer, a trade name or a vendor catalogue number, it is for the purpose of establishing a grade or quality of materials, goods or equipment only. It is not intended to rule out the use of other equivalent materials, goods or equipment. If, however, products other than those specified are proposed in any Proposal, the Proposal must explicitly include under the heading "Alternative Solutions" the names of such products and their manufacturers, any trade names and any applicable vendor catalogue numbers, and the City may request that the Proponent provide specific evidence of equivalency. Evidence of quality in the form of samples may also be requested.
3. To the extent that the Scope of Work expresses estimates of quantities or volumes of goods or services expected to be required by the City, the City cannot offer any assurances that such quantities or volumes will in fact be required.

9.0 FORM OF AGREEMENT

1. The Form of Agreement sets out the City's proposed commercial terms for the Agreement. The City prefers that the commercial terms for the Agreement not vary from the commercial terms set out in the Form of Agreement. However, if any such terms are unacceptable to a Proponent, then the Proponent may include proposed amendments to the Form of Agreement with its Proposal in the manner indicated in the applicable Questionnaire. If a Proponent elects to include a proposed amendment, then the Proponent should indicate the rationale for the proposed amendment, the applicable change to the

language of the Form of Agreement, and the benefit to the City (such as amount of cost-savings), if any, applicable to the proposed amendment. A Proponent will be deemed to fully accept all the commercial terms for the Agreement as set out in the Form of Agreement, except as may be expressly indicated otherwise in its Proposal.

10.0 INSURANCE

1. A Certificate of Insurance is to be duly completed and signed by the Proponent's insurance agent or broker as evidence of its existing insurance, along with a letter from its insurance broker or agent indicating whether or not (and, if not, then to what extent) it will be able to comply with the insurance requirements set out in the Form of Agreement, should the Proponent be selected as a successful Proponent. (Any successful Proponent will also be required to provide proof of the satisfaction of all insurance requirements prior to or concurrently with the City entering into any Agreement.)

Stage Description

No description available.

Prerequisites

★ Required to Enter Bid

1 ★ **Instructions To Supplier :**

Acceptance of the Legal Terms and Conditions is required prior to proposal submission.

Certification

The Proponent acknowledges that it has reviewed and agrees to the Legal Terms and Conditions of RFP as attached.

Supplier Must Also Upload a File:

No

Prerequisite Content:

LEGAL TERMS AND CONDITIONS

1. The legal obligations of a Proponent that will arise upon the submission of its Proposal are stated in Appendix 1 - Legal Terms and Conditions of RFP. Except where expressly stated in these Legal Terms and Conditions: (i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City.
2. POTENTIAL PROPONENTS MUST REVIEW THESE LEGAL TERMS AND CONDITIONS CAREFULLY BEFORE SUBMITTING A PROPOSAL.

Buyer Attachments

Appendix 1 - Terms and Conditions RFP Process.pdf	Appendix 1 - Terms and Conditions RFP Process.pdf	../Attachments/Appendix 1 - Terms and Conditions RFP Process.pdf
PS20220050 - ENG - RFP - SOW.pdf	PS20220050 - ENG - RFP - SOW.pdf	../Attachments/PS20220050 - ENG - RFP - SOW.pdf
PS20220050-ENG-RFP_Soil Cell - Sample Form of Agreement_Aug 12 22.pdf	PS20220050-ENG-RFP_Soil Cell - Form of Agreement_Aug 12 22.pdf	../Attachments/PS20220050-ENG-RFP_Soil Cell - Form of Agreement_Aug 12 22.pdf
PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf	PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf	../Attachments/PS20220050 - ENG - RFP - Attachment A - GI Design Guidance Manual.pdf
PS20220050-ENG-RFP - AMD1.pdf	PS20220050-ENG-RFP - AMD1.pdf	../Attachments/PS20220050-ENG-RFP - AMD1.pdf
PS20220050-ENG-RFP - AMD2.pdf	PS20220050-ENG-RFP - AMD2.pdf	../Attachments/PS20220050-ENG-RFP - AMD2.pdf

★ Supplier Response Is Required

Supplier Profile Content

Confidential Mode Enabled

Questions

Technical Proposal

Group 1.1

1.1.1	Provide a brief executive summary of your Proposal. File Upload	
1.1.2	Work Plan: Detail the sequential process by which the Proponent proposes to undertake the work. The Proponent's work plan should make reference to the Scope of Work as appropriate. Describe how your Proposal is responsive to the Scope of Work. File Upload	★
1.1.3	Notwithstanding any other provision hereof, the City welcomes Proposals respecting innovative or novel approaches to the City's objectives and requirements and may consider value-creating Proposals that derogate from the Scope ow Work. Provide details on any proposed innovative approaches to meeting the City's requirements. File Upload	★
1.1.4	Proponent Experience: Describe the type of entity (for example, individual, corporation, partnership, sole proprietorship) and if a joint venture, clearly state this and state who the joint venture parties are and identify who is acting as the lead. (i)Describe the company/entity history, business locations, size, and number of employees. (ii)Provide key personnel (and their qualifications) that will be performing the work on this project. (iii)Provide details, where available, of Proponent's experience with: •Environmental Compliance; •Construction Deadlines; •Operational Safety File Upload	★
1.1.5	Reference Projects: Provide information on reference projects to demonstrate the Proponent's experience and capabilities. Information may be provided on up to three (3) projects, and should focus on projects with similar supply agreements as described in the Scope of Work). For each reference project, provide the following information, including additional information as necessary, within the submission: (i)Project name, location, and client; (ii)The scale of the project (e.g. demonstration, commercial); (iii)Unit size and number of units; (iv)Maintenance and warranties provided; (v)Status of facility (e.g. operating, under construction); (vi)Major problems, market adaptations and lessons learned. File Upload	★
1.1.6	Delivery Lead Time & Local Storage: The proponent shall provide the typical lead-time from the order date, as well as any special offers being made to the City as part of this contract. Please provide the source of the upstream material being used in the product including the polymer resin source. Ensure that all special conditions of current market condition are included (i.e. supply chain delays, international transit delays, etc.). The proponent shall indicate whether there is a local warehouse or fulfillment center in the Metro Vancouver area. Please indicate the three closest storage locations, their capacities, and their average delivery time to the Vancouver area. File Upload	★
1.1.7	Product Specifications: The proponent shall provide full specifications concerning the soil cells and any additional product(s) required for the complete solution that will be provided to the City. Please see item 7.0 Soil Cell Specifications and 8.0 Additional Product Specifications in the Scope of Work for details. File Upload	★

1.1.8	Design Integration: The proponent shall include the ability of their product to integrate with commonly used Green Infrastructure materials such as liners (impermeable and permeable), as well as the possibility of integrating into irregularly shaped designs (i.e. not square or rectangular). The proponent shall also provide specifications on the ease of construction of their product. Please see item 10.0 Constructability in the Scope of Work for details. File Upload	★
1.1.9	Training and Installation: The proponent shall provide a sample of the training materials necessary for construction crews to familiarize themselves with before beginning construction. Please see item 11.0 Training and Installation in the Scope of Work for details. File Upload	★
1.1.10	Quality Control: The proponent shall provide details on their quality control process and plan for the successful installation and implementation of the product. File Upload	★
1.1.11	Warranty: Provide the City with the minimum and maximum warranty offered on each delivered product. Please reference to the attached Form of Agreement section 3.7 Warranty for more information associated with warranty The proponent shall also include their integration plan for future product updates. (I.e. Are older product models on hand for future repairs and/or replacements? How will new models integrate with the old models?) File Upload	★

Sustainability

Group 2.1

2.1.1	Majority owned/controlled by Multiple Select (Pick Many) Women Indigenous People Non-Profit/Charity (Soc. Ent.) Co-Op Community Contribution Corporation Ethno-Cultural LGBTQ2+ People with Disabilities Veteran Small Business	★
2.1.2	Environmental Sustainability Questions File Upload Environmental Sustainability Questions - ../Attachments/QuestionAttachments/PS20220050 - ENG-RFP - Environmental Sustainability Questions.doc	★
2.1.3	General SEPP Questions File Upload SEPP General Questions - ../Attachments/QuestionAttachments/PS20220050-ENG-RFP - SEPP -	★

Commercial Proposal - Pricing Schedule

Group 3.1

3.1.1	Complete & submit Commercial Proposal & Pricing Schedule in Excel format File Upload Commercial Proposal - Pricing Schedule - ../Attachments/QuestionAttachments/PS20220050 - ENG - RFP - Soil Cell - Commercial Proposal.xlsx	★

Form of Proposal

Group 4.1

4.1.1	Please complete the attached form. File Upload	★

Proponent's References

Group 5.1: Client Reference

5.1.1 Client Name
Text (Single Line)

5.1.2 Address (City and Country)
Text (Single Line)

5.1.3 Contact Name
Text (Single Line)

5.1.4 Title of Contact
Text (Single Line)

5.1.5 Telephone No.
Text (Single Line)

5.1.6 E-mail Address
Text (Single Line)

5.1.7 Length of Relationship
Text (Single Line)

5.1.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Group 5.2: Client Reference

5.2.1 Client Name
Text (Single Line)

5.2.2 Address (City and Country)
Text (Single Line)

5.2.3 Contact Name
Text (Single Line)

5.2.4 Title of Contact
Text (Single Line)

5.2.5 Telephone No.
Text (Single Line)

5.2.6 E-mail Address
Text (Single Line)

5.2.7 Length of Relationship
Text (Single Line)

5.2.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Group 5.3: Client Reference

5.3.1 Client Name
Text (Single Line)

5.3.2 Address (City and Country)
Text (Single Line)

5.3.3 Contact Name
Text (Single Line)

5.3.4 Title of Contact
Text (Single Line)

5.3.5 Telephone No.
Text (Single Line)

5.3.6 E-mail Address
Text (Single Line)

5.3.7 Length of Relationship
Text (Single Line)

5.3.8 Type of Goods and/or Services provided to this Client
Text (Multi-Line)

Certificate of Existing Insurance

Group 6.1

6.1.1 A Certificate of Existing Insurance is to be duly completed and signed by the Proponent's insurance agent or broker as evidence of its existing insurance, along with a letter from its insurance broker or agent indicating whether or not (and, if not, then to what extent) it will be able to comply with the insurance requirements set out in the Form of Agreement, should the Proponent be selected as a successful Proponent. (Any successful Proponent will also be required to provide proof of the satisfaction of all insurance requirements prior to or concurrently with the City entering into any Agreement.) ★

File Upload

Existing Insurance - ../Attachments/QuestionAttachments/Existing Insurance formatted.docx

Declaration of Supplier Code of Conduct Compliance

Group 7.1

7.1.1 All proposed suppliers are to complete and submit this Declaration of Supplier Code of Conduct Compliance form to certify compliance with the supplier performance standards set out in the Supplier Code of Conduct. ★

File Upload

Declaration of Supplier Code of Conduct Compliance - ../Attachments/QuestionAttachments/Declaration of Supplier Code of Conduct Compliance.docx

Subcontractors

Group 8.1

8.1.1 Do you propose to use any subcontractors?
Yes/No

8.1.2 Complete the attached form and upload.

File Upload

Subcontractors - ../Attachments/QuestionAttachments/Subcontractors.docx

Proposed Amendments to Form of Agreement

Group 9.1

9.1.1 Do you have any proposed amendments to Form of Agreement?
Yes/No

9.1.2 Complete the attached form and upload.

File Upload

Proposed Amendments to Form of Agreement - ../Attachments/QuestionAttachments/Proposed+Amendments+to+Form+of+Agreement.docx

Conflicts; Collusion; Lobbying

Group 10.1

10.1.1 Do you have any exceptions to Declaration as to no Conflict of Interest in RFP Process (Section 9.1 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.2 Provide details of your exceptions.

Text (Multi-Line)

10.1.3 Do you have any exceptions to Declaration as to No Conflict of Interest Respecting Proposed Supply (Section 9.2 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.4 Provide details of your exceptions.

Text (Multi-Line)

10.1.5 Do you have any exceptions to Declaration as to No Collusion (Section 9.3 of Appendix 1 - Legal Terms and Conditions of RFP)

Yes/No

10.1.6 Provide details of your exceptions.

Text (Multi-Line)

10.1.7 Do you have any exceptions to Declarations as to No Lobbying (Section 9.4 of Appendix 1 - Legal Terms and Conditions of RFP)?

Yes/No

10.1.8 Provide details of your exceptions.

Text (Multi-Line)

Proof of WorkSafeBC Registration

Group 11.1

11.1.1 Attached proof of valid WorkSafeBC registration.

File Upload

Product Line Items

Group P1

#	Item Name, Commodity Code, Description	Qty.	UOM	Target Price	Allow Alternates	Requested Delivery
P1.1	TOTAL PRICE Supply and Delivery of Soil Cell	1	EA - Each	-		-

Service Line Items

There are no Items added to this event.

Price Components

There are no Price Components added to this event.

DECLARATION OF SUPPLIER CODE OF CONDUCT COMPLIANCE

Complete this Declaration of Supplier Code of Conduct Compliance in the form set out below.

All proposed suppliers are to complete and submit this form to certify compliance with the supplier performance standards set out in the Supplier Code of Conduct.

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct (SCC) <https://policy.vancouver.ca/AF01401P1.pdf>. The SCC defines minimum labour and environmental standards for City suppliers and their subcontractors.

Suppliers are expected to comply with the aforementioned standards upon submitting a tender, proposal, application, expression of interest or quotation to the City, or have a plan in place to comply within a specific period of time. The City reserves the right to determine an appropriate timeframe in which suppliers must come into compliance with these standards. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration and include this declaration with its submission:

As an authorized signatory of _____*(vendor name),* I declare that I have reviewed the SCC and to the best of my knowledge, _____ *(vendor name)* and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted in the table below *(include all violations/convictions that have occurred in the past three years as well as plans for corrective action).*

Section of SCC / title of law	Date of violation /conviction	Description of violation / conviction	Regulatory / adjudication body and document file number	Corrective action plan

I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of _____ *(vendor name).*

Signature: _____

Name and Title: _____

CITY OF VANCOUVER

CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** **City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4**
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.
2. **NAMED INSURED** ***(must be the same name as the Proponent/bidder and is either an individual or a legally incorporated company)***

BUSINESS TRADE NAME or DOING BUSINESS AS

BUSINESS ADDRESS

DESCRIPTION OF OPERATION

3. **PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)**

INSURER_____ **Insured Values (Replacement Cost) -**
TYPE OF COVERAGE_____ Building and Tenants' Improvements $ _____
POLICY NUMBER_____ Contents and Equipment $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**

Including the following extensions: INSURER _____
√ Personal Injury POLICY NUMBER _____
√ Property Damage including Loss of Use POLICY PERIOD From _____ to _____
√ Products and Completed Operations **Limits of Liability (Bodily Injury and Property Damage Inclusive) -**
√ Cross Liability or Severability of Interest Per Occurrence $ _____
√ Employees as Additional Insureds Aggregate $ _____
√ Blanket Contractual Liability All Risk Tenants' Legal Liability $ _____
√ Non-Owned Auto Liability Deductible Per Occurrence $ _____

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles

INSURER_____ **Limits of Liability -**
POLICY NUMBER_____ Combined Single Limit $ _____
POLICY PERIOD From_____ to _____ ***If vehicles are insured by ICBC, complete and provide Form APV-47.***

6. ☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE** **Limits of Liability (Bodily Injury and Property Damage Inclusive)**

INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Self-Insured Retention $ _____

7. **PROFESSIONAL LIABILITY INSURANCE** **Limits of Liability**

INSURER_____ Per Occurrence/Claim $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Occurrence/Claim $ _____

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date: _____

8. **OTHER INSURANCE**

TYPE OF INSURANCE_____ **Limits of Liability**
INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____
TYPE OF INSURANCE_____ **Limits of Liability**
INSURER_____ Per Occurrence $ _____
POLICY NUMBER_____ Aggregate $ _____
POLICY PERIOD From_____ to _____ Deductible Per Loss $ _____

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

_____ Dated _____

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

PROPOSED AMENDMENTS TO FORM OF AGREEMENT

Outline your Proposed Amendments to Form of Agreement in the form set out below by detailing any proposed amendments to the Form of Agreement in the Buyer Attachments section. It is at the City's sole discretion whether or not these proposed amendments will be considered for the Form of Agreement.

Section / General Condition	Proposed Amendment	Rationale and Benefit

REQUEST FOR PROPOSALS NO. PS20220050-ENG-RFP
SUPPLY AND DELIVERY OF SOIL CELLS
COMMERCIAL PROPOSAL - PRICING SCHEDULE

INSTRUCTIONS:

1) Pricing should be held firm for a period of one (1) year.
2) Prices are to be quoted CIP, destination (Incoterms, 2010). For the avoidance of doubt, freight, insurance, unloading at the destination designated by the City, import duties, brokerage, royalties, handling, operational cost, overhead, profit and all other similar costs are to be included in quoted prices.
3) Prices are to inclusive of provincial sales tax
4) Prices are to be quoted in Canadian Currency.
5) Proponents to complete Table 3 to propose a pricing adjustment mechanism for the subsequent years beyond 1-year pricing fixed term.
6) Quantities stated herein is the City's best estimation of its requirements. actual quantities may vary.

TABLE 1 - PRODUCT PRICING INFORMATION

PRODUCT DESCRIPTION	PRODUCT DIMENSIONS/SPECIFICATIONS	UNIT PRICE (A)	QUANTITY OF PRODUCT REQUIRED FOR ONE TREE (30m^3) (B)	PRODUCT PRICE PER TREE (30m^3) (C) (C = A*B)	TOTAL PRICE FOR 40 TREES (C*40)
Soil Cell		$		$	$
			TOTAL:	$	$

TABLE 2 - VOLUME DISCOUNT

QUANTITY THRESHOLD	DISCOUNT %

TABLE 3 - PROPOSED PRICING ADJUSTMENT MECHANISM		
Cost Elements	**Percentage in The Cost Structure**	**Supportive Associated Indices to Calculate the Adjustment**

ENVIRONMENTAL SUSTAINABILITY

ENVIRONMENTAL OPERATIONS

City of Vancouver is committed to being the Greenest City and values the environmental impact and sustainability of proponents in addition to the goods or services offered with regards to Healthy Ecosystems (minimizing pollution/toxicity, conserving natural resources, and regenerating ecological; local food; clean water / water consumption), Zero Waste (reducing and/or diverting), Zero Carbon (reducing/eliminating greenhouse gases)

1. For the following, please indicate those you track and/or report

	Track	Report
GHG Emissions	☐	☐
Energy usage	☐	☐
Water usage	☐	☐
Any hazardous/toxic air or water emissions	☐	☐
Generation/recycling/reduction of solid waste	☐	☐
Generation/recycling/reduction of hazardous	☐	☐
Other	☐	☐

   a. If reporting, please indicate to whom or where
      - ☐ Government(s)/Agencies
      - ☐ Industry Association(s) ie. "industry-wide environmental product declaration"
      - ☐ CDP
      - ☐ Global certification system ie. World Business Council for Sustainable Development
      - ☐ Other(s) ie. Concrete Sustainability Council

b. Do you request/require your supply chain to track and report any of the above? Y/N, explain.

2. *Has your company achieved (or is it committed to) any of the following activities? Check all that apply and provide details/targets/goals*
   - ☐ Increase renewable energy sources and/or reduce the company's overall energy usage
   - ☐ Reduced carbon use, GHG emissions or use of ozone depleting substances
   - ☐ Implemented initiatives to reduce waste at the source or divert the waste from landfills/incineration
   - ☐ Recycled water or other water recovery systems to reduce the use of potable water
   - ☐ Responsibly dispose of all hazardous waste generated from production.
   - ☐ 2030 Sustainable Development Goals of the United Nations
   - ☐ Other: include an explanation of any on-going efforts or plans that the vendors has, or has taken to address climate change and their environmental impact.

Please provide details:

Do you engage with your supply chain on any above noted issues? Y/N, explain

RECYCLED/POST-CONSUMER MATERIALS AND 'END OF LIFE' REUSE/REFURBISH/RECYCLING:

Sustainability: Materiality

Please provide details regarding the inclusion of recycled and/or post-consumer content within materials or proposed alternative materials.

Sustainability: Circularity

Please provide details regarding the durability and life-span of material, including end of life decommissioning with regards to options for reuse/refurbishing and/or recycling.

FORM OF PROPOSAL

PS20220050 – ENG – RFP - SUPPLY AND DELIVERY OF SOIL CELL (the "RFP")

Proponent Full Legal Name: _____
"**Proponent**"

Address: _____

_____

Jurisdiction of Legal Organization: _____

Key Contact Person: _____

Telephone: _____

E-mail: _____

The Proponent, having carefully examined and read the RFP, including all amendments and addenda thereto, if any, and all other related information published on the City's sourcing system (Jaggaer), hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to Appendix 1 - Legal Terms & Conditions.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

_____ _____

Signature of Authorized Signatory for the Proponent Date

_____

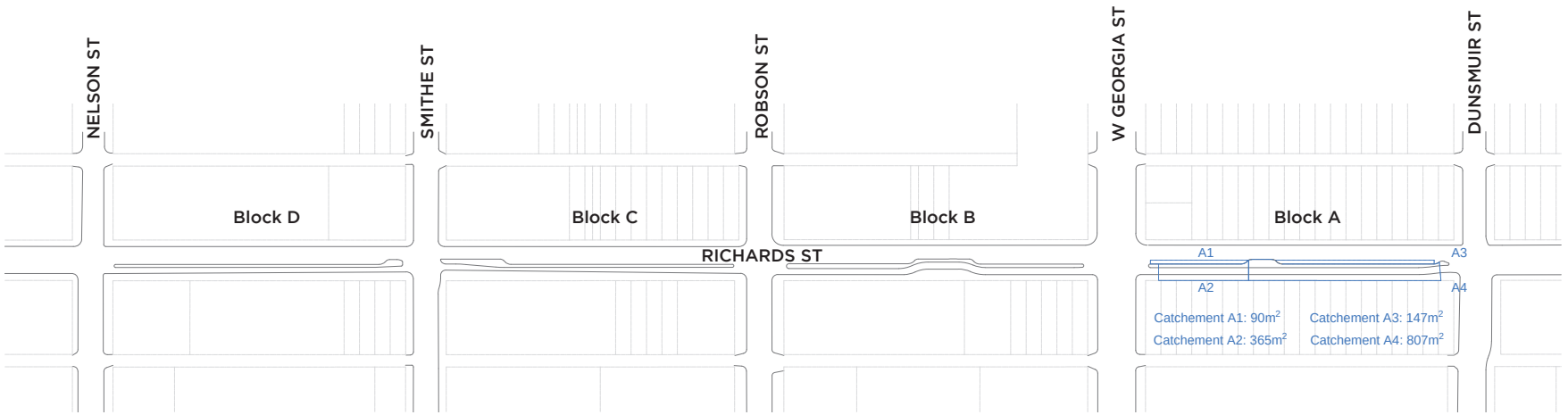
Name and Title

_____ _____

Signature of Authorized Signatory for the Proponent Date

_____

Name and Title



NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.

Drawing Index

Drawing Number	Drawing Title	Rev	Date
2019-14-D-GI-00A	Cover Sheet & Index		05/13/2020
2019-14-D-GI-01A	Site Plan Block A	2	05/13/2020
2019-14-D-GI-02A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-03A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-04A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-05A	Plan & Section Block A	2	05/13/2020
2019-14-D-GI-06A	Details Block A	2	05/13/2020
2019-14-D-GI-07A	Details Block A	2	05/13/2020

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

ATTENTION

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CITY OF VANCOUVER

	REVISIONS	BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

ENGINEER

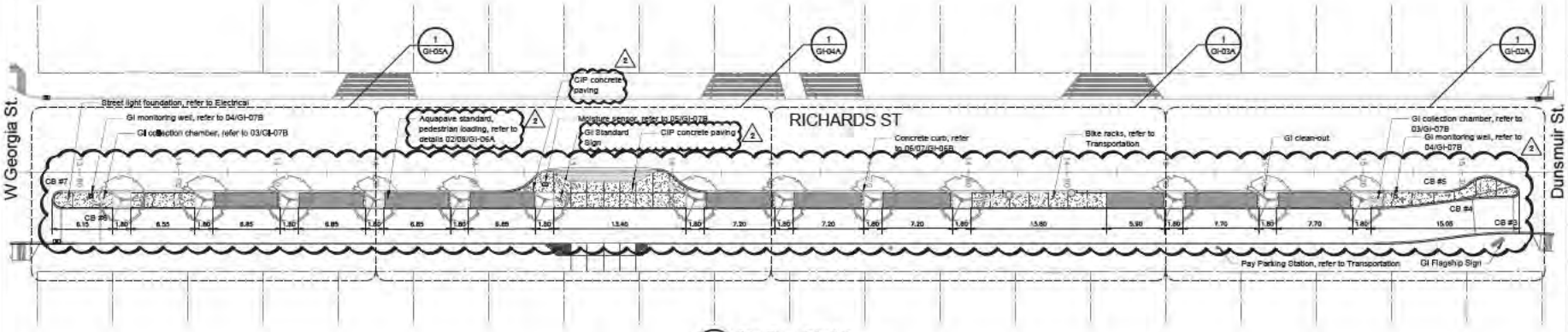
ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Cover Page & Index Block A: Dunsmuir St. to W Georgia St.

SCALE:	N/A
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-00A
REV. N0.	2
SHEET:	1 OF 8

2 GI-01A Location Map
Scale: 1:2000



1 GI-01A Site Plan - Block A
Scale: 1:200

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NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199880
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

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Legend (Block A)

Structural Soil & Growing Medium

Proposed Tree	13	
Structural Soil	30	m^3
Tree Pit 0.90m Deep Growing Medium		
Silva cells; 130 frames, 130 decks Growing Medium	56	m^2

Paving

80mm AquaPave Standard Colour: Charcoal, Running Bond pattern accounted for 5% paver wastage	60	m^2	52.5 m^2
Colour: Natural, Running Bond pattern accounted for 5% paver wastage	60	m^2	52.5 m^2
C.I.P. Concrete Paving, Light Broom Finish with 25mm Deep Sawcut Joints			
Bedding Material: ¾" clear crush	5	m^3	
CoV #15 clear crush	53	m^3	
Joint stabilizer	3	m^3	

PVC (SDR 28) Pipes

150mm Ø PVC (solid)	20	m approx.
150mm Ø PVC (perforated)	55	m approx.
50mm Ø PVC (solid)	9	m
Flexible rubber coupling	21	
Bends (⅛)	1	
Bends (¼)	9	
Bends (⅛)	17	
Inserta tee	5	
Straight Coupling	20	

Blue Brute C900 Pipes

150mm Ø pipe (solid)	4.2	m approx.
High deflection coupler	2	
Bands	2	

Geotextiles

Nilex 4551 (non-woven)	524	m^2
Nilex 2440HF (woven)	108	m^2
Nilex 30mil LLDPE	179	m^2
Stratagrid SG150	340	m^2
NaDrain GRS	8	m^2

GI Miscellaneous

Inspection chamber	2	
Clean-out	4	
Monitoring well	2	
Moisture sensor	1	
Flagship Sign	1	
Standard Sign	1	
Zip Ties	122	

REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

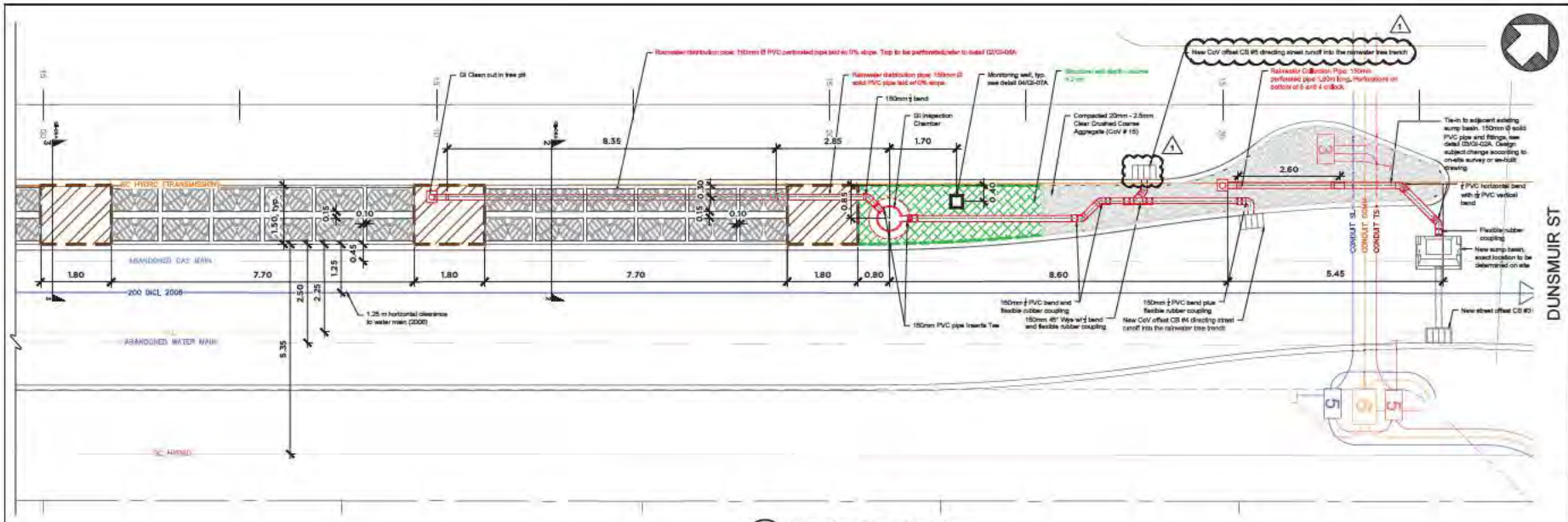
LANDSCAPE ARCHITECT | ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

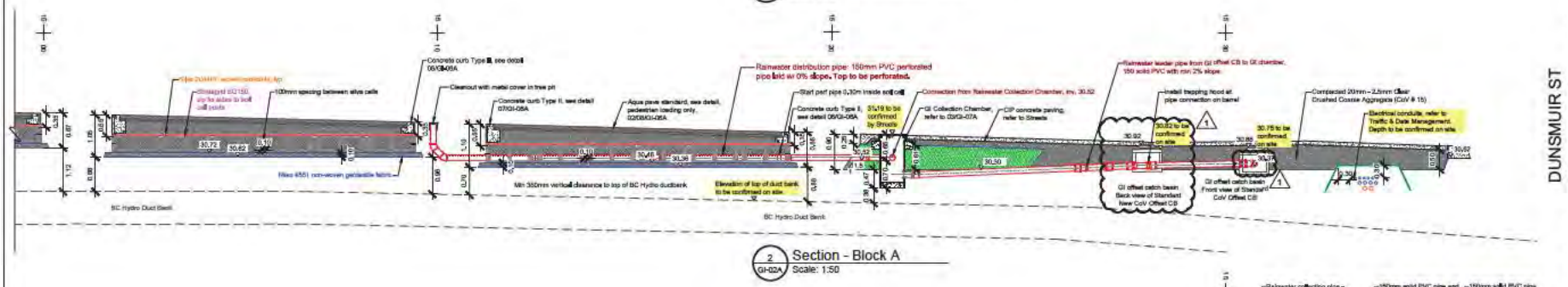
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Site Plan Block A: Dunsmuir St. to W Georgia St.

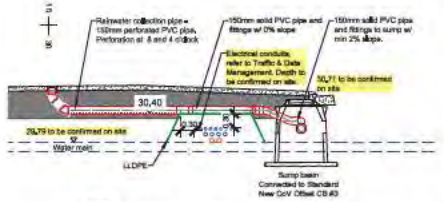
SCALE:	As noted
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-01A
REV. NO.	2
SHEET:	2 OF 8



1 Subsurface Plan - Block A
GI-02A Scale: 1:50



2 Section - Block A
GI-02A Scale: 1:50



3 Section - North Subdrain
GI-02A Scale: 1:50

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3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.
4. Top of electrical conduit elevation is to be surveyed by Street Ops before collection pipe can be laid. Maintain minimum 0.3m vertical clearance from electrical conduits.
5. Rainwater collection pipe connection to CB #3 subject to change with on-site survey, or As-Built drawings from Sewer Ops .

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
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DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

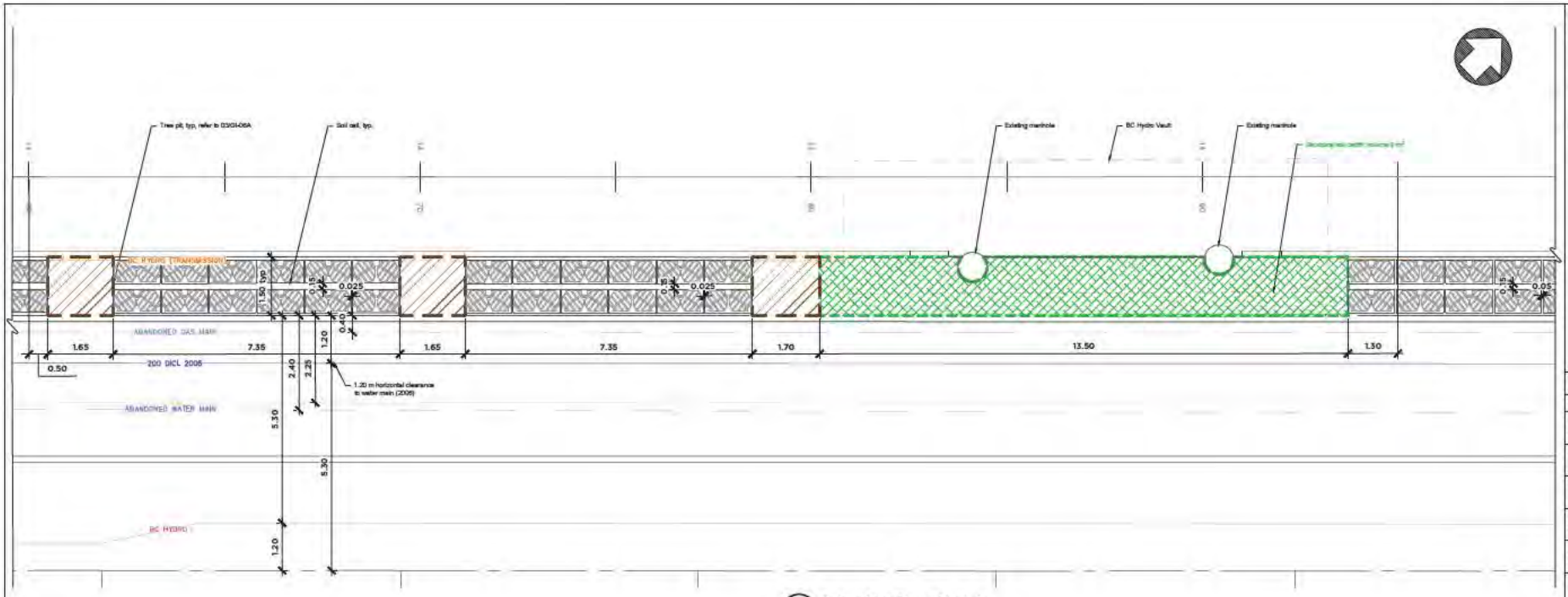
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

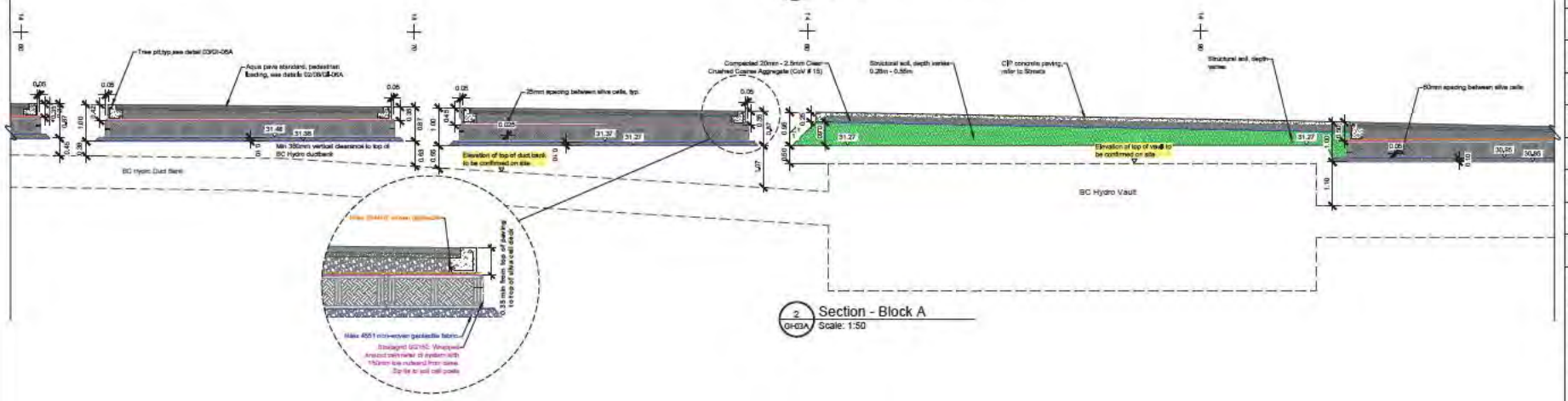
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-02A
REV. NO.	2
SHEET:	3 OF 8



1 GI-03A Subsurface Plan - Block A
Scale: 1:50



2 GI-03A Section - Block A
Scale: 1:50

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GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199405
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
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GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
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GI Externally-sourced Materials	CER1144539

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CITY OF VANCOUVER

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DRAFTER	Alex Scott	604.673.6272

FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - Block A_REV 02.dwg

LANDSCAPE ARCHITECT

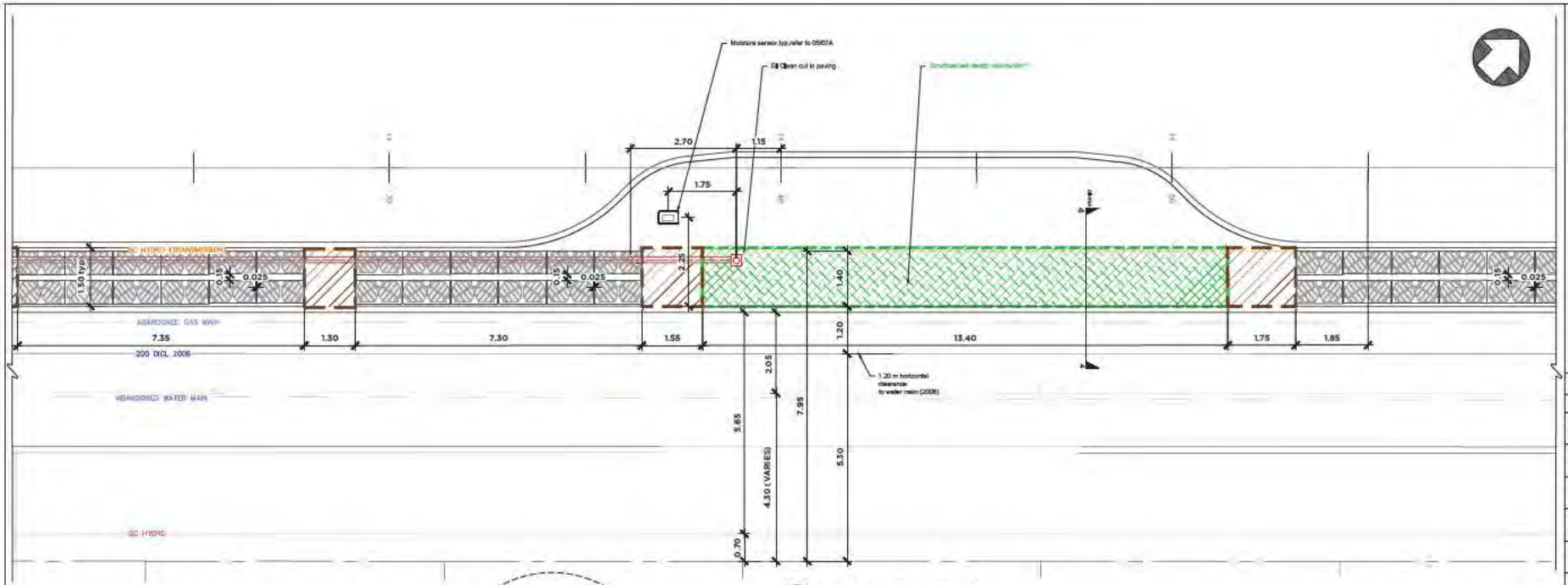
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

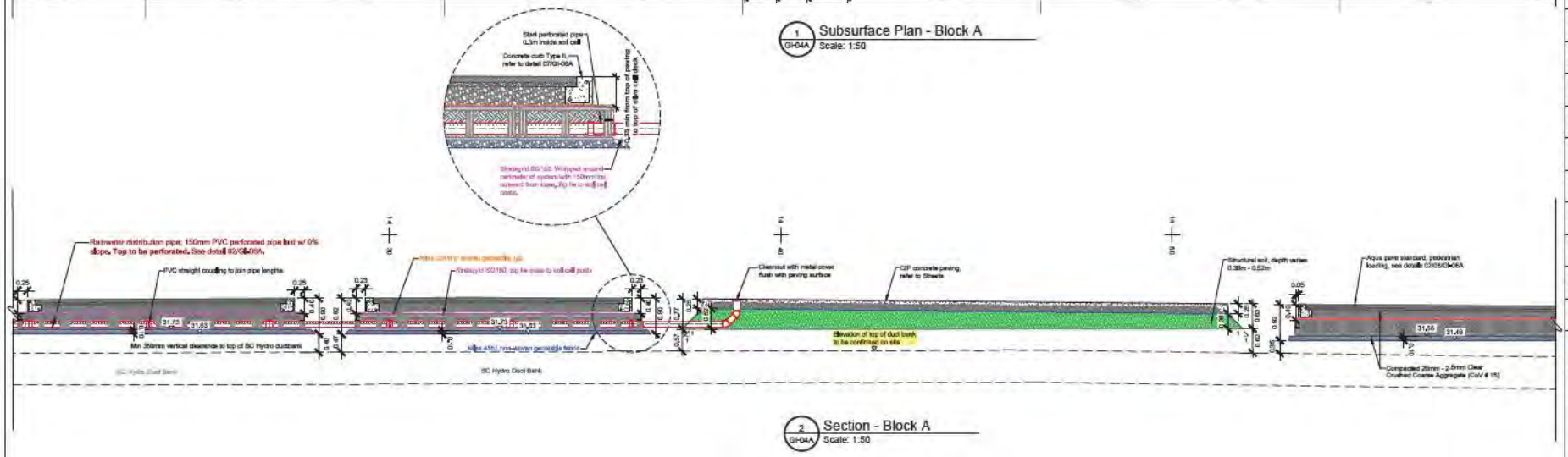
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-03A
REV. NO.	2
SHEET:	4 OF 8



1 GI-04A Subsurface Plan - Block A
Scale: 1:50



2 GI-04A Section - Block A
Scale: 1:50

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GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
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GI Paver Install	CEV1198181
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REVISIONS		BY
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LANDSCAPE ARCHITECT

ENGINEER

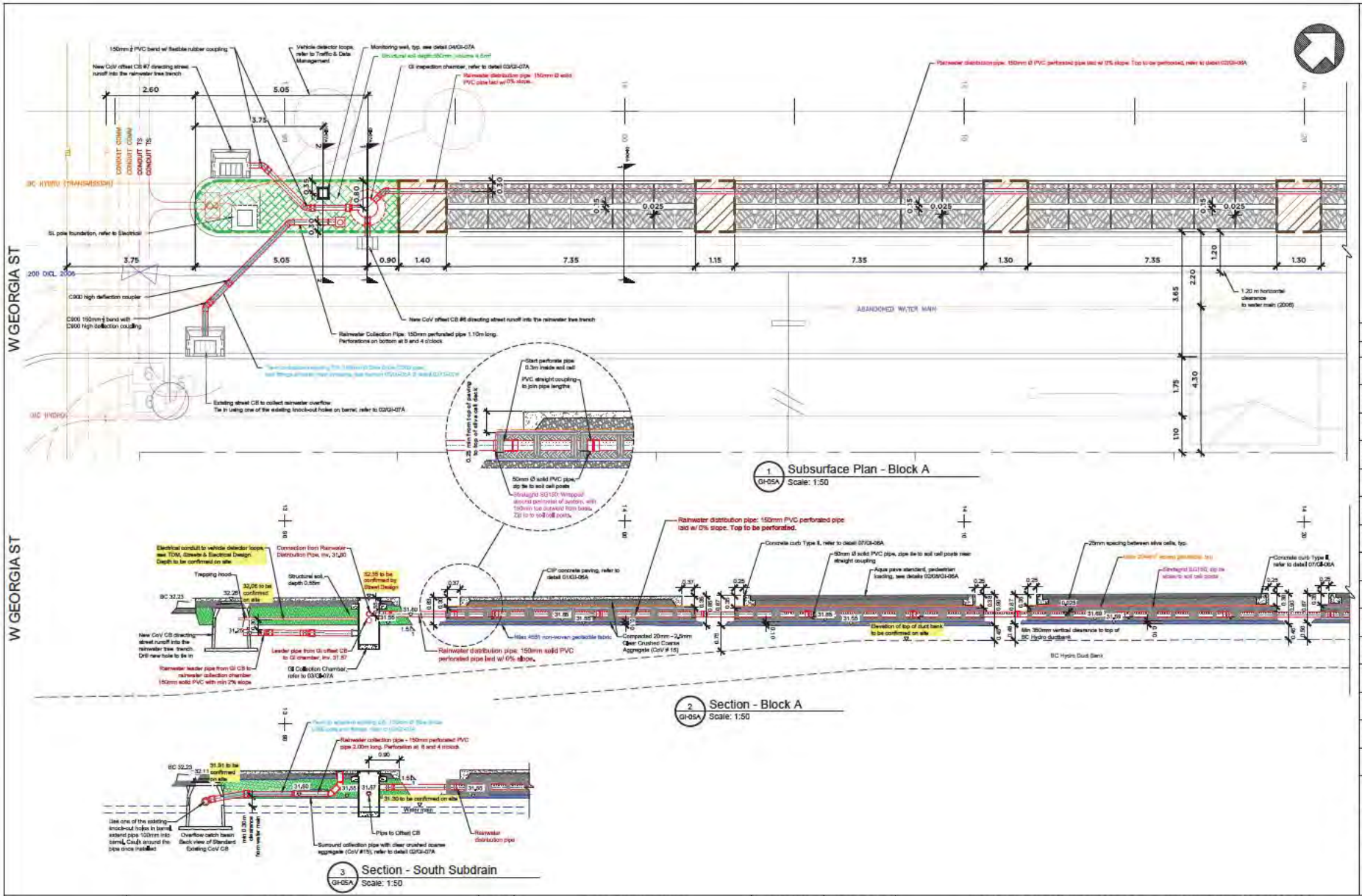
ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-04A
REV. NO.	2
SHEET:	5 OF 8

FILE: N:\GREEN INFRASTRUCTURE\13-4100-40 - Green Infrastructure Case Files\ENG - GI - Richards St Bike Lane - Dunsmuir to Pacific\11 - Design\ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg DATE:May 13, 2020 - 5:09pm USER:HEP38



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GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
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REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272
FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

ENGINEER

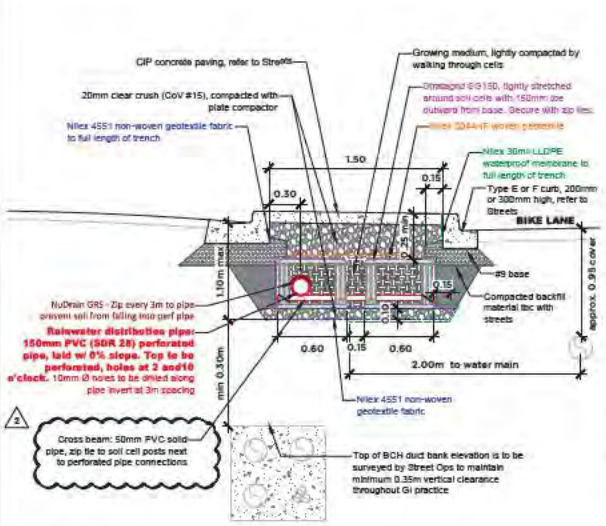
ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

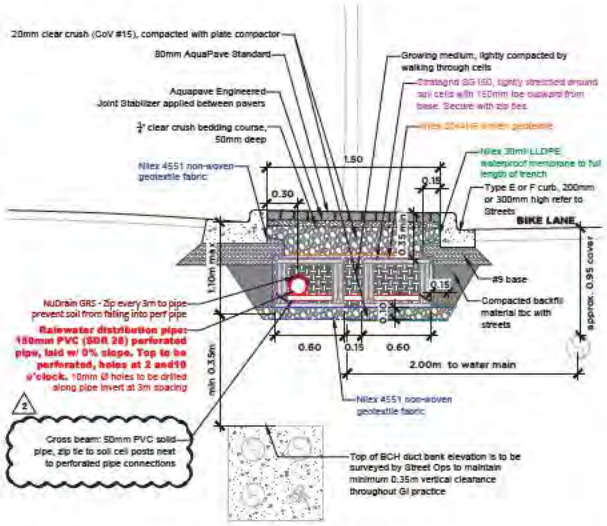
Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Plan & Section Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:50
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-05A
REV. NO.	2
SHEET:	6 OF 8

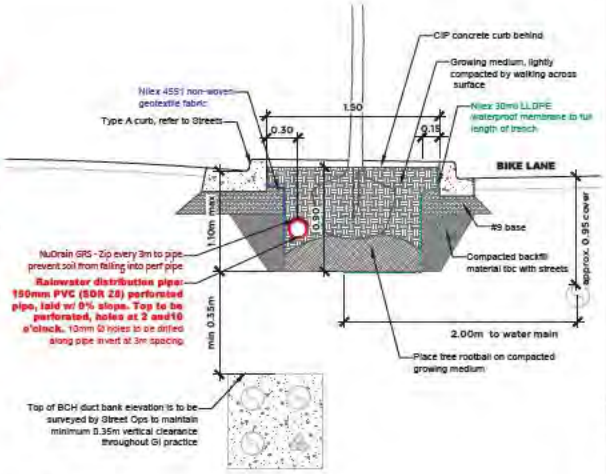
FILE: I:\GREEN INFRASTRUCTURE\13-6100-40 - Green Infrastructure Case Files\ENG - GI - Richards St Bike Lane - Dunsmuir to Pacific\01 - Design\ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg DATE:May 13, 2020 - 3:11pm USER:NERSE



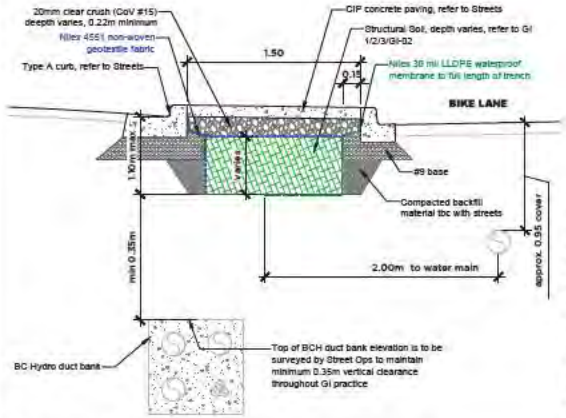
1 GI-06A Typical GI Section - Concrete Surface on Silva Cell
Scale: 1:20



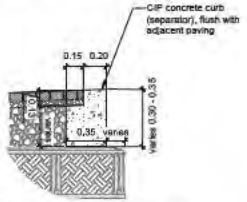
2 GI-06A Typical GI Section - Paver Surface on Silva Cell
Scale: 1:20



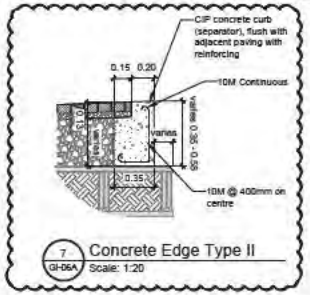
3 GI-06A Typical GI Section - Tree Pit
Scale: 1:20



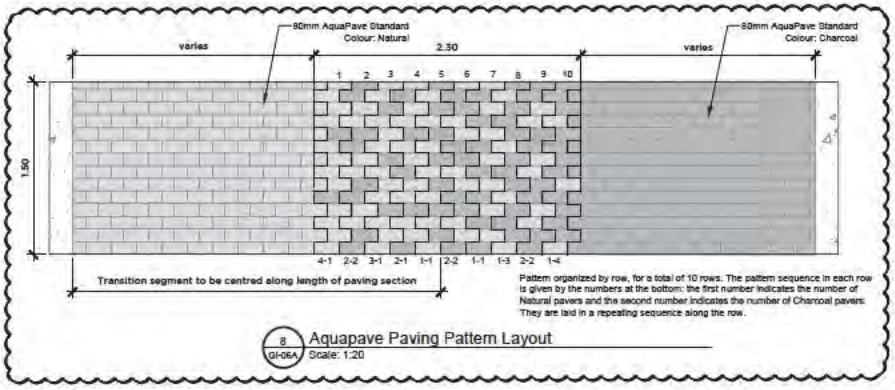
4 GI-06A Typical GI Section - Concrete Surface on Structural Soil
Scale: 1:20



6 GI-06A Concrete Edge Type I
Scale: 1:20



7 GI-06A Concrete Edge Type II
Scale: 1:20



8 GI-06A Aquapave Paving Pattern Layout
Scale: 1:20

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
2. Top of BCH duct bank elevation is to be surveyed by Street Ops before excavation. Maintain minimum 0.35m vertical clearance from BCH duct bank throughout GI practice.
3. Top of water main elevation is to be surveyed by Street Ops before excavation. Maintain 0.3m clearance from water main throughout GI practice.

NETWORK NUMBERS

ITEM	NETWORK
GI Surface Saw Cut (50% Transportation, 50% GI)	CEV1199890
GI Excavation (25% Transportation, 75% GI)	CEV1198177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1198179
GI Tree Pit Install	CEV1198180
GI Paver Install	CEV1198181
GI Traffic Control (50% Transportation, 50% GI)	CEV1198182
GI Site Safety (50% Transportation, 50% GI)	CEV1198183
Streets-sourced GI Materials	CEV1198184
GI Externally-sourced Materials	CER1144539

ATTENTION

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ELEVATIONS & COORDINATES SHOWN ON THIS DRAWING ARE IN METRES BASED ON G.V.R.D. NAD83 DATUM (ISSUED MARCH 31, 2005)

REVISIONS		BY
3		
2	Revised paving pattern, concrete edge depth; added pipe cross beams; addressed utility offsets	AS / CX
1	GI CB changed to offset CB	AS
0		

CONTACT INFORMATION		
ENGINEER	Robb Lukes	604.296.2979
LANDSCAPE ARCHITECT	Cherie Xiao	604.296.2975
DRAFTER	Alex Scott	604.673.6272

FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg

LANDSCAPE ARCHITECT

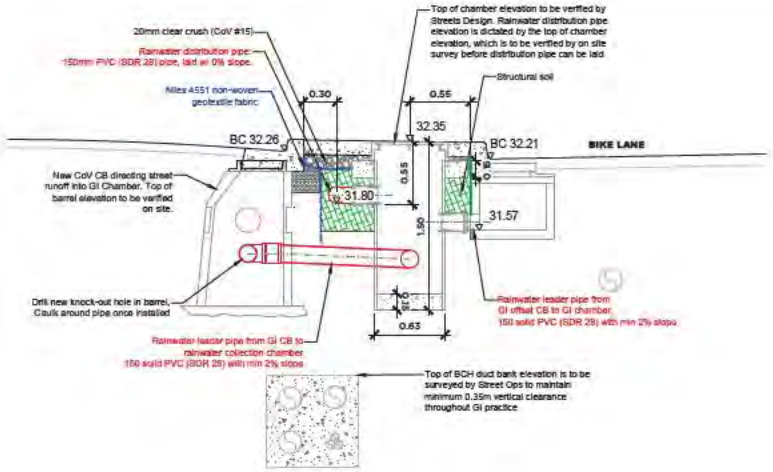
ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

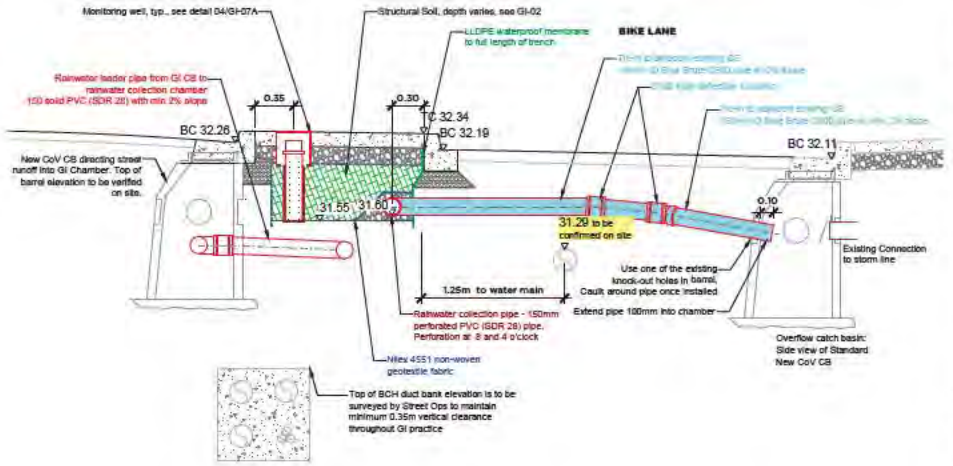
DESIGNED BY:	CX / RL
DRAFTED BY:	AS
CHECKED BY:	CX / RL
DATE CHECKED:	5/13/2020

Richards St. AAA Bikelane - Green Infrastructure
Rainwater Tree Trench
Details Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:20
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-06A
REV. NO.	2
SHEET:	7 OF 8



1 GI-07A New CB and Offset CB Connection to Inspection Chamber STA 13+92.5
Scale: 1:20



2 GI-07A Subdrain Connection to CB STA 13+91
Scale: 1:20

NOTES:

1. Rainwater distribution pipe elevation is dictated by the top of inspection chamber elevation, which is to be verified by Streets Design and on site survey before distribution pipe can be laid.
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NETWORK NUMBERS

ITEM	NETWORK
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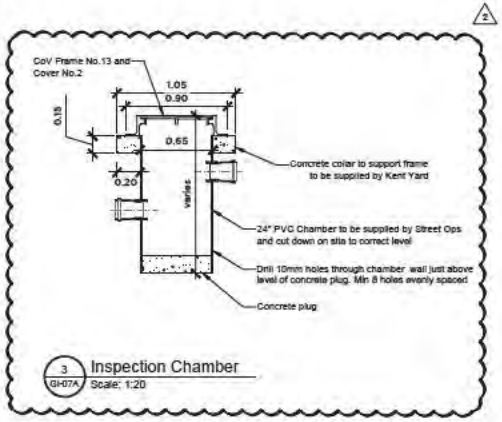
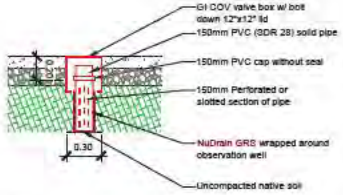
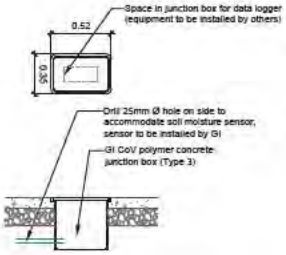
GI Excavation (25% Transportation, 75% GI)	CEV1199177
GI Install - Catchbasins	CEV1199406
GI Install - Soil Cell/Geogrid/ Geotextile	CEV1199407
GI Install - Growing Medium Placement	CEV1199408
GI Install - Pipes & Inspection Chamber	CEV1199409
GI Install - Junction Box & Monitoring Well & Moisture Sensor	CEV1199410
GI Sub Base Install	CEV1199179
GI Tree Pit Install	CEV1199180
GI Paver Install	CEV1199181
GI Traffic Control (50% Transportation, 50% GI)	CEV1199182
GI Site Safety (50% Transportation, 50% GI)	CEV1199183
Streets-sourced GI Materials	CEV1199184
GI Externally-sourced Materials	CER1144539



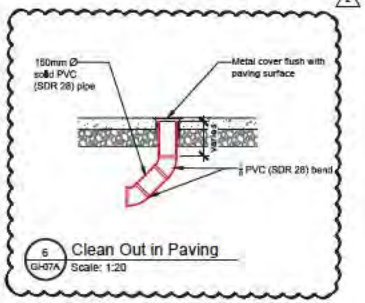
3 GI-07A Inspection Chamber
Scale: 1:20



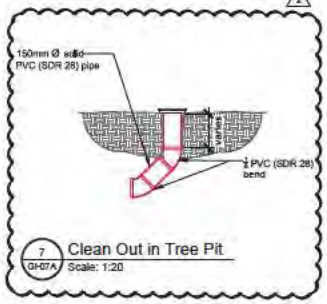
4 GI-07A Monitoring Well
Scale: 1:20



5 GI-07A Moisture Sensor
Scale: 1:20



6 GI-07A Clean Out in Paving
Scale: 1:20



7 GI-07A Clean Out in Tree Pit
Scale: 1:20

ATTENTION

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FILE NAME: ENG - GI - RSU - Base Layout - Phase 1 and 2 - BlockA_REV 02.dwg		

LANDSCAPE ARCHITECT

ENGINEER

ENGINEERING SERVICES – CITY OF VANCOUVER

DESIGNED BY:	CX / RL
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CHECKED BY:	CX / RL
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Richards St. AAA Bikelane - Green Infrastructure
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Details Block A: Dunsmuir St. to W Georgia St.

SCALE:	1:20
DATE:	5/13/2020
DWG. NO.	2019-14-D-GI-07A
REV. NO.	2
SHEET:	8 OF 8

SUBCONTRACTORS

Provide details on Subcontractors in the form set out below by listing all of the subcontractors that the Proponent proposes to use in carrying out its work under an Agreement.

If selected to enter into an Agreement with the City, the Proponent may be limited to using subcontractors listed in its Proposal. If the City objects to a subcontractor listed in a Proposal, the City may permit a Proponent to propose a substitute Subcontractor acceptable to the City.

Subcontracted Scope		
Subcontractor		
Contact (name, title, email, telephone no.)		
Approximate Percent of the Work to be Subcontracted		
Social Value Business - shall mean a business that has a recognized environmental or social certification and/or is majority owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).	In the space below, detail the Proponent's proposed use of Social Value Businesses as sub-contractors/consultants (if any) and provide brief company profiles of those Social Value Businesses and descriptions of how they qualify as Social Value Businesses.	
The Subcontractor's Relevant Experience (identify at least three similar projects within the last five years, including the client)	1. Project Name:	
	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	
	2. Project Name:	

	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	
	3. Project Name:	
	Client:	
	Nature of Work:	
	Value:	
	Client Contact:	

Certificate of Registration

This is to certify that the Quality Management System of

UPM

13245 Los Angeles St.
Baldwin Park, CA 91706

has been assessed for conformance with the provisions set forth by

ISO 9001:2015

Scope of Registration

Manufacturer of custom injection molding.

Certificate No. 1715
Issue Date: 08/20/2022
Expiration Date: 08/19/2025
Certified since August 20, 2007

The conditions for maintaining this certificate of registration are set forth in ISA's Registration Policies 5.1. This registration is granted subject to the organization maintaining compliance to the noted standard. The validity of this certificate is dependent upon ongoing surveillance audits.

ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

President

International Standards Authority, Inc.
www.isaregistrar.com
525 Queensland Cir.
Corona, CA 92879. USA
Tel: 951-736-0035