

Part 1 General

1.1 RANGE OF WORDS

Non-exhaustive list:

- .1 Supply and installation of interior green wall system specified in this section and plans, including all materials, components accessories; devices required for irrigation and automatic fertilization of the green wall; their connections, testing and commissioning fully functional and without defect;
- .2 Supply and planting of plants prescribed, including the substrate with low water consumption specifically developed for green walls and all fertilizer products required to ensure the viability and performance of the wall;
- .3 Weekly maintenance of green wall during the warranty period in order to maintain the facilities in good operating condition and to maintain plant health and growth.

1.2 RELATED SECTIONS

Non-exhaustive list:

- .1 Section 05 50 00E – Metal and aluminum structures
- .2 Section 09 21 16E – Gypsum panels
- .3 Section 09 22 16E – Metallic wall framing system
- .4 Section 09 30 13E – Ceramic tiles
- .5 Division 22 – Plumbing
- .6 Division 23 – Heating, ventilation and air conditioning (HVAC)
- .7 Division 26 – Electricity

1.3 REFERENCE STANDARDS

The year of change for each standard is noted as an indication only.

Comply with applicable standards (latest modification).

In the submission of shop drawings and other documents, specify the referenced standards and the year of revision thereof; document that the manufacturer considered.

- .1 Reference
 - .1 Agriculture et Agri-food Canada (AAFC)
 - .1 Plant hardiness zones of Canada – 2000
 - .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC, 1.0-2004 version, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction & Major Renovations (Reference kit, including addenda 2007).
 - .3 Canadian Nursery Landscape Association (CNLA) et Association canadienne des pépiniéristes et des paysagistes – ACPP
 - .1 Canadian Standards for Nursery Stock-2006.
 - .4 Health Canada/ Workplace Hazardous Materials Information System (WHMIS)
 - .1 Data sheets (MSDS).
- .2 Definitions

- .1 Rooted Cutting: A vegetative portion removed from a parent plant that has been induced to form roots and eventually new leaves and shoots.
- .3 Caliper: The above ground diameter of a distinct part of a nursery stock stem, measured in accordance with these standards.
- .4 Grade, Nursery Stock Grade: Any and all designations associated with a plant group signifying sizes, qualities and historical details of a nursery stock item.
- .5 Plug: A cylinder of medium in which a plant is grown.
- .6 Root Pruning: The systematic pruning of roots of nursery stock growing in the field, in order to stimulate branching of roots and the production of fibrous roots.
- .7 Certified: Designated free of injurious pests or diseases.
- .8 Crown: Part of a plant located directly above the branches begins.
- .9 Collar: The region of the plant where root and shoot meet, generally at the soil line.
- .10 Container: The pot in which a nursery product is grown or sold. Made of peat moss or plastic, wood, paper, cloth etc. Container nursery products shall be used only for transit plants, unlike decorative pots.
- .11 Height: Unless otherwise specified, the vertical distance between the ground line and the top of the stem of nursery stock, measured in its natural position.
- .12 Liners: Young, immature plants intended for growing on to mature sizes in nurseries, either by lining-out in the field or in containers. Typically 1 or 2 years old and often sold bare-root or in small containers.
- .13 Root Ball: The intact ball of earth containing the roots of nursery stock.
- .14 Mycorrhizas: Symbiotic association of a fungus with the roots of a plant. This symbiotic association promotes the establishment of plants in soil recently imported and managed.
- .15 Bare-root plant: Plant whose root system is not attached to a clod of earth; cultivated in nursery, dormancy period, not setting tontine or grown in containers.
- .16 Balled plant: Plant roots and harvested with soil ball intact and placed directly into a container instead of jute.
- .17 Plant balled made: Plant bare root harvested in a dormant state, to which is added a moist substrate to form a mound that used to establish roots.
- .18 Exotic and tropical plant: Plant is not native to a region.
Any plant growing in a place outside its natural range can be described as exotic in this place. This term refers to a plant so in association with a specific place: a Hibiscus rosa-sinensis is exotic in Europe but not in the tropical regions of Southeast Asia.
- .19 Habit: The manner of natural or nursery formed growth, consistent with specific species; e.g. whether tall, dwarf, spreading, trailing, columnar, open, or tree, shrub or herb.
- .20 Nursery stock: Plants, both woody and herbaceous, including roots, crowns, bulbs, corms and tubers, produced for transplanting. "Nursery Stock" are plants which have been propagated, lined out and grown to promote growth and root development to enable full recovery after transplanting.

- .21 Roots: All normal quality nursery stock must have an adequate fibrous root system that has been developed by proper cultivating practices, particularly transplantings or root pruning.
- .22 Hardiness: The designation of nursery stock shall conform to the hardiness zones of Canada as published by Agriculture Canada, titled, "Map of Plant Hardiness Zones in Canada".
- .23 Collected: Material dug from native stands, established woodlots or other non-cultivated areas. Collected plants must be designated as such.
- .24 Medium: Material plants may be grown in.
- .25 Plants: Nursery Product, free of disease, insects, defects or bruises, having a structure and healthy root system fascicled, robust and peak health.
- .26 Native plants (see also collected): 40 mm in maximum diameter, with well-developed crown and branches characteristic of the species. The height of the shaft must not exceed 40% of the total height of the plant.
 - .1 During the gathering, ensure that no more than 10% of a culture (or plant) bears seeds must be harvested within a large population and health, among several plants of the same species.

1.4 SUBMITTAL PROCEDURES FOR APPROVAL / INFORMATION

- .1 Submit for approval, documents and samples in accordance with section 01 33 00E, at least four (4) weeks prior to commencing work.
- .2 Shop drawings:
 - .1 Submit shop drawings of the green wall system, appropriate for the project.
 - .1 Identify all equipment, piping and their locations;
 - .2 Specify the type of recommended transplanting device and their anchorages;
 - .3 Identify quantities and dimensions.
 - .2 Submit a scheme offering distribution and location of plants on green wall.
- .3 Data sheets
 - .1 Submit product data sheets for specified indoor green wall system (structure, transplanting device, network drippers, pipes and equipment for irrigation and fertilization) as well as instructions and manufacturers documentation for installation and maintenance.
 - .2 Submit product data relating to plants, fertilizers, mycorrhizae, equipment and accessories required as well as documentation and instructions for planting and maintenance.
 - .3 The sheets must indicate product features, performance criteria, dimensions, finish and limitations.
- .4 List of plants :
 - .1 Submit list of plants (see also section 1.6.2);
 - .1 Attach color images of each specified plant in the list.
 - .2 Identify quantities and dimensions.
 - .2 Ministerial representative reserves the right to change the types of plants and/or the quantities required for each plant before the specialized contractor in this section begins work.
- .5 Planting Calendar

- .1 Depending on the type of planting modules used, planting should be done either at the site or in the workshop before delivery of modules on site. Follow the manufacturer's recommendations in this regard.
- .2 The planting schedule must include the following information.
 - .1 The type and number of plants to be planted in yard.
 - .2 Date of arrival at site.
 - .3 Plantation date.
- .6 Samples
 - .1 Submit, at the request of the Ministerial representative, all samples for verification purposes.
 - .2 Approved samples will serve as a reference for the project.
 - .3 Keep a copy on site of the approved sample.

1.5 QUALITY ASSURANCE

- .1 Competence and experience
 - .1 All components of the indoor green wall including all materials, equipment and plants, shall be supplied and installed by the contractor specialized in this section.
 - .2 The Contractor, specialized in this section must be a member of:
Canada Green Building Council / Conseil du bâtiment durable du Canada
NB The Contractor may also be a member in good standing:
 - .1 Québec Interdisciplinary Federation of Ornamental Horticulture/Fédération interdisciplinaire de l'horticulture ornementale du Québec (FIHOQ);
 - .2 Québec Society of Landscape Architects/Association des architectes paysagistes du Québec (AAPQ);
 - .3 Association des paysagistes professionnels du Québec (APPQ);
 - .4 Association des services en horticulture ornementale du Québec (ASHOQ);
 - .5 Association québécoise de commercialisation en horticulture ornementale (AQCHO) :
Trois secteurs : Jardinierie – Fleuristerie- Fournisseur de produits horticoles et services connexes;
 - .6 Syndicat des producteurs en serres du Québec (SPSQ);
 - .7 Association Irrigation Québec (AIQ).
 - .3 The contractor specialized in this section must have completed and maintained at least (5) interior green walls, of the same scope and of the same type, within five (5) years. Ministerial representative reserves the right to require supporting evidence before awarding the contract.
 - .4 The contractor specialized in this section must have operating facilities in Quebec for at least five (5) years, including, among other greenhouses hosting a stock of indoor plants acclimatized and healthy with good root systems developed and full foliage. He must maintain in operation until the end of the warranty period.
 - .5 The Contractor specialized in this section must also be recognized importer and wholesaler of exotic plants interior for at least five (5) years, possessed all the necessary permits.
 - .6 The Contractor, specialized in this section must deploy for the project, staff highly trained like horticulture service technicians, with a minimum of five (5) years experience in maintenance of exotic plants and as well as tropical indoor plants, especially in the design, construction and

maintenance of such indoor green walls equipped with irrigation and fertilization integrated. Ministerial representative reserves the right to require supporting evidence before awarding the contract.

.2 Quality Control at source:

- .1 All imported plants must be accompanied by permits and import necessary licenses. Comply with federal, provincial or territorial law.

1.6 DESIGN CRITERIA

- .1 The contractor specialized in this section (which is authorized to design, construct and maintain a system of indoor green wall) must validate that the conditions of implementation are acceptable, in order to ensure good growth plant, during and after the warranty period.
- .1 Degree temperature (ambient air): 22 degrees C (accuracy: + - 2 °C)
 - .2 Relative Humidity: 30% (accuracy: + - 3%)
 - .3 Location of water supply and drainage: nearby
 - .4 Temperature of source water (warm water supply): 55 °F (13 °C)
 - .5 Water pressure at the source lbs/in² 60-85 (413-586 kPa)
 - .6 Location of heating sources, ventilation and air conditioning (HVAC): nearby.
 - .7 Minimum level of lighting to be provided by Division 26: 250 ft. candles, 2690 lux
 - .8 Electric. Power Source (Socket 120 V, 15 amp): nearby (room: 5A-112.3)
 - .9 Minimum Clearance (for devices and connections): 550mm wide x 406mm deep x 1525mm high (room: 5A-112.3)
- .2 The contractor specialized in this section has the responsibility to inform the Ministerial representative of all conditions that affected the growth of plants of the new green wall at least four (4) weeks prior to commencing work on site.
- If the contractor determines that the specialized type of plants required is not adequate for the conditions listed, it must provide the scientific proof to the Ministerial representative. Where appropriate, he shall recommend its parallel evidence of other plants as an alternative, the same size, the same template of suitable families of similar colors indicating the price differences in relation to plants prescribed. Plants prescribed and / or subject to alternative must be available. Any delay in the timetable will not be accepted. Ministerial representative reserves the right to refuse or accept the alternative proposals of the contractor.
- .3 He must validate the type of support as well as all conditions of implementation. He must examine and verify on site all dimensions and levels.
- .4 The fact that commencing work on site will be deemed acceptance of the conditions by the contractor specialized in this section.
- .5 No changes to requirements, without the written permission of the Ministerial representative shall be permitted.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials and equipment as required.
- .2 Delivery and Acceptance
- .1 Deliver materials of the system in accordance with manufacturer's recommendations. Only pre-approved materials will be accepted.

- .2 Deliver plants in sufficient quantity to the site, ideally to install the same day.
- .3 Perform the necessary care to plants during transport.
- .4 Deliver materials and equipment to site in original packaging, which must be labeled with the name and address of the manufacturer.
- .5 Upon delivery, protect plants against frost, excessive heat, wind and sun.
- .6 Protect plants against damage during transport.
 - .1 Use a closed truck.
- .7 Replace all nine plants damaged during delivery.
- .3 Storage and handling
 - .1 Store system materials in accordance with the manufacturer's recommendations. Handle products without damaging.
 - .2 Place plants on pallets at a minimum of 100mm from the ground, in the shade, in a ventilated place and temperature greater than 16 °C but not too high, awaiting installation.
 - .3 Perform necessary care to the plants during storage.
 - .4 Protect plants at all times stored against frost, excessive heat, wind and sun, by taking the following steps:
 - .1 In the case of plants with bare roots, retain moisture around the roots by putting plants in gauge or burying their roots in the soil and watering throughout the depth of the root zone.
 - .2 In the case of plants in containers, maintain adequate moisture in the containers.
 - .5 Replace all nine plants damaged by handling.
 - .6 Replace all nine plants not installed, after more than 36 hours of storage on site.
- .4 Waste management: remove and recover packaging waste for recycling / reuse in accordance with section 01 74 19E – Management and removal of garbage.
Sort waste if needed.

1.8 WARRANTY

- .1 The system (structure, planting modules, drippers network/piping and equipment for irrigation and fertilization)

Provide a certificate of guarantee, signed and issued on behalf of the Ministerial representative, stating that all the works in this section are warranted against defects for a period of five (5) years from the date of signature of the certificate of provisional acceptance work. Comply with section 01 78 00E.
- .2 Plants:

Provide a certificate of guarantee, signed and issued on behalf of the Ministerial representative stating that all plants of this section are warranted against defects for a period of one (1) year from the date of signature of the certificate of provisional acceptance work. Comply with section 01 78 00E.

The plants will be subject to verification one (1) time per month by Ministerial representative and at the end of the warranty period.

Ministerial representative reserves the right to extend the liability of the Contractor as long as necessary if, at the end of the original warranty period, foliage and development do not seem sufficient to ensure the future survival of plants and/or in the situation where there are deficiencies to be corrected.

1.9 MAINTENANCE PROGRAM

- .1 Maintain any indoor green wall system and plants throughout the warranty period of the plants, one (1) year from the date of provisional acceptance of works certified in writing by the Ministerial representative.
- .2 Maintenance is to oversee the facilities, to keep them in perfect working order, to provide all necessary care to maintain plant growth and to ensure their sustainability.
 - .1 To do this, the contractor specialized in this section must:
 - .1 Visit the site at least one (1) time per week;
 - .2 Have access to facilities and technical room 5A-112.3 during normal business hours (between 7am and 5pm);
 - .3 Adjust the system to existing conditions:
 - .1 Increase or decrease water intake;
 - .2 Increase or decrease the supply of fertilizer;
 - .3 Check and adjust the temperature of the water and the pH.
 - .4 Treat as necessary plants against insects;
 - .5 Replace immediately sick plants, dried or dead;
 - .6 Trim and treat plants according to accepted horticultural practices;
 - .7 Humidifier (by spraying) foliage as needed;
 - .8 Clean the area and remove debris.
 - .2 Date, initial and record all healing done to the registry left on site (room: 5A-112.3);
 - .3 Perform a general inspection one (1) time per month with the Ministerial representative, and at the end of the maintenance program;
 - .4 Corrections to the green wall system involving the replacement of materials, equipment and / or plants during the warranty period (maintenance program) must be made with materials, equipment and plants identical to those installed in the project.

Part 2 Products

2.1 INDOOR GREEN WALL SYSTEM

- .1 The system includes, without limitation, a robust supporting frame, interchangeable planting modules prefabricated, ready to install, filled with a medium specially designed for green walls and low water consumption allowing natural cultivation plants; fittings required components; a network of piping and control devices for automatic irrigation and fertilization of the green wall; plants selected based on existing environmental conditions and other products to ensure the viability and performance of the wall.
 1. Structure: By Contractor
Wall-mounting consisting of:
 - .1 Galvanized metal studs, 92mm wide 16 gauge, willing at 300mm c/c and equipped with bottom and top plates, of girts at 1200mm c/c maximum, all anchored to the building structure (see 09 22 16E);

- .2 38mm plywood (2 layers of 19mm, screwed to 300mm c/c);
- .3 Waterproof gypsum 16mm thick, screwed to 300mm c/c (see 09 21 16E);
- .4 Primer: Elastocol stick by Soprema;
- .5 Adhesive membrane 1mm thick.: SopresealStick 1100T by Soprema
NB Foresee overlapping membrane 75mm at the joints of the membranes and with the architectural guidelines and the lower chute, to ensure and guarantee a perfect seal of the wall, anywhere.

Design criteria/weight of the system to support: 100 kg/m² (modules + medium saturated with water + plants).

The total expense of green wall will be taken by the wall and the building structure (walls, floor slab and ceiling-tile).

Reinforce, if needed, the structure of the wall by integrating robust steel elements to the dimensions of the green wall specified in drawings; to support the mass and dimensions of prefabricated planting modules; to the existing structure of the building.

Other possible materials:

- .1 Tubes, rods, profiles, steel plate: grade 300W or 350W according to standard CAN/CSA-G40.20 and G40.21.
 - .1 Welding materials: according to standard CAN / CSA W59.
 - .2 Welding Electrodes: according to standard CAN/CSA W48 series.
- .2 Finish: hot dip galvanizing, producing a uniform layer of zinc, having a basis weight of at least 610 g/m², according to CAN/CSA-G164.
- .3 Mounting of the structure under construction: stainless steel nuts and bolts: conforming to ASTM F593, throughout unless otherwise specified.
- .4 The type of anchorage must be adapted to the type of surface (concrete, gypsum, wood, metal, etc.).

2. Components accessories: By Contractor

All materials and finishing profiles that compose the architectural framework (head, side jambs, lower chute for recovery and disposal of excess irrigation eventual and river pebbles).

Material:

- .1 Tubes, rods, profiles, plates and basin stainless steel, 16 gauge: according to standard ASTM A269, Type 304, commercial grade, to be welded, without longitudinal seam, finish AISI No. 4.
- .2 Pebbles river: round stones, prewashed ranging from 38mm up to 100mm minimum diameter dia. maximum, thickness of 150mm min.
- .3 Dimensions of the architectural framework: see drawings.

3. Planting modules: By contractor specialized in this section

Planting modules come in different forms from one manufacturer to another, and different sizes and different materials as well.

General:

Tray specifically designed for indoor green wall, provided with periphery tongues for the modules overlapping and overall sealing of the system.

Once installed, the modules must not allow the water to spill over the rear wall, but designed to direct the water from one module to the other, at the limit to the chute provided at the bottom.

100% modular trays allowing all possible interventions behind the living wall, without removing adjacent modules or higher or lower.

Each module must have interconnected cells for planting, allowing the circulation and distribution of water and fertilizers; preformed with an angle of inclination respecting the plants natural phototropism; facilitating planting and possible replacements.

The cells will be large enough to allow planting without breaking the roots.

The modules have a drainage cavity at the top for collecting the water from the dropwise pipe.

Quantity: Provide all the necessary planting modules for work. Cut and assemble the modules according to the dimensions of the living wall.

.1 Option A: Modules made of polypropylene bins:

Made of expanded polypropylene high density (EPPHD), as manufactured by "ELT Easy Green" Brandon (Ontario) Canada; www.elteasygreen.com, or approved equivalent.

- .1 Module dimensions: 300mm x 300mm x 98mm thick.
- .2 Capacity: 10 cells per module or 93 seedlings/m²
- .3 Color: black
- .4 Material density: 80 gr/l
- .5 UV resistance (0.7 mm maximum of surface material degraded after 3 years of direct UV exposure)
- .6 Fire resistance: Class B2
- .7 Frost resistance: Voltage 1.5 MPa and 50% at -30 °C
- .8 Resistance to temperature difference of -40 °C to 80 °C
- .9 Nitrates resistance: Provides excellent resistance to prolonged immersion in diluted nitric acid to 10% (H+No3: Strong oxidizing agent)
- .10 Very good resistance to Ketones (acetones), alco-hols, Esters, mineral oils, alkalis, inorganic acids and hot water (85 °C).

.2 Option B: Modules made of pocket panels:

Made of indestructible, nylon felt mounted on a recycle plastic sheeting, nontoxic (high density polypropylene expanded (HDPPE)), as manufactured by "Florafelt Corporation", Norcross (Georgia) USA; www.florafelt.com, or approved equivalent.

- .1 Module dimensions: 810mm x 610mm x 110 mm thick.
- .2 Capacity: 12 pockets per module or 24 plants / m²
- .3 Color: gray pockets on black panel
- .4 Curbweight: 1.5 lbs/in² (0,75 g/m²)
- .5 Weight (planted): 5 lbs/in² (2,4 g/m²)
- .6 Panel (HDPPE),
 - .1 Material density: 80 gr/l

- .2 UV resistance (0.7 mm maximum of surface material degraded after 3 years of direct UV exposure);
- .3 Fire resistance: Class B2
- .4 Frost resistance: tension 1.5 MPa and 50% at -30 °C;
- .5 Resistance to temperature difference of -40 °C to 80 °C.
- .6 Nitrates resistance: Provides excellent resistance to prolonged immersion in diluted nitric acid to 10% (H+No3: Strong oxidizing agent).
- .7 Very good resistance to Ketones (acetones), alco-hols, Esters, mineral oils, alkalis, inorganic acids and hot water (85 °C).

4. Culture medium: By contractor specialized in this section

Designed specifically for green walls, the medium must be very good for root development; anti-settling, no suffocation of the roots; good water holding capacity, good drainage; high porosity which allows microbial activity; disease-free, fungus-free, adventitious-free or insect-free; designed to reduce leaching of fertilizers; good resistance to gelifraction and have the following properties:

- .1 Dry Density: 600 kg/m³
- .2 Density waterlogged: 1100 kg/m³
- .3 Maximum capacity of water retention: pF1 = 500 ml/l
- .4 Water at the limit of what can be extracted from the roots: pF2 = 315 ml/l
- .5 Grain size: 0,06 mm to 8 mm
- .6 Permeability: 0,15 cm/s
- .7 Air permeability at pF1: 450 ml/l
- .8 Potentiel of hydrogen (pH): between 5.5 and 6.2
- .9 Level of organic matter (weight %): 4%
- .10 Water holding capacity (% of the volume): 40% to 50%
- .11 Volume: 60 L/m² approximatly to ensure a sufficient volume for the root system.
- .12 Organo-mineral composition (30%-70%) strictly composed of pouzzolan, of clay balls crushed, of peat and of water retainers (cross-linked polymeric).

Note: The choice of a medium first requires taking into account culture requirements, constraints irrigation, fertilization and technical nature of the work. Based on these information, make a selection based on the characteristics of the mediums. Among them, physical characteristics hold a special place. The medium is the place of root system development. It is essential that the conditions necessary for its proper metabolic functioning are met. Thus, the ability to renew the oxygen environment, its ability to provide water supply (and therefore the irrigation management) are all factors that we should know best. Do not rely only on their fertilization culture media, be interested also in physical characteristics. They can be obtained from the supplier (AFNOR/Labeling). You can also get them by making an analysis of the product by a laboratory at your expense

The analysis of the porosity, and the dry bulk density, water and air retained pF1; water availability are all factors to be checked.

5. Plants: By the specialized contractor in this section

The "nursery product" must conform to the name and the specified class or specified dimensions (height, width or diameter), or the age of the plant.

The nomenclature of the plant must appear in the publication Hortus Third 1976 or any other internationally publication recognized most recent, such as: www.internationalplantnames.com

Product quality must be characteristic of the species that is cultivated under suitable conditions. Fertile soil, proper spacing, control of weeds and pests, adequate moisture, pruning and size, transplanting or pruning at least once (1) every four years, depending on the species, are all necessary requirements for normal quality "nursery product".

The specimen or group of plants must bear a label or other identification method which clearly indicates the variety, grade or size of each plant or group of plants.

List of plants:

Provide plants in perfect health, of appropriate size to the module.

Plant	Description	Quantity required
Type 1	HEDERA	30% of the wall area
Type 2	ALTERNANTHERA FICOIDEA WHITE CARPET	30% of the wall area
Type 3	HELVETIOSCOPUS (SOLEIROLIA SOLEIROLII)	20% of the wall area
Type 4	TRADESCANTIA PALLIDA PURPUREA	10% of the wall area
Type 5	ECHEVERIA LAUI	10% of the wall area

Distribution and location of plants on green wall:

During the shop drawings step, submit a scheme for approval by the Ministerial representative.

6. Irrigation and fertilization: For the entrepreneur specialized in this section

The green wall irrigation must be done by an automated system that handle alone (continuous and regular, homogeneous, simple and standalone) watering and fertilizing.

The watering system shall be sized according to the configuration of the green wall.

Water pressure of the building will ensure the proper functioning of the system.

Coordinate the work of this section with those of Divisions 22 and 26.

A water meter will be implemented by the contractor's plumber (Division 22) to record water consumption of green wall.

A backflow preventer put in place by the plumber (by Division 22) on the network will prevent the potential return of fertilizer in the network.

The irrigation and fertilization system will be divided into two (2) parts:

- The watering system located at the green wall modules: network drippers.
- A technical room near the green wall: programmer, solenoid valve, metering pump, filters, anti-waterhammer, purging, etc.

.1 Network dripper:

Each module must be watered by a drip line, itself connected to a wastewater irrigation.

The drippers shall be established to a consumption of:

2 liters/hour (watering times to be adjusted and programmed according to the existing conditions and the green wall configuration).

Self-regulating dripper and spaced so as to fall in the center of each column of cells of planting.

The nursing line must be in HDPE pipe 25mm dia. and drippers lines made of PE pipe from 6 to 16mm dia. depending on the size of the system.

Lines from 6mm to 16mm must be must be looped to one another in termination in order to limit pressure losses.

Venting valve will be set up on each sector of the wall so that the green wall receives all of the watering time.

The number of watering sectors should be determined based on the height and width of the green wall to delineate the pressure loss and to ensure a consistent and regular watering.

The spaces left between the modules will allow easy access for essential maintenance of drip lines.

.2 Technical room:

In this room dedicated to the maintenance of the green wall, the contractor must install special watering station that will control the frequency and duration of watering and fertilizing of the green wall using a programmer and solenoid valves (with the possibility of remotely manage or not).

In this room, we find:

- A supply of drinking water of 3/4" (19mm) dia. (by Division 22) allowing a minimum pressure of 3 bar (300 kPa) ou 43.5 lbs/ft² at the top of the green wall
- A network backflow preventer BA made of pipe of 3/4" (19mm) dia. (by Division 22)
- A power supply (Division 26) to connect the programmer and / or the remote management system
- An evacuation positioned below the backflow preventer (by Division 22)
- Solenoid valves 3/4" (19mm) dia., low-flow model
- A programmer remote management or classic
- A pressure regulator 3/4" (19mm) dia., 1-4 bars (100 to 400kPa) or 14.5 to 58 lbs/ft²
- Non-electric metering pump dosage of 0.2 to 1% max. with accuracy of 0.1%
- A filter retaining impurities ≤ to 100μ
- Check valve
- Accessories and pipes made of rigid PVC

- Fixings and pipe clamps made of stainless steel
- A bottle of fertilizers, additives and pH correctors (commercial chemical fertilizers determined according to the manufacturer's recommendations).

The addition of mycorrhizal fungus when planting can promote better root system and relieve stress growth. Ensure that new roots are in contact with mycorrhizae. Use mycorrhizae accordance with the manufacturer's written recommendations.

The frequency and duration of watering should be adapted to the type of plants and to maintain medium moisture of 25% to 40% throughout the year. The system must allow watering by small amount of water, fractionated and regular.

Example: With 4 drippers of 2 liter/hour per module and a watering of 2 minutes in the morning and 1 minute in the evening, we observe 40 cl per day, or 0.8 and 5.6 liters/m²/week.

The evacuation of the eventual trickling from the lower part of the green wall must be made through the drip channel made of stainless steel filled with river stone (see section 2.1.2) and by the plumbing drain (by Division 22) located at the bottom of the chute.

A sediment collector must be installed at the drain strainer to counter obstruction plumbing, due to the possible erosion of the medium.

2.2 WATER

- .1 Provided by Ministerial representative.
- .2 Water free from impurities that could affect plant growth.

Part 2 Work

3.1 INSPECTION

- .1 Verification of Conditions: Before proceeding with the installation of the indoor green wall system, make sure that the state of surfaces / supports previously implemented under other sections or contracts is acceptable and allows the work to be done in accordance with manufacturer's written instructions.
 - .1 Inform Ministerial representative immediately of any unacceptable condition detected.

3.2 PREPARATORY WORKS

- .1 Prepare surfaces to receive indoor green wall system.
- .2 Prepare plants in accordance with Canadian Standards for Nursery Stock – 2006.

3.3 PLANTATION

- .1 Start installation work on site only after receiving written approval from the Ministerial representative.
- .2 Follow work schedule approved.
- .3 For plants in containers or whose ball is wrapped with a non-degradable material, completely remove the container or envelope without damaging the rootball.

CIMAISE
V/Réf. : A12-5.2.1
N/Réf : 09350-55

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- .4 Planting plants in all cells (or pockets) of modules planting.
 - .1 Direct them so that they produce the best possible effect.
 - .2 Place them according to the approved planting scheme.
- .5 Plant them according to the recommendations of the Canadian Standards for Nursery Stock - 2006 and the green wall system manufacturer to ensure the growth and sustainability of each plant.
- .6 Use approved medium and apply it in accordance with accepted horticultural practices for a green wall.
 - .1 Do not over pack the substrate but eliminate air pockets.
 - .2 When the cell (cover) is filled two-thirds (2/3), moisten.
 - .3 Once water has penetrated into the medium, fill to the final level.

3.4 MAINTENANCE DURING PERIOD OF ESTABLISHMENT

- .1 Maintain the entire system and plants until the inspection by Ministerial representative.

1.5 MAINTENANCE DURING THE WARRANTY PERIOD

- .1 Perform the following maintenance from the time of acceptance of the work by Ministerial representative to the end of the warranty period.

3.6 CLEANING

- .1 Cleaning during work: Leave the place clean at the end of each working day.
- .2 Final Cleaning: Remove from site materials/equipment surplus, waste, tools and equipment.

*****END*****