RAINWATER TREE TRENCH DESIGN NOTES AND GUIDANCE

PURPOSE:

RAINWATER TREE TRENCHES (RTT) RETAIN RAINWATER RUNOFF BY PROVIDING SURFACE, SUBSURFACE STORAGE AND INFILTRATION INTO NATIVE SOIL. WATER IS ALSO TREATED AS IT FILTERS THROUGH THE SOIL AND THE ROOTS WITHIN THE TREE TRENCH.

RELATED DETAILS	
EDGE TREATMENTS:	GI 3.5 - GI 3.6
INLETS:	GI 2.1 - GI 2.5
UNDERDRAINS:	GI 3.7
CHECK DAMS:	GI 4.7
MONITORING WELL	GI 3.2
CLEANOUTS:	GI 3.4
INSPECTION CHAMBERS	GI 3.3
CATCHBASINS	GI 3.1, GI 3.8, S 11.2

DESIGNER NOTES & GUIDELINES:

1. THE DESIGNER MUST ADAPT PLAN AND SECTION DRAWINGS TO ADDRESS SITE-SPECIFIC CONDITIONS.
2. RTT SURFACE AREA, PONDING DEPTH, BIORETENTION SOIL DEPTH, AND AGGREGATE STORAGE DEPTH MUST BE SIZED TO MEET PROJECT HYDROLOGIC PERFORMANCE GOALS.
3. REQUIREMENTS FOR PONDING AND SYSTEM DRAWDOWN TIME (i.e., TIME FOR MAXIMUM SURFACE PONDING TO DRAIN THROUGH THE BIORETENTION SOIL AFTER THE END OF A STORM):
   - ☐ 24 HOUR MAXIMUM SURFACE PONDING DRAWDOWN
   - ☐ 72 HOUR MAXIMUM DRAWDOWN FOR RTT SOIL AND AGGREGATE STORAGE
4. RTT'S MAY BE DESIGNED USING STRUCTURAL SOIL OR MANUFACTURED SOIL CELLS. STRUCTURAL SOIL AND SOIL CELLS MUST MEET CITY OF VANCOUVER SPECIFICATIONS REGARDING LOADING CAPACITY OF RIGHT-OF-WAY INFRASTRUCTURE.
5. WHEN FACILITY CONSTRUCTION IMPACTS EXISTING SIDEWALK, ALL SAW CUTS MUST ADHERE TO CoV REQUIREMENTS. SAW CUTS SHOULD BE ALONG SCORE LINES AND ANY DISTURBED SIDEWALK PANELS SHOULD BE REPLACED IN THEIR ENTIRETY.
6. GI FACILITIES IN PUBLIC RIGHT OF WAY SHALL BE DESIGNED WITH A SAFE, DESIGNATED OVERLAND FLOW PATH TO THE STREET IN THE EVENT THAT THE OVERFLOW STRUCTURE IS OBSTRUCTED OR CLOGGED. THIS FLOW PATH SHOULD BE REFLECTED IN SITE GRADING AND LABELED ON GI DRAWINGS.
7. THE DESIGNER MUST EVALUATE UTILITY SURVEYS FOR POTENTIAL UTILITY CROSSINGS OR CONFLICTS. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT CITY OF VANCOUVER ASSET PROTECTION STANDARDS AND OTHER UTILITY PROVIDER REQUIREMENTS.
8. VEGETATION MUST BE SPECIFIED BY DESIGN PROFESSIONAL PER CoV GREEN INFRASTRUCTURE PLANTING GUIDELINES. TREE SPECIES MUST BE CONFIRMED WITH PARKS BOARD STAFF
9. CLEANOUTS OR INSPECTION CHAMBERS ARE REQUIRED AT INTERMEDIATE LOCATIONS ALONG DISTRIBUTION PIPES WHERE THE LENGTH OF THE DISTRIBUTION PIPE IS >45m SUCH THAT NO UNINTERRUPTED LENGTH OF DISTRIBUTION PIPE IS GREATER THAN 45m.
10. INSPECTION CHAMBERS ARE REQUIRED IN PLACE OF A 90-BEND OR T-JOINT
11. ALL INTERMEDIARY CLEANOUTS SHALL FACE UPSTREAM/UP GRADIENT PER GI3.4

RELATED SPECIFICATIONS	COV SPEC NO.
- BIORETENTION SOIL	***
- RAINWATER TREE TRENCHES	***
- STRUCTURAL SOIL	***
- AGGREGATES AND GRANULAR MATERIALS	31 05 17
- DRAINAGE FABRIC	31 32 19

***TEMPLATE ONLY. AVAILABLE UPON REQUEST FROM THE GII BRANCH.

LAYOUT REQUIREMENTS:

1. REFER TO THE CITY OF VANCOUVER ACCESSIBILITY STRATEGY, STANDARD DRAWINGS AND CONSTRUCTION SPECIFICATIONS FOR RIGHT-OF-WAY, PARKING SPACE, AND ACCESSIBLE PATH REQUIREMENTS.
2. LOCATE CURB CUTS AND GUTTER MODIFICATIONS TO AVOID CONFLICTS WITH ACCESSIBILITY REQUIREMENTS (E.G., LOCATE OUTSIDE OF CROSSWALKS).
3. IDENTIFY ALL SIGN AND POST LOCATIONS WITHIN THE GI AREA AND ENSURE PROPER BACKFILL MATERIALS ARE PRESENT TO SUPPORT ALL SIGN BASES.

DESIGNER CHECKLIST (MUST SPECIFY, AS APPLICABLE):

- ☐ EXTENT AND VOLUME OF STRUCTURAL SOIL
- ☐ DEPTH OF PONDING
- ☐ DEPTH OF FREEBOARD
- ☐ DEPTH OF SYSTEM
- ☐ DEPTH AND TYPE OF AGGREGATE STORAGE, IF ANY
- ☐ SURFACE ELEVATION AT UPSLOPE AND DOWNSLOPE ENDS OF FACILITY
- ☐ DIMENSIONS AND DISTANCE TO EVERY MUNICIPAL SERVICE/UTILITY WITHIN 10m OF THE FACILITY
- ☐ ELEVATIONS OF EVERY INLET, OUTLET, STRUCTURE RIM AND INVERT,
- ☐ TYPE AND DESIGN OF COMPONENTS (E.G., EDGE TREATMENTS, INLETS/GUTTER MODIFICATIONS, UTILITY CROSSINGS, LINER, AND PLANTING DETAILS)

RAINWATER TREE TRENCH (RTT) DRAWING DESCRIPTIONS

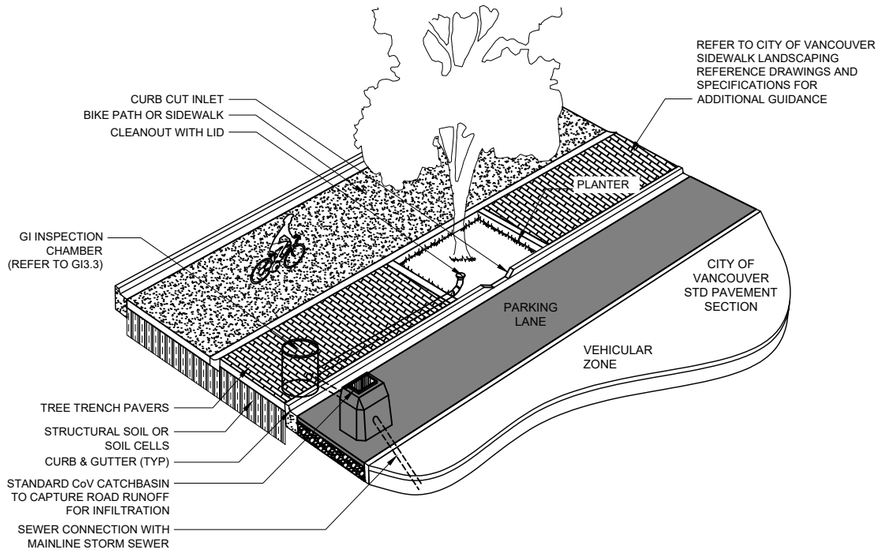
GI5.0A	RAINWATER TREE TRENCH DESIGN NOTES	THE RAINWATER TREE TRENCH DESIGN NOTES PROVIDE GUIDANCE TO DESIGNERS ON HOW TO USE AND ADAPT THE TEMPLATE STANDARDS IN THIS SECTION.
GI5.0B	RAINWATER TREE TRENCH DRAWING DESCRIPTIONS	THIS PAGE DESCRIBES THE PURPOSE AND INTENDED USE OF EACH RAINWATER TREE TRENCH DRAWING.
GI5.1	RAINWATER TREE TRENCH LAYOUT	THE RAINWATER TREE TRENCH LAYOUT STANDARD PROVIDES PLAN AND PROFILE DRAWINGS OF A TYPICAL TREE TRENCH, ALONG WITH A CONCEPTUAL AXONOMETRIC DIAGRAM. THE STANDARD PROVIDES AN EXAMPLE OF ONE SECTION OF A TREE TRENCH. THE DESIGN MAY BE EXTENDED IN EITHER DIRECTION AND ALONG THE FULL LENGTH OF A CITY BLOCK.
GI5.2	RTT INSPECTION CHAMBER	THIS STANDARD PROVIDES ADDITIONAL DETAILS ON HOW INSPECTION CHAMBERS (GI3.3.) CAN BE CONNECTED CATCHBASINS IN THE ROADWAY AND INTEGRATED INTO TREE PIT DESIGN. IT HIGHLIGHTS THE SEWER DESIGN CONSTRAINTS OF THESE SYSTEMS AND THE IMPACT OF INVERT ELEVATIONS ON TREE TRENCH SATURATION LEVELS.
GI5.3	STRUCTURAL SOIL ADJACENT TO RTT	GI5.3. DEPICTS THE INTERFACE BETWEEN RAINWATER TREE TRENCH AREAS WITHIN THE BOULEVARD AND ADJACENT SIDEWALKS OR BIKELANES WITH UNDERLYING STRUCTURAL SOIL. STRUCTURAL SOIL IS USED TO PROVIDE SUFFICIENT SOIL VOLUME FOR STREET TREES WHILE PROVIDING STRUCTURAL SUPPORT FOR ADJACENT PAVED SURFACES.
GI5.4	GI SWALE BOULEVARD WITH STREET TREES	RAINWATER TREE TRENCHES MAY BE DESIGNED WITH A VARIETY OF DIFFERENT SURFACE TREATMENTS. GI5.4 DEPICTS A RAINWATER TREE TRENCH WHERE THE BOULEVARD SPACE BETWEEN TREES IS VEGETATED. THE TREE TRENCH CROSS-SECTIONS PROVIDE ADDITIONAL DETAILS ON TREE DESIGN, LAYERING, COMPONENTS, AND INTEGRATION WITH ADJACENT STRUCTURAL SOIL.
GI5.5	GI TREE PIT WITH STRUTURAL SOIL	GI5.5 DEPICTS A RAINWATER TREE TRENCH WHERE THE SPACE BETWEEN TREES IS COVERED WITH A PAVEMENT OR PAVER SURFACE TREATMENT. THIS DESIGN VARIANT IS APPROPRIATE IN HIGH DENSITY AREAS WITH SIGNIFICANT FOOT TRAFFIC AND IN AREAS WITH ADJACENT STREET PARKING. ROADWAY RUNOFF IS DIRECTED TO THE TREES THROUGH A DISTRIBUTION PIPE (REFER TO GI5.6.) AND THROUGH SURFACE LEVEL CURB CUTS INTO THE TREE PIT AREAS.
GI5.6	GI TREE PIT WITH DISTRIBUTION PIPE	ROADWAY RUNOFF MAY BE DIRECTED INTO RAINWATER TREE TRENCHES THROUGH A PERFORATED DISTRIBUTION PIPE THAT RUNS ALONG THE TRENCH AND THROUGH THE TREE PLANTING AREAS. GI5.6. DEPICTS A TREE PIT WITH WITH A DISTRIBUTION PIPE PASSING THROUGH THE TREE PIT AREA. THE DRAWING INCLUDES INFORMATION ON INTEGRATION WITH ADJACENT STRUCTURAL SOIL.
GI5.7	VERTICAL EDGE RTT CROSS-SECTIONS	GI5.7. DEPICTS A TREE PIT WITH A VERTICAL INTERFACE BETWEEN THE ROADWAY AND THE RTT AREAS. IN CONSTRAINED BOULEVARD SPACES, IT MAY BE NECESSARY TO OPTIMIZE THE SOIL VOLUME AVAILABLE TO STREET TREES. THIS MAY BE ACHIEVED BY EXCAVATING VERTICALLY FROM THE BACK OF CURB INSTEAD OF RETAINING A SLOPED CURB BASE AND SUB-BASE. THE USE OF VERTICAL EDGES IS ONLY ACCEPTABLE IN LOW-RISK AREAS AND REQUIRES APPROVAL FROM STREETS DESIGN STAFF AND THE PROJECT ENGINEER.

CITY OF VANCOUVER

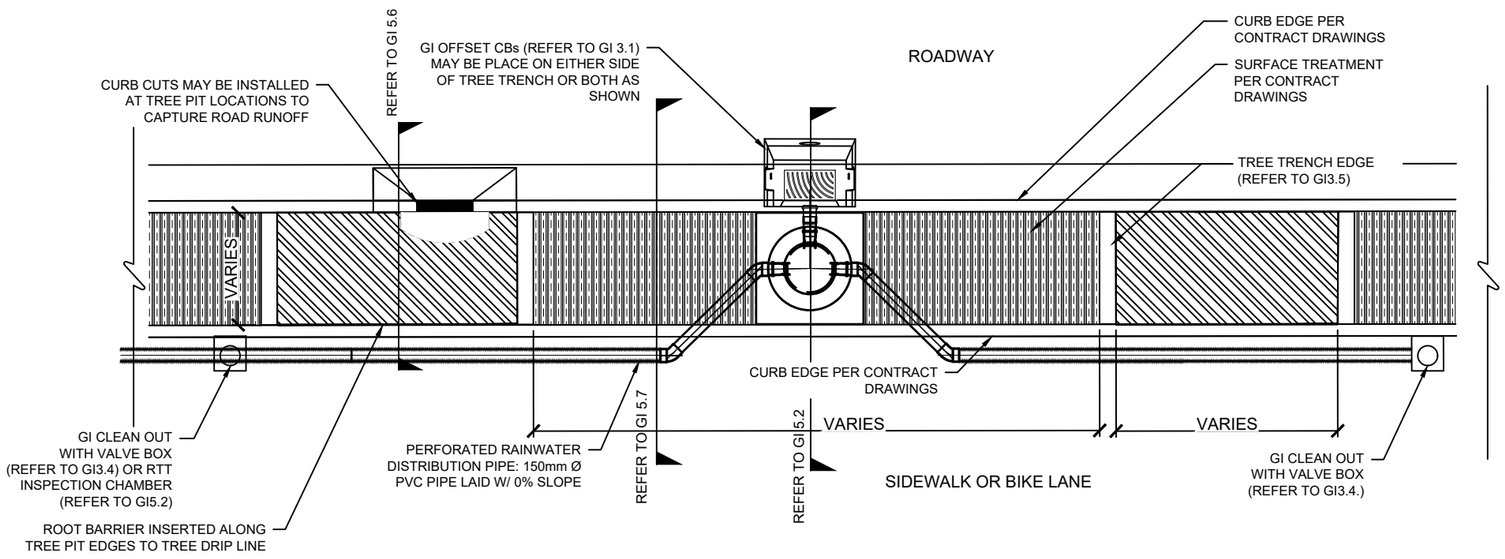
STANDARD DETAIL DRAWINGS
ENGINEERING SERVICES - VANCOUVER, B.C.

DRAWING No.
GI5.1

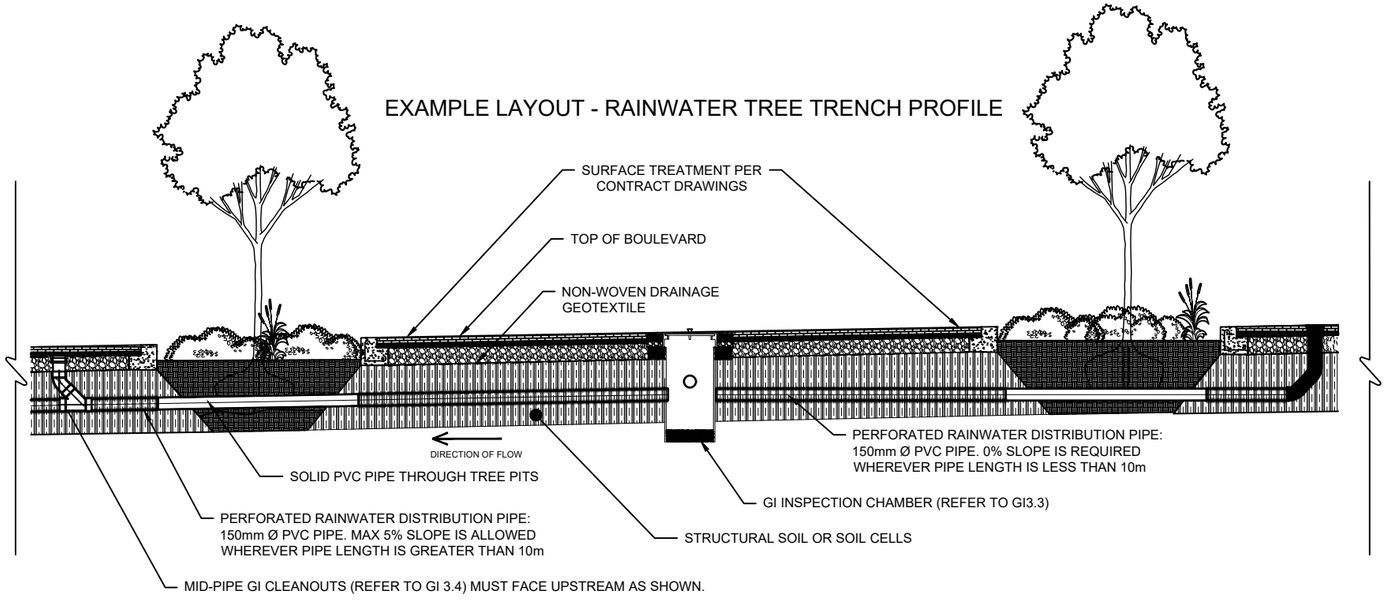
CONCEPTUAL AXONOMETRIC



EXAMPLE LAYOUT - RAINWATER TREE TRENCH PLAN VIEW



EXAMPLE LAYOUT - RAINWATER TREE TRENCH PROFILE



NOTES:
1. TREE TRENCH SEGMENTS MAY BE CONNECTED IN SERIES TO IMPROVE WATER DISTRIBUTION AND DRAINAGE. S-BENDS CAN BE USED TO CONNECT SEGMENTS AT DIFFERENT ELEVATIONS TO ENSURE DISTRIBUTION PIPES STAY AT 0%.
2. UNDERDRAIN PIPES SHOULD BE PLACED AT A MINIMUM OF 0.30m FROM THE BOTTOM OF THE SURFACE TREATMENT.
3. DRAINAGE MAY BE DIRECTED TO THE SOIL MEDIUM THROUGH CURB CUTS OR CATCHBASINS AND DRAINAGE PIPES.
4. STRUCTURAL SOIL MUST BE FULLY COMPACTED PRIOR TO SURFACE TREATMENT INSTALLATION
5. ARRANGEMENTS OF INSPECTION CHAMBERS, OFFSET CBs AND TREE PITS MAY VARY.
6. EXTENT OF STRUCTURAL SOIL OR SOIL CELLS MAY VARY.
7. TREES IN RAINWATER TREE TRENCHES SHALL HAVE THE APPROPRIATE SOIL VOLUME AS OUTLINED IN THE CITY OF VANCOUVER URBAN FOREST STRATEGY
8. RAINWATER TREE TRENCHES SHALL CONTAIN THE SOIL VOLUME NECESSARY TO SUPPORT THE NUMBER OF TREES IN A CONTIGUOUS TRENCH, AS OUTLINES IN THE CITY OF VANCOUVER URBAN FOREST STRATEGY.

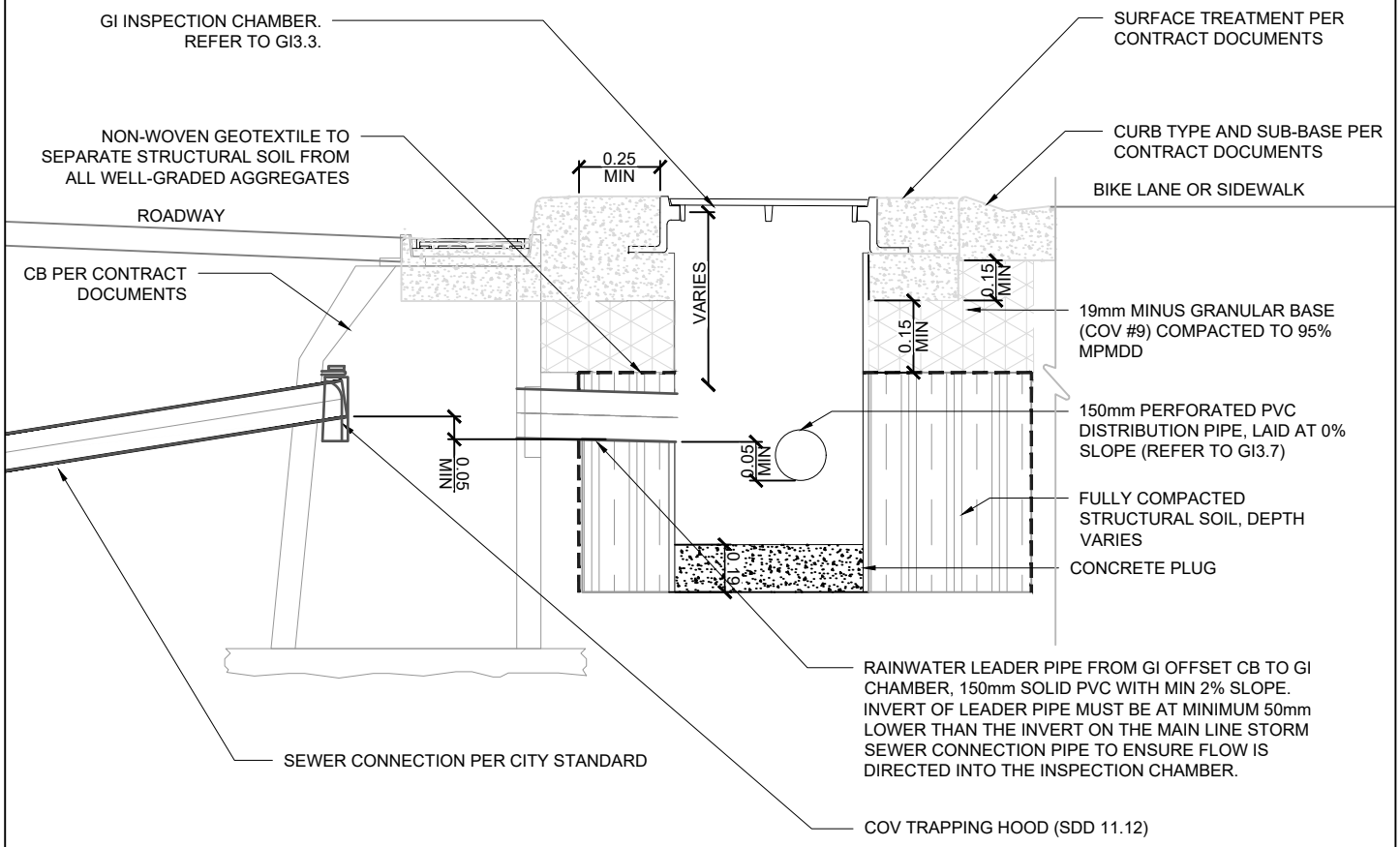
REV.	REVISION DATE	APPROVED

RAINWATER TREE TRENCHES
RAINWATER TREE TRENCH LAYOUT

ISSUE DATE: FEBRUARY 2026

APPROVED BY: N. MEAD-FOX

CITY OF VANCOUVER	STANDARD DETAIL DRAWINGS ENGINEERING SERVICES - VANCOUVER, B.C.	DRAWING No. GI5.2



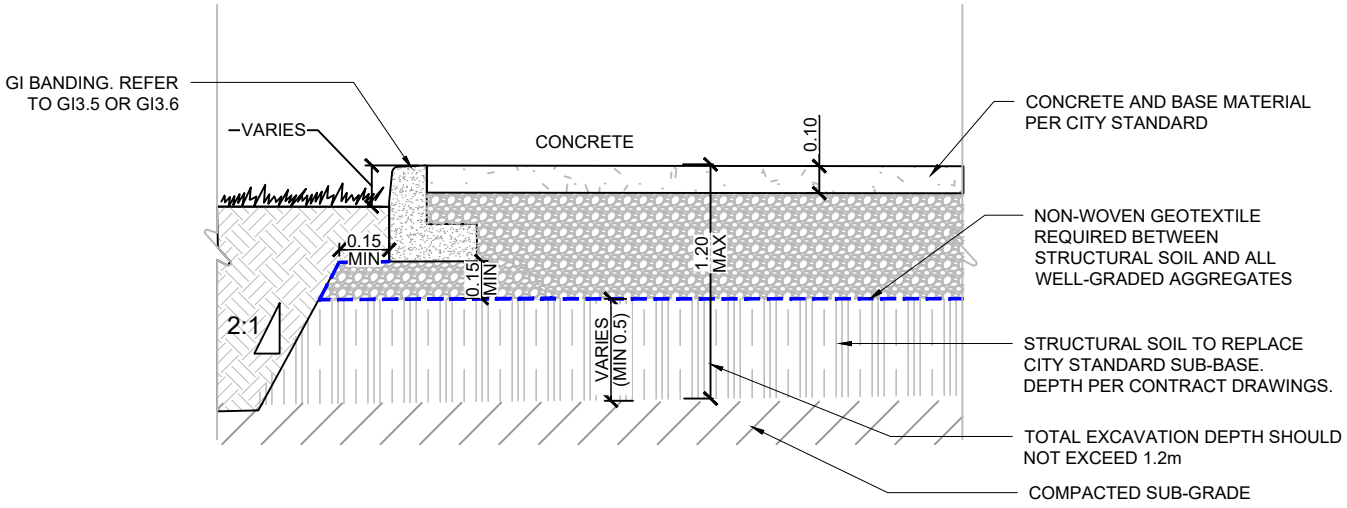
NOTES:
1. CONNECTIONS TO INSPECTION CHAMBER AND LOCATION OF OFFSET CBs MAY VARY DEPENDING ON SITE CONDITIONS
2. OFFSET CBs MAY REPLACE STANDARD CBs
3. CBs MAY BE PLACED ON ONLY ONE SIDE OF TREE TRENCH OR ON BOTH SIDES AS SHOWN
4. INVERT OF CONNECTION TO MAIN LINE CB MUST BE AT MINIMUM 150mm ABOVE THE DISTRIBUTION PIPE INVERT
5. STRUCTURAL SOIL SHALL NOT BE PLACED UNDER ROAD CURBS
6. 6.0m VERTICAL CLEARANCE OVER ALL INSPECTION CHAMBERS IS PREFERRED FOR CLEANOUT ACCESS.

REV.	REVISION DATE	APPROVED

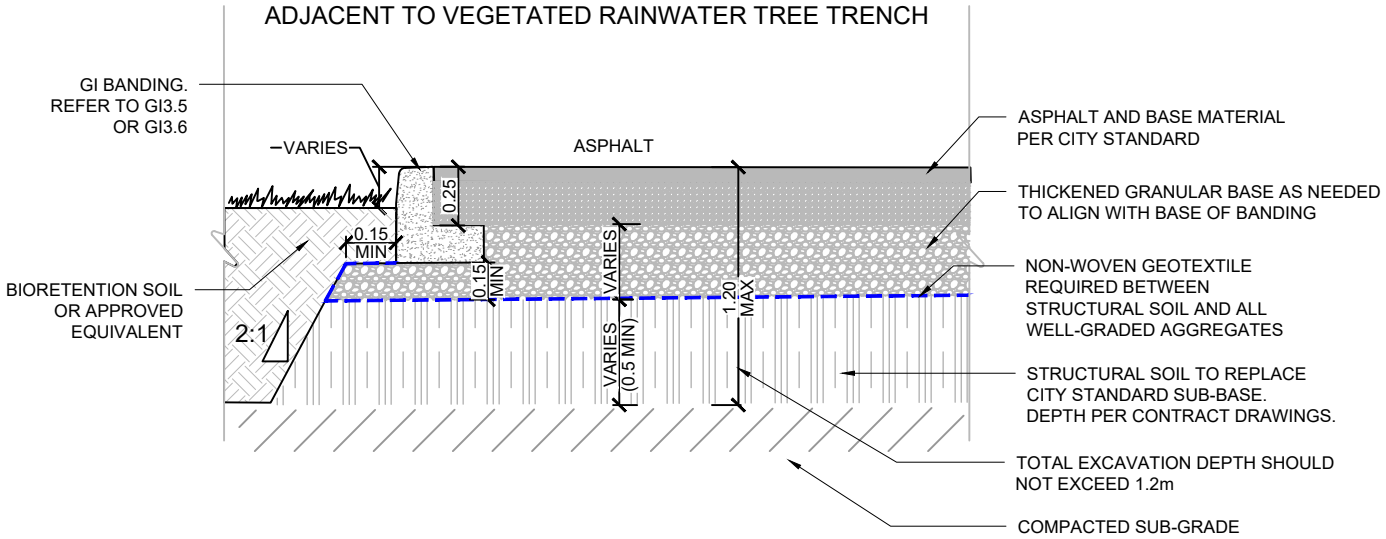
RAINWATER TREE TRENCHES
RTT INSPECTION CHAMBER

ISSUE DATE: FEBRUARY 2026
APPROVED BY: N. MEAD-FOX

STRUCTURAL SOIL UNDER CONCRETE SIDEWALK ADJACENT TO VEGETATED RAINWATER TREE TRENCH



STRUCTURAL SOIL UNDER ASPHALT BOULEVARD ADJACENT TO VEGETATED RAINWATER TREE TRENCH



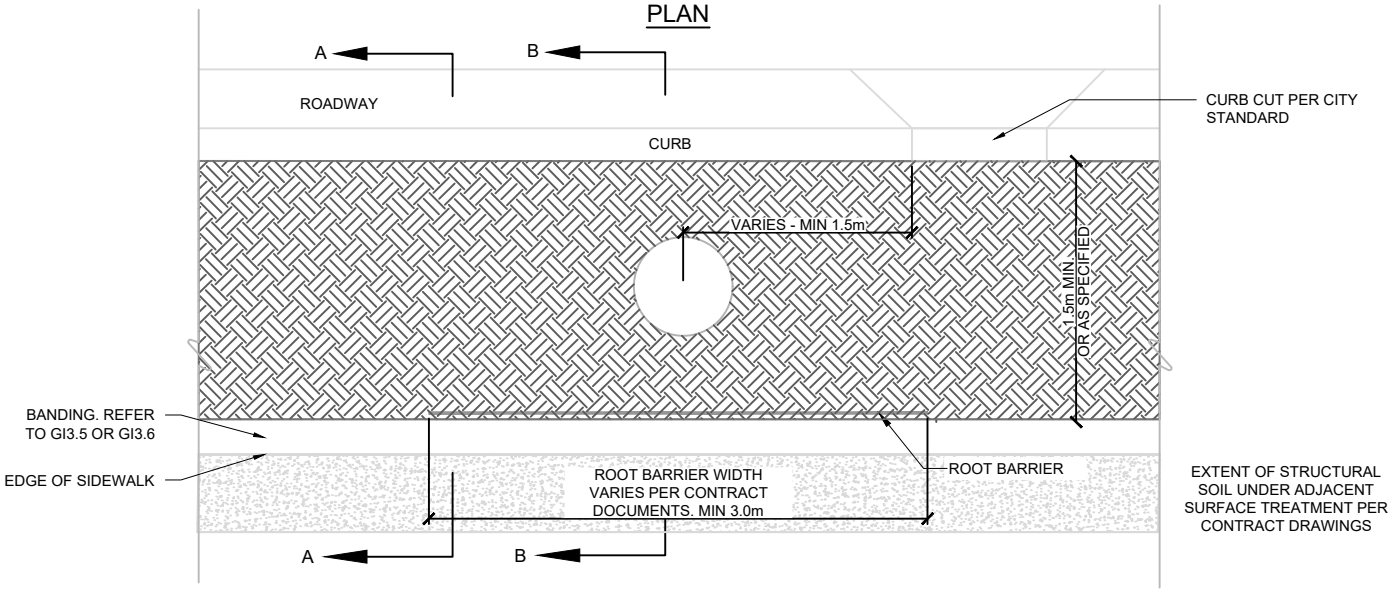
CITY OF VANCOUVER

STANDARD DETAIL DRAWINGS
ENGINEERING SERVICES - VANCOUVER, B.C.

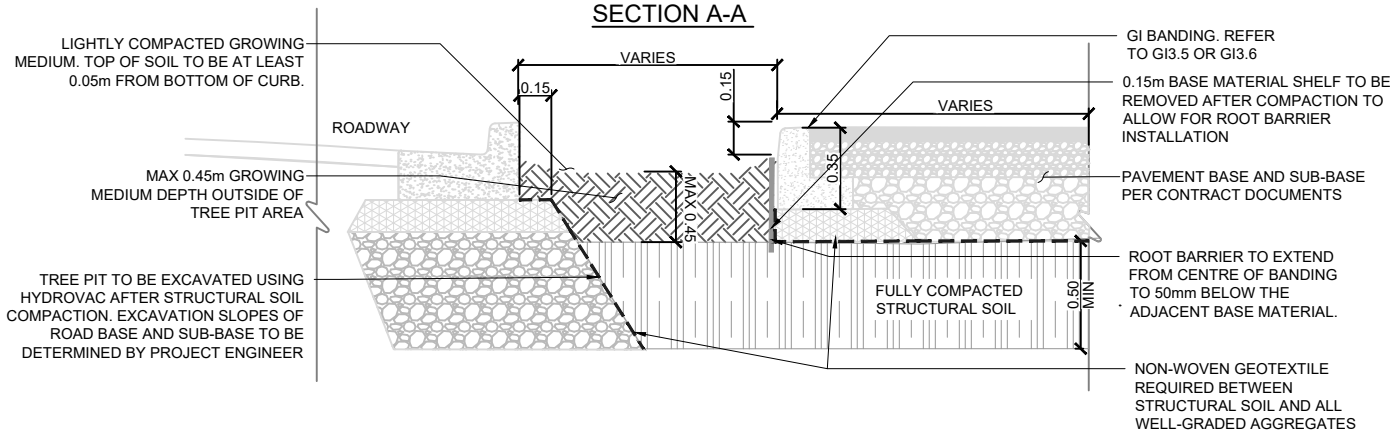
DRAWING No.

GI5.4

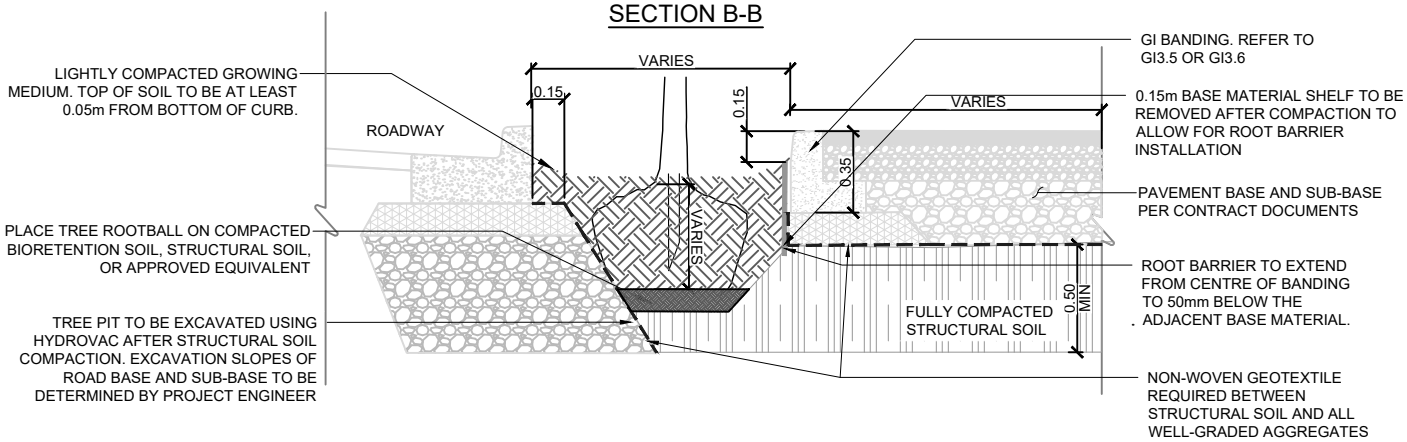
PLAN



SECTION A-A



SECTION B-B



NOTES:
1. PREFERRED GROWING MEDIUM DEPTH FOR GI SYSTEMS IS 450mm. A GROWING MEDIUM DEPTH LESS THAN 450mm MUST BE APPROVED BY THE PROJECT ENGINEER.
2. STRUCTURAL SOIL DEPTH SHOULD RANGE FROM 0.45m TO 1.00m
3. STRUCTURAL SOIL OR SOIL CELLS UNDERNEATH SIDEWALKS OR BIKE LANES REQUIRE STREETS REVIEW AND APPROVAL.
4. CROSS-SLOPE OF TREE TRENCH AND ADJACENT PAVED SURFACES MAY VARY DEPENDING ON SITE CONDITIONS
5. ROOT BARRIERS SHALL BE INSTALLED IMMEDIATELY ABUTTING THE CONCRETE SIDEWALK AND EXTEND 5cm ABOVE BOTTOM OF BANDING
6. TREE PIT TO BE EXCAVATED USING HYDROVAC AFTER STRUCTURAL SOIL COMPACTION. WHERE APPLICABLE, INTERFACE BETWEEN CURB SUB-BASE AND STRUCTURAL SOIL TO BE 2V:1H

REV.	REVISION DATE	APPROVED

RAINWATER TREE TRENCHES
GI SWALE BOULEVARD WITH STREET TREES

ISSUE DATE: FEBRUARY 2026

APPROVED BY: N. MEAD-FOX

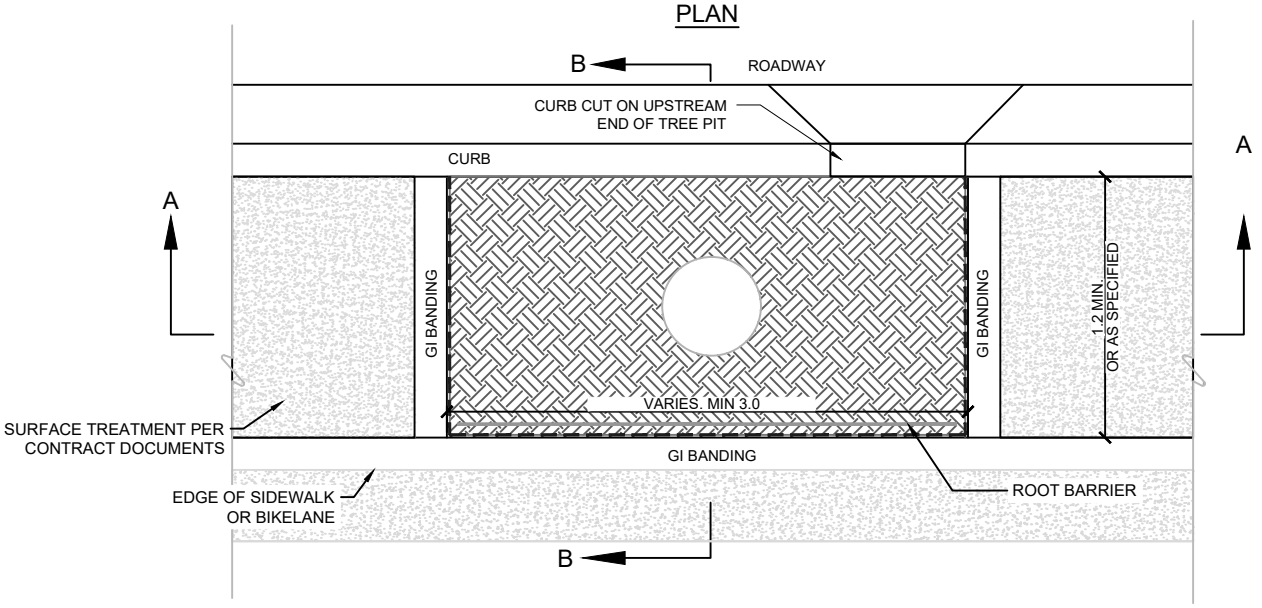
CITY OF VANCOUVER

STANDARD DETAIL DRAWINGS
ENGINEERING SERVICES - VANCOUVER, B.C.

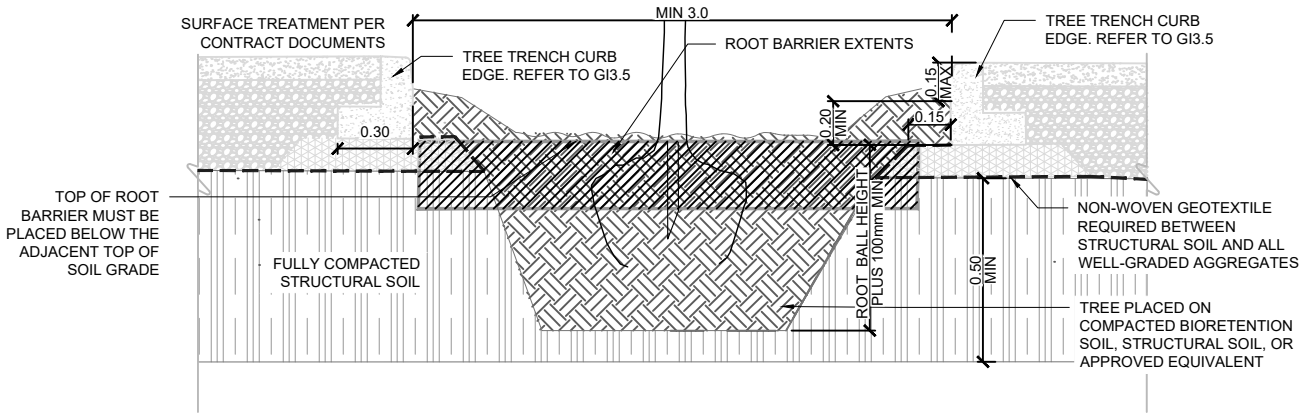
DRAWING No.

GI5.5

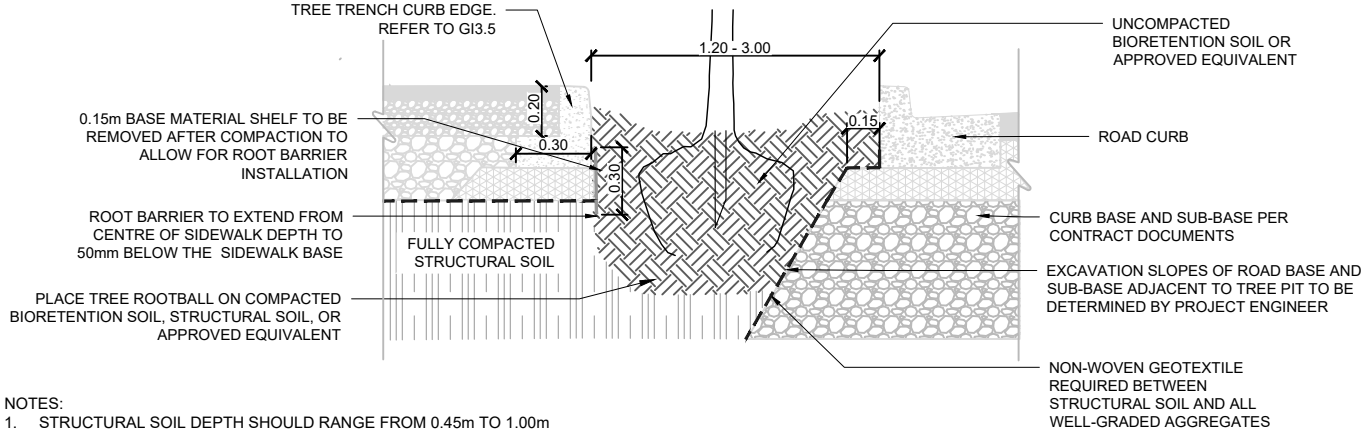
PLAN



SECTION A-A



SECTION B-B



NOTES:
1. STRUCTURAL SOIL DEPTH SHOULD RANGE FROM 0.45m TO 1.00m
2. STRUCTURAL SOIL OR SOIL CELLS UNDERNEATH SIDEWALKS OR BIKE LANES REQUIRE STREETS REVIEW AND APPROVAL.
3. CROSS-SLOPE OF TREE TRENCH AND ADJACENT PAVED SURFACES MAY VARY DEPENDING ON SITE CONDITIONS
4. ROOT BARRIERS SHALL BE INSTALLED IMMEDIATELY ABUTTING THE CONCRETE SIDEWALK AND EXTEND AT MINIMUM 5cm ABOVE BOTTOM OF BANDING AND 5cm BELOW THE SIDEWALK BASE MATERIAL
5. AFTER TREE PIT EXCAVATION, SLOPES AT INTERFACE BETWEEN CURB SUB-BASE AND STRUCTURAL SOIL TO BE 2V:1H UNLESS SPECIFIED OTHERWISE IN CONTRACT DOCUMENTS

REV.	REVISION DATE	APPROVED

RAINWATER TREE TRENCHES
GI TREE PIT WITH STRUCTURAL SOIL

ISSUE DATE: FEBRUARY 2026

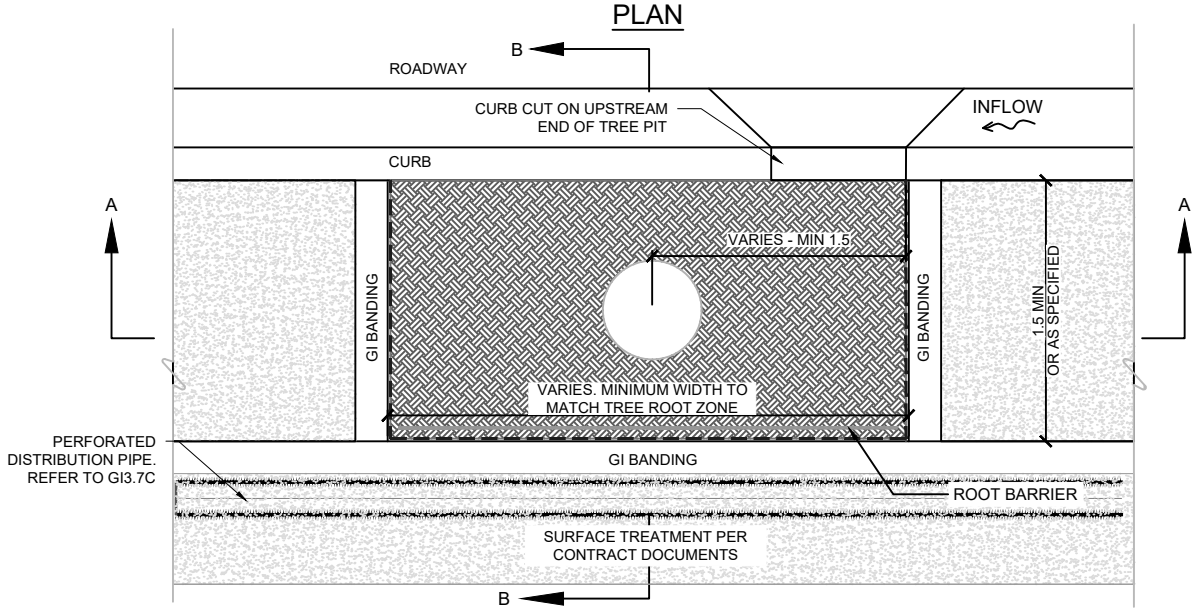
APPROVED BY: N. MEAD-FOX

CITY OF VANCOUVER

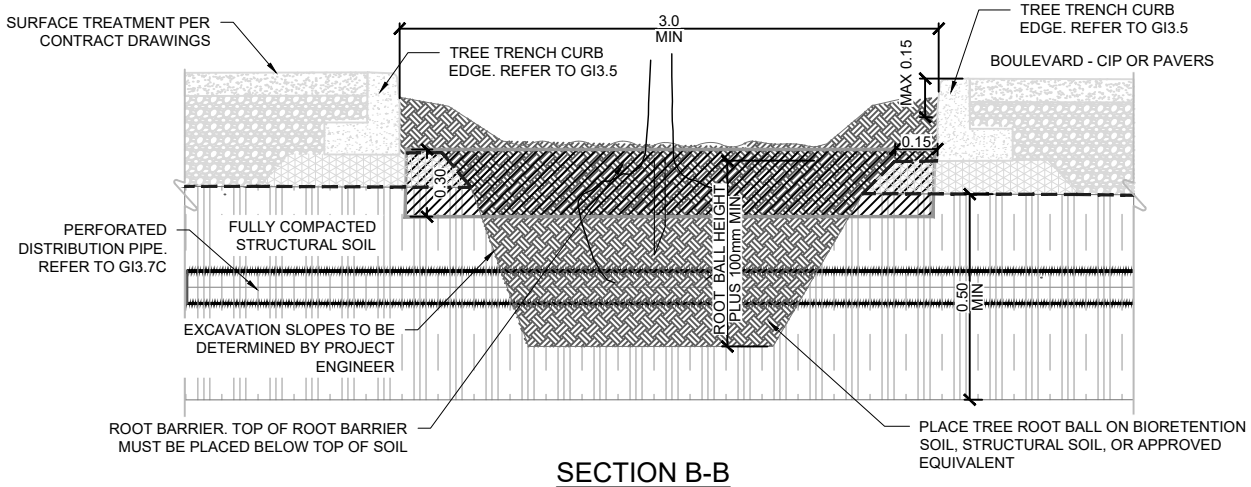
STANDARD DETAIL DRAWINGS
ENGINEERING SERVICES - VANCOUVER, B.C.

DRAWING No.
GI5.6

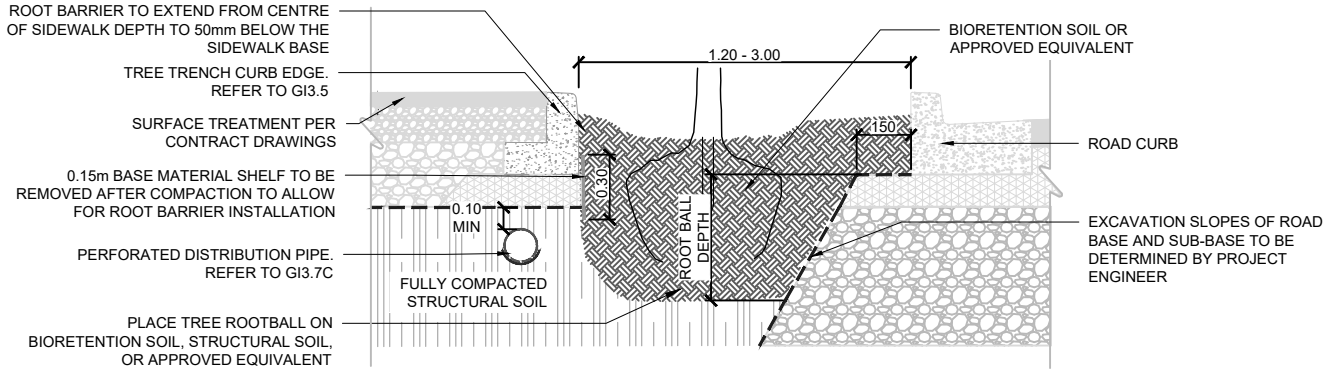
PLAN



SECTION A-A



SECTION B-B



NOTES:
1. STRUCTURAL SOIL DEPTH SHOULD RANGE FROM 0.45m TO 1.00m
2. STRUCTURAL SOIL OR SOIL CELLS UNDERNEATH SIDEWALKS OR BIKE LANES REQUIRE STREETS REVIEW AND APPROVAL.
3. CROSS-SLOPE OF TREE TRENCH AND ADJACENT PAVED SURFACES MAY VARY DEPENDING ON SITE CONDITIONS
4. ROOT BARRIERS SHALL BE INSTALLED IMMEDIATELY ABUTTING THE CONCRETE SIDEWALK AND EXTEND AT MINIMUM 5cm ABOVE BOTTOM OF BANDING AND 5cm BELOW THE SIDEWALK BASE MATERIAL
5. AFTER TREE PIT EXCAVATION, SLOPES AT INTERFACE BETWEEN CURB SUB-BASE AND STRUCTURAL SOIL TO BE 2V:1H UNLESS SPECIFIED OTHERWISE IN CONTRACT DOCUMENTS

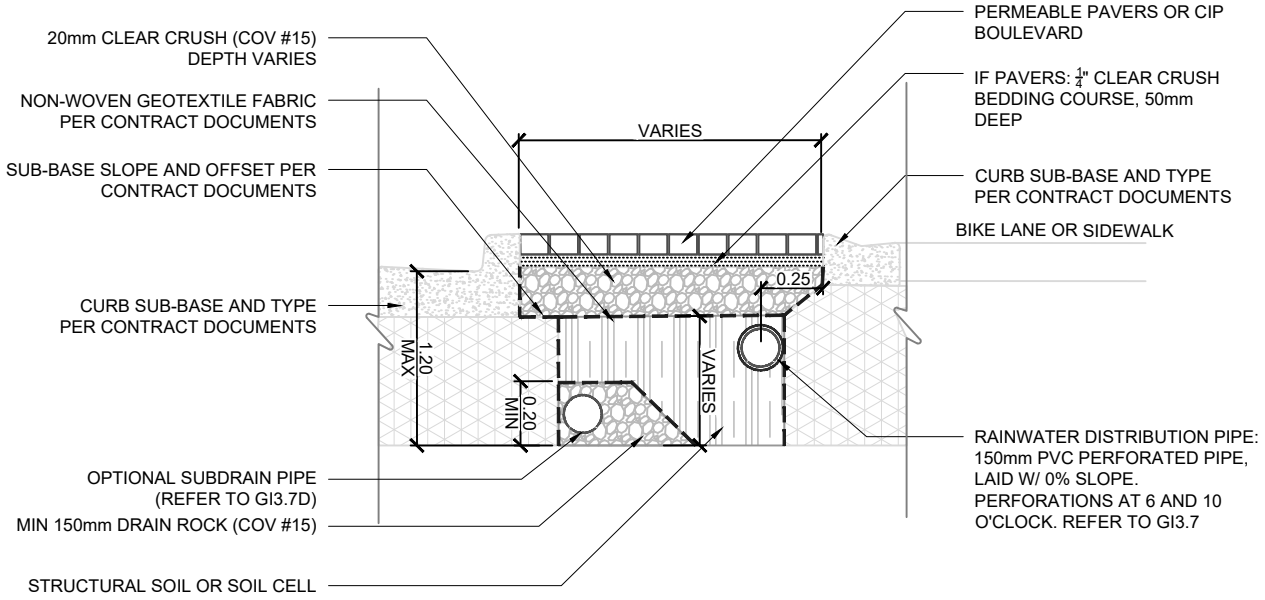
REV.	REVISION DATE	APPROVED

RAINWATER TREE TRENCHES
GI TREE PIT WITH DISTRIBUTION PIPE

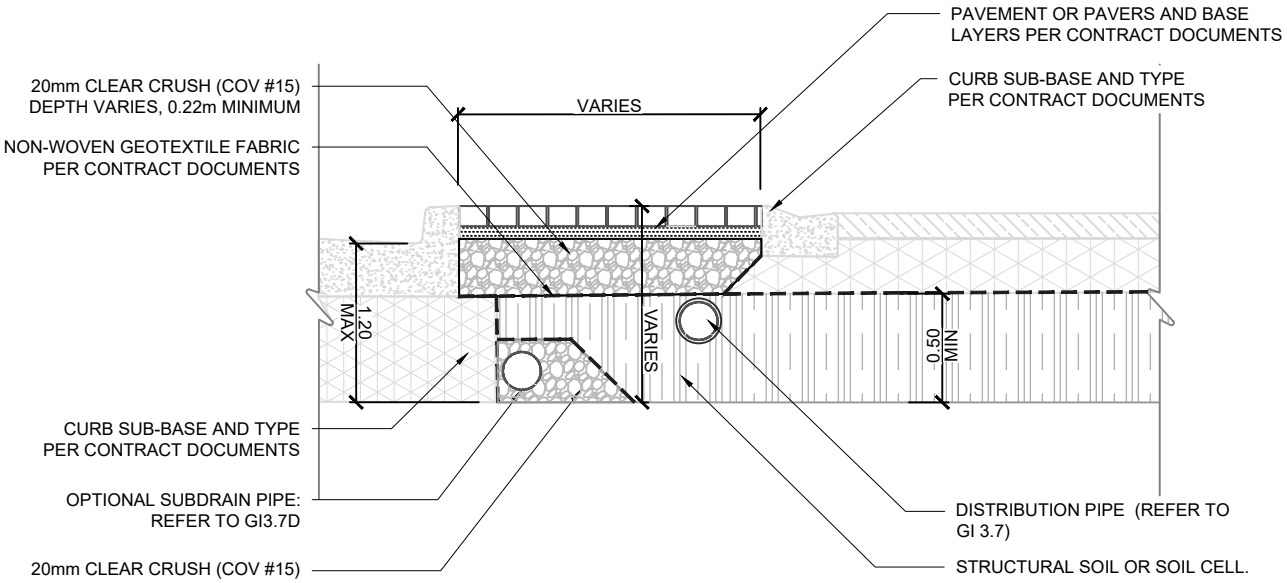
ISSUE DATE: FEBRUARY 2026

APPROVED BY: N. MEAD-FOX

RAINWATER TREE TRENCH CROSS-SECTION WITH PAVED BOULEVARD



RAINWATER TREE TRENCH CROSS-SECTION WITH PAVERS AND STRUCTURAL SOIL EXTENSION



NOTES:
1. STRUCTURAL SOIL OR SOIL CELLS UNDERNEATH SIDEWALKS OR BIKE LANES REQUIRE STREETS REVIEW AND APPROVAL.
2. CROSS-SLOPE OF TREE TRENCH AND ADJACENT PAVED SURFACES MAY VARY DEPENDING ON SITE CONDITIONS
3. VERTICAL EDGE SHOULD ONLY BE ALLOWED DURING SIMULTANEOUS ROAD CONSTRUCTION WHEN THE CURB BASE AND SUB-BASE CAN BE INSTALLED IN LIFTS DIRECTLY ADJACENT TO THE STRUCTURAL SOIL.
4. ACCEPTABILITY OF VERTICAL EDGE CONDITIONS IS DEPENDENT ON A SUPPORTIVE GEOTECHNICAL SITE ASSESSMENT.