SDOT Urban Forestry

March 2023 Briefing

to the Urban Forestry Commission

Seattle Department of Transportation

Our Vision, Mission, Values, & Goals

Seattle is a thriving equitable community powered by dependable transportation. We're on a mission to deliver a transportation system that provides safe and affordable access to places and opportunities.

Core Values & Goals:

Equity, Safety, Mobility, Sustainability, Livability, and Excellence.

Presentation Outline

- Accomplishments through 2023
- UF Operations overview and examples
- Aurora Sidewalk Repairs
- Soil Volume Standards
- Q&A

2022 Accomplishments

371 Trees Planted

181 Trees Removed

4085 Trees Pruned

487 Traffic Sign or Signal Obstructions Cleared

1449 Landscape Maintenance Events

2023 Year to Date

160 Trees Planted

19 Trees Removed

781 Trees Pruned

126 Traffic Sign or Signal Obstructions Cleared

173 Landscape Maintenance Events

2016-2022 Totals

2,663 Trees Planted

1,272 Trees Removed

33,442 Trees Pruned

3,189 Traffic Sign or Signal Obstructions Cleared

10,402 Landscape Maintenance Events

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Clearing obstructions for safety

Before pruning

After pruning

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Storm Response and High-Risk Tree Removal

Storm damage

Hazard tree removal

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Landscape Maintenance: Forest understory in the ROW

Medians on Sandpoint Way

Sequoia planter

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Trees & Sidewalks

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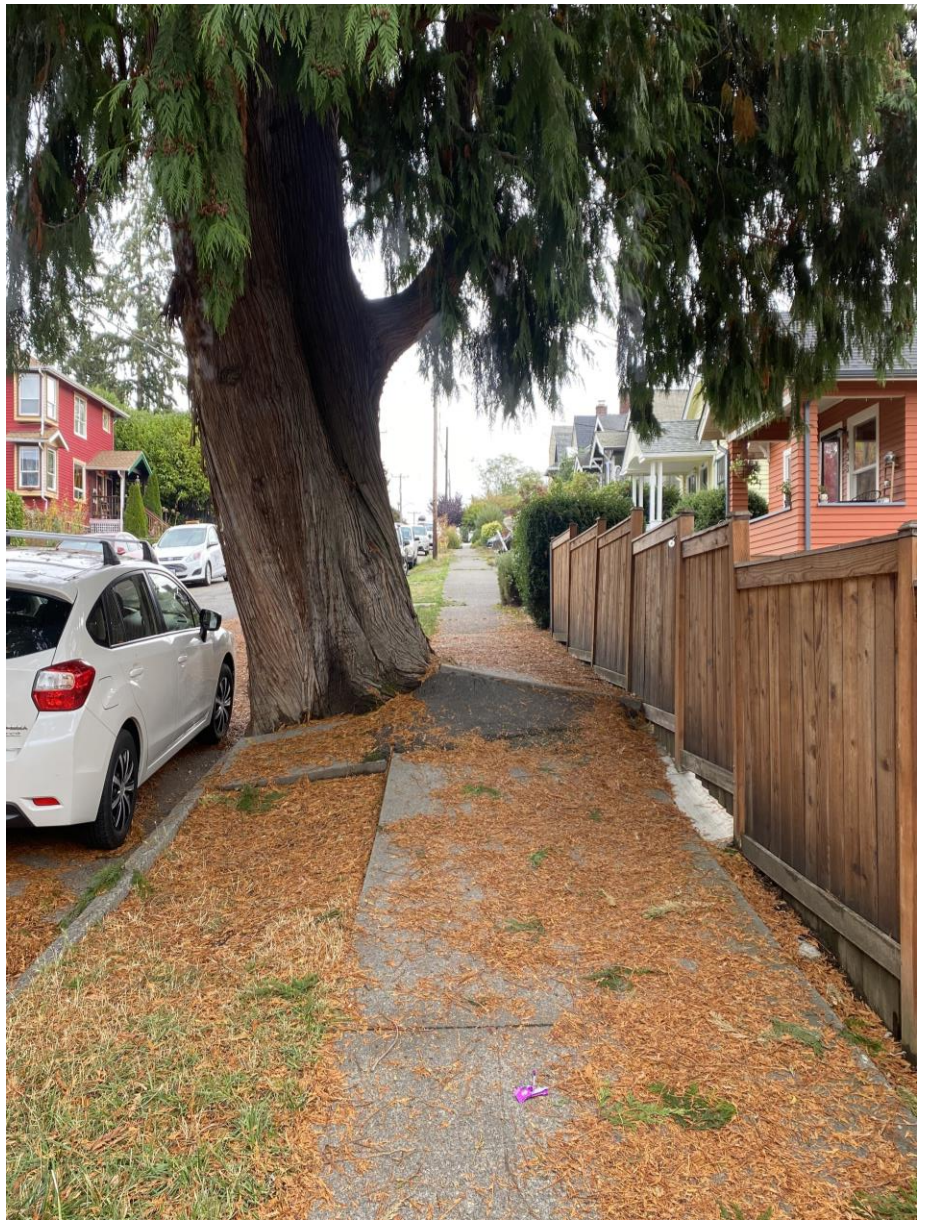
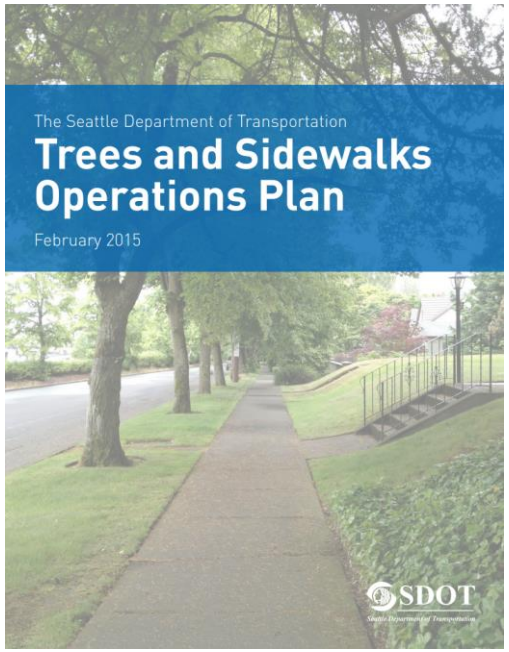
Trees & Sidewalks: Background

- Large canopy trees were planted in undersized tree pits without regard to future growth.
- Roots tend to grow just under sidewalk paving seeking moisture under the concrete surface.
- As roots increase in diameter, they push up on sidewalk panels, creating hazards for people walking and rolling.



Trees & Sidewalks: Background

SDOT's Trees and Sidewalks Operations Plan encourages custom solutions for repairing sidewalks and preserving trees.



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Case Study: Aurora Sidewalk Repairs

Problem Statement:

Trees planted decades ago along Aurora Ave N lower temperatures and contribute to Seattle's tree canopy. Over time, roots have buckled sidewalks and made them difficult to navigate for people walking and rolling. In the past, tree removal may have been considered for sidewalk repairs.

We wanted to find a way to create ADA-compliant sidewalks on Aurora Ave N without removing these mature trees.

N 81st Street – Location 1

In 1980, the City planted Sweet Gums on both sides of Aurora Ave N between N 80th and N 85th Streets.

Original tree pits were 20 square feet (4 foot by 5 foot). SDOT wanted to replace temporary patches with concrete sidewalks.

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N 81st Street - Location 1

Roots were pruned and shaved to allow for an ADA-compliant sidewalk.

Tree roots close to the surface called for custom sidewalk solution.

Sweet Gum on Aurora Ave N just south of N 81st St

Aluminum sidewalk plate over roots provides a smooth walking surface with less harm to the tree.

Aluminum plate has a durable non-skid coating used on commercial docks in marine environments.

N 81st Street - Location 1

N 81st Street - Location 1

Aluminum plate secured with tamper-proof concrete anchors.

Fasteners can be removed as needed for future root maintenance.

N 81st Street - Location 1

Finished sidewalk with metal sidewalk plate meets ADA and preserves the existing tree. The metal sidewalk plate blends with the concrete sidewalk paving.

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N 81st Street - Location 2

- Sweet Gum trees north of N 81st Street had also outgrown undersized tree pits (20 sf).
- The chain fence on metal poles runs along the ROW line.

N 81st Street - Location 2

- SDOT shifted the sidewalk east to the ROW line and sloped the sidewalk to go over existing tree roots.
- Tree pits were expanded to form a continuous planting strip.
- Wheel stops along the sidewalk prevent people from accidentally walking or rolling onto the sloped planting strip.
- Low shrubs were planted in the planting strip to further discourage people from traversing the slope.

Soil Volume & Trees

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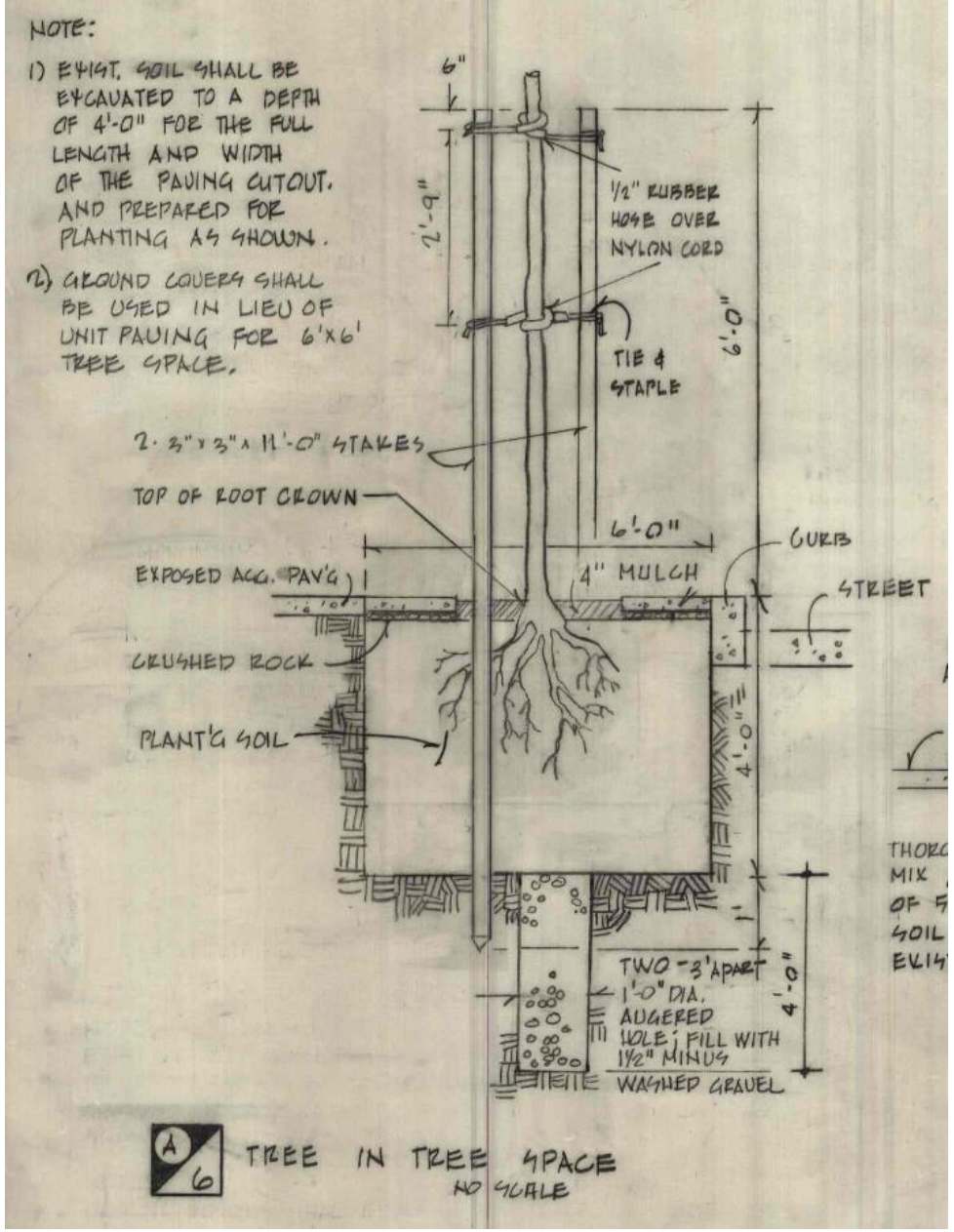
What's Below the Surface?

Landscape architects in 1968 recognized the importance of soil volume for trees.

Detail shows 4 ft planting soil depth with
4 ft trench of washed gravel below planting soil.



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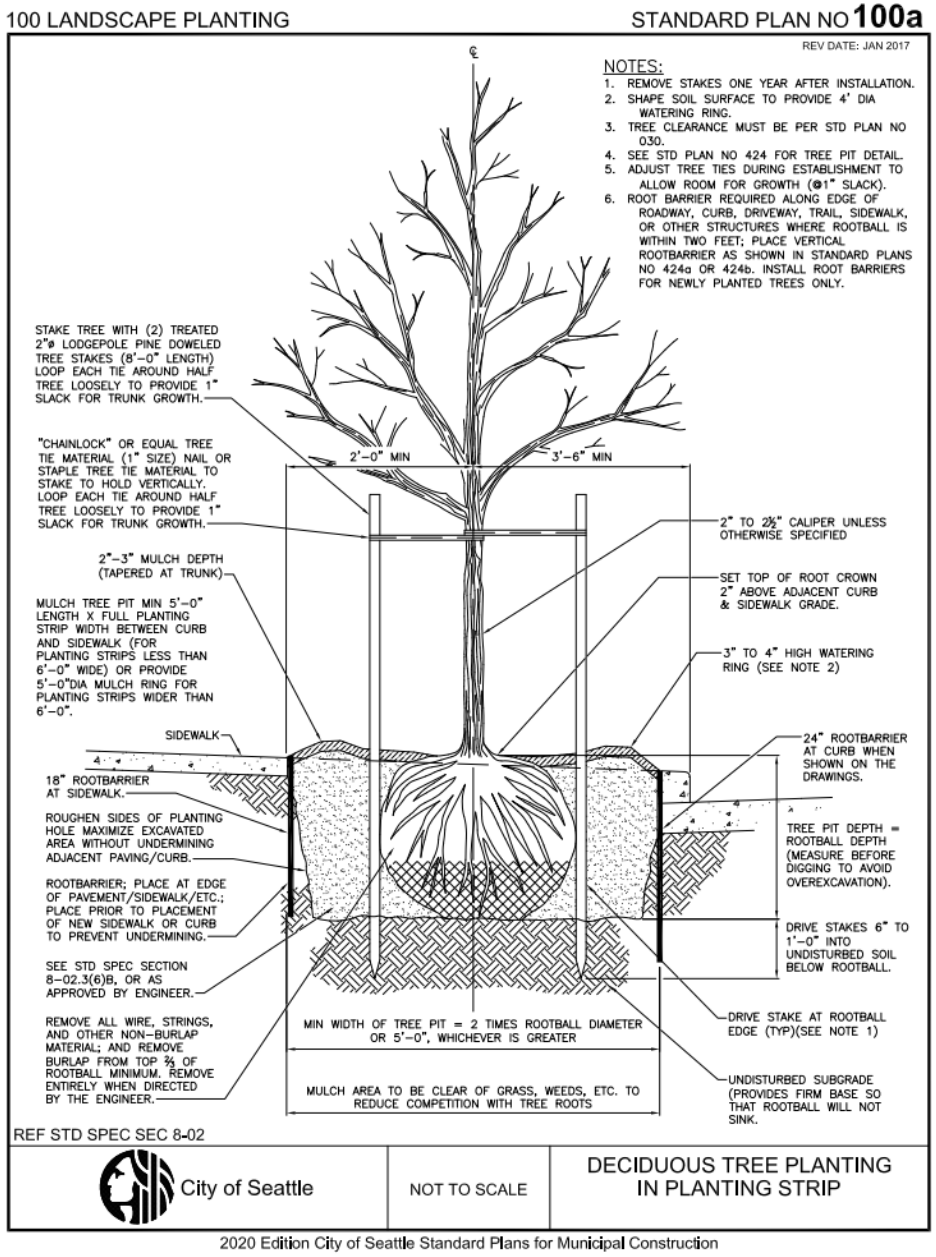
What's Below the Surface?

Planting details today assume trees can access native soil under the sidewalk.

Planting strips are excavated to depth of root ball and backfilled with planting soil.



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City of Seattle

NOT TO SCALE

DESIRABLE LOCATIONS FOR UTILITIES (RESIDENTIAL STREET)

REF STD SPEC SEC 1-07.16, 1-07.17, 1-07.28

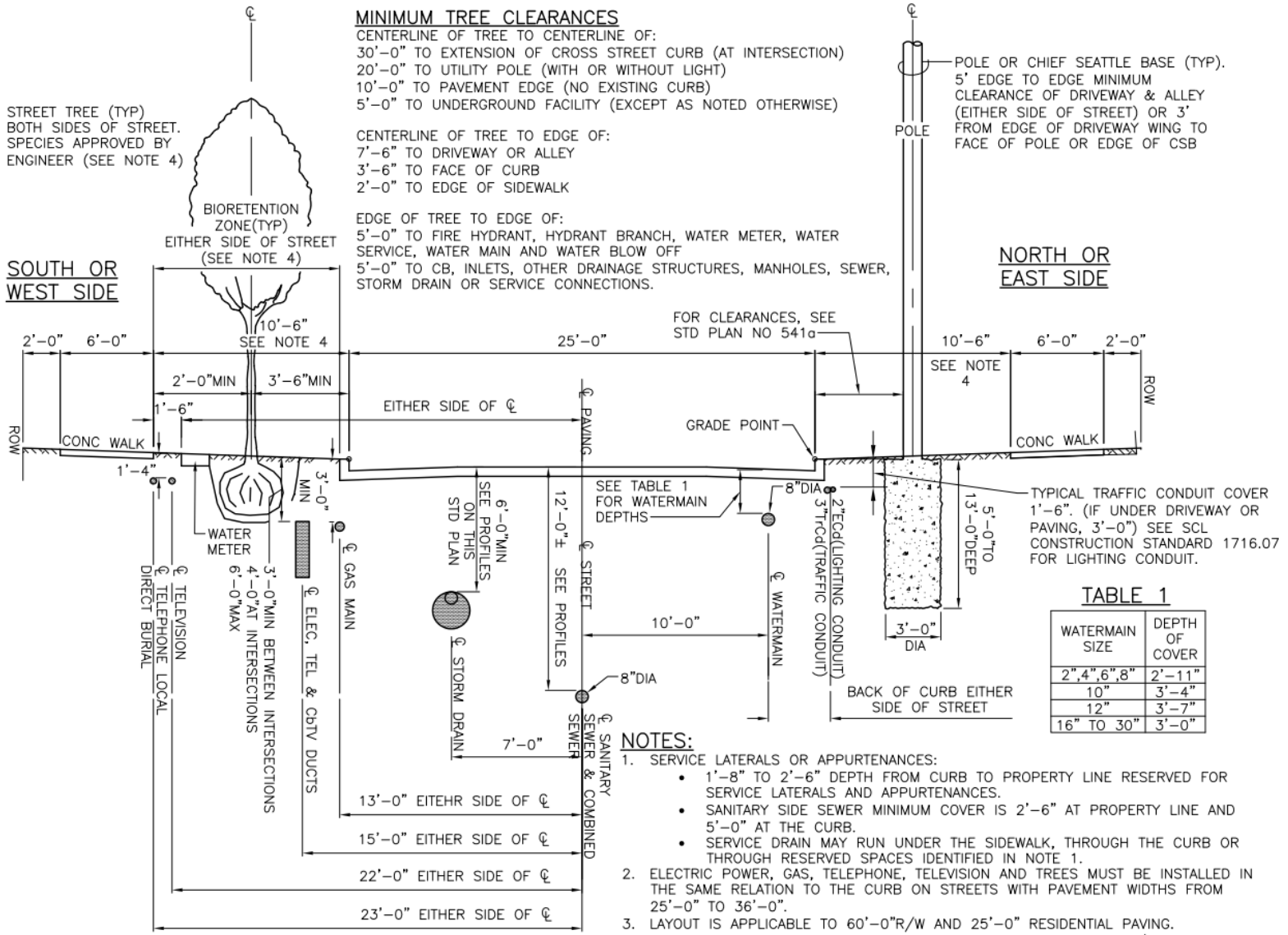


TABLE 1

WATERMAIN SIZE	DEPTH OF COVER
2",4",6",8"	2'–11"
10"	3'–4"
12"	3'–7"
16" TO 30"	3'–0"

NOTES:

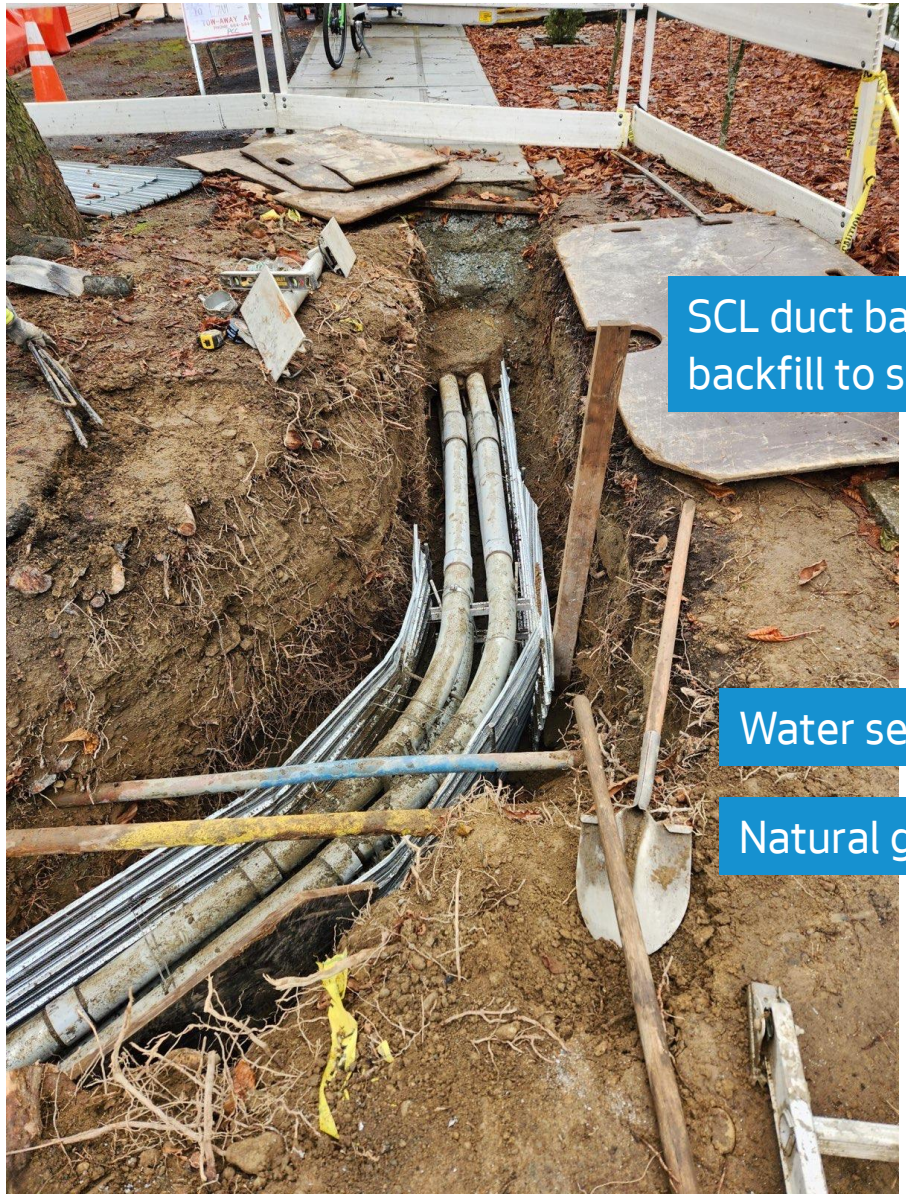
1. SERVICE LATERALS OR APPURTENANCES:
   - 1'–8" TO 2'–6" DEPTH FROM CURB TO PROPERTY LINE RESERVED FOR SERVICE LATERALS AND APPURTENANCES.
   - SANITARY SIDE SEWER MINIMUM COVER IS 2'–6" AT PROPERTY LINE AND 5'–0" AT THE CURB.
   - SERVICE DRAIN MAY RUN UNDER THE SIDEWALK, THROUGH THE CURB OR THROUGH RESERVED SPACES IDENTIFIED IN NOTE 1.
2. ELECTRIC POWER, GAS, TELEPHONE, TELEVISION AND TREES MUST BE INSTALLED IN THE SAME RELATION TO THE CURB ON STREETS WITH PAVEMENT WIDTHS FROM 25'–0" TO 36'–0".
3. LAYOUT IS APPLICABLE TO 60'–0"R/W AND 25'–0" RESIDENTIAL PAVING.
4. REDUCING CLEARANCE BETWEEN A NEW UTILITY AND EXISTING TREE/PLANTING STRIP, REDUCING CLEARANCE BETWEEN A NEW/REPLACEMENT TREE AND EXISTING UTILITY, INCORPORATING GSI (BIORETENTION) INTO PLANTER STRIP OR CURB EXTENSION OR CHANGING THE 10'–6" WIDTH OF PLANTING STRIP REQUIRES REVIEW AND APPROVAL OF THE ENGINEER AND MAY REQUIRE ADDITIONAL MITIGATING MEASURES.
5. BACKFILL OVER ALL UTILITY INSTALLATIONS BETWEEN BACK OF CURB AND R/W AND WITHIN 5' OF CENTERLINE OF TREES MUST BE PLANTING SOIL FOR A MINIMUM DEPTH EQUAL TO THE DEPTH OF THE ROOTBALL (NO CDF ALLOWED IN THIS ZONE).

REV DATE: NOV 2017

What's Below the Surface?

As the city continues to underground power, high voltage duct banks and vaults placed in the sidewalk and planting strip further reduce soil volume for trees.

SCL vault in planting strip



SCL duct bank with CDF backfill to surface

Water service (blue)

Natural gas (yellow)

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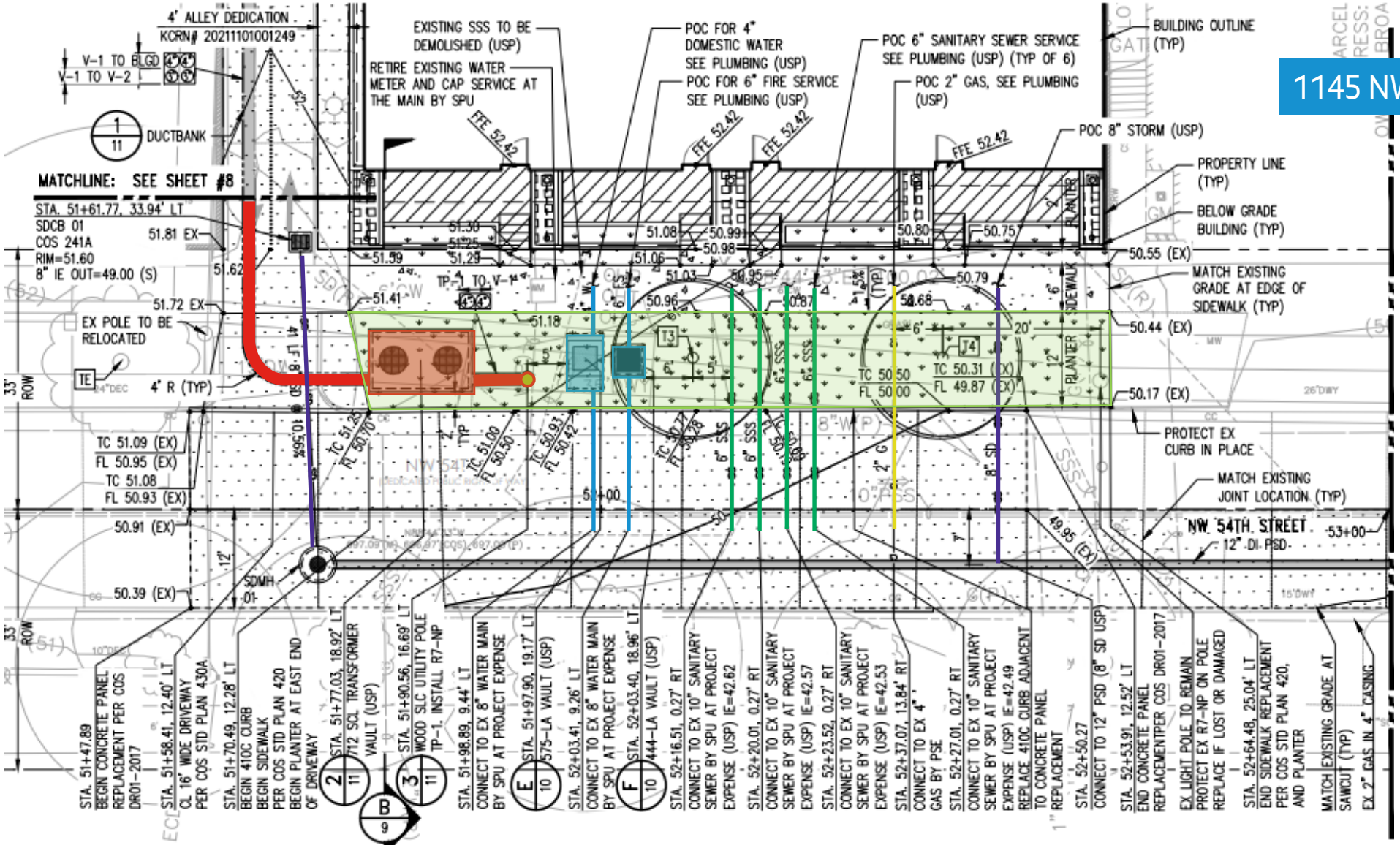
What's Below the Surface?



1145 NW Market Street

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Soil Volume & Canopy Spread

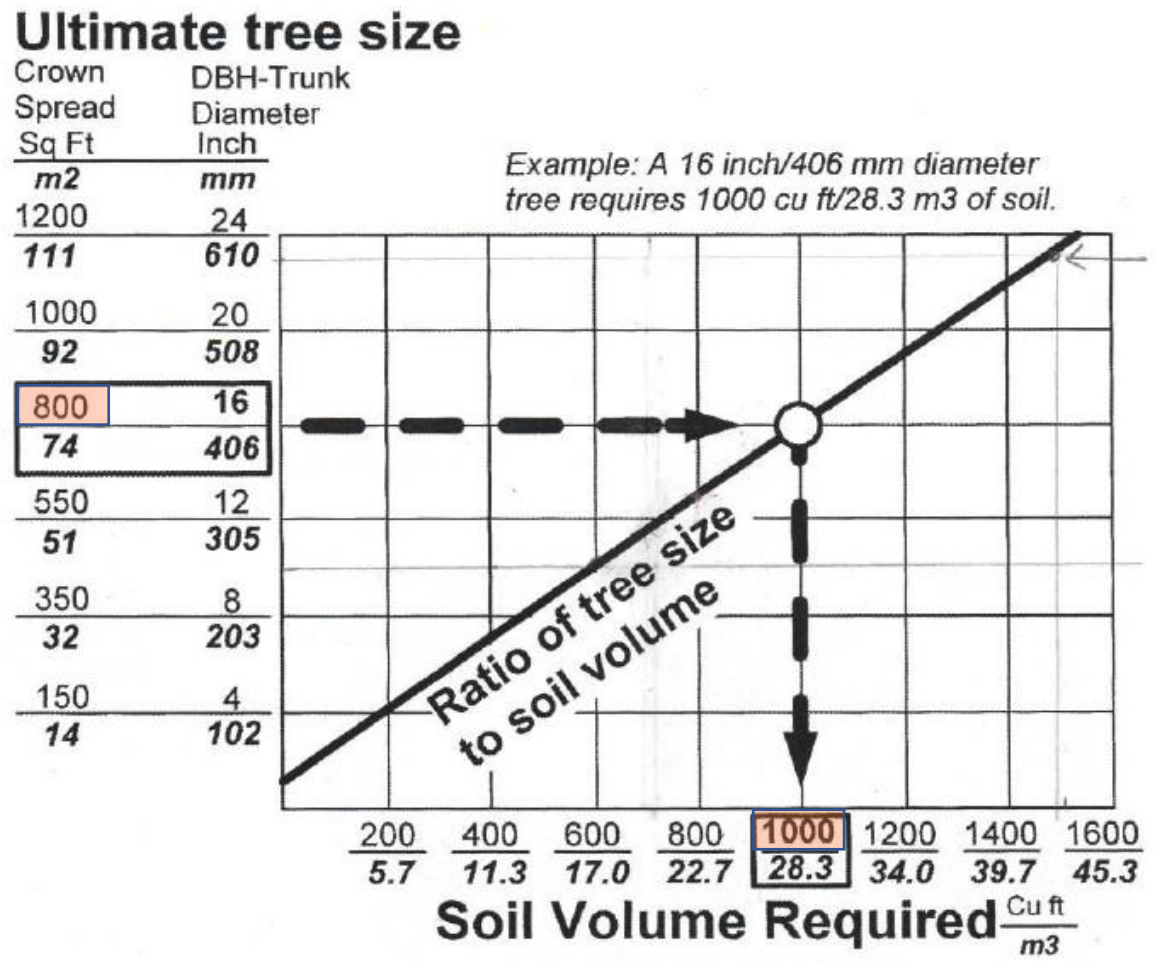
Multiple studies have shown the relationship between soil volume and tree canopy spread.

A general rule of thumb is that 1.25 cubic feet of soil volume should be provided for every square foot of mature canopy spread.

800 SF mature canopy
(28 ft spread)

1000 CF soil volume
(250 SF for 4 FT depth)

Table 2.4.1. Tree size to soil volume relationships *(Urban 1992)*.



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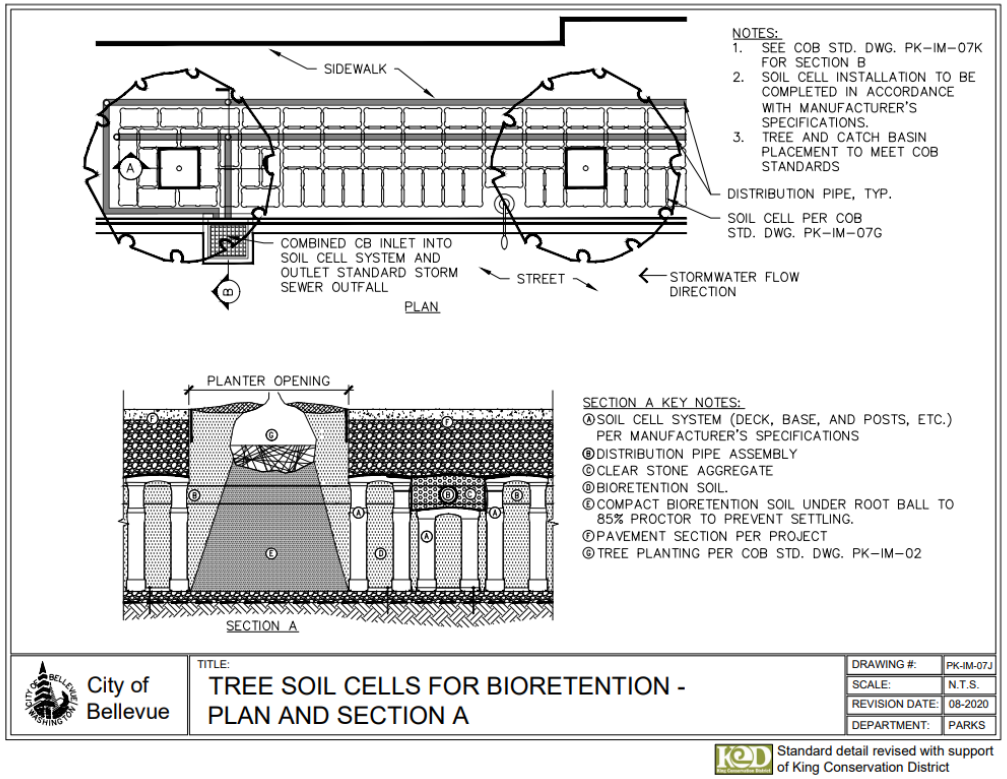
Soil Volume Strategies

Soil cells are becoming more widely used as cities seek to expand soil volume for trees under crowded urban conditions.



Soil cells at Escala Condos on 4th Avenue

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Soil Volume Standards

City of Bellevue

Tree Size	Soil Volume (CF)
Large trees (35+ ft canopy spread, ~24" mature DSH)	1500
Medium trees (25-35 ft canopy spread, ~16" mature DSH)	1000
Small trees (10-25 ft canopy spread, ~8" mature DSH)	500

City of Seattle - Streets Illustrated

1,200 CF of soil volume for each tree planted in urban areas or downtown

City of Seattle - Green Factor

Tree Size	Soil Volume (CF)
Large trees (26+ ft canopy spread)	550
Large/Medium trees (21-26 ft canopy spread)	400
Medium/Small trees (16-21 ft canopy spread)	250
Small trees (8-16 ft canopy spread)	150

Questions?

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From the entire SDOT Team:

Thank you!

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