TREE PLANTING REQUIREMENTS NEAR UNDERGROUND ELECTRIC FACILITIES

ISSUING DIVISION: Electric Engineering
SVP SPONSOR: Kevin Keating, Manager

Signed by Kevin Keating
Date Signed 8 December, 2017
Revision 0 **Sheet 1 of 9**

SECTION: Clearances SD-1235

Scope of Document

This document is intended for use by Developers, Contractors, and by City forces. Its purpose is to:

1. Provide a standard design for landscape trees and the use of root barriers near SVP Underground facilities within the City of Santa Clara, or within electric easements dedicated to SVP.
2. Define the type of trees and the minimum distances they are to be planted from SVP substructures, pad mounted equipment, and underground conduits.
3. Define work requirements for installation of root barriers.
4. Act as a supplement to detailed design drawings prepared by Silicon Valley Power (SVP).

Revisions

This is a new document in the Clearances section of the System Design Manual. There are no revisions at this time.

References

TREES:

Sacramento Municipal Utility District (SMUD), www.smud.org/en/residential/environment/shade-trees/choices.htm
Marina Tree & Garden Club, www.marinatreeandgarden.org/treelist
Friends of the Urban Forest, Trees of San Francisco: A guide to street-tree planting and care, FUF, 1994, www.fuf.net.
Urban Forest Ecosystems Institute, www.selectree.calpoly.edu/search/.
Western Garden Book, Sunset Publishing Corporation, Menlo Park, CA, 2012.
Sacramento Tree Foundation, www.sactree.com.

ROOT BARRIER:

ASTM D638, "Standard Specification for Tensile Modulus, Tensile stress @ yield and Elongation break %"

Rescissions

None – This is a new document in the Clearances section of the System Design Manual.

Definition of Terms

- **Contractor**: The person or persons, firm, partnership, corporation or combination thereof, who has entered a contract with the City of Santa Clara, as a party or parties of the second part of his or their legal representative.
- **City:** City of Santa Clara or the City Council of the City of Santa Clara.
- **City Engineer:** City Engineer of the City of Santa Clara.
- **Developer**: A developer is any person who causes land to be divided into two or more parcels for himself or others; or is engaged in the development of property, in whole or in part, by the placing of any improvements thereon, whether the property was previously developed in whole, in part, or at all.
- **High Voltage (Marking):** Safety identifier of any electric system where the nominal system voltage is greater than 1000 volts. This is not the same as the NEC definition for "High Voltage".
- **Low Voltage:** Any electric system where the nominal system voltage is less than 600 volts
- **Primary:** SVP Electric facilities operating at 12,000V
- **Public Works Inspector:** City of Santa Clara Public Works Dept. Inspector, responsible for verifying proper installation and repair of all facilities within City right of ways and easements.
- **Silicon Valley Power (SVP):** Municipal Electric Department of the City of Santa Clara.
- **SVP Inspector:** Silicon Valley Power Electric Inspector responsible for verifying proper installation of electric substructures installed for use of SVP.

Work Requirements

A. The Contractor, or SVP, shall furnish and install all facilities as shown and specified in the Project Specifications and/or on the detailed drawing(s). In the event of a conflict between the Project Specifications and the detailed drawings, the more stringent will apply.
B. The Contractor shall notify Underground Service Alert (U.S.A.) at (800) 227-2600 or 811 at least 2 working days in advance of any excavation to plant trees, install root barriers or any other work that requires excavation.

C. Keep all trees, people, and equipment away from all electric power lines, including services.
D. The Contractor shall meet and follow all National Pollutant Discharge Elimination System (NPDES) requirements in effect at the time of construction.
E. If archaeological materials are uncovered during grading, trenching, tree planting excavation, or any other excavation, all earthwork within 100 feet of these materials shall be stopped until a professional archaeologist who is certified by the Society of California Archaeology (SCA) and/or the Society of Professional Archaeology (SOPA) has had an opportunity to evaluate the significance of the find and suggest appropriate mitigation measures, if they are deemed necessary.

Materials

A. Root barrier shall be constructed of a polyethylene material and have a minimum thickness of 0.06" and shall be a minimum width of 48". It may be a minimum 10' roll or in 5 -24" long panels. Panels must be interlocking. Root barrier shall be installed per the manufacturer's recommendations, per project specifications, or per the direction of the SVP Engineer. Approved vendors for root barriers are:

a. DeepRoot, (Tel. 800-458-7668)
b. Century Products, (Tel. 714-632-7083)
c. Villa Root Barrier, Inc., (800-654-4067)

B. Refer to Table 1 for specific trees approved for planting near SVP electric facilities. Table 1 also includes the minimum planting distances from SVP facilities for specific trees as well. Figures 1 and 2 provide installation diagrams for root barriers near SVP facilities.

						Planting Distances	
Common Name	**Botanical Name**	**Height**	**Width**	**Growth Rate**	**Flower**	**Min. Distance from pad mounted equipment (d)**	**Min. Distance from Underground Lines (d)**
AUSTRALIAN WILLOW	Geijera parviflora	35'	20'	Moderate	White	8'	10'
BLUE PALO VERDE	Cercidium floridum	25'	20'	Moderate	Yellow	8'	8'
CATALINA IRONWOOD	Lyonothamnus floribundus	30'	15'	Rapid	White	8'	8'
CHASTE TREE	Vitex agnuscastus	15'	15'	Moderate	Lavender/blue	8'	3'
CHINESE FLAME TREE	Koelreuteria bipinnata	40'	35'	Moderate	Yellow	8'	12'
CRAPE MYRTLE	Lagerstroemia hydrid	25'	12'	Moderate	Pink,White, Lav.	8'	3'
EVERGREEN PEAR	Pyrus kawakamii	30'	35'	Moderate	White	8'	6'
FERN PINE	Podocapus gracilior	20'	12'	Slow	insignificant	6'	3'
FLOWERING CHERRY	Prunus 'Okame'	30'	30'	Rapid	White/Pink	6'	8'
FLOWERING CRABAPPLE	Malus 'Adirondack'	16'	22'	Moderate	White	8'	8'
FLOWERING PLUM	Prunus cerasifera 'Krauter Vesuvius'	20'	15'	Moderate	Pink	6'	6'
GOLDENRAIN TREE	Koelreuteria paniculata	40'	35'	Rapid	Yellow	8'	12'
HONEY LOCUST	Gleditsia triacanthos f. inermis	8'	8'	Rapid	Yellow-Green	6'	6'
JACARANDA	Jacaranda mimosifolia	40'	40'	Rapid	Blue/Purple	10'	10'
JAPANESE CRABAPPLE	Malus floribunda	18'	25'	Moderate	White	8'	3'
JAPANESE MAPLE	Acer palmatum	25'	20'	Slow	Red	8'	8'
JAPANESE SNOWBELL	Styrax japonicus	20'	20'	Slow	White	8'	3'
JERUSALEM THORN	Parkinsonia aculeata	20'	25'	Rapid	Yellow	8'	5'
LOCUST	Robinia pseudoacacia f. umbraculifera	12'	12'	Rapid	White	8'	8'
OLIVE	Olea eupropaea 'Swan Hill'	30'	20'	Slow	White	8'	8'
SARATOGA SWEET BAY LAUREL	Laurus 'Saratoga'	30'	25'	Slow	Pale yellow	12'	8'
MAGNOLIA, LITTLE GEM	Magnolia grandiflora 'Little Gem'	20'	10'	Slow	White	12'	8'
MAGNOLIA, SAUCER	Magnolia x soulangeana	30'	25'	Moderate	Pink to White	15'	8'
PURPLE SMOKE TREE	Cotinus coggygria	16'	12'	Moderate	Pink	6'	3'
REDBUD, EASTERN	Cercis canadensis	30'	20'	Moderate	Pink to White	8'	3'
REDBUD, WESTERN	Cercis occidentalis	15'	10'	Moderate	Purplish-pink	6'	3'
THREE-FLOWER MAPLE	Acer triflorum	30'	20'	Slow	Pink/Yelow-Green	8'	8'
WRIGHT ACACIA	Acacia wrightii	25'	30'	Slow	White to Cream	8'	8'

References:

Sacramento Municipal Utility District (SMUD), www.smud.org/en/residential/environment/shade-trees/choices.htm

Marina Tree & Garden Club, www.marinatreeandgarden.org/treelist.

Friends of the Urban Forest, Trees of San Francisco: A Guide to Street-Tree Planting and Care, FUF, 1994, www.fuf.net.

Urban Forest Ecosystems Institute, www.selectree.calpoly.edu/search/

Western Garden Book, Sunset Publishing Corporation, Menlo Park, CA

Sacramento Tree Foundation, www.sactree.com

Table 1: Minimum Planting Distances for Approved Trees

Note: This table is to be used in conjunction with Figures 1 and 2 of this document. Please also refer to the Workmanship section of this document for root barrier installation requirements.

Workmanship

A. EXAMINATION

1. Verify that field conditions are acceptable and ready to receive work.
2. Beginning of construction means Contractor accepts existing conditions.

B. PREPARATION

1. Check tree design layout. If conflicts with SVP substructures are found, Contractor shall notify the Landscape Designer and SVP to determine a new location for the tree(s) that do not conflict with the conditions stated in this document.
2. If the Contractor needs to trim, plant, or remove trees, the Contractor shall not do any work within 10 feet of high voltage lines. Only a Contractor that has the appropriate OSHA certification is qualified to work on trees within 10 feet of high voltage lines. Contractor is required to notify SVP two business days prior to start of work.

C. INSTALLATION

1. For pad mounted equipment, install root barrier as shown in Figure 1 of this document. The root barrier must run the length of the pad + 2' past each end of the pad facing the tree. Root barrier must be installed a minimum of 3' from the pad or as described in Table 1 and Figure 1.
2. For underground conduits, install a minimum of 10' of root barrier for trees that will have a mature crown width of 12' and minimum of 20' of root barrier for trees that will have a mature crown width greater than 12'. The root barrier shall be installed half the minimum planting distance shown in Table 1 in this document. Refer to Figure 2 of this document for root barrier installation details.
3. The area around SVP equipment needs to be kept clear and available for immediate unhindered access by SVP personnel. At no time, shall a tree be planted within 10' of doors for SVP equipment. Trees planted within 10' of SVP equipment doors are subject to removal without replacement by SVP. No trees shall be planted within 6 feet of any non-door sides of SVP equipment.

Inspections

A. Work in a Public Right of Way or Public Easement

The Public Works Inspector shall be responsible for inspection. The Public Works Inspector will inspect all backfill and tree planting. The Silicon Valley Power Inspector will be responsible only for inspecting conduits, manholes, vaults, boxes, SVP equipment pads, streetlight foundations, and backfill around SVP substructures in accordance with UG 0345.
Phone: *408-615-3000* for Public Works Inspector (Have permit number available).
408-640-6302 for S.V.P. Inspector (Give Estimate Number of job when calling).

B. Work outside of a Public Right of Way or Public Easement

The Silicon Valley Power Inspector shall be responsible for inspection and will inspect all work including backfill.
Phone: *408-640-6302* (Give Estimate Number of job when calling)

C. Inspector Notification

The Inspector shall be informed at least 24 hours in advance before commencing any item of construction or installation of material to permit proper inspection of materials and workmanship. No work shall be embedded, backfilled or otherwise covered until it has been inspected and approved by the Inspector. Any materials and / or workmanship failing to meet the requirements of this Specification, good acceptable engineering or construction practices, or installed without prior notice to Inspector shall be subject to rejection. If required by the Inspector, the Developer or Contractor shall, at his own expense, remove rejected work, finish and install approved material and /or workmanship.

D. Private Electric Equipment

For all work performed on the "Service Entrance" and other private-electrical equipment, a Building permit shall be obtained from the City Building Inspection Division. Inspection of private electric equipment shall be performed by the Building Inspector.

E. Safety Regulations

It is the Developer's and Contractor's responsibility to comply with all State and OSHA Safety Regulations

Permits

For all work performed within a public right of way or public easement, an encroachment permit shall be obtained from the City Engineer's Office. An encroachment permit is not required for work outside of a public right of way or public easement.

For work within a California State Highway right of way, a Caltrans permit is required. Work within the right of way of a Santa Clara County road or expressway will require a County Permit. Work near railroad or Light Rail tracks may require a permit from the appropriate rail agency having jurisdiction over the tracks. Work near creeks, streams and waterways, may require a permit from the Santa Clara Valley Water District.

Acceptance

Upon completion of improvements satisfactory to SVP's Inspector, SVP shall accept the work.

Root Barrier Placement at Surface Pads

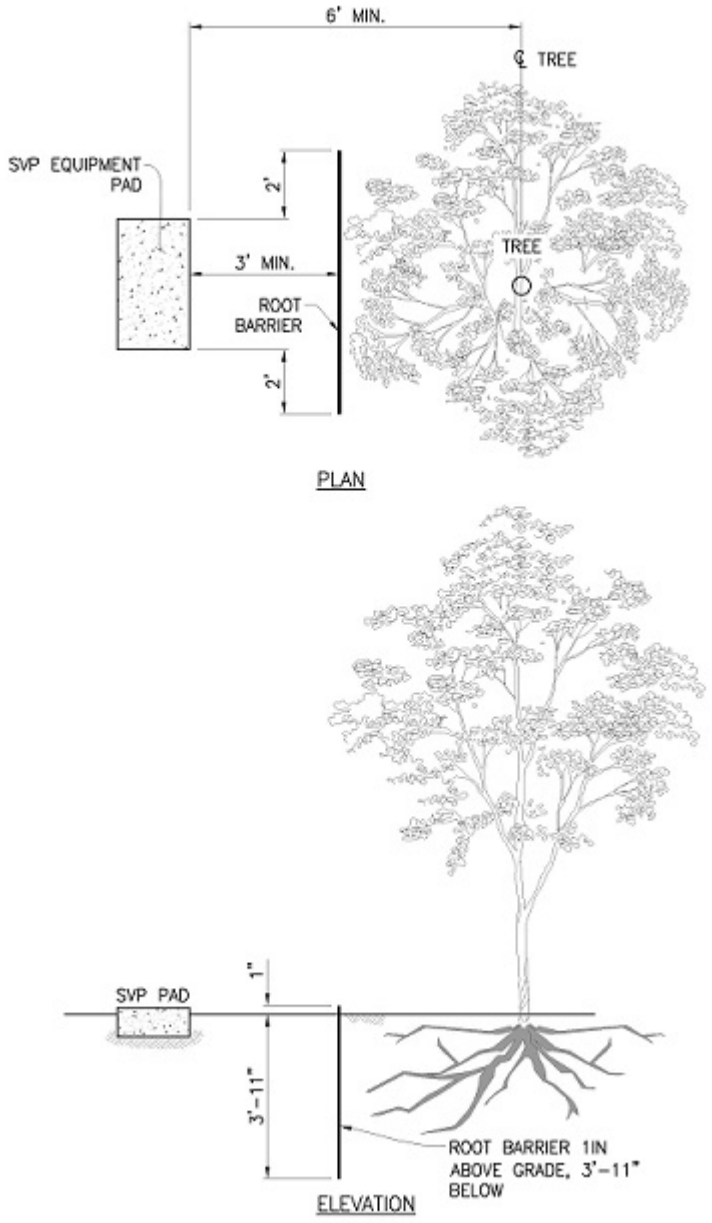

Figure 1: Tree Planting in the Vicinity of SVP Pads and Vaults

Note: This figure applies to situations where trees may be planted near SVP equipment pads, switch vaults, manholes, and primary pullboxes. A pad is shown in the figure only for representation purposes. Root barriers are to extend a minimum of two feet past the edges of the pad or structure that face the location of the tree. Lateral distances are as described in Table 1.

Root Barrier Placement at Underground Structures

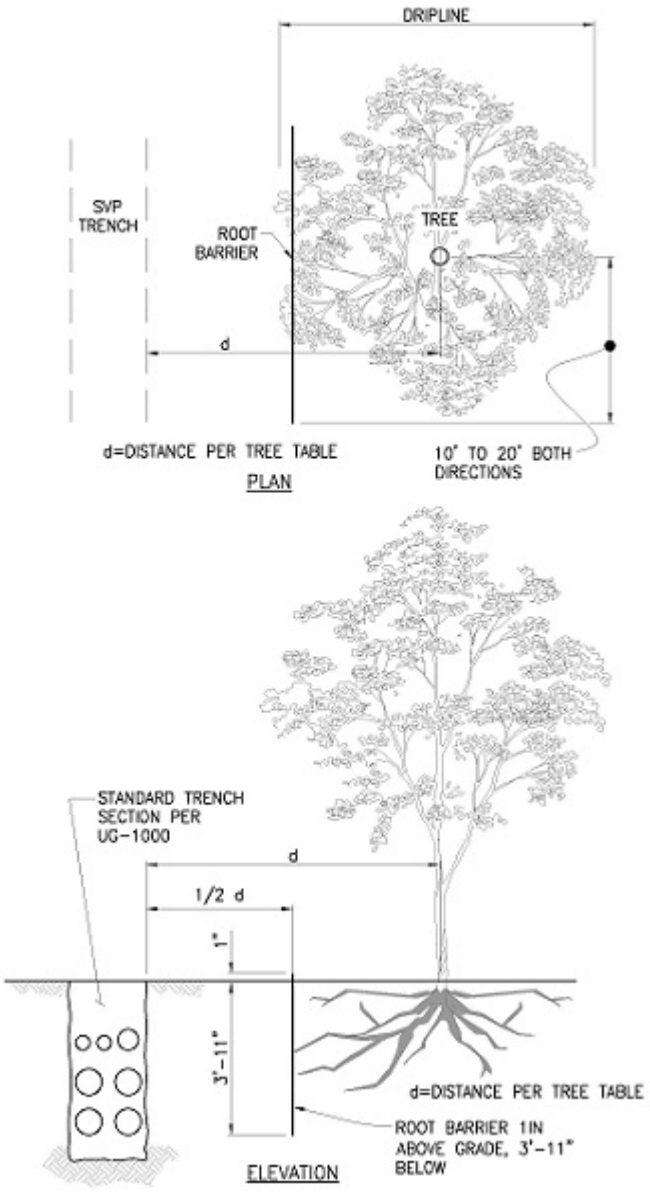

Figure 2: Root Barrier Installation Parallel with SVP Trench Structures

Note: This figure applies to situations where trees may be planted near SVP conduits, splice boxes, handholes, and other similar low voltage enclosures in the vicinity of SVP trench structures. A typical trench section is shown in the figure only for representation purposes. Root barriers shall be installed parallel with the trench alignment as described in Figure 2 and in the Workmanship section of this document. Lateral distances are as described in Table 1.