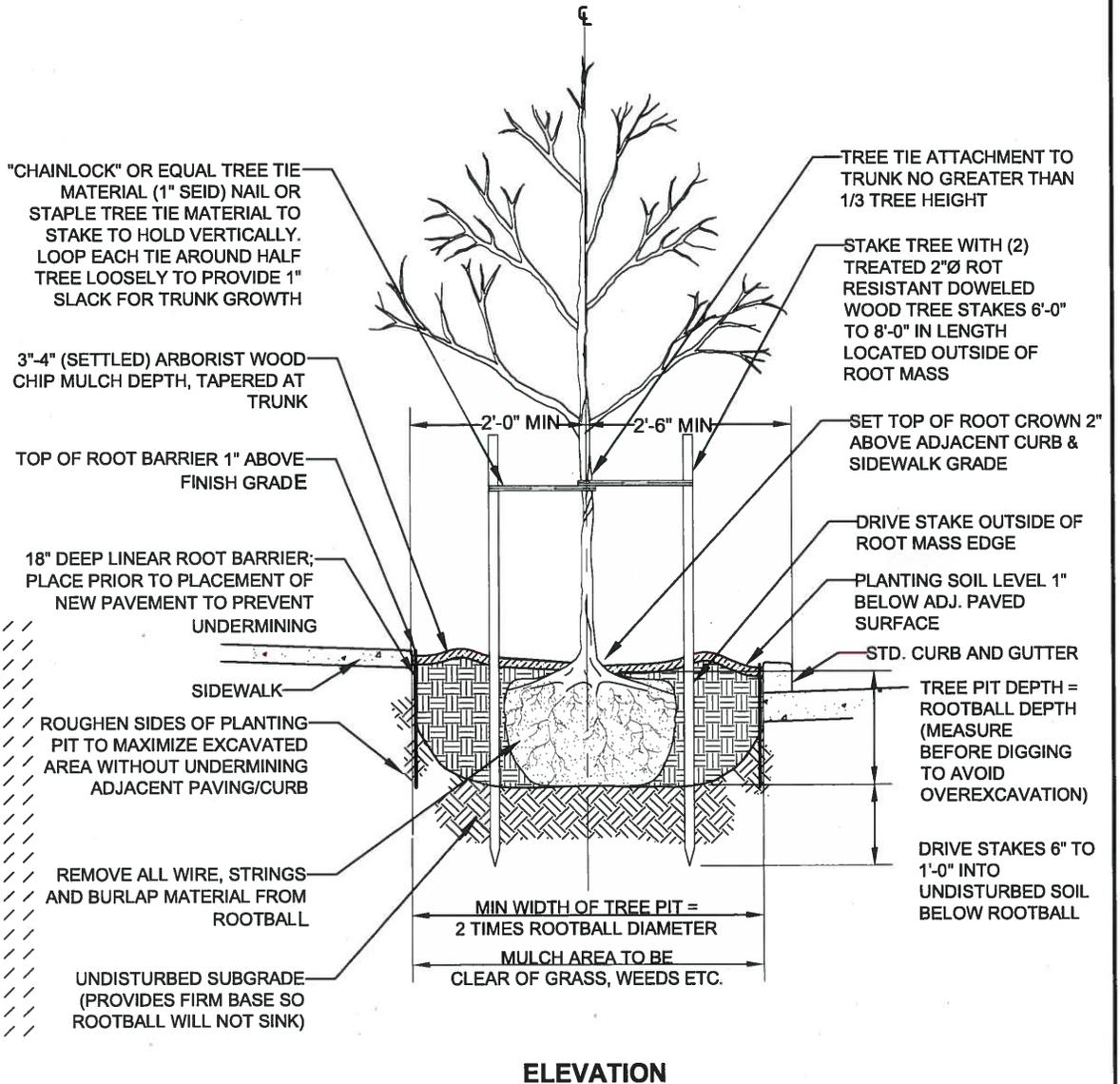
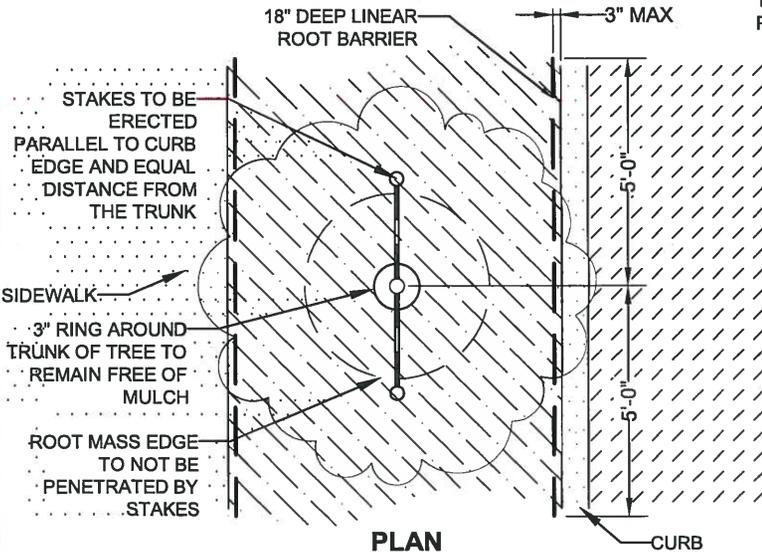


**NOTES:**

1. Planting includes removal of stakes one year after installation.
2. Shape soil surface to provide 4' dia watering ring.
3. Tree clearance shall be per STD PLAN LS-02.
4. See STD PLAN LS-03 for tree well dimension detail.
5. Root barriers shall be an injection molded or extruded modular component made of high density polypropylene or polyethylene plastic. 18" depth x 10' length root barrier is required along edge of roadways, curbs, driveways, trails, sidewalks, or other structures where root ball is within 4 feet. install root barrier for newly planted trees only.

MULCH TREE PIT MIN 5'-0" LENGTH AND FULL PLANTING STRIP WIDTH BETWEEN CURB AND SIDEWALK, FOR PLANTING STRIPS LESS THAN 6'-0" WIDE; OR PROVIDE 5'-0" DIA MULCH RING, FOR PLANTING STRIPS WIDER THAN 6'-0".



|  |   |  |
|--|---|--|
| <p>CITY OF TACOMA<br/>DEPARTMENT OF PUBLIC WORKS</p> | <p>APPROVED FOR PUBLICATION</p> <p><i>[Signature]</i><br/>CITY ENGINEER</p> <p><i>2/2/15</i><br/>DATE</p> | <p>STREET TREE PLANTING</p> <p>STANDARD PLAN NO. LS-01</p> |
|--|---|--|

**NOTES:**

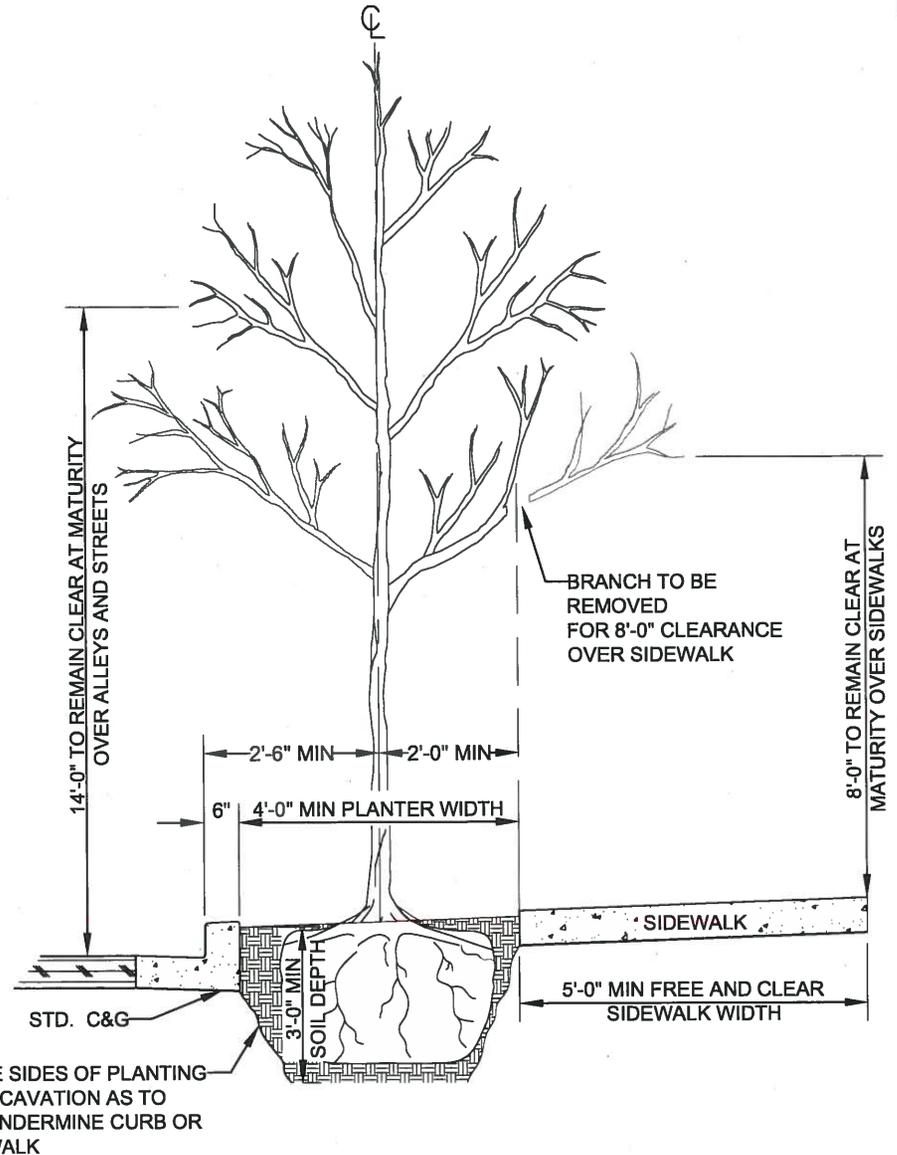
1. Street trees shall have a trunk free of branches up to the height listed below when planted:
  - A. Small trees, whose mature height is 15 to 25 feet, shall have a trunk free of branches up to a minimum of 4 feet.
  - B. Conifer/evergreen trees shall have a trunk free of branches up to a minimum of 2 feet.
  - C. Trees with ascending branches (examples - Ulmus Americana and Zelkova Serrata) may be branched 1 foot or More below the standard height and still provide proper clearance when planted.
  - D. All other trees shall have a trunk free of branches up to a minimum of 6 feet.
2. Street trees shall not be less than 1.5 inches in caliper for broadleaf trees or 6 feet in height for evergreen/conifers.
3. For minimum unpaved planting area dimensions refer to tree well dimension detail, STANDARD PLAN NO. LS-03.
4. The accessible portion of the sidewalk must be a minimum of 5 feet and be free of obstructions.

**MINIMUM TREE SETBACKS (AT PLANTING):**

|   |        |
|---|--------|
| Centerline of tree to centerline of:              |        |
| Street corner (extension of outside face of curb) | 25'-0" |
| Stop or yield sign                                | 25'-0" |
| Utility pole                                      | 15'-0" |
| Other traffic control sign                        | 5'-0"  |
| Centerline of tree to edge of:                    |        |
| Driveway  | 5'-0"  |
| Face of curb                                      | 2'-6"  |
| Pavement  | 2'-0"  |
| Edge of tree to edge of:                          |        |
| Utility worker access lids                        | 5'-0"  |
| Gas shutoff valves                                | 5'-0"  |
| Fire hydrant & hydrant branch                     | 10'-0" |
| Water meter, water service & water mains          | 5'-0"  |
| Storm inlet, cb, & manhole                        | 5'-0"  |
| Storm/sanitary service connections & mains        | 5'-0"  |

**MINIMUM TREE CLEARANCES (AT MATURITY):**

|                              |        |
|------------------------------|--------|
| Lowest branch to surface of: |        |
| Streets                      | 14'-0" |
| Sidewalks                    | 8'-0"  |



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STREET TREE CLEARANCE

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*7/2/15*  
DATE

STANDARD PLAN NO. LS-02

**TREE SIZE:**

Trees are categorized as small, medium or large based the canopy factor, which takes into account the trees mature height, crown spread and growth rate. The following formula shall be used to determine the canopy factor:

$$(\text{MATURE HEIGHT IN FEET}) \times (\text{MATURE WIDTH IN FEET}) \times (\text{GROWTH RATE}) \times (0.01) = \text{CANOPY FACTOR}$$

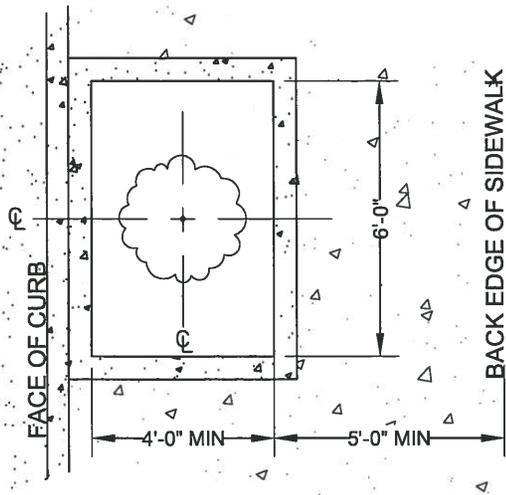
The growth rate number is 1 for slow growing trees, 2 for moderately growing trees and 3 for fast growing trees.

Tree size categories are as follows:

- A. LARGE TREES = Canopy factor greater than 90
- B. MEDIUM TREES = Canopy factor from 40-90
- C. SMALL TREES = Canopy factor less than 40

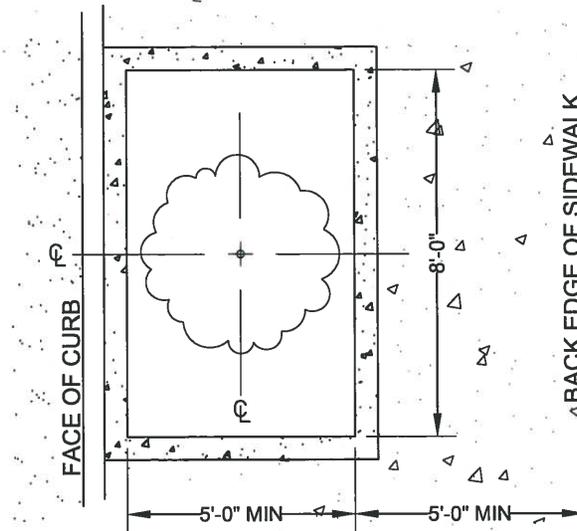
**SMALL TREES**

24 SQUARE FEET MIN  
UNPAVED PLANTING AREA



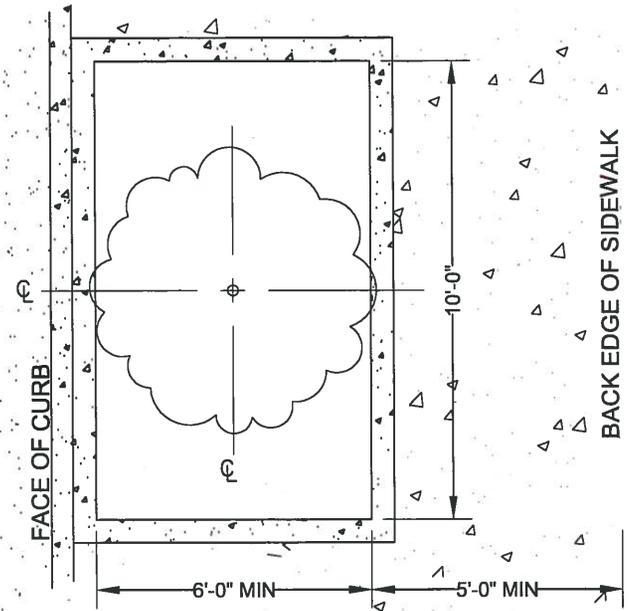
**MEDIUM TREES**

40 SQUARE FEET MIN  
UNPAVED PLANTING AREA



**LARGE TREES**

60 SQUARE FEET MIN  
UNPAVED PLANTING AREA



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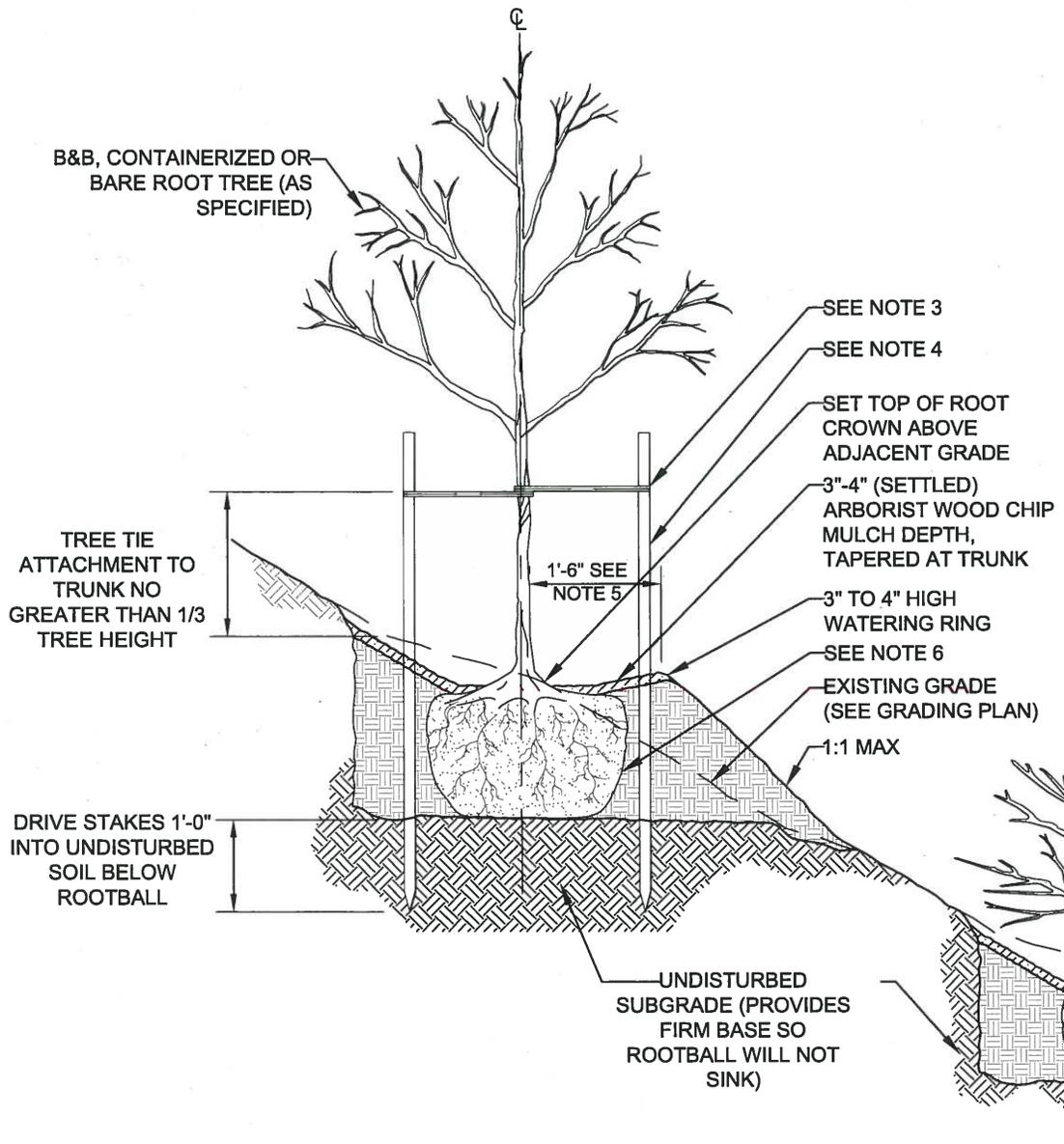
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DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER

*[Signature]* 7/6/18  
DATE

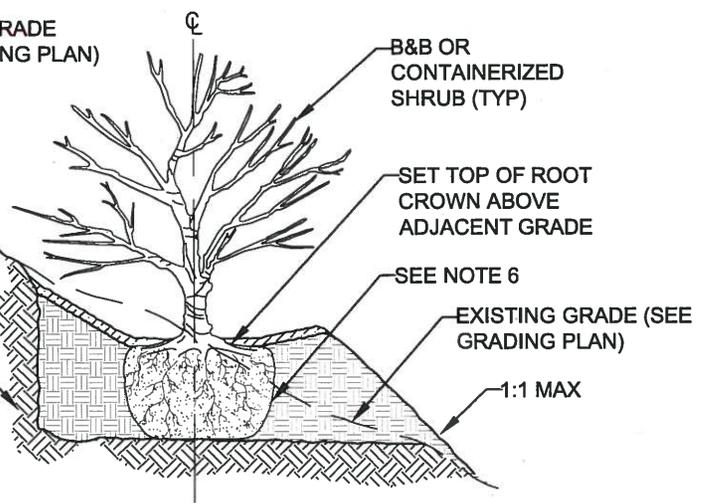
TREE WELL DIMENSION

STANDARD PLAN NO. LS-03



**NOTES:**

1. Stake trees per STD PLAN NO. LS-01
2. Slopes steeper than 2:1 may require an approved embankment stabilization system to create a level tree pit such as
  - Rock facing
  - Precast concrete wall units
  - Timber wall
  - Manufactured slope retention units
3. "Chainlock" or equal tree tie material (1" side) nail or staple tree tie material to stake to hold vertically. Loop each tie around half tree loosely to provide 1" slack for trunk growth.
4. Stake tree with (2) treated 2"Ø rot resistant doweled wood tree stakes 6'-0" to 8'-0" in length located outside of root mass
5. Shape soil to provide 3' diameter or Rootball diameter, whichever is greater, watering ring.
6. Remove all wire, strings and burlap material from Rootball.



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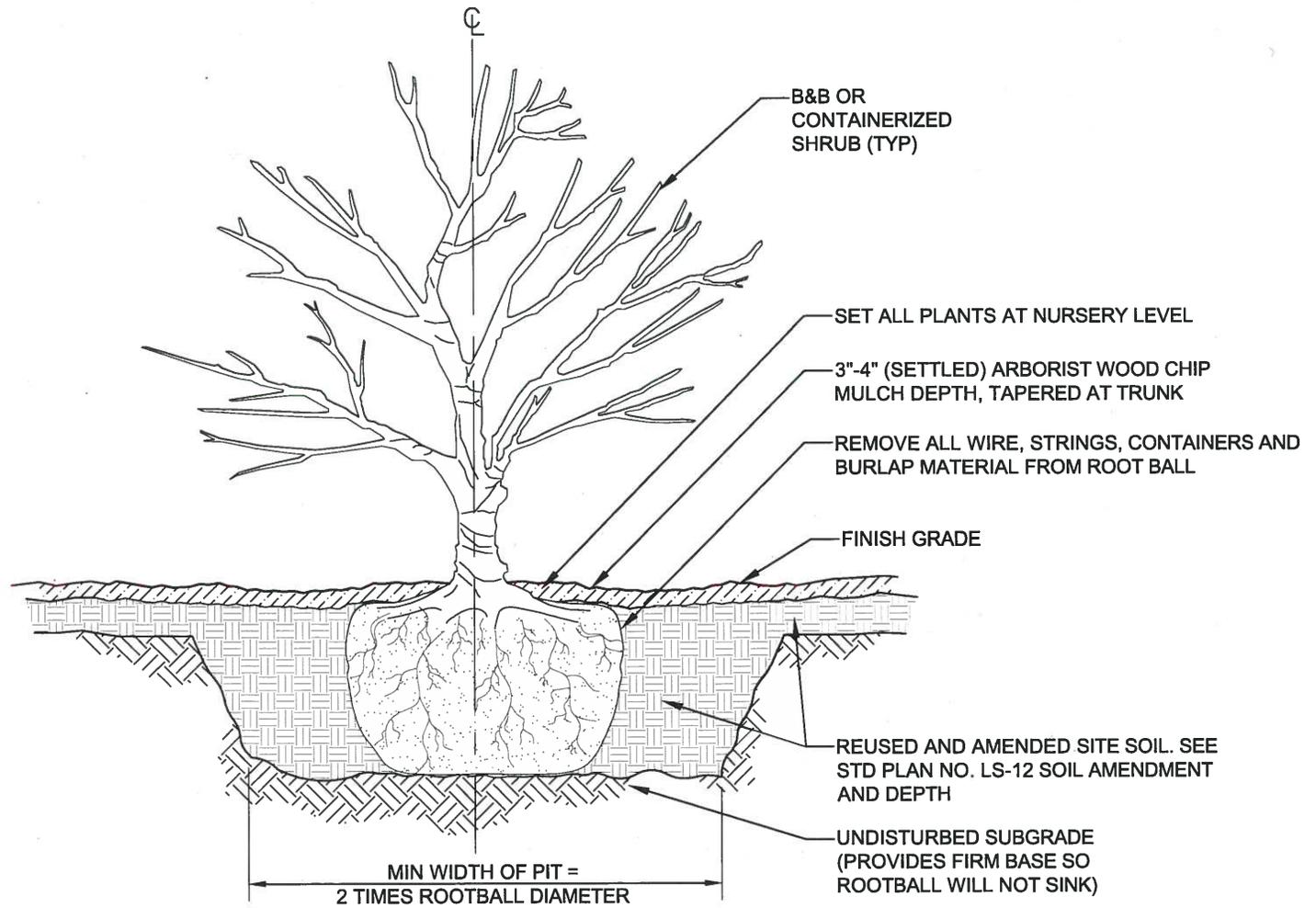
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DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER

*[Date]*  
DATE

TREE & SHRUBS PLANTING  
ON SLOPES

STANDARD PLAN NO. LS-04



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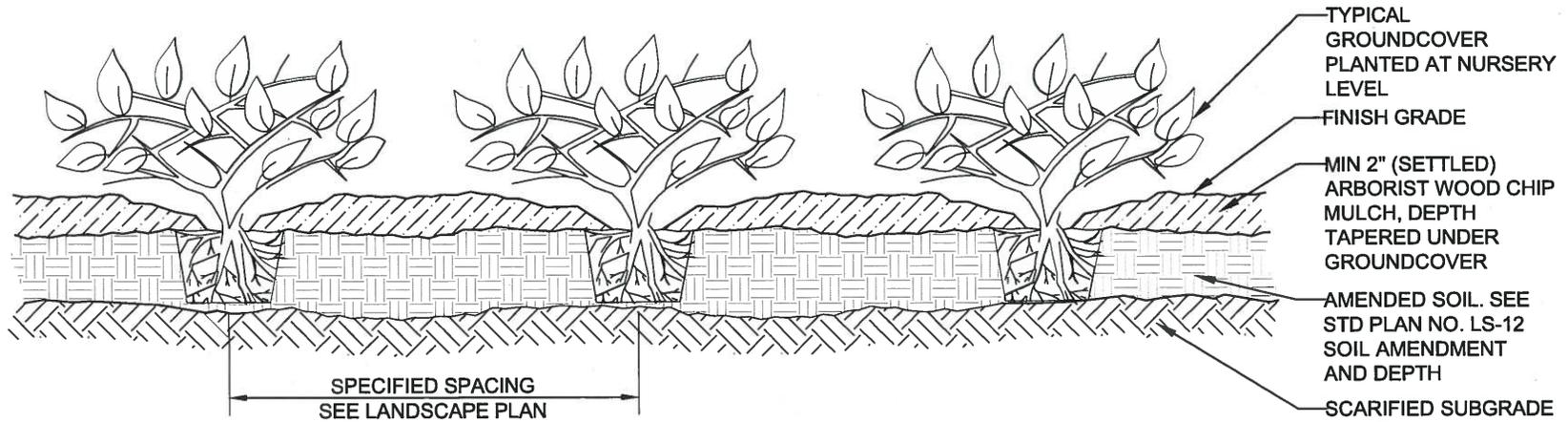
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DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER

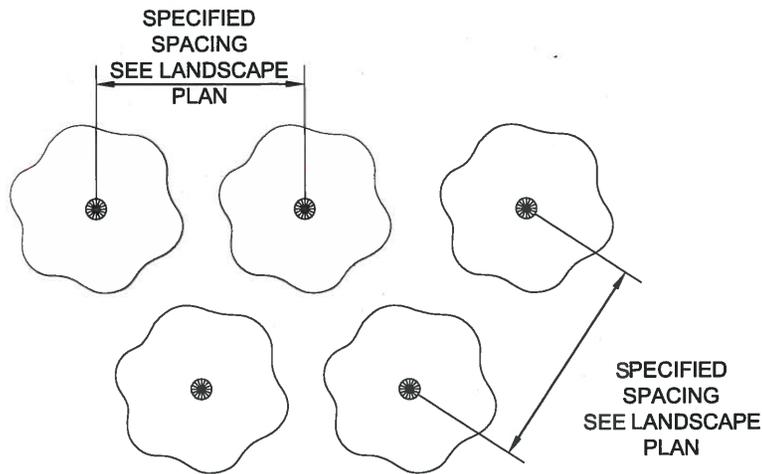
*5/6/15*  
DATE

SHRUB PLANTING

STANDARD PLAN NO. LS-05



**ELEVATION**



**PLAN**

| PLANT SPACING (INCHES) | PLANTS NEEDED TO FILL 100 SF |
|------------------------|------------------------------|
| 6                      | 460                          |
| 8                      | 260                          |
| 10                     | 167                          |
| 12                     | 115                          |
| 18                     | 51                           |
| 24                     | 29                           |
| 30                     | 19                           |
| 36                     | 13                           |
| 48                     | 7                            |

**TYPICAL PLANT QUANTITY NEEDED TO FILL 100 SF**

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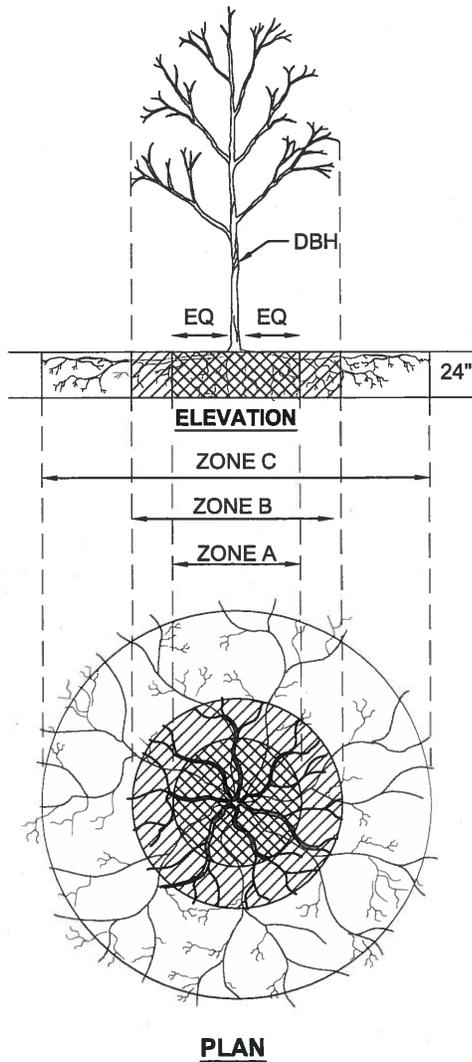
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GROUNDCOVER PLANTING

STANDARD PLAN NO. LS-06



**ZONE A (CRITICAL ROOT ZONE)**

The Critical Root Zone is the area under a tree measuring 1 foot of radius per 1 inch of diameter at breast height (DBH) from the trunk outwards and 24 inches in depth. For example: for a 10 inch dbh tree, the Critical Root Zone is located at least 10 feet out from the trunk and 24 inches deep.

**RESTRICTIONS**

1. No disturbance allowed without site-specific inspection and approval of methods to minimize root damage.
2. If roots larger than 2" IN DIA. are encountered, inspection and approval is required before proceeding trenching/excavation work.
3. Tunneling is required to install lines 3'-0" below grade or deeper.

**ZONE C (FEEDER ROOT ZONE)**

The Feeder Root Zone is the area under a tree measuring 2 feet of radius per 1 inch of DBH from the trunk outwards and 24 inches in depth. For example: for a ten inch diameter tree, The Critical Root Zone is located at least 20 feet out from the trunk and 24 inches deep.

**RESTRICTIONS**

1. Operation of heavy equipment and/or stockpiling of materials subject to approval. \*Surface protection measures required
2. Trenching permitted as follows:
  - excavation by hand or WITH hand-driven trencher maybe required
  - Minimize trench width to the extent possible
  - Maintain 2/3 or more of ZONE C in an undisturbed condition

**ZONE B (DRIP LINE)**

The Drip Line is the area below the tree in which the boundary is designated by the edge of the tree's crown.

**RESTRICTIONS**

1. Operation of heavy equipment and/or stockpiling of materials subject to approval. \*Surface protection measures required
2. Trenching permitted as follows:
  - Excavation by hand or with a hand-driven trencher may be required
  - Minimize trench width to the extent possible
  - No disturbance permitted within ZONE A
  - Maintain 2/3 or more of zone b in an undisturbed condition
3. Tunneling may be required for trenches deeper than 3'-0"

**\*SURFACE PROTECTION MEASURES**

1. Wood chip mulch layer, 6"-12" depth; or
2. 4" wood chip mulch layer under 3/4" plywood; or
3. 4" gravel over staked geotextile fabric
4. 4" wood chip mulch layer under steel plates;
5. 4" wood chip mulch layer under logging road mats

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CITY ENGINEER

*[Signature]*  
DATE 7/4/16

TREE PROTECTION  
DURING CONSTRUCTION

STANDARD PLAN NO. LS-08

### TREE PROTECTION ZONE (TPZ)

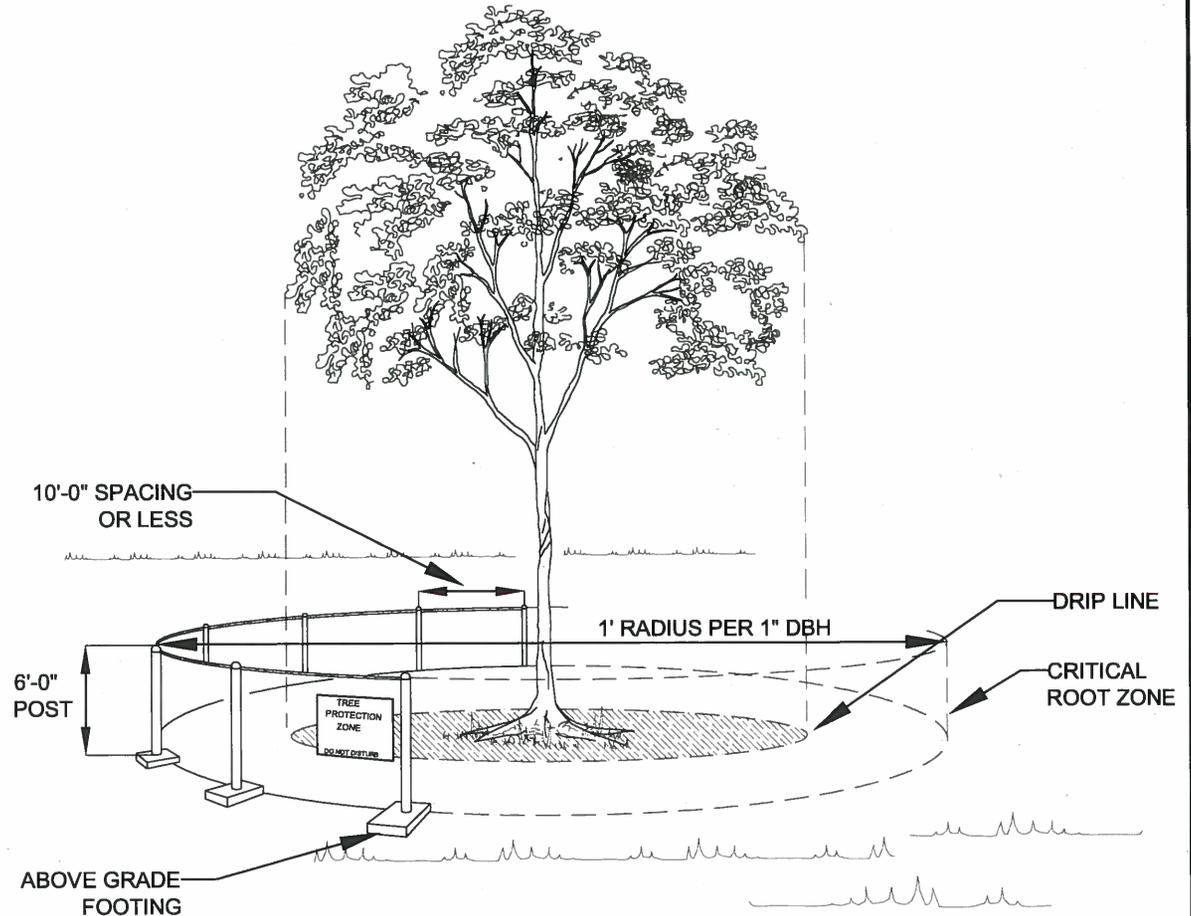
The Tree Protection Zone is an arborist defined area surrounding the trunk intended to protect the roots and soil to ensure future tree health and safety.

The location of the Tree Protection Zone is at the edge of the Critical Root Zone OR Drip Line, whichever is greater, or area as defined by the projects arborist.

For Critical Root Zone and Drip Line measurements see TREE PROTECTION DURING CONSTRUCTION STANDARD PLAN NO. LS-08.

### TREE PROTECTION FENCING

1. Erect readily visible six-foot (6'-0") high chain link fencing at the edge of the Tree Protection Zone, and at the boundary of any open space tracts or conservation easements that abut the construction site except where, due to space restrictions, a specific distance is specified by the project's arborist.
2. Fencing shall be secured 6 foot metal posts with movable footings located above ground. metal posts shall not be more than 10 feet apart.
3. Fencing shall be flush with the initial undisturbed grade.
4. Signs shall be attached to the fencing stating that the tree is designated for protection and the area inside the fencing is a TPZ, which is not to be disturbed unless prior approval has been obtained from the city and/or the project's arborist.
5. Maintain the fencing in place until the city authorizes removal or a final certificate of occupancy is issued, whichever occurs first.
6. Ensure that any landscaping done in the TPZ, subsequent to the removal of the fencing, shall be accomplished with light machinery or hand labor.
7. No construction activity shall occur within the TPZ, including but not limited to:
  - Dumping or storage of materials such as building supplies, soil, waste items, and
  - storage of vehicles or equipment



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DATE

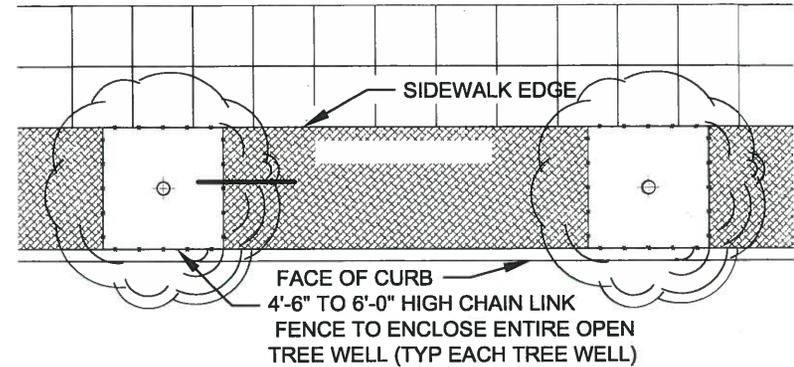
TREE PROTECTION  
DURING CONSTRUCTION

STANDARD PLAN NO.

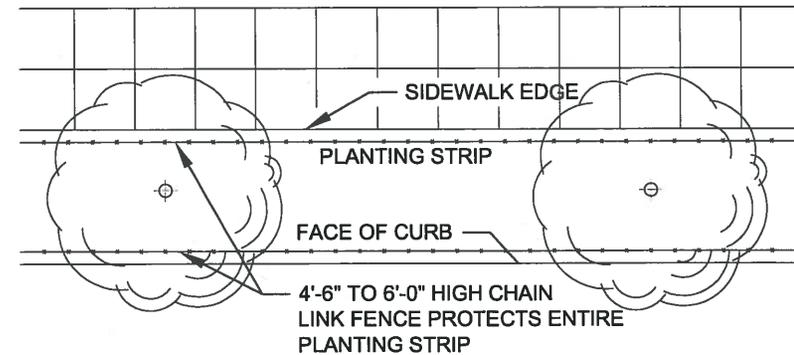
LS-09

**NOTES:**

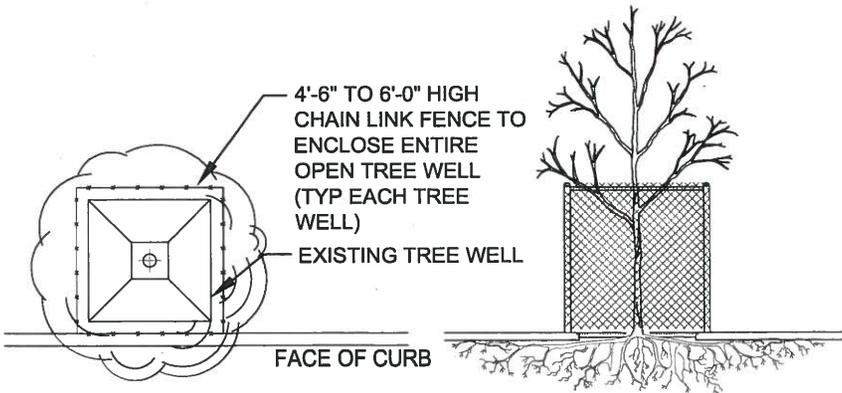
1. Tree protection requirements included in this standard detail are for trees which are directly adjacent to paved surfaces which will be retained through construction.
2. Required protection measures for trees other than those in tree wells and planting strips are contained in the TYPICAL TREE PROTECTION FENCING STANDARD PLAN NO. LS-09.
3. Reusable temporary tree and landscape protection fencing can be substituted for chain link fencing in tree wells and planting strips (SEE REUSABLE TREE PROTECTION FENCING FOR PAVED AREAS STANDARD PLAN NO. LS-11).
4. Consider traffic turning visibility and pedestrian visibility when selecting fence height; typically shorter fencing around tree pits between sidewalk and roadway is desired.



**TREE IN PLANTING STRIP-OPTION 1**



**TREE IN PLANTING STRIP-OPTION 2**



**TREE IN TREE WELL**

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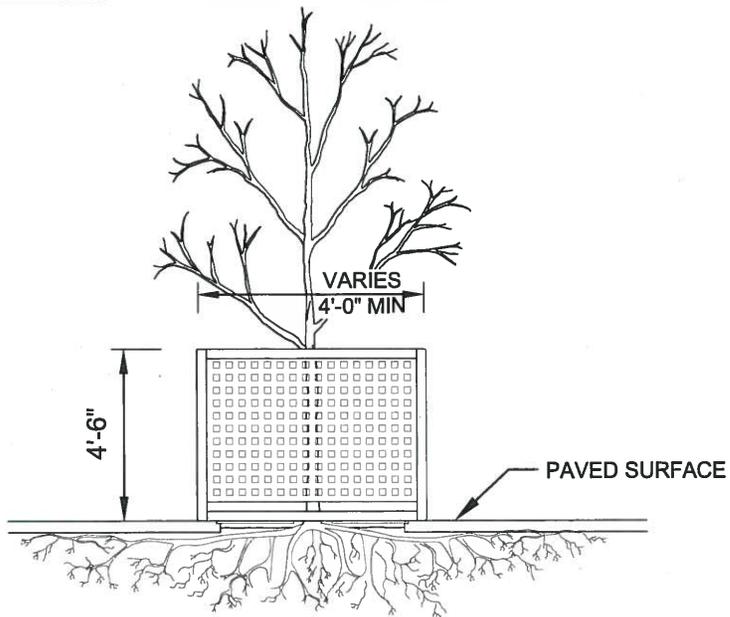
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CITY ENGINEER

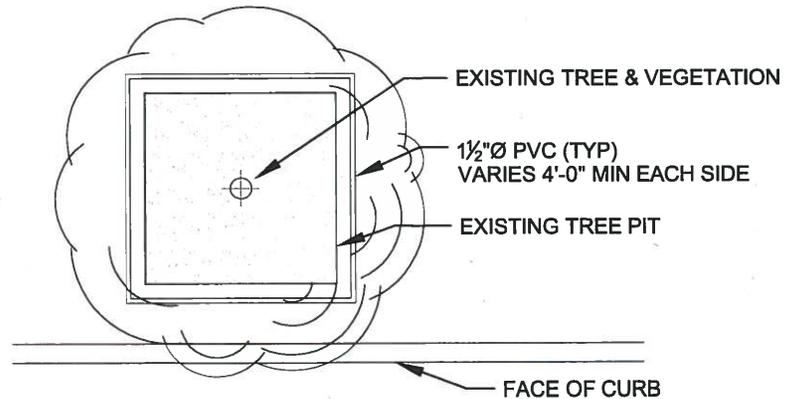
*7/6/16*  
DATE

TREE PROTECTION FENCING  
FOR TREES IN PAVED AREAS

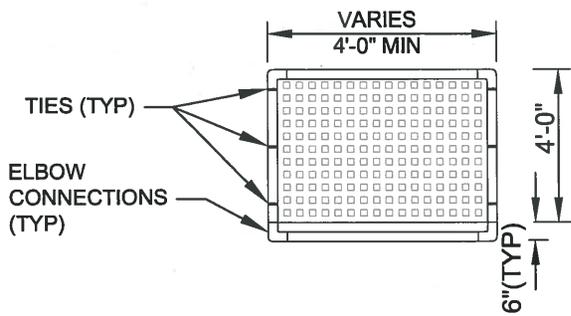
STANDARD PLAN NO. LS-10



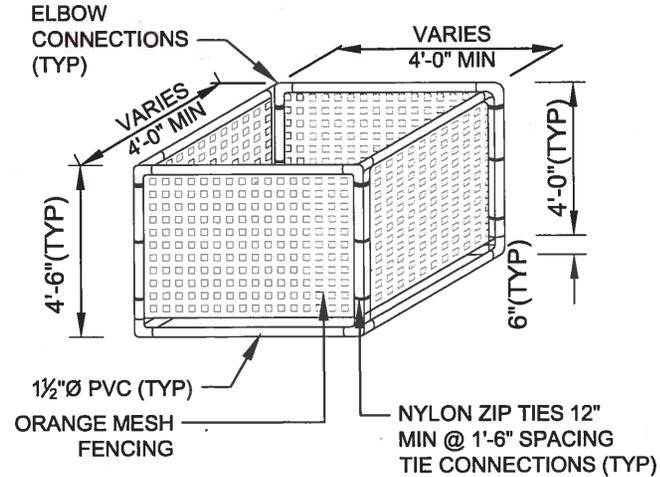
**TYPICAL TREE GUARD RAIL**



**PLAN VIEW**



**TYPICAL PANEL**



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REUSABLE TREE PROTECTION  
FENCING FOR PAVED AREAS

STANDARD PLAN NO. LS-11

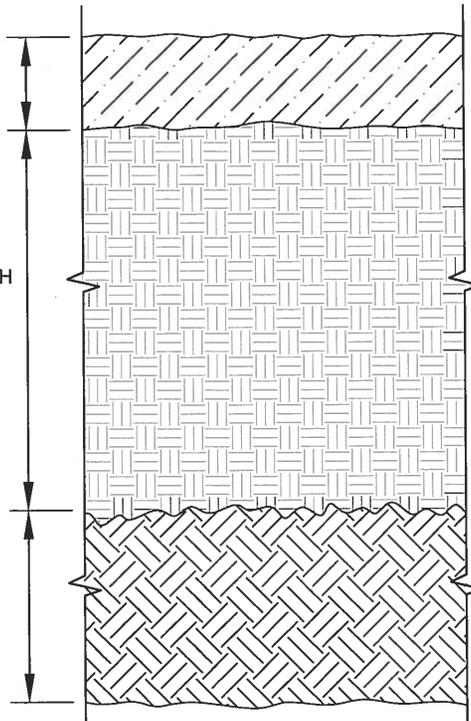
**PLANTING BEDS**

**TURF (LAWN) AREAS**

3"-4" (SETTLED)  
ARBORIST WOOD CHIP  
MULCH

3 INCHES OF COMPOST  
INCORPORATED INTO 5  
INCHES OF SITE SOIL  
(TOTAL AMENDED DEPTH  
OF 9.5 INCHES, FOR A  
SETTLED DEPTH OF 8  
INCHES)

SUBSOIL SCARIFIED 4"  
BELOW COMPOST  
AMENDED LAYER (12"  
BELOW SOIL  
SURFACE), AS  
DETERMINED BY THE  
ENGINEER



0"

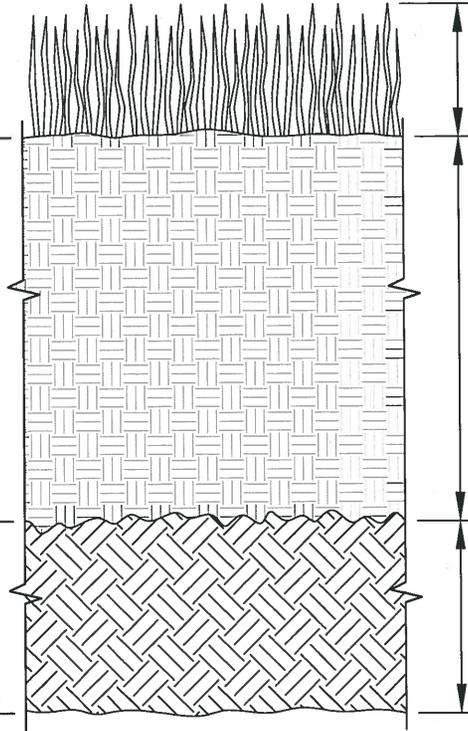
8"

12"

GRASS SEED OR SOD

1.75 INCHES OF  
COMPOST  
INCORPORATED INTO  
6.25 INCHES OF SITE  
SOIL (TOTAL AMENDED  
DEPTH OF 9.5 INCHES,  
FOR A SETTLED DEPTH  
OF 8 INCHES)

SUBSOIL SCARIFIED 4"  
BELOW COMPOST  
AMENDED LAYER (12"  
BELOW SOIL  
SURFACE), AS  
DETERMINED BY THE  
ENGINEER



**NOTES:**

All soil areas disturbed or compacted during construction, and not covered by buildings or pavement, shall be amended with compost as described below.

1. Subsoil should be scarified (loosened) 4 inches below amended layer, to produce 12-inch depth of un-compacted soil, except where scarification would damage tree roots or as determined by the engineer.
2. Compost shall be tilled in to 8 inch depth into existing soil, or place 8 inches of compost-amended soil, per soil specification.
3. Turf areas shall receive 1.75 inches of compost tilled in to 8-inch depth, or may substitute 8" of imported soil containing 20-25% compost by volume. Then plant grass seed or sod per specification.
4. Planting beds shall receive 3 inches of compost tilled in to 8-inch depth, or may substitute 8" of imported soil containing 35-40% compost by volume. Mulch after planting, with 2-4 inches of arborist wood chip mulch or approved equal.
5. SETBACKS: To prevent uneven settling, do not compost-amend soils within 3 feet of utility infrastructures (poles, vaults, meters etc.). within one foot of pavement edge, curbs and sidewalks soil should be compacted to approximately 90% proctor to ensure a firm surface.

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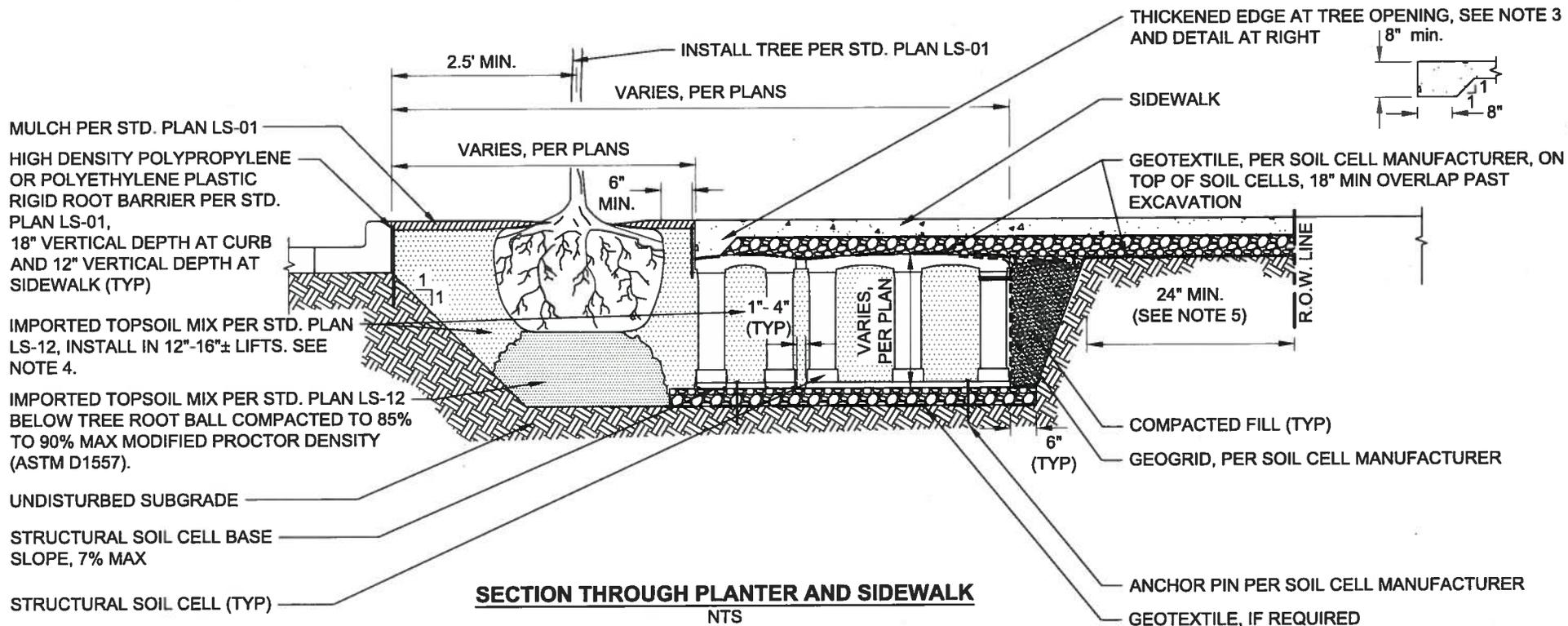
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CITY ENGINEER

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DATE

SOIL AMENDMENT AND DEPTH

STANDARD PLAN NO. LS-12



**NOTES:**

1. Install soil cells per manufacturer's requirements.
2. Tree shall have minimum soil volume required per TMC 13.06.502.
3. Sidewalk thickened edge required where soil cells are adjacent to planting areas. Sidewalk thickened edge shall extend to soil cell deck.
4. Structural bedding may be required per soil cell manufacturer or geotechnical professional.
5. Designer to review adjacent soil, topography, structures and other adjacent conditions for excavation setback requirements.

|  |  |   |  |   |
|--|--|---|--|---|
| <p><i>DCS</i><br/>PUBLIC WORKS</p> <p><i>NA</i><br/>TACOMA POWER</p> | <p>REVIEWED BY <i>[Signature]</i></p> <p>ENVIRONMENTAL SERVICES</p> <p><i>NA</i></p> <p>TACOMA WATER</p> |  | <p>APPROVED FOR PUBLICATION</p> <p><i>[Signature]</i></p> <p>CITY ENGINEER</p> <p><i>4/21/20</i></p> <p>DATE</p> | <p>CITY OF TACOMA</p> <p>STRUCTURAL SOIL CELLS SECTION</p> <p>STANDARD PLAN NO. LS-13</p> |
|--|--|---|--|---|