TREECAREUNLIMITED

Tree Care Unlimited,.LLC
5600 Rosewood St.
Lake Oswego, OR 97035

April 10, 2012

Joel Komarek, P.E.
Director, Lake Oswego—Tigard Water Supply Partnership
P.O. Box 369
Lake Oswego, OR 97034

Dear Mr. Komarek,

Attached please find the Tree Protection Plan for the Raw Water and Fresh Water Pipelines in West Linn. The work included assessing 151 trees and developing a tree protection plan subject to City of West Linn Tree Ordinance and Community Development Code.

Sincerely,

Kay Kinyon
International Society of Aboriculture
Certified Arborist PN 0409A

Lake Oswego & Tigard Water Partnership Pipeline
West Linn Pipeline Mary S. Young Park, Mapleton Dr. & Oregon Highway 43
West Linn, Oregon

TREE PROTECTION PLAN

Prepared For

Lake Oswego-Tigard Water Supply Partnership
P.O. Box 369
Lake Oswego, Oregon 97034

Residential and Commercial Removal•Pruning•Arboricultural Services•Consultation
MEMBER: Tree Care Industry Association•International Society of Arboriculture•Oregon Construction Contractors Assoc.State Licensed Tree Service #195179•Insured
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ARBORIST REPORT

Subject:	Tree Protection Plan
Address of the Report:	Mary S. Young Park to Arbor Dr. West Linn, Oregon
Date of the Report:	April 10, 2012
Report Submitted To:	Joel Komarek Director, Lake Oswego-Tigard Water Partnership City of Lake Oswego P.O. Box 369 Lake Oswego, OR 97034 Phone: 503-697-6588 FAX: 503-534-5225 E-mail: jkomarek@ci.oswego.or.us

SUMMARY

I have completed an on site assessment of all trees shown within the proposed pipeline easement and staging area adjacent to Mary S. Young Park on Mapleton Dr. and continuing the entire length of the proposed route to the West Linn/Lake Oswego city limits near Arbor Dr. This assessment includes 151 trees of which are 112 regulated by The City of West Linn Ordinance 1542 and Development Code Chapter 55. Thirty one of the regulated trees are considered to be Significant Trees. Nineteen trees are proposed for removal. No Significant Trees as defined by the City of West Linn will be removed. All trees impacted by the pipeline installation will be protected as if they are Significant Trees.

ASSIGNMENT

Tree Care & Landscapes Unlimited, Inc. was asked to perform an assessment of trees in and near the proposed raw water and finished water pipelines within the City of West Linn and develop a tree protection plan for that pipeline. The easement for the pipelines starts at the Willamette River at Mary S. Young Park. It includes Mapleton Drive and Oregon Highway 43 from Mapleton Drive to the Lake Oswego city limits.

OBSERVATIONS

The complete Tree Assessment is found in the attached "**Appendix 1—West Linn Pipeline Easement Tree Assessment**". "**Appendix 2—West Linn Tree Protection Plan**" shows the location of all protected trees. **Appendix** 2 also shows Tree Protection Zone Boundaries and Tree Protection Fence locations. "**Appendix 3 –O.P.R.D. Properties Tree Protection Plan**" shows tree protection details for that portion of the pipeline.

All diameters as listed in **Appendix--1** under the column, "DBH", are in inches. All diameters are measured at 54 inches above mean ground level at the base of the tree or at the narrowest trunk area below stem break in the case of multiple stem trees. Exceptions are noted in the "Comments" column. Height and spread of trees is estimated. Trunk area method was used to determine multiple stem tree diameters.

The column headed "Condition" describes the health of trees surveyed which are indicated as being Very Good, Good, Fair, Poor, Very Poor or Dead. Trees rated as Very Good are prime specimens with no visible defects. Trees rated as good may have minor defects but are stable trees in good health. Trees rated as Fair usually contain at least one visible defect that may become more significant some time in the future. Poor trees contain at least one significant visible defect. The defect may be structural or cosmetic. They usually displaying reduced vigor and may be candidates for removal. Trees rated as Very Poor contain significant defects, are hazardous or near hazardous. Dead trees are dead and should be removed before decay advances to the point that they become hazardous.

DISCUSSION

The organization of the tree protection plan includes three major segments, "Before Construction", "During Construction" and "Maintenance and Post Construction Activities". Each major segment includes an outline of general measures to be taken. Following the general measures are detailed definitions and descriptions of tree protection items. The definitions and descriptions are based on the City of West Linn "Technical Tree Manual".

Many of the trees along the portions of the pipeline on Mapleton Dr. and Oregon State Highway 43 are on adjacent privately owned property. All personnel working on the site are expected to respect the ownership rights of the private trees. All trees along the pipeline route with Tree Protection Zones (TPZ) that are impacted by the pipeline are subject to the following tree protection measures within this document. In addition to fencing or other similar barriers, protection for these trees depends on the existing paving within TPZ's and distance from edge of paving.

The portion of the pipeline within Mary S. Young Park is to be bored with no access from the surface. The bore line is to be well below the root zone of trees along the pipeline route.

All trees within the Oregon State owned property portion of the raw water pipeline are native or naturalized trees. Three trees, all mature Douglas Firs, in the Oregon Parks & Recreation land parcels are significant. The remaining trees in this segment are shorter lived trees of lower quality. The portion of this pipeline within Mary S. Young Park will be bored under the existing soil surface. All trees within the park will have a vertical clearance of at least 8 feet of soil between soil surface and top of the bore. There will be no tree removals within Mary S. Young Park as part of the pipeline installation. The boring pit and supporting equipment are to be set up on the Oregon State owned property adjacent to the park at the East end of Mapleton Dr. Nineteen trees will be removed in the boring pit area. Eight of the 19 trees are regulated trees (12" in diameter or larger).

Installation of the pipeline is a dynamic process whereby the actual active construction site is constantly moving along the pipeline route. Due to this unique nature of a pipeline, this tree protection plan depends on weekly meetings with pipeline installers and the Project Arborist to assess the coming week's work and implement appropriate tree protection measures which

both protects trees and are compatible with the work. The tree protection measures are expected to conform to those in this document.

Trees along the rest of the combined raw water and finished water pipelines include both native and introduced tree species. The trees are naturally occurring, landscape trees and street trees.

Most of the work is on paved surfaces. These surfaces if left intact provide a measure of root protection. In some instances the tree is located far enough from the construction easement that distance from the tree reduces impact of damage from construction. For example Tree #1 on Mapleton Dr. is located on a cut bank that helps increase both the horizontal and vertical distance from the construction zone. Installing a Tree Protection Fence would have little practical affect. The Project Arborist may require such fencing for trees in similar situations.

RECOMMENDATIONS FOR HEALTH & LONG TERM WELFARE OF TREES

I. Before Construction:

Before construction the Lake Oswego-Tigard Water Partnership shall retain a Project Arborist who shall be an International Society of Arboriculture Certified Arborist to perform or supervise others to perform the following:

a. Identify and number the trees to be protected, verify by mapping and/or tagging and note their size in D.B.H. (Diameter at Breast Height), variety, health and structural conditions, review plans.

b. Check with local government agencies for tree protection ordinances.

c. Remove any low limbs that may be in the way of construction equipment, and prune as needed to adhere to Standards of Practice of National Arborist Association, Inc. (NAA) which includes Pruning Fertilizing, Cabling, Pesticide Applications and Lighting System Installation, National Arborist Association, 3537 Stratford Road, Wantagh, New York 11793.

d. Leave a protective covering on the soil, i.e., existing groundcover or mulch.

e. Notify all other contractors that these trees are to be saved and protected.

f. Install a temporary 6' high no-climb fence to protect the trees and their root systems. Install tree protection sign on fence. Posts located at a maximum 10' on center as a general rule . For every inch in diameter of the trunk (D.B.H.) allow one half foot of radius from the trunk as the protected area. (Example: 24" D.B.H. = 12' radius of protected root system.) Ideally, we need to protect more than the drip zone. The drip zone into the trunk is the support roots that hold the tree up. The roots from that drip zone out provide nutrition, water and oxygen. Try to avoid loss of more than 30% of root on any one side. This allows some encroachment within the drip line. This should be determined on a case by case basis at the site while under the supervision of an International Society of Arboriculture (I.S.A.) Certified Arborist.

g. Engineer and design proposed structures and construction to avoid root loss.

h. Consider tree removals adjacent to trees to be saved for wind related stability concerns.

i. Check trees for stability.

j. Minimize environmental changes such as soil compaction, changes in surface drainage patterns near trees and excessive moisture loss.

II. SPECIFICATIONS FOR TREE PROTECTION DURING CONSTRUCTION

The following measures are typical in nature and do not apply to all trees in all locations. In the event that these measures do not provide adequate tree protection in a practical manner, the Project Arborist may modify or develop alternate methods that achieve tree protection. The Contractor and any other Lake Oswego Water Partnership agents directly involved with the pipeline installation work shall utilize these measures as directed by the Project Arborist

a. Keep equipment off of the TPZ system to avoid compaction.

b. Keep equipment away from tree structure to prevent damage to trunk and limbs.

c. Don't allow chemicals to be dumped on the ground near the tree, i.e., gasoline, diesel, paint, herbicide, cleaner, thinners, etc. within TPZ.

d. Provide means of temporary irrigation if the project runs through the summer as recommended by the Project Arborist.

e. If roots or limbs are cut or damaged, have them inspected by an ISA Certified Arborist and repaired or treated according to his/her recommendations.

f. Protect the trees from excessive heat, i.e., equipment, paving and/or burning.

g. Avoid trenching through the root systems. Boring under them or hand digging can save roots.

h. Contact the ISA Certified Project Arborist prior to and during any activity within the drip zone or tree protection fencing for consultation.

TREE PROTECTION ZONE (TPZ)

Each tree to be retained shall have a designated tree protection zone (TPZ) identifying the area sufficiently large enough to protect the tree and roots from disturbance. The standard for computing the size of the TPZ shall be a 1/2 foot radius per caliper inch measured from the trunk of the tree. For example, a 30 inch DBH tree would have a TPZ with a radius of 15 feet from the trunk, or a 30 foot diameter full circle around it. The tree protection zone shall be shown on all site plans for the project. Improvements or activities such as paving, utility and irrigation trenching and other ancillary activities shall occur outside the tree protection zone, unless authorized by the Project Arborist, or by project approval. Unless otherwise specified, the protective fencing shall serve as the tree protection zone. Activities prohibited within the tree protection zone include:

- Storage or parking vehicles, building materials, refuse, excavated spoils or dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to, paint, petroleum products, concrete, dirty water or any other material which may be deleterious to tree health.
- The use of tree trunks as a winch support, anchorage, as a temporary power pole, sign posts or other similar function.
- Cutting of tree roots by utility *trenching,* foundation digging, placement of curbs and

trenches and other miscellaneous excavation without prior approval of the Project Arborist.
- Soil disturbance or grade change unless supervised by the Project Arborist.
- Drainage changes.

Activities permitted or required within the tree protection zone include:

- Mulching. During construction, wood chips may be spread within the TPZ to a 4-to 6-inch depth, leaving the trunk clear of mulch to help inadvertent *compaction* and moisture loss from occurring. The mulch may be removed if improvements or other landscaping is required. Mulch material shall be 2-inch unpainted, untreated wood chip mulch or approved equal.
- Root Buffer. When areas under the tree canopy cannot be fenced, a temporary buffer is required and shall cover the root zone and remain in place at the specified thickness until final grading stage. At locations where existing paving such as concrete sidewalks or asphalt and concrete roadways exist within the TPZ, the paving may serve as a protective buffer.
- Irrigation, aeration, fertilizing or other beneficial practices that have been specifically approved for use within the tree protection zone.
- Erosion Control. If a tree is adjacent to or in the immediate proximity to a grade slope of 8% or more, then approved erosion control or silt barriers shall be installed outside the TPZ to prevent siltation and/or erosion within the tree protection zone. The object being to avoid either removal of soil or depositing soil within the TPZ.

TREE PROTECTION FENCING

Fenced enclosures shall be erected around trees to be protected to achieve three primary goals, (1) to keep the foliage crowns and branching structure clear from contact by equipment, materials and activities; (2) to preserve roots and soil conditions in an intact and non-compacted state and; (3) to identify the tree protection zone in which no soil disturbance is permitted and activities are restricted, unless otherwise approved.

- **Size and type of fence:** All trees to be preserved shall be protected with six foot high chain link fences six foot high "no climb" wire fencing. Fences are to be mounted on two inch diameter galvanized iron posts or 8' studded tee steel fence posts, driven into the ground to a depth of at least 2-feet at no more than 10-foot spacing. This detail shall appear in the construction plan set, and can be referenced in the City's Construction Standards. Where tree protection fencing is placed on existing paved surfaces, concrete or steel bases designed to support fence posts may be used. The Project Arborist may require drilling and pinning of the bases into the supporting paved surface if shifting of the fence occurs.
- **Area to be fenced:** The fences shall enclose the entire area within the tree protection zone of the tree(s) to be saved throughout the life of the project as mapped by the building permit approval, or as mapped within the tree protection and preservation plan contained in the Arborist Report for the project. The fencing shall remain until final improvement work within the area is required, typically near the end of the project. If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete base. For trees situated within a narrow planting strip, only the planting strip shall be enclosed with the required chain link protective fencing in order to keep the sidewalk

and street open for public use. Trees situated in a small tree well or sidewalk planter pit, shall be wrapped with 2-inches of orange plastic fencing as padding from the ground to the first branch with 2-inch thick wooden slats bound securely on the outside. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also require plastic fencing as directed by the Project Arborist or City Arborist.

- **Duration:** Tree fencing shall be erected before demolition, grubbing, grading or construction begins and remain in place until final inspection of the project permit, except for work specifically required in the approved plans in which case the Project Arborist or City Arborist (in the case of street trees) must be consulted.
- **Warning Sign:** A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5 x 11-inches and clearly state:
    - WARNING:

    Tree Protection Zone.
- **Violations:** The penalty for the unauthorized removal or relocation of a tree protection fence, and/or unauthorized activity within a TPZ, is $500, plus $500 per day until the fence is repaired or replaced and any damage to the tree properly mitigated.

TREE PROTECTION ALERNATIVE

In situations where construction impact intrudes into a TPZ but is compatible with the long term viability of the tree(s) as determined by the Project Arborist the Project Arborist may prescribe alternative tree protection to fencing. Such protection measures may include minimum 12 inch thick wood chip layer over a soil cloth base. Steel plates placed over the ground to protect TPZ from soil compaction may also be an example of a Project Arborist prescribed alternative protection measure.

CONSTRUCTION MEETING AND INSPECTION SCHEDULE

A certified arborist may be required to be retained by the applicant during the construction of large development projects. This Project Arborist retained shall conduct the following required inspections for the duration of construction activity. Correspondence may be as simple as e-mail in some cases or may require larger documents with tables, photographs, etc. for others.

- **Inspection of Protective Tree Fencing:** The West Linn City Arborist shall be in receipt of a written statement from the applicant or Project Arborist verifying that the protective tree fencing has been installed and may be inspected by the City Arborist prior to issuance of a demolition, grading, or building permit, unless otherwise approved.
- **Pre-Construction Meeting:** Prior to commencement of construction, the applicant or contractor may be required to conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, certified arborist, and City Arborist.
- **Weekly Inspections:** If a Project Arborist is required for the development project, he/she shall perform weekly inspections to monitor changing conditions and tree health. The City Arborist shall be in receipt of an inspection summary during the first week of each calendar month or, immediately if there are any changes to the approved plans or protection measures.
- **Special Activity Within the Tree Protection Zone:** Work in this area (TPZ) requires the direct onsite supervision of the Project Arborist or City Arborist.
- **Project Summary and Conclusion:** A brief summary discussing the project's trees shall be submitted to the City Arborist at the conclusion of all construction activity. It

shall include concerns about trees that may have been negatively impacted as well as recommendations for care of the trees in the future.

TREE PRUNING, SURGERY AND REMOVAL

Prior to construction, various trees may require that branches be pruned clear from structures, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery. The most compelling reason to prune is to develop a strong, safe framework and tree structure. Such pruning, surgery or the *removal* of trees shall adhere to the following standards:

- **Minimum Pruning:** If the Project Arborist recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of *'crown cleaning'* as defined by ISA pruning guidelines. Trees shall be pruned to reduce hazards and develop a strong, safe framework.
- **Maximum Pruning:** Maximum pruning should only occur in special situations approved by the City Arborist. No more than one-third (33 percent) of the functioning leaf and stem area may be removed within one calendar year of any tree, or removal of foliage so as to cause the unbalancing of the tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. The Project Arborist shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual.
- **Tree Workers:** Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree care specialist or certified tree worker, according to specifications contained within the City of West Linn Tree Technical Manual.
- **Surgery:** Prior to construction, if it is necessary to promote health and prolong useful life or the structural characteristics, then trees shall be provided the appropriate treatments as specified by the Project Arborist or City Arborist.
- **Root Pruning:** All roots 2" in diameter and larger shall be pruned cleanly in sound tissue at a right angle to the central axis of the root. This work shall be supervised by an I.S.A. Certified Arborist.
- **Tree Removal:** Removal of trees that extend into the branches or roots of protected trees shall not be attempted by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.
- **Stump Removal:** Before performing stump extraction, the developer shall first consider whether or not roots may be entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting the stump. *Removal* shall include the grinding of stump and roots to a minimum depth of 24-inches but expose soil beneath stump to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed and the planting pit dug to a depth of 30-inches. If dug below 30-inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils and backfilled with City approved topsoil to grade, and the area tamped to settle the soil.

CONSTRUCTION ACTIVITY

Construction is normally prohibited in the TPZ. Under certain circumstances it may be necessary to work in the TPZ, however only with approval from the City Arborist. If any construction activity is to occur in the TPZ the following guidelines apply:

Excavation and Grading

The following guidelines shall be followed in regard to excavation and grading activities:

1. Contractor shall notify the Project Arborist and City Arborist a minimum of 24 hours in advance of the activity in the tree protection zone.
2. Roots that are encountered shall be cut to sound wood and repaired. Roots 2-inches and greater in diameter must remain injury free and uncut unless directed to do otherwise by the Project Arborist.
3. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the tree protection zone. Methods permitted are by hand digging, hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather. Grade changes within the tree protection zone are not permitted unless approved by the City Arborist.
4. Grade changes outside of the tree protection zone shall not significantly alter drainage within the TPZ.
5. Grade changes under specifically approved circumstances shall not allow more than 6-inches of fill soil added or allow more than 4-inches of existing soil to be removed from natural grade.
6. Grade fills over 6-inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material or other approved mitigation.
8. Grade cuts exceeding 4-inches shall incorporate retaining walls or an appropriate transition equivalent.
9. If excavation or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 2-inches in diameter and greater. Prior to excavation for foundation/footings/walls, grading or trenching within the TPZ, roots shall first be severed cleanly 1-foot outside the tree protection zone and to the depth of the future excavation. The trench must then be hand dug and roots pruned with approved root pruning equipment.
10. If injurious activity or interference with roots greater than 2-inches will occur within the tree protection zone, plans shall specify a design of special foundation, footing, walls, concrete slab or pavement designs subject to *City Arborist* approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil.
11. Basement excavations shall be designed outside the tree protection zone of all protected trees unless approved by the City Arborist, and shall not be harmful to other neighboring property trees.
12. Use of backhoes, steel tread tractors or any heavy vehicles within the TPZ is prohibited unless approved by the Project Arborist. If allowed, a protective root buffer is required. The protective buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, layered by 3/4-inch quarry gravel to stabilize 3/4-inch plywood on top. This buffer within the tree protection zone shall be maintained throughout the entire construction process.

Trenching, Tunneling and Directional Drilling for Utilities

1. If trenching or pipe installation has been approved within the tree protection zone, then the trench shall be either cut by hand, air-spade, hydraulic vacuum excavation or, by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology.
2. Utility pipe must be installed immediately, backfilled with soil and soaked within the same day.

3. Street Trees that are in conflict with utility infrastructure where the conflict cannot be resolved may be removed if approved by the City Arborist. All Street Tree removals are subject to replacement.
4. Emergency utility repairs shall be exempt from the above restriction zones within the Tree Protection Zone. The City Arborist shall be contacted after any such repairs that may result in significant tree damage or removal.

Pavement and Hardscape

Conflicts may occur when tree roots grow adjacent to paving, foundations, sidewalks or curbs (hardscape). Improper or careless extraction of these elements can cause severe injury to the roots and instability or even death of the trees. The following alternatives must first be considered before root pruning within the tree protection zone of a tree:

1. Grinding a raised sidewalk edge.
2. Ramping the walking surface over the roots.
3. Routing the sidewalk around the tree roots.
4. Install flexible paving or rubberized sections.
5. On private property, new sidewalk or driveway design should consider alternatives to conventional pavement and sidewalk materials. Substitute permeable materials for typical asphalt or concrete overlay, sub-base or footings to consider are: permeable paving materials (such as ECO-Stone or RIMA pavers), interlocking pavers, flexible paving, wooden walkways, porches elevated on posts and brick or flagstone walkways on sand foundations.

Removal of existing pavement over tree roots shall include the following precautions:

1. Break hardscape into manageable pieces with a jackhammer or pick and hand load the pieces onto a loader. The loader must remain on undisturbed pavement or off exposed roots.
2. Do not remove base rock that has been exploited by established absorbing roots.

Replacement of pavement or sidewalk:

1. An alternative to the severance of roots greater than 2- inches in diameter should be considered before cutting roots.
2. If an alternative is not feasible, remove the sidewalk, remove roots only as approved by the City Arborist and replace sidewalk using #3 dowels at the expansion joint if within 10-feet of a street tree. Use a wire mesh reinforcement within if within 10-feet of the trunk of a protected or street tree. Any work in the right-of-way requires a street work permit from Public Works Department.

Conflicts and associated costs can be avoided or reduced by the following planting practices:

1. Plant deep rooted trees that are proven to be non-invasive.
2. Over soil that shrinks and swells, install a sidewalk with higher strength that has wire mesh and/or expansion slip joint dowel reinforcement.
3. Follow soil loosening planting techniques to promote deep rooting.
4. Install root barrier only along the hardscape area of the tree and allow roots to use open lawn or planter strip areas.
5. Dedicate at least 10-linear feet of planting space for the growth of each tree.

6. When designing hardscape areas near trees, the project architect or engineer should consider the use of recommended base course material such as an engineered structural soil mix.

Invasive Species Removal

Often, contractors will be required to remove invasive plant species from the understory in TPZ's. In most cases, native understory plants shall be saved and the area will be fully cleared of invasive species. The following practices must be followed when removing invasives:

1. The preferred method for invasive plant removal, is by hand, extracting the entire plant, including the roots. Other manual methods include cutting the plants to ground level, either mechanically, or with hand tools, and spraying the new growth with an approved herbicide. In either case, native understory plants may not be harmed or removed.
2. If heavy machinery is used, for example, a brush rake attached to an excavator, the machine must stay outside of the TPZ and "reach" into the area, carefully extracting the invasives without damaging the protected trees or native understory whatsoever.
3. In some cases, a restoration of native understory may be required. An approved list of native plants is included as *appendix B*

CONSTRUCTION DAMAGE TO PROTECTED TREES

Any damage or injury to trees shall be reported within 6-hours to the Project Arborist and Site Superintendent or City Arborist so that mitigation can take place. All mechanical or chemical injury to branches, trunk or to roots over 2-inches in diameter shall be reported in the weekly inspection report. In the event of injury, the following mitigation and damage control measures shall apply:

- **Root injury:** If trenches are cut and tree roots 2-inches or larger are encountered they must be cleanly cut back to a sound wood lateral root. All exposed root areas within the TPZ shall be backfilled or covered within one hour. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 3-feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls.
- **Bark or trunk wounding:** Current bark treatment methods shall be performed by a qualified tree care specialist within two days.
- **Scaffold branch or leaf canopy injury:** Remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult the Project Arborist within 6 hours.
- **Significant Root Loss:** Tree protection zones that have been impacted to 50% of their tree protection zone by excavation work shall be determined to have lost enough root zone to require remedial maintenance of deep root liquid fertilizer soil injection. The application shall be made to the remaining root zone of the tree at the direction of the Project Arborist.

Construction Injury Mitigation

The following specifications apply primarily to building type construction. However in the event that the pipeline work causes a situation where protected trees are stressed as described below, the Project Arborist may require implementation of any or all of these measures.

A mitigation program may be required if it is found the approved development will cause drought stress, dust accumulation or soil compaction to trees that are to be saved. To help reduce impact injury, one or more of the following mitigation measures shall be implemented and supervised by the Project Arborist as follows:

- **Irrigation Program:** Irrigate to wet the soil within the tree protection zone to a depth of 24-inches to 30-inches. Or, apply sub-surface irrigation at regular specified intervals by injecting on approximate 3-foot centers, 10-gallons of water per inch trunk diameter within the tree protection zone. Duration shall be until project completion or monthly until seasonal rainfall totals at least 8-inches of rain, unless specified otherwise by the certified arborist.
- **Dust Control Program:** During periods of extended drought, wind or grading, spray wash trunk, limbs and foliage to remove accumulated construction dust.
- **Compaction Mitigation:** If inadvertent compaction of the soil has occurred within the tree protection zone, the soil shall be loosened by one or more of the following methods to promote favorable root conditions: vertical mulching, soil fracturing, core-venting, radial trenching or other method approved by the City Arborist.
- **Aeration System:** If an approved paving, hardscape or other compromising material encroaches within the tree protection zone, an aeration system may be required and shall be designed by the Project Arborist and used within this area.

Non-compliance, Penalty and Enforcement

Non-compliance with any City mandated mitigation shall result in enforcement of penalties set forth in section 8.740 of the West Linn Tree Ordinance.

III. Recommendations for Maintenance and Post Construction Activity

The following maintenance standards apply to maintenance obligations for impacted trees along the pipeline route for a period of two years following completion of the improvement installation. Impacted trees are those trees which have endured construction related intrusion into their TPZ.

a. Carefully landscape the area under the tree, being careful of the roots and structure. Use plantings that will live under the same conditions as that of the tree. This item applies to disturbed portions of impacted TPZ's that are not paved.

b. Provide insect and disease control, fertilization and pruning as needed or adhere to long term protection plan if required by Project Arborist.

c. Avoid direct irrigation spraying onto the trunk. The amount of irrigation needed to keep new plantings alive can often be enough to kill mature trees.

d. Do not cover existing root systems with more than 2" of soil. The more soil you add, the greater the chances of damaging the root system.

e. Provide irrigation and/or drainage to emulate pre-construction conditions.

PRUNING STANDARDS

The most compelling reason to prune trees is to develop a strong, safe framework. All work to be performed on trees shall be in accordance with the standards set forth in this manual. All specifications for working on trees shall be written and shall be administered by a qualified arborist, and shall be designed to promote the preservation of tree structure and health. All work on trees shall be in accordance with the most current industry standards. Climbing and pruning practices shall not injure the tree except for the pruning cuts. To reduce the probability of insect infestation, disease or infection, seasonal recommendations apply, except when public safety is a concern. All species should not be pruned during the flush of spring shoot growth. Trees with thin bark should not be pruned in summer when sunscald injury may be a factor. Deciduous trees are best pruned November-February. Hazardous trees of any species may be pruned any time of the year for abatement reasons.

Mature Trees

There are six types of pruning that may be required on mature trees. Prior to entering the tree, the tree worker is required to be familiar with these types of pruning as stated in the Performance Standards, ANSI, A300-1995. 'Species-specific' pruning promotes the natural shape of the tree (i.e. excurrent, decurrent, vase-shaped, fast growing, etc.) The six pruning types are:

- Crown Cleaning
- Crown Thinning
- Crown Raising
- Crown Restoration
- Crown Reduction
- Utility Pruning

Distressed Trees

Distressed trees require as much leaf area as possible to overcome stressed conditions. To avoid additional injury, the following measures shall be followed for these trees:

- If a tree has been damaged by injury or disturbance, delay pruning until deadwood becomes evident (typically 1-3 years after injury). Crown cleaning is then recommended.
- Trees that have received little or no care or maintenance may need moderate crown thinning, reduction of end weights or entire crown restoration.

Young Trees

By pruning trees early, it will improve life expectancy and is a proven, cost-effective measure. Added benefits are also reflected in safer trees with fewer branch failures. For trees that serve as a replacement tree, they shall be pruned in the following way:

- Prune during the second year after planting to improve their structure, and only minor crown cleaning every 3-7 years thereafter. Refer to *ISA Tree Pruning Guidelines.*
- Do not top the main leader except to position the lowest main branch. Other main branches should be spaced at least 18-inches apart to alleviate a tight grouping branches.
- Select permanent branching and allow temporary low branching on the lowest part of the trunk to remain.

FERTILIZING

This section outlines performance standards for fertilizing and apply only if fertilizing is specified. Fertilizing mature trees is generally not necessary. Fertilizing may be specified for trees that will be impacted by upcoming disturbance, grade changes or a modified environment. Benefits gained from the increase stored resources may aid the tree to overcome the stress caused by disturbance. The Project Arborist shall determine specific amounts of fertilizer to be applied to specifics trees as may be necessary.

Foliar disease

Leaf spot or galls may be chronic or reoccur with specific seasons. Though many of these diseases destroy leaf tissue and become unsightly, they may not significantly reduce the trees health and therefore normally need not be treated unless otherwise specified.

TREE PLANTING SPECIFICATIONS

Planting specifications apply for trees that are planted as a replacement for a tree approved for removal. Using the following specifications will result in consistent city-wide plantings, and superior tree growth and vitality. To achieve this, landscape architects shall incorporate these items into their specifications.

PLANTING STOCK

It is the contractor's responsibility to supply stock that meets ANSI 760.1-1996 and City of West Linn *Tree Technical Manual Standards.* All plants and trees installed within the City of West Linn

shall conform with American Association of Standards, ANSI Z60.1, *Specifications for Acceptance of Nursery Trees at the Time of Delivery*, in all ways.

- Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.
- Method of application: The method shall be subsurface injection, on approximate 3-foot centers (within the root ball on young trees; 2-feet out on older trees) and out to the approximate dripline perimeter. Specific situations may justify other variations such as vertical mulch, soil-fracture or surface-broadcast methods.
- Material and Rates: Unless specified otherwise, fertilizer formula shall be a slow-release, complete fertilizer with chelate trace elements (e.g. 22-14-14 or 20-20-20) and mixed at label rates not to exceed 4-pounds nitrogen per 100-gallons of water. Extraordinary cases may require soil and tissue sampling to correct target deficiencies.
- Amount: Unless specified otherwise, volume shall be determined by mixing 10-gallons of water per inch of trunk diameter when measured at 54-inches above natural grade.
- Timing: Timing should not be detrimental to tree health. Best results are derived from applications made during the prior growing season. Apply fertilizer between May and September for best results.

WATERING

Newly installed trees and root zone impacted trees, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. Periods of extreme heat, wind or drought may require more or less water than recommended in these specifications. The method and amount that is applied may vary depending upon soil composition, heat, wind, companion plantings, rainfall amounts. The watering of trees or their replacements shall follow the standards set forth in this manual.

New Trees

During the establishment period (1-2 years) trees should be watered thoroughly to their root depth as frequently as needed. The minimum standards shall be as follows:

- 3 months in the ground: 4 times per month or as necessary
- 6 months in the ground: 2 times per month or as necessary
- 12 months in the ground: 1 time per month or as necessary

Mature trees and root zone impacted trees

- 1 time per month during irrigation season (usually June through September)

Watering Methods

The following options shall fulfill the watering requirements. One or more of the following may be utilized dependent upon unique circumstances subject to the City Arborist determination. The options are as follows: Automated Watering Systems. All new trees shall be provided with one of the following automatic watering systems. Other city maintained systems shall be per Parks Department specifications.

Bubbler Heads (Preferred). One or two bubbler heads mounted on flexible tubing are to be placed adjacent to or on top of the root ball. The placement of bubbler within an aeration tube is not allowed.
Drip Loop System. A continuous loop of drip tubing circling around the trunk at a point two-thirds out from the trunk to the edge of the root ball (for new trees 36-inch box size and greater, a second loop of drip tubing is required at a point just beyond the root ball on native soil). Hand watering systems. Recommended for trees that are part of a development project that must be watered to insure tree survival during the course of construction until automatic irrigation is installed. Flood watering. Newly installed trees must be 'flood or basin-watered' on top of the root ball to allow the water to infiltrate through the root zone. Subsurface injections using a hydraulic spray pump (practical for use in hard, compacted soils or steep hillsides).
Soaker Hose. Slow, deep watering using a garden type soaker hose. Wetting agent. A root ball that has been allowed to dry out beyond the wilting point shall require the addition of a wetting agent to the water (such as Aqua-grow or equivalent).

Amount

Unless otherwise specified, the volume of water applied at each irrigation should be in the range of 10-gallons per inch of trunk diameter when measured at 54-inches above natural grade. The final decision of whether to water or not should be based on accurate soil probe samples that are taken from the root ball.

SOIL IMPROVEMENT

During development, compaction of the soil is the largest single factor responsible for the decline of older trees. Ninety percent of the damage to the upper eighteen inches of soil occurs during the first pass of heavy equipment - and cannot be reversed. Every effort to avoid compaction of soil porosity within the tree protection zone shall be taken at all times. When required as mitigation for injury or a prohibited action, the following performance standards for improvement of compacted or damaged soil shall be implemented:

Aeration

Soil that is damaged or compacted within the dripline of trees shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified an in effort to correct compacted soil conditions:

- Vertical Mulching: Auger holes 2 to 4-inch diameter, 2 to 3-feet deep, on 4-foot centers and backfilled with porous material such as perlite, vermiculite or volcanic rock.
- Radial Trenching: With an air excavator, excavate a soil trench 3 to 6-inches wide and a minimum of 12-inches deep from (approximately) 3-feet from the trunk out to the dripline area. The trenches shall radiate out from one foot apart at the closest point.
- Soil-fracturing with a pneumatic air-driven device.
- Subsurface injections under moderate hydraulic pressure using a three foot probe and applied on 3-foot centers under the dripline.

Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil, and water infiltration rates are less than 2-

inches an hour, then one of the following drainage systems or other approved measures must be implemented:

- French drain, a minimum of three feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, a minimum of 4-inches in diameter, 24-inches deep and filled with medium sand or fine gravel

INSECT AND DISEASE CONTROL

Generally, insect populations do not threaten tree health to the point of mortality. More often, when their populations become too great they create a nuisance. If action is warranted, Integrated Pest Management (I.P.M.) suggests that the pest source be identified and targeted with a specific and timely treatment. If insects or disease can lead to the death of *a protected tree*, then it is the responsibility of the property owner to evaluate the condition according to the guidelines set forth in this manual, and treat the problem in a timely fashion to prevent further deterioration of the tree.

Insects

Accurate timing is critical for success. Nontoxic materials should be used whenever possible to control leaf-chewing insects.

Disease and Decay - above ground

Disease such as heart-rot decay that erodes the health or weakens the structure of a tree may compromise the safety of people or property. It is the property owner's responsibility to correct a known hazardous condition in a timely fashion.

Consult with a certified arborist for remedy possibilities, for example, pruning out infected branches, thinning, or the spray application of a chemical treatment.

Disease - below ground

Soil-borne diseases, such as Armillaria or Phytophthora, are present in West Linn soils. Often, a poor landscape design surrounding old trees encourages harmful, and often lethal diseases. Combined with poorly drained soil, these factors often activate normally dormant fungi to become opportunistic and infect the tree to cause the decline and eventual death of the tree. This decline can be slow and may not be evident for many years. To identify cultural conditions that may lead to diseases such as Verticillium, Phytophthora or other soilborne fungi, review the *Sunset Western Garden Book* or consult with a Certified Arborist. The following conditions that favor a disease environment must be avoided:

- Compacting of the soil within the tree's dripline, adding fill dirt, roto-tilling, trenching, removing soil from the tree root area.
- Excessive or regular watering on or near the tree trunk area and planting incompatible water-loving plants within the tree's dripline.
- Landscape Design: When planning landscaping around a tree, an evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the property owner to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the protected or designated tree.

Foliar disease

Leaf spot or galls may be chronic or reoccur with specific seasons. Though many of these diseases destroy leaf tissue and become unsightly, they may not significantly reduce the trees health and therefore normally need not be treated unless otherwise specified.

IV. MITIGATION TREE MAINTENANCE RECOMMENDATIONS

TREE PLANTING SPECIFICATIONS

Planting specifications apply for trees that are planted as a replacement for a tree approved for removal. Using the following specifications will result in consistent city-wide plantings, and superior tree growth and vitality. To achieve this, landscape architects shall incorporate these items into their specifications.

PLANTING STOCK

It is the contractor's responsibility to supply stock that meets ANSI 760.1-1996 and City of West Linn *Tree Technical Manual Standards.* All plants and trees installed within the City of West Linn shall conform with American Association of Standards, ANSI Z60.1, *Specifications for Acceptance of Nursery Trees at the Time of Delivery*, in all ways.

- Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.
- Container stock shall be grown for at least 8-months in containers in which delivered and shall not be root bound or have girdling roots.
- Trees shall not have been topped or headed.
- Plants and trees with broken tops, branches or injured trunks shall be rejected.

RECOMMENDED MITIGATION TREES

There are many trees available that are appropriate for use as mitigation trees, and new varieties are being developed every year. The City shall maintain a list of appropriate trees for planting in the City, either as street trees, or for use in yards, parks, etc. and is *appendix A* to the City of West Linn Tree Technical Manual. The list will be updated periodically as new varieties are available, or as information is received about diseases, insects and other nuisances. Please consider the location, size of planting area, and other site specific variables when choosing a tree.

MISCELANEOUS MATERIALS

The following materials shall be used unless otherwise specified:

- **Tree stakes:** Support stakes shall be treated 2-inch diameter pine or equal, two stakes per tree. No cross brace shall be used. After installation, stakes shall be trimmed so that the branches clear the top of the stake.
- **Tree Ties:** Twist brace, fabric-reinforced rubber (3/8-inch minimum), or equivalent approved by the City of West Linn shall be used and installed in a figure eight fashion to support the tree to the stakes.
- **Mulch:** Screened untreated wood chips, bark dust or approved equal, spread to a 2-inch depth out to the edge of the root ball. The mulch should be kept at least two inches away from the trunk and shall be applied to each tree.
- **Mower guards:** For trees in turf areas requiring regular mowing, the tree stem shall be protected with Tree Guard or equivalent.

- **Tree Grates:** Where sidewalk width is less than 8-feet and new trees will be installed in a tree well, metal tree grates shall be used and approved by Public Works. Minimum size grates shall be 4' x 4' unless specified otherwise. All tree grates shall be mounted in frames inset into a concrete foundation within the sidewalk or surface material and shall be flush with the surrounding surface.

SOIL PREPARATION AND CONDITIONING

- All debris, wood chips, pavement, concrete and rocks over 2-inches in diameter shall be removed from the planting pit to a minimum of 24-inch depth, unless specified.
- Trees in a confined planter pit or sidewalk area: The planting hole shall be excavated to a minimum of 30-inches deep x the width of the exposed area. Scarify the sides of the pit. Soil beneath the root ball shall be compacted to prevent settling.
  Trees in all other areas: Excavate the hole's width a minimum of three times the diameter of the container, and deep enough to allow the root ball of the container to rest on firm soil. Scarify the sides and the bottom of the pit.
  The height of the container root ball should be 1-2-inches higher than grade level, except when structural urban tree soil mix is used, in which case the tree may be planted at level grade.
  If the soil is dry, add a few inches of water in the hole. Let it drain before planting the tree.

PLACING THE TREE

Roots: Remove tree from the container and trim the root ball in the following Way. Straighten and/or cut cleanly any thick circling roots. For thin roots, make three to four vertical cuts 1/2-inch deep around root ball and spread the bottom out if necessary

Orientation: Locate the tree in the hole, and rotate the tree to direct the main branches away from the street side, if possible.

Filling the Hole: Place the aeration tubes, fill the hole halfway up with original soil (amended soil only when approved), and gently tamp out air pockets with a pole or shovel handle. Add about 1 -inch of water, and let drain. Fill the rest of the hole to grade, water the fill soil, and let drain.

Staking: Place the stakes at the edge of the root ball (drive them 2-feet into undisturbed ground), and avoid contact with the branches. If in a windy area, set the stakes in a plane at right angles to the wind. Remove the nursery stake. Loosely place two ties in a figure eight around the trunk, as low as needed to hold the tree upright and nail to the stake. Stakes shall be trimmed so that the branches clear the top of the stake. Do not install a cross-brace.

Berm, Mulch and Water: In non-turf areas, form a soil berm 3 to 4-inches high at the outermost edge of the root ball. Place 1 to 2-inches of mulch or bark over root ball and berm, keeping the mulch away from the trunk a minimum of 2-inches. Fill the berm with water to capacity.

Turf Areas: In turf areas that receive regular watering, the watering berm may be eliminated. The turf shall be maintained a minimum of one foot from the new tree stem, and mulch placed on top of the root ball. The mulch shall not be touching the tree stem.

Aeration Tubes for Trees: If required, 4-inch diameter perforated aeration

tubes with grated plastic caps placed at the edge of the root ball to the bottom of the pit. Irrigation heads shall not be installed inside the aeration pipes. Any of the above holes, pipes, grates or fixtures shall include the installation of Filter Fabric wrap over the side openings and secured as recommended by manufacturer when connected to an approved aeration system.

Alternate Specifications: Occasionally, tree planting must occur in poor or difficult soil where standard planting techniques will result in poor-to-average performance or mortality (such as unique or unusual regional geology, slope,oil volume, restrictive physical or chemical properties, poor drainage, etc.). In this case, the responsible party must investigate alternative solutions to enable long term tree growth. Alternative planting specifications or plans that vary from the native or typical soil conditions shall be submitted to the *City Arborist* for approval prior to installation. Alternative or specified soils, such as engineered, amended or structural urban tree soil mix, including written specifications and physical samples, shall be submitted for approval from the City Arborist and/or Landscape Architect.

V. Tree Maintenance Specifications

The following maintenance standards apply to maintenance obligations for trees along the pipeline route for a period of two years following completion of the pipeline installation.

PRUNING STANDARDS

The most compelling reason to prune trees is to develop a strong, safe framework. All work to be performed on trees shall be in accordance with the standards set forth in this manual. All specifications for working on trees shall be written and shall be administered by a qualified arborist, and shall be designed to promote the preservation of tree structure and health. All work on trees shall be in accordance with the most current industry standards. Climbing and pruning practices shall not injure the tree except for the pruning cuts. To reduce the probability of insect infestation, disease or infection, seasonal recommendations apply, except when public safety is a concern. All species should not be pruned during the flush of spring shoot growth. Trees with thin bark should not be pruned in summer when sunscald injury may be a factor. Deciduous trees are best pruned November-February. Hazardous trees of any species may be pruned any time of the year for abatement reasons.

Mature Trees

There are six types of pruning that may be required on mature trees. Prior to entering the tree, the tree worker is required to be familiar with these types of pruning as stated in the Performance Standards, ANSI, A300-1995. 'Species-specific' pruning promotes the natural shape of the tree (i.e. excurrent, decurrent, vase-shaped, fast growing, etc.) The six pruning types are:

- Crown Cleaning
- Crown Thinning
- Crown Raising
- Crown Restoration
- Crown Reduction
- Utility Pruning

Distressed Trees

Distressed trees require as much leaf area as possible to overcome stressed conditions. To avoid additional injury, the following measures shall be followed for these trees:

- If a tree has been damaged by injury or disturbance, delay pruning until deadwood becomes evident (typically 1-3 years after injury). Crown cleaning is then recommended.
- Trees that have received little or no care or maintenance may need moderate crown thinning, reduction of end weights or entire crown restoration.

Young Trees

By pruning trees early, it will improve life expectancy and is a proven, cost-effective measure. Added benefits are also reflected in safer trees with fewer branch failures. For trees that serve as a replacement tree, they shall be pruned in the following way:

- Prune during the second year after planting to improve their structure, and only minor crown cleaning every 3-7 years thereafter. Refer to *ISA Tree*

Pruning Guidelines.

- Do not top the main leader except to position the lowest main branch. Other main branches should be spaced at least 18-inches apart to alleviate a tight grouping branches.
- Select permanent branching and allow temporary low branching on the lowest part of the trunk to remain.

FERTILIZING

This section outlines performance standards for fertilizing and apply only if fertilizing is specified. Fertilizing mature trees is generally not necessary. Fertilizing may be specified for trees that will be impacted by upcoming disturbance, grade changes or a modified environment. Benefits gained from the increase stored resources may aid the tree to overcome the stress caused by disturbance.

Specifications

Fertilizing, if specified, shall be performed to the following standards:

Disease - below ground

Soil-borne diseases, such as Armillaria or Phytophthora, are present in West Linn soils. Often, a poor landscape design surrounding old trees encourages harmful, and often lethal diseases. Combined with poorly drained soil, these factors often activate normally dormant fungi to become opportunistic and infect the tree to cause the decline and eventual death of the tree. This decline can be slow and may not be evident for many years. To identify cultural conditions that may lead to diseases such as Verticillium, Phytophthora or other soilborne fungi, review the *Sunset Western Garden Book* or consult with a Certified Arborist. The following conditions that favor a disease environment must be avoided:

- Compacting of the soil within the tree's dripline, adding fill dirt, roto-tilling, trenching, removing soil from the tree root area.
- Excessive or regular watering on or near the tree trunk area and planting incompatible water-loving plants within the tree's dripline.
- Landscape Design: When planning landscaping around a tree, an evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the property owner to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the protected or designated tree.

Foliar disease

Leaf spot or galls may be chronic or reoccur with specific seasons. Though many of these diseases destroy leaf tissue and become unsightly, they may not significantly reduce the trees health and therefore normally need not be treated unless otherwise specified.

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- Method of application: The method shall be subsurface injection, on approximate 3-foot centers (within the root ball on young trees; 2-feet out on older trees) and out to the approximate dripline perimeter. Specific situations may justify other variations such as vertical mulch, soil-fracture or surface-broadcast methods.
- Material and Rates: Unless specified otherwise, fertilizer formula shall be a slow-release, complete fertilizer with chelate trace elements (e.g. 22-14-14 or 20-20-20) and mixed at label rates not to exceed 4-pounds nitrogen per 100-gallons of water. Extraordinary cases may require soil and tissue sampling to correct target deficiencies.
- Amount: Unless specified otherwise, volume shall be determined by mixing 10-gallons of water per inch of trunk diameter when measured at 54-inches above natural grade.
- Timing: Timing should not be detrimental to tree health. Best results are derived from applications made during the prior growing season. Apply fertilizer between May and September for best results.

WATERING

Newly installed trees, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. Periods of extreme heat, wind or drought may require more or less water than recommended in these specifications. The method and amount that is applied may vary depending upon soil composition, heat, wind, companion plantings, rainfall amounts. The watering of trees or their replacements shall follow the standards set forth in this manual.

New **Trees**

During the establishment period (1-2 years) trees should be watered thoroughly to their root depth as frequently as needed. The minimum standards shall be as follows:

- 3 months in the ground: 4 times per month or as necessary
- 6 months in the ground: 2 times per month or as necessary
- 12 months in the ground: 1 time per month or as necessary

Mature trees

- 1 time per month during irrigation season (usually June through September)

Watering Methods

The following options shall fulfill the watering requirements. One or more of the following may be utilized dependent upon unique circumstances subject to the City Arborist determination. The options are as follows: Automated Watering Systems. All new trees shall be provided with one of the following automatic watering systems. Other city maintained systems shall be per Parks Department specifications.
Bubbler heads. One or two bubbler heads mounted on flexible tubing are to be placed adjacent to or on top of the root ball. The placement of bubbler within an aeration tube is not allowed.
Drip Loop system. A continuous loop of drip tubing circling around the trunk at a point two-thirds out from the trunk to the edge of the root ball (for new trees 36-inch box size and greater, a second loop of drip tubing is required at a point just beyond the root ball on native soil). Hand watering systems. Recommended for trees that are part of a development project that must be watered to insure tree survival during the course of construction until automatic irrigation is installed. Flood watering. Newly installed trees must be 'flood or basin-watered' on top of the root ball to allow the water to infiltrate through the root zone. Subsurface injections using a hydraulic spray pump (practical for use in hard, compacted soils or steep hillsides).
Soaker hose. Slow, deep watering using a garden type soaker hose. Wetting agent. A root ball that has been allowed to dry out beyond the wilting point shall require the addition of a wetting agent to the water (such as Aqua-grow or equivalent).

Amount

Unless otherwise specified, the volume of water applied at each irrigation should be in the range of 10-gallons per inch of trunk diameter when measured at 54-inches above natural grade. The final decision of whether to water or not should be based on accurate soil probe samples that are taken from the root ball.

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During development, compaction of the soil is the largest single factor responsible for the decline of older trees. Ninety percent of the damage to the upper eighteen inches of soil occurs during the first pass of heavy equipment - and cannot be reversed. Every effort to avoid compaction of soil porosity within the tree protection zone shall be taken at all times. When required as mitigation for injury or a prohibited action, the following performance standards for improvement of compacted or damaged soil shall be implemented:

Aeration

Soil that is damaged or compacted within the dripline of trees shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified an in effort to correct compacted soil conditions:

- Vertical Mulching: Auger holes 2 to 4-inch diameter, 2 to 3-feet deep, on 4-foot centers and backfilled with porous material such as perlite, vermiculite or volcanic rock.
- Radial Trenching: With an air excavator, excavate a soil trench 3 to 6-inches wide and a minimum of 12-inches deep from (approximately) 3-feet from the trunk out to the dripline area. The trenches shall radiate out from one foot apart at the closest point.
- Soil-fracturing with a pneumatic air-driven device.
- Subsurface injections under moderate hydraulic pressure using a three foot probe and applied on 3-foot centers under the dripline.

Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil, and water infiltration rates are less than 2-inches an hour, then one of the following drainage systems or other approved measures must be implemented:

- French drain, a minimum of three feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, a minimum of 4-inches in diameter, 24-inches deep and filled with medium sand or fine gravel

INSECT AND DISEASE CONTROL

Generally, insect populations do not threaten tree health to the point of mortality. More often, when their populations become too great they create a nuisance. If action is warranted, Integrated Pest Management (I.P.M.) suggests that the pest source be identified and targeted with a specific and timely treatment. If insects or disease can lead to the death of *a protected tree,* then it is the responsibility of the property owner to evaluate the condition according to the guidelines set forth in this manual, and treat the problem in a timely fashion to prevent further deterioration of the tree.

Insects

Accurate timing is critical for success. Nontoxic materials should be used whenever possible to control leaf-chewing insects.

Disease and Decay - above ground

Disease such as heart-rot decay that erodes the health or weakens the structure of a tree may compromise the safety of people or property. It is the property owner's responsibility to correct a known hazardous condition in a timely fashion.

Consult with a certified arborist for remedy possibilities, for example, pruning out infected branches, thinning, or the spray application of a chemical treatment.

Disease - below ground

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- Compacting of the soil within the tree's dripline, adding fill dirt, roto-tilling, trenching, removing soil from the tree root area.
- Excessive or regular watering on or near the tree trunk area and planting incompatible water-loving plants within the tree's dripline.

- Landscape Design: When planning landscaping around a tree, an evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the property owner to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the protected or designated tree.

Foliar disease

Leaf spot or galls may be chronic or reoccur with specific seasons. Though many of these diseases destroy leaf tissue and become unsightly, they may not significantly reduce the trees health and therefore normally need not be treated unless otherwise specified.

PLANTING STOCK

It is the contractor's responsibility to supply stock that meets ANSI 760.1-1996 and City of West Linn *Tree Technical Manual Standards.* All plants and trees installed within the City of West Linn shall conform with American Association of Standards, ANSI Z60.1, *Specifications for Acceptance of Nursery Trees at the Time of Delivery,* in all ways.

- Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.

VI. Individual Tree Protection Description

Basic tree protection measures for each tree located along Mapleton Drive and Oregon Highway 43 are called out in the following list. Other measures as described above may also be employed as directed by the Project Arborist. Tree protection measures for the portion of the pipeline route in State of Oregon owned property adjacent to Mary S. Young Park are shown on the drawing in Appendix 3. Tree Protection Fencing placement as described below shall be inspected by the Project Arborist and placed at his direction. Other methods to designate limits of work within a TPZ may also be implemented at the direction of the Project Arborist. Consult with the Project Arborist for additional details to clarify tree protection at each location.

- Tree #1 is a 9" Bigleaf Maple located on the cut bank above the street. Clearance prune as directed by Project Arborist. The Contractor shall refrain from activity on bank slope under tree. No equipment or materials shall be placed on slope.
- Tree #2 is a 12" Cherry located on a cut bank above the street. Clearance prune as necessary with Project Arborist supervision. Vertical and horizontal distances should provide adequate tree protection. In the event that construction activity appears to compromise welfare of tree the Project Arborist may require protective fencing.
- Trees #3 through #5 are Cottonwoods with diameters of 24", 16" & 28". Install tree protection fence at edge of paving to limits of tree protection zone.
- Trees #6 & #7 are a 10" Cherry and a 10" Dogwood located behind a private fence. Prune as directed by Project Arborist if necessary.
- Tree #8 is a 9" Pear located in a landscaped island. Clearance prune or tie back limbs as necessary as directed by Project Arborist. Install tree protection fencing at edge of paving and to extents of tree protection zone. Also include two adjacent larger shrubs.
- Tree #9 is a 12" Bigleaf Maple. Install tree protection fence Clearance prune if necessary. Install tree protection fence on edge of shoulder.
- Tree #10 is a 19" Red Alder. Install tree protection fence at back side of ditch to extents of tree protection zone. Clearance prune as directed by Project Arborist.
- Tree #11 is a 6" Bigleaf Maple. Clearance prune as directed by Project Arborist.
- Tree #12 is a 10" Bigleaf Maple with 3 stems near top of cut bank. Prune as directed by Project Arborist if necessary.
- Tree #13 is a 6" Bigleaf Maple. Clearance prune as directed by Project Arborist.
- Tree #14 is a 14" Sweet Cherry on cut bank. Install tree protection fence behind ditch to tree protection zone extents. Project Arborist shall supervise excavation.
- Trees #15 through #17 are Western Red Cedars(17", 8" & 5"). Install tree protection fence at back side of ditch to extents of tree protection zone. Tie back limbs for clearance.
- Tree #18 is a 6" Plum. Install tree protection fence behind ditch to extents of tree protection zone. Tie back limbs for clearance.
- Trees #19 through #22 are Western Red Cedars(8", 5", 13" & 15"). Install tree protection fence at back side of ditch to extents of tree protection zone. Tie back limbs for clearance.
- Tree#23 is an 8" Western Red Cedar located near the top of a cut bank. The tree has a severe lean toward the street.
- Tree #24 is a 19" Bigleaf Maple. Tie back limbs for clearance if necessary. If tying back is not practical prune as directed by Project Arborist as necessary.
- Trees #25 through #32 include several species of deciduous trees. Diameters range from 14" to 38". Install tree protection fence at back side of ditch to extents of tree protection zone. Tie back or clearance prune as directed by Project Arborist. Project Arborist shall supervise excavation work near these trees.
- Trees #33 & #34 are 20" & 19" Plums located behind a private fence. The Project Arborist shall supervise tie back or pruning of limbs for clearance. Any excavation within the tree protection zones for these trees shall be supervised by the Project Arborist.
- Tree #14438 is an 18" Oregon White Oak. It is a significant tree. Install tree protection fence at edge of paving to tree protection zone extents. The Project

Arborist shall supervise any pruning work. The Project Arborist shall supervise excavation done within the TPZ of this tree.

- Tree #35 is a 31" American Sweetgum. Place tree protection fence at 8' from North trunk face to tree protection zone extents. The Project Arborist shall supervise excavation work done within the tree protection zone of this tree.
- Tree #36 is a 39" Oregon White Oak which is significant. Install tree protection fence at back of ditch to tree protection zone extents. The Project Arborist shall supervise excavation work done within the tree protection zone for this tree.
- Trees # 37 through #39 are Horse Chestnuts with diameters of 16", 9" & 21". Install tree protection fence at back of ditch to tree protection zone extents.
- Tree #40 is a 17" Oregon Ash. Install tree protection fence to tree protection zone extents.
- Tree #41 is a 15" Douglas Fir. Install tree protection fence at back side of ditch to extents of tree protection zone.
- Tree #42 is a 26" Oregon Ash. Install tree protection fence at back side of ditch to extents of tree protection zone.
- Tree #43 is an 11" Douglas Fir. Install tree protection fence at back side of ditch to extents of tree protection zone.
- Tree #44 is a 10" Douglas Fir. Install tree protection fence at back side of ditch to extents of tree protection zone.
- Tree #45 is a 25" Western Red Cedar. Install tree protection fence at back side of ditch to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #46 is an 18" Scotch Pine. Install tree protection fence at back side of ditch to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #47 is a 9" Shore Pine. Install tree protection fence at back side of ditch to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #48 is 22" Western Red Cedar. Install tree protection fence at 5' from trunk face. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #49 is 21" Bigleaf Maple. Install tree protection fence at 5' from trunk face. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #50 is 20" Western Red Cedar. Install tree protection fence at 5' from trunk face or at R/W boundary which is farthest from tree trunk. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #51 is a 15" Western Red Cedar. Install tree protection fence at 5' from tree trunk or at R/W boundary which is farthest from tree trunk. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #52 is a 20" Western Red Cedar. Install tree protection fence at 5' from trunk face or R/W boundary which ever is farthest from tree trunk. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #53 is a 12" Bigleaf Maple. Install tree protection fence at 5' from trunk face or at R/W boundary which ever is farthest from tree trunk. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #54 is a 24" Western Red Cedar. Install tree protection fence at 5' from trunk face or at R/W boundary which is farthest from tree trunk. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #55 is a 16" European White Birch. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree. The Project Arborist may opt not to install protective fencing due distance between trunk and excavation work.
- Tree #56 a 15" Oregon Ash. Install tree protection fence at 5' from trunk face. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.

- Tree #57 is a 39" Lombardy Poplar. Install tree protection fence at edge of paving to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #58 is a 24" Norway Maple. Install tree protection fence at edge of paving to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #59 is a 17"Flowering Cherry. Install tree protection fence at edge of paving to extents of tree protection zone. The Project Arborist shall supervise any excavation work done within the tree protection zone for this tree.
- Tree #60 is a 27" Deodar Cedar is a significant tree behind an existing chain link fence. Tie back limbs for vertical clearance. The Project Arborist shall supervise any clearance pruning if necessary. The Project Arborist shall supervise any excavation done within the tree protection zone for this tree.
- Tree #61 is a 13" Bigleaf Maple. Install tree protection fence at edge of construction easement.
- Tree #62 is a 21" Black Cottonwood. Install tree protection fence at edge of paving. The Project Arborist shall supervise excavation work done within the tree protection zone for this tree.
- Tree #63 is a 31" Black Cottonwood. Install tree protection fence at edge of paving. The Project Arborist shall supervise excavation work done within the tree protection zone for this tree.
- Tree #64 is a 42" Oregon White Oak which is significant. Install tree protection fence at edge of paving. Tree crown is quite high. Pruning is not likely. The Project Arborist shall supervise if any clearance pruning is necessary.
- Tree #65 is a 34" Oregon White Oak which is significant. Install tree protection fence at edge of paving. Tree crown is quite high. Pruning is not likely. The Project Arborist shall supervise if any clearance pruning is necessary.
- Tree #66 is a 39" Oregon White Oak which is significant. Install tree protection fence at edge of paving. Tree crown is quite high. Pruning is not likely. The Project Arborist shall supervise if any clearance pruning is necessary.
- Tree #67 is a 21" Red Alder.
- Tree #68 is a 2" Honeylocust which is a street tree in an enclosure guard. Install tree protection fence at edge of paving. Tie back limbs if necessary for clearance.
- Tree #69 is a 2" Honeylocust which is a street in an enclosure guard. Install tree protection fence at edge of paving. Tie back limbs if necessary for clearance.
- Tree #70 is a 2" Honeylocust which is a street in an enclosure guard. Install tree protection fence at edge of paving. Tie back limbs if necessary for clearance.
- Tree #71 is a 3" Red Maple street tree. Fence at curb to tree protection zone extents.
- Tree #72 is a 3" Red Maple street tree. Fence at curb to tree protection zone extents.
- Tree #73 is a 3" Red Maple street tree. Fence at curb to tree protection zone extents.
- Tree #74 is an 11" Littleleaf Linden street tree. Fence at curb to tree protection extents.
- Tree #75 is a 26" Oregon White Oak which is significant. Install tree protection fence at curb to tree protection zone extents.
- Tree #76 is a 24" Douglas Fir. Install tree protection fence at curb to extents of tree protection zone.
- Tree #77 is an 18" Pacific Madrone which is significant and leans toward the street. Install tree protection fence at curb to tree protection zone extents. The Contractor will need to work around any vertical obstruction from this tree as pruning and tie back are not possible.
- Tree #78 is an 11" Bigleaf Maple. The Project shall supervise clearance pruning if necessary. Existing chain link fence provides protection.
- Tree #79 is a 14" Bigleaf Maple. The Project shall supervise clearance pruning if necessary. Existing chain link fence provides protection.
- Tree #80 is a 11" Bigleaf Maple. The Project shall supervise clearance pruning if necessary. Existing chain link fence provides protection.
- Tree #81 is a 9" American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.

- Tree #82is a 11″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #83 is a 12″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #84 is a 12″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #85 is a 12″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #86 is a 15″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #87 is a 15″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #88 is a 14″ American Sweetgum. Install tree protection fencing at curb to tree protection zone extents.
- Tree #89 is a 23″ Oregon Ash. High crown and distance form work should protect tree.
- Tree #90 is a 13″ Oregon Ash. Install tree protection fence at curb to tree protection zone extents. The Project Arborist shall supervise clearance pruning.
- Tree #91 is a 34″ Oregon Ash. Install tree protection fencing at curb to tree protection zone extents.
- Tree #92 is a 24″ Western Red Cedar. Install tree protection fencing at curb to tree protection zone extents.
- Tree #93 is a 19″ Western Red Cedar. Install tree protection fencing at curb to tree protection zone extents.
- Tree #94 is a 34″ Western Red Cedar which is significant. Install tree protection fencing at curb to tree protection zone extents.
- Tree #95 is a 16″ Bigleaf Maple. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #96 is an 18″ Oregon Ash. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #97 is an 18″ Oregon Ash. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #98 is a 31″ Douglas Fir which is significant. Install tree protection fencing at edge of paving to tree protection zone extents.
- Tree #99 is a 9″ Willow. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #100 is an 18″ Oregon Ash. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #101 is a 16″ Sweet Cherry. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #102 is a 30″ Douglas Fir which is significant. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #103 is a 12″ Douglas Fir. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #104 is a 20″ Oregon White Oak which is significant. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #105 is a 36″ Oregon White Oak which is significant. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #106 is a 22″ Oregon White Oak which is significant. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #107 is a 19″ Oregon Ash. Install tree protection fence at edge of paving to tree protection zone extents.
- Tree #108 is a 30″ Oregon White Oak which is significant. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.

- Tree #109 is a 23" Oregon White Oak which is significant. Install tree protection fencing at curb to tree protection zone extents. Project Arborist shall supervise clearance pruning.
- Tree #110 is a 36" Douglas Fir which is significant. Existing "Jersey Barrier" provides fence protection. Project Arborist shall supervise clearance pruning as required..
- Tree #111 is a 33" Douglas Fir which is significant. Existing "Jersey Barrier" provides fence protection. Project Arborist shall supervise clearance pruning as required.
- Tree #112 is a 13" Douglas Fir. Existing "Jersey Barrier" provides fence protection. Project Arborist shall supervise clearance pruning as required.
- Tree #113 is a 22" Bigleaf Maple. The existing concrete barricade and distance protect the tree.
- Tree #114 is a 22" Oregon Ash. The existing concrete barricade provides fence protection. The Project Arborist shall supervise clearance pruning.
- Pipeline Bore Staging Area at end of Mapleton Dr. on Oregon Parks & Recreation Department properties requires special tree protection measures. Fence area as shown in Appendix 3. Other protection measures that may apply are found in Section VIII Special Conditions of this document.

VII. Construction Meeting and Inspection Schedules & Tree Montoring

A certified arborist shall be retained by the applicant during the construction of the projects. This Project Arborist retained shall conduct the following required inspections for the duration of construction activity. Correspondence may be as simple as e-mail in some cases or may require larger documents with tables, photographs, etc. for others. See construction schedule and Construction Management Plan in the Land Use application.

- **Inspection of Protective Tree Fencing:** The City Arborist shall be in receipt of a written statement from the applicant or Project Arborist verifying that the protective tree fencing has been installed and may be inspected by the City Arborist prior to issuance of a demolition, grading, or building permit, unless otherwise approved.
- **Pre-Construction Meeting:** Prior to commencement of construction, the applicant or contractor may be required to conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, Project Arborist, and City Arborist.
- **Weekly Inspections:** Protection for trees associated with the pipelines will include measures listed in the section titled, "Specifications for Tree Protection during Construction". Tree protection review shall also be included in the preconstruction meeting for this project with emphasis given to trees that are at higher risk of construction damage. Weekly work meetings with the pipeline installation contractor and the Project Arborist in attendance shall be held to review tree protection issues regarding subsequent week's work. The Project Arborist shall perform weekly inspections to monitor changing conditions and tree health. The City Arborist shall be in receipt of an inspection summary during the following week of each inspection or, immediately if there are any changes to the approved plans or protection measures.
- **Special Activity Within the Tree Protection Zone:** Work in this area (TPZ) requires the direct onsite supervision of the Project Arborist.
- **Project Summary and Conclusion:** A brief summary discussing the project's trees shall be submitted to the City Arborist at the conclusion of all construction activity. It shall include concerns about trees that may have been negatively impacted as well as recommendations for care of the trees in the future.

VIII. Special Conditions

1. Any pruning of overhanging tree canopies shall be supervised by the Project Arborist who shall be an International Society of Arboriculture Certified Arborist. The Contractor shall be prepared to work around tree branches or limbs that are deemed not to be pruned. The Contractor shall immediately notify the Project Arborist of any damage, no matter how slight, to above ground portions of any tree within the project. The Contractor shall be prepared to immediately undertake mitigation measures as recommended by the Project Arborist.
2. Any roots encountered that are 2" in diameter or larger shall be inspected by the Project Arborist to determine what action is to be taken. The Contractor shall notify the Project Arborist immediately when roots of this description are encountered. The Contractor shall be prepared to undertake alternative measures such as tunneling under the root if pruning is not approved.
3. Where pipeline installation method is boring rather than open trench, minimum vertical clearance between existing soil surface and top of pipeline bore shall be at least 7.5 feet when in root zone not directly under tree trunk. If pipeline bore is located directly under a tree trunk, the vertical clearance between the soil surface and top of pipeline bore shall be at least 7.5 feet.
4. The Contractor shall avoid blocking driveways when placing tree protection fences.
5. If the configuration of supporting equipment layout at the bore pit area at the end of Maple Dr. requires connection ways between the arms of the layout, the connection ways shall be fenced and the ground covered with a protective barrier such as soil cloth covered with wood chips to a depth of 12 inches or plywood. The purpose of the connection ways would be for hoses, wiring and personnel passage. The connection ways shall not be used for equipment access. Maximum width of the connection ways shall be 5 feet.

NOTE: This tree protection plan identifies construction protection measures to prevent unwarranted tree loss. The identified measures limit the amount of earth disturbance surrounding the trees, and limit the removal of the tree's root systems. Due to the variation of every project, it is unlikely all of the above identified measures can be practicably applied to each individual tree; nor is it likely each measure is necessary to retain each tree. Prior to the beginning of construction a meeting between the Project Arborist and the necessary contractors will be held to determine the appropriate level of protection for each tree, in relation to what work needs to be completed in the tree's vicinity. On site supervision by the Project Arborist will be determined in accordance with this Tree Protection Plan, the Construction Contract, and by the City Arborist.

Sincerely,

Kay Kinyon
Tree Care & Landscapes Unlimited, Inc.
Certified Arborist by the International
Society of Arboriculture, #PN-0409

Appendix 1--West Linn Pipeline Easement Tree Assessment

West Linn Pipeline

Mapleton Drive to Arbor Drive Trees										
NO	**COMMON NAME**	**BOTANNICAL NAME**	**DBH**	**HEIGHT**	**SPREAD**	**CONDITION**	***REGULATED**	****SIGNIFICANT**	**REMOVE**	**COMMENTS**
1	Big leaf Maple	*Acer macrphyllum*	9	25	20	Poor				6" x 18" cavity from ground on E side. Clearance prune.
2	Cherry	*Prunus sp.*	12	25	25	Poor	Yes			Clearance prune.
3	Black Cottonwood	*Populus trichocarpa*	24	35	15	Poor	Yes			Broken top. Fence at r/w.
4	Black Cottonwood	*Populus trichocarpa*	16	30	15	Poor	Yes			Broken top. Fence at r/w.
5	Black Cottonwood	*Populus trichocarpa*	28	75	30	Fair	Yes			Fence at R/W.
6	Cherry	*Prunus*	10	15	15	Good				Tie back limbs as necessary.
7	Dogwood	*Cornus florida*	10	25	20	Good				Tie back limbs as necessary.
8	Pear	*Pyrus sp.*	9	15	15	Poor				Tie back limbs as necessary. Fence with two adjoining
9	Big leaf Maple	*Acer macrphyllum*	12	15	15	Very Poor	Yes			Topped. Clearance as necessary.
10	Red Alder	*Alnus rubra*	19	70	25	Poor	Yes			Die back in crown. Fence at back of ditch. Supervise
11	Bigleaf Maple	*Acer macrphyllum*	6	25	20	Fair				Prune as necessary.
12	Bigleaf Maple	*Acer macrphyllum*	10	25	35	Poor				3 steams 6,6,6. Prune as necessary.
13	Bigleaf Maple	*Acer macrphyllum*	6	25	20	Poor				Prune as necessary.
14	Sweet Cherry	*Prunus avium*	14	20	20	Poor	Yes			Topped. Supervise excavation.
15	Western Red Cedar	*Thuja plicata*	17	20	15	Poor	Yes			Topped. Tie back limbs for clearance.
16	Western Red Cedar	*Thuja plicata*	8	20	15	Poor				Topped. Tie back limbs for clearance.
17	Western Red Cedar	*Thuja plicata*	5	20	15	Poor				Topped. Tie back limbs for clearance.
18	Plum	*Prunus sp.*	6	20	15	Poor				Topped. Tie back limbs for clearance.
19	Western Red Cedar	*Thuja plicata*	8	20	10	Poor				Topped. Tie back limbs for clearance.
20	Western Red Cedar	*Thuja plicata*	5	20	15	Poor				Topped. Tie back limbs for clearance.
21	Western Red Cedar	*Thuja plicata*	13	20	15	Poor	Yes			Topped. Tie back limbs for clearance.
22	Western Red Cedar	*Thuja plicata*	15	20	20	Poor	Yes			Topped. Tie back limbs for clearance.
23	Western Red Cedar	*Thuja plicata*	8	25	15	Poor				Remove.
24	Big leaf Maple	*Acer macrphyllum*	19	70	35	Good	Yes			Tie limbs back for clearance. Also tagged 1073.
25	Big leaf Maple	*Acer macrphyllum*	16	55	30	Good	Yes			Prune as necessary.
26	Red Alder	*Alnus rubra*	14	65	30	Good	Yes			Fence behind ditch. Clearance prune as necessary. Supervise excavation.
27	Red Alder	*Alnus rubra*	18	60	30	Poor	Yes			Cavities. Fence behind ditch. Clearance as necessary. Supervise excavation.
28	Big leaf Maple	*Acer macrphyllum*	33	70	50	Good	Yes			3 stems 20, 20 & 17. Fence at back edge of ditch.
29	Red Alder	*Alnus rubra*	17	60	40	Very Poor	Yes			Cavities. Hazardous. Fence at back edge of ditch.
30	American	*Liquidambar styraciflua*	29	65	35	Good	Yes	Yes		Fence at edge of paving.
31	European White	*Betula pendula*	12	20	20	Very Poor	Yes			Topped with decay column. Prune as necessary.
32	Bigleaf Maple	*Acer macrphyllum*	38	70	50	Good	Yes	Yes		2 stems 23 & 33. Fence behind ditch. Supervise
33	Plum	*Prunus sp.*	20	20	30	Good	Yes			Work around limbs. Tie back if possible. Supervise
34	Plum	*Prunus sp.*	19	20	20	Good	Yes			Avoid contact with limbs. Supervise excavation.
35	American	*Liquidambar styraciflua*	31	60	40	Fair	Yes	Yes		Fence 8' N FOT. Supervise excavation.
14438	Oregon White Oak	*Quercus garryana*	17	20	20	Fair	Yes	Yes		Topped. Fence at edge of street shoulder. In WTP
36	Oregon White Oak	*Quercus garryana*	39	90	40	Good	Yes	Yes		Fence at back of ditch. Supervise excavation.
37	Horse Chestnut	*Aesculus hippocastanum*	16	50	35	Good	Yes			Fence at back side of ditch.
38	Horse Chestnut	*Aesculus hippocastanum*	9	30	30	Fair				Fence at back side of ditch.
39	Horse Chestnut	*Aesculus hippocastanum*	21	50	35	Good	Yes	Yes		Fence at back side of ditch.
40	Oregon Ash	*Fraxinus latifolia*	17	40	30	Poor	Yes			
41	Douglas Fir	*Pseudotsuga menziesii*	15	40	20	Poor	Yes			Topped. Fence at back side of ditch.
42	Oregon Ash	*Fraxinus latifolia*	26	40	25	Very Poor	Yes			Cavities in lower bole. Topped. Fence at back side of
43	Douglas Fir	*Pseudotsuga menziesii*	11	25	45	Fair				Fence at back side of ditch.
44	Douglas Fir	*Pseudotsuga menziesii*	10	25	45	Fair				Fence at back side of ditch.
45	Western Red Cedar	*Thuja plicata*	25	55	30	Good	Yes	Yes		Fence at back side of ditch. Supervise excavation.
46	Scotch Pine	*Pinus sylvestris*	18	15	25	Poor	Yes			3 stems 8, 11 & 12. Fence at back of ditch. Supervise excavation. Topped.
47	Shore Pine	*Pinus contorta*	9	15	15	Very Poor				Fence at back of ditch. Supervise excavation. Topped.

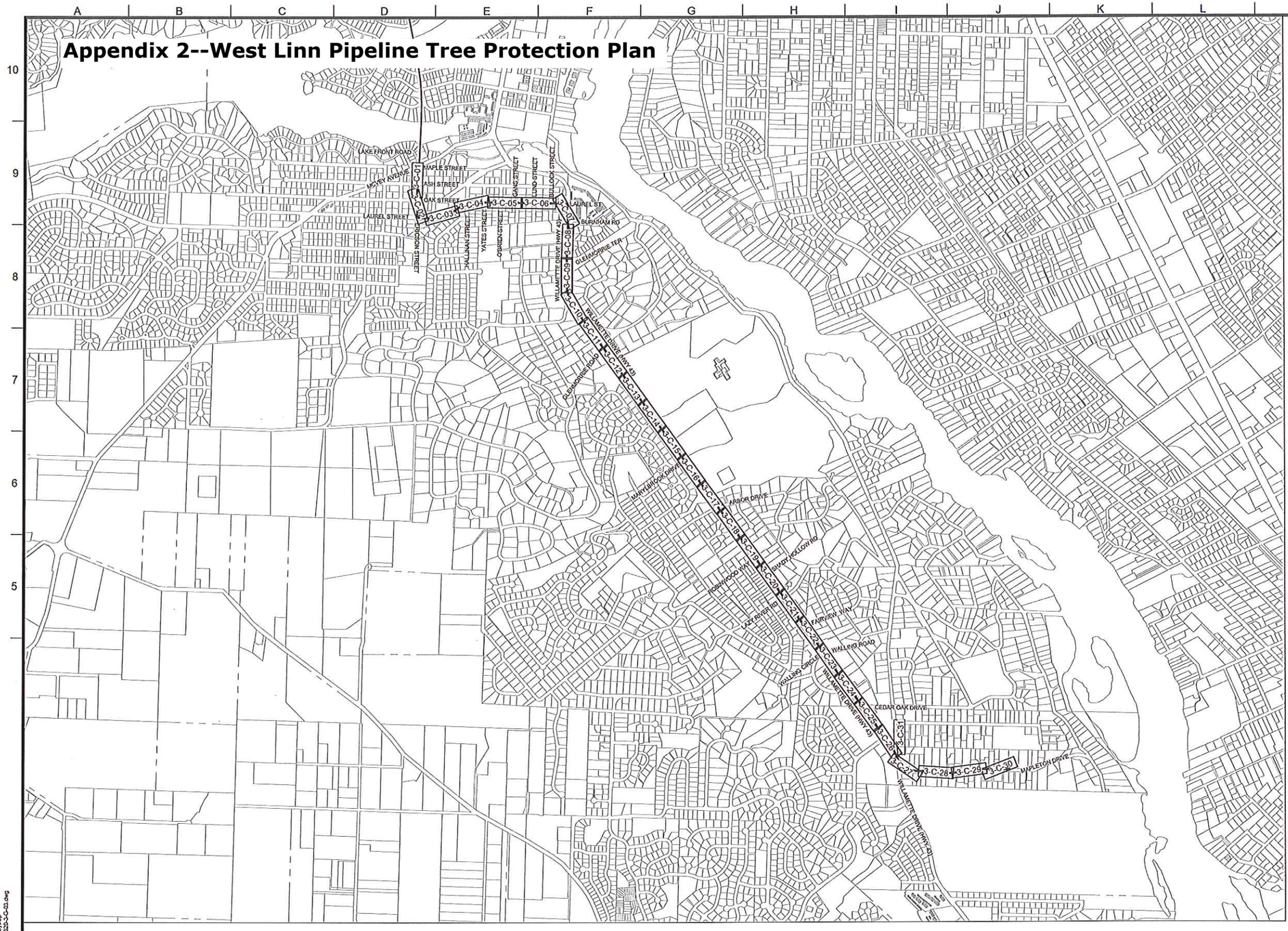
NO	COMMON NAME	BOTANNICAL NAME	DBH	HEIGHT	SPREAD	CONDITION	*REGULATED	**SIGNIFICANT	REMOVE	COMMENTS
48	Western Red Cedar	*Thuja plicata*	22	20	35	Poor	Yes			Topped. Fence at 5' FOT. Supervise excavation.
49	Big leaf Maple	*Acer macrphyllum*	21	20	35	Poor	Yes			Topped. Fence at 5' FOT. Supervise excavation.
50	Western Red Cedar	*Thuja plicata*	20	20	35	Poor	Yes			2 stems 17 & 10.Topped. Fence at 5' FOT. Supervise
51	Western Red Cedar	*Thuja plicata*	15	20	35	Poor	Yes			Topped. Fence at 5' FOT. Supervise excavation.
52	Western Red Cedar	*Thuja plicata*	20	20	35	Poor	Yes			2 stems 17 & 10.Topped. Fence at 5' FOT. Supervise
53	Big leaf Maple	*Acer macrphyllum*	12	20	25	Poor	Yes			Topped. Fence at 5' FOT. Supervise excavation.
54	Big leaf Maple	*Acer macrphyllum*	24	20	40	Poor	Yes			4 stems 11, 12, 12 & 14. Topped. Fence at 5' FOT. Supervise excavation.
55	European White	*Betula pendula*	16	60	35	Good	Yes			Supervise excavation.
56	Oregon Ash	*Fraxinus latifolia*	15	45	30	Good	Yes			Supervise excavation.
57	Lombardy Poplar	*Populus nigra* 'Italica'	39	90	45	Fair	Yes			Fence at edge of paving. Supervise excavation.
58	Norway Maple	*Acer pseudotplatanus*	24	50	40	Fair	Yes			Fence at edge of paving. Supervise excavation.
59	Flowering Cherry	*Prunus serrulata*	17	15	20	Fair	Yes			Fence at edge of paving.
60	Deodar Cedar	*Cedrus deodara*	27	80	50	Good	Yes			Tie back limbs for clearance.
61	Big leaf Maple	*Acer macrphyllum*	13	45	30	Fair	Yes			Fence at edge of. Construction easement
62	Black Cottonwood	*Populus trichocarpa*	21	75	30	Fair	Yes			Fence at edge Of Paving. Supervise excavation.
63	Black Cottonwood	*Populus trichocarpa*	31	90	40	Fair	Yes			Fence at edge Of Paving. Supervise excavation.
64	Oregon White Oak	*Quercus garryana*	42	90	50	Good	Yes	Yes		Fence at edge of paving.
65	Oregon White Oak	*Quercus garryana*	34	90	65	Good	Yes	Yes		Fence at edge of paving.
66	Oregon White Oak	*Quercus garryana*	39	90	70	Good	Yes	Yes		Fence at edge of paving.
67	Red Alder	*Alnus rubra*	21	45	25	Poor	Yes			Fence at edge Of Paving. Supervise excavation.
68	Honeylocust	*Gleditsia triacanthos*	2	10	6	Good	Yes	Yes		Street tree with guard enclosure. Fence at curb.
69	Honeylocust	*Gleditsia triacanthos*	2	10	6	Good	Yes	Yes		Street tree with guard enclosure. Fence at curb.
70	Honeylocust	*Gleditsia triacanthos*	2	10	6	Good	Yes	Yes		Street tree with guard enclosure. Fence at curb.
71	Red maple	*Acer rubrum*	3	12	7	Good	Yes	Yes		Street tree. Fence at curb.
72	Red maple	*Acer rubrum*	3	12	7	Good	Yes	Yes		Street tree. Fence at curb.
73	Red maple	*Acer rubrum*	3	12	7	Good	Yes	Yes		Street tree. Fence at curb.
74	Littleleaf Linden	*Tilia cordata*	11	30	25	Good	Yes	Yes		Street tree. Fence at curb.
75	Oregon White Oak	*Quercus garryana*	26	35	35	Good	Yes	Yes		2 stems 18 & 19. Fence at curb. Tie limbs for clearance
76	Douglas Fir	*Pseudotsuga menziesii*	24	60	25	Good	Yes	Yes		Fence at curb.
77	Pacific Madrone	*Arbutus menziesii*	18	35	30	Poor	Yes	Yes		Diseased. Fence at curb.
78	Big leaf Maple	*Acer macrphyllum*	11	45	40	Fair				Prune for clearance. Existing chain link fence protects.
79	Big leaf Maple	*Acer macrphyllum*	14	45	40	Fair	Yes			Prune for clearance. Existing chain link fence protects.
80	Big leaf Maple	*Acer macrphyllum*	11	40	35	Fair				Prune for clearance. Existing chain link fence protects.
81	American	*Liquidambar styraciflua*	9	25	20	Good				Fence at curb.
82	American	*Liquidambar styraciflua*	11	25	20	Good				Fence at curb.
83	American	*Liquidambar styraciflua*	12	25	20	Good	Yes			Fence at curb.
84	American	*Liquidambar styraciflua*	12	25	20	Good	Yes			Fence at curb.
85	American	*Liquidambar styraciflua*	12	25	20	Good	Yes			Fence at curb.
86	American	*Liquidambar styraciflua*	15	35	30	Good	Yes			Fence at curb.
87	American	*Liquidambar styraciflua*	15	35	30	Good	Yes			Fence at curb.
88	American	*Liquidambar styraciflua*	14	35	30	Good	Yes			7" root cut by others. Fence at curb.
89	Oregon Ash	*Fraxinus latifolia*	23			Very Poor	Yes			2 stems 14 & 18. Distance from work is adequate for t.ree protection. Large cavities. Topped.
90	Oregon Ash	*Fraxinus latifolia*	13	40	15	Very Poor	Yes			Hollow trunk. Prune as necessary. Fence at edge of
91	Oregon Ash	*Fraxinus latifolia*	34	55	45	Fair	Yes			Fence at edge of paving.
92	Western Red Cedar	*Thuja plicata*	24	60	35	Very Poor	Yes			Large trunk cavity. Fence at edge of paving.
93	Western Red Cedar	*Thuja plicata*	19	60	35	Very Poor	Yes			Large trunk cavity. Fence at edge of paving.
94	Western Red Cedar	*Thuja plicata*	34	60	35	Fair	Yes	Yes		Fence at edge of paving.
95	Big leaf Maple	*Acer macrphyllum*	16	40	40	Fair	Yes			3 stems 8, 9 & 11. Fence at edge of paving.
96	Oregon Ash	*Fraxinus latifolia*	18	65	50	Poor	Yes			2 stems 12 & 14. Fence at edge of paving. Clearance as
97	Oregon Ash	*Fraxinus latifolia*	18	65	50	Poor	Yes			2 stems 13 & 14. Fence at edge of paving. Clearance as
98	Douglas Fir	*Pseudotsuga menziesii*	31	85	40	Poor	Yes			Topped. Fence at edge of paving
99	Willow	*Salix sp.*	9	30	20	Fair				Fence at edge of paving.

NO	COMMON NAME	BOTANNICAL NAME	DBH	HEIGHT	SPREAD	CONDITION	*REGULATED	**SIGNIFICANT		COMMENTS
100	Oregon Ash	*Fraxinus latifolia*	18	60	35	Poor	Yes			Cavity. Fence at edge of paving.
101	Sweet Cherry	*Prunus avium*	16	40	20	Fair.	Yes			2 stems 11 & 12. Fence at edge of paving.
102	Douglas Fir	*Pseudotsuga menziesii*	30	75	35	Fair.	Yes	Yes		Fence at edge of paving.
103	Douglas Fir	*Pseudotsuga menziesii*	12	30	20	Poor	Yes			Suppressed. Fence at edge of paving.
104	Oregon White Oak	*Quercus garryana*	20	60	50	Good	Yes	Yes		Clearance prune. Fence at edge of paving.
105	Oregon White Oak	*Quercus garryana*	36	75	45	Good	Yes			Fence at edge of paving.
106	Oregon White Oak	*Quercus garryana*	22	65	50	Good	Yes			Fence at edge of paving.
107	Oregon Ash	*Fraxinus latifolia*	19	55	35	Fair	Yes			2 stems 11 & 15. Fence at edge of. Paving.
108	Oregon White Oak	*Quercus garryana*	30	80	50	Good	Yes	Yes		Fence at edge of paving.
109	Oregon White Oak	*Quercus garryana*	23	70	40	Good	Yes	Yes		Fence at edge of paving.
110	Douglas Fir	*Pseudotsuga menziesii*	36	90	45	Good	Yes	Yes		Fence at edge of paving.
111	Douglas Fir	*Pseudotsuga menziesii*	33	90	45	Good	Yes	Yes		Fence at edge of paving.
112	Douglas Fir	*Pseudotsuga menziesii*	13	50	30	Poor	Yes			Broken top.Fence at edge of paving.
113	Big leaf Maple	*Acer macrphyllum*	22	55	35	Fair	Yes	Yes		3 stems 12, 12 & 14. Jersey barricade provides tree
114	Oregon Ash	*Fraxinus latifolia*	22	60	45	Fair	Yes			Clearance prune. Existing Jersey barricade provides tree
Oregon Parks & Recreation Department Land Parcels										
NO	**COMMON NAME**	**BOTANNICAL NAME**	**DBH**	**HEIGHT**	**SPREAD**	**CONDITION**	***REGULATED**	****SIGNIFICANT**	**REMOVE**	**COMMENTS**
32887	Sweet Cherry	*Prunus avium*	20	60	25	Poor	Yes		Yes	4" x 5' cavity from ground on E. side.
32888	Bigleaf Maple	*Acer macrophyllum*	13	20	10	Very Poor	Yes			3 stems7,3,3. Topped.
32890	Bigleaf Maple	*Acer macrophyllum*	6	20	15	Poor				Topped.
32892	Black Cottonwood	*Populus trichocarpa*	36	100	40	Fair	Yes			
32896	Black Cottonwood	*Populus trichocarpa*	28	90	35	Fair	Yes			
32906	Red Alder	*Alnus rubra*	11	40	25	Fair	Yes		Yes	
32910	Bigleaf Maple	*Acer macrophyllum*	9	20	10	Very Poor			Yes	3 stems7,3,3. Topped.
32911	Sweet Cherry	*Prunus avium*	7	20	10	Very Poor			Yes	3 stems7,3,3. Topped.
32912	Black Cottonwood	*Populus trichocarpa*	33	100	40	Fair	Yes		Yes	
32936	Red Alder	*Alnus rubra*	11	40	20	Very Poor			Yes	10" x 4' cavity from 2' to 4' above ground on N. side.
32937	Red Alder	*Alnus rubra*	14	50	25	Fair	Yes		Yes	Also tagged 33051.
32938	Red Alder	*Alnus rubra*	8	30	15	Poor			Yes	Broken top.
32939	Red Alder	*Alnus rubra*	7	30	15	Fair			Yes	
32940	Red Alder	*Alnus rubra*	12	40	20	Very Poor	Yes		Yes	Broken top. Wound seam from ground on S. side.
32941	Red Alder	*Alnus rubra*	7	30	15	Fair			Yes	
32942	Red Alder	*Alnus rubra*	6	30	10	Poor			Yes	Broken top.
32988	Bigleaf Maple	*Acer macrophyllum*	38	90	50	Poor	Yes	Yes		Over mature. Decay in root crown.
33029	Bigleaf Maple	*Acer macrophyllum*	30	80	45	Very Poor	Yes			Epicormics. Burls. Cavities.
33030	Douglas Fir	*Pseudotsuga menziesii*	27	90	30	Good	Yes	Yes		
33031	Douglas Fir	*Pseudotsuga menziesii*	29	90	30	Good	Yes	Yes		
33032	Bigleaf Maple	*Acer macrophyllum*	16	55	25	Fair	Yes			
33033	Black Cottonwood	*Populus trichocarpa*	26	100	35	Fair				
33036	Red Alder	*Alnus rubra*				Dead				
33040	Red Alder	*Alnus rubra*	7	30	15	Fair				
33042	Bigleaf Maple	*Acer macrophyllum*	14	30	20	Fair	Yes			2 stems 8,9.
33043	Bigleaf Maple	*Acer macrophyllum*	9	40	20	Poor				Suppressed.
33044	Red Alder	*Alnus rubra*	14	60	25	Fair	Yes		Yes	High crown.
33050	Red Alder	*Alnus rubra*	7	35	20	Fair			Yes	
33051	Red Alder	*Alnus rubra*	7	55	20	Poor			Yes	High crown.
33053	Bigleaf Maple	*Acer macrophyllum*	28	65	40	Fair	Yes		Yes	Stems 26,6,7
33054	Red Alder	*Alnus rubra*	9	45	20	Fair			Yes	
33055	Red Alder	*Alnus rubra*	11	50	25	Fair			Yes	
33056	Red Alder	*Alnus rubra*	12	50	25	Poor	Yes		Yes	
33059	Bigleaf Maple	*Acer macrophyllum*	10	40	25	Poor				
33060	Bigleaf Maple	*Acer macrophyllum*	13	35	20	Very Poor	Yes			
33061	Douglas Fir	*Pseudotsuga menziesii*	46	100	45	Good	Yes			

*Regulated--Regulated trees are Oregon White Oak, Pacific Madrone and Pacific Dogwood with a 6 inch diameter DBH and all other trees with a DBH of 12 inches or greater and all Street Trees.

**Significant--Significant Trees are those trees deemed to be so by the City of West Linn.

Appendix 2--West Linn Pipeline Tree Protection Plan



0 400 800 1200
1"=800'

PLAN

DRAWING LIST TABLE

DWG No.	SHT No.	SHEET TITLE
3-G-01	1	SCHEDULE 3 - TITLE SHEET
3-G-02	2	LEGEND AND SYMBOL SHEET
3-G-03	3	SCHEDULE 3 PIPELINE SHEET INDEX
3-C-01	4	SCHEDULE 3 PIPELINE PLAN STA 300+00.00 TO 304+00.00
3-C-02	5	SCHEDULE 3 PIPELINE PLAN STA 304+00.00 TO 308+60.00
3-C-03	6	SCHEDULE 3 PIPELINE PLAN STA 308+60.00 TO 313+80.00
3-C-04	7	SCHEDULE 3 PIPELINE PLAN STA 313+80.00 TO 319+00.00
3-C-05	8	SCHEDULE 3 PIPELINE PLAN STA 319+00.00 TO 324+20.00
3-C-06	9	SCHEDULE 3 PIPELINE PLAN STA 324+20.00 TO 329+40.00
3-C-07	10	SCHEDULE 3 PIPELINE PLAN STA 329+40.00 TO 334+60.00
3-C-08	11	SCHEDULE 3 PIPELINE PLAN STA 334+60.00 TO 339+80.00
3-C-09	12	SCHEDULE 3 PIPELINE PLAN STA 339+80.00 TO 345+00.00
3-C-10	13	SCHEDULE 3 PIPELINE PLAN STA 345+00.00 TO 350+20.00
3-C-11	14	SCHEDULE 3 PIPELINE PLAN STA 350+20.00 TO 355+40.00
3-C-12	15	SCHEDULE 3 PIPELINE PLAN STA 355+40.00 TO 360+60.00
3-C-13	16	SCHEDULE 3 PIPELINE PLAN STA 360+60.00 TO 365+80.00
3-C-14	17	SCHEDULE 3 PIPELINE PLAN STA 365+80.00 TO 371+00.00
3-C-15	18	SCHEDULE 3 PIPELINE PLAN STA 371+00.00 TO 376+20.00
3-C-16	19	SCHEDULE 3 PIPELINE PLAN STA 376+20.00 TO 381+40.00
3-C-17	20	SCHEDULE 3 PIPELINE PLAN STA 381+40.00 TO 386+60.00
3-C-18	21	SCHEDULE 3 PIPELINE PLAN STA 386+60.00 TO 391+80.00
3-C-19	22	SCHEDULE 3 PIPELINE PLAN STA 391+80.00 TO 397+00.00
3-C-20	23	SCHEDULE 3 PIPELINE PLAN STA 397+00.00 TO 402+20.00
3-C-21	24	SCHEDULE 3 PIPELINE PLAN STA 402+20.00 TO 407+40.00
3-C-22	25	SCHEDULE 3 PIPELINE PLAN STA 407+40.00 TO 412+60.00
3-C-23	26	SCHEDULE 3 PIPELINE PLAN STA 412+60.00 TO 417+80.00
3-C-24	27	SCHEDULE 3 PIPELINE PLAN STA 417+80.00 TO 423+00.00
3-C-25	28	SCHEDULE 3 PIPELINE PLAN STA 423+00.00 TO 428+20.00
3-C-26	29	SCHEDULE 3 PIPELINE PLAN STA 428+20.00 TO 433+40.00
3-C-27	30	SCHEDULE 3 PIPELINE PLAN STA 433+40.00 TO 438+60.00
3-C-28	31	SCHEDULE 3 PIPELINE PLAN STA 438+60.00 TO 443+80.00
3-C-29	32	SCHEDULE 3 PIPELINE PLAN STA 443+80.00 TO 449+00.00
3-C-30	33	SCHEDULE 3 PIPELINE PLAN STA 449+00.00 TO 454+20.00
3-C-31	34	SCHEDULE 3 CONNECTION TO (E) PUMP STATION

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
DESIGNED: JAB
DRAWN: DDM
CHECKED: TRH
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON MAY. 09, 1989 AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
GENERAL
SCHEDULE 3 PIPELINE SHEET INDEX

FILENAME 119101620-3-G-03
KENNEDY/JENKS PROJECT NUMBER 1191016.20
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 3-G-03
3 OF 33

PLOT DATE: January 30, 2012 - 4:15PM USER: SACSyOp
FILE: N:\D\1\1\1\9\1\0\1\6\2\0_LakeOswego_Fish\Wr\119101620-3-G-03.dwg

NOTE TO ENGINEER:
WATER LINES IN THIS AREA HAVE NOT BEEN FIELD LOCATED. LINES ARE BASED ON CITY OF WEST LINN WATER GIS DATA.

Tree Protection Zone Boundary 16.5' Radius
Tree Protection Zone Boundary 18' Radius
Tree Protection Zone Boundary 15' Radius
Tree Protection Zone Boundary 9.5' Radius
Tree Protection Zone Boundary 11' Radius
Tree Protection Zone Boundary 11' Radius
Tree Protection Zone Boundary 18' Radius
Tree Protection Zone Boundary 11' Radius
Tree Protection Fence
Tree Protection Fence

114 113 112 111 110 109 108 107 106 105

NOTES:
1.

WILLAMETTE DRIVE (HWY 43)
CONCRETE SIDEWALK
EDGE OF PAVEMENT
AC WALK
"JERSEY BARRIER"
SIGN "SPEED ZONE"
(N) 48"Ø FWP
MATCHLINE SEE SHEET 3-C-16
MATCHLINE SEE SHEET 3-C-18
STA 383+90.57 CAV N 637705.75 E 7649657.15
WEST LINN CITY LIMITS
STA 384+47.19 DRAIN N 637752.90 E 7649690.37
POSSIBLE TELECOMM DUCT BANK-NOT MARKED
STA 386+10.69 22.50° BEND N 637620.49 E 7649766.27
IE 12"=166.62
SSMH NUMBER 87477 RIM ELEVATION 185.54 IE 8" (W) 179.39 IE 8" (S) 179.34
CB NUMBER 89738 RIM ELEVATION 183.85 IE 12" (S) 181.35
SDMH NUMBER 69747 RIM ELEVATION 190.02 IE 24" (W) 184.02 IE 24" (S) 183.22
GUARDRAIL
WETLAND FLAG #1
WETLAND FLAG #2
WETLAND FLAG #3
WETLAND FLAG #4
IE 36"=170.59
IE 36"=173.19
IE 30"=175.95
IE 12"=UNKNOWN
MAP 2 1E 14CA 1433
MAP 2 1E 14CA 800
CB NUMBER 87502 RIM ELEVATION 186.76 IE 12" (S) 185.25 IE 12" (N) 185.25
SSMH NUMBER 87420 RIM ELEVATION 187.71 IE 8" (N) 178.61 IE 8" (W) 178.56 IE 8" (S) 178.51
CB NUMBER 87501 RIM ELEVATION 187.63 IE 12" (N) 185.83 IE 12" (S 185.93 IE 12" (W) 185.83
ASTOR DRIVE
0 10 20 30 1"=20'
PLAN

5'-0" MIN. CLR. RULE VIOLATION TO ACCOMMODATE 36" SD
(E) 36" SD
(E) 2" G"
(E) 6" W"
(E) SURFACE
5'-0" MIN CLR
48"Ø BFV
4.5'
48" Ø S= -1.72%
48" Ø S= 0.00%
48" Ø S= 1.45%
12" CLR
STA 383+70.57 VERT. BEND L EL. 178.75
STA 383+90.57 DRAIN
STA 384+50.57 VERT. BEND R EL. 178.75
STA 386+10.69 HORIZ. BEND EL. 181.08
STA 386+29.26 HORIZ. BEND EL. 181.35
382+00 383+00 384+00 385+00 386+00 386+60
0 10 20 30 1"=20' HORIZ.
PROFILE
0 2 4 6 1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: EM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 03, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
CIVIL
SCHEDULE 3 PIPELINE PLAN
STA 381+40.00 TO 386+60.00

FILENAME 1191016 20-3-C-17
KENNEDY/JENKS PROJECT NUMBER 1191016.20
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 3-C-17
20 OF 33

PLOT DATE: January 30, 2012 - 5:44PM USER: DoigM
FILE: N:\2011\11191016\20_LakeOswego_FinWtr\11191016 20-3-C-17.dwg

Tree Protection Zone Boundary
6' Radius

Tree Protection Zone Boundary
15' Radius

Tree Protection Zone Boundary
10' Radius

Tree Protection Zone Boundary
8' Radius

Tree Protection Zone Boundary
9' Radius

Tree Protection Zone Boundary
4.5' Radius

This Tree Does Not Exist

Tree Protection Fence

Tree Protection Fence

104 103 102 101 100 99

BLOCK WALL
BOTTOM=186.3'
TOP=191.8'

BLOCK WALL
BOTTOM=187.0'
TOP=192.5'

BLOCK WALL
BOTTOM=188.6'
TOP=192.1'

NOTE TO ENGINEER:
WATER LINES IN THIS AREA HAVE NOT BEEN FIELD LOCATED. LINES ARE BASED ON CITY OF WEST LINN WATER GIS DATA.

NOTE TO ENGINEER:
WATER LINES IN THIS AREA HAVE NOT BEEN FIELD LOCATED. LINES ARE BASED ON CITY OF WEST LINN WATER GIS DATA.

MAP 2 1E 14DD 2600
MAP 2 1E 14DD 2800
MAP 2 1E 14DD 2700
MAP 2 1E 14DD 4400
MAP 2 1E 14DD 4304
MAP 2 1E 14DD 4305
MAP 2 1E 14DD 4306
MAP 2 1E 14DD 4307
MAP 2 1E 14DD 4000

STA 387+10.69
0.96° BEND
N 637540.59
E 7649846.40

STA 388+34.41
CAV
N 637440.44
E 7649919.05

6H WOOD FENCE

(N) 48"Ø FWP

WILLAMETTE DRIVE (HWY 43)

MATCHLINE STA 386+60 SEE SHEET 3-C-17

MATCHLINE STA 391+80 SEE SHEET 3-C-19

SSMH NUMBER 87401
RIM ELEVATION 190.23
IE 8" (E) 178.23
IE 8" (N) 177.13
IE 8" (S) 177.13
IE 8" (W) 181.73

SSMH NUMBER 87403
RIM ELEVATION 187.66
IE 8" (N) 176.36
IE 8" (S) 176.26

IE 12"=187.78
IE 4"=187.39
IE 12"=186.90
IE 12"=187.46
IE 12"=186.75
IE 12"=186.47
IE 4"=189.83
IE 6"=185.95

(1)-14", (1)-18", & (5)-6"

EDGE OF DWY

0 10 20 30
1"=20'

PLAN

(E) 8" SS

(E) 12" G

5'-0" MIN CLR

12" CLR

48" Ø S=0.10%

48" Ø S=-0.83%

STA 386+99.18
VERT. BEND
EL. 182.38

STA 387+10.69
HORIZ. BEND
EL. 182.38

STA 388+34.41
CAV

STA 389+99.18
VERT. BEND
EL. 182.56

STA 391+49.17
VERT. BEND
EL. 180.48

387+00 388+00 389+00 390+00 391+00 391+80

0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1993 AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
CIVIL
SCHEDULE 3 PIPELINE PLAN
STA 386+60.00 TO 391+80.00

FILENAME 119101620-3-C-18
KENNEDY/JENKS PROJECT NUMBER 1191016.20
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 3-C-18
21 OF 33

PLOT DATE: January 30, 2012 - 5:50PM USER: SAC\jmOp
FILE: N:\2011\11191016.20_LakeOswego_Fin\Wa\119101620-3-C-18.dwg

Tree Protection Zone Boundary
15.5' Radius

98

Tree Protection Fence Boundary
9' Radius

97

96

95

Tree Protection Zone Boundary
8' Radius

94

Tree Protection Fence

Tree Protection Fence

Tree Protection Fence

Tree Protection Fence

WILLAMETTE DRIVE (HWY 43)

WILLAMETTE DRIVE (HWY 43)

ROBINWOOD WAY

6H WOOD FENCE

6H WOOD FENCE

EDGE OF PAVEMENT

POSSIBLE TELECOMM DUCT BANK-NOT MARKED

RETAINING WALL TOP=188.3' BTM=186.0'

SSMH NUMBER 87362
RIM ELEVATION 183.53
IE 8" (W) 174.73
IE 8" (N) 174.43
IE 8" (S) 174.43

MAP 2 1E 14DD 3100
MAP 2 1E 14DD 1700
MAP 2 1E 14DD 1600
MAP 2 1E 14DD 1500
MAP 2 1E 14DD 3900
MAP 2 1E 14DD 3800
MAP 2 1E 14DD 3400
MAP 2 1E 14DD 3200
MAP 2 1E 14DC 103

MATCHLINE SEE SHEET 3-C-18 STA: 391+80

MATCHLINE SEE SHEET 3-C-20 STA:397+00

0 10 20 30
1"=20'

PLAN

NOTES:

1.

5'-0" MIN. CLR. RULE VIOLATION TO ACCOMMODATE 24" SD

(E) 24" SD

(E) 76"W"

(E) SURFACE

5'-0" MIN CLR

3'-0"

12" CLR

5'-0" MIN CLR

48" Ø S= -0.59%

48" Ø S= 0.00%

48" Ø S= -3.77%

48" Ø S= -0.27%

48" Ø S= -0.34%

STA: 393+18.46
VERT. BEND
EL. 179.45

STA: 393+58.46
VERT. BEND
EL. 179.49

STA: 394+39.08
VERT. BEND
EL. 176.45

STA: 394+75.27'
HORIZ. BEND
EL. 176.36

STA: 396+73.26
VERT. BEND
EL. 175.82

392+00 393+00 394+00 395+00 396+00 397+00

0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRH
CHECKED: BM
APPROVED: FN

REVISIONS

REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
NOV. 09, 1979
AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE

CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 391+80.00 TO 397+00.00

FILENAME
119101620-3-C-19
KENNEDY/JENKS PROJECT NUMBER
119101620
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-19
22 OF 33

PLOT DATE: January 30, 2012 - 5:56PM USER: SACSmCp
FILE: N:\2011\119101620_LakeOswego_FinWtr\119101620-3-C-19.dwg

Tree Protection Zone Boundary
9.5' Radius

Tree Protection Zone Boundary
17' Radius

Tree Protection Zone Boundary
12' Radius

Tree Protection Zone Boundary
Radius 6.5'

Tree Protection Zone Boundary
Radius 13' Radius

Tree Protection Zone Boundary
7.5' Radius

Tree Protection Zone Boundary
6' Radius

Tree Protection Zone Boundary
6' Radius

Tree Protection Zone Boundary
6' Radius

Tree Protection Zone Boundary
5.5' Radius

Tree Protection Zone Boundary
5.5' Radius

Tree Protection Zone Boundary
7' Radius

Tree Protection Zone Boundary
5.5' Radius

Tree Protection Zone Boundary
4.5' Radius

Tree Protection Fence

Tree Protection Fence

Tree Protection Fence

Tree Protection Zone Boundary
7.5' Radius

Tree Protection Zone Boundary
7' Radius

Tree Protection Zone Boundary
6' Radius

Existing Fence Provides
Tree Protecion

NOTES:
1.

93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78

SHADY HOLLOW RD

WILLAMETTE DRI

MATCHLINE SEE SHEET 3-C-19

MATCHLINE SEE SHEET 3-C-21

STA 398+67.75
0.19° BEND
N 636605.05
E 7650527.25

SSMH NUMBER 87280
RIM ELEVATION 180.33
IE 8"(N) 173.03
IE 8"(S) 173.03

MAP 2 1E 14DC 200 | 201 | 300 | 400 | 500 | 600 | 700 | 800 | 900

0 10 20 30
1"=20'

PLAN

SEE SHEET 3-C-19 — MATCHLINE STA 397+00

MATCHLINE STA 402+20 — SEE SHEET 3-C-21

(E) SURFACE

5'-0" MIN CLR.

48" Ø S= -1.19%

48" Ø S= -2.00%

STA: 396+99.13
VERT. BEND
EL. 175.73

STA: 398+67.75
HORIZ. BEND
EL. 173.73

STA: 399+99.13
VERT. BEND
EL. 172.75

STA: 402+00.00
VERT. BEND
EL. 167.75

(E) 24" G

(E) 24" G

398+00 | 399+00 | 400+00 | 401+00 | 402+00 | 402+20

0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 8
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: BH
APPROVED: FN

REVISIONS

REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
NOV. 03, 1989
AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE

CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 397+00.00 TO 402+20.00

FILENAME
1191016 20-3-C-20
KENNEDY/JENKS PROJECT NUMBER
1191016.20
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-20
23 OF 33

PLOT DATE: January 30, 2012 - 4:02PM USER: SACRAMDo
FILE: N:\2011\11191016\20_LakeOswego_Fin\Wtr\11191016S3-C-20.dwg

Tree Protection Zone Boundary
12' Radius

Tree Protection Zone Boundary
13' Radius

77

76

75

Tree Protection Fence

Tree Protection Fence

NOTE TO ENGINEER:
WATER LINES IN THIS AREA HAVE NOT BEEN FIELD LOCATED. LINES ARE BASED ON CITY OF WEST LINN WATER GIS DATA.

WILLAMETTE DRIVE (HWY 43)

PLAN

1"=20'

PROFILE

1"=20' HORIZ.

1"=4' VERT.

NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: EM
APPROVED: EN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON JULY 09, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

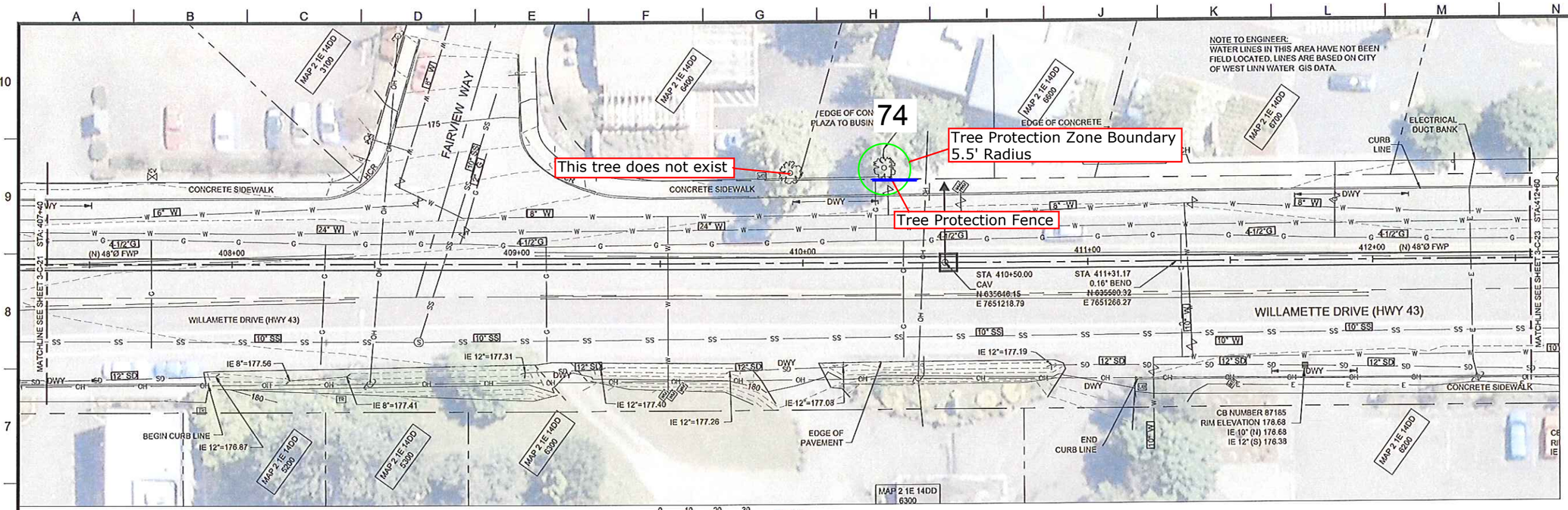
FINISHED WATER PIPELINE

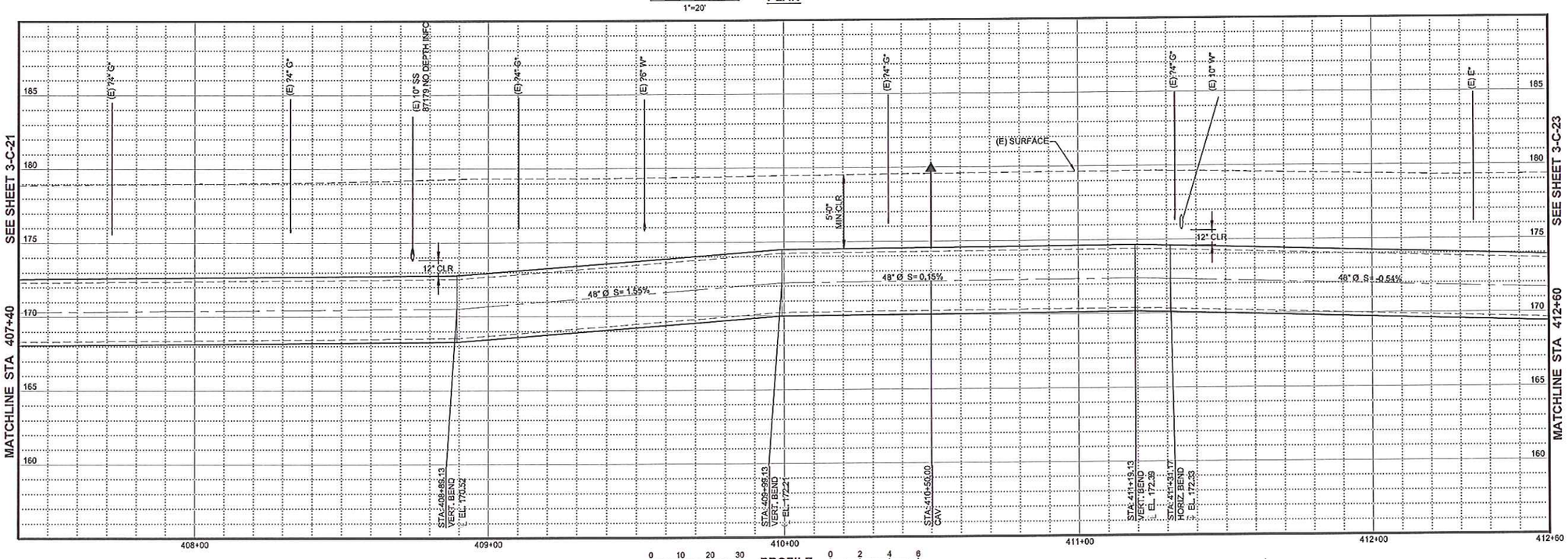
CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 402+20.00 TO 407+40.00

FILENAME
11910620-3-C-21
KENNEDY/JENKS PROJECT NUMBER
1191016.20
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-21
24 OF 33

PLOT DATE: January 30, 2012 - 6:49PM USER: DavidM
FILE: N:\2011\11910162\0_LakeOswego_ExWork\11910162\0-3-C-21.dwg





NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants 200 SW MARKET, SUITE 500, PORTLAND OREGON 97201	LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY) DESIGNED: JAB DRAWN: DDM CHECKED: TRM CHECKED: BM APPROVED: FN	30% SUBMITTAL	FINISHED WATER PIPELINE CIVIL SCHEDULE 3 PIPELINE PLAN STA 407+40.00 TO 412+60.00

SUBMITTED: ______ PROJECT MANAGER DATE: ______

APPROVED: ______ KENNEDY/JENKS CONSULTANTS DATE: ______

REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 03, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FILENAME 119101620-3-C-22
KENNEDY/JENKS PROJECT NUMBER 1191016.20
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 3-C-22
25 OF 33

PLOT DATE: January 30, 2012 - 6:15PM USER: DougM
FILE: N:\2011\1191016.20_LakeOswego_FinWtr\1191016.20-3-C-22.dwg

Tree Protection Zone Boundary
1.5' Radius

Tree Protection Zone Boundary
1.5' Radius

Tree Protection Fences

73

72

71

NOTES:

1.

PLAN

1"=20'

PROFILE

1"=20' HORIZ.

1"=4' VERT.

PRELIMINARY N.F.C.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: BH
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
JULY 29, 1994
AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE

CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 412+60.00 TO 417+80.00

FILENAME	119101620-3-C-23
KENNEDY/JENKS PROJECT NUMBER	1191016.20
SCALE	AS SHOWN
DRAWING/FIGURE NUMBER	3-C-23
	28 OF 33

PLOT DATE: January 30, 2012 - 6:22PM USER: DougM
FILE: N:\2011\11910162O_LakeOswego_Fin\W\11910162O-3-C-23.dwg

Tree Protection Zone Boundary
1' Radius

Tree Protection Zone Boundary
1' Radius

Tree Protection Zone Boundary
1' Radius

70

69

68

Tree Protection Fences

WETLAND FLAG #3
WETLAND FLAG #1
WETLAND FLAG #4
WETLAND FLAG #2
RETAINING WALL/HEAD WALL
6' WIDE BOX CULVERT
SDMH NUMBER 86046
RIM ELEVATION 179.71
IE 12" IN (S) 175.91
IE 12" IN (N) 175.91
IE 12" OUT (SE) 175.81
CB NUMBER 86052
SSMH NUMBER 86880
RIM ELEVATION 180.35
IE 8" (S) 174.90
IE 8" (W) 174.90
IE 8" (N) 174.90
6'x8'x20' TALL METAL POLE
61H COMMERCIAL SIGN
CB NUMBER 86066
RIM ELEVATION 179.69
IE 12" (N) 177.69
IE UNKNOWN
EXISTING
24" WATER MAIN
MAP 2 1E 23AA 1700
MAP 2 1E 23AA 700
MAP 2 1E 23AA 702
MAP 2 1E 23AA 705
MAP 2 1E 23AA 703
CANOPY
CANOPY
DWY
DWY
STA: 417+80
MATCHLINE SEE SHEET 3-C-23
STA: 423+00
MATCHLINE SEE SHEET 3-C-25
(N) 48"Ø FWP
STA 418+00.00
CAV
N 635038.92
E 7651658.93
STA 420+50.00
DRAIN
N 634838.56
E 7651805.77
WILLAMETTE DRIVE (HWY 43)
END
CURB LINE
BEGIN
CURB LINE
POSSIBLE TELECOMM DUCT BANK
UTILITY NOT LOCATED
GUARDRAIL
CB NUMBER 86069
RIM ELEVATION 181.18
IE 12" (W) 179.08
IE 24"=170.31
IE 10"=178.03
IE 12"=177.38
IE 12"=181.83
IE 18"=177.51
IE 12"=177.67
EXISTING
WATER LINE
NOT MARKED
EXISTING
WATER LINE
NOT MARKED
SSMH NUMBER 86099
RIM ELEVATION 182.25
IE 8" (W) 178.25
IE 8" (E) 175.20
EDGE OF
PAVEMENT
TRANSFORMER ON
CONCRETE PAD
BOX CULVERT/HEAD
WALL 5' WIDE
OPENING X 4'7" DEEP
TOP WALL=168.1'
FLOW LINE=163.5'
CB NUMBER 86082
RIM ELEVATION 179.69
IE 10" (N) 177.79
IE 12" (S) 177.89
WETLAND FLAG #1
WETLAND FLAG #3
WETLAND FLAG #5
WETLAND FLAG #2
WETLAND FLAG #4
WETLAND FLAG #6
MAP 2 1E 23AA 2900
MAP 2 1E 23AA 1801
MAP 2 1E 23AA 3000
MAP 2 1E 23AA 3100
0 10 20 30
1"=20'
PLAN

NOTES:

1.

5'-0" MIN. CLR. RULE VIOLATION TO ACCOMMODATE 24" SD
(E) 24" SD
(E) SURFACE
3'-0"
5'-0" MIN CLR
(E) 8"
(E) 8" SS
(E) 1" D
(E) 60" SD
NO I.E. OUTLET SIDE
12" CLR
48" Ø S= 0.00%
48" Ø S= 1.21%
12" CLR
STA: 418+00.00
CAV
STA: 418+03.19
VERT. BEND
EL. 173.98
STA: 420+50.00
DRAIN
STA: 421+50.01
VERT. BEND
EL. 174.78
SEE SHEET 3-C-23
MATCHLINE STA 417+80
SEE SHEET 3-C-25
MATCHLINE STA 423+00
185
180
175
170
165
160
418+00
419+00
420+00
421+00
422+00
423+00
0 10 20 30
1"=20' HORIZ.
PROFILE
0 2 4 6
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
DESIGNED: JAB
DRAWN: DDM
CHECKED: TRM
CHECKED: BM
APPROVED: EN

REVISIONS

REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
JULY 09, 1999
AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
CIVIL
SCHEDULE 3 PIPELINE PLAN
STA 417+80.00 TO 423+00.00

FILENAME
1191016 20-3-C-24
KENNEDY/JENKS PROJECT NUMBER
1191016.20
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-24
27 OF 33

PLOT DATE: January 20, 2012 - 6:39PM USER: SAOSheOp
FILE: N:\2011\11191016.20_LakeOswego_Fin\W\11191016\3-C-24.dwg

NOTE TO ENGINEER: LINES HAVE NOT BEEN FIELD LOCATED. CITY OF WEST LINN WATER LINES IN THIS AREA ARE BASED ON GIS DATA. WATER

67

Tree Protection Boundary
10.5' Radius

NOTES:

1.

PLAN

1"=20'

PROFILE

1"=20' HORIZ.
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants 200 SW MARKET, SUITE 500, PORTLAND OREGON 97201	FINISHED WATER PIPELINE CIVIL SCHEDULE 3 PIPELINE PLAN STA 423+00.00 TO 428+20.00
SUBMITTED: _____ DATE: _____ PROJECT MANAGER APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS	LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY) DESIGNED: JAB DRAWN: DDH CHECKED: TRH CHECKED: EM APPROVED: FN
REVISIONS REV. / DESCRIPTION / BY / APP.	REGISTERED PROFESSIONAL ENGINEER 62653 OREGON JULY 13, 1979 AARON EDER EXPIRATION DATE: 12/31/11
30% SUBMITTAL	Lake Oswego · Tigard Water Partnership sharing water · connecting communities
FILENAME 1191016620-3-C-25 KENNEDY/JENKS PROJECT NUMBER 1191016.20 SCALE AS SHOWN DRAWING/FIGURE NUMBER 3-C-25 28 OF 33	

PLOT DATE: January 20, 2012 - 6:37PM USER: SADDaDo
FILE: N:\2011\11191016\20_LakeOswego_FWW\11191016\20-3-C-25.dwg

Tree Protection Fence Boundary
17' Radius

Tree Protection Zone Boundary
19.5' Radius

Tree Protection Zone Boundary
15.5' Radius

Tree Protection Zone Boundary
10.5' Radius

Tree Protection Zone Boundary
21' Radius

66 65 64 63 62

Tree Protection Fence

Tree Protection Fence

8H WOOD FENCE

OLD RIVER ROAD

MATCHLINE SEE SHEET 3-C-27

MATCHLINE SEE SHEET 3-C-25

WILLAMETTE DRIVE (HWY 43)

CURBED MEDIAN

CONCRETE SIDEWALK

18" CONNECT TO PUMP STATION

BEGIN WALL TO NORTH ALONG BACK OF WALK

CB NUMBER 86390
RIM ELEVATION 187.35
IE 10" (N) 185.05

CB NUMBER 86333
RIM ELEVATION 187.35
IE 10" (W) 185.65

SDMH NUMBER 86359
RIM ELEVATION 189.64
IE 24" (NW) 188.04
IE 24" (SE) 188.04

SDMH NUMBER 86332
RIM ELEVATION 188.06
IE 24" (N) 185.36
IE 24" (S) 185.06

CB NUMBER 86202
RIM ELEVATION 187.41
IE 15" (N) 183.61
IE 24" (W) 183.21

CB NUMBER 16107
AREA DRAIN
RIM ELEVATION 183.13
"UNABLE TO OBTAIN INVERTS"

STA 431+92.16
BEGIN CURVE
N 633912.01
E 7652476.41

RIM ELEVATION 183
"UNABLE TO OBTAI
INVERTS"

MAP 2 1E 24AD TAX LOT 6100

MAP 2 1E 24BB TAX LOT 4801

MAP 2 1E 24AD TAX LOT 6000

0 10 20 30
1"=20'

PLAN

NOTES:

1.

SEE SHEET 3-C-25

MATCHLINE STA 428+20

SEE SHEET 3-C-27

MATCHLINE STA 433+40

(E) 4'-0" G

(E) SURFACE

5'-0" MIN CLR.

48"Ø S= 0.00%

48"Ø S= 0.00%

48"Ø BFV

(E) 8" W

12" CLR

STA 429+98.13
VERT. BEND
EL. 191.66

STA 431+92.16
HORIZ. BEND
BEGIN CURVE
EL. 191.60

STA 433+22.52
CAV

STA 433+29.11
INVERT TEIN
EL. 191.60

195 190 185 180 175 170

429+00 430+00 431+00 432+00 433+00 433+40

0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 8
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRH
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
JULY 09, 1999
AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE

CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 428+20.00 TO 433+40.00

FILENAME
119101620-3-C-26
KENNEDY/JENKS PROJECT NUMBER
1191016.20
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-26
29 OF 33

PLOT DATE: January 20, 2012 - 6:45PM USER: SHOrton
FILE: N:\2011\11191016.20_LakeOswego_Fin\W\11191016\03-3-C-26.dwg

Tree Protection Zone Boundary
6.5' Radius

61

Tree Protection Fence

Tree Protection Zone Boundary
13.5' Radius

60

Tree Protection Zone Boundary
8.5' Radius

Tree Protection Fence

59

Tree Protection Zone Boundary
12' Radius

Tree Protection Fence

58

GUARDRAIL

MATCHLINE SEE SHEET 3-C-26

MATCHLINE SEE SHEET 3-C-28

(N) 48"Ø FWP

WILLAMETTE DRIVE

MAPLETON DRIVE

MAP 2 1E 23AD
6200

MAP 2 1E 24BC
TAX LOT 1000

MAP 2 1E 24BC
TAX LOT 1200

MAP 2 1E 24BC
TAX LOT 1500

MAP 2 1E 24BC
TAX LOT 1600

CB NUMBER 86213
RIM ELEVATION 188.94
IE 18" (N) 185.74
IE 24" (S) 185.64

CB NUMBER 86227
RIM ELEVATION 187.58
UNABLE TO OBTAIN IE

CURB LINE

STA 435+33.31
END OF CURVE
N 633395.08
E 7652587.69

STA 435+42.23
45° BEND
N 633586.18
E 7652590.21

UNABLE TO OBTAIN 12" IE

EDGE OF PAVEMENT

FENCE 3'H CHL

GATE

3'H WOOD FENCE

STA 435+65.15
37.66° BEND
N 633570.95
E 7652607.35

SSMH NUMBER 88131
RIM ELEVATION 189.64
IE 8" (W) 183.74
IE 8" (E) 183.44

GRAVEL DRIVEWAY

2 MAILBOXES

SSMH NUMBER 15905
RIM ELEVATION 180.88
IE 8" (W)=174.08
IE 8" (E)=174.06

0 10 20 30
1"=20'

PLAN

NOTES:

1.

(E) SURFACE

(E) 4-12" CI

(E) 12" SD
NO I.E. OUTLET SIDE

(E) 72" CI

(E) 76" VC

(E) 72" CI

(E) 76" VC

(E) 76" VC

(E) 72" CI

5'-0" MIN CLR

48" Ø S= 0.00%

48" Ø S= 4.17%

48" Ø S= 9.60%

STA 435+33.31
HORIZ. BEND
END CURVE
EL. 181.60

STA 435+42.23
HORIZ. BEND
EL. 181.60

STA 435+65.15
HORIZ. BEND
EL. 181.60

STA 436+21.02
CAV

STA 436+49.13
VERT. BEND
EL. 181.60

STA 437+99.13
VERT. BEND
EL. 175.35

MATCHLINE STA 433+40

MATCHLINE STA 438+60

SEE SHEET 3-C-26

SEE SHEET 3-C-28

195
190
185
180
175
170

434+00
435+00
436+00
437+00
438+00
438+60

0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
JULY 09, 1999
AARON EDER
EXPIRATION DATE: 12/31/11

30%
SUBMITTAL

Lake Oswego · Tigard
Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE

CIVIL

SCHEDULE 3 PIPELINE PLAN
STA 433+40.00 TO 438+60.00

FILENAME
119101620-3-C-27
KENNEDY/JENKS PROJECT NUMBER
119101620
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
3-C-27
30 OF 33

PLOT DATE: January 30, 2012 - 8:44PM USER: DaveM
FILE: N:\2011\11191016\20_Lake-Oswego_FWW\11191016D3-C-27.dwg

Tree Protection Zone Boundary
6' Radius

Tree Protection Zone Boundary
10' Radius

Tree Protection Zone Boundary
12' Radius

Tree Protection Fence

Tree Protection Fence

Tree Protection Zone Boundary
10' Radius

Tree Protection Zone Boundary
8' Radius

Tree Protection Fence

Tree Protection Zone Boudary
7.5' Radius

Tree Protection Zone Boundary
19.5' Radiuis

NOTES:
Tree Protection Fence

54 53 52 51 50

57 56 55

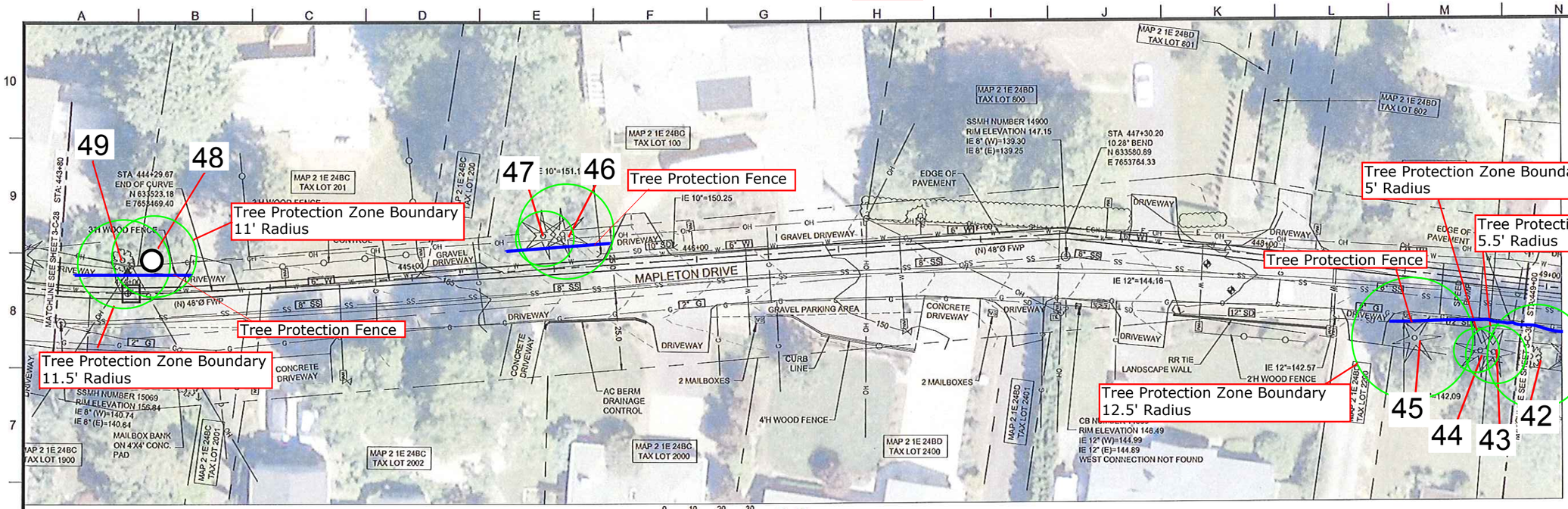
PLAN
1"=20'

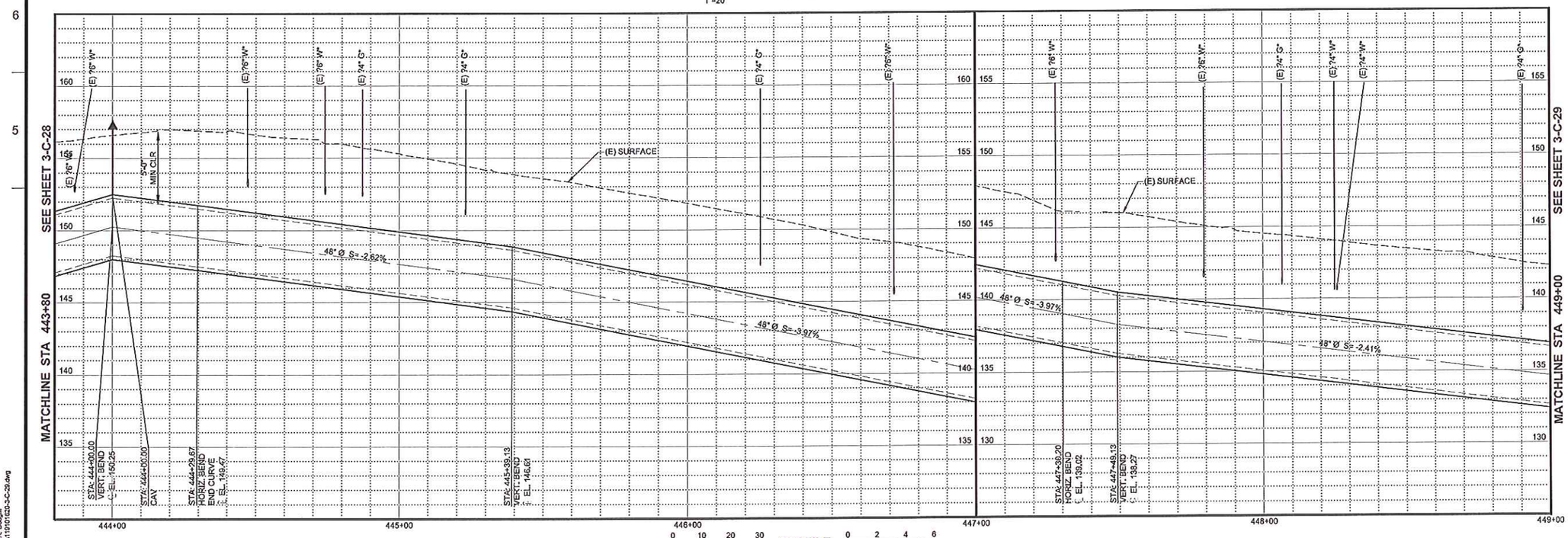
PROFILE
1"=20' HORIZ.
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants 200 SW MARKET, SUITE 500, PORTLAND OREGON 97201 SUBMITTED: _____ DATE: _____ PROJECT MANAGER APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS	LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY) DESIGNED: JAB DRAWN: DDH CHECKED: TRH CHECKED: BH APPROVED: FN	REVISIONS REV. / DESCRIPTION / BY / APP.	REGISTERED PROFESSIONAL ENGINEER 62653 OREGON JULY 29, 1994 AARON EDER EXPIRATION DATE: 12/31/11	30% SUBMITTAL	Lake Oswego · Tigard Water Partnership sharing water · connecting communities	FINISHED WATER PIPELINE CIVIL SCHEDULE 3 PIPELINE PLAN STA 438+60.00 TO 443+80.00	FILENAME 119101620-3-C-28 KENNEDY/JENKS PROJECT NUMBER 1191016.20 SCALE AS SHOWN DRAWING/FIGURE NUMBER 3-C-28 31 OF 33

PLOT DATE: January 30, 2012 - 7:29PM USER: DougM
FILE: N:\2011\119101620_LakeOswego_FinWat\119101620-3-C-28.dwg





PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
DESIGNED: JAB
DRAWN: DDH
CHECKED: TRH
CHECKED: EM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
CIVIL
SCHEDULE 3 PIPELINE PLAN
STA 443+80.00 TO 449+00.00

FILENAME	119101620-3-C-29
KENNEDY/JENKS PROJECT NUMBER	1191016.20
SCALE	AS SHOWN
DRAWING/FIGURE NUMBER	3-C-29
	32 OF 33

PLOT DATE: January 30, 2012 - 7:13PM USER: DougM
FILE: N:\2011\11191016\20_LakeOswego_FWW\11191016\20-3-C-29.dwg

Tree Protection Fence

Tree Protection Fence

Tree Protection Zone Boundary
8' Radius

Tree Protection Zone Boundary
8.5' Radius

Tree Protection Zone Boundary
10.5' Radius

Tree Protection Zone Boundary
7.5' Radius

Tree Protection Zone Boundary
13' Radius

Tree Protection Zone Boundary
8.5' Radius

Tree Protection Fence

Tree Protection Zone Boundary
Radius 19.5'

Tree Protection Zone for this tree
does not extend beyond backside of
ditch adjacent to street. Distance between tree and
travelled protion of street provides tree protection.

14438 (Included in
Water Treatment Plant Inventory)

Tree Protection Fence

Tree Protection Zone Boundary
15.5' Radius

Tree Protection Fence

42 41 40 39 38 37 36 35

0 10 20 30
1"=20'
PLAN

SEE SHEET 3-C-29

MATCHLINE STA 449+00

(E) SURFACE

5'-0" MIN CLR

48" Ø S= 4.10%

12" CLR

48" Ø S= 0.00%

END SCHEDULE 3 PIPELINE
STA 452+83.65

450+00 451+00 452+00 453+00 454+00 454+20

0 10 20 30
1"=20' HORIZ.
PROFILE
0 2 4 6
1"=4' VERT.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRH
CHECKED: EM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1989 AARON EDER
EXPIRATION DATE: 12/31/11

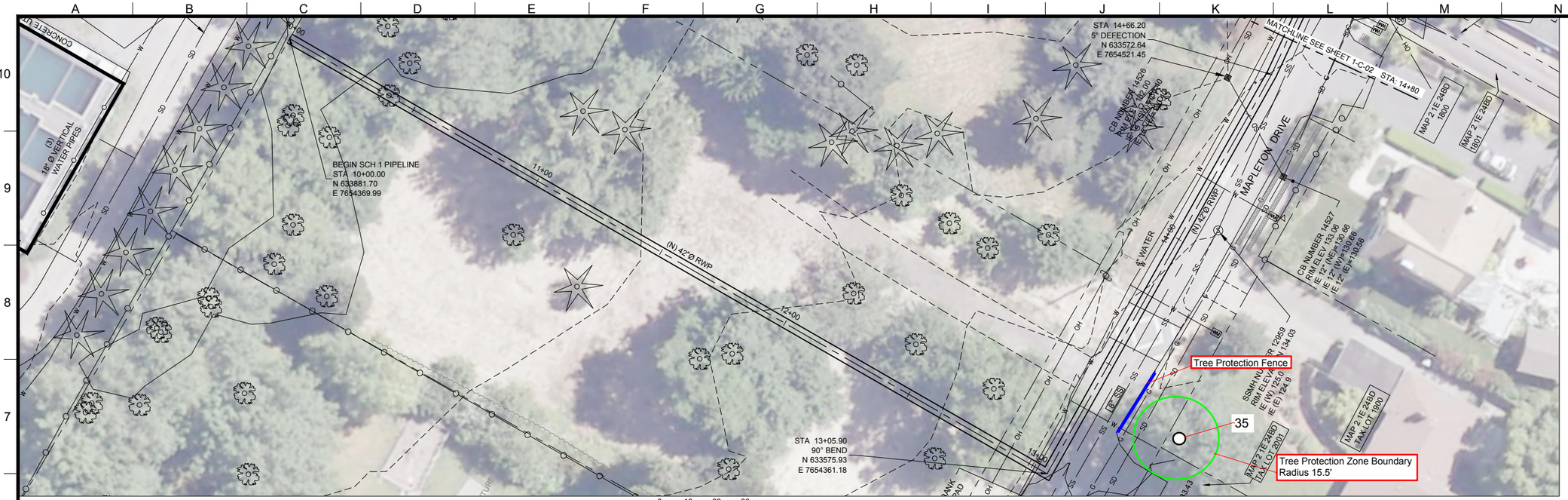
30% SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

FINISHED WATER PIPELINE
CIVIL
SCHEDULE 3 PIPELINE PLAN
STA 449+00.00 TO 454+20.00

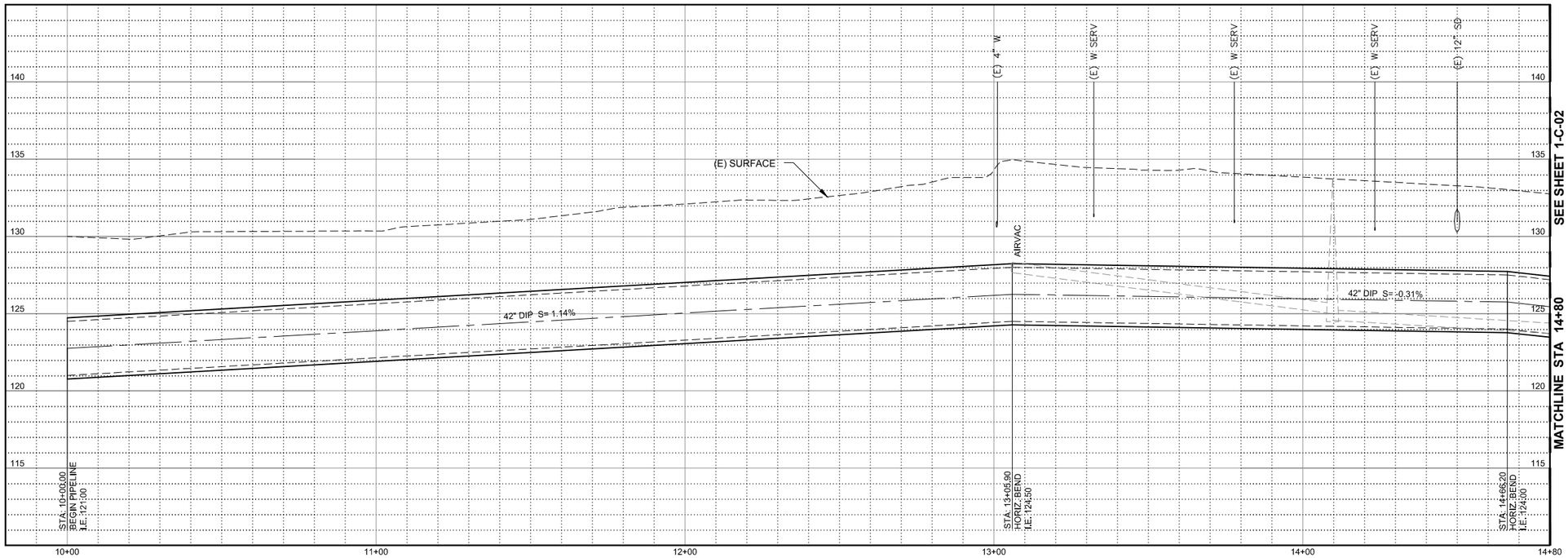
FILENAME 1191016 20-3-C-30
KENNEDY/JENKS PROJECT NUMBER 1191016.20
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 3-C-30
33 OF 33

PLOT DATE: January 30, 2012 - 7:21PM USER: DougM
FILE: N:\2011\11191016.20_LakeOswego_Fin\Wtr\11191016.20-3-C-30.dwg



0 10 20 30
1"=20'

PLAN



0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRM
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

DRAFT SUBMITTAL

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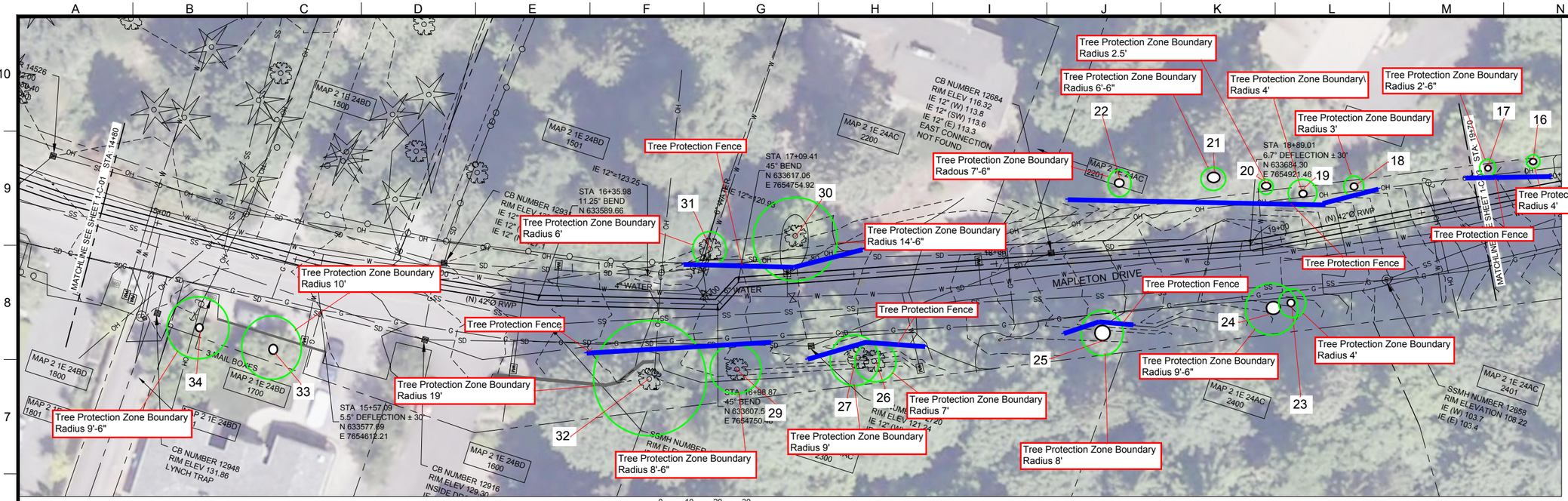
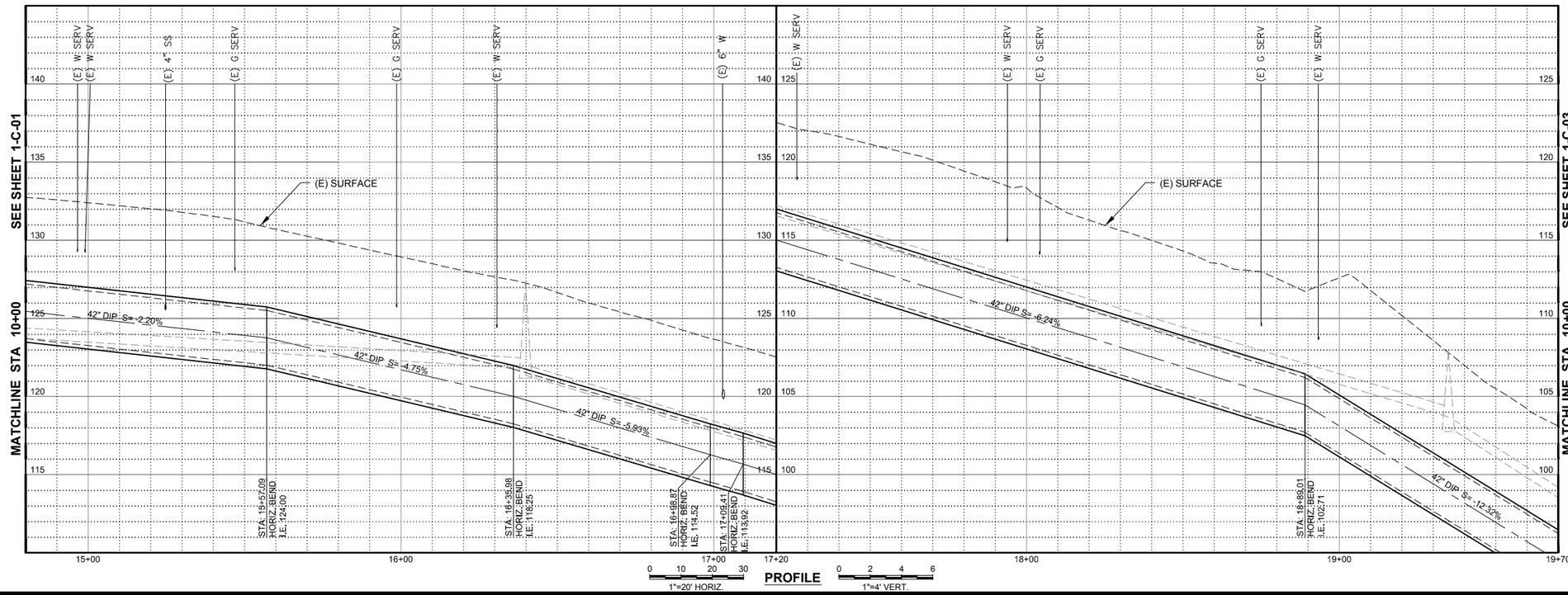
sharing water · connecting communities

RAW WATER PIPELINE
CIVIL
SCHEDULE 1 PIPELINE PLAN
STA 10+00.00 TO 14+80.00

FILENAME	119101610-1-C-01
KENNEDY/JENKS PROJECT NUMBER	1191016.10
SCALE	AS SHOWN
DRAWING/FIGURE NUMBER	1-C-01
	1 OF 28

PLOT DATE: March 8, 2012 - 11:12AM USER: Slanz
FILE: P:\cad\119\191610\10_CIVIL\dwg\119191610-1-C-01.dwg





NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRM
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

DRAFT SUBMITTAL

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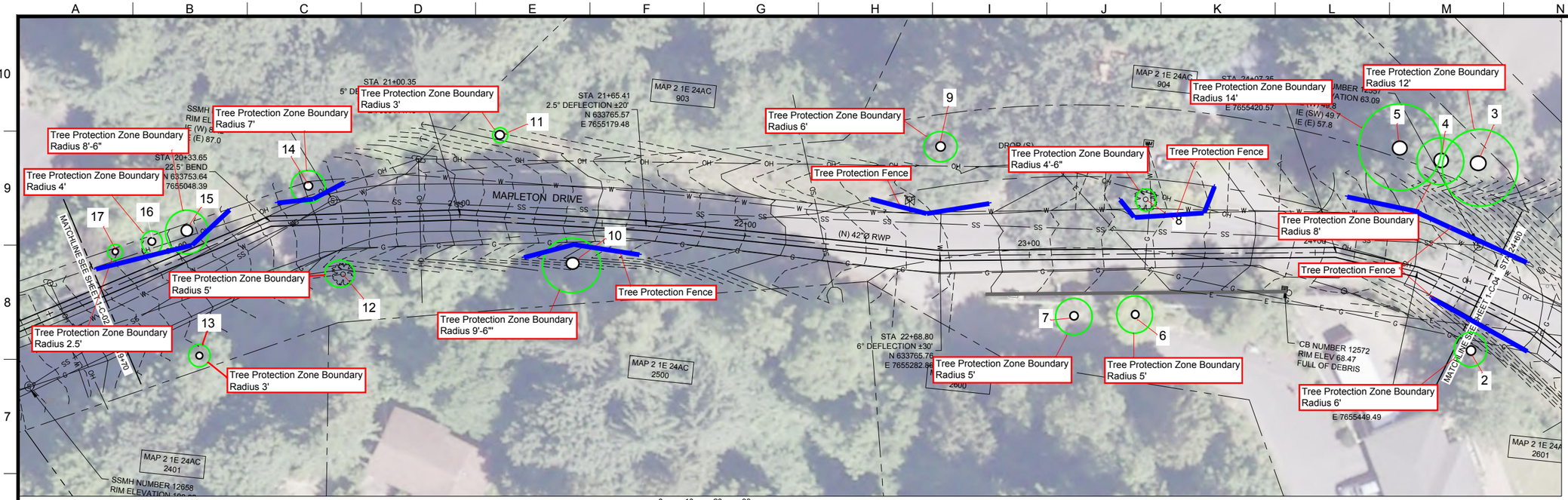
RAW WATER PIPELINE
CIVIL
SCHEDULE 1 PIPELINE PLAN
STA 14+80.00 TO 19+70.00

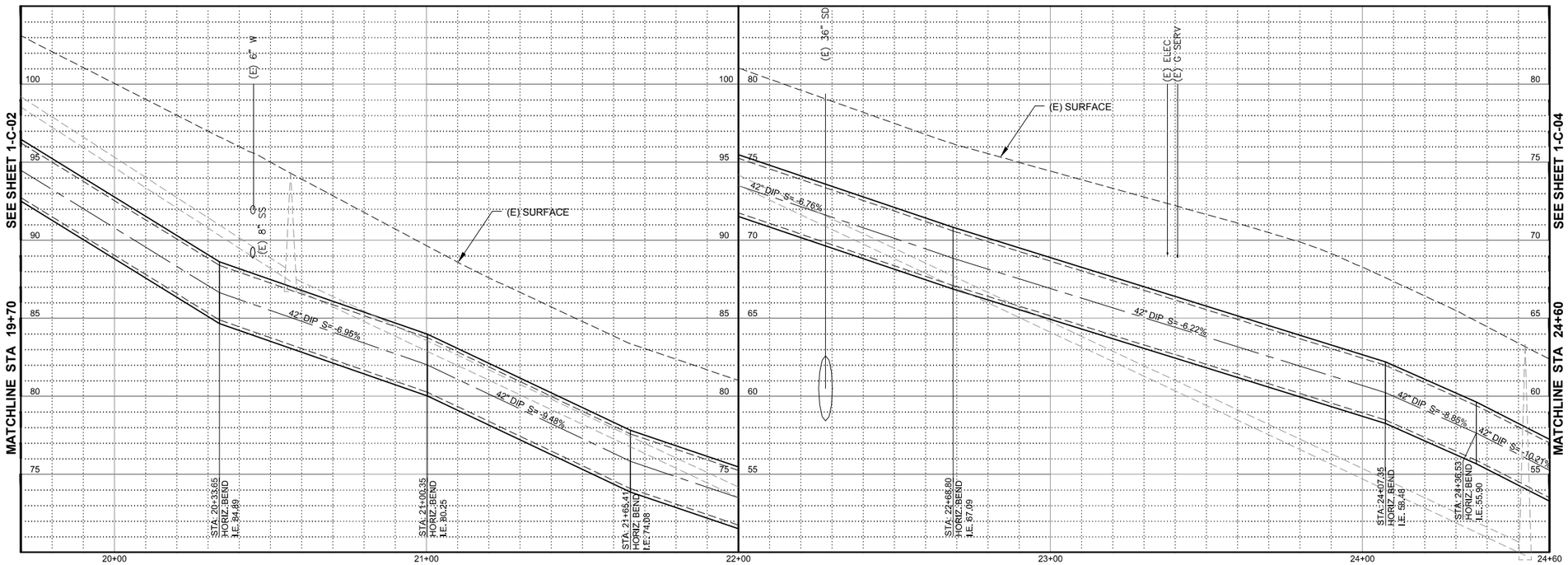
FILENAME 119101610-1-C-02
KENNEDY/JENKS PROJECT NUMBER 1191016.10
SCALE AS SHOWN
DRAWING/FIGURE NUMBER 1-C-02
1 OF 28

PLOT DATE: March 8, 2012 - 11:13AM USER: Stanl
FILE: P:\asb\1\1191016.10_LOW-flow\1191016\0-1-C-02.dwg



0 10 20 30
1"=20'

PLAN



0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____ PROJECT MANAGER

APPROVED: _____ DATE: _____ KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRM
CHECKED: BM
APPROVED: FN

REVISIONS				
REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER 62653 OREGON NOV. 09, 1999 AARON EDER
EXPIRATION DATE: 12/31/11

DRAFT SUBMITTAL

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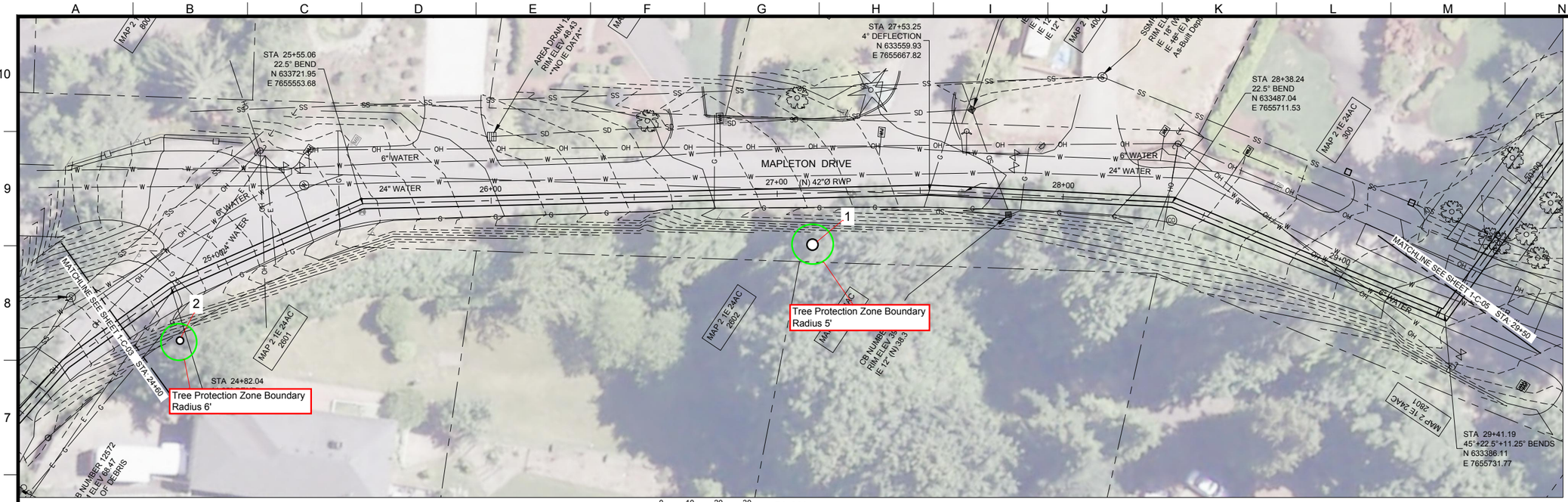
sharing water · connecting communities

RAW WATER PIPELINE
CIVIL
SCHEDULE 1 PIPELINE PLAN
STA 19+70.00 TO 24+60.00

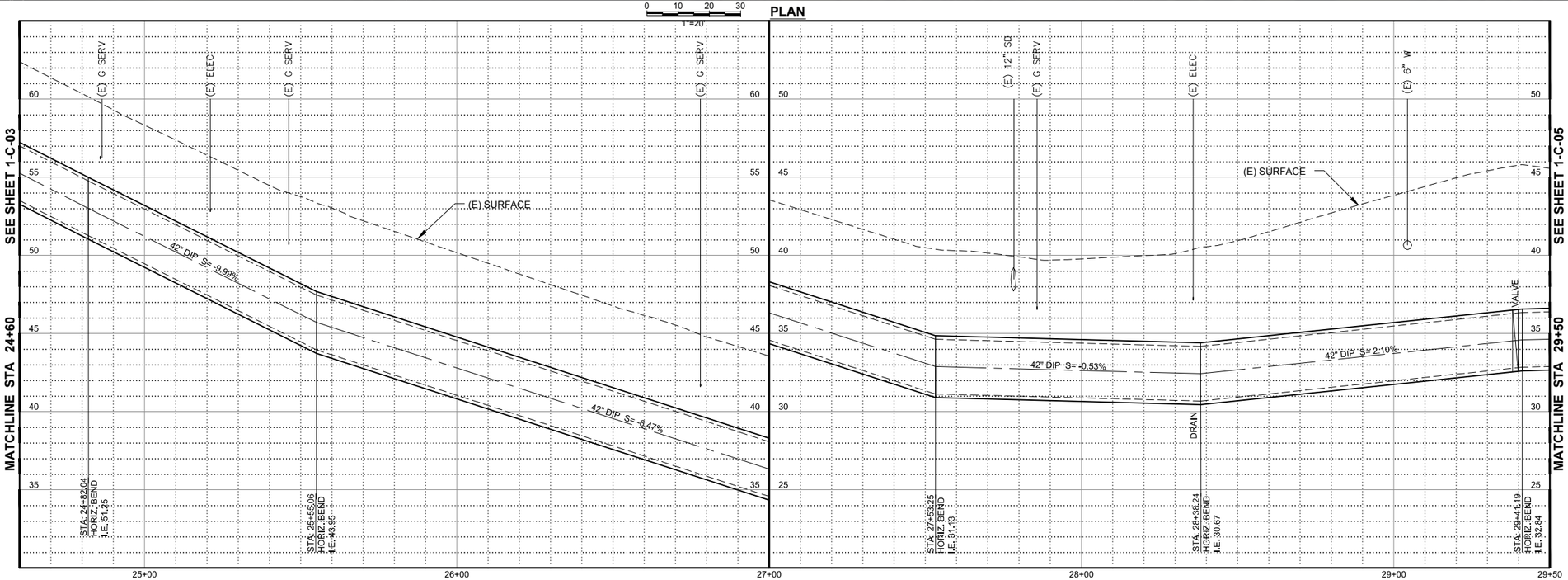
FILENAME	119101610-1-C-03
KENNEDY/JENKS PROJECT NUMBER	1191016.10
SCALE	AS SHOWN
DRAWING/FIGURE NUMBER	1-C-03
	1 OF 28

PLOT DATE: March 8, 2012 - 11:14AM USER: StanL
FILE: P:\sdd\1191\1910\16.10_GOVP4\anWW\1191016-1-C-03.dwg



0 10 20 30
1"=20'

PLAN



0 10 20 30
1"=20' HORIZ.

PROFILE

0 2 4 6
1"=4' VERT.

NOTES:

1.

PRELIMINARY N.F.C.

Kennedy/Jenks Consultants
200 SW MARKET, SUITE 500, PORTLAND OREGON 97201

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
KENNEDY/JENKS CONSULTANTS

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: JAB
DRAWN: DDM
CHECKED: TRM
CHECKED: BM
APPROVED: FN

REVISIONS

REV.	DESCRIPTION	BY		APP.

REGISTERED PROFESSIONAL ENGINEER
62653
OREGON
NOV. 09, 1999
AARON EDER
EXPIRATION DATE: 12/31/11

DRAFT SUBMITTAL

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

RAW WATER PIPELINE

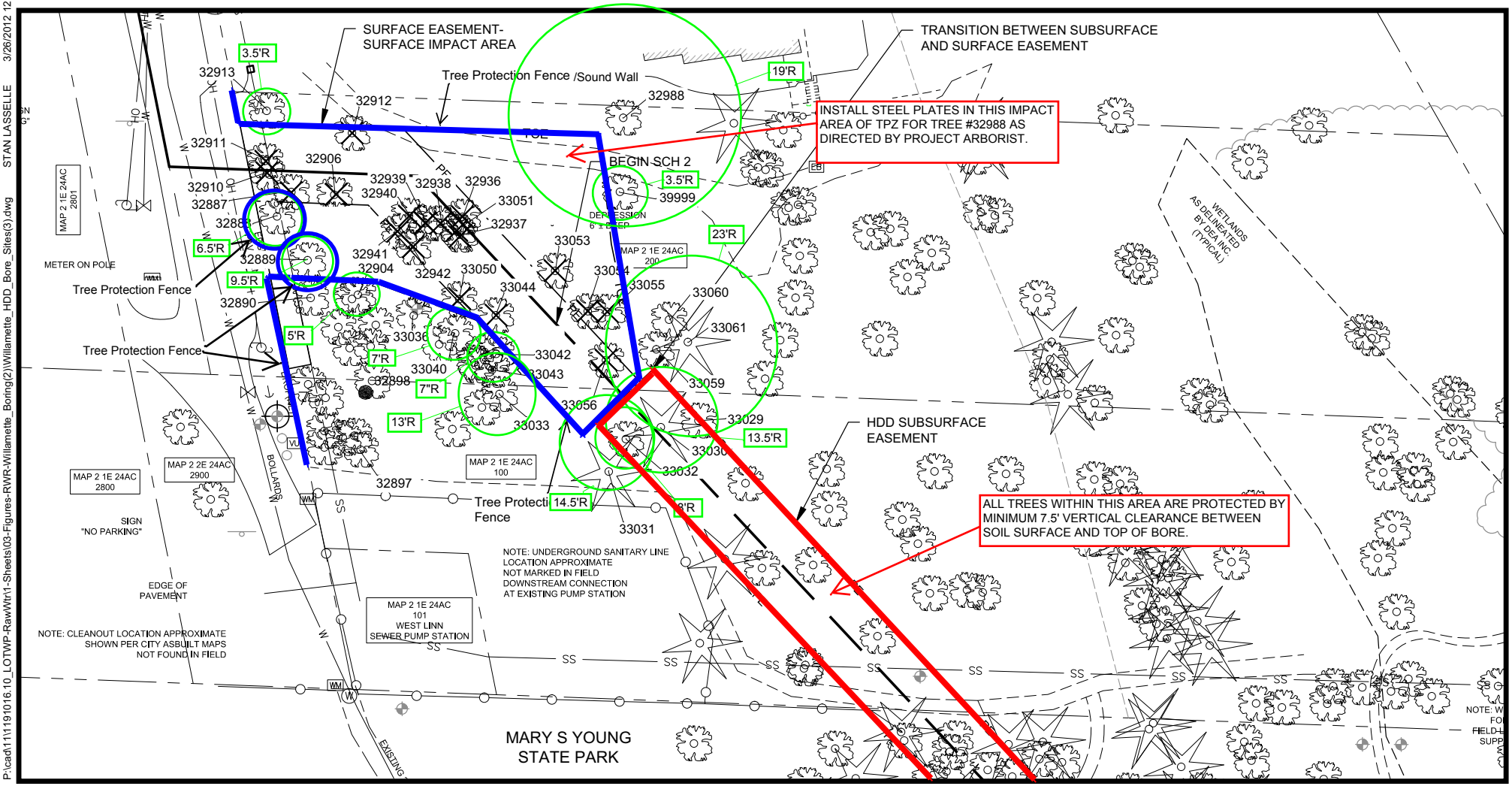
CIVIL

SCHEDULE 1 PIPELINE PLAN
STA 24+60.00 TO 29+50.00

FILENAME	119101610-1-C-04
KENNEDY/JENKS PROJECT NUMBER	1191016.10
SCALE	AS SHOWN
DRAWING/FIGURE NUMBER	1-C-04
	1 OF 28

PLOT DATE: March 8, 2012 - 11:14AM USER: Slanl
FILE: P:\dsn\11\19\16.10_LOT\PFA\dwg\11919161610-1-C-04.dwg

Appendix 3--ORPD Staging Area Tree Protection Plan



LEGEND

- **OPEN CUT PIPE ALIGNMENT**
- **HDD PIPE ALIGNMENT**
- **TREES TO BE REMOVED**
- **PE — PERMANENT EASEMENT**
- **TCE — TEMPORARY CONSTRUCTION EASEMENT**
- TREE PROTECTION ZONE BOUNDARY

NOTES:

1. TREE #33036 IS DEAD
2. PLACE STEEL PLATES AS PER PROJECT ARBORIST INSTRUCTION SEE PAGE 7, "TREE PROTECTION ALTERNATIVE".
3. TREES WITH DBH LESS THAN 12" DIAMETER IN THIS LOCATION DO NOT REQUIRE TREE PROTECTION.
4. UNLESS NOTED OTHERWISE IMPACTED TPZ AREAS OUTSIDE TREE PROTECTION FENCES BUT WITHIN WORK AREA DO NOT REQUIRE TREE PROTECTION DUE TO LIMITED IMPACT. HOWEVER, EXCAVATION WORK WITHIN THESE AREAS REQUIRES PROJECT ARBORIST SUPERVISION.
5. CONNECTION WAYS MAY BE USED NEAR TREE #32888 & TREE #32889 AS APPROVED BY PROJECT ARBORIST SEE PAGE 34 "SPECIAL CONDITIONS" ITEM #5.

N

0 15 30

APPROXIMATE SCALE IN FEET

Kennedy/Jenks Consultants

CITY OF LAKE OSWEGO
RAW WATER PIPELINE
LAKE OSWEGO, OREGON

SCHEDULE 2
WILLAMETTE BORING EXIT
MAPLETON LOTS LOCATION

KJ 1191016*10

FIGURE 6