

# IRRIGATION AND LANDSCAPE STANDARDS

The following standard specifications are intended to indicate the requirements of the City of Durango for Park Development and are an accurate description of the minimum standards acceptable. [Note: as used herein, the terms “contractor” and “developer” are synonymous.]

## I. IRRIGATION SPECIFICATIONS

### A. Irrigation System

1. The system shall be designed for 100% head to head coverage. The Contractor shall submit a detailed irrigation plan. Plans, shall be complete with line sizes, automatic valve types, wire gauges, sprinkler heads, power and controller location. Plans should also include 6 spare zone valve wires and 1 spare common wire run to the end of all main line trenches.
2. Sprinkler system to be inspected by the City of Durango. The location of all utilities will be completed before any excavation work is started.
3. The Contractor shall furnish the City with:
  - one (1) quick coupler key with hose swivel
  - one (1) drain key
  - one (1) turn-off key
  - two (2) control clock keys; one Ametex valve box key
  - two (2) sprinkler head wrench for each type of head.
4. Water Tap - All taps into water mains shall be made by the City of Durango or approved contractor. The size of the water tap will be determined and approved by the City of Durango.
5. Meter Pit - A meter pit or vault designed specifically for water meters will be installed by the Contractor to house the water meter. This shall comply with City of Durango Water Department specifications. The type of meter will be approved by the City of Durango Water Department.
6. Backflow Preventer – Up to 2” taps shall be a FEBCO 825 Series reduced pressure backflow preventer. It will be sized in accordance with manufacturer’s recommended velocities, but no velocities shall exceed the normal industry practice of 7.5 feet per second through the backflow device. For 3” Taps and larger the backflow device shall be a FEBCO 880V reduced pressure backflow preventer. It will be sized according to manufacturer’s recommend velocities, but no velocities shall exceed normal industry practice of 7.5 feet per second through device. Each backflow preventer shall be enclosed in a locked, stainless steel strong box with the following features:
  - Marine grade aluminum alloy construction
  - 100% stainless steel hardware
  - Flush, mounted, locking mechanism for security
  - Full-release locking mechanism for service and repair access

- Pre-punched viewing ports
    - a. Strongboxes shall be sized in accordance with manufacturer's recommendations, and must be approved by the City of Durango.
    - b. Backflow preventer(s) shall be installed in accordance with the applicable sections of the Uniform Building Code. It shall have either a brass union or a bolted flange connection on both the inlet and discharge side of the device.
    - c. Contractor shall provide a quick coupler blow out valve beyond the backflow preventer on the main line prior to any automatic valves for winterizing the irrigation system as noted below.
7. Raw water filtration: Irrigation systems of individual parks that are less than 5 acres using raw water will utilize an Agricultural Products, Inc. spin clean filter. These filters will be either 3" or 4" depending on water requirements. Irrigation of larger parks or parks that use extremely dirty raw water will utilize a Netafim USA Disc-Kleen filter. The size and configuration of filter system will be in accordance with manufacturers specifications and irrigation requirements. The City of Durango reserves the right to specify which filter system will be used depending on the quality of raw water. Rainbird #44 quick coupler valve shall be installed on the main line following either backflow preventer or filters on raw water systems.
8. Pipe:
- a. Irrigation system piping shall be as follows:
    - i. Primary water service line shall be seamless copper tube designated as "Type K" (in conformance with ASTM Specification B-88-62) and shall be used for service lines three fourths inch (3/4") through two inches (2").
    - ii. Primary water service lines greater than two inches (2") shall be ductile iron. These will be installed in accordance with City of Durango public works standards.
    - iii. The primary water service line will consist of schedule (sch) 80 PVC for water service two inches (2") and smaller. Start the sch 80 PVC and sch 80 fittings following the water meter and continue through the backflow preventer or raw water filtering system. Run sch 80 for at least ten feet (10') after backflow preventer or raw water filtering system. For water services eight inches (8") and above ductile iron and ductile iron fittings will be used in the same manner as the sch 80 and sch 80 fittings were used.
  - b. Irrigation Main Line:
    - i. No irrigation main line shall be smaller than one inch (1").
    - ii. Two inch (2") and smaller piping shall consist of sch 40 PVC and will be assembled with a solvent weld. In the solvent weld process use I.P.S. weld on 725 Wet 'R Dry PVC plastic cement.

Use I.P.S. weld on p-75 Wet 'R Dry PVC Plastic primer. These will be used according to manufacturer's specifications.

- iii. Three inch (3") and above Class 200 PVC gasket O ring type pipe will be used. It shall be installed using proper Thust blocks as recommended by manufacturer and as may be required.
  - c. Lateral Lines:
    - i. All lateral lines shall be sch 40 solvent weld. Recommended PVC plastic cement and primes shall be in accordance with main line specifications. No lateral lines shall be smaller than one inch (1") in diameter.
9. Quick Coupler Valves: Shall be installed according to Irrigation drawings. All main lines will have quick coupler valves installed at the end of main line runs. Rainbird 44RC shall be used. 3 Rainbird 44 quick coupler key with hose swivels will be supplied for each irrigation system unless otherwise stated by City of Durango. Quick coupler valves shall be on a swing joint staked and installed in a rectangular antek or Carson valve box or approved equivalent by the City of Durango. Lids on boxes will be marked QC on top.
10. Controllers:
  - a. Shall be Rainbird electrical type, compatible with Rainbird MaxiCom System. Controllers within existing City of Durango Parks system will have radio link capability.
  - b. New construction of large park parcels or separate community parks or sports complexes out of the radio range of existing MaxiCom system will either be a Rainbird site control plus system with decoders or in a case by case evaluation by City of Durango parks staff may be a hardwire MaxiCom system.
  - c. It will feature a manual advance switch, lightning protection, manual operating mode, stainless steel weatherproof turf cabinet and mounted on a turf pedestal.
  - d. Controllers will be properly grounded with an eight-foot (8') ground rod. It will be mounted on a turf pedestal.
  - e. The type of controller must meet the approval of the City of Durango. Each controller will have a minimum of six (6) extra stations, and will not exceed forty-eight (48) stations.
11. Zone Valves:
  - a. The zone valves will be an industrial commercial, diaphragm type with a contamination-proof filter, a flow control and a manual bleed screw, such as the Rainbird PEB or PESB series or City approved equivalent. They will be operated with a twenty-four (24) volt solenoid and will be capable of allowing compressed air to flow through them. Each zone valve shall be installed with a line sized union for easy replacement or servicing.

- b. All zone valves will be placed in an Ametek, Carson, or City of Durango approved equivalent. Valve box covers will be brought to grade using valve box extenders. There will be a minimum of 6" between fittings with a pipe size greater than 1". No more than two zone valves per Jumbo box. All valve box lids must be stamped according to what they contain (Station 1, 2, 3, or quick coupler, etc.)
- c. Zone valves will consist of the following:
  - i. Potable water will use a Rainbird PEB or equivalent approved by the City of Durango.
  - ii. Non-potable water will use a Rainbird PESB or equivalent approved by the City of Durango.

12 Field Wiring

- a. Lead wire: For runs less than seven thousand seven hundred feet (7,700'), the lead wire connecting the valves to the controller shall be #14 UF single strand, direct burial, PVC jacketed, copper wire with the insulation being red in color throughout the entire jacket. For runs in excess of seven thousand seven hundred feet (7,700'), the lead wires shall be #12 UF.
- b. Common wire: All common wire shall be #12 UF single strand, direct burial, PVC jacketed, copper wire with the insulation being white in color throughout the entire jacket.
- c. Installer shall provide 6 extra field wires and one extra common wire to the end of all main line trenches. These 6 extra field wires shall be of a different color than red.
- d. On long wire runs requiring splices, all spliced shall be made in designated areas and place in valve boxes marked Splice Box on the lid. Connections only DBR or DBY 3m water resistant connectors will be used in making wire connections including in valve boxes, unless the equivalent is approved by the City of Durango.
- e. All wire connections in splice boxes shall be twenty inches (20") linear length of wire coiled. All wire connections in the zone valve boxes shall be thirty inches (30") linear length of wire coiled.
- f. When installing field and common wires for every five hundred feet (500') run, a three foot (3') loop of wires will be made and laid in the trench. A three foot (3') loop will be installed and placed in the trench on all corners or direction changes with field or common wire runs.

13. Irrigation Heads

- a. In large turf areas as well as athletic fields, Rainbird Eagle 700 BRC for 360 degree arc and a Rainbird 750 BRC for an adjustable 30 degree to 345 degree arc or equivalent approved by the City of Durango should be used.
- b. For medium turf areas Rainbird 5000 plus series heads, Rainbird 5500 series rotors or Rainbird Falcon 6504 rotors or equivalent approved by

- the City of Durango should be used. All these sprinkler heads have full and part circle capability.
- c. For small turf areas where rotors are too large and spray heads have to be used, Rainbird 1800-PRS heads with appropriate pop-up height will be used or equivalent approved by the City of Durango.
  - d. For Shrub and flower beds, when appropriate Rainbird 1800 series pop-ups with a minimum pop-up height of twelve inches (12") shall be used or equivalent approved by the City of Durango.
  - e. All sprinkler heads will be installed with approved swing joints. Rainbird TSJ series swing joints in three quarter inch (3/4"), one inch (1") and one and one half (1 1/2") or equivalent approved by the City of Durango. Rainbird SPX series swing pipe flex will be used in conjunction with Rainbird 1800 or equivalent approved by the City of Durango.
  - f. Drip and Bubblers shall be approved by the City of Durango.
14. Irrigation Pipe Fittings: All main lines and lateral lines two inches (2") and smaller will use sch 40 PVC solvent weld fittings. There will be no male PVC adaptors allowed on any City of Durango irrigation projects. Female adapters and toe nipples will be used or only PVC toe nipples as needed. All main lines and lateral lines larger than two inches (2") will use Harco ductile iron fittings for IPS-size PVC pipe. Either Harco gasketed Ductile Iron Fittings or Harco Ductile Iron saddles will be allowed. All gasketed fittings will use Thrust blocking in accordance with manufacturers recommendations and requirements.
15. Manual Drains shall be installed according to irrigation drawings.
- a. All will have an access sleeve of two inch (2") PVC with a PVC cap and shall be in a ten-inch (10") diameter valve box as manufactured by Ametek or Carson. Top of valve box will be labeled accordingly.
  - b. All manual drains shall be Ford FIP or approved equal and will be a minimum of three-fourths inch (3/4") in size and have a cross handle.
  - c. All manual drains will discharge into a gravel sump, which is three (3) cubic feet minimum and contains three-fourths inch (3/4") washed rock with the top surface of the rock covered with plastic visquene or filter fabric.
16. Isolation Valves: Isolation valves shall be installed at locations noted on the accepted plans or as required by the City of Durango.
17. Pressure Reducing Valves may be used upon request by the City of Durango.
18. Sleeving:
- a. All piping and wires shall be sleeved under sidewalks, curbs, roadways, or similar structures.
  - b. Sleeves shall be placed in an excavated trench that provides the proper alignment for the pipe.

- c. Sleeves shall be PVC SDR-26 or heavier pipe and shall be a minimum of one inch (1") larger inside diameter than the maximum outside diameter (bello end) of the pipe to be installed through it. Sleeves shall extend a minimum of twelve inches (12") beyond the edge of the sidewalk, curb, roadway or similar structure.
  - d. Wires and piping shall be run in separate sleeves.
19. Site Conditions:
- a. The Contractor will coordinate his work with that of other subcontractors whenever possible so as to prevent conflicts. Before starting work, the Contractor will inspect the site and check all grades to determine that he may safely proceed. Before proceeding with any work, the Contractor will carefully check and verify all dimensions.
  - b. Changes or alterations in the system to meet site conditions will be subject to the approval of the City of Durango and will be made at the Contractor's expense. The Contractor will prepare a set of "as built" drawings. Exact measurements of buried valves and wire locations will be shown. The Contractor will supply the field notes to the City of Durango prior to receiving final acceptance.
20. Excavation: All trenching, backfilling, and compacting, shall comply with Standards and Specifications for the City of Durango.
21. Process:
- a. Staking: Prior to excavating or trenching, the Contractor will stake all proposed and existing utilities and all sprinkler head and line locations. Stakes will be suitable stakes color coded for materials and maintained throughout the sprinkler installation process. The City of Durango representative shall approve staking of sprinkler head locations prior to trenching.
  - b. Pipe assembly: will follow manufacturers and Irrigation Industry Standards and Requirements.
  - c. Trenching: All pipes will be installed in an excavated trench. Trenches will be dug true to the alignments shown on the accepted plans. Excavation of the trenches will be done in a professional manner, providing a trench that is straight and true with a flat bottom containing no rocks or other deleterious material that may damage the pipe.
    - i. Separate trenches will be dug for each line. No doubling up of lines in a single trench will be allowed. Trenches will be dug deep enough to allow the following cover over the top of the pipe:

Main Line Size:	Min. Cover	Max. Cover
1" – 1-1/2"	12"	18"
2" – 3"	18"	30"
Greater than 3"	24"	48"

Lateral Line Size:		Min. Cover	Max. Cover
1" – 3"	(where impact rotors are used)	12"	18"
1" – 3"	(where spray heads 4" – 8" pop up height are used)	18"	30"
1" – 3"	Where spray heads 12' or over pop-up heights are used)	24"	48"

- ii. No trench will be left open overnight without specific prior approval by the City of Durango or designee and without sufficient barricades to protect the public.
  - d. Control valves: Control valves will be installed twelve to twenty four inches (12 - 24") below grade, depending on depth of main line, in valve boxes, and valve box extenders will be used to bring the cover of the valve box to the finished grade. All electric valve control wires will be to one side of the main line and bundled/tied together every five feet (5'). All wire will be buried deep enough to maintain a minimum cover of twelve to twenty four inches (12 - 24") depending on size of mainline, and a minimum of thirty inches (30") of slack for both the lead wire and the common wire will be provided within each valve box. All control valves shall be installed with a Schedule 80 union on the upstream side for replacement purposes. There will be no male PVC adaptors allowed.
  - e. Backfill: shall consist of rock and debris free material. On some applications backfill may have to be hauled onto the site. Backfill will be approved by the City of Durango.
  - f. The Contractor must notify the City of Durango for inspections of sprinkler location staking, main line installation, wiring installation and coverage test. The Contractor will notify the City as soon as any discrepancies between plans and specifications are discovered.
22. Sprinkler Location Staking:
- a. The City of Durango will inspect the staked locations of all lines and heads for conformance to the accepted plans.
  - b. The City of Durango reserves the right to move, shift and adjust any of the stakes to better achieve the design intentions as shown on the accepted plans.
  - c. No trenching will be done until the inspection is complete and the staked locations accepted by the City of Durango.
23. Main Line Inspection: The City of Durango will inspect the depth of pipe, manual drain valves, sumps and control valves for conformance to the accepted plans prior to covering the pipe. Sprinkler mains will be pressure tested for 1 hour at 150 psi, and shall be observed by the City of Durango. Pressure losses shall be less than 7.5 psi.
24. Coverage Test - After the sprinkler heads have been installed and backfilling operations are complete, the Contractor, in the presence of the City of Durango,

will perform a coverage test to determine the conformance to the accepted plans. No partial acceptance will be made.

25. Warranty Period

- a. The Developer shall be responsible for the entire sprinkler system for a period of one (1) year following final acceptance of project by the City of Durango. The Developer will not be responsible for repair of the sprinkler system due to vandalism after the work has been accepted by the City of Durango.
- b. Any settling of backfilled trenches which may occur during the warranty period will be repaired without expense to the City, including the complete restoration of all damaged property.
- c. Turn on and winterization: During the year of warranty the contractor shall be responsible for winterizing and the startup the following spring.

**II. LANDSCAPING SPECIFICATIONS**

A. Turf Specifications

1. Installation

- a. The area of the project that has been intended to be seeded for turf grass will have a soil test run. After receiving results amendment to soil will be added when necessary. Amendment will be roto-tilled into the soil to a six to eight (6-8) inch maximum depth.
- b. All sticks, stones and other debris appearing on the surface or larger than one inch in any dimension shall be carefully removed. The entire area shall be carefully bladed so that no unevenness appears.
- c. Before seeding, the soil shall be watered to a point of almost saturation to allow for compaction. After this process the site shall be rolled to assure proper final grading. This finish grade shall be in accordance with the grading plan that is part of the plans and specifications. The finish grade must be approved by the City of Durango prior to seeding. After final grade has been approved by the City of Durango, a 3/4" to 1" seed bed will be loosened in the soil before planting.
- d. During soil preparation, and while the initial grading is being done, and prior to seeding the contractor shall take soil tests to determine the proper amounts of trace elements that are to be added to the soil. A slow release nitrogen urea-form (150 pounds available nitrogen fertilizer per acre) with a fertilizer base of 18-46-0 shall be applied to the soil with the additional trace elements thoroughly mixed into the base mix. This fertilizer shall be incorporated into the soil at a 4" to 6" depth along with the soil amendments at a rate of 250 to 400 pounds per acre, depending upon the topsoil quality and as required from the soil tests. The City of Durango shall approve the fertilizer recommendations as per the soil testing. A copy of the soil tests shall be provided to the City of Durango.
- e. All seed shall be applied by approved seeding method or seeder approved by the City of Durango.



2. Seed:
  - a. All seed mixes will be approved by the City of Durango prior to seeding.
  - b. Seed shall be spread according to manufacturers specifications on a still day where there is no breeze. Germination will be certified to be 95% or higher. All seed shall be free of *Poa annua* and all noxious objectionable weeds.

B. Tree and Shrub Specifications

1. Planting Standards
  - a. Public projects, i.e. parks, streets, medians, substations, treatment plants, plazas, and public buildings, shall provide for street and park tree planting as a part of the development process. The landscape plan for such projects shall be approved by the Director of Parks and Recreation or representative and adhere to these standards and specifications.
  - b. Site criteria to be evaluated in determining tree planting locations are:
    1. visibility of site
    2. probability of long term tree survival
    3. likelihood of private participation and financing
    4. overall benefit to the community
  - c. The following are the minimum sizes for plant material. Larger sizes may be required to ensure survival or provide a landscape effect.
    1. Standard deciduous trees (2 inch caliper)
      - i. Business, Commercial, Industrial Areas, Public Parks and Rights-of-Way
      - ii. Residential Areas (1 ¾ inch caliper)
    2. Small ornamental trees – non fruit-bearing (1 ¾ inch caliper)
    3. Evergreen trees – 6 feet (not allowed in public right-of-ways) may only be planted in city parks and open space areas
    4. Shrubs (adequate size to be consistent with design intent) – 5 gallon minimum size
    5. All plant material shall meet specifications of the American Association for Nurserymen for Number 1 grade.
2. Public tree planting shall be balled and burlapped only. Ball shall be burlap encased, wrapped in a metal wire basket. Container and bare root plantings are not permitted without the written permission of the City Arborist.
3. Plant Material
  - a. Plant material shall conform to American Standard for Nursery stock. Plant material shall be of standard quality, true to name and type and first class representatives of their species or variety.
  - b. Plants shall have normal, well-developed branches and vigorous root systems. They shall be healthy, vigorous plants free from defects, decay, sunscald injuries, and abrasions of the bark, insect pests and all forms of infestations or objectionable disfigurements.
  - c. Refer to City of Durango “Tree, Shrub, & Perennial Selection & Care Guide” for specific tree and shrub selection examples.

- d. Balled and burlapped plants shall be dug with solid balls of adequate size, the balls securely wrapped with burlap, tightly bound with rope or twine and wrapped in a metal wire basket.
  - e. The Director of Parks and recreation or representative may request to inspect any trees or shrubs before they are planted.
4. Planting Procedures
- a. No plant pits shall be dug or prepared until their location is approved by the Director of Parks and Recreation or representative.
  - b. Tree pits will be excavated two feet (2') greater in diameter than the ball and only deep enough to allow a firm platform so the top of the ball remains two inches (2") higher than the surrounding finish grade.
  - c. Shrubs will be planted in pits twelve inches (12") greater in diameter than the diameter of the container and as deep as necessary to properly set the plant.
  - d. All plants will be set plumb and straight and in the center of the pits.
  - e. When balled and burlapped trees are set, backfill mixture for this type of planting operation will be placed and water settled around the bases of all balls to fill all voids. All ropes or wires will be removed from the bases of the trees and shrubs. Backfill mixture shall consist of one-third organic material and two-thirds native soil.
  - f. All wire baskets will be removed from the root ball before the tree or shrub is backfilled. Care should be taken to assure root ball does not fall apart.
  - g. The backfill mixture will be thoroughly blended prior to placing in the pit or planter bed. Backfill mixture shall consist of one-third organic material and two-thirds native soil.
  - h. After placing of the backfill material around the roots or balls, the plant will be thoroughly watered.
  - i. When planting stock is stored on site, it must be watered daily until planting.
  - j. For all plants moved with a tree spade, all holes and cavities between the ball and the surrounding soil should be filled. The ball should be thoroughly soaked with water after planting.
  - k. All plants should be centered in the pit and set at the depth of the ball or slightly higher than they were when growing at the nursery.
  - l. All evergreen trees in excess of 6 feet in height and any deciduous tree insecure in the ground should be guyed. The method should be approved by the City Arborist.
  - m. Check with utility companies for underground electric or telephone lines, gas lines, water lines or any other improvements, public or private, before planting is begun.

\*Refer to Tree & Shrub Planting Details sheet for visual diagram.

5. Mulching

- a. Upon completion of the planting operations, the Contractor will prepare the plant pits and planter beds for mulch.
  - b. The plant pits will have a four inch (4") high earth berm built around the tree to form a saucer.
  - c. The diameter of the saucer will be two feet (2') greater than the ball diameter for deciduous trees and at the drip line for evergreen trees.
  - d. All tree and shrub plantings should be mulched over the root system with four inches (4") of shredded cedar bark mulch or equal equivalent upon approval of the City Arborist.
6. Fertilizing
- a. During the planting operations, the Contractor will place fertilizer tablets around the ball of the plant in accordance with the manufacturer's recommendation.
  - b. Fertilizer shall be as specified in "Agriform" tablets, or equal having a chemical analysis of Nitrogen-20, Phosphate-10 and Potash-5 in a slow release form.
  - c. It will be placed in the backfill mixture according to the manufacturer's recommendation.
7. Cleanup
- a. Throughout the entire operation of planting, no rope, wire, burlap, empty containers, rocks, clods and other debris will be allowed to accumulate; these items will be removed daily, and the site will be kept as tidy as possible at all times.
  - b. Soil excavated from plant pits and planter beds as necessary to install the specified quantities of backfill mixture will be removed from the site.
  - c. Upon completion of the planting, all excess soils, rocks and debris, which have not previously been cleaned up, will be removed from the site or disposed of.
8. Warranty Period and Replacements
- a. The warranty period for trees and shrubs shall begin at the date of acceptance.
  - b. The contractor shall guarantee all plant material to be in healthy condition for a period of two growing seasons from the date of acceptance.
  - c. When work is accepted in parts, the warranty periods extend from acceptances to the terminal date of the guarantee of the last acceptance.
  - d. The contractor shall replace, without cost, as soon as weather conditions allow and within a specified planting period, all plants determined by the City Arborist to be dead or in an unacceptable condition during and at the end of the warranty. To be considered acceptable, plants shall be free of dead or dying branch tips and shall bear foliage of normal density, size, and color and shall closely match adjacent specimens of the same species. Replacement is subject to all requirements stated in this specification.

- e. The guarantee of all replacement plants shall extend for an additional two growing seasons from the date of their acceptance after replacement. In the event that replacement plant is not acceptable during or at the end of said extension period, the City Arborist may elect subsequent replacement or different plant item.

### III FORESTRY STANDARDS

#### A. Definitions

- 1. Street Trees: Street Trees are herein defined as trees on public right-of-way between the curb and property line along the side of streets or in median of all streets, avenues, or ways within the City.
- 2. Park Trees: Park Trees are herein defined as trees in public parks, cemeteries and all other areas owned by the City, or any area to which the public has free access as a park.

#### B. Areas of Responsibility

- 1. Street Trees: Street trees are the responsibility of the Department of Parks and Recreation – Forestry Division for planting and management. All existing street trees are managed by the City.
- 2. Park Trees: Park trees are the responsibility of the Department of Parks and Recreation – Forestry Division for planting and management. This includes trees in parks, cemeteries, and all other areas owned by the City.

#### C. Maintenance Standards

- 1. All public deciduous trees on improved properties shall be pruned on a rotational basis of not more than seven (7) years. This involves pruning each City-owned deciduous tree at least once in this time period based on the maintenance prune specifications in this document.
- 2. Public trees shall be managed in such a manner as to promote their general health by providing the necessary cultural practices which may include insect and disease control, fertilization, irrigation, staking, guying, wrapping, cabling, bracing and pruning.
- 3. Trees shall be maintained in such a manner as not to endanger, interfere, or otherwise conflict with requirements of safe public use of an area.
- 4. Any public tree which because of habit of growth, age, condition or disease becomes a hazard to public safety or obstructs a clear view of streets, signs, signals or intersection, thus creating a hazard, shall be maintained to correct the problem. Hanging limb and branch growth shall be maintained 14 feet above streets and eight (8) feet above sidewalks.
- 5. Every owner of any tree or shrub overhanging any street or right-of-way within the City shall prune the branches so that such branches shall not interfere with the safe use of the street or sidewalk or obstruct the view of any street intersection. The City shall have the right to prune any tree or shrub on private property when it interferes with the visibility of any traffic control device or sign.

6. Any tree which, because of an epidemic disease (i.e. Dutch Elm Disease) or insect infestation (i.e. Mountain Pine Beetle); poses a threat to other trees or plants in the community shall be treated so as to control the spread of the problem organism.

D. Street Tree Spacing and Location Requirements

1. At the intersection of roadways or vehicular access points, no plant material with a mature height greater than 30 inches shall be planted within sight triangle measuring 35 feet along the boundary of each of the intersecting roadways, measure from the point of intersecting curb lines, except where engineering standards indicate otherwise.
2. No tree planting is permitted where the distance between a curb and a detached sidewalk is less than 5 feet. In addition, a planting area defined by two curbs, curb and fence, or sidewalk and fence must be 5 feet wide if street trees are to be planted.
3. Trees must be centered in the planting strip when the distance between the curb and detached sidewalk is 8 feet or less.
4. Where the sidewalk is attached to the curb as a continuous element, the street tree planting must be at least 5 feet in back of the walk. The tree must be located on the public right-of-way.
5. Larger maturing trees should be spaced 40 feet apart and smaller maturing trees 30 feet apart. The Director of Parks and Recreation or representative may require wider spacing if it is necessary for development of the tree or for safe use of the street or sidewalk. When space is limited or to achieve certain design effect, closer spacing may be considered.
6. No tree shall be planted closer than 15 feet from any driveway or alley nor shall a tree or shrub be planted in such a manner that its eventual growth cannot be reasonably controlled so as to avert interference with or obstruction to any improvements installed for public benefit.
7. Tree plantings made in a sidewalk must have a minimum of 15 square feet cutout area.
8. No tree planting is to be made within 10 feet of any building or structure.
9. All plantings adjacent to utilities shall be done so as to not impact such said services: water, sewer, gas, communications and electrical.
10. No street trees other than those low-growing species that do not attain a mature height greater than 30 feet shall be planted under or within 10 feet of any overhead power line exclusive of street light or service lines.
11. When planting in an underground utility zone, consideration will be given to the effects of a mature root system on the impact of such said zone.

- E. Tree Removal Criteria: It is the objective of the City of Durango to provide a tree planting program on City property that insures the future existence of the City's tree resource by the planting of as many or more trees than must be removed due to infection, death, hazardous condition, nuisance or construction occurring in the area. In addition, a set of tree removal criteria is used to prevent indiscriminate removal. Wildlife habitat, historic value and species significance is considered as a factor in

making all tree management and removal decisions. City trees may be removed only when one or more of the following criteria are met:

1. The tree is infected with an epidemic insect or disease where the recommended control is not applicable and removal is the recommended practice to prevent transmission.
2. The tree poses an extreme public nuisance because of its species, size, location or condition. The nuisance could be caused by fruit or seed drop, harboring of insects or excessive twig or limb breakage.
3. The tree poses a severe safety hazard that cannot be corrected by pruning, transplanting or other treatments.
4. The tree severely interferes with the growth and development of a more desirable tree.
5. The aesthetic values of the tree are so low or negative that the site is visually enhanced by the tree's removal.

F. Tree Replacement Policy for New Development or Construction:

The City policy for construction projects, if trees have to be removed due to no other alternatives is as follows:

Diameter of Tree to be removed	Number of 3" caliper replacements
Less than 9"	1
10 – 14"	2
15 – 19"	3
20" and above	5

This is policy and not City code, but generally this works well when trees have to be removed. If the number of trees to be replanted on the site exceeds the site capacity, then the additional trees shall be planted in City of Durango Parks or Open Space.

#### IV PRUNING AND REMOVAL SPECIFICATIONS

A. Specific Requirements Pertaining to Pruning of Trees

1. No tree shall be cut back in such a manner that its health will be impaired. An exception to this may occur in tree removal or emergency relief of an immediate danger to persons or property. Any such emergency procedures must be reported promptly to the Director of Parks and Recreation or representative (or other authority) with plans for completion or follow-up work submitted for approval.
2. Authority to prune trees does not include the cutting back of sound, healthy tree branches in excess of 6 inches in diameter, unless specifically approved by the Director of Parks and Recreation or representative, or if required by accepted arboricultural standards in the course of utility line clearance work and approved by the Director of Parks and Recreation or representative. The topping of trees in the public right-of-way is prohibited.
3. When tree pruning cuts are made to a side branch, it is desirable that the remaining branch possess a basal thickness of at least ½ of the diameter of the wound so affected, and the maximum cut will not exceed a 3 to 1 ratio. Such cuts shall be considered proper only when such remaining branch is vigorous enough to maintain adequate foliage to produce woody growth capable of healing the cut within a reasonable period of time.

4. All final tree pruning cuts shall be made in such a manner as to favor the earliest possible covering of the wound by natural callus growth. Excessively deep flush cuts which produce large wounds or weaken the tree at the cut shall not be made. Tree pruning cuts should be made just outside the branch collar.
5. Tree branches shall be removed and controlled in such a manner as not to cause damage to other parts of the tree or to other plants or property.
6. All tools used on a tree known to contain an infectious tree disease shall be properly disinfected immediately after completing work in such a tree.
7. All cutting tools and saws used in making tree pruning cuts shall be kept sharpened adequately to result in final cuts with a smooth surface and secure bark remaining adjacent thereto.
8. Whenever pruning cuts are to be made while removing branches too large to hold securely in one hand during the cutting operation, the branches shall be cut off first one to two feet beyond the intended final cut. Then the final cut shall be made in a manner to prevent unnecessary tearing back of the bark and wood.
9. Any cutting of tree roots, other than when in the process of tree removal, shall give due consideration to the future welfare of the tree. Proper cutting of roots shall be directed by the City Arborist and all actions shall be taken, utilizing the latest scientific techniques, to treat resulting wounds to prevent entry of decay organisms. Also the latest engineering techniques will be used to minimize root damage before, during and after construction around trees.

\*Refer to Pruning Deciduous Trees sample sheet

B. Standards of Workmanship for Pruning and Removal

1. Cleanup of branches, logs or any other debris resulting from any tree pruning or removing shall be promptly and properly accomplished. The work area shall be kept safe at all times until the cleanup operation is completed. Under no condition shall the accumulation of brush, branches, logs or other debris be allowed upon a public property in such a manner as to result in a public hazard.
2. The use of climbing spurs or spike shoes in the act of pruning trees is prohibited.
3. The use of climbing spurs is not an acceptable work practice for pruning operations on live trees. Climbing spur use is permissible on tree removals and in emergencies where aerial rescue must be performed.
4. Under no condition shall it be considered proper to leave any severed or partially cut branches in any tree being worked on after the tree workers leave the scene of the operation.
5. Whenever large tree sections are being cut in a treetop that may endanger the public or property, such sections shall be secured by ropes and lowered safely in a controlled manner.
6. Unless the tree work area is totally barricaded or otherwise kept safe while pruning or removing trees, at least one responsible tree worker shall serve to coordinate safe operations on the ground at all times when work operations are in progress.

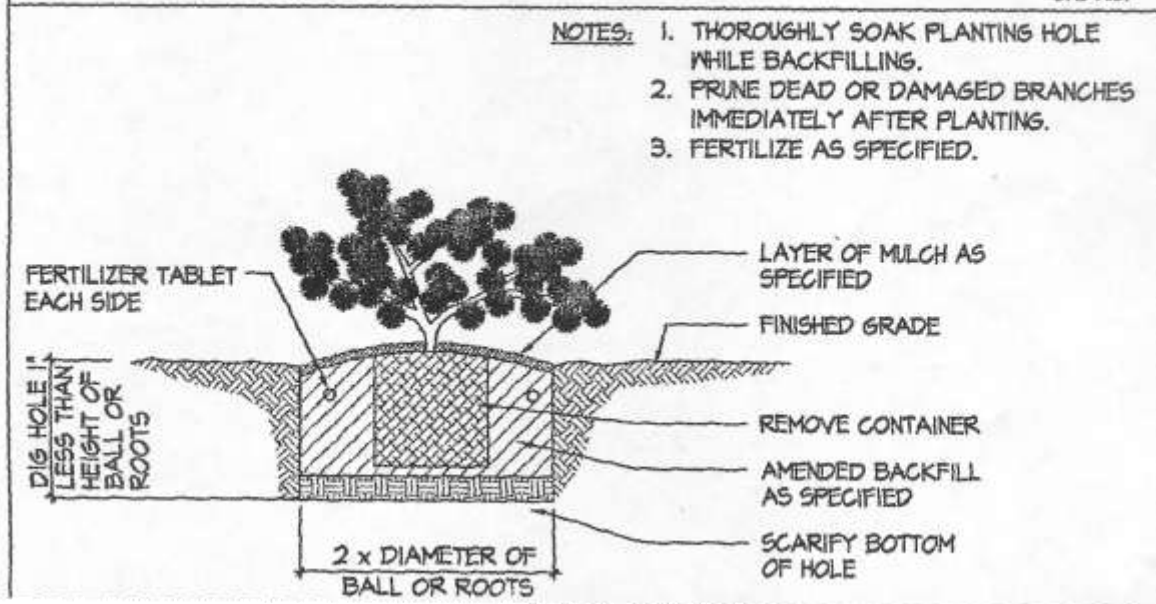
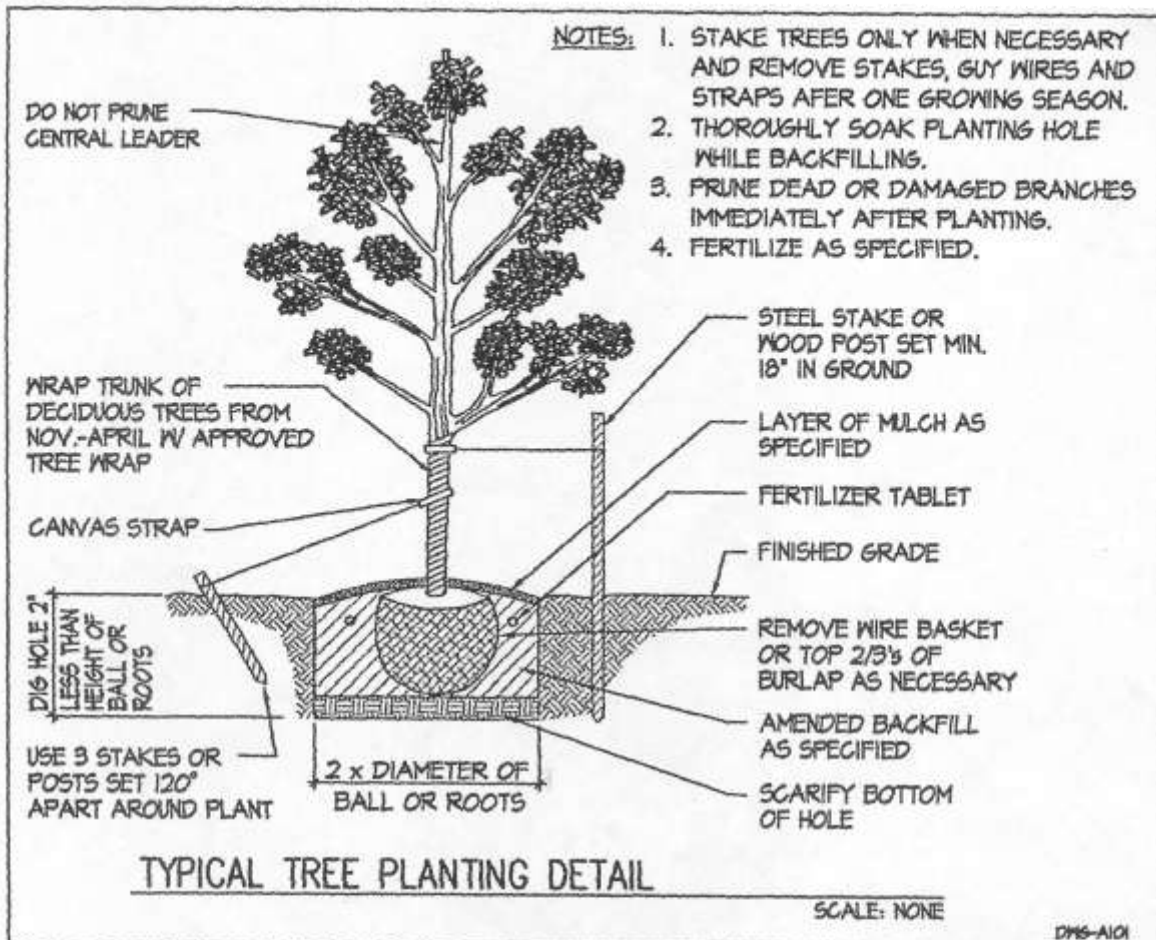
- C. Authorized Types of Tree Pruning: The following pruning types are the general categories of pruning used on all species of trees. The user may include one or several of these types at any time on any particular tree or trees or any part of a tree, depending on the desired results. If work is to be performed by a private contractor on City-owned trees in the public right-of-way, a detailed sheet of specific pruning requirements will accompany the contract.
1. Hazard Reduction Pruning. Hazard reduction pruning is recommended when the primary goal is to reduce the danger to a specific target caused by visible defined hazards in a tree. This pruning shall consist of the removal of dead, diseased, obstructing, split and/or broken branches 2 inches (5.0 cm) in diameter or greater. The removal of such described branches is to include those inside the crown of the tree. Limbs susceptible to failure from dense or heavy foliar masses should be thinned.
  2. Maintenance Pruning. Maintenance pruning is recommended when the primary goal is emphasis on hazard reduction pruning, tree health and structure. Maintenance pruning shall consist of removal of dead, dying, diseased, interfering, obstructing, split and broken branches and girdling roots. The removal of such described branches is to include those within the crown of the tree ½ inch in diameter or greater (refer to Maintenance Prune Spec sheet).
  3. Aesthetic Pruning. Aesthetic pruning is recommended when the primary goal is emphasis on maintenance pruning, tree health, structure and overall appearance. Aesthetic pruning shall consist of removal of dead, dying, diseased, interfering, obstructing, split and broken branches ½ inch (1.25 cm) in diameter or greater. Selective thinning may also be accomplished on the entire tree or any specific branch, as needed. The main difference between maintenance and aesthetic pruning is that the branch diameter to be removed is smaller, thus a much finer job, and selective thinning is incorporated.
  4. Crown Reduction. Consideration should be given to the ability of a species to sustain this type of pruning. Crown reduction is reduction of the top, sides or individual limbs by means of removal of the longest portion of a limb to a lateral no less than ½ of the total diameter of the original limb or no more than ¼ of the leaf surface and with a maximum of 1/3 in total crown mass. In most cases, one of the three previously mentioned pruning types will accompany this procedure. Crown reduction is the least desirable pruning technique and should only be used as a last resort option.(refer to Crown Reduction Spec sheet)
  5. Vista Pruning. Vista pruning consists of crown reduction and/or primary and selective thinning to allow a specific view of an object from a predetermined point.

#### V. MAINTENANCE PRUNING SPECIFICATIONS

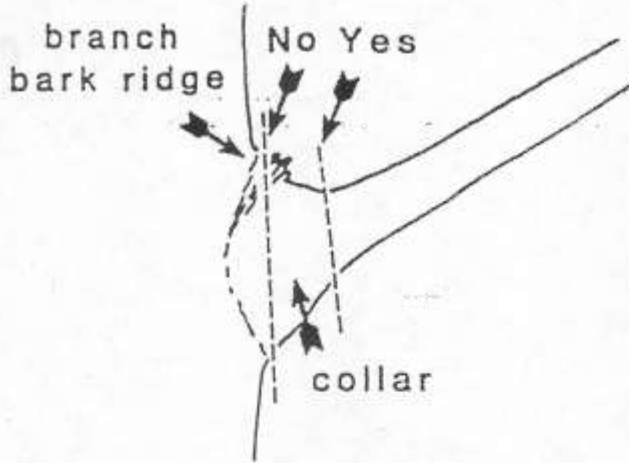
- A. Description of ‘Maintenance Prune.’ This operation of tree trimming shall consist of the general removal of those dead or living branches as may menace the future health, strength and attractiveness of the tree.
- B. Specification for Maintenance Prune



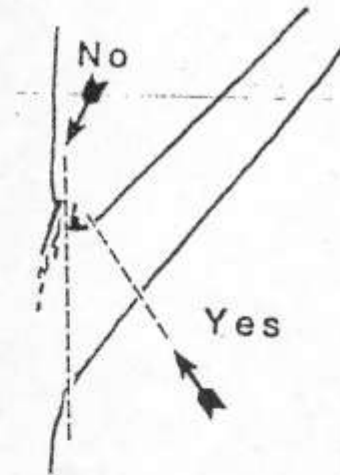
1. Properly remove all dead and dying branches of one half inch (.5") and over in diameter.
  2. Remove all broken branches or any loose branches lodged in the tree.
  3. Remove all dead and live stubs of previously broken or poorly cut limbs.
  4. Remove any live branches which interfere with the tree's structural strength and healthful development, which will include the following:
    - a. Limbs which rub and abrade a more important branch.
    - b. Limbs of weak structure which are not important to the framework of the tree.
    - c. Limbs which, if allowed to grow, would wedge apart the junction of more important branches.
    - d. Limbs with twigs and foliage obstructing the development of more important branches.
    - e. Limbs forming multiple leaders in a single leader type tree.
    - f. Branches near the end of a limb which will produce more weight or offer more resistance to wind than the limb is likely to support.
    - g. Undesirable sucker and sprout growths.
    - h. Selective removal to one or more developing leaders where multiple branches growth exists near the end of broken or stubbed limbs.
    - i. Removal of branches which project too far outward beyond an otherwise symmetrical form.
- C. All final cuts should be made to the branch collar of the limb being removed. Extremely deep cuts which produce excessively wide wounds or weaken the tree shall not be made.



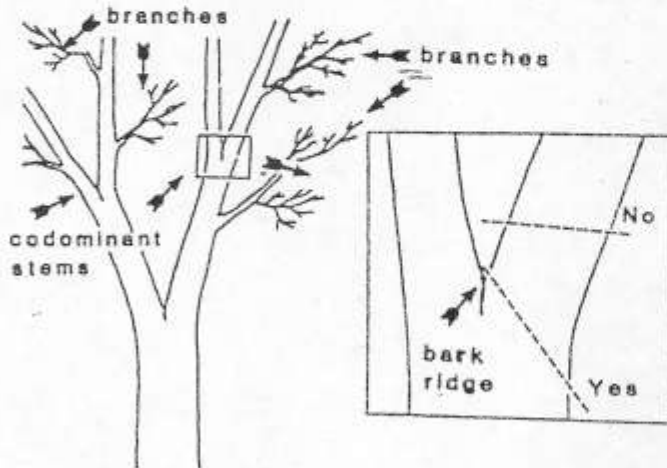
## PRUNING DECIDUOUS TREES



When removing a branch, always cut outside the branch bark ridge and collar. Do not make a flush cut.

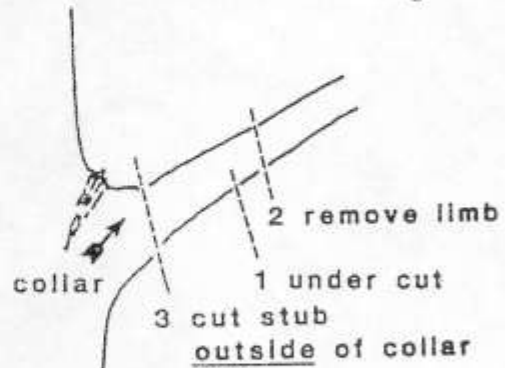


Branches that do not have a distinct collar should be cut at a right angle to the branch outside the branch bark ridge.



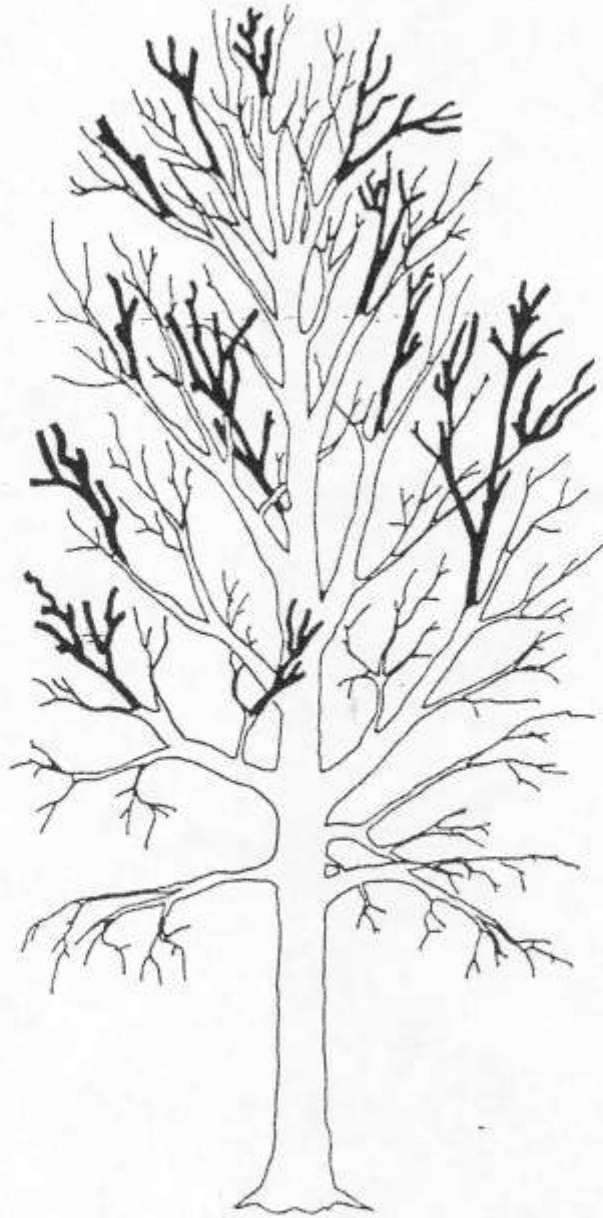
Trees may have co-dominant stems, as shown on the left. If a co-dominant stem must be removed, cut at an angle outside of the bark ridge as shown in the insert at right.

Avoid leaving any stub.



When removing heavy limbs, first make an undercut several inches outside of the collar. Then remove limb by a second cut an inch or so outside of the first cut. Remove stub with a third cut just outside of the collar. (Feucht, 1985)

## CROWN REDUCTION PRUNING



Proper crown reduction of a tree showing where the cuts are to be made. In each case a leader allowed to remain. This prevents or reduces latent bud growth, thus reduces unwanted suckers. After crown reduction note that the tree is thinned and somewhat cut back but without the pruned or sheared look.