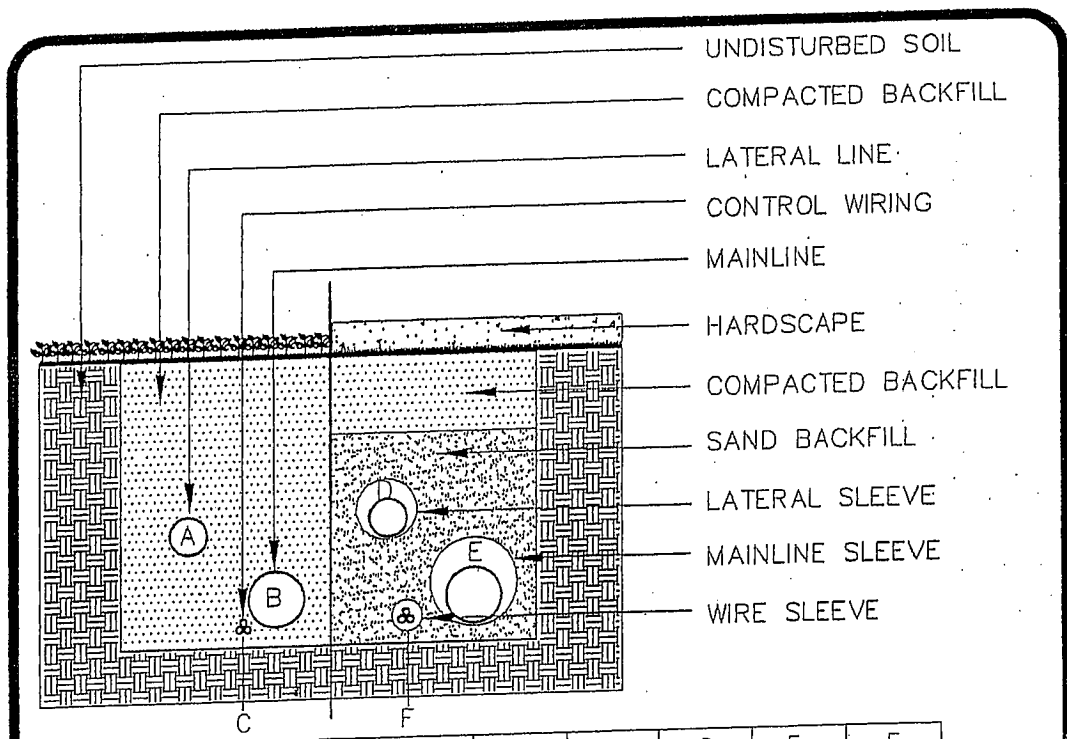


NOTES:

1. ALL WIRING MUST CONFORM TO LOCAL CODES
2. PROVIDE EXPANSION COILS AT EACH WIRE CONNECTION
3. PROVIDE 3" CLEARANCE BETWEEN WIRES & BOX
4. ELECTRICAL SWEEP OPEN END SHALL BE SEALED WITH EXPANSION FOAM
5. PROVIDE 4 EA. CLAY BRICKS UNDER VALVE BOX (TYP.)
6. NO WIRE SPLICES SHALL BE ALLOWED UNLESS APPROVED BY D.R.P.D.
7. ALL SPARE WIRES FOR END OF RUN SHALL BE IN A PULL BOX TYP. AND SHALL BE LABELED IN BOX AND AT CONTROLLER

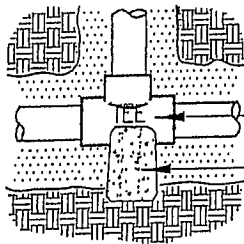
DURHAM RECREATION & PARK DISTRICT	
PULL BOX	IR-10



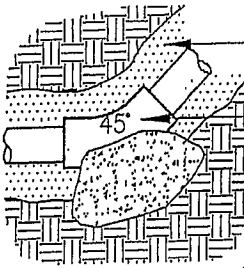
DEPTH	A	B	C	D	E	F
4" & LARGER	-	30"	30"	36"	36"	36"
3" & SMALLER	18"	24"	24"	30"	36"	36"
2-1/2" & SMALLER	12"	24"	24"	24"	30"	30"
WIRING	-	-	BELOW MAIN	-	-	BELOW MAIN

- NOTES:
1. LINES MUST HAVE MIN. CLEARANCE OF 4" FROM EACH OTHER & 24" FROM OTHER TRADES
 2. RUN WIRING UNDER MAINLINE, TAPE & BUNDLE @ 10' O.C.
 3. TIE A 24" LOOP IN ALL WIRING AT CHANGES IN DIRECTION
 4. ALL SLEEVES MUST BE 2X THE DIAMETER OF THE PIPE WITHIN
 5. ALL SLEEVES MUST HAVE FOAM SEALANT INSIDE PIPE
 6. ALL SLEEVES MUST EXTEND 12" MIN. DISTANCE PAST CURB OR SIDEWALK
 7. CONTRACTOR MUST ADJUST MAINLINE AROUND ALL STREET LIGHT LOACTIONS

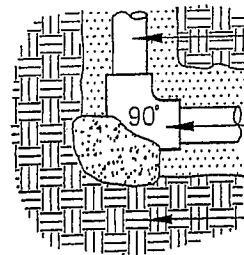
DURHAM RECREATION & PARK DISTRICT		
PIPE & WIRE TRENCHING		IR-11



SCH 80 MAINLINE TEE
 CONCRETE THRUST BLOCK TYP.



COMPACTED BACKFILL TYP.
 SCH 80 MAINLINE ELL 45

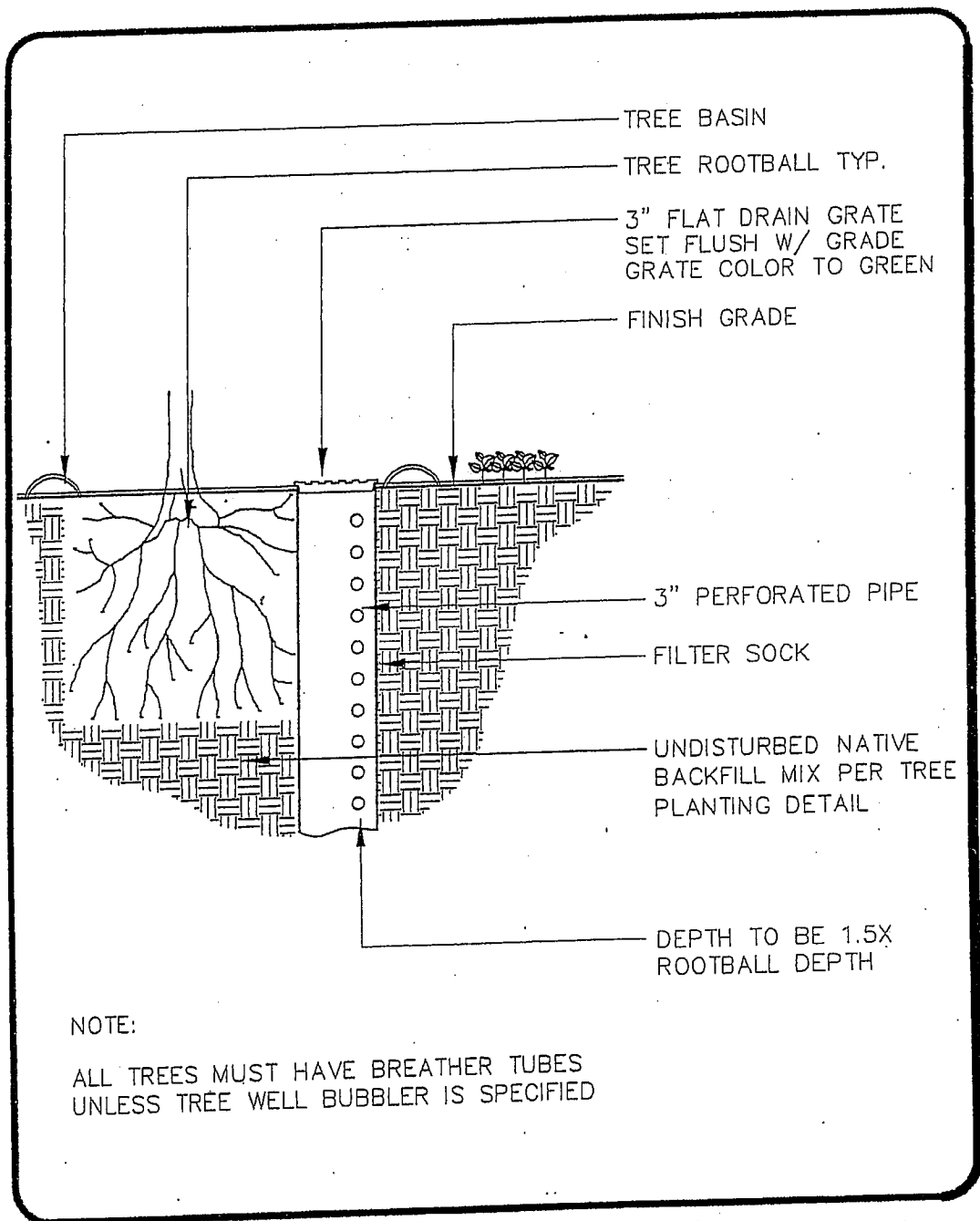


MAINLINE PER SPECS. TYP.
 SCH 80 MAINLINE ELL 90
 UNDISTURBED NATIVE SOIL TYP.

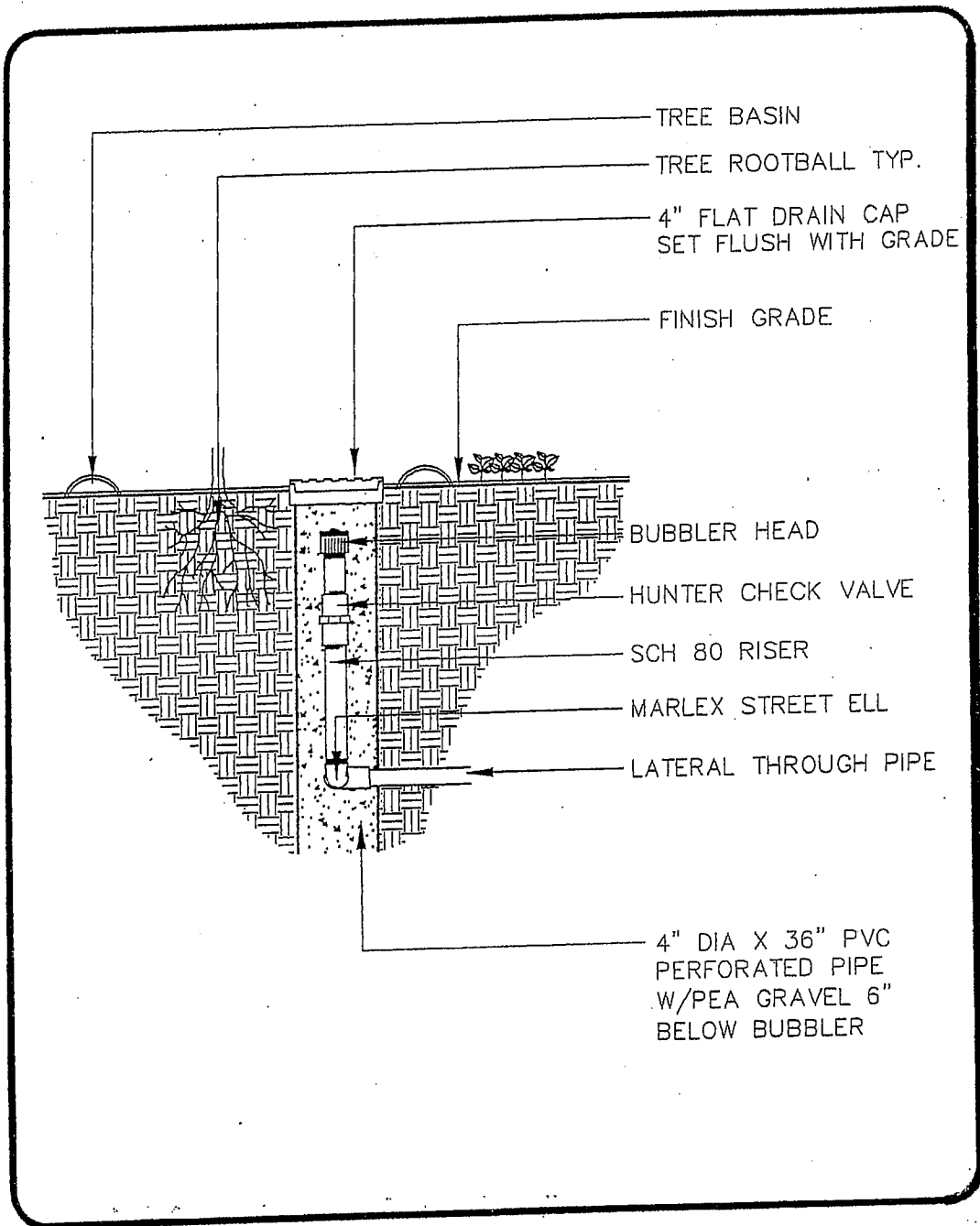
NOTES:

1. SUPPLY LINES 2" - 3" IN DIAMETER SHALL RECEIVE CONCRETE THRUST BLOCKS
2. SUPPLY LINES OVER 3" SHALL HAVE IRON DUCTILE RESTRAINT SYSTEM
3. A MINIMUM OF 6" OF CONCRETE SHALL BE POURED ON VIRGIN OR COMPACTED SOIL BENEATH EACH INSTALLATION
4. CONCRETE SHALL BE 3 SACK MIX SLURRY CONTAINING NO GRAVEL
5. WHERE CONCRETE AND PVC ARE TOGETHER PVC PIPE SHALL BE PROTECTED WITH PIPE WRAP

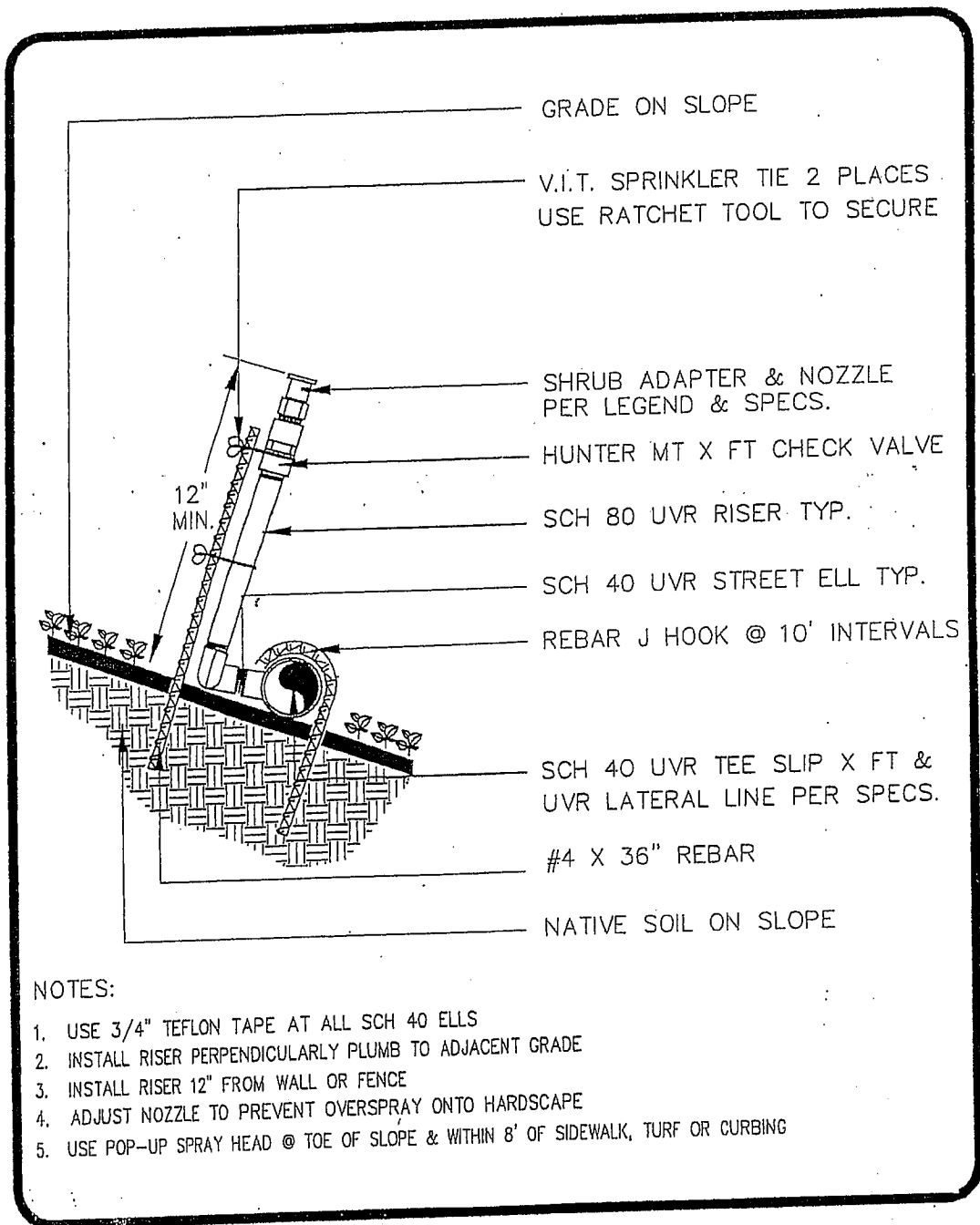
DURHAM RECREATION & PARK DISTRICT		
	CONCRETE THRUST BLOCK	IR-12



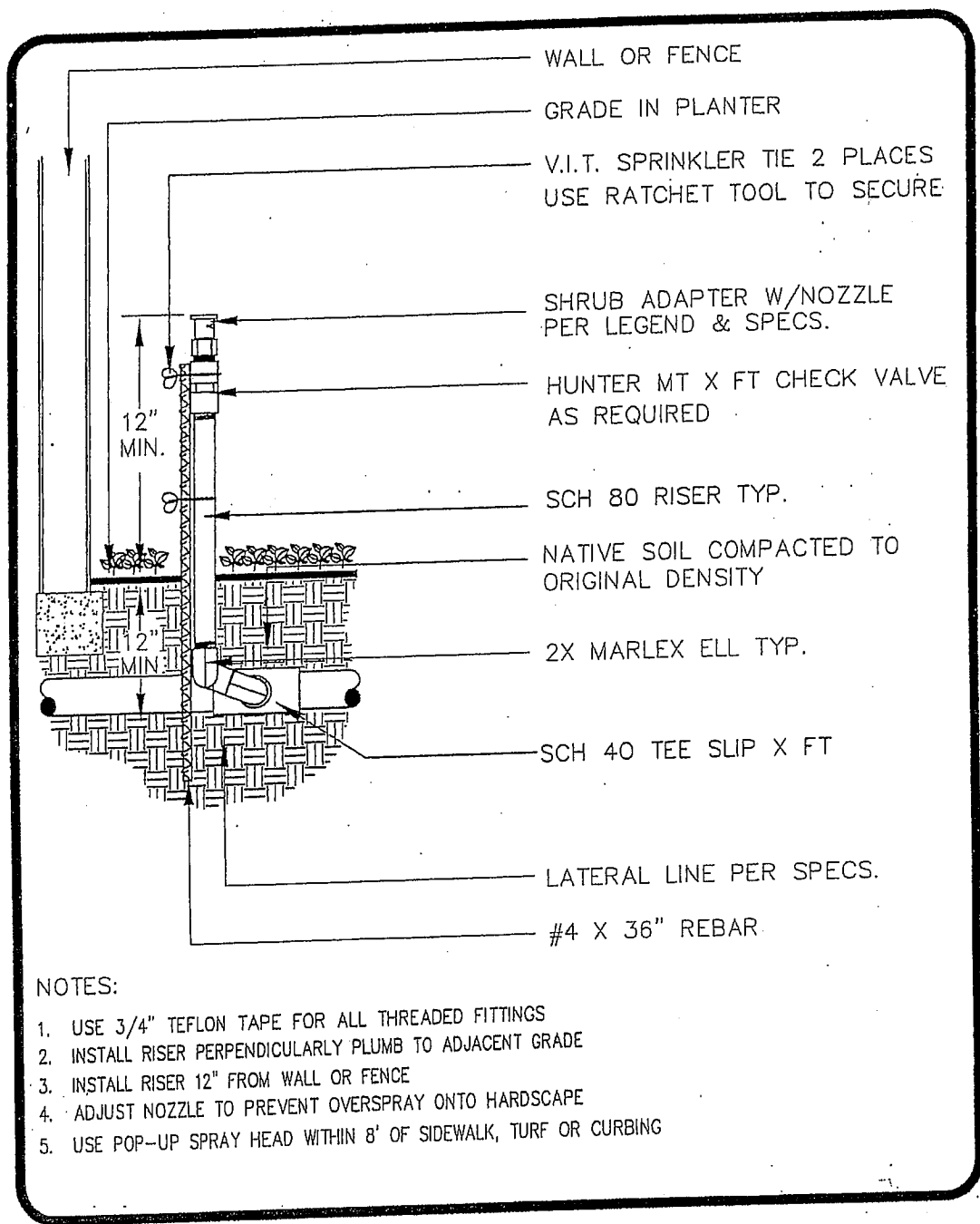
DURHAM RECREATION & PARK DISTRICT	
TREE BREATHER TUBE	IR-13



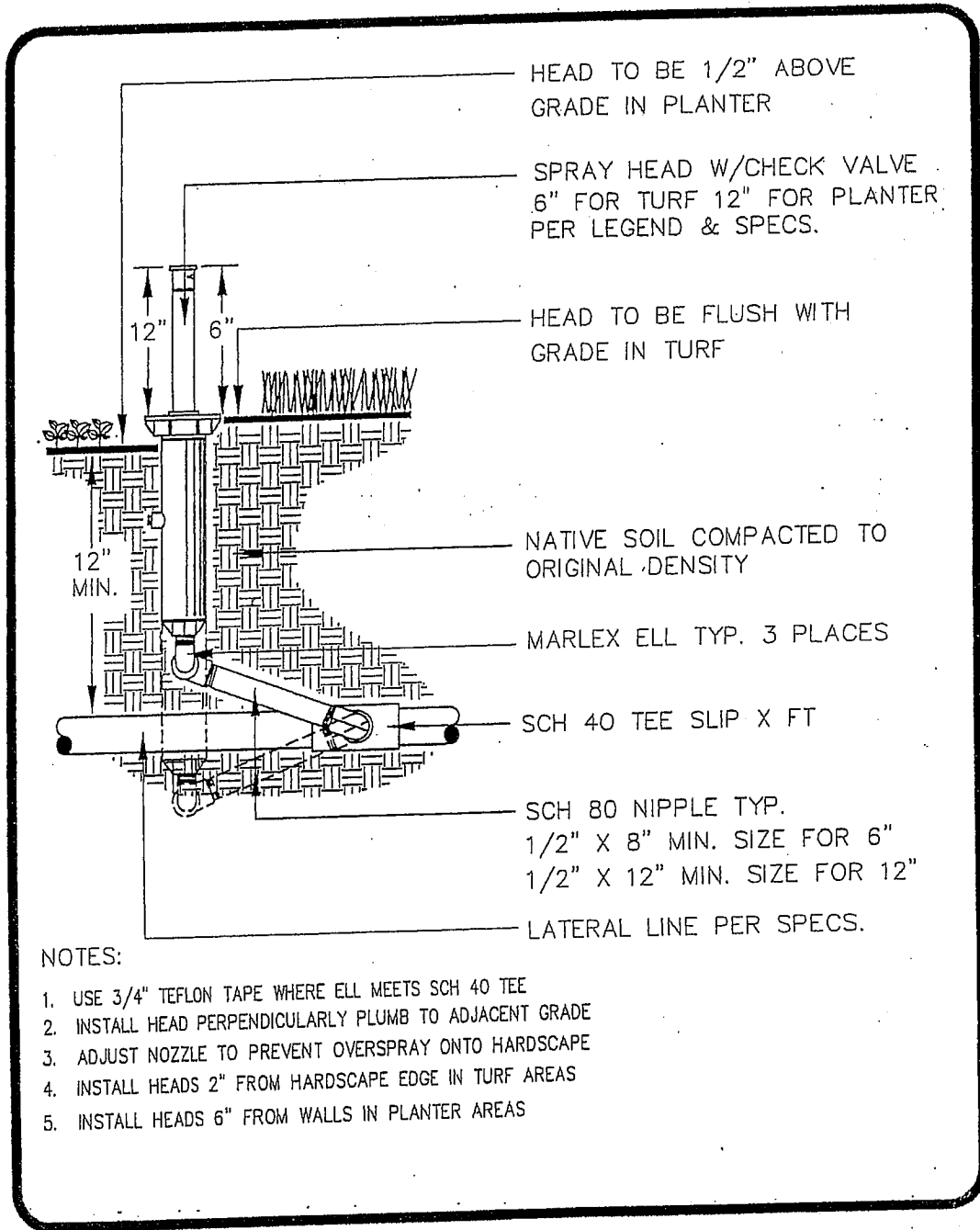
DURHAM RECREATION & PARK DISTRICT	
TREE WELL BUBBLER	IR-14



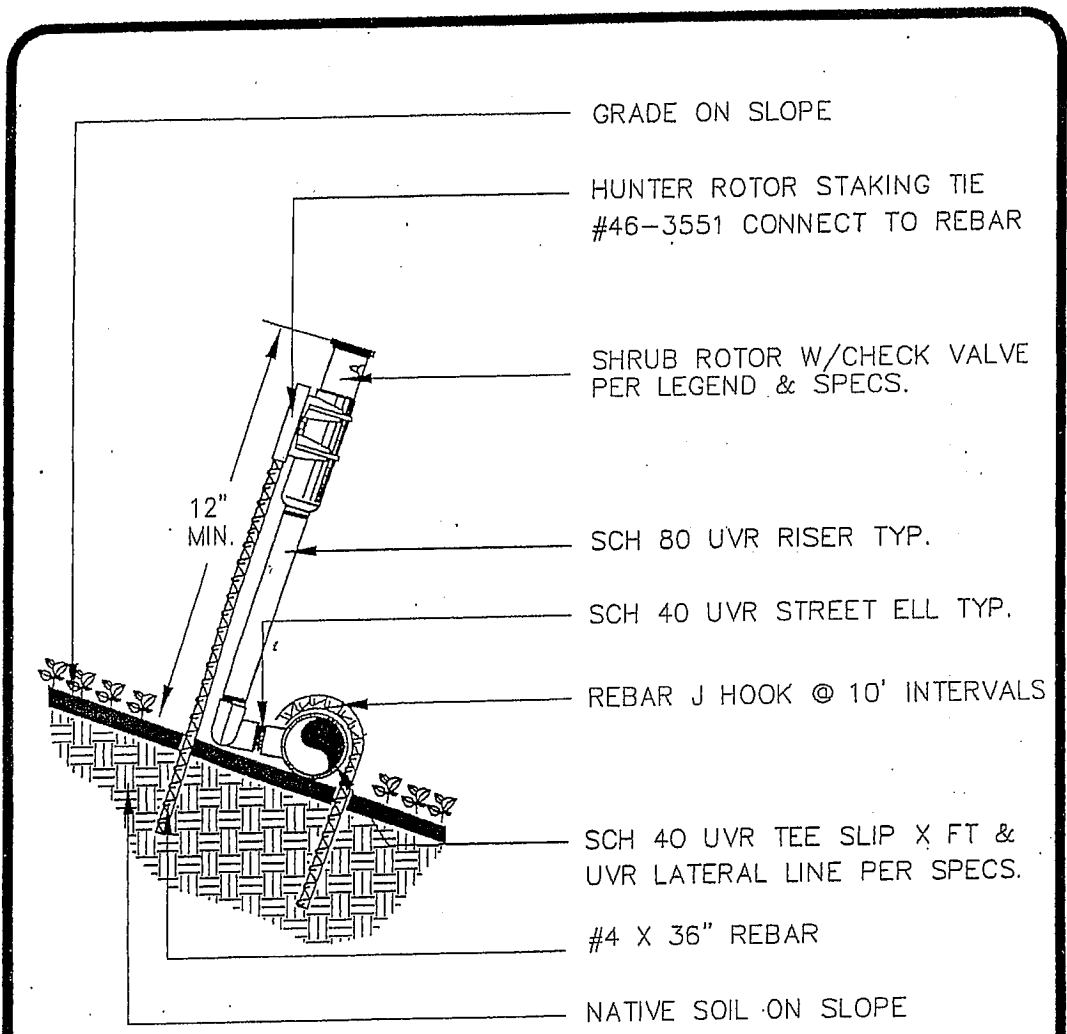
DURHAM RECREATION & PARK DISTRICT	
SHRUB SPRAY ON GRADE	IR-15



DURHAM RECREATION & PARK DISTRICT	
SHRUB SPRAY ON RISER	IR-16



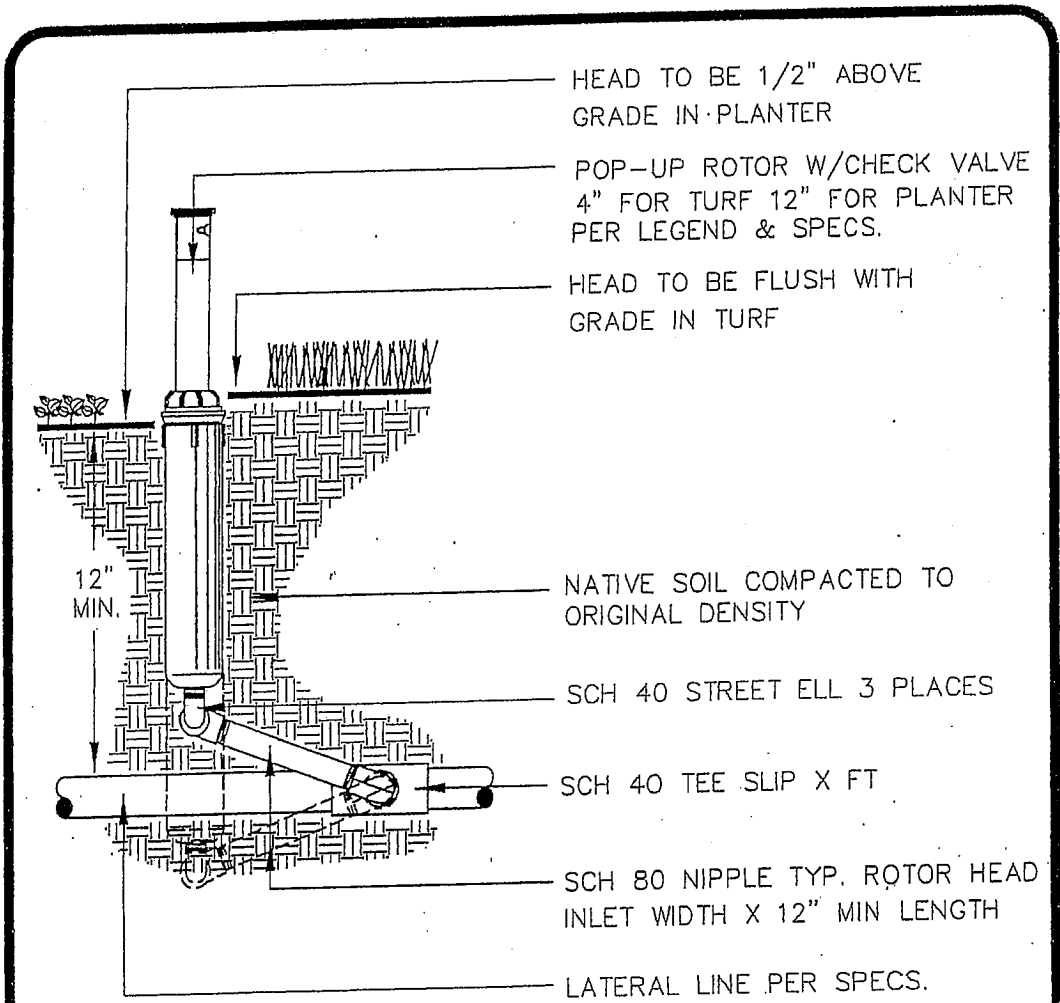
DURHAM RECREATION & PARK DISTRICT	
POP-UP SPRAY HEAD	IR-17



NOTES:

1. USE 3/4" TEFLON TAPE, AT ALL SCH 40 ELLS
2. INSTALL RISER PERPENDICULARLY PLUMB TO ADJACENT GRADE
3. INSTALL RISER 12" FROM WALL OR FENCE
4. ADJUST NOZZLE TO PREVENT OVERSPRAY ONTO HARDSCAPE
5. USE POP-UP SPRAY ROTOR @ TOE OF SLOPE & WITHIN 8' OF SIDEWALK, TURF OR CURBING

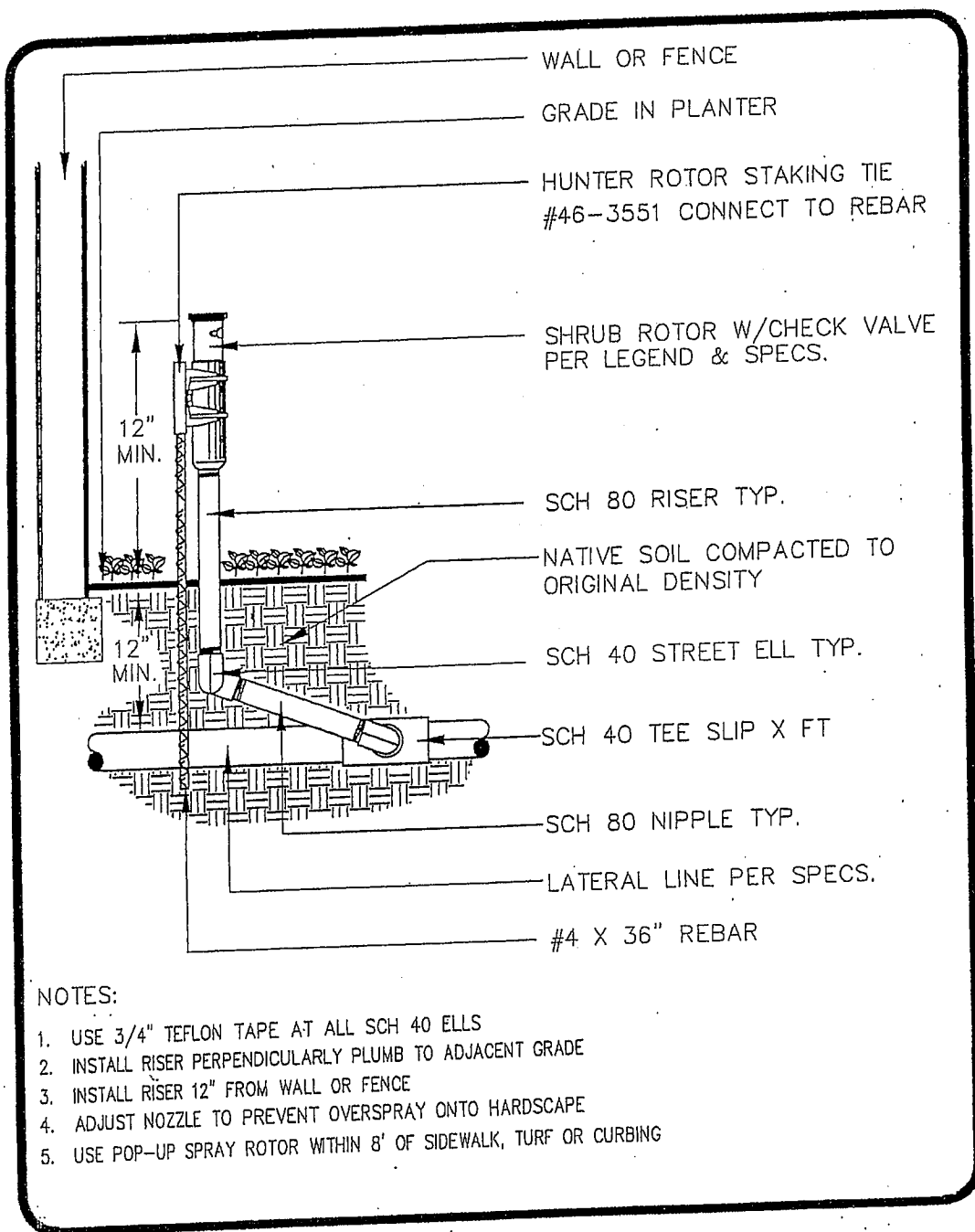
DURHAM RECREATION & PARK DISTRICT	
SHRUB ROTOR ON GRADE	IR-18



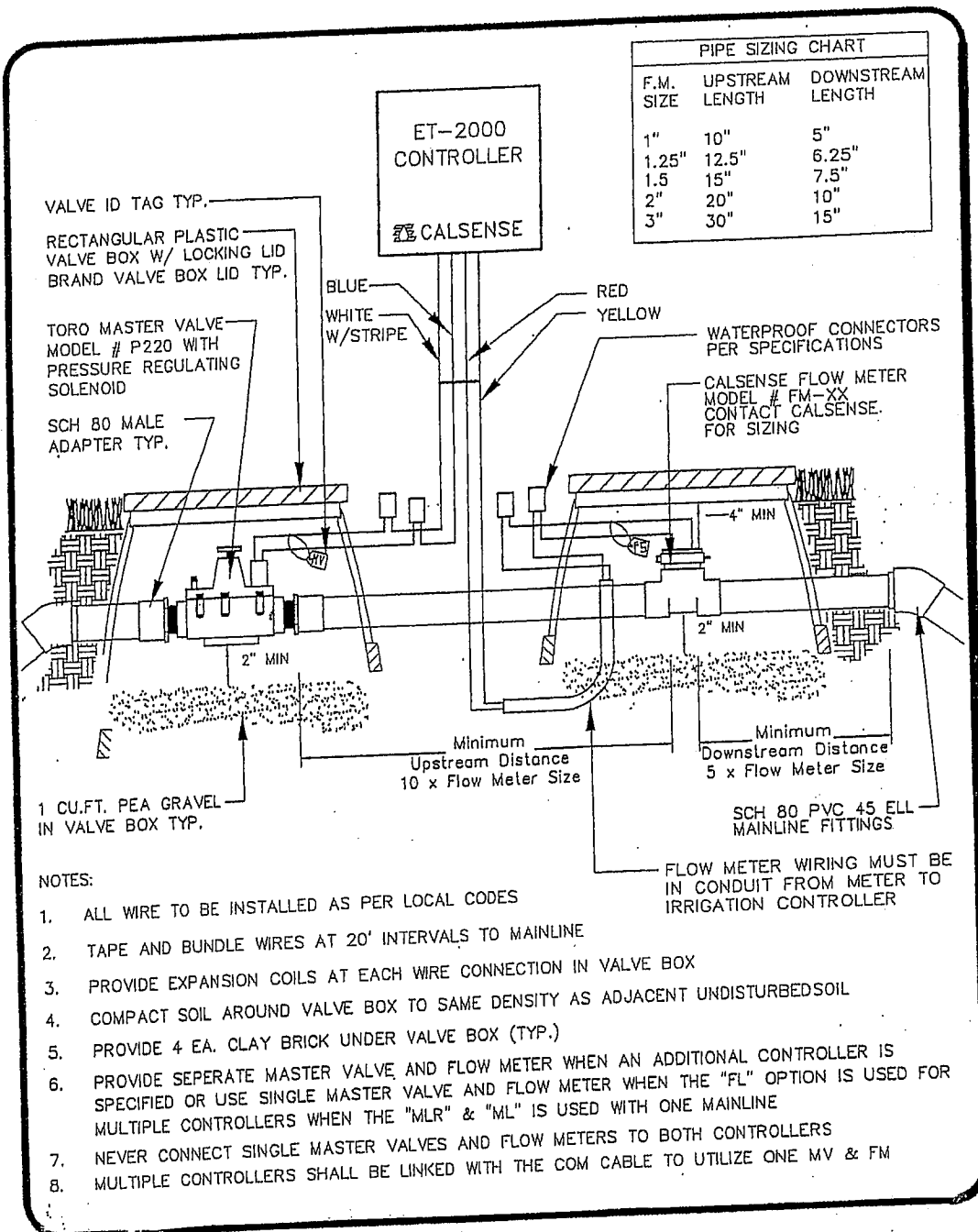
NOTES:

1. USE 3/4" TEFLON TAPE AT ALL SCH 40 ELLS
2. INSTALL HEAD PERPENDICULARLY PLUMB TO ADJACENT GRADE
3. ADJUST NOZZLE TO PREVENT OVERSPRAY ONTO HARDSCAPE
4. INSTALL HEADS 4" FROM HARDSCAPE EDGE IN TURF AREAS
5. INSTALL HEADS 4" FROM HARDSCAPE EDGE IN PLANTER AREAS
6. INSTALL 12" POP-UP ROTORS FOR TURF AREAS WITHIN BOTTOM OF DETENTION BASINS

DURHAM RECREATION & PARK DISTRICT	
POP-UP ROTOR HEAD	IR-19

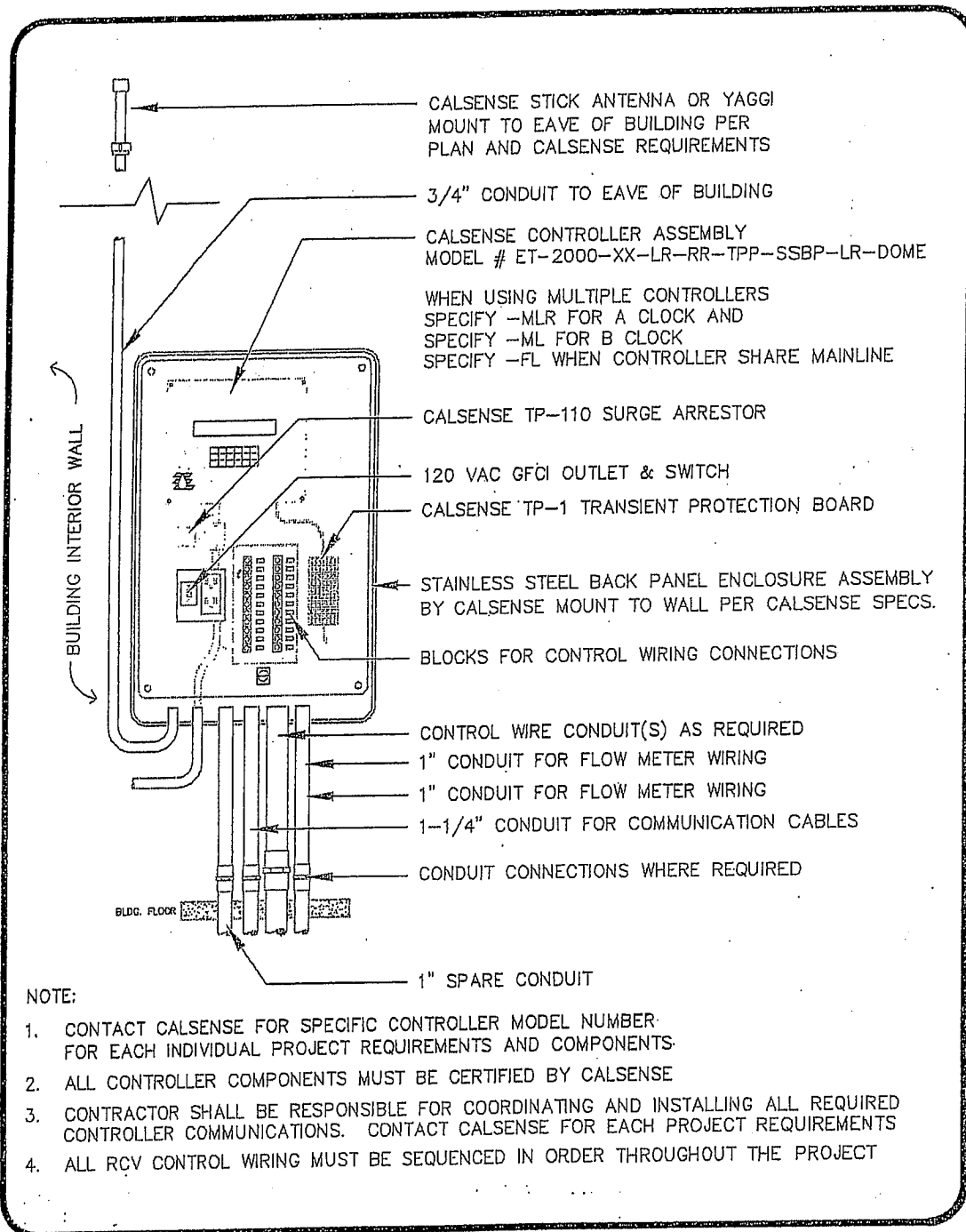


DURHAM RECREATION & PARK DISTRICT	
SHRUB ROTOR ON RISER	IR-20

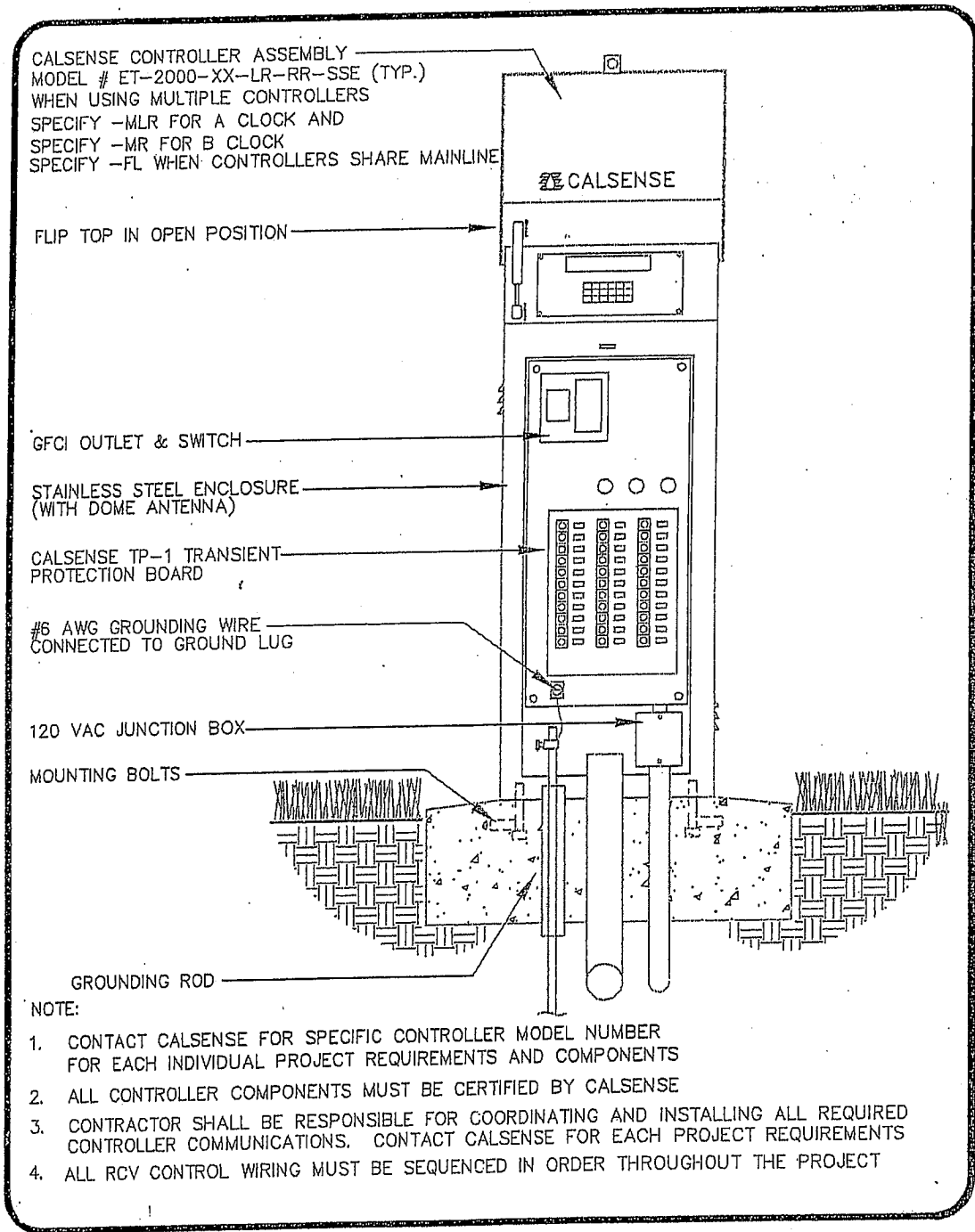


DURHAM RECREATION & PARK DISTRICT

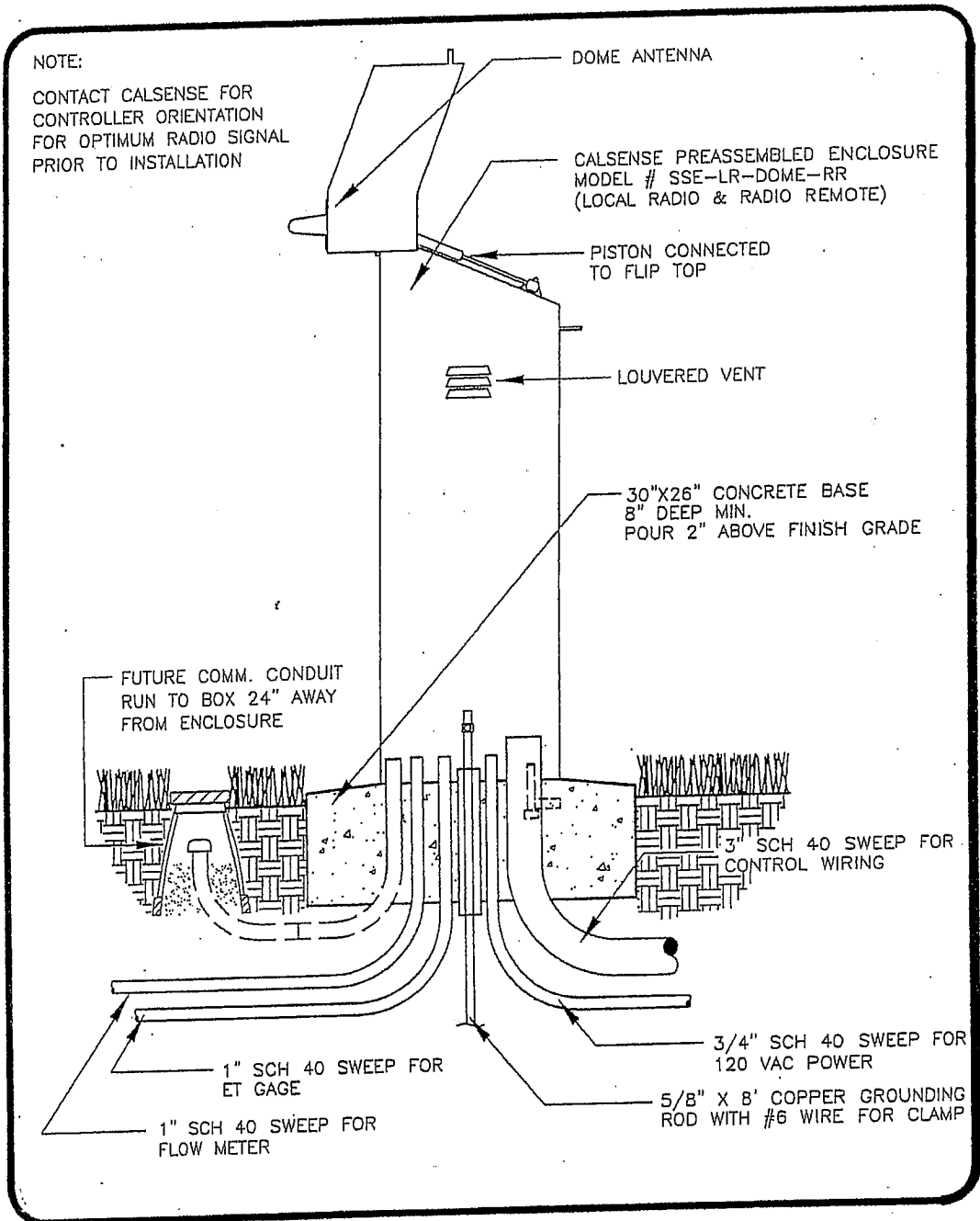
MASTER VALVE & FLOW METER | IR-21



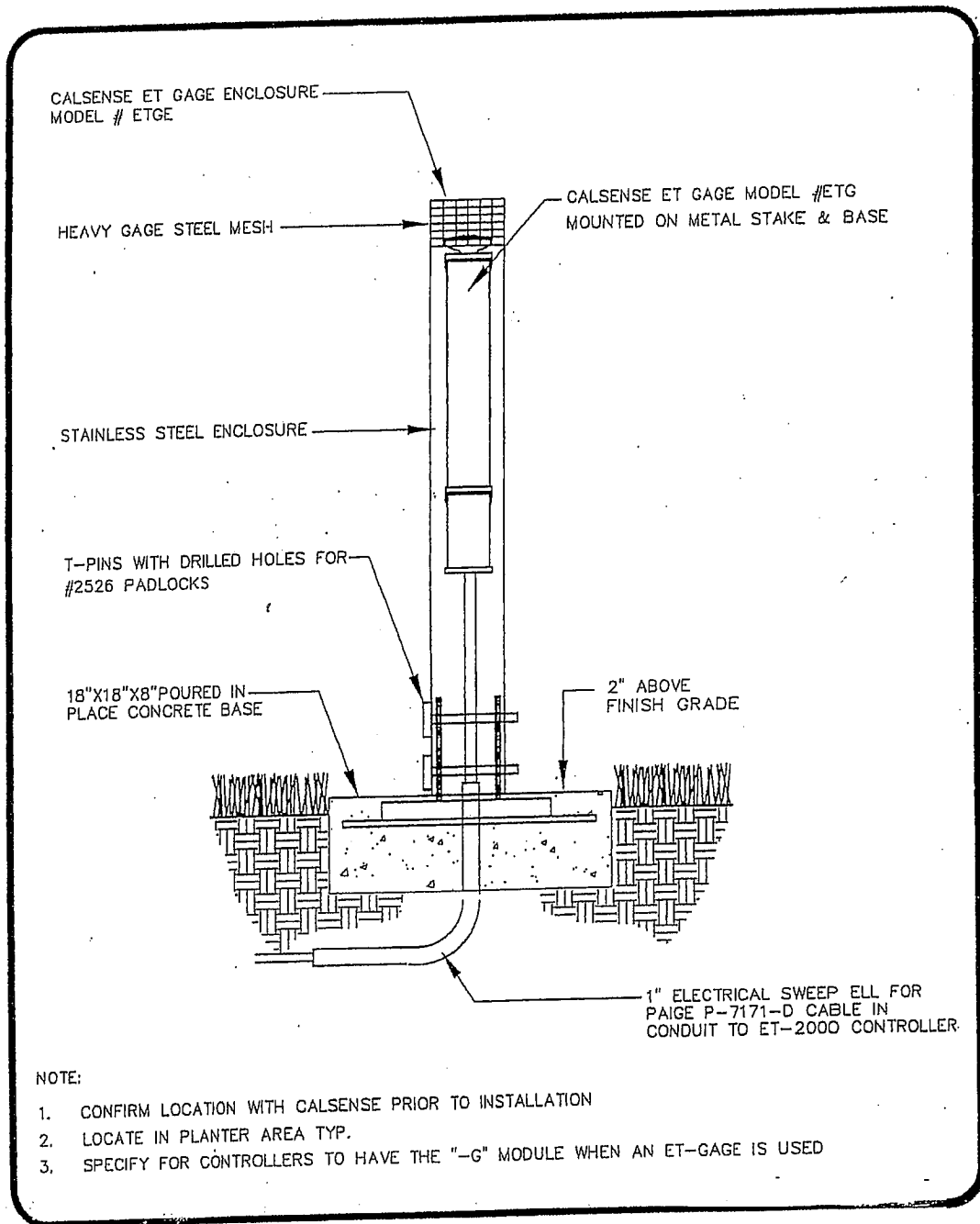
DURHAM RECREATION & PARK DISTRICT	
INTERIOR CONTROLLER	IR-22



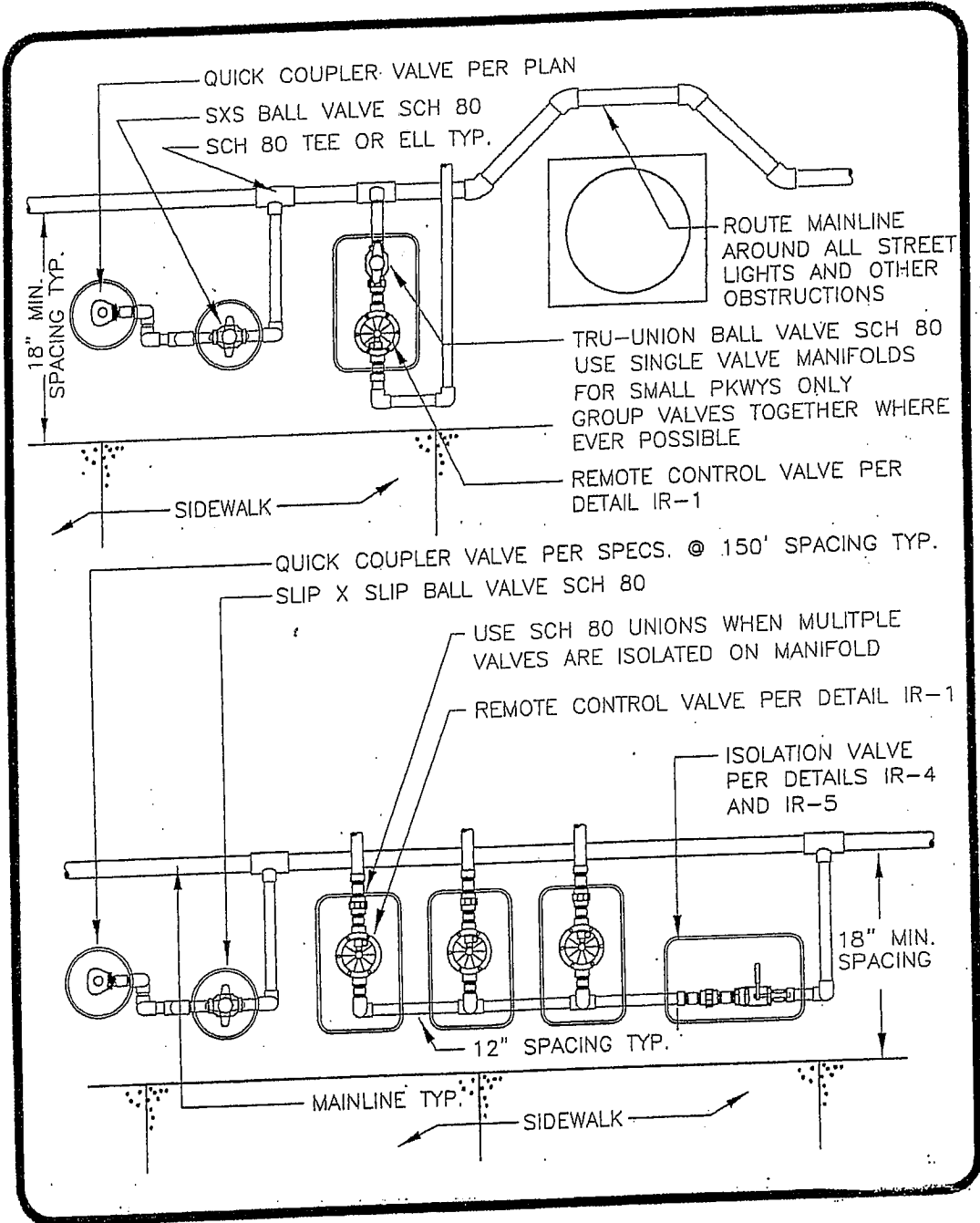
DURHAM RECREATION & PARK DISTRICT	
PEDESTAL CONTROLLER	IR-23



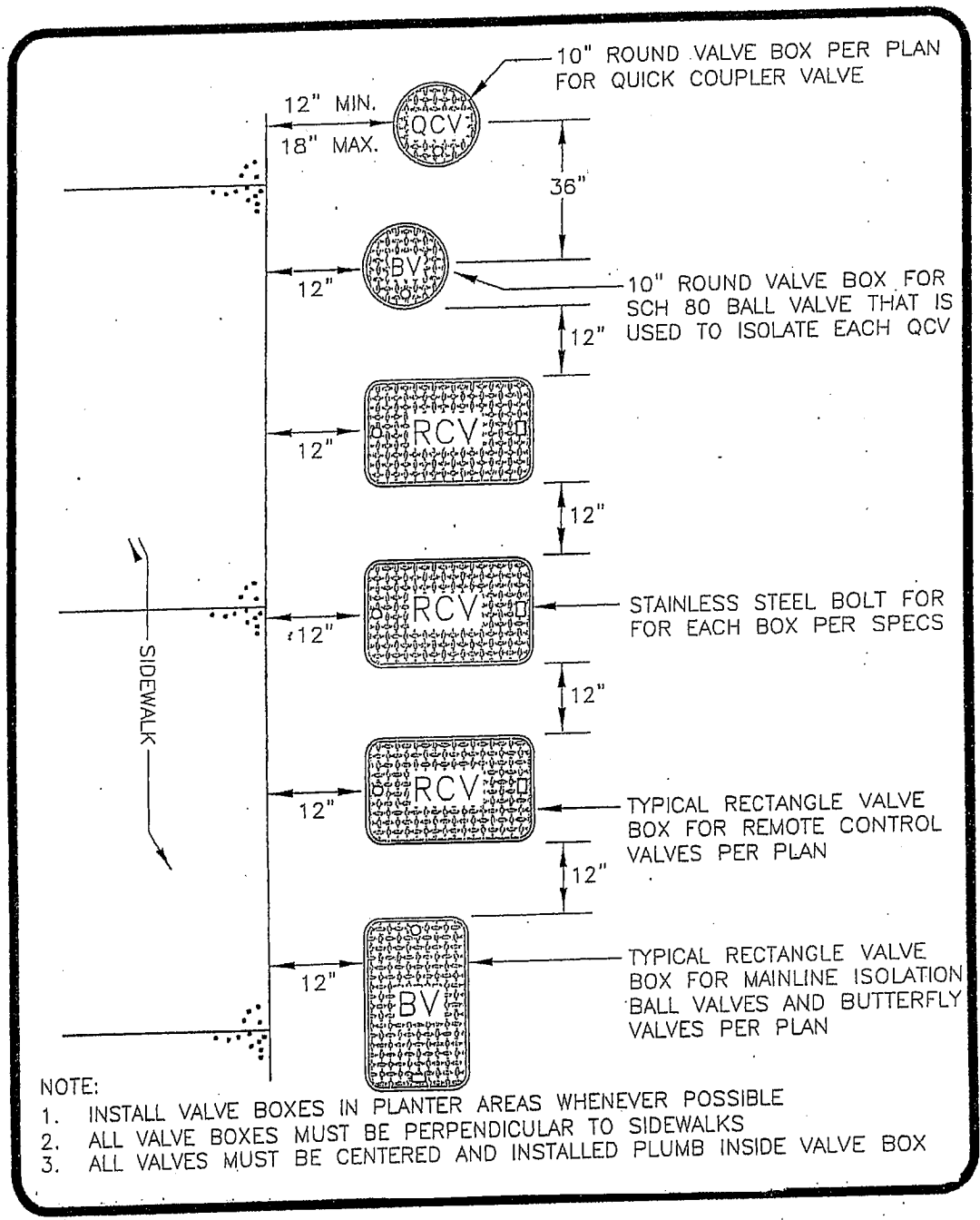
DURHAM RECREATION & PARK DISTRICT	
PEDESTAL ASSEMBLY	IR-24



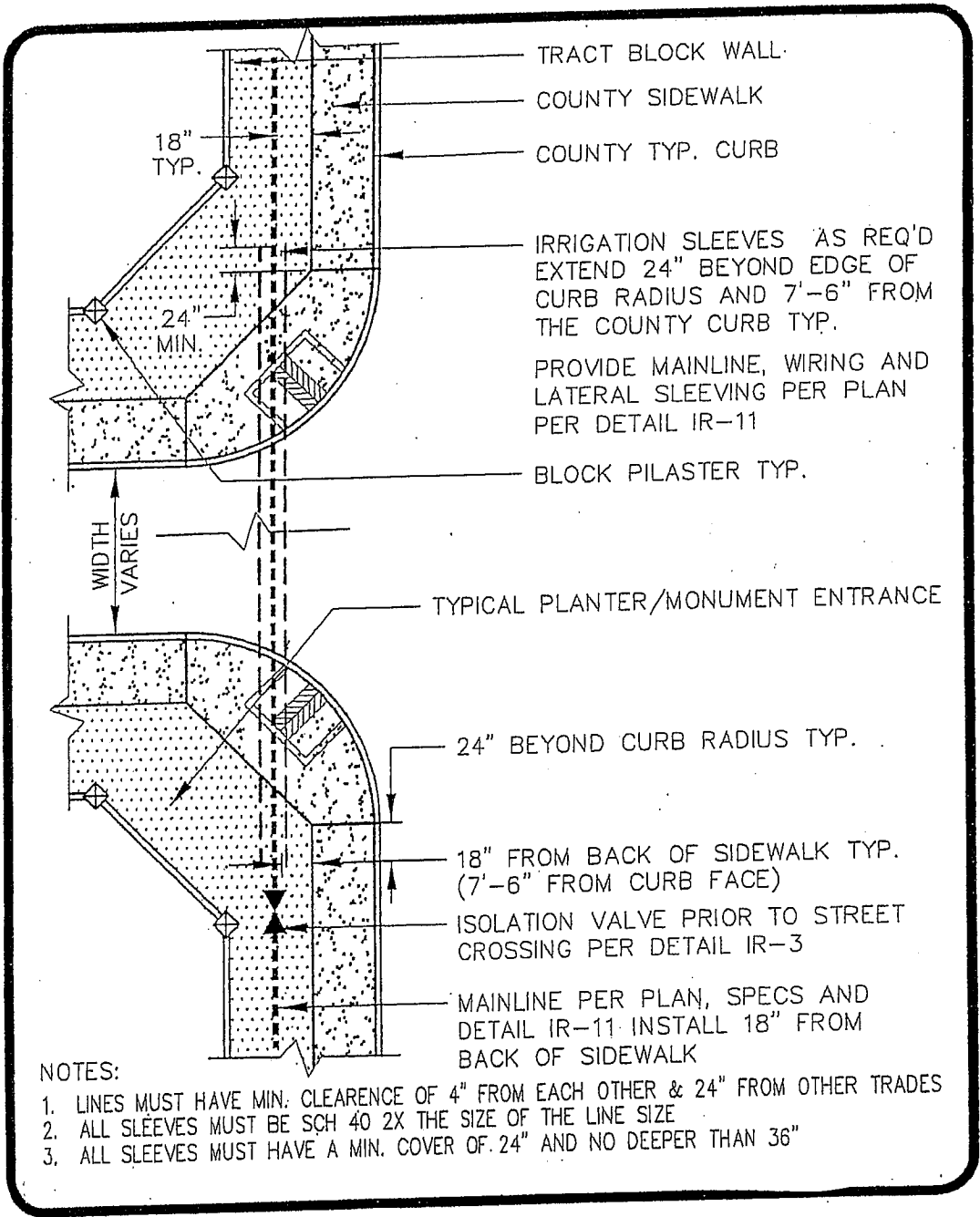
DURHAM RECREATION & PARK DISTRICT	
ET GAGE AND ENCLOSURE	IR-25



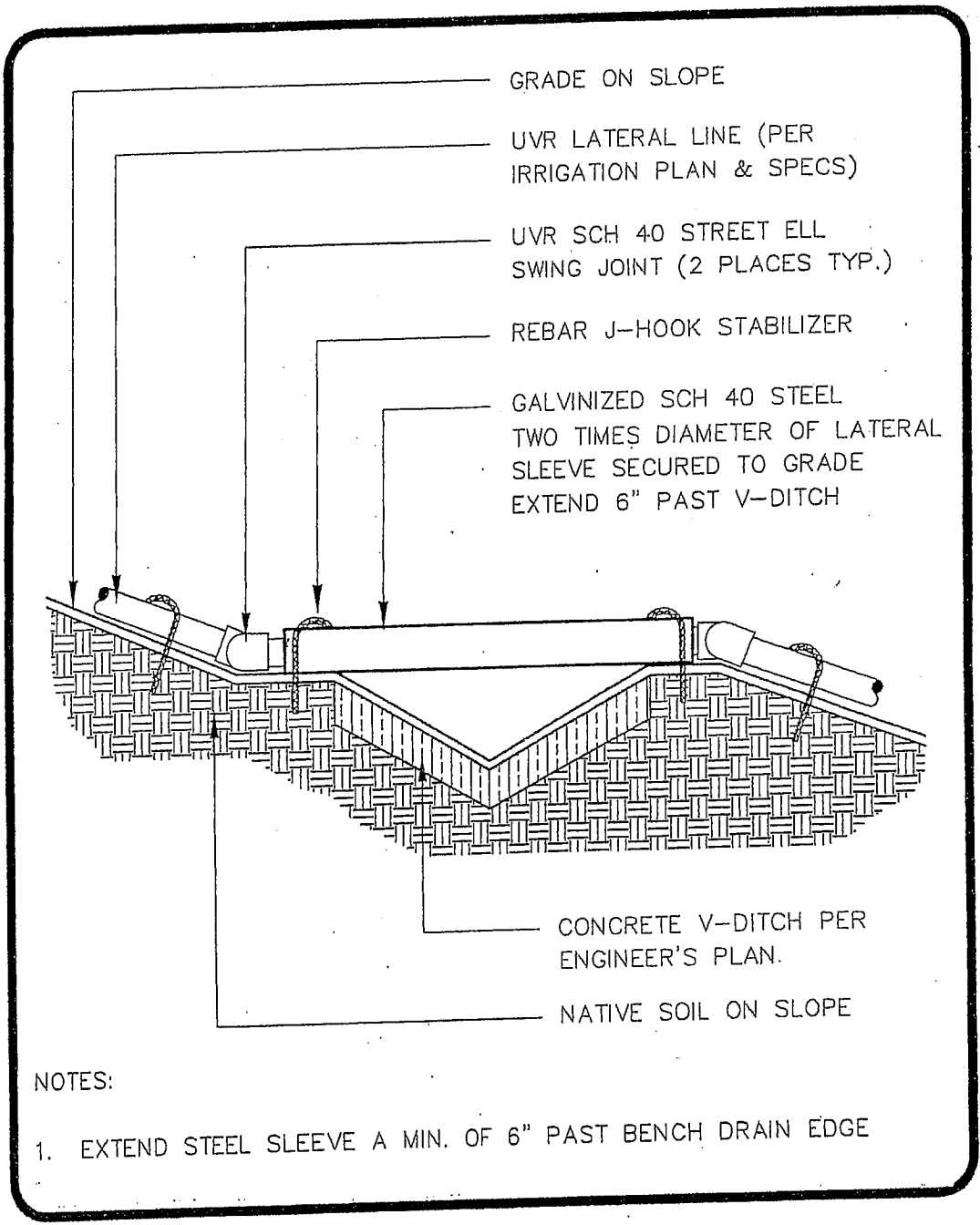
DURHAM RECREATION & PARK DISTRICT	
VALVE MANIFOLD	IR-26



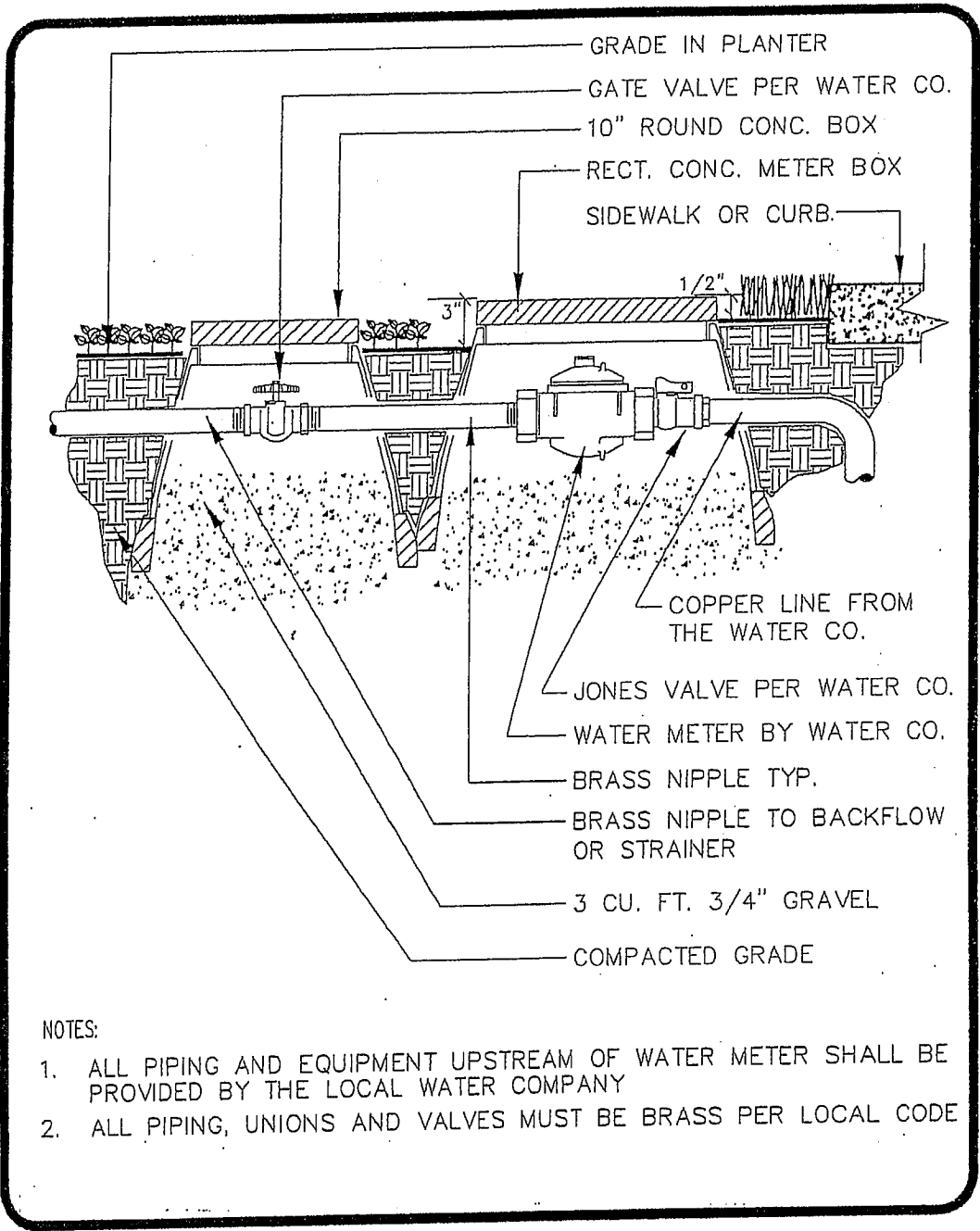
DURHAM RECREATION & PARK DISTRICT		
VALVE BOX LAYOUT		IR-27



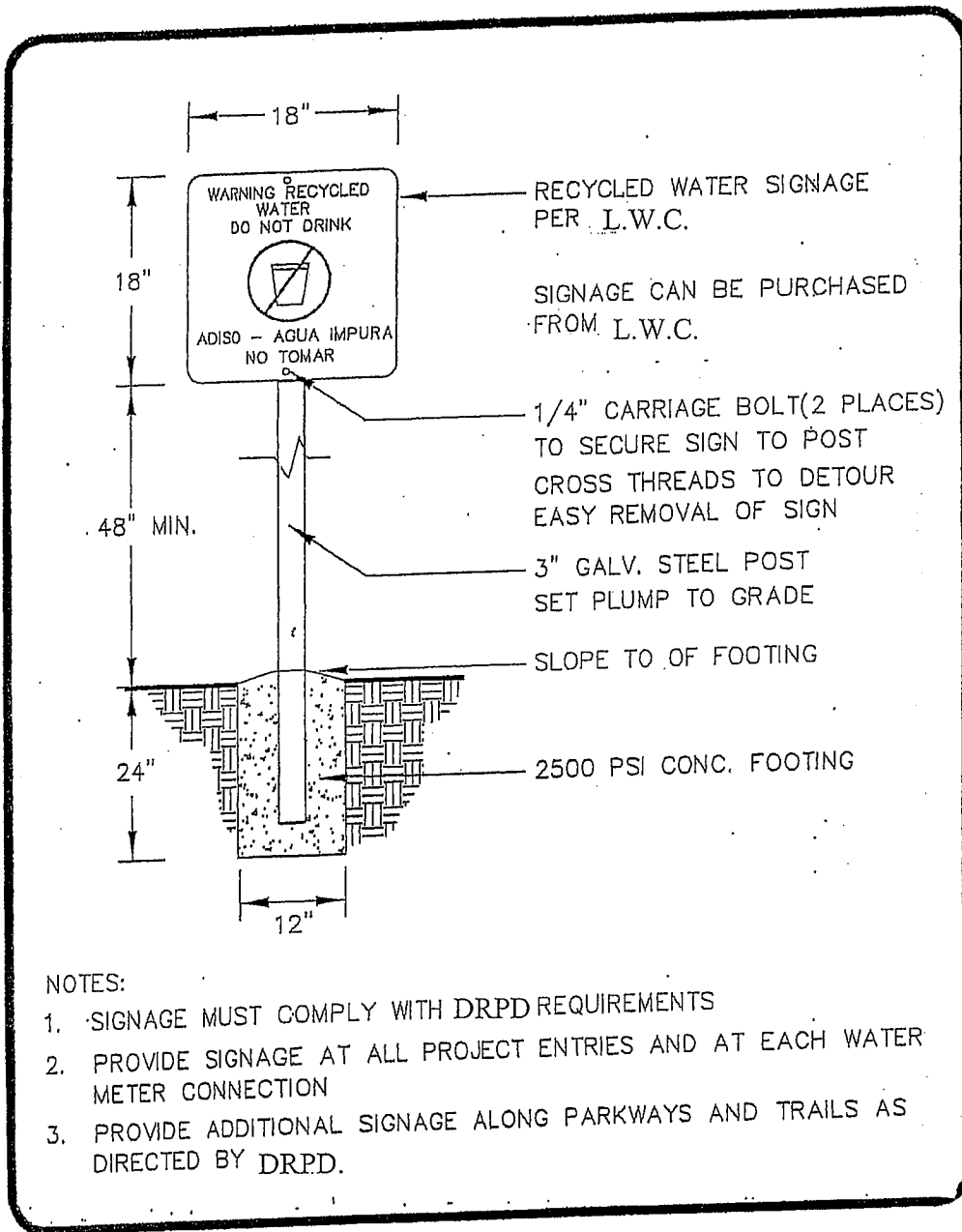
DURHAM RECREATION & PARK DISTRICT	
STREET SLEEVING	IR-28



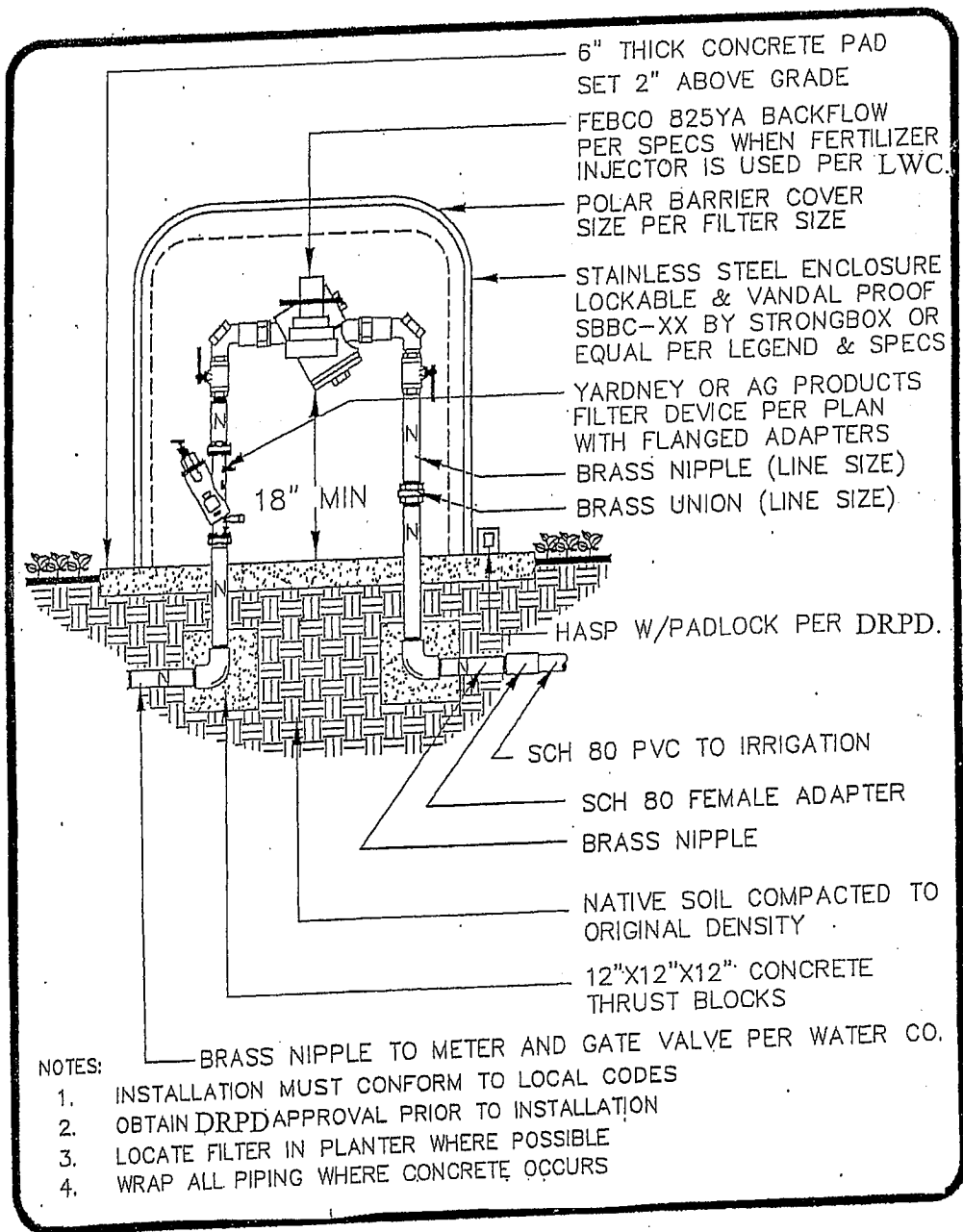
DURHAM RECREATION & PARK DISTRICT	
BENCH DRAIN CROSSING	IR-29



DURHAM RECREATION & PARK DISTRICT	
WATER METER CONNECTION	IR-30



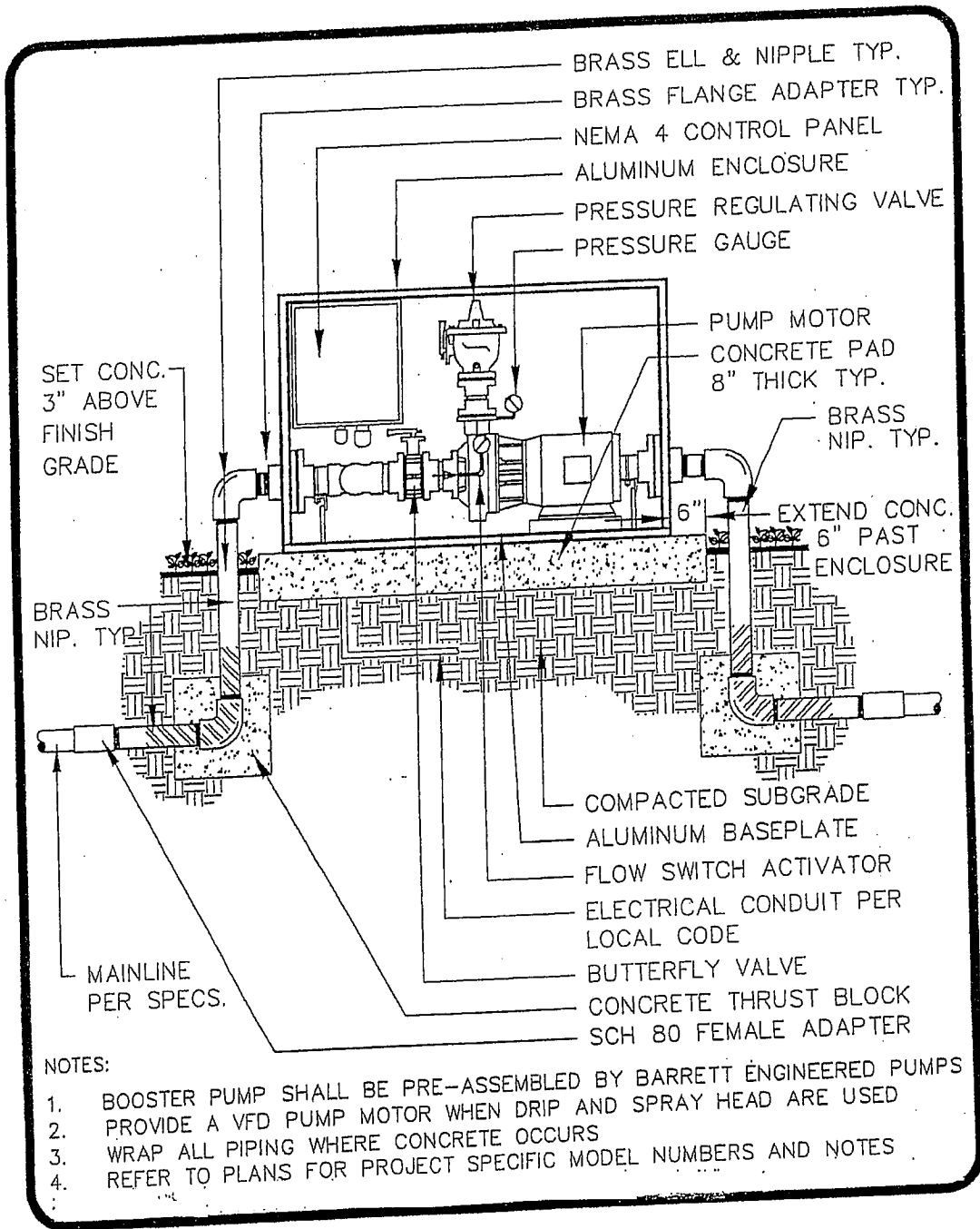
DURHAM RECREATION & PARK DISTRICT	
RECYCLED WATER SIGN	IR-31



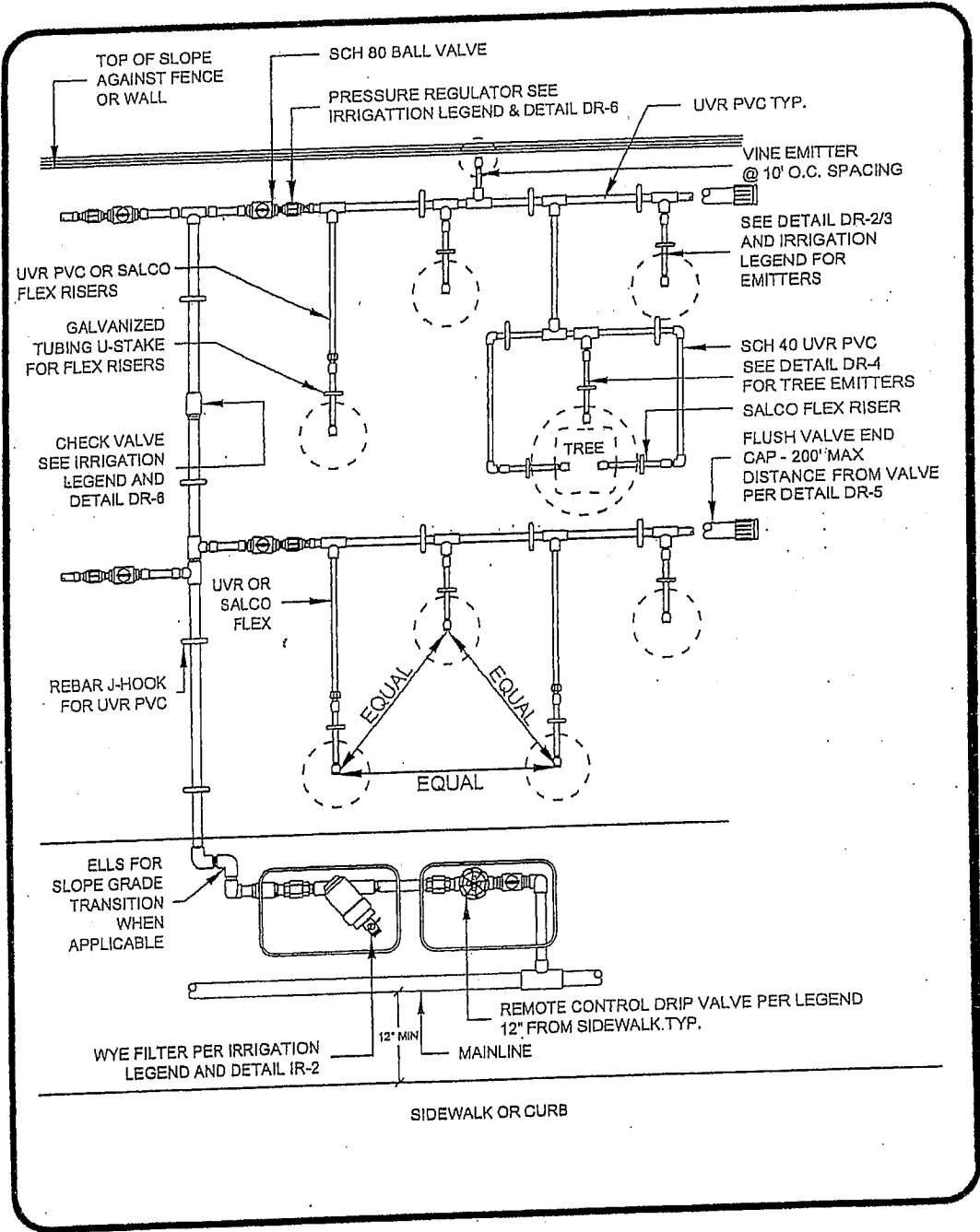
DURHAM RECREATION & PARK DISTRICT

RECYCLED WATER FILTER
WITH BACKFLOW DEVICE

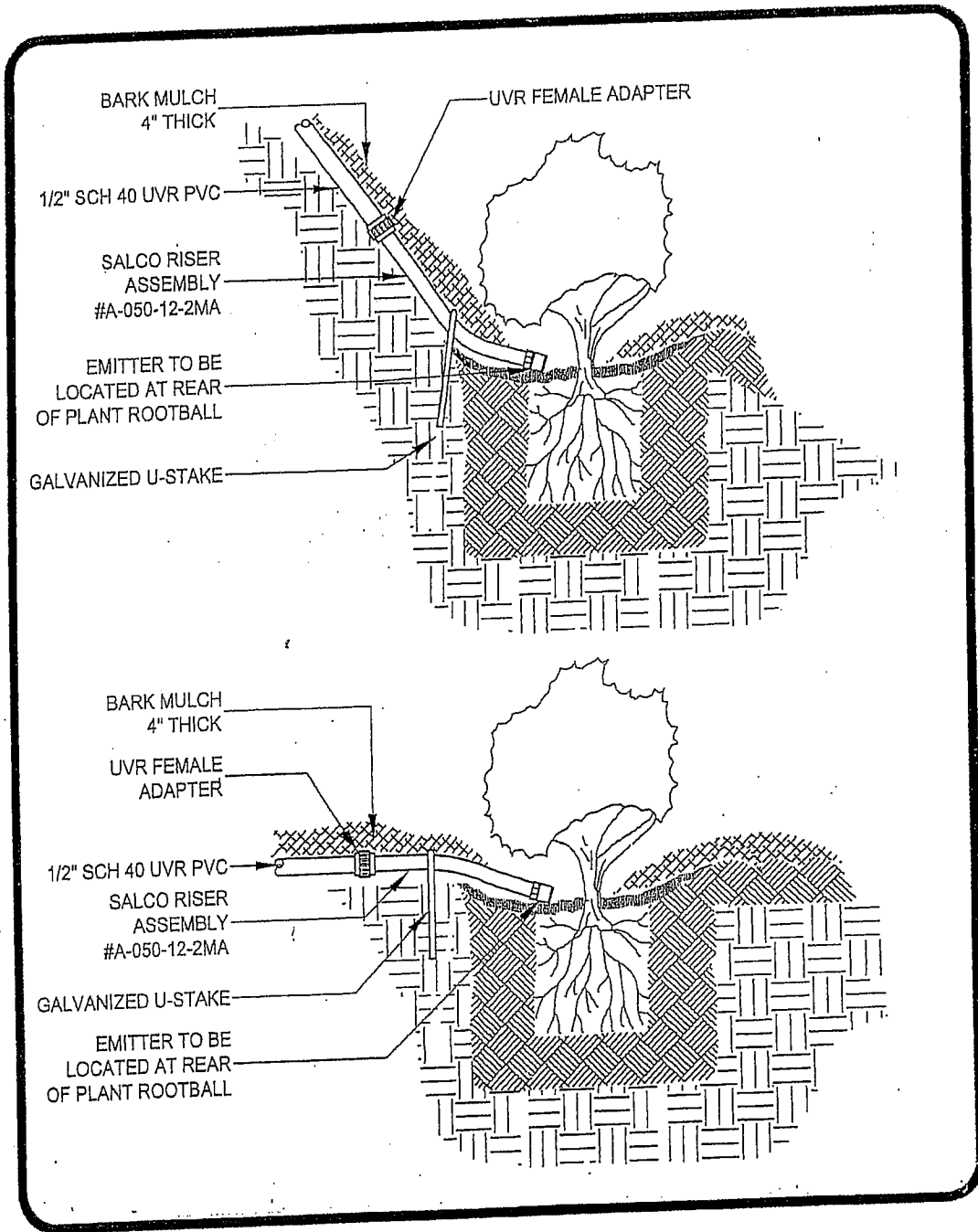
IR-32



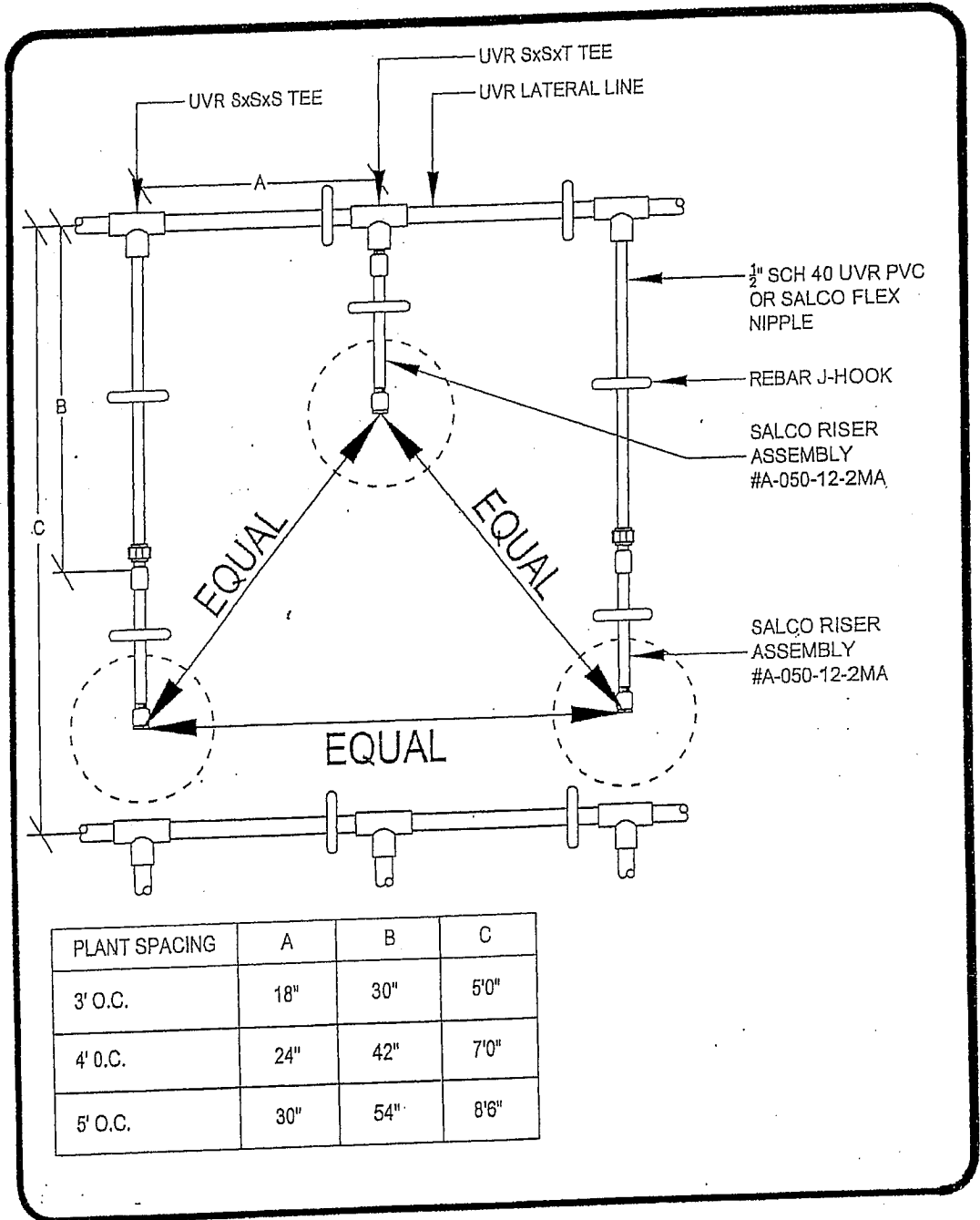
DURHAM RECREATION & PARK DISTRICT
 TYPICAL BOOSTER PUMP IR-33



DURHAM RECREATION & PARK DISTRICT	
POINT TO POINT LAYOUT	DR-1

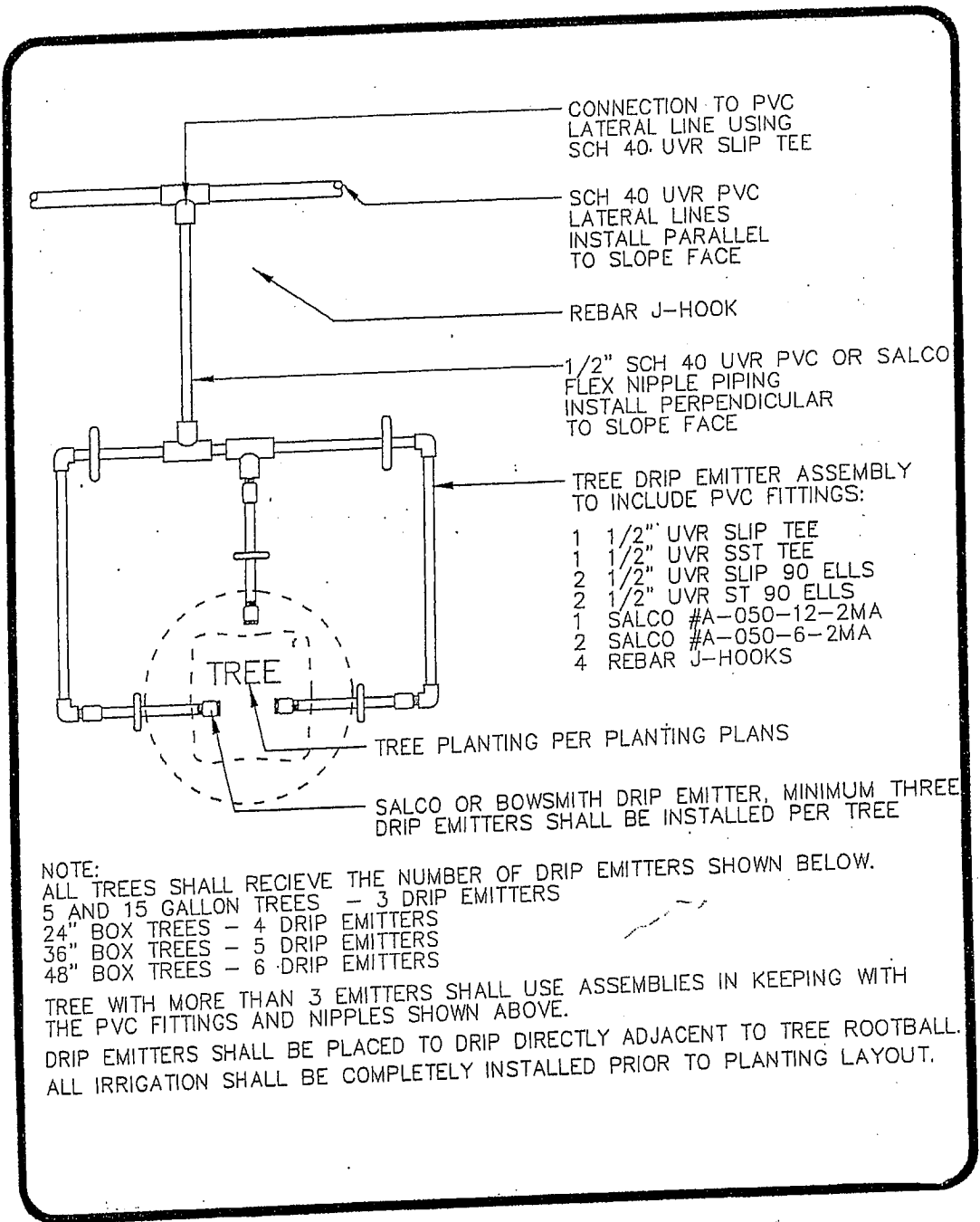


DURHAM RECREATION & PARK DISTRICT		
SHRUB EMITTER		DR-2

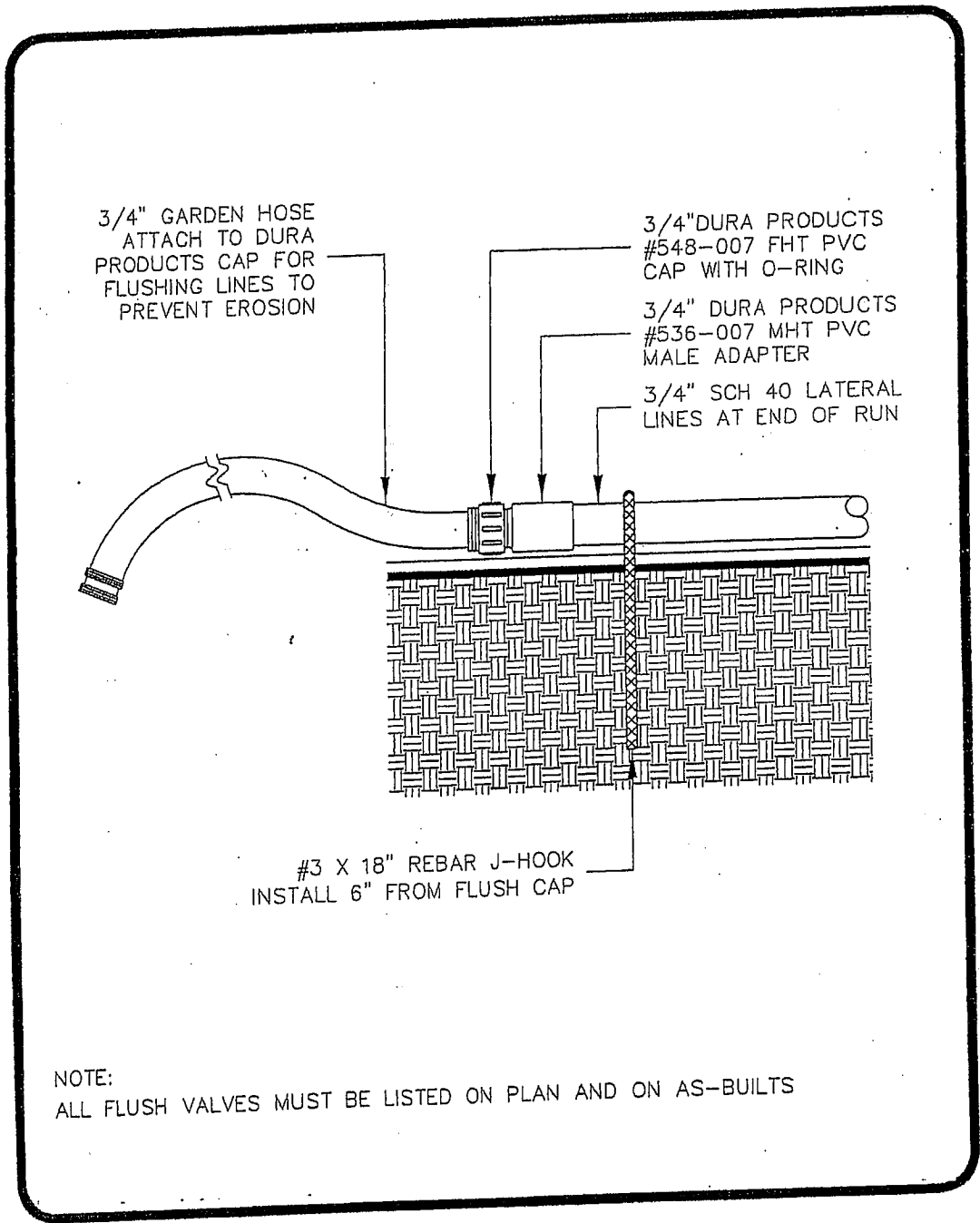


PLANT SPACING	A	B	C
3' O.C.	18"	30"	5'0"
4' O.C.	24"	42"	7'0"
5' O.C.	30"	54"	8'6"

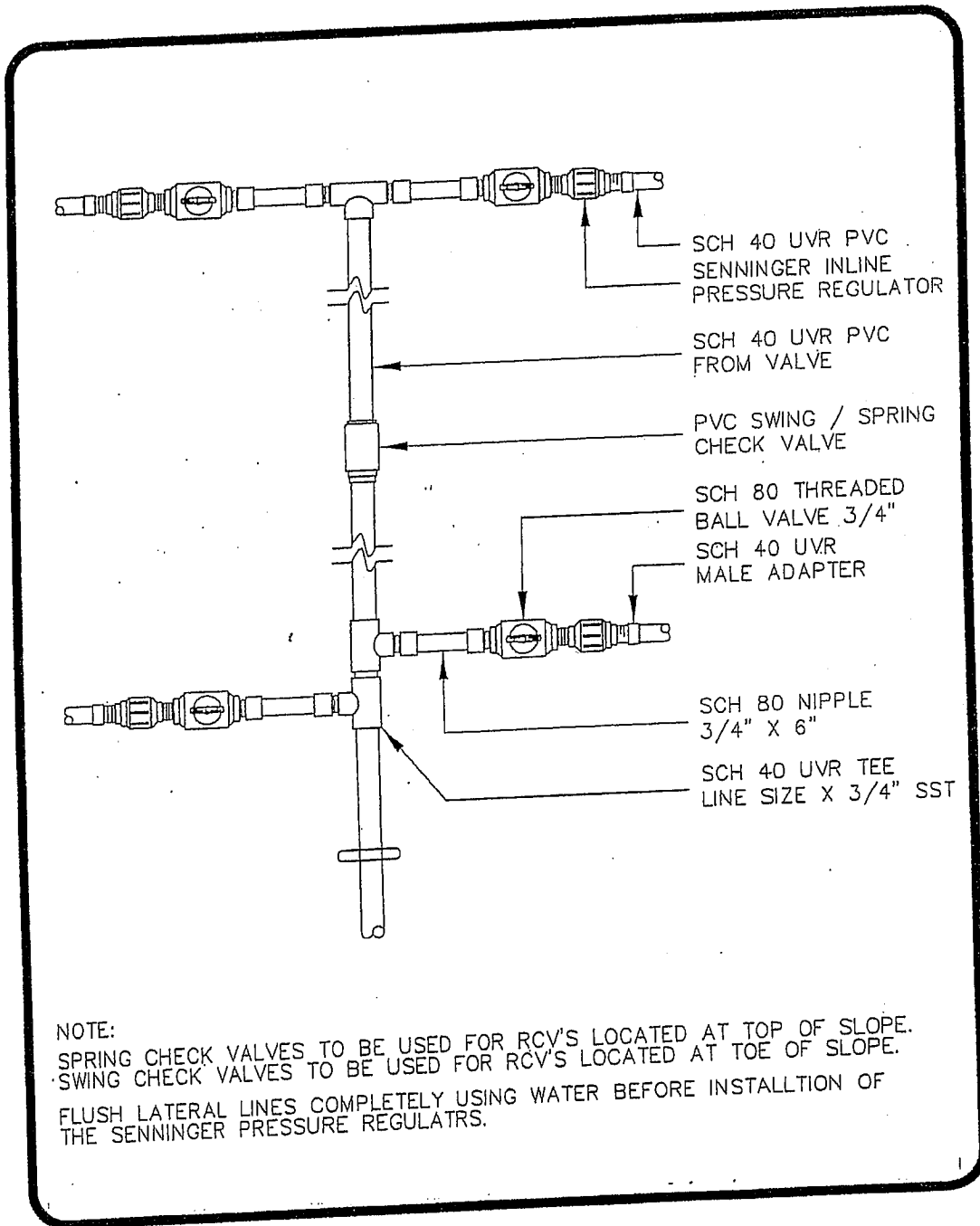
DURHAM RECREATION & PARK DISTRICT	
EMITTER ASSEMBLY	DR-3



DURHAM RECREATION & PARK DISTRICT		
TREE EMITTER LAYOUT		DR-4



DURHAM RECREATION & PARK DISTRICT	
D RIP FLUSH ASSEMBLY	DR-5

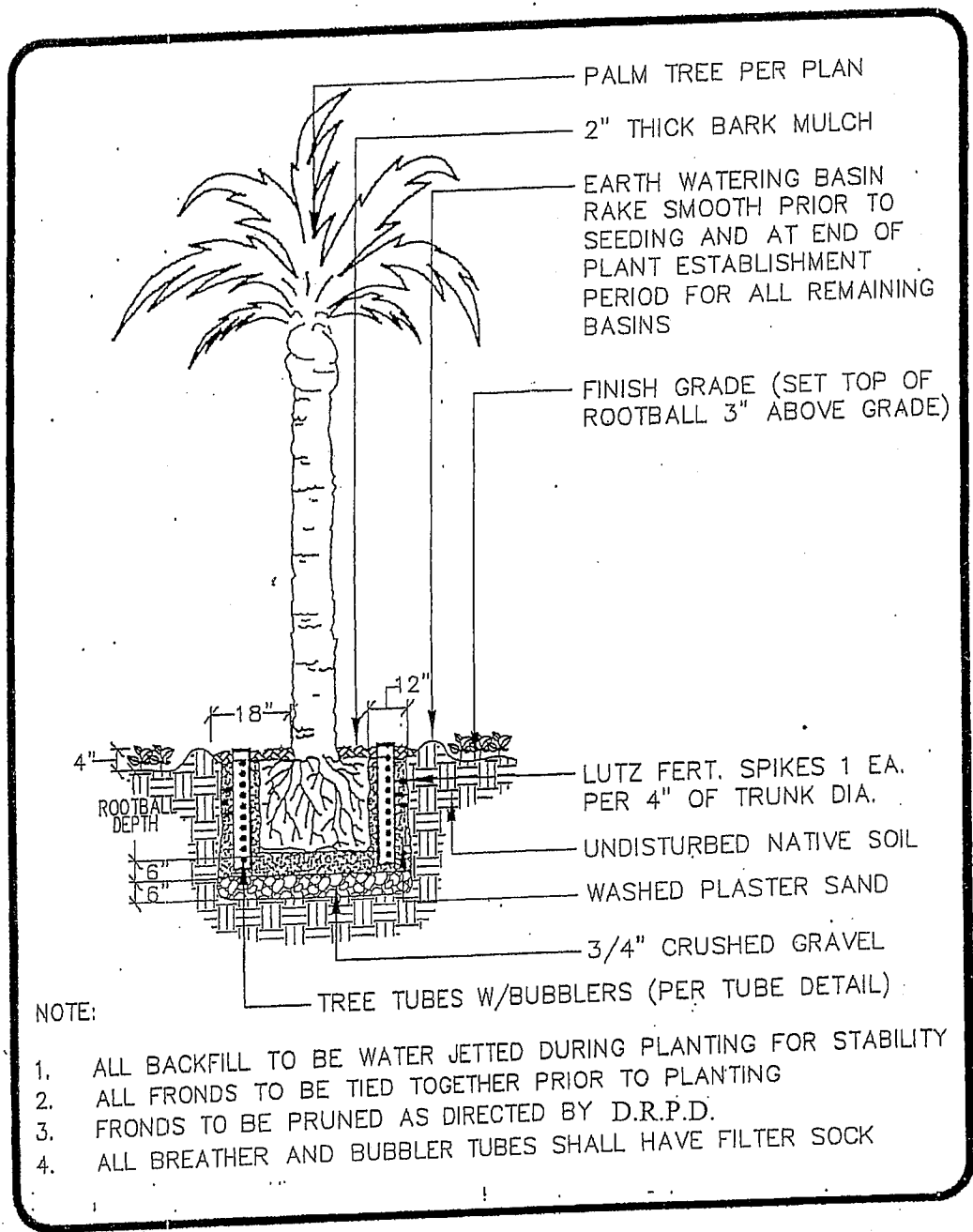


DURHAM RECREATION & PARK DISTRICT		
	CHECK VALVE & PR.	DR-6

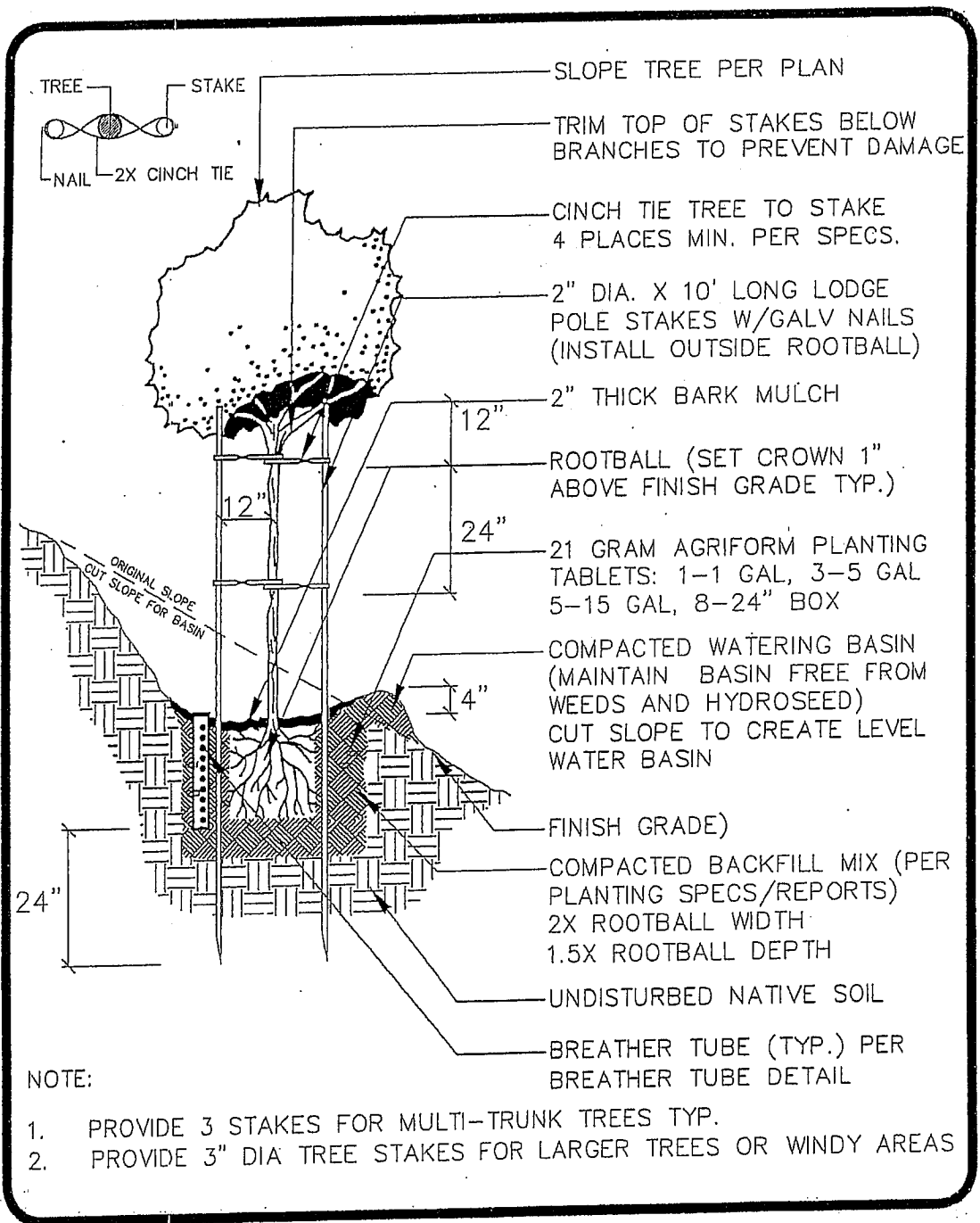
DURHAM RECREATION & PARK DISTRICT

Standard Planting Details

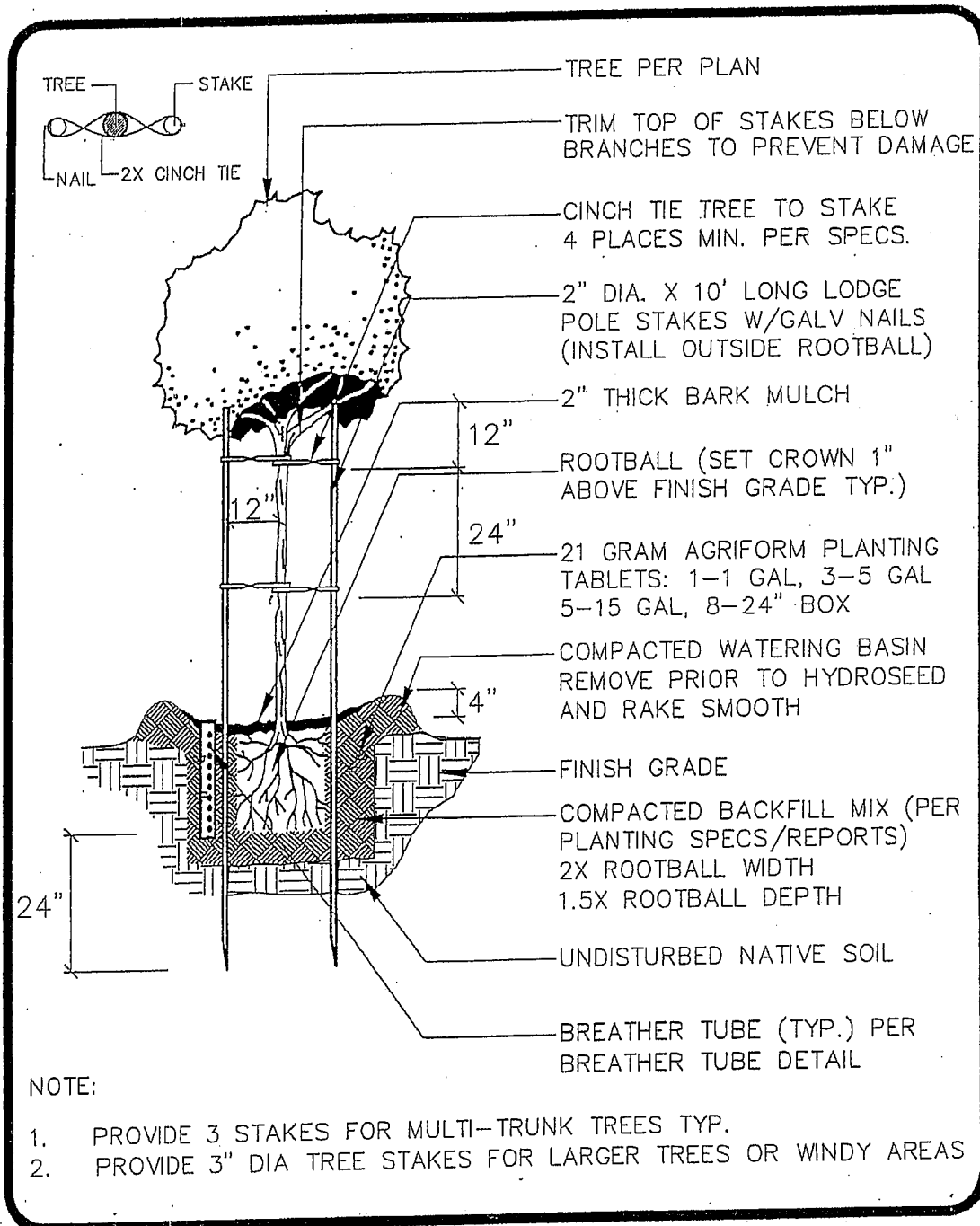
Detail No.	Detail Description	Drawing Name
PL-1	Palm Tree Planting	PL-001.dwg
PL-2	Slope Tree Planting	PL-002.dwg
PL-3	Tree Planting	PL-003.dwg
PL-4	Slope Shrub Planting	PL-004.dwg
PL-5	Shrub Planting	PL-005.dwg
PL-6	Vine Planting	PL-006.dwg
PL-7	Bark Mulch	PL-007.dwg
PL-8	Concrete Mowcurb	PL-008.dwg
PL-9	Root Barrier	PL-009.dwg
PL-10	Ground Cover Planting	PL-010.dwg
PL-11	Plastic Bend-a-Board Header	PL-011.dwg
PL-12	Boulder Placement	PL-012.dwg
PL-13	Tree Guy	PL-013.dwg



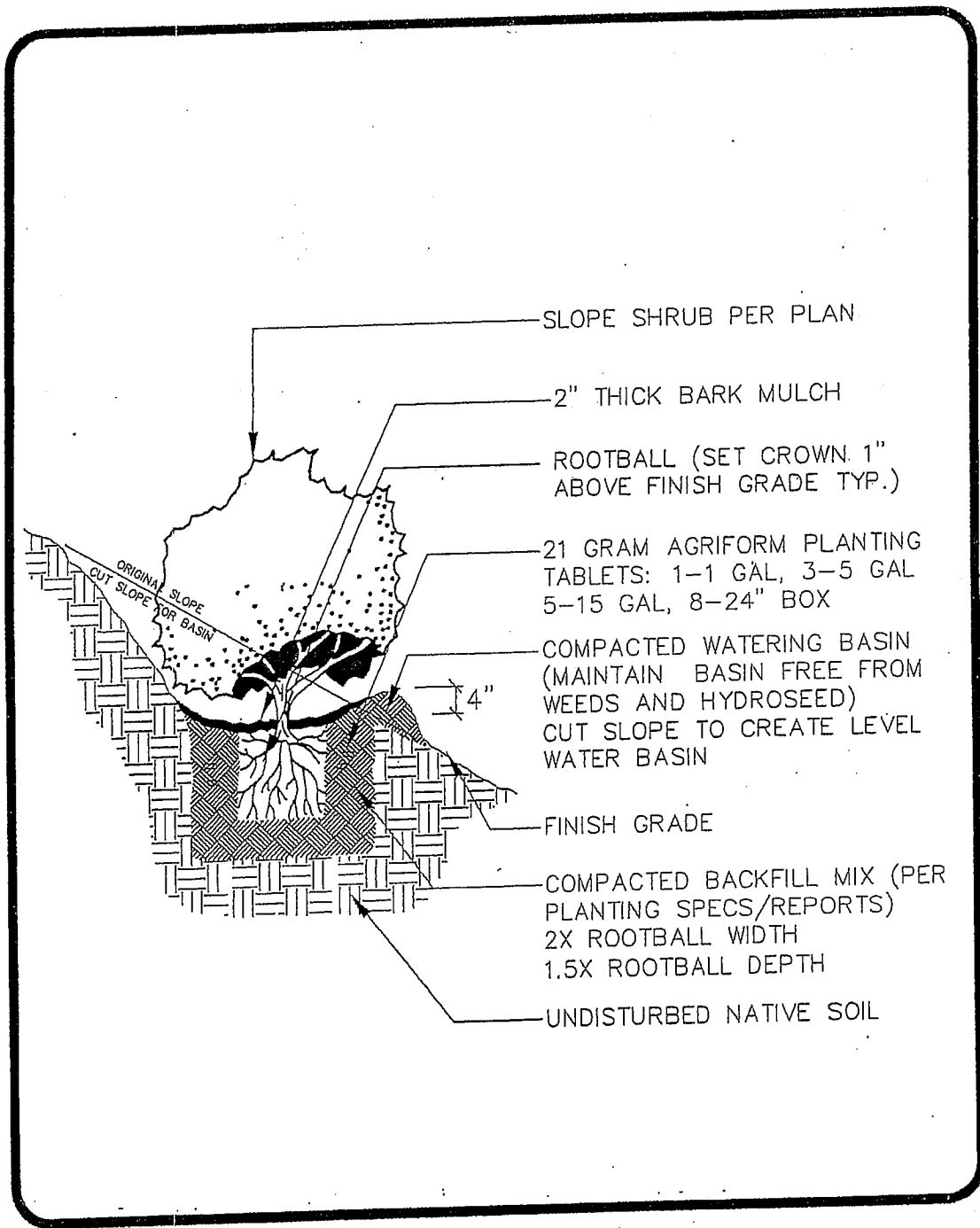
DURHAM RECREATION & PARK DISTRICT		
PALM TREE PLANTING		PL-1



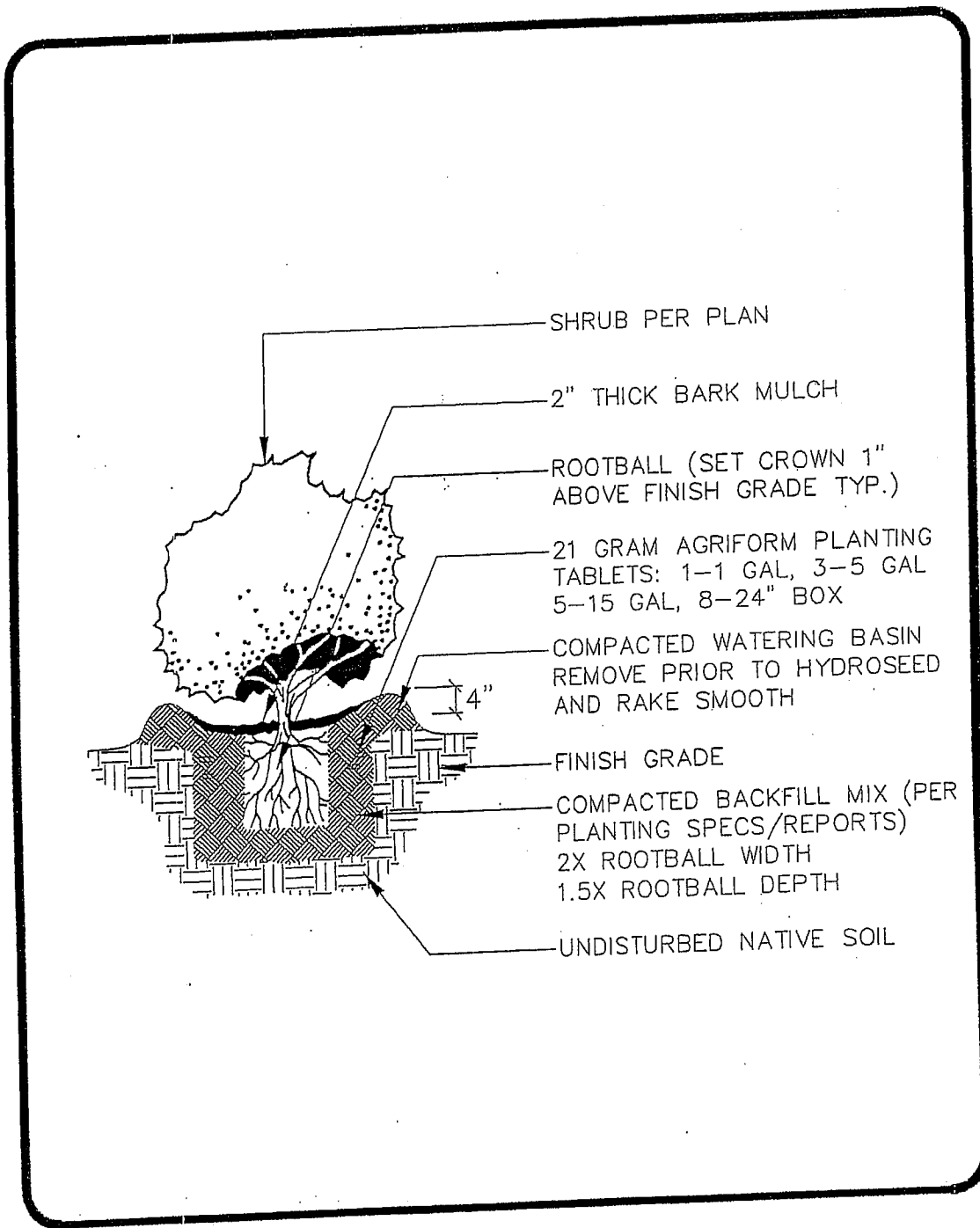
DURHAM RECREATION & PARK DISTRICT	
SLOPE TREE PLANTING	PL-2



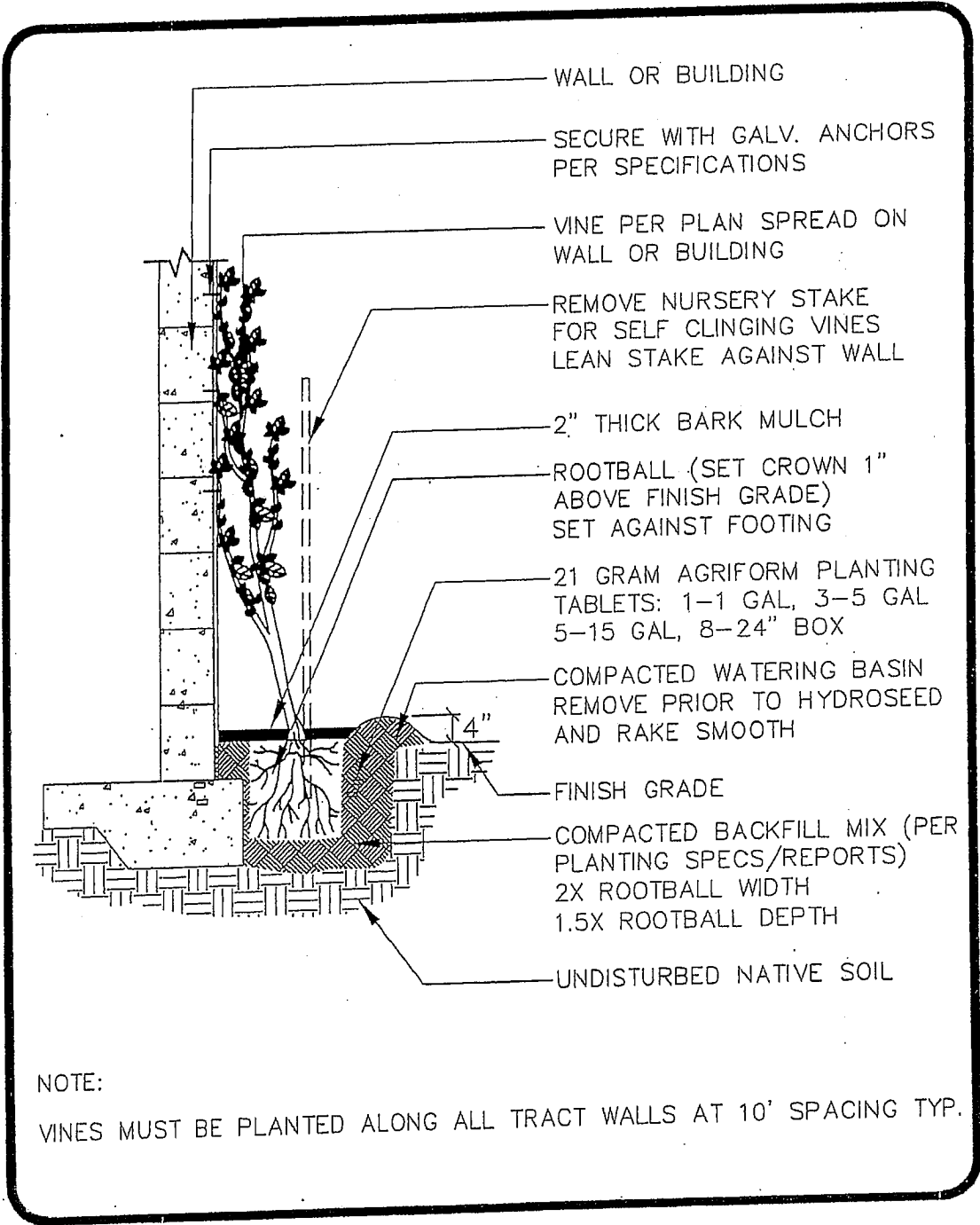
DURHAM RECREATION & PARK DISTRICT	
TREE PLANTING	PL-3



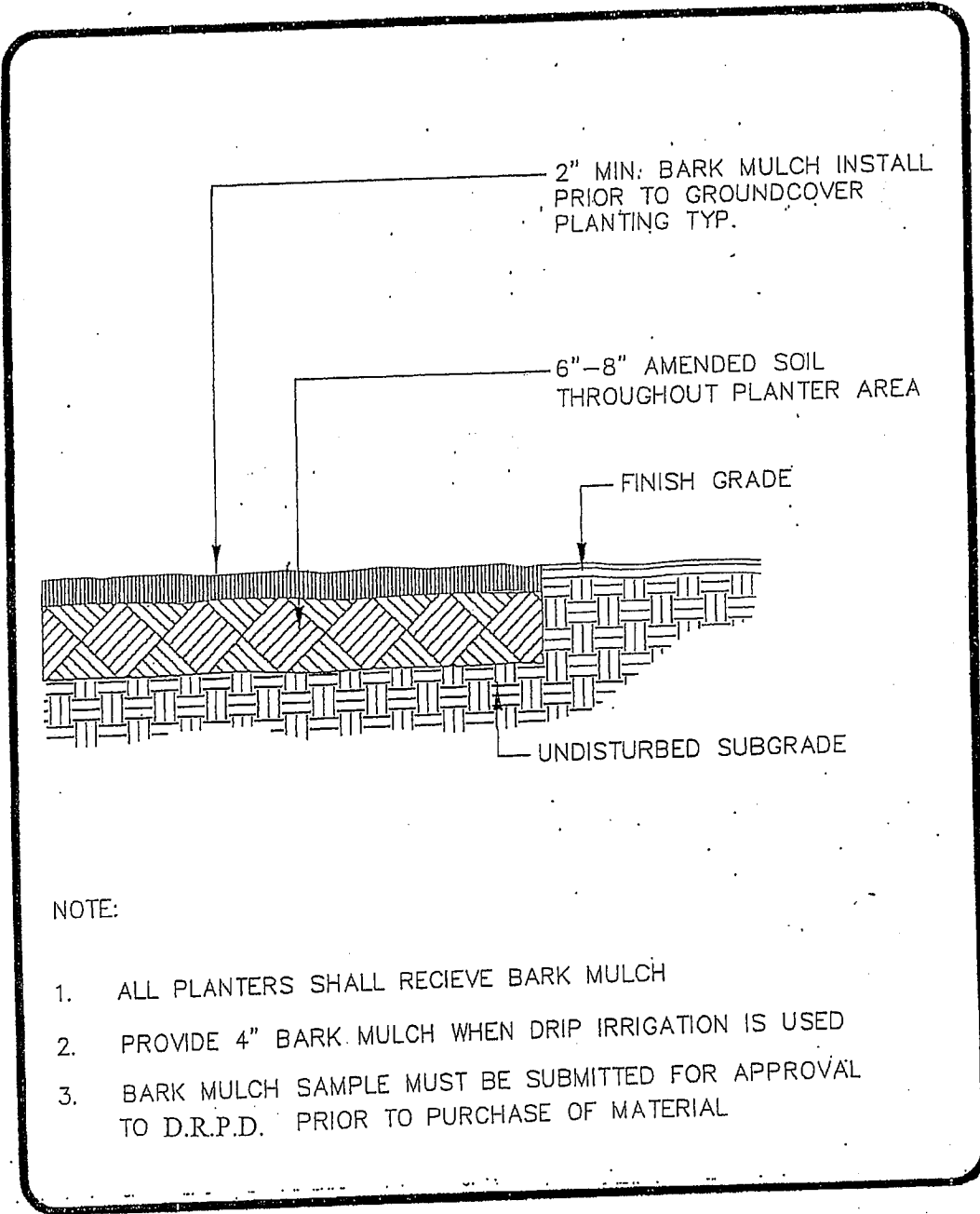
DURHAM RECREATION & PARK DISTRICT	
SLOPE SHRUB PLANTING	PL-4



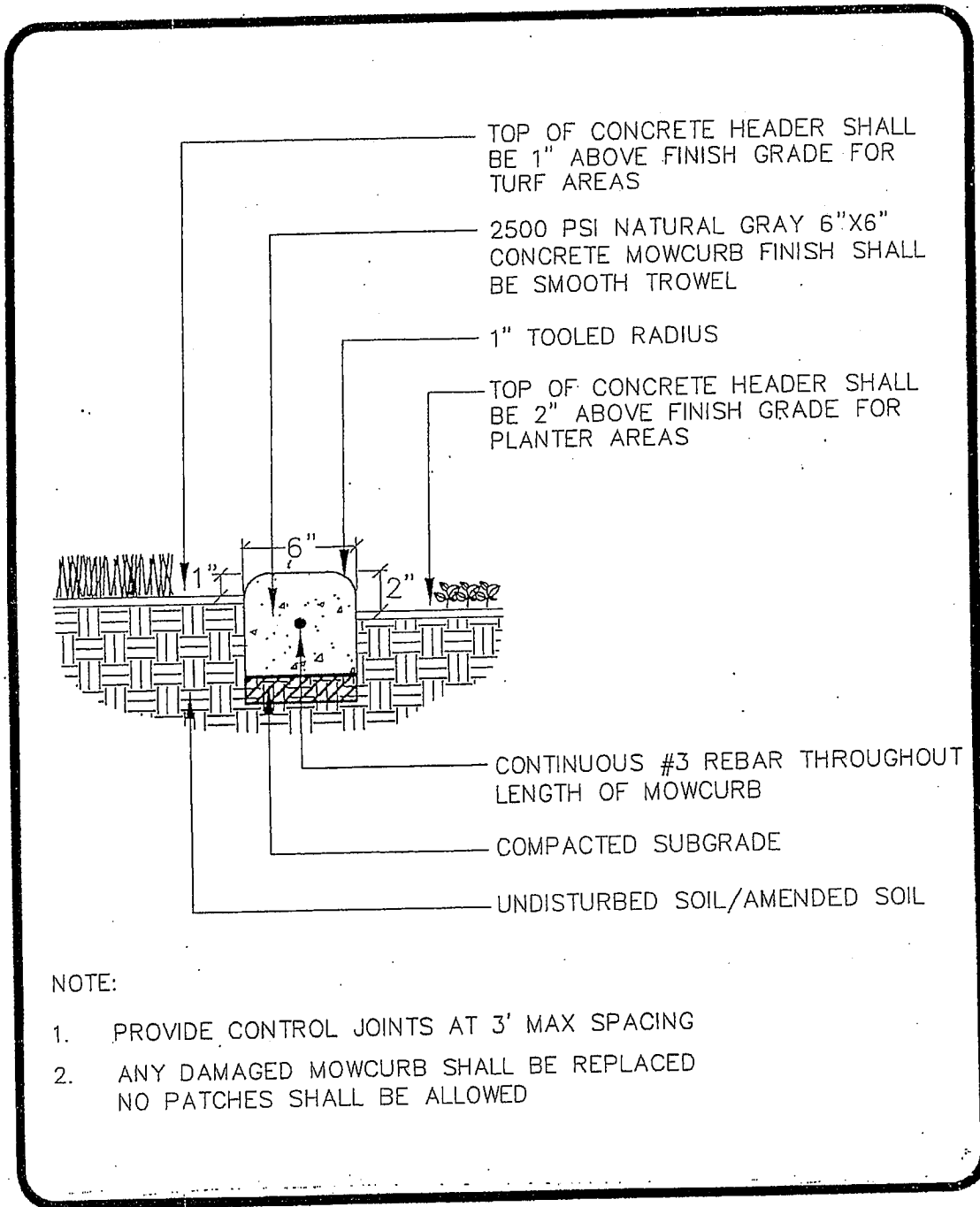
DURHAM RECREATION & PARK DISTRICT		
SHRUB PLANTING	PL-5	



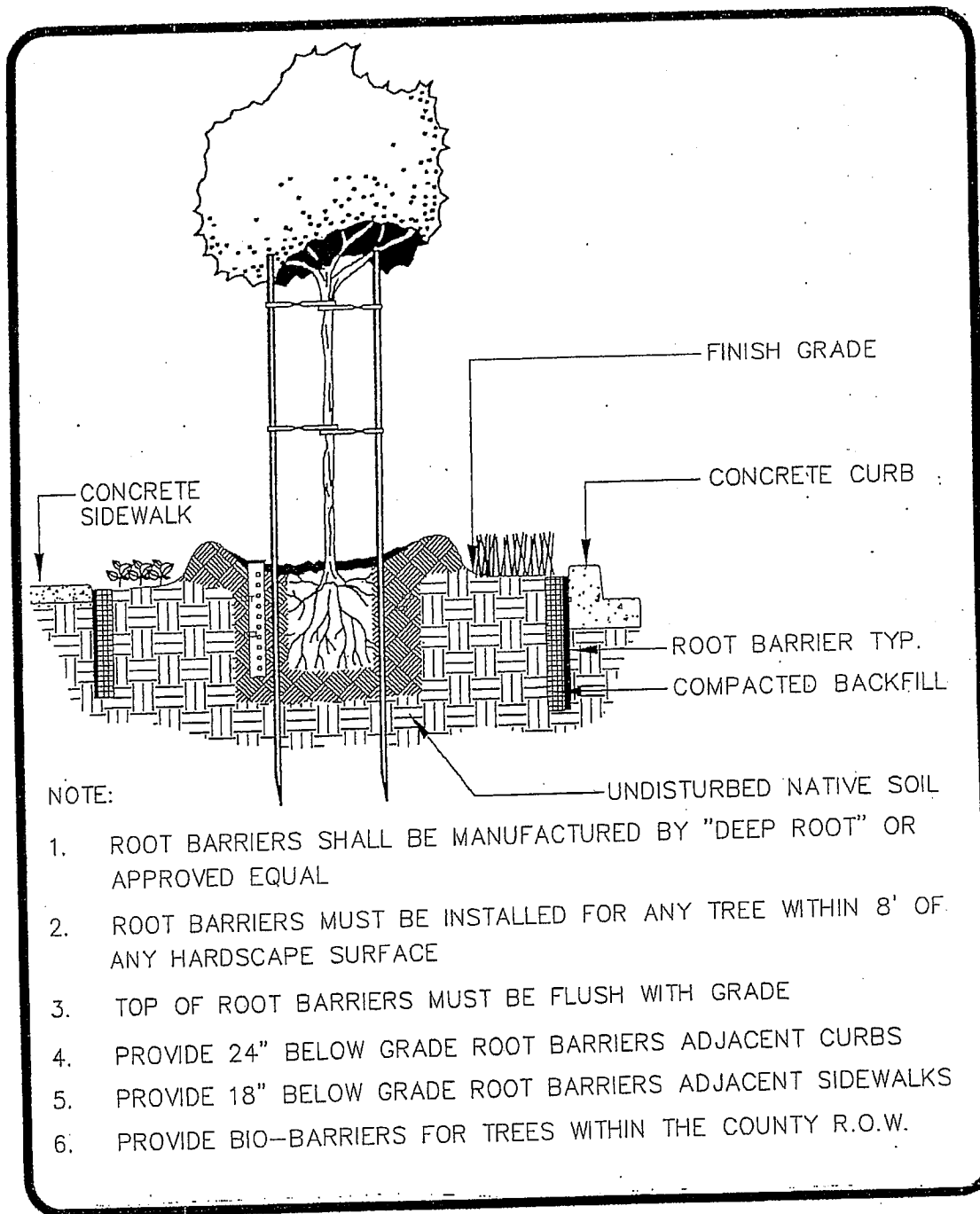
DURHAM RECREATION & PARK DISTRICT		
	VINE PLANTING	PL-6



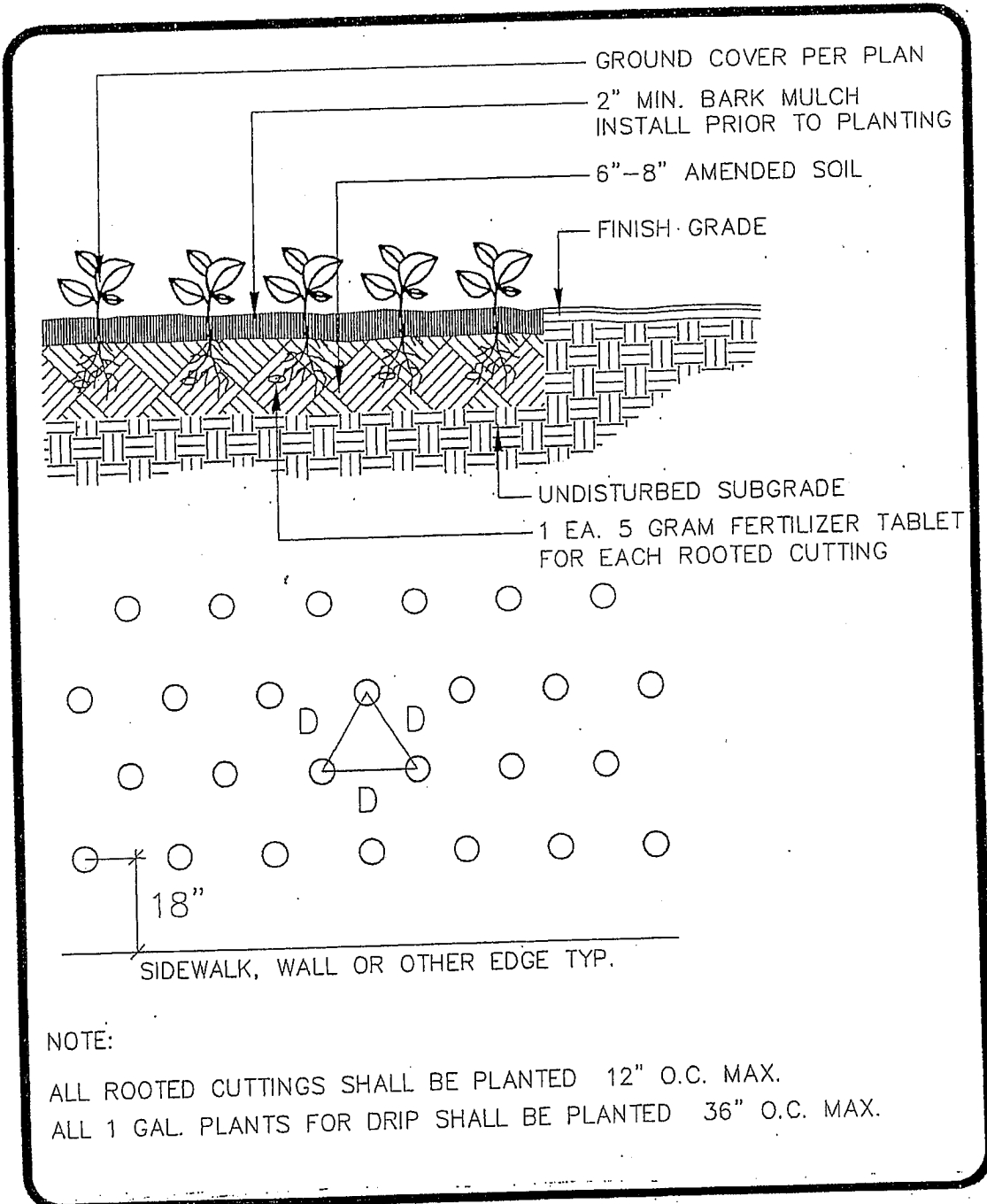
DURHAM RECREATION & PARK DISTRICT		
	BARK MULCH	PL-7



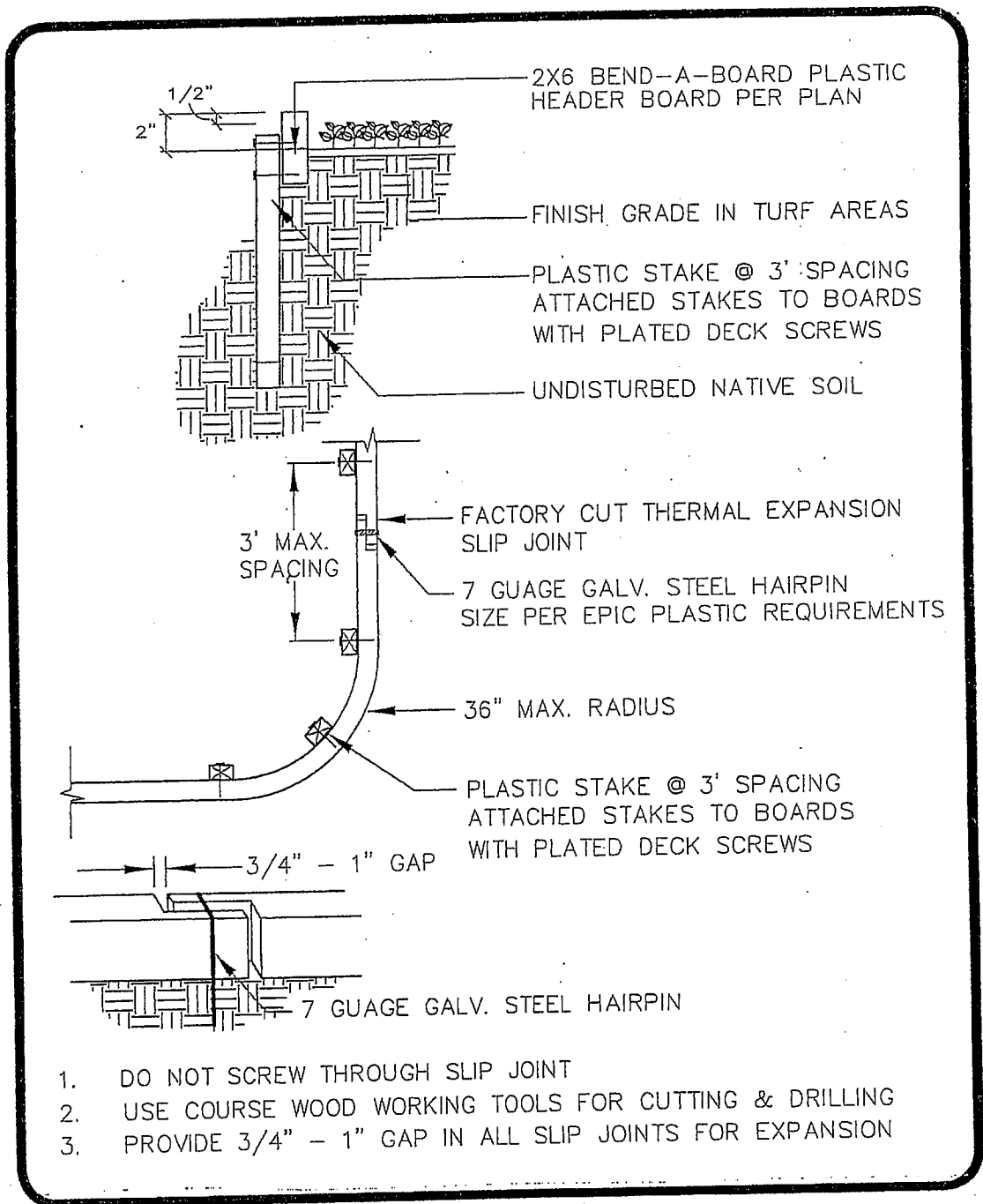
DURHAM RECREATION & PARK DISTRICT		
CONCRETE MOWCURB		PL-8



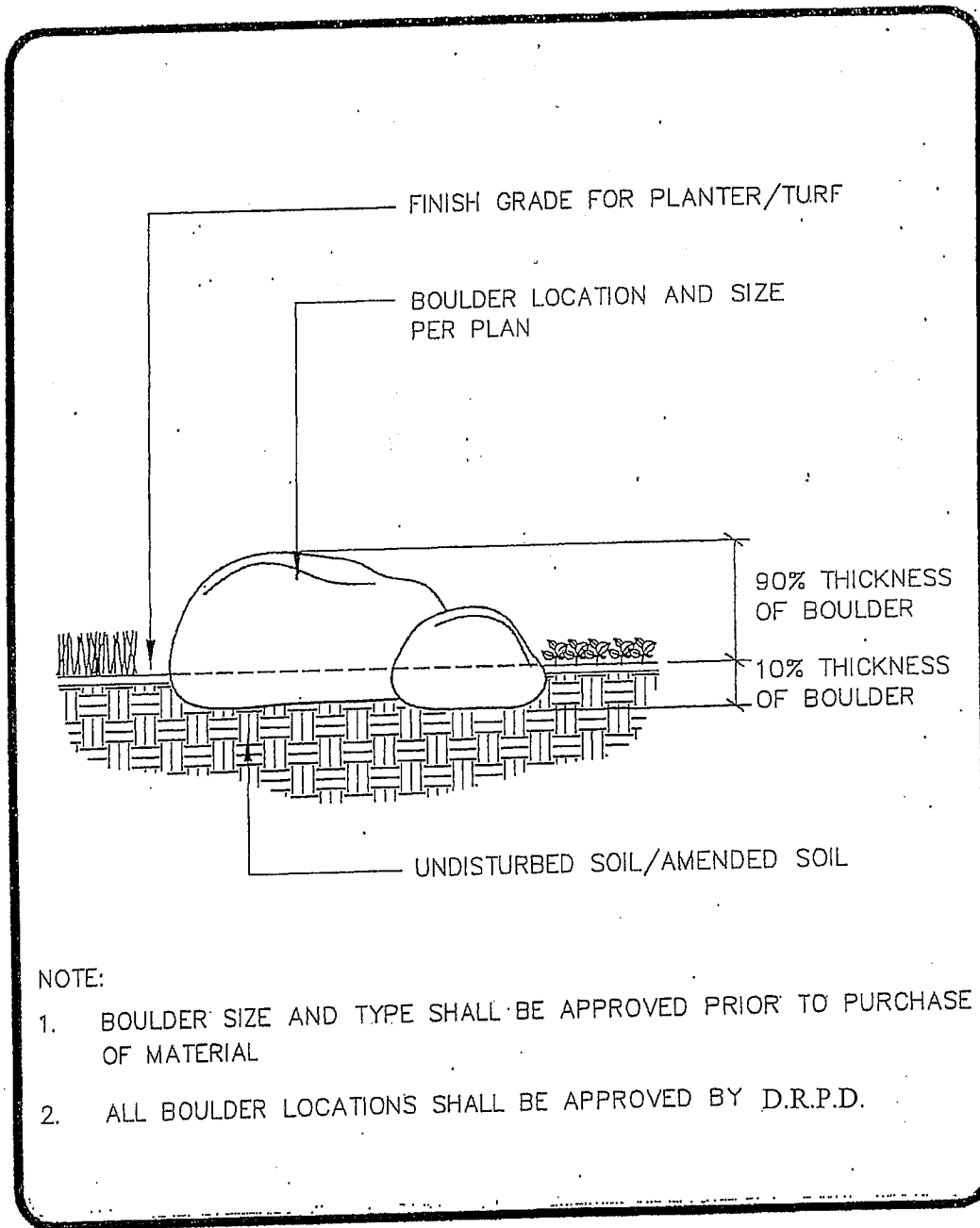
DURHAM RECREATION & PARK DISTRICT		
ROOT BARRIER		PL-9



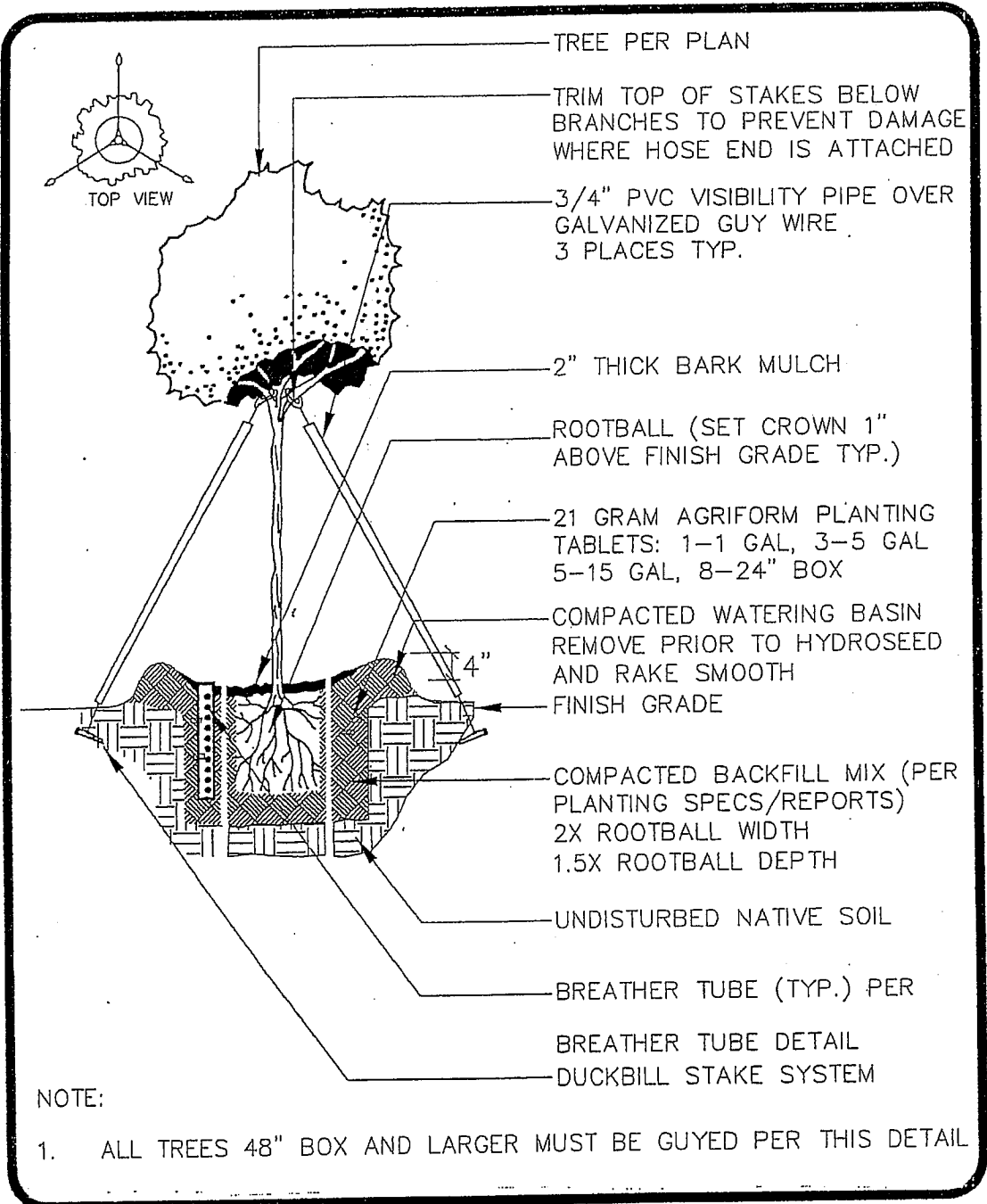
DURHAM RECREATION & PARK DISTRICT		
	GROUND COVER PLANTING	PL-10



DURHAM RECREATION & PARK DISTRICT	
PLASTIC HEADER	PL-11



DURHAM RECREATION & PARK DISTRICT	
BOULDER PLACEMENT	PL-12



DURHAM RECREATION & PARK DISTRICT	
TREE GUYING	PL-13

SECTION 02400 – PLAYGROUND EQUIPMENT

1. PLAYGROUND SPECIFICATIONS: GENERAL

1. Scope

- a. Furnish labor, material and equipment necessary for the installation of the playground equipment, structure or modular unit as shown on the drawings and specified herein.
- b. Work shall include, but not limited to the following: excavation; layout; and the installing of playground equipment in accordance with the manufacturer's installation specifications, including all appurtenances and accessories as required for a full and complete installation.

2. Products

- a. The layout shown in the plan view is based upon district purchased equipment from Miracle Recreation. Miracle Recreation can be contacted at 800-264-7225 (phone) or 909-676-8706 (fax) or equivalent. sales@miracleplayground.com.

3. Playground Safety Standards and Quality Assurance

- a. All public playground equipment supplied shall meet all applicable provisions of the current California Code of Regulations Title 22, Div. 4, Chapter 22. All productions shall bear the certifications seal of the International Playground Equipment Manufacturers Association (IPEMA). All designs shall meet or exceed the Americans with Disabilities Act (ADA) "Final Accessibility Guidelines for Play Areas" regulations as published on October 18, 2000. All manufacturers' must be ISO 9001 certified.

4. References and Standards

- a. California Title 22, Division 4, Chapter 22 Playground Safety Regulations
- b. CPSC: Consumer Product Safety Commission
- c. IPEMA: International Playground Equipment Manufacturers Associations
- d. ADA: Americans with Disabilities Act
- e. ISO: International Organization for Standardization

5. Warranty/Guaranty

- a. The Contractor shall guarantee installation workmanship for a period of one year from the date of Substantial Completion of the Project. The Contractor

shall be responsible for coordinating manufacturer material warranty items with the manufacturer/distributor and for the installation of replacement material(s) at no additional cost to the owner.

- b. Provide copy of contractor's installation warranty on company letterhead.

II. Part 2. Execution

1. Installation

- a. Instructions: Explicit installation instructions shall be provided by the manufacturer, which shall include detailed, scaled plan view; elevations; footing drawings and details; as well as, written instructions to assure proper installation of the playground equipment, structure or modular unit.
- b. Playground equipment must be installed by a manufacturer certified installer and be installed in accordance with the manufacturer's installation specifications. Installation crew leader must be CPSI certified. If not installed by a manufacturer certified installer the play equipment shall be inspected after installation by a CPSI not employed by the installer and signed off by said CPSI before the playground is opened for first use.
- c. Close Out: Contractor shall provide the owner with one copy of complete manufacturers installation instructions and maintenance kit if provided. Most manufacturers send at least two sets of installation manuals with each order. Additional sets of installation instructions should be purchased from the manufacturer if originals are lost or damaged. It is the contractor's responsibility to secure the installation instructions from the installer. Miracle Recreation mails one complete set of installation instructions/directions directly to the owner and the contractor shall not be required to supply additional sets to the owner.
- d. Clean-up: The site shall be kept clean and free of tools, trash, debris and installation materials on a daily basis. Material may be stored on site during installation with appropriate protective measures and approval by the owner's representative.

-End of section -

SECTION 02500 – RESTROOMS

I. RESTROOMS SPECIFICATIONS: GENERAL

1. General Requirements

- a. Contact The Public Restroom Company for project specific layouts and requirements.
- b. Submit conceptual layout of restroom/maintenance room building prior to commencement of construction plans and prior to submittal to the County of Butte Planning Department.
- c. Restroom/maintenance building plans must be submitted to DRPD to be reviewed for layout, material, appearance and required amenities only.
- d. The County of Butte Planning Department must also approve plans and all other requires agencies.
- e. All restrooms must also have a maintenance room to house irrigation controllers, electrical timers and misc. park equipment. The size of the restrooms and maintenance room will be determined by project size and amenities.
- f. Provide note on drawings to read, "Restroom buildings must be inspected by D.R.P.D. representative prior to final".
- g. All restroom buildings must be compliant with ADA regulations.
- h. Provide A.D.A.A.G. note on title sheet of drawings.
- i. Exterior colors must correspond with adjacent community color scheme.

2. Permits

- a. Contractor shall obtain and pay for any permits required.

3. Intent

- a. The intent of the drawings and specifications is to indicate the process required for the installation without additional cost in labor and material to the owner.

4. Scope of Work

- a. Furnish all labor, material, equipment, tools and all necessary operations to perform and complete all construction as indicated in specifications and drawings.

5. Inspections
 - a. A 48-hour notice is required for inspections.
 - b. Contractor must be on site for all inspections.
 - c. Any non-productive inspection shall be billed to the contractor at the current inspector's rate.
6. Submittals
 - a. All submittals shall be submitted within 15 days after receipt of executed contract.
 - b. Contractor shall submit all, but not limited to, the following items:
 - i. Manufacturer specifications of material used.
 - ii. All manufacturers' product cut-sheets for all material specified.
 - iii. Required shop drawings.
 - iv. Submittals for substitutions will be considered when specified material is proven unavailable.
 - v. All substitutions shall be approved in writing.
7. Turnover Items
 - a. Contractor must provide electrical, sewer and water as-builts.
 - a. Building pad compaction certification.
 - b. Building certification of completion from County of Butte.
 - c. Domestic backflow device certification.

II. RESTROOM SPECIFICATIONS: MATERIALS

1. Foundations
 - a. Foundations must be per Engineer's drawings based on soil test and governing agencies.

2. Walls
 - a. All restroom walls must be 8 x 8 x 16 precision block walls with split-face on exterior.
 - b. Provide anti-graffiti coating to all block walls inside and out.
 - c. Chalk between all blocks and wood.
3. Doors
 - a. Doors shall be commercial steel doors with steel frames.
 - b. Specify for all entry doors to swing inward.
 - c. Provide electronic battery operated door locks model # CM51961BO-06-KD-626-RH-HSS for restrooms only. Contact Jody Culver @ McAloney Enterprises Inc. (626) 303-3835, or approved equal.
4. Roofing
 - a. Roofing shall be standing seam metal roofing.
 - b. Color must correspond with adjacent community color scheme.
5. Flooring
 - a. All restroom/maintenance floors shall be standard broom finish concrete.
 - b. All restroom/maintenance rooms shall have a floor drain with brass grate.
 - c. All floor drains must be positioned in center of room.
6. Vents
 - a. Provide gable vents as applicable.
 - b. Gable vents must match exterior colors.
7. Lighting
 - a. Exterior lights must be controlled by a photocell.
 - b. A timer must control interior lights.
 - c. Parking lot light standards to be reviewed for layout only.
 - d. County of Butte Planning Department must approve plans and all other requires agencies.
 - e. Contractor must submit all manufacturer's product cut-sheets for all material specified.

8. Drinking Fountain

- a. Provide exterior drinking fountains for all restroom buildings.
- b. Specify model #1025 Green by Haws Corporation.
www.hawscorporation.com.

9. Grading

- a. Grading plan for restrooms and parking lots within a park to be reviewed for elevations and layout only.
- b. Plans must be also be approved by County of Butte Planning Department and all other requires agencies.
- c. Restroom and parking lot plan to be reviewed for layout only.
- d. The contractor shall complete grading and filling as needed and remove all rocks and debris.
- e. Sub-grading preparation shall be in accordance local governing agencies.
- f. Prior to commencing any work the contractor shall carefully check all grades and verify that after all irrigation work and soil preparation completed, all grades will be per specified depth as per the landscape contractor's scope of work with $\pm 1/10$.
- g. All existing trees, shrubs, groundcovers, hardscaping and structures within the limits of work specified shall be protected under this section.

10. Clean-Up

- a. Clean up shall take place on a daily basis, after each portion of work has been completed and as directed by the owner's representative. The contractor shall legally remove from site any trash or material from his scope of work.

11. Final Approval

- a. Durham Recreation & Park District must approve all restroom/maintenance buildings in addition to County of Butte final.
- b. The owner's representative must approve final turnover in writing.

- End of section -

SECTION 02600 – CONCRETE

I. CONCRETE SPECIFICATIONS: GENERAL

1. Permits
 - a. Contractor shall obtain and pay for any permits required.
2. Intent
 - a. The intent of the drawings and specifications is to indicate the process required for the installation without additional cost in labor and material to the owner.
3. Scope of Work
 - a. Furnish all labor, material, equipment, tools and all necessary operations to perform and complete all construction as indicated in specifications and drawings.
4. Inspections
 - a. A 48-hour notice is required for inspections.
 - b. Contractor must be on site for all inspections
 - c. Any non-productive inspection shall be billed to the contractor at the current inspector's rate
5. Submittals
 - a. All submittals shall be submitted within 15 days after receipt of executed contract.
 - b. Contractor shall submit all, but not limited to, the following items:
 - i. Manufacturer specifications of material used
 - ii. Manufacturer warranties
 - iii. Required shop drawings

- iv. Specifications for herbicide
 - v. Base rock
 - vi. Portland cement
- c. Submittals for substitutions will be considered when specified material is proven unavailable.
- d. All substitutions shall be approved in writing.

II. CONCRETE SPECIFICATIONS: MATERIALS

1. Cement

- a. Cement shall be Portland cement standard brand type I or II in compliance with ASTM C-150.

2. Aggregates

- a. Aggregates shall be aggregate hardrock in compliance with ATSM C-33. Aggregates shall be class II with a maximum of 3/8" in diameter.

3. Sand

- a. Sand shall be natural, strong and durable washed, not containing more than 2% of shale; clay or other harmful material, free of impurities.

4. Water

- a. Water shall be potable free from harmful levels of alkali, acid or salt.

5. Bars

- a. Bars shall be Grade 40 and in compliance with ASTM A-615.

6. Welded Wire Mesh

- a. Welded wire mesh shall be 6" x 6" unless otherwise noted. Welded wire mesh shall be in compliance with ASTM A-185.

7. Tie Wire
 - a. Tie wire shall be 16 gauge minimum, black annealed.
8. Integral Pigment
 - a. Integral pigment shall be iron oxide plain concrete.
9. Curing Compound
 - a. Curing compound shall be A.C. Horn or equal.
10. Expansion Joints
 - a. Expansion joints shall be asphalt impregnated fiberboard 3/8" thick minimum.

III. CONCRETE SPECIFICATION: EXECUTION

1. Sub-grade Preparation
 - a. Prior to placement of concrete the sub-grade shall be compacted using a tamp or roller.
 - b. Sub-grade shall be compacted to 95% density unless otherwise noted.
2. Sand Base
 - a. Sand Base shall have a depth as specified in details.
 - b. Sand Base shall be mechanically compacted to a smooth surface and watered after completion.
3. Forms
 - a. Forms shall be Douglas Fir or equal with a minimum height of 3½ inches. Forms shall have a smooth texture, straight upper edge.
 - b. Bender board or thin planks shall be used for radius curves.
 - c. Forms shall not vary from vertical grade by more than 0.02' in 10' and from horizontal alignment by more than 6". A window of fill dirt may be required to eliminate bulging when concrete is poured.

- d. All forms shall be protected in place for a period of 12 hours minimum with the exception of vertical curbs.
 - e. All forms shall be clean and coated with a light oil to prevent the concrete from adhering to forms.
 - f. All forms shall be held in place with steel or wood stakes as required.
4. Reinforcing
- a. Bars
 - i. Bars shall be as specified in drawings.
 - ii. Bars shall be clean, free of rust, oil and grease.
 - iii. Bars shall be secured together at intersections with 16-gauge wire.
 - iv. Intersections shall be supported with pre-cast mortar blocks or other approved spacers.
 - v. The bars shall be supported in a manner to support foot traffic and concrete pouring without displacement.
 - vi. All bar welding shall be performed by a qualified welder in compliance with the American Welding Society's recommendations for welding reinforcing steel. (AWS D 12.1) latest edition.
 - vii. Existing reinforcing bars, which are connected to new reinforcing bars, shall be cleaned to remove any dirt, rust, oil or grease.
 - b. Welded wire mesh shall be as specified and be overlapped one full mesh square and shall be held in the middle of the slab.
5. Concrete Mixing
- a. Concrete mixing shall be in compliance with ASTM C-94 and shall consist of the following:
 - i. 6 sacks of Portland cement per cubic yard.
 - ii. 6-3/4 gallons of water per sack of cement maximum.

- b. Slump, 2 to 5 inches of concrete shall fall in globs from chute. Any soupy mixtures shall not be accepted.
- c. Mixing strength for footings, curbs and flat work shall be 2,500 pounds per square inch @ 28 days.
- d. Concrete mixed in a transit mixer shall be mixed for a period of 10 minutes minimum at a peripheral drum speed of 200 feet per minute.
- e. Concrete color shall be standard gray unless otherwise specified.

6. Site Conditions

- a. All existing trees, shrubs, groundcovers, hardscaping and structures within the limits of work specified shall be protected under this section.

7. Weather Conditions

- a. No concrete shall be poured or finished when rain is apparent.
- b. No concrete paving shall commence during rainfall or unless air temperature is 50°F and increasing unless previously approved in writing. No request will be reviewed unless contractor submits a program for cold weather pouring. Report shall be based on ACI Standards.
- c. No concrete shall be mixed or poured when the temperature is below 40°F or when conditions indicate that the temperature will fall below 40°F. within 72 hours. Concrete when deposited shall have a temperature of not less than 60°F. Reinforcements, forms, and ground of which concrete will come in contact with shall be completely free of frost.

8. Pouring

- a. Prior to placement of concrete, all tools and equipment used for mixing and conveying shall be cleaned. All forms must be wet and entire area where concrete will be place must be cleaned.
- b. Concrete pouring shall be carried on, as a continuous operation until the areas of approved size is complete. Cut off locations shall be approved and shall never end on a driveway.

- c. Concrete shall be handled as rapidly as practicable from the mixer to the place of final deposit by methods, which prevent the separation or loss of material. It shall be deposited as nearly as practicable, in its final position to avoid re-handling or flowing. Concrete shall not be dropped freely more than six feet. Concrete that has partially hardened shall not be deposited in the work. The discharge of concrete shall be started not more than 45 minutes after the introduction of mixing water. Placing of concrete shall be completed within 90 minutes of the first introduction of water into the mix. It shall not be reworked.
- d. In pouring columns, walls or thin sections of considerable heights, openings in the forms, elephant trunks or other approved devices shall be used which will permit the concrete to be placed without segregation and the accumulation of hardened concrete on the forms or metal reinforcement above the level of the concrete. Such devices shall be installed so the concrete will be dropped vertically. At least two hours must elapse after depositing concrete in wall or columns before depositing concrete in heads over openings, supported beams, girders or slabs.
- e. All concrete shall be thoroughly compacted using approved mechanical vibrators. Internal vibration must be by direct action in the concrete and not against forms or reinforcement. Each pour shall be vibrated until the water shows indications of rising, but not until the water has risen.
- f. Along the faces of the forms, suitable tools shall be used during the pour to force large particles away from the forms and bring mortar to the surface of the forms. In addition, when approved by the owner's representative, external form vibration may be used. The responsibility for providing fully filled out, smooth, clean and properly aligned surfaces free from objectionable pockets and blemishes shall rest entirely upon the contractor.
- g. Slabs shall be tamped to depress the rock and push floated with a fill float as necessary. Care shall be taken at all times so that the wet slab meets the screeds accurately and does not rise above or lower below them.
- h. When the slab is indicated as being poured directly on an earth construction pad without rock fill, proceed as follows: Although the construction pad was made level within 1.10 feet, it is assumed that by the time all the excavation for footings and utility trenches is completed, the surface will be considerably disturbed. Therefore, it shall be bladed off and brought to an accurate level of slight scarifying

if necessary and compacted to a smooth, true surface. This level shall be thoroughly re-leveled before each day's pour and thoroughly wet down, but not flooded.

- i. Cast in place concrete foundation piers shall be poured into undisturbed pier holds. Casing should be placed where walls of the pier holes show instability. Casing should be withdrawn gradually as pour proceeds. Where ground water occurs in the pier hole, it should be pumped dry before pour or concrete by tremie method.

9. Construction Joints

- a. Location and details of construction joints shall be as indicated. Joints shall be made and located as not to impair strength of the structure. Review all locations of construction joints with the owner's representative before blocking out the pours.
- b. Large slabs poured on grade shall be limited to 10 x 10 ft. between construction joints, or as shown on the details and as approved by the owner's representative. Pathways shall have control joints every 5 feet. In general, lines of joints shall follow column lines or permanent walls. Construction and control joints shall be tooled with a ½" radius edge tool on both sides of the joint. Made joints straight, true and level. Control joints shall be ¼" wide by ¾" deep minimum.

10. Finishing

- a. Finish shall be as specified on the details.
- b. After concrete has been troweled to a smooth finish following lines and grades shown on the drawings, one of the following finishes shall be executed:
 - i. Broom: Draw broom across the surface at 90° to direction of traffic in a continuous motion from score mark to score mark or edge to edge. The degree of texture – light, medium or heavy broom – will be specified on the drawings. Broom marks shall be neat, parallel and uniform in texture throughout.
 - ii. Washed aggregate finish: Evenly expose aggregate by water washing and brushing or other approved means to an average depth of 1/8 inch.
 - iii. Avoid pocketing and kicking out of aggregate.

- iv. Finish shall be uniform throughout in color, texture and degree of exposure of aggregate and shall match existing work.

11. Protections

- a. Concrete surfaces shall be protected from the elements, defacement and traffic during construction operations with plywood.

12. Defects

- a. If any concrete work is not formed as indicated, is under-strength concrete, concrete out of line, level, plumb, or showing objectionable cracks, honeycomb, rock pockets, voids, spalling, exposed reinforcing or vandalism, it shall be repaired or removed and replaced as directed by the owner's representative. All cleaning, patching and repairs shall be subject to the owner's representative's approval and acceptance.
- b. Defects in concrete work shall be repaired as directed by the owner's representative. Voids shall be chipped to a depth of at least one (1) inch or to remove all loose material with the edges perpendicular to the surface and parallel of form markings. Voids, surface irregularities, chipped areas, etc.. Shall be filled by patching, gunite and/or rubbing as directed by the owner's representative and shall be done at the contractor's expense. Repaired surfaces shall duplicate the appearance of the unpatched work. Prepare a sample of a repaired condition for approval before proceeding with all of this work.

13. Grading

- a. The contractor shall complete grading and filling as needed and remove all rocks and debris.
- b. Sub-grading preparation shall be in accordance local governing agencies.
- c. Prior to commencing any work the contractor shall carefully check all grades and verify that after all irrigation work and soil preparation completed, all grades will be per specified depth as per the landscape contractor's scope of work with $\pm 1/10$.

14. Clean-Up

- a. Clean up shall take place on a daily basis, after each portion of work has been completed and as directed by the owner's representative. The contractor shall legally remove from site any trash or material from his scope of work.

15. Final Approval

- a. All concrete paving shall be inspected in its entirety by the owner's representative and have project final approval in writing.

- End of Section -

SECTION 02700 IRRIGATION SYSTEMS

IRRIGATION SPECIFICATIONS

GENERAL

1. General Requirements

- a. Permits: Contractor shall obtain and pay for any permits required.
- b. Contractor shall be responsible for notifying all utility companies 3 days prior to any trenching.
- c. Contractor must provide DRPD representative with the Dig Alert number at first inspection.
- d. The current Standard Landscape Specifications & Design Guidelines booklet must be on site at all times for each project.

2. Scope of Work

- a. The intent of the drawings and specifications is to indicate the processes required for the installation of a complete operating irrigation system.
- b. The work consists of furnishing all tools, equipment, material, labor and any processes required to provide a complete operating irrigation system as specified in the drawings and specifications.
- c. Drawings are diagrammatic and must be field verified. Contractor must notify Engineer and/or DRPD immediately of any discrepancies prior to starting work.
- d. Due to the scale of the drawings it is not possible to show all offsets, assemblies, fittings, etc. for a complete irrigation system.
- e. Under this section the contractor shall provide all necessary assemblies, fittings, etc. to provide a complete fully automatic irrigation system as listed in drawings and specifications with no additional cost to the owner.
- f. Any extra work performed shall be approved in writing by the Owner or Owner's representative prior to the start of such work.
- g. Any unapproved work may be at the contractor's expense.
- h. If reclaimed water is used, contractor shall provide all necessary reclaimed water signage and equipment. The entire irrigation system must be in accordance to the local reclaimed water specifications and as listed in drawings.

3. Record Drawings

- a. Record accurately on one set of black and white prints denoting variation in work from original drawings.
- b. Dimension from two permanent points of reference (sidewalks, pavement, curbs, street lights, buildings) Record on as-builts daily or as work is performed. All drafting must be clearly legible and dimensions shall be no smaller than 1/4" in size.

- c. Show dimensions from the following locations and depths:
 - i. Point of connection (P.O.C.).
 - ii. Backflow prevention assembly, master valve and flow sensor.
 - iii. Routing of irrigation pressure mainlines and all directional changes.
 - iv. Ball and butterfly isolation valves.
 - v. Irrigation control valves.
 - vi. Automatic controller, rain sensors and electrical conduits.
 - vii. Sleeves and pull boxes.
 - viii. Other related equipment (as directed by the Engineer).
- e. Upon completion and approval of record drawing prints, transfer all information to reproducible mylars and provide two additional blue line copies.
- d. Maintain as-built drawings on site at all times. These drawings are subject to inspection at any time.
- e. Make changes to reproducible drawings in ink (no ball-point pen). Erase or use eradicating fluid when revising drawings. Make changes in a manner equal to the original drawings.
- f. Contractor must submit as-built drawings (sepia mylars and two sets of blue lines) to the Engineer inspecting the site seven days prior to the start of the maintenance period for approval.
- g. **As-built measurements must be transferred to an Autocad digital file by the Landscape Architect or qualified draftsman prior to turn-over. All site lines must be black, mainline and valves must be red and dimension lines must be blue.**

4. Controller Charts

- a. As-built drawings shall be approved in writing prior to preparing charts.
- b. Provide two controller charts for each controller supplied, showing the area covered by the automatic controller.
- c. The chart shall be a reduced reproduction of the as-built system. If the controller sequence is not legible when reduced, enlarge it to a size that will be legible when reduced.
- d. Charts shall be black line print with a different transparent color used to show area of coverage for each station.
- e. Completed and approved charts must be laminated with plastic 10 mil thick minimum.
- f. Charts shall be completed and approved prior to final inspection of the irrigation system.

- g. Controller access. The Engineer reserves the right to have complete access to the controller clocks for monitoring and controlling system failures. The contractor shall provide the Engineer with two sets of all keys necessary for access to the controller clocks within the designated area. The keys will then become the property of the Owner.

5. Operation and Maintenance Manuals

- a. Prepare and deliver to the Engineer, prior to the start of maintenance, all required and necessary descriptive material in complete detail and sufficient quantity properly prepared in four individually bound copies. Describe the material installed in sufficient detail to permit qualified operating personnel to understand, operate and maintain all equipment. Each manual shall include the following:
 - i. Index sheet, stating contractor's address and telephone number.
 - ii. Duration of guarantee period with guarantee forms.
 - iii. List of equipment with names and addresses of manufacture's local representatives.
 - iv. Complete operating and maintenance instructions on all major equipment.
- b. In addition to the maintenance manuals, provide the maintenance personnel with the instructions for major equipment and show written evidence to the Engineer at the conclusion of the work that this service has been completed.

6. Spare Parts and Equipment

- a. Prior to the start of maintenance prepare and deliver to the Engineer, all required spare parts, tools and equipment. Spare parts, tools and equipment shall include but not limited to the following:
 - i. Two quick coupler keys with 3/4 inch bronze hose bib with hand wheel.
 - ii. Two quick coupler lid keys
 - iii. One valve box cover wrench or key
 - iv. Two wrenches and shrew drivers for adjustment and disassembly for each type of sprinkler head used in the irrigation system
 - v. One 5-foot tee wrench for operating isolation valves specified
 - vi. Six extra sprinkler heads of each type and size used in the irrigation system
 - vii. Remote radio device for irrigation controller(s) for systems 30 stations or greater and if otherwise specified

7. Guarantee

- a. Provide written guarantee in form approved that all work with defects in workmanship and materials will be repaired or replaced at no cost to the

Owner for a period of one year from the date of acceptance by the Owner's representative.

- b. This form shall be transferred onto the contractor's letterhead and must contain the following:

Name of Project

We hereby guarantee that the irrigation system we have furnished and installed for **Name of Project** is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications. Ordinary wear and tear and unusual abuse or neglect expected. We agree to repair or replace any defects in material or workmanship, which may develop during the period of one (1) year from the date of acceptance, and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time after receipt of such written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of such written notice from the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay for the cost and charges therefore upon demand.

Project Name: _____

Owner: _____

Landscape Architect: _____

Location: _____

Signed: _____ Title: _____

Address: _____

Telephone: (____) _____

Date of Signature: _____

8. Inspections

- a. Site inspections and notification time.

i.	Pre-construction conference	7 days
ii.	Pressure line installation and testing	48 hours
iii.	Controller installation	48 hours
iv.	Lateral line and sprinkler installation	48 hours
v.	Coverage test	48 hours
vi.	Final Grading	48 hours
vii.	Weed-abatement	48 hours
viii.	Tree & shrub observation & layout	48 hours
ix.	Finish grade prior to hydro-seeding	48 hours
x.	Acceptance to commence maintenance	48 hours
xi.	Monthly maintenance walk	48 hours
xii.	Final Inspection	7 days

- b. No field inspections will commence unless record drawings are current and available for observation upon request by the Owner's representative.

9. Irrigation System Testing

- a. Owner's representative must be notified 48 hours prior to any irrigation testing or inspections.
- b. Contractor shall perform a pressure test to all pressure lines in the presence of the Owner's representative.
- c. All pressure line must be tested under hydrostatic pressure of 150 pounds per square inch (PSI) and be proven watertight.
- d. Pressure lines must maintain pressure for as period of 2 hours. If pressure drop occurs, contractor shall replace joints and repeat test until no pressure drop is achieved.

10. Pressure Line Observation

- a. Prior to any backfilling of any trench(s) contractor shall call for field observation for verification of material, depths, clearances and warning tape by the Owner's representative.
- b. Any trenching covered that was not inspected or approved shall be made visible for observation at the cost of the Contractor.

11. Controller Testing

- a. Prior to final acceptance contractor shall provide certification from manufacture stating that controller specified on drawings has been installed per manufacturer's specifications.
- b. Contractor shall test in the presence of the Owner's representative that all control wires and extra control wires are functioning properly.
- c. Contractor shall provide sufficient manpower and/or radio device to complete such testing in a timely manner.

12. Lateral Line Testing

- a. Prior to any backfilling of any trench(s) contractor shall call for field observation for verification of material, depths and clearances by the Owner's representative.
- b. All sprinklers and assemblies shall be made visible for observation for verification that all material has been installed per plans and specifications.
- c. Any trenching covered that was not inspected or approved shall be made visible for observation at the cost of the Contractor.

13. Coverage Test

- a. Contractor shall perform a coverage test in the presence of the Owner's representative. All irrigation sprinkler systems must providing 100% head to head coverage. Any areas not receiving head to head coverage shall be corrected and retested per the Owner's representative.
- b. Permanent power must be connected prior to scheduling of the coverage test.

- c. Contractor shall provide sufficient manpower and/or radio device to complete such testing in a timely manner.
- d. All heads must be adjusted to prevent over spray to buildings, walks, streets etc. (see adjusting the system section).
- e. No planting or hydro-seeding shall take place until coverage test as been approved in writing by the Owner's representative.
Tree planting may commence upon approval from Owner's representative.

14. Final Irrigation Inspection

- a. All irrigation systems shall be tested in the presence of the Owner's representative and by under complete automatic operation and proven to be leak free irrigating designated areas per plans and specification with least amount of over spray as possible.
- b. Contractor shall provide as-built record drawings and controller charts at final irrigation inspection for approval prior to mylar transfer and laminating of controller charts.
- c. All irrigation turn over items shall be turned in to the Owner's representative prior to the start of maintenance.

IRRIGATION SPECIFICATIONS

MATERIALS

1. Backflow Prevention Devices

- a. Backflow prevention units shall be approved by the Foundation for Cross-Connection Control and Hydraulic Research.
- b. Backflow assemblies shall be installed using brass ells, unions and nipples.
- c. Type: Febco 825YA or approved equal.
- d. Backflow device enclosure shall be constructed of stainless steel #9 expanded metal with an angle iron frame. Enclosure shall have a hinge on one end that allows for removal of the enclosure for backflow service. Enclosure shall be bolted to a concrete pad using galvanized steel hardware.

Manufactures: LeMeur, Strong Box, All Spec or approved equal.

2. Pressure Reducing Valves

- a. Pressure reducing valves shall be of bronze and stainless steel construction and be adjusted from 25 P.S.I. to 125 P.S.I.

Manufactures: Wilkens 500HLR or approved equal.

3. **Wye Strainers**

- a. Wye strainer shall be bronze construction with a stainless steel screen element. Wye strainer shall have a standard filtration size of 80 mesh.

Manufactures: Wilkens 100YSBR or approved equal.

4. **Shut off Valves**

a. **Ball Valve:**

- i. Shut off valves 2-1/2 inch and smaller shall be ball valves.
- ii. Ball valves shall have a one-piece body constructed of 600 lb. WOG Bronze material conforming to ASTM B-584 alloy 844. Ball valve shall have a vented ball with a blowout proof system. Ball valves shall have a working pressure of not less than 150 P.S.I. and shall conform to AWWA standards.

Manufactures: Nibco T-580 or approved equal.

b. **Butterfly Valves:**

- i. Shut off valves 3 inch and larger shall be butterfly valves.
- ii. Butterfly valves shall have a one-piece body constructed of cast iron and stainless steel stem. Butterfly valves shall be equipped with Vanstone large adapters and a 2-inch square-operating nut. Butterfly valves shall have a working pressure of not less than 150 P.S.I. and shall conform to AWWA standards. Butterfly valves shall have a ductile iron porcelain enamel coated disc.

Manufactures: Nibco, Matco or approved equal.

5. **Quick Coupler Valves**

- a. Quick coupler valves shall have a body constructed of red brass with a wall thickness guaranteed to withstand normal working pressure of 150 P.S.I. without leakage with female threads (penning at base). Quick coupler valve shall have a hinge cover constructed of red brass with leather like vinyl cover bonded to it on such a manner that it becomes permanent type of cover. Quick couplers used with potable water shall have vinyl covers yellow in color. Quick coupler valves used for reclaimed water shall have vinyl covers purple in color with the appropriate reclaimed water warnings in English and Spanish as well as the international "Do Not Drink" symbol.
- b. All quick coupler valves must have a schedule 80 ball valve to isolate mainline from quick coupler valve. Mainline shall be the size of quick coupler valve from mainline tee to quick coupler.

Manufactures: Potable Water: Rainbird 44LRC, Rainbird 33LRC or approved equal
Reclaimed Water: Nelson # 7645

6. Remote Control Valves

- a. The remote control valve shall be normally closed 24 VAC solenoid actuated globe pattern, spring-loaded diaphragm type. The valve shall be pressure rated up to 200 P.S.I. at 150 degrees F.
- b. The valve shall have a 600-pound test fabric reinforced rubber diaphragm assembly with self-cleaning stainless steel screen.
- c. Remote control valve body and bonnet shall be brass and the valve shall have a stainless steel control/ shut-off stem and manual operator.

Manufactures: Rainbird PESB-PRS or approved equal.

7. Master Control Valves

- a. The master control valve shall be a switch-able normally closed or open 24 VAC solenoid actuated globe pattern, spring loaded diaphragm type. The valve shall have up to 220 P.S.I. at 150 degrees F. pressure rating.
- b. The body bonnet shall be plastic and the valve shall have a stainless steel control shut-off stem and manual operator.
- c. The valve shall have a 600-pound test fabric reinforced rubber diaphragm assembly with self-cleaning stainless steel screen.
- d. The master valve shall be capable of regulating pressure.
- e. Install down stream of filter.

Manufactures: Toro P220 or approved equal.

8. Flow Meter

- a. Flow meter shall be constructed of a schedule 80 tee whenever possible with a solid state o-ring sealed epoxy fused sensor housing and nylon impeller.
- b. Flow meter must be installed and wired per manufacturer's specifications.
- c. Irrigation zones must be sized so that the specified flow meter is capable of reading the minimum and maximum gallons per minute for all proposed zones.
- d. Install down stream of master valve.

Manufacture: Calsense FM-X

9. Rain Sensor

- a. Rain sensor shall be a heavy-duty plastic container with epoxy sealed electronics installed within a 1/8-inch thick steel enclosure. Mount sensor on controller enclosure or building eave per manufacturer's specifications. Sensor shall be wired per manufacturer's specs.

- b. The sensor must be housed within a stainless steel vandal proof enclosure by the manufacturer.

Manufacture: WCS Rainguard

10. Filtration Device (Reclaimed Water)

- a. Filter shall be manufactured with a steel powder coat or stainless steel body with an 80-mesh filtration element with a stainless steel basket.
- b. Filter must comply with all EMWD requirements.

Manufactures: Yardney, Ag Products or approved equal.

11. Booster Pump

- a. Booster pump shall be as manufactured by Barrett Engineered Pumps, San Diego, California (619) 232-7867. The engineer shall determine pump.
- b. The booster pump must be controlled by a flow switch activator. Pump relay switches will not be allowed.
- c. The booster pump must be pre-assembled from the manufacturer with an enclosure and pressure regulator.
- d. Pump size, pressure regulator settings and relay timing shall be determined by the landscape architect and the pump manufacturer and approved by DRPD.
- e. Pumps with VFD motors are recommended when low-volume drip valves and high flow spray head or rotor valves are used together.

12. Filtration Equipment

- a. Filter shall be Turbo-Clean in filter available from Amiad Filtration Systems Inc. (800) 969-4055.
- b. Specify filter at P.O.C. directly down stream of the backflow device. Install per filter detail.
- c. Filter must have an automatic remote control valve with control wiring connected to irrigation controller for automatic flushing per filter detail.
- d. Auto flush valve must be connected to DRIP 2 program within the Calsense controller for District monitoring.

13. Fertigation Injector

- a. All point-to-point irrigation systems must have an in-line fertilizer injector.
- b. Fertilizer injector shall be #F-4000 available from Plant's Choice, Inc. (619) 585-9909

- c. Fertilizer injector must be installed after the flow meter.
- d. Fertilizer injector shall be installed in a jumbo valve box supplied by the manufacturer. Valve box must be set at grade per typical valve box detail.
- e. Fertilizer injector must be installed per manufacture's installation specifications.

14. **Automatic Controller**

- a. The controller shall operate on a minimum of 120 volts A.C. power input and shall be capable of operating up to four 5.5 VAC 24 volt A.C. remote control valves at once. The controller shall have a reset circuit breaker to protect the controller from overloading.
- b. The controller shall have independent programmable stations. The controller-programming schedule shall be capable of allowing four automatic start times per day on four separate programs. Station timing shall be variable from 1 to 99 minutes. The controller must have a water budgeting function to allow increasing or decreasing of watering times for all stations at once.
- c. The controller shall have a master valve/remote pump start circuit for use with a master valve to pressurize the system when the programmed cycle starts to activate a remote pump start relay to run the pump during the programmed cycle.
- d. The controller shall have manual watering capabilities for single station operation at any time with out changing programmed times.
- e. The controller shall have a factory installed backup program for standby operation and a backup battery to maintain the programs during power loss.
- f. Install one extra 1-1/2" inch conduit to controller for future use.
- g. Contractor shall be responsible to communicate with Calsense to insure that all of the required components are ordered and installed per the District's requirements as determined by Calsense for each individual project.
- h. Architect must provide the following information to Calsense:
 - i. Project name and tract number
 - ii. Project location-cross streets or address if applicable
 - iii. Number of controllers on the project and proposed specification
 - iv. Number of water meters on the project

Example (ET2000-24-LR-RR-SSER) This is important to make sure that the specification is correct for application and location.

- i. The architect must obtain a letter from Calsense confirming District compliance.
- j. Controller compliance letter must be attached with first irrigation plan submittal.

Manufacture: Calsense ET-2000. Contact Bob Moxley with Calsense at (800) 572-8608 for specific District requirements and communication components as determined per project.

15. Controller Enclosure

- a. All controllers installed outside must be mounted inside a stainless steel enclosure with lockable-hinged doors provided by the controller manufacturer.
- b. The enclosure shall have one full time 120 VAC GFCI type circuit with on/off switch and pigtail connection for remote control use.

Manufacture: Calsense SSE-R.

16. Electrical Pedestal

- a. All electrical pedestals must be stainless steel
- c. All electrical pedestals must comply with local electrical code and agency requirements.

Manufactures: Strongbox #MPS-A16-10K or approved equal

17. Control Wiring

- a. All control wiring for connections between remote control valves and controllers shall be direct burial AWG-F wire installed in accordance with manufacture's specifications.
- b. All splices shall be sealed with waterproof connectors and waterproof sealant.
- c. All extra wires shall be sealed with waterproof connectors.
- d. Wiring shall be buried adjacent to mainline wherever possible and for more than one wire they shall be bundled at every ten feet using black electrical tape.
- e. Expansion curl shall be provided within three feet of each connection and at all changes in direction. Provide a two-foot expansion loop for every 100 feet of run.
- f. Wire size shall not be less than #14. Provide #12 for runs over 2500 feet.
- g. All common wires shall be #12.
- h. Control wires shall be black in color. If additional controllers are installed provide different color common wires for each controller.
- i. Common wire shall be white in color. If additional controllers are installed provide white wire with colored stripe. Stripe to be same color as control wire color.
- j. Contractor shall provide one extra wire for every five valves and two extra wires shall be provided for every valve in any isolated area and the extra wires shall extend past the last valve in a group. Extra wires shall be orange in color and looped in every valve box and made accessible for future use if needed.
- k. No wire splices shall be permitted unless run is longer than 2500 feet or approved by Owner's representative.

Manufactures: Paige or approved equal.

18. Valve Boxes

- a. Rectangular valve boxes shall be 9-1/2 inch wide by 16 inch long and 11 inch high. Round valve boxes shall be 10-inch diameter and 10 1/4 inch. All valve boxes shall be constructed of rigid polyolefin.
- b. Valve boxes shall have locking covers secure with a 3/8-inch stainless steel bolt and washer.
- c. Rectangle valve boxes shall be used for control valves, master control valves, pressure regulators, flow sensors, wye strainers, filtration devices, ball valves, butterfly valves and pull boxes.
- d. Round valve boxes shall be used for quick coupler valves.
- e. All valve boxes to be green in color unless otherwise specified for use of reclaimed water. All valve boxes for reclaimed water shall be purple in color and bare the reclaimed water warnings as well as the international "Do Not Drink" symbol.
- f. Heat brand all box lids with the appropriate two-inch high identification letters and/or numbers.
- g. All valve boxes shall receive landscape fabric. Landscape fabric shall be constructed of 5.0 oz. weight proven polypropylene weed barrier with burst strength of 225 P.S.I. and capable of 12 gallons per minute of water flow and puncture strength of 60 lbs. Dewitt Pro, Mirify or approved equal.
- h. All valve boxes shall receive 2 cubic feet of 3/4-inch gravel per plan.

Manufactures: Carson, Brooks, or approved equal.

19. General Piping

- a. Pressure line from point of connection to backflow prevention device shall be brass or Type K copper
- b. Pressure lines 2" and smaller after backflow prevention device shall be Schedule 40 solvent weld PVC
- c. Pressure lines 2-1/2 inch to 3 inch after backflow prevention device shall be Class 315 solvent-weld P.V.C.
- d. Pressure lines 1-1/2 inch and smaller after backflow prevention device shall be Schedule 40 solvent-weld P.V.C.
- e. Pressure lines 4 inch and larger after backflow device shall be Class 200 bell and gasket P.V.C.
- f. Lateral lines 1-1/2 inch and smaller shall be Schedule 40 solvent-weld P.V.C.
- g. Lateral lines 2 inch and larger shall be Class 315 solvent-weld P.V.C.
- h. All pipe and fittings shall bear the markings of the Manufacturer's name, nominal pipe size, pressure rating P.S.I., NSF, schedule or class and date of extrusion.

20. Plastic Pipe

- a. Solvent weld pipe shall conform to ASTM D 1784 or D 2241 to meet the requirements of cell classification 12454B for pipe. Pipe shall be extruded of an improved P.V.C. virgin pipe compound high impact strength. Compound shall have a hydrostatic design stress rating of 2,000 P.S.I. Manufactures: Pacific Plastics or approved equal.
- b. Rubber gasket P.V.C. pipe shall conform to ASTM D-1784 Type I, Grade I 2,000 P.S.I. design stress. All pipes shall conform to commercial standards CS-256-64 and NSF testing laboratories. Rubber gaskets shall conform to ASTM-1869.

Manufacturers: Pacific Plastics or approved equal.

- c. Reclaimed water pipe shall conform to ASTM D1784 or D 2241 to meet the requirements of cell classification 12454B for pipe. Pipe shall be extruded of an approved P.V.C. virgin pipe compound high strength. Compound shall have a hydrostatic design street rating of 2,000 P.S.I. Reclaimed water pipe shall be purple in color and bare the words "CAUTION - RECLAIMED WATER" printed in black letters on two sides of all pipes.

Manufacturers: Pacific Plastics or approved equal.

- d. Ultra Violet Resistant (U.V.R.) pipe shall conform to ASTM D 1784 or D 2241 to meet the requirements of cell classification 12454B for pipe. Pipe shall be extruded of an approved P.V.C. virgin pipe compound high strength. Compound shall have a hydrostatic design street rating of 2,000 P.S.I. U.V.R. pipe shall be manufactured using material proven to resist corrosion by ultra-violet radiation. Pipe shall be brown in color.

Manufacturers: Pacific Plastics or approved equal.

21. Fittings

- a. All pressure line fittings 3 inch and smaller shall be Schedule 80 solvent weld P.V.C. Fabricated pipe shall be from an NSF approved Type I, Grade I, P.V.C. compound conforming to ASTM D1784

Manufacturers: Dura, Lasco or approved equal.

- b. All pressure line fittings 4 inch and larger shall be iron ductile deep bell type constructed of grade 65-45-12 and shall be in accordance with ASTM A536. Rubber for gaskets in fittings shall be in accordance with ASTM-477. All iron ductile fittings shall have stainless steel exterior lugs to secure a joint restraint system.

Manufacturers: Leemco or approved equal.

- c. All lateral line fittings downstream control valve shall be Schedule 40 solvent weld P.V.C. Fabricated pipe shall be from an NSF approved Type I, Grade I, P.V.C. compound to ATTM D1784

Manufacturers: Dura, Lasco or approved equal.

- d. Provide primer and solvent cement for PVC solvent weld pipe and fittings of specified type by manufactures recommendations.

Manufacturer: Weld-on or approved equal.

- e. All fittings shall have the manufacture's name, trademark and size applicable NSF or IPS approval.
- f. All threaded fittings shall have ¼ inch teflon tape.

22. Brass Pipe and Fittings

- a. Brass pipe shall be in accordance with American National Standard Institute and be 85 percent Schedule 40 red brass.
- b. Brass fittings shall be threaded 125-pound class.

23. Galvanized Steel Pipe and Fittings

- a. Galvanized steel pipe shall be Schedule 40 hot dipped galvanized.
- b. Galvanized fittings shall be Schedule 40 hot dipped galvanized.

24. Irrigation Heads (General)

- a. All irrigation heads shall be the size, type, and provide the same rate of precipitation with the same radius of spray, pressure and discharge in G.P.M. as listed on drawings
- b. All spray head sprinklers shall have stainless steel screw adjustment for radius of spray.
- c. Riser and swing joint assemblies shall be as indicated on drawings.
- d. All irrigation heads shall have a factory installed check valve or have an after market check valve installed.
- e. All other requirements for non-pressure lateral line pipe to be as specified in fitting specification section.
- f. In no case shall the irrigation head spacing exceed the maximum manufacturer's recommendation.
- g. Irrigation heads along walks, curbs, paving, etc. shall be positioned 1 inch above finish grade. Irrigation in turf areas shall be positioned 2 inches above finish grade.
- h. All sprinkler heads shall be set perpendicular to finish grades.
- i. All sprinklers in turf areas shall have a minimum pop-up height of six (6) inches.
- j. All sprinklers in planter/slope areas shall have a minimum pop-up height of twelve (12) inches.

25. Bubblers

- a. Bubblers shall be constructed of heavy duty plastic and be pressure compensation full circle. The bubbler shall have a screen to protect it from clogging.
- b. Bubblers shall be adjustable from .25 - 1.0 GPM and operate between 20-90 PSI.

Manufacturer: Rainbird 1400 Series or approved equal.

26. Sprinkler Heads

- a. The sprinkler body, nozzle, stem and screen shall be molded out of heavy duty plastic.
- b. Pop-up height shall be as listed in drawings and in no case shorter than 4 inches.
- c. The sprinkler shall have an adjustment screw used for regulating flow and radius with matched precipitation rate (MPR) nozzle.
- d. The sprinkler shall have a removable screen to protect it from clogging.
- e. The sprinkler shall have a stainless steel spring for proper pop down.
- f. The sprinkler shall be equipped with a factory installed check valve identified on the cap and capable of holding water up to 10 feet of elevation change.
- g. The sprinkler shall be equipped with a factory installed pressure-regulating device constructed of stainless steel and heavy-duty plastic capable of maintaining a pressure of 35-70 P.S.I. to 30 P.S.I. for operation of the sprinkler.

Manufacturers: Hunter INST-CV. or approved equal.

27. Rotor Heads (Medium Range)

- a. All pop-up rotors shall have a rubber cover and be constructed of heavy duty plastic except for wiper seal, bearing spring and bearing washers. All rotors to have a reinforced rib design with flange encasement.
- b. Pop-up height shall be as listed in drawings and in no case be shorted than 3-1/2 inches.
- c. The rotor shall have a diffuser pin for regulating flow and radius.
- d. The rotor shall have a screen to protect it from clogging and have a minimum inlet of 3/4 inch.
- e. The rotor shall be capable of covering 16-55 feet radius at 20-60 PSI with a rate of .5 - 9.2 GPM. and be adjustable from 1-360 degrees.

Manufacturers: Hunter I-10, Hunter I-20, Rainbird 5000 Plus series or approved equal.

28. Rotor Heads (Large Range)

- a. All pop-up rotors shall have a rubber cover and be constructed of heavy duty plastic except for wiper seal, bearing spring and bearing washers. The riser shall be constructed of plastic encased in a stainless steel sleeve. All rotors to have a reinforced rib design with flange encasement.
- b. Pop-up height shall be as listed in drawings and in no case be shorted than 3-1/2 inches.
- c. The rotor shall have a diffuser pin for regulating flow and radius.
- d. The rotor shall have a screen to protect it from clogging and have a minimum inlet of 1 inch.

- e. The rotor shall be capable of covering 16-55 feet radius at 40-74 PSI with a rate of 3.8 - 27.5 GPM. and be adjustable from 1-360 degrees.

Manufacturers: Hunter I-25, Hunter I-40 Rainbird 7005 or approved equal.

29. Trenching and Backfilling

- a. Contractor must contact Dig Alert prior to any trenching.
- b. No trenches are to be backfilled until approval from Owner's representative has been acquired.
- c. Excavate trenches straight and support pipe continuously on the bottom of trench per layout indicated on drawings.
- d. All lines shall have a minimum clearance of 4 inches from each other and 24 inches from any other lines from other trades.
- e. Provide the minimum covers as listed below:
 - i. Pressure lines 4 inch and larger 30 inches
 - ii. Pressure lines 3 inch and larger: 24 inches
 - iii. Pressure lines 2-1/2 inches and smaller: 24 inches
 - iv. Lateral lines 18 inches
 - v. Control wiring 24 inches
- f. Fine granular soil not larger than 1/2 inch shall be for initial backfill and compacted to a density equal to undisturbed soil. Clean backfill soil not greater than 1 inch for remaining backfill.
- g. No flooding shall be performed to compact trenches unless approved by the Owner's representative.
- h. Sand backfill to a minimum of 3 inches shall be applied to all piping under paved areas.
- i. If any settlements occur and irrigation adjustments are required the contractor shall make these adjustments with no additional cost to the Owner.
- j. Contractor shall install concrete thrust blocks for all pressure lines 2 inch and larger. Thrust blocks shall be a minimum size of one cubic foot. For bell and gasket pipe a joint restraint system shall be used instead of thrust blocks per manufacture's specifications.

30. Flushing the System

- a. Open control valve after all piping and required assemblies have been completed to flush out the system.
- b. Irrigation heads are to be installed after completion of flushing the system satisfactory to the Owner's representative.

31. Adjusting the System

- a. The contractor shall flush and adjust all irrigation heads, control valves, pressure regulators, etc. for optimum performance.
- b. All heads must be adjusted to prevent over spray to buildings, walks, streets etc.

32. Sleeving

- a. All sleeving shall be 2 times the diameter of the pipe used. Sleeving for control wires shall be 2 inches in diameter minimum.
- b. All sleeving shall have minimum a cover of 24 inches under paving.
- c. All sleeving shall extend 12" past paving.
- d. All street sleeving must be installed per sleeving detail
- e. All trenches for sleeving must be compacted to 95% compaction using manual or mechanical taping device.
- f. Contractor shall cap and pressure test all pressure lines under paving prior to backfilling and paving.
- g. Contractor shall be responsible for the installation of all sleeves required for the irrigation system not listed in the drawings.

33. Layout

- a. Contractor shall layout irrigation mainline, valves, and sprinklers etc. for approval from the Owner's representative.

34. Additional Miscellaneous Items

- a. All pipe above grade are to be stabilized with j-hooks at every 10 feet. J-hooks shall be #4 x 18 inch rebar painted with black epoxy paint prior to installation.
- e. All assemblies requiring rebar stabilizing rods per plan and details shall be with #4 x 30 inch rebar and supported by vandal proof clamps constructed of stainless steel installed with a tool specifically designed for the process.
- c. Contractor shall install metallic warning tape over all pressure supply line with a cover of 12 inches from grade. Warning tape for potable water shall be blue in color and the words, "CAUTION WATER LINE" permanently attached to tape. Warning tape for reclaimed water shall be lavender in color and the words, "CAUTION RECLAIMED WATER" permanently attached to tape. Warning tape shall be 3" wide minimum.
- d. Contractor shall provide identification tags with the number labeled for each valve attached the each valve. For potable water the tags shall be yellow in color with black lettering. For reclaimed water the tags shall be lavender in color with black lettering.

- e. All utilities, valve boxes, valves, sprinklers, quick couplers, etc. shall either have lavender caps or lavender colored parts as provided by the manufacturer for use a reclaimed water.

35. Water Supply

- a. The Irrigation system shall be connected to water supply as shown on drawings. Contractor shall notify Architect immediately of any discrepancies.
- b. The Contractor shall be responsible for any minor changes due to actual site conditions.

36. Electrical Supply

- a. Contractor to coordinate final location of controller with job site Superintendent and Owner's representative.
- b. Prior to installation of controller contractor to verify that all required electrical equipment is accessible for complete installation.
- c. Electrical connections and equipment must be as listed in controller installation section and per manufacturer's specifications.

37. Grades

- a. Prior to commencing any work the contractor shall carefully check all grades and verify that after all irrigation work and soil preparation completed, all grades will be per specified depth as per the landscape contractor's scope of work with a +/- 1/10.

38. Maintenance

- a. Contractor shall have irrigation system under complete operation for a period of 7 days prior to and planting or hydro-seeding.
- b. Contractor shall maintain entire irrigation system to an acceptable condition to the Owner's representative for the period of 90 days unless otherwise noted.

40. Clean-Up

- a. Clean up shall take place on a daily basis, after each portion of work has been completed and as directed by the Owner's representative. The contractor shall legally remove from site any trash or material from his scope of work.

41. Final Approval

- a. All irrigation shall be tested in its entirety by the Owner's representative and approved in writing before commencement of planting and hydro-seeding except for trees as directed by the Owner's representative.
- b. Contractor shall provide all charts, record drawings, turn over items etc. as listed in Irrigation (general) section prior to final approval.

- END OF SECTION -

SECTION 02800

PLANTING

PLANTING SPECIFICATIONS

GENERAL

1. General Requirements

- a. Permits: Contractor shall obtain and pay for any permits required.
- b. All irrigation shall be completed, approved and under automatic irrigation in order for the weed-abatement process to commence.
- c. No planting shall commence until the weed-abatement process has been completed.
- d. The current Standard Landscape Specifications & Design Guidelines booklet must be on site at all times for each project.
- e. No planting can occur until permanent electric and power is provided.

2. Scope of Work

- a. The intent of the drawings and specifications is to indicate the processes required for the installation of complete planting

3. Inspections

- a. Request for inspections must have 48 hour notice in advance.
- b. Contractor must be on site for all inspections.
- c. Any work not completed when inspector arrives which was requested for, shall be billed to the contractor at the current inspector's rate
- d. Any work completed without inspection or approval shall be removed, exposed or replaced at the cost of the contractor.
- e. Contractor shall call for inspection for the following items:
 - i. Final grading
 - ii. Weed-abatement Observation
 - iii. Tree and shrub layout
 - iv. Tree and shrub planting pits
 - v. Finish grade prior to hydro-seeding
 - vi. Final Inspection

4. Submittals

- a. All submittals shall be submitted at the time of the pre-job conference

- b. Contract shall submit the follow items but not limited to:
 - i. Plant material proof of purchase with listed nurseries and material sizes for approval
 - ii. All soil amendments
 - iii. Bark mulch
 - iv. Soil report
 - v. Labels for all herbicide and fertilizers used
 - vi. Hydro-seed mix

PLANTING SPECIFICATIONS MATERIALS

- 1. **Plant Material**
 - a. All plant material shall be the same as specified in the drawings.
 - b. Contractor shall tag one plant from each bundle or lot with the plant name in accordance with the recommendations of the American Association of Nurserymen.
 - c. All plant material shall be free of pest, plant diseases abrasions or any other object-able disfigurations.
 - d. Plant material must show vigorous habit of growth that is normal for that particular species.

- 2. **Tree Stakes/Guying**
 - a. Tree stakes shall be copper maphthanate, green color impregnated lodge pole.
 - b. Tree stake shall be 2" in diameter 10 feet long.
 - c. Tree stake for larger trees or windy areas shall be 3" diameter.
 - d. Tree ties shall be V.I.T. cinch ties or approved equal (four per tree).
 - e. Tree ties shall be attached to lodge poles with galvanized nails per detail.
 - f. Contractor shall install 3" diameter stakes for all trees where high winds occur as directed by DRPD representative.
 - g. All trees 36" box and larger shall have three guys with 1/2" PVC pipe to protect wire.
 - h. 3" lodge poles may be used for 36" box trees and larger in high traffic areas or in small tree wells with the approval of DRPD representative.

3. **Vine Ties**
 - a. Vine ties shall be as specified in details.

4. **Herbicides**
 - a. Contractor shall submit labels of all herbicides used prior to application for approval.
 - b. Contractor shall apply pre-emergent herbicide to all areas possible as recommended by a licensed pest control consultant.

5. **Concrete Mow Curb**
 - a. Concrete mow curb shall be 2500 PSI concrete and as specified in detail.
 - b. All mowcurb shall be 6" x 6" with #3 continuous rebar.

6. **Plastic Bend-A-Board Header**
 - a. Plastic header shall be manufactured by Epic Plastics unless otherwise approved in writing by DRPD.
 - b. All borders between turf and planters shall be concrete mowcurb unless otherwise approved in writing by DRPD. When mowcurb has been approved to be substituted, a plastic header must be used.
 - c. Plastic headers must be 2" x 6" minimum size unless header must concave or convex more than 12" in height per 36" run.
 - d. Plastic headers may also be used for long temporary project limits in lieu of concrete mowcurbs when approved in writing by DRPD.

7. **Plant Tablets**
 - a. Planting tablets shall be Agriform, Gro-Power or approved equal as specified in plans and details.
 - b. The NPK and specific application rates must be determined per project and per the soil report.

8. **Soil Conditioners**
 - a. All soil conditioner material shall be approved prior to ordering under this section.
 - e. Soil conditioners shall be based on soil report recommendations.

- f. Soil conditioners shall be EPA class 'A' co-compost or compost with SAR less than 3.0 and CN ratio of 15 to 25:1 passing through 1/2" mesh screen as approved by DRPD representative prior to delivery of material.

PLANTING SPECIFICATIONS

EXECUTION

1. Installation

- a. Contractor shall clean, remove and legally dispose of all weeds, grasses including roots and construction debris under this section.
- b. Contractor shall be responsible for the protection and storage of all material for the project.
- c. All grades shall be as indicated on the drawings and must be +/-10%.

2. Landscape Grading

- a. The contractor shall complete grading and filling as needed or remove additional dirt, rock and debris over 3/4 inch in diameter within the top 3 inches in all turf and planter areas less than 3:1.
- b. Contractor shall bring all landscaped areas to finish grade.
- c. Flow lines shall be established to existing curbs and/or sidewalks.
- d. All landscape areas shall be sloped to provide positive drainage.

3. Soil Preparation

- a. Contractor shall rotor-till amendments into all turf and planter areas 3:1 or less throughout the first 6 inches.
- b. Contractor shall rake soil conditioner lightly into all 2:1 slopes areas.
- c. The following application rate is for bidding purposes only and is per 1000 square feet of planting area.
 - i. 4 cubic yards of soil conditioner
 - ii. 30 lbs. of commercial fertilizer approved by the Owner's representative
 - iii. 50 lbs. of agriculture grade gypsum
 - iv. 25 lbs. soil sulfur
- g. Actual soil preparation shall be based on the soil report.

- f. Soil samples shall be taken in the presence of the Owner's representative.
- g. Contractor shall submit soil samples to an approved laboratory testing facility.
- h. Contractor shall provide one soil report for every 50,000 square feet.
- i. Soil recommendations must be separated for turf, planter, slope and plant material backfill mix.

4. **Weed-abatement**

- a. Weed-abatement shall not commence until complete irrigation system is under complete automatic irrigation and has been approved.
- b. Upon completion of soil preparation the contractor shall complete the following:
 - i. Irrigate all areas to be planted, sodded or seeded for a period of seven days to germinate all weed seeds.
 - ii. Cut watering and apply approved weed killer per manufacturer's recommendations and allow adequate time to complete kill.
 - iii. Repeat step one and two.
 - iv. Obtain approval of completed weed-abatement prior to any planting. Trees may be planted prior to weed-abatement process with the approval of the Owner's representative in writing.

5. **Layout**

- a. Contractor shall layout all trees and shrubs for approval from the Owner's representative prior to excavation of any planting pits.
- d. Contractor shall not willfully layout any planting material where obstructions exist. The contractor shall notify the engineer to obtain direction.
- e. Contractor shall adjust tree locations around all street lights as directed by DRPD representative.

6. **Planting**

- a. Planting shall be as shown in detail and as follows:
 - i. Excavate all planting pits to a diameter twice the size of container to be planted and 1 1/2 times the depth of container to be planted.
 - ii. Contractor shall scarify the side of planting pits if an auger is used with shovel or digging bar.
 - iii. Plant material shall be placed in planting pit in a manner as not to disrupt the root ball and the crown shall be set 1" above grade.
 - iv. Provide 21gram fertilizer tablets per detail.

- v. Backfill all plant material with approved backfill mix.
- vi. Contractor shall provide 5 gram fertilizer tablets to all rooted cuttings.

7. **Percolation Test**

- a. Contractor shall flood planting pits with water to test water penetration through the soil, if no penetration occurs the contractor shall auger 6 inches in diameter and 36 inches long and backfill with pea gravel, repeat water test and if water still does not penetrate the contractor shall notify the Owner's representative prior to planting.

8. **Sodded Turf**

- a. All sodded areas shall be semi dwarf fescue unless otherwise noted.
- b. Contractor shall evenly rake all sodded areas to level and remove all rocks 3/4 inch in diameter and larger.
- c. Contractor shall spread 16-20-0 commercial fertilizer to all sodded areas.
- d. Contractor shall lay sod immediately upon arrival.
- e. Sod must be laid along a straight line staggering each row like laying bricks and must be butted tightly together preventing any air pockets. Do not overlap edges.
- f. Sod shall be cut with a sharp knife and never pulled apart.
- g. Sod shall be rolled immediately after sod is installed.
- h. Sod must be watered thoroughly to a depth of 12 inches.
- i. Contractor shall monitor watering to prevent browning and fungus.
- j. Contractor shall take every measure possible to protect sod by providing temporary fencing if necessary at no additional cost.

9. **Hydro-seeding**

- a. Turf hydro-seed mix shall be "Team Crest available from Creative Hydroseed (951) 461-9745
- b. Contractor shall evenly rake all areas to receive turf to level and remove all rocks 3/4 inch in diameter and larger.
- c. Hydro-seed mixes shall be as follows:

FESTUCA RUBRA

440 #S/PER AC.
2000

CREEPING RED FESCUE
WOOD FIBER MULCH

300 15-15-15 FERTILIZER
120 M-BINDER

BASIN BOTTOMS

174#S/PER AC. HYBRID BERMUDA
261#S PERENNIAL RYE
2000 WOOD FIBER MULCH
120 M-BINDER

PARK/PARKWAY TURF

653#S/PER AC. TEAM FESCUE 90% CREST BLUEGRASS 10%
2000 WOOD FIBER MULCH
300 15-15-15 FERTILIZER

- d. Additional hydro-seed mixes may be specified for detention basin bottom based on project specific layouts and sizes as approved by
- e. Contractor shall monitor watering to prevent browning and fungus.
- f. Contractor shall take every measure possible to protect seed by providing temporary fencing if necessary at no additional cost.
- g. Hydro-mulch^f slurry shall be applied under high pressure evenly and provide a uniform coat on all areas specified.
- h. Over spray shall be removed immediately from sidewalks, walls or any structures.
- i. Contractor shall provide 98 percent germination to all hydro-seeded areas prior to turn-over.
- j. Hydro-seeding can not commence until all irrigation, soil preparation and final finish grade has been accepted.

10. Root Barriers

- a. Root barrier shall be "Deep Root" control barrier panels # UB 24-2 or approved equal. No cylinder root barriers shall be approved.
- b. Root barrier shall be "Bio Barrier" for all trees within 8 feet of and street curbs within the County right of way.
- c. Root barriers shall be installed for all trees planted within 8 feet of any walls, sidewalks, building structure or other hard surface.
- d. Contractor shall install root barriers per detail.

11. Jute Netting

- a. Jute netting shall be uniform plain weave mesh. Geo-jute or approved equal. The mesh shall be brown in color.

- b. Jute shall be 48 inches wide with a weight of .97 pounds per linear yard.
- c. All slopes adjacent sidewalks are subject to jute netting as directed by DRPD representative.

12. Grades

- a. Prior to commencing any work the contractor shall carefully check all grades and verify that after all irrigation work and soil preparation completed, all grades will be per specified depth as per the landscape contractor's scope of work with a +/- 1/10.

13. Guarantee

- a. All trees and shrubs shall guaranteed for a period of one year.
- b. All plant material that is dead or dying or as directed by the engineer within the guarantee period shall be replaced at the cost of the contractor with 7 days of written notice.
- c. All replacement plant material shall be exact as specified in species and size. No substitutions shall be allowed unless written approval is obtained.
- d. Guarantee period shall start on the date of the project letter of acceptance.

- END OF SECTION -

SECTION 02900

MAINTENANCE SPECIFICATIONS

GENERAL

1. Maintenance Duration

- a. Contractor shall maintain entire project within the contractor's scope of work until approval to enter into maintenance period has been obtained in writing. After approval the contractor shall enter into the 90 calendar day maintenance period and call for the following inspections:
 - i. 30 Day Maintenance Walk
 - ii. 60 Day Maintenance Walk
 - iii. 90 Day Maintenance Walk/Final Inspection
- b. Contractor shall continuously maintain the entire project until all correction items have been completed and approved in writing.

2. Turf Maintenance

- a. Contractor shall mow weekly or as needed, all turf areas to a height between $\frac{3}{4}$ " and 2 $\frac{1}{2}$ " depending on variety of turf.
- b. Contractor shall edge all turf areas adjacent sidewalks, walls, or other applicable structures and trees bi-weekly or as needed.
- c. All clippings must be removed from sidewalks and adjacent areas.
- d. Contractor shall remove all excess clipping from turf areas.
- e. Contractor shall monitor watering to all turf areas and provide sufficient moisture levels as required to achieve a lush appearance.

3. Tree and Shrub Maintenance

- a. Contractor shall remove any dead growth on all trees and shrubs as needed.
- b. Lower branches of all trees under twelve feet shall be pruned using best horticultural practices and as directed by DRPD representative.
- c. No topping of any tree is allowed unless directed by DRPD representative.
- d. Pruning of trees above twelve feet will be considered additional work.
- e. Contractor shall remove tree stakes when stakes are no longer needed.

4. Groundcover

- a. Contractor shall edge all groundcover areas as required to maintain a neat lush thriving appearance and shall edge no less that once per month.
- b. Contractor shall edge groundcover around shrub and tree basins as required.
- c. Contractor shall trim all groundcover over 24" in height.

5. Weed Control

- a. Contractor shall eradicate all weeds from all turf, planter and slope areas by means of manual or chemical abatement.
- b. Contractor must have a valid pest control license.
- c. Contractor shall apply pre-emergent herbicide where possible to prevent weeds as directed by a licensed pest control consultant.
- d. Any undesirable plant $\frac{3}{4}$ " or larger shall be considered a weed.
- e. Contractor shall maintain all sidewalks clean and weed free.

6. Rodent Control

- a. Contractor shall be responsible for maintaining a rodent free project.
- b. All measures to eradicate rodents must be as directed by a licensed pest control consultant.
- c. Contractor shall repair/replace all damaged caused by rodents under this section.

7. Fertilization

- a. Contractor shall fertilize turf, slope and planter areas every 30 calendar days with approved fertilizer at the manufacture's recommended application rate.
- b. Approved fertilizers are 15-15-15, 16-6-8 and 21-7-14

8. Irrigation

- a. Contractor shall be responsible for complete irrigation adjustments to achieve proper moisture levels throughout all projects for all seasons as required to promote healthy, thriving plant material, ground cover and turf while taking every possible measure to conserve water.
- b. Contractor shall be responsible for repairing all nozzles, sprinkler heads, lateral lines, mainlines, valves and/or other required assemblies throughout the project.
- c. Contractor shall ensure that all irrigation heads are adjusted properly to alleviate over spray wherever possible.
- d. Contractor shall test irrigation system a minimum of once per week or as required.

- e. Provide backflow certification prior to turn-over.
- f. Repair and/or replace and damaged backflow devices, water meters, electric pedestals and/or irrigation controllers.

9. **Maintenance General**

- a. Edge groundcover as needed to maintain no growth over sidewalks, around tree and shrub basins or up walls or fences.
- b. Remove all trash weekly
- c. Test complete irrigation system biweekly.

10. **Clean-Up**

- a. Clean up shall take place on a daily basis, after each portion of work has been completed and as directed by DRPD representative.
- b. The contractor shall legally remove from site any green waste, trash or other debris.

11. **Graffiti**

- a. Removal of any and all graffiti shall be completed within 48 hours of notification.
- b. Contractor shall be responsible until project has been completed and has received the letter of completion.

12. **Vandalism**

- a. Contractor shall be responsible for all vandalism to the project until project has been completed, and approved in writing.

13. **Final Approval**

- a. All landscaped areas shall be inspected in its entirety by DRPD representative upon the completion of the 90 calendar day maintenance period.
- b. Contractor shall provide all charts, record drawings, turn over items etc. prior to final turn over.
- c. The contractor shall be responsible for the entire project until final acceptance has been provided in writing by DRPD.

- END OF SECTION -

D.R.P.D. Inspection List

Call () for all inspections

1. Irrigation Inspections:

- a. Site inspections and notification time.
 - i. Pre-construction conference 7 days
 - ii. Pressure line installation and testing 48 hours
 - iii. Controller installation 48 hours
 - iv. Lateral line and sprinkler installation 48 hours
 - v. Coverage test 48 hours
 - vi. Final Inspection 7 days
- b. No field inspections will commence unless record drawings are current and available for observation upon request by the Owner's representative.

2. Planting Inspections:

- a. Request for inspections must have 48 hour notice in advance.
- b. Contractor must be on site for all inspections.
- c. Any work not completed when inspector arrives which was requested for, shall be billed to the contractor at the current inspector's rate
- d. Any work completed without inspection or approval shall be removed, exposed or replaced at the cost of the contractor.
- e. Contractor shall call for inspection for the following items:
 - i. Final grading
 - ii. Weed-abatement Observation
 - iii. Tree and shrub layout
 - iv. Tree and shrub planting pits
 - v. Finish grade prior to hydro-seeding
 - vi. Final Inspection

3. Submittals:

- a. All submittals shall be submitted within 15 days after receipt of executed contract.
- b. Contract shall submit the follow items but not limited to:
 - i. Plant material proof of purchase with listed nurseries and material sizes for approval
 - ii. All soil amendments
 - iii. Bark mulch
 - iv. Soil report
 - v. Labels for all herbicide and fertilizers used
 - vi. Hydro-seed mix

Durham Recreation & Park District Landscape Inspection Card

Call () for 48 hr notice for inspection

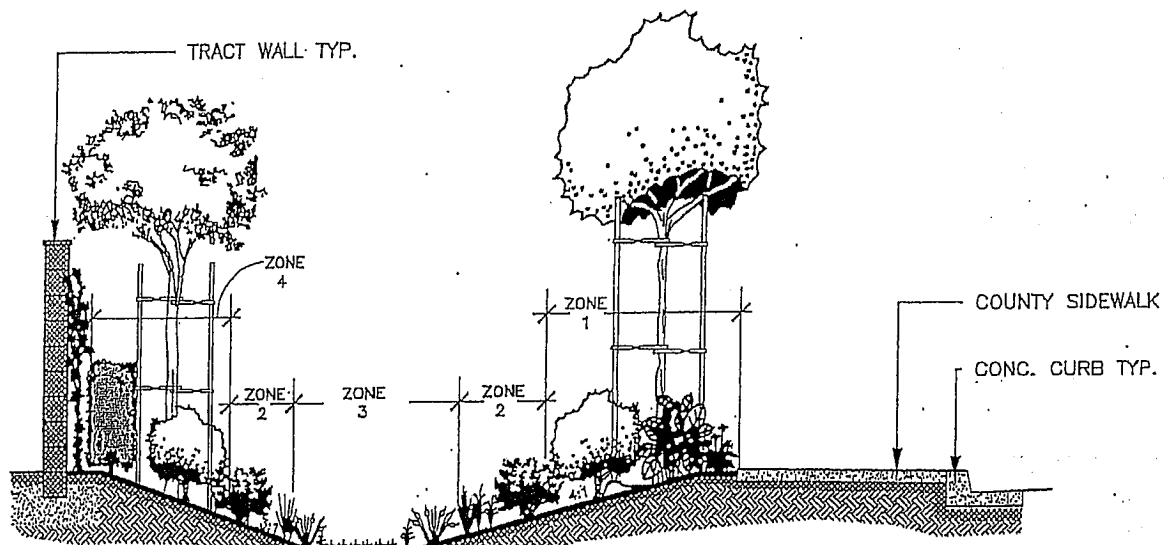
Provide tract number and project name when calling for inspection. Approved plans must be on job at time of inspection.

Project Name _____ Tract # _____ Start Date _____ Developer _____

Inspection	Re-inspection If needed	Approval Date	Approved by Inspector
Pre-job conference			
Verify approved plans	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify submittals	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Coordinate inspection proc.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Sleeving			
Verify sleeving depth, type & size	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify sleeving separation, bedding	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Mainline			
Mainline depth, type & size	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Mainline connections	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Hydrostatic Test (150 psi for 3 hrs)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Wiring for size, depth, color (min 14 ga)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Backflow Preventer			
Verify backflow Cert.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify type, size & location	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify thrust blocks, cage, & pad	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Booster Pump			
Location/enclosure, Install	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Installation/power connect.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Booster pump certification	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Irrigation (Open Trench)			
Verify lateral line depth, Size, & type	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify head type, spacing	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify swing joint assembly	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify RCV for type & size	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Irrigation (General)			
Verify box supports, gravel, markings	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify valve I.D. tags	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify wire connections	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
UVR or Sch 80 above ground	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify pipe & head staking	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify reclaimed I.D. tags	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Controller type/stations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Location/enclosure installation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Installation/power connection	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify current as-builts	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Controller Certification	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Coverage Test (100% coverage)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		

Inspection	Re-inspection If needed	Approval Date	Approved by Inspector
Planting Installation			
Weed eradication program	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Verify Soil Amendments/prep	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify plant species/size/quantities/location	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify tree pit depth	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify root barriers where specified	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify tree staking/installation/ties	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Finish Grade (prior to hydroseed)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Turf Installation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Verify Hydroseed species mix/installation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Hydroseed (100% germination)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Ground cover (95% coverage)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Hardscape/Site Amenities			
Site furnishings	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Play equipment	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Fencing, type/height/material	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Walks/curbs/layout	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Signage where required	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Play equipment certification	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Maintenance			
Compliance to begin maintenance	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Turn over controller charts, as-builts	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
30 day maintenance walk	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
60 day maintenance walk	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Final maintenance walk	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Final Acceptance			
Materials to be turned over per specifications	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____	_____
Walk-through inspection with contractor/owner	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Landscape Architect/inspector	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Letter of completion from Landscape Architect	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Cut sheets/guarantees/warranties	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Other requested/required inspections			

No work shall be covered without inspection



FILTER FABRIC PER
CALTRANS STD B8-1.03

GRAVEL LAYER CALTRANS 25MM
COARSE AGGREGATE PER 90-3.02

BIO-SWALE PER RCFC&WCD DRAWINGS
WITH A 5% MAX AND 0.5% MIN.
LONGITUDINAL SLOPE

2/3 CALTRANS FINE AGGREGATE (SAND) PER 90-3.03
1/3 PEAT OR WELL ROTTED COMPOST MIX

6" DIA. PERFORATED PIPES UNDER DRAIN CONNECTED TO
OUTLET DRAIN. ADDITIONAL PIPES REQ'D. WHEN WIDTH
EXCEEDS 6 FT. CLEAN-OUT WYES REQ'D. AT UP AND DOWN
STREAM ENDS AND AT 50 FT. MAX. SPACING

NOTES:

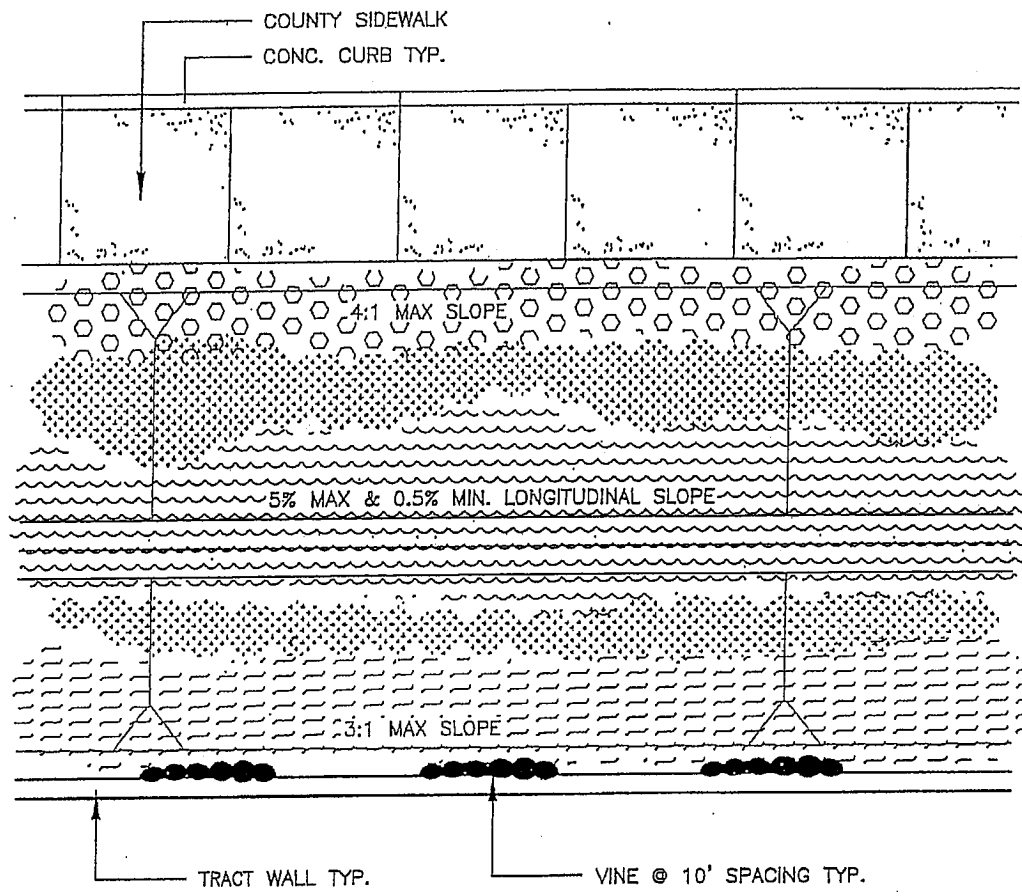
1. REFER TO DRPD PLAN ZONE PLANT PALLETTE FOR RECOMMENDED PLANT SPECIES.
2. ALL TREES MUST BE LOCATED AT LEAST 36" OUTSIDE OF TOE OF BIO-SWALE.
3. ALL PLANT MATERIAL SHALL COMPLY WITH THE MSHCP PLANT LIST OF AVOIDABLE INVASIVE SPECIES.
4. ALL BIO-SWALES SHALL BE IRRIGATED WITH POINT-TO-POINT LOW VOLUME IRRIGATION PER BIO-SWALE. IRRIGATION DETAIL. NO OVER-HEAD CONVENTIONAL SPRAY IRRIGATION WILL BE ALLOWED.
5. PLANTING SHALL NOT OCCUR WHEN MOISTURE LEVELS EXCEED NORMAL PLANTING CONDITIONS. AND INTERIM DRAIN LINE CAN BE INSTALLED TO REMOVE EXCESSIVE WATER CONTENT IF NEEDED DURING THE FIRST PLANTING SEASON ONLY. ALL MEANS OF WATER REMOVAL MUST COMPLY THE GOVERNING WATER BOARD REGULATIONS.
6. ALL BIO-SWALE GRADES AND DRAINAGE MUST BE APPROVED IN WRITING BY DURHAM RECREATION AND PARK DISTRICT PRIOR TO ANY IRRIGATION OR PLANTING.
7. DUE TO THE DENSITY OF PLANTING AND WATER FLOW, ZONES 2 AND 3 WILL NOT REQUIRE BARK MULCH. 4" DEEP BARK MULCH WILL BE REQUIRED FOR ALL OTHER ZONES.
8. STORM WATER SHALL NOT BE DIRECTED TO SWALE UNTIL ALL UPSTREAM AREA HAS BEEN COMPLETELY STABILIZED FOR EROSION AND SILTATION CONTROL AND VEGETATION HAS BEEN ESTABLISHED. IF A BIOFILTRATION SWALE IS PUT INTO OPERATION BEFORE ALL CONSTRUCTION IN THE DRAINAGE AREA OF THE SWALE IS COMPLETE, THE SWALE MUST BE CLEANED OF SEDIMENT PRIOR TO ACCEPTANCE. FINANCIAL GUARANTEES WILL NOT BE RELEASED IF SWALES ARE NOT RESTORED AND VIGOROUS PLANT GROWTH IS ESTABLISHED.



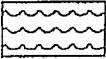
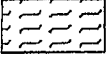
PARKWAY PLANTING SECTION VIEW

Durham Recreation & Park District

TYPICAL BIO-SWALE
N.T.S. 4-24-08

BIOS-01.DWG



- 
 ZONE 1 STANDARD PERENNIAL FLOWERS & SHRUBS
PER STD. PLANT PALLETTE
- 
 ZONE 2 SEE BIO-SWALE ZONE 2 PLANT PALETTE
24" - 36" TYPICAL PLANT SPACING
- 
 ZONE 3 SEE BIO-SWALE ZONE 3 PLANT PALLETTE
12" - 24" TYPICAL PLANT SPACING
- 
 ZONE 4 STANDARD ORNAMENTAL SHRUBS, SCREEN HEDGES & VINES
PER DRPD STD. PLANT PALLETTE

PARKWAY PLANTING PLAN VIEW

Durham Recreation & Park District

TYPICAL BIO-SWALE
N.T.S. 4-24-06

BIOS-02.DWG

ZONE 2 PLANT PALETTE

BOTANICAL NAME	COMMON NAME	HEIGHT	WIDTH
ALOPECURUS PRATENSIS	YELLOW FOXTAIL GRASS	12"	18"
CALAMAGROSTIS ACUTIFLORA	FEATHER REED GRASS	30"	36"
CAREX BUCHANANII	LEATHER LEAK SEDGE	36"	30"
CAREX CONICA	SNOWLINE SEDGE	12"	24"
CAREX FLACCA	BLUE SEDGE	24"	24"
CAREX FLAGALLIFERA	NEW ZEALAND SEDGE	30"	30"
CAREX MARROWII EXPALLIDA	VARIEGATA JAPANESE SEDGE	12"	18"
CAREX TESTACEA	NEW ZEALAND SEDGE	24"	60"
DESCHAMPSIA CESPITOSA	TUFTED HAIR GRASS	18"	24"
DESCHAMPSIA FLEXUOSA	CRINKLED HAIR GRASS	12"	24"
ELYMUS MAGELLANICUS	MAGELLAN WHEATGRASS	18"	18"
FESTUCA IDAHOENSIS	FESCUE	12"	12"
HELICOTRICHON SEMPERVIRENS	BLUE OAT GRASS	30"	30"
IMPERATA CYLINDRICA RUBRA	JAPANESE BLOOD GRASS	18"	12"
MISCANTHUS SINENSIS	JAPANESE SILVER GRASS	30"	30"
MUHLENBERGIA RIGENS	DEER GRASS	36"	48"
NASSELLA TENUISSIMA	MEXICAN FEATHER GRASS	30"	30"
PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	40"	40"
PENNISETUM SETACEUM RUBRUM	RED FOUNTAIN GRASS	40"	40"
POA PRATENSIS	KENTUCKY BLUE GRASS	12"	12"
SPARTINA PECTINATA	PRAIRIE CORD GRASS	60"	36"
STIPA SPECIES	FEATHER GRASS	24"	24"

ZONE 3 PLANT PALETTE

BOTANICAL NAME	COMMON NAME	HEIGHT	WIDTH
CAREX ELATA 'AUREA'	BOWLES GOLDEN SEDGE	24"	18"
CAREX SPISSA	SAN DIEGO SEDGE	36"	36"
CHONDROPETALUM TECTORUM	CAPE RUSH	36"	36"
CYPERUS ALTERNIFOLIUS	UMBRELLA PLANT	36"	36"
EQUISETUM HYEMALE	HORSETAIL	36"	24"
JUNCAS PATENS	CALIFORNIA GRAY RUSH	24"	24"
JUSTICA BELOPERONE GUTTATA	SHRIMP PLANT	24"	24"
MILIUM EFFUSUM AUREUM	BOWLES GOLDEN GRASS	24"	24"
MOLINIA CAERULEA VARIEGATA	MOOR GRASS	18"	18"
PANICUM VIRGATUM	SWITCH GRASS	48"	24"
SCIRPUS CERNUUS	FIBER OPTICS PLANT	12"	20"
SISYRINCHIUM CALIFORNIA	YELLOW-EYED GRASS	24"	10"

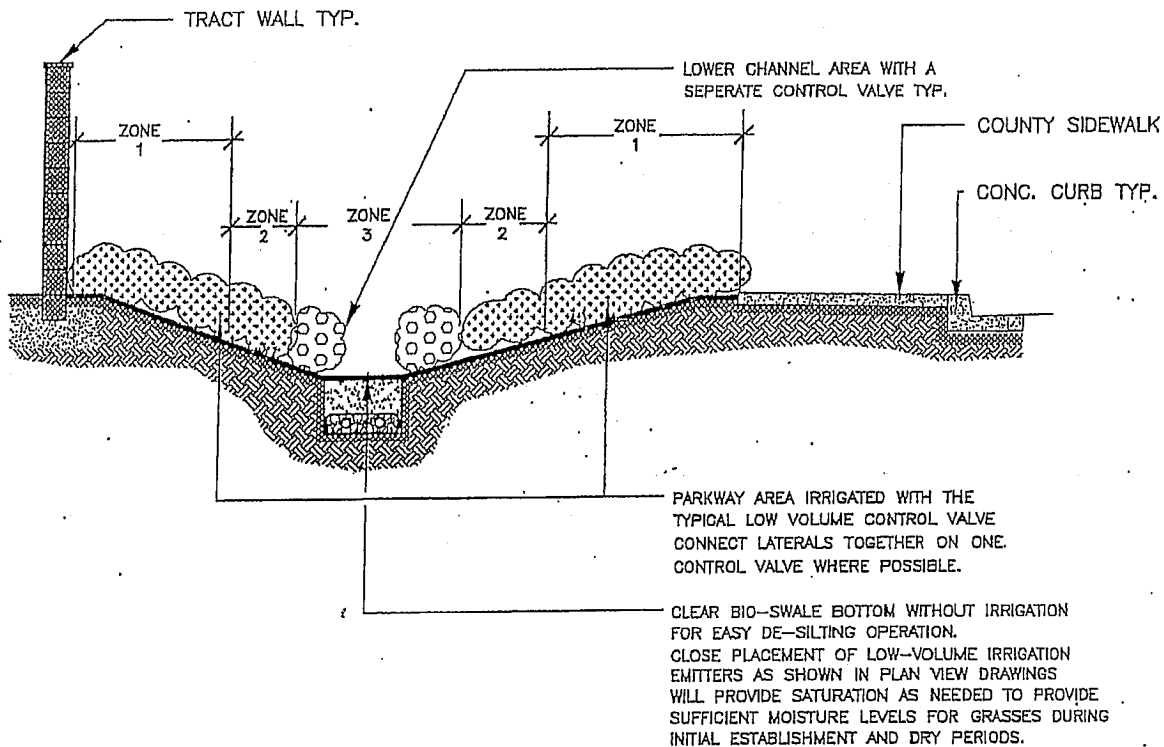
MOST SPECIES LISTED ARE CONTRACT GROWN ONLY. ARCHITECT MUST PROVIDE PLANT SOURCE AND LEAD TIMES AND INDICATE ON PLANS TO INSURE AVAILABILITY.

BIO-SWALE PLANT PALLETTE

Durham Recreation & Park District

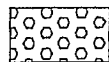
4-24-06

BIOS-03.DWG



ZONES
1, 2 & 4

REFER TO PLAN VIEW DRAWING FOR EXACT EMITTER LAYOUT
24" - 36" TYPICAL EMITTER SPACING PER PLANTING LAYOUT



ZONE 3

REFER TO PLAN VIEW DRAWING FOR EXACT EMITTER LAYOUT
12" - 24" TYPICAL EMITTER SPACING PER PLANTING LAYOUT

NOTES:

1. ALL CHANNEL BOTTOMS SHALL BE IRRIGATED WITH A SEPERATE CONTROL VALVE FOR MOISTURE CONTROL.
2. IRRIGATION FOR EACH SIDE OF CHANNEL BOTTOM OUTSIDE OF ZONE 3 SHOULD BE CONNECTED TOGETHER.
4. ALL BIO-SWALES SHALL BE IRRIGATED WITH POINT-TO-POINT LOW VOLUME IRRIGATION AS INDICATED. NO OVER-HEAD CONVENTIONAL SPRAY IRRIGATION WILL BE ALLOWED UNLESS APPROVED IN WRITING.
5. ALL IRRIGATION MUST CONFORM TO DRPD LOW-VOLUME IRRIGATION DETAILS.
6. ALL BIO-SWALE GRADES AND DRAINAGE MUST BE APPROVED IN WRITING BY DURHAM RECREATION AND PARK DISTRICT PRIOR TO ANY IRRIGATION OR PLANTING.
7. DRAWINGS INDICATE ABOVE GRADE PIPING, ALTHOUGH BELOW GRADE PIPING IS ALSO ACCEPTABLE.

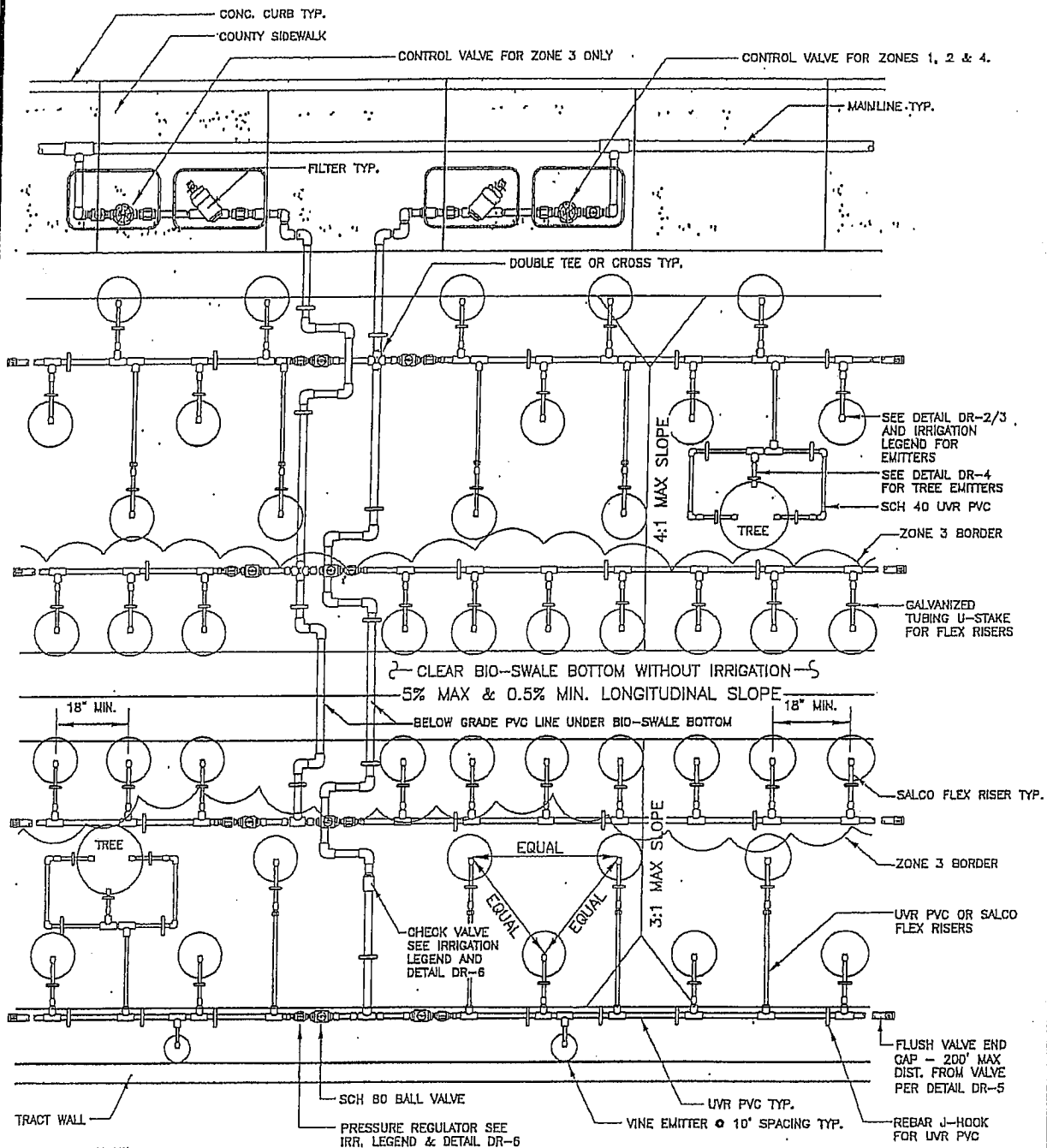
PARKWAY IRRIGATION SECTION VIEW

Durham Recreation & Park District

TYPICAL BIO-SWALE

N.T.S. 4-24-06

BIOS-04.DWG



NOTES:

1. LOWERS PORTIONS OF BIO-SWALE SHALL BE IRRIGATED WITH A SEPERATE CONTROL VALVE FOR MOISTURE CONTROL.
2. IRRIGATION FOR EACH SIDE OF CHANNEL BOTTOM OUTSIDE OF ZONE 3 SHOULD BE CONNECTED TOGETHER.
4. MAINLINE LOCATION IS SHOWN FOR CLARITY ONLY, ALL VALVES AND MAINLINE MUST COMPLY WITH DETAILS IR-26, IR-27 AND IR-28.
5. ALL IRRIGATION MUST CONFORM TO DRPD LOW-VOLUME IRRIGATION DETAILS.
6. SLEEVES FOR CHANNEL CROSSING MUST BE INSTALLED UNDER LOW-FLOW DRAIN LINE.

PARKWAY IRRIGATION PLAN VIEW

Durham Recreation & Park District

TYPICAL BIO-SWALE

N.T.S. 4-24-06

BIOS-05.DWG