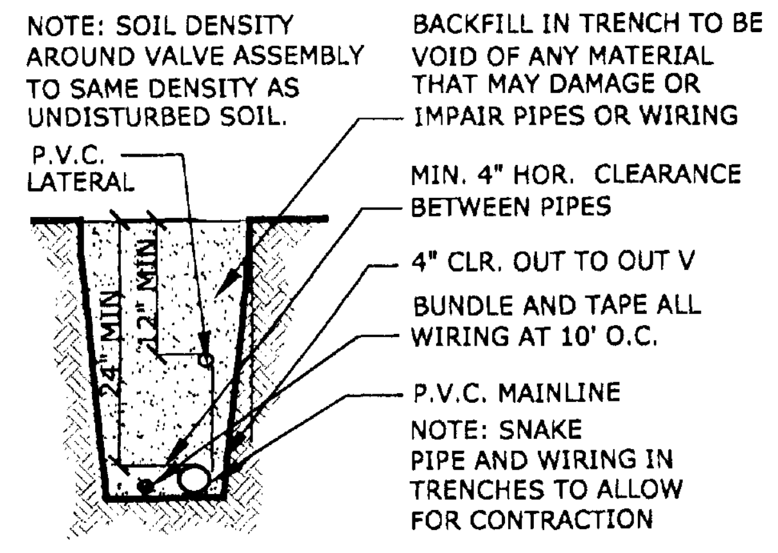
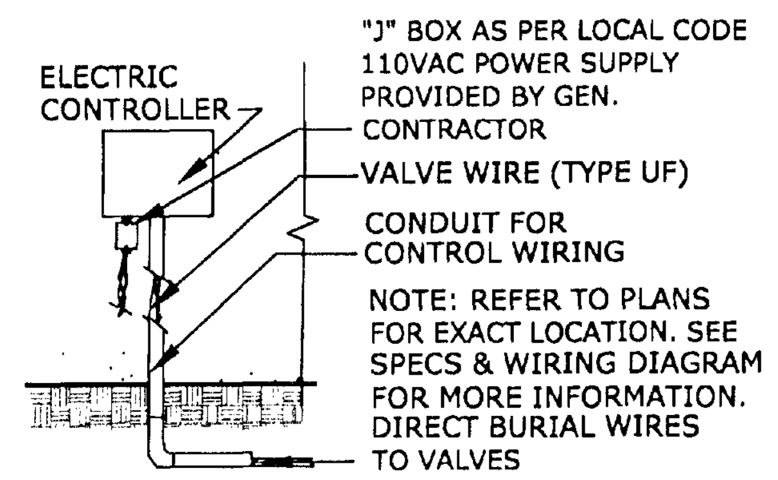


TRENCHING

NO SCALE

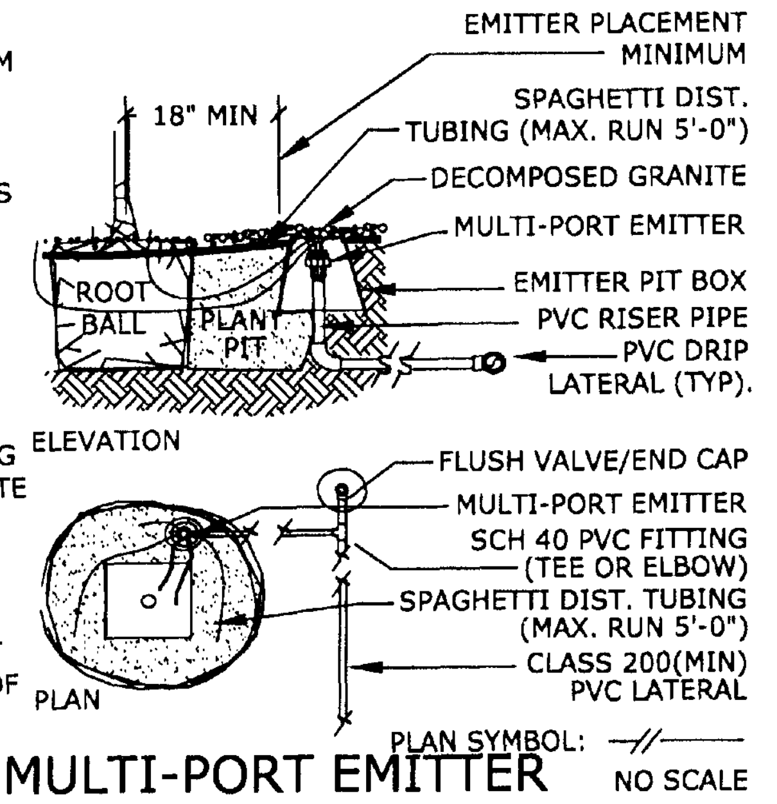


-MOUNT CONTROLER PER MANUFACTURER'S SPECS.
-ALL WIRE TO BE INSTALLED PER LOCAL CODE

ELECTRIC CONTROLLER

NO SCALE

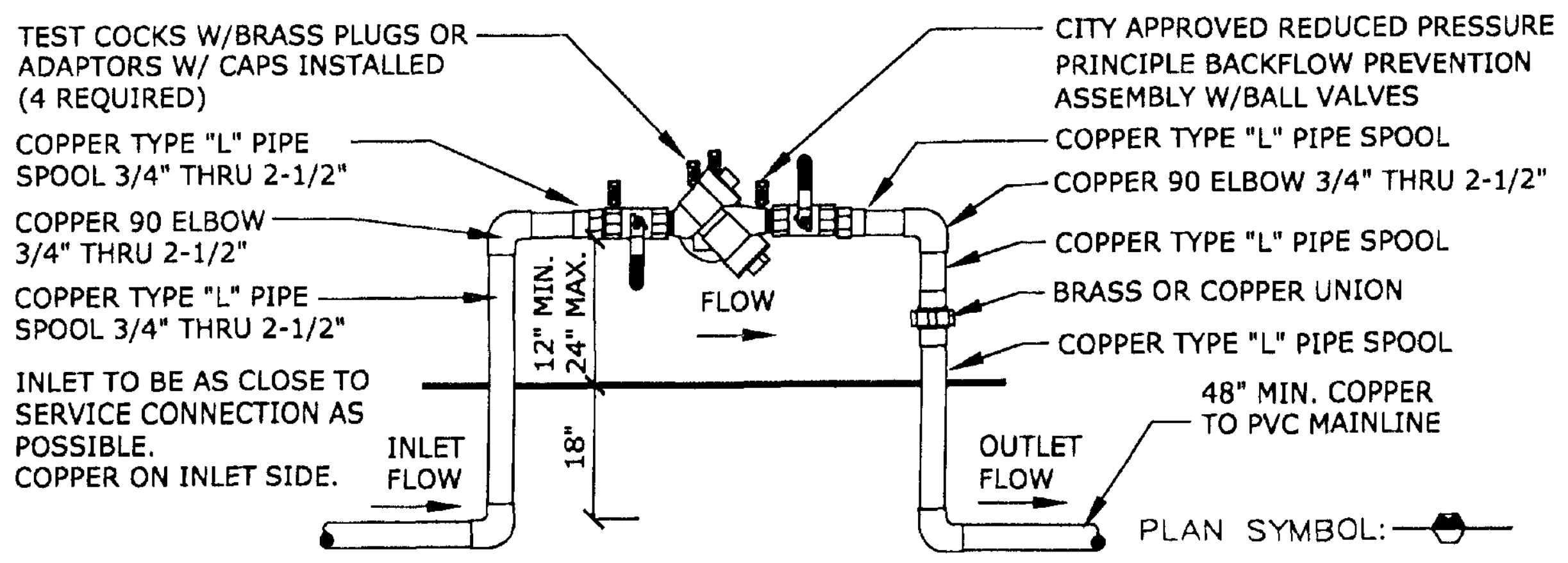
NOTES:
1) INSTALL A MINIMUM OF (1) BOWSMITH ML200 SERIES OR APPROVED EQUAL MULTI-PORT EMITTERS PER TREE EQUALLY SPACED AROUND DRIPLINE OF TREE CANOPY TYPICAL. OPEN ADDITIONAL PORTS AND INSTALL SPAGHETTI DISTRIBUTION TUBING TO PROVIDE ADEQUATE WATER AS TREE MATURES (TYP)
2) FOR SLOPED CONDITIONS PLACE DISTRABUTION POINT AT THE HIGH POINT OF PLANTING WELL



BOWSMITH MULTI-PORT EMITTER

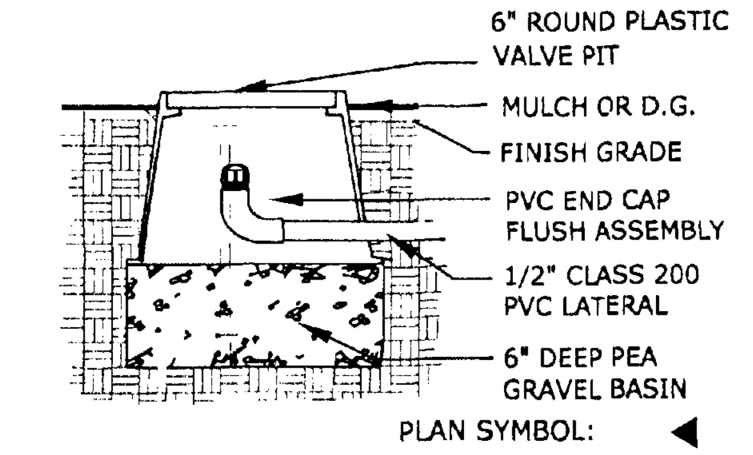
NO SCALE

NOTE: REFER TO SPECIFICATIONS FOR MORE INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION PER LOCAL CODE



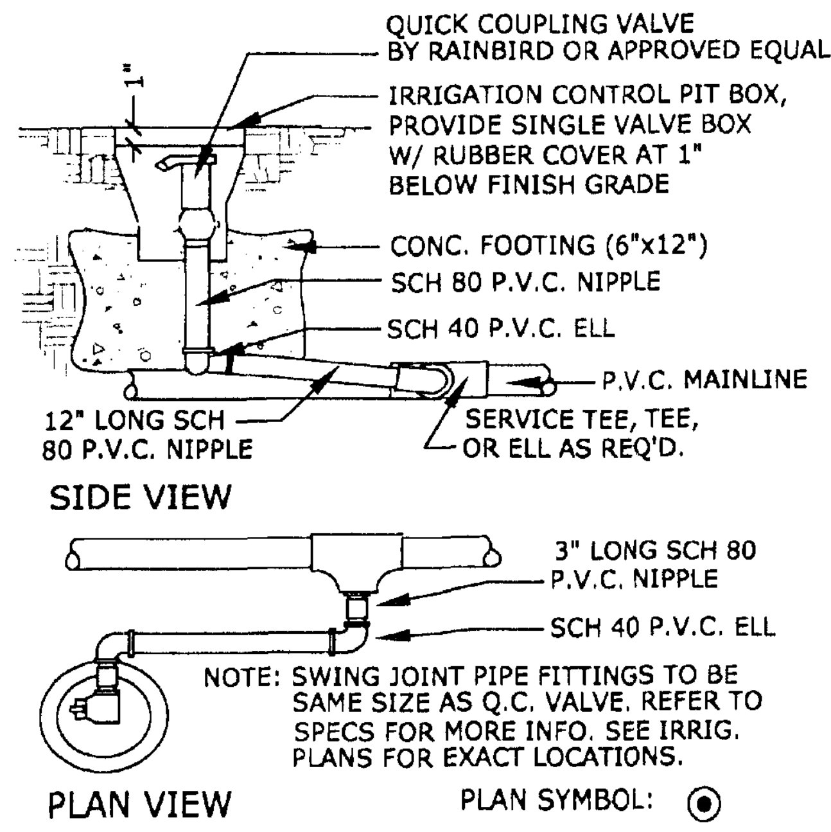
BACKFLOW PREVENTION ASSEMBLY 3/4" THRU 2-1/2"

NO SCALE



FLUSH VALVE

NO SCALE

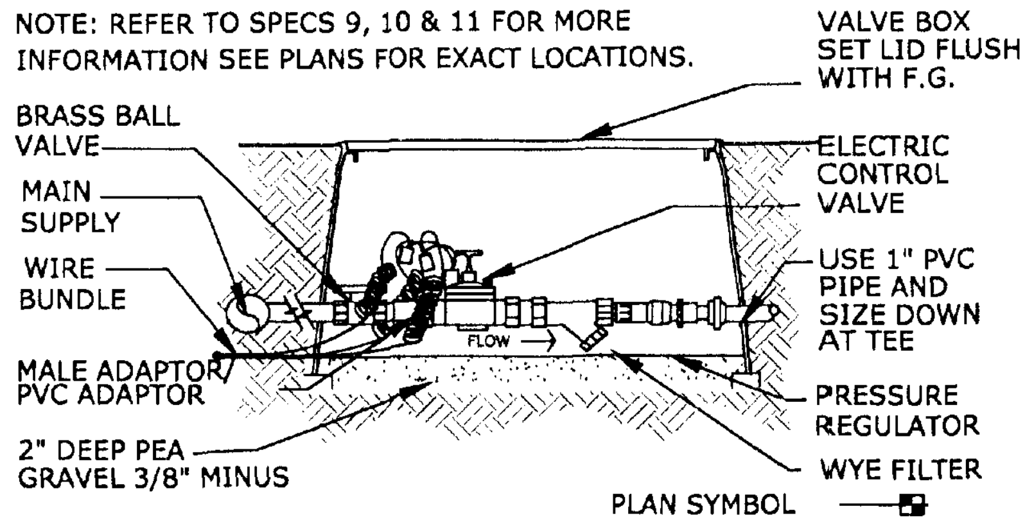


NOTE: SWING JOINT PIPE FITTINGS TO BE SAME SIZE AS Q.C. VALVE. REFER TO SPECS FOR MORE INFO. SEE IRRIG. PLANS FOR EXACT LOCATIONS.

QUICK COUPLER VALVE

NO SCALE

NOTE: REFER TO SPECS 9, 10 & 11 FOR MORE INFORMATION SEE PLANS FOR EXACT LOCATIONS.



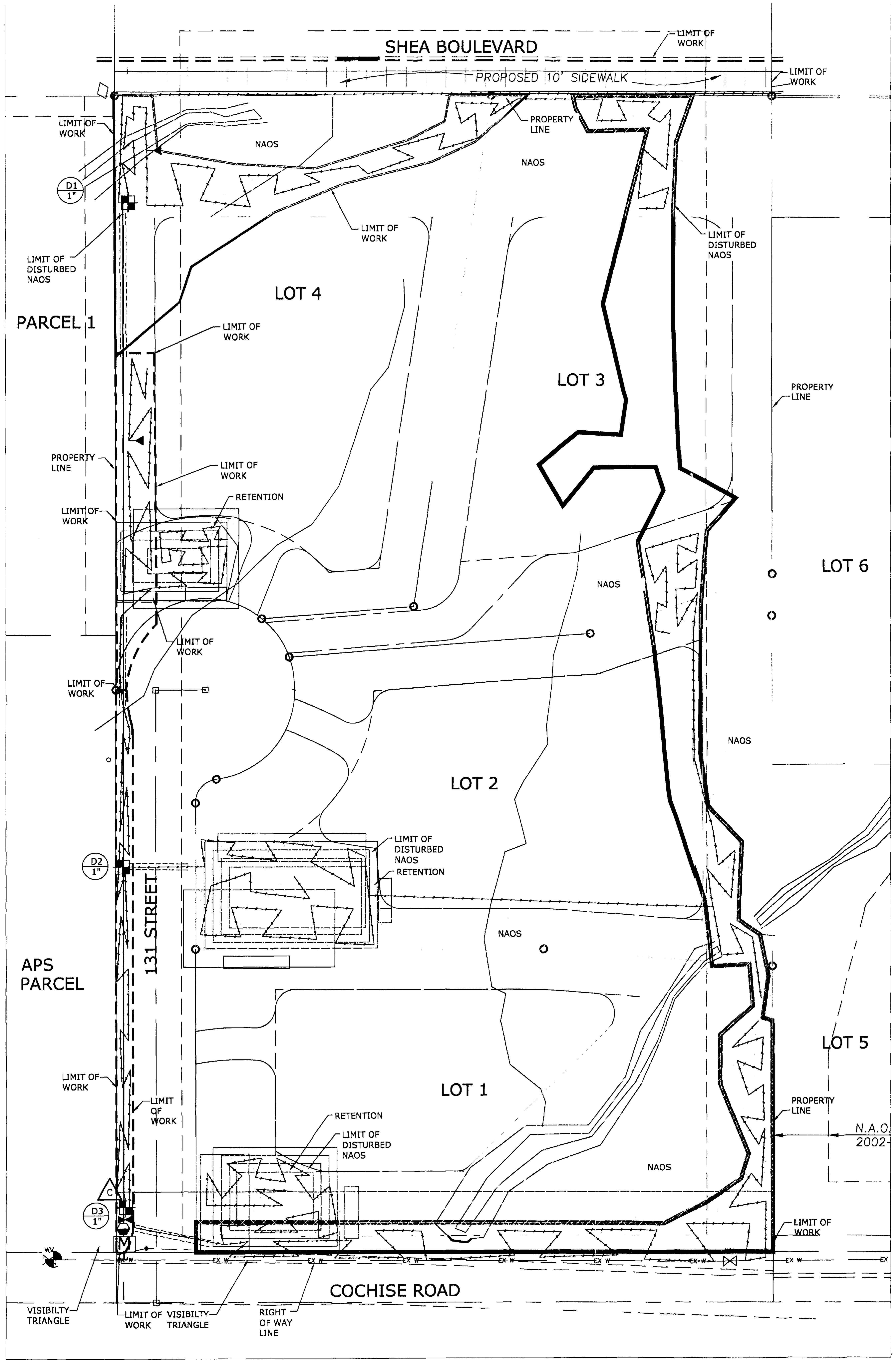
DRIP VALVE ASSEMBLY UNIT

NO SCALE

GENERAL NOTES:

-CONTACT THE CITY WATER & WASTEWATER OPERATIONS BACKFLOW PREVENTION FOR LATEST LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES OR CERTIFIED TESTERS.
-BACKFLOW PREVENTERS MUST BE TESTED BY A CERTIFIED TESTER BEFORE FINAL APPROVAL IS ISSUED.
-COPPER FITTINGS SHALL BE CONNECTED WITH LEAD FREE SOLDER JOINTS.
-ALL NIPPLES TO BE BRASS OR COPPER.
-PIPING UNDER CITY RIGHT-OF-WAY MUST BE COPPER TYPE "K"
-CALL BACKFLOW PREVENTION, FOR UNDERGROUND INSPECTION PRIOR TO BACKFILLING TRENCHES.
-INSTALL BACKFLOW UNIT WITHIN AN APPROVED SECURITY CAGE.

NO SCALE



SCALE 1" = 30'

IRRIGATION PLAN

IRRIGATION LEGEND

EMITTER SCHEDULE

PLANT TYPE	PLANT SIZE	GPH PER OUTLET	# OF OUTLET	TOTAL GPM PER PLANT
TREES	15 GAL.	2 GPH	3	6 GPH
TREES	24" BOX	2 GPH	4	8 GPH
TREES	36" BOX	2 GPH	5	10 GPH
TREES	48" BOX	2 GPH	6	12 GPH
SHRUBS	5 GAL.	1 GPH PLANTS	2	2 GPH
SHRUBS AND G.C.	1 GAL.	1 GPH	1	1 GPH

PIPE LEGEND

1/2"	4.22	GPM
3/4"	8	GPM
1"	12	GPM
1-1/2"	30	GPM
2"	50	GPM

CLASS 200 PVC —— .5" MIN. LATERALS
SCHED. 40 PVC —— 1" MIN. MAINLINE
SCHED. 40 PVC ==== 2" MIN. SLEEVE

D=DRIP/T=TURF/PD=PALMS DRIP VALVE SIZE $\frac{X}{\#"}$

DRIP EQUIPMENT

RAINBIRD 100-PEB-PRS-B ELECTRIC VALVE PRESSURE REGULATOR 420-3/4 (150 MESH) HYDRO RAIN WYE STRAINER VALVE BOX BY CARSON-OR APPROVE EQUAL ▚

RAINBIRD 16A-FDV 1/2" FUSH VALVE OR APPROVED EQUAL —◀

PVC DRIP SYSTEM - SEE DETAIL THIS SHEET EMITTER LINE W/ BUG CAPS EMITTERS PER TREE-EQUALLY SPACED /

CAP OR TIE INTO EXISTING WATERLINE ┬

EQUIPMENT

(1) 0.75" WATER METER - INSTALL PER CIVIL PLAN AND ALL LOCAL CODES M

(1) FEBCO 825Y-BV 0.75" REDUCED PRESSURE BACKFLOW PREVENTER ⬣

(1) IRRITROL RAIN DIAL RD-6PLUS-6 STATION OR APPROVED EQUAL △C

WATEROUS SERIES 500 1" BRASS GATE VALVE OR APPROVED EQUAL ⧓

CARSON-OR APPROVE EQUAL VALVE BOXES

NOTE:

1. ALL EMISSION POINTS TO BE LOCATED ON THE UPHILL SIDE OF PLANT MATERIAL ONE EMISSION POINTS TO BE LOCATED AT THE PLANT BALL, WITH THE ADDITIONAL POINTS WITHIN PLANT PIT PERIMETER.
2. SCREEN ENCLOSURE TO BE GUARDSHACK AS MANUFACTURED BY BACLFLOW PREVENTION DEVICE ENCLOSURES INC. 602-788-5411 OR APPROVED EQUAL. FINSIH: POWDER COAT COLOR: DESERT TAN. PROVIDE 4" THICK CONC. SLAB FOR ENCLOSURE FOUNDATION.

IRRIGATION NOTES

-THE IRRIGATION PLAN IS DIAGRAMMATIC AND IT SHALL BE THE IRRIGATION CONTRACTOR'S RESPONSIBILITY TO ADJUST THE LOCATION OF OR WATERING RATE OF ANY HEAD OR DRIP EMMITER TO PROVIDE FULL AND ADEQUATE COVERAGE OR TO ADD ADDITIONAL HEADS AS NECESSARY TO ENSURE 100% COVERAGE TO TURF AND OPTIMUM GROWING CONDITIONS FOR ALL PLANT MATERIAL. CONTRACTOR TO ASSUME LIABIILITY FOR INSUFFICIENT IRRIGATION.
-THE IRRIGATION SYSTEM HAS BEEN DESIGNED FOR 65 PSI. THE IRRIGATION CONTRACTOR SHALL VERIFY THE WATER PRESSURE IN THE FIELD AND NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY SHOULD A DISCREPANCY EXIST.
-THE IRRIGATION CONTRACTOR SHALL SIZE THE PIPE ACCORDING TO THE PIPE SCHEDULE. GALLONS PER MINUTE ARE CALCULATED BY THE COMBINED EMISSION HEAD OUTPUT DOWNLINE FROM PIPE BEING SIZED.
-IRRIGATION SLEEVES ARE TO BE SCHEDULE 40 PVC WITH A MINIMUM DIAMETER TWICE THE SIZE OF THE IRRIGATION MAIN LINE. IRRIGATION SLEEVES ARE TO EXTEND 12" BEYOND EDGE OF PAVEMENT, WALL OR CURB AND A MINIMUM OF 36" BEYOND EDGE OF SIDEWALKS. PROVIDE SEPERATE SLEEVE FOR WIRE AT EACH SLEEVE LOCATION.
-CONTROLLERS ARE TO BE PROGRAMMED TO ALLOW SUFFICIENT FLOW RATES ARE MAINTAINED THROUGHOUT THE SYSTEM.
-ALL VALVE BOXES (IRRIGATION, GATE VALVES, FLUSH CAP, WATER FEATURES, CONTROL WIRE ETC.) ARE TO BE PLACED IN DECOMPOSED GRANITE/PLANTING AREAS. UNDER NO CIRCUMSTANCES ARE THE VALVE BOXES TO PLACED IN A LAWN OR HARDSCAPE AREA. BOX/LID COLOR TO MATCH ADJAVENT GRANITE/SURFACE MATERIAL.
-THE GENERAL CONTRACTOR IS RESPONDSIBLE TO PROVIDE POWER TO THE IRRIGATION CONTROLLER
-SUBMIT SHOP DRAWINGS OF PROPOSED SYSTEM, LAYOUT AND ANY PRE-AGREED UPON EQUIPMENT AND/OR LAYOUT MODIFICATION FOR LA APPROVAL PRIOR TO INSTALLATION.
-LOCATE PARTS AND EQUIPMENT (ELEC. VALVES, GATE VALVES, FLUSH VALVES, QUICK COUPLER VALVES AND CONTROLLERS) FOR LA APPROVAL PRIOR TO INSTALLATION.
-SCREEN SERVICE EQIPMENT WITH LANDSCAPE MATERIAL FROM VIEW OF STREETS, WALKWAYS AND ADJACENT PROPERTIES.
-24 VOLT WIRING TO BE #14 UFUL DIRECT BURIAL-SOLID COPPER
-WIRE SLEEVE TO BE 2" CLASS 200 PVC (MIN.)
-EXTEND (2) ADDITIONAL CONTROL WIRES TO FURTHEST VALVE BOX, WIRE TO CONTROLLER, COIL WIRE AND LABEL STATION NUMBERS.
SUBMIT AS-BUILT RECORD DRAWINGS ILLUSTRATING COMPLETE IRRIGATIONS SYSTEM TO LA/OWNER REP. AT TIME OF COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL PAYMENT.
-CIVIL PLANS SHALL GOVERN IN THE INSTALLATION OF WATER, SEWER, STORM DRAINAGE AND FIRE PROTECTION LINES. SEE CIVIL PLANS FOR LOCATION AND SIZES.

Cochise Manor
131 street and cochise avenue
scottsdale, arizona

u r b a n . g r a p h i t e
landscape architecture - site planning 7151 east 6th avenue scottsdale, arizona 85251 p480.775.3714 f480.990.0754 mail@urbangraphite.com

32932
DREW AQUILINA
Date Signed 06/14/07

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△1	12-8-06
△2	06-14-07 city comments

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SECTION 02810 IRRIGATION SYSTEM

1.0 GENERAL CONDITIONS

1.1 CONTRACTOR SHALL VISIT AND INSPECT SITE AND BE THOROUGHLY INFORMED OF ALL EXISTING CONDITIONS PRIOR TO THE BID. DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THOSE SHOWN ON DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT FOR CLARIFICATION.

1.2 "PROJECT COMPLETION" SHALL BE DEFINED AS THE DATE CONSTRUCTION IS COMPLETE AND THE MAINTENANCE PERIOD BEGINS.

1.3 THE IRRIGATION CONTRACTOR, WITH THEIR BID SUBMITTAL SHALL PROVIDE WRITTEN VERIFICATION OF THREE (3) YEARS DEMONSTRATIVE ABILITY TO PERFORM THE WORK SPECIFIED HEREIN. PAST WORK SHALL BE OF SIMILAR TYPE, SCALE AND QUALITY.

2.0 WORK SPECIFIED HEREIN

2.1 THE WORK SPECIFIED WITHIN THIS SECTION SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY TO COMPLETE ALL THE IRRIGATION AS DETAILED AND SPECIFIED, INCLUDING THE FOLLOWING WORK REASONABLY INCIDENTAL THERETO.

2.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING WORK UNLESS OTHERWISE SPECIFIED ON THE PLANS.

2.2.1 COORDINATION OF ALL THE IRRIGATION WORK TO INSURE SUCCESSFUL INTEGRATION WITH THE LANDSCAPING.

2.2.2 ACCEPTING THE FINISHED GRADE PROVIDED, +/- 0.1 OF A FOOT AS SHOWN ON THE GRADING PLAN.

3.0 SAMPLES & TESTS

3.1 THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO TAKE AND ANALYZE SAMPLES OF MATERIALS FOR CONFORMITY TO SPECIFICATIONS AT ANY TIME. CONTRACTOR SHALL FURNISH SAMPLES UPON REQUEST BY LANDSCAPE ARCHITECT. REJECTED MATERIALS SHALL BE IMMEDIATELY REMOVED FROM THE SITE AND REPLACED AT THE CONTRACTOR'S EXPENSE. COST OF TESTING OF MATERIALS NOT MEETING SPECIFICATION SHALL BE PAID BY CONTRACTOR.

3.2 UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PASSING ALL CITY REQUIRED INSPECTIONS, TESTING AND PERFORMANCE VERIFICATION OF THE IRRIGATION SYSTEM REPRESENTED ON THESE PLANS.

3.3 REQUIREMENTS OF REGULATORY AGENCIES:

3.3.1. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH LATEST RULES AND REGULATIONS OF SAFETY ORDERS OF DIVISION OF INDUSTRIAL SAFETY, THE UNIFORM PLUMBING CODE, AND OTHER APPLICABLE LAWS OR REGULATIONS.

3.3.2. SHOULD THE CONTRACT DOCUMENTS BE A VARIANCE WITH REGULATORY REQUIREMENTS, NOTIFY LANDSCAPE ARCHITECT AND RECEIVE INSTRUCTIONS BEFORE PROCEEDING WITH WORK AFFECTED.

3.4 TESTING:

3.4.1. PRELIMINARY REVIEW OF COMPLETED INSTALLATION WILL BE MADE BY LANDSCAPE ARCHITECT PRIOR TO BACKFILLING OF TRENCHES AND DURING HYDROSTATIC TESTING.

3.4.2. FINAL REVIEW WILL BE MADE IN CONJUNCTION WITH THE FINAL REVIEW OF SHRUB AND TREE PLANTING.

4.0 COORDINATION AND RESPONSIBILITY

4.1 COORDINATE AND COOPERATE WITH OTHER TRADES WORKING ON THE SITE FOR SUCCESSFUL COMPLETION OF THE PROJECT.

4.2 BEFORE COMMENCING WORK ON THE SITE, BECOME THOROUGHLY ACQUAINTED WITH LAYOUT OF ALL UNDERGROUND UTILITIES AND STRUCTURES OVER THE ENTIRE SITE. ALL REQUISITE REPAIRS TO CORRECT DAMAGE CAUSED BY WORK OF THIS SECTION SHALL BE AT THE CONTRACTOR'S EXPENSE. CONTRACTOR MUST ADDRESS DEMOLITION NOTES IN LANDSCAPE SPECIFICATIONS.

4.3 ALL EXISTING PLANT MATERIAL AND ASSOCIATED ELEMENTS NOT INDICATED FOR REMOVAL SHALL BE PROTECTED AND MAINTAINED AS NECESSARY TO ENSURE SURVIVAL. SHOULD A TEMPORARY IRRIGATION SYSTEM BE REQUIRED TO ENSURE SURVIVAL, THE CONTRACTOR SHALL PROVIDE SUCH SYSTEM AS PART OF THIS CONTRACT. COORDINATE WORK WITH GENERAL CONTRACTOR.

4.4 A RECONSTRUCTION CONFERENCE TO DISCUSS THE IRRIGATION PROJECT WORK SHALL BE HELD AT A TIME AGREED UPON. THE CONTRACTOR, TOGETHER WITH REPRESENTATIVES OF HIS LANDSCAPE SUBCONTRACTOR, SHALL ATTEND, AS WILL THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT. THE PURPOSE OF THIS CONFERENCE IS TO DISCUSS THE PROJECT IN DETAIL, INCLUDING SCHEDULING OF WORK, SITE PREPARATION, INTERPRETATION OF DOCUMENTS AND TO ANSWER QUESTIONS THAT MAY ARISE. UNLESS FOLLOWED UP IN WRITING, VERBAL AUTHORIZATIONS OR ACKNOWLEDGMENT BY ANYONE PRESENT SHALL NOT BE BINDING.

5.0 STANDARDS

5.1 EXISTING CONDITIONS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE OR BREAKAGE TO EXISTING EQUIPMENT, AND RETURNING IT TO ITS EXISTING CONDITION (INCLUDING PIPE, FIXED STRUCTURES, OR LANDSCAPING), BEING SURE TO FLUSH AND CLEAN OUT ALL VALVES AND SPRINKLERS AS IS NECESSARY. THE CONTRACTOR SHALL REFER TO THE DRAWINGS PROVIDED, AND CONSULT THE PROJECT SUPERINTENDENT TO AVOID DAMAGE TO EXISTING FEATURES AND UTILITIES. REFER TO DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS SHEET.

5.2 MATERIALS: ALL MATERIALS TO BE INCORPORATED IN THIS SYSTEM SHALL BE NEW AND WITHOUT FLAWS OR DEFECTS AND OF QUALITY AND PERFORMANCE AS SPECIFIED WITHIN THE CONSTRUCTION DOCUMENTS. WHENEVER MATERIAL IS SPECIFIED BY NAME OR NUMBER, SUCH SPECIFICATIONS SHALL BE DEEMED TO FACILITATE A DESCRIPTION OF THE MATERIAL; NO SUBSTITUTIONS OF MATERIAL SHALL BE PERMITTED UNLESS SPECIFICALLY APPROVED BY THE CITY IN WRITING. NO SUBSTITUTIONS OF SMALLER PIPE SIZES MAY BE APPROVED. ALL PIPE DAMAGED OR REJECTED BECAUSE OF DEFECTS SHALL BE REMOVED FROM THE SITE.

5.3 RECORD DRAWINGS: THE OWNER SHALL FURNISH THE CONTRACTOR WITH ONE (1) SET OF BOND PLOTS, SHOWING ALL WORK REQUIRED UNDER THIS CONTRACT, FOR THE PURPOSE OF HAVING THE CONTRACTOR RECORD ON THESE PRINTS ALL CHANGES THAT MAY BE MADE DURING THE ACTUAL INSTALLATION OF THE SYSTEM. IMMEDIATELY UPON INSTALLATION OF ANY PIPING, VALVES, WIRING, ETC., IN LOCATIONS OTHER THAN SHOWN ON THE ORIGINAL DRAWINGS, OR OF SIZES OTHER THAN INDICATED, THE CONTRACTOR SHALL CLEARLY INDICATE SUCH CHANGES ON THE SET OF DRAWINGS WITH DIMENSIONS OF MAIN LINE FITTINGS, GATE VALVES, AND MAIN LINE ROUTING EVERY 100'. (AFTER FINAL ACCEPTANCE OF THE COMPLETED INSTALLATION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING COMPLETE DRAWINGS PREPARED SHOWING ALL SUCH CHANGES AND THESE "AS BUILT DRAWINGS" SHALL BE TURNED OVER TO THE OWNER'S REPRESENTATIVE FOR RECORDING PURPOSES, WITH THE REST OF THE MYLARS AT THE END OF THE JOB).

5.4 MATERIAL STORAGE AND CLEAN UP: THE CONTRACTOR SHALL KEEP THE PREMISES FREE FROM RUBBISH AND DEBRIS AT ALL TIMES AND SHALL ARRANGE HIS MATERIAL STORAGE SO AS NOT TO INTERFERE WITH THE CONSTRUCTION OF THE PROJECT BY OTHER TRADES. ALL UNUSED MATERIAL, RUBBISH AND DEBRIS SHALL BE REMOVED FROM THE SITE PER DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS.

5.5 EQUIPMENT, TOOLS AND LABOR: THE CONTRACTOR SHALL FURNISH ALL SUCH EQUIPMENT, TOOLS, AND LABOR NECESSARY TO COMPLETE WORK IN AN EFFICIENT AND ACCEPTABLE MANNER. THIS CONTRACT IS BASED ON THE CONTRACTOR FURNISHING AND USING HIS OWN EQUIPMENT, TOOLS AND LABOR WHICH ARE SUITABLE TO CARRY OUT THIS CONTRACT IN A FIRST CLASS MANNER, UNLESS OTHERWISE HEREIN SPECIFIED.

5.6 THE INSTALLATION

THE CONTRACTOR SHALL UNDERSTAND THAT THESE DRAWINGS ARE DIAGRAMMATIC AND THE CONTRACTOR SHALL BE RESPONSIBLE TO ACHIEVE 100% COVERAGE WITHOUT EXCESSIVE OVERSPRAY OR PUDDLING. IN ALL SITUATIONS THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A SAFE AND EFFICIENT IRRIGATION SYSTEM WETHER CALLED OUT ON THE DRAWINGS OR NOT, ALL CACTI SHALL BE VALVED SEPARATELY. COORDINATE WITH THE LANDSCAPE CONTRACTOR.

5.7 SUBMITTALS

5.7.1. FURNISH REQUIRED COPIES OF MANUFACTURER'S LITERATURE, CERTIFICATIONS, AND OPERATING INSTRUCTIONS FOR THE COMPLETE LIST OF MATERIALS, FOR THE FOLLOWING ITEMS:

A. IRRIGATION CONTROLLER.
B. BACKFLOW PREVENTOR, IF APPLICABLE.
C. GATE VALVES.
D. PIPE AND FITTINGS.
E. REMOTE-CONTROL VALVES.
F. VALVE BOXES.
G. QUICK-COUPLING VALVES AND MANUAL VALVES.
H. DRIP EMITTERS, AND BUBBLERS.
I. LOW VOLTAGE WIRES AND CONNECTORS.
J. PRESSURE REGULATOR DEVICE.
K. FILTER DEVICE.
L. AIR RELIEF VALVE.

5.8 WARRANTY

5.8.1. IN ADDITION TO MANUFACTURER'S WARRANTIES, WORK SHALL BE WARRANTED AND GUARANTEED FOR 1 YEAR FROM THE DATE OF COMPLETION AGAINST DEFECTS IN MATERIAL, EQUIPMENT, AND WORKMANSHIP. WARRANTY/GUARANTY SHALL ALSO COVER REPAIR OF DAMAGE TO ANY PART OF PREMISES RESULTING FROM LEAKS OR OTHER DEFECTS IN MATERIALS, EQUIPMENT, AND WORKMANSHIP, TO THE SATISFACTION OF THE OWNER.

5.8.2. CONTRACTOR SHALL NOT BE HELD RESPONSIBLE FOR FAILURES DUE TO NEGLECT BY OWNER, VANDALISM, ETC., DURING WARRANTY/GUARANTY PERIOD. REPORT SUCH CONDITIONS TO THE OWNER IN WRITING.

5.8.3. CONTRACTOR SHALL NOT ALLOW NOR CAUSE ANY OF HIS WORK TO BE COVERED OR ENCLOSED UNTIL IT HAS BEEN INSPECTED, TESTED AND ACCEPTED BY THE AUTHORIZED PERSONNEL. SHOULD ANY OF HIS WORK BE ENCLOSED OR COVERED BEFORE SUCH INSPECTION AND TEST, HE SHALL UNCOVER THE WORK AT HIS OWN EXPENSE AND AFTER IT HAS BEEN INSPECTED, TESTED AND ACCEPTED, SHALL MAKE ALL REPAIRS WITH LIKE MATERIALS NECESSARY TO RESTORE ALL HIS WORK AND THAT OF OTHER CONTRACTORS TO ITS ORIGINAL CONDITION, AT NO ADDITIONAL COST TO THE OWNER.

6.0 EXCAVATION WORK

6.1 EXCAVATION AND BACKFILL: PIPE TRENCHES SHALL BE EXCAVATED OF SUFFICIENT DEPTH AND WIDTH TO PERMIT PROPER HANDLING AND INSTALLATION OF THE PIPE AND FITTINGS. THE BACKFILL SHALL BE THOROUGHLY COMPACTED AND EVENED OFF WITH THE ADJACENT SOIL LEVEL IN A MANNER WHICH MINIMIZES TRENCH SETTLING. SELECTED FILL DIRT OR SAND SHALL BE USED IF SOIL CONDITIONS ARE ROCKY. IN ROCKY AREAS, THE TRENCHING DEPTH SHALL BE (2) INCHES BELOW NORMAL TRENCH DEPTH TO ALLOW FOR BEDDING. THE FILL DIRT OR SAND SHALL BE USED IN FILLING FOUR (4) INCHES ABOVE THE PIPE. THE REMAINDER OF THE BACKFILL SHALL CONTAIN NO LUMPS OR ROCKS LARGER THAN (3) INCHES. THE TOP SIX (6) INCHES OF BACKFILL SHALL BE FREE OF ROCKS OVER (1) INCH, SUBSOIL OR TRASH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPACTING TRENCHED AREAS UNDER PAVED AREAS PER SECTION 02220 AND 85% UNDER PLANTED AREAS.

6.2 EXISTING UTILITIES AND STRUCTURES THE EXACT LOCATION OF ALL EXISTING UTILITIES AND STRUCTURES AND UNDERGROUND UTILITIES, WHETHER INDICATED ON THE DRAWINGS OR NOT, SHALL BE IDENTIFIED BY THE CONTRACTOR AND THEY SHALL CONDUCT THEIR WORK SO AS TO PROTECT EXISTING STRUCTURES AND UTILITY SERVICES AND SHALL BE RESPONSIBLE FOR THEIR REPLACEMENT IF DAMAGED. REFER TO DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS.

6.3 MINOR ADJUSTMENTS IN THE SYSTEM SHALL BE PERMITTED TO CLEAR EXISTING FIXED OBSTRUCTIONS; SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE. GENERAL CONTRACTOR SHALL PROVIDE POWER TO ALL POINTS SHOWN ON PLANS. THE GENERAL CONTRACTOR SHALL MAKE APPLICATION WITH THE LOCAL UTILITY FOR DRAWINGS AND PERMITS TO COMPLETE THE ABOVE WORK.

7.0 PIPE AND TUBE

7.1 GENERALLY, UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS, THE CONSTRUCTION OF IRRIGATION LINES AND INSTALLATION OF CONTROL WIRING AND/OR CONTROL LINES SHALL INCLUDE EXCAVATION AND BACKFILL, THE FURNISHINGS, INSTALLING AND TESTING OF SPRINKLER PIPE, TUBE AND FITTINGS, AND THE REMOVAL AND/OR RESTORATION OF EXISTING IMPROVEMENTS AND ALL OTHER WORK IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

7.1.1 UNLESS OTHERWISE INDICATED ON THE DRAWINGS, ALL PIPE SHALL BE INSTALLED WITH A MINIMUM COVER OF TWELVE (12) INCHES BELOW FINISHED GRADE.

7.1.2 GENERALLY, PIPING/SLEEVING UNDER CONCRETE OR ASPHALT SHALL BE INSTALLED PRIOR TO ANY SURFACE WORK. JACKING, BORING OR HYDRAULIC DRIVING SHALL BE AN ACCEPTABLE METHOD TO INSTALL PIPE UNDER EXISTING CONCRETE OR ASPHALT. WHERE ANY CUTTING OR BREAKING OF SIDEWALKS,, CONCRETE WORK AND/OR ASPHALT IS NECESSARY, IT SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR. PERMISSION TO CUT OR BREAK SIDEWALKS, CONCRETE AND/OR ASPHALT SHALL BE OBTAINED FROM THOSE HAVING PROPER JURISDICTION. SEE DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS FOR ANY ROAD OR SIDEWALK CONSTRUCTION.

7.1.3 ALL IRRIGATION PIPE LESS THAN 4" DIAMETER INSTALLED UNDER CONCRETE OR PAVEMENT SHALL BE SLEEVED WITHIN A SCHEDULE 40 PVC PIPE TWICE THE DIAMETER OF THE IRRIGATION LINE BEING SLEEVED. SLEEVE SHALL BE OF SUFFICIENT LENGTH TO PERMIT A MINIMUM OF 12" EXTENDING BEYOND EDGE OF CONCRETE OR PAVEMENT. ALL IRRIGATION PIPE 4" OR GREATER IN DIAMETER SHALL BE UNSLEEVED SCHEDULE 40 PVC.

7.2 PLASTIC PIPE LINES: PLASTIC PIPE SHALL BE RIGID, UNPLASTICIZED PVC; SIZE AND PRESSURE RATING OR SCHEDULE AS SHOWN ON THE PLANS, EXTRUDED FROM VIRGIN PARENT MATERIAL OF THE TYPE SPECIFIED ON THE DRAWINGS. THE PIPE SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM VISIBLE CRACKS, HOLES, FOREIGN MATERIALS, BLISTERS, DELETIONS, WRINKLES, AND DENTS.

7.3 PLASTIC PIPE FITTINGS AND CONNECTIONS: ALL PLASTIC PIPE FITTINGS TO BE INSTALLED SHALL BE MOLDED FITTINGS MANUFACTURED OF THE SAME MATERIAL AS THE PIPE AND SHALL BE SUITABLE FOR SOLVENT WELD, SLIP JOINT, RING TIGHT SEAL, OR SCREWED CONNECTIONS. NO FITTINGS MADE OF OTHER MATERIAL SHALL BE USED EXCEPT BRASS SADDLE TEES AND CROSSES AS HEREINAFTER SPECIFIED. SLIP FITTING SOCKET TAPER SHALL BE SO SIZED THAT A DRY UNSOFTENED PIPE END, CONFORMING TO THESE SPECIAL PROVISIONS, CAN BE INSERTED NO MORE THAN HALFWAY INTO THE SOCKET. PLASTIC SADDLE AND FLANGE FITTINGS SHALL NOT BE PERMITTED. ONLY SCHEDULE 80 PIPE SHALL BE THREADED. WHEN CONNECTION IS PLASTIC TO METAL, PLASTIC SOLVENT WELD MALE ADAPTERS SHALL BE USED. THE MALE ADAPTER SHALL BE HAND TIGHTENED, PLUS ONE TURN WITH A STRAP WRENCH. JOINT COMPOUND SHALL BE TEFLON TAPE.

7.4 IDENTIFICATION: ALL PIPE SHALL BE CONTINUOUSLY AND PERMANENTLY MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR TRADEMARK, SIZE, SCHEDULE AND TYPE OF PIPE, WORKING PRESSURE AT 73 DEGREES F. AND NATIONAL SANITATION FOUNDATION (N.S.F.) APPROVAL. ALL PIPE CARRYING TREATED EFFLUENT (NON-POTABLE WATER) SHALL BE LABELED IN SUCH A MANNER TO IDENTIFY IT AS DIFFERENT FROM POTABLE WATER BY COLOR AND WRITTEN IDENTIFICATION ORIGINATING AT THE MANUFACTURER.

7.5 DELIVERY

PLASTIC PIPE SHALL BE DELIVERED TO THE SITE IN UNBROKEN BUNDLES, ROLLS, OR PACKAGES IN SUCH A MANNER AS TO PROVIDE ADEQUATE PROTECTION FOR THE PIPE ENDS, EITHER THREADED OR PLAIN. PLASTIC PIPE SHALL BE COVERED TO PROVIDE PROTECTION FROM THE SUN'S RAYS.

7.6 INSTALLATION OF PLASTIC PIPE

PLASTIC PIPE SHALL BE INSTALLED IN A MANNER SO AS TO PROVIDE FOR EXPANSION AND CONTRACTION AS RECOMMENDED BY THE MANUFACTURER. PLASTIC PIPE SHALL BE CUT SQUARE IN A LOCALLY ACCEPTABLE MANNER. BURRS AT CUT ENDS SHALL BE REMOVED PRIOR TO INSTALLATION SO THAT A SMOOTH UNOBSTRUCTED FLOW IS OBTAINED. ALL PLASTIC TO PLASTIC JOINTS SHALL BE SOLVENT WELD JOINTS OR SLIP SEAL JOINTS. ONLY THE SOLVENT RECOMMENDED BY THE PIPE MANUFACTURER SHALL BE USED. ALL PLASTIC PIPE AND FITTINGS SHALL BE INSTALLED AS OUTLINED AND INSTRUCTED BY THE PIPE MANUFACTURER AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE PIPE MANUFACTURER FOR ANY FIELD ASSISTANCE THAT IS NECESSARY. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE CORRECT INSTALLATION. ALL PLASTIC-TO-METAL JOINTS SHALL BE MADE WITH SOLVENT WELD PLASTIC MALE ADAPTER OR SLIP SEAL JOINTS. ONLY THE SOLVENT RECOMMENDED BY THE PIPE MANUFACTURER SHALL BE USED. ALL PLASTIC PIPE AND FITTINGS SHALL BE INSTALLED AS OUTLINED AND INSTRUCTED BY THE PIPE MANUFACTURER AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE PIPE MANUFACTURER FOR ANY FIELD ASSISTANCE THAT IS NECESSARY FOR THE CORRECT INSTALLATION.

7.6.1 THE SOLVENT WELD JOINTS SHALL BE MADE IN THE FOLLOWING MANNER:

1. THOROUGHLY CLEAN THE MATING PIPE AND FITTINGS WITH A CLEAN, DRY CLOTH.
2. APPLY A UNIFORM COAT OF PRIMER TO THE OUTSIDE OF THE PIPE WITH A NON SYNTHETIC BRISTLE BRUSH.
3. APPLY PRIMER TO THE FITTING IN A SIMILAR MANNER.
4. APPLY A UNIFORM COAT OF SOLVENT TO THE OUTSIDE OF THE PIPE WITH A NON-SYNTHETIC BRISTLE BRUSH.
5. APPLY SOLVENT TO THE FITTING IN A SIMILAR MANNER.
6. RE-APPLY A LIGHT COAT OF SOLVENT TO THE PIPE AND QUICKLY INSERT IT INTO THE FITTING.
7. GIVE THE PIPE OR FITTING A QUARTER TURN TO INSURE EVEN DISTRIBUTION OF THE SOLVENT AND MAKE SURE THE PIPE IS INSERTED TO THE FULL DEPTH OF THE FITTING SOCKET.
8. HOLD IN POSITION FOR FIFTEEN (15) SECONDS.
9. WIPE OFF EXCESS SOLVENT THAT APPEARS AT THE OUTER SHOULDER OF THE FITTING.

7.6.2 CARE SHALL BE TAKEN SO AS NOT TO USE AN EXCESS AMOUNT OF SOLVENT, THEREBY CAUSING A BURR OR OBSTRUCTION TO FORM ON THE INSIDE OF THE PIPE.

7.6.3 THE JOINTS SHALL BE ALLOWED TO SET AT LEAST 24 HOURS BEFORE PRESSURE IS APPLIED TO THE SYSTEM ON PVC PIPE.

7.7 FLUSHING AND TESTING

AFTER ALL NEW DRIP PIPING IS IN PLACE AND CONNECTED, FOR A GIVEN SECTION, AND ALL NECESSARY DIVISION WORK HAS BEEN COMPLETED AND PRIOR TO INSTALLATION OF SPRINKLER HEADS, ALL CONTROL VALVES SHALL BE OPENED AND A FULL HEAD OF WATER USED TO FLUSH OUT THE SYSTEM. THE SYSTEM SHALL BE RUN UNDER FULL LOAD OF IRRIGATION DEMAND AS THE FINAL TEST.

7.8 STEEL PIPE AND FITTINGS AT BACK FLOW PREVENTER (AS NEEDED)

7.8.1 STEEL PIPE SHALL BE NEW, SCALE-FREE, MILD STEEL PIPE AND SHALL BE STANDARD WEIGHT SCHEDULE 40.

7.8.2 STEEL PIPE FITTINGS SHALL BE HEAVY PATTERN, BANDED, GALVANIZED MALLEABLE IRON, EPOXY COATED, THREADED PIPE FITTINGS. ALL NIPPLES SHALL BE OF THE SAME MATERIAL AS THE PIPE. BUSHINGS, CLOSE NIPPLES AND CROSSES SHALL NOT BE INSTALLED. STREET ELBOWS SHALL BE INSTALLED ONLY AS PART OF THE DRAIN VALVE ASSEMBLY.

7.8.3 PIPE SHALL BE CAREFULLY CLEANED BEFORE INSTALLATION. THE ENDS OF ALL THREADED PIPE SHALL BE REAMED OR FULL SIZE. JOINTS IN ALL SCREWED PIPING SHALL BE MADE BY APPLYING AN APPROVED OIL BASE THREAD LUBRICANT ON THE MALE THREAD ONLY.

7.9 MAIN LINE FITTINGS

FITTINGS, BENDS, TEES AND CROSSES IN THE MAIN LINES SHALL BE IN ACCORDANCE WITH AWWA CAST IRON OR DUCTILE IRON TYPE. ALL MAIN LINE FITTINGS SHALL BE CAST IRON TYPE FOR PVC PIPE AS PER PLAN AND DETAILS INCLUDING TAPS TO ELECTRIC VALVES. CONTRACTOR SHALL FURNISH FITTINGS, ALL ADAPTERS, REDUCERS AND APPURTENANCE OF THE SIZE AND TYPE NECESSARY FOR THE COMPLETION OF THE PIPELINE. WHERE TAPS MUST BE MADE IN EXISTING MAIN LINE PIPE, USE ROMAC # 202-N DOUBLE STRAP SADDLE FITTINGS.

7.10 RISERS

ALL QUICK-COUPLING VALVES SHALL HAVE AN ADJUSTABLE RISER ASSEMBLY (DOUBLE SWING JOINT RISER) ASSEMBLED BY THE USE OF AT LEAST THREE (3) PVC SCH. 80 ELLS OR TEES AS RECOMMENDED BY THE QUICK COUPLER MANUFACTURER AND/OR AS SHOWN ON THE DRAWINGS. THESE DOUBLE SWING JOINT RISERS SHALL BE OF SCH. 80 PVC PLASTIC PIPE AND FITTINGS UNLESS OTHERWISE INDICATED, AS SHOWN ON DETAIL DRAWINGS OF PLANS. THE HORIZONTAL NIPPLE CONNECTED DIRECTLY INTO THE SIDE OUTLET OF THE MAIN LINE SHALL BE A MINIMUM OF SIX (6) INCHES LONG. ALL OTHER NIPPLES OF THE SWING JOINT RISER SHALL BE OF LENGTH AS REQUIRED FOR PROPER INSTALLATION OF THE QUICK COUPLER, DRAIN VALVE AND/OR AUTOMATIC CONTROL VALVE. THE SWING JOINT RISER SHALL BE OF PROPER PIPE SIZE AS SHOWN ON THE DRAWINGS.

8.0 DRIP IRRIGATION

8.1 ELECTRIC CONTROL VALVES: CONTROL VALVES SHALL BE THE TYPE INDICATED ON THE DRAWINGS AND BE CAPABLE OF OPERATING AT 10 G.P.M.'S. NOTE: DRIP FOR PALM TYPE TREE OR FREE STANDING PLANTERS SHALL BE SET UP ON INDIVIDUAL VALVES.

8.2 Y-FILTERS: FILTERS SHALL BE "Y" BODY TYPE AND SHALL BE CONSTRUCTED FROM GLASS REINFORCED POLYPROPYLENE WITH 150 MESH SCREENS OR AS INDICATED ON THE DRAWINGS.

8.3 PRESSURE REGULATORS: PRESSURE REGULATORS SHALL BE FACTORY PRE-SET AT 25 PSI AND SHALL BE THE ADJUSTABLE, TYPE AS INDICATED ON THE DRAWINGS.

8.4 DRIP IRRIGATION PIPING: DRIP IRRIGATION PIPING SHALL BE CLASS 315 OR 200 PVC, NOMINAL SIZE OF 1/2" OR LARGER.

8.5 EXTENSION TUBING: MICRO-TUBING SHALL MEET EMITTER MANUFACTURER'S RECOMMENDATIONS. BOWSMITH EMITTER WITH TUBING SHALL NOT EXCEED 5' IN LENGTH AND SHALL HAVE AN EMITTER OUTLET CHECK VALVE (BUG CAP) ATTACHED TO THE END.

8.6 FLUSH CAP: END CAPS AND END CAP CONNECTORS (MINIMUM OF TWO PER STATION OR AS PER DETAIL).

8.7 OTHER MATERIALS: PROVIDE OTHER MATERIALS WHICH MAY NOT BE CALLED OUT IN THE SPECIFICATIONS BUT ARE CALLED OUT IN THE DRAWINGS AND INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.

9.0 VALVES AND KEYS

9.1 GENERAL: UNLESS OTHERWISE SPECIFIED, THE INSTALLATION OF ALL VALVES SHALL INCLUDE THE EXCAVATION AND BACKFILL, THE FURNISHING, INSTALLING AND TESTING OF RISERS, FITTINGS, AND VALVES, AND THE REMOVAL AND/OR RESTORATION OF EXISTING IMPROVEMENTS AND ALL OTHER WORK IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND AS REQUIRED FOR THE COMPLETED INSTALLATION.

9.1.1 ALL DRAIN VALVE ASSEMBLIES SHALL BE INSTALLED WITH A LENGTH OF 2" PVC PLASTIC PIPE OF LENGTH REQUIRED TO EXTEND FROM THE TOP OF THE VALVE TO FINISH GRADE LINE. A RAINBIRD LOCKING TYPE VALVE MARKER OR EQUAL, SHALL BE INSTALLED IN THE TOP OF THE 2" PIPE FOR EASY LOCATION OF THE VALVE AND FOR ACCESS FOR OPERATION OF THE VALVE.

9.1.2 IF SHOWN ON THE PLANS THE 2" DRAIN VALVE SHALL BE PROVIDED WITH PROPER GRAVEL SUMP AT THE OUTLET, OF SUFFICIENT SIZE TO PROVIDE PROPER DRAINAGE OR IF CONDITIONS ARE SUCH, THE OUTLET SHALL BE PIPED TO A DRAINAGE TILE, DRAINAGE DITCH OR POND AS DESIRED TO PROVIDE PROPER DRAINAGE.

9.1.3 WHERE REQUIRED BY LOCAL OR STATE CODE, AN ATMOSPHERIC OR PRESSURE TYPE ANTI-SIPHON OR BACKFLOW PREVENTION TYPE VALVE SHALL BE INSTALLED IN ACCORDANCE WITH ALL LOCAL CODES. BACKFLOW PREVENTION ASSEMBLY SHALL BE TESTED AND APPROVED BY THE PROPER AUTHORITIES PRIOR TO ACCEPTANCE.

9.1.4 ALL QUICK-COUPLING VALVES SHALL BE INSTALLED WITH AN ADJUSTABLE SWING JOINT RISER ASSEMBLY UNIT (DOUBLE SWING JOINT RISER) ASSEMBLED BY THE USE OF AT LEAST THREE (3) 90 DEGREE ELLS OR TEES. THESE DOUBLE SWING JOINT RISERS SHALL BE OF SCHEDULE 80 PVC NIPPLES AND SCHEDULE 80 PVC FITTINGS OR UNLESS OTHERWISE DESIGNATED ON THE DRAWINGS. THE SWING JOINT RISER SHALL BE OF PROPER PIPE SIZE AS SHOWN ON THE DRAWINGS. (FACTORY PRE-ASSEMBLED UNITS MAY BE USED).

9.2 KEYS AND QUICK COUPLING VALVES: THE QUICK-COUPLING VALVES, WHERE INDICATED ON THE DRAWINGS, SHALL BE TWO PIECE BODY QUICK COUPLER TURF VALVES CONSTRUCTED OF HIGHEST GRADE HEAVY DUTY BRONZE CASTING BODIES.

9.2.1 BODY SHALL BE OF TWO PIECE CONSTRUCTION CONSISTING OF A LOWER AND UPPER PIECE BODY. THE UPPER VALVE BODY SHALL BE EASILY REMOVABLE FOR MAINTENANCE. THE VALVE PARTS SHALL BE REPLACEABLE AND EACH VALVE SHALL HAVE THREE (3) STOPS, OR OPEN POSITIONS TO PROVIDE REGULATION OF FLOW. VALVE COVER SHALL BE OF HEAVY, CAST IRON WITH CADMIUM PLATE PROTECTIVE FINISH.

9.2.2 THE QUICK-COUPLING VALVES SHALL BE THREE QUARTER (3/4) INCH QUICK-COUPLING OR AS INDICATED ON THE DRAWINGS, AND SHALL HAVE 3/4-INCH SIZE BOTTOM FEMALE PIPE THREAD CONNECTION. VALVES SHALL BE COMPLETE WITH STANDARD TOP.

9.2.3 THE CONTRACTOR SHALL SUPPLY THE OWNER WITH ONE (1) PREPLACEMNT RAINBIRD #33 K QUICK-COUPLER WITH HOSE SWIVEL ELLS FOR EVERY QUICK COUPLER SHOWN ON PLAN.

9.3 GATE VALVES (STANDARD)ALL ZONE SHUT-OFF OR OTHER VALVES, NOT INDICATED AS MANUAL ANGLE CONTROL VALVES, OF SIZES TWO (2) INCH AND SMALLER SHALL BE ALL BRONZE DOUBLE DISC WEDGE TYPE WITH INTEGRAL TAPER SEATS AND WITH NON-RISING STEM. ALL GATE VALVES LARGER THAN 2" SHALL BE IRON BODY, BRASS TRIMMED, DOUBLE DISC WEDGE TYPE WITH INTEGRAL TAPER SEATS AND WITH NON-RISING STEMS. GATE VALVES SHALL FUNCTION AND BE EQUAL TO WATEROUS SERIES 500 OR EQUAL. GATE VALVES 4" OR LARGER SHALL HAVE A 2" SQUARE NUT FOR FLOW CONTROL. ALL VALVES SHALL BE PLACED IN A VALVE BOX (TYPICALLY).

9.4 AUTOMATIC, REMOTE CONTROL VALVES, ELECTRIC SOLENOID TYPE. ALL AUTOMATIC REMOTE CONTROL VALVES SHALL BE PER PLANS AND SPECIFICATIONS OR EQUAL SERIES. IN ADDITION, PLANS MAY REQUIRE ELECTRIC VALVE FOR WASTEWATER AND GREY WATER APPLICATIONS. THE SOLENOID ELECTRICAL OPERATING RANGE SHALL BE 20 TO 30 VAC, 50-60 HZ MEAN SOLENOID VOLT-AMP RATING SHALL BE 8.5 VA AT 24 VAC, 60 HZ. SOLENOID COIL D.C. RESISTANCE SHALL BE 15 PLUS OR MINUS 3 OHMS.

9.5 AUTOMATIC DRAIN VALVES: AT ALL LOCATIONS INDICATED ON THE DRAWINGS INSTALL AUTOMATIC DRAIN VALVES, IF SHOWN ON PLANS. THE AUTOMATIC DRAIN VALVES SHALL BE OF THE BALL-CHECK TYPE CONSTRUCTED OF HIGHEST GRADE MACHINE BRASS AND WITH STAINLESS STEEL BALL. VALVE SHALL POSITIVELY SEAL OFF AT 3 PSI PRESSURE IN THE LINE. VALVES SHALL HAVE 1/2-INCH MALE PIPE THREAD CONNECTION. INSTALL A MAXIMUM OF 2 CONTROL VALVES PER VALVE BOX UNLESS OTHERWISE NOTED ON THE DRAWINGS.

10.0 CONTROLS

10.1 CONTROL CABLE: ALL ELECTRICAL CONTROL AND GROUND WIRE SHALL BE COPPER IRRIGATION CONTROL CABLE OF SIZE AS INDICATED BY MANUFACTURER'S SPECS. ALL WIRING USED FOR CONNECTING THE AUTOMATIC REMOTE CONTROL VALVES TO THE AUTOMATIC CONTROLLERS SHALL BE TYPE "UF", 600 VOLT; 7 STRAND OR SOLID COPPER, SINGLE CONDUCTOR WIRE WITH PVC INSULATION AND BEARING UL APPROVAL FOR DIRECT UNDERGROUND BURIAL FEEDER CABLE. ALL PILOT OR "HOT" WIRES SHALL BE OF ONE COLOR AND ALL "COMMON" WIRES ARE TO BE OF ANOTHER.

10.1.1 INSULATION SHALL BE FOUR-SIXTY-FOURTHS (4/64) INCH THICK MINIMUM COVERING OF ICC-100 COMPOUND FOR POSITIVE WATERPROOFING PROTECTION. SIZES FOURTEEN (14), TWELVE (12), TEN (10), AND EIGHT (8) SHALL BE SINGLE CONDUCTOR SOLID COPPER WIRE AND SIZES SIX (6), FOUR (4), AND TWO (2) SHALL BE STRANDED COPPER WIRE. ALL CONTROL OR "HOT" WIRES SHALL BE OF ONE (1) COLOR (BLACK) AND ALL COMMON OR "GROUND" WIRES SHALL BE OF ONE COLOR (WHITE). VERIFICATION OF WIRE TYPES AND INSTALLATION PROCEDURES SHALL BE MADE TO CONFORM TO LOCAL CODES.

10.2 ELECTRICAL WIRE CONNECTIONS

WIRE CONNECTIONS TO REMOTE CONTROL ELECTRIC VALVES AND SPLICES OF WIRE IN THE FIELD SHALL BE MADE IN THE FOLLOWING MANNER, USING RAINBIRD PEN-TITE WIRE CONNECTORS AND SEALING CEMENT (OR APPROVED EQUAL):

1. STRIP ENDS OF WIRES AND PUSH WIRES THROUGH THE HOLES OF THE BASE SOCKET.
2. TWIST WIRES TOGETHER AND MECHANICALLY BOND TOGETHER USING CRIMP SLEEVE AND CRIMP PLIERS.
3. PULL WIRE CONNECTION BACK INTO BASE SOCKET AS FAR AS IS POSSIBLE.
4. APPLY SOLVENT CEMENT TO OUTSIDE OF SEALING PLUG AND THEN FILL CAVITY OF SEALING PLUG COMPLETELY WITH SOLVENT CEMENT.
5. PUSH SEALING PLUG INTO BASE SOCKET, USING SLIGHT TWISTING MOTION, UNTIL IT BOTTOMS.
6. PUSH WIRES DOWN INTO BASE PLUG AS FAR AS THEY WILL GO, WITHOUT UNSEATING SEALING PLUG.

10.2.1 THIS ASSURES CEMENT COMPLETELY SEALING AROUND WIRE INSULATION AND WATERPROOFING THE CONNECTION. IT IS IMPORTANT THAT THE JOINT BE ABSOLUTELY WATERPROOF SO THAT THERE IS NO CHANCE FOR LEAKAGE OF WATER AND CORROSION BUILD-UP ON THE JOINT.

10.3 AUTOMATIC CONTROLLERS: THE CONTRACTOR SHALL PROVIDE ADEQUATE PERSONNEL TO ASSIST THE OWNER TO PROGRAM THE CONTROLLER IN THE FIELD AND REVIEW THE OPERATION OF EACH STEP AFTER INSTALLATION. CONTRACTOR SHALL PROVIDE A WRITTEN STATEMENT TO SHOW WHICH GROUP OF VALVES IS TO WHICH CLOCK PROGRAM AND WATERING TIMES FOR EACH PROGRAM.

10.4 DO NOT PREPARE CHARTS UNTIL RECORD DRAWINGS HAVE BEEN APPROVED BY THE LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE.

10.4.1 PROVIDE ONE CONTROLLER CHART PER CONTROLLER.

1. CHART MAY BE A REPRODUCTION OF THE RECORD DRAWING, IF THE SCALE PERMITS FITTING THE CONTROLLER DOOR. IF PHOTO REDUCTION PRINTS ARE REQUIRED, KEEP REDUCTION TO MAXIMUM SIZE POSSIBLE TO RETAIN FULL LEGIBILITY.
2. CHART SHALL BE BLACKLINE PRINT OF THE ACTUAL SYSTEM, SHOWING THE AREA COVERED BY THAT CONTROLLER.

10.4.2 IDENTIFY THE AREA OF COVERAGE OF EACH REMOTE CONTROL VALVE, USING A DISTINCTLY DIFFERENT PASTEL COLOR, DRAWN OVER THE ENTIRE AREA OF COVERAGE.

10.4.3 FOLLOWING APPROVAL OF CHARTS BY THE LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE, THEY SHALL BE HERMETICALLY SEALED BETWEEN TWO LAYERS OF 20 MIL THICK PLASTIC SHEET.

10.4.4 CHARTS MUST BE COMPLETED AND APPROVED PRIOR TO FINAL ACCEPTANCE OF THE IRRIGATION SYSTEM.

10.4.5 COORDINATE WITH CITY FORCES AS TO THE VALVE STATIONING OF THE NEW AREAS TO BE PROGRAMMED INTO THE EXISTING CONTROLLER.

10.5 INSTALLATION OF CONTROL CABLE: ALL ELECTRIC CONTROL CABLE SHALL BE OF SIZES SHOWN ON MANUFACTURER'S SPECS AND SHALL BE INSTALLED IN THE PIPING TRENCHES WHEREVER POSSIBLE. PIPE TRENCH SHALL BE PARTIALLY BACKFILLED TO PROVIDE THREE (3) TO FOUR (4) INCHES OF COVER OVER THE PIPE BEFORE WIRE IS INSTALLED. WIRE SHALL THEN BE PLACED IN THE TRENCH TO ONE SIDE OF THE PIPE. WIRE SHALL BE PLACED IN THE TRENCH AS LOOSELY AS POSSIBLE TO ALLOW FOR EXPANSION AND CONTRACTION OF THE WIRE; EXPANSION COILS (5-6 TURNS OF WIRE WRAPPED AROUND A PIECE OF 1/2" PVC PIPE) AT 200' INTERVALS, ALSO SHALL BE ACCEPTABLE. WHERE IT IS NECESSARY TO RUN WIRE IN A SEPARATE TRENCH, THE WIRE SHALL HAVE A MINIMUM COVER OF TWELVE (12) INCHES. ALL WIRE UNDER CONCRETE OR PAVEMENT SHALL BE PLACED IN A SCHEDULE 40 PVC SLEEVE. THE DIAMETER SHALL BE SUFFICIENT TO ACCOMMODATE THE WIRE BUNDLE.

10.5.1 ALL WIRE CONNECTIONS AT REMOTE CONTROL VALVES, EITHER DIRECT BURIAL OR IN CONTROL BOXES, SHALL HAVE SUFFICIENT WIRE WHICH CAN BE BROUGHT TO THE SURFACE WITHOUT DISCONNECTING THE WIRES.

10.5.2 EACH REMOTE CONTROL VALVE OR GROUP OF REMOTE CONTROL VALVES, WHICH ARE TO BE CONNECTED TO ONE STATION OF A CONTROLLER, SHALL HAVE WIRES AS SHOWN IN THE WIRING DIAGRAMS ON THE DRAWINGS OR AS SPECIFIED. ALL REMOTE CONTROL VALVES, WHICH ARE TO BE CONNECTED TO THE SAME CONTROLLER, SHALL BE CONNECTED TO A COMMON GROUND WIRE OF A SIZE AS SHOWN ON THE DRAWINGS OR AS SPECIFIED.

10.6 VALVE BOXES: ALL REMOTE CONTROL VALVES, MANUAL CONTROL VALVES, ZONE SHUT-OFF VALVES, GATE VALVES OR BUTTERFLY VALVES, UNLESS OTHERWISE INDICATED, SHALL BE INSTALLED IN SUITABLE VALVE ACCESS BOXES OF PROPER SIZE AS REQUIRED FOR EASY ACCESS TO THE VALVE. ACCESS BOXES ON THE DRAWINGS, OR OTHERWISE INDICATED OR SPECIFIED SHALL BE INSTALLED USING VALVE MARKERS, SHALL NOT REQUIRE VALVE ACCESS BOXES. LOCKING AND/OR HINGED COVERS FOR ACCESS BOXES SHALL BE REQUIRED. ALL VALVE BOXES SHALL BE IMPRINTED WITH THE VALVE STATION IN A PERMANENT AND LEGIBLE MANNER FOR EASY REFERENCE.

*****END OF SECTION*****

Cochise Manor
131 street and cochise avenue
scottsdale, arizona

u r b a n . g r a p h i t e
landscape architecture - site planning 7151 east 6th avenue scottsdale, arizona 85251 p480.775.3714 f480.990.0754 mail@urbangraphite.com

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 32932
DREW AQUILINA

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△2 06-14-07 city comments

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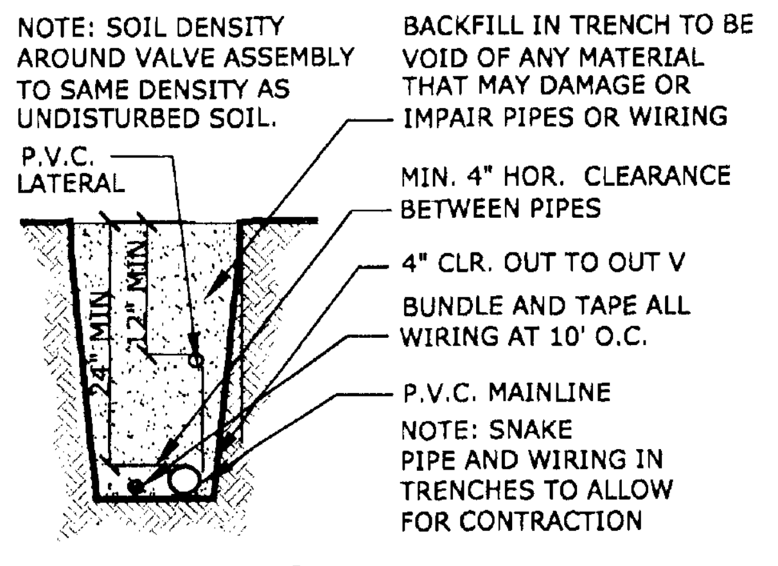

TRENCHING

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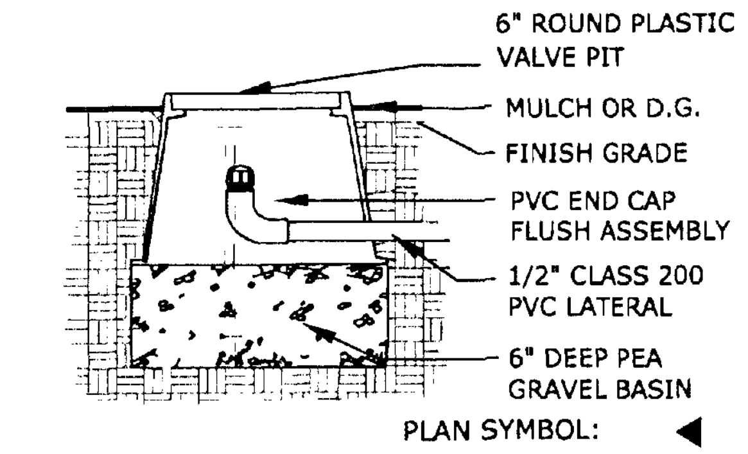

FLUSH VALVE

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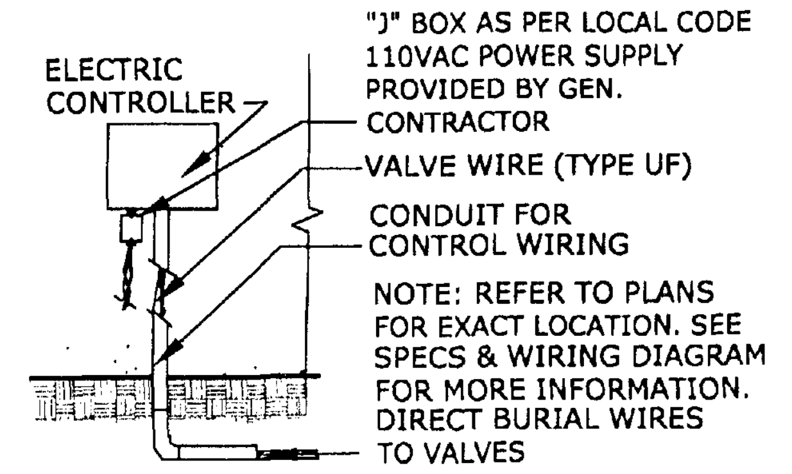
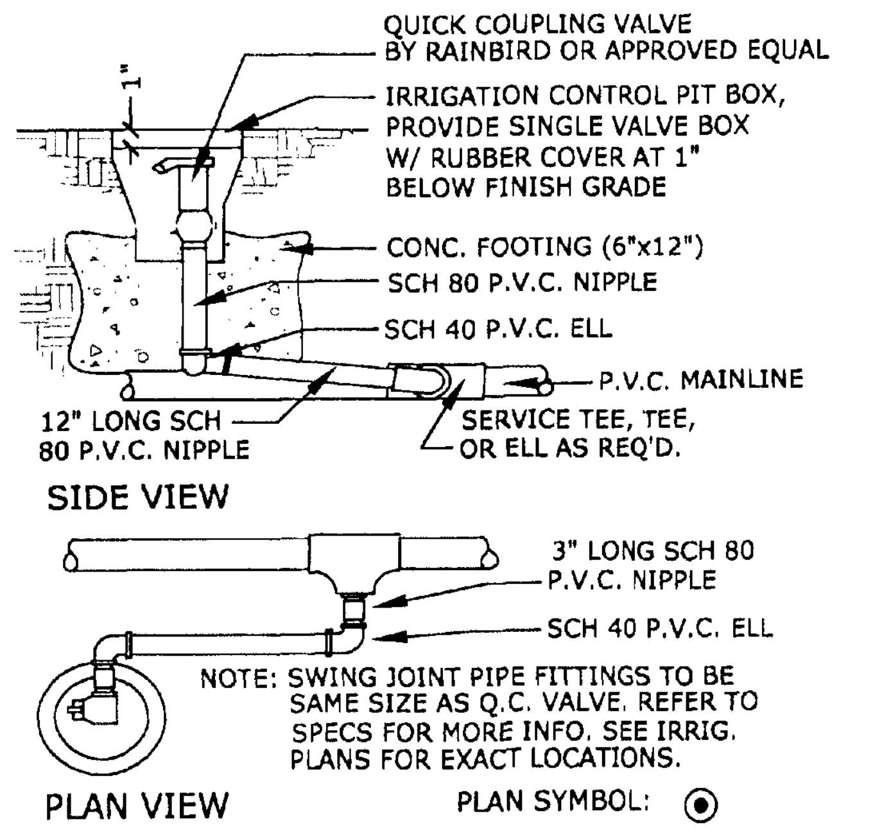


-MOUNT CONTROLER PER MANUFACTURER'S SPECS.
-ALL WIRE TO BE INSTALLED PER LOCAL CODE

ELECTRIC CONTROLLER

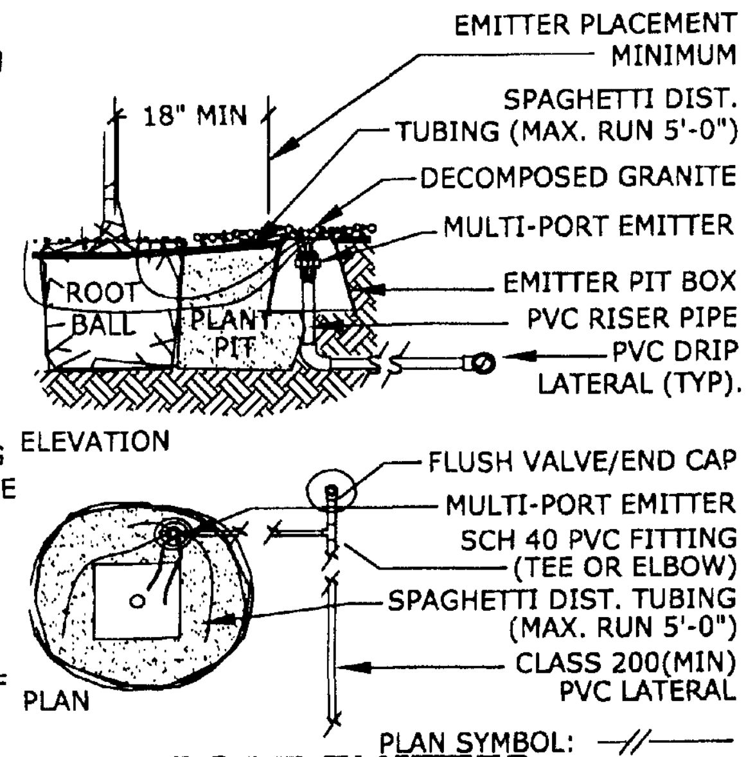
NO SCALE



QUICK COUPLER VALVE

NO SCALE

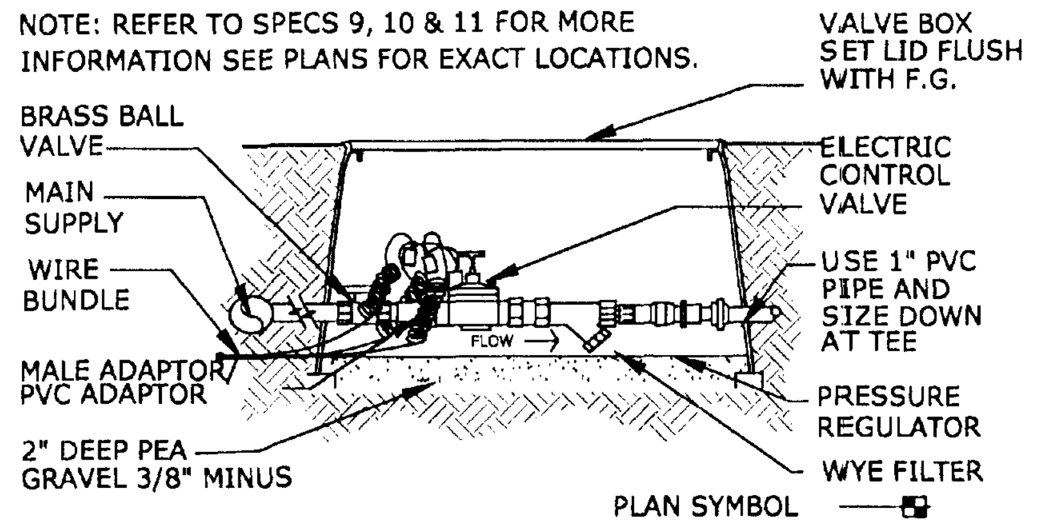
NOTES:
1) INSTALL A MINIMUM OF (1) BOWSMITH ML200 SERIES OR APPROVED EQUAL MULTI-PORT EMITTERS PER TREE EQUALLY SPACED AROUND DRIPLINE OF TREE CANOPY TYPICAL. OPEN ADDITIONAL PORTS AND INSTALL SPAGHETTI DISTRIBUTION TUBING TO PROVIDE ADEQUATE WATER AS TREE MATURES (TYP)
2) FOR SLOPED CONDITIONS PLACE DISTRABUTION POINT AT THE HIGH POINT OF PLANTING WELL



BOWSMITH MULTI-PORT EMITTER

NO SCALE

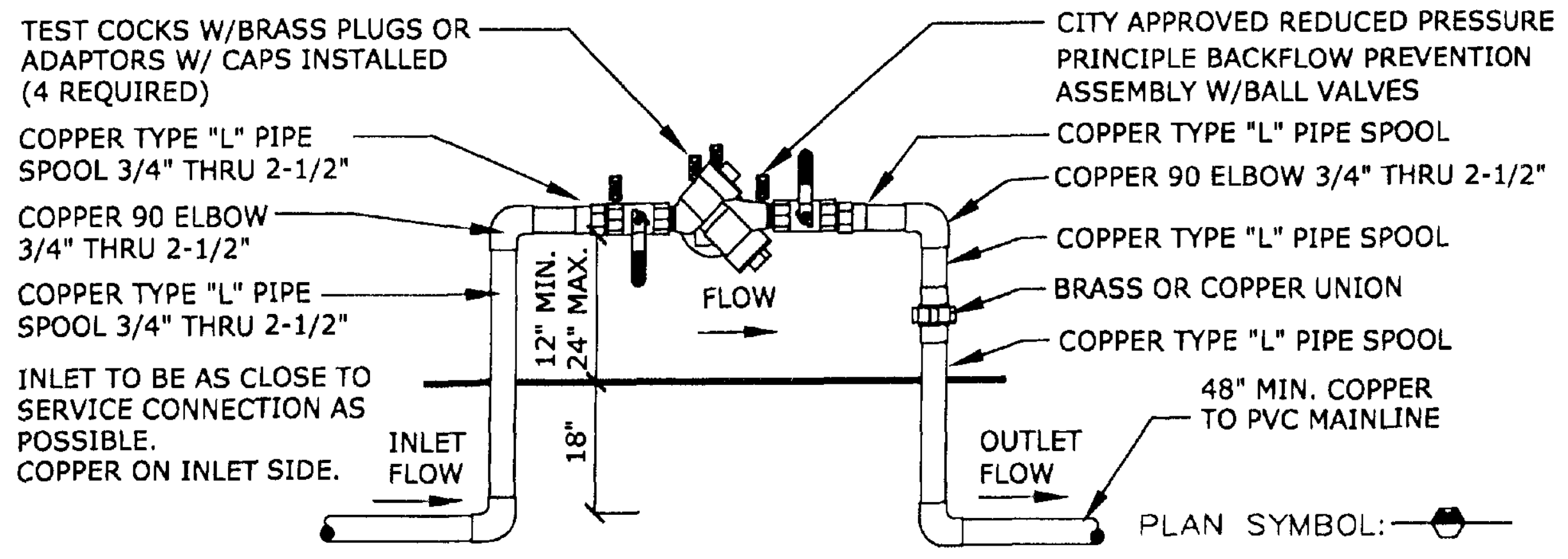
NOTE: REFER TO SPECS 9, 10 & 11 FOR MORE INFORMATION SEE PLANS FOR EXACT LOCATIONS.



DRIP VALVE ASSEMBLY UNIT

NO SCALE

NOTE: REFER TO SPECIFICATIONS FOR MORE INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION PER LOCAL CODE

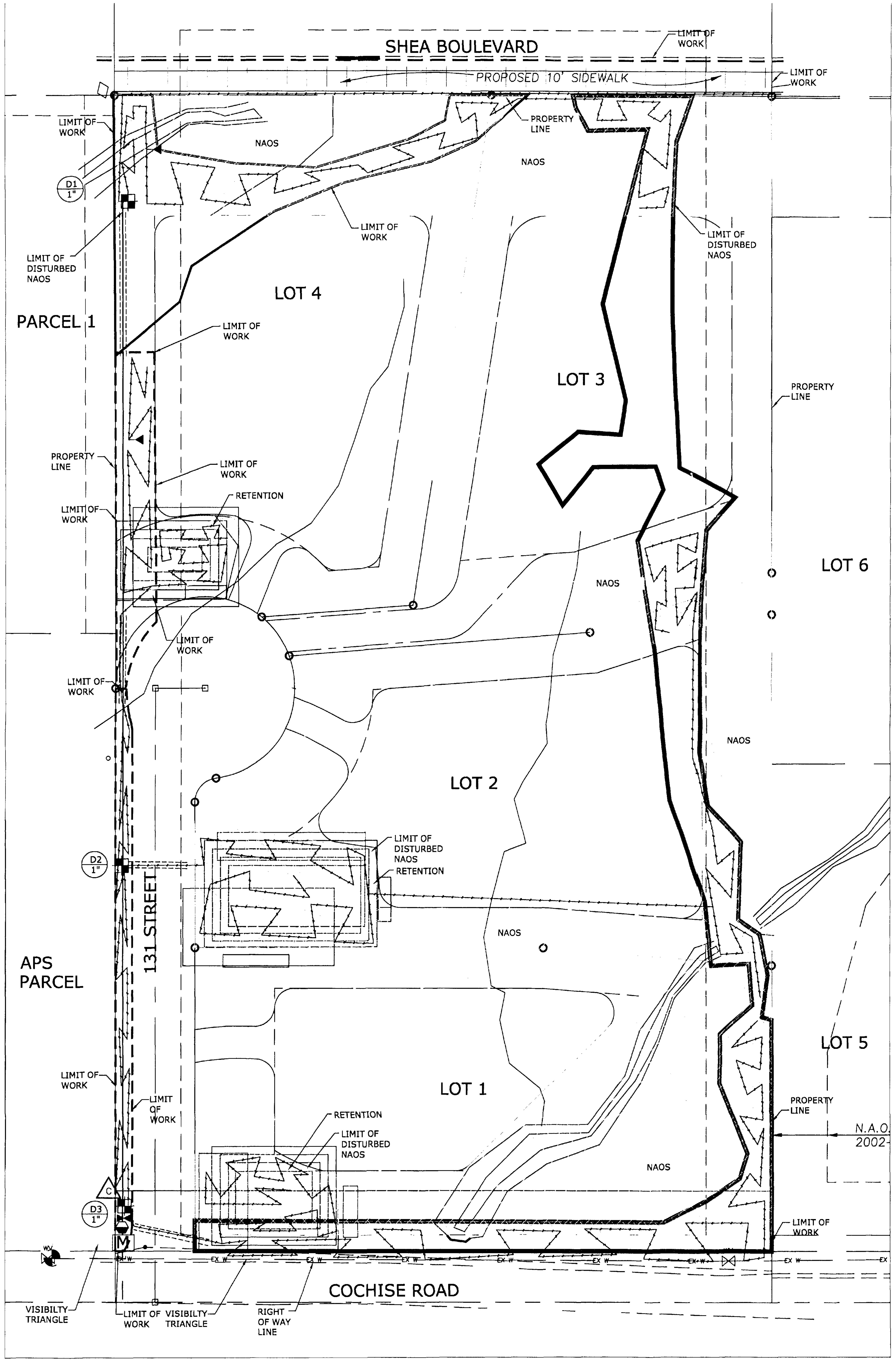


GENERAL NOTES:

-CONTACT THE CITY WATER & WASTEWATER OPERATIONS BACKFLOW PREVENTION FOR LATEST LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES OR CERTIFIED TESTERS.
-BACKFLOW PREVENTERS MUST BE TESTED BY A CERTIFIED TESTER BEFORE FINAL APPROVAL IS ISSUED.
-COPPER FITTINGS SHALL BE CONNECTED WITH LEAD FREE SOLDER JOINTS.
-ALL NIPPLES TO BE BRASS OR COPPER.
-PIPING UNDER CITY RIGHT-OF-WAY MUST BE COPPER TYPE "K"
-CALL BACKFLOW PREVENTION, FOR UNDERGROUND INSPECTION PRIOR TO BACKFILLING TRENCHES.
-INSTALL BACKFLOW UNIT WITHIN AN APPROVED SECURITY CAGE.

BACKFLOW PREVENTION ASSEMBLY 3/4" THRU 2-1/2"

NO SCALE



SCALE 1" = 30'

IRRIGATION PLAN

IRRIGATION LEGEND

EMITTER SCHEDULE

PLANT TYPE	PLANT SIZE	GPH PER OUTLET	# OF OUTLET	TOTAL GPM PER PLANT
TREES	15 GAL.	2 GPH	3	6 GPH
TREES	24" BOX	2 GPH	4	8 GPH
TREES	36" BOX	2 GPH	5	10 GPH
TREES	48" BOX	2 GPH	6	12 GPH
SHRUBS	5 GAL.	1 GPH PLANTS	2	2 GPH
SHRUBS AND G.C.	1 GAL.	1 GPH	1	1 GPH

PIPE LEGEND

1/2"	4.22	GPM
3/4"	8	GPM
1"	12	GPM
1-1/2"	30	GPM
2"	50	GPM

CLASS 200 PVC .5" MIN. LATERALS ——
SCHED. 40 PVC 1" MIN. MAINLINE ——
SCHED. 40 PVC 2" MIN. SLEEVE ====

D=DRIP/T=TURF/PD=PALMS DRIP VALVE SIZE (X / #")

DRIP EQUIPMENT

RAINBIRD 100-PEB-PRS-B ELECTRIC VALVE PRESSURE REGULATOR 420-3/4 (150 MESH) HYDRO RAIN WYE STRAINER VALVE BOX BY CARSON-OR APPROVE EQUAL

RAINBIRD 16A-FDV 1/2" FUSH VALVE OR APPROVED EQUAL —◀

PVC DRIP SYSTEM - SEE DETAIL THIS SHEET EMITTER LINE W/ BUG CAPS EMITTERS PER TREE-EQUALLY SPACED

CAP OR TIE INTO EXISTING WATERLINE

EQUIPMENT

(1) 0.75" WATER METER - INSTALL PER CIVIL PLAN AND ALL LOCAL CODES M

(1) FEBCO 825Y-BV 0.75" REDUCED PRESSURE BACKFLOW PREVENTER

(1) IRRITROL RAIN DIAL RD-6PLUS-6 STATION OR APPROVED EQUAL △C

WATEROUS SERIES 500 1" BRASS GATE VALVE OR APPROVED EQUAL ⋈

CARSON-OR APPROVE EQUAL VALVE BOXES

NOTE:

1. ALL EMISSION POINTS TO BE LOCATED ON THE UPHILL SIDE OF PLANT MATERIAL ONE EMISSION POINTS TO BE LOCATED AT THE PLANT BALL, WITH THE ADDITIONAL POINTS WITHIN PLANT PIT PERIMETER.
2. SCREEN ENCLOSURE TO BE GUARDSHACK AS MANUFACTURED BY BACLFLOW PREVENTION DEVICE ENCLOSURES INC. 602-788-5411 OR APPROVED EQUAL. FINSIH: POWDER COAT COLOR: DESERT TAN. PROVIDE 4" THICK CONC. SLAB FOR ENCLOSURE FOUNDATION.

IRRIGATION NOTES

-THE IRRIGATION PLAN IS DIAGRAMMATIC AND IT SHALL BE THE IRRIGATION CONTRACTOR'S RESPONSIBILITY TO ADJUST THE LOCATION OF OR WATERING RATE OF ANY HEAD OR DRIP EMMITER TO PROVIDE FULL AND ADEQUATE COVERAGE OR TO ADD ADDITIONAL HEADS AS NECESSARY TO ENSURE 100% COVERAGE TO TURF AND OPTIMUM GROWING CONDITIONS FOR ALL PLANT MATERIAL. CONTRACTOR TO ASSUME LIABIILITY FOR INSUFFICIENT IRRIGATION.
-THE IRRIGATION SYSTEM HAS BEEN DESIGNED FOR 65 PSI. THE IRRIGATION CONTRACTOR SHALL VERIFY THE WATER PRESSURE IN THE FIELD AND NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY SHOULD A DISCREPANCY EXIST.
-THE IRRIGATION CONTRACTOR SHALL SIZE THE PIPE ACCORDING TO THE PIPE SCHEDULE. GALLONS PER MINUTE ARE CALCULATED BY THE COMBINED EMISSION HEAD OUTPUT DOWNLINE FROM PIPE BEING SIZED.
-IRRIGATION SLEEVES ARE TO BE SCHEDULE 40 PVC WITH A MINIMUM DIAMETER TWICE THE SIZE OF THE IRRIGATION MAIN LINE. IRRIGATION SLEEVES ARE TO EXTEND 12" BEYOND EDGE OF PAVEMENT, WALL OR CURB AND A MINIMUM OF 36" BEYOND EDGE OF SIDEWALKS. PROVIDE SEPERATE SLEEVE FOR WIRE AT EACH SLEEVE LOCATION.
-CONTROLLERS ARE TO BE PROGRAMMED TO ALLOW SUFFICIENT FLOW RATES ARE MAINTAINED THROUGHOUT THE SYSTEM.
-ALL VALVE BOXES (IRRIGATION, GATE VALVES, FLUSH CAP, WATER FEATURES, CONTROL WIRE ETC.) ARE TO BE PLACED IN DECOMPOSED GRANITE/PLANTING AREAS. UNDER NO CIRCUMSTANCES ARE THE VALVE BOXES TO PLACED IN A LAWN OR HARDSCAPE AREA. BOX/LID COLOR TO MATCH ADJAVENT GRANITE/SURFACE MATERIAL.
-THE GENERAL CONTRACTOR IS RESPONDSIBLE TO PROVIDE POWER TO THE IRRIGATION CONTROLLER
-SUBMIT SHOP DRAWINGS OF PROPOSED SYSTEM, LAYOUT AND ANY PRE-AGREED UPON EQUIPMENT AND/OR LAYOUT MODIFICATION FOR LA APPROVAL PRIOR TO INSTALLATION.
-LOCATE PARTS AND EQUIPMENT (ELEC. VALVES, GATE VALVES, FLUSH VALVES, QUICK COUPLER VALVES AND CONTROLLERS) FOR LA APPROVAL PRIOR TO INSTALLATION.
-SCREEN SERVICE EQIPMENT WITH LANDSCAPE MATERIAL FROM VIEW OF STREETS, WALKWAYS AND ADJACENT PROPERTIES.
-24 VOLT WIRING TO BE #14 UFUL DIRECT BURIAL-SOLID COPPER
-WIRE SLEEVE TO BE 2" CLASS 200 PVC (MIN.)
-EXTEND (2) ADDITIONAL CONTROL WIRES TO FURTHEST VALVE BOX, WIRE TO CONTROLLER, COIL WIRE AND LABEL STATION NUMBERS.
SUBMIT AS-BUILT RECORD DRAWINGS ILLUSTRATING COMPLETE IRRIGATIONS SYSTEM TO LA/OWNER REP. AT TIME OF COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL PAYMENT.
-CIVIL PLANS SHALL GOVERN IN THE INSTALLATION OF WATER, SEWER, STORM DRAINAGE AND FIRE PROTECTION LINES. SEE CIVIL PLANS FOR LOCATION AND SIZES.

12-PP-2006
4TH: 06/14/2007

Cochise Manor
131 street and cochise avenue
scottsdale, arizona

u r b a n . g r a p h i t e
landscape architecture - site planning 7151 east 6th avenue scottsdale, arizona 85251 p480.775.3714 f480.990.0754 mail@urbangraphite.com

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 32932
DREW AQUILINA
ARIZONA
06/14/07

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SECTION 02810 IRRIGATION SYSTEM

1.0 GENERAL CONDITIONS

1.1 CONTRACTOR SHALL VISIT AND INSPECT SITE AND BE THOROUGHLY INFORMED OF ALL EXISTING CONDITIONS PRIOR TO THE BID. DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THOSE SHOWN ON DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT FOR CLARIFICATION.

1.2 "PROJECT COMPLETION" SHALL BE DEFINED AS THE DATE CONSTRUCTION IS COMPLETE AND THE MAINTENANCE PERIOD BEGINS.

1.3 THE IRRIGATION CONTRACTOR, WITH THEIR BID SUBMITTAL SHALL PROVIDE WRITTEN VERIFICATION OF THREE (3) YEARS DEMONSTRATIVE ABILITY TO PERFORM THE WORK SPECIFIED HEREIN. PAST WORK SHALL BE OF SIMILAR TYPE, SCALE AND QUALITY.

2.0 WORK SPECIFIED HEREIN

2.1 THE WORK SPECIFIED WITHIN THIS SECTION SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY TO COMPLETE ALL THE IRRIGATION AS DETAILED AND SPECIFIED, INCLUDING THE FOLLOWING WORK REASONABLY INCIDENTAL THERETO.

2.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING WORK UNLESS OTHERWISE SPECIFIED ON THE PLANS.

2.2.1 COORDINATION OF ALL THE IRRIGATION WORK TO INSURE SUCCESSFUL INTEGRATION WITH THE LANDSCAPING.

2.2.2 ACCEPTING THE FINISHED GRADE PROVIDED, +/- 0.1 OF A FOOT AS SHOWN ON THE GRADING PLAN.

3.0 SAMPLES & TESTS

3.1 THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO TAKE AND ANALYZE SAMPLES OF MATERIALS FOR CONFORMITY TO SPECIFICATIONS AT ANY TIME. CONTRACTOR SHALL FURNISH SAMPLES UPON REQUEST BY LANDSCAPE ARCHITECT. REJECTED MATERIALS SHALL BE IMMEDIATELY REMOVED FROM THE SITE AND REPLACED AT THE CONTRACTOR'S EXPENSE. COST OF TESTING OF MATERIALS NOT MEETING SPECIFICATION SHALL BE PAID BY CONTRACTOR.

3.2 UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PASSING ALL CITY REQUIRED INSPECTIONS, TESTING AND PERFORMANCE VERIFICATION OF THE IRRIGATION SYSTEM REPRESENTED ON THESE PLANS.

3.3 REQUIREMENTS OF REGULATORY AGENCIES:

3.3.1. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH LATEST RULES AND REGULATIONS OF SAFETY ORDERS OF DIVISION OF INDUSTRIAL SAFETY, THE UNIFORM PLUMBING CODE, AND OTHER APPLICABLE LAWS OR REGULATIONS.

3.3.2. SHOULD THE CONTRACT DOCUMENTS BE A VARIANCE WITH REGULATORY REQUIREMENTS, NOTIFY LANDSCAPE ARCHITECT AND RECEIVE INSTRUCTIONS BEFORE PROCEEDING WITH WORK AFFECTED.

3.4 TESTING:

3.4.1. PRELIMINARY REVIEW OF COMPLETED INSTALLATION WILL BE MADE BY LANDSCAPE ARCHITECT PRIOR TO BACKFILLING OF TRENCHES AND DURING HYDROSTATIC TESTING.

3.4.2. FINAL REVIEW WILL BE MADE IN CONJUNCTION WITH THE FINAL REVIEW OF SHRUB AND TREE PLANTING.

4.0 COORDINATION AND RESPONSIBILITY

4.1 COORDINATE AND COOPERATE WITH OTHER TRADES WORKING ON THE SITE FOR SUCCESSFUL COMPLETION OF THE PROJECT.

4.2 BEFORE COMMENCING WORK ON THE SITE, BECOME THOROUGHLY ACQUAINTED WITH LAYOUT OF ALL UNDERGROUND UTILITIES AND STRUCTURES OVER THE ENTIRE SITE. ALL REQUISITE REPAIRS TO CORRECT DAMAGE CAUSED BY WORK OF THIS SECTION SHALL BE AT THE CONTRACTOR'S EXPENSE. CONTRACTOR MUST ADDRESS DEMOLITION NOTES IN LANDSCAPE SPECIFICATIONS.

4.3 ALL EXISTING PLANT MATERIAL AND ASSOCIATED ELEMENTS NOT INDICATED FOR REMOVAL SHALL BE PROTECTED AND MAINTAINED AS NECESSARY TO ENSURE SURVIVAL. SHOULD A TEMPORARY IRRIGATION SYSTEM BE REQUIRED TO ENSURE SURVIVAL, THE CONTRACTOR SHALL PROVIDE SUCH SYSTEM AS PART OF THIS CONTRACT. COORDINATE WORK WITH GENERAL CONTRACTOR.

4.4 A RECONSTRUCTION CONFERENCE TO DISCUSS THE IRRIGATION PROJECT WORK SHALL BE HELD AT A TIME AGREED UPON. THE CONTRACTOR, TOGETHER WITH REPRESENTATIVES OF HIS LANDSCAPE SUBCONTRACTOR, SHALL ATTEND, AS WILL THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT. THE PURPOSE OF THIS CONFERENCE IS TO DISCUSS THE PROJECT IN DETAIL, INCLUDING SCHEDULING OF WORK, SITE PREPARATION, INTERPRETATION OF DOCUMENTS AND TO ANSWER QUESTIONS THAT MAY ARISE. UNLESS FOLLOWED UP IN WRITING, VERBAL AUTHORIZATIONS OR ACKNOWLEDGMENT BY ANYONE PRESENT SHALL NOT BE BINDING.

5.0 STANDARDS

5.1 EXISTING CONDITIONS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE OR BREAKAGE TO EXISTING EQUIPMENT, AND RETURNING IT TO ITS EXISTING CONDITION (INCLUDING PIPE, FIXED STRUCTURES, OR LANDSCAPING), BEING SURE TO FLUSH AND CLEAN OUT ALL VALVES AND SPRINKLERS AS IS NECESSARY. THE CONTRACTOR SHALL REFER TO THE DRAWINGS PROVIDED, AND CONSULT THE PROJECT SUPERINTENDENT TO AVOID DAMAGE TO EXISTING FEATURES AND UTILITIES. REFER TO DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS SHEET.

5.2 MATERIALS: ALL MATERIALS TO BE INCORPORATED IN THIS SYSTEM SHALL BE NEW AND WITHOUT FLAWS OR DEFECTS AND OF QUALITY AND PERFORMANCE AS SPECIFIED WITHIN THE CONSTRUCTION DOCUMENTS. WHENEVER MATERIAL IS SPECIFIED BY NAME OR NUMBER, SUCH SPECIFICATIONS SHALL BE DEEMED TO FACILITATE A DESCRIPTION OF THE MATERIAL; NO SUBSTITUTIONS OF MATERIAL SHALL BE PERMITTED UNLESS SPECIFICALLY APPROVED BY THE CITY IN WRITING. NO SUBSTITUTIONS OF SMALLER PIPE SIZES MAY BE APPROVED. ALL PIPE DAMAGED OR REJECTED BECAUSE OF DEFECTS SHALL BE REMOVED FROM THE SITE.

5.3 RECORD DRAWINGS: THE OWNER SHALL FURNISH THE CONTRACTOR WITH ONE (1) SET OF BOND PLOTS, SHOWING ALL WORK REQUIRED UNDER THIS CONTRACT, FOR THE PURPOSE OF HAVING THE CONTRACTOR RECORD ON THESE PRINTS ALL CHANGES THAT MAY BE MADE DURING THE ACTUAL INSTALLATION OF THE SYSTEM. IMMEDIATELY UPON INSTALLATION OF ANY PIPING, VALVES, WIRING, ETC., IN LOCATIONS OTHER THAN SHOWN ON THE ORIGINAL DRAWINGS, OR OF SIZES OTHER THAN INDICATED, THE CONTRACTOR SHALL CLEARLY INDICATE SUCH CHANGES ON THE SET OF DRAWINGS WITH DIMENSIONS OF MAIN LINE FITTINGS, GATE VALVES, AND MAIN LINE ROUTING EVERY 100'. (AFTER FINAL ACCEPTANCE OF THE COMPLETED INSTALLATION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING COMPLETE DRAWINGS PREPARED SHOWING ALL SUCH CHANGES AND THESE "AS BUILT DRAWINGS" SHALL BE TURNED OVER TO THE OWNER'S REPRESENTATIVE FOR RECORDING PURPOSES, WITH THE REST OF THE MYLARS AT THE END OF THE JOB).

5.4 MATERIAL STORAGE AND CLEAN UP: THE CONTRACTOR SHALL KEEP THE PREMISES FREE FROM RUBBISH AND DEBRIS AT ALL TIMES AND SHALL ARRANGE HIS MATERIAL STORAGE SO AS NOT TO INTERFERE WITH THE CONSTRUCTION OF THE PROJECT BY OTHER TRADES. ALL UNUSED MATERIAL, RUBBISH AND DEBRIS SHALL BE REMOVED FROM THE SITE PER DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS.

5.5 EQUIPMENT, TOOLS AND LABOR: THE CONTRACTOR SHALL FURNISH ALL SUCH EQUIPMENT, TOOLS, AND LABOR NECESSARY TO COMPLETE WORK IN AN EFFICIENT AND ACCEPTABLE MANNER. THIS CONTRACT IS BASED ON THE CONTRACTOR FURNISHING AND USING HIS OWN EQUIPMENT, TOOLS AND LABOR WHICH ARE SUITABLE TO CARRY OUT THIS CONTRACT IN A FIRST CLASS MANNER, UNLESS OTHERWISE HEREIN SPECIFIED.

5.6 THE INSTALLATION

THE CONTRACTOR SHALL UNDERSTAND THAT THESE DRAWINGS ARE DIAGRAMMATIC AND THE CONTRACTOR SHALL BE RESPONSIBLE TO ACHIEVE 100% COVERAGE WITHOUT EXCESSIVE OVERSPRAY OR PUDDLING. IN ALL SITUATIONS THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A SAFE AND EFFICIENT IRRIGATION SYSTEM WETHER CALLED OUT ON THE DRAWINGS OR NOT, ALL CACTI SHALL BE VALVED SEPARATELY. COORDINATE WITH THE LANDSCAPE CONTRACTOR.

5.7 SUBMITTALS

5.7.1. FURNISH REQUIRED COPIES OF MANUFACTURER'S LITERATURE, CERTIFICATIONS, AND OPERATING INSTRUCTIONS FOR THE COMPLETE LIST OF MATERIALS, FOR THE FOLLOWING ITEMS:

A. IRRIGATION CONTROLLER.
B. BACKFLOW PREVENTOR, IF APPLICABLE.
C. GATE VALVES.
D. PIPE AND FITTINGS.
E. REMOTE-CONTROL VALVES.
F. VALVE BOXES.
G. QUICK-COUPLING VALVES AND MANUAL VALVES.
H. DRIP EMITTERS, AND BUBBLERS.
I. LOW VOLTAGE WIRES AND CONNECTORS.
J. PRESSURE REGULATOR DEVICE.
K. FILTER DEVICE.
L. AIR RELIEF VALVE.

5.8 WARRANTY

5.8.1. IN ADDITION TO MANUFACTURER'S WARRANTIES, WORK SHALL BE WARRANTED AND GUARANTEED FOR 1 YEAR FROM THE DATE OF COMPLETION AGAINST DEFECTS IN MATERIAL, EQUIPMENT, AND WORKMANSHIP. WARRANTY/GUARANTY SHALL ALSO COVER REPAIR OF DAMAGE TO ANY PART OF PREMISES RESULTING FROM LEAKS OR OTHER DEFECTS IN MATERIALS, EQUIPMENT, AND WORKMANSHIP, TO THE SATISFACTION OF THE OWNER.

5.8.2. CONTRACTOR SHALL NOT BE HELD RESPONSIBLE FOR FAILURES DUE TO NEGLECT BY OWNER, VANDALISM, ETC., DURING WARRANTY/GUARANTY PERIOD. REPORT SUCH CONDITIONS TO THE OWNER IN WRITING.

5.8.3. CONTRACTOR SHALL NOT ALLOW NOR CAUSE ANY OF HIS WORK TO BE COVERED OR ENCLOSED UNTIL IT HAS BEEN INSPECTED, TESTED AND ACCEPTED BY THE AUTHORIZED PERSONNEL. SHOULD ANY OF HIS WORK BE ENCLOSED OR COVERED BEFORE SUCH INSPECTION AND TEST, HE SHALL UNCOVER THE WORK AT HIS OWN EXPENSE AND AFTER IT HAS BEEN INSPECTED, TESTED AND ACCEPTED, SHALL MAKE ALL REPAIRS WITH LIKE MATERIALS NECESSARY TO RESTORE ALL HIS WORK AND THAT OF OTHER CONTRACTORS TO ITS ORIGINAL CONDITION, AT NO ADDITIONAL COST TO THE OWNER.

6.0 EXCAVATION WORK

6.1 EXCAVATION AND BACKFILL: PIPE TRENCHES SHALL BE EXCAVATED OF SUFFICIENT DEPTH AND WIDTH TO PERMIT PROPER HANDLING AND INSTALLATION OF THE PIPE AND FITTINGS. THE BACKFILL SHALL BE THOROUGHLY COMPACTED AND EVENED OFF WITH THE ADJACENT SOIL LEVEL IN A MANNER WHICH MINIMIZES TRENCH SETTLING. SELECTED FILL DIRT OR SAND SHALL BE USED IF SOIL CONDITIONS ARE ROCKY. IN ROCKY AREAS, THE TRENCHING DEPTH SHALL BE (2) INCHES BELOW NORMAL TRENCH DEPTH TO ALLOW FOR BEDDING. THE FILL DIRT OR SAND SHALL BE USED IN FILLING FOUR (4) INCHES ABOVE THE PIPE. THE REMAINDER OF THE BACKFILL SHALL CONTAIN NO LUMPS OR ROCKS LARGER THAN (3) INCHES. THE TOP SIX (6) INCHES OF BACKFILL SHALL BE FREE OF ROCKS OVER (1) INCH, SUBSOIL OR TRASH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPACTING TRENCHED AREAS UNDER PAVED AREAS PER SECTION 02220 AND 85% UNDER PLANTED AREAS.

6.2 EXISTING UTILITIES AND STRUCTURES THE EXACT LOCATION OF ALL EXISTING UTILITIES AND STRUCTURES AND UNDERGROUND UTILITIES, WHETHER INDICATED ON THE DRAWINGS OR NOT, SHALL BE IDENTIFIED BY THE CONTRACTOR AND THEY SHALL CONDUCT THEIR WORK SO AS TO PROTECT EXISTING STRUCTURES AND UTILITY SERVICES AND SHALL BE RESPONSIBLE FOR THEIR REPLACEMENT IF DAMAGED. REFER TO DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS.

6.3 MINOR ADJUSTMENTS IN THE SYSTEM SHALL BE PERMITTED TO CLEAR EXISTING FIXED OBSTRUCTIONS; SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE. GENERAL CONTRACTOR SHALL PROVIDE POWER TO ALL POINTS SHOWN ON PLANS. THE GENERAL CONTRACTOR SHALL MAKE APPLICATION WITH THE LOCAL UTILITY FOR DRAWINGS AND PERMITS TO COMPLETE THE ABOVE WORK.

7.0 PIPE AND TUBE

7.1 GENERALLY, UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS, THE CONSTRUCTION OF IRRIGATION LINES AND INSTALLATION OF CONTROL WIRING AND/OR CONTROL LINES SHALL INCLUDE EXCAVATION AND BACKFILL, THE FURNISHINGS, INSTALLING AND TESTING OF SPRINKLER PIPE, TUBE AND FITTINGS, AND THE REMOVAL AND/OR RESTORATION OF EXISTING IMPROVEMENTS AND ALL OTHER WORK IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

7.1.1 UNLESS OTHERWISE INDICATED ON THE DRAWINGS, ALL PIPE SHALL BE INSTALLED WITH A MINIMUM COVER OF TWELVE (12) INCHES BELOW FINISHED GRADE.

7.1.2 GENERALLY, PIPING/SLEEVING UNDER CONCRETE OR ASPHALT SHALL BE INSTALLED PRIOR TO ANY SURFACE WORK. JACKING, BORING OR HYDRAULIC DRIVING SHALL BE AN ACCEPTABLE METHOD TO INSTALL PIPE UNDER EXISTING CONCRETE OR ASPHALT. WHERE ANY CUTTING OR BREAKING OF SIDEWALKS, CONCRETE WORK AND/OR ASPHALT IS NECESSARY, IT SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR. PERMISSION TO CUT OR BREAK SIDEWALKS, CONCRETE AND/OR ASPHALT SHALL BE OBTAINED FROM THOSE HAVING PROPER JURISDICTION. SEE DEMOLITION NOTES ON LANDSCAPE SPECIFICATIONS FOR ANY ROAD OR SIDEWALK CONSTRUCTION.

7.1.3 ALL IRRIGATION PIPE LESS THAN 4" DIAMETER INSTALLED UNDER CONCRETE OR PAVEMENT SHALL BE SLEEVED WITHIN A SCHEDULE 40 PVC PIPE TWICE THE DIAMETER OF THE IRRIGATION LINE BEING SLEEVED. SLEEVE SHALL BE OF SUFFICIENT LENGTH TO PERMIT A MINIMUM OF 12" EXTENDING BEYOND EDGE OF CONCRETE OR PAVEMENT. ALL IRRIGATION PIPE 4" OR GREATER IN DIAMETER SHALL BE UNSLEEVED SCHEDULE 40 PVC.

7.2 PLASTIC PIPE LINES: PLASTIC PIPE SHALL BE RIGID, UNPLASTICIZED PVC; SIZE AND PRESSURE RATING OR SCHEDULE AS SHOWN ON THE PLANS, EXTRUDED FROM VIRGIN PARENT MATERIAL OF THE TYPE SPECIFIED ON THE DRAWINGS. THE PIPE SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM VISIBLE CRACKS, HOLES, FOREIGN MATERIALS, BLISTERS, DELETIONS, WRINKLES, AND DENTS.

7.3 PLASTIC PIPE FITTINGS AND CONNECTIONS: ALL PLASTIC PIPE FITTINGS TO BE INSTALLED SHALL BE MOLDED FITTINGS MANUFACTURED OF THE SAME MATERIAL AS THE PIPE AND SHALL BE SUITABLE FOR SOLVENT WELD, SLIP JOINT, RING TIGHT SEAL, OR SCREWED CONNECTIONS. NO FITTINGS MADE OF OTHER MATERIAL SHALL BE USED EXCEPT BRASS SADDLE TEES AND CROSSES AS HEREINAFTER SPECIFIED. SLIP FITTING SOCKET TAPER SHALL BE SO SIZED THAT A DRY UNSOFTENED PIPE END, CONFORMING TO THESE SPECIAL PROVISIONS, CAN BE INSERTED NO MORE THAN HALFWAY INTO THE SOCKET. PLASTIC SADDLE AND FLANGE FITTINGS SHALL NOT BE PERMITTED. ONLY SCHEDULE 80 PIPE SHALL BE THREADED. WHEN CONNECTION IS PLASTIC TO METAL, PLASTIC SOLVENT WELD MALE ADAPTERS SHALL BE USED. THE MALE ADAPTER SHALL BE HAND TIGHTENED, PLUS ONE TURN WITH A STRAP WRENCH. JOINT COMPOUND SHALL BE TEFLON TAPE.

7.4 IDENTIFICATION: ALL PIPE SHALL BE CONTINUOUSLY AND PERMANENTLY MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME OR TRADEMARK, SIZE, SCHEDULE AND TYPE OF PIPE, WORKING PRESSURE AT 73 DEGREES F. AND NATIONAL SANITATION FOUNDATION (N.S.F.) APPROVAL. ALL PIPE CARRYING TREATED EFFLUENT (NON-POTABLE WATER) SHALL BE LABELED IN SUCH A MANNER TO IDENTIFY IT AS DIFFERENT FROM POTABLE WATER BY COLOR AND WRITTEN IDENTIFICATION ORIGINATING AT THE MANUFACTURER.

7.5 DELIVERY

PLASTIC PIPE SHALL BE DELIVERED TO THE SITE IN UNBROKEN BUNDLES, ROLLS, OR PACKAGES IN SUCH A MANNER AS TO PROVIDE ADEQUATE PROTECTION FOR THE PIPE ENDS, EITHER THREADED OR PLAIN. PLASTIC PIPE SHALL BE COVERED TO PROVIDE PROTECTION FROM THE SUN'S RAYS.

7.6 INSTALLATION OF PLASTIC PIPE

PLASTIC PIPE SHALL BE INSTALLED IN A MANNER SO AS TO PROVIDE FOR EXPANSION AND CONTRACTION AS RECOMMENDED BY THE MANUFACTURER. PLASTIC PIPE SHALL BE CUT SQUARE IN A LOCALLY ACCEPTABLE MANNER. BURRS AT CUT ENDS SHALL BE REMOVED PRIOR TO INSTALLATION SO THAT A SMOOTH UNOBSTRUCTED FLOW IS OBTAINED. ALL PLASTIC TO PLASTIC JOINTS SHALL BE SOLVENT WELD JOINTS OR SLIP SEAL JOINTS. ONLY THE SOLVENT RECOMMENDED BY THE PIPE MANUFACTURER SHALL BE USED. ALL PLASTIC PIPE AND FITTINGS SHALL BE INSTALLED AS OUTLINED AND INSTRUCTED BY THE PIPE MANUFACTURER AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE PIPE MANUFACTURER FOR ANY FIELD ASSISTANCE THAT IS NECESSARY. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE CORRECT INSTALLATION. ALL PLASTIC-TO-METAL JOINTS SHALL BE MADE WITH SOLVENT WELD PLASTIC MALE ADAPTER OR SLIP SEAL JOINTS. ONLY THE SOLVENT RECOMMENDED BY THE PIPE MANUFACTURER SHALL BE USED. ALL PLASTIC PIPE AND FITTINGS SHALL BE INSTALLED AS OUTLINED AND INSTRUCTED BY THE PIPE MANUFACTURER AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE PIPE MANUFACTURER FOR ANY FIELD ASSISTANCE THAT IS NECESSARY FOR THE CORRECT INSTALLATION.

7.6.1 THE SOLVENT WELD JOINTS SHALL BE MADE IN THE FOLLOWING MANNER:

1. THOROUGHLY CLEAN THE MATING PIPE AND FITTINGS WITH A CLEAN, DRY CLOTH.
2. APPLY A UNIFORM COAT OF PRIMER TO THE OUTSIDE OF THE PIPE WITH A NON SYNTHETIC BRISTLE BRUSH.
3. APPLY PRIMER TO THE FITTING IN A SIMILAR MANNER.
4. APPLY A UNIFORM COAT OF SOLVENT TO THE OUTSIDE OF THE PIPE WITH A NON-SYNTHETIC BRISTLE BRUSH.
5. APPLY SOLVENT TO THE FITTING IN A SIMILAR MANNER.
6. RE-APPLY A LIGHT COAT OF SOLVENT TO THE PIPE AND QUICKLY INSERT IT INTO THE FITTING.
7. GIVE THE PIPE OR FITTING A QUARTER TURN TO INSURE EVEN DISTRIBUTION OF THE SOLVENT AND MAKE SURE THE PIPE IS INSERTED TO THE FULL DEPTH OF THE FITTING SOCKET.
8. HOLD IN POSITION FOR FIFTEEN (15) SECONDS.
9. WIPE OFF EXCESS SOLVENT THAT APPEARS AT THE OUTER SHOULDER OF THE FITTING.

7.6.2 CARE SHALL BE TAKEN SO AS NOT TO USE AN EXCESS AMOUNT OF SOLVENT, THEREBY CAUSING A BURR OR OBSTRUCTION TO FORM ON THE INSIDE OF THE PIPE.

7.6.3 THE JOINTS SHALL BE ALLOWED TO SET AT LEAST 24 HOURS BEFORE PRESSURE IS APPLIED TO THE SYSTEM ON PVC PIPE.

7.7 FLUSHING AND TESTING

AFTER ALL NEW DRIP PIPING IS IN PLACE AND CONNECTED, FOR A GIVEN SECTION, AND ALL NECESSARY DIVISION WORK HAS BEEN COMPLETED AND PRIOR TO INSTALLATION OF SPRINKLER HEADS, ALL CONTROL VALVES SHALL BE OPENED AND A FULL HEAD OF WATER USED TO FLUSH OUT THE SYSTEM. THE SYSTEM SHALL BE RUN UNDER FULL LOAD OF IRRIGATION DEMAND AS THE FINAL TEST.

7.8 STEEL PIPE AND FITTINGS AT BACK FLOW PREVENTER (AS NEEDED)

7.8.1 STEEL PIPE SHALL BE NEW, SCALE-FREE, MILD STEEL PIPE AND SHALL BE STANDARD WEIGHT SCHEDULE 40.

7.8.2 STEEL PIPE FITTINGS SHALL BE HEAVY PATTERN, BANDED, GALVANIZED MALLEABLE IRON, EPOXY COATED, THREADED PIPE FITTINGS. ALL NIPPLES SHALL BE OF THE SAME MATERIAL AS THE PIPE. BUSHINGS, CLOSE NIPPLES AND CROSSES SHALL NOT BE INSTALLED. STREET ELBOWS SHALL BE INSTALLED ONLY AS PART OF THE DRAIN VALVE ASSEMBLY.

7.8.3 PIPE SHALL BE CAREFULLY CLEANED BEFORE INSTALLATION. THE ENDS OF ALL THREADED PIPE SHALL BE REAMED OR FULL SIZE. JOINTS IN ALL SCREWED PIPING SHALL BE MADE BY APPLYING AN APPROVED OIL BASE THREAD LUBRICANT ON THE MALE THREAD ONLY.

7.9 MAIN LINE FITTINGS

FITTINGS, BENDS, TEES AND CROSSES IN THE MAIN LINES SHALL BE IN ACCORDANCE WITH AWWA CAST IRON OR DUCTILE IRON TYPE. ALL MAIN LINE FITTINGS SHALL BE CAST IRON TYPE FOR PVC PIPE AS PER PLAN AND DETAILS INCLUDING TAPS TO ELECTRIC VALVES. CONTRACTOR SHALL FURNISH FITTINGS, ALL ADAPTERS, REDUCERS AND APPURTENANCE OF THE SIZE AND TYPE NECESSARY FOR THE COMPLETION OF THE PIPELINE. WHERE TAPS MUST BE MADE IN EXISTING MAIN LINE PIPE, USE ROMAC # 202-N DOUBLE STRAP SADDLE FITTINGS.

7.10 RISERS

ALL QUICK-COUPLING VALVES SHALL HAVE AN ADJUSTABLE RISER ASSEMBLY (DOUBLE SWING JOINT RISER) ASSEMBLED BY THE USE OF AT LEAST THREE (3) PVC SCH. 80 ELLS OR TEES AS RECOMMENDED BY THE QUICK COUPLER MANUFACTURER AND/OR AS SHOWN ON THE DRAWINGS. THESE DOUBLE SWING JOINT RISERS SHALL BE OF SCH. 80 PVC PLASTIC PIPE AND FITTINGS UNLESS OTHERWISE INDICATED, AS SHOWN ON DETAIL DRAWINGS OF PLANS. THE HORIZONTAL NIPPLE CONNECTED DIRECTLY INTO THE SIDE OUTLET OF THE MAIN LINE SHALL BE A MINIMUM OF SIX (6) INCHES LONG. ALL OTHER NIPPLES OF THE SWING JOINT RISER SHALL BE OF LENGTH AS REQUIRED FOR PROPER INSTALLATION OF THE QUICK COUPLER, DRAIN VALVE AND/OR AUTOMATIC CONTROL VALVE. THE SWING JOINT RISER SHALL BE OF PROPER PIPE SIZE AS SHOWN ON THE DRAWINGS.

8.0 DRIP IRRIGATION

8.1 ELECTRIC CONTROL VALVES: CONTROL VALVES SHALL BE THE TYPE INDICATED ON THE DRAWINGS AND BE CAPABLE OF OPERATING AT 10 G.P.M.'S. NOTE: DRIP FOR PALM TYPE TREE OR FREE STANDING PLANTERS SHALL BE SET UP ON INDIVIDUAL VALVES.

8.2 Y-FILTERS: FILTERS SHALL BE "Y" BODY TYPE AND SHALL BE CONSTRUCTED FROM GLASS REINFORCED POLYPROPYLENE WITH 150 MESH SCREENS OR AS INDICATED ON THE DRAWINGS.

8.3 PRESSURE REGULATORS: PRESSURE REGULATORS SHALL BE FACTORY PRE-SET AT 25 PSI AND SHALL BE THE ADJUSTABLE, TYPE AS INDICATED ON THE DRAWINGS.

8.4 DRIP IRRIGATION PIPING: DRIP IRRIGATION PIPING SHALL BE CLASS 315 OR 200 PVC, NOMINAL SIZE OF 1/2" OR LARGER.

8.5 EXTENSION TUBING: MICRO-TUBING SHALL MEET EMITTER MANUFACTURER'S RECOMMENDATIONS. BOWSMITH EMITTER WITH TUBING SHALL NOT EXCEED 5' IN LENGTH AND SHALL HAVE AN EMITTER OUTLET CHECK VALVE (BUG CAP) ATTACHED TO THE END.

8.6 FLUSH CAP: END CAPS AND END CAP CONNECTORS (MINIMUM OF TWO PER STATION OR AS PER DETAIL).

8.7 OTHER MATERIALS: PROVIDE OTHER MATERIALS WHICH MAY NOT BE CALLED OUT IN THE SPECIFICATIONS BUT ARE CALLED OUT IN THE DRAWINGS AND INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.

9.0 VALVES AND KEYS

9.1 GENERAL: UNLESS OTHERWISE SPECIFIED, THE INSTALLATION OF ALL VALVES SHALL INCLUDE THE EXCAVATION AND BACKFILL, THE FURNISHING, INSTALLING AND TESTING OF RISERS, FITTINGS, AND VALVES, AND THE REMOVAL AND/OR RESTORATION OF EXISTING IMPROVEMENTS AND ALL OTHER WORK IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND AS REQUIRED FOR THE COMPLETED INSTALLATION.

9.1.1 ALL DRAIN VALVE ASSEMBLIES SHALL BE INSTALLED WITH A LENGTH OF 2" PVC PLASTIC PIPE OF LENGTH REQUIRED TO EXTEND FROM THE TOP OF THE VALVE TO FINISH GRADE LINE. A RAINBIRD LOCKING TYPE VALVE MARKER OR EQUAL, SHALL BE INSTALLED IN THE TOP OF THE 2" PIPE FOR EASY LOCATION OF THE VALVE AND FOR ACCESS FOR OPERATION OF THE VALVE.

9.1.2 IF SHOWN ON THE PLANS THE 2" DRAIN VALVE SHALL BE PROVIDED WITH PROPER GRAVEL SUMP AT THE OUTLET, OF SUFFICIENT SIZE TO PROVIDE PROPER DRAINAGE OR IF CONDITIONS ARE SUCH, THE OUTLET SHALL BE PIPED TO A DRAINAGE TILE, DRAINAGE DITCH OR POND AS DESIRED TO PROVIDE PROPER DRAINAGE.

9.1.3 WHERE REQUIRED BY LOCAL OR STATE CODE, AN ATMOSPHERIC OR PRESSURE TYPE ANTI-SIPHON OR BACKFLOW PREVENTION TYPE VALVE SHALL BE INSTALLED IN ACCORDANCE WITH ALL LOCAL CODES. BACKFLOW PREVENTION ASSEMBLY SHALL BE TESTED AND APPROVED BY THE PROPER AUTHORITIES PRIOR TO ACCEPTANCE.

9.1.4 ALL QUICK-COUPLING VALVES SHALL BE INSTALLED WITH AN ADJUSTABLE SWING JOINT RISER ASSEMBLY UNIT (DOUBLE SWING JOINT RISER) ASSEMBLED BY THE USE OF AT LEAST THREE (3) 90 DEGREE ELLS OR TEES. THESE DOUBLE SWING JOINT RISERS SHALL BE OF SCHEDULE 80 PVC NIPPLES AND SCHEDULE 80 PVC FITTINGS OR UNLESS OTHERWISE DESIGNATED ON THE DRAWINGS. THE SWING JOINT RISER SHALL BE OF PROPER PIPE SIZE AS SHOWN ON THE DRAWINGS. (FACTORY PRE-ASSEMBLED UNITS MAY BE USED).

9.2 KEYS AND QUICK COUPLING VALVES: THE QUICK-COUPLING VALVES, WHERE INDICATED ON THE DRAWINGS, SHALL BE TWO PIECE BODY QUICK COUPLER TURF VALVES CONSTRUCTED OF HIGHEST GRADE HEAVY DUTY BRONZE CASTING BODIES.

9.2.1 BODY SHALL BE OF TWO PIECE CONSTRUCTION CONSISTING OF A LOWER AND UPPER PIECE BODY. THE UPPER VALVE BODY SHALL BE EASILY REMOVABLE FOR MAINTENANCE. THE VALVE PARTS SHALL BE REPLACEABLE AND EACH VALVE SHALL HAVE THREE (3) STOPS, OR OPEN POSITIONS TO PROVIDE REGULATION OF FLOW. VALVE COVER SHALL BE OF HEAVY, CAST IRON WITH CADMIUM PLATE PROTECTIVE FINISH.

9.2.2 THE QUICK-COUPLING VALVES SHALL BE THREE QUARTER (3/4) INCH QUICK-COUPLING OR AS INDICATED ON THE DRAWINGS, AND SHALL HAVE 3/4-INCH SIZE BOTTOM FEMALE PIPE THREAD CONNECTION. VALVES SHALL BE COMPLETE WITH STANDARD TOP.

9.2.3 THE CONTRACTOR SHALL SUPPLY THE OWNER WITH ONE (1) PREPLACEMNT RAINBIRD #33 K QUICK-COUPLER WITH HOSE SWIVEL ELLS FOR EVERY QUICK COUPLER SHOWN ON PLAN.

9.3 GATE VALVES (STANDARD)ALL ZONE SHUT-OFF OR OTHER VALVES, NOT INDICATED AS MANUAL ANGLE CONTROL VALVES, OF SIZES TWO (2) INCH AND SMALLER SHALL BE ALL BRONZE DOUBLE DISC WEDGE TYPE WITH INTEGRAL TAPER SEATS AND WITH NON-RISING STEM. ALL GATE VALVES LARGER THAN 2" SHALL BE IRON BODY, BRASS TRIMMED, DOUBLE DISC WEDGE TYPE WITH INTEGRAL TAPER SEATS AND WITH NON-RISING STEMS. GATE VALVES SHALL FUNCTION AND BE EQUAL TO WATEROUS SERIES 500 OR EQUAL. GATE VALVES 4" OR LARGER SHALL HAVE A 2" SQUARE NUT FOR FLOW CONTROL. ALL VALVES SHALL BE PLACED IN A VALVE BOX (TYPICALLY).

9.4 AUTOMATIC, REMOTE CONTROL VALVES, ELECTRIC SOLENOID TYPE. ALL AUTOMATIC REMOTE CONTROL VALVES SHALL BE PER PLANS AND SPECIFICATIONS OR EQUAL SERIES. IN ADDITION, PLANS MAY REQUIRE ELECTRIC VALVE FOR WASTEWATER AND GREY WATER APPLICATIONS. THE SOLENOID ELECTRICAL OPERATING RANGE SHALL BE 20 TO 30 VAC, 50-60 HZ MEAN SOLENOID VOLT-AMP RATING SHALL BE 8.5 VA AT 24 VAC, 60 HZ. SOLENOID COIL D.C. RESISTANCE SHALL BE 15 PLUS OR MINUS 3 OHMS.

9.5 AUTOMATIC DRAIN VALVES: AT ALL LOCATIONS INDICATED ON THE DRAWINGS INSTALL AUTOMATIC DRAIN VALVES, IF SHOWN ON PLANS. THE AUTOMATIC DRAIN VALVES SHALL BE OF THE BALL-CHECK TYPE CONSTRUCTED OF HIGHEST GRADE MACHINE BRASS AND WITH STAINLESS STEEL BALL. VALVE SHALL POSITIVELY SEAL OFF AT 3 PSI PRESSURE IN THE LINE. VALVES SHALL HAVE 1/2-INCH MALE PIPE THREAD CONNECTION. INSTALL A MAXIMUM OF 2 CONTROL VALVES PER VALVE BOX UNLESS OTHERWISE NOTED ON THE DRAWINGS.

10.0 CONTROLS

10.1 CONTROL CABLE: ALL ELECTRICAL CONTROL AND GROUND WIRE SHALL BE COPPER IRRIGATION CONTROL CABLE OF SIZE AS INDICATED BY MANUFACTURER'S SPECS. ALL WIRING USED FOR CONNECTING THE AUTOMATIC REMOTE CONTROL VALVES TO THE AUTOMATIC CONTROLLERS SHALL BE TYPE "UF", 600 VOLT; 7 STRAND OR SOLID COPPER, SINGLE CONDUCTOR WIRE WITH PVC INSULATION AND BEARING UL APPROVAL FOR DIRECT UNDERGROUND BURIAL FEEDER CABLE. ALL PILOT OR "HOT" WIRES SHALL BE OF ONE COLOR AND ALL "COMMON" WIRES ARE TO BE OF ANOTHER.

10.1.1 INSULATION SHALL BE FOUR-SIXTY-FOURTHS (4/64) INCH THICK MINIMUM COVERING OF ICC-100 COMPOUND FOR POSITIVE WATERPROOFING PROTECTION. SIZES FOURTEEN (14), TWELVE (12), TEN (10), AND EIGHT (8) SHALL BE SINGLE CONDUCTOR SOLID COPPER WIRE AND SIZES SIX (6), FOUR (4), AND TWO (2) SHALL BE STRANDED COPPER WIRE. ALL CONTROL OR "HOT" WIRES SHALL BE OF ONE (1) COLOR (BLACK) AND ALL COMMON OR "GROUND" WIRES SHALL BE OF ONE COLOR (WHITE). VERIFICATION OF WIRE TYPES AND INSTALLATION PROCEDURES SHALL BE MADE TO CONFORM TO LOCAL CODES.

10.2 ELECTRICAL WIRE CONNECTIONS

WIRE CONNECTIONS TO REMOTE CONTROL ELECTRIC VALVES AND SPLICES OF WIRE IN THE FIELD SHALL BE MADE IN THE FOLLOWING MANNER, USING RAINBIRD PEN-TITE WIRE CONNECTORS AND SEALING CEMENT (OR APPROVED EQUAL):

1. STRIP ENDS OF WIRES AND PUSH WIRES THROUGH THE HOLES OF THE BASE SOCKET.
2. TWIST WIRES TOGETHER AND MECHANICALLY BOND TOGETHER USING CRIMP SLEEVE AND CRIMP PLIERS.
3. PULL WIRE CONNECTION BACK INTO BASE SOCKET AS FAR AS IS POSSIBLE.
4. APPLY SOLVENT CEMENT TO OUTSIDE OF SEALING PLUG AND THEN FILL CAVITY OF SEALING PLUG COMPLETELY WITH SOLVENT CEMENT.
5. PUSH SEALING PLUG INTO BASE SOCKET, USING SLIGHT TWISTING MOTION, UNTIL IT BOTTOMS.
6. PUSH WIRES DOWN INTO BASE PLUG AS FAR AS THEY WILL GO, WITHOUT UNSEATING SEALING PLUG.

10.2.1 THIS ASSURES CEMENT COMPLETELY SEALING AROUND WIRE INSULATION AND WATERPROOFING THE CONNECTION. IT IS IMPORTANT THAT THE JOINT BE ABSOLUTELY WATERPROOF SO THAT THERE IS NO CHANCE FOR LEAKAGE OF WATER AND CORROSION BUILD-UP ON THE JOINT.

10.3 AUTOMATIC CONTROLLERS: THE CONTRACTOR SHALL PROVIDE ADEQUATE PERSONNEL TO ASSIST THE OWNER TO PROGRAM THE CONTROLLER IN THE FIELD AND REVIEW THE OPERATION OF EACH STEP AFTER INSTALLATION. CONTRACTOR SHALL PROVIDE A WRITTEN STATEMENT TO SHOW WHICH GROUP OF VALVES IS TO WHICH CLOCK PROGRAM AND WATERING TIMES FOR EACH PROGRAM.

10.4 DO NOT PREPARE CHARTS UNTIL RECORD DRAWINGS HAVE BEEN APPROVED BY THE LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE.

10.4.1 PROVIDE ONE CONTROLLER CHART PER CONTROLLER.

1. CHART MAY BE A REPRODUCTION OF THE RECORD DRAWING, IF THE SCALE PERMITS FITTING THE CONTROLLER DOOR. IF PHOTO REDUCTION PRINTS ARE REQUIRED, KEEP REDUCTION TO MAXIMUM SIZE POSSIBLE TO RETAIN FULL LEGIBILITY.
2. CHART SHALL BE BLACKLINE PRINT OF THE ACTUAL SYSTEM, SHOWING THE AREA COVERED BY THAT CONTROLLER.

10.4.2 IDENTIFY THE AREA OF COVERAGE OF EACH REMOTE CONTROL VALVE, USING A DISTINCTLY DIFFERENT PASTEL COLOR, DRAWN OVER THE ENTIRE AREA OF COVERAGE.

10.4.3 FOLLOWING APPROVAL OF CHARTS BY THE LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE, THEY SHALL BE HERMETICALLY SEALED BETWEEN TWO LAYERS OF 20 MIL THICK PLASTIC SHEET.

10.4.4 CHARTS MUST BE COMPLETED AND APPROVED PRIOR TO FINAL ACCEPTANCE OF THE IRRIGATION SYSTEM.

10.4.5 COORDINATE WITH CITY FORCES AS TO THE VALVE STATIONING OF THE NEW AREAS TO BE PROGRAMMED INTO THE EXISTING CONTROLLER.

10.5 INSTALLATION OF CONTROL CABLE: ALL ELECTRIC CONTROL CABLE SHALL BE OF SIZES SHOWN ON MANUFACTURER'S SPECS AND SHALL BE INSTALLED IN THE PIPING TRENCHES WHEREVER POSSIBLE. PIPE TRENCH SHALL BE PARTIALLY BACKFILLED TO PROVIDE THREE (3) TO FOUR (4) INCHES OF COVER OVER THE PIPE BEFORE WIRE IS INSTALLED. WIRE SHALL THEN BE PLACED IN THE TRENCH TO ONE SIDE OF THE PIPE. WIRE SHALL BE PLACED IN THE TRENCH AS LOOSELY AS POSSIBLE TO ALLOW FOR EXPANSION AND CONTRACTION OF THE WIRE; EXPANSION COILS (5-6 TURNS OF WIRE WRAPPED AROUND A PIECE OF 1/2" PVC PIPE) AT 200' INTERVALS, ALSO SHALL BE ACCEPTABLE. WHERE IT IS NECESSARY TO RUN WIRE IN A SEPARATE TRENCH, THE WIRE SHALL HAVE A MINIMUM COVER OF TWELVE (12) INCHES. ALL WIRE UNDER CONCRETE OR PAVEMENT SHALL BE PLACED IN A SCHEDULE 40 PVC SLEEVE. THE DIAMETER SHALL BE SUFFICIENT TO ACCOMMODATE THE WIRE BUNDLE.

10.5.1 ALL WIRE CONNECTIONS AT REMOTE CONTROL VALVES, EITHER DIRECT BURIAL OR IN CONTROL BOXES, SHALL HAVE SUFFICIENT WIRE WHICH CAN BE BROUGHT TO THE SURFACE WITHOUT DISCONNECTING THE WIRES.

10.5.2 EACH REMOTE CONTROL VALVE OR GROUP OF REMOTE CONTROL VALVES, WHICH ARE TO BE CONNECTED TO ONE STATION OF A CONTROLLER, SHALL HAVE WIRES AS SHOWN IN THE WIRING DIAGRAMS ON THE DRAWINGS OR AS SPECIFIED. ALL REMOTE CONTROL VALVES, WHICH ARE TO BE CONNECTED TO THE SAME CONTROLLER, SHALL BE CONNECTED TO A COMMON GROUND WIRE OF A SIZE AS SHOWN ON THE DRAWINGS OR AS SPECIFIED.

10.6 VALVE BOXES: ALL REMOTE CONTROL VALVES, MANUAL CONTROL VALVES, ZONE SHUT-OFF VALVES, GATE VALVES OR BUTTERFLY VALVES, UNLESS OTHERWISE INDICATED, SHALL BE INSTALLED IN SUITABLE VALVE ACCESS BOXES OF PROPER SIZE AS REQUIRED FOR EASY ACCESS TO THE VALVE. ACCESS BOXES ON THE DRAWINGS, OR OTHERWISE INDICATED OR SPECIFIED SHALL BE INSTALLED USING VALVE MARKERS, SHALL NOT REQUIRE VALVE ACCESS BOXES. LOCKING AND/OR HINGED COVERS FOR ACCESS BOXES SHALL BE REQUIRED. ALL VALVE BOXES SHALL BE IMPRINTED WITH THE VALVE STATION IN A PERMANENT AND LEGIBLE MANNER FOR EASY REFERENCE.

END OF SECTION

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