SECTION 02442 - UNDERGROUND SPRINKLER SYSTEM

PART 1 - GENERAL

EXTENT OF WORK

It is intended that the Contractor provide all labor, materials and equipment required to construct a complete and operational irrigation system as shown on the drawings. The contractor is to complete the piping and calculations necessary to make the system operable in compliance with local codes and regulations. The drawings should be considered schematic in nature and actual piping routes may vary if deemed necessary for an efficient system.

Related Work Specified Elsewhere: The Contractor shall review the drawings and specifications to coordinate work of this Section with all other related work.

As Built Prints: The Contractor shall provide one set of reproducible "as built" drawings annotating all installation additions, changes, relocations, and/or corrections to the installation plan. These shall be carefully recorded and kept up to date throughout the progress of the job to completion of the project, whereupon they shall be returned to the Landscape Architect for a permanent record of this work.

Staking: The locations of the existing and proposed improvements shall be surveyed and staked by the Contractor. Plan dimensions and scaled distances on the plan shall be used. Discrepancies in plan vs. field layout shall be reported to the Landscape Architect for further direction.

Manufacturer's Specifications: The latest printed specification of the approved manufacturer for the installation of all materials used for the system shall automatically become a part of these Specifications.

Submittals:

Submit complete manufacturer's specifications and product data for all products used in sprinkler system.

PART 2 - PRODUCTS

PVC Pipe: All PVC pipe shall be Class 160 PVC except 3/4" to 1" shall be Class 200, NSF, PVC, bell-end, solvent weld, with factory chamfered male ends, conforming to cell Class 23458, SDRI. Pipe under paving shall be Schedule 40.

PVC Fittings: All fittings used for joining PVC pipe shall be Schedule 40 (except threaded nipples which shall be Schedule 80 PVC), NSF, PVC, solvent weld, with factory imprint showing size and type.

Solvent Cement: Compatible with PVC pipe and of proper consistency.

Swing Riser Fittings: Swing riser fittings may be flexible swing joints using flexible pipe and spiral barb fittings.

Sprinkler Heads: Shrub and pop-up spray nozzles shall be plastic with a radius of 15' containing a pressure compensating device in order to eliminate nozzle fogging. Full circle nozzle shall spray approximately 4.0 GPM at 40-75 PSI with 15' radius. Shrub spray nozzles shall mount on 15" riser of black plastic with 1/2" NPT male thread inlet. Riser to bring nozzle to approximate height of top of shrubs. Select nozzle arc for location need.

Pop-up sprays shall be of plastic construction containing a wiper seal and stainless steel retraction spring. Nozzle shall pop up approximately 4" and contain a 1/2" NPT female thread inlet. Average flush rate shall be less than .3 GPM. Select nozzle arc for location.

Small lawn areas shall be watered with gear drive rotary sprinkler with a pop-up stroke of 3". Body shall have 3/4" NPT female thread inlet and a recommended operating pressure of 35-50 PSI, maximum 75 PSI. Part of full circle operation shall be accomplished by use of an arc plate inserted beneath the nozzle. The sprinkler shall be capable of covering a 28'-38' radius at 35-50 PSI with a discharge rate of 4.1-4.8 GPM for 360 arc. Sprinkler shall contain a stainless steel retraction spring and shall have a riser seal and wiper to flush riser during stroke. Rotation shall be by a sealed, oil packed gear assembly isolated from the water supply.

Large lawn areas shall be watered with gear drive rotary sprinklers with a pop-up stroke of 3-1/2". Body shall have a 3/4" NPT female thread inlet and a recommended operating pressure of 35-60 PSI. Part or full circle operation shall be accomplished by the use of an arc plate beneath the rotation nozzle. The sprinkler shall cover a 38'-43' radius at 35-60 PSI with a discharge rate of 6.9-9.3 GPM for the 360 arc. Sprinkler shall contain a stainless steel retraction spring, riser seal and wiper to flush riser during stroke. Rotation shall be by a sealed, oil packed gear assembly isolated from the water supply.

Valves: Valve shall have a manual flow control stem with wheel/handle. All parts shall be serviceable without removing valve from line. Valve shall contain a pressure regulating device when called for.

Electric Remote Control Valves: Electric remote control valves shall be of all brass construction, with a throttling stem and manual vent. The solenoid shall be fully encapsulated 24 volt. Valves shall be Toro 21C Series Brass Valves, pressure regulating model where called for on plans.

Valve Actuation Wire: Wire shall be No. 14 UF, UL approved, 600-volt rated; RED for control, WHITE for common.

Wire Splices: Wire splicing shall be done with Pen-tite type available from Spears, Rain Bird or Toro.

Gate Valves: Gate valves shall be all brass construction; wheel handle, screwed ends, line size, 150-pound rated, American-made.

Valve Access Boxes: Valve access boxes shall be constructed of high-strength, impact-resistant thermoplastic material. Valve box lid shall be of the locking type. All valve access boxes shall be rectangular shape.

Automatic Drain Valves: Automatic drain valves shall be King Tech or approved equal.

Quick Coupling Valves: Quick coupling valves shall be all brass construction, one piece construction, standard cover with lock. Valve shall be activated by 1" single lug key.

Backflow Preventer: Backflow preventer shall be reduced pressure principle backflow prevention assembly with resilient seated shut-off valves and test cocks, with bronze body and in-line serviceability.

Irrigation Controller: Irrigation controller shall be solid state pedestal mounted, 24 station model which may be operated manually or by central computer. Shall have 1 to 99 minute or 0.1 to 9.9 hour station timing. Housing shall be stainless steel with top-access face panel. Location shall be approved by Landscape Architect prior to installation.

~~Water Meters shall be provided by the City.~~

PART 3 - EXECUTION

GENERAL:

Install equipment in compliance with all applicable local and state codes.

Layout work as accurately as possible to Drawings which are diagrammatic to the extent that offsets and all fittings are not shown.

Full and complete coverage is required. Contractor shall make any necessary minor adjustments to layout required to achieve full coverage of irrigated areas at no additional cost to the Owner.

PVC Pipe: PVC pipe shall be laid in a dry, rock-free trench. Main-line pipe at 36-inch soil cover; lateral-line pipe at 12-inch soil cover. Use PVC primer on all solvent weld surfaces. The leading edge of all pipe to be solvent welded shall be chamfered. Solvent weld joints shall sit 12 hours before moving or pressure testing. All main lines shall be flushed prior to backfilling and installation of remote control valves. Backfill areas to original soil density. Backfill only with rock-free material.

SPRINKLER HEADS:

Lawn Pop-ups: Install 6-inches from curbs, walks, and 24 inches from drives. Firmly tamp backfill around sprinkler to prevent settling.

Shrub Sprays: Install 6-inches from curbs, walks, and 24-inches from drives. Firmly tamp final backfill to prevent settling.

Rotor Pop-ups: Install 6-inches from curbs, walks and 24-inches from drives. Firmly tamp final backfill to prevent settling.

Electric Remote Control Valve: Install only one valve per valve box. Valve handle-top at 8-inches below finish grade. Use PVC 45-degree elbows down to lateral line depth. Make wire splice completely waterproof and wrap each wire 18 times around 1/2-inch pipe and leave within valve access box. Use only threaded connections between the main-line pipe and the valve inlet.

Valve Actuation Wire: Install under the main-line pipe at all possible locations. Bundle and tape at 50-foot intervals. Install within pipe sleeves at all locations where pipe is sleeved. Install within a PVC pipe sleeve where unable to place under system pipe.

Wire Splices: Make all wire splices in accordance with manufacturer's specifications; make waterproof; and place within valve access box.

Valve Access Boxes: Place an 18-inch long cedar 2 x 4 board under each long side of the valve box to stabilize. Bring lid to finish grade. Firmly tamp backfill to prevent settling. Place 2 cubic feet of gravel within each valve box, under the contained valve.

Gate Valves: Install at pipeline depth. Place 6-inch PVC pipe around handle of valve and bring to within three inches (3") of bottom of access box lid. Backfill around six inch (6") pipe. Install only one gate valve per valve box.

Irrigation Controller: Electrical service to the controller shall be installed by the Irrigation Contractor. City shall provide drop and meter at location convenient to controller locations. Contractor shall coordinate with City and K.G.&E. for location of drop and meter. The controller shall be pedestal mounted and its location shall be approved prior to installation.

Automatic Drain Valves: Install automatic drain valves at locations to facilitate the complete drainage of the circuit lines of the irrigation system for winterization. Place a 5-cubic foot gravel sump under each automatic drain valve to facilitate drainage.

Manual Drain Valves: Install manual drain valves on the main line of the irrigation system generally at locations shown on plan, but should be located at all low points in the main line so that the entire line may be drained for winterization. Slope pipe to one side of drainage swales so that drain valves are located a minimum of half way up the side slope. Place a 6-cubic foot gravel sump under each manual drain valve to facilitate drainage. Place 6-inch PVC Pipe around handle of valve and bring to within (3") of bottom of access box lid. Backfill around six-inch (6") pipe.

Back Flow Preventers: Install as per requirements of local public agency and manufacturer.

Testing: Prior to installing sprinkler heads, thoroughly flush all pipe lines, cap all risers and sequentially test each zone at the intended system operating pressure. Repair all defective components and joints.

Operational Testing: After the hydrostatic test, sprinkler heads shall be installed and the system completed and tested to demonstrate functional efficiency. The Contractor shall balance and adjust all components to perform as designed.

Clean-Up: The Contractor shall remove all rocks, excess dirt and debris, and equipment from the site at the completion of the work.

Extra Materials: The Contractor shall furnish to the Owner at project completion two of each key necessary to open and/or operate all pieces of irrigation equipment.

ACCEPTANCE, GUARANTEE:

ACCEPTANCE: At the conclusion of irrigation installation, an inspection shall be made by the Landscape Architect. The purpose of this inspection shall be for the acceptance of the contract work. If there are any deficiencies, the Contractor will be notified and the work subject to reinspection before final acceptance.

GUARANTEE: Materials and workmanship shall be guaranteed for one year after acceptance.

END OF SECTION 02442

PROJECT NO.	SHEET NO.	TOTAL SHEETS
	82	82

IRRIGATION SUMMARY

SHEET NO.	MAIN LINE PIPING (FT.)	QUICK-COUPLER VALVES	MANUAL DRAIN VALVES (MIN)	GATE VALVES	BACKFLOW PREVENTION ASSEMBLIES	SATELLITE CONTROLLER	REMOTE CONTROL VALVES 2"	REMOTE CONTROL VALVES 1½"	REMOTE CONTROL VALVES 1"	CIRCUIT LINE PIPING SIZE AS REQUIRED	SHRUB SPRAY HEADS	LAWN SPRAY HEADS	LAWN ROTARY HEADS	PIPE (FT.) SLEEVING (BY OTHERS)	TAP ON CITY MAIN	METER SIZE	BORE FT.
51	2355	7	4	1										40			
52	5955	21	8	3	1 (2½")									40	2½" on 12" A.C.	2"	
53	2170	13	2														
54	6043	27	13	4	1 (2½")									120	2½" on 12" A.C.	2"	68
55	2510	7	8											40			
56	3700	12	4	2													
57	3590	10	5	3			1	9	2	4650			53	350			
58	4625	10	10	5	1 (2½")	1	4	7	1	5393			57	130	2½" on 24" RCCP	2"	
59	2928	8	3	2										50			
60	3777	11	12	2													
61	4898	8	14	6	1 (2½")	1	2	17	5	9328	249		103	480	2½" on 16" A.C.	2"	
62	3638	9	6	2													
63		6	6	2													
64		10	6	5			3	4	1	1400	63			220			
65	4212	10	8	6	1 (2½")	1	2	9	5	6635	175		81	350	2½" on 24" L.J.	2"	
66	3340	12	3	2													
67	3675	9	5	2													
68	4762	12	9	8	1 (2½")	1	3	15	5	7480			104	480	2½" on 16" A.C.	2"	
69	3012	13	1	2													
70	3165	9	7	2													
71	3512	10	8	2													
72	5192	9	9	7	1 (2½")	1	7	8	3	4975	295			300	2½" on 16" A.C.	2"	
73	1132	5	1	1				2	1	1175	60			70			
74	See sht. 57		See sht. 58							1724	34	85		See sht. 57	See sht. 58	See sht 58	114
75										150		11			See sht. 61	See sht. 61	18
76	See sht. 61									1767	34	103		See sht. 61			90
77	See sht. 65		See sht. 65							1956	38	115		See sht. 65			114
78	See sht. 68		See sht. 68				See sht. 72			800	17	47		See sht. 68		See sht. 68	54
79	See sht. 68									1100	21	63		See sht. 68	See sht. 68	See sht. 68	60
80	See sht. 72		See sht. 72							2652	108	118		See sht. 72			60
TOTAL	85,404	248	152	69	7 (2½")	5	22	71	23	51,185	1,894	542	398	2,670	7 @ 2½"	7 @ 2"	570

NOTE: SEE SHT. "_" INDICATES THAT QUANTITIES FOR THESE ITEMS ARE INCLUDED ON DESIGNATED SHEET.

ENGINEERING DIVISION — CITY OF WICHITA

K-96 LANDSCAPING/BEAUTIFICATION IMPROVEMENTS

IRRIGATION SPECIFICATIONS

K-96 BYPASS

I-135 TO CITY LIMITS

PDS DESIGN GROUP, Wichita, Kansas

MID-KANSAS ENGINEERING CONSULTANTS, P.A. ENGINEERS WICHITA, KANSAS

Designed by | Checked by

Drawn by | Date 4/10/89 Rev. 8/14/89 | Job No. 3244-5-5