
IRRIGATION SYSTEM SPECIFICATIONS – INSTALLATION

1.0 GENERAL

1.1 GENERAL REQUIREMENTS

- 1.1.1 Section 1.0, General Requirements, and all other sections of the General Specifications form an integral part of the requirements of this Section.
- 1.1.2 Co-operate and co-ordinate with the requirements of other units of work specified in other sections.
- 1.1.3 No additional payment will be made for work described in the following sections, unless otherwise noted and provided for within the tender schedules.

1.2 SCOPE OF WORK

- 1.2.1 To install pipe, wire, valves, sprinklers, controllers and all other appurtenances in strict accordance with the manufacturers recommended procedures, standard industry practices, these specifications and the directions of the Owner's representative in the field.

1.3 EXCAVATION AND PIPE INSTALLATION

- 1.3.1 All pipe 63 mm or smaller may be pulled in by vibratory plow. Where pulling method is used, compact the ridge "hump" left by the vibratory plow level with the existing surface by using a steel wheel roller or equivalent equipment.
- 1.3.2 Sod removal is not required before trenching.
- 1.3.3 Pipe trenches shall be excavated wide enough to allow for placement of the control wires and for proper tamping around the pipe in accordance with pipe manufacturer's recommendations.
- 1.3.4 Main Line trench depth is to be sufficient to allow for a minimum of 450 mm of cover over the pipe.
- 1.3.5 Lateral piping depth is to be 350 mm.
- 1.3.6 The trench bottom is to be free of stones, clods and roots. Generally, the loose material left by the trenches will be adequate for bedding the pipe. Where gravel or rock or roots are encountered, such material is to be hauled to a site designated by the Owner at the Contractor's expense.
- 1.3.7 The Contractor, if needed, will supply suitable sand or backfill material.
- 1.3.8 All trenches or open excavation need appropriate protection when workers are not on site. The Contractor shall keep a minimum amount of trench left open overnight and shall not leave open trenches or excavation over a weekend without suitable protection.
- 1.3.9 The Contractor is responsible for hand locating, exposing and protecting by supporting or other means all underground utilities and surface structures encountered in the work.
- 1.3.10 Install pipe and fittings in accordance with manufacturer's specifications and standards.

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1. Only qualified personnel shall do solvent-weld connections. Pipe temperature and air temperature must be at least 5 degrees Celsius when making solvent-weld connections.
2. Only certified personnel shall make HDPE connections.

- 1.3.11 All pipe greater than 63 mm shall not be installed with a curve in the line.
- 1.3.12 Maximum number of joints in a 6 m length of pipe is 2.
- 1.3.13 For add on lines to zones, connections using saddles shall only be approved by the City.
- 1.3.14 Pipe installation must be surveyed and marked on City property.
- 1.3.15 HDPE joints and all fusion connections shall be done in a tent in the event of high winds (over 8 kph), low temperatures (below 5 degrees Celsius) and during events of precipitation. In events of high wind and cold weather, the ends off pipe shall be covered during pipe fusing.

1.4 BACKFILLING

- 1.4.1 The trench is to be hand filled and tamped around the pipe to a depth of 75 mm over the pipe. Select excavated material free from stones and hard objects larger than 50 mm in size, frozen lumps, roots, sod or other organic material shall be used for the initial backfilling around and to a depth of 75 mm over the pipe.
- 1.4.2 Ensure that the backfill material is placed in the haunching of the pipe to eliminate any voids.
- 1.4.3 Suitable backfill material shall be imported from other locations on the site if necessary.
- 1.4.4 The balance of the fill can be machine backfilled and tamped in lifts not exceeding 150 mm in un-compacted depth. Trench line is to be brought within 50 mm of the surface in grassed areas, or as directed by the Engineer.
- 1.4.5 The trench compaction must meet Engineer's satisfaction and any excess material is to be legally removed from the site by the Contractor.

1.5 THRUSTING

- 1.5.1 Thrust blocking applies to PVC pipe only.
- 1.5.2 Install thrust blocks or anchoring for 63 mm and larger fittings, in strict accordance with the manufacture's recommendations, for all changes of direction in piping, reducers and isolation valves.
- 1.5.3 Install the thrust block of the appropriate bearing area against solid ground.
- 1.5.4 Concrete thrust block shall not touch the pipe or wires to allow access for repair. Wrap all changes of direction in piping (bends), reducers and isolation valves with 6 mil plastic to prevent direct contact with the concrete blocking.
- 1.5.5 In no case will field stone, concrete or cinder blocks or wood of any form, be acceptable for thrusting.

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1.6 CLEANING OF LINES

- 1.6.1 Contractor shall prevent dirt, debris, rodents and any unnecessary materials from entering the pipe, valves, sprinklers, quick couplers, etc.
- 1.6.2 All materials and equipment shall be checked and cleaned before installation and connections to other materials and equipment.
- 1.6.3 Prior to initial operation and the pressure testing, all piping shall be thoroughly flushed.
- 1.6.4 On block systems, flushing should be done before installation of sprinkler heads.

1.7 SWING JOINTS

- 1.7.1 Construction shall be installed as per standard details drawings
- 1.7.2 The schedules 80 PVC nipple shall be of sufficient length to suit the depth of bury, for the pipe and sprinkler/quick coupler. Install two ells on one end of the nipple and one ell on the other end. Make up swing joints in a shop, or other clean sheltered location where good joints can be assured.
- 1.7.3 All threaded connections shall be wrapped with Teflon tape in accordance with the manufacturer's specifications prior to assembly. Teflon tape is not to be used in O-ring and compression fittings.
- 1.7.4 Install the swing joint with a lateral tee fitting with the swing joint set horizontal and the riser portion inclined to suit the depth.
- 1.7.5 Do not install the riser and sprinkler/quick coupler vertically. Other fittings and nipple piece may be required to suit the location of the lateral line and the sprinkler.

1.8 SPRINKLER AND SPRAY HEADS

- 1.8.1 All Sprinklers shall be installed as per the irrigation plan, and locations must be confirmed in sprinkler lay out inspection.
- 1.8.2 Install sprinkler and spray heads plumb and flush with the finish grade.
- 1.8.3 Use teflon tape or appropriate joint compound as recommended by manufacturer to make connection to swing joint.
- 1.8.4 Spacing shall be in accordance with the plan and the installation shall be as per standard detail drawing.
- 1.8.5 Carefully hand tamp the backfill material around the swing joint and the sprinkler.
- 1.8.6 Install sprinkler heads 75 mm maximum distance from pathways, curbs, fences, etc. Heads can be installed closer depending on wind considerations. For part circle spray heads install heads 75 mm maximum from curbs, fences and other structures.

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1.9 QUICK COUPLING VALVES

- 1.9.1 Install quick coupling valves plumb and flush with finish grade and on pressurized main line pipe as per standard detail drawing.
- 1.9.2 Quick coupling valves to be installed in a 250 mm round valve box.
- 1.9.3 Accurately locate all quick coupling valves on the working drawings or as directed by the-Engineer.
- 1.9.4 Use Teflon tape as specified by manufacturer to make connection to swing joint as per standard detail drawing.

1.10 ISOLATION VALVES

- 1.10.1 Isolation valves shall be installed plumb and level, and anchored in accordance with the pipe manufacturer's recommendations.
- 1.10.2 Isolation valves shall be afforded access through a valve box as indicated on standard detail drawing.

1.11 DRAIN VALVES

- 1.11.1 Install drain valves with valve boxes at system low points as directed by the Engineer in the field.
- 1.11.2 Gravel sumps and filter fabric shall be installed below the valve to provide for disposal of water as per standard detail drawing.

1.12 REACH WELLS, VALVE BOXES

- 1.12.1 Support all reach wells, valve boxes on treated lumber as shown on the standard detailed drawings and properly notch or "saddle" them with 50 mm to 75 mm clearance from the pipe, so they will not damage pipe or wire if they are pushed down.
- 1.12.2 To be installed flush with surface grade and thoroughly compact the backfill around the box to the same density as the adjacent undisturbed soil.
- 1.12.3 Install filter fabric and pea gravel in the base of the reach well, valve box and control valve box. Wrap filter fabric around the sides and around the pipe access into the valve box to prevent dirt from entering the box from the around the pipe as specified.
- 1.12.4 Gravel shall be minimum 150 mm thick under the valve box. Install the valve box with the long side parallel to the direction of the valve and pipe.
- 1.12.5 Install two 50 mm x 150 mm x 750 mm pressure treated lumber under both of the long sides of the valve box with the flat side down to support the valve box.

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1.13 ELECTRIC CONTROL VALVES

- 1.13.1 Install remote control valves in plastic valve boxes as per standard detail drawings.
- 1.13.2 Ensure that proper pipe thrusting will prevent pipe from pulling apart as a result of a valve closure. Install filter fabric and 150 mm pea gravel under each remote control valve.
- 1.13.3 Wrap filter fabric around the sides and around the pipe access into valve box to prevent dirt from entering the box from around the pipe.
- 1.13.4 Gravel to be installed under the valve and not "poured" over the valve after it is installed.

1.14 CONTROLLERS

- 1.14.1 Install all controllers in strict accordance with manufacturer's instructions.
- 1.14.2 All controllers and electrical equipment are to be grounded to a 15 mm x 2 m copperweld rod driven into the ground at the controller and connected with a copper conductor 6 AWG and a one-piece clamp connector. "Lightning Arrestor" equipment to be installed as part of the system. Grounding must meet manufacturer's specification. Megger test may be required to confirm adequate grounding.
- 1.14.3 Provide a diagram inside the controller showing the sequence and the zone that each station irrigates.

1.15 WIRE

1.15.1 WIRE GENERAL

- 1. Wire installation must meet local and provincial codes.
- 2. All wires to be installed by trenching not ploughing. Do not yank, stretch, or excessively pull wire during installation.
- 3. Take strict precautions to ensure that wires are not cut, scraped or nicked during installation. Do not lay wire above, or on top of, the pipe. Install wires in neat, orderly fashion, between 4 o'clock and 8 o'clock position under irrigation pipes. Wire shall be placed consistently along one side of the pipe in the trench.
- 4. When power and satellite actuation wire runs do not follow pipe trenches, lay them in a straight line which will be carefully located on the As-built drawings. If a change of direction is required in these runs, make it as an angle between two straight runs, and not as a sweeping curve.
- 5. Minimum 50 mm PVC pipe shall be used as wire conduit to bridge the crossing and hard surfaces.
- 6. Wire shall be sized to meet manufacturer's recommendations for their controller, valves and length of run.
- 7. Where wires are installed separately from pipe, depth of wire shall be 300 mm.
- 8. All wiring shall be color coded for future identification.
- 9. The color coding requirements for each site will vary depending upon the complexity of the control system and shall be determined by the Engineer and will be on wiring schematic.
- 10. The wiring shall follow the wiring schematic provided with the Irrigation Plan.

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11. All common wire shall be white in colour (this does not apply to direct current (DC) systems).

1.15.2 SINGLE CONDUCTOR FOR CONVECTIONAL CONTROLLER

1. Provide a minimum of 300 mm of slack, in an expansion coil, in each 30 m of wire. Lay wire on a firm even bed in the trench so that the wire shall be supported its entire length. Bundle and tape wiring together every 6 meters.
2. At splice locations provide sufficient slack to allow the splice to be raised a minimum of 600 mm above grade for inspection.
3. Install a reach well at the angle point and leave sufficient slack in all wire to allow them to be raised at least 600 mm above grade. Accurately locate the reach wells with measurements for the As-built drawings.

1.15.3 TWO-WIRE FOR DECODER CONTROLLER

1. Decoders to be installed as per manufacturer's specifications and labelled with the corresponding irrigation zone number. The decoder address must be recorded on the as-built drawing.
2. In case of expansion and/or servicing, a minimum loop of decoder wire of 900 mm shall be left at each valve, at each change in direction, at every 152 m of straight run, and at each controller.
3. Splice for decoder wire shall only be made at valves boxes.
4. For instances of new construction and/or additional installation phases, the outer jacket of the two-wire cable needs to be a different colour (for easy identification).

1.16 WIRE SPLICING

- 1.16.1 Splice all wires to requirements of local minimum regulations or to the following specifications, whichever is more restrictive.
- 1.16.2 Make all wire splices waterproof by using 3M DBR/Y-6 connector kits, in strict accordance with manufacturer's specifications.
- 1.16.3 Minimize the number of splices in the wire. Use of multiple short pieces of wire spliced together to make longer pieces is not allowed.
- 1.16.4 Where there are multiple control wires in a run (3 or 4 more) the splices in the wires should be arranged so that it occurs in the same location. In this situation install the splices in a reach well and accurately locate them on the As-built plant.
- 1.16.5 Install Flow Meter as per Standards.

1.17 WATER SERVICE COMPLETION

- 1.17.1 The City shall supply a water supply line terminating with a vertical riser at the water service box.
- 1.17.2 For existing water services, check valves and backflow devices may exist and will require removal and salvaging.
- 1.17.3 For new water services the Contractor shall supply and install the double check valve(s) assembly. The Contractor shall supply and install all other required fittings and appurtenances to complete the water service connection. Install as per standard detail drawing.

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- 1.17.4 The double check valve assembly (DCVA) shall be installed in a horizontal orientation.
- 1.17.5 All installation of backflow prevention equipment shall be done in accordance with City standards (Please refer to Irrigation System Specifications Section 07011-15.1).
- 1.17.6 After installation of the irrigation system is completed and prior to operating the system, the backflow prevention equipment must be inspected by a certified inspector/tester of backflow prevention equipment. All forms (City of Lethbridge, EN CCC-1) and documents required by the City and other authorities must be satisfactorily completed and submitted.
- 1.17.7 In the event the equipment fails the test, the Contractor must make the necessary repairs and/or adjustments to the equipment.
- 1.17.8 As part of the Spring Start-up requirements the Contractor is required to arrange for the testing of the backflow prevention equipment (same as for the initial test) prior to putting the irrigation system into operation for the year. This test must occur prior to the Spring Start-up meeting and proper documentation of the successful test must be provided at the meeting to confirm that the backflow prevention equipment is approved for operation.
- 1.17.9 No separate or additional payment will be made for either of the testing requirements. All costs associated with the testing of the backflow prevention equipment must be included within the unit prices of the other work.
- 1.17.10 The Contractor shall make arrangements with the City to have the water service installation inspected and approved prior to use.
- 1.17.11 When the water service is 5 m or more away from the pump station, above ground water service box or underground vault Schedule 80 PVC pipe can be used versus steel pipe, otherwise steel pipe must be used. If PVC pipe is used install pipe to a minimum depth of cover of 1.2 m above pipe. Install pipe with a slight grade towards the part service to allow supply line to drain.
- 1.17.12 On the water service supply line install a flanged connection 300 mm from the water service vault or pump station. Tape and/or coat the flange and bolts with an approved product for water proofing and corrosion protection. Flange shall be 150 lb. with stainless steel bolts.
- 1.17.13 Show the location of the water service supply line on the As-built drawings.

1.18 ELECTRICAL SERVICE

- 1.18.1 Wiring: Electrical wiring for 120/240 VAC single phase power to the controller shall be in accordance with all governing codes and regulations.
- 1.18.2 Enclosure: All electrical equipment is to be installed in an EENMC 12 enclosure. The City shall provide single phase, 120/240 VAC, 3-wire electric service up to the base of the enclosure.

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- 1.18.3 The Contractor shall supply and install ducting (minimum 50 mm ID) through the controller or booster pump station pad and extending 20 inches beyond the edge of the concrete base at a depth in accordance with the City Electrical Code, as well as connections of the service panel to the controller and any other associated work.
- 1.18.4 Miscellaneous: The Contractor is responsible for supply and installation of all required equipment (main breaker, secondary breaker, duplex receptacle, etc.), electrical wiring, grounding, etc., to provide a complete functional system in accordance with all governing codes and regulations. The Contractor shall install any equipment or appurtenances not specifically mentioned in this specification, but required for a complete safe-operating system. All electrical work must be inspected and approved by the electrical inspections department.
- 1.18.5 Power Connection: The Contractor is responsible for co-ordination with the City for primary power installation. Payment for the connection will be by the City unless otherwise noted.
- 1.18.6 Duct Location: The electrical ducts under the concrete pad and extending out of the concrete pile are to be located as specified by the Engineer.
- 1.18.7 Electrical Ducts: long radius sweep shall be used.
- 1.18.8 Show the location on the As-built drawings.

1.19 BOOSTER PUMP STATION

- 1.19.1 Variable frequency drive (VFD) control to be used, unless otherwise specified by the Engineer.
- 1.19.2 The Contractor shall install the booster pump station work in conjunction with the water service completion work.
- 1.19.3 The Contractor shall supply and install the DCVA and all necessary fittings and appurtenances to complete the booster pump station and water service connection as identified in the standard drawing details.
- 1.19.4 Pipe supports shall be used as required.
- 1.19.5 The booster pump station concrete pad shall be level and set to the proper grade.
- 1.19.6 The booster pump station enclosure shall be securely bolted to the concrete pad. Metal spacers shall be used to provide sufficient space between the enclosure and concrete pad for ventilation underneath the enclosure.
- 1.19.7 Install a metal screen around the bottom inside of the enclosure for rodent control. Set the enclosure level and square on the concrete pad.
- 1.19.8 The booster pump shall be set level and shall be supported with a pump base.
- 1.19.9 A drain pipe with stop cock shall be installed on pump casing bottom.

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1.19.10 The “Booster Pump Station” standard drawings are provided in the Specifications. The drawing shows the preferred layout of the equipment. Minor adjustments to the layout may be required at the time of installation as directed by the Engineer.

1.20 SLEEVES FOR CROSSINGS

- 1.20.1 Piping Sleeve shall be at least twice as large as the irrigation pipe and shall be IPS series 160 PSI P.V.C.
- 1.20.2 Irrigation pipe and control wire shall be sleeved separately when crossing all hard surface paths and sidewalks.
- 1.20.3 Piping Sleeves to be installed @ 450 mm below top of path grade and shall extend 150 mm past the edge of path at both ends of crossing.
- 1.20.4 Piping sleeves to be installed @ 450 mm below road surface (below lip of gutter) and shall extend 150 mm past the edge of road at both ends of crossing.
- 1.20.5 When crossing roads, HDPE shall be used and installed as per standard detail drawing.

1.21 CANAL CROSSINGS

- 1.21.1 All canal crossings shall be through a culvert at a maximum depth of 1 meter or may be attached to a bridge structure.
- 1.21.2 If attached to a bridge structure, the culvert shall be metal (corrugated).

1.22 INSPECTIONS AND TESTING

1.22.1 GENERAL

- 1. Inspections of the work shall be scheduled and conducted with the Engineer and the Owner. The Contractor shall provide the Engineer with minimum 48 hours’ notice prior to scheduled inspections.
- 2. Leave pipe, joints, fittings, valves and accessories exposed for inspection by the Engineer. Wait seven days minimum for standard concrete backing to cure and two days minimum for early strength concrete backing to cure.

1.22.2 TRENCH INSPECTION

- 1. A visual inspection of trenches needs to be carried out to:
 - a) Verify adequate depth, width and bedding preparation.
 - b) Ensure mainline pipe is supported along its complete length.
 - c) Inspect the wire installation in trench for bundling, relation to the mainline and other wire installed in trench, expansion / contraction loops in the wire.
- 2. Thrust blocking of PVC gasketed mainlines. Placement, size of block, and pipe protected with 6 mil plastic.
- 3. When performing connections on PVC solvent weld mainlines, clean joints by removing extra cement, and apply pipe primer as per manufacturer’s instructions.
- 4. A visual inspection of HDPE pipe fusion welds for bead roll back. If the visual inspection indicates a poor weld, the Engineer may request the Contractor to cut out the weld and re-do it.
- 5. Location of drains where required and ensure gravel sump is adequate.

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1.22.3 PRESSURE TEST PVC

1. The Contractor shall request in writing the presence of the Engineer and Owner at least 48 hours in advance of testing.
2. Test mainline prior to connection of any laterals and prior to backfilling.
3. Irrigation main has been filled with water for period of 24 hours and air has been expelled.
4. Supply pumps, connections, gauges and required apparatus for this test.
5. Subject water pipe to hydrostatic pressure 50% greater than operating pressure at lowest point of system or 90% of rated pipe capacity whichever is less.
6. Test for 1 hour adding make up water to maintain pressure. Monitor for leaks in the pipe.
7. Leakage test will consist of monitoring drop from test pressure for 1 hour without adding make up water.
8. Pipe installation will not be accepted when pressure drop is greater than 5% of test pressure.
9. Replace defective material.
10. Contractor shall supply water for testing.
11. Ensure water line does not freeze, if performing test in cold temperatures.

1.22.4 PRESSURE TEST HDPE

1. Standard Practice of Pressure Piping system using Hydrostatic Pressure, Reference ASTM F2164-13.
2. 2HDPE pipe shall be partially backfilled. All underground connections, joints, seals shall be exposed for observation during the test. Ensure sufficient backfill material is placed on pipe, between joints to prevent movement prior to performing the Mainline Pressure Test.
3. Fill mainline with water 24 hours in advance of mainline test to allow water / pipe temperatures to equalize. Bleed off entrapped air to ensure pipe is filled with water.
4. Gradually bring pressure in the HDPE mainline being tested to 1.5 times system operating pressure (or lowest pressure rated component attached to the system).
5. Maintain maximum test pressure for a three (3) hour period, topping up as required to maintain pressure.
6. After three (3) hours have elapsed, reduce pressure in HDPE mainline by 10 psi and monitor pressure for 1 hour. Do not increase pressure or add water during the 1-hour test period.
7. If pressure falls more than 5% in the 1-hour test period, the pressure test has failed. Bleed off pressure and make any repairs as required.
8. Pipe has to relax for eight (8) hours prior to performing the test again.

1.22.5 DATA LOGGER REPORTS FOR HDPE

1. A data logger report must be performed with all HDPE pipe butt-fusion joints made on the site.
2. The HDPE pipe must be marked in permanent paint with the same reference 'code' as the data logging report.
3. The report will be submitted to the Engineer at the time of HDPE pressure test.

1.22.6 LATERAL LINE INSPECTION

1. Ensure zone entry tees are properly located and not pointing down.
2. Ensure electric control valve is installed 350mm below finish grade.

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3. Ensure swing joint for zone entry is positioned at approximately 90° from vertical clockwise from the 12 O'clock position.
4. Ensure swing joint is sized properly, connected to bottom inlet of sprinkler, and set at 45° from vertical in a positive clockwise position.
5. Ensure drain rock is in bottom of valve box as per Specification.
6. Ensure use of 3M DBY wire connectors on 24v AC electric control valve wiring. Guarantee sufficient spare wire is neatly coiled and stowed in valve box.
7. Ensure top of valve box is level and at finish grade.
8. Ensure depth of lateral line(s) as per section 3.5.
9. Ensure the specified sprinklers and nozzles are installed.

1.22.7 SYSTEM LAYOUT INSPECTION

1. Conduct an on-site meeting to discuss the irrigation design, draw Contractors attention to specific construction details, and answer Contractors questions as needed.
2. Inspect Contractors layout of the irrigation system and ensure it matches the contracted Drawings. Ensure layout meets the criteria set out in this specification and have it approved by the Engineer before commencement of work.
3. During construction it may be necessary to adjust the layout of the irrigation system. Field changes of the system shall be approved by the Engineer before any work is carried out.

1.23 CCC and FAC

To achieve Construction Completion Certificate (CCC) and Final Acceptance Certificate (FAC), corresponding inspections must be completed and passed. The FAC inspection shall be conducted one (1) month before the end of the Maintenance and Warranty period. See *City of Lethbridge Design Standards* for complete details. All CCC and FAC inspections must be completed by October 31.

1.23.1 CCC INSPECTION

1. A visual inspection of the controller cabinet installation.
2. A visual inspection of the controller wiring for neatness, routing, proper gauge, connection, and identification.
3. Conduct a "ground grid megger" test if not performed during an earlier inspection.
4. Make sure each irrigation zone shall be capable of being programmed to operate independently from other irrigation zones.
5. The Irrigation controller shall operate the irrigation system and verify the automatic operation for each irrigation zone.
6. A visual inspection confirming sprinklers are installed plumb to grade on flat surfaces and plumb at half slope when installed on the side of a hill.
7. A visual inspection confirming sprinklers are installed at grade as specified by the manufacturer.
8. A visual inspection confirming sprinkler "throws" are head to head. If sprinklers do not throw head to head confirm that:
 - a) Sprinkler type and nozzle size are correct.
 - b) Electric control valve is adjusted and operating properly.
 - c) Irrigation system operating pressure is within design parameters.
 - d) Sprinkler spacing is correct as per the Contract Drawings.
9. A visual inspection of landscape rehabilitation to verify all trenches, sprinklers, and valve boxes are at grade and either seed or sod has been applied to the landscape.

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10. Sod must tie into existing turf at grade and not be left sitting higher than the existing turf.
11. The As-built drawings shall be received a minimum of 5 business days prior to the CCC inspection.

1.23.2 FAC INSPECTION

1. A review of deficiencies identified during the Substantial Performance Inspection. Ensure deficiencies have been corrected before performing the rest of the total performance inspection.
2. A visual inspection to determine if maintenance has been performed during the warranty period.
3. A visual inspection of all valve boxes to ensure they are level and at grade.
4. A visual inspection inside valve boxes to determine drain rock is sufficient and there is enough clearance around the 24v AC valve to perform maintenance.
5. A visual inspection of the 24v AC valve to ensure extra wire is neatly coiled and stowed. All electrical connections made properly with 3M DBY electrical connectors.
6. Ensure all sprinklers are installed to grade and are plumb.
7. Ensure the proper sprinkler and nozzle are installed.
8. A system operation test to confirm the irrigation system will operate automatically from the controller.
9. Where a central irrigation controller is being used, ensure that it is installed, functioning, and communicating with the City's Central Control System.
10. The As-built drawings shall be received a minimum of 5 business days prior to the FAC inspection.