



Office of the Vice President
and Chief Financial Officer
Procurement Services
<https://procurement.ufl.edu/>

971 Elmore Drive
PO Box 115250
Gainesville, FL 32611-5250
(352) 392-1331 Fax 352-392-8837

January 10, 2019

ADDENDUM NUMBER 1 ON INVITATION TO BID ITB19KO-120

TITLE: Center Pivot Irrigation Systems at NFREC-Marianna

Mandatory pre-bid meeting was held at the site on January 9, 2019 at 10:00 AM CST. **Bid opening** will be held January 23, 2019 at 3:00 PM EST in UF Procurement Services, 971 Elmore Drive, Gainesville, FL 32611.

This addendum shall be considered part of the Contract Documents for the above mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original Contract documents, this addendum shall govern and take precedence. Bidders are hereby notified that they shall acknowledge receipt of the addendum.

NOTES:

See attached eight (8) pages of revised "UF Pivot Machine Specification" that shall replace pages 9-15 of the Bid Documents.


Karen Olitsky
Procurement Agent III

**PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM 1 AND RETURN WITH YOUR BID.
FAILURE TO ACKNOWLEDGE THIS ADDENDUM COULD CONSTITUTE REJECTION OF YOUR BID.**

VENDOR NAME

VENDOR ADDRESS

SIGNATURE

UF Pivot Machine Specification (REV. 1/10/19)

CENTER PIVOT IRRIGATION EQUIPMENT PIVOT SPECIFICATIONS

For

University of Florida
North Florida Research and Education Center

General Description of Work

- A. An authorized Pivot dealer will furnish, install and place in satisfactory operating condition center pivot irrigation systems and all required appurtenances in accordance with these specifications. The description of the equipment to be provided is provided in Attachment A.
- B. The units will be a self-contained, electrically propelled land irrigation machine driven by individual drive unit structures supported on rubber pneumatic tires. The basic power train will consist of a three-phase electric motor at each drive tower that will drive the wheels through a series of gear reductions. Each tower will be electrically controlled to maintain the selected operating speed and correct alignment.
- C. A control panel, located at the center of each machine, shall be supplied by the system's manufacturer and will provide the operator local and remote-control functionality.

General Design Criteria

- A. All equipment furnished will be new and unused, and will be the product of a manufacturer having successful experience in the manufacture of center pivot irrigation equipment.
- B. All equipment provided will be capable of maximum interchangeability of spare parts. The equipment incorporated in this proposal will be the product of, and furnished by, a manufacturer who is regularly engaged in the production of such equipment for similar applications, and who has an experience record of a minimum of twenty (20) years with installations similar to that contemplated in these specifications.
- C. All of the equipment will be the manufacturer's latest and proven design. These Specifications call attention to certain features, but do not purport to cover all details entering into the design of the entire pivot.
- D. All electrical components of the pivot will operate from existing 480-volt, three-phase, 60-Hertz, 4-wire power supply to be provided at the pivot. Connection to the electrical power shall be completed by the pivot dealer according to NEC standards and compliant with local codes.
- E. All controls for remote electrically operated or motor driven equipment will be complete, including all necessary auxiliary relays so as to require only remote wiring and wiring connections to the equipment.
- D. Commercially plated fasteners will be used on all connections, including the drive train U-joints, center drives and wheel gearboxes.
- G. All necessary fuses or switches required by the manufacturer for his equipment will be provided with the equipment.

Basis of Bid

- A. It is the intent that all equipment as defined from the pivot point to the end of the machine in this specification shall be supplied by the irrigation pivot manufacturer. Other equipment not supplied by the system's manufacturer or supplied material to be designed, procured and installed by the authorized dealer completing the work.

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- B. The manufacturer or dealer of the center pivot irrigation equipment will erect the center pivot with one or more factory trained personnel. This will include assembly of the mechanical portion of the center pivot, and start-up and adjustment of the equipment. This portion of the manufacturer's responsibility will be concluded when the center pivot has been operated continuously for at least one (1) field revolution.
- C. The bidder shall inspect the existing pivot point foundations to verify that it will comply with the requirements set by the center pivot manufacturer. If he finds the pivot foundations can be reused for the new machinery it will be at his sole risk, the UF will not accept any responsibility for the decision. If the foundations are determined to be unsuitable their replacement should be included in the bidder's proposal as a separate line item.
- D. The manufacturer's warranty for each item supplies and dealer's warranty for workmanship shall be included in the bid(s) submitted.
- E. These Specifications are intended to provide guidelines for the quality of the equipment supplied and generally the functional requirements of the system supplied. The purchaser understands that there will be multiple ways to meet the minimum requirements and accomplish functional requirements, even within one manufacturer's product line. Therefore, the bidder may provide more than one option where he thinks they are applicable and provide the purchaser choices that should be considered. Each option should be provided as a complete and separate bid with a lump sum price that does not require the purchaser to add together the cost of options to get a total. **The bid will be awarded to the lowest total bid price. If there is a tie between two or more bids, award will be made at UF's discretion. Pricing sheet will be provided in future addendum.**

Instruction Manuals

One (1) copy of the Owner's Manual will be inserted inside the door of the pivot control panel.

Structural

- A. Pivot Point - The four-legged pivot point structure will be erected with galvanized steel angle. The horizontal braces will be galvanized angle. Fixed pivot leg pads will be provided. The rotating swivel will be constructed with a water tight, long life water seal gasket. The riser pipe will be a minimum of 8 5/8" O. D. for systems which exceed 800' in length and a minimum of 8" O.D. for systems less than 800' long. Riser support angles and gussets will be provided to stabilize the riser against deflection.
- B. Steel Pipeline - The main structural water supply pipe will be 12 gauge or thicker, hot dipped galvanized steel. A combination of 6", 6 5/8", 8 5/8" and 10" O. D. pipe may be used to minimize the pressure loss through the pivot. Water outlet couplings to be 3/4" NPT steel welded to or made an integral part of the top of the pipeline.
- C. Pipe Support Structure - The pipe support structure of the pivot will be of a bow string, under truss design. Vee positioned truss angles will be 2" x 2" attached to brackets welded to the span pipes. The truss angles will be supported with a 2" x 2" spreader angle positioned perpendicular to the pipeline. Truss rods will be a minimum 3/4" diameter steel and the rods will have radius hot forged head ends.
- D. Span Connections - The spans will be connected using a flexible joint which allows for span to span flexibility, and does not transmit bending or torsional stresses into the pipe. The pipeline in adjacent spans will be connected by replaceable flex hose which will not obstruct the water flow inside the pipeline. The flex hose will match the pipe diameter.
- E. Drive Unit Tower - The drive unit tower will be a four-legged structure designed to withstand the forces induced when traversing rough terrain and ridged row crops. The drive unit legs will be fabricated from galvanized angle with a minimum dimension of 1/4" x 3" x 3". Pre-galvanized steps and angle braces will provide rigidity and strength to the drive unit. The horizontal base beam at the lower end of the structure will be constructed of 6 5/8" O. D. pipe with a minimum of 12-gauge steel and will provide mounting flanges for the motor and wheel drive gear boxes.

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- F. Drive Unit Attachment - The fixed pipe of each span will be constructed of one piece of tubing. No stub pipe assemblies will be used **with the exception on pivot # 8 where gates are located. Towers must be aligned with the gates in order to pass through multiple fences. If the irrigation contractor cannot hit these locations/gates, he/she must identify how many fence locations/gates that will need modification and shall include the price of those modifications in their total bid price.** Drive unit legs will be attached to the one piece fixed or last pipe assembly to minimize the number of flanged connections on each span.
- G. Tower Supports - Two pre-galvanized tubular tower support assemblies will be attached between the drive unit legs and pipeline attachment brackets.
- H. Structural Component Finish - All critical structural members, including the pipe, angles, and base beam will be hot dip galvanized per ASTM Specification 123 on all surfaces, with the exception of some components in the alignment hardware which will have other appropriate coatings. All supplied components shall be protected from corrosion and degradation in the irrigation environment.
- I. Fasteners - All bolts will be Grade 5 minimum. Locknuts will be used in all structural assemblies. All fasteners will be plated for corrosion protection.

Drive Train

- A. Center Drive - The center drive will use a high efficiency, totally enclosed irrigation duty motor directly coupled to a double reduction gearbox with stainless steel stator bolts. Steel heat treated helical gears will be used for maximum efficiency and strength. The motor housing will be finned aluminum or coated steel to provide additional cooling for longer life. The complete unit shall be designed to operate under extreme environmental conditions and is CSA and UL certified. The center drive motors shall be the HP as specified by the pivot manufacturer with a thermal sensitive device to protect the motor against excessive current or heat. One (1) motor at each drive unit provides input power to the two-wheel gearboxes.
- B. Wheel Gearbox - The pivot will be equipped with heavy duty gearboxes as identified by and supplied by the manufacturer of the pivot machine. The wheel drive gearboxes will be a self-locking worm gear design to provide positive braking. A hermetically sealed vented expansion chamber with a rubber diaphragm will compensate for variations in operating temperature to minimize pressure fluctuations inside the gearbox. The output shaft of the wheel gearbox will 2 1/4" diameter steel. The input and output shaft will use barriers that resist water contamination and oil leakage. All gearboxes will be properly filled with lubricant by the manufacturer. Visual inspection of the lubricant will be provided by removal of the expansion chamber cover or fill level plug.
- B. Gearbox Oil - The gearboxes shall be shipped will be filled with oil to its normal operating level. The original lubricant will meet the manufacturer's specifications and classification. Dealer shall check each gearbox during erection to ensure they are adequately filled.
- D. The drive shafts will be designed to withstand the maximum torque of the drive train with no permanent deformation. The drive shaft will be adequately shielded to meet OSHA safety standards. Greaseless U-joints will connect the drive train components. The U-joints will incorporate flexible urethane inserts to absorb shock from motor starts and stops to reduce stress. Urethane inserts anchored between cast aluminum yokes will be attached to the drive shafts.
- E. Tires will have an R-1 agricultural traction tread design. The rims will be hot dipped galvanized in accordance to ASTM 123. Tires shall be 11.2 x 24" as specifically designed and manufactured for center pivot machines.

Control Panel

- A. The pivot shall be equipped by the manufacturer with a user interface type control panel. The essential characteristics of the control panel includes:
 - 1. Start-stop
 - 2. Change speeds or depth of application

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3. Direction control, forward or reverse
 4. Position in the field display
 5. Programmable end gun controls
 6. Programmable functions by field position, time, date and external inputs
 7. Programmable application rate by field position
 8. Digital voltage display and low voltage shut down
 9. Advanced diagnostics for easy trouble shooting
 10. Touchscreen **and/or display per manufacturer standard system**
 12. Pump start/stop
 13. Bypass switch for engine run/start
 14. Stop-in-slot bypass
 15. Wet and dry digital hour meter
 16. Auto reverse/Auto Stop
 17. GPS Position Ready
 18. Compatible with central control system similar to BaseStation3 (Valley) or FieldNet (Zimatic)
 19. Enabled for Remote Control Similar to AgSense
 20. Variable Rate Irrigation capable
- B. The main control panel will be constructed to meet or exceed the standards for a National Electrical Manufacturers Association (NEMA) Type 3R enclosure. All operator controls will be protected from the elements by an outside door. The main panel will also be provided with latches to accommodate a padlock. 480-volt, three-phase, 4-wire, 60-cycle electrical power will be furnished to the main control panel at the appropriate amperage to match the pivot requirements. The pivot panel will be rated for a minimum of 30 amps as calculated and specified by the pivot manufacturer. All wiring will be color coded.
- C. Each main pivot control panel will include functional capability for starting/stopping, speed/depth of water applied, start/override button, forward-stop-reverse, 480/120 control transformer, volt meter, fuses and main disconnect switch. Diagnostic display will identify cause for pivot shut-down from control panel, towers or end tower. Each center pivot will be equipped to automatically restart itself in the event of a power interruption, up to three (3) seconds in duration, and to shut itself down if the pivot fails to move for a preselected time interval. Units will be grounded in accordance with the National Electric Code, Article 250, Section H.
- D. The main pivot panel shall be equipped with auxiliary contacts which will interface with auxiliary equipment such as the water control valve and remote pump. The bidder shall verify that the existing main power cable and auxiliary wires and appropriately sized for the proposed new installation. If either requires replacement due to ampacity of the proposed equipment or the physical condition the bidder shall include the electrical work as a separate line item in his bid. Not including wiring upgrades means the bidder accepts the existing conditions and assumes all responsibility unless the fault can reasonably be shown to be unforeseen.

Electrical

- A. The pivot electrical circuits will operate from a 480-volt, three-phase, 4-wire power (with ground) source with a step-down transformer for a 120-volt, VAC., single-phase control and safety circuits.
- B. The main power cable from the pivot box to the tower boxes will be a minimum 12-gauge stranded copper wire. All exposed wiring will be bundled and jacketed with a black, U.V. stabilized polyethylene cable jacketing material, specifically designed for center pivot irrigation.
- C. The individual tower panels will be constructed to meet or exceed the standards for a National Electrical Manufacturers Association (NEMA) Type 3R enclosure. All wiring will be appropriately sized and color coded.
- D. The electrical alignment system will consist of micro-switches for tower alignment and safety shutdown. The motor control or alignment micro-switch will not cycle the center drive motors more than once each 10 seconds.

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- E. Integral, thermal sensitive automatic reset overload protection will be provided for all 480-volt motors. A suppresser circuit will be provided in each tower control box to reduce arcing at contacts.
- F. The collector ring will be mounted at the pivot point on a stainless-steel J Tube that extends through the rotating swivel. A water tight seal will be provided around the tube. A collector ring cover with gasket will protect the internal electrical components against the effects of the environment.
- G. The collector ring will use sliding contactors rated at 600 volts with ampacity rating to match the control panel. To assure positive contact of the brushes to the contact point, leaf springs will be used. Slip rings will be seamless.
- H. Electric irrigation equipment shall be designed and manufactured according to the National Electrical Code (NEC) Article 675, including:
 - Article 430 - motors, motor circuits and controllers
 - Article 250 - grounding
 - Article 240 – over current protection
 - Article 310 - conductors for general wiring
- I. Electrical equipment shall be designed to meet the conditions outlined in ASABE Standard: ASABE S362. This standard covers all electrical equipment, apparatus, component and wiring necessary for electrically driven or controlled irrigation machines from the point of connection of the electric power to the machine. Other Standards cited are:
 - ASABE 318 - Safety for Agricultural Equipment
 - ASABE S350 - Safety Alert Symbol for Agricultural Equipment
 - ANSI 235-1 - Specification for Accident Prevention Signs
 - NEMA 151.1 - Controls and System
 - NFPA No. 70 - National Electric Code
- J. All electrical components and wiring will meet or exceed the requirements of the National Electric Code, Article 675, and American Society of Agricultural and Biological Engineers Standard S362, "Wiring and Equipment for Electrically Driven or Controlled Irrigation Machine."
- K. All part circle operating pivots will be equipped with End of Field Auto Stop/Auto Reverse units with barriers to ensure that encroachment beyond field boundaries is prevented. These devices will be mounted on a distant tower unit.
- L. Options may be specified in Attachment A to provide additional capability for the pivot.

Sprinklers

- A. The bidder shall be responsible install low-pressure sprinkler packages as specified herein on the four new replacement center pivots and the East pivot. The #7 pivots will have a sprinkler package installed by others. All parts shall be new and in good condition.
- B. The design of the sprinkler packages shall be completed by the pivot manufacturer or the sprinkler manufacturer. A "Sprinkler Chart" shall be provided with each machine showing for each sprinkler the design flow rate, inlet pressure, and location on the machine.
- C. The sprinklers shall be i-Wob as manufactured by Senninger of Clermont, Florida. Each sprinkler shall have a pressure regulator, weight, nozzle and mounting hardware also supplied by Senninger. The mounting height of the sprinklers will be approximately 6.0' above ground.
- D. Flexible ¾" hose drops and goose necks will be provided by the pivot manufacturer or Senninger for each sprinkler.

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- E. The bidder shall specify for each center pivot the proposed end gun, booster pump, flow rate and effective watering radius in his bid.
- F. **Project Schedule- Agronomy Unit. Project schedule requirements is for pivots #4 Farm and #3 NW be completed within 30 days after award. For pivot East & #5 SW to be completed within 45 days.**
- G. **Project Schedule- Beef Unit. Project schedule is for pivot #7 (repairs completed by others prior to award) and #8, well and #7 controls completed no later than 60 days from award. VFD procurement lead time is critical to meet this requirement.**

Pivot & Pump Controls

- A. Each center pivot shall have a Nelson 800 Series (**on/off**) control valve installed at the pivot point connection. The valve will be wired to the control panel in a way that it enables water flow from the pump if the pivot is operated in the “Wet” mode. Some of the existing pivots have existing 800 Series valves but they may have been damaged in the hurricane or may not be functional for other reasons (See Attachment A). The bidder may repair or install new valves as needed but must state his intentions for each pivot in his bid.
- B. There are two existing irrigation pumps which supply the water to the pivots. Irrigation pump improvements are proposed to improve the function and performance of the pump stations. The work will be a separate but parallel project to the center pivots. It is anticipated that the final pumps will be 75 HP deep well turbine pumps with VFD electric drives to maintain pressure. Attachment A indicates how the pumps are connected to the pivot machines. **This project will provide a new inverter rated motor and VFD with surge protection for Pump B- Beef Unit. VFD shall have bypass control capability.**
- C. The center pivot control system shall “enable” the VFD drive to operate the pump when a connected center pivot is operating in “Wet” mode and “disable” it when all machines have stopped. **Wireless pump shut off is to be part of this control set up.** This control feature can be by direct wiring if the pump is local to the machine or through radio links or a cloud-based interface. The dealer should supply a system that has proven reliability, ease of use and that can be upgraded in the future. One pump control module should be provided at each pump station.

Flowmeters

The pivot manufacturer shall include a flowmeter at each **well point which is tied to the pump VFD telemetry** on the pivot control panel. **Flowmeter shall be pulse type.** The meter information shall also be accessible remotely through the central control system. **This is typical for both pumps A & B.**

Removal of Damaged Pivots

The bidder shall be responsible to move the damage pivot debris machines to the edge of the field in a location specified by the purchaser. The salvage value of the removed pivots shall remain the property of University of Florida.

Training

The Authorized Dealer will orient the on-site operators regarding operation of the proposed pivot equipment.

Acceptable Manufacturers and Models

Center Pivots shall be as manufactured by Valmont Industries, Inc. (Valley), ~~or~~ Lindsay Manufacturing, Inc. (Zimmatic), **or Reinke Manufacturing Co. (Reinke).**

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The following tables summarizes the scope of work required for each center pivot machine:

SUMMARY OF WORK	
PUMP A – AGRONOMY UNIT	
PIVOT ID	DESCRIPTION
#3 NW	Complete machine replacement & new sprinkler package. Connect to PVC main and electric power at pivot point from previous pivot. Provide central control functionality. Provide Nelson 800 Series valve to be replaced. Existing to be turned over to the owner.
#4 Farm	Complete machine replacement & new sprinkler package. Connect to PVC main and electric power at pivot point from previous pivot. Provide central control functionality. Water supply pipe and control valve was damaged in hurricane and will require repair. Provide Nelson 800 Series valve to be replaced. Existing to be turned over to the owner. This machine should be equipped with a Variable Rate Irrigation package per each manufactures standard spacing with individual cut off at each.
#5 SW	Complete machine replacement & new sprinkler package. Connect to PVC main and electric power at pivot point from previous pivot. Provide Nelson 800 Series valve to be replaced. Existing to be turned over to the owner. Provide central control functionality.
East	This machine was undamaged in the storm and is completely functional. Bidder should install new sprinkler nozzles pipeline down to meet the proposed flow rate as specified in the information table below. Provide Nelson 800 Series valve to be replaced. Existing to be turned over to the owner. Also provide central control functionality which is compatible with the proposed control system.
PUMP B – BEEF UNIT	
PIVOT ID	DESCRIPTION
#7 Dubeux	This machine is in the process of being repaired under a separate contract. A Nelson 800 Series valve will be installed by the same company. Bidder should provide central control functionality which is compatible with the proposed central control system.
#8 Beef	Complete machine replacement & new sprinkler package. Connect to PVC main and electric power at pivot point from previous pivot. Install Nelson 800 Series valve. Provide central control functionality.
IRRIGATION SYSTEM PUMPS	
PUMP ID	DESCRIPTION
Pump A	Agronomy Unit – Install pump control module consistent with the central control system proposed for the center pivots. At a minimum the module shall enable or disable VFD drive through a dry switch closure. It is proposed that this pump will be upgraded by others from the current 970 gpm flow rate to 1000 gpm.
Pump B	Beef Unit – Install pump control module consistent with the central control system proposed for the center pivots. A new inverter rated motor and VFD is to be replaced as part of this irrigation project by the irrigation contractor. At a minimum the module shall enable or disable VFD drive through a dry switch closure. The existing 1000 gpm pump will remain unchanged. A new VFD unit and analog pressure transducer will be installed by others.

CENTER PIVOT INFORMATION						
DESCRIPTION	#3 NW	#4 Farm	#5 SW	East	#7 Dubeux	#8 Beef
¹ Wetted Radius	820'	1,360'	640'	760'	434'	1,320'
¹ Steel Radius	710'	1,284'	576'	669'	385'	1,238'
Rotation	Part Circle	Full Circle	Part Circle	Part Circle	Full Circle	Full Circle
Connected to Which Pump	A	A	A	A	B	B
Pump is Local or Remote	Remote	Local	Remote	Remote	Remote	Local
# of Acres	20	116	12	19	14	128
Runs With	East or #5	None	#3 or East	#3 or #5	None	None
GMP Per Acre	10 gpm	8 gpm	10 gpm	10 gpm	12 gpm	7 gpm

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¹Note: Dimensions provided by purchaser's records, MIL reports and from aerial interpretation. Bidders are responsible to verify dimensions in the field before submitting order for machines. All pivot stops should be left in place for each replacement pivot machine or irrigation contractor needs to provide the necessary labor and materials to ensure a complete end point stop.

The proposed sprinkler package for Pump A assumes the flow rate will be increased from the current 970 gpm to 1000 gpm. Bidder should verify the final flow rate of the pump before ordering the sprinkler packages.