

Appendix E

Flow Meter Calibration Facility



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Foundation and Building

The construction of the Flow Meter Calibration Facility began in April of 2006. The contract for the foundation labor was issued to Joe Farias and materials were the responsibility of Harlingen Irrigation District. The form work was completed in accordance with the Engineers design in late April. Due to the nature of the pours the



District hired L&G Concrete to pump one hundred and seventy two yards of concrete for the foundation. The foundation was poured in three parts and this began the first part of May 2006.



The design called for a 60' x 100' x 12' open sided building. After reviewing several bids the District purchased the building from Muller Buildings Inc in April of 2006. The building was delivered in May and the District hired AAA crane service to erect the building. Erecting began mid May 2006 and was completed in two weeks.

Office and Meeting Room

Upon completion of the shell erection, District personnel began construction of the 20' x 40' office and meeting room facilities. This facility consists of a 20x30 meeting room with one restroom and an office /control room. Electrical and plumbing work was



Meeting Room



Office/Control Room

contracted to Parish Electrical and Plumbing. The District hired two local building tradesmen to finish the interior of the office as well as lay the tile floor. All building construction was done in compliance with the building codes of Cameron County Texas. The construction was inspected on a regular basis by Cameron County building Inspectors as well as Texas Water Development board inspector Juan Bujanos. The foundation, building and office facilities were completed in November of 2006.

Water Conveyance System

The District began construction of the water conveyance portion of the Flow Meter Calibration Facility in June of 2006 with the construction of the water diversion box. This box is used to divert the water pumped from the inlet channel to three pipelines. One feeds the open channel flume, one feeds the closed pipe manifold and one feeds the discharge to the main canal. The diversion box is constructed of a twelve inch foundation with a four foot wall topped with two nine feet by 7 feet concrete boxes. The box is divided by a sixteen foot head wall to provide a constant head to the facility. The over flow from the headwall is diverted back to the inlet channel. The diversion is controlled by three twenty-four inch slide gates in the diversion box.



Diversion Box Foundation



Setting the Concrete Boxes

Open Channel Flume

Upon completion of the diversion box work began on the open channel flume. This flume is designed to demonstrate and calibrate open channel water measurement devices. The flume is three feet wide by four feet deep and one hundred and forty feet long. The fall from high end to low end is .083 inches per foot. It is divided into ten foot sections by two inch aluminum channels imbedded in the concrete wall allowing for the placement of control gates and check structures. The flume discharges into the inlet channel allowing for recirculation of water. There are also four, eight inch discharge pipes placed along the outside of the flume for canal turn out simulation.



Flume inlet with Sharp Crested Weir



Flume Discharge with Broad Crested Ramp



Water flowing
over Sharp
Crested Weir at
a rate of 6.5cfs

Water over Broad
Crested Ramp at a
rate of 6.5 cfs



Closed Pipe Manifold



The closed pipe manifold was designed to calibrate insertion type meters for pipe sizes ranging from twenty-four inches to six inches in diameter. The manifold was built by Morrill Industries and assembled by District personnel. At the inlet of the manifold are two Siemens certified 6000 Mag flow meters. A twenty-four inch meter for high flows and a twelve inch meter for low flows. The manifold is designed to allow for interchangeable pipe diameters and many flow meter configurations.



Calibration Tank

In addition to the Mag Meters the District has constructed a calibration tank to measure the flow of water volume over time. Water can be diverted from the open channel flume as well as the closed pipe manifold into the tank for a more precise flow measurement. The tank is built on a twelve inch thick one hundred and forty four square foot foundation topped with two ten by ten concrete boxes and a four foot poured concrete wall. The tank has a fifteen inch discharge that is controlled by an air operated flush valve.



Calibration tank and discharge/flume foundation /drain pipe.

Calibration tank 15" discharge pipe.





Calibration tank poured wall and flume end.

Manifold discharge and calibration tank



Catwalk and Viewing Platform

For easier access and viewing of the demonstration area the District constructed a catwalk and viewing platform. This structure allows for the mounting of electrical conduit and data cable conduit as well as access to both sides of the flume and pipe manifold.



Control and Automation

The District has purchased a rack mounted pc for control and automation of the Flow Meter Calibration Facility. The pc and related software will allow the facility operators to control and demonstrate many methods of total canal automation and control as well as perform calibration on meters. The system consists of the rack mounted pc, one SCADA system for data acquisition and control, a 48 to 24 channel patch panel to route data in and out of the control room and a wireless interface for communication with external devices such as laptop computers. The installation and programming of this system as well as installation of flow measurement devices is the majority of the work left to complete at the facility. We expect to have this work completed in May of this year.

The District has solicited many flow measurement device manufactures for donations of devices for demonstration and automation of the facility. To date we have received positive responses from Rubicon Systems America, Siemens, Sontec and Seametrics. Over the next several months the District will be working with these companies to install their devices for demonstration and evaluation purposes as well as aids in the automation of the facility. We have also begun contacting all the irrigation districts in the Rio Grande Valley to survey the needs of the individual districts to better prepare for the type of meters we will calibrating.



Use of Facilities

Since the completion of the meeting room facilities in November, the District has had the opportunity to host several workshops and grower information meetings. In December of 2006 the District hosted a USDA-NRCS EQIP information meeting. This meeting was well attended by growers and agency personnel alike. Also in December we held an ADI managers meeting to discuss data collection and the building of the irrigation information database.

In February the District in conjunction with Cameron County Extension, Texas A&M Extension and USDA-NRCS held its second water management workshop at the new Flow Meter Calibration Facility meeting room. The workshop was attended by approximately 20 growers and agency personnel. We have planned another Water Management workshop for May 2007.



Enrique Perez , Cameron County Extension Agent, addressing the attendees of the Water Management Workshop