Annual Progress Report for 2006

March 1, 2006 through February 28, 2007

for Work Under

Maximization of On-Farm Surface Water Use Efficiency by Integration of On-Farm Application and District Delivery Systems

Texas Water Development Board
Agricultural Water Conservation
Demonstration Initiative Grant

Submitted to:

Harlingen Irrigation District
Cameron County No. 1
Harlingen, Texas

February 28, 2007

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1. Introduction and Overview

This report contains the annual progress report for the Agricultural Demonstration Initiative Project as indicated in the Scope of Work contained in the contract between Harlingen Irrigation District – Cameron County No. 1 (HIDCC1 or the District) and Axiom-Blair Engineering, L.P. (ABE). A description of the overall progress, description of any problems encountered that have any effect on the study, delay of the timely completion of work or change in the deliverables or objectives of the contract are discussed, as well as any corrective actions necessary.

During the year 2006, ABE was tasked to provide the following general support to the project:

- Subcontracting Contract Execution: The Subcontractor will assist the District in preparing and executing the subcontracts with Delta Lake Irrigation District, Texas A&M University Kingsville, and others to provide support and services to the District on the primary contract.
- District and On-Farm Flow Meter Calibration and Demonstration Facility: The Subcontractor will provide civil engineering services to: 1) diagram the flow meter pipe and placement layout; 2) diagram the test canal configuration depicting weir and test gate locations and layout; and 3) PLC programming; and 4) other technical support as necessary to conclude the design and implementation of the facility.
- Demonstration of Internet Based Information Real-Time Flow, Weather, and Water User Accounting System: The Subcontractor will assist the District in finalizing the development of the real-time flow, weather, and water user information system (RTIS), with computer programming services to extend the current SCADA software to display flow rate and other information from the District's secondary On-farm flow measurement telemetry system, and incorporate portions of the existing water use accounting system into the internet display application. The Subcontractor will also develop new RTIS software to collect real-time rainfall measurements at five telemetry sites along with software to collect weather station information at two of those sites, for display within the current Internet display application. The two weather station sites will be incorporated into two of the existing primary telemetry sites. The District shall make the District's water user accounting system and any programming consultant for the system available to the Subcontractor and such programming consultant may be retained by the Subcontractor for the purposes of providing the necessary software interface between the water user accounting system and the RTIS. The Subcontractor will assist the District in documenting the features and capabilities of the RTIS.

- Technical Support: The Subcontractor will provide engineering and other technical support to the District, as directed, regarding efforts to sustain the primary contract task or support other subcontract activities.
- Variable Speed Pump Control and Optimization of Delivery of On-Farm Demands: The Subcontractor will provide assistance to Delta Lake Irrigation District (DLID) in the design, implementation, and purchase of the pump controller/PLC to use with DLID pump equipment to demonstrate the use of internal combustion engines in matching the quantity of water diverted from the district canal for meeting irrigation demands. A technical workshop and the associated training materials will be prepared for training district managers in the proper design, installation, and cost of installing and operating variable speed drives, and the associated pumping and pipeline systems.

The following sections address the specific Scope of Work between the District and ABE, and the work completed on each task during March 2006 through February 2007.

2. Scope of Work

The Task Descriptions and work provided for each Task is discussed below.

2.1 Subcontracting Contract Execution

2.1.1 Task 1 Description

The Subcontractor will assist the District in preparing and executing the subcontracts with Delta Lake Irrigation District, Texas A&M University Kingsville, Texas Cooperative Extension, and others to provide support and services to perform the work task.

2.1.2 Work Completed

The subcontracts for Delta Lake Irrigation District, Texas A & M University Kingsville, Texas Cooperative Extension, and others were completed. Contract modification work requested by TWDB has been completed.

2.2 District and On-Farm Flow Meter and Demonstration Facilities

2.2.1 Task 2 Description

The Subcontractor will provide civil engineering services for the design of the facilities, including but not limited to preparing site plan drawings, pump and piping system layout, open channel flow measurement system, pump and remote control specifications, construction bid and contracting documents, and preparation of environmental summary reports for submittal by the District to Texas Historical Commission, Texas Parks and Wildlife Department, and the US Army Corps of Engineers.

2.2.2 Work Completed

A Flow Meter Calibration and Demonstration Facility was constructed in 2006 and early 2007. The primary work in 2006 consisted of site review of construction, design and bidding of the flow meter manifold system, and design of the SCADA control system. Engineering drawings for the manifold system are available from the district.

The remaining design work for the Calibration Facility includes flow meter pipe The only engineering work remaining for the Calibration Facility consists of wiring in the SCADA control system and development, installation of the automatic gate and variable speed motor controllers, and software development for the control system

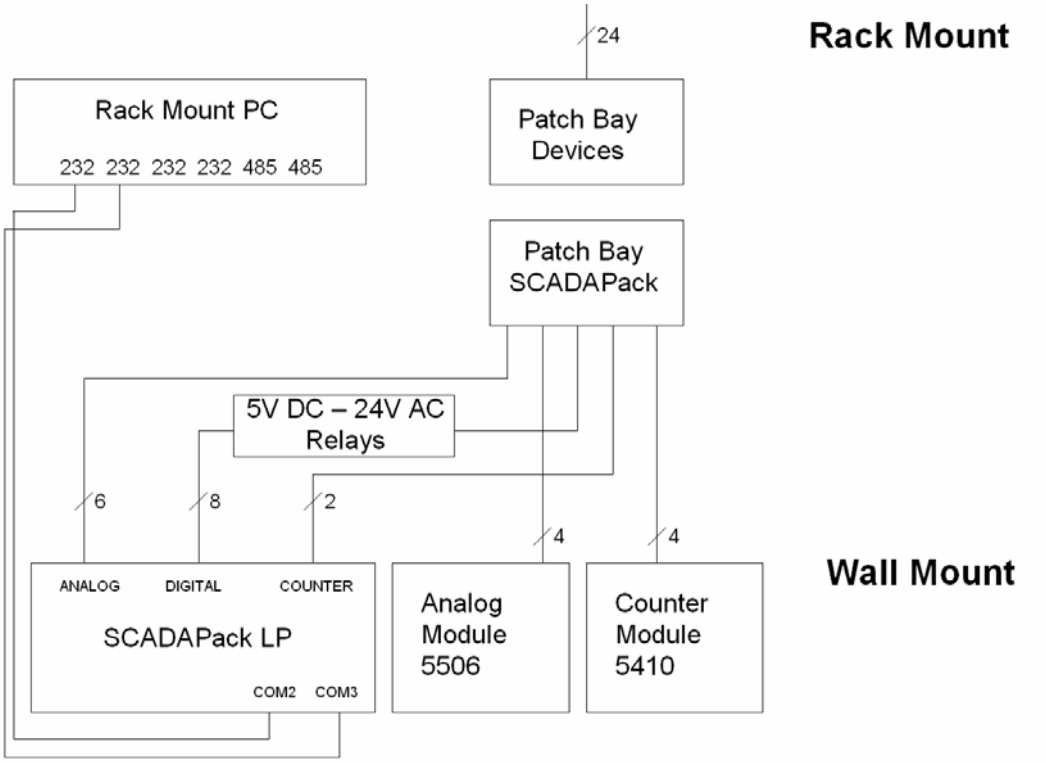


Figure 1 – Block Diagram of Flow Meter Calibration Facilty SCADA System

. Figure 2 – Flow Measurement Manifold System

2.3 Demonstration of Internet Based Information and Real-Time Flow, Weather and Water User Information (RTIS)

2.3.1 Task 3 Description

The Subcontractor shall assist the District in developing the real-time flow, weather, and water user information system (RTIS), including computer programming services such as those necessary to develop the software to display specific District information from the District's existing flow measurement telemetry system and existing water use accounting system on the internet. The Subcontractor shall develop the necessary software to collect real-time rainfall data from five locations selected by the district and co-located at existing flow measurement telemetry nodes and display such rainfall data on the District's web site. The Subcontractor will assist the District in preparing a document that defines the features and capabilities of the RTIS, and the Subcontractor shall use this document in developing the RTIS software. The Subcontractor shall make use of the District's water user accounting system and any programming consultant for the system and such programming consultant shall be retained by the Subcontractor for the purposes of providing the necessary software interface between the water user accounting system and the RTIS.

2.3.2 Work Completed

The initial phase consisted of development of a general website for HIDCC. This task was completed on August 15, 2005. The second phase consists of developing the computer programming necessary to display flow measurement data from HIDCC telemetry server in real-time over the Internet. This phase was completed in November of 2005 and the system is operational. Additional meters and rain gauges are being added to the web display system as such devices become operational.

The third phase consists of development of software for secure access to on-farm flow meter records, water use charges, and water billing by interfacing the Internet server with the District's existing accounting system computer. The District water accounting software is being updated by a third-party at the District's expense, and this software update needs to be completed before significant progress can be made in this phase. Initial work on this phase addresses the accounting and water ticket database fields related to user information such as property identification, crops, requested water amounts, times, etc.

The following is an initial release of the information that outlines the features and uses of the Internet accessed real-time flow, weather, and water user information system (RTIS). The following details how to locate and use the RTIS website, and how to select a pumphouse and water deliveries to view as an example of navigating the website. The source code for this part of the RTIS software system is attached as Appendix F.

2.3.2.1 HID Internet Website RTIS Reporting User Guide – Part I

Welcome to the Harlingen Irrigation District Agricultural Water Conservation Demonstration Initiative Internet Based Information project! This documentation outlines the features of the Internet accessed Real-Time flow, weather and water user Information System (RTIS) and how to use it. The web interface to the system is available on the district's website, which is located at http://www.hidcc1.org. After navigating to the district website, select Telemetry as shown below in Figure 2.1.

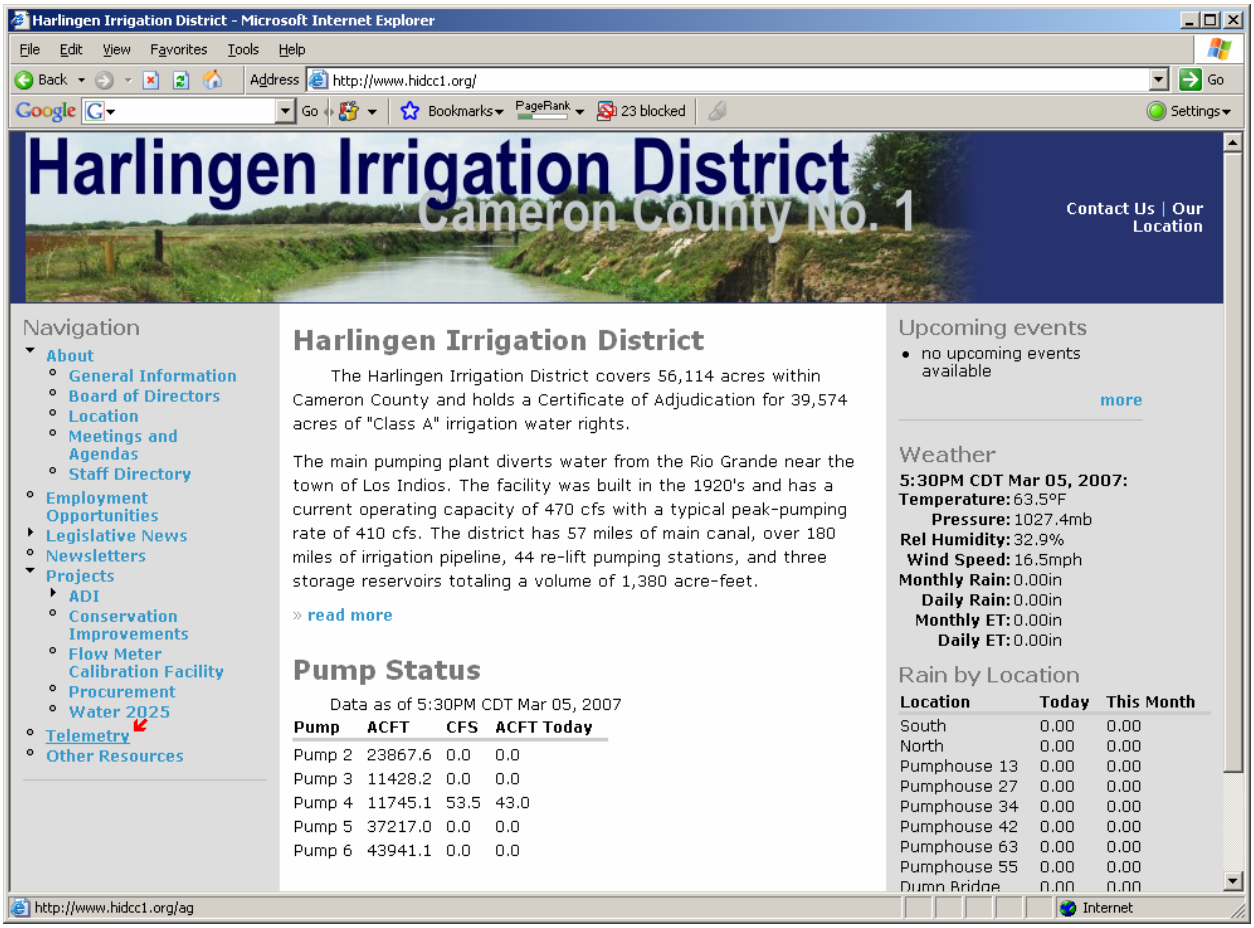


Figure 2.3.2.1.1: Harlingen Irrigation District Web Site Main Screen

Now at the Telemetry Main Page, you are shown a list of site groups which may be expanded to reveal sites and data points.

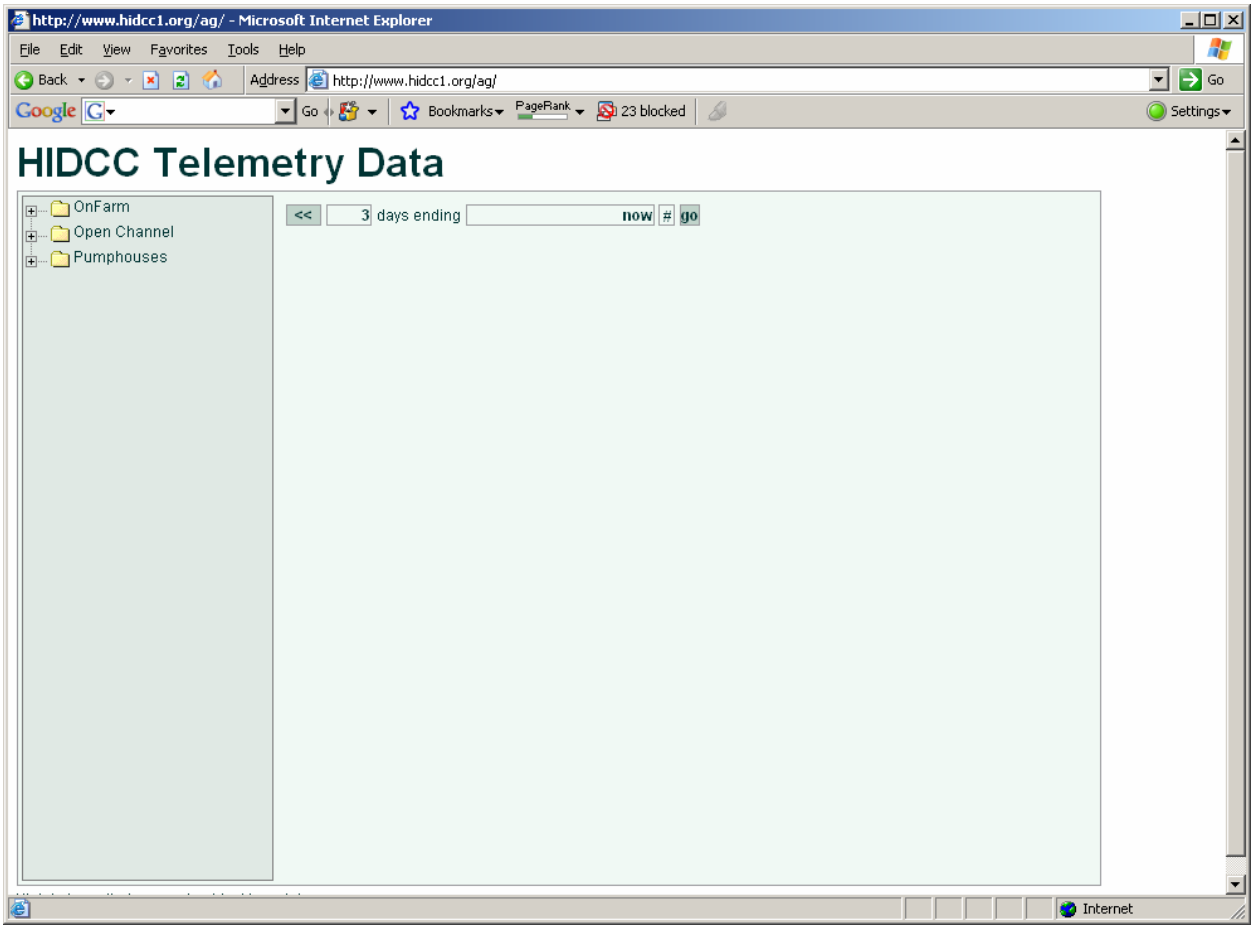


Figure 2.3.2.1.2: Telemetry Main Page

Once at the Telemetry Main Page, you may expand the desired section by clicking the Plus sign (+) to the left of the folder you wish to examine, then select a specific site by clicking on that site's text label or expand the site to display a single graph from the site.

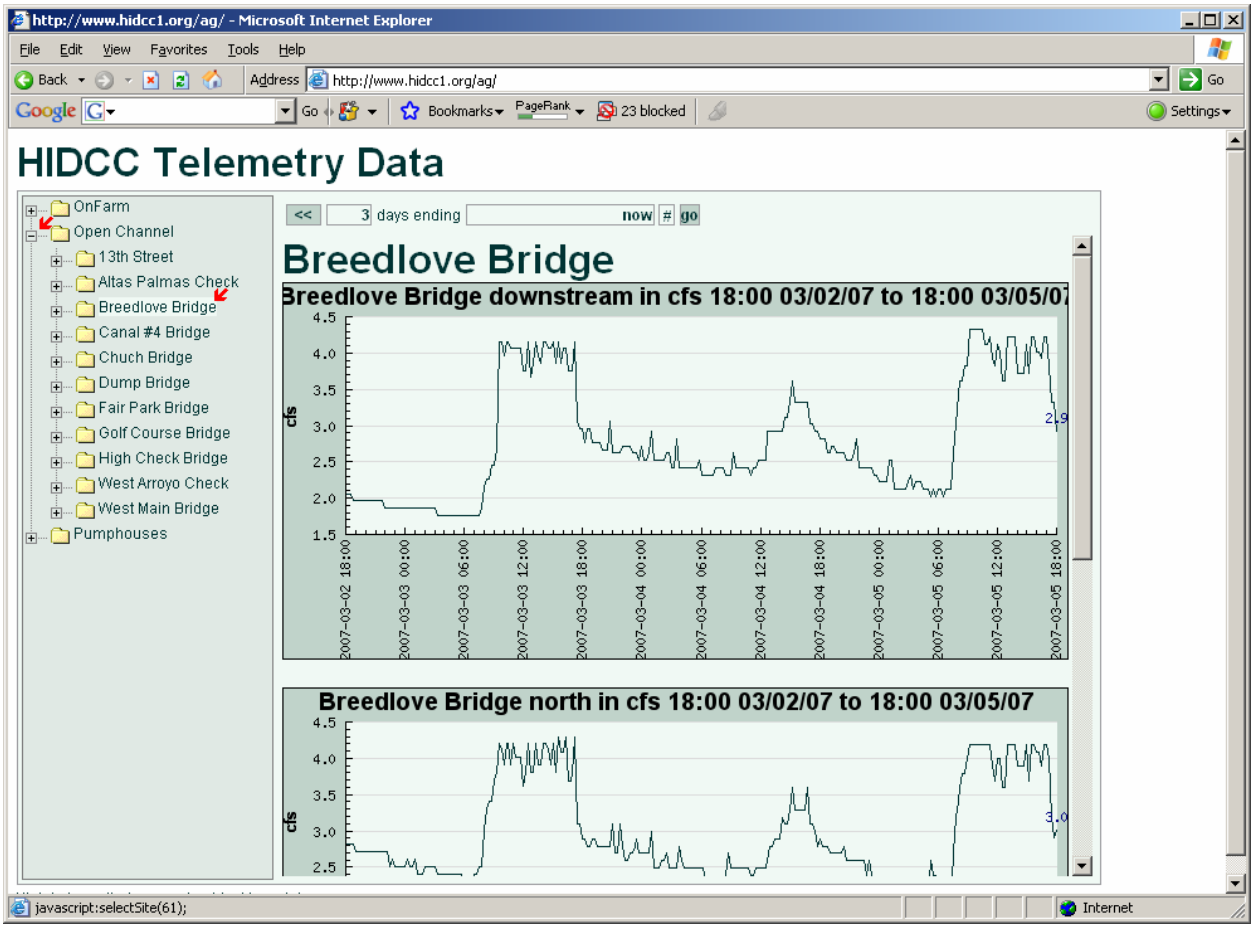


Figure 2.3.2.1.3: Telemetry Data Display

2.3.2.2 Website CMS (Content Management System)

2.3.2.2.1 System Overview

This brief users' guide provided a basic reference to editing, adding, and removing documents from the hidcc1.org website using the Content Management System. Using the CMS, you will be able to make changes to the website using our completely web-based interface.

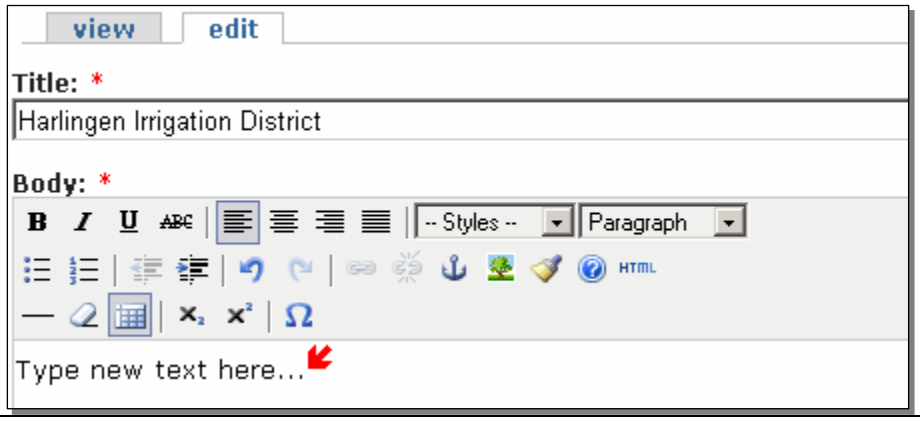
2.3.2.2.2 Logging in

To log in to the Content Management System, point your web browser to http://www.hidcc1.org/user and enter your username and password.

2.3.2.2.3 Updating Existing Content

To update existing content, log in and select the page you would like to edit from the grey menu on the left (1), and then click the 'edit' tab at the top of the page (2).

Next, edit the page as desired in the Body field.

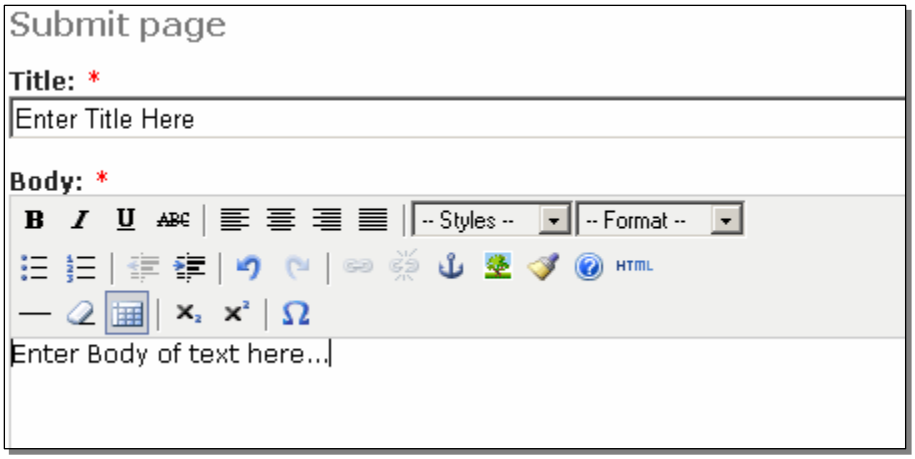


You may also alter how the page is listed in the site menu under 'Menu settings' or add/remove file attachments under 'File attachments'. Finally, remember to click 'Submit' when you are pleased with the changes that you've made.

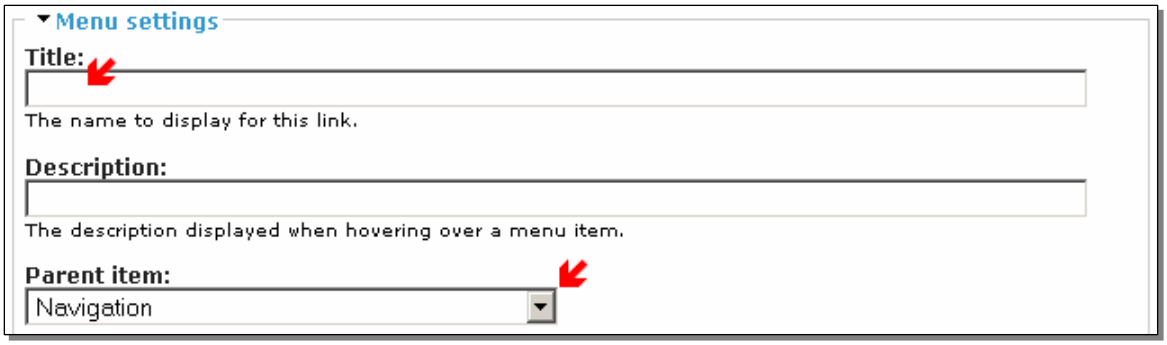
2.3.2.2.4 Creating New Content

If you would like to add a new page, log in and under the grey menu on the left, select 'create content'. You will then have a choice of what type of item you would like to create. For general web pages, select 'page', to add an item to the upcoming events calendar, select 'event'.

You must enter something for both the Title and Body of every item that you create. You may use the formatting toolbar above the Body section to select how you wish your item to be laid out.



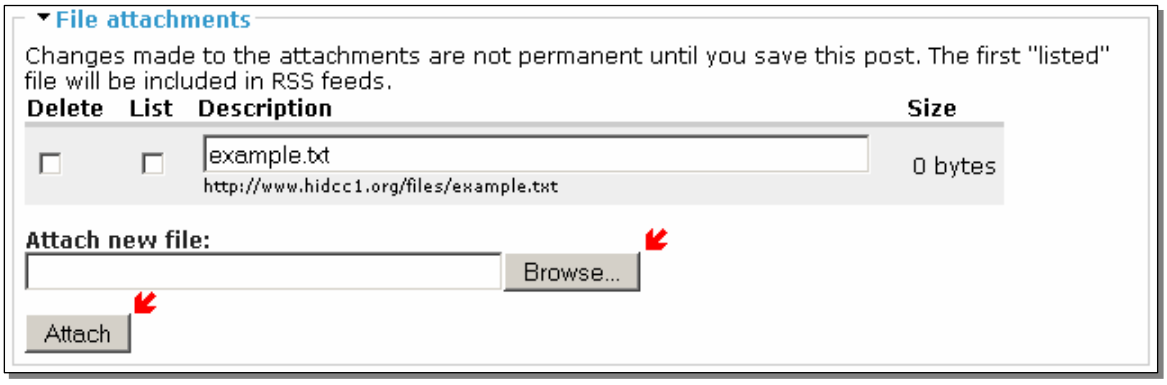
If you would like the item to be listed in the Navigation menu on the left so that users will be able to find it, you will need to specify how and where it should be listed. You will do this by expanding the 'Menu settings' section and entering the label you would like to appear in the menu in the 'Title' box and selecting the menu section under which you would like the item to appear.



If you would like this item to be displayed on the front page when users visit the site, select 'Promoted to front page' under 'Publishing options'.

2.3.2.2.5 Posting Files

To post a file, you will use the 'File attachments' section. Click on 'File attachments' to expand the section. Next click 'Browse' to bring up the file selection dialog and select the file that you wish to post. Use the 'Browse' button instead of typing the filename directly. Do not alter the contents of the 'Attach new File' box; if you would like to label the file differently you will have a chance to do so later. After using the 'Browse' button to select the desired file, click 'Attach'. Wait for the file to upload, then you will see it listed along with any other files currently attached to the page. If you would like the file to be listed for users to find and download, select the 'List' box next to the file. If you are uploading an image to be displayed on the page (as described later), leave the 'List' box unchecked. If you would like to give the file a label besides its filename, you may enter it in the box below 'Description' after Browsing and Attaching it. As always, be sure to click 'Submit' at the bottom of the page after making changes. You must do this before the files will become available to you or anyone else. If you need to post an attachment type that is not currently allowed, contact your system administrator.

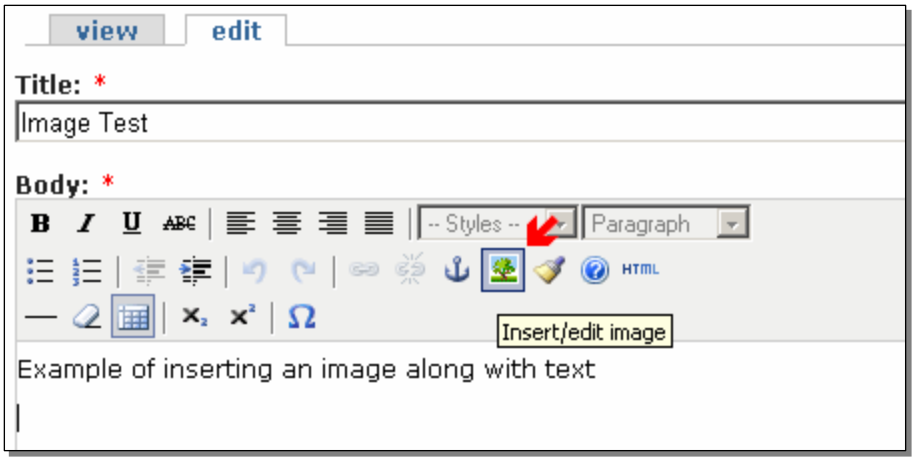


Remember to click Submit

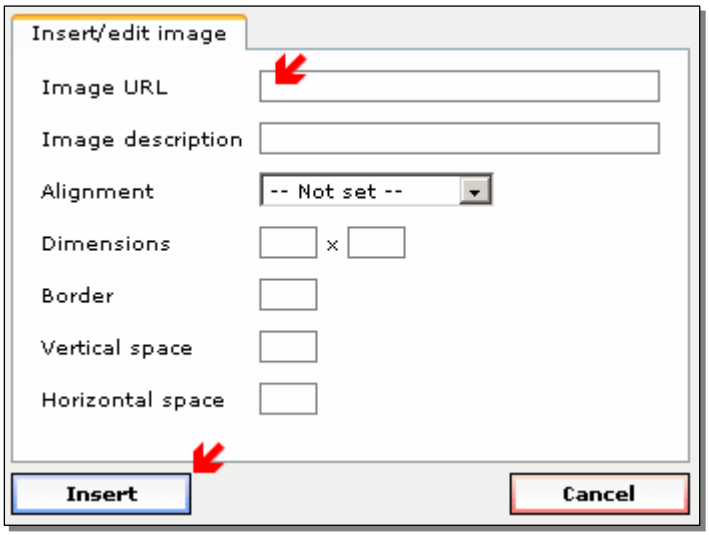
2.3.2.2.6 Inserting Images

To display an image, you will need to first attach the image file as described in the **Posting Files** section above and Submit the changes. When you have attached the file and Submitted the changes, return to the edit tab and you may then insert the file into the body of your text. You will need to look at the url text listed below the file description of the desired file. It will begin with http://www.hidcc1.org/files/. Copy this string, you will need to enter this text later.

After positioning the text cursor within the body text where you would like the image to be displayed, click the Insert/edit image button in the toolbar above to bring up the image properties dialog box.



In the ‘Image URL’ box, paste the exact text described above, then click ‘Insert’.



You should now see the image displayed inline with the body text.

This task will extend into 2007 with the primary work being associated with providing a internet based data entry system for the field demonstration projects and the linking of the district's water ordering/account database with the real-time on-farm flow measurement telemetry system.

2.4 On-Farm Demonstration of Surge and Center Pivot Irrigation Systems

2.4.1 Task 4 Description

The Subcontractor shall provide technical assistance to the District, as requested in writing by the District, in the design and specification of any surge or center pivot irrigation systems used for demonstration projects and assist the District in developing the type of data and methods of data collection need for determining the irrigation efficiency and other water use data of the demonstration project.

2.4.2 Work Completed

No requests for support have been made other than attending technical meetings and advising on the need for detailed specifications for data collection.

2.5 Variable Speed Pump Control and Optimization of Delivery of On-Farm Demands

2.5.1 Task 4 Description

The Subcontractor will provide assistance to Delta Lake Irrigation District (DLID) in the design, implementation, and purchase of the pump controller/PLC to use with DLID pump equipment to demonstrate the use of internal combustion engines in matching the quantity of water diverted from the district canal for meeting irrigation demands. A technical workshop and the associated training materials will be prepared for training district managers in the proper design, installation, and cost of installing and operating variable speed drives, and the associated pumping and pipeline systems.

2.5.2 Work Completed

Work in 2006 primarily consisted of prepartion and giving of a training course on variable speed pumping plants and hydraulic modeling. This course was giving in March of 2006. Training manuals, software, and course review forms are available from the district. The SCADA PLC control specifications were developed for a diesel powered pumping plant and two locations were evaulated for the demonstration project. Delta Lake Irrigation District relift station 45 and HIDCC's Flow Measurement Calbration Facilities Rio Grande Lift pump # 7.

The project will continue in 2007 with the installation of the PLC at one or more sites and the addition of the site to the field demonstration day.

3. Project Task Budget

Table 3.1 indicates the budget and expenditures for each of the four tasks discussed. 58% of the budget has been expended with approximately the same amount of task work being completed.

Table 3.1: Project Task Budget

Task Budget March 1, 2006 through February 28, 2007 (4th Quarter Expenses)

	Task Budget	Expenses This Period	Previous Expenses	Accumulated Expenses	Balance Remaining	Percent Remaining
Task 1 Administration/Contracts	$ 5,020.00	$ 1,200.00	$ 190.00	$ 1,390.00	$ 3,630.00	72%
Task 2 Calibration Facility	$ 20,000.00	$ 1,365.00	$ 11,495.69	$ 12,860.69	$ 7,139.31	36%
Task 3 Internet User Info	$ 144,600.00	$ 5,032.50	$ 67,737.67	$ 72,770.17	$ 71,829.83	50%
Task 4 Technical Support	$ 4,800.00	$ -	$ -	$ -	$ 4,800.00	100%
Task 5 Variable Speed Pump	$ 45,800.00	$ -	$ 9,080.93	$ 9,080.93	$ 36,719.07	80%
Total	$ 220,220.00	$ 7,597.50	$ 88,504.29	$ 96,101.79	$ 124,118.21	56%

Expense Budget	Total Budget	Expenses This Period	Previous Total Expenses	Total Expenses Incurred	Balance Remaining	Percent Remaining
Salary and Wages [1]	$ 205,420.00	$ 7,097.50	$ 85,686.23	$ 92,783.73	$ 112,636.27	55%
Fringe[2] (20% of Salary)		$ -	$ -	$ -	$ -	
Travel (estimated)	$ 5,000.00	$ 500.00	$ 2,656.05	$ 3,156.05	$ 1,843.95	37%
Expendable Supplies (estimated)	$ 1,800.00	$ -	$ -	$ -	$ 1,800.00	100%
Capital Equipment		$ -	$ -	$ -	$ -	
Subcontracting Services	$ 8,000.00	$ -	$ -	$ -	$ 8,000.00	100%
Technical/Computer		$ -	$ -	$ -	$ -	0%
Reproduction	$ -	$ -	$ 162.01	$ 162.01	$ (162.01)	0%
Overhead		$ -	$ -	$ -	$ -	0%
Profit		$ -	$ -	$ -	$ -	0%
Profit					$ -	0%
Total	$ 220,220.00	$ 7,597.50	$ 88,504.29	$ 96,101.79	$ 124,118.21	56%

*amends quarterly reports. February. 2006 expense were accidentally included in the quarterly reports for the March 2006 through February 2007 time period.