A STEP I PRE-PROPOSAL FOR ENVIRONMENTAL INFRASTRUCTURE PROJECTS

Submitted to the

Border Environment Cooperation Commission

for a Grant for the Purchase and Installation of a District Wide Flow Measurement, Telemetry, and Water Delivery Management System

Prepared by

Harlingen Irrigation District Cameron County No. 1

August 23, 2002

301 E. Pierce Harlingen, Texas 78551
Phone: 956-423-7015 Fax: 956-423-4671
Email:halbwayn@aol.com

Border Environment Cooperation Commission

STEP I: PRE-PROPOSAL FOR ENVIRONMENTAL INFRASTRUCTURE PROJECTS (OTHER SECTORS)

Date of Submittal to the BECC August 23, 2002 Date of Receipt by the BECC ___________

NAME AND TYPE OF PROJECT

1. NAME OF THE PROJECT:

Harlingen Irrigation District Cameron County No. 1
Flow Measurement, Telemetry, and Water Delivery Management Project

2. TYPE OF INFRASTRUCTURE AND/OR NON-STRUCTURAL ACTIONS:

B. Water Conservation

PROJECT DESCRIPTION

3. BRIEF PROJECT DESCRIPTION: **The grant requested under this proposal will be used by the District to purchase and install flow measurement, flow telemetry devices, and water delivery management system for use in improving the District's water management by minimizing the amount of water loss due to untimely or excess deliveries to water users. The proposed measurement system will facilitate the District moving towards 100% volumetric pricing of water delivered by the District to water users.**

PRIMARY APPLICANT

4. NAME OF THE ORGANIZATION:	**Harlingen Irrigation District Cameron County No. 1**
Name of Contact Person:	**Wayne Halbert**
Position:	**General Manager**
Address:	**301 East Pierce, P.O. Box 148** **Harlingen, Texas 78551**
Phone No.:	**956-423-7015**
Fax:	**956-423-4671**
E-mail Address:	**halbwayn@aol.com**

CO-APPLICANT (IF APPLICABLE)

5 and 6. **Not Applicable**

GENERAL PROJECT INFORMATION

7. LOCATION OF PROJECT:	United States
8. City where project is located, or nearest City to the Project:	Harlingen, Texas
9. DISTANCE FROM NEAREST CITY (in miles):	in and near Harlingen, Texas
10. POPULATION OF NEAREST CITY:	50,000
11. POPULATION BENEFITED:	50,000
12. WITHIN BORDER REGION? (62 mi)	Yes
13. TYPE OF PROJECT:	PUBLIC
14. PROJECT TYPE:	NEW/RETROFIT
15. ESTIMATED LIFE CYCLE OF THE PROJECT:	10 years
16. SPECIFIC DESCRIPTION OF PROJECT:	

INDICATE TYPE OF PROJECT, SIZE IN COMPARISSON WITH OTHER SIMILAR PROJECTS, HOW THE PROJECT SOLVES AN ENVIRONMENTAL PROBLEM, THE BENEFIT TO BE GAINED WITH THE PROJECT, ETC.

The project proposes to use flow measurement and telemetry technology to salvage water that would have otherwise been lost to excess deliveries or spills. The project will provide the District water operations and management with real time information regarding quantity of water being delivered, water flow rates within the delivery system, and water spilled from canals to drainage ditches. The Rio Grande Valley is currently experiencing a drought and any water salvaged benefits both the District and the community by making more water available for delivery. The project is estimated to salvage approximately 4,000 acre-feet per year.

PROJECT PLANNING INFORMATION

THE PROJECT ALREADY HAS :

17. ENVIRONMENTAL ASSESSMENT:	underway
18. PRELIMINARY ENGINEERING STUDY:	completed
19. TECHNICAL FEASIBILITY STUDY:	underway
20. FINANCIAL FEASIBILITY AND PROJECT MANAGEMENT STUDY*:	underway
21. PRELIMINARY DESIGN:	underway
22. FINAL DESIGN:	underway
23. DETAILED COST ESTIMATE:	underway

***Economic feasibility study current underway by Texas A&M University**

24. COST ESTIMATE FOR:	$ U.S.
Final Design Development*:	$60,000
Construction of Facilities:	$1,400,000
Operation & Maintenance (annual):	$120,000
Financing Costs (annual):	0
Total Cost	**$1,580,000**

*** rough estimated cost in addition to ongoing engineering efforts funded by the TWDB**

25. ESTIMATE THE TIME REQUIRED FOR EXECUTION OF*	**Months**
Planning:	**0**
Design:	**6**
Environmental Assessments:	**6**
Authorizations:	**0**
Acquisition/Preparation of Site:	**0**
Construction of Facilities or Installation of Systems:	**12**
Operation Start-up:	**18**
Total Time Required	**18**

***elapsed time from date grant authorization to proceed is issued**

26. HAVE POTENTIAL SOURCES OF FINANCING BEEN IDENTIFIED?	**No**
27. AMOUNT TO BE REQUESTED FROM THE NADB:	**$1,580,000**
28. What will be the Source of Revenue for Repayment of the Loans?:	**NOT APPLICABLE**
29. PUBLIC MEETINGS HAVE BEEN HELD IN THE COMMUNITY:	**No**

ADDITIONAL INFORMATION

30. ADDITIONAL INFORMATION THAT YOU WOULD LIKE TO PROVIDE:

SEE ATTACHED INFORMATION

I declare that all the information presented above in the BECC Step I: Pre-Proposal Form is correct to the best of my knowledge.

	Wayne Halbert
(Signature of the Project Applicant)	*(Name of Project Applicant)*

Projects presented to the BECC may be directed to any of the following addresses:

In Mexico:

Apartado Postal
Apartado Postal 3114-J
Cd. Juárez, Chihuahua
México

Teléfonos: (01-656) 688-4600
Fax: (01-656) 625-61-80
Correo Electrónico: becc@cocef.org

In the United States:

Post Office Box
P.O. Box 221648
El Paso, TX 79913
USA

Phone: (011-52-656) 688-4600
Fax: (011-52-656) 625-61-80
E-mail: becc@cocef.org

Office Location
Blvd. Tomás Fernández # 8069
Fracc. Los Parques
Cd. Juárez, Chihuahua C.P. 32470
México

Additional Information

Description of Proposed Conservation Measures

The table below list the locations of the 73 proposed meter sites.

Site #	Pump # or Check	Pipeline Number	Pipeline Size (in.)	Insert Length	Meter Type
1	11	11	18	20	Prop
2	12	14	21	20	Prop
3	13	17	30	30	Prop
4	14	22	24	20	Prop
5	15	23	30	30	Prop
6	16	WH-1	24	20	Prop
7	17	31	30	30	Prop
8	18	35	30	30	Prop
9	20	10	24	20	Prop
10	21	15	36	30	Prop
11	22	17-A-1	18	20	Prop
12	23	18	30	30	Prop
13	24	21-S	24	20	Prop
14	25	21-N	24	20	Prop
15	26	25	30	30	Prop
16	27	27	30	30	Prop
17	28	28	24	20	Prop
18	29	29	30	30	Prop
19	31	38	30	30	Prop
20	31	38-A	18	20	Prop
21	32	40	24	20	Prop
22	33	41	36	30	Prop
23	34	43	30	30	Prop
24	34	42	30	30	Prop
25	35	1	36	30	Prop
26	41	46	42	40	Prop
27	42	26	36	30	Prop
28	42	26-A	18	20	Prop
29	51	2-J	30	30	Prop
30	52	3-9-B	24	20	Prop
31	53	DC	36	30	Prop
32	53	DC-1	24	20	Prop
33	54	6-A	30	30	Prop
34	55	(none)	30		Prop
35	56	(none)	15	20	Prop
36	56	(none)	15	20	Prop
37	56	(none)	15	20	Prop
38	61	1F	30	30	Prop
39	62	1J	24	20	Prop

40	64	B1	36	30	Prop
41	17A	17B	24	20	Prop
42	23A	M-5	18	20	Prop
43	27A	27-A	18	20	Prop
44	RESERVOIR				Diff. Head
45	HIGH				Diff. Head
46	WEST MAIN				Diff. Head
47	ECHOLS				Diff. Head
48	PETERS				Diff. Head
49	ALDERDICE				Diff. Head
50	CHURCH				Diff. Head
51	GOLF COURSE 1				Diff. Head
52	GOLF COURSE 2				Diff. Head
53	LITTLE CREEK				Diff. Head
54	CANAL #3				Prop
55	PARKWOOD 30				Prop
56	CANAL #4				Prop
57	DUMP				Diff. Head
58	CITRUS				Diff. Head
59	TAYLOR				Diff. Head
60	TSTC				Diff. Head
61	FAIR PARK				Diff. Head
62	HARVEY				Diff. Head
63	WYRICK #1				Diff. Head
64	BREEDLOVE				Diff. Head
65	GODWIN				Diff. Head
66	GOAT				Diff. Head
67	LAKE				Diff. Head
68	WEST ARROYO				Diff. Head
69	ARROYO STUB				Diff. Head
70	BOWMAN				Diff. Head
71	#42				Diff. Head
72	ALTAS PALMAS N				Prop
73	ALTAS PALMAS E				Prop
74	Portable #1				Trans. Flow
75	Portable #2				Trans. Flow
76	Portable #3				Trans. Flow
77	Portable #4				Trans. Flow

Existing Facilities and Water Delivery System Description

Figure 1 shows HIDCC's system of canals and laterals used to deliver irrigation and raw water.

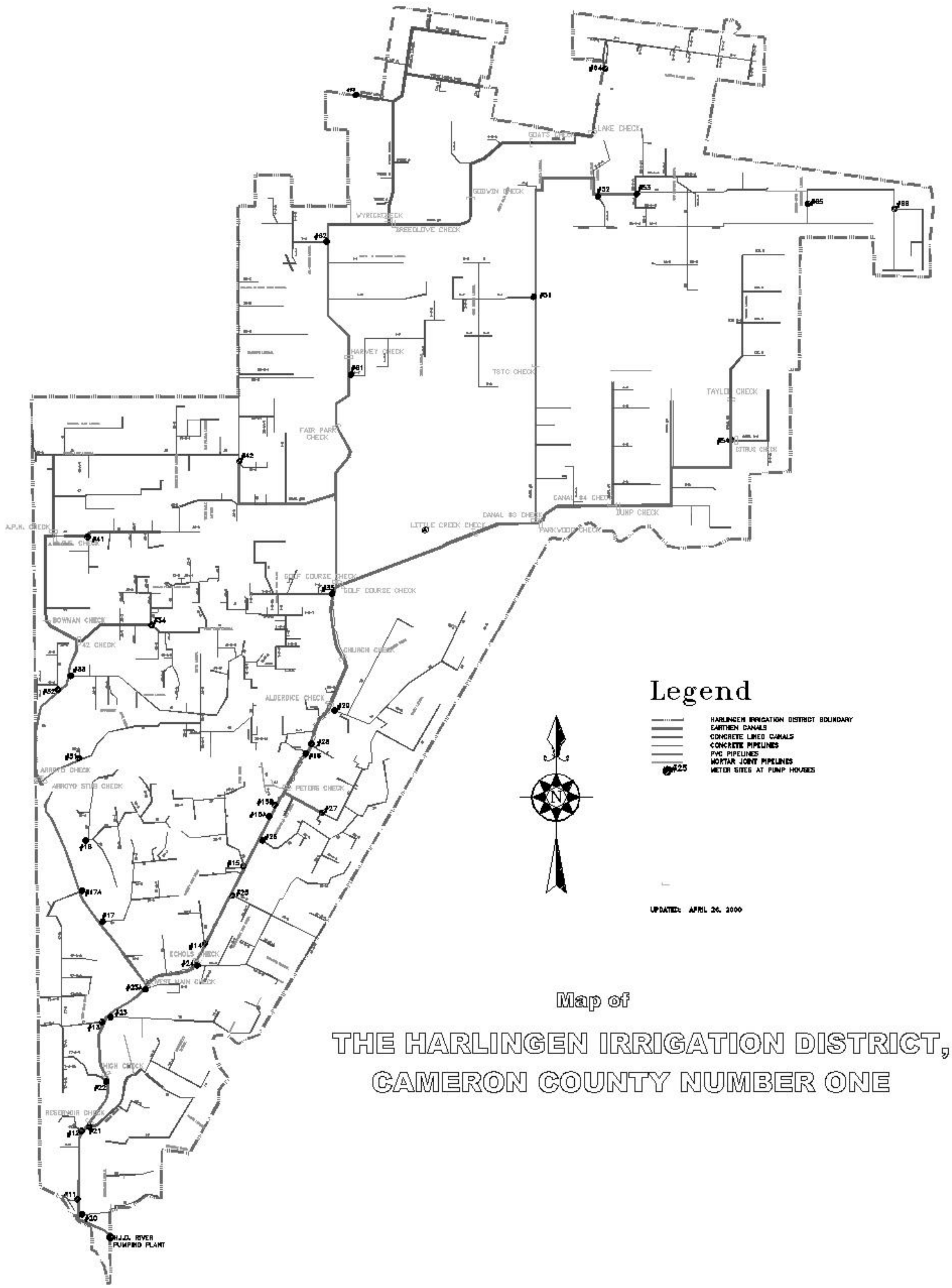


Figure 1 – HIDCC Main Canal and Lateral Distribution System

Water Delivery Management System

The Project Study will determine the type of water delivery management hardware and software system proposed for use by District staff in collecting water delivery information. One system being considered is marketed by EasyReader International of Ventura, California. The EasyReader system uses a handheld barcode scanner/data terminal (shown to the right) and custom database software to manage water delivery information.

Telemetry and Network System Design

The Project Study will determine the type of telemetry system and communication network proposed for use in collecting the flow data and making such data available to management.

a. Cellular Digital Packet Data (CDPD)

CDPD is relatively new to the Harlingen area and provides a relatively low cost wireless IP device with little overhead or setup expense. A CDPD device is both a modem and transceiver that operates in the 826 to 905 Mhz frequency range and can uses ATT's or Bell South or others cellular radio system for communication. The cost of a CDPD radio/modem varies from $300 to $600 and monthly fees per CDPD device range from $6 to $10 each. The Sierra Wireless DART 300 CDPD modem costs $475 and is shown in the adjacent photograph.

Each CDPD device is assigned a unique IP address and once activated and operational it behaves like a wireless IP connection and allows remote transfer of data via secure or unsecure UDP (user datagram protocol) or TCP (transport control protocol). A typical CDPD system would need a data module such as the Keithly M1251 or a RTU such as the Scadapack Lite to measure flow.

b. Flow Measurement Calibration and Quality Control

All flow measurement systems require some calibration and period maintenance to remain operational and achieve an acceptable level of flow measurement accuracy. The success of the flow measurement program is dependent on the initial calibration of the flow measurement structure and water level transmitter, frequent verification of the water level transmitter accuracy, periodic re-calibration of the meter and water level transmitter, and accurate and easily accessible flow data records.

c. Open Channel Flow Meter Calibration

All newly constructed open channel flow metering structures require calibration with the exception of flumes and weirs that are installed according to strict design criteria and well controlled upstream conditions. At least one flow measurement using the standard USGS stream gauging procedures should be performed on "pre-designed" laboratory calibrated meters. All other installed structures should initially have a minimum of 4 stream flow measurements made over the range of flow conditions expected for the meter site and then monthly for the first six months. The flow calibration of each meter should be checked each year for flumes and weirs and weekly or monthly in canals or channels with moveable beds. The equation typically used to predict flow is of the algebraic form:

$$Q = a \times (H - b)^{c}$$

where Q is the flow rate in cubic feet per second, H is the water level stage in feet, and a, b, and c are calibrated coefficients. If a zero water level stage (H=0), there is zero flow (Q=0), then the coefficient b=0.

d. Closed Conduit Measurements

An impeller meter can be placed in pressurized pipe lines and used to accurately measure flow. The photograph to the right is of a saddle mounted impeller meter/

e. Water Level Transmitter Calibration and Maintenance

The water level transmitter must be initially calibrated for both slope and offset. The equation used for a typical 4-20mA transmitter is of the form:

$$H = \text{slope} \times (\text{mA}) + \text{offset},$$

where H is the water level in feet, slope has units of ft per mA, and offset has the units of feet. Typically the slope is very stable for most transmitters but the offset will drift overtime. Once the slope is calibrated, the offset can be determined by comparing the electronic reading of water level with the observed staff gauge.

f. Flow Record Data Base and Data Distribution

The primary purpose of a flow measurement system is to obtain flow records for use in reports regarding water rights, District water charges, operations management, and engineering evaluations. The proper design and maintenance of the flow record data base is key to a successful flow measurement program. The three most common methods for storing flow records are using strip charts (paper records), data logger files (ASCII file stored on magnetic media), or a central data base update via telemetry. Once data is collected it can be distributed in real-time or near real-time if telemetry is used or on a monthly basis via conventional methods.

g. Data Logger Files

Some RTU's and all data loggers can store data for periodic on-site retrieval using a portable computer or other device. These files usually require some processing or formatting on an office computer prior to being usable by others. Once data is download from the field sites and transferred, processed, and formatted the flow records for each meter site can be distributed via mail, e-mail, facsimile, or transferred to an ftp or http internet site.

h. Central Computer Data Base

Once the flow data is acquired either by manual downloads into a portable computer or via real-time telemetry, such data must be organized and stored on a central computer system. The software database can be something as simple as a spreadsheet program or as sophisticated as an internet compatible database such as ORACLE. The quality of the flow measurement data is maintained by the manager of the data received by the central computer system. The usefulness and accessibility of the entire flow measurement program depends on the integrity of the central computer data base.

i. Automatic E-mail and Pager Distribution of Flow Data

If flow data is collected via telemetry at a central computer then periodic flow information can automatically be distributed via e-mail and alphanumeric pagers. The cost for e-mail distribution is typically included with the cost of the Internet service for the central computer system and the monthly rental fee for alphanumeric pagers ranges from $8 to $25 depending on geographic coverage. The alphanumeric pager updates provide a key management tool for operators of irrigation system for the minimum cost. The District may use a pager system to periodically (twice daily) inform water operations managers of the system status and to warn the operators of hazardous conditions (24 hour, 7 days a week).

j. Internet Access of Real-Time Data and Data Archives

If flow data is collected via telemetry at a central computer then real-time and historical flow information can automatically be accessed via the Internet. Various software packages can be used to format and display the flow data. Access to such data can be limited by password and user account information..

k. Tasks for Design and Installation of Metering Structures

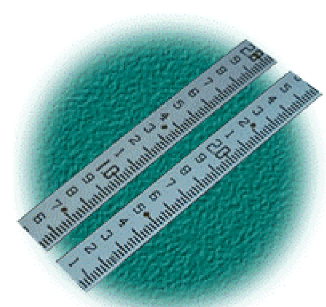
1) Field Surveys of Sites
2) Final selection of Flow Measurement Structure and Measurement Systems for each site,
3) Final design drawings and construction specification for District construction and identification of all construction project tasks and project schedules,
4) Construction Administration (field coordination and review of submittals), and
5) Maintenance and Operation Training.

l. Meter Structures Components

The total structure costs is the sum of the cost for the structure, stilling well, staff gauge, instrument conduit, vandal housing, instrument enclosure and antenna solar panel mast.

Stilling Well: Each meter site requires a galvanized metal 2” diameter stilling well anchored to concrete. The stilling wells are designed to be vandal resistant but have easy access for inspection and cleaning of the submerged pressure transmitter (SPT).

Staff Gauge: A porcelain enameled staff gauge is required at each meter site. The gauge is mounted flush to the concrete side wall of the channel or on an upstream portion of the meter structure. Staff gauges installed on the sloping side wall of the canal can be purchased such that the gauge markings are compensated for side slope of the canal.



Instrument Conduit: Buried PVC or above ground rigid metal conduit shall be used to protect all instrument wiring from the SPT to the instrument housing and from such housing to the solar panel and antenna.

Vandal Housing: Typically a 24”x24”x12” – 3/16” plate steel box is used to protect the instrument housing. The vandal housing provides protection against most small arms fires. The adjacent photograph shows a vandal housing for a flow and automatic gate telemetry system.

Instrument Housing: Typically a 20”x20”x8” NEMA 12 instrument enclosure is used to house the telemetry instrumentation.

Mast: Typically a 17’ tall free standing mast is installed a each site. The height of the mast is primarily for improving radio reception and reducing vandal damage to the solar panel and antenna. Typical masts are set 3’ deep in a reinforced concrete anchor and telescope from a 3” to a 1 ½ “ steel pipe.

Sensor: The proposed water level transmitter is 4-20mA loop powered stainless steel submersible pressure transmitter (SPT).

RTU System: The RTU System cost includes the CDPD radio/modem, the Onset Data Module, a 12 to24VDC converter (to power the SPT), a 12VDC solar panel regulator, a 80 amp-hr sealed battery, a 10 db yagi directional antenna, RF and power cabling, a 20 watt solar panel with mounting hardware, and system assembly, parts ordering, and QA/QC.

Calibration/Installation: Each meter structure will require one to four stream flow measurements or pipe velocity profiles, and the field installation and programming of the RTU system.

Field Survey of Meter Locations

Each proposed meter location shall be field surveyed and photographed. A general site plan shall be developed and the specific placement of the flow meter and other devices and conduit shall be indicated on an engineering drawing.

Determination of Water and Energy Conserved

Construction Cost Estimates

Construction cost estimates will be prepared using local cost information and unsolicited cost quotations from supply and material vendors. The cost estimates shall use procedures recommend by Reclamation and those generally accepted by the heavy construction industry.

O&M Cost Estimates

The O&M cost for maintenance and repair of the flow meters and telemetry system will be estimated based on the experience of other irrigation district with such systems. It is anticipated that a full time technician will be need to maintain, calibrate, and repair the proposed 70 meters and associated telemetry. An O&M training workshop is proposed to be funded by the “Monitoring” portion of this proposal. The workshop will focus on the proper maintenance and calibration of the installed flow meters.

Cost Benefit Analysis

A simple cost-benefit analysis shall be prepared for the proposed project. Such analysis shall included fixed, operational, and maintenance costs associated with the flow measurement and telemetry system.

Effect on Development of New Water Supplies and Assessment of Water Demand

The effect of the proposed project on the development of new water supplies for the Lower Rio Grande Valley shall be proportional to the quantity of water conserved as estimated under section 6.1.4 of this report.

NEPA, NHPA, ESA, CWA Issues

The proposed flow measurement devices will be installed on existing pipelines, pumping plants, and canal turnouts. No new flow structures are planned to be constructed and as such the District shall seek a "Categorical Exclusion" from Reclamation regarding the National Environmental Policy Act (NEPA). Likewise, since the proposed project has no potential for any impacting any endangered species, a letter shall be obtained from the U.S. Fish and Wildlife stating the proposed project does not require any approval or review by Fish and Wildlife with respect of the Endangered Species Act (ESA). The Texas Historical Commission shall be contacted for their concurrence that the proposed project is exempt from the National Historical Preservation Act (NHPA). The U.S. Army Corps of Engineer shall be contacted regarding Section 404 of the Clean Water Act (CWA). It is anticipated the proposed project will be found to be exempt from any CWA permitting requirements.