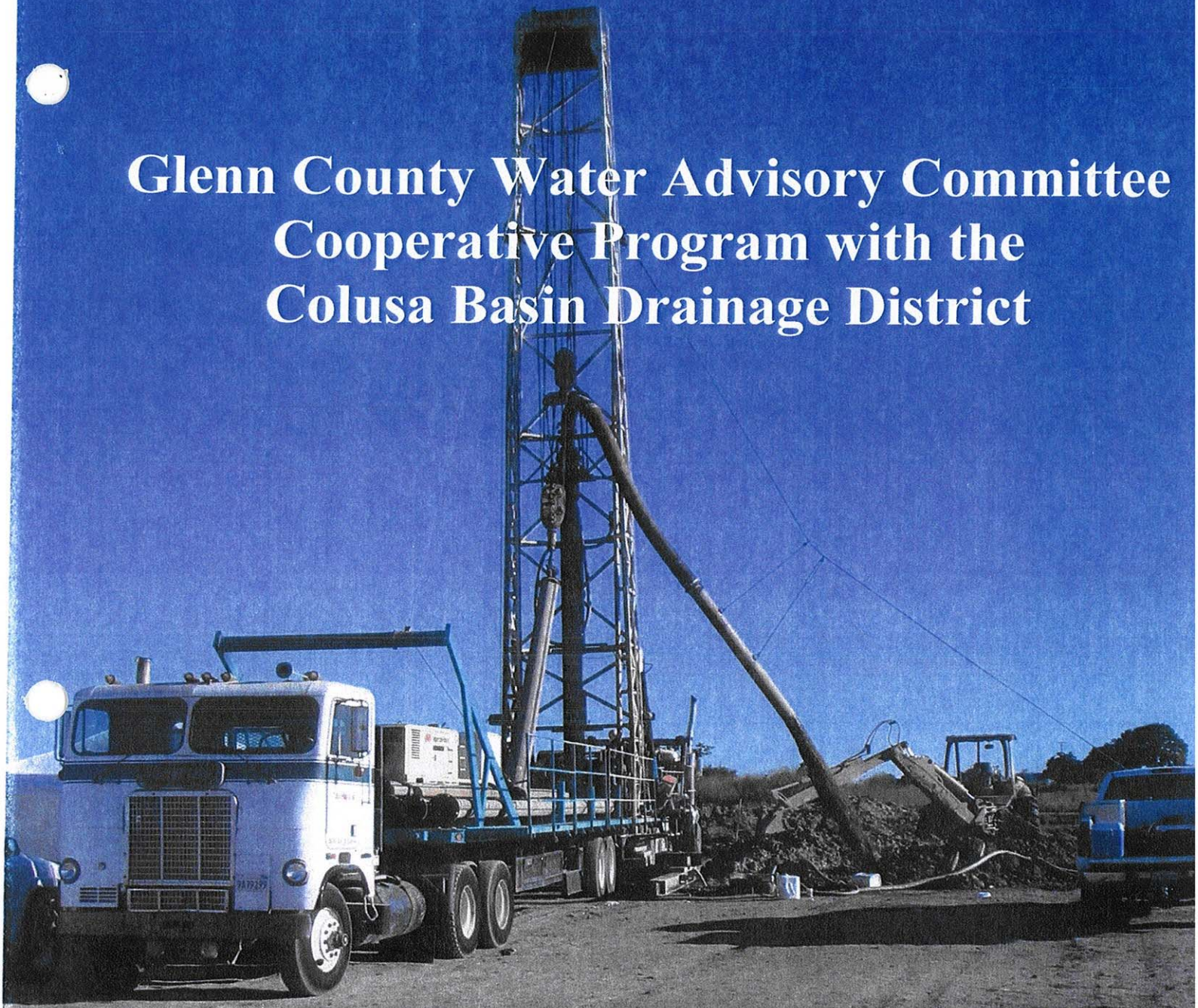
Glenn County Water Advisory Committee
Cooperative Program with the
Colusa Basin Drainage District



Dedicated Monitoring Well Installation
In Support of
Groundwater Replenishment

PROJECT SUMMARY

The proposed project incorporates the ongoing activities of the Glenn County Department of Agriculture (County) on behalf of the Glenn County Water Advisory Committee (WAC/TAC) with the Colusa Basin Drainage District's (CBDD) Integrated Watershed Management Plan (IWMP). This includes programs of investigative studies and information gathering that is currently underway within the boundary of the CBDD, which includes a significant portion of the Counties of Glenn and Colusa and a small portion of Yolo County (See Project Area Map, Figure 1). The County assumes that Northern District staff will be a regional contact for the Department of Water Resources (DWR).

CBDD is currently in the process of exploring the possibilities of incorporating the duties associated with a groundwater replenishment district within their legislative authority. A significant component of groundwater replenishment would be to quantify existing and future conditions through groundwater monitoring. This can be done through strategic placement of dedicated "multi-completion" monitoring wells. This proposal will hopefully provide a cost effective means of assisting the CBDD to incorporate replenishment district monitoring in the confines of the district within the Counties of Glenn, Colusa, and possibly Yolo.

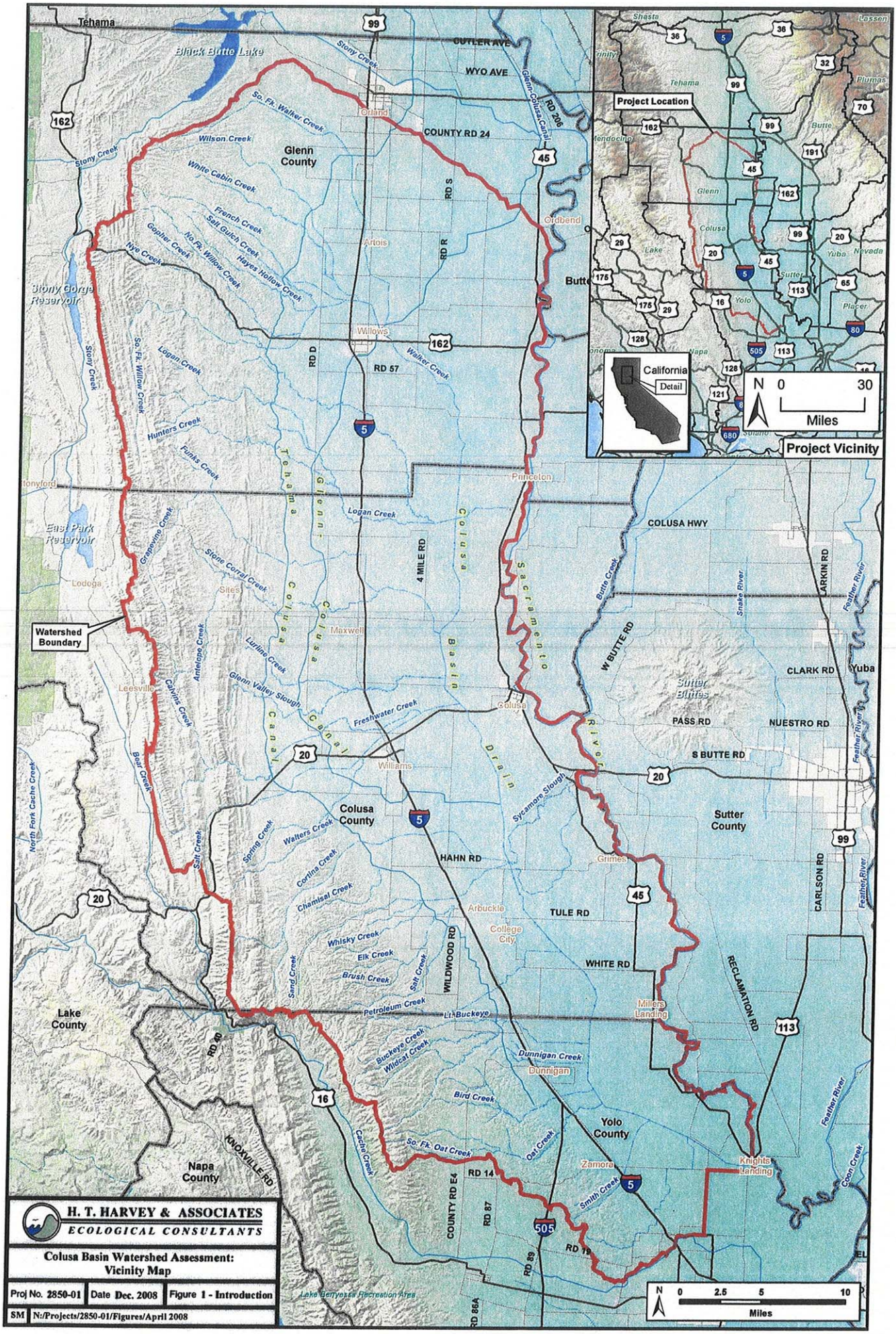
BACKGROUND

In July 2008 the County provided CBDD with a proposal to utilize a portion of the Proposition 13 funding that may be available. At that time, eligible projects may include the installation of tail water suppression systems, detention basins, relief wells, "test wells", flood warning systems, and telemetry devices. Clearly "test wells" as presented above would provide the necessary monitoring infrastructure to support groundwater replenishment.

The proposed work plan is consistent with the CBDD IWMP to develop programs that will:

- Work in tandem with local and state agencies
- Provide opportunities for groundwater recharge
- Be consistent with CALFED goals and objectives

In 2005, the County entered into an agreement with CBDD to perform tasks associated with a basin hydrogeologic evaluation in the Wilson Creek drainage of the county. This project was to provide information prior to design and/or construction of a detention facility located in that area. In June 207, the County provided CBDD with a final report of activities with that project. As you may recall, the scope of work included the installation of shallow borings and a deep dedicated monitoring well. Ultimately, the location of the deep well was changed and the project was successfully completed.



H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Colusa Basin Watershed Assessment: Vicinity Map

Proj No. 2850-01	Date Dec. 2008	Figure 1 - Introduction
SM	N:/Projects/2850-01/Figures/April 2008	

GROUNDWATER MANAGEMENT

Prudent groundwater management can be achieved through many of the following elements available through a planned monitoring program:

- The control of saline water intrusion
- Identification and management of wellhead protection areas and recharge
- Regulation of the migration of contaminated groundwater
- The administration of a well abandonment and well destruction
- Mitigation of conditions of overdraft
- Replenishment of groundwater extracted by water producers
- Monitoring of groundwater levels and storage
- Facilitating conjunctive use
- Identification of well construction policies
- The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction
- The development of relationships with state and federal regulatory agencies
- The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater

REGIONAL EFFORTS

Four County MOU - Over the last several years, the Counties of Butte, Tehama, Glenn and Colusa have worked closely to integrate and coordinate the management of their ground and surface water. This coordinated effort was stimulated by funding supplied under the CALFED Drinking Water Program in 2004, which resulted in the development of the Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document in June 2005. In the development of the drinking water strategies, it became apparent that increased coordination among the counties would result in a more efficient approach to the overall management of the shared groundwater basin.

In 2006, the Counties developed a Four County Memorandum of Understanding (Four County MOU), (Attached), which was passed unanimously by all four Boards of Supervisors. Under the Four County MOU, the Counties have pledged to work together on water-related activities. The Four County MOU has encouraged and emphasized working on a regional basis and has resulted in monthly staff meetings of the counties to discuss their activities and look for ways to integrate their actions. The group has

discovered that working together on water-related issues provides them more efficiency as well as a stronger voice when dealing with entities within and outside of the Four County area. Funding from this program was utilized to perform additional outreach through the University of California Extension office in Red Bluff for the development of five groundwater newsletters. These newsletters were distributed to over 1,500 interested stakeholders, and are available to be viewed at the Butte, Glenn, and Tehama Counties' water web pages.

WORK PLAN

The work plan of the proposed project will include the following tasks:

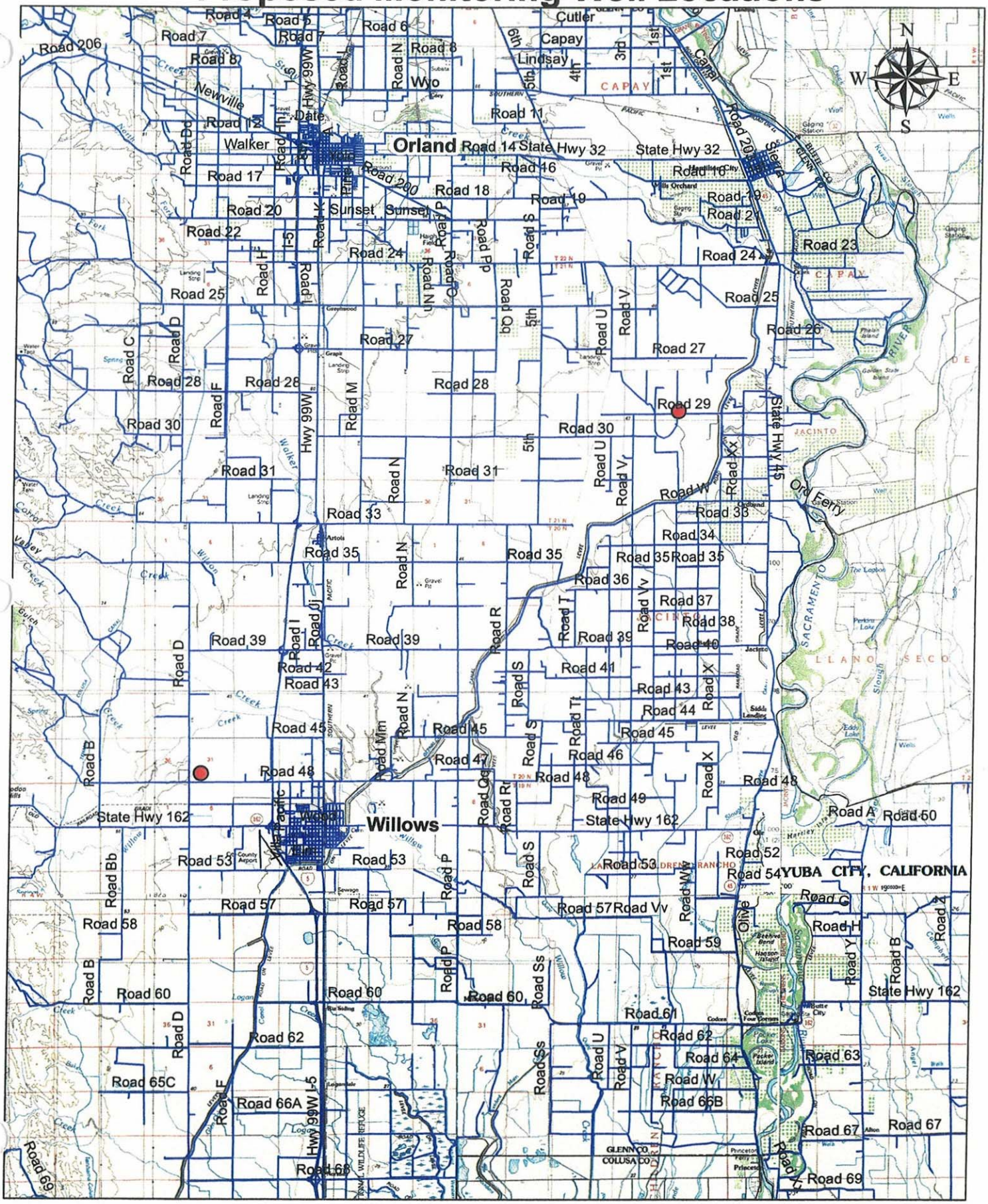
Task 1) Monitoring Well Installation
Scope, Purpose, and Goals, Objectives and Location Map (Figure 2)

Scope of the Work
Glenn County is proposing to augment the existing deep monitoring well network for the groundwater basin underlying Glenn and/or Colusa County. The program scope includes construction of two (2) new "multi-completion" dedicated monitoring wells within areas of the Counties sensitive to groundwater use, areas of known groundwater depressions, or areas subject to future aquifer performance testing. The new wells will become part of the dedicated monitoring well networks within the Counties.

Purpose of the Work
Currently, groundwater levels, groundwater quality, and land subsidence are cooperatively monitored by the Counties and DWR-Northern District. Through the development of Conjunctive Water Management Programs it has been determined that there are areas where information regarding the interaction between the Tehama and Tuscan Formations is critically limiting. These include areas of sparse, deep monitoring well coverage, areas near the approximate western boundary of the Lower Tuscan Formation, and areas where additional exploratory work in conjunction with monitoring well development would aid in developing geologic cross-sections for future consideration.

Through consultations between water and irrigation districts, counties, and DWR-Northern District, additional "multi-completion" dedicated monitoring wells have been deemed to have the highest priority to fill existing data gaps in basin understanding and in monitoring groundwater conditions. These new dedicated wells will help CBDD: 1) Better understand the extent of the aquifer systems that underlie the region, 2) Better monitor the localized effects of groundwater pumping on groundwater surface elevations, 3) Observe groundwater elevation trends in response to conjunctive use activities (such as artificial and natural groundwater recharge), and 4) Better understand the effects of various management strategies on overall basin storage.

Figure 2
Proposed Monitoring Well Locations



Goals and Objectives of the Work

The expanded deep monitoring well network will provide valuable and necessary data to support CBDD groundwater replenishment decisions as water purveyors within the basin work to meet their respective goals and objectives. The Work Plan included in these sections discuses the locations of existing deep monitoring wells and the planned approximate locations for two (2) new deep monitoring wells.

Each proposed location will be chosen based on the need to determine certain characteristics of the basin and monitor impacts of potential development of the Tehama Formation or Tuscan Formation in the area. These new dedicated monitoring wells will help CBDD: 1) Observe changes in groundwater elevation and storage in response to conjunctive use activities to better understand the effects of various management strategies, 2) Better understand groundwater flow paths, and 3) Better understand the relationship between the aquifer systems and streams.

Proposed Detailed Project Work Plan

The detailed Work Plan includes the following activities:

- Monitoring Well Siting
- Environmental Compliance
- Permitting
- Monitoring Well Design
- Monitoring Well Drilling and Construction
- Monitoring Well Completion Data Transmittal
- Project Management
- Quality Assurance/Quality Control (QA/QC)

These activities have been organized into six project tasks, described in detail in this Work Plan:
Task 1 - Monitoring Well Siting
Task 2 - Environmental Compliance and Permitting
Task 3 - Monitoring Well Design
Task 4 - Well Drilling/Construction/Development
Task 5 - Monitoring Well Data Transmittal and additional Data Logger Placement
Task 6 - Project Management/Coordination and *QA/QC*

Task 1: **Monitoring Well Siting**

With assistance from DWR Northern District staff, the County has selected preliminary well locations on public lands or with landowners willing to participate. These preliminary locations are shown on Figure 2 and will be finalized based on further coordination with DWR-Northern District and the landowners. Right-of-entry agreements with the landowners will be completed. These agreements will address public notification procedures, notification of the Underground Service Alert 48 hours before the start of drilling operations, site access and traffic controls for construction and monitoring, and responsibility for

maintenance of monitoring facilities.

Task Deliverables

- A map showing the final site locations for the monitoring wells, and completed right-of-entry agreements.

Task 2: Environmental Compliance and Permitting

The primary objective of this task is to prepare environmental compliance documentation and obtain permits required for the construction of monitoring wells at locations shown on Figure 2. In compliance with the California Environmental Quality Act (CEQA) Glenn County staff will complete an appropriate level of environmental review prior to constructing the monitoring wells. For purposes of this work plan it is assumed that CEQA compliance will not necessitate development of an Environmental Impact Statement/Environmental Impact Report (EIS/EIR), and that construction for the monitoring wells is categorically exempt from such requirements. Documentation will be filed with the County Recorder and the State Clearinghouse where the documents will be made available for a 30-day public comment period. (See CEQA Example Attachment A)

Two individual permits will be required for the construction of each monitoring well from the Glenn County Environmental Health County.

Task Deliverables

- A statement of categorical exemption or a negative declaration for the monitoring wells.
- Well permits.

Task 3: Monitoring Well Design

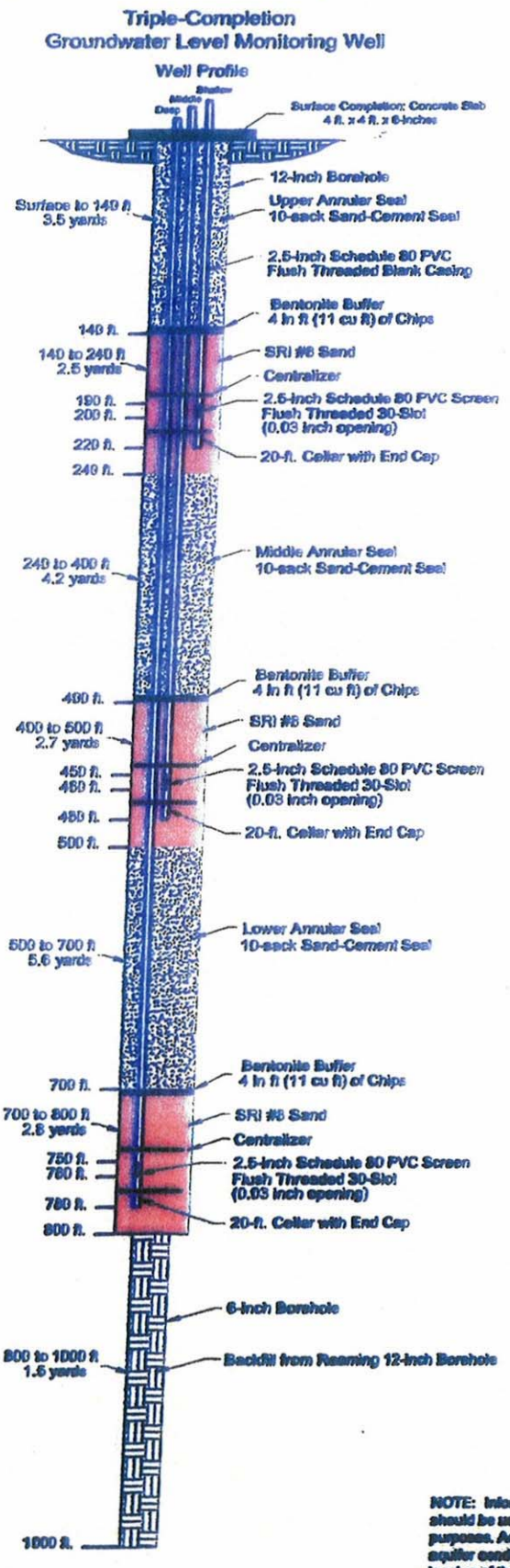
Monitoring well designs are based on the design as shown in Figure 3 titled *Proposed Monitoring Well Design and* Figure 4 *Surface Completion for "multi-completion" Monitoring Well.* The design will be prepared with assistance from DWR-Northern District staff, if funding is available, or by a qualified consultant. Final monitoring well designs will be provided to the drilling contractor at the time of geophysical log interpretation. Based on the results of exploratory drilling and lithologic/geophysical logging, the County may modify the well design (screened interval and slot size) as deemed necessary by the staff field geologist. DWR-Northern District prepared a conceptual design for a triple completion monitoring well; this conceptual monitoring well design is provided in Figure 3. All monitoring wells will be constructed with schedule 80, 2.5-inch nominal diameter polyvinyl chloride (PVC) casing, screen and end cap material. The conceptual design in illustrates:

- Borehole diameter
- Screen and casing diameter
- Screen interval
- Seal depth and thickness
- Depth and thickness of transition sand, and
- Structure of surface completion

Figure: 3

(revised 2-(

Proposed Monitoring Well Design



NOTE: Information presented in this drawing should be used as a general guideline for bidding purposes. Actual well is designed based on aquifer conditions delineated during drilling and logging of the test hole.

Task Deliverables

- Final design for the two "multi-completion" monitoring wells.

Task 4: Well Drilling/Construction/Development

Monitoring wells will be drilled and constructed by a single subcontracted California State Licensed Well Driller using the monitoring well design specified in Task 3. Similar to past monitoring well construction efforts in Glenn County, it is anticipated that DWR-Northern District staff, if funding is available, or a qualified consultant will provide onsite construction management services during the drilling and construction of each of the proposed monitoring wells. Drilling and construction activities are expected to include:

- Borehole drilling: All monitoring wells will be drilled solely using direct mud rotary drilling techniques
- Geophysical logging: Samples will be collected for visual inspection every 10 feet during drilling and a suite of geophysical logs will be run on all boreholes (to include short and long normal resistivity, gamma, spontaneous potential logs, and caliper logs)
- Disposal of cuttings: it is assumed that mud and cuttings will be disposed of on-site
- Monitoring well construction and geologic oversight
- Monitoring well development consistent with DWR standards
- Construction of above ground surface well completions: The completion will consist of a lockable standpipe of special design on a 4ft x 4ft x 6 inch concrete pad with four (4) traffic bollards around the completion (See Figure 4)
- When completed, wells will be equipped with continuous data loggers (See Figure 5)

Task Deliverables

- Copies of field logbook entries
- Copies of construction documentation
- Copies of inspection documentation

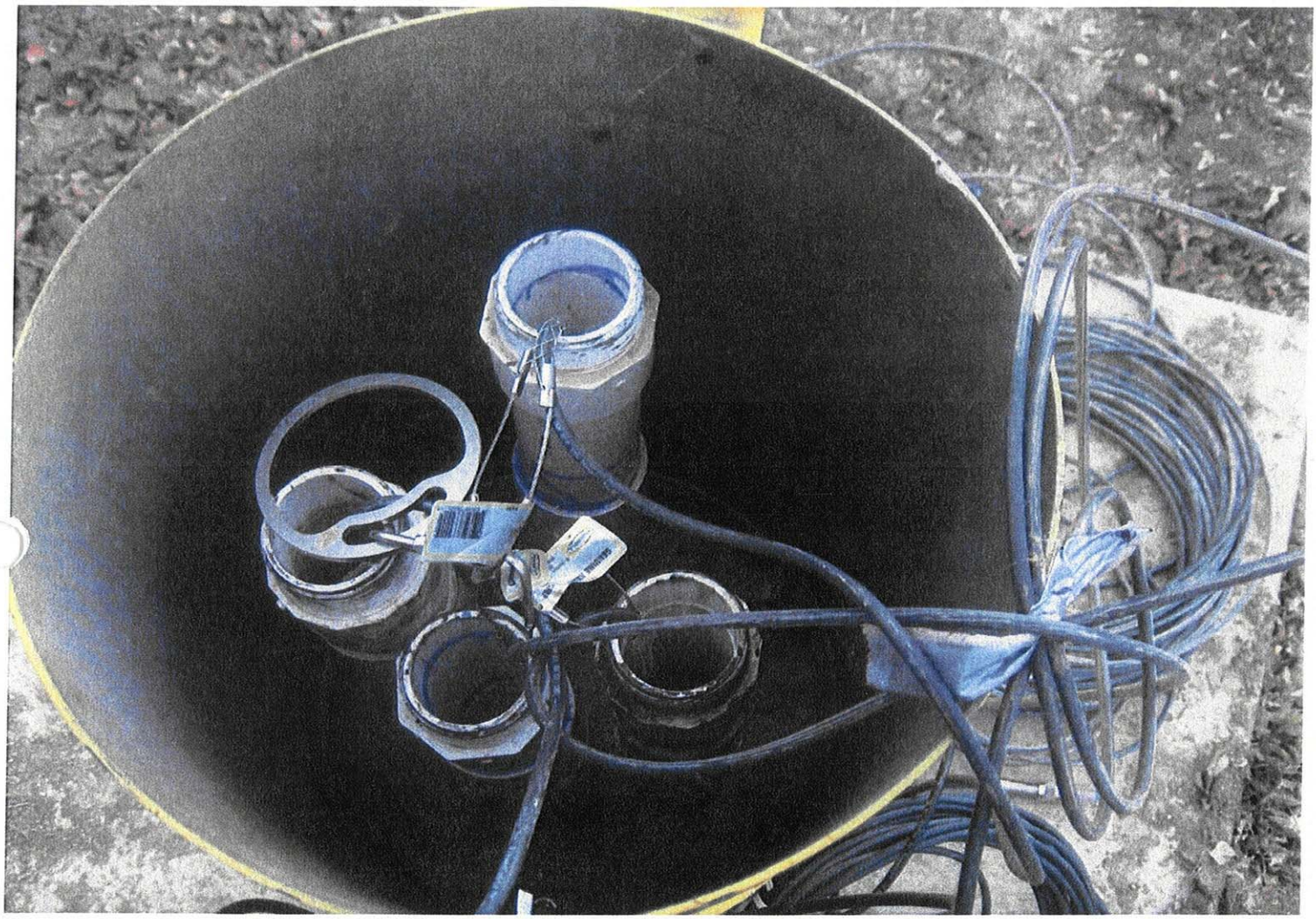
Task 5: Prepare Monitoring Well Completion Data Transmittal

The County will prepare and submit to DWR a Monitoring Well Completion Data Transmittal detailing the activities during monitoring well drilling, construction, and development. The transmittal will include the following items:

- Summary documentation of major activities
- Lithologic log prepared from descriptions of drill cuttings
- Geophysical logs
- Well development data
- As-built well construction diagrams, and
- Locations where additional data loggers are placed

Figure: 4
Surface Completion for Dedicated Monitoring Well

Figure: 5
Distinct Monitoring Zones With Data Loggers



Task Deliverables

- Monitoring Well Completion Data Transmittal
- State well number
- Permit number
- Date of installation
- Drilling method

Task 6: Project Management and QA/QC

The County will communicate with DWR regarding project status throughout the preparation of monitoring well design and during construction. DWR will be provided an opportunity to review and comment on all project deliverables. Progress reports will be submitted to DWR quarterly. The progress reports will include a summary of activities for the last quarter, activities for the upcoming quarter, and a review of budget and schedule. The final project documentation and all data collected will be submitted to DWR in written and electronic format at the conclusion of the project.

Task Deliverables

- Agendas and minutes for all meetings when the project is discussed
- Quarterly progress reports to DWR
- Consistency with Budget and Schedule

The tasks detailed in the Work Plan are consistent with the budget and schedule.

ATTACHMENT A
CEQA

County of Glenn **Department of Agriculture**

Mark D. Black, Agricultural Commissioner
Sealer of Weights & Measures

Jean S. Miller, Assistant Agricultural Commissioner
Sealer of Weights & Measures

Date: May 28, 2007

To: Colusa Basin Drainage District
ATTN: Gene Massa
P.O. Box 390
Willows, CA 95988

From: Glenn County Department of Agriculture
P. O. Box 351
720 N. Colusa Street
Willows, CA 95988

RE: Notice of Exemption for Dedicated Monitoring Well

The project involves the installation of one multi-completion groundwater well by Glenn County in cooperation with the Colusa Basin Drainage District. The well will be located south Wilson Creek in Glenn County. The project purpose is basic data collection related to groundwater monitoring and recharge.

Enclosed is a filed exemption for such projects in the County and a site specific project description.

If you have any questions concerning this project, please contact me at (530) 934-6501 or at wateradv@countyofglenn.net.

Sincerely,

Lester Messina
Water Resources Coordinator

Attachment 1: Notice of Exemption
Figure 1: Site Map

720 N. Colusa Street
P.O. Box 351
Willows, CA 95988

Phone: (530) 934-6501
Fax: (530) 934-6503
Email: agcommr@countyofglenn.net

ATTACHMENT 1

NOTICE OF EXEMPTION

To: Colusa Basin Drainage District
ATTN: Gene Massa
P.O. Box 390
Willows, CA 95988

From: Glenn County Department of Agriculture

Project Title: Dedicated Monitoring Well Installation

Project Location: Glenn County (see attached figure)

Project Location: Specific location: ½ mile south of County Road 35, east of County Road D Section 7, T 20 N, R 3 W

Description of Nature, Purpose, and Beneficiaries of Project:
The construction portion of proposed project will involve the drilling of a test hole to at least 1000 feet. Required permits have been secured. After the bore hole is e-logged, a construction design will be decided which will incorporate at least four screened intervals to capture specific aquifer properties. Drilling and construction will take place in May/June 2007. No improvements to site access will be required. No sump excavation will be required. With landowners permission all drill wastes (rock cuttings and inert bentonite clay) will be spread and left on-site upon well completion. A small 5-foot by 5-foot concrete pad with protective steel bollards will be installed over the monitoring well to protect the well head.

Potential site impacts include minor disturbance of the ground surface within and adjacent to the drill location and a temporary increase in noise levels during drilling and installation of the well. Once the well is completed, it will be used for monitoring of groundwater levels with continuous level loggers. No impacts associated with monitoring of these wells have been identified.

The project purpose is basic data collection related to groundwater production, recharge, and long-term ground water level fluctuations. Project beneficiaries include the Colusa Basin Drainage District, Glenn County, California Department of Water Resources, the Bureau of Reclamation, local water districts, and all Glenn County water users.

Name of Public Agency Approving Project: Glenn County Planning Division, #2001-07

Name of Person or Agency Carrying Out Project: Glenn County Department of Agriculture for the Glenn County Water Advisory Committee

Exempt Status: Categorical exemption for basic data collection (Section 15306)

Reasons Why the Project Is Exempt: Section 15306 -basic data collection, research, experimental management, and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource.

Contact Person:

Signature:_____

DRAFT BUDGET

DRAFT

CBDD Well Installation BudgetBudget

Task/Activity	Staff or Technical Consultants					Total Hours
	Engineer $150	Geologist $125	Staff $70	ACAD/GIS $75	Clerical $55	
1. Monitoring Well Siting						
1. Gather & Compile Information and Evaluate/Select Locations	6	10	10			26
2. Develop and Execute Agreements			20		8	28
3. Develop Map Showing Locations			4	4		8
Subtotal, hrs.	6	10	34	4	8	62
Subtotal	$900	$1,250	$2,380	$300	$440	$5,270
2. Environmental Compliance						
1. Develop Site Specific Environmental Documentation			16	2	4	22
Subtotal, hrs.	0	0	16	2	4	22
Subtotal	$0	$0	$1,120	$150	$220	$1,490
3. Monitoring Well Design						
1. Evaluate Existing and Proposed Groundwater Monitoring Wells at Selected Locations for Final Design	4	12	10			26
Subtotal, hrs.	4	12	10			26
Subtotal	$600	$1,500	$700			$2,800

Task/Activity	Well Drilling Contractor, Consultant or Staff					Total
	Well Driller	Geologist $125	Staff $70	ACAD/GIS $75	Clerical $55	
4. Well Drilling/Well Construction & Development						
1. Develop & Execute Contracts			20		6	26
2. Mobilization - 2 each @ $3000	$6,000					
3. Drilling-Up to 300 ft. 16 in. borehole @ $ 38/ft	$11,400					
3. Drilling-Up to 1000 ft. 12 in. borehole @ $ 38/ft	$38,000					
3. Drilling-Up to 1000 ft. 8-10 in. borehole @ $ 25/ft	$25,000					
4. Borehole Geophysical Logs 2 each at $4,020	$8,040					
5. Well Construction/Labor and Materials	$74,000					
6. Well Development	$5,000					
7. Geologic & Staff Oversight		40	20			60
Subtotal, hrs.		40	40		6	86
Subtotal		$5,000	$2,800		$330	$8,130
Subtotal Contractors	$167,440					
5. Monitoring Well Data and Additional Data Logger Replacement						
1. Data Logger/Cable Purchase - 8 @ $1,900 each	$15,200					
2. Purchase Data Logger Reader - 1@$1,800	$1,800					
3. Install Additional Data Loggers			40			40
Subtotal, hrs.			40			
Subtotal			$2,800			$2,800
Subtotal Supplies	$17,000					
6. Project Management - QA/QC						
1. Coordinate With Consultants and DWR		20	40			60
2. Coordinate With Colusa Basin Drainage District		40	20			60
3. Prepare Quarterly and Final reports			40	10	20	70
Subtotal, hrs.		60	100	10	20	190
Subtotal		$7,500	$7,000	$750	$1,100	$16,350
Total hrs	10	122	240	16	38	426
Subtotal $, Consultants and Staff	$1,500	$15,250	$16,800	$1,200	$2,090	**$36,840**
Subtotal, Contractors and Supplies	**$184,440**					**$184,440**
Colusa Basin Drainage District Admin - 10% of Total						**$22,128**
Grant Request Total						**$243,408**

*** Costs are for estimation purposes only, actual costs may change due to unexpected labor and material increases**