

# Requirements Spec

Water Rights Information System Mobile Application Development

at

Division of Water Resources

Kansas Department of Agriculture  
Manhattan, KS

Project No. 78288

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Version: 3/25/2015



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## 1.0 INTRODUCTION

### 1.1 PURPOSE

The purpose of this requirements specification document is to describe, in understandable terms, the requirements for the Mobile Water Rights Information System (WRIS) application development project as communicated to Burns & McDonnell by the Kansas Department of Agriculture, Division of Water Resources.

## 2.0 REQUIREMENTS SPECIFICATIONS

### 2.1 PLATFORM REQUIREMENTS

#### 2.1.1 Software Platform Requirements

The new WRIS Mobile application will need to run on Windows based devices. The devices can be laptops, desktops or tablets. The application will need to be built to work with KDA's standard Windows 7 operating system image/setup. The mobile application will be constructed in the ESRI 10.2.4 .Net runtime SDK. All application code will be developed in the C# programming language. The new application will require the use of runtime licenses that are available as part of KDA's enterprise license agreement with ESRI. The mobile application will use KDA's existing ESRI ArcGIS Server 10.2.2 enterprise GIS environment. The ESRI ArcGIS Server 10.2.2 enterprise GIS environment will be running on a single server configuration without the use of an ESRI web adaptor.

#### 2.1.2 Database Platform Requirements

The WRIS Mobile application will use the MS SQL Server relational database management system. SQL Server 2008 R2 will be the version used for the management of the mobile application data. The ESRI Spatial Database Engine (SDE) will be used in conjunction with SQL Server to manage the mapping information for the application. SDE version 10.2.2 will be the version used for the mobile application. The WRIS Mobile application data will also interact with the WRIS database in the Oracle database platform. Data replication/integration tools will be implemented to allow for the synchronization and coordination of the Oracle and SQL Server database platforms. The WRIS database will be in Oracle version 10.

#### 2.1.3 Web Server Platform Requirements

The WRIS Mobile application will use web services to transfer data between the devices running the application and the backend enterprise data management systems. The web services will use Microsoft IIS 8.

#### 2.1.4 Server/Storage Platform Requirements

The WRIS Mobile application will allow users to collect digital photos in the field and these images/documents will be stored on a server share location, within the KDA server environment, once they are transferred from the field devices to the enterprise data management systems. The images will then be processed from the server share location into the Docuware document management system.

## 2.2 WRIS USER REQUIREMENTS

BMcD uses Microsoft Team Foundation Server (TFS) to track all requirements and activity throughout the project lifecycle. The following requirements contain the unique ID associated with TFS. The new WRIS Mobile application has been subdivided into five main features to allow it to be developed in modular pieces based on user needs, schedule and budget. The five application features that make up the WRIS Mobile application are: *Integration to WRIS Database, WRIS Mobile Core, Compliance Investigation, Compliance and Enforcement Investigation, Field Inspection Report*. Additionally, one feature was discussed with the application stakeholder that doesn't interact directly with the existing WRIS database systems. The *Water Level Measurement* feature is considered a required feature for WRIS Mobile application. KDA is in process of combining the *Compliance Investigation* and the *Compliance and Enforcement Investigation* forms into one. At such time the two sections will be combined to reflect that change.

### 2.2.1 Workflow

The existing workflow for planning field activities differs depending on the field office. Some offices use desktop GIS to plan their field activities where others use a combination of technologies such as Google maps and excel spreadsheets. In the initial deployment of the mobile WRIS application, these methods will continue with a longer range goal of standardizing the process across all the offices.

The anticipated goal would allow a field user to start their work activity in the office using the WRIS mobile application, where they would use either a desktop or the tablet connected to the GIS feature services running at HQ. The services show the PDIV's color coded by significance; showing action needed. Using this information the field user could plan out their trip using the following Pre-Planning workflow. A user will be able to open a table that shows all the current actions that are open in the WRIS Database. The data fields shown in the table are; type of action, date, and Water Right File Number. The user will be able to sort the action table by clicking on the column headings to sort or group items by type, date, etc. If the user clicks on the "plus" next to the action type, they will expand a section below the action that shows all the Points of Diversion that could be associated with the action. The user will then be able to view some key data about the different Points of Diversion and check a box next to the appropriate Point of Diversion to note which location requires the completion of the action. Once the user has checked the box next to the Point of Diversion, the application will automatically connect that action with the appropriate Water Right File Number as well as mark the actual Point of Diversion point on the map with a special symbology noting that it is marked for completion of an action.



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streamlined in the system by allowing a user to collect the actual PDIV location using built in GPS. All PDIVs will be created initially in HQ. Field personnel will not be creating new features but rather adjusting them from proposed to actual locations based on GPS readings.

Photos are also an extremely important part of the field exercise. Users will be able to take and attach as many photos as they wish for the field observation. These photos will be uniquely named and stored prior to syncing with Docuware.

An additional exercise that is completed in the field is the creation of “Authorized Place of Use” and “Actual Place of Use” polygons. “Authorized Place of Use” is the area of allowable water use as described upon water right issuance and “Actual Place of Use” polygons are the area where the water is actively being used at time of field observation. The field user would be able to create these layers both in the field on and on desktop. The current use of these features throughout KDA is limited; however users have noted they would be beneficial to have as an enterprise layer available to all of KDA.

Once complete with a field observation the user would save the work and move on to the next location. If all field observations are complete the user would sync the data back to the database for review. If the user has either VPN connection or is at the office on the network they would initiate the sync process. After the data has been synced the data is available for review by a user with review permissions. This person would verify the data is collected in a manner acceptable to KDA and will either accept or reject the inspection. If accepted the reviewer fills out a review data attribute which will allow the observation to post back to HQ during the sync process. If the observation was rejected the field user would correct the data and post again for review.

### 2.2.2 Integration to WRIS Database Requirements

- **Requirement #7399 – Mobile GIS Database Sync to WRIS Database**
  - A KDA MOBILE WRIS user needs to be able to interact with data within the new mobile application that is updated or synced between the current enterprise WRIS Oracle database and the new WRIS Mobile GIS database in MS SQL Server.

### 2.2.3 WRIS Mobile Core Mobile Application

- **Requirement # 7344 – Mobile application needs to have multiple user group levels**

- 
- Read Only
    - *Only able to view the data in the field and reports*
  - User
    - *Able to create data but not allowed to submit final*
  - Reviewer
    - *Able to create data and allowed to submit*
  - Admin
    - *Highest level of permission*
- **Requirement #7377 – Disconnect from Server / Internet**
    - KDA MOBILE WRIS users will need a mobile application that allows them to go to the field and perform critical business workflows. The core application will need to allow them to view data from both GIS and the WRIS database in the office to plan their field activities, as well as allow them to choose a service area in the application so that it can be used completely disconnected from the network or internet. The application will include functionality to allow the user to sync data back to the WRIS enterprise database(s) upon connection to the KDA network.
  - **Requirement # 7378 – Main Application Toolbar**
    - KDA MOBILE WRIS user will need to be able to interact with a toolbar in the mobile application that has a set of tools built to support their workflows. The toolbar will include the following core application tools:
      - *Zoom to full extent*
      - *Measure tool*

- 
- *Download or cache service area*
  - *Fixed zoom in and fixed zoom out*
  - *Add or create feature*
  - *An about or information button*
- **Requirement #7379 – Table of Contents / Layer List**
    - KDA MOBILE WRIS users will need to be able to view a table of contents that shows all the different data layers within the application and the symbols that are used to depict the data in the map. Users will also need to be able to turn data layers on or off within the table of contents.
  - **Requirement #7380 – Create / Edit Feature**
    - KDA MOBILE WRIS users will need to be able to create new operational data features or edit existing operational data features. Users will need to be able to create features or edit them spatially by tapping the screen in a heads up editing workflow or use GPS in the device to locate the feature.
  - **Requirement #7381 – Delete Feature**
    - KDA MOBILE WRIS users will need the ability to select and delete a feature from the map. The delete will need to delete the selected feature and any related data about the feature. This capability, will most likely need to be limited to key users so that features are not accidentally deleted.
  - **Requirement #7382 – User Roles & Capabilities**
    - KDA MOBILE WRIS users will need to be assigned to specific user roles within the application to control some functionality in the application. The exact roles and functionality controls will be defined in other requirements but the core application needs to be constructed with the ability to control nearly all aspects of the application based on a user's role.
    - Anticipated roles and capabilities are:

- 
- *Read Only*
    - Only able to view the data in the field and reports
  - *User*
    - Able to create data but not allowed to submit final
  - *Reviewer*
    - Able to create data and allowed to submit
  - *Admin*
- **Requirement #7383 – User Authentication**
    - A KDA MOBILE WRIS user will require a login for the new WRIS mobile application. The user login will need to control a user's access to the application and assign them into their specific role within the application based on the KDA Active Directory which controls the roles based on domain groups.
  - **Requirement #7384 – Identify Data**
    - KDA MOBILE WRIS users will need to have a tool within the application that allows them to click within the mapping view of the app and identify the features and data associated with the features in the map. This would provide the users a way to view attribute data about all features on the map.
  - **Requirement #7388 – Pre Load Base Data**
    - A KDA MOBILE WRIS user will need the ability to pre load base cache information onto their field devices and have that used within the mobile application. The mobile application will not be used to build base cache data and data created as part of backend caching processes will be used to support the base data needs for the mobile users. Base caches will be built and updated at headquarters using ArcGIS Server level tools and disseminated out to the field offices on a periodic basis.

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- **Requirement #7389 – Pre Load Vector Data Files**
    - A KDA MOBILE WRIS user needs the ability to Pre load GIS vector data in the form of shapefiles to their field device for use in the mobile application. This would allow the field users to be very dynamic with regards to the base information they have on their devices in the field, such as adding in a wetlands or parcel file.
  
  - **Requirement #7401 – Asset / Data Search**
    - A KDA MOBILE WRIS user will need a search tool that will allow them to quickly find data associated with the features and attributes stored in the application on the mobile device
  
  - **Requirement #7736 – Pre-Planning**
    - A KDA MOBILE WRIS user will be able to open a table that shows all the current actions that are open in the WRIS Database. The data fields shown in the table are: Type of action, Date, and Water Right File Number. The user will be able to sort the action table by clicking on the column headings to sort or group items by type, date, etc. If the user clicks on the “plus” next to the action type, they will expand a section below the action that shows all the Points of Diversion that could be associated with the action. The user will then be able to view some key data about the different Points of Diversion and check a box next to the appropriate Point of Diversion to note which location requires the completion of the action. Once the user has checked the box next to the Point of Diversion, the application will automatically connect that action with the appropriate Water Right File Number as well as mark the actual Point of Diversion point on the map with a special symbology noting that it is marked for completion of an action.

#### 2.2.4 **Compliance, Compliance and Enforcement, Administration Investigation**

- **Requirement #7346 – Compliance / Compliance and Enforcement / Administration Investigation**

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- A KDA MOBILE WRIS user needs the ability to complete a compliance and enforcement / administration investigation in the field. This form does not populate back to WRIS database but the field offices use this frequently.
  - **Requirement #7391 – KDA Field Office Data Review Process**
    - A KDA MOBILE WRIS user will need the ability to review data from the mobile application through the forms and tables available in the application. The review process will include allowing the user to open the data forms for a specific event and check a QA/QC complete box to signify that the data has been reviewed and is ready for use in other workflows and the overall WRIS database.
  - **Requirement #7393 – Ability to view data field history**
    - A KDA MOBILE WRIS user will need the ability to view the historical edit information for any data field in the database. The mobile application will track the changes to all data in the schema but the users will need the ability to actually review or see the historical data from the mobile application in order to get value from the historical information. In most cases, the user would want to be able to see this historical data values in a disconnected mode out in the field to help compare information about assets over time.
  - **Requirement #7395 – Ability to create reports similar to legacy forms**
    - A KDA MOBILE WRIS user will need the ability to produce a report from the mobile application that will take the data for a specific field event and produce a report the mimics the structure of the legacy reports that have been used.
    - Field offices store hard copy version onsite as backup. The application should allow for or facilitate in the creation of the forms in a standard format to print off a copy for hardcopy storage.
    - There are currently 4 forms

- 
- **Requirement #7397 – Ability to track history on all fields**
    - A KDA MOBILE WRIS user needs the ability to track the history of all changes on every data field in the mobile application data structure. Users want to be able to know that the application will track any changes or adjustments that are made to any data field in the database.
  
  - **Requirement #7339 – Place of Use polygon**
    - A KDA MOBILE WRIS user needs the ability to draw/edit place of use polygon features within the mobile application. The place of use polygons represent the actual area authorized for use or being used by the water right/point of diversion. Users would rely upon GPS and base mapping data to delineate these features in the field and then once the features are synced back to the enterprise geodatabase they may be edited or modified within the desktop GIS tools to clean up the field delineations.  
  
Anticipated feature attributes are:
      - Status = Actual, Authorized, Unauthorized, Proposed
      - Comments = Text box
      - Water Right File # - Text

### 2.2.5 **Field Inspection Report**

- **Requirement #7343 – Field Inspection Report**
  - A KDA MOBILE WRIS user needs the ability to complete a field inspection report in the mobile application. The user will first download points of diversion while connected in the office and then while disconnected out in the field, they will perform a field inspection. The field inspection report will include a variety of data from the existing WRIS database and user values that are input in the field.

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- The field inspection report is one of the main forms used by the field staff. There are slight variations used by different offices but there is a large common core.
  - As with all forms the field staff would like the ability to add additional groups of data if needed. On the FIR the following areas would need this ability.
    - Authorized Point of Diversion
    - Actual Point of Diversion
    - Lands to be Included on Certificate
    - Land IrrigatedAll bold headers on page 2 and 3 are section breaks  
The tabulation of water use on page 4
  - A new section not currently on the form "Geocenter" This follows the same fields as "Actual" and would go directly following the "Actual" fields.
  - Page 3 has many calculated fields - See attached page 3.
  - The field users would like the application to calculate as much data as possible to reduce user calculations and possibility for error.
- **Requirement #7392 – KDA Field Office Data Review Process**
    - A KDA MOBILE WRIS user will need the ability to review data from the mobile application through the forms and tables available in the application. The review process will include allowing the user to open the data forms for a specific event and check a QA/QC complete box to signify that the data has been reviewed and is ready for use in other workflows and the overall WRIS database.
  - **Requirement #7394 – Ability to view data field history**
    - A KDA MOBILE WRIS user will need the ability to view the historical edit information for any data field in the database. The mobile application will track the changes to all data in the schema but the users will need the ability to actually review or see the historical data from the mobile application in order to get value from the historical information. In most cases, the user would want to be able to see this historical data values in a disconnected mode out in the field to help compare information about assets over time.

- **Requirement #7396 – Ability to create reports similar to legacy forms**
  - A KDA MOBILE WRIS user will need the ability to produce a report from the mobile application that will take the data for a specific field event and produce a report that mimics the structure of the legacy reports that have been used.
  - Field offices store hard copy version onsite as backup. The application should allow for or facilitate in the creation of the forms in a standard format or print off a copy for hardcopy storage.
  - There are currently 4 forms
  
- **Requirement #7398 – Ability to track history on all fields**
  - A KDA MOBILE WRIS user needs the ability to track the history of all changes on every data field in the mobile application data structure. Users want to be able to know that the application will track any changes or adjustments that are made to any data field in the database.

#### 2.2.6 Water Level Measurement

- **Requirement #7400 – Record Water Level Measurements in Field**
  - A KDA MOBILE WRIS user needs to be able to record water level measurements within the mobile application while out in the field. The user will attach water level data to a specific well ID and will need to record the following data:
    - *Measurement Date*
    - *Dbls –(Calculated)*
    - *Hold*
    - *Cut*
    - *Initials*
    - *Point above grade*

- *Comment*
- *UMT / Reason*
- User will also want to see the last three readings that were taken at the well to help verify that the information being collected appears to match with historical ranges for the well.

### 2.2.7 **Miscellaneous Application Features**

- **Requirement #7322 – Auto name Digital Photos Based on KDA File Number**
  - A KDA MOBILE WRIS user will need to take and attach photos in the mobile application. The photos will be synced to a centralized server share as a .jpg once the field device is connected to the network. The photos will need to be auto named by the mobile application to ensure they are unique and that they can be easily found once they are uploaded into the agencies document management software, Docuware. The photo will need to be named with KDA file number as the prefix on the file and then trailing characters to ensure uniqueness can be added. The photos will be readily related to PDs based on a primary/fk relationship but if a user wants to find photos without the user of the mobile application through a tool like Docuware, they will need a photo name that has some intelligence imbedded so they can find the data they want.
- **Requirement #7323 – Streamline upload to Docuware process**
  - A KDA MOBILE WRIS user needs the ability to automatically have a report version of their field work created and uploaded to the KDA document management system, Docuware.
- **Requirement #7328 – Additional logic in photo naming convention**
  - A KDA MOBILE WRIS user needs the ability to impart logic into the naming of the photograph by selecting the type of asset they are photographing and have the name of the photo somehow reflect the type of asset that was being photographed. The field user would like to be able to select the type of asset

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being photographed and have the image suffixed with a value based on the asset type.

◦ *Examples could be: M for Meter, S for seal, etc.*

- **Requirement #7330 – Ability to pull Docuware documents**

- A KDA MOBILE WRIS user would need to extract key documents stored in the KDA document management system, Docuware, during a data disconnection process in the mobile application. The users would have the ability to review documents, data, base mapping, all disconnected while out in the field.

- **Requirement #7334 – Reporting ability to form letters**

- A KDA MOBILE WRIS user needs the ability to generate a report from the mobile application that produces a form letter of information that is boiler plate and key data fields from the mobile application database. The user would then print or export the report and move into a water right holder notification process with the document.

- **Requirement #7336 – Ability to create sketches and notes on images**

- A KDA MOBILE WRIS user will need the ability to create sketches and notes on images to save within the mobile application, while also maintaining the original.

- **Requirement #7337 – Ability to create spatial features to denote crop and usage information**

- A KDA MOBILE WRIS user will need the ability to create sketch features in the mobile application that are actual GIS vector feature classes. The sketching features will only include the geometry of the feature, edit tracking data fields, and a comments box. The users will be able to use these features for a variety of different needs.
- Will include all three major vector feature types: Point, Line, Poly.

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- Field user would create a feature in the field and may later refine that spatial feature in the office using desktop for desktop mapping needs. Would need access to the feature created in the field.
  
  - **Requirement #7340 – Point of Diversion Location Based on PLSS**
    - A KDA MOBILE WRIS user needs to be able to extract the location of the point of diversion based on the distance north and west of the southeast corner of the section. This functionality is currently carried out in the office using an application called LeoBase but the users could eliminate the need for the office processing if the PLSS data was represented in the mobile application and the actual location could be calculated as a geo-processing operation of the application.
    - All coordinates and distances are to be done using the NAD 27 datum per state standards.
  
  - **Requirement #7342 – Ability to draw and show access roads**
    - A KDA MOBILE WRIS user needs the ability to create vector features in the mobile application that represent access roads to and from points of diversion. Field users would create and maintain this data through the mobile application as well as within desktop GIS tools that are connected to the access road feature class. The access road feature would have a limited number of attributes such as:
      - *Status - Pick List*
      - *Comments - Text*
      - *Date*
      - *Created By*

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## 2.3 REQUIREMENTS INCLUDED IN PHASE I

- **WRIS Mobile Core**
  - #7344 – Mobile application needs to have multiple user group levels
  - #7377 – Disconnect from Server / Internet
  - # 7378 – Main Application Toolbar
  - #7379 – Table of Contents / Layer List
  - #7380 – Create / Edit Feature
  - #7381 – Delete Feature
  - #7382 – User Roles & Capabilities
  - #7383 – User Authentication
  - #7384 – Identify Data
  - #7388 – Pre Load Base Data
  - #7389 – Pre Load Vector Data Files
  - #7401 – Asset / Data Search
  - #7736 – Pre-Planning
  
- **Compliance, Compliance and Enforcement, Administration Investigation**
  - #7346 – Compliance and Enforcement / Administration Investigation
  - #7391 – KDA Field Office Data Review Process
  - #7393 – Ability to view data field history
  - #7397 – Ability to track history on all fields

- 
- #7339 – Place of Use polygon
  - **Field Investigation Report**
    - #7343 – Field Inspection Report
    - #7392 – KDA Field Office Data Review Process
    - #7394 – Ability to view data field history
    - #7398 – Ability to track history on all fields
  - **Water Level Measurement**
    - #7400 – Record Water Level Measurements in Field
  - **Miscellaneous Application Features**
    - #7322 – Auto name Digital Photos Based on KDA File Number
    - #7323 – Streamline upload to Docuware process
    - #7328 – Additional logic in photo naming convention
    - #7336 – Ability to create sketches and notes on images
    - #7337 – Ability to create spatial features to denote crop and usage information
    - #7340 – Point of Diversion Location Based on PLSS
    - #7342 – Ability to draw and show access roads

## 2.4 FUTURE PHASE REQUIREMENTS

- **Compliance Investigation**
  - #7325 – Ability to create reports similar to legacy forms
- **Compliance and Enforcement Investigation**

- #7395 – Ability to create reports similar to legacy forms
  
- **Field Investigation Report**
  - #7396 – Ability to create reports similar to legacy forms
  
- **Miscellaneous Application Features**
  - #7330 – Ability to pull Docuware documents
  
  - #7334 – Reporting ability to form letters

### **3.0 APPENDIX A**

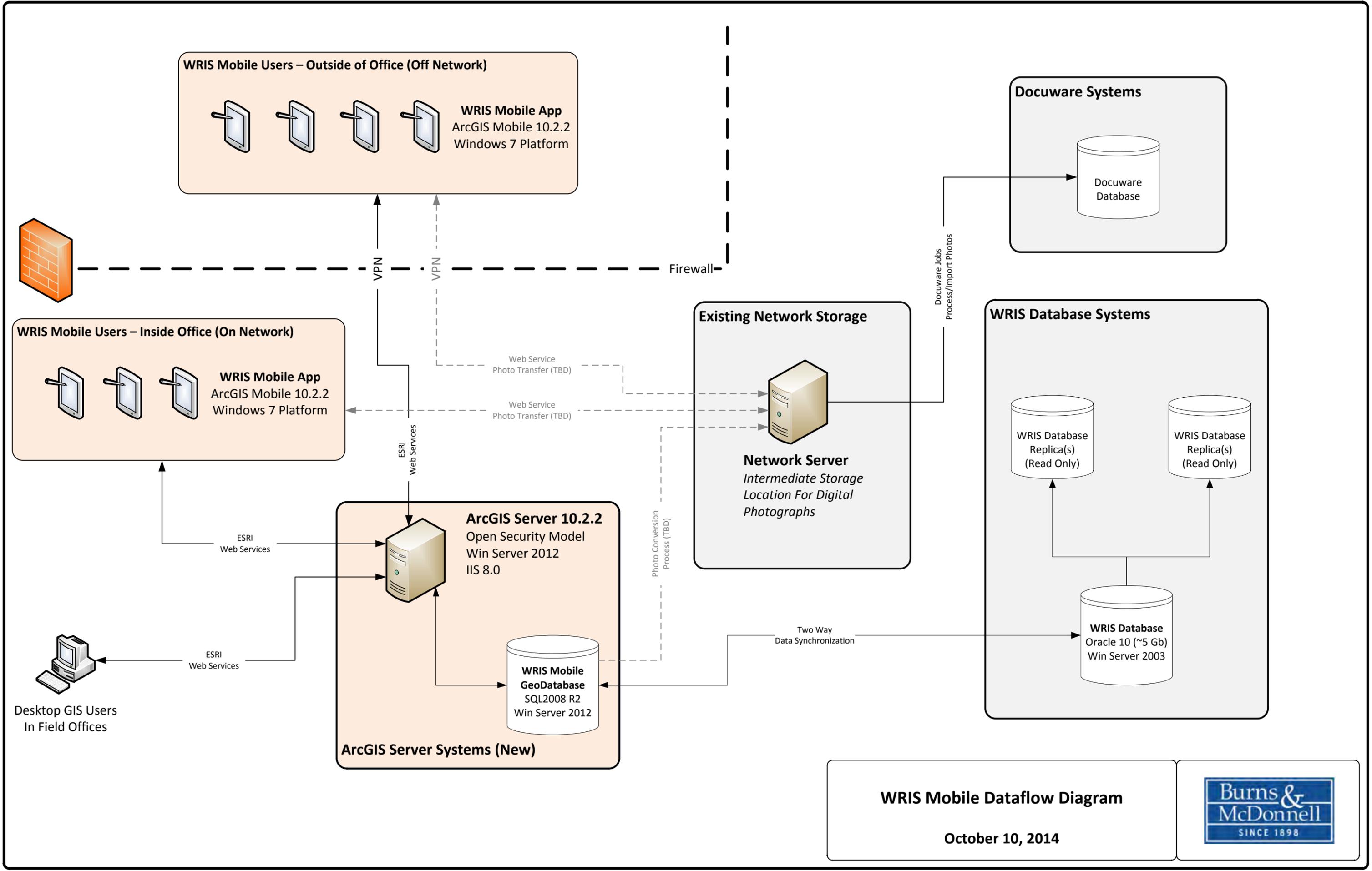
WRIS Mobile Dataflow Diagram

### **4.0 APPENDIX B**

Field Investigation Example

Compliance / Compliance & Enforcement / Administration Investigation Example

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**WRIS Mobile Dataflow Diagram**

October 10, 2014



**FIELD INSPECTION REPORT**

Field Office No. \_\_\_\_\_  
 G.M.D. No. \_\_\_\_\_

- Full
- Partial
- Compliance Investigation  
 (In Compliance/ Not In Compliance)

Test \_\_\_\_\_ of \_\_\_\_\_ diversion points. County \_\_\_\_\_

File No. \_\_\_\_\_ Inspection Date \_\_\_\_\_ Inspector \_\_\_\_\_

Current Landowner \_\_\_\_\_ Phone No. (\_\_\_\_\_) \_\_\_\_\_

Address \_\_\_\_\_

Additional landowners and addresses identified in remarks section.

- Water Use  Domestic  Industrial  Irrigation  Municipal  Hydraulic Dredging
- Classification:  Recreation  Stockwatering  Water Power  Artificial Recharge  Contamination Remediation
- Dewatering  Fire Protection  Thermal Exchange  Sediment Control  Other \_\_\_\_\_

Source:  Groundwater  Surface Water Basin/Stream \_\_\_\_\_

**Authorized** Point of Diversion: \_\_\_\_\_ Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_ ID No. \_\_\_\_\_

Approximately \_\_\_\_\_ ft. North and \_\_\_\_\_ ft. West of SE corner of Sec. \_\_\_\_\_

**Actual** Point of Diversion: \_\_\_\_\_ Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_

Approximately \_\_\_\_\_ ft. North and \_\_\_\_\_ ft. West of SE corner of Sec. \_\_\_\_\_

How were distances determined? \_\_\_\_\_ Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

"Approved" Quantity \_\_\_\_\_ AF "Approved" Diversion Rate \_\_\_\_\_ g.p.m. (\_\_\_\_\_ c.f.s.)

"Approved" Storage Quantity \_\_\_\_\_ AF "Approved" Storage Rate \_\_\_\_\_

Limitation(s): \_\_\_\_\_

Priority Date \_\_\_\_\_ Approval Date \_\_\_\_\_ Perfection Date \_\_\_\_\_

Other applications covering land and/or point of diversion \_\_\_\_\_  
 (include discussion of overlapping files in remarks section)

**LAND TO BE INCLUDED ON CERTIFICATE:**

S	T	R	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES		
			NE	NW	SW	SE															

**LAND IRRIGATED – YEAR OF RECORD \_\_\_\_\_**

S	T	R	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES			
			NE	NW	SW	SE																

**TESTED DIVERSION RATES**

Maximum G.P.M. \_\_\_\_\_ (c.f.s. \_\_\_\_\_) Normal G.P.M. \_\_\_\_\_ (c.f.s. \_\_\_\_\_)

**FOR D.W.R. USE ONLY**

Year of Record \_\_\_\_\_

AF Applied = \_\_\_\_\_ hrs. x \_\_\_\_\_ g.p.m. x  $\frac{4.419}{24 \times 1000}$  = \_\_\_\_\_ AF

"Approved" land irrigated \_\_\_\_\_ acres, with \_\_\_\_\_ AF = \_\_\_\_\_ AF/acre

Perfected Rate \_\_\_\_\_ g.p.m. (\_\_\_\_\_ c.f.s.) Perfected Quantity \_\_\_\_\_ AF

**GENERAL INFORMATION ON IRRIGATION SYSTEM:**

**Center Pivot**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_  
Drive:  Water  Electric Length of Pivot Arm \_\_\_\_\_ Acres Irr. \_\_\_\_\_  
Pivot Design GPM \_\_\_\_\_ at \_\_\_\_\_ p.s.i. Operating Pressure-Pivot \_\_\_\_\_ p.s.i.  
Is there an end gun? **Y/N** Is end gun operating during test? **Y/N**  
End Gun Model \_\_\_\_\_ Rating \_\_\_\_\_ g.p.m.

**Gravity Irrigation**

Items to be shown on sketch of system: 1) layout of pipe, 2) sizes of pipe, 3) type of pipe, 4) set which was tested, 5) test location and 6) hydrant location

Description \_\_\_\_\_

**Other**

Type \_\_\_\_\_  
Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_

**POWER UNIT INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ HP \_\_\_\_\_  
Serial No. \_\_\_\_\_ Fuel \_\_\_\_\_ Rated RPM \_\_\_\_\_

**PUMP INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ No. Stages \_\_\_\_\_  
Serial No. \_\_\_\_\_ Size/Type \_\_\_\_\_ Rated RPM \_\_\_\_\_

**GEAR HEAD INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_  
Serial No. \_\_\_\_\_ Drive \_\_\_\_\_ Ratio \_\_\_\_\_

**WELL INFORMATION:**

Date Drilled \_\_\_\_\_ Original Depth \_\_\_\_\_ ft. Static Water Level When Drilled \_\_\_\_\_ ft.  
Length of time well has  rested  operated prior to inspection \_\_\_\_\_  days  hours  
Is measurement tube required? **Y/N** Is measurement tube present? **Y/N**  
Depth to water \_\_\_\_\_ ft. below LSD Location of M.P. \_\_\_\_\_

**ADDITIONAL REQUIREMENTS:**

Required? **Y/N** Date Installed \_\_\_\_\_ Reading when installed \_\_\_\_\_  
Manufacturer \_\_\_\_\_ Model No. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_ Units: \_\_\_\_\_ Multiplier factor \_\_\_\_\_ Size \_\_\_\_\_  
Acceptable? **Y/N** Comparative test? **Y/N** Installed properly? **Y/N** If no, explain below.  
Security Seal Installed? **Y/N** Security Seal Stamp labeled \_\_\_\_\_ (manufacturer's seal name)  
Distance upstream: \_\_\_\_\_ downstream: \_\_\_\_\_  
Reading \_\_\_\_\_ Instantaneous Rate: \_\_\_\_\_ GPM (\_\_\_\_\_) CFS Other \_\_\_\_\_  
Flow measurement chamber required? **Y/N** Chamber present? **Y/N** Straightening Vanes? **Y/N** Strainer? **Y/N**  
Portable pump? **Y/N** More than one pd? **Y/N** Chemigation equipment required? **Y/N**  
Steady linear, full pipe flow? **Y/N/Undetermined** Low pressure drain present? **Y/N** Vacuum breaker present **Y/N**  
Injection port present? **Y/N** Injection system being operated? **Y/N** Check valve? **Y/N**  
Have conservation plans been followed? **Y/N** If no, explain: \_\_\_\_\_

**TEST OF DIVERSION RATE:** Location of test \_\_\_\_\_  
 Pipe Diameter (I.D.) \_\_\_\_\_ inches (measured)

**Test No. 1 ---- Normal Conditions**  
 R.P.M. POWER UNIT \_\_\_\_\_  
 R.P.M. PUMP UNIT \_\_\_\_\_  
 Pressure at Pump \_\_\_\_\_ psi

**Test No. 2 ---- Maximum Conditions**  
 R.P.M. POWER UNIT \_\_\_\_\_  
 R.P.M. PUMP UNIT \_\_\_\_\_  
 Pressure at Pump \_\_\_\_\_ psi

**Non-Intrusive Meter Test** Meter Type \_\_\_\_\_ Meter Serial No. \_\_\_\_\_  
 Ending \_\_\_\_\_ gal. Ending \_\_\_\_\_ gal.  
 Beginning \_\_\_\_\_ gal. Meas. O.D. \_\_\_\_\_ Beginning \_\_\_\_\_ gal.  
 Difference \_\_\_\_\_ gal. Meas. Wall \_\_\_\_\_ Difference \_\_\_\_\_ gal.  
 Time \_\_\_\_\_ min. XDCR Setting \_\_\_\_\_ mm Time \_\_\_\_\_ min.  
 Rate \_\_\_\_\_ gpm. Rate \_\_\_\_\_ gpm.

**Diagnostics:**  
 Signal Strength SS up: \_\_\_\_\_ SS dn: \_\_\_\_\_ (Should be over 55 highest on PVC, up and dn should be close to the same)  
 SNDSP: \_\_\_\_\_ (Should be close to book value for the soundspeed at measured temp) Temp \_\_\_\_\_ F  
 Signal Quality: Q up \_\_\_\_\_ Q dn \_\_\_\_\_ (Should be + - 300 or greater)  
 AMPup: \_\_\_\_\_ AMPdn: \_\_\_\_\_ (Should be 20 - 28 fluctuations)  
 P#up: \_\_\_\_\_ P#dn: \_\_\_\_\_ (100 to 900, closest to 500 is best)

**Installed Meter Test** Meter Serial No. \_\_\_\_\_ Mfg. \_\_\_\_\_ Model \_\_\_\_\_  
 (If different from page 2)  
 Ending \_\_\_\_\_ gal./AF Ending \_\_\_\_\_ gal./AF  
 Beginning \_\_\_\_\_ gal./AF Beginning \_\_\_\_\_ gal./AF  
 Difference \_\_\_\_\_ gal./AF Difference \_\_\_\_\_ gal./AF  
 Time \_\_\_\_\_ min. Time \_\_\_\_\_ min.  
 Rate \_\_\_\_\_ gpm. Rate \_\_\_\_\_ gpm.

% Error Calculation:  $\frac{\text{Test} - \text{Meter}}{\text{Test}} \times 100$  % error \_\_\_\_\_

**Other Flowmeter** Use Supplemental Sheet (include meter identification, data and calculations).

**IMAGE OF PLACE OF USE, LOCATION OF DIVERSION WORKS, AND DISTRIBUTION SYSTEM.**



DIVISION OF WATER RESOURCES—KANSAS DEPARTMENT OF AGRICULTURE  
**COMPLIANCE/ COMPLIANCE & ENFORCEMENT/ ADMINISTRATION INVESTIGATION**

File No. \_\_\_\_\_ Overlap **P/D or P/U** File No(s). \_\_\_\_\_ Date \_\_\_\_\_

Agency **KDA-DWR** Inspector \_\_\_\_\_

- Reason:  New Application  PD Change c-\_\_\_\_\_ )  PU Change c-\_\_\_\_\_ )  
 Meter Installed  MYFA  Random  
 Past Violation notice/order  Meter repair/Replace  
 Other \_\_\_\_\_

**PD CHANGE:**  YES  NO  In Compliance, Date \_\_\_\_\_  Out of Compliance, Date \_\_\_\_\_

Chg No. C \_\_\_\_\_ Date of N of C Ack \_\_\_\_\_ Date completed \_\_\_\_\_ old PD ID \_\_\_\_\_

Source:  Groundwater  Surface Water Basin/Stream \_\_\_\_\_

**Actual** Point of Diversion: \_\_\_\_\_ Sec. \_\_\_\_\_, T. \_\_\_\_\_ **S**, R. \_\_\_\_\_ **W**

Approximately \_\_\_\_\_ ft. North and \_\_\_\_\_ ft. West of SE corner of Sec \_\_\_\_\_. Projection: \_\_\_\_\_

How were distances determined? \_\_\_\_\_ Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Distance from old pd \_\_\_\_\_ ft (N / S) and \_\_\_\_\_ ft (E / W) Old well: plugged  capped  equipped  other: \_\_\_\_\_?

**PU CHANGE:**  YES  NO  In Compliance, Date \_\_\_\_\_  Out of Compliance, Date \_\_\_\_\_

Chg No. C \_\_\_\_\_ Date of N of C Ack \_\_\_\_\_ Date completed \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**POWER UNIT INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ HP \_\_\_\_\_ Serial No. \_\_\_\_\_ Fuel \_\_\_\_\_ Rated RPM \_\_\_\_\_

**PUMP INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ No. Stages \_\_\_\_\_ Serial No. \_\_\_\_\_ Size/Type \_\_\_\_\_ Rated RPM \_\_\_\_\_

**GEAR HEAD INFORMATION:**

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Drive \_\_\_\_\_ Ratio \_\_\_\_\_

**WELL INFORMATION:**

Date Drilled \_\_\_\_\_ Original Depth \_\_\_\_\_ ft. Static Water Level When Drilled \_\_\_\_\_ ft.

Water level measurement tube required? **Y / N** Water level measurement tube present? **Y / N**

Static Water Level **Y / N** \_\_\_\_\_ Depth to water \_\_\_\_\_ ft. below LSD Location of M.P. \_\_\_\_\_

**METER INFORMATION:**  YES  NO  Checked- In Compliance, Date \_\_\_\_\_  Checked- Out of Compliance, Date \_\_\_\_\_

If source of supply is a surface water reservoir, is a stage-measuring device installed? **Y / N** \_\_\_\_\_

Flowmeter Installed? **Y / N** Flowmeter at well? **Y / N**

**Meter Reading** \_\_\_\_\_ If No, other location \_\_\_\_\_

Units \_\_\_\_\_ *Well Head Illustration*

Multiplier Factor \_\_\_\_\_ Type of Chamber  
MFG. \_\_\_\_\_

Anti-Reverse required? **Y / N** Installed? **Y / N**

Manufacturer \_\_\_\_\_

Type \_\_\_\_\_

Serial No. \_\_\_\_\_

Model No. \_\_\_\_\_

Size \_\_\_\_\_ **(ID)** **(OD)**

Measured Size \_\_\_\_\_ **(OD)**

Manufacturer seal: \_\_\_\_\_

Seal to pipe required?: **Y / N** Installed? **Y / N**

DWR seal: \_\_\_\_\_

GMD seal: \_\_\_\_\_

Chamber w/ vanes, or  
strainer present? **Y / N**

Non-Intrusive Rate: \_\_\_\_\_ **GPM** Form Attached?

Instantaneous Rate: \_\_\_\_\_ **GPM**

Distance upstream: \_\_\_\_\_

Downstream: \_\_\_\_\_

Pressure Gage: \_\_\_\_\_

**Timed Flow Rate**

BEG Read: \_\_\_\_\_ Time: \_\_\_\_\_

END Read: \_\_\_\_\_ Calc. Rate: \_\_\_\_\_

**ADDITIONAL REQUIREMENTS:**

Injection port present? **Y / N** Injection system being operated? **Y / N** Chemigation equipment required? **Y / N**

**WATER USE INFORMATION:**

Beginning of Calendar year meter reading: \_\_\_\_\_ Authorized Quantity: \_\_\_\_\_ Authorized Rate: \_\_\_\_\_

Reading at Repair: \_\_\_\_\_ Reading After Repair: \_\_\_\_\_

Quantity not metered: Hours: \_\_\_\_\_ Rate: \_\_\_\_\_ Quantity Calc: \_\_\_\_\_ Water Use to Date: \_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Reading \_\_\_\_\_ Quantity Used \_\_\_\_\_ Engine / pivot hours / or timed flowrate \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_