

**COMPREHENSIVE WATERSHED MANAGEMENT  
WATER USE TRACKING PROJECT**

**Software Requirements Specification**



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Date	Revision	Description	Author



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# Software Requirements Specification

## 1 Introduction

### 1.1 Purpose

The Software Requirements Specification (SRS) is a collection and organization of all the requirements surrounding a project. As the Vision Document was a broad statement of user needs, goals and objectives, and features of the system, the SRS begins the detailing of those needs and features, and how they are going to be implemented in the solution. The SRS is a collection, or package, of artifacts that describe the complete external behavior of the system (i.e., what the system has to do to deliver those features).

Following the Rational Unified Process (RUP) and its iterative nature, the SRS is not a frozen document, but rather a living artifact. It has a number of uses as the developer begins the implementation efforts. It serves as a basis for communication between all parties (i.e., between the developers themselves, between the developers and the stakeholders). The SRS will also serve as input to software testing and quality assurance checks. During testing, Test Cases will be created to ensure that the developed system does indeed fulfill the requirements outlined in the SRS.

### 1.2 Overview

The Water Use Tracking (WUT) System's SRS, as outlined above, is a collection of artifacts that have been developed separately during the Implementation Phase of the project. This packaging of artifacts will include information from the following documents:

- Vision Document
- Requirements Workshops Summaries
- Requirement Traceability Matrix
- Use Case Model and Use Cases
- Supplementary Specification

This SRS outlines the process the WUT Project Development Team followed to gather the requirements for the project. This document will also describe how the requirement statements gathered from the stakeholders make their way into use case documents and, eventually, into features of the system.



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## 2 Project Scope

The vision of the Water Use Tracking (WUT) System, as captured during the Executive Stakeholders Workshop, defines the system as:

“A GIS-based system that allows District employees and external customers to spatially and temporally track and analyze key Regulatory and Resource Management data.”

This system will support Southwest Florida Water Management District’s (SWFWMD) activities defined in the Southern Water Use Caution Area (SWUCA) Management Plan and to validate and assess the results of the SWUCA II Rules. Although this system is being built to support the efforts within the SWUCA, it will support the same functionality for anywhere within the District.

### 2.1 Problem Statement

Rules are in the process of being implemented in support of the SWUCA Recovery Strategy that has no current, automated way of being validated or assessed in their fulfillment of the needs of the plan. One problem is no formal or consistent system exists at the District (manual or automated) to comprehensively track and analyze geographic and temporal trends in permitted and actual water uses within the SWUCA. Currently, tracking of spatial and temporal trends in permitted and actual water uses is done using manual and semi-automated methodologies by a number of groups in the District.

Examples of current work include monthly summary reports of permitted pumpage developed by the Technical Services Department, annual water use estimates developed by the Conservation Projects Department, and ad hoc maps of permitted pumpage developed by the Mapping and GIS Section (MGIS). This approach is staff time intensive, and since data sources and methodologies vary between different groups conducting these analyses, it may lead to inconsistent or apparently conflicting results. This is further complicated by the fact that current database management systems and data collection activities were not specifically designed to support these types of activities. The result is that the current system does not adequately support the types of analyses required for successful implementation of the SWUCA Management Plan.

### 2.2 Product Position Statement

The WUT Project will provide software for several different customer types. As outlined in the *SWUCA Permitted Water Use Tracking Application – Feasibility Study*, the primary groups who will be using the system are:

***Water Use Permit (WUP) Evaluators*** – The system will assist in the WUP review process.

***Technical Services Staff*** – The system will be used to track and analyze long-term trends in permitted and actual water use and to assist in identifying underlying causes for these trends (land use change, socio-economic conditions, environmental factors, etc.). It will also provide tools that can be used to aggregate permitted and actual pumpage over specified geographic areas (model grid cells, counties, Most Impacted Area (MIA), watershed, etc.).



**Records and Data Staff** – The system will provide tools to assist in the quality control/quality assurance of WUP data.

**Resource Conservation and Development Department** – The system will provide information that can be used to assist in the calibration of ground water models. The system will also provide information on WUPs that can support the establishment and monitoring of Minimum Flows and Levels. In addition, the system will provide information that assists in the development of estimated water use

**Planning Department** – The system will provide tools to assist in studies analyzing impacts of changing demographics and economic conditions on water use within the SWUCA.

**Executive Staff/Governing Board** – The system will provide standard reports that are published as hardcopy or web-accessible documents. Web accessible maps and documents could be interactive, allow users to zoom, pan, and query areas of interest.

**External Customers** – External customers potentially include local governments, the media, and the general public. Standard interactive map interfaces will provide information in a consistent, low maintenance environment.

**Other Users** – This system is in line with the objectives of the CWM Information Technology initiative presented to the Governing Board in June 2002. It will provide improved access to WUP data for all District staff.

### 2.3 Stakeholder Summary

The following is a list of Stakeholders that will participate in the development of the Water Use Tracking System:

Name	Role	Title
<b>Executive Sponsors:</b>		
Bruce Wirth	Executive level view of requirements.	Deputy Executive Director
Gene Heath	Executive level view of requirements.	Assistant Executive Director
John Heuer	Executive level view of requirements.	Deputy Executive Director

Name	Role	Title
<b>Co-Sponsors:</b>		
B. J. Jarvis	Oversees the computer entry of permit and pumpage data.	Director, Records and Data Department
Mark Barcelo	Oversees Groundwater modeling activities and ensures the project adheres to SWUCA Rules.	Hydrologic Evaluation Manager



<b>Name</b>	<b>Role</b>	<b>Title</b>
<b>Science Business Experts:</b>		
Albert Bond	Estimates past water usage and projects future water use.	Hydrologist
Chris Zajac	Estimates past water usage and projects future water use.	Senior Water Conservation Analyst
Granville Kinsman	Compare Regulatory Database to Water Mgmt Database for redundant well points.	Manager, Hydrologic Data Collection Section
Mike Beach	Use data in model to track minimum flows and levels changes.	Senior Professional Engineer
Mike Hancock	Use data in model to track minimum flows and levels changes.	Senior Professional Engineer
Ron Basso	Use data in model to track minimum flows and levels changes.	Senior Professional Geologist/Engineer
Rand Frahm	Track the project for ways planning department can use information.	Planning Manager
Margit Crowell	Water management database expertise.	Staff Hydrologist
<b>Regulatory Business Experts:</b>		
Christine Jackson	Provide Water Use Permitting and SWUCA Expertise.	Senior Professional Geologist/Engineer
Jay Yingling	Use to study cost impacts in regards to water use rule changes.	Senior Economist
Deanna Naugler	Expertise on administrative aspect of the permitting process.	Senior Regulatory Systems Analyst
Debbie Ammendola	Computer entry of permit and pumpage data that will be utilized.	Records Processing Supervisor
Jim Whalen	Familiar with the issues that people are trying to resolve.	Regulatory Data Analyst
Martha Norris	Knowledge of permit data.	Permit Data Analyst
John Parker	Ensure that permit rule criteria and compliance issues are satisfied.	Water Use Regulatory Manager

<b>Name</b>	<b>Role</b>	<b>Title</b>
Karen Lloyd	Monitor how well the project can be used to implement District rules.	Senior Attorney
Ken Weber	Ensures that the project adheres to SWUCA Rules.	Regulation Program Director
Mike Balsler	Ensure that permit rule criteria and compliance issues are satisfied.	Water Use Regulatory Manager
Susan Caye	Familiar with the issues that people are trying to resolve.	Senior Regulatory Systems Analyst
Ralph Kerr	Ensure that permit rule criteria and compliance issues are satisfied.	Water Use Regulatory Manager
Scott Laidlaw	Ensure that permit rule criteria and compliance issues are satisfied.	Water Use Regulatory Manager
<b>Technical Experts:</b>		
Axel Griner	Geodatabase design support.	Senior GIS Analyst
Cheryl Glenn	Supply GIS aspects of permitting.	GIS Analyst 2
Eileen Burns-Wilson	Provide expertise on how the Regulatory database is built.	Computer Systems Support – Scientific
Priscilla Thoophong	ArcGIS programming support	Lead Programmer Analyst
Robin Allen	Provide expertise on how the Regulatory database is built.	Senior Systems Analyst
Sherrie Kubis	Oracle database design support.	Computer Systems Support – Scientific
Steven Dicks	Technical Team Leader	Mapping & GIS Manager
<b>Other Impacted Parties:</b>		
Diana Burdick	Coordinate with Land Resources Dept. Database Project	Senior GIS Analyst
Richard Owen	Provide planning perspective to project.	Planning Director
Kurt Fritsch	Provide District-wide, cross-cultural view of the project, and help to ensure scope is maintained.	Inspector General

## **2.4 Project Environment**

### **2.4.1 Hardware/Software Environment**

The proposed system does not appear to require any significant hardware or software resources beyond that which currently exists, or is planned for implementation, at the District.

#### *2.4.1.1 IBM DB2 Data Server*

The IBM DB2 data server was upgraded in January 2003 and it is anticipated that it has sufficient capacity to support the proposed system. It is likewise anticipated that the current DB2 database software configuration will support the proposed system.

#### *2.4.1.2 HP-UX ArcSDE/Oracle Data Server*

The District is currently retiring the obsolete HP Tru-64 computer system and replacing it with an HP-UX system. It is anticipated that when this upgrade is completed in fiscal year (FY) 2004 that the system will have sufficient capacity to support the proposed system. It is likewise anticipated that when the upgrade is completed, current ArcSDE/Oracle database system configuration will support the proposed system.

#### *2.4.1.3 Communications/Data Network*

The primary impact of this system on the network will occur during the transfer of data between the IBM and HP-UX systems. Since this transfer will occur only during non-business hours, it is not anticipated that it will have a significant impact on the current network.

#### *2.4.1.4 Web/ArcIMS Servers*

The current Web/ArcIMS Server environment will be expanded in FY 2004 to support of CWM activities and it is anticipated that it will have sufficient capacity to support the proposed system. In the event that these servers are not adequate, they are relatively inexpensive to upgrade.

#### *2.4.1.5 Desktop Workstations*

It is anticipated that this system will operate within the ArcGIS ArcView and ArcIMS web browser environment that is currently implemented at the District.

## **2.5 Product Perspective**

The system will require a combination of permitting, geographic, and water resource data derived from the following sources.

### **2.5.1 WUP Data**

The data source for WUPs is the Regulatory Database (RDB). This database is implemented in the IBM DB2 environment on the District's IBM mainframe data server located in the Tampa Data Center. The Records and Data Department is the primary entity responsible for the entry and maintenance of the data in the RDB. The Information Resources Department (IRD) is responsible for the design, development, and maintenance of the RDB.



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### **2.5.2 Geographic Data**

The data source for geographic data is the GIS. This database is implemented in the ArcSDE/Oracle environment on the District's HP-UX data server located in the Brooksville computer room. The Mapping and GIS Section (MGIS) is the primary entity responsible for the entry and maintenance of most of the data in the GIS. The Land Resources, Operations, and Records and Data Departments maintain specialized datasets within the GIS. IRD and MGIS are jointly responsible for the design, development, and maintenance of the GIS.

### **2.5.3 Water Resource Data**

It is anticipated that data on ground and surface water levels, water quality, stream flows, and climatological trends will be used in this system. The source for these data is the Water Management Database (WMDB). This database is implemented in the IBM DB2 environment on the District's IBM mainframe data server located in the Tampa Data Center. The Operations Department is the primary entity responsible for the entry and maintenance of the water levels/flows and meteorological data in the RDB. Water quality data stored in the WMDB are collected by multiple departments, processed by the District's laboratory, and loaded into the WMDB. It is important to note that while almost all water level information collected by the District is entered into the WMDB, loading of water quality data is less common. The WMDB, therefore, does not provide a comprehensive collection of water quality data. The Information Resources Department (IRD) is responsible for the design, development, and maintenance of the WMDB.

### **2.5.4 GIS/RDB/WMDB Data Integration**

The proposed system will require the integration of data in the GIS, RDB, and WMDB. Data in these systems are logically linked using a common identifier known as the Universal ID (UID). Each WUP withdrawal point and data collection site is assigned a UID. UIDs are unique for physical objects such as wells, rain gauges, and stream gauges. Unique UIDs are also assigned to surface water quality sample sites. In cases where a well is both associated with a WUP and also serves as a data collection site, it is assigned a single UID that provides linkages to data stored in both the RDB and WMDB. In the GIS, the UID is associated with a physical location and, therefore, can be represented within a data layer representing WUPs, stream gauges, or rainfall stations.

Data are physically transferred from the DB2-based WMDB and RDB to the ArcSDE/Oracle based GIS using the Transformation Server software. This software provides tools for moving data between databases in their entirety or as selected subsets. While this transfer is currently only done from the WMDB/RDB to the GIS, it is technically possible to transfer data in the other direction.

## **2.6 Assumptions and Dependencies**

Requirements have surfaced that require data that is currently not available, either not collected or not stored in one of the databases (e.g., relocated quantities, lapsed quantities, etc.). It is assumed that the needed changes, to collect and store the data, will be made within the current application and database. These changes would need to be implemented on the mainframe and it

is assumed this would not be within the scope of this project. However, if the required changes cannot be completed to the current systems in a timely manner, the WUT System will need to implement these requirements within the new application.

It is also assumed that the current databases mentioned above are still available in their current form during the development of the WUT System. The WUT System will be dependent on the data stored in the WUP, WMDB, GIS, and RDB databases. Changes to the current systems would need to be done in collaboration with the WUT Project Development Team. Communication between the responsible parties is key in the success of the development of this system.

One requirement for the WUT System is that it will be developed with the hardware and software architecture currently in place at the District. Changes to the current architecture requirements could have a negative impact on the development of this system and cause delays in the release of the system.

## 2.7 Needs

The following is a list of needs that were captured in the *SWUCA Permitted Water Use Tracking Application – Feasibility Study*. These needs and the requirements gathered at the Requirements Workshops will be consolidated and presented to the Stakeholders at the Requirements Summary Workshop for discussion and prioritization.

Needs:

- Depict geographic and temporal trends in permitted and/or actual pumpage within the SWUCA
- "Cradle to grave" tracking and analysis of individual ground and surface water withdrawal points
- Identification of sources for withdrawal points (surface versus ground, aquifer, status, alternative sources, etc.)
- Monitoring changes in permitted and actual pumping
- Tracking changes in predominant use types
- Tracking changes in permit ownership
- Identifying withdrawal points with lapsed permitted quantities. As used here, lapsed quantities refer to any reductions in permitted pumpage for a particular well. These may be the result of expiration of a permit, purchase of land that leads to retiring of a WUP, changes in predominant use type, plugging of well, or any other event that leads to a reduction in the permitted withdrawal from that point.
- Aggregate permitted pumpage, actual use, and lapsed quantities for defined geographic areas
- Must be able to analyze the impacts of alternative supplies on pumpage in a particular geographic area

## 2.8 Other Product Requirements

It is anticipated that the proposed system will be developed within the current software development environment used at the District. The following is the current systems and their associated development environments:

<b>System</b>	<b>Development Environment</b>
WMDB, RDB	JCL, SQL, J2EE, COBOL
SDE/Oracle	PL/SQL, Visual Studio .NET, ArcObjects
ArcIMS	Visual Studio .NET, ArcIMS ArcObjects
ArcGIS ArcView	Visual Studio .NET, SQL, ArcObjects

## 3 Requirements Gathering Process

By following the RUP process, the WUT Project Development Team is executing a software development approach that is iterative, architecture-centric, and use-case driven. Use cases are a very important artifact of the initial phase of the project. The RUP outlines a process of how the development team goes from a vision of the system to be built, to specific requirements extracted from stakeholders, and, finally, to a use case model and use cases.

### 3.1 Requirement Workshops and Summaries

Requirement workshops were held in the initial weeks of the project to gather the user's requirements to the system. The stakeholders for the project are categorized into four categories: Executive Staff, Technical Staff, Science Business Staff, and Regulatory Staff. Workshops were held for each of these groups with follow-up one-on-one interviews to clarify or refine requirements. The agenda for each of these workshops was tailored to each of these groups. For example, the Executive Staff meeting is more focused on the vision of the project. The Technical Staff meeting is more focused on the technical requirements of the project. The remaining two groups, mostly made up of the power-users of the system, concentrated on the actual requirements of the system. An additional workshop was held to outline specific requirements needed for the system to support the SWUCA Recovery Plan. A summary was produced for each of the workshops and distributed to the participants for review. Feedback was received through the review process and the summaries were updated to reflect these comments.

### 3.2 Requirements Traceability Matrix

All the requirements gathered during the requirement workshops were reviewed and consolidated into the Requirements Traceability Matrix (RTM). The purpose of the WUT RTM is to document and manage the business and functional requirements for the WUT Project. The WUT RTM provides a master list of business and functional requirements organized into a number of meaningful features, each of which is a set of logically related requirements. Within the matrix, each requirement is mapped to one or more use cases within the WUT Use Case Model that supports the requirement. Once all requirements are mapped to a use case, SWFWMD is guaranteed that all business and functional requirements will be supported by the WUT software system. The WUT RTM also provides a means to scope the WUT Project for

success by prioritizing the features and/or requirements associated with each feature across the various releases of the WUT System.

For purposes of requirements management and traceability, the requestor(s) of each requirement is included in the matrix. This allows the project development team to easily know whom to contact if questions or concerns arise during the development of the system regarding a certain requirement. The capability to map these requirements increases the likelihood that upon the customer acceptance of a software solution that supports all the use cases within the Use Case Model, the project development team will have delivered a software product that fulfills the customer's needs.

As more detailed and precise information is learned about the water use permitting analysis and reporting business processes throughout the WUT Project life cycle, the WUT RTM will be updated to refine existing requirements statements and to capture new business and functional requirements as they are identified. Keeping the WUT RTM updated is a critical success factor because it provides one of the primary mechanisms for measuring and ensuring the success of the WUT Project. That is, the mapping of business and functional requirements to use cases ensures that these requirements drive the software engineering effort through design, implementation, and testing as a result of the use case realization process utilized by the WUT Project Development Team. Once all the use cases within the WUT Use Case Model have been implemented, then all the business and functional requirements have been satisfied and the WUT Project will have completed successfully.

### **3.3 Use Case Model and Use Cases**

The use case model primarily sets the functional requirements on the system, and is used as an essential input to analysis and architectural design. In essence, the use case model and use cases are a contract between the project development team and the stakeholders with regards to the functionality of the system. The initial release of the model in the inception phase is used to outline the scope of the system. The use case model is refined by more detailed flows of events during the elaboration and construction phases. The use case model is continuously kept consistent with the design model.

The use case model consists of use case packages. A use case package is a collection of use cases, actors, relationships, diagrams, and other packages. It is used to structure the model by dividing it into smaller parts. The WUT Use Case Model consists of two packages:

- Maintain Water Use Tracking Information
- View Water Use Permit Information

The functionality of a system is defined by use cases, each of which represents a specific flow of events. The description of a use case defines what happens in the system when the use case is performed. All functional requirements must be able to be linked to at least one use case. This ensures all required functionality is being included in the system to be built. Use cases contain several key items:

- Business Context – A description of the business need of the use case.

- Pre-Conditions – A list of any conditions that must be met before the use case can be executed.
- Flow of Events – The sequence of events that can take place during the execution of the use case. This includes the Primary Flow, or basic path, Alternate Flows, Warning Flows, and Exception Flows.
- Post-Conditions – A list of conditions that can be expected after the use cases ends, dependent on the flow of events executed.
- Special Requirements – A list of any special requirements for a particular use case. This is a “catch-all” section where any information regarding a use case can be captured and stored.

The users and any other system that may interact with the system are the actors. Because they represent system users, actors help delimit the system and give a clearer picture of what it is supposed to do. Use cases are developed on the basis of the actors' needs. This ensures that the system will turn out to be what the users expected.

Also included in the use case model are the use case diagrams. These diagrams illustrate the use cases and the actors and the interaction between the two. Use case diagrams can also be organized by use case packages to show only what is relevant within a particular package.

The WUT Use Case Model was created and is currently stored in the Enterprise Architect modeling tool. The model includes all requirements gathered to-date for the project. The model also has all use cases that will be developed for the WUT System. All requirements are linked within the model to one or more use cases. All the actors identified for the project are also in the model. The use case diagrams show the interaction between the actors and the use cases.

### **3.4 Supplementary Specification**

In contrast to business and functional requirements, non-functional requirements are system requirements that cannot be readily traced to specific use cases within the Use Case Model but are nonetheless critical to the overall success of the software project. In general, there are two types of non-functional requirements, qualitative and general systems. The first type of non-functional requirements are actually constraints upon the various functions, tasks, or behaviors that constitute the system’s business and functional requirements and are, thus, commonly considered to be the qualitative aspects of the proposed software system.

Qualitative systems requirements include considerations like:

- Usability
- Reliability
- Performance
- Supportability
- Performance Measures

The other type of non-functional requirements is general systems requirements typical to most software engineering projects. No specific general systems requirements were gathered during the requirement workshops for the WUT Project. However, these topics will be covered in the

Software Architecture Document created during the Elaboration Phase of the project. General systems requirements include considerations like:

- Security
- Relational Database Management System
- Backup and Recovery and Disaster Recovery
- User Documentation and Training

Because non-functional requirements cannot be traced to specific use cases within the use case model or, in some cases like security, apply to all use cases within the use case model, these requirements are typically not documented in the Requirements Traceability Matrix. Rather, non-functional requirements are documented and managed through a separate deliverable called a Supplementary Specification.

The purpose of the WUT Supplementary Specification is to document and manage the non-functional requirements, or the qualitative and general systems requirements that are not mapped to a specific use cases within the WUT Use Case Model. These requirements were collected during the Requirement Workshops held during the Inception Phase of the project. This Supplementary Specification will be managed and iteratively refined as appropriate throughout the life of the WUT Project.

The Supplementary Specification will be a valuable aid to all members of the WUT Project Development Team. This specification will be used as a communication medium between the development team and the Project Stakeholders with regards to both qualitative and general systems requirements. The Development Team itself will use the supplementary specification as a reference when designing responsibilities, operations, and attributes on classes within the WUT Design Model, and when adjusting the classes within the model to the proposed implementation environment. Finally, the supplementary specification will be used to verify compliance of the non-functional requirements during the testing of the WUT software.

## 4 WUT Requirements

### 4.1 WUT Requirements Traceability Matrix

The current version of the WUT RTM is organized into two sections:

- Requirements for the Initial Release of the WUT System
- Requirements Identified for a Possible Subsequent Release of the WUT System

The first section identifies the set of business and functional requirements that will be supported in the initial release of the WUT System and the second section is comprised of the balance of the requirements that will be prioritized by the WUT Project Manager for a subsequent release of system. Within each section, the requirements are organized into a number of features, each of which is a logically related set of requirements. Within each feature, the requirements are documented and managed within a matrix or table comprised of the following columns:

- **Req ID** – A unique identifier for each requirement
- **Requirement Statement** – Individual WUT business and functional requirements expressed as a sentence that includes the word *shall*, *will* or *must*
- **Use Case** – A unique name that identifies the WUT Use Case that supports the requirement

#### 4.1.1 Functional Requirements by Category

##### 4.1.1.1 SWUCA

Req ID	Requirement Statement	Use Case
EW11b RW16 SR20 SR21 SR22 SR23	Track the movement of lapsed quantities in an area, including: <ul style="list-style-type: none"> <li>• Which permit and well obtained the lapsed quantities.</li> <li>• Where the lapsed quantities are located.</li> <li>• Why the quantities are lapsed (i.e. expired, cancelled, retired).</li> <li>• What MFL zone the lapsed quantities are in.</li> </ul>	<ul style="list-style-type: none"> <li>• View Lapsed and Project Quantities Summary</li> <li>• View Report</li> <li>• View Use of Lapsed Quantities</li> </ul>
EW11a SR18 RW1	Track the relocation of active water use within the SWUCA.	<ul style="list-style-type: none"> <li>• View Net Benefit Summary</li> <li>• View Report</li> </ul>
EW11b RW16 SR20 SR21 SR22 SR23	Track the movement of lapsed quantities in an area, including: <ul style="list-style-type: none"> <li>• Which permit and well obtained the lapsed quantities.</li> <li>• Where the lapsed quantities are located.</li> <li>• Why the quantities are lapsed (i.e. expired, cancelled, retired).</li> <li>• What MFL zone the lapsed quantities are in.</li> </ul>	<ul style="list-style-type: none"> <li>• View Lapsed and Project Quantities Summary</li> <li>• View Report</li> <li>• View Use of Lapsed Quantities</li> </ul>



Req ID	Requirement Statement	Use Case
JY4 SR7	Report on the history of irrigation water conserving credits, including the balance, how much earned, and how much used, and drought quantities. Know who uses them and who has accumulated them, and be able to report on an individual basis, by a geographic area, or aggregate the data.	<ul style="list-style-type: none"> <li>• View Water Use Permit</li> <li>• View Report</li> </ul>
RW13 RW18 SR32	Track and report on the history of permitted data, such as use type, irrigated acres, and pumpage (one use would be to know whether expired permits have had quantities reallocated).	<ul style="list-style-type: none"> <li>• View Water Use Permit</li> <li>• View Withdrawal Pumpage Information</li> </ul>
RW14 SR8	Track and measure alternative source projects (note: some of these may be included in table 8): <ul style="list-style-type: none"> <li>• Surface water or stormwater projects.</li> <li>• Reclaimed water (reuse water).</li> <li>• Augmented surface water (reservoirs, harvesting of high flows (floodwaters).</li> <li>• ASR (Aquifer storage recovery)</li> <li>• Desalination.</li> <li>• Conservation (defined as a beneficial reduction of water use resulting in:               <ul style="list-style-type: none"> <li>○ modification of water use practices,</li> <li>○ reduction of unaccounted-for losses, or</li> <li>○ installation and maintenance of low volume water use systems, processes, fixtures, or devices.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• View Map</li> <li>• View Report</li> <li>• View Use of Quantities Associated With District Projects</li> </ul>
RW28 RW20 SR4 SR6	View the spatial impact of a person's application with other active applications on-line so the applicant or evaluator has a visual of who else is available to compete for quantities with. Also include application and permit data on-line, either with scanned documents or access to database. The historical data should also be available, but viewing restrictions for certain legal documents has to be followed. Be able to query by geographic area or permit number.	<ul style="list-style-type: none"> <li>• View Map</li> <li>• View Water Use Permit Search</li> <li>• View Report</li> </ul>
RW30a	Create heat map indicating who was over-pumping, who was not over-pumping, or who was using their water credits.	<ul style="list-style-type: none"> <li>• View Map</li> </ul>
RW30b	Heat map for water quality. Add the District WUPnet sentinel wells on this map - those are the District wells that have been in existence the longest time and we have the best data with. So if we bring them up in an area we know we have reliable data.	<ul style="list-style-type: none"> <li>• View Map</li> </ul>

Req ID	Requirement Statement	Use Case
SR12a	Report on the permits that have been relocated by a permit holder.	<ul style="list-style-type: none"> <li>• View Net Benefit Summary</li> <li>• View Report</li> <li>• View Change in Use Type or Owner</li> </ul>
SR12b SR13 SR26a EW12	Track the impact that water use has to the set MFL levels. In particular, compare the affects of the new or modified use to the actual flow and level of the water body or aquifer to make sure the actual level will not go below the MFL level. Types of things to check are: <ul style="list-style-type: none"> <li>• New applications, renewals, or modifications.</li> <li>• Relocated uses.</li> <li>• Change of use type.</li> <li>• Lapsed quantities.</li> <li>• Retired permits (some are lapsed - some are not).</li> </ul>	<ul style="list-style-type: none"> <li>• View Net Benefit Summary</li> <li>• View Change in Use Type or Owner</li> <li>• View Use of Lapsed Quantities</li> <li>• View Water Withdrawal Credit</li> <li>• View Land Use Information</li> <li>• View Lapsed and Project Quantities Summary</li> </ul>
SR14 SR26b EW2 SR15	Track net benefit changes. Some things involved are: <ul style="list-style-type: none"> <li>• Relocated permits</li> <li>• Permits with a change of use</li> <li>• Old and new locations</li> <li>• Lapsed quantities</li> <li>• Reclaimed water (not in database yet)</li> <li>• Projects</li> <li>• Amount of net benefit gained or lost from the change</li> <li>• New permits that came from an older permit due to a new benefit gain</li> </ul>	<ul style="list-style-type: none"> <li>• View Net Benefit Summary</li> <li>• View Change in Use Type or Owner</li> <li>• View Use of Lapsed Quantities</li> <li>• View Water Withdrawal Credit</li> <li>• View Land Use Information</li> <li>• View Lapsed and Project Quantities Summary</li> </ul>
SR16	Report the net benefit amount in MGD for: <ul style="list-style-type: none"> <li>• Change of permitted location or use</li> <li>• Land use change</li> <li>• Use of lapsed quantities</li> <li>• Water withdrawal credit (replacement, reclaimed water)</li> </ul>	<ul style="list-style-type: none"> <li>• View Net Benefit Summary</li> <li>• View Change in Use Type or Owner</li> <li>• View Use of Lapsed Quantities</li> <li>• View Water Withdrawal Credit</li> <li>• View Land Use Information</li> <li>• View Lapsed and Project Quantities Summary</li> </ul>



Req ID	Requirement Statement	Use Case
SR17	Mark those permits that have a land use change so the quantities can be relocated to the public supply utility.	<ul style="list-style-type: none"> <li>View Change in Use Type or Owner</li> <li>View Report</li> </ul>
SR19	Create layer that includes "cones of depression" for the MFL information, which will indicate the area of influence to an MFL.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
SR24 SR25	Report on any water use amounts sold or given from one permit to another permit, especially reclaimed water (reclaimed water can be taken away, depending on the contract. It is kind-of-like "leasing" the water, but can be taken away).	<ul style="list-style-type: none"> <li>View Net Benefit Summary</li> <li>View Water Withdrawal Credit</li> </ul>
SR28	For mitigation of MFL impacts, report on the improvement percentage amount, where it was located, the cost, how the decrease was obtained and what impacts it had.	<ul style="list-style-type: none"> <li>View Mitigation of MFL Impacts</li> </ul>
SR29 SR9	Report on how much water was made available through the District's water resource development projects. Elements of the report should be: <ul style="list-style-type: none"> <li>Source of benefit (aquifer or surface water).</li> <li>The locations of the alternative sources.</li> <li>What permits are using the quantities generated by the projects, and what project they are getting the water from.</li> </ul>	<ul style="list-style-type: none"> <li>View Mitigation of MFL Impacts</li> <li>View Use of Quantities Associated With District Projects</li> <li>View Map</li> </ul>
SR3	Report on the permit duration (To track expiration dates for those looking for someone to compete with).	<ul style="list-style-type: none"> <li>View Report</li> <li>View Water Use Permit Search</li> </ul>
SR31	Should allow comparison to adjacent districts GIS layers to permit GIS layer to access adjacent data.	<ul style="list-style-type: none"> <li>View Map</li> <li>Maintain Quicklinks</li> </ul>
SR33	Report compliance on a permit (not wells). Crop reports on permits (not wells).	<ul style="list-style-type: none"> <li>View Report</li> </ul>
SR5	Report on competing applications (including ones that are in modification or expiring).	<ul style="list-style-type: none"> <li>View Report</li> <li>View Water Use Permit Search</li> </ul>
SW20	Supply the Regulatory requirements of MFL data: <ul style="list-style-type: none"> <li>What water levels are in relationship to MFL so you know who has to mitigate or how much excess flow there is.</li> <li>Need the historic and current levels so applicant knows how much to mitigate or what is available.</li> </ul>	<ul style="list-style-type: none"> <li>View Report</li> </ul>
TW9	Be able to determine the availability of alternative use supplies, such as reclaimed water and desalination.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
SR2	Report the Reservation from use amounts allocated to certain participants.	<ul style="list-style-type: none"> <li>View Water Use Permit Search</li> </ul>

#### 4.1.1.2 Water Use Permits

Req ID	Requirement Statement	Use Case
EW14	Track ownership of wells or permits over the life of the withdrawal point so the relocated quantities can be traced from owner to owner. Quantities that are relocated will have certain restrictions placed on them, as well as any quantities that remain on the original permit. For permits that have multiple withdrawal points, we need the ability to track ownership of specific withdrawal points over time.	<ul style="list-style-type: none"> <li>View Report</li> <li>View Water Use Permit</li> </ul>
EW21	Be able to look at permitted quantities, actual quantities (pumpage), and the resources it uses (Water Management DB)	<ul style="list-style-type: none"> <li>View Water Use Permit</li> <li>View Report</li> </ul>
EW9	Ability to track requested and permitted quantities.	<ul style="list-style-type: none"> <li>View Water Use Permit</li> </ul>
JY1	Identify when a standby permit is reactivated due to the loss of alternative quantities.	<ul style="list-style-type: none"> <li>View Net Benefit Summary</li> <li>View Water Withdrawal Credit</li> </ul>
RW19	Have a heat map that shows permit information for specific time periods. You should be able to input a geographic area (whether by county, department, or entire District area), select the time period(s) you want, and select one of two views: permits issued or active permits in that time period, and produce the map show the locations. On a high-level view, you need to be able to see the locations with the predominate use type reflected on the map itself, and include a graph or chart showing the total number of permits, predominate use shown by %, and the time period involved. If you click on it, bring up the permit details, such as name, permit number, issue date, expire date, use type, wuca, and average quantities.	<ul style="list-style-type: none"> <li>View Map</li> <li>View Report</li> </ul>



Req ID	Requirement Statement	Use Case
RW27	Automate some of the requests that Jim Whalen receives. The majority of request are related to permitted and pumpage quantities, both at the permit level and well level. They are usually sorted temporally or geographically.	<ul style="list-style-type: none"> <li>• View Water Use Permit</li> <li>• View Report</li> <li>• View Withdrawal Pumpage Information</li> <li>• View Well Construction Information</li> <li>• View Resource Information</li> <li>• View Crop Report Information</li> <li>• View Land Use Information</li> <li>• View Compliance Information</li> </ul>
RW29	Ability for public utilities and internal staff to find existing permits in or near their service area so they can spatially see what water is available, or may become available, when they plan for their future growth and water resources. They will need to view the use type (interested mainly in agricultural and mining), owned acres, and the current permittee's contact information.	<ul style="list-style-type: none"> <li>• View Map</li> <li>• View Water Use Permit Search</li> </ul>
RW37 TW4	Analyze permits using a soils type GIS layer. Have a second soils layer based on the soil types indicated on the permittees compliance to conditions.	<ul style="list-style-type: none"> <li>• View Map</li> </ul>
RW4	Ability to have printable and customizable maps	<ul style="list-style-type: none"> <li>• View Map</li> </ul>
RW46a	Identify when the District or another governmental agency purchases land, a link should be available to show if there is a permit on that area so it can be retired.	<ul style="list-style-type: none"> <li>• View Map</li> </ul>
RW46b	Need to know how water use changes when land use changes.	<ul style="list-style-type: none"> <li>• View Report</li> <li>• View Land Use Information</li> </ul>
RW6 SW17 RW26a	Have an easy way to query data by various fields: <ul style="list-style-type: none"> <li>• Issue date</li> <li>• Expiration date</li> <li>• Use type or other commodity</li> <li>• Predominate use</li> <li>• Pumpage reports</li> <li>• Permitted quantities</li> <li>• Permit status (active/delete/app/permit)</li> </ul>	<ul style="list-style-type: none"> <li>• View Water Use Permit Search</li> </ul>



Req ID	Requirement Statement	Use Case
SW18	Ability to pull a well package that provides a view of water use at a particular time that is then plugged into models used to generate water use amounts. The data would include wells, land elevation, aquifer, and total and cased depths.	<ul style="list-style-type: none"> <li>• Generate Well Package</li> </ul>
SW24 SW25	The ability to associate permitted quantities, pumpage quantities, and use code data at the well level.	<ul style="list-style-type: none"> <li>• View Water Use Permit</li> <li>• View Withdrawal Pumpage Information</li> </ul>
TW12	Track changes in land use and how it affects water availability.	<ul style="list-style-type: none"> <li>• View Report</li> <li>• View Land Use Information</li> </ul>
TW16	Need historical data for Water Use Permits including their spatial representations (polygons)	<ul style="list-style-type: none"> <li>• View Map</li> </ul>

#### 4.1.1.3 Water Use

Req ID	Requirement Statement	Use Case
EW1	Must be able to track trends in land use and water use changes. These include several means by which a proposed new withdrawal that impacts an MFL waterbody can achieve a "Net Benefit," including the provisions for relocated, lapsed, and water withdrawal credits.	<ul style="list-style-type: none"> <li>• View Report</li> <li>• View Land Use Information</li> </ul>
EW4 EW5 EW7	Ability to track water use over time and negotiate reasonable new water use based on water use pumpage trends.	<ul style="list-style-type: none"> <li>• View Withdrawal Pumpage Information</li> <li>• View Report</li> </ul>
RW15	Track by withdrawal source – what aquifer or USGS water body are general and Individual permits pumping from.	<ul style="list-style-type: none"> <li>• View Water Use Permit Search</li> <li>• View Map</li> </ul>
RW33	Have map be able to show quantity of pumpage. Hover over or click a point in the map and see the average rolling 12, peak month, and max month compared to the pumpage of the well. Also get the cumulative quantities for an area you enter manually.	<ul style="list-style-type: none"> <li>• View Report</li> </ul>
RW49	Provide the ability for applicants or District staff to compare the percentage a permit is over-pumping, based on use type, against the regional average for the same use type. The region would be the area that fell within the buffer distance entered, and the time of interest would also be entered.	<ul style="list-style-type: none"> <li>• View Report</li> <li>• View Withdrawal Pumpage Information</li> </ul>



Req ID	Requirement Statement	Use Case
SW11	Need to know what aquifer is being pumped from. There are permitting constraints in ETB MIA that no additional water from the Floridan Aquifer can be pumped, but it is allowed from Intermediate aquifer.	<ul style="list-style-type: none"> <li>View Withdrawal Pumpage Information</li> </ul>
SW15 SW9	Select water use data temporally or with geographic overlays, which can be from another layer or graphics on the page. Also be able to place it in an Excel spreadsheet.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
SW21	Select water use based on predominant use, use types, and regions they fall in. The predominant use would be agricultural, industrial, mining & dewatering, public supply, and recreational. Each predominate use is further broken down into more detailed categories, such as melons or citrus for the agricultural predominate use. This needs historical data for trend analysis.	<ul style="list-style-type: none"> <li>View Report</li> <li>View Water Use Permit Search</li> </ul>
SW6	Generate monthly reports for Board Packet that shows the difference in quantities permitted every month for specified geographic areas (i.e., counties, MIA, etc.).	<ul style="list-style-type: none"> <li>View Report</li> </ul>
TW1	Establish relationships between inputs (i.e. rainfall) and pumpage data. (Note: In response to one of Kurt's comments regarding the amount of pumping in areas in relationship to amount of rainfall and irrigation system efficiency.)	<ul style="list-style-type: none"> <li>View Report</li> </ul>
TW10 TW11	Show the intensity of water use in a geographic area on a color-coded map.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
TW15	Identify different types of water use, such as groundwater, surface water, and re-use.	<ul style="list-style-type: none"> <li>View Water Use Permit</li> </ul>
TW8	Know how much water has been permitted and how much has been used based on land use over time.	<ul style="list-style-type: none"> <li>View Report</li> </ul>

#### 4.1.1.4 Water Management Database

Req ID	Requirement Statement	Use Case
EW13	Support extraction or reporting of data for ad-hoc geographic areas by using spatial queries such as graphics or polygon buffering. The ability to aggregate the data must be there and any type of polygon should be able to be used.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
RW22 RW23 RW24 RW48	Track aquifer level changes, lake level changes, rainfall level changes, and stream flow changes by area over time (i.e. monthly).	<ul style="list-style-type: none"> <li>View Report</li> </ul>
RW25	Create layer that shows the Developments of Regional Impacts (DRI) and their status. This layer will be plugged into the new model for population projections and water supply demand projections.	<ul style="list-style-type: none"> <li>View Map</li> </ul>
RW45	Identify what lakes are stressed, when they became stressed, and if/when they came off stressed list.	<ul style="list-style-type: none"> <li>View Report</li> <li>View Map</li> </ul>

#### 4.1.1.5 Compliance

Req ID	Requirement Statement	Use Case
RW10 RW9b	Track pumpage oddities. Two examples are: A. Permittees that have consistent pumpage readings even when some of the data is missing. Use this information to predict whether they are in compliance in spite of the missing data. B. Permittees that enter zero on their pumpage reports.	<ul style="list-style-type: none"> <li>View Report</li> <li>View Withdrawal Pumpage Information</li> <li>View Compliance Information</li> <li>View Resource Information</li> <li>View Water Use Permit Search</li> </ul>
RW34 RW9a	Track permittees not submitting conditional/pumpage reports, and generate a map showing their locations.	<ul style="list-style-type: none"> <li>View Map</li> <li>View Compliance Information</li> <li>View Resource Information</li> </ul>
TW13 TW14	Obtain report of those out of compliance of permit conditions by over-pumping their allowable quantities. Show how much over pumping is done, and have option to select by time period or by area. Need to break down to a permit-by-permit basis, but also show the whole thing on a map.	<ul style="list-style-type: none"> <li>View Map</li> <li>View Report</li> <li>View Compliance Information</li> </ul>

4.1.1.6 *Minimum Flows and Levels*

Req ID	Requirement Statement	Use Case
EW6	<p>Need a protocol to assess how the actual flow and levels (AFL) compare to the established minimum flows and levels (MFL), including general trending information and whether waterbody-specific criteria are being met. There are 3 major provisions to track:</p> <ul style="list-style-type: none"> <li>• Minimum aquifer level - The saltwater intrusion MFL is met when the moving 10-year AFL is at or above the MFL for five consecutive years. The MFL is not met when the 10-year moving AFL in the reference wells is below the MFL for two consecutive years.</li> <li>• Minimum flows on the upper Peace River - The MFL is met when the MFL's are at or above the established MFL for three consecutive years. Once the MFL has been considered met, if it is followed by two years where the MFL is not met within a rolling ten-year period, then the AFL shall be considered below the MFL. A determination of whether AFL's are meeting the established MFL is made at each one of the established minimums (Bartow, Ft. Meade and Zolfo Springs).</li> <li>• Minimum lake levels - The proposed MFL is achieved when the long-term P50 is at or above the MFL and the long-term P10 is at or above the High Minimum Lake Level for five consecutive years. Once in compliance, MFL is not met when the long-term P50 is below the MFL for two or more consecutive years or the long-term P10 is below the High Minimum Lake Levels for two or more consecutive years.</li> </ul>	<ul style="list-style-type: none"> <li>• View Report</li> </ul>
SW19 SR34	<p>Use system to publish a chart or graph that compares the MFL to a running average of AFL's. This should reflect how the AFL's are moving along the MFL line and indicate how different resources impact the MFL. The resources to include are pumpage, new projects, and rainfall. It will probably be run on a monthly basis.</p>	<ul style="list-style-type: none"> <li>• View Report</li> </ul>

#### 4.1.1.7 Water Estimates

Req ID	Requirement Statement	Use Case
EW19	Ability to add estimated quantities for unmetered permits, which is found in the Water Estimates Database.	<ul style="list-style-type: none"> <li>Maintain Water Use Estimates</li> </ul>

#### 4.1.1.8 External Data

Req ID	Requirement Statement	Use Case
RW42	Provide access to population data in system that are aggregated to appropriate geographic areas (services areas, counties, etc.).	<ul style="list-style-type: none"> <li>View Map</li> </ul>

#### 4.1.1.9 Crop Reports

Req ID	Requirement Statement	Use Case
SW26	The ability to access crop report information spatially and temporally.	<ul style="list-style-type: none"> <li>View Crop Report Information</li> <li>View Map</li> </ul>

#### 4.1.1.10 Data Integration

Req ID	Requirement Statement	Use Case
RW2 SW16	Link between Water Use Permits (WUP), Environmental Resource Permits (ERP), and Well Construction Permits. One use would be as a means of notifying appropriate District staff when pertinent land use changes. (i.e. want to know if an ERP is issued or applied for a subdivision where permit has been issued for a farm.)	<ul style="list-style-type: none"> <li>View Report</li> <li>View Map</li> </ul>

#### 4.1.2 Requirements Identified for a Possible Subsequent Release of the WUT System

Req ID	Requirement Statement
RW11	Calculate water quality trends by geographic area.
SR11	Compare the population reported to the Bureau of Economic and Business Research (BEBR) report.
RW47	Ability to provide external customers a means to query and view application information and locations by entering spatial, temporal, or data specific information. Current applications satisfying the criteria would be viewed immediately; future applications would be e-mailed.
RW21	Create a consistent grid to analyze data through time, including population, water use, etc).

Req ID	Requirement Statement
EW16	Use GIS layers to analyze how salt-water intrusion is affecting water quality, etc. Layer would need to be updated either quarterly or annually.
RW41	<p>Develop a link between pumpage, water quality, and water levels (both of MFL's and other water bodies). The permittee has to stop pumping when certain levels are reached:</p> <ul style="list-style-type: none"> <li>• Augment lake when water levels are too high.</li> <li>• Pump water when chlorides concentrations too high.</li> <li>• Pump more out of well to pond &amp; from pond to golf course.</li> <li>• Use more ground water when allowed to, when also q's for surface water.</li> </ul>
SW22 SW4 SW5 SW3	Need tool to be able to estimate water use (now being done in SAS). To do this estimate, you need to be able to query the water use data with various variables, such as time period, use types, withdrawal type (groundwater or surfacewater), and geographic areas. Once the initial query is complete, you need to be able to refine the resulting data set. An example is when you select active permits in a time period. If a permit expired inside of the time period, the refine tool would help determine if that permit would or would not be a part of the result set, perhaps by determining at what point in the time line it expired.
RW5	Capture crop report data and link it with the corresponding use quantities, so you can observe changing crop patterns, see where land has shifted out of crops, and track water use per planted acre per crop to see patterns in water use by geography. The accumulation (or depletion) of credits by geographic area could point out potential problems in permitting in specific geographic areas. It may point to soil type or local cultural practice problems. Link to requirement JY4/SR7, the report of water credits used and earned.
SR33	Report compliance on a permit (not wells). Crop reports on permits (not wells) (I think this was a requirement to report this data some how at a well level).
SR1	Report the Reservation from use amounts associated with some surface water.
SR10	<p>Report the per capita daily water figures for the permitted amount, reported amount and adjusted number for per utility. The formula for adjusted gross capita is:</p> $\frac{WD + IM - EX - TL - SU - EM}{Population}$ <p>where:</p> <p>WD = ground water &amp; surface water withdrawals  IM = water imported/bought from another supplier  EX = Water exported/sold to other suppliers  TL = treatment loss (typically R/O or sand filtration)  SU = Significant uses  EM = Environmental mitigation, if required as a District permit condition.  Population = Functional population</p>

Req ID	Requirement Statement
JY5 RW32 J6	<p>Provide the ability to obtain data necessary to determine and access the population estimates for an area or on a permit-by-permit basis. Needs to accommodate how it is determined now and how it will be determined under the SWUCA 2 rules. This would include:</p> <ul style="list-style-type: none"> <li>• Seasonal residential report based on AHCA hospital report (determine seasonal populations).</li> <li>• Block group and "place" level Census Transportation Planning Package data on total workers in Parts A and B for calculating net service area commuter populations (the planned highway and road construction - to see commuter data and areas of growth).</li> <li>• Census group and block data (total and by age), housing units, household, and group quarters population.</li> <li>• Zip code tabulation areas (ZCTA) by age.</li> <li>• Public Supply Service areas.</li> <li>• Development of Regional Impact (DRI).</li> </ul> <p>(Note: To calculate projections for service area population and water supply demand the new model needs the DRI's and Road Construction layers.)</p>
RW44	<p>Access well construction data for domestic wells using locational data, such as GPS or section, township, and range.</p>
EW8	<p>The external users need to be able to click on an area and obtain data for the surrounding area, such as lapsed quantities, historical use, and adjacent permits. Need to support decision-making on the applicant's part, especially when their request does not meet the MFL requirements.</p>
JY2	<p>Make the following property appraiser data available so you can improve the ability to project service area populations in inter-Census years in several ways:</p> <ul style="list-style-type: none"> <li>• Provide a more discreet and up-to-date count of housing units in a utility service area.</li> <li>• Help determine when a DRI is completed.</li> <li>• Match commercial properties by the connection data provided by utilities.</li> <li>• Use lot sizes, where available, to determine its role in household water use compared to other variables in research projects.</li> <li>• There may be other data of use as well (wells, pools, etc).</li> </ul>

## 4.2 WUT Use Case Model

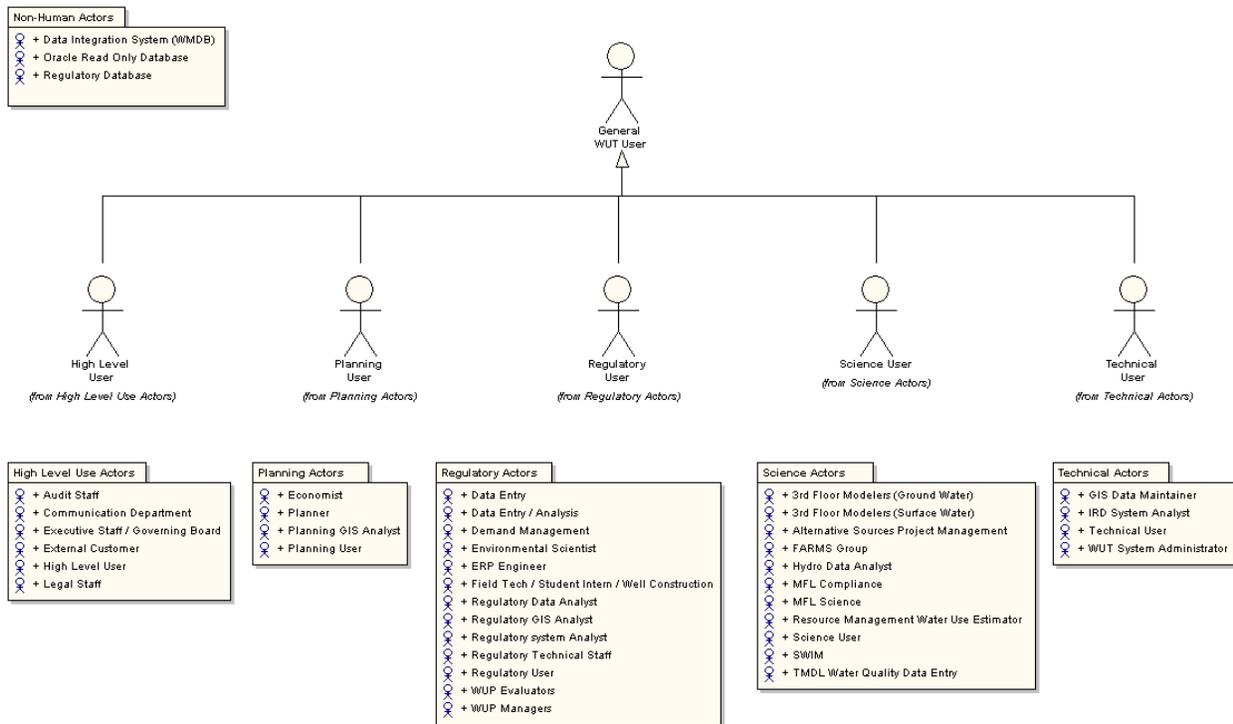
As explained above, the WUT Use Case Model has been created and is maintained within the Enterprise Architect modeling software. For a detailed view of the model, the Enterprise Architect tool can be used to view such items as:

- Requirements of the system and their relationships to use cases
- All the actors that have been identified for the system
- The use case packages used to organize the model
- The use cases, organized by package.
- The actors and their interaction with the use cases

The following sections will describe the various components of a use case model.

### 4.2.1 Actors

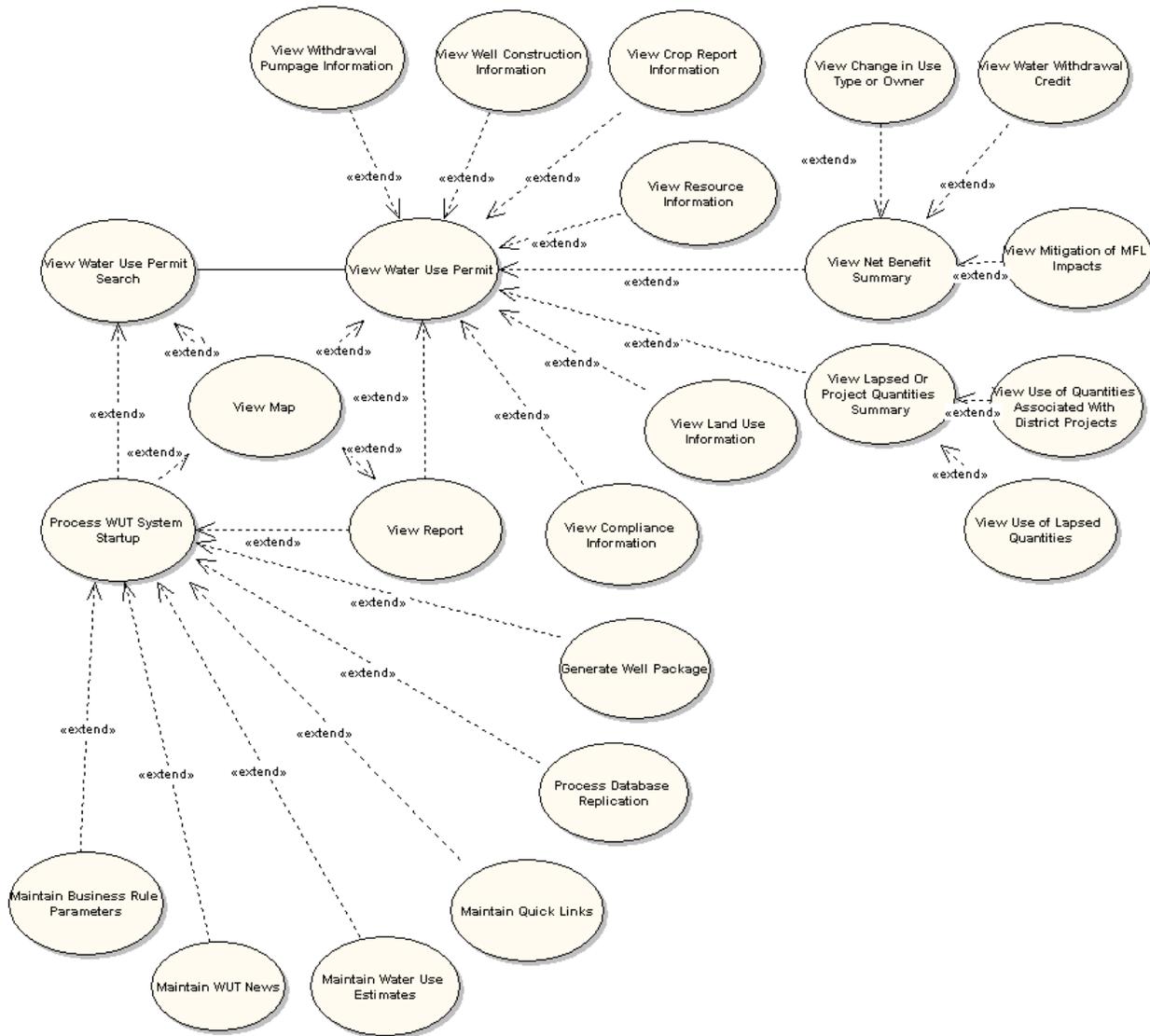
Over forty actors, with very specific job duties, were identified for the WUT System during a use case workshop. All these actors were consolidated into more general categories. Since a majority of the WUT System is reporting in nature, all the actors will have the ability to run reports, view maps, and query water use permits (i.e., General WUT User). Only a few of the features within the system involve the editing of data used by the system. These features will only be available to a select few users (i.e., WUT Administrator, Water Use Estimator). Figure 1 shows all the actors that were identified during the workshops, the general categories of these actors, as well as three non-human actors (i.e., Data Integration System, Oracle Read Only Database, Regulatory Database).



**Figure 1 – WUT Actors**

### 4.2.2 Use Cases

Identifying use cases in a use case model is only the critical first step. The business processes identified by each use case in the use case model must be described in detail in a narrative document. This narrative describes the behaviors the resulting software system must be designed to support. However, following the iterative nature of RUP, not all use cases are fully completed during the initial phase of the project. A selection of critical and architecturally significant use cases were identified to be completed during the initial phase of the project. Figure 2 below shows the Use Case diagram illustrating all the use cases identified to-date for the WUT Project.



**Figure 2 – WUT Use Case Diagram**

The critical and architecturally significant use cases identified for the initial release have been completed and are included in the Appendix of this document. They are:

- Process Database Replication
- Process WUT System Startup
- View Map
- View Report
- View Water Use Permit
- View Water Use Permit Search

Although not all use cases will be fully realized during the initial release of the system, a Business Context has been created for every use case shown in the diagram in Figure 2. The following sections contain these business contexts.

#### *4.2.2.1 Process WUT System Startup*

This use case will be used when an actor needs to access the Water Use Tracking (WUT) System, a browser-based, distributed 3-tier client/server application initially deployed on SWFWMD's Intranet. To access the WUT System, the actor will request the browser to display the WUT System Startup Page. This startup page will display information (e.g., WUT System News) as well as provide access to the various features supported by the WUT System (e.g., View Water Use Permit information, performing spatial analysis using Geographic Information Systems (GIS) maps, or running a report).

The information and features available to the actor will be controlled through the WUT System role-based security and WUT System Roles and their associated privileges. When the actor initially requests access, the WUT System will determine the actor's role and this will, in turn, determine the features available to the actor. Any actor not explicitly assigned to a WUT System Access Criteria role (i.e., WUT Admin User, WUT Manager User) will, by default, be assigned to the WUT System General User Role. This general role will be allowed to access all features that are not restricted to a specific WUT user role.

#### *4.2.2.2 Generate Well Package*

This use case will be used when an actor needs to generate a well package file for import into Groundwater Vistas to model the impact of well/withdrawal changes. The well package is a comma-delimited file that contains many attributes, including location information, regarding water withdrawal wells within the District. The well package is used as input into the creation of the District-wide Regulatory Model, as well as in the creation of regional models.

#### *4.2.2.3 Maintain Business Rule Parameters*

This use case will be used when an actor needs to update business rule parameters within the WUT System. Generally, these parameters are used in making specific calculations within the system. For example, information in the SWUCA II rules explicitly defines how a Lapsed Quantity or Water Withdrawal Credits are calculated. Any parameter that could be used in a calculation could be maintained using this use case. It is important to note that these parameters will not be used to change the original information stored in the database, but would be used to create "derived" data to be shown within reports or on the screen.

#### *4.2.2.4 Maintain Quick Links*

This use case will be used when an actor needs to manage the quick links located on the WUT Home Page. These are links to other websites that could be helpful to a WUT user. For example, a link to other water district's websites to possibly view water use permit information could be helpful. If a permit is requested near the boundary of the District, the ability to view data from the adjacent District would be helpful in determining the impacts of the new permit.

#### 4.2.2.5 *Maintain Water Use Estimates*

This use case will be used when an actor needs to maintain water use estimation values for water use permits. The permitted quantity is known for all water use permits. However, the actual pumpage is only known for those permittees that submit their data. For those permits that do not submit pumpage data, their water use is estimated, based on the data that is submitted from other wells. Currently, the water use estimates are stored in Excel spreadsheets and SAS datasets. Currently, this data can only be viewed in summarized form in the Water Use Estimates document published annually. This use case will allow the actor to import water use estimate data for each water use permit into a database table that can be used by the WUT System. This will allow users of the system to view pumpage data, as an estimated value, even for permittees that do not submit their pumpage information.

#### 4.2.2.6 *Maintain WUT News*

This use case is used when the actor needs to maintain WUT news items for communication to users when they access the WUT Home Page. For example, the system administrator may need to inform WUT users that the system will be down for maintenance over the weekend. Using this feature, the system administrator can create a system maintenance news item for display starting and ending on specified dates. Displaying news on the WUT Home Page ensures that all users will have access to this important information when they first access the application.

#### 4.2.2.7 *Process Database Replication*

This use case will be used when an actor needs to replicate and normalize (restructure) data that has been copied directly from a DB2 database on the IBM mainframe to a read-only Oracle database. The current data structure was implemented to support a data entry system and not for the use in a decision support reporting system. The data is being restructured to take advantage of the strengths of a relational database management system. After the initial replication of the DB2 tables, nightly updates are made to the Oracle tables with the data that has changed since the previous replication process. By normalizing the data into relational tables, it will allow the data to be more accessible using ad-hoc query tools.

#### 4.2.2.8 *View Change in Use Type or Owner*

This use case will be used when an actor needs to view information about the relocation of permitted quantities associated with a specific water use permit. When an application is made to relocate permitted quantities and change the use type or owner of an existing permitted quantity that impacts an MFL waterbody that is below its minimum level, the application is subject to certain criteria. The previously permitted quantity is first reviewed under the reasonable beneficial use test. The quantity available for the new owner or new use type is limited to 90 percent of the permitted historically used portion of the reasonable-beneficial quantity, not including any Drought Credit quantities. This 10 percent reduction in historically used permitted reasonable-beneficial quantity impacting the MFL waterbodies constitutes a Net Benefit.

If any reasonable beneficial, historically unused quantities will remain on the source permit, these quantities are also reduced by the Net Benefit provision (i.e., 10 percent) and are available only for the existing use type at the source permit site. If any reasonable-beneficial, historically

used quantities will remain on the source permit, these quantities are not subject to the Net Benefit provisions and may be used for the existing use type. Any future application to modify the use type or owner, or to relocate with a change in use type or owner, these remaining reasonable-beneficial, historically used quantities will be subject to the Net Benefit provisions. Any historically unused quantities remaining at the source permit site may not be relocated in the future and may not have a change in use type.

The following information will be displayed pertaining to the relocation of a WUP:

- Historical used quantity
- Historical unused quantity
- Reasonable beneficial quantity
- The WUP that the relocated amount came from
- The WUP that the relocated amount went to
- The dates that any of these values took affect or changed

#### *4.2.2.9 View Compliance Information*

This use case will be used when an actor needs to view Compliance data associated with a specific water use permit. Depending on the data submitted by the permittee, compliance data could include pumpage quantities, meter readings, crop reports, well construction specifications, and any other condition data associated with a water use permit. Providing compliance information will give District staff time-saving devices with which they can better monitor the enforcement activities of the District, with minimal impact to staff time. Better access to those who are not submitting pumpage information will help evaluators better determine the site conditions while evaluating the impacts of new applications in the same area.

#### *4.2.2.10 View Crop Report Information*

This use case will be used when an actor needs to view crop report data associated with a specific permit. Crop report data is collected on an annual or semi-annual basis and is submitted by the permittee. A different form is submitted for recreational use, annual crops, and seasonal crops. It contains the crop or use type, acreage for each use, predominate soil type, and planting dates. The data submitted with crop reports, in many cases, is not audited for accuracy, and is often incomplete or inaccurate. The primary purposes of this form are to verify the actual soil type for the location so that more accurate water allocations can be made, link the actual ground conditions to the use information in the database, and monitor the use of water conserving credits.

#### *4.2.2.11 View Land Use Information*

This use case will be used when an actor needs to view land use data associated with a specific water use permit. Possible scenarios include viewing trends for specified areas or determining how water use changed as land use changes.

Land use data can be collected during permit submittal or as conditions set on a permit, as well as from map analysis. Permittees will supply land use information as water use code types or from crop reports submitted for certain WUPs. Map analysis is conducted from the land use

layer derived from Florida's land use cover classification system (FLUCCS), color infrared (CIR) digital orthophoto quarter quadrangles (DOQQs), or other aerial photography.

#### *4.2.2.12 View Lapsed or Project Quantities Summary*

This use case will be used when an actor needs to view lapsed or project quantities data associated with a specific water use permit. With the implementation of the new SWUCA rules, this process will allow the actor to track these quantities.

Most of the land within the SWUCA is associated with an existing water use permit. Over time, permits are reduced, abandoned due to land use changes or abandonment of an activity, retired due to acquisition of land for preservation purposes, or by other means. Historically, this permit activity has resulted in an overall reduction in water use. Now, however, these lapsed quantities will be available for new and expanding water users to meet their needs. Another way for a water use permit applicant to get water that meets their needs is by the use of quantities that are associated with District projects.

#### *4.2.2.13 View Map*

This use case will be used when an actor needs to view water use permit (WUP) information spatially using a map created with the functionality provided by a Geographic Information Systems (GIS). Viewing WUP information in a pre-defined report format can be very effective from the point of view of efficiency, organization, and the presentation of large amounts of data. Even so, a report is simply a one-dimensional presentation of information when that information has at its basis a spatial context. When viewing WUP information in a report, the subtlety and complexity of the spatial relationships cannot be presented at all or is, at best, difficult to comprehend. The viewing of information within its spatial context is exactly where GIS excels and is the primary reason for this View Map Use Case. When additional GIS layers are added to a map, the multi-dimensional presentation of information provides for a richness of analysis simply not possible using a report format.

Although not intended exclusively for this actor, one of the primary actors who will use this use case is the WUP Evaluators. They are responsible for the analysis of all new, modified, and renewed WUPs. During the analysis process, the evaluator will frequently require access to a map to view WUP data within its spatial context. Doing so will enable the evaluator to view other important data within the area of interest resulting in a far richer analytical effort. By having the ability to add different GIS layers to the map, the evaluator will have more information at their disposal to assist in their analytical effort. Add to this the capability to pan, zoom, and print at any time, the evaluator will have all the information and functionality required to make better, more informed decisions.

#### *4.2.2.14 View Mitigation of MFL Impacts*

This use case will be used when an actor needs to view information of how a specific water use permit has mitigated its impact on a MFL waterbody. When an applicant demonstrates compliance with all conditions for issuance, except that it impacts a minimum flow or level waterbody, the applicant can apply for a permit if they provide a Net Benefit to the impacted MFL waterbody. This mitigation strategy could include the proposition of a water resource

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development project that more than negates their proposed impact or it could be the purchasing of adjacent land with water use permits for their own use.

The following information will be displayed to show the mitigation of MFL impacts:

- The permits and their quantities that were bought out to mitigate the MFL impact
- The District's projects and their quantities used to mitigate the MFL impact
- The self-funded projects and their quantities used to mitigate the MFL impact

#### *4.2.2.15 View Net Benefit Summary*

This use case will be used when an actor needs to analyze Net Benefit data associated with a specific water use permit. With the implementation of the new SWUCA rules, this process will allow the actor to track the Net Benefits. A Net Benefit is obtained when the proposed withdrawal, coupled with other activities or measures, will result in an improvement to the MFL waterbody that more than offsets the impact of the withdrawal. In all Net Benefit options, reasonable beneficial use plays a key part. Permits are granted based upon meeting numerous rule criteria including that the quantities requested are fully needed for the proposed use, or existing use in case of a renewal.

The applicant for a new permit or for a modification or renewal of an existing permit is required to file detailed information to demonstrate and justify to the reasonable satisfaction of the District the reasonable beneficial quantities intended to be used during the term of the proposed permit before it will be issued. This requirement is intended to assist the District in seeking to reduce the difference between permitted quantities and used quantities. For those cases in which an applicant is seeking a modification or renewal of an existing permit, the District will consider historical use, metered pumping data, trends and patterns of usage, actual type of usage, and other relevant factors.

A Net Benefit can be obtained in several ways including:

- Relocation with a change in use type or owner
- Water withdrawal credits
- Mitigation of minimum flow and level impacts

There are several ways that the District is going to gain water with the new SWUCA rules, from reclaimed water lines, lapsed quantities, water withdrawal credits, and the relocations rules.

#### *4.2.2.16 View Report*

This use case will be used when an actor needs to produce a report from within the WUT Report Library. It is anticipated that the WUT System will have a large number of reports available in its report library. Every report use case within the WUT Report Library will extend this use case as appropriate for the specific report.

A report in this library provides information in a pre-defined format. While the information content of the report is pre-defined, the system enhances the flexibility of the report by providing the actor with the capability to optionally limit the information in any given report to the actor's

specific area of interest (e.g., a specific county). This is accomplished through report specifications. While a given report may be run frequently, the information content will often vary from report to report based upon the run-time report specifications given by the actor.

This use case provides support for the numerous reports within the WUT Report Library. Once the actor specifies the report of interest and optionally supplies any run-time report criteria, the system will retrieve the information for the actor and present it in the pre-defined format. The actor can then choose to simply view the report online or download the report for analysis, printing, or saving as an electronic file in a variety of supported formats.

#### *4.2.2.17 View Resource Information*

This use case will be used when an actor needs to view water resource data associated with a specific water use permit. The water resource data is collected by the permittee, and varies depending on the requirements of the permit including water quality data, water flows and levels, total dissolved mineral levels (TDML), and rainfall amounts.

#### *4.2.2.18 View Use of Lapsed Quantities*

This use case will be used when an actor needs to view the use of lapsed quantities associated with a specific water use permit. Historically, reduced, abandoned, and retired permits have resulted in an overall reduction in water use. But now, these quantities will be a primary means for many new or expanding water users to meet their needs. Where an applicant demonstrates compliance with all conditions for issuance, except that it impacts an MFL waterbody, the applicant can apply for up to 90% of the water it has identified as historically used by a water use permit holder that has permanently discontinued their use and abandoned their permit. The applicant must also demonstrate that other Net Benefit options, including relocation, mitigation, participation in a District Source Augmentation Project, are not feasible. This Net Benefit provision applies only when the previous water use was derived from a source where the permanently discontinued use had a similar or greater effect on the impacted MFL waterbody as the proposed use.

One of the main goals of the WUT System is to track changes in permitted and used quantities so that historically used, reasonable beneficial quantities potentially available from reduced, abandoned, or retired permits and their relation to MFL waterbodies will be known for potential applicants and for District decision making. Quantities of water retired from land acquisition programs are included for use as lapsed quantities unless the acquiring agency specifically requests for them to be excluded from use.

The following information will be displayed pertaining to lapsed quantities associated with reduced, abandoned, and retired permits:

- The quantities a retired WUP has contributed to another WUP
- The quantities a WUP has received from a retired WUP
- The retired WUP that a lapsed quantity came from
- The quantities from the retired WUP available as lapsed quantities
- The WUP that a lapsed quantity went to

- Whether a WUPs quantity has been excluded from the lapsed quantity pool as a result of a land acquisition program
- The dates that any of these values took affect or changed

#### *4.2.2.19 View Use of Quantities Associated With District Projects*

This use case will be used when an actor needs to view the quantities used from District Source Augmentation Projects associated with a specific water use permit. Where applicants demonstrate compliance with all conditions for issuance except that it impacts an MFL waterbody, the applicant can apply for the source augmentation accomplished through a District water resource development project, provided that the source of supply is the same source being augmented.

#### *4.2.2.20 View Water Use Permit*

This use case will be used when an actor needs to view information about a specific water use permit. This water use permit information is collected at the time the permit is submitted and approved by the District. A water use permit is required from the District when:

- Total capacity of the permit is greater than or equal to 1 million gallons per day
- Total annual average quantities for the permit is greater than or equal to 100,000 gallons per day
- Well diameter is greater than or equal to 6 inches
- Surface water withdrawal pipe diameters are greater than or equal to 4 inches
- Cumulative well diameters greater than or equal to 6 inches, if in MIA and constructed after April 11, 1994, and is not a replacement well of same or smaller diameter of one being plugged
- If withdrawal is likely to cause significant adverse impacts to existing water or land uses, or the surrounding water resources

The actual area of the permit is digitized as a polygon into a GIS layer based on color infrared (CIR) digital orthophoto quarter quadrangles (DOQQs). The general data that is collected with the permit includes the permittee information, acreage amounts, permitted quantities, water use information, expiration date, and aquifer information. This information will be displayed to the actor, with the option to "drill-down" to get more detailed information, such as well information or actual pumpage quantities.

#### *4.2.2.21 View Water Use Permit Search*

This use case will be used when an actor needs to search for and identify a water use permit for analysis. This use case, as well as the View Map Use Case, is considered among the class of Find use cases. A Find use case provides the capability to identify, locate, and access information within the WUT System, as it pertains to a water use permit. The View Water Use Permit Search use case enables the actor to efficiently and effectively search for and identify permits that meet a given search criteria. The system returns basic information about the permit with the ability to get more detailed information regarding the permit (i.e., wells, Net Benefits, compliance data). This use case is used in support of the View Water Use Permit Use Case.

#### *4.2.2.22 View Water Withdrawal Credit*

This use case will be used when an actor needs to view water withdrawal credit information associated with a specific water use permit. A water withdrawal credit is an incentive for an applicant to provide other water use permit holders with alternative supplies. The holder of the credits can use them to provide a Net Benefit in order to obtain water from an MFL waterbody because the overall impact will be an improvement. The applicant (Supplier) provides an alternative supply to offset actual withdrawals from an existing permit holder (Receiver). The credit is 50% of the offset amount. The discontinued quantities are placed in a standby permit and are given back to the Receiver in the event the Supplier ever stops providing the alternative source, essentially giving the Receiver their original quantity back.

The following information will be displayed pertaining to the water withdrawal credits for a WUP:

- The offset quantity coming from an alternative source
- Where the alternative source coming from
- The Supplier of the alternative source
- The Receiver of the alternative source
- The distribution of the credit (50% of the offset) between the Supplier and Receiver
- The discontinued quantities to be stored in a standby permit
- The dates that any of these values took affect or changed

#### *4.2.2.23 View Well Construction Information*

This use case will be used when an actor needs to view well construction information that is associated with a specific water use permit. Well construction information is gathered during the construction and permitting of the wells. This information includes well depth, casing depth, well diameter, status code, drilling method, and completion date. When a well also requires a Water Use Permit, some of this information is entered in both the Well Construction database and the Water Use Permit Well database. The two tables are loosely linked. When the Water Use Permit and well number are entered into the Well Construction database, a link is created to that permit in the Water Use Permit Well database. The actual information in the table is not updated, but another page of well construction information (well construction number, completion date, diameter, total and case depth, and well status) is available to view, but only on the specified revision. The well completion information in the Well Construction database is considered to supersede the WUP Well information, which can contain estimated data. Depth information is important in determining what aquifer a well is pumping water from so the drawdown impacts for new water use can be calculated accurately.

#### *4.2.2.24 View Withdrawal Pumpage Information*

This use case will be used when an actor needs to view withdrawal pumpage information associated with a specific water use permit. Pumpage data is collected at certain wells and estimated for others based on several categories of water and land use. Most pumpage data is collected on a monthly basis, either through a permittee submittal or a utility company meter reading. Based on these actual values, other wells that are not metered can be estimated. Permittees submit their readings by mail, e-mail, or the Internet. The older permits are required

to submit actual pumpage values, while new permits submit the meter readings that are then used to calculate the actual pumpage amount.

### 4.2.3 WUT Supplementary Specification

The WUT Supplementary Specification will organize all non-functional requirements into the following qualitative categories:

- Usability
- Reliability
- Performance
- Supportability

For each category within the supplementary specification, the following information will be provided:

#### *Non-Functional Requirement Category*

The name of the non-functional requirement category

#### *Non-Functional Requirement Category Definition*

For each qualitative systems requirements category, a definition of the category will be provided. For each general systems requirements category, an overview of the category will be provided.

#### *Non-Functional Requirements*

A matrix of all non-functional requirements identified to date for the WUT Project in the form of a statement and organized by category. Similar to the Requirements Traceability Matrix, the following will be provided for each non-functional requirement:

- *Req ID* – A unique identifier for each non-functional requirement
- *Requirement Statement* – Individual WUT non-functional requirements statements expressed as a request.

##### 4.2.3.1 Usability

Usability is defined as the ease with which a user can learn to operate, prepare inputs for, and interpret outputs of a system or component.

<b>Req #</b>	<b>Requirement Statement</b>
EW15	Need quick access to currently published information to base decisions on.
EW17	Replicate the DB2 data daily in Oracle.
EW22	Support consistency in decision-making among various users.
RW12	Hire a metadata librarian to manage data associated with the Water Use Tracking project.
RW26b	The value you enter should be the actual data value, not any code number associated with it.
RW35	Have consistent way to report on permit status and withdrawal status.
RW43	Develop and make readily accessible metadata for the data (i.e. need to know the time frames when the data is considered to be good).



Req #	Requirement Statement
SW10	System has to be user-friendly.
SW12	Ability to customize queries.
SW2	A process needs to be established so corrections to the source data sets can be initiated, i.e. when errors are discovered when running models.
SW23	The same datasets need to be used by all departments or sections of the District.
SW27	Need to receive job-specific training and support.
SW7	The data has to be available in real time.
TW17	Clear documentation that lends to the defensibility of system for when permits are denied or modified.
TW18	Clear documentation that lends to the defensibility of system for when permits are denied or modified.
TW19	Could have wizards to help users perform tasks.
TW20	Have a decision tree for the help desk personnel that will receive questions.
TW27	Clear hours of availability need to be established.
TW3	System has to have the flexibility to handle different scenarios, or "what-if" questions, or 1-10,2-10, and 5-10 drought events.
TW31	Need on-line help and training.
TW32	Need training material for in-house training.
TW35	Need to be able to save (or download) the results of queries into an outside system.
TW7	Has to manage the metadata, and metadata has to be FGDC compliant.

#### 4.2.3.2 Reliability

Reliability is defined as the ability of a system or component to perform its required functions under stated conditions for a specified period of time.

Req #	Requirement Statement
EW18	Update interval protocols for updating different data types.
RW17	Populate missing data in the database, especially permits and pumpage reports.
SW1	The results from queries need to be consistent and reliable over time.
SW14	The tools the system will use to access the data need to be better than what is available now.
SW8	The data has to be accurate.

#### 4.2.3.3 Performance

Performance is defined as the degree to which a device or system fulfills its specifications.

Req #	Requirement Statement
EW3	Application must fit into statutory time frames for evaluating permitting applications, so there must be a quick turn-around time.
TW28	Reasonable refresh rates.
TW30	Need to establish response rates if it will be on a web page.

#### 4.2.3.4 Supportability – Definition

Supportability is defined as the ability of the system to be supported by the resources required for specific maintenance tasks. For large complex systems, supportability considerations will be significant and will have a major impact upon the total life cycle cost. It is therefore particularly important that the appropriate level of supportability is determined in relation to other system characteristics and cost.

<b>Req #</b>	<b>Requirement Statement</b>
SW13	Data to support requirements must exist in the database, and be readily available.
TW21	Get compilable versions of code stored in SourceSafe.
TW22	Do not use SDE log files.
TW23	Be consistent in naming and terminology conventions.
TW24	A web application is preferred. If ArcMap, has to be able to run in Citrix ArcView.
TW25	If toolbars are written, must be in .dll format.
TW26	Consider the ease of deployment of application.
TW29	Can extend the current District architecture, i.e. Oracle Spatial, if needed.
TW33	Need technical documentation for maintainability.
TW34	Follow District change management standards.
TW36	Do not join features based on the shape column.
TW5	System should be written in map.net – either VB or C#.
TW6	Follow District programming standards.

## **Appendix A – Use Cases**

1. Process Database Replication
2. Process WUT System Startup
3. View Map
4. View Report
5. View Water Use Permit
6. View Water Use Permit Search