Draft Technical Memo

To: Laura Foglia and Tom Grovhoug

From: Irene Ramirez and Christian Petersen

Date: December 24, 2018

Re: Data Management Plan for Development of the Ukiah Basin Groundwater Sustainability Plan, GEI Project No. 1804400

To: Laura Foglia and Tom Grovhoug

Introduction

The purpose of the Data Management Plan (Plan) is to guide the selection of a Data Management System (DMS) and in the collection, review and uploading of data used to develop a Groundwater Sustainability Plan (GSP) for the Ukiah Basin. This Plan documents the work that will be completed by the LWA/ GEI consulting team.

A needs assessment was completed to determine the type of data and information required to complete the GSP, to seek input for consideration in designing the data management system, and to establish the goals of the Ukiah Valley Groundwater Basin (UVB) DMS. The intent of this document is to provide guidance on the approach and process to efficiently develop and populate the DMS.

The Plan will now serve as guidance for the collection and management of groundwater and surface water information required for GSP development and will be used as part of the continued reporting during the GSP implementation phase. This Plan also presents a long-term strategy for building and expanding the size and functionality of the DMS.

SGMA Requirements

The SGMA regulations (California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2) give broad requirements on data management, stating that a GSP must follow the following guidelines for a DMS:

- Article 3, Section 352.6: Each Agency shall ***develop*** and ***maintain*** a **data management system** that is capable of ***storing*** and ***reporting*** information relevant to the development or implementation of the Plan and monitoring of the basin. Also, must have clear identification of all monitoring sites and description of the QA/ QC checks performed on the data.
- Article 5, Section 354.40: ***Monitoring data*** shall be ***stored*** in the ***data management system*** developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.
- ***Well information*** used to develop the basin setting shall be ***maintained*** in the Agency's ***data management system***

In summary, to comply with SGMA, the Groundwater Sustainability Agency will need to create a DMS that stores groundwater basin information and reports monitoring data. The data being stored in the DMS must have a clear unique identifier and QA/QC must be performed on the data.

Data Management During GSP Development

During the development of the GSP, the DMS will be populated with data used to support the completion of the GSP. This section describes an overview of what the LWA/GEI team understands to be the types of data and information needed to develop the Ukiah Valley Basin GSP. The specific data needed to populate the DMS are shown in **Table 1**.

Data Needs

The table below illustrates the datasets that are publicly accessible or available from the Mendocino County and will be used in populating the DMS. Other data that will populate the database is point locations that may not have a relationship to the well. This data may include precipitation, landuse, and surface water data.

Table 1. Datasets Available for Use in Populating the Ukiah Valley Basin DMS

Data Sets	Data Category							
	Well and site info	Well construction	Aquifer properties and lithology	Water level	Pumping	Recharge	Diversion	Water quality
DWR (CASGEM)	X	X		X				
DWR (Well Logs)*	X	X	X					
DWR (CDEC)							X	X
Mendocino County	X	X		X			X	
Geotracker GAMA	X							X
USGS	X	X		X				X
Irrigated Lands Program								X
Participating Districts	X	X	X	X	X	X	X	X

**Well log information will be entered for selected wells, as-needed to satisfy the requirements of the SGMA regulations.*

During the development of the GSP by the client team and project stakeholders, access to data through the DMS will be required for completion of several chapters and sections. The GSP sections that will need the data listed in **Table 1** are as follows: Overview of the Plan Area, Hydrogeologic Conceptual Model, Overview of Existing Monitoring Programs, Groundwater Elevation and Flow Conditions, Ukiah Subbasin Water Budget, Groundwater Quality Conditions, Land Surface Subsidence, Interconnected Surface Water, Groundwater Dependent Ecosystems, and Conditions as of January 1,2015, the date when SGMA went into effect.

Data Design

The proposed DMS data structure design is shown in **Appendix E**. The figure contains an entity relationship diagram (ERD) of the DMS. The ERD is a graphical representation of the different tables to be included in the data system. The ERD is color coordinated to show the relationship between tables:

- **Blue Tables –** Main tables that include point data with a unique identification and unique point location to be added to database (e.g. Well_Info and Site Info)
- **Green Tables** – Are related to the main table and hold additional details about the well or unique identifier (e.g. correlation of a well point with water level or water quality)
- **Orange Tables** – Lookup tables that contain the unique values for specific data columns that can be used as filters when data needs to be queried (e.g. Season_LU and Principal_Aquifer_LU)

A breif desription of the main and sub tables in the ERD is listed below. Figure 1, also has all the tables that are currently in the Microsoft Access Database and the tables that will be added. A more detailed description of each column in each table can be found in **Appendix B** .

- **Well_Info** - Contains general information about well, including identifiers used by various agencies.
- **Site_Info** - Contains site information about a well, recharge site, or diversion, including location, elevation, and address information
- **Well_Constr** - Contains well construction information, including depth, diameter, etc.
- **Well_Constr_Screen**- Supplements Well_Constr with well screen information. One well can have many screens.
- **Well_Geologic_Aquifer** - Contains information about the aquifer parameters of the well such as pumping test information, confinement, and transmissivity.
- **Well_Geologic_Lithology** - Lithologic information at a well site. Each well may have many lithologies at different depths.
- **Water_Level** - Water level measurements for wells
- **Well_Pumping** - Pumping measurements for wells, annual or monthly
- **SW_Recharge** - Recharge measurements for a recharge site, annual or monthly
- **SW_Diversion** - Diversion volume measurements for a diversion site, annual or monthly
- **Water_Quality** - Contains water quality data for wells or any other type of site

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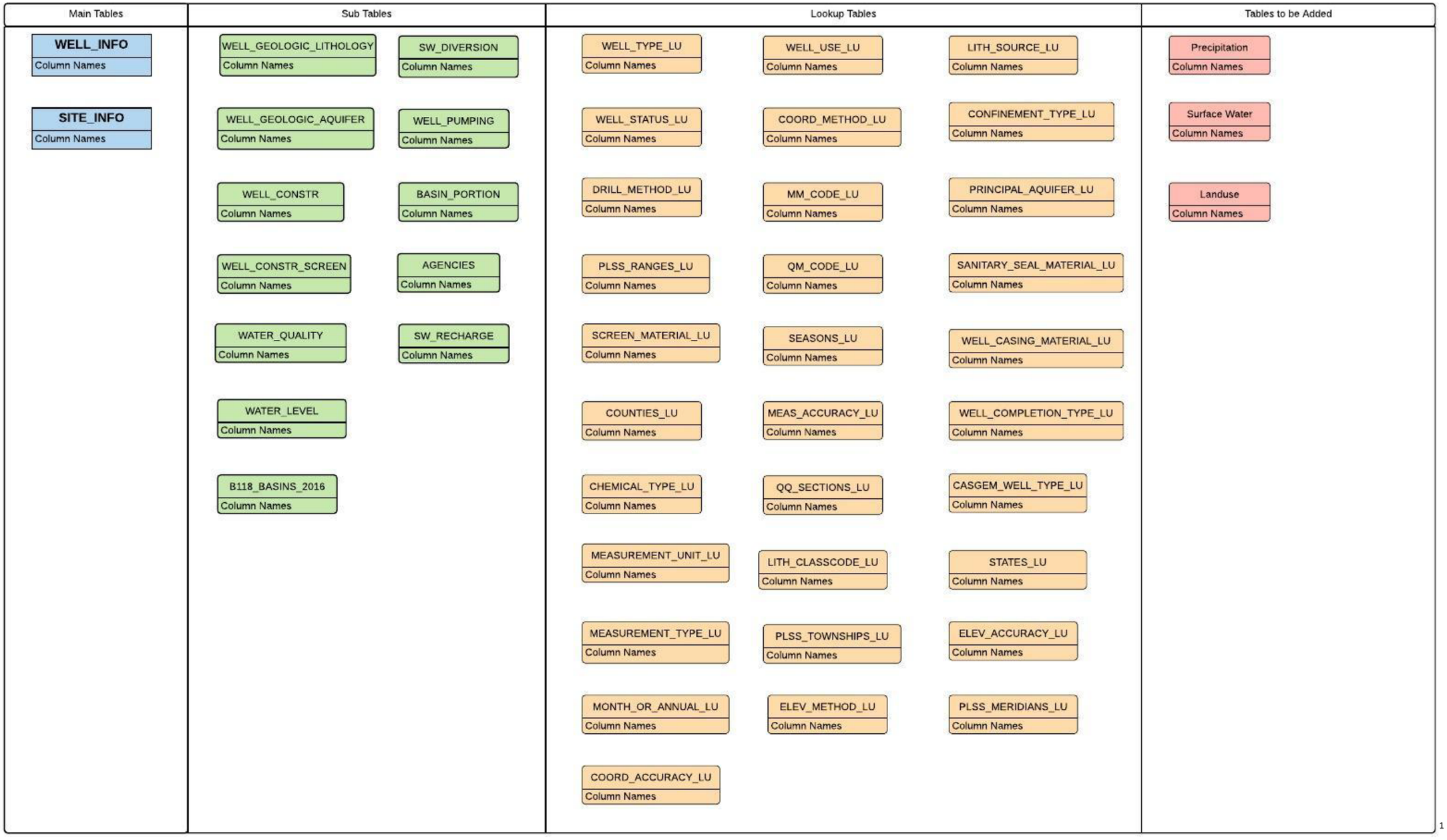

Figure 1. Tables in the Ukiah Valley Basin DMS

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Data Compilation and Review

As data is being compiled, it will follow the generalized workflow shown in **Figure 2**. The LWA/GEI team will obtain data from a wide variety of sources and compile into excel files that will be organized into a formatted data template that can then be processed through the Access Microsoft code. Before the data is processed into the Access database, a data review process will occur to make sure the data being uploaded into the database attains data quality objectives. After the data is prepared it will be pulled into the database by LWA/ GEI team using the VBA access code. The goal of the Access Microsoft Data Management System is to centralize all data listed in **Table 1** for Ukiah Valley Basin. Each step in the data process shown on **Figure 2** is described below.

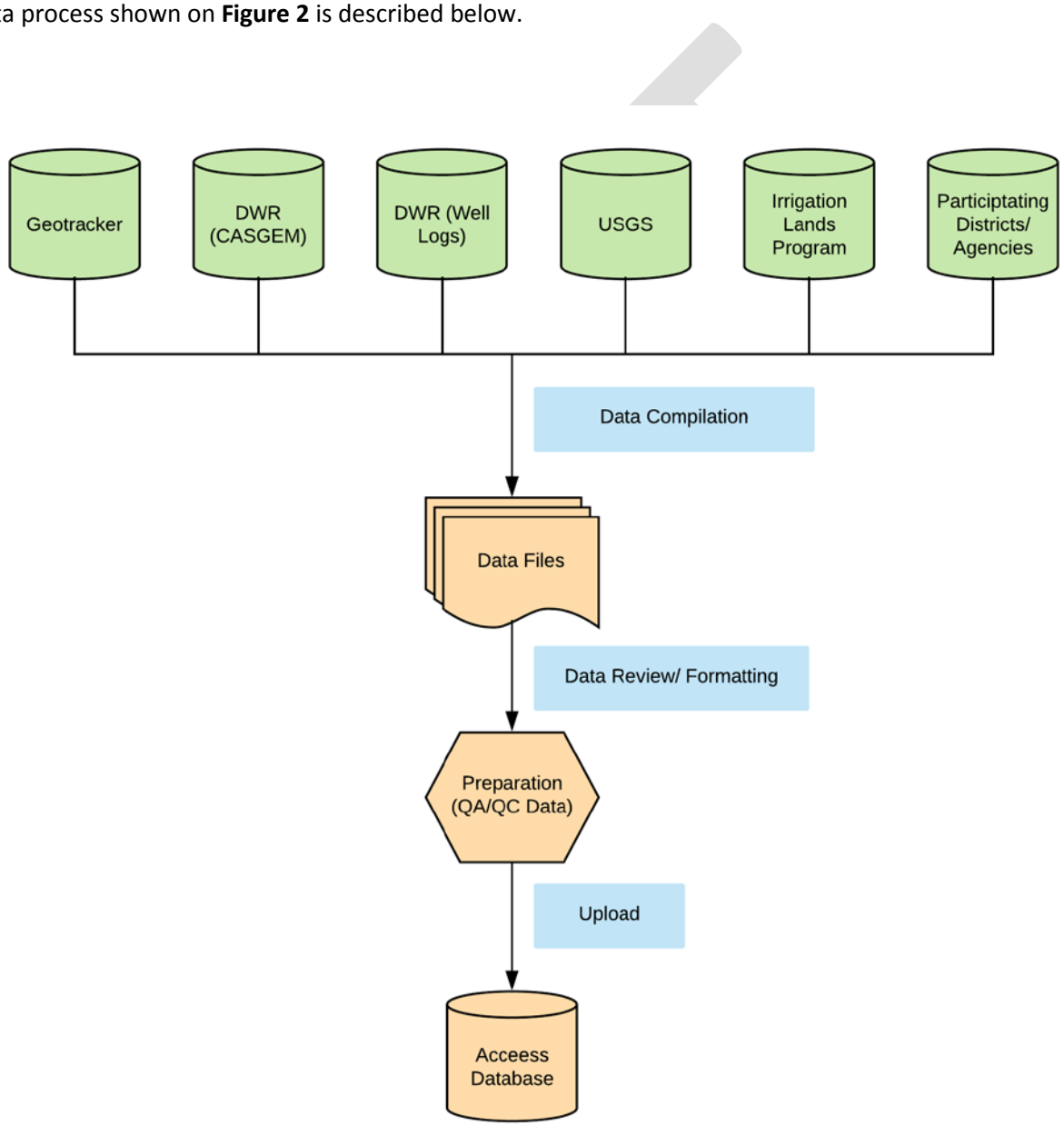

Figure 2. Data Process

Data Compilation

LWA has compiled some data (**Appendix A**) already and portions of the data will be used to populate the Access database. The data that LWA has gathered is in a GIS database and the other data being compiled are coming from webpages, so the data will be exported as excel files for simplicity. For efficiency and operational flexibility, the data will be exported or converted to excel files (e.g. xlsx or csv). GEI will obtain additional Ukiah Basin data from larger databases as displayed in **Figure 2**.

During completion of the GSP, the LWA/GEI team anticipates continuing to identify and obtain additional data that will benefit the GSP, so this collection process may continue through completion of the Draft GSP.

Data Review

The complied data will be reviewed before it is migrated into the Access database. The review process will be a thorough preliminary evaluation of the data. The team's data review process will be focused and limited in scope during the development of the Draft GSP. It will include the following checks:

- Identifying outliers that may have been introduced during the original data entry process by others.
- GEI will remove or flag questionable data being uploaded in the DMS. This applies to historic water level data, water quality data, and water level over time.
- Visualization of data in various software platforms outside the DMS will be used to further assess the quality of data before uploading.

After the data is imported into the Access DMS, the user can check the error tables to see if any errors occurred during the import process. The error tables that currently exist in the access database is water level and/ or well construction data. **Figure 3** has a few examples of how the errors appear in the database.

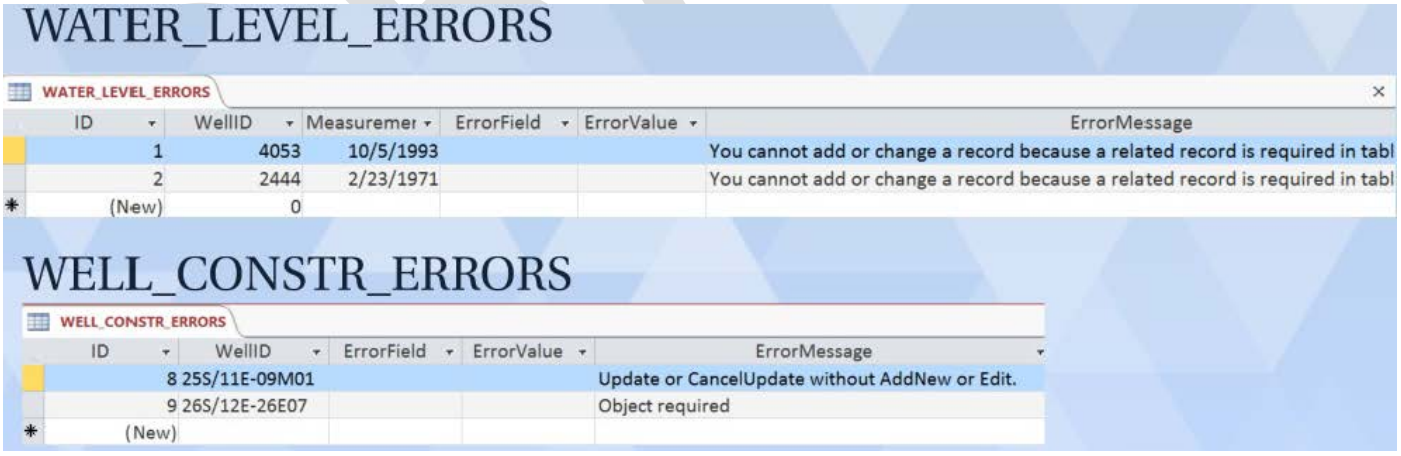

Figure 3. Error Handling in DMS

Data Upload/ Import

Following data compilation and review, GEI will organize the data into interim spreadsheets, that are QA/QC'ed and then uploaded into Access Database. The data will be uploaded into the Access Database using templates that are similar to the tables in the database. During the Upload process, GEI will utilize

upload tools, some of which are referenced in **Appendix C**. **Appendix D** provides a diagram of how GEI's data analyst will logically work through each row of data in the excel files. Note that each process shown depends on the type of data being imported.

Data Management System Selection

Desktop Application

Microsoft Access will serve as the primary software platform for the DMS, allowing users to query and export data. Microsoft Excel will be used for populating and updating the DMS and for exporting data to users.

Because the DMS will have a wide range of users, including water agency staff and their consultants, Excel and Access were chosen as platforms as these tools are widely used and do not require specialized programming skills. It should be noted that the Access platform does have limitations, particularly with respect to the ability to build web-based functionality. However, at this stage of GSP development, web-based functionality is not essential, and the DMS can be migrated in the future to a software platform that supports web-based functionality should the need arise.

A second limitation of an Access-based DMS is that Microsoft Access does not have a robust ability to reconcile data when multiple copies of a database are modified independently and recombined. Initially, this limitation will not be important because the DMS will be housed on GEI's internal network, accessible by GEI staff. When the DMS is transferred to a locally-managed network, procedures for access and use of the DMS by staff at participating agencies will be developed together with protocols for backing up the DMS and for secure password protection.

The rational is that the Microsoft desktop application is the best fit given the schedule and budget available for development of this initial GSP. There will also be password protection levels placed on the database to restrict certain users from editing the data and/or code. The LWA/GEI team will have developer rights, with full access to the database. This access capability can be transferred to the Mendocino County when the desktop application is ready to be passed along.

Web Tool Application – Considerations during SGMA implementation for 2022-2042

An Oracle database could be served as a secondary software platform for the DMS allowing users to view the data from web interface. Microsoft Access and/or excel spreadsheets would be used to help populate the DMS.

The benefits of having the DMS in Oracle is the possibility to host the data on a web page. The data can be set up with a GIS interface which can help with the GSP implementation and long-term monitoring. The limitations to an Oracle database is that it would have to be maintained by someone who has special programming skills. Another limitation is that the data would have to be displayed in a specific manner on the webpage to extract the data and can't be easily extracted by selecting to download all the data.

Schedule

In February 2019, the LWA/GEI team will present and discuss the Data Management Plan with the Technical Advisory Committee (TAC). During this meeting, we hope to reach agreement with the TAC on the DMS Plan and use of software as described herein. Completion of the DMS is planned for the end of 2019.

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Attachment A - Data Field Descriptions

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Data	Format	Time Period	Number	Source	Comments
Streams	Shapefile				Received from Sarah. We can also download from state and federal databases in case.
Springs	Shapefile				Received form Sarah.
Water bodies	Shapefile				Received from Sarah. We can also download from state and federal databases in case.
Streamflow Measurements (gages)	CSV-Shapefile	1991-2015	7 (3 inside UVB)	USGS	We can download data and we already have for five of them
Precipitation		Varies	8 (Daily*)	NOAA	Received from Sarah. We can download (Samira has already) from state and federal databases in case.
Precipitation			1 (Hourly)	CIMIS	Received from Sarah. We can download (Samira has already) from state and federal databases in case.
Precipitation			2 (*)	CDEC	Received from Sarah. We can download (Samira has already) from state and federal databases in case.
Land Use	Shapefile	2010	1	DWR	
Land Use	Shapefile	2014	1	SGMA Portal LU Viewer	
Land Use	Shapefile	2011	1	Sarah (NLCD)	Received from Sarah
Land Use	Shapefile	2011	1	Sarah	Received from Sarah. Mendocino County Vector Shapefile. We don't know what year it is. Probably what LACO used.
Geology	Shapefile				Received from Sarah
Elevation (DEM)	Raters Lidar	2017		USGS	We have to download
Elevation (DEM)					Sarah shared NED for UVB area with 30m resolution
Wells	Shapefile		48	CASGEM	We have the map of the 42 wells. We should download the data from database
Wells	Shapefile		436	GeoTracker	We have the map of the 436 wells. We should download the data from database. It's going to take some time if we can't get it from Sarah.

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Data	Format	Time Period	Number	Source	Comments
Soil	Map/CSV		1	DWR/SSURGO	Received from Sarah. We can also download from state and federal databases in case. What Sarah shared does not seem to be local.
Geologic Cross Sections	Maps		3	LACO Prelim Studies	3 cross sections we don't have the maps.
Land Use	Excel Files	1991-2015	*	UC Davis 2017	Haven't received it yet, it is in the 2017 Masters Thesis.
Streamflow Measurements (gages)			4	NFSM	Missing timeseries data. Shapefile was not shared but LACO has a figure
Streamflow Measurements (gages)			3	CLSI	Missing timeseries data. Have the shapefile and location.
Wells					IHCM Appendix includes some of them.
Wells					
River Bed Properties					We have some info from MODLFOW file and the LACO Water Budget study, we won't be probably getting much data in this sense.

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Attachment B – Access DMS Field Description

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Attachment C - Data Upload/ Import

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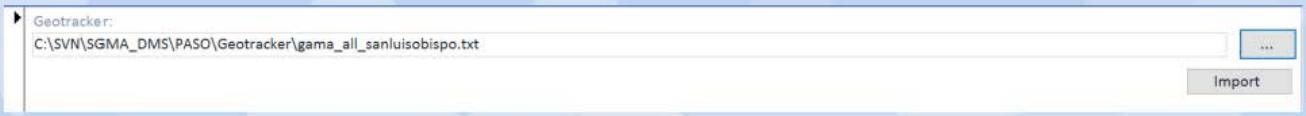
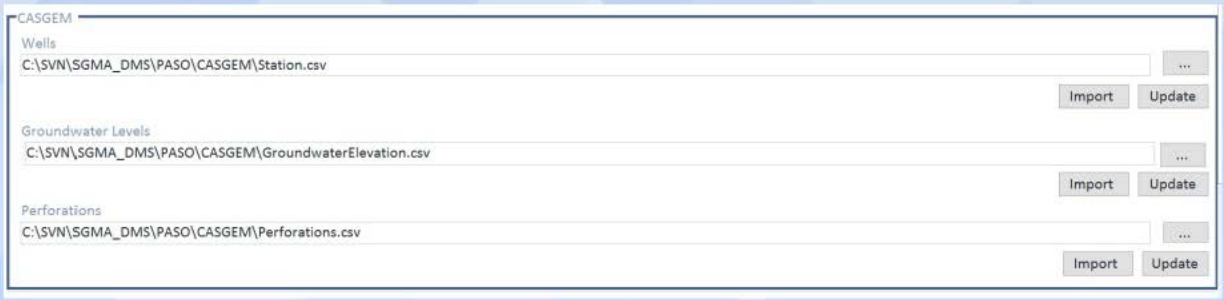
How to Import GeoTracker Data

- Go to GeoTrackers web page and download text file:
  http://geotracker.waterboards.ca.gov/gama/datadownload
- Import/ update the data into the DMS
  - Well Info, Site Info, and Water Quality Table



How to Import CASGEM Data

- Go to CASGEM web page and download csv file
  https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer
- Import/Update the data into the DMS
  - Well Info, Site Info, Water Level, Well Construction, Well Construction Screen Table
- Import vs Update
  - Imports into a temporary table
  - Updates the DMS with data in temporary table
    - Checks for duplicates
    - Erroneous data



How to Import Client Data
• All files being imported must:
• Adhere to template
• Be in csv format
• Import/Update the data into the DMS
• Well Info, Site Info, Water Level, Well Construction, Well Construction Screen Table
• Import vs Update
• Imports into a temporary table
• Updates the DMS with data in temporary table
• Checks for duplicates
• Erroneous data
Client Data
Well and Site Info
C:\SVN\SGMA_DMS\PASO\Client\Public_Data.xlsx
...
Import
Water Levels
C:\SVN\SGMA_DMS\PASO\Client\CSV_Access_Use\Test_WL.csv
...
Import
Update
Well Construction
C:\SVN\SGMA_DMS\PASO\Client\CSV_Access_Use\Test_WellConstr.csv
...
Import
Update
Well Construction Screen
C:\SVN\SGMA_DMS\PASO\Client\CSV_Access_Use\Test_WellConstrScr.csv
...
Import
Update

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Appendix D – Access Database Logic Diagram for CASGEM and Geotracker

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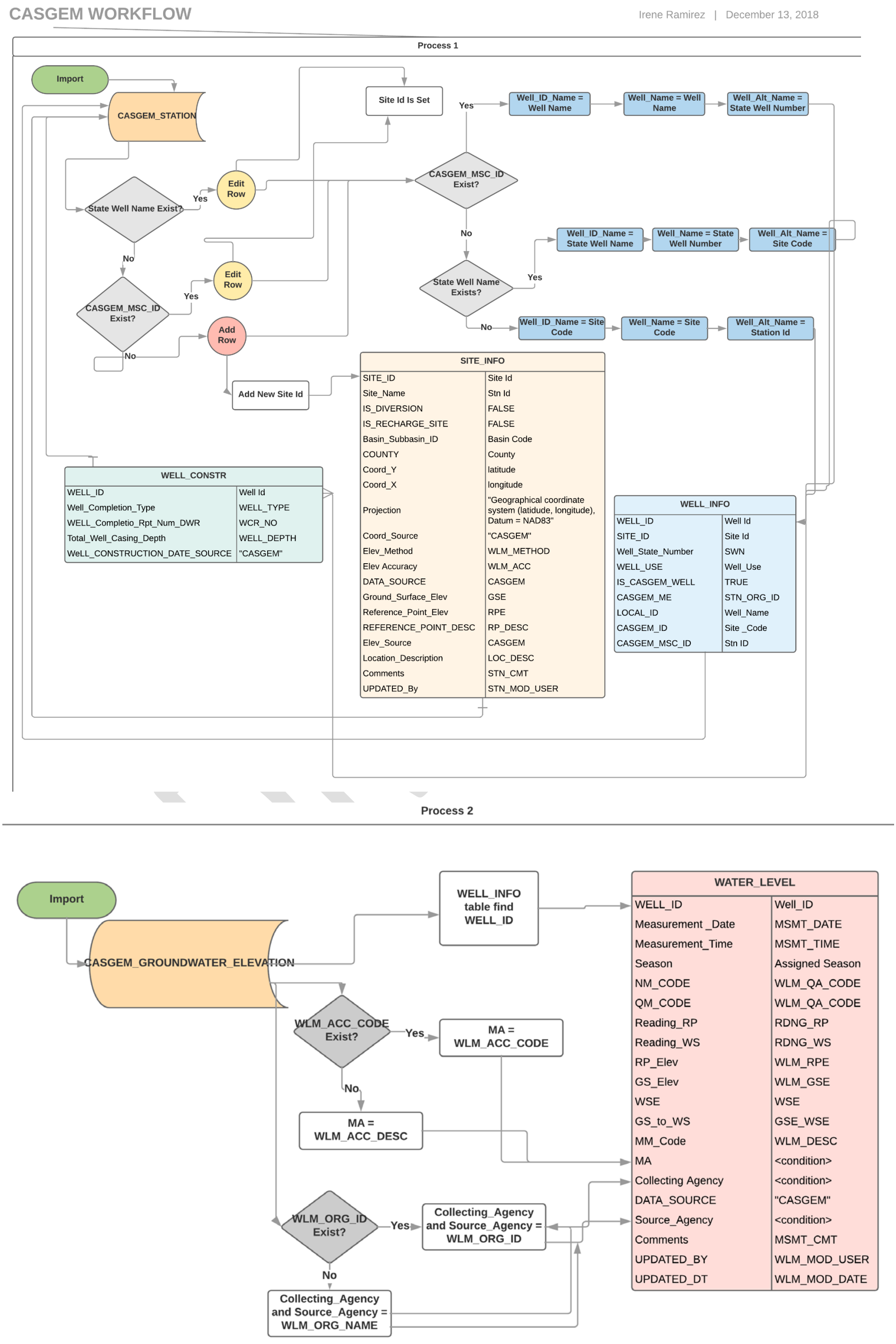
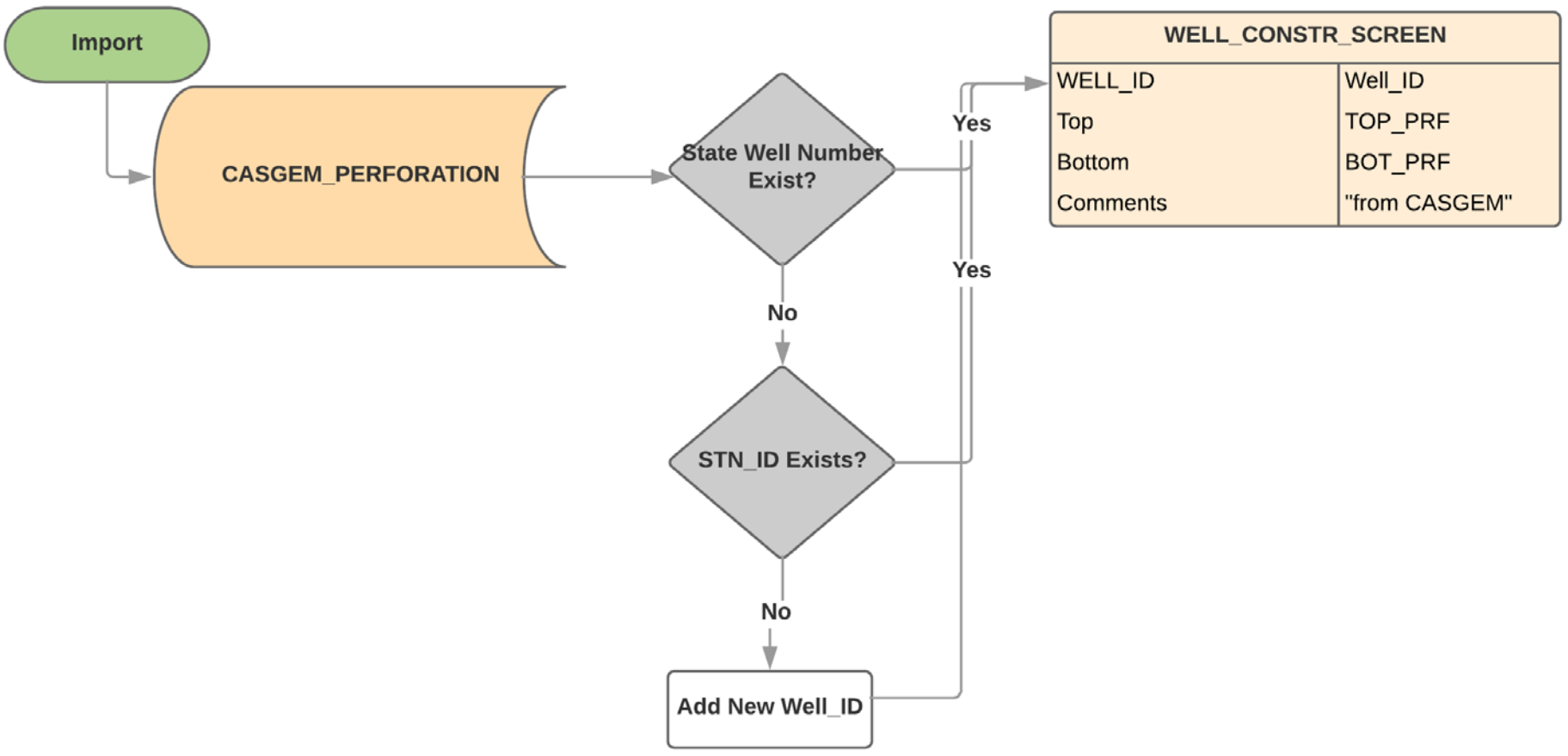

CASGEM WORKFLOW
Irene Ramirez | December 13, 2018
Process 1
Import
CASGEM_STATION
State Well Name Exist?
Yes
Edit Row
No
CASGEM_MSC_ID Exist?
Yes
Edit Row
No
Add Row
Add New Site Id
Site Id Is Set
Yes
Well_ID_Name = Well Name
Well_Name = Well Name
Well_Alt_Name = State Well Number
CASGEM_MSC_ID Exist?
No
State Well Name Exists?
Yes
Well_ID_Name = State Well Name
Well_Name = State Well Number
Well_Alt_Name = Site Code
No
Well_ID_Name = Site Code
Well_Name = Site Code
Well_Alt_Name = Station Id
SITE_INFO
SITE_ID | Site Id
Site_Name | Stn Id
IS_DIVERSION | FALSE
IS_RECHARGE_SITE | FALSE
Basin_Subbasin_ID | Basin Code
COUNTY | County
Coord_Y | latitude
Coord_X | longitude
Projection | "Geographical coordinate system (latidude, longitude), Datum = NAD83"
Coord_Source | "CASGEM"
Elev_Method | WLM_METHOD
Elev Accuracy | WLM_ACC
DATA_SOURCE | CASGEM
Ground_Surface_Elev | GSE
Reference_Point_Elev | RPE
REFERENCE_POINT_DESC | RP_DESC
Elev_Source | CASGEM
Location_Description | LOC_DESC
Comments | STN_CMT
UPDATED_By | STN_MOD_USER
WELL_CONSTR
WELL_ID | Well Id
Well_Completion_Type | WELL_TYPE
WELL_Completio_Rpt_Num_DWR | WCR_NO
Total_Well_Casing_Depth | WELL_DEPTH
WeLL_CONSTRUCTION_DATE_SOURCE | "CASGEM"
WELL_INFO
WELL_ID | Well Id
SITE_ID | Site Id
Well_State_Number | SWN
WELL_USE | Well_Use
IS_CASGEM_WELL | TRUE
CASGEM_ME | STN_ORG_ID
LOCAL_ID | Well_Name
CASGEM_ID | Site _Code
CASGEM_MSC_ID | Stn ID
Process 2
Import
CASGEM_GROUNDWATER_ELEVATION
WELL_INFO table find WELL_ID
WLM_ACC_CODE Exist?
Yes
MA = WLM_ACC_CODE
No
MA = WLM_ACC_DESC
WLM_ORG_ID Exist?
Yes
Collecting_Agency and Source_Agency = WLM_ORG_ID
No
Collecting_Agency and Source_Agency = WLM_ORG_NAME
WATER_LEVEL
WELL_ID | Well_ID
Measurement _Date | MSMT_DATE
Measurement_Time | MSMT_TIME
Season | Assigned Season
NM_CODE | WLM_QA_CODE
QM_CODE | WLM_QA_CODE
Reading_RP | RDNG_RP
Reading_WS | RDNG_WS
RP_Elev | WLM_RPE
GS_Elev | WLM_GSE
WSE | WSE
GS_to_WS | GSE_WSE
MM_Code | WLM_DESC
MA | <condition>
Collecting Agency | <condition>
DATA_SOURCE | "CASGEM"
Source_Agency | <condition>
Comments | MSMT_CMT
UPDATED_BY | WLM_MOD_USER
UPDATED_DT | WLM_MOD_DATE

Process 3



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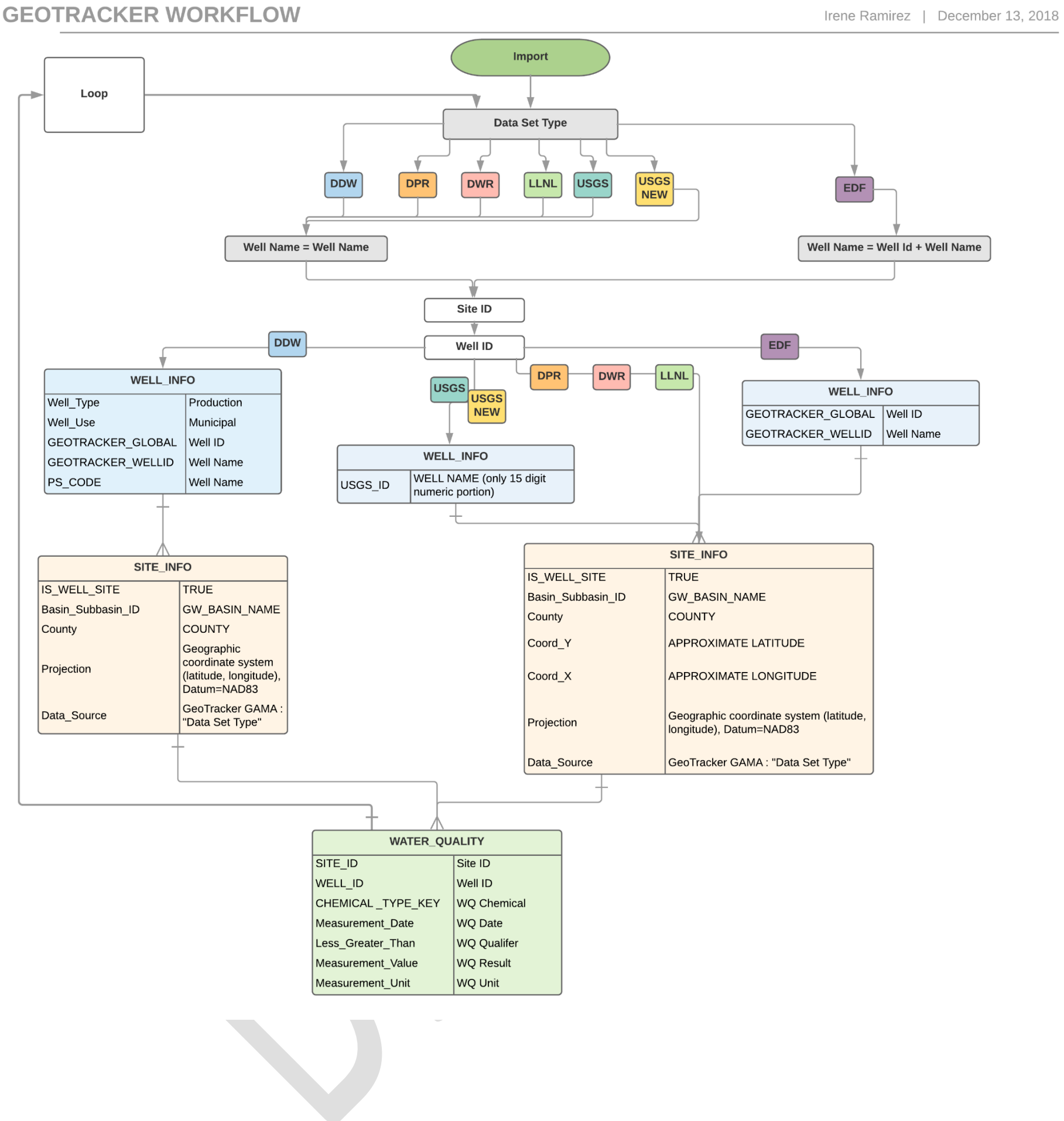
GEOTRACKER WORKFLOW
Irene Ramirez | December 13, 2018
Import
Loop
Data Set Type
DDW
DPR
DWR
LLNL
USGS
USGS NEW
EDF
Well Name = Well Name
Well Name = Well Id + Well Name
Site ID
DDW
Well ID
EDF
DPR
DWR
LLNL
USGS
USGS NEW
WELL_INFO
Well_Type Production
Well_Use Municipal
GEOTRACKER_GLOBAL Well ID
GEOTRACKER_WELLID Well Name
PS_CODE Well Name
WELL_INFO
USGS_ID WELL NAME (only 15 digit numeric portion)
WELL_INFO
GEOTRACKER_GLOBAL Well ID
GEOTRACKER_WELLID Well Name
SITE_INFO
IS_WELL_SITE TRUE
Basin_Subbasin_ID GW_BASIN_NAME
County COUNTY
Projection Geographic coordinate system (latitude, longitude), Datum=NAD83
Data_Source GeoTracker GAMA : "Data Set Type"
SITE_INFO
IS_WELL_SITE TRUE
Basin_Subbasin_ID GW_BASIN_NAME
County COUNTY
Coord_Y APPROXIMATE LATITUDE
Coord_X APPROXIMATE LONGITUDE
Projection Geographic coordinate system (latitude, longitude), Datum=NAD83
Data_Source GeoTracker GAMA : "Data Set Type"
WATER_QUALITY
SITE_ID Site ID
WELL_ID Well ID
CHEMICAL _TYPE_KEY WQ Chemical
Measurement_Date WQ Date
Less_Greater_Than WQ Qualifer
Measurement_Value WQ Result
Measurement_Unit WQ Unit

Attachment E - Entity Relationship Diagram (ERD) Proposed for the Ukiah Valley Basin DMS

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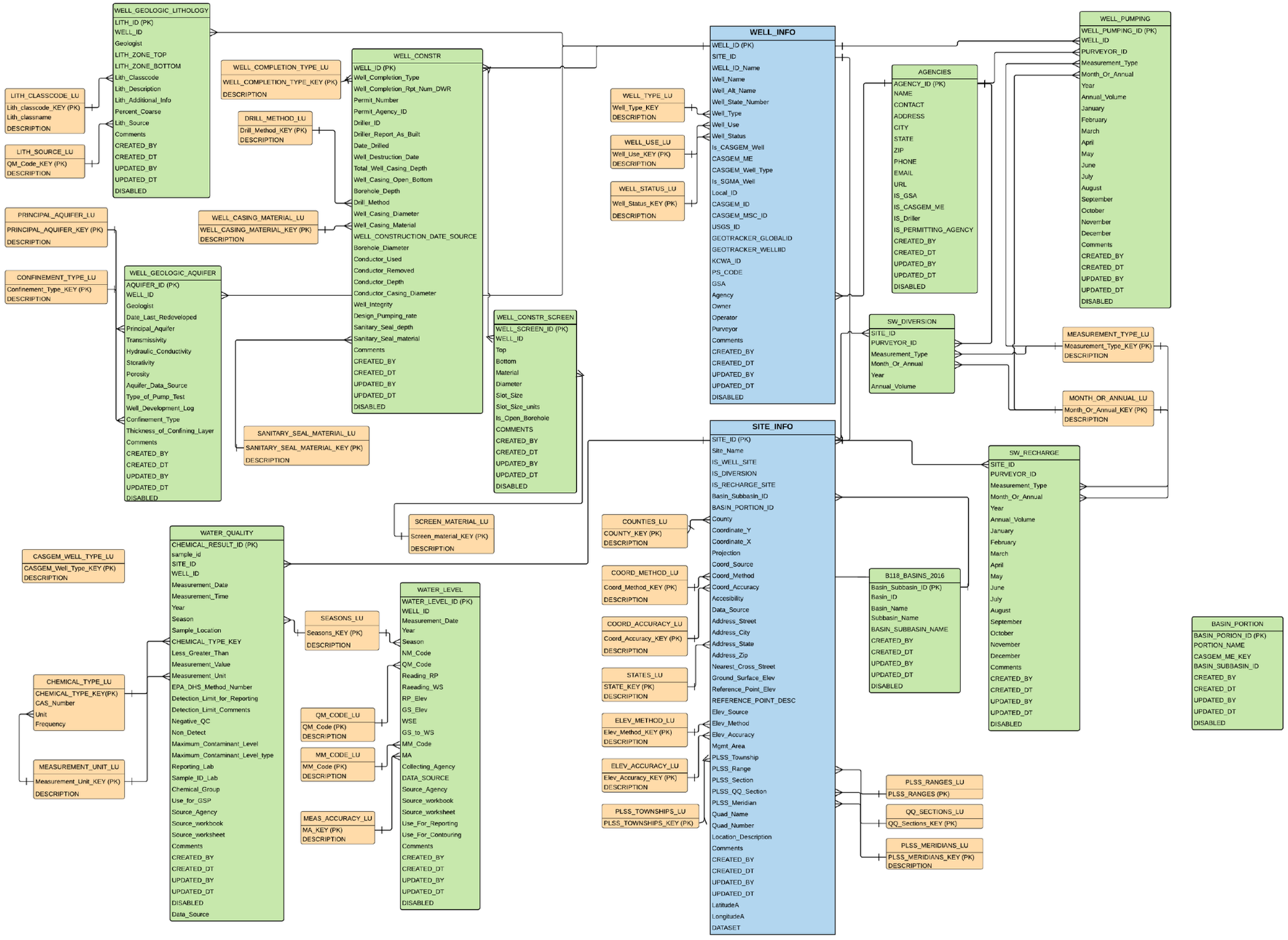
WELL_GEOLOGIC_LITHOLOGY
LITH_ID (PK)
WELL_ID
Geologist
LITH_ZONE_TOP
LITH_ZONE_BOTTOM
Lith_Classcode
Lith_Description
Lith_Additional_Info
Percent_Coarse
Lith_Source
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
LITH_CLASSCODE_LU
Lith_classcode_KEY (PK)
Lith_classname
DESCRIPTION
LITH_SOURCE_LU
QM_Code_KEY (PK)
DESCRIPTION
WELL_COMPLETION_TYPE_LU
WELL_COMPLETION_TYPE_KEY (PK)
DESCRIPTION
DRILL_METHOD_LU
Drill_Method_KEY (PK)
DESCRIPTION
WELL_CONSTR
WELL_ID (PK)
Well_Completion_Type
Well_Completion_Rpt_Num_DWR
Permit_Number
Permit_Agency_ID
Driller_ID
Driller_Report_As_Built
Date_Drilled
Well_Destruction_Date
Total_Well_Casing_Depth
Well_Casing_Open_Bottom
Borehole_Depth
Drill_Method
Well_Casing_Diameter
Well_Casing_Material
WELL_CONSTRUCTION_DATE_SOURCE
Borehole_Diameter
Conductor_Used
Conductor_Removed
Conductor_Depth
Conductor_Casing_Diameter
Well_Integrity
Design_Pumping_rate
Sanitary_Seal_depth
Sanitary_Seal_material
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
WELL_CASING_MATERIAL_LU
WELL_CASING_MATERIAL_KEY (PK)
DESCRIPTION
PRINCIPAL_AQUIFER_LU
PRINCIPAL_AQUIFER_KEY (PK)
DESCRIPTION
CONFINEMENT_TYPE_LU
Confinement_Type_KEY (PK)
DESCRIPTION
WELL_GEOLOGIC_AQUIFER
AQUIFER_ID (PK)
WELL_ID
Geologist
Date_Last_Redeveloped
Principal_Aquifer
Transmissivity
Hydraulic_Conductivity
Storativity
Porosity
Aquifer_Data_Source
Type_of_Pump_Test
Well_Development_Log
Confinement_Type
Thickness_of_Confining_Layer
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
SANITARY_SEAL_MATERIAL_LU
SANITARY_SEAL_MATERIAL_KEY (PK)
DESCRIPTION
WELL_CONSTR_SCREEN
WELL_SCREEN_ID (PK)
WELL_ID
Top
Bottom
Material
Diameter
Slot_Size
Slot_Size_units
Is_Open_Borehole
COMMENTS
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
SCREEN_MATERIAL_LU
Screen_material_KEY (PK)
DESCRIPTION
WELL_INFO
WELL_ID (PK)
SITE_ID
WELL_ID_Name
Well_Name
Well_Alt_Name
Well_State_Number
Well_Type
Well_Use
Well_Status
Is_CASGEM_Well
CASGEM_ME
CASGEM_Well_Type
Is_SGMA_Well
Local_ID
CASGEM_ID
CASGEM_MSC_ID
USGS_ID
GEOTRACKER_GLOBALID
GEOTRACKER_WELLID
KCWA_ID
PS_CODE
GSA
Agency
Owner
Operator
Purveyor
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
WELL_TYPE_LU
Well_Type_KEY
DESCRIPTION
WELL_USE_LU
Well_Use_KEY (PK)
DESCRIPTION
WELL_STATUS_LU
Well_Status_KEY (PK)
DESCRIPTION
AGENCIES
AGENCY_ID (PK)
NAME
CONTACT
ADDRESS
CITY
STATE
ZIP
PHONE
EMAIL
URL
IS_GSA
IS_CASGEM_ME
IS_Driller
IS_PERMITTING_AGENCY
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
WELL_PUMPING
WELL_PUMPING_ID (PK)
WELL_ID
PURVEYOR_ID
Measurement_Type
Month_Or_Annual
Year
Annual_Volume
January
February
March
April
May
June
July
August
September
October
November
December
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
SW_DIVERSION
SITE_ID
PURVEYOR_ID
Measurement_Type
Month_Or_Annual
Year
Annual_Volume
MEASUREMENT_TYPE_LU
Measurement_Type_KEY (PK)
DESCRIPTION
MONTH_OR_ANNUAL_LU
Month_Or_Annual_KEY (PK)
DESCRIPTION
SITE_INFO
SITE_ID (PK)
Site_Name
IS_WELL_SITE
IS_DIVERSION
IS_RECHARGE_SITE
Basin_Subbasin_ID
BASIN_PORTION_ID
County
Coordinate_Y
Coordinate_X
Projection
Coord_Source
Coord_Method
Coord_Accuracy
Accesibility
Data_Source
Address_Street
Address_City
Address_State
Address_Zip
Nearest_Cross_Street
Ground_Surface_Elev
Reference_Point_Elev
REFERENCE_POINT_DESC
Elev_Source
Elev_Method
Elev_Accuracy
Mgmt_Area
PLSS_Township
PLSS_Range
PLSS_Section
PLSS_QQ_Section
PLSS_Meridian
Quad_Name
Quad_Number
Location_Description
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
LatitudeA
LongitudeA
DATASET
SW_RECHARGE
SITE_ID
PURVEYOR_ID
Measurement_Type
Month_Or_Annual
Year
Annual_Volume
January
February
March
April
May
June
July
August
September
October
November
December
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
B118_BASINS_2016
Basin_Subbasin_ID (PK)
Basin_ID
Basin_Name
Subbasin_Name
BASIN_SUBBASIN_NAME
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
BASIN_PORTION
BASIN_PORION_ID (PK)
PORTION_NAME
CASGEM_ME_KEY
BASIN_SUBBASIN_ID
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
COUNTIES_LU
COUNTY_KEY (PK)
DESCRIPTION
COORD_METHOD_LU
Coord_Method_KEY (PK)
DESCRIPTION
COORD_ACCURACY_LU
Coord_Accuracy_KEY (PK)
DESCRIPTION
STATES_LU
STATE_KEY (PK)
DESCRIPTION
ELEV_METHOD_LU
Elev_Method_KEY (PK)
DESCRIPTION
ELEV_ACCURACY_LU
Elev_Accuracy_KEY (PK)
DESCRIPTION
PLSS_TOWNSHIPS_LU
PLSS_TOWNSHIPS_KEY (PK)
PLSS_RANGES_LU
PLSS_RANGES (PK)
QQ_SECTIONS_LU
QQ_Sections_KEY (PK)
PLSS_MERIDIANS_LU
PLSS_MERIDIANS_KEY (PK)
DESCRIPTION
WATER_QUALITY
CHEMICAL_RESULT_ID (PK)
sample_id
SITE_ID
WELL_ID
Measurement_Date
Measurement_Time
Year
Season
Sample_Location
CHEMICAL_TYPE_KEY
Less_Greater_Than
Measurement_Value
Measurement_Unit
EPA_DHS_Method_Number
Detection_Limit_for_Reporting
Detection_Limit_Comments
Negative_QC
Non_Detect
Maximum_Contaminant_Level
Maximum_Contaminant_Level_type
Reporting_Lab
Sample_ID_Lab
Chemical_Group
Use_for_GSP
Source_Agency
Source_workbook
Source_worksheet
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED
Data_Source
CASGEM_WELL_TYPE_LU
CASGEM_Well_Type_KEY (PK)
DESCRIPTION
CHEMICAL_TYPE_LU
CHEMICAL_TYPE_KEY(PK)
CAS_Number
Unit
Frequency
MEASUREMENT_UNIT_LU
Measurement_Unit_KEY (PK)
DESCRIPTION
SEASONS_LU
Seasons_KEY (PK)
DESCRIPTION
QM_CODE_LU
QM_Code (PK)
DESCRIPTION
MM_CODE_LU
MM_Code (PK)
DESCRIPTION
MEAS_ACCURACY_LU
MA_KEY (PK)
DESCRIPTION
WATER_LEVEL
WATER_LEVEL_ID (PK)
WELL_ID
Measurement_Date
Year
Season
NM_Code
QM_Code
Reading_RP
Raeading_WS
RP_Elev
GS_Elev
WSE
GS_to_WS
MM_Code
MA
Collecting_Agency
DATA_SOURCE
Source_Agency
Source_workbook
Source_worksheet
Use_For_Reporting
Use_For_Contouring
Comments
CREATED_BY
CREATED_DT
UPDATED_BY
UPDATED_DT
DISABLED