Notice and Agenda of a Board Meeting of the Yucaipa Sustainable Groundwater Management Agency

Wednesday, October 23, 2019 at 10:00 a.m.

City of Yucaipa, 34272 Yucaipa Boulevard
Yucaipa, California 92399
(909) 797-2489 | www.yucaipasgma.org

I. Call to Order

II. Roll Call

III. Introductions of Board Members and Public Participants

IV. Public Comments At this time, members of the public may address the representatives of the Yucaipa Groundwater Sustainability Agency on matters within its jurisdiction.

V. Review and Approval of Meeting Minutes

A. Meeting Minutes - September 25, 2019 [Page 3 of 59]

VI. Discussion Items

A. Presentation and Discussion of Borrego Valley GSA Data Management System
   - Discussion of Draft Data Management System Request for Proposals

B. Discussion of Data Management System Framework Design Technical Memorandum [Page 6 of 59]

C. Discussion of Data Management System Funding Options

D. Status Report and Discussion on Additional Infiltration Testing for the Yucaipa Basin

E. Status Report on the Sustainable Groundwater Management Act Grant and Financial Status

VII. Topics for Future Meetings

- Workshop - February 26, 2020
  - Development of a Water Budget for the Yucaipa Region
  - Discussion Regarding a Database Management System
  - Discussion Regarding Stream Monitoring Locations
  - Status Report on the Sustainable Groundwater Management Act Grant and Financial Status
- Workshop - March 25, 2020
  - Discuss potential recharge projects to be included in the groundwater model
- Unscheduled Future Topics
  - Discussion regarding groundwater dependent ecosystems

VIII. Comments by Board of Directors

IX. Announcements - Future Meetings

A. Wednesday, January 22, 2020 at 10:00 am - **Board Meeting**

B. *Public Meeting No. 1 - Yucaipa Performing Arts Center, 12062 California Street, Yucaipa, California - Tentatively set for February 2020*

C. Wednesday, February 26, 2020 at 10:00 am - Workshop

D. Wednesday, March 25, 2020 at 10:00 am - Workshop

X. Adjournment

Roll Call - Board of Directors

	Present	Primary Representative	Present	Alternative Representative
Purveyors				
South Mesa Water Company		David Armstrong		George Jorritsma
South Mountain Water Company		Bob Martin		Rolland Moore
Western Heights Water Company		Mark Iverson		Tim Green
Yucaipa Valley Water District		Joseph Zoba		Jennifer Ares
Municipals				
City of Redlands		Cecilia Griego		Kevin Watson
City of Yucaipa		Ray Casey		Fermin Preciado
Regionals				
San Bernardino Valley MWD		Doug Headrick		Bob Tincher
San Gorgonio Pass Water Agency		Jeff Davis		Leonard Stephenson

* Quorum of the Board of Directors requires a total of five Purveyor, Municipal, Regional Members

Stakeholders			
County of Riverside		Steve Horn	Jeff Johnson
County of San Bernardino		Bob Page	- -
City of Calimesa		Lori Askew	Bonnie Johnson

Future Dates and Milestones

The dates provided below are subject to change.

Public Presentation of the Goals and Objectives of the Groundwater Sustainability Plan - Meeting Number 1	February 2020
Distribution of the Administrative Draft of the Yucaipa SGMA Groundwater Sustainability Plan	Monday, July 20, 2020
Release of the Draft Yucaipa SGMA Groundwater Sustainability Plan for Public Comment	Monday, January 18, 2021
Final Groundwater Sustainability Plan Submitted to the Department of Water Resources for Review and Approval	Monday, May 24, 2021

MINUTES OF THE YUCAIPA SUSTAINABLE GROUNDWATER MANAGEMENT AGENCY

September 25, 2019 - 10:00 a.m.
City of Yucaipa, 34272 Yucaipa Boulevard, Yucaipa, California

---

I. Call to Order - Chairman Mark Iverson called the meeting to order at 10:00 a.m.

II. Roll Call - The following representatives, as assigned by each Party, attended the meeting:

Purveyors	Present	Primary Representative	Present	Alternative Representative
South Mesa Water Company	✓	David Armstrong		George Jorritsma
South Mountain Water Company	✓	Bob Martin	✓	Rolland Moore
Western Heights Water Company	✓	Mark Iverson	✓	Tim Green
Yucaipa Valley Water District	✓	Joseph Zoba	✓	Jennifer Ares
Municipals				
City of Redlands	✓	Cecilia Griego		Kevin Watson
City of Yucaipa		Ray Casey	✓	Fermin Preciado
Regionals				
San Bernardino Valley MWD		Doug Headrick		Bob Tincher
San Gorgonio Pass Water Agency		Jeff Davis	✓	Leonard Stephenson
Stakeholders				
County of Riverside		Steve Horn		Jeff Johnson
County of San Bernardino		Bob Page		
City of Calimesa		Lori Askew		Bonnie Johnson

A quorum of the Board of Directors was present to start the meeting.

III. Introductions of Board Members and Public Participants - In addition to the Board of Directors identified above, the following members of the public attended the meeting:

- Paul Kielhold - San Bernardino Valley Municipal Water District
- Kristine Kim - Riverside County Environmental Health
- Kathryn Hallberg - Yucaipa Valley Water District
- Matt Howard - San Bernardino Valley Municipal Water District
- Matthew Palavido - Dudek
- Steve Stuart - Dudek

IV. Public Comments – None.

V. Review and Approval of Meeting Minutes

A. Meeting Minutes - August 28, 2019

Mark Iverson moved to approve the minutes for August 28, 2019.

Leonard Stephenson seconded the motion.

South Mesa Water Company	Yes
South Mountain Water Company	Yes
Western Heights Water Company	Yes
Yucaipa Valley Water District	Yes
City of Redlands	Yes
City of Yucaipa	Yes
San Bernardino Valley MWD	- -
San Gorgonio Pass Water Agency	Yes

The motion was approved.

VI. Discussion Items

A. Development of a Water Budget for the Yucaipa Region

On September 16, 2019, Steve Stuart sent correspondence requesting information for projected growth and water demands as well as project descriptions to be included in the Groundwater Sustainability Plan. The requested data is to be transmitted to Dudek by February 28, 2020.

B. Discussion and Demonstration of a Database Management System

Matthew Palavido provided an overview of the Database Management System created for the Borrego Valley Groundwater Basin. A copy of the draft database RFP will be available for review in the near future.

C. Discussion and Update on the Proposed Construction of Stream Gaging Site(s) by the Department of Water Resources (DWR)

Matt Howard discussed three to four stream monitoring sites that will be used to record surface flows in the Yucaipa Basin area.

D. Review of Possible Sustainable Groundwater Management Act Funding Opportunities

Steve Stuart discussed funding opportunities and a proposed timeline for implementation grants.

E. Status Report on the Sustainable Groundwater Management Act Grant and Financial Status

Matt Howard provided an overview and update on the progress of the overall project and the current funding status.

VII. Topics for Future Meetings

- Board Meeting - January 22, 2021
    - Review of sustainable yield calculation
    - Review and Preparation for Public Meeting No. 1
- Workshop - February 26, 2020
    - Development of a Water Budget for the Yucaipa Region
    - Discussion Regarding a Database Management System
    - Discussion Regarding Stream Monitoring Locations
    - Status Report on the Sustainable Groundwater Management Act Grant and Financial Status
- Workshop - March 25, 2020
    - Discuss potential recharge projects to be included in the groundwater model
- Unscheduled Future Topics
    - Discussion regarding groundwater dependent ecosystems

VIII. Comments by the Board of Directors - None

IX. Announcements - The next meeting of the Yucaipa Sustainable Groundwater Management Agency will be on Wednesday, October 23, 2019 at 10:00 a.m.

X. Adjournment - The meeting was adjourned at 11:05 a.m.

605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 F 760.632.0164

DRAFT - DATA MANAGEMENT SYSTEM FRAMEWORK DESIGN TECHNICAL MEMORANDUM

To:	Yucaipa GSA
From:	Matthew Palavido, Dudek
Subject:	Yucaipa Basin GSP Data Management Plan
Date:	August 21, 2019
cc:	Steven Stuart, Dudek; Bob Tincher, SBVMWD
Attachment(s):	Exhibit 1: High Level Entity Relationship Diagram
	Exhibit 2: Entity Relationship Diagram
	Exhibit 3: Geodatabase Object Specification Sheet
	Exhibit 4: Data Flow Diagram

Dudek has developed the framework for the Data Management System (DMS) for the Yucaipa Basin Groundwater Sustainability Plan (GSP). This technical memorandum outlines the DMS structure and development methodologies. The DMS fulfills the requirements of the Sustainable Groundwater Management Act (SGMA) Chapter 6 Section 10727.2 and Section 10728 (2014) and California Code of Regulations Title 23 Article 3 § 352.4 and § 352.6.

The following paragraphs and attachments explain the database structure and detail the development process of the DMS. The workflow for the DMS consists of assessing compiled data, configuring the historical data sources for relevance and need within the DMS, inputting data into the DMS, and establishing methods for sharing data securely. The DMS is composed of historical data and allows for collection and input of future data with the ability to disseminate information in various formats. The data is stored in a Geographic Information System (GIS) relational geodatabase format. A geodatabase is a collection of spatial data, attributes or characteristics associated with the data, and any relationships that exist among them. The data is housed in a versioned ESRI Enterprise Geodatabase (GDB) and runs on the SQL Server platform (version 2016), allowing for rapid processing times, large data storage potential, web viewing capabilities, and multiple customization options for secure data dissemination.

Historical Data Input

The workflow begins with a determination of the key management wells within the Yucaipa Basin. As seen in the Data Flow Diagram (Exhibit 1), the Data Source Review Task is conducted as a step in which to sort the data by relevance for use within the DMS. Once the sorting is complete, code will be written for automated input of the historical data. Following automated input of data into the DMS, cases in which data does not follow a typical format or requires additional research or attention will be input manually as needed. A quality assurance/quality control (QA/QC) step follows the manual data input. This includes manually checking a random representative sample of the data as well as automated scripts to check for data consistency and anomalies.

Database Diagram and Architecture

The Database Diagram is representative of the DMS database architecture (Exhibit 2 and 3). The database architecture is the format in which the data is housed (e.g. groundwater levels stored as numbers). The boxes in the diagram represent specific tables within the database architecture; each box contains the table's name in the header, with a list of attribute columns below the header. This structure is further elaborated in the Specification (Spec) Sheet (Exhibit 4), which provides additional details regarding ESRI-specific conventions, data types, and configurations.

The Database Diagram also defines the relationships between tables. For example, a water well is stored as a GIS data point (i.e., consisting of a latitude and longitude coordinate). Other tables are related to this well point via relationships of One-to-One (1:1), One-to-Many (1:M), or Many-to-Many (M:M). An example 1:1 relationship is a relationship between one well and its associated construction information. An example 1:M relationship is a relationship between one well and many associated groundwater level measurements. An example M:M relationship is a relationship between wells and weather stations (i.e., a given well may be associated with any number of weather stations, and a given weather station may be associated with many wells depending on the criteria used to associate them).

As seen in the attached Database Diagram, the database tables store static well information such as well construction details, well reference point elevations, and aquifer designations. Additional data stored in database tables include data that are continuously collected, such as well production, groundwater levels, groundwater quality data, and weather station data. Weather station data are necessary to correct groundwater level data that are measured via a transducer that is configured to account for changes in the barometric pressure.

Future Data Collection

The DMS is configured for the collection of field data such as a well location or groundwater level measurement. Field data may be input during the field site visit as a GPS data point from a mobile device (i.e. iOS, Android, or Windows device), input by hand on a personal computer (e.g., transcribed from field notes), or automatically imported from specifically formatted tables via an automated procedure (e.g., from a laboratory electronic data deliverable). Future data from sources such as the Division of Drinking Water can be added to the DMS with pre-written import script(s) customized to validate and import each distinct data source.

Data Dissemination

The DMS will be viewable via Internet (any modern Web browser) and may be viewed geographically on a map viewer. The DMS is able to output data in GIS (file geodatabase) or Microsoft Excel format. Role-based access control will be used to ensure users can only see, or in some cases have the ability to edit, data they have specifically been given access to. This allows for multiple levels of access depending on the need and to whom data is made available. Future options include adding functionality to automatically output SGMA required reporting items, such as groundwater level contour maps with specific formatting.

Process for Future DMS Modifications

The Database Diagram included with this memo corresponds with the alpha version of the DMS (version 0.5.0). We understand that as applications and systems evolve, the underlying database structure and/or application design will likely need periodic updates.

To track and organize these changes over time, each subsequent release of the DMS will be associated with a version number, following a process known as semantic versioning. Under semantic versioning, three numbers are separated by periods to indicate the major release number, the minor release number, and the patch number, respectively, and can be defined as follows:

- Major release numbers (e.g., version 1.0.0, version 2.0.0) correspond to changes to the application that are paradigm shifts in structure, design and/or function. For instance, upon deploying the DMS for production use we will advance to version 1.0.0 to denote the first "stable" DMS release. An example would be a major overhaul of the existing data structures and relationships among the data.

- Minor release numbers (e.g., version 1.1.0, version 1.2.0) indicate incremental additions of useful functionality and/or other changes that are not disruptive to the system as a whole. An example of an incremental addition would be the addition of a new table or dataset, or adding additional relationships among existing data without modifying existing relationships.

- Patch numbers (e.g., version 1.1.9, version 1.1.10) represent bug fixes and/or other small updates to address issues with current functionality, without adding new functionality to the system. An example of a patch would be the addition of new values to a list of valid values for a specific field in a table.

We will use semantic versioning to track each iterative modification to the DMS, so the system may remain consistent and a history of changes may be retained.

High-Level Entity Relationship Diagram

Yucaipa Basin GSP

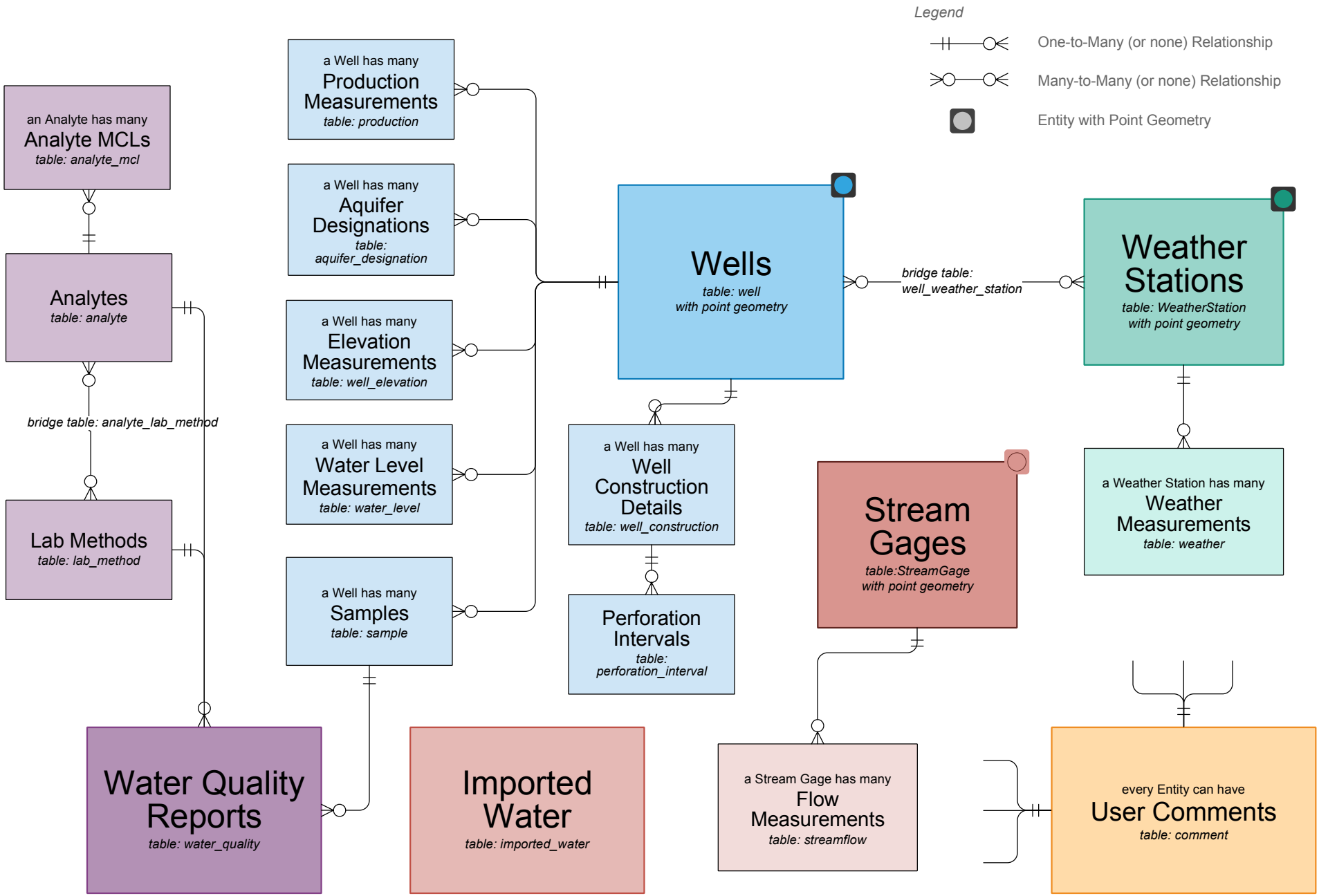


Exhibit 1

Exhibit 2


Yucaipa Basin GSP
Draft Entity Relationship Diagram (v0.5.0, rev 2019-07-30)
Well
geometry: point
perforation_interval
production
well_construction
well_weather_station
WeatherStation
geometry: point
weather
imported_water
well_elevation
water_level
aquifer_designation
water_quality
lab_method
analyte_lab_method
comment
StreamGage
geometry: point
sample
analyte_incl
analyte
streamflow

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

This database architecture specification sheet (spec sheet) outlines the specific data fields (column headers, data types, constraints, indexes, etc.) used in the Data Management System (DMS). This spec sheet is intended to supplement the Entity Relationship Diagram (ERD), providing more commentary and ESRI-specific information regarding the database. Please consult the ERD as the primary source regarding database architecture.

Bolded and italicized text rows are requirements per the DWR Emergency Regulations. Bolded text rows represent information that the DWR Emergency Regulations ask be included if it is available.

Glossary of Terms

Term	Definition
Column	The SQL Server column name.
Alias	The column name as it appears in the ESRI attribute table.
SQL Server Data Type	The SQL Server data type of the column: • **uniqueidentifier** = Global ID (for internal use, looks like this: {d468b22b-577c-485e-94bf-390cf491c764}) • **nvarchar(n|max)** = Text fields, where 'n' is the max character length allowed (note: nvarchar(max) ~ 1 billion characters); if a value is specified for 'n' the limit is 4096 characters. • **integer** = Whole number (positive or negative) – no decimals. • **decimal(x, y)** or **double(x, y)** = Number, where x is the total number of digits allowed in the number (both sides of decimal point), and y is the number of allowed digits to the right of the decimal point). Decimal handles precision at long decimal points slightly better than double, otherwise they are basically the same. • **datetime2** = full date and time, e.g., 2019-07-30 07:30:11; we recommend using this for all dates and times. If no time, set to what DDW uses (i.e. midnight).
ESRI Data Type	The ESRI data type of the column: • **GlobalId or Guid** = Global ID (for internal use, looks like this: {d468b22b-577c-485e-94bf-390cf491c764}). Translates to **uniqueidentifer** in SQL Server. • **Text(n)** = Text fields, where 'n' is the max character length allowed (4096 characters or less recommended for SQL Server 2012). Translates to **nvarchar(n)** in SQL Server. • **Long** = Whole number (positive or negative) – no decimals. Translates to **integer** in SQL Server.

	• **Double (x, y)** = Number, where x is the total number of digits allowed in the number (both sides of decimal point), and y is the number of allowed digits to the right of the decimal point). Translates to **double(x,y)** in SQL Server. • **Date** = ESRI's catch-all date type for full date and time (e.g., 2019-07-30 07:30:11), simple date (e.g., 2019-07-30), or simple time (e.g., 07:30:11). Translates to **datetime2** in SQL Server.
Nullable	Does the field allow NULL values? If the field is Nullable, a blank record will include the value of NULL (i.e., no value), if the field is non-nullable, a blank record will show as blank (i.e., empty string '') or a 0, depending on the data type. For data collection, non-nullable fields are required.
Default	The default value if none is specified upon collection.
Domain	Is this column domain-driven? If yes, the coded domain is provided inline or at the end of this spec sheet.
Validation Rule(s)	If applicable, the set of CHECK constraints and/or other validation rules to apply to the column for QA/QC purposes.
Comments	Much of this is database jargon for where we would index or add constraints, and there are also some questions in there we can address when the time is right. Some notes indicate that a Domain is being used. The Domain is a separate lookup table that is referenced by that datatype, for example well status could be active, inactive, etc.

Column Typeface Key

Bold and Italic: Required by regs.
Bold: Requested by regs if available.
Normal: Not required or requested by regs.

Additional Notes

- ESRI does not support many-to-many (M:N) relationship classes in Collector; as a result, the two M:N relationship classes used to bridge many-to-many relationships in this specification (analyte_lab_method and well_weather_station) would need to be approximated as standalone bridge tables with a combination of one-to-many (1:M) and one-to-one (1:1) relationship classes, managed in parallel to the M:N native relationship class.
- ESRI does not support unique indexes on tables in a versioned SDE environment; as a result, this specification makes parenthetical recommendations on where unique indexes would be valuable for data integrity, e.g., nonclustered (unique) index, but these unique constraints will not actually be implemented at the database tier. Where possible, enforce uniqueness at the application layer.

- ESRI does not support adding domains to field of type GUID; for this reason, domains used as lookup lists of features (with the GlobalID as the code) cannot be explicitly tied to foreign keys for direct use within ESRI applications, though they will be maintained for convenience of use at the application layer. In these cases, the domains are listed in parentheticals, e.g., (wells).

well

object type: feature class (with attachments)

geometry: point

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	**uniqueidentifier**	**GlobalID**	**GlobalId**	**no**	**{GUIDv4}**	**no**	**na**	**primary key**
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
state_well_id	***nvarchar(50)***	***Text(50)***	***State Well ID***	***no***	***-***	***no***	***match regex: (\d{3})(S|N)(\d{3})(E|W)(\d{2})([A-Z]{1})(\d{3})(S|N)*** ***e.g., 000S000E00A000S***	***nonclustered (unique) index***
agency_well_id	nvarchar(100)	Text(50)	Well Name	yes	NULL	no	na	nonclustered index
ddw_well_id	nvarchar(50)	Text(50)	Station Code	yes	NULL	no	na	nonclustered index
usgs_site_id	nvarchar(50)	Text(50)	USGS Site ID	yes	NULL	no	na	nonclustered index
usgs_model_id	nvarchar(50)	Text(50)	USGS Model ID	yes	NULL	no	na	nonclustered index
casgem_well_id	nvarchar(50)	Text(50)	CASGEM Well ID	yes	NULL	no	na	nonclustered index
casgem_site_code	nvarchar(50)	Text(50)	CASGEM Site Code	yes	NULL	no	na	nonclustered index
dwr_wcr_number	nvarchar(50)	Text(50)	DWR Well Completion Report Number	yes	NULL	no	na	nonclustered index
dwr_legacy_wcr_number	nvarchar(50)	Text(50)	DWR Legacy Well Completion Report Number	yes	NULL	no	na	nonclustered index
cnty_well_permit_number	nvarchar(100)	Text(50)	County Permit Number	yes	NULL	no	na	nonclustered index
cnty_well_permit_county	nvarchar(50	Text(50)	County Name	yes	NULL	no	na	nonclustered index

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
apn	nvarchar(10)	Text(10)	APN	yes	NULL	no	length == 10 AND match regex: (\d{10}) e.g., 1234567890	nonclustered index
township	nvarchar(50)	Text(50)	Township	yes	NULL	no	na	
range	nvarchar(50)	Text(50)	Range	yes	NULL	no	na	
section	nvarchar(50)	Text(50)	Section	yes	NULL	no	na	
status	***nvarchar(16)***	***Text(16)***	***Status***	***yes***	***NULL***	***well_statuses***	***na***	***nonclustered index***
status_other	nvarchar(255)	Text(255)	Other Status	yes	NULL	no	na	Only completed if 'Other' is chosen for status
ownership	nvarchar(255)	Text(255)	Ownership	yes	NULL	no	na	
current_use	***nvarchar(50)***	***Text(50)***	***Current Use***	***yes***	***NULL***	***well_current_uses***	***na***	***nonclustered index***
current_use_other	nvarchar(255)	Text(255)	Other Current Use	yes	NULL	no	na	Only completed if 'Other' is chosen for current_use
access_permission	nvarchar(255)	Text(255)	Access Permission	yes	NULL	no	na	
x	***double(20,12)***	***Double(20,12)***	***Longitude***	***yes***	***NULL***	***no***	***na***	
y	***double(20,12)***	***Double(20,12)***	***Latitude***	***yes***	***NULL***	***no***	***na***	
location_source	nvarchar(100)	Text(100)	Location Source	yes	NULL	well_sources	na	nonclustered index
location_source_other	nvarchar(255)	Text(255)	Other Location Source	yes	NULL	no	na	Only completed if 'Other' is chosen for location_source
source_x	nvarchar(50)	Text(50)	Source X	yes	NULL	no	na	
source_y	nvarchar(50)	Text(50)	Source Y	yes	NULL	no	na	
source_datum	***nvarchar(255)***	***Text(255)***	***Source Datum***	***yes***	***NULL***	***datums***	***na***	***nonclustered index***
source_datum_other	nvarchar(255)	Text(255)	Other Source Datum	yes	NULL	no	na	Only completed if 'Other' is chosen for source_datum
source_accuracy	***nvarchar(50)***	***Text(50)***	***Source Accuracy***	***yes***	***NULL***	***well_source_accuracies***	***na***	***nonclustered index***
source_accuracy_other	nvarchar(255)	Text(255)	Other Source Accuracy	yes	NULL	no	na	Only completed if 'Other' is chosen for source_accuracy

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
source_units	nvarchar(50)	Text(50)	Units of Source Datum	yes	NULL	no	na	This column can be determined from the source_datum and is not strictly necessary
narrative_description	***nvarchar(max)***	***Text(1073741822)***	***Well Site Location Narrative Description***	***no***	***-***	***no***	***na***	
keywords	nvarchar(255)	Text(255)	Keywords	yes	NULL	no	na	For use in Queries/Filters in Web GIS apps; nonclustered index

multi-column indexes/constraints:

- none

well_elevation

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
elevation_ft_msl	**double(15,6)**	**Double(15,6)**	**Reference Point Elevation (feet MSL)**	**yes**	**NULL**	**no**	**na**	

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
elevation_ref_point	***nvarchar(255)***	***Text(255)***	***Elevation Reference Point Description***	***yes***	***NULL***	***no***	***na***	***Options include Well casing, ground surface, well pad, sounding port, USGS Elevation Marker. Not a domain; freeform text.***
measurement_date	datetime2	Date	Measurement Date	yes	NULL	no	na	nonclustered index
elevation_source	***nvarchar(100)***	***Text(100)***	***Elevation Source and Method***	***yes***	***NULL***	***well_elevation_sources***	***na***	
elevation_source_other	***nvarchar(255)***	***Text(255)***	***Other Elevation Source and Method***	***yes***	***NULL***	***no***	***na***	***Only completed if 'Other' is chosen for elevation_source***
vertical_datum	***nvarchar(255)***	***Text(255)***	***Vertical Datum***	***yes***	***NULL***	***vertical_datums***	***na***	
vertical_datum_other	***nvarchar(255)***	***Text(255)***	***Other Vertical Datum***	***yes***	***NULL***	***no***	***na***	***Only completed if 'Other' is chosen for vertical_datum***
elevation_accuracy	**nvarchar(50)**	**Text(50)**	**Elevation Accuracy**	**Yes**	**NULL**	**well_elevation_accuracies**	**na**	
elevation_accuracy_other	**nvarchar(255)**	**Text(255)**	**Other Elevation Accuracy**	**Yes**	**NULL**	**no**	**na**	**Only completed if 'Other' is chosen for elevation_accuracy**
groundsurface_elev_ft_msl	***double(15,6)***	***Double(15,6)***	***Ground Surface Elevation (feet MSL)***	***yes***	***NULL***	***no***	***na***	
comment	nvarchar(max)	Text(1073741822)	Comment	yes	NULL	no	na	

multi-column indexes/constraints:

- [well_globalid, measurement_date]->unique()

well_program

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
program	**nvarchar(100)**	**Text(100)**	**Program**	**yes**	**NULL**	**well_programs**	**na**	**nonclustered index**

multi-column indexes/constraints:

- none

well_construction

object type: table

geometry: none

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
construction_date	datetime2	Date	Construction Date	yes	NULL	no	na	nonclustered index
driller	nvarchar(255)	Text(255)	Driller	yes	NULL	no	na	nonclustered index

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
const_type	***nvarchar(50)***	***Text(50)***	***Construction Type***	***yes***	***NULL***	***const_types***	***na***	
const_type_other	***nvarchar(255)***	***Text(255)***	***Other Construction Type***	***yes***	***NULL***	***no***	***na***	***Only completed if 'Other' is chosen for const_type***
hole_depth_ft	***double(15,6)***	***Double(15,6)***	***Total Depth of Boring (feet)***	***yes***	***NULL***	***no***	***>0***	***nonclustered index***
well_depth_ft	***double(15,6)***	***Double(15,6)***	***Total Depth of Completed Well (feet)***	***yes***	***NULL***	***no***	***>0 AND <={hole_depth_ft}***	***nonclustered index***
borehole_dia_in	double(15,6)	Double(15,6)	Borehole Dia. (inches)	yes	NULL	no	>0	
casing_dia_in	**double(15,6)**	***Double(15,6)***	**Casing Diameter (inches)**	**yes**	**NULL**	**no**	**>0 AND <={borehole_dia_in}**	**nonclustered index**
casing_material	nvarchar(50)	Text(50)	Casing Material/Grade	yes	NULL	casing_materials	na	nonclustered index
casing_material_other	nvarchar(255)	Text(255)	Other Casing Material/Grade	yes	NULL	no	na	
casing_mod	**nvarchar(max)**	**Text(1073741822)**	**Casing Modifications**	**yes**	**NULL**	**no**	**na**	
pump_type	nvarchar(255)	Text(255)	Pump Type	yes	NULL	no	na	nonclustered index
power_source	nvarchar(255)	Text(255)	Power Source	yes	NULL	no	na	nonclustered index
original_gpm	**double(15,6)**	**Double(15,6)**	**Original Production Rate (gpm)**	**yes**	**NULL**	**no**	**na**	**nonclustered index**
dwr_wcr	**nvarchar(2048)**	**Text(2048)**	**DWR Well Completion Report**	**yes**	**NULL**	**no**	**na**	**URL link**
geophys_elog	**nvarchar(2048)**	**Text(2048)**	**Geophysical Log (e-log)**	**yes**	**NULL**	**no**	**na**	**URL link**
const_diagram	**nvarchar(2048)**	**Text(2048)**	**Well Construction Diagram**	**yes**	**NULL**	**no**	**na**	**URL link**
source	nvarchar(max)	Text(1073741822)	Well Construction Data Source	yes	NULL	no	na	Source of well construction data

multi-column indexes/constraints:

- none

perforation_interval

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
well_construction_globalid	uniqueidentifier	guid	Well Construction GlobalId	no	-	no	na	nonclustered index; foreign key references (GlobalId) on (well_construction)
perf_inter_top_ft	***double(15,6)***	***Double(15,6)***	***Top of Perforation Interval (feet bgs)***	***yes***	***NULL***	***no***	***>0***	***nonclustered index***
perf_inter_bottom_ft	***double(15,6)***	***Double(15,6)***	***Bottom of Perforation Interval (feet bgs)***	***yes***	***NULL***	***no***	***>0 AND > perf_inter_top_ft***	***nonclustered index***

multi-column indexes/constraints:

- [well_construction_globalid ,perf_inter_top_ft, perf_inter_bottom_ft]->unique()

aquifer_designation

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
subbasin	nvarchar(50)	Text(50)	Subbasin	yes	NULL	subbasins	na	
zone	***nvarchar(50)***	***Text(50)***	***Aquifer Zone***	***yes***	***NULL***	***aquifer_zones***	***na***	***nonclustered index***
pct_screened	integer	Long	Percent Screened	yes	NULL	no	>=0 AND <=100	nonclustered index

multi-column indexes/constraints:

- [well_globalid, zone]->unique()

water_level

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Valudation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
measurement_date	datetime2	Date	Measurement Date	yes	NULL	no	na	nonclustered index
depth_to_water_ft	***double(15,6)***	***Double(15,6)***	***Depth to Water (feet)***	***yes***	***NULL***	***no***	***>0***	
water_elevation_ft_msl	double(15,6)	Double(15,6)	Water Level Elevation (feet MSL)	yes	NULL	no	na	calculated value: (well_elevation.elevation_ft_msl – water_level.depth_to_water_ft)
vertical_datum	***nvarchar(255)***	***Text(255)***	***Vertical Datum***	***yes***	***NULL***	***vertical_datums***	***na***	
Vertical_datum_other	***nvarchar(255)***	***Text(255)***	***Other Vertical Datum***	***yes***	***NULL***	***no***	***na***	***Only completed if 'Other' is chosen for vertical_datum***
measurement_method	***nvarchar(100)***	***Text(100)***	***Measurement Method***	***yes***	***NULL***	***measurement_methods***	***na***	***nonclustered index.*** Pick from CASGEM list
measurement_method_other	nvarchar(255)	Text(255)	Other Measurement Method	yes	NULL	no	na	Only completed if 'Other' is chosen for measurement_method
nm_code	nvarchar(100)	Text(100)	No Measurement Reason	yes	NULL	water_level_nm_codes	na	Only completed if no value is entered for depth_to_water_ft.
nm_code_other	nvarchar(255)	Text(255)	Other No Measurement Reason	yes	NULL	no	na	
qm_code	nvarchar(100)	Text(100)	Questionable Measurement Reason	yes	NULL	water_level_qm_codes	na	If applicable.
qm_code_other	nvarchar(255)	Text(255)	Other Questionable Measurement Reason	yes	NULL	no	na	

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Valudation Rule(s)	Comments
measuring_agency	nvarchar(100)	Text(100)	Water Level Measuring Agency	yes	NULL	water_level_measuring_agencies	na	
measuring_agency_other	nvarchar(255)	Text(255)	Other Water Level Measuring Agency	yes	NULL	no	na	
measurement_source	nvarchar(100)	Text(100)	Water Level Measurement Source	yes	NULL	water_level_measurement_sources	na	Primarily pertains to historical data. Use USGS "Source of measurement code"
measurement_source_other	nvarchar(255)	Text(255)	Other Water Level Measurement Source	yes	NULL	no	na	
measurement_accuracy	nvarchar(50)	Text(50)	Measurement Source Accuracy	yes	NULL	water_level_measurement_accuracies	na	
measurement_accuracy_other	nvarchar(255)	Text(255)	Other Measurement Source Accuracy	yes	NULL	no	na	
measurement_frequency	***nvarchar(50)***	***Text(50)***	***Measurement Frequency***	***yes***	***NULL***	***no***	***na***	***DJD – No codes for this…chose between N/A, biannual, quarterly, monthly, transducer setting (eg 15 min) or custom.***
measurement_frequency_other	nvarchar(255)	Text(255)	Other Measurement Frequency	yes	NULL	no	na	
comment	nvarchar(max)	Text(1073741822)	Comment	yes	NULL	no	na	

multi-column indexes/constraints:

- [well_globalid, measurement_date]
- [well_globalid, measurement_method]
- [well_globalid, measurement_date, measurement_method, depth_to_water_ft]->unique()

production

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
well_globalid	uniqueidentifier	Guid	Well GlobalId	yes	NULL	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
measurement_date	datetime2	Date	Date	yes	NULL	no	na	nonclustered index
flow_rate_gpm	**double(15,6)**	**Double(15,6)**	**Flow Rate (gpm)**	**yes**	**NULL**	**no**	**>=0**	**nonclustered index**
totalizer	double(20,6)	Double(20,6)	Totalizer	yes	NULL	no	>=0	nonclustered index
totalizer_units	nvarchar(50)	Text(50)	Totalizer Units	yes	NULL	no	na	nonclustered index
measurement_period_start	datetime2	Date	Measurement Period Start	yes	NULL	no	na	nonclustered index
measurement_period_stop	datetime2	Date	Measurement Period Stop	yes	NULL	no	na	nonclustered index
volume	double(20,6)	Double(20,6)	Volume This Period	yes	NULL	no	na	nonclustered index
volume_units	nvarchar(50)	Text(50)	Volume Units	yes	NULL	no	na	nonclustered index

multi-column indexes/constraints:

- [well_globalid, measurement_date]->unique()
- [measurement_period_start, measurement_period_stop]->index()
- [totalizer, totalizer_units]->index()
- [volume, volume_units]->index()

sample

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	(wells)	na	nonclustered index; foreign key references (GlobalId) on (well)
sample_id	nvarchar(255)	Text(255)	Sample ID	yes	NULL	no	na	nonclustered (unique) index; ID created by the person collecting the sample—not all samples will have a sample ID, in that case we will default to the state_well_id and the date.
sample_date	datetime2	Date	Sample Date	yes	NULL	no	na	nonclustered index
comment	nvarchar(max)	Text(1073741822)	Comment	yes	NULL	no	na	

multi-column indexes/constraints:

- none

water_quality

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
sample_globalid	uniqueidentifier	Guid	Sample GlobalID	no	-	(samples)	na	nonclustered index; foreign key references (GlobalId) on (sample)
analyte_globalid	uniqueidentifier	Guid	Analyte ID	no	-	(analytes)	na	nonclustered index; foreign key references (GlobalId) on (analyte)

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
lab_method_globalid	uniqueidentifier	Guid	Lab Method GlobalID	no	-	(lab_methods)	na	nonclustered index; foreign key references (GlobalId) on (lab_method)
value_qualifier	nvarchar(4)	Text(4)	Value Qualifier	no	"="	no	na	This will be a comparative operand qualifier, usually "=" or "<".
value	double(20,12)	Double(20,12)	Result Value	yes	NULL	no	na	Only NULL if lab could not run the analysis or report a value. If result is 'ND' then this column should default to the reporting limit and the value qualifier should be "<".
units	nvarchar(50)	Text(50)	Result Units	yes	NULL	no	na	
result_flag	nvarchar(50)	Text(50)	Laboratory Flag	yes	NULL	no	na	
reporting_limit_value	double(20,12)	Double(20,12)	Laboratory Reporting Limit or Practical Quantification Limit	yes	NULL	no	na	If NULL, reports should fall back to mdl_value for the associated lab_method. This field will retain a NULL to indicate there was no reporting limit provided with the results for this analyte.
reporting_limit_units	nvarchar(50)	Text(50)	Laboratory Reporting Limit or Practical Quantification Limit Units	yes	NULL	no	na	If reporting_limit_value is NULL, fall back to mdl_units for the associated lab_method. See comments above.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
lab_report_link	nvarchar(2048)	Text(2048)	Link to Lab Report	yes	NULL	no	na	URL Link
lab_name	nvarchar(255)	Text(255	Lab Name	yes	NULL	no	na	

multi-column indexes/constraints:

- [sample_globalid, analyte_globalid]->unique()
- [sample_globalid, analyte_globalid, lab_method_globalid]

analyte

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
name	nvarchar(100)	Text(100)	Name	yes	NULL	no	na	nonclustered (unique) index
description	nvarchar(max)	Text(1073741822)	Description	yes	NULL	no	na	

multi-column indexes/constraints:

- none

analyte_mcl

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
analyte_globalid	uniqueidentifier	Guid	Analyte ID	no	-	(analytes)	na	nonclustered index; foreign key references (GlobalId) on (analyte)
name	nvarchar(100)	Text(100)	Name	yes	NULL	no	na	nonclustered index
mcl_value	double(20,12)	Double(20,12)	Maximum Contaminant Level (MCL)	yes	NULL	no	>=0	
mcl_units	nvarchar(50)	Text(50)	Maximum Contaminant Level (MCL) Units	yes	NULL	no	na	
description	nvarchar(max)	Text(1073741822)	Description	yes	NULL	no	na	

multi-column indexes/constraints:

- none

analyte_lab_method

object type: relationship class (cardinality: many-to-many)

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	guid	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
analyte_globalid	uniqueidentifier	Guid	Analyte GlobalID	no	-	no	na	nonclustered index; foreign key references (GlobalId) on (analyte)
lab_method_globalid	nvarchar(max)	Guid	Lab Method GlobalID	no	-	no	na	nonclustered index; foreign key references (GlobalId) on (lab_method)

multi-column indexes/constraints:

- [analyte_globalid, lab_method_globalid]->unique()

lab_method

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
name	nvarchar(100)	Text(100)		yes	NULL	no	na	nonclustered (unique) index
mdl_value	double(20,12)	Double(20,12)	Method Detection Limit (MDL)	yes	NULL	no	na	
mdl_units	nvharchar(50)	Text(50)	Method Detection Limit (MDL) Units	yes	NULL	no	na	
description	nvarchar(max)	Text(1073741822)	Description	yes	NULL	no	na	

multi-column indexes/constraints:

- none

weather

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE( )	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE( )	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
weather_station_globalid	uniqueidentifier	Guid	Weather Station GlobalId	no	-	(weather_stations)	na	nonclustered index; foreign key references (GlobalId) on (weather_station)
measurement_date	datetime2	Date	Measurement Date	yes	NULL	no	na	nonclustered index
measurement_type	nvarchar(50)	nvarchar(50)	Measurement Type	yes	NULL	no		nonclustered index
value_qualifier	nvarchar(4)	Text(4)	Value Qualifier	no	"="	no	na	This will be a comparative operand qualifier, usually "=" or "<".
value	double(20,12)	Double(20,12)	Value	yes	NULL	no	na	Only NULL if instrument failed or measurement could not be taken for some other reason. If result is 'ND' or trace then this column should default to the instrument's reporting limit and the value qualifier should be "<". Zero is also an acceptable value (e.g., 0 precip).
units	nvarchar(50)	Text(50)	Units	yes	NULL	no	na	

multi-column indexes/constraints:

- [weather_station_globalid, measurement_date]->unique()
- [measurement_date, measurement_type]->index()

WeatherStation

object type: feature class (with attachments)

geometry: point

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
cimis_station_num	nvarchar(50)	Text(50)	CIMIS Station Number	yes	NULL	no		nonclustered index
elevation_ft	double (15,6)	Double(15,6)	Elevation (feet MSL)	yes	NULL	no	>0	
x	double(20,12)	Double(20,12)	Longitude	yes	NULL	no	na	
y	double(20,12)	Double(20,12)	Latitude	yes	NULL	no	na	
location_source	nvarchar(100)	Text(100)	Location Source	yes	NULL	weather_station_sources	na	nonclustered index
location_source_other	nvarchar(255)	Text(255)	Other Location Source	yes	NULL	no	na	Only completed if 'Other' is chosen for location_source
source_x	nvarchar(50)	Text(50)	Source X	yes	NULL	no	na	
source_y	nvarchar(50)	Text(50)	Source Y	yes	NULL	no	na	
source_datum	nvarchar(255)	Text(255)	Source Datum	yes	NULL	datums	na	nonclustered index
source_datum_other	nvarchar(255)	Text(255)	Other Source Datum	yes	NULL	no	na	Only completed if 'Other' is chosen for source_datum
source_accuracy	nvarchar(50)	Text(50)	Source Accuracy	yes	NULL	weather_station_source_accuracies	na	nonclustered index

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
source_accuracy_other	nvarchar(255)	Text(255)	Other Source Accuracy	yes	NULL	no	na	Only completed if 'Other' is chosen for source_accuracy
source_units	nvarchar(50)	Text(50)	Units of Source Datum	yes	NULL	no	na	This column can be determined from the source_datum and is not strictly necessary
narrative_description	nvarchar(max)	Text(1073741822)	Weather Station Location Narrative Description	yes	NULL	no	na	
station_name	nvarchar(100)	Text(100)	Station Name	yes	NULL	no	na	nonclustered index
ncdc_id	nvarchar(50)	Text(50)	NCDC ID	yes	NULL	no	na	nonclustered index
wrcc_coop_id	nvarchar(50)	Text(50)	WRDD COOP ID	yes	NULL	no	na	nonclustered index
uci_map_id	nvarchar(50)	Text(50)	UCI Map ID	yes	NULL	no	na	nonclustered index
status	nvarchar(50)	Text(50)	Status	yes	NULL	no	na	nonclustered index

multi-column indexes/constraints:

- none

well_weather_station

object type: relationship class (cardinality: many-to-many)

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
well_globalid	uniqueidentifier	Guid	Well GlobalId	no	-	no	na	nonclustered index; foreign key references (GlobalId) on (well)
weather_station_globalid	uniqueidentifier	Guid	Weather Station GlobalId	no	-	weather_station	na	nonclustered index; foreign key references (GlobalId) on (weather_station)

multi-column indexes/constraints:

- [well_globalid, weather_station_globalid]->unique()

imported_water

object type: table (with attachments)

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
water_source	nvarchar(100)	Text(50)	Source	no	NULL	no*	na	Source of the imported water. This can be modified to be a domain if values are identified. nonclustered index

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
water_destination	nvarchar(100)	Text(50)	Destination	yes	NULL	no*	na	Destination of the imported water. Possible examples would be recharge, treatment plant, etc. This can be modified be a domain if valid values are identified. nonclustered index
acre_ft	Integer	Long	Acre Ft	no	NULL	no	na	Acre feet of water imported

multi-column indexes/constraints:

- None

StreamGage

object type: feature class (with attachments)

geometry: point

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
gage_id	nvarchar(50)	Text(10)	Gage Name or Identifier	yes	NULL	no		nonclustered index
location_source	nvarchar(100)	Text(100)	Location Source	yes	NULL	weather_station_sources	na	nonclustered index

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
location_source_other	nvarchar(255)	Text(255)	Other Location Source	yes	NULL	no	na	Only completed if 'Other' is chosen for location_source
source_x	nvarchar(50)	Text(50)	Source X	yes	NULL	no	na	
source_y	nvarchar(50)	Text(50)	Source Y	yes	NULL	no	na	
source_datum	nvarchar(255)	Text(255)	Source Datum	yes	NULL	datums	na	nonclustered index
source_datum_other	nvarchar(255)	Text(255)	Other Source Datum	yes	NULL	no	na	Only completed if 'Other' is chosen for source_datum

multi-column indexes/constraints:

- none

streamflow

object type: table

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
gage_globalid	uniqueidentifier	Guid	Stream Gage GlobalId	no	-	(StreamGage)	na	nonclustered index; foreign key references (GlobalId) on (StreamGage))
measurement_date	datetime2	Date	Measurement Date	yes	NULL	no	na	nonclustered index
measurement_agency	nvarchar(100)	Text(100)	Measurement Agency	yes	NULL	no	na	nonclustered index
measurement_duration	double(2,2)	Double	Duration (hours)	yes	NULL	no	na	
stream_flow	double(15,2)	Double(15,2)	Stream Flow (ft^3/s)	no	NULL	no	na	
gage_height	double(15,2)	Double(15,2)	Gage Height (ft)	yes	NULL	no	na	

multi-column indexes/constraints:

- none

comment

object type: table (with attachments)

geometry: none

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
GlobalId	uniqueidentifier	GlobalID	GlobalId	no	{GUIDv4}	no	na	primary key
created_by	nvarchar(100)	Text(100)	Created By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
created_at	datetime2	Date	Created At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates.
updated_by	nvarchar(100)	Text(100)	Updated By	yes	NULL	no	na	Metadata. Will be enabled for Editor Tracking.
updated_at	datetime2	Date	Updated At	no	GETUTCDATE()	no	na	Metadata. Will be enabled for Editor Tracking with UTC dates. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
deleted_by	nvarchar(100)	Text(100)	Deleted By	yes	NULL	no	na	Metadata.

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Column	SQL Server Data Type	ESRI Data Type	Alias	Nullable	Default	Domain	Validation Rule(s)	Comments
deleted_at	datetime2	Date	Deleted At	yes	NULL	no	na	Metadata. Enables soft-deleting records (i.e., if this field is not NULL then the record will be considered deleted, but will be retained for archival). Use UTC Date when populating. Not part of ESRI's built-in Editor Tracking – will be managed via application/script.
item_source_table	nvarchar(255)	Text(255)	Item Source Table	yes	NULL	no	na	nonclustered index
item_globalid	uniqueidentifier	Guid	Item GlobalId	no	-	no	na	nonclustered index
comment_date	datetime2	Date	Comment Date	yes	NULL	no	na	nonclustered index
commentor	nvarchar(100)	Text(100)	Commentor	yes	NULL	no	na	nonclustered index
comment	nvarchar(max)	Text(1073741822)	Comment	yes	NULL	no	na	

multi-column indexes/constraints:

- [item_source_table, item_globalid]
- [item_source_table, item_globalid, comment_date]
- [item_source_table, item_globalid, commentor]
- [item_source_table, item_globalid, comment_date, commentor]
- [item_globalid, comment_date]
- [item_globalid, commentor]
- [item_globalid, comment_date, commentor]
- [comment_date, commentor]

Domains

Domain Name	Items
wells	Populated via recurring job to mirror Well features: Key = Well.GlobalId Description = Well.local_well_id
well_statuses	Active Inactive Destroyed Unknown Other
well_current_uses	Observation Industrial Irrigation Public Supply Residential Stockwatering Unknown Other
well_sources	CASGEM DDW DWR USGS Dudek Unknown Other
well_source_accuracies	1 ft. 10 ft. 30 ft. 75 ft. 150 ft. Unknown Other

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Domain Name	Items
well_elevation_accuracies	0.1 ft. 2.5 ft. 5 ft. 10 ft. 20 ft. 50 ft. > 50 ft. Unknown Other
well_elevation_sources	USGS quad GPS GPS WAAS Surveyed to a benchmark Digital Elevation Model Google Earth Unknown Other
measurement_methods	Electric sounder measurement Steel tape Measurement Acoustic or sonic Sounder Airline measurement, pressure gage, or manometer Electric pressure transducer Observed Unknown Other
water_level_nm_codes	Measurement Discontinued Pumping Pump house locked Tape hung up Can't get tape in casing Unable to locate well Well has been destroyed Special/Other Casing leaking or wet Temporarily inaccessible Dry well Flowing artesian well Unknown

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Domain Name	Items
water_level_qm_codes	Caved or deepened Pumping Nearby pump operating Casing leaking or wet Pumped recently Air or pressure gauge measurement Recharge or surface water effects near well Oil or foreign substance in casing Acoustical sounder measurement Recently flowing Flowing artesian well Nearby flowing Nearby recently flowing Unknown Other
water_level_measurement_accuracies	0.1 ft. 0.01 ft. 0.001 ft. 1 ft. Unknown Other
water_level_measuring_agencies	Montecito Water District County of Santa Barbara California Department of Water Resources U.S. Geological Survey Dudek Unknown Other
water_level_measurement_sources	Reported by another government agency From driller's log or report Reported by person other than the owner, driller, or another government agency Reported by owner of well Measured by personnel of reporting agency Unknown Other
water_level_measurement_frequencies	N/A Biannual Quarterly Monthly Transducer Setting (specify time in remarks, e.g., 15 minutes) Custom

Exhibit 3. Geodatabase Object Specification Sheet

Yucaipa Basin (v0.5.0, rev 2019-07-30)

Domain Name	Items
weather_stations	Populated via recurring job to mirror WeatherStation features: Key = WeatherStation.GlobalId Description = (WeatherStation.cimis_station_num) WeatherStation.description
samples	Populated via recurring job to mirror sample records: Key = sample.GlobalId Description = sample.sample_id
analytes	Populated via recurring job to mirror analyte records: Key = analyte.GlobalId Description = analyte.name
lab_methods	Populated via recurring job to mirror lab_method records: Key = lab_method.GlobalId Description = lab_method.name
datums	… add list of datums Other Unknown Key = WKID Description = full datum name
vertical_datums	NAVD88 … add list of vertical datums Other Unknown Key = WKID Description = full datum name
casing_materials	Concrete Steel ABS PVC Other
const_types	Single Clustered Nested Other
aquifer_zones	Upper Middle Lower
subbasins	… add list of subbasins if applicable

Exhibit 3. Geodatabase Object Specification Sheet

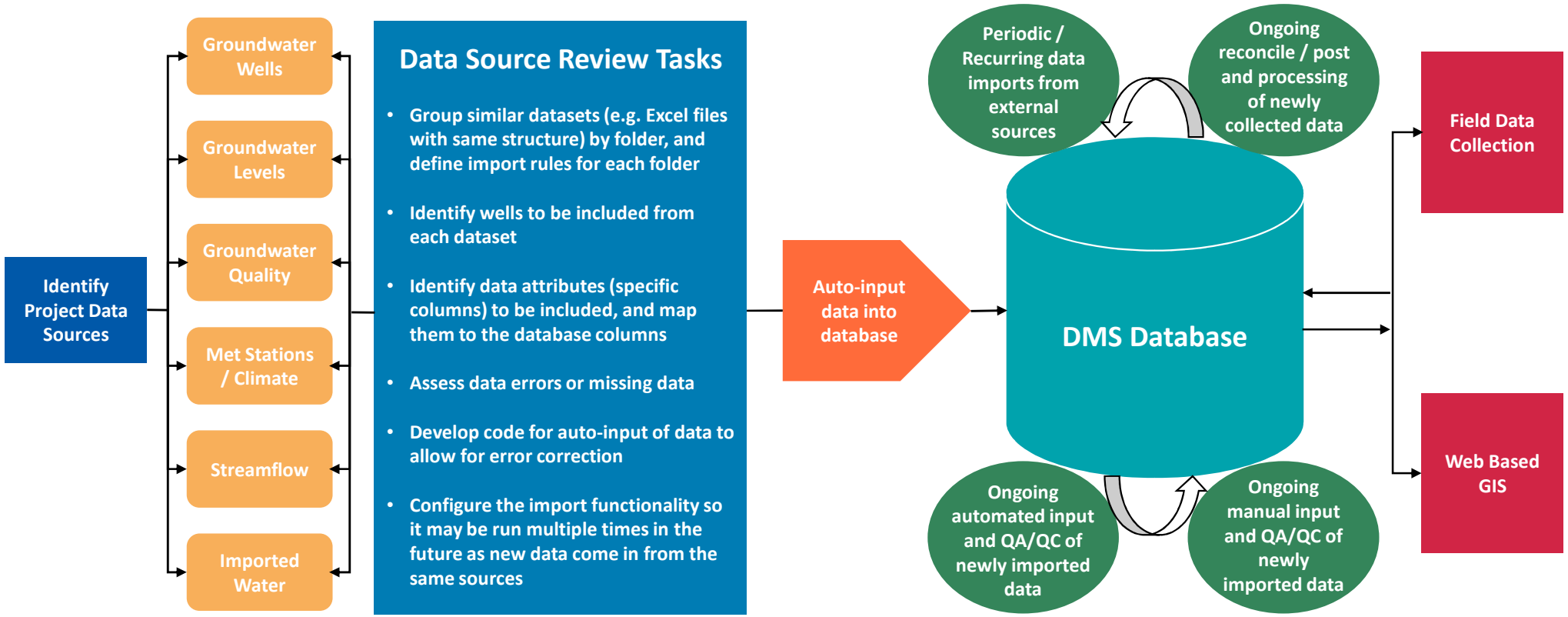
Yucaipa Basin (v0.5.0, rev 2019-07-30)

Domain Name	Items
weather_station_sources	NOAA Citizen Weather Observer Program (CWOP) Weather Underground University/Academic Private Unknown Other
weather_station_source_accuracies	1 ft. 10 ft. 30 ft. 75 ft. 150 ft. Unknown Other
well_programs	Groundwater Elevation Monitoring Groundwater Quality Monitoring Groundwater Modeling

Exhibit 4

Data Management System (DMS)

Historical Data Collection and Review



DUDEK

Yucaipa SGMA

Groundwater Sustainability Plan (GSP) Development

Board Meeting
October 23, 2019

Data Management System Overview

Field Collection

- Collect electronically
- Download into DMS

Database Management System (DMS)

- User-friendly
- Hosted

DMS Uses

- Tracking
- Flow Model
- CASGEM
- SWRCB GAMA

Data Management System RFP Schedule

- Release of RFP

November 25, 2019

December 30, 2019 (4:00PM)

- Deadline for Valley District Receipt of Proposals

- Notice of Interviews (optional)

January 13, 2020

January 20, 2020

- Interviews (optional)

- Board of Directors Approval/Award Contract

February 4, 2020

Consider Prop 1 Grant Deliverable Task 4

DMS Framework Design Technical Memorandum

- Anticipated to be included in the DMS RFP

- Goals of the Yucaipa DMS
  - Support the development of the GSP
  - Provide a data framework for the continued monitoring for GSA
  - Serve as the central repository of information for these efforts

Category (c): GSP Development
Task 3. Stakeholder Engagement
Develop a coordinated outreach plan to document communication channels, a communications schedule, and stakeholder engagement opportunities. Contacts associated with outreach to low-income, minority, and Spanish speaking communities will be consulted in development of the plan. The existing "Interested Parties" list will be reviewed to be sure it captures the appropriate contact information for all Yucaipa Basin beneficial users. A website and outreach materials will be developed and updated to facilitate outreach. Interested parties will be contacted to explain how they may participate in the development and implementation of the GSP. To promote specific technical input, a Technical Advisory Committee (TAC) will be formed. Non-technical meetings/workshops will be held and geared to the broad stakeholder list (land use jurisdictions, disadvantaged communities, general public, DWR) during GSP development. If needed, inter-basin agreements will be developed.

Deliverables:
- Outreach Plan
- Meeting summaries included in Quarterly Progress Report as attachment(s)

Task 4. Data Management System
Develop a Data Management System (DMS). A memorandum will discuss the database architecture and the preferred architecture of the DMS. A DMS database specifications sheet will be developed along with a user guide.

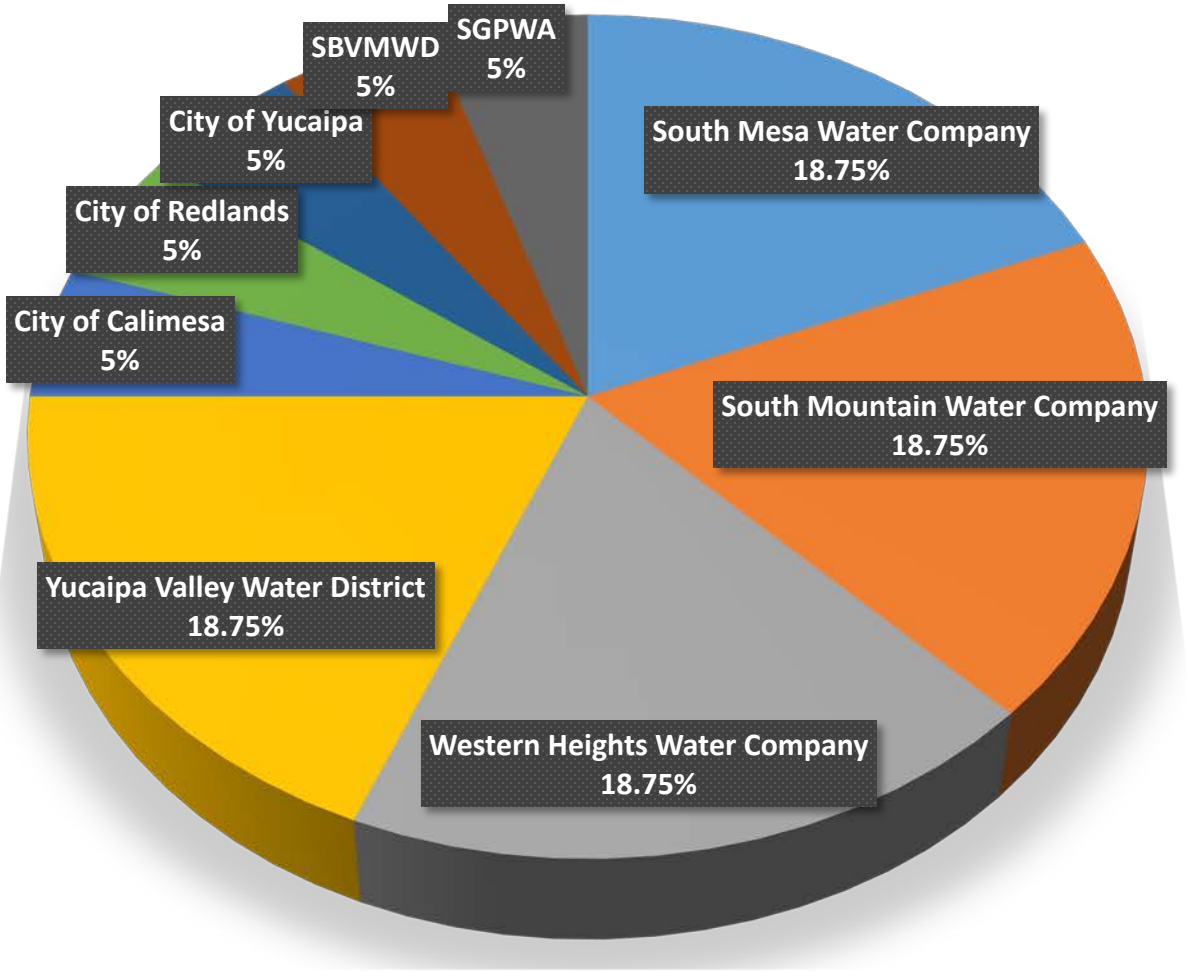
Deliverables:
- Memorandum on the DMS

DMS Funding Split

- **MOA to Form Yucaipa GSA**
  - 75% Purveyors/25% Municipalities and Regionals split for cost share
- Category B - Planning
  - Yucaipa Basin Groundwater Model
  - Infiltration Testing
- Category C - GSP Development
  - Stakeholder Engagement
  - DMS (memorandum only)
  - GSP Development

Project Budget					
Project Title: Yucaipa Groundwater Sustainability Plan					
Budget Category		Grant Amount	Required Cost Share (non-state source)*	Other Cost Share**	Total Cost
(a)	Grant Administration	$0	$0	$20,000	**$20,000**
(b)	Planning Activities	$400,000	$250,000	$325,000	**$975,000**
(c)	GSP Development	$415,100	$250,000	$215,000	**$880,100**
	TOTAL COSTS	**$815,100**	**$500,000**	**$560,000**	**$1,875,100**

DMS Funding Split

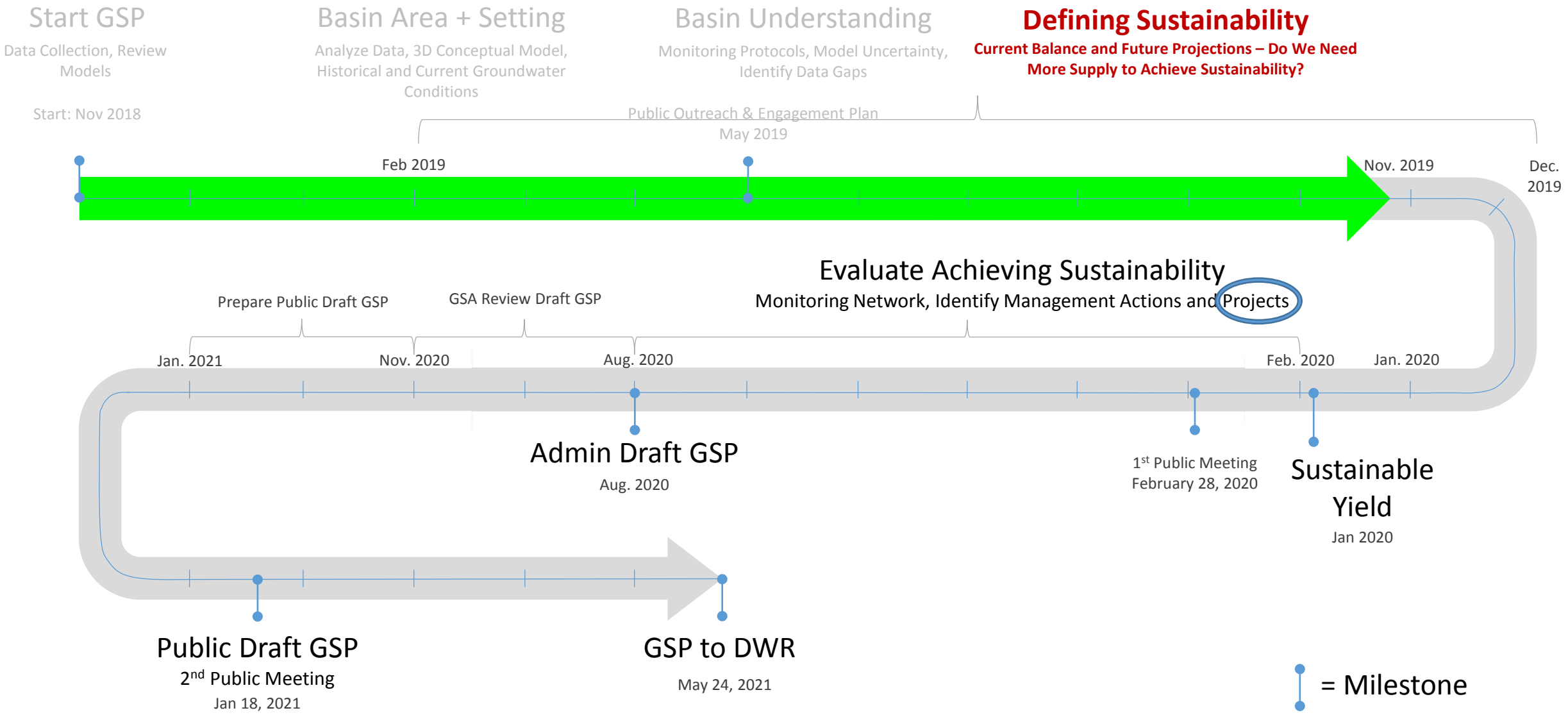


Totals:

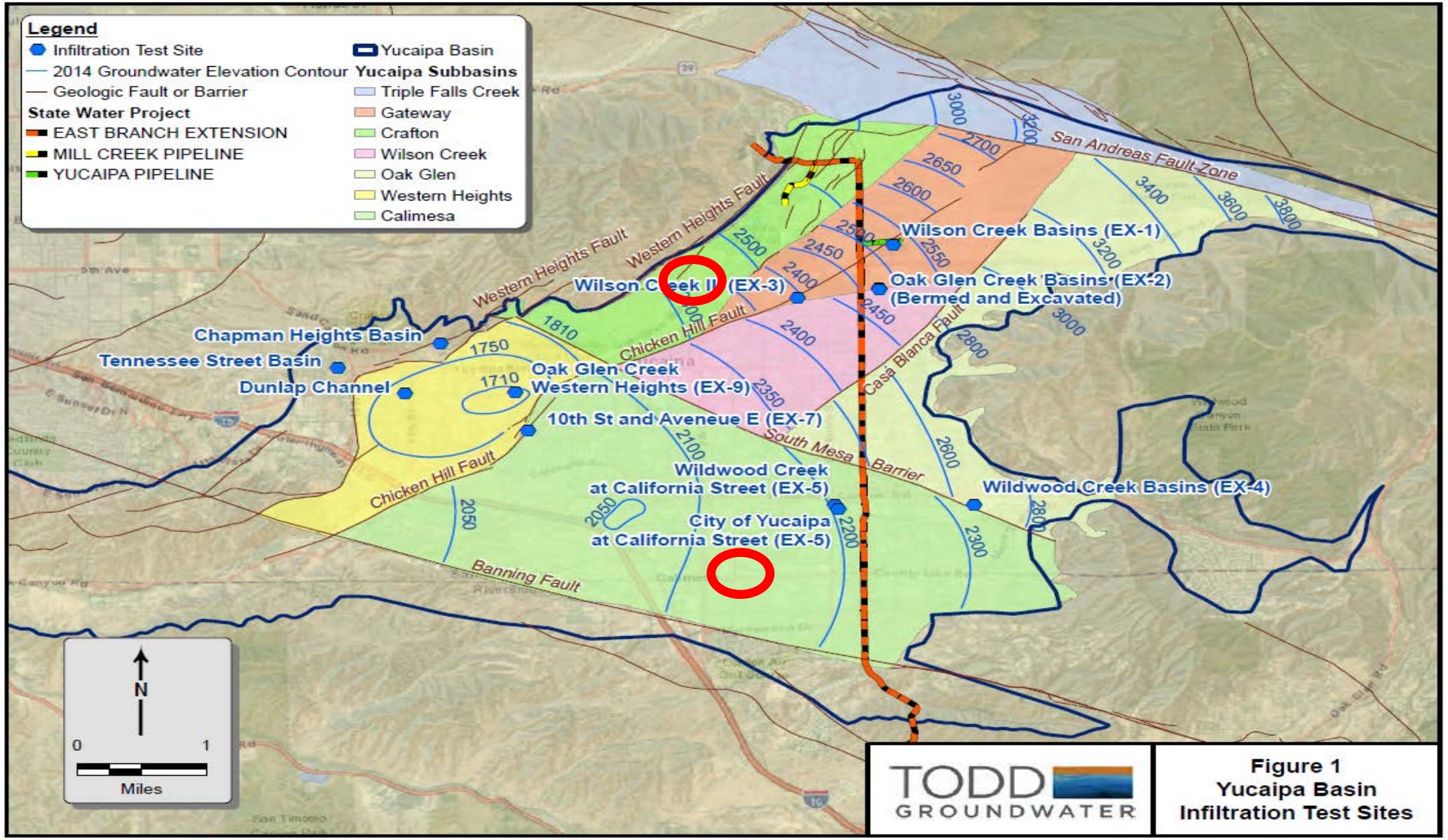
Water Purveyors (75%)

Municipalities and Regionals (25%)

GSP Road Map


Start GSP
Data Collection, Review Models
Start: Nov 2018
Basin Area + Setting
Analyze Data, 3D Conceptual Model, Historical and Current Groundwater Conditions
Basin Understanding
Monitoring Protocols, Model Uncertainty, Identify Data Gaps
Defining Sustainability
Current Balance and Future Projections – Do We Need More Supply to Achieve Sustainability?
Public Outreach & Engagement Plan
May 2019
Feb 2019
Nov. 2019
Dec. 2019
Evaluate Achieving Sustainability
Monitoring Network, Identify Management Actions and Projects
Prepare Public Draft GSP
GSA Review Draft GSP
Jan. 2021
Nov. 2020
Aug. 2020
Feb. 2020
Jan. 2020
Admin Draft GSP
Aug. 2020
1st Public Meeting
February 28, 2020
Sustainable Yield
Jan 2020
Public Draft GSP
2nd Public Meeting
Jan 18, 2021
GSP to DWR
May 24, 2021
= Milestone

Additional Infiltration Testing in the Yucaipa GSA



Infiltration Testing

Gateway Wash Basins

- Proposed recharge testing
- Prelim design capacity: 10 CFS
- Basins approx. 8 Acres

Infiltration Testing

County Line Road Basin

- Proposed recharge testing
- Prelim design capacity: 10 CFS
- Basins approx. 3.5 acres

Infiltration Testing (2018)

Infiltration Testing in the Yucaipa Basin

Oct 2019 - Feb 2020

- Proposal & CEQA/Environmental Studies

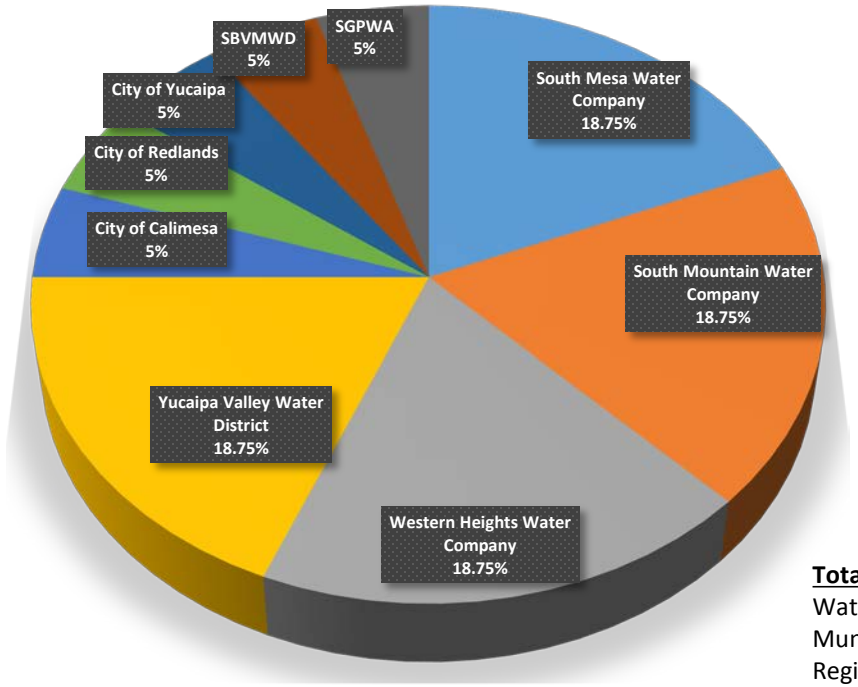
Feb 2020 – April 2020

- Contracts, NTP, Infiltration Tests

May 2020

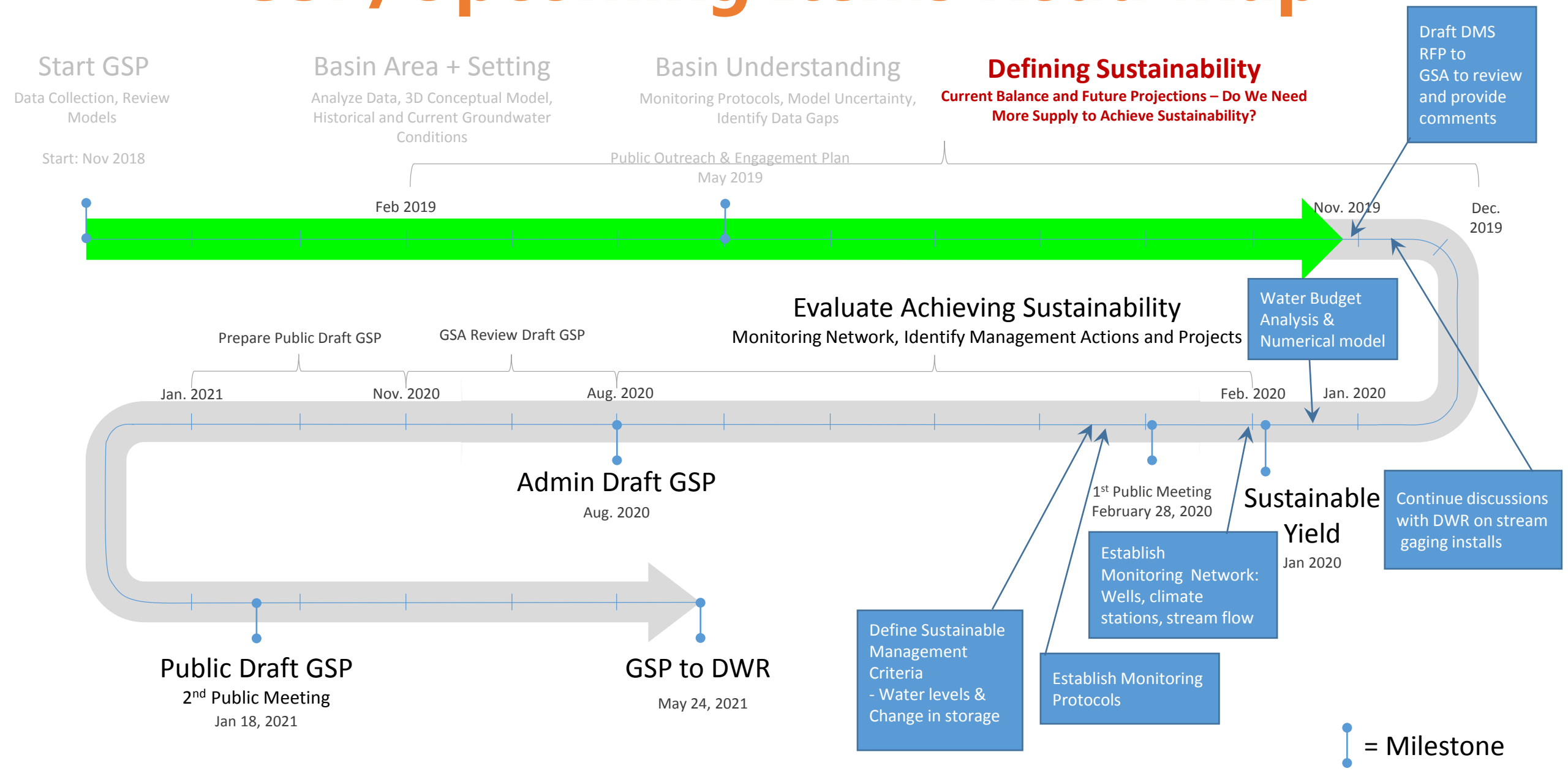
- Project complete
- Results from infiltration testing available

Infiltration Testing Funding Split



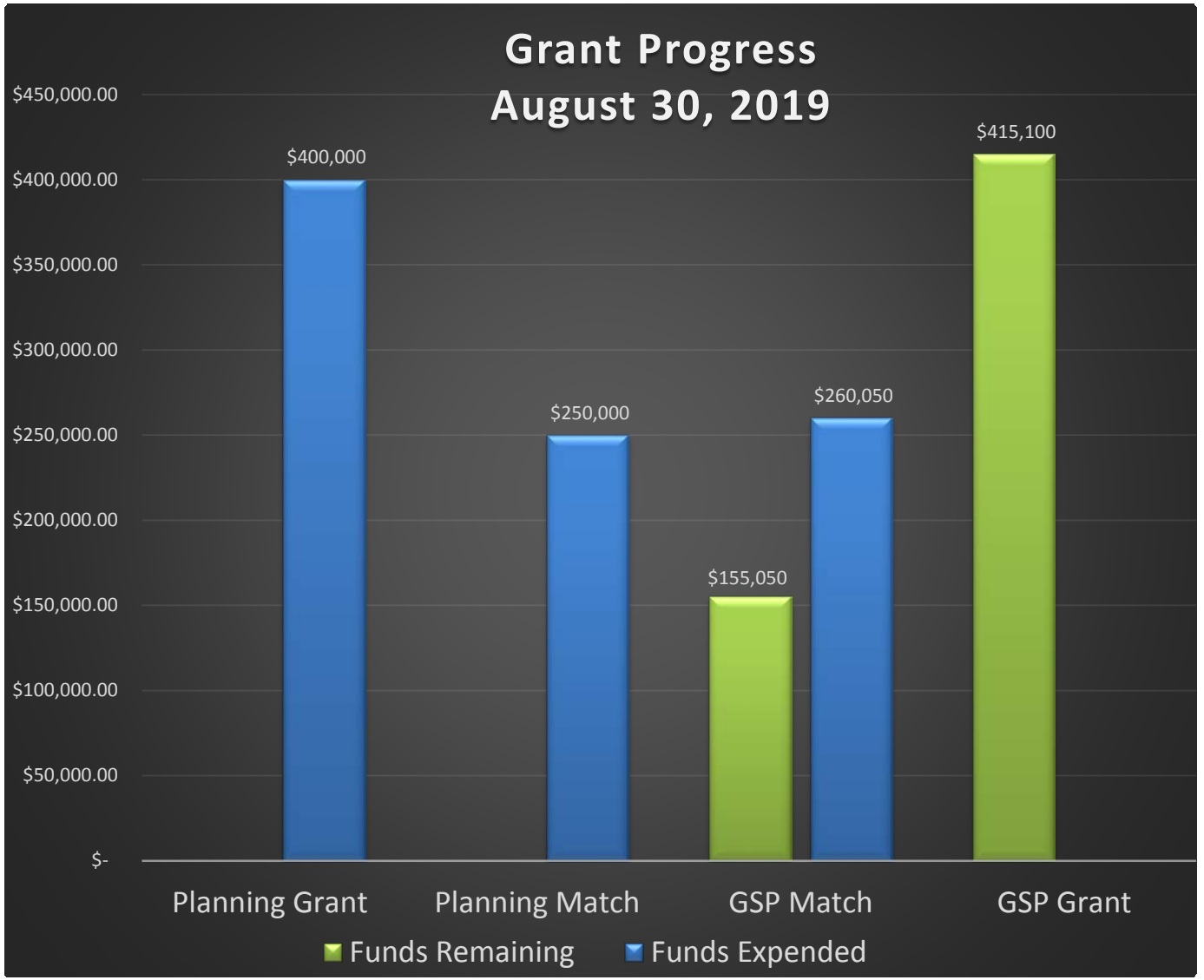
Totals:
Water Purveyors (75%)
Municipalities and Regionals (25%)

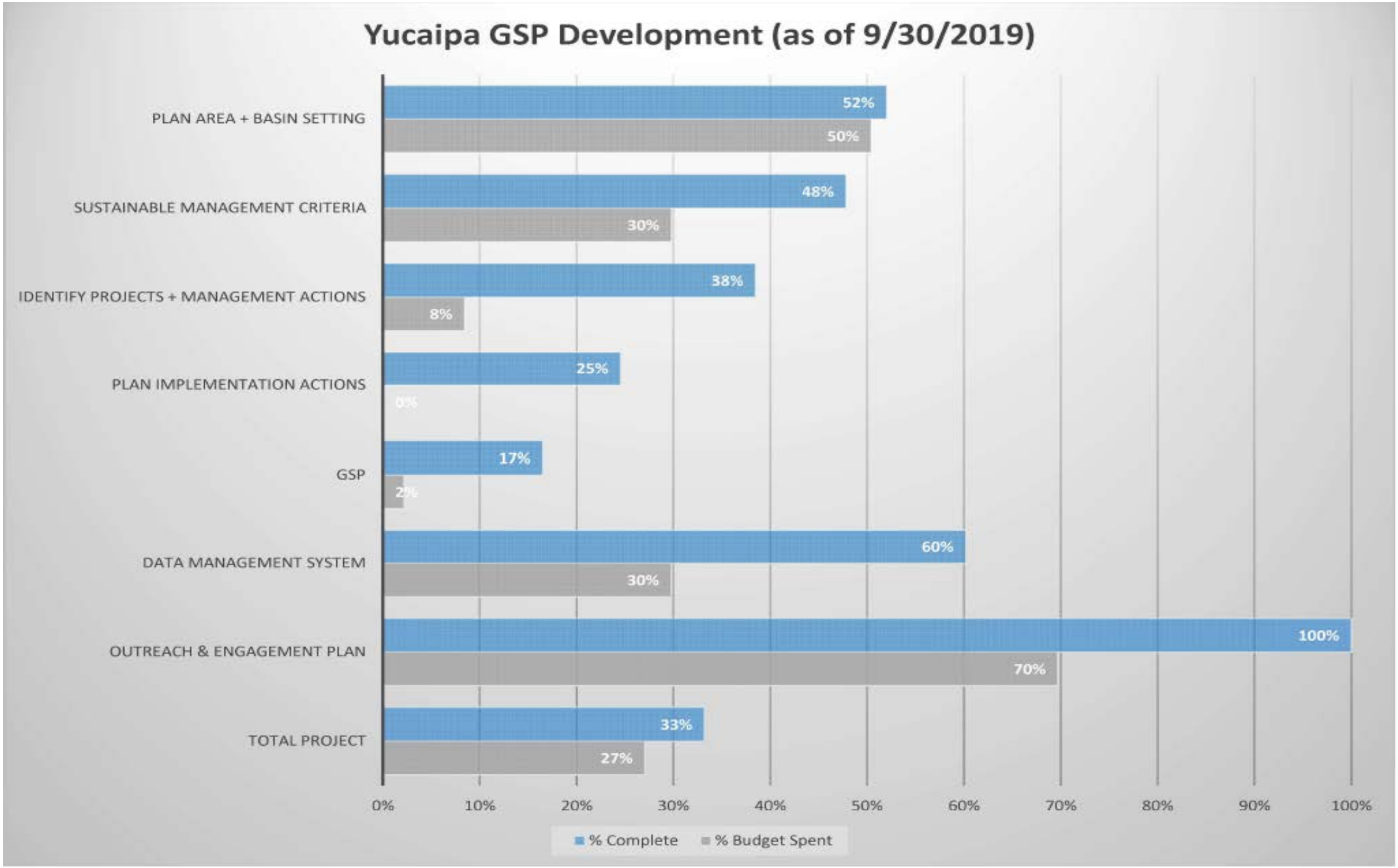
GSP/Upcoming Items Road Map



Grant Status

- 3rd Quarterly Report (7/1/19-9/30/19)
- Planning Activities 95% Complete
  - The final Model Report is the last outstanding deliverable
- GSP Activities 31% Complete
  - Outreach Plan Submitted
  - Match Requirements will be met in 4th Quarter (10/1/19-12/31/19)




Yucaipa GSP Development (as of 9/30/2019)
PLAN AREA + BASIN SETTING
52%
50%
SUSTAINABLE MANAGEMENT CRITERIA
48%
30%
IDENTIFY PROJECTS + MANAGEMENT ACTIONS
38%
8%
PLAN IMPLEMENTATION ACTIONS
25%
0%
GSP
17%
2%
DATA MANAGEMENT SYSTEM
60%
30%
OUTREACH & ENGAGEMENT PLAN
100%
70%
TOTAL PROJECT
33%
27%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% Complete
% Budget Spent