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DATA MANAGEMENT SYSTEM PLATFORM
TECHNICAL MEMORANDUM

To:	Yucaipa GSA DMS Working Team
From:	Matthew Palavido, Dudek
Subject:	Yucaipa Basin GSP Data Management System Platform
Date:	October 2, 2020
cc:	Matt Howard, Steve Stuart

Dudek has developed the framework for the Data Management System (DMS) for the Yucaipa Basin Groundwater Sustainability Plan (GSP). Subsequently, a DMS working group was formed and met on 6/11/2020 to discuss the platform that the DMS will be built upon. This technical memorandum outlines the front-end user facing technology and complements the previously completed technical memorandum outlining the database structure. 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 by providing the ability to store and report information relevant to the creation of a GSP and the monitoring of the Yucaipa basin. SGMA does not specify any additional functional requirements of a DMS.

The DMS will be built upon ArcGIS Enterprise, Esri's commercial off the shelf software platform. ArcGIS Enterprise platform. This platform is a widely accepted industry standard and allows for easy transfer of technologies between stakeholders. The following paragraphs explain the components of ArcGIS Enterprise that will comprise the DMS.

Database Technology

The data for the DMS will be housed in a SQL Server 2016 database in an Esri enterprise geodatabase. An enterprise geodatabase provides the ability to support the following capabilities:

- Simultaneous access and editing by multiple users
- Scalability and security
- Ease of backups
- Data integrity
- Transferability

The enterprise geodatabase can easily be transferred or translated to another database platform for hosting by stakeholders.

Map Service Delivery

A key component of the DMS is the spatial representation of data collected in the DMS. ArcGIS Server 10.8.1 will be used to provide this capability. ArcGIS Server is a server-based software that allows for the access, sharing and security of geographic data through web services. It is a widely adopted technology throughout many organizations, including many of the Yucaipa GSP stakeholder agencies. Use of this technology ensures that the resulting DMS platform can easily transfer to ArcGIS Online or a stakeholder's own infrastructure.

User Interface

The front facing user interface will be developed using ArcGIS Web AppBuilder hosted within Portal for ArcGIS version 10.8.1. Portal for ArcGIS is a server-based software that allows organizations to share maps, data, and applications. It adds an additional layer of security and access controls above and beyond those provided by ArcGIS Server mentioned in the previous section. Portal for ArcGIS, and specifically ArcGIS Web AppBuilder, provide out of the box user interface solutions that can easily be configured without the need for custom programming or development. Like the other components of the system, applications configured in the Portal for ArcGIS environment can easily be transferred to ArcGIS Online or a stakeholder's own infrastructure.

Portal for ArcGIS also provides additional out of the box user interface capabilities specifically for field data collection. The field data collection tools include Collector for ArcGIS and Survey123. Both applications are easily configurable and can be rapidly deployed to people collecting data in the filed on a range of mobile devices.

Programming Language

A critical function of the DMS is ease of data import, data validation, and the overall health of the underlying database. Automation of these tasks reduces the need for manual intervention and repetitive tasks. Python is the programming language used to accomplish these types of tasks. Python is a widely adopted, highly flexible, and well documented language that is supported directly within the ArcGIS environment. Python is free, supported on multiple platforms (i.e. Linux, Windows, Unix), and is open source. Python 3 is the current version used in version 10.8.1 of the ArcGIS platform. Like the other platform components mentioned in the previous sections, and important aspect of the use of Python is the fact that it can easily be transferred and shared with stakeholders for use in their own environment if the need arises.