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Technical Memorandum

Date: August 31, 2023
From: Spencer Harris, Principal Hydrogeologist
Timothy Kershaw, Environmental Scientist
To: Daniel Heimel, PE, Los Osos Basin Management Committee Executive Director

SUBJECT: Well database development for the Los Osos BMC

Dear Mr. Heimel:

Cleath-Harris Geologists (CHG) has completed the expansion and consolidation of existing well datasets into a comprehensive Geographic Information Systems (GIS) master database for the Los Osos Basin Management Committee (BMC). The purpose of the work is to improve Basin management efficiency and well data access by providing the BMC with an information system that can be queried and analyzed using GIS tools or (for managers without easy access to GIS) through Google Earth and MS Excel. This memorandum presents an overview of the database. Database files are provided separately.

BACKGROUND

The Los Osos BMC oversees the implementation of the Los Osos Basin Plan (LOBP) in the adjudicated area (Plan Area) of the locally defined groundwater basin. The LOBP groundwater monitoring program included 93 monitoring well locations within the basin. There are additional wells in two other existing, ongoing monitoring programs that historically overlapped with the LOBP monitoring program: the San Luis Obispo County Water Level Monitoring Program and the Los Osos Water Recycling Facility (LOWRF) Groundwater Monitoring Program. There are also many other private domestic and irrigation wells in the Plan Area that are not part of the above monitoring programs, but for which information is available through the County and through historical reports and studies. The database covers the Los Osos Adjudicated Plan Area.

DATA SOURCES

The following data sources were used to develop location confidence for wells, compare and merge datasets and enter well information in the database:

1. Well Completion Reports (WCRs) from California Department of Water Resources (DWR) database
2. Well location database and WCR database from County of San Luis Obispo Environmental Health Services Department
3. In-house GIS datasets, historical maps, reports, and studies.

4. SLO County Flood Control and Water Conservation District (FCWCD) well location maps and well information sheets
5. LOBP, LOWRF, and County Water Level Monitoring Program well databases
6. Aerial imagery from various sources including Google Earth, NAIP and ESRI
7. Historical aerial imagery from UCSB's Map and Imagery Library FrameFinder
8. GeoTracker on-line

DATABASE FORMAT

The Los Osos BMC well database has been constructed using MS Excel and QGIS. The Excel file is based on a template used for the County of San Luis Obispo Data Management System for basins subject to the Sustainable Groundwater Management Act of 2014. There are 63 fields available for use, although not all the fields are applicable to wells in the Adjudicated Plan Area. There were three additional fields added to the list to enhance understanding of well records and ease of use of the database

1. Notes – Any additional information not represented in the other fields
2. File_Name – Filename for pdf corresponding to each well record
3. File_Path – Dynamic clickable link in the database spreadsheet to open the corresponding pdf showing information for the well record

A list of the fields is attached. Shapefiles were created using QGIS that allow the wells and field attributes to be imported into a geographic information system for spatial analysis. As an option for non-GIS users, files are provided that can used with Google Earth for viewing well locations.

DATBASE FILES

Database files (provided separately) include the following:

- Folder with pdfs of WCRs or well log sheets for each well with available information, and an Excel spreadsheet with well records and links to respective pdfs
- GIS shapefile showing well locations with fields corresponding to spreadsheet fields
- KML with well locations and fields corresponding to spreadsheet fields

WORKFLOW

A GIS database of well locations and collection of Well Completion Reports (WCRs) was provided by the County Environmental Department of Environmental Health Services (EHS) for wells in and directly adjacent to the Adjudicated Plan Area. This dataset included a non-comprehensive list of completed wells and folder of WCR pdf files named by a "WP number" that matches the record in the shapefile. The County EHS well locations were updated after careful review of each WCR. Additional information used to increase location accuracy included the

following: FCWCD well information documents and scanned and georeferenced well location maps; current and historical aerial imagery; google street view images; and in-house maps, reports, studies, and experience.

WCRs were also gathered from the DWR's WCR Online Map Application by Township/Range/Section for sections of interest inside and touching the Adjudicated Plan Area. These were merged with the existing WCR database in order to combine all necessary information about each of the wells. Duplicate WCRs were appended to existing WCR pdfs where it was determined that unique information supplemented existing information. WCRs from the DWR database without a matching record were added as new records into the database.

After combining and consolidating the above information, in-house records from historical reports, maps, and studies, were reviewed and additional WCRs and well information was incorporated where applicable, and additional well records were added where absent. Information from selected test holes (soil borings) that are considered useful for Basin subsurface analysis were also included.

Available well information from WCRs and logs was transferred to the database fields for each unique well in the LOBP monitoring program. The fields for other Basin wells can be completed over time, as needed or as funding permits (the information is in the linked pdf files). Wells from the provided datasets for which no WCR was matched are in the database but with limited information.

DATABASE SUMMARY

There are 581 records in the Los Osos BMC Well Database with the following distribution by well type.

	Records
Domestic	316
Irrigation	49
Municipal	24
Observation	124
Destruction	44
Industrial	2
Other (Soil Borings)	15
Unknown	7

ATTACHMENT

Los Osos BMC Well Database Fields

	GIS Name	Field Name	Field Description
1	Name	Primary_Name	Name of the well. Must be unique to each well record.
2	Name2	Alternative_Name	Alternative name of the well.
3	State_Num	State_Number	State Well Number that has been assigned by DWR.
4	Well_Type	Well_Type	Type of well from lookup list identified by DWR in their system. E.g. production, monitoring, etc.
5	Well_Use	Well_Use	Use of well from lookup list identified by DWR in their CASGEM system. E.g. domestic, municipal, irrigation, etc.
6	Status	Well_Status	Status of Well from lookup list (active, inactive, unknown, destroyed).
7	Local_ID	Local_ID	Is the site an indentified managed recharge site by the Groundwater Strategic Plan or Groundwater Sustainability Agency?
8	SiteCode	Master_Site_Code	ID of well in CASGEM system (A.K.A. Master Site Code) in format: "387739N1212382W001".
9	EW_ID	EW_ID	EW ID of the well in the CASGEM system.
10	USGS_ID	USGS_ID	USGS ID of well in format: "373930118491602".
11	GT_Global	GeoTracker_GlobalID	GeoTracker site global ID in format "T0600300005". In combination with the GeoTracker_FieldPtNm, it identifies a unique well.
12	GT_FieldPt	GeoTracker_FieldPtNm	GeoTracker Field Point Name (well name such as "MW-1"). In combination with the GeoTracker_GlobalID, it identifies a unique well.
13	PubSupCode	Public_Supply_Code	Public Supply code assigned by the Division of Drinking Water in the format: "0202503-001".
14	Contour	Is_Contour_Well	Is the well typically used to develop contours.
15	RP_Elev_DH	RP_Elevation_Downhole	Elevation of the downhole reference point for an extensometer in feet above mean sea level (NAVD88).
16	Compl_Type	Well_Completion_Type	Type of well completion from lookup table (single well or part of a nested/multi-completion well).
17	WCR_Num	Well_Completion_Report_Number	Well Completion Report number.
18	Date_Drill	Date_Drilled	Date well was drilled (if known).
19	Date_Destr	Date_Destroyed	Date well was destroyed (if known).
20	Depth	Depth	Total depth of well (i.e. the depth that would be obtained by a tagline lowered into the well).
21	Cas_Mat	Casing_Material	Type of well casing material from a lookup table (PVC, Carbon Steel, Stainless Steel, etc).
22	Open_Bot	Is_Open_Bottom	Is the well casing bottom open?
23	Cas_Diam	Casing_Diameter	Diameter of the well casing in inches.
24	ScreenTop1	Screen_1_Top_Depth	Depth of the top of first screen interval in feet below ground surface..
25	ScreenBot1	Screen_1_Bottom_Depth	Depth of the bottom of first screen interval in feet below ground surface.
26	ScreenTyp1	Screen_1_Type	Type of screen first screen interval from lookup table (mills knife, wire-wrapped, open borehole, etc).
27	ScreenTop2	Screen_2_Top_Depth	Depth of the top of second screen interval in feet below ground surface.
28	ScreenBot2	Screen_2_Bottom_Depth	Depth of the bottom of second screen interval in feet below ground surface.
29	ScreenTyp2	Screen_2_Type	Type of screen second screen interval from lookup table (mills knife, wire-wrapped, open borehole, etc).
30	ScreenTop3	Screen_3_Top_Depth	Depth of the top of third screen interval in feet below ground surface.
31	ScreenBot3	Screen_3_Bottom_Depth	Depth of the bottom of third screen interval in feet below ground surface.
32	ScreenTyp3	Screen_3_Type	Type of screen third screen interval from lookup table (mills knife, wire-wrapped, open borehole, etc).
33	ScreenTop4	Screen_4_Top_Depth	Depth of the top of fourth screen interval in feet below ground surface.
34	ScreenBot4	Screen_4_Bottom_Depth	Depth of the bottom of fourth screen interval in feet below ground surface.
35	ScreenTyp4	Screen_4_Type	Type of screen fourth screen interval from lookup table (mills knife, wire-wrapped, open borehole, etc).
36	ScreenTop5	Screen_5_Top_Depth	Depth of the top of fifth screen interval in feet below ground surface.
37	ScreenBot5	Screen_5_Bottom_Depth	Depth of the bottom of fifth screen interval in feet below ground surface.
38	ScreenTyp5	Screen_5_Type	Type of screen fifth screen interval from lookup table (mills knife, wire-wrapped, open borehole, etc).
39	Confidentl	Is_Confidential	Is the well information confidential? Not public information?
40	Basin_Subb	Basin_Subbasin	Name of the basin/subbasin the well is within, from lookup table.
41	County	County	Name of the county the well is within, from lookup table.
42	Region	Region	Name of the region the well is withing, from lookup table.
43	Lat_NAD83	Latitude_NAD83	The latitude in decimal degrees, based on the NAD83 datum. Latitudes should be positive in California (e.g. 38.1234, -121.4321).
44	Lon_NAD83	Longitude_NAD83	The longitude in decimal degrees, based on the NAD83 datum. Longitudes should be negative in California (e.g. 38.1234, -121.4321).
45	Loc_Descr	Location_Description	A description of the well's location.
46	Coord_Mthd	Coordinate_Method	The method used to determine the well's coordinates, from lookup table.
47	Coord_Acc	Coordinate_Accuracy	The level of accuracy attributed to the well's coordinates, from lookup table.
48	GS_Elev	Ground_Surface_Elevation	The ground surface elevation of the well, measured from the NAVD 88 datum.
49	RP_Elev	Reference_Point_Elevation	The elevation of the reference point from which measurements are taken at the well, measured from the NAVD 88 datum.
50	RP_Descr	Reference_Point_Description	A description of the reference point's location.
51	Elev_Mthd	Elevation_Method	The method used to determine the well's ground surface elevation, from lookup table.
52	Elev_Acc	Elevation_Accuracy	The level of accuracy attributed to the well's ground surface elevation, from lookup table.
53	Mgmt_Area	Management_Area	The name of the management area, if known.
54	GSA_Name	GSA Name	The name of the GSA the well is within. Must match record from AGENCY table.
55	Purv_Name	Purveyor_Name	The name of the well's purveyor. Must match record from AGENCY table.
56	Owner_Name	Owner_Name	The name of the well's owner. Must match record from AGENCY table.
57	Data_Src	Data_Source_Name	The name of the agency the well data was sourced from. Must match record in AGENCY table.
58	Princp_Aq	Principal_Aquifer	Principal Aquifer as defined in the LOBP.
59	Transmiss	Transmissivity	Transmissivity of aquifer in ft/day.
60	Conduct	Conductivity	Hydraulic Conductivity of aquifer in ft/day.
61	Storatvty	Storativity	Storativity of aquifer, no units.
62	Porosity	Porosity	Fraction of aquifer material that is pore space.
63	Descriptn	Description	Additional comments concerning the aquifer.
64	Notes	Notes	Additional comments concerning the well location accuracy
65	Filename	File_Name	File name for the corresponding pdf containing information about the well record
66	Filepath	File_Path	File path to link to the pdf for each well record.