

CARSON WATER SUBCONSERVANCY DISTRICT Regional Water System & Flood Committee

NOTICE OF PUBLIC MEETING

DATE: March 30, 2021
TIME: 10 am
LOCATION: Video Conference ZOOM Meeting

NOTICE TO PUBLIC: *The State of Nevada and Carson City are currently in a declared State of Emergency in response to the global pandemic caused by the coronavirus (COVID-19) infectious disease outbreak.*

In accordance with the Governor's Declaration of Emergency Directive 006, which has suspended the provisions of NRS 241.020 requiring the designation of a physical location for meetings of public bodies where members of the public are permitted to attend and participate, public meetings of Carson Water Subconservancy District will NOT have a physical location open to the public until such time this Directive is removed.

Members of the public who wish to participate during a public meeting may do so by providing public comment during the two designated public comment periods, indicated on the agenda, via telephone.

You may attend the virtual meeting by clicking this [Zoom Link](#). If you prefer to phone in, call (669)900 9128. Meeting ID: 895 4538 0591; Passcode: 370779. You may also provide public comment in advance of a meeting by written submission to the following email address: catrina@cwsd.org. For inclusion or reference in the minutes of a meeting, your public comment must include your full name and be submitted via e-mail by not later than 3pm the day before the date of the meeting.

AGENDA

Please Note: *The Carson Water Subconservancy District (CWSD) Board may: 1) take agenda items out of order; 2) combine two or more items for consideration; and/or 3) remove an item from the agenda or delay discussion related to an item at any time. All votes will be conducted by CWSD Board of Directors. Reasonable efforts will be made to assist and accommodate individuals with disabilities who wish to join the meeting. Please contact Catrina Schambra at (775)887-7450 (catrina@cwsd.org), at least two business days in advance so that arrangements can be made.*

1. Call to Order the CWSD Regional Water System & Flood Committee
2. Roll Call
3. For Discussion Only: Public Comment - Action may not be taken on any matter brought up under public comment until scheduled on an agenda for action at a later meeting.
4. For Possible Action: Approval of Agenda
5. For Possible Action: Approval of the Regional Water System and Flood Committee August 12, 2020 Meeting Minutes

6. For Possible Action: Discuss and possibly authorize CWSD to apply for a Grant from BOR for a Basin Plan Study
7. For Possible Action: A review of the various projects to be submitted under FEMA MAS 12 Grant Application
8. For Possible Action: Discussion of MB Web Access Proposal
9. For Discussion Only: Public Comment - Action may not be taken on any matter brought up under public comment until scheduled on an agenda for action at a later meeting.
10. For Possible Action: Adjournment

Supporting material for this meeting may be requested from Catrina Schambra at 775-887-7450 (catrina@cwsd.org) and is available on the CWSD website at www.cwsd.org.

In response to COVID-19 Emergency Directive:

Posting in public buildings in accordance with NRS 241.020 has been waived by COVID-19 Emergency Directive #6 of Governor Sisolak. Therefore, this notice and agenda of video conference meeting has been posted on or before 9am on March 24, 2021 on the following websites for the March 30, 2021 meeting of the Carson Water Subconservancy District Regional Water System and Flood Committee, in accordance with NRS 241.020:

Carson Water Subconservancy District Website:

<http://www.cwsd.org>

State Public Meetings Website:

<http://notice.nv.gov>

CARSON WATER SUBCONSERVANCY DISTRICT Regional Water System & Flood Committee

August 12, 2020, 8:30 am

Draft Minutes

The CWSD Regional Water System & Flood Committee meeting was held via Zoom Videoconference and teleconference due to Governor Sisolak's statewide Emergency Directive in response to the COVID-19 Pandemic.

Committee Members Present:

Brad Bonkowski
Kathy Canfield
Carl Erquiaga
David Griffith
Jack Jacobs
Mike Workman

Committee Members Not Present:

Fred Stodieck

CWSD Staff Present:

Ed James
Debbie Neddenriep
Catrina Schambra

Others Present:

Michael Bennett, Lumos & Assoc. Inc.
Mark Lovelady, Gardnerville Water Co.
Greg Reed, Gardnerville Ranchos GID

Committee Member Erquiaga called the video/teleconference meeting of the Carson Water Subconservancy District's Regional Water System and Flood Committee to order at 8:30 am. Roll call was taken and a quorum of the committee was determined to be present.

Item #3 – Discussion Only: Public Comment - None

Item #4 - For Possible Action: Approval of Agenda

Committee Member Bonkowski made a motion to approve the Regional Water System and Flood Committee Agenda. The motion was seconded by Committee Member Griffith and unanimously approved by the Regional Water System and Flood Committee.

Item #5 - For Possible Action: Approval of the Regional Water System and Flood Committee Minutes of May 4, 2020

Committee Member Bonkowski made a motion to approve the Regional Water System and Flood Committee Minutes from May 4, 2020. The motion was seconded by Committee Member Griffith and unanimously approved by the Regional Water System and Flood Committee.

Item #6 - For Possible Action: Discuss a funding request from Gardnerville Ranchos GID & Gardnerville Water Company for an intertie between the two utilities

Greg Reed, District Manager for Gardnerville Ranchos GID presented the emergency intertie project between GR GID and Gardnerville Water Company. Two possible locations being considered are (1) at the intersection of Centerville Lane and Waterloo Lane and (2) at the intersection of Highway 395 and Muller Parkway. He discussed logistics of both options. To get the project started, GR GID has hired Lumos to conduct a feasibility study of the two locations for both emergency and potential long-term use. GR GID is very excited and determined to complete this project. Mr. Reed is here today, along with Mark Lovelady of Gardnerville Water Company to bring the project to the CWSD Board for possible future funding consideration. The contract with Lumos was just signed this week, so the project is in preliminary stage, but they wanted it on CWSD radar.

Mr. James explains to the committee that the purpose today is to make sure that this is a project CWSD wants to support, not that we are committing to funding, but a consensus in favor of the project goals. Any actual funding requests will be brought back later to CWSD for consideration when the project scope and costs have been determined.

Director Workman asks if the Lumos contract scope of work includes determining funding sources. Michael Bennett (Lumos) explained the funding aspect is not included in their current contract, just the feasibility of the project itself. Is it physically possible, reasonable, and safe? Is the project viable?

Director Workman suggests that when the funding search begins that they reach out to Jason Cooper (SRF Program) as he is a member of that Board and they heavily favor interties. Also, Sheryl Couch at USDA would be a possible source.

Director Bonkowski stated that this all seems very preliminary and the most CWSD can do today is support the idea behind the project, but we need actual budget numbers before we can approve anything to move forward. Committee Member Griffith agrees, stating we do support interties, but we need more information. Come back after the study is completed.

Mr. James says since this question of interties in Douglas County was last discussed back in 2010, he wanted the discussion to be brought back to the committee to ascertain that this is still something CWSD wants to pursue. We are looking for direction to move forward.

Chairman Erquiaga appreciates it being brought to the committee and states there is a consensus of strong support for interties.

No action was taken.

Item # 7 – For Discussion Only – Update on the Carson River Watershed Workshop

Mr. James discussed the plans moving forward on the virtual Workshop which is tentatively scheduled for October 12. There are many local and state professionals taking part and some

of the presentations will be pre-recorded. This is our first foray into a virtual workshop, and we are excited by the challenge to make it both engaging and effective. There will be more details ready to present to the Board at the August meeting.

No action was taken.

There being no further business to come before the Regional Water System and Flood Committee, Director Erquiaga adjourned the meeting at 8:52 am.

Respectfully submitted,

Catrina Schamblra

Secretary to the Board

**CARSON WATER SUBCONSERVANCY DISTRICT
REGIONAL WATER SYSTEM AND FLOOD COMMITTEE**

TO: REGIONAL WATER SYSTEM AND FLOOD COMMITTEE

FROM: EDWIN D. JAMES

DATE: MARCH 30, 2021

SUBJECT: Agenda Item Background Information

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Item # 6 – For Possible Action - Discuss and possibly authorize CWSD to apply for a Grant from BOR for a Basin Plan Study

In 2012, CWSD applied for a BOR Basin Plan Study to evaluate the water supply and demands for the entire Carson River Watershed. The grant amount was for \$200,000. CWSD received the grant. As we were developing the detail scope of work, UNR and other Agencies received a grant to conduct the *Water for the Seasons* study for the Truckee and Carson rivers. This grant was for \$4 million dollars. Included in the study was the development of various model tools for the Carson River. Upon hearing this project CWSD decided it would be prudent to withdraw the BOR grant and wait until the various models were developed.

Last year the *Water for the Seasons* project was completed. Out of the study the USGS developed a detail groundwater/surface water model for the Carson Valley and a detail climate model. At the same time, the USGS completed their modeling efforts on the Middle-Carson River sections.

With these various tools, staff would like to pursue enhancing the models and incorporate the work the USGS is doing in Douglas County to develop an overall watershed water plan. This plan will help define the water strategies in the watershed for the next 40 years.

The BOR grant requires 50% match; however, this money can be leverage with the USGS 35% matching funds. The estimated cost of the project are as follows:

Basin Plan Costs - \$210,000
BOR Grant Match - \$105,000
CWSD Cash Match – \$50,000
CWSD In-Kind Match - \$55,000

USGS modeling \$160,000.
USGS matching Funds - \$56,000
CWSD match funds - \$104,000

The funds for this project would be used to (a) pay USGS \$104,000, and (b) pay an engineering firm to prepare the plan \$51,000.

Item # 7 – For Possible Action - A review of the various projects to be submitted under FEMA MAS 12 Grant Application

The FEMA CTP funding announcement will be released around April 1, 2021. CWSD has met with the various counties and has developed a list of projects. Attached is a list of projects and estimated costs. The total grant requests will be \$785,000.

Item # 7 – For Possible Action – Discussion of Michael Baker Inc. (MB) Web Access Proposal

Included in MAS 11 funding requests was a project develop a web access platform where engineers, developers, and county staff could utilize the data from the various flood models that have been developed in the Carson River Watershed. MB is the engineering firm selected to conduct this project. Attached is their propose business plan, schedule, and costs to conduct the project.

FEMA MAS 12 Proposed Projects

In October 2020, CWSD contacted all the counties in the watershed asking them what flood projects they would like CWSD to pursue in the next round of FEMA CTP funding. Below is a list of proposed projects. CWSD has recently heard that FEMA may have funding available for all the projects below. The costs are a rough estimate. The total estimated cost for all the studies plus administration costs is \$785,000.

Project Management

Budget Estimate: - \$30,000

Depending on the number of projects that are approved by FEMA, CWSD estimates that the costs to administer the grant will be around \$30,000.

1. Southeast Carson Area Drainage Plan

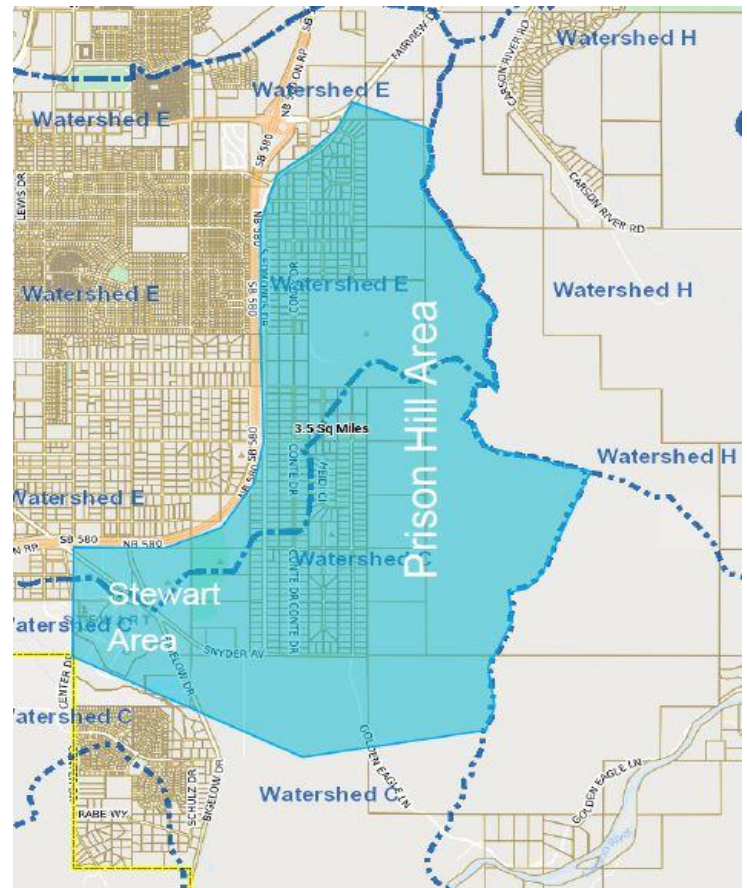
Technical Hazard Identification

Estimated FEMA Costs: \$130,000

Background: Carson City has remapped several floodplains in both the south and east parts of the City. The new floodplain maps have identified properties and structures that are located within the FEMA special flood hazard areas (SFHA) or have other drainage concerns. Carson City is interested in reducing the number of properties/structures in the SFHA which are subject to shallow flooding in the Stewart and Prison Hill areas.

Scope:

The Carson Water Subconservancy District (CWSD) will retain an engineering firm to evaluate what infrastructure is needed to reduce the number of properties/structures in the SFHA and other shallow flooding areas. CWSD will utilize the hydrology and hydraulics developed during the flood hazard mapping update. Using this information, the selected engineering firm will determine the appropriate mitigation measures such as: detention basins, channels and pipe sizes, and inlet locations, which will best reduce SFHA and shallow flooding impacts. The figure below includes the proposed study area shown in cyan (approximately 3.5 square miles).



2. Buckeye Creek detention/flood control basin design.

Technical Hazard Identification

Estimated FEMA Costs: \$155,000

This project would look at Buckeye Creek and design a detention basin that would remove residences from the 100-year floodplain. Additionally, the project will evaluate culvert sizing to pass the flows for the proposed construction of Muller Parkway. There is also a network of ditches that will need to be improved to remove property from the floodplain. In the future there will be a need to conduct a LOMR which could come in a different funding phase.

3. Virginia City– Drainage Mitigation Study and Community Outreach

Technical Hazard Identification

Estimated FEMA Costs: \$140,000

Stormwater runoff from Virginia City cumulates into Six Mile Canyon, which then empties into an alluvial fan at the base of the canyon into an area studied by the Dayton Valley Area Master Drainage Plan. The base of Six Mile Canyon is also identified on FEMA mapping as a special flood hazard area.

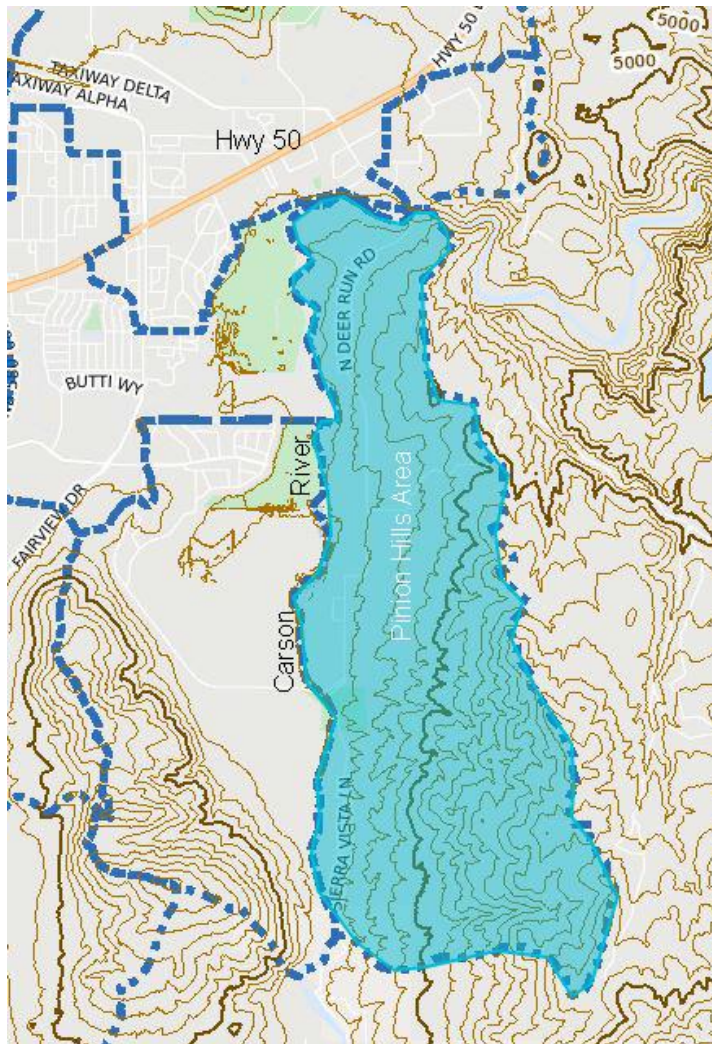
Virginia City is located on a steep slope, with runoff (water and sediment) reaching a high velocity entering Six Mile Canyon. While Six Mile Canyon is for the most part in a natural condition, Virginia City is a developed town with both paved and dirt roadways. Although there are some storm drains and infrastructure improvements in certain areas, the majority of runoff is directed onto streets following the slope downhill. An overall plan for stormwater runoff for the town is needed and has been included on the initial Capital Improvement Program proposed for the County. An evaluation of the runoff, and the potential for retention/detention and controlling sediment flow prior to entering and impacting Six Mile Canyon is desired.

Storey County desires an overall plan to address flooding and stormwater impacts for Virginia City. The plan would identify impacted areas and potential mitigation that could occur prior to water reaching Six Mile Canyon. The County desires to avoid runoff impacting Six Mile Canyon roadway and would desire a study to identify potential modifications to the existing channel to maintain runoff in the channels, slow sediment and avoid adverse effects to the outflow of the canyon and the FEMA mapped special flood hazard area.

4. East Carson Area Drainage Plan

Technical Hazard Identification

Estimated FEMA Costs: \$180,000



Background: Carson City is interested in an Area Drainage Master Plan for the Pinion Hills area which is east of the Carson River. To date, Carson City has not performed floodplain mapping specific to this area.

Scope:

The Carson Water Subconservancy District (CWSD) will retain an engineering firm to evaluate the needed infrastructure to reduce the number of properties and structures located in flood areas and which may be subject to shallow flooding. CWSD will perform a hydrologic analysis; the analysis will include an evaluation of existing hydraulics structures in addition to data collection of topographic features within the study area. The selected engineering firm will determine the appropriate mitigation measures such as: detention basins, channels and pipe sizes, and inlet locations, which will best reduce flooding and shallow flooding impacts.

The figure below includes the proposed study area shown in cyan (approximately 4.8 square miles).

5. Six Mile Canyon

Technical Hazard Identification

Estimated FEMA Costs: \$100,000

Six Mile Canyon is narrow and contains a 2-lane roadway in Storey County which is a vital connection from the Dayton Valley to Virginia City and Reno. This roadway has eroded in past large storm events and rebuilding has occurred several times. Improvements to incremental pieces of the canyon drainage system have been implemented. An overall evaluation of the system, along with recommendations for improvements to stabilize the roadway while also allowing for runoff to occur without serious impacts to the roadway or canyon erosion, including potential mercury movement, is desired. Currently, the County is addressing this area in a reactionary method as impacts occur.

The majority of runoff reaching Six Mile Canyon comes from Virginia City. Virginia City is located on a steep slope, with runoff (water and sediment) reaching a high velocity entering Six Mile Canyon. While Six Mile Canyon is for the most part in a natural condition, Virginia City is a developed town with both paved and dirt roadways. Although there are some storm drains and infrastructure improvements in certain areas, the majority of runoff is directed onto streets following the slope downhill. An overall plan for stormwater runoff for the town is needed and has been included on the initial Capital Improvement Program proposed for the County. An evaluation of the runoff, and the potential for retention/detention and controlling sediment flow prior to entering and impacting Six Mile Canyon is desired.

Storey County desires an overall plan to address flooding and stormwater impacts for Six Mile Canyon. The plan would identify impacted areas and potential mitigation that could occur prior to water reaching Six Mile Canyon. The County desires to avoid runoff impacting Six Mile Canyon roadway and would desire a study to identify potential modifications to the existing channel to maintain runoff in the channels, slow sediment and avoid adverse effects to the outflow of the canyon and the FEMA mapped special flood hazard area.

Community Outreach and Mitigation Strategies

Estimated FEMA Cost: \$35,000 - \$50,000

This includes project outreach coordination with contractors, flood awareness week program (which newspaper, billboards, and Spanish ads), and adding a social media and digital engagement calendar to the communication plan. (\$35,000)

If there are additional funds available – (\$15,000)

- Create high water mark signs on bridges (similar to those in Roseville, CA).
- Collect flood stories from people at flood awareness booths.

March 19, 2021

Mr. Edwin James, General Manager
Carson Water Subconservancy District
777 E. William St., Suite 110A
Carson City, NV 89701

Re: Business Plan for the Development of a Web Access System for Flood Studies Data Completed in the Carson River Watershed

Dear Mr. James:

After meeting with representatives from Carson Water Subconservancy District and the five counties in which the Carson River Watershed lies, Michael Baker International (Michael Baker) has prepared a business plan for the project. This plan includes the understood Scope of Work for each of the six tasks outlined in Exhibit A from the RFQ; the schedule and timeline for the proposed tasks; and the fee, which will be a not-to-exceed lump sum in accordance with the RFQ. We have also included a cost estimate for infrastructure hosting, since our exploratory discussions have indicated that none of the participating counties are able to host the application.

We look forward to working closely with CWSD, the counties, consultants, developers, and stakeholders on developing a Web Access System that will be beneficial and user-friendly for accessing 2-D model results from Area Drainage Master Plans (ADMPs), flood mitigation studies, and LOMRs that have been conducted over the past several years.

Please provide feedback and updates to the attached plan in order for us to create a usable, interactive, long-term application to meet the needs of CWSD, the participating counties and stakeholders, and the public.

Sincerely,
MICHAEL BAKER INTERNATIONAL



Polly Boardman, PMP
Project Manager and Principal-in-Charge

Web Access System Business Plan

Project Purpose and Need

The primary purpose of the Web Access System (WAS) is to enable counties' staff, developers, and engineering firms the ability to utilize the hydrologic and hydraulic models that have already been developed for several drainages in the Carson River Watershed.

One of the advancements in the use of geographic data in the last decade is the integration of mapping information with the web. Many GIS layers are prepared with the intention of posting the geospatial and attribute data to a website for government or public consumption. The County agencies and the general public need mapping data but do not always have the luxury of a full-fledged geographic information system. The perfect solution is a website that displays mapping layers and information upon clicking or querying the layers. This allows non-technical users to gather information quickly and to trust that the data is accurate.

Michael Baker's application development group includes a web development team proficient in web-enabled development technologies, such as HTML5, JavaScript, ArcGIS API for JavaScript, Perl, etc. Our web development team creates custom websites to client specifications that are both public facing and/or internal to organizations accessed via log-in credentials. Michael Baker develops websites with desktop and mobile viewing in mind so that the sites can be properly displayed on any device. Michael Baker's GIS Analysts will team with our web developers to create aesthetically pleasing, easy to understand cartographic displays.

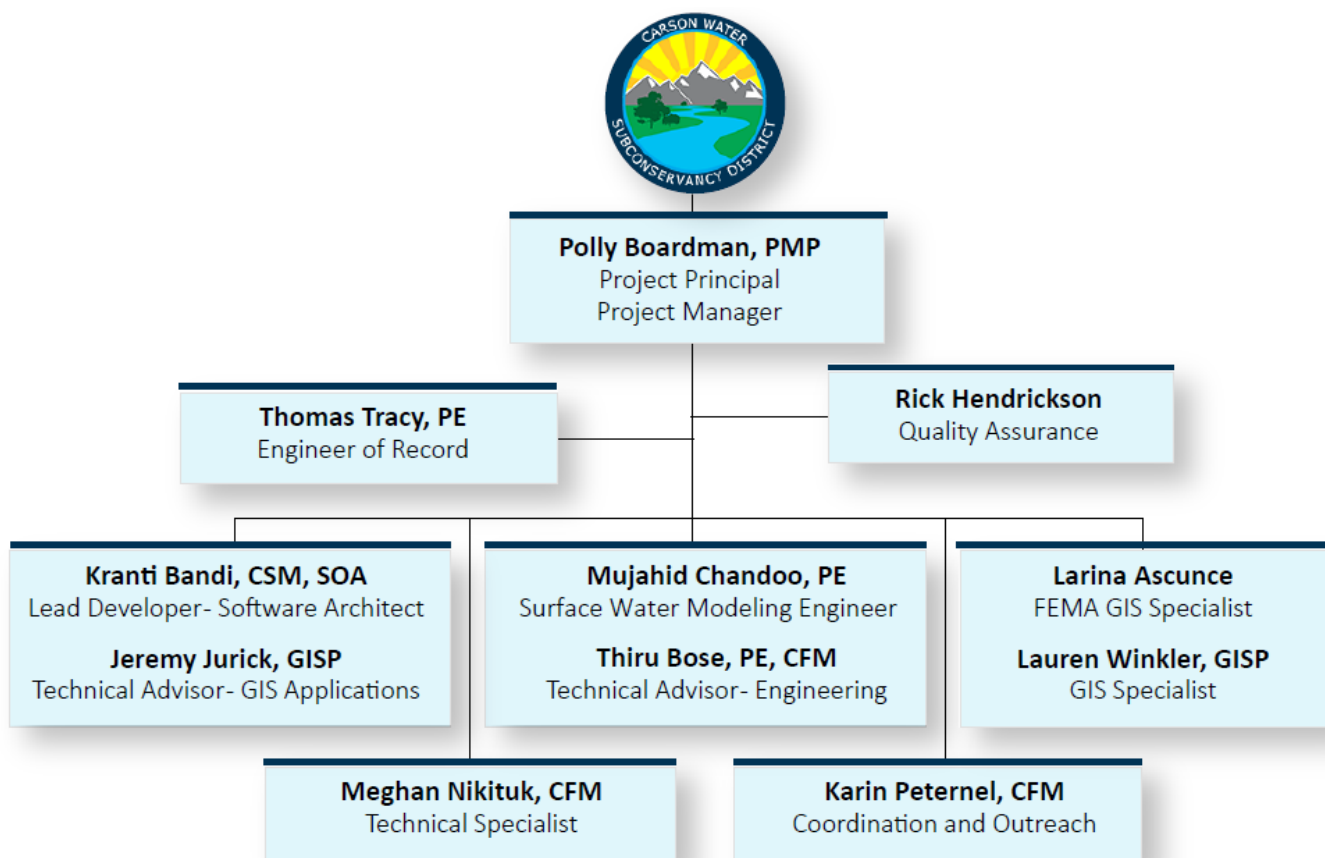
Project Services and Tasks

Task 1.0: Project Management

1.1 Project Manager

Michael Baker has identified Polly Boardman, PMP, from the Reno, Nevada office at 5470 Kietzke Ln., Suite 208, Reno, NV 89511 as the Project Manager. Polly has almost 20 years of GIS management experience in Northern Nevada. She will be the official point of contract between the client and consultant teams for all issues related to the project. As Principal-in-Charge in the Reno office and an Officer of the company, she will also be responsible and accountable for all contract issues and negotiations, as well as legally binding the company for contract agreements. Polly will be supported by the staffing plan as shown below in the organizational chart.

Deliverables: N/A



1.2 Project Coordination Meetings

Polly Boardman will schedule bi-weekly (every other week) project coordination meetings with the client team to keep the team informed and to ensure communication and collaboration throughout the duration of the project.

Deliverables:

- Recurring bi-weekly meeting invite

1.3 Invoicing

Polly Boardman will invoice the CWSD monthly with a percent complete estimate for each task. The invoice will be processed by Michael Baker on the first Tuesday of the following month and will be emailed or mailed to CWSD's point of contact, to be identified in the contracting process. The invoice each month will include a brief progress report per task.

Deliverables:

- Monthly invoice

Task 2.0: Develop System Architecture and Implementation Plan

2.1 System Architecture and Implementation Plan and Needs Assessment

This task has several purposes: to determine the data and functionality for the Web Access System, to develop an implementation plan, and to determine the system architecture. Because of the multitude of jurisdictions involved, the complexity of the functionality of the tool, and the extent of data input necessary, we find it beneficial to meet with the developers of the existing web access tools to provide us with some background and input. This is necessary

to ensure the scope is clear from the outset, due to the technical and programming complexity of this project. We recommend a minimum of one, two-hour meeting with the appropriate Flood Control District of Maricopa County staff, as well as any other developers that would be willing to participate.

Our intent is to fully understand the ultimate functionality desired by CWSD and the jurisdictions as a result of the review by CWSD staff of the Mohave County and Flood Control District of Maricopa County applications. Once the initial outline of the system and the functionality desired is established, Michael Baker will then meet with the jurisdictions individually (Storey, Lyon, Carson City, Douglas, and Churchill counties) or collectively over a series of 2-3 meetings to ensure that all jurisdictions understand what is being developed. In the event there are additional items that are desired to be included by the different counties, Michael Baker will work with CWSD staff to determine which of those additional inputs or functions will be included. We want to start out on the right foot – to make sure that what CWSD is envisioning is the ultimate product produced.

We understand this type of application and potential functionality is new to many of the participants; therefore, during these meetings, Michael Baker will inform the counties of the possibilities and will help to guide the discussions. A matrix will be created that identifies the expected functionality of each agency and highlights the overlapping needs. The matrix will be used to prioritize functionality and data that should be included in the application. In addition to functionality, these meetings will also be used to gather existing data sources and input on which data should be included in the application. The matrix will be included in a Needs' Assessment document to summarize the findings.

Dependent on the counties' needs, Michael Baker proposes one of these two options:

- ArcGIS Online Web Apps
- Custom Websites Hosted on Cloud or On-Premise

ArcGIS Online Web Apps

ArcGIS Online provides the functionality to create mapping websites that the public can easily understand and use. Typical functionality includes zooming, panning, identification of features, query of information, and location tracking. This functionality also crosses over to mobile platforms, both phones and tablets.

Custom Websites

Upon the outcome of the GIS web mapping needs assessment, Michael Baker may determine that ArcGIS Online is not the best solution for CWSD's web maps. Reasons for this may be as follows:

- Requirements for log-in privileges with varying rights per log-in
- Out-of-the-Box functionality does not meet needs

In this scenario, Michael Baker proposes creating a custom web mapping application for CWSD. Michael Baker will design and create the front-end of the website to CWSD's specifications, leveraging ArcGIS API for JavaScript. A focused implementation plan will then be developed, which will include the system architecture best suited for this application. A document will be developed that describes where the application will reside, the software and hardware required, and, at a high level, how they should be configured.

A final meeting will be a good time to circle back on feedback and revisions and to present the findings and recommendations.

Deliverables:

- Needs Assessment meetings
 - Background review meeting with CWSD and other agencies to establish overall functionality and intent
 - Follow up meeting with Michael Baker and CWSD staff to review suggested product
 - 1-2 Meetings with jurisdictions to review web access tool intent
 - Final meeting with all agencies
- Needs Assessment Documentation – exploration of data and functions desired (required + wish list), plus a matrix for any suggested add-ons
- Implementation Plan with high-level infrastructure

Task 3.0: Hardware and Software Purchase and Installation Support

3.1 Hardware Acquisition and Setup

Funds for hardware purchase and/or cloud-based server use are not included in this scope/fee and will vary depending upon the needs identified by CWSD and counties. Since Carson City IT is not able to host the application, Michael Baker has provided the cost breakdown of hardware and software infrastructure needs in **Attachment A**. After a first review in February 2021 of the licensing and hosting costs for CWSD to set up their own infrastructure and determining it was cost-prohibitive, other options were explored. Options for infrastructure location include:

1. Michael Baker hosting, either short- or long-term. Costs are shown in Attachment A for this option.
2. Counties hosting separate applications with their existing infrastructure. This option will cause a change in scope for the project, but it can be a cost-effective solution, only if all the counties already have the appropriate infrastructure in place.

3.1.1 Technical Discussion with Esri

In conferring with Esri technical experts, it was agreed that the ArcGIS Online (AGOL) solution does not have the capabilities for some of the core concepts in the desired scope. Additionally, because the scope for the application includes large sets of data, Flo-2D modeling, and geoprocessing tools, we recommend a customized application with storage and processing occurring in ArcGIS Enterprise rather than in ArcGIS Online for cost savings.

Expenditures of “AGOL credits” can get expensive – these credits are the driving factors and are needed for most interactions with ArcGIS Online. AGOL credits are bought in packs of 1,000 at \$100 each, but storage and processes can burn through these credits very quickly. Therefore, Michael Baker and Esri both agree that this would not be the proper solution, so this is not included in the comparative cost analysis in Attachment A.

3.1.2 Hosting and Infrastructure

Michael Baker has decades of experience hosting client applications both on premise and cloud infrastructures. With a dedicated Information Technology (IT) department, hosting providers, server space, high-level systems security, regularly scheduled maintenance and back-ups, patches, and a suite of job responsibilities, Michael Baker can provide support from software development to hosting services. Michael Baker’s technical team can provide support on as-needed basis as time and materials whenever needed. If and when CWSD or one of the counties decide to host the application, Michael Baker can work with their IT Departments to assist in configuring and installing the WAS application.

3.1.3 Deployment and Hand-off

Our goal would be to roll over the application hosting and maintenance to CWSD or one of the counties when they are ready so that the application is completely run in-house.

Michael Baker understands the desire for jurisdictions to have control of their data and applications as to not be tied to a consultant. With mapping solutions, something to keep in mind are the licensing and maintenance costs that come with Esri software and Azure cloud hosting services. If and when a jurisdiction takes over hosting, budget will need to be set aside for a dedicated IT professional to maintain the license and infrastructure.

3.2 Network Infrastructure Coordination

The network infrastructure plan will be determined based on the direction selected by CWSD for hosting. Michael Baker will set aside hours for coordination with CWSD for any Network Infrastructure related discussions and recommendations. Michael Baker will ensure that the counties know the level of effort required for hosting the application, whether right away or after a period of being hosted on the Michael Baker servers.

3.3 Software Purchase

Michael Baker has the ability and is willing to coordinate with CWSD to purchase appropriate software and software licenses for the WAS. Michael Baker will need to have the hardware, infrastructure, and software set up in order to start with Task 4, since we will want to start development on the server that is going to be used.

If Option 2 for hosting is selected, each county will be responsible for obtaining the ArcGIS Enterprise 10.8.1 license files from Esri through the Esri representative. Michael Baker can provide support in terms of purchasing the appropriate license, if one is not already in place.

Deliverables:

- Assistance with Esri Licensing, if applicable

Task 4.0: System Software/Site Development

4.1 ArcGIS Enterprise Installation

Michael Baker will install and configure ArcGIS Enterprise 10.8.1 (Portal and Server) for the purposes of internal and public facing usage. Michael Baker proposes to create two different server instances, one each for ArcGIS Enterprise Portal and Enterprise Spatial Data Engine (SDE). ArcGIS Enterprise SDE will be configured to use PostgreSQL, a Relational Database Management Systems (RDBMS).

If it is determined that the counties will host the application themselves rather than having Michael Baker start with hosting, after the successful installation / configuration of the ArcGIS Enterprise solution on each county's server, Michael Baker will hand over account details with appropriate connection information to ensure that the counties will continue to maintain and host ArcGIS Enterprise and will not need to rely on Michael Baker. This implementation will grant each county access to create ArcGIS Enterprise sites, to publish MXDs as map services on ArcGIS Server, and to create custom web, desktop, and mobile applications, as needed.

Deliverables:

- Document with ArcGIS Enterprise information, including usernames and passwords

4.2 Model Symbolology and Layers Development and Generation of Model Spatial Data

A potential list of items and information that will be included, depending on availability, in the WAS are as follows, which will be finalized during the needs assessment task:

1. Watershed/Study Area
 - a. Info will be obtained from ADMP/MPD
2. Drainage info
 - a. Channel Linework

- b. Regional Systems (if available)
- 3. Inundation Maps (This info is dependent on available models/studies)
 - a. Depth
 - b. Velocity
 - c. WSEL
 - d. Animations
- 4. Channel Status (Deficiency Systems)
 - a. Channel status not defined
 - b. No Flooding
 - c. Flooding Possible
 - d. Flooding Likely
- 5. Gauge (From USGS, DWR, or CWSD)
 - a. Stream Gauge
 - b. Rain Gauge
- 6. FEMA Datasets
 - a. DFIRM
 - b. LOMA
 - c. LOMR
 - d. FIRM Panel
 - e. Elevation Certificates
- 7. Topography
 - a. Raster
 - b. Contours
- 8. Address Search
- 9. Parcel Data
- 10. Tools
 - a. Measurement Tools
 - b. Print
 - c. Other tools

The datasets and sources will be quality controlled and formatted as needed to serve as the backbone of the application. The data layers will be published as ArcGIS REST services to be used in the application. Certain layers that are developed by others, such as FEMA, may be included directly as services from those agencies that serve up the data. Otherwise, CWSD will become responsible for downloading and maintaining data developed by others.

4.3 Geoprocessing Service Publishing in ArcGIS Server

It is anticipated that certain tools will require geoprocessing services to function and produce results. Michael Baker will assist CWSD in publishing the geoprocessing services required for the WAS to function as determined under Task 2. The services will be published to the ArcGIS Server instances configured in section 4.1.

The command line tools used in the Flood Control District of Maricopa County's application will be evaluated for use and inclusion under Task 2. The cost and benefits will be weighed against the other identified needs and wishes, along with available budget and CWSD will determine which features to include.

4.4 Website Configuration

Michael Baker will build out the application as defined during Task 2. Michael Baker will design and create the front end of the website to CWSD's specifications, leveraging ArcGIS API for JavaScript or ArcGIS Online.

The data services published under Task 4.2 and the geoprocessing services published under 4.3 will feed into and provide the content for the application. The result of this task will be a functional application supporting the identified needs of CWSD and the jurisdictions, which will be then be ready to roll-out for testing.

Deliverables:

- Working Web Access System (WAS) Application

Task 5.0 System Documentation and Roll-Out

5.1 System Documentation

System documentation will be prepared during the development, testing, and deployment of the application to ensure that CWSD has thorough knowledge and back-end information regarding the system and infrastructure of the application.

Deliverables:

- System Documentation

5.2 Response to Testing

Acceptance testing will be a crucial step in the application roll-out. CWSD will be provided with a matrix of functionality and data for which to test. Upon testing completion, Michael Baker will correct known problems and reissue for testing. Once this testing and break/fix process is complete, the application will be considered final.

Deliverables:

- User Acceptance Testing Matrix for feedback

5.3 Training

Michael Baker will provide training to appropriate staff at CWSD and to the five counties on how to utilize the WAS. Training documentation will also be provided for CWSD staff to train other applicable staff going forward. This task is intended to aid in ease of use of the website and for allowing staff to perform administrative duties. It does not include modification to geoprocessing services, model symbology, or published map services. Subjects may include:

ArcGIS Portal / Server

- Portal for ArcGIS Administration – Discuss and demonstrate administration (logins, group creation, access rights, etc.) for Portal for ArcGIS.
- GIS Website Maintenance – Discuss how to create and make updates (i.e., symbology changes, add/remove layers, add/remove widgets, etc.) to GIS Mapping Websites and Applications
- Questions and Answers (Q&As) - Discuss any outstanding questions or issues regarding server infrastructure or other GIS administration issues.

GIS Server Maintenance

- Discuss and demonstrate GIS Server hardware and software with CWSD IT; demonstrate how the production environment links to the web hosted solution

Deliverables:

- Training Manual
- Training session(s) for CWSD staff, either onsite or remotely

Task 6.0 As-Needed Support

Michael Baker will provide any additional GIS technical support or training not already included in items 1 through 4 which CWSD requests such as upgrading ArcGIS Enterprise. These support services will be rendered, only as requested for a period of ONE YEAR, on a time-and-materials not-to-exceed basis.

Deliverables:

- As-needed support contact information

Project Schedule

		2021								2022					
		May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
<i>*Completed by end of:</i>															
1	Project Management														
	1.1 Project Manager														
	1.2 Project Coordination Meetings														
	1.3 Invoicing														
2	System Architecture/Implementation Plan & Needs Assessment														
3	Hardware and Software Purchase and Installation Support														
	3.1 Hardware Acquisition and Setup														
	3.2 Network Infrastructure Coordination														
	3.3 Software Purchase														
4	System Software/Site Development														
	4.1 ArcGIS Enterprise Installation														
	4.2 Model Symbolology and Layers; Generation of Spatial Data														
	4.3 Geoprocessing Service Publishing in ArcGIS Server														
	4.4 Website Configuration														
5	System Documentation and Roll-Out														
	5.1 System Documentation														
	5.2 Response to Testing														
	5.3 Training														
	5.4 CWSD and stakeholder feedback and final sign-off														
6	As-Needed Support (1-year extended from WAS deliverable)														

**timeline assumes a notice-to-proceed start date of May 1st, 2021. Timeline shown in this chart will be pushed back in accordance with start date if it is delayed.*

Project Fee : Web Access System Development and Deployment

Project Task	Level of Effort	Estimated Allotment of Budget
Task 1	7%	\$ 11,200.00
Task 2	15%	\$ 24,000.00
Task 3	5%	\$ 8,000.00
Task 4	55%	\$ 88,000.00
Task 5	15%	\$ 24,000.00
Task 6	3%	\$ 4,800.00
Total Cost	100%	\$ 160,000.00

This fee is all-inclusive, with the exception of hosting and licensing fees that were not part of the proposal scope and are addressed in Attachment A

Attachment A: Hosting and Infrastructure Fees Estimate

Michael Baker Hosted Solution

Hardware/Software Infrastructure	Price/Month
Esri AEC License*	\$ 100.00
Esri Enterprise Perpetual License: Michael Baker provided	\$ 500.00
Microsoft Azure Hosting, Storage, Networking, and Backup Costs: Michael Baker provided	
Dedicated flat file space on shared Michael Baker server for data & files	
Setup, Security, and Maintenance Labor	
Total Monthly Cost	\$ 600.00
Annual Total Cost of Hosting on Michael Baker Server (Monthly x 12)**	\$ 7,200.00

**License cost to Esri for Michael Baker to host another entity's application on their A/E Consultant's enterprise license*

***3- or 5-year hosting agreement. Costs and hosting location can be re-assessed at this time.*

No extra charge for adding new floodplain studies to the application. Space needed will be determined ahead of time and allotted to CWSD on the shared server

Hosting fees do not include the cost of application development