Draft Scope of Work

City of Flagstaff
Water Resources Master Plan

January 3, 2020

Project Overview

The City of Flagstaff (City) is preparing a Water Resources Master Plan (WRMP) modeled after the *One Water* concept (One Water Flagstaff). The end product will represent a long-term commitment to ensure Flagstaff's water future through collaboration, innovation, and public involvement. One Water Flagstaff will provide a history of water resource planning, a decision framework, vision, and implementation strategy required to meet long-term water supply demands for a prosperous and innovative population.

The planning effort will adopt One Water concepts from the *US Water Alliance One Water Roadmap: The Sustainable Management of Life's Most Essential Resource (2016)* and the Water Research Foundation's *Blueprint for One Water*. The plan will inform the five arenas for action defined in the One Water Roadmap: Reliable & Resilient Utilities, Thriving Cities, Competitive Business and Industry, Social and Economic Inclusion, and Healthy Environments.

Flagstaff City Council has set a goal to be a national leader in water conservation for all sectors. While the focus in Water Services Department is to provide for the basic human needs of a high-quality, safe, reliable water supply for the community, the department has an additional obligation to be stewards of that supply while supporting a thriving local economy, community vitality, and natural, healthy ecosystems. This project will align the integrated master planning approach with community goals and values, resource protection, and resources utilization in one plan.

The WRMP will include the following goals and objectives:

1. Provide a roadmap to implement water management strategies that satisfy near-term (20 year) and long-term (50 year) water demands anticipated for land uses contained in the voter-approved Regional Plan 2030.
2. Develop a sustainable water budget. Flagstaff currently operates under the State's water adequacy program.
3. Develop value-based sustainability metrics that embed elements of how water and energy resources can support the community vision of the Regional Plan and City goals and policies.
4. Assess water supply options for alignment with City's Climate Action and Adaptation Plan (CAAP). Specifically, define how the following CAAP strategies will be met:
    - Improve water infrastructure and expand water reuse
    - Improve ecosystem management for protection of water resources
    - Continue to support water conservation efforts across the Flagstaff community.
    - Maximize passive and active community rainwater infiltration

    The plan should identify specific actions Water Services can take to have the greatest impact on the CAAP.

The following sections outline the scope of work including objectives, activities, deliverables and assumptions for each task.

Abbreviations

- City - City of Flagstaff
- BC - Brown and Caldwell
- SWDR - Southwest Decision Resources
- WWR - West Water Research

Phase 100 Background

Background information in the City's history of water resources, regulatory framework, and water sources and challenges will be summarized by the City and compiled in the into the WRMP Report prepared in Phase 400.

Compile Background Information

Objectives: The City of Flagstaff will develop a document summarizing history and background information about their water resources, regulation, and current challenges which BC will incorporate into the water resources master plan. The City will provide BC with a summary of the following:

- A history of Flagstaff's water system and a chronology of past water supply augmentation projects that have been investigated by the City over the past 100 years.
- City and regulatory practices to managing water resources and additional regulatory programs the City may consider as management programs including:
    - How the City manages its water resources;
    - The Arizona Department of Water Resources Water Adequacy Program and the City's current Designation of Adequate Water Supply obtained in 2013;
    - Relevant water quality regulations administered by the Arizona Department of Environmental Quality affecting the utility, including regulations or upcoming legislation tied to potable and recycled water;
    - Little Colorado River Adjudication and various agreements and stipulations that govern Flagstaff's water rights; and
    - Additional regulatory programs the City could consider as management programs, summarize strengths and limitations of the recommended programs, as they may apply when assessing scenarios.
- The City's current water sources and challenges associated with each in terms of water quality, quantity, legal constraints, watershed health, and impacts due to climate change including:
    - A description of the water sources that the City currently relies upon (i.e., groundwater, Upper Lake Mary surface water, and recycled water), as well as the Coconino Plateau's multi-layered aquifer system;
    - Challenges faced by the City for each of these supplies such as water quality; water quantity, legal constraints, watershed health, and their impacts from climate change; and
    - Challenges associated with aging infrastructure and capacity, pricing and rate structure.

Activities:

- BC will review and compile the summary document for use in development of the WRMP.

Assumptions:

- The City will provide BC the summary in Microsoft Word format to be formatted into BC standard report formatting.

Phase 200 – Stakeholder Engagement and Public Outreach

The work of Phase 200 seeks to obtain input from stakeholders and water utility customers regarding the goals, objectives and policies that drive the development of the water resources master plan and impacts to water rates and quality of life.

Task 210 Stakeholder Group Formulation and Workshop #1: Establish City Goals, Values and Policies as Plan Drivers

Objectives: The objective of this task is to gain clear goals, objectives and policies through stakeholder engagement. Select a group of stakeholders who will participate in the process.

Activities:

- Develop stakeholder engagement process and approach.
- Identify participating stakeholders, develop survey questions, and plan the workshop. Meeting duration is assumed to be 2 hours
- Conduct stakeholder analysis. This will include creating a survey; creating a registry of stakeholder issues; and creating a plan for identifying critical issues (e.g., climate change). The survey will be distributed in advance of the workshop to provide insights into stakeholder issues.
- Guide stakeholder interactions through selection of goals, values and policies through a workshop format. Develop materials, tools and methods for engaging stakeholders. Conduct one (1) 4-hour workshop with stakeholders and City staff to identify driving goals and concepts of the WRMP.
- Conduct follow up meeting with staff to document the resulting goals, objectives and policies.

- Develop focus groups in collaboration with stakeholders. Focus groups may be formed for specific topics of the master plan including direct reuse, potable reuse, Red Gap Ranch, stormwater recovery/reuse, water conservation, and water quality.

Assumptions:

- Stakeholder group is expected to include between 10 and 20 persons. Participants may include individuals from the following groups or additional groups/stakeholders from the Friends of the Rio de Flag Watershed Plan, Water Conservation Strategic Plan, Climate Action and Adaptation Plan, and Sustainability Commission:
    - Water Services, Community Development, and Economic Vitality staff
    - City Council,
    - Water Commission,
    - Northern Arizona Leadership Alliance
    - Friends of the Rio de Flag
    - Economic Collaborative of Northern Arizona
    - Friends of Flagstaff's Future
    - Greater Flagstaff Chamber of Commerce
    - Northern Arizona University
    - Tribal interest group

Deliverables:

- Workshop Materials: Electronic and hardcopies (up to 25) will be provided
- Technical Memorandum: The draft and final technical memorandum will be submitted in electronic form, in Word and/or PDF format

Task 220 Workshop #2: Alternatives Development

Objectives: The objective of this task is to develop a set of criteria that form a decision tool for evaluation of water supply alternatives. The criteria can be based on community values as determined by the stakeholder group and public surveys. The stakeholder group will also provide input on metrics by which to measure water resource scenarios such as value of economic development per unit of water.

Activities:

- Meet with City staff to plan the workshop. This will include developing questions, activities and exercises to achieve the objectives of the workshop. Meeting duration is assumed to be 2 hours
- Guide stakeholder interactions through selection of decision factors and water supply alternatives comparison metrics through a workshop format. Develop materials, tools and methods for engaging stakeholders. Conduct one (1) 4-hour workshop with stakeholders and City staff to identify key decision factors and alternatives comparison metrics
- Conduct follow up meeting with staff to document the resulting decision factors and metrics.

Assumptions:

- The same stakeholder group as identified in Task 210 will be invited to participate in this workshop.

Deliverables:

- Workshop Materials: Electronic and hardcopies (up to 25) will be provided
- Technical Memorandum: The draft and final technical memorandum will be submitted in electronic form, in Word and/or PDF format

Task 230 Workshop #3 with Public Outreach

Objectives: Develop a public outreach campaign that allows the public to comment on alternatives recommended from the previous Section. Factors such as a determination of the impact to water bills in the near, mid and far future, and water quality considerations will be included in the outreach campaign. The outreach effort will include a survey, a public forum in conjunction with a third "observable" stakeholder workshop, and up to one public event to inform final recommendations on the master plan. The consultant should plan to attend three meetings.

Activities:

- Develop public survey to post on the City website for input on the master plan. Stakeholders will review and provide input on the public survey. Public survey will be conducted to solicit input on goals, values and preferred water supply alternatives.
- The subconsultant and BC will conduct a third (final) workshop with stakeholders, which will also be open to the public for observation and subsequent Q&A.
- Workshop #3 will be held after the technical analysis is complete, including supply reliability, cost, rate impacts, etc. as outlined below.
- The workshop will present results of alternative comparisons, and allow stakeholders to explore, in real time, different blends of Direct Potable Reuse, Indirect Potable Reuse, Imported Groundwater, and Conservation to arrive at an agreeable supply portfolio.
- This will be a three-hour workshop to educate the public on the alternative and planning effort outlined as follows:
    - 2 hours: Interaction with stakeholders to explore the costs, benefits, and impacts of alternative supply portfolios. This will be open to the public for observation.
    - 1 hour: Following the observation of the workshop, members of the public will have the opportunity to ask questions and engage in moderated/facilitated dialogue with the subconsultant, BC, and stakeholders.

Assumptions:

- The same stakeholder group as identified in Task 210 will be invited to participate in this workshop.

Deliverables:

- Workshop Materials: Electronic and hardcopies (up to 25) will be provided
- Technical Memorandum: The draft and final technical memorandum will be submitted in electronic form, in Word and/or PDF format

Phase 300 –Water Demand Projections

Objectives: The City will develop a water demand projection model using population and land use-based methods that accounts for variable growth rates and unit water demands. Results from the model will be provided to BC and incorporated into the WRMP.

Activities:

- The City will define projected growth curves for low, medium and fast growth scenarios in terms of developable parcels and population. Growth will be defined in 5 year increments from 2020 through 2050.
- The City will define range of unit water demands to be used in the demand projection model.

Assumptions:

- The City will provide model results from the water demand projection to BC in Excel format for use in development of the WRMP.

Phase 400 – Water Supply Alternatives Assessment

Task 410 Reclaimed Water Balance

Objectives: Develop a water balance for all reclaimed water options to determine available reclaimed water supply, considering impacts of conservation efforts and the seasonal availability of reclaimed sources.

Activities:

- Review current reclaimed water allocations, future wastewater flow projections, seasonal variability, and conservation planning efforts; and
- Determine available reclaimed water for use as a supply to be used in the Task 430.

Assumptions:

- The City will provide current reclaimed water agreements, monthly and total annual flow data and flow projection data; and
- Future reclaimed water generation rates will be prepared for up to 3 unit wastewater generation scenarios for evaluation of the impacts of water conservation.

Task 420 Define Water Supply Alternatives

Objectives: Define and describe the future water supply alternatives to be included in Task 420. The listing of water supply alternative should include the following:

- Cost of additional local water supply wells
- Reclaimed system "purple-pipe" expansion to offset potable, indoor and outdoor and reclaimed water prioritization
- On-site reuse
- Stormwater recharge
- Water conservation as water supply options
- Recharge of excess Upper Lake Mary water during times of overflow using recharge and recovery wells, or similar recharge mechanisms, in the vicinity of Lower Lake Mary water wells
- Indirect Potable Reuse
    - Groundwater Augmentation
        - Managed Recharge (stream-bed recharge)
            - with Class A+ Reclaimed Water
            - with Advanced Treatment (IPR)
        - Constructed Recharge (wells)
            - with Class A+ Reclaimed Water
            - with Advanced Treatment (IPR)
    - Surface Water Augmentation
        - Upper Lake Mary Surface Water Augmentation with Advanced-Treated Reclaimed Water
- Direct Potable Reuse
- Red Gap Ranch Groundwater Importation

Activities:

- Research existing reports and background information on identified alternatives.
- Develop summary descriptions for each alternative including potential volume of water available, schedule/phasing for utilization, water quality considerations, summary of costs, and alignment with community values identified through stakeholder process.
- Group water supply alternatives as: defined water supply alternative, conceptual water supply alternative, or best practices. Defined water supply alternatives include those for which a defined water quantity potential and an engineering study with class 4 capital cost estimate and operating expense model exist. Conceptual water supply alternatives includes those for which no defined water supply quantity exists or no cost information exists. Best practices include recommendations for policies, ordinances or public education programs which may help enhance water supply or reduce water demand.
- Develop indices for water cost and/or economic value including total cost per acre foot for installed capacity and delivered water (representing phased utilization of supply).

Assumptions:

- Does not include development of engineering studies or cost estimates for water supplies.

Task 430 Assess Water Supply Alternatives

Objectives: Assess the water supply alternatives and organize outcomes of each section thus far to develop the appropriate number of water supply scenarios that achieve goals established in Task 130, planning for multiple futures, being inclusive of community values, and the costs and financial implications associated with each alternative. Scenario considerations may include population growth, aging infrastructure, climate change, and extreme events, energy costs, as well as with activities in the city that may drive timing or success of water supply development options, such as land development, economic development, and consumer behavior. The outcome of the exercise will be a decision making tool that allows stakeholders to evaluate tradeoffs and determine which of the supply alternative scenarios is best. A dashboard interface will also be developed to allow staff and the community to demonstrate the effects certain factors can have on the water demand and supply outcomes..

The assessment will include the following metrics:

- Certainty of the quantity of water available as a useable resource;
- Time scale for how long each supply option will satisfy demands before the next water source must be developed ;
- Quantify impact on aquifer (water balance/sustainable water budget);
- Costs (infrastructure costs, phasing or utilization considerations, operation, and maintenance);
- Energy demand or carbon footprint per acre-foot;
- Cost comparisons that include industry-standard metrics, such as total life cycle cost per acre foot of water (both on an installed-capacity basis, and per *delivered* acre-foot);
- Implementation challenges (rights of way, public acceptance, etc); and
- Results of stakeholder and community values;

Activities:

- Provide recommendations for further study of conceptual water supply options and development of best practices;
- Rank conceptual water supply options and best practices according to conformance with policies, values, and other non-cost- factors;
- Propose a tool, such as a decision support tool or logic model, that allows stakeholders to consider tradeoffs (i.e., decision factors or characteristics for each solution) to allow a judgment by the stakeholders as to which of the supply alternatives is best;
- Develop a dashboard interface that staff and the community can use to demonstrate the interplay of how certain factors and decisions can affect water demand and supply outcomes;
- Develop decision tool to screen indirect potable reuse options to one alternative;
- In collaboration with stakeholders and staff, identify 3 (up to 5) significant, feasible and quantifiable scenarios for water supply development;
- Develop phasing plans for the quantifiable water supply scenarios;
- Determine how far in time or growth each supply can meet demands; and
- Align capital and lifecycle costs for water supply scenarios and perform cost comparison of alternatives.

Assumptions:

- All cost information will be provided from recent reports prepared by others. The effort in this task will include a review and correction of any cost information to common assumptions; and
- Water supply scenarios for the assessment will include defined water supplies including direct reuse, indirect potable reuse, direct potable reuse, and Red Gap Ranch.

Task 440 Assess Water Rate Impacts (by WWR)

Objectives: Assess the impacts of each alternative on customer water rates and review potential funding sources for the City. Resulting rate estimates inform the alternatives assessment.

Activities:

- Estimate the impacts of each alternative on future water rates;
- Identify and evaluate up to 3 alternative funding options for future water supplies; and
- Prepare summary memorandum of water rate impacts, additional funding options and recommendations.

Assumptions:

The City will provide Consultant with the existing water rates model. The City has noted that a new rate study effort will be launched in 2020. Pertinent information from this study will be provided to BC and WWR for the assessment.. The existing or anticipated (note that a rate study will be occurring concurrently with the development of the water resources master plan) water rates model will be relied upon for forecasting and estimation of impacts.

Deliverables:

- Technical memorandum summarizing results of rate impacts analysis and potential funding sources.

Task 450 Assess Economic Value of Water (by WWR)

Objectives: Prepare an Excel-based model that the City can use to evaluate the water resource impacts of proposed land use changes. The water resource impacts will be expressed in changes in annual water use, accounting for reclaimed water

generation and re-use. Impacts will also be quantified in terms of fiscal benefit (or cost) to the city per unit of annual water use.

Activities:

- Assemble City financial data from the most recent CAFR;
- Understand the land use classifications in the City's general land use plan (Flagstaff Regional Plan 2030);
- Understand the water demand and reclaimed water generation factors for each land use classification; and
- Prepare a customized tool that City staff can apply to estimate the water resource and fiscal impacts of proposed land use changes.

Assumptions:

- The City will supply water demand and reclaimed water generation factors for the various land use classifications; and
- To ensure time and cost efficiency, the model will build upon previous work completed by subconsultant for the City of Peoria.

Deliverables:

- Excel-based model for determining economic value of water for given zoning and development scenarios.
- Technical memorandum providing explanatory support for the Excel-based model.

Task 460 Report and Presentation

Objectives: BC will develop the WRMP which will provide recommendations to implement the preferred alternative. Recommendations will also include suggested management changes to current water supply operation strategies, identify funding strategies to implement the path forward, and identify capital needs for consideration in rate studies or capital improvement plans. The report will emphasize the importance of compliance to existing and new water efficiency building codes, Flagstaff Regional Plan 2030, the adopted elements of the Water Conservation Strategic Plan, and the Climate Action and Adaptation Plan to ensure performance of the water resources master planning efforts as assumed. The report will identify recommendations that may require city code adoption, policy refinement or adoption of new policies, or state-wide advocacy towards ADWR or ADEQ legislation to achieve the path forward directed by council.

Activities:

- Prepare a draft report of the plan summarizing all tasks, activities, analyses and findings
- Prepare and deliver a presentation of the plan for the Water Commission and City Council
- Prepare a final report incorporating council, water commission and staff comments.
- Prepare a quick-reference of report highlights

Assumptions:

- Three week schedule is provided for staff review of draft report and quick reference guide
- Water Commission presentation and City Council presentations will be 30 minutes in length plus an additional 30 minutes for questions and discussion.
- Draft quick reference guide will be delivered prior to first presentation

Deliverables:

- Summary report of the plan for quick-reference of plan highlights;
- Electronic files of all models and spreadsheets used to develop the master plan;
- Draft plan for City review provided in electronic (PDF) format;
- Final plan, including comment resolution in electronic (PDF) and hardcopy forms; and
- Presentation to the Water Commission and City Council

Phase 500 – Project Management

Objectives: The objectives of this task are to keep the project on schedule, stay within budget, and to deliver the scope of work necessary for a successful project.

Task 510 Project Control and Reporting

Specific activities under this task include:

- Project Management Planning: Establish the project goals, objectives and critical success factors; project team members, their roles and responsibilities; scope of services with work breakdown structure; project schedule (schedule updates will be provided in monthly progress reports if changes have been made and agreed upon by City; project budgets; communications plan; quality assurance/quality control (QA/QC) plan; project documentation plan and file structure; change management process; and Health and Safety Plan for field work, where applicable.
- Project Control and Reporting: Monthly invoices will be prepared and submitted to City in an approved format. Monthly project status reports will be prepared and submitted to City along with the monthly invoices. These reports will include summary of services completed since the previous report, current project schedule and budget status, project issues, and potential change logs.
- Project Closeout: During project closeout, BC will resolve final invoices to City, consolidate and archive project files, and meet with City to review the project performance and achievement of project objectives.

Task 520 Project Kick-off and Updates

This task includes a project kick-off meeting and regular project updates.

- Project Kick-off Meeting: The project kick-off meeting will include a review of the project objectives, success factors, scope of work, schedule, team roles and responsibilities, and communications. Meeting duration is expected to be 2 hours and will be conducted in-person at the City's site.
- Project updates. Regular updates will be provide on a bi-weekly basis by teleconference. Updates will be based on a standing agenda of open issues, activities, action items and decisions/deliverables. A written update will be provided ahead of a teleconference call.

Task 530 Subconsultant Management

This activity includes preparation and management of subcontracts, including review of invoices and work products.

Deliverables:

- Monthly invoices and progress reports
- Meeting agendas, handouts and meeting notes

Summary of Deliverables

- Meeting agendas, notes and handouts
- Summary report of the plan for quick-reference of plan highlights;
- Electronic files of all models, spreadsheets, GIS used to develop the master plan;
- Draft plan for City review provided in electronic (PDF) format;
- Final plan, including comment resolution in electronic (PDF) and hardcopy forms; and
- Presentation to the Water Commission and City Council

Summary of Meetings

This scope of work includes the following meetings and workshops:

- (1) 2-hour on-site kick off meeting including up to 3 BC staff, 2 SWDR staff 1 WWR staff
- (2) 4-hour on-site workshops including up to 2 BC staff and 2 SWDR staff
- (1) 2-hour on-site meeting including up to 2 BC staff and 1 WWR staff
- (2) 2-hour on-site meetings including up to 2 BC staff and 2 SWDR staff
- (1) 3-hour on-site workshop including up to 2 BC staff and 2 SWDR staff

- (1) 3-hour on-site public event including up to 2 BC staff and 2 SWDR staff
- (1) 1-hour on-site presentation to Flagstaff Water Commission including up to 2 BC staff, 1 SWDR Staff and 1 WWR staff
- (1) 1-hour on-site presentation to City Council including up to 2 BC staff, 1 SWDR Staff and 1 WWR staff
- Up to (24) ½-hour off-site (teleconference) project update meetings

Summary of Reference Documents

The following reference documents will be provided by the City:

- Draft Water Resources Master Plan (Hill, 2011)
- Annual Reports to the Water Commission (2012-2019)
- Resiliency and Preparedness Study (City of Flagstaff, 2012)
- Utilities Integrated Water Master Plan (City of Flagstaff, 2014)
- City Water Policies, 2014
- Arizona Administrative Code, Title 18
- ADEQ Rules and Regulations
- ADWR Designation of Adequate Water Supply
- Little Colorado Adjudication
- Water Conservation Strategic Plan, 2020, in draft
- Red Gap Ranch Feasibility Review (Jacobs Engineering, TBD)
- Water Supply Alternative Costs (Carollo Engineers, 2017)
- Climate Action and Adaptation Plan, 2018
- Flagstaff Regional Plan, 2030

Schedule

The final master plan report is scheduled to be delivered 12 months from notice to proceed.