Section 6: Projects and Management Actions

Groundwater Sustainability Plan
Sonoma Valley Groundwater Subbasin

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6 PROJECTS AND MANAGEMENT ACTIONS

This section satisfies Sections 354.42 and 354.44 of the SGMA regulations, which require that GSPs include descriptions of projects and management actions that the GSA has determined will help achieve and maintain the sustainability goal as well as respond to changing conditions in the basin over the 50-year planning horizon. Additionally, the GSP is required to include:

1. Which MO will benefit from a specific project or management action

2. Criteria and circumstances that would trigger implementation and future termination

3. The process by which the GSA will determine a project or management action is necessary to execute Projects and management actions can be used to attain the MOs, meet interim milestones, and avoid MT exceedances and undesirable results.

The management actions and projects covered in this chapter outline a framework for achieving sustainability; however, many details must be negotiated and finalized before many of the projects and management actions can be implemented. The costs for management actions and project implementation are additional to the funding required to sustain the operation of the GSA and for monitoring and reporting. The projects and management actions discussed in this section demonstrate that sufficient options exist to reach and maintain sustainability. Not all projects and actions have to be implemented to attain sustainability. Therefore, the projects and management actions included herein should be considered a list of options that will be refined during GSP implementation.

6.1 Identification of Projects and Management Actions

The identification of projects and management actions was an iterative process which included significant Advisory Committee and GSA Board input, and a substantial amount of staff work. Input received from the Advisory Committee and GSA Board helped refine and categorize the selection of projects and management actions into those that could be initially evaluated as part of this GSP and those that require further assessment or study prior to implementation. For example, recharge net-metering programs, water markets, and net-zero water use requirements for new development need further refinement. Management actions the GSA has under its authority, such as mandatory conservation or pumping reductions, will also be studied and considered during the first 5 years of GSP implementation, as described in **Section 6.4**.

- The projects and management actions considered for implementation and further planning build upon the successful, historical groundwater management activities conducted within the Subbasin listed below: Use of imported surface water by the City of Sonoma and VOMWD municipalities (Sonoma Water's water contractors) in lieu of local groundwater supplies.

- Development and use of recycled water supplies for meeting agricultural and landscape irrigation demands.

- Implementation of water-use efficiency and conservation programs within the urban water-use sector.
- Studies and implementation of water-use efficiency measures within the agricultural sector.
- Studies and initial planning for managed aquifer recharge, including:
    - Feasibility study and initial planning for ASR
    - Studies, data collection, and pilot testing for stormwater recharge projects

While some of these initiatives and activities have historically been developed and planned specifically to address groundwater conditions within the Subbasin, many have been developed and implemented to achieve other benefits, objectives, and purposes. Inclusion and further assessment of these initiatives and activities during implementation of the GSP will facilitate coordination and optimization of these initiatives and activities to support sustainable groundwater management. **Sections 6.2** through **6.4** describe the identified projects, summarize initial assessment of projects using scenario modeling, and describe identified management actions.

6.2 Project Descriptions

To prevent potential undesirable results and to achieve MOs, projects, and management actions are planned as part of GSP implementation. Based on the frequency of chronic lowering of groundwater levels in portions of the deep aquifer system and the results of projected baseline model scenarios, a portfolio of projects and management actions is needed to limit future MT exceedances and avoid future undesirable results. The GSA plans to immediately implement selected projects and management actions. In some cases, initial implementation steps include performing studies or analyses to refine the concepts into actionable projects. **Sections 6.2.1** through **6.2.4** provide descriptions of the projects included in the portfolio, including information required by Section 354.44 of the GSP Regulations. Where applicable, CEQA analysis will be performed for projects. A CEQA analysis includes an assessment of water supply impacts, greenhouse gas emissions, and impacts on tribal cultural resources.

The projects described were assembled into different groups for the purposes of performing an initial assessment of benefits using model scenarios:

<u>Group 1:</u>

- Water-Use Efficiency and Alternate Water Source Projects
- Recycled Water Expansion Projects (addition of existing contracts along existing alignments only)

Group 2A:

- Recycled Water Expansion Projects (additional deliveries to new contracts along new alignments)
- ASR (City of Sonoma and VOMWD service areas)

Group 2B:

- ASR (other areas)
- Stormwater Capture and Recharge

Details of the methodology and results of model scenarios developed to assess projects are summarized in **Section 6.3** and provided in **Appendix 6-A**. The evaluation of projects and management actions incorporate the future climate change and growth assumptions described in **Section 3.4.4.**

6.2.1 Water-use Efficiency and Alternate Water Source Projects

The water-use efficiency and alternate water source projects include smaller-scale dispersed land-owner projects, such as turf removal, rainwater harvesting, and distributed stormwater capture/reuse. These projects are initially planned as voluntary, incentive-based projects focused on groundwater users, primarily rural, residential, agricultural, and commercial/industrial groundwater users. The programs and education offered to rural, domestic, and commercial groundwater users will mirror programs offered to regional municipal water users, which have led to a 37 percent reduction in per capita water use since 2010. It is assumed that existing water-use efficiency by municipal groundwater users will continue through the Sonoma-Marin Saving Water Partnership. In addition to the Sonoma-Marin Saving Water Partnership, described in **Section 2.6**, numerous other regional and local water conservation programs are operational in the Plan Area, including the LandSmart Program and the Sustainable Winegrowing Program. Many grape growers already use drip irrigation and rely on new technologies to determine when and how much to irrigate vines. This program would be focused on leveraging existing tools and BMPs and working with farmers who have not had either access or the resources available to reduce water use. Examples of the tools and BMPs included in these programs are:

- Indoor (high-efficiency toilets, fixtures, and washers) and outdoor (landscaping assistance, surveys, and retrofits) water-use efficiency
- Conservation rebate programs for high-efficiency appliances and fixtures, landscape water budgets, landscape and irrigation design, and irrigation scheduling
- Stormwater management through low-impact development practices
- Rainwater harvesting

- BMPs for conserving water use in commercial processing, including wineries
- Soil moisture monitoring and efficient irrigation scheduling

During the first year of GSP implementation, this project will include an assessment of the exact types of water-use efficiency tools and alternate water source projects that are expected to be most effective and feasible for Subbasin stakeholders, including groundwater-use characteristics, existing levels of conservation and water-use efficiency, and recommendations on preferred tools and strategies for implementation (such as incentive options). While implementation of these projects is initially planned to be on a voluntary basis, the assessment will also identify specific metrics for evaluating the benefits of the projects and assess Subbasin conditions that may lead to mandatory implementation of management actions.

6.2.1.1 Objectives, Circumstances and Timetable for Implementation

Implementation of the water use efficiency and alternate water source projects will help achieve MOs and avoid undesirable results for the chronic lowering of groundwater levels sustainability indicator. Achieving MOs and avoiding undesirable results for the chronic lowering of groundwater levels sustainability indicator is also expected to benefit the groundwater storage, seawater intrusion, and land subsidence sustainability indicators. Additionally, depending upon the locations within the Subbasin where projects are implemented, there may be benefits to the MOs for the depletion of interconnected surface water sustainability indicator.

After a short planning period, it is assumed that water-use efficiency and alternate water source projects will begin in 2023. Initial implementation of these projects will include an assessment of the exact types of water-use efficiency tools and alternate water source projects that are expected to be most effective and feasible for Subbasin stakeholders. The assessment will also identify specific metrics for evaluating the benefits of the projects and assess Subbasin conditions that may lead to mandatory implementation of management projects.

6.2.1.2 Expected Benefits

Expected benefits from implementation of water use efficiency and alternate water source projects are described in detail in **Appendix 6-A**. For the purpose of estimating the potential benefits of these projects, it was assumed that the Group 1 scenario simulates the impacts of a 20 percent reduction in all rural domestic use and a 10 percent reduction in consumptive use for all vineyards, beginning in 2025. This assumption was considered to represent a reasonable level of groundwater use reduction based on the outcomes from existing BMPs and other water-use efficiency programs. Other groundwater-use sectors would be included in the project, including commercial, industrial, and agricultural crops. However, for the purpose of conducting the scenario modeling, only reductions in rural domestic and vineyard groundwater use were applied, as these components were most readily able to be incorporated in the model.

Based on these assumptions and as described in **Appendix 6-A**, expected benefits include reduction in the number of potential future MT exceedances for the chronic lowering of groundwater levels sustainability indicator, as well as decreasing the decline in groundwater storage, reducing inflows from the Baylands area, and improving net surface water and groundwater exchange. Benefits simulated by the model relative to the baseline scenario for the Group 1 scenario, which primarily includes the water-use efficiency projects but also includes the addition of existing recycled water contracts, are summarized as follows:

- Simulated project yields: total of 651 AFY (377 AFY from reduction in vineyard consumptive use, 223 AFY reduction in rural domestic groundwater use, and 51 AFY of recycled water delivery offsets)
- Simulated increase in groundwater levels: 5- to 30-foot increase, with largest increases east of the Eastside Fault
- Simulated increase in groundwater storage: 110 AFY
- Simulated net reduction in surface water depletion: 140 AFY
- Simulated reduction to inflows from the Baylands area: 120 AFY

The planned initial assessment of projects will include recommendations for evaluating specific metrics for the actual benefits of the projects during implementation.

6.2.1.3 Public Noticing, Permitting and Regulatory Process

Public notice and outreach communications will be a critical component of the success of implementing water use efficiency and alternate water source projects, because these actions are initially planned as voluntary and will rely on Subbasin stakeholders clearly understanding their importance and benefits. Activities described in **Section 7.2.2** will include outreach to DACs, tribal, rural residential, commercial, industrial, and agricultural stakeholders focused on highlighting the benefits of participation.

Some of the water use efficiency and alternate water source projects do not have permitting or regulatory requirements. Any projects that may include permit or regulatory requirements, such as graywater systems, would need to comply with local requirements and ordinances.

6.2.1.4 Estimated Costs and Funding Plan

A total of $80,000 is included in the initial 5-year budget provided in **Section 7.2** to perform the assessment of water use efficiency and alternate water source projects and to fund initial rollout of voluntary measures. To continue and expand implementation of water use efficiency and alternate water source projects, the GSA will seek grant funding. The GSA is also considering applying for funding of high-efficiency toilet replacement and agricultural BMP implementation through the State's 2021 Drought Relief Program or other applicable grant opportunities.

6.2.1.5 Legal Authority

No legal authority is anticipated to be needed to voluntarily implement the water use efficiency and alternate water source projects.

6.2.2 Recycled Water Expansion

Recycled water is water that goes into the wastewater system from within the service area of the SVCSD and is treated to tertiary standards at the Sonoma Valley Wastewater Treatment Plant. Recycled water has been and will continue to be an important source of irrigation water to offset the use of local groundwater and potable water supplies in Sonoma Valley. Recycled water can be used in applications where potable water is often used, such as the irrigation of public parks and golf courses, and for agriculture. In addition to allowing for potable water offsets, recycled water use can facilitate in lieu groundwater recharge. For example, if a farm that has historically used well water for crop irrigation begins using recycled water instead, the groundwater aquifer beneath will recover through reduced pumping and natural recharge. Additionally, using recycled water for irrigation also means a decrease in discharge of treated wastewater to local water bodies such as the San Pablo Bay.

Initial assessment and study for expanding recycled deliveries within the Subbasin are included in SVCSD's Recycled Water Plan (West Yost 2018), which focused on East Study, West Study, and City of Sonoma Study Areas. To reliably deliver recycled water during the irrigation season, it is assumed that additional storage facilities would need to be developed to seasonally store wintertime recycled water flows. For the purpose of evaluating recycled water expansion projects in this GSP, the recycled water system expansion focused on the East Study Area and portions of the West Study Area located to the east of Sonoma Creek (included with Group 2A model scenario). Future expansion within the City of Sonoma Study Area was not included in the model scenarios for this GSP, as the city primarily uses imported Russian River water, and would therefore represent a relatively lower benefit to groundwater within the Subbasin.

The SVCSD has included the construction of the Napa Road Recycled Water Pipeline and associated storage alternative in the Phase 2 Environmental Impact Report (EIR) developed through the North Bay Water Reuse Program (Environmental Science Associates 2018). This proposed pipeline alternative is located within the East Study Area and would expand the recycled water service area in the unincorporated areas of Sonoma County east of the City of Sonoma along Napa Road. Pipeline construction would include 11,500 linear feet (LF) of 12-inch diameter pipeline located within the roadway or roadway shoulder and associated storage. The pipeline would connect to existing pipelines and extend eastward from 5th Street East to serve additional customers. The implementation of the West Study Area is also incorporated into the Group 2A scenario evaluated in this GSP and includes construction of 8,410 LF of new 12-inch diameter recycled water pipeline located within the roadway or roadway shoulder. Collectively, recycled water is assumed to be delivered to approximately 900 acres of farmland currently using groundwater for irrigation in the East and West Study Areas.

6.2.2.1 Objectives, Circumstances and Timetable for Implementation

Implementation of expanded recycled water deliveries will help achieve MOs and avoid undesirable results for the chronic lowering of groundwater levels sustainability indicator. Achieving MOs and avoiding undesirable results for the chronic lowering of groundwater levels sustainability indicator is also expected to benefit the groundwater storage, seawater intrusion, and land subsidence sustainability indicators. Additionally, depending upon the locations within the Subbasin where recycled water projects are expanded, there may be benefits to the MOs for the depletion of interconnected surface water sustainability indicator.

Recycled water projects require permitting, environmental analysis, and engineering design. The SVCSD has included the Napa Road Recycled Water Pipeline in the Final EIR developed for the Phase 2 North Bay Water Reuse Program (Environmental Science Associates 2018). Initiation of design is dependent upon securing funding for the project. For the purposes of evaluating using model scenarios, it is assumed that the Napa Road Recycled Water Pipeline would be initiated in 2025. The timing of projects is based on best estimates and may shift as GSP implementation proceeds, depending upon project needs at the time.

6.2.2.2 Expected Benefits

Potential benefits from the implementation of recycled water projects are described in **Appendix 6-A**. Using the assumptions described in **Appendix 6-A**, potential benefits include reduction in the number of potential future MT exceedances for the chronic lowering of groundwater levels, as well as decreasing the projected decline in groundwater storage. Benefits from recycled water projects would primarily be evaluated using changes in measured groundwater levels and improvements to groundwater storage changes. Benefits are simulated by the model for the Group 2A scenario (relative to the Group 1 scenario). Group 2A primarily includes the recycled water system expansion, but also includes the addition of ASR at two locations, with benefits summarized as follows:

- Simulated project yields: total of 342 for expanded recycled water deliveries (Group 2A also includes 140 AFY for ASR at City of Sonoma and VOMWD existing well sites)
- Simulated increase in groundwater levels: 15- to 20-foot increase, with largest increases east of the Eastside Fault
- Simulated increase in groundwater storage: 60 AFY
- Simulated net reduction in surface water depletion: 80 AFY
- Simulated reduction to inflows from the Baylands area: 80 AFY

6.2.2.3 Public Noticing, Permitting and Regulatory Process

Public notice for aspects of the recycled water projects will be carried out by the lead agency, which is anticipated to be the SVCSD. For recycled water projects where the GSA is not the lead agency, the GSA will provide support for outreach activities to nearby well owners and the local

community. Compliance with CEQA is incorporated into the existing EIR for the Phase 2 North Bay Water Reuse Project (Environmental Science Associates 2018). Any additional recycled water projects would be included in future CEQA analysis, as needed. A CEQA analysis includes an assessment of water supply impacts, greenhouse gas emissions, and impacts on tribal cultural resources.

Existing wastewater treatment and recycled water production occur at the SVCSD Waste Water Treatment Plant in compliance with Order No. R2-2014-0020 (National Pollution Discharge Elimination System [NPDES] Permit No. CA0037800) issued by the SFBRWQCB. It is anticipated that future expansion of recycled water deliveries would also occur under this or future revised or amended orders.

6.2.2.4 Estimated Costs and Funding Plan

Preliminary costs for the recycled water system improvements for the East and West Study Area are estimated to be $7,946,000 and $4,590,000, respectively, which does not include the needed storage facilities (West Yost 2018). Preliminary costs to develop the Napa Road Pipeline portion of the East Study Area and associated storage are estimated to be approximately $3,600,000 (Brown and Caldwell 2017). This project is included in the Phase 2 North Bay Water Reuse Program and the GSA will closely coordinate with project proponents to advance and support opportunities to obtain grant funding for the project.

A total of $70,000 is included in the initial 5-year budget provided in **Section 7.2** for the GSA to perform an assessment of additional recycled water opportunities in collaboration with SVCSD. It is anticipated that the assessment will include:

- Evaluation of existing and future availability, delivery commitments, and constraints
- Assessment of options for optimization of existing and projected future available supplies
- Preliminary cost and benefit analyses for future options

6.2.2.5 Legal Authority

The SVCSD has the legal authority to treat wastewater and deliver recycled water for irrigation uses.

6.2.3 Aquifer Storage and Recovery

As described in **Section 2.6**, regional planning for ASR and well-specific assessments have been performed by local agencies within the Subbasin (GEI et al. 2013 and West Yost 2018). Conceptually, an ASR program would involve the diversion and transmission of surplus Russian River water produced at existing drinking water production facilities during wet weather conditions (that is, the winter and spring seasons) for storage in the deep aquifer system of the Subbasin. The stored water would then be available for subsequent recovery and use during dry weather conditions (that is, the summer and fall seasons) or emergency situations. The Groundwater Banking Feasibility Study (GEI et al. 2013) provided an evaluation of regional needs and benefits, source water availability and quality, regional hydrogeologic conditions, and alternatives for groundwater banking. Based on the findings from the study, pilot studies to

further assess the technical feasibility of ASR as a method for groundwater banking were recommended and in 2018 a pilot project was completed in the City of Sonoma along the margins of the Subbasin (GEI et al. 2020).

The feasibility study also found that adequate water for the hypothetical 5,000 AFY groundwater recharge program would be available for diversion from Sonoma Water's diversion facilities along the Russian River more than 90 percent of the time. This divertible flow was calculated by simulating the river system operations to meet Water Agency demands, simulating Water Agency diversions, and then subtracting minimum flows needed to meet the Biological Opinion and other instream requirements. In general, water is expected to be available for groundwater recharge in most years during the months of December through May. Because of the high-flow rates in these winter and spring months (with 100 cfs or more divertible flow expected 90 percent of the time), this pattern of availability is expected to be present under higher future levels of demand. Some water would also be available for diversion to groundwater storage during June through November, though less frequently (GEI et al. 2013). An updated assessment of water available for recharge will be performed during the early stages of GSP implementation.

For the purpose of this GSP, initial assessment of ASR was conducted for the following two general phases:

- Phase 1: Implementation of ASR operations at two locations within the City of Sonoma and VOMWD service areas (simulated under the Group 2A scenario):
    - City of Sonoma: Based on the outcome of the 2018 pilot study, it is recommended that a new well, specifically designed for ASR operations, be constructed in the vicinity of the city's existing municipal Well No. 6 (which is nearly 70 years old) in addition to two new groundwater monitoring wells and associated equipment. Preliminary estimates of work needed to implement the project include construction of one new ASR well (and associated pump and equipment), two new monitoring wells, and 500 LF of 6-inch-diameter pipelines.
    - VOMWD: The potential VOMWD ASR site consists of an existing municipal well (Verano Avenue Well), which has recently been upgraded and designed to accommodate ASR operations. The project would include construction of two groundwater monitoring wells and associated equipment, as well as the implementation of a pilot study to refine operational parameters for the ASR project.
- Phase 2: Study additional potential ASR locations and implementation of ASR at three additional locations within the Subbasin (simulated under the Group 2B scenario). For the purpose of conducting an initial assessment of potential benefits, locations were selected to coincide with areas of largest groundwater withdrawals and/or substantial historical groundwater level declines. The three locations incorporated into the simulations are the Carriger Road area in El Verano near 8th Street East and Napa Road, and at Denmark Street and Napa Road.

Prior to implementing long-term ASR programs, pilot projects are recommended to verify location-specific feasibility, including aquifer capacity for recharge and recovery operations and geochemical compatibility. Pilot testing involves injecting potable drinking water into the Subbasin's aquifers and recovering it to assess injection and recovery capacities and monitor potential water quality impacts to native groundwater resources. Information generated by pilot test evaluations will help inform the degree to which ASR is a feasible strategy to improve reliable water supply, along with helping to evaluate whether or not an ASR project can be developed and operated in a manner that will achieve both supply reliability and groundwater sustainability benefits. A pilot project has already been implemented in the City of Sonoma, and another one will be conducted by VOMWD before going forward with full-scale implementation of ASR at the potential VOMWD ASR location.

Both the City of Sonoma and VOMWD are planning to submit grant funding applications for advancing the Phase 2a ASR projects through the State's 2021 Drought Relief Program in response to the 2020/2021 drought, which may expedite the timeframe for implementation. The GSA will coordinate and provide support for planning and implementation of ASR projects that may be developed and implemented by other project proponents in response to current drought conditions, because these projects are also expected to help achieve MOs and avoid undesirable results.

6.2.3.1 Objectives, Circumstances, and Timetable for Implementation

Implementing ASR projects will help achieve MOs and avoid undesirable results for the chronic lowering of groundwater levels sustainability indicator. Achieving MOs and avoiding undesirable results for the chronic lowering of groundwater levels sustainability indicator are also expected to benefit the groundwater storage and land subsidence sustainability indicators. Additionally, depending upon the locations within the Subbasin where ASR projects are implemented, benefits to the MOs for the depletion of interconnected surface water sustainability indicator may also be realized.

ASR projects require permitting, environmental analysis, and engineering design, which would begin in 2022. Depending upon results of pilot studies, full-scale implementation of the City of Sonoma and VOMWD ASR projects is anticipated to begin in 2024 and 2025, respectively. The timing of projects is based on best estimates and may shift as GSP implementation proceeds, depending upon project needs at the time. This timeframe may be further accelerated in response to the 2021/2022 drought.

6.2.3.2 Expected Benefits

Expected benefits from implementation of ASR projects include:

- Limiting the potential for chronic lowering of groundwater levels and undesirable results for other associated sustainability indicators.

- Enhanced reliability of the regional water supply during droughts, natural hazard events (such as earthquakes), and periods of peak seasonal water demands.

Potential benefits from implementation of ASR projects based on the scenario modeling are described in **Appendix 6-A**. Based on the assumptions described in **Appendix 6-A**, benefits simulated include reduction in the number of potential future MT exceedances for the chronic lowering of groundwater levels, as well as decreasing the decline in groundwater storage. Benefits from ASR projects would primarily be evaluated using changes in measured groundwater levels and improvements to groundwater storage changes. The potential project yields associated with the ASR projects were simulated to be approximately 140 AFY for Phase 1 (simulated under the Group 2A scenario) and 180 AFY for Phase 2 (simulated under the Group 2B scenario). Because the ASR projects were simulated with both expanded recycled water deliveries (Group 2A scenario) and stormwater capture and recharge projects (Group 2B scenario), the estimated quantified benefits to water budget terms are difficult to discern. Benefits to groundwater levels primarily occur within the deep aquifer system and are inferred to range from 5- to 90-foot increases depending upon the location, with the highest simulated increases occurring closer to the ASR wells and east of the Eastside Fault.

6.2.3.3 Public Noticing, Permitting and Regulatory Process

Public notice for aspects of the ASR pilot projects will be carried out by the lead agency for each project. For ASR projects where the GSA is not the lead agency, the GSA will provide support for outreach activities to nearby well owners and the local community. The Phase 1 ASR projects are included at a programmatic CEQA level in the existing EIR for the Phase 2 North Bay Water Reuse Project (Environmental Science Associates 2018). For the full-scale ASR project, public notice is anticipated to occur through compliance with CEQA as well as local and state permitting requirements for any facilities or plans associated with the project. This includes the development of an underground storage supplement to permit the storage of water in the Subbasin that is required by the SWRCB, and through discussions of the proposed project at public meetings. A CEQA analysis includes an assessment of water supply impacts, greenhouse gas emissions, and impacts on tribal cultural resources.

The SWRCB has recognized that it in the best interest of the state to develop a comprehensive regulatory approach for ASR projects, and has adopted general waste discharge requirements for ASR projects that inject drinking water into groundwater (Order No. 2012-0010-DWQ or ASR General Order). The ASR General Order provides a consistent statewide regulatory framework for authorizing both pilot ASR testing and permanent ASR projects. Pilot tests and any future permanent ASR facility will be permitted under the ASR General Order. Oversight of these regulations is done through the RWQCBs and will require project proponents to comply with the monitoring and reporting requirements of the ASR General Order. Any additional permits required for the construction and operation of an ASR facility will be obtained by the lead agency for each ASR project as needed. Future GSP implementation projects or actions that require their own site-specific monitoring network, such as ASR, would take into consideration any localized COCs and regulatory requirements to avoid potential impacts on beneficial users, including domestic well users and DACs.

6.2.3.4 Estimated Costs and Funding Plan

Preliminary cost estimates to test, permit, and construct project facilities for ASR is estimated to range from about $300,000 to $3,600,000, depending upon the complexity of each project, with the lower cost estimates representing the use of existing wells that have the necessary monitoring infrastructure (GEI et al. 2013). For the purpose of estimating the approximate 5-year costs for implementing the Phase 1 ASR projects, a total of $5,000,000 is estimated for capital project costs associated with the City of Sonoma and VOMWD projects. The range of the costs also varies dependent upon whether existing facilities could be retrofitted or new facilities would need to be constructed. Preliminary costs will need to be further refined and provided upon completion of site-specific evaluation and pilot testing. The current plan for developing ASR in the Subbasin would use existing infrastructure, meaning that new infrastructure would be limited, thus allowing for earlier onset of both incremental drought supply and groundwater sustainability benefits. Costs for implementing Phase 2 ASR in other areas of the Subbasin requires additional study and project development prior to estimating.

A total of $325,000 is included in the GSA's initial 5-year budget provided in **Section 7.2** to contribute to an updated regional ASR feasibility study and to complete site-specific investigations of favorable areas. To continue and expand implementation of ASR projects, the GSA will coordinate with other project proponents who may be pursuing ASR projects, consider providing additional funding in future years, and will seek opportunities for grant funding.

6.2.3.5 Legal Authority

Local water supply agencies and the GSA have the authority to develop water supply projects such as ASR for both water supply benefits and to provide groundwater sustainability benefits.

6.2.4 Stormwater Capture and Recharge

As described in **Section 2.6**, planning for stormwater capture and recharge efforts, including site investigations and pilot studies, has been initiated by local agencies and growers within the Subbasin. Stormwater capture projects could be implemented in three areas that were evaluated under the Group 2B scenario:

- Carriger, Felders, and Rodgers Creek alluvial fan
- Arroyo Seco Creek alluvial fan
- Sonoma Creek near Glen Ellen

Stormwater capture and recharge projects are intended to cover two general types of stormwater capture activities that have been identified in the Russian River Storm Water Resource Plan (Russian River Watershed Association 2018). The first stormwater capture activity involves retaining and recharging onsite runoff. Examples of this type of activity include low-impact development and on-farm recharge of local runoff. The second stormwater capture activity involves the recharge of unallocated storm flows, which could include multi-benefit projects such as managed floodplain inundation. These actions require temporary diversions of storm flows from streams and conveyance of those flows to recharge locations. State programs

and grants (such as FLOOD-MAR, Proposition 68) and local entities (such as RCDs) can be used as resources to move forward on stormwater capture and recharge efforts.

Prior to implementing long-term stormwater capture and recharge programs, site-specific field investigations and assessments will be needed to identify suitable locations. Therefore, early stages of implementing stormwater capture and recharge projects are anticipated to include site-specific investigations and pilot studies of on-farm and other dispersed recharge opportunities that consider and include the following:

- Water available for recharge
- Areas with permeable near-surface soils
- Optimal methods and techniques
- Outreach to interested landowners with locations that could help sustain baseflows to streams and support GDEs

6.2.4.1 Objectives, Circumstances and Timetable for Implementation

Implementing the stormwater capture projects is primarily anticipated to help achieve MOs and avoid undesirable results for the depletion of interconnected surface water sustainability indicator. Depending upon the location of stormwater capture and recharge projects, and hydraulic connection between surficial recharge locations and the shallow aquifer system, there may be benefits to the chronic lowering of groundwater levels, groundwater storage, and land subsidence sustainability indicators.

Stormwater capture and recharge projects require permitting, environmental analysis, and engineering design, which would begin with planning for site investigations in 2022. Depending upon results of site investigations and pilot studies, planned to be initiated in 2023, full-scale implementation of stormwater capture and recharge projects is anticipated to begin in 2028. However, implementation of smaller-scale low-impact development type projects may proceed sooner, as permitting requirements are anticipated to be much less involved than projects that involve recharging diverted streamflows. The timing of projects is based on best estimates and may shift as GSP implementation proceeds, depending upon project needs at the time, permitting timelines, and resources available.

6.2.4.2 Expected Benefits

Expected benefits from implementation of stormwater capture and recharge projects are described in **Appendix 6-A**. Based on the assumptions described in **Appendix 6-A**, benefits simulated include increases in spring and summertime streamflows, reduction in the number of potential future MT exceedances for the chronic lowering of groundwater levels, as well as decreasing the decline in groundwater storage. Benefits from stormwater capture and recharge projects would primarily be evaluated using changes in measured groundwater levels and surface water flows near and downstream of project locations. The potential project yields

associated with the stormwater capture and recharge projects were simulated to be approximately 166 AFY. Because the stormwater capture and recharge projects were simulated with ASR projects (Group 2B scenario), the estimated quantified benefits to many water budget terms are difficult to discern. Benefits to groundwater levels primarily occur within the shallow aquifer system and are inferred to range from 5- to 15-foot increases in the vicinity of the recharge locations. Benefits to net surface water and groundwater exchange are simulated to be approximately 90 AFY under Group 2B, which is primarily inferred to be caused by the stormwater capture and recharge projects.

6.2.4.3 Public Noticing, Permitting and Regulatory Process

Public outreach would be conducted to identify landowners interested in participating in stormwater capture and recharge projects. The degree of public noticing will vary depending upon the scale and type of recharge project.

Recharge of stormwater by retaining and recharging onsite runoff may require local grading permits depending upon the scale and need for grading or excavation activities. Recharge of unallocated storm flows is currently subject to the SWRCB's streamlined permit program for groundwater recharge by capturing high-flow events. Recharge of unallocated storm flows will be subject to the terms of these 5-year permits. Stormwater capture may also be subject to CEQA permitting. Additionally, stormwater management projects will need to comply and coordinate with existing NPDES and MS4 permits for regional municipal stormwater systems. Future GSP implementation projects or actions that require their own site-specific monitoring network, such as some stormwater capture and recharge projects, would take into consideration any localized COCs and regulatory requirements to avoid potential impacts on beneficial users, including domestic well users and DACs.

6.2.4.4 Estimated Costs and Funding Plan

A total of $160,000 is included in the initial 5-year budget provided in **Section 7.2** to perform site-specific investigations and fund a pilot study. To continue and expand implementation of stormwater capture projects, the GSA will coordinate with other project proponents who may be pursing multi-benefit projects, consider providing additional funding in future years, and seek opportunities for grant funding.

6.2.4.5 Legal Authority

Other than acquiring required permits and the right to divert stormwater, there are no other

legal authorities required to implement stormwater capture and recharge.

6.3 Evaluation of Projects Through Scenario Modeling

For the purposes of conducting an initial evaluation of projects for this GSP, staff assembled conceptual projects that are likely to be initiated within the first 5 years of implementation into two general categories:

- Group 1 projects are those that have identified potential funding sources, or are voluntary or incentive-based with lower costs. The Group 1 projects include the voluntary, incentive-based water-use efficiency and alternate water source projects focused on non-municipal groundwater users. Examples include smaller-scale dispersed land-owner projects, such as turf removal, rainwater harvesting, and irrigation efficiency practices. The exact types of these dispersed projects are not distinguished for the purposes of evaluating potential benefits using model scenarios. Group 1 projects also include recycled water deliveries to recent rural domestic and agricultural customers for existing contracts that began after the baseline scenario period.

- Group 2A and Group 2B projects are new or significantly expanded, and are more costly projects and actions. This includes projects that require further studies and planning for implementation:

    - Group 2A projects expand upon the Group 1 scenario projects by increasing recycled water deliveries and adding managed aquifer recharge. The managed aquifer recharge consists of operation of two ASR wells in the service areas of City of Sonoma and VOMWD to offset existing localized pumping. The expansion of recycled deliveries includes new deliveries and storage along 8th Street East and Napa Road, which includes a 50 percent build out of West Study Area described in the Recycled Water System Plan (West Yost 2018).

    - Group 2B projects represent additional managed aquifer recharge projects that aim to raise and maintain groundwater levels in depletion areas in the shallow and deep aquifers and benefit streamflows. The Group 2B projects consist of additional ASR projects in the El Verano area and east of the Eastside Fault, and stormwater capture and recharge projects that could specifically benefit shallow aquifer system groundwater levels and streamflows within the Subbasin.

These general categories formed the basis for model scenarios of potential projects. Additionally, to provide an evaluation of the relative benefit of potential management actions that may be needed, an additional Group 3 scenario was performed to simulate the effects of a potential net-zero groundwater use policy for future development. The Group 3 scenario and results are described separately in **Section 6.4.1.2**. The model scenarios for potential projects were performed as an initial evaluation of benefits of the Groups 1, 2A, and 2B projects and management actions relative to the baseline 50-year projected scenario and incorporate the future climate change and growth assumptions described in **Section 3.4.4**. **Table 6-1** summarizes the simulated yields expected for each grouping of projects. Approximate locations of the projects are shown on **Figure 6-1**.

Table 6-1. Summary of Project Grouping and Yields

Project	Group 1	Group 2A	Group 2B	Total Annual Simulated Yields
Reduce Vineyard Consumptive Use	Averages 377 AFY less agricultural pumping than baseline simulation	Same as Group 1	Same as Group 1	377 AFY
Reduce Rural Domestic Pumping	Averages 223 AFY less rural domestic pumping than the baseline simulation	Same as Group 1	Same as Group 1	223 AFY
Recycled Water Deliveries	Average deliveries of 51 AFY to Group 1 Farms (begins in in WY2020)	In addition to Group 1 deliveries, average deliveries of 200 AFY at 8th Street and Napa Road area beginning in WY2025; average deliveries of 142 AFY at the West Study Area beginning in WY 2035	Same as Group 2A	393 AFY
ASR	None	Injection of 80 AFY at the VOMWD Verano Well beginning in WY 2024. Injection of 60 AFY at City of Sonoma Well 6 beginning in WY 2025	In addition to Group 2A injection, injection of 60 AFY at each of three wells (8th Street, Napa Road/Denmark Street, and Golf Course wells) beginning in WY 2025	320 AFY
Stormwater Managed Aquifer Recharge	None	None	Recharge averaging 66 AFY at Sonoma Creek and 25 AFY (approximately) at each of the four tributaries (all begin in WY 2025)	166 AFY

The methodology and results of the scenario modeling are described in **Appendix 6-A** and summary results of potential benefits are provided in **Section 6.4.1.2**.

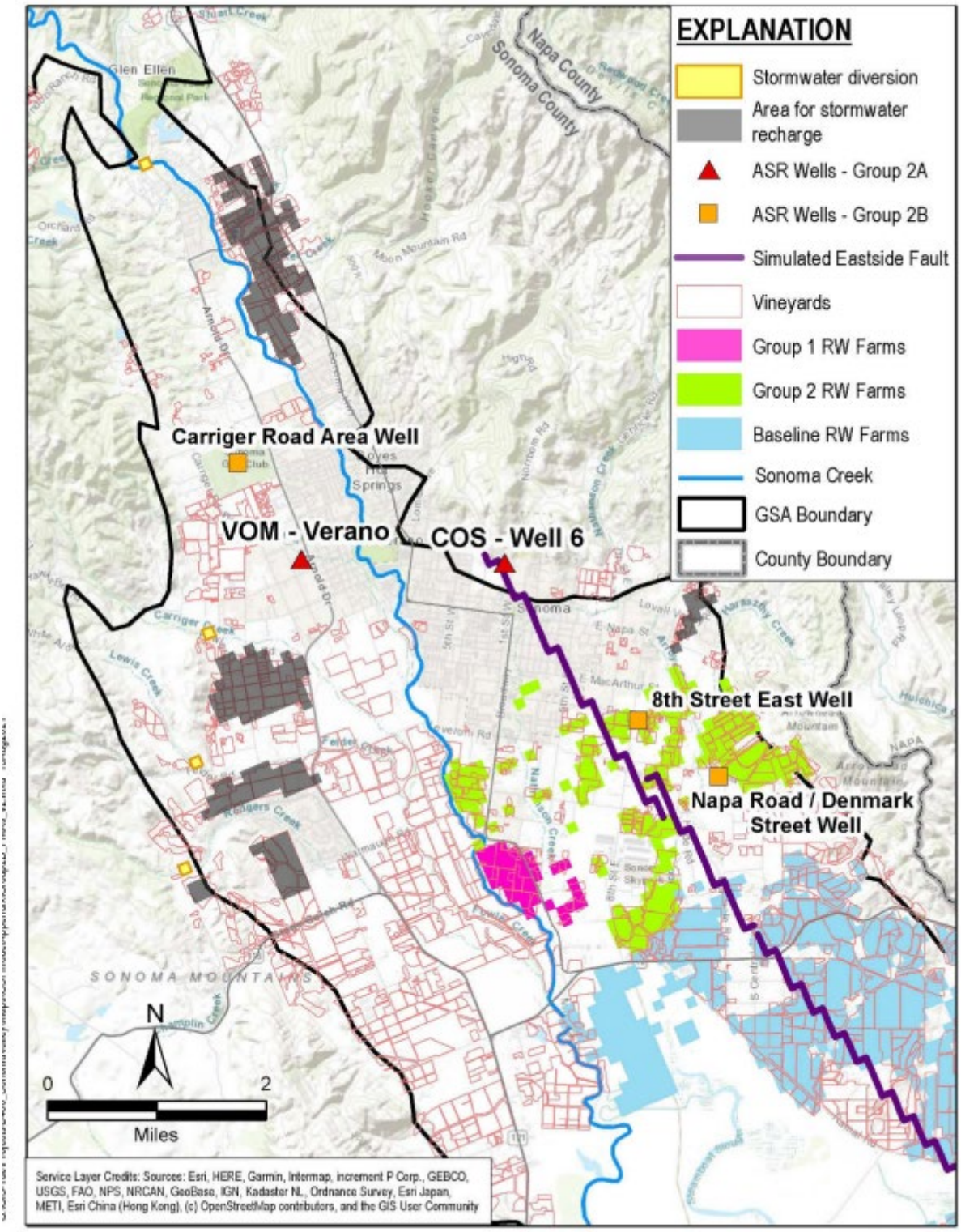

Figure 6-1. Locations of Simulated Projects

General findings from the model scenarios indicate the following:

- **Groundwater Levels**: In the baseline scenario (2021 – 2070), groundwater levels in the shallow aquifer are generally above MTs and no undesirable results are projected to occur within the initial 20-years of the simulation. For the deep aquifer system, MT exceedances and undesirable results are projected to occur during the initial 20 years of the simulation. For the later stages of the 50-year simulation, MT exceedances are projected to occur more frequently in response to the simulated 20-year drought:

    - During future normal and wetter climactic cycles, Group 1 projects are projected to raise groundwater levels 5 to 30 feet in some areas of the Subbasin and reduce the frequency of MT exceedances within the deep aquifer system; however, Group 1 projects alone are not projected to address chronic groundwater level declines within the deep aquifer system.

    - Group 2A projects are projected to raise groundwater levels an additional 5 to 20 feet in the vicinity of the projects and further reduce the frequency of MT exceedances within the deep aquifer system. Group 2A projects are not projected to fully address chronic groundwater level declines within the deep aquifer system.

    - Group 2B projects are projected to raise groundwater levels an additional 25 to 90 feet in the vicinity of the projects and further reduce the frequency of MT exceedances within the deep aquifer system. For the deep aquifer, no simulation avoids undesirable results for the entire simulation period. However, there are only 2 years with undesirable results during the Group 2B simulation period. These 2 years correspond to excessive drought conditions.

- **Groundwater storage:** Groundwater in storage under a baseline scenario without projects is estimated to decline by an average of 290 AFY over the entire 50-year projection period that includes a simulated extreme 20-year drought between 2050 and 2070. Cumulatively, the Groups 1, 2A, and 2B projects are simulated to mitigate the average decline by approximately 220 AFY over the entire 50-year projection (that is, the simulated 290 AFY baseline storage decline improves to 70 AFY storage decline over the entire 50-year projection). For all three scenarios, average annual change in storage is positive from 2021-2040, which represents a wetter period in the future projected climate record. All scenarios have a negative average annual change in storage during 2041-2070, which represents drought conditions included as part of the future climate scenario selected for the GSP. The definition of undesirable results for change in groundwater storage is identical to the definition for chronic lowering of groundwater. Therefore, the three project groups have groundwater storage undesirable results identical to the groundwater level undesirable results.

- **Stream-Aquifer Interaction:** While undesirable results cannot be explicitly assessed for the surface water depletion sustainability indicator using the model scenarios, due to the initial nature and need for improving focused simulation of surface water and groundwater

interaction processes, general benefits to simulated streamflows were assessed. Higher groundwater levels near streams can better support streamflow, particularly in the summer and fall months. Results show that with Group 1, Group 2A, and Group 2B projects, there is a projected reduction in net streamflow depletion due to reduced pumping and increased recharge. Simulated results indicate that streams within the Subbasin change from a net losing stream leakage of 120 AFY under the baseline scenario to a net gaining system of 190 AFY under the cumulative Group 1, 2A, and 2B scenarios (net improvement of approximately 310 AFY). In general, the most significant benefits to net groundwater-surface water exchange occur in spring to early summer, along Carriger Creek and Sonoma Creek.

- **Potential for Seawater Intrusion:** Higher groundwater levels near the Baylands area can reduce the inflow of higher salinity groundwater from the Baylands area. Similar to stream-aquifer interaction, undesirable results could not be explicitly assessed for seawater intrusion due to the initial nature and need for improving characterization and monitoring of seawater intrusion. However, results show that with Group 1, Group 2A, and Group 2B projects, there is a projected reduction in net inflows from the Baylands area of approximately 380 AFY, which would help reduce the potential for future minimum threshold exceedances and undesirable results.

The Group 1, Group 2A, and Group 2B project scenarios improve groundwater declines but do not avoid all MT exceedances. The Group 2B project scenarios show the largest improvement to the water budget as well as to groundwater elevations. The Group 2B Scenario helps improve groundwater declines during the latter portion of the projected period (affected by the major drought) in both the shallow and deep aquifers. Although MT exceedances are not completely avoided during this more extreme dry period under these scenarios, the exceedances during severe droughts are not representative of undesirable results unless groundwater levels do not recover during subsequent wetter time periods.

Considering current uncertainties pertaining to modeling, data gaps, and project information, these project scenarios provide a pathway for reaching sustainability and preparing for future changed conditions in the Subbasin to meet GSP requirements. Additional data collection and project conceptualization during early phases of GSP implementation will help refine these scenarios and allow for consideration of additional scenarios, including mandatory restrictions on groundwater extractions if necessary to achieve sustainability. The projects will also be supplemented by the planned management actions outlined in **Section 6.4**, which include an assessment and prioritization of policy options that focus on demand management for the GSA Board's consideration.

6.4 Management Actions

In addition to initiating the projects detailed in this section, the GSA will further assess and implement the following management actions:

- Assessment and prioritization of potential policy options

- Coordination of Farm Plans with GSP implementation

Additionally, as provided by SGMA, should the above-described projects and management actions not be sufficient to eliminate undesirable results during implementation of the GSP, the GSA has authorities to limit groundwater pumping. **Section 6.4.1.5** further describes these authorities and potential situations where they may be considered.

6.4.1 Development of Potential Policy Options for Groundwater Sustainability Agency Consideration

SGMA provides several authorities to GSAs, which can be used to achieve groundwater sustainability and requires coordination between GSAs and land use agencies. This management action involves a collaboration between the GSA Board, local land use agencies, GSA member agencies, and stakeholders to assess and develop future policy options that may be appropriate for the GSA to consider adopting or recommending for adoption by other agencies. This management action will first include a study to prepare a prioritized list of potential policy options, including stronger demand management actions that may need to be adopted should the projects not be implementable or successful. Based on input from the Advisory Committee, GSA Board, and the public, the following initial list of policy options has been developed for potential inclusion in the study:

- Water conservation plan requirements for new development, which could include a policy for net-zero groundwater use for future development
- Discretionary review of well permits for any special areas identified in GSP:
    - Restrictions on permits in specific areas could be considered if additional localized pumping drives one or more sustainability indicators below MTs, leading to undesirable results.
    - Limits could also be placed on which aquifers could be extracted from if there was a potential adverse impact in a particular zone that might affect certain sustainability indicators.
- GSA review of discretionary projects that impact groundwater resources
- Low-impact development or water efficient landscape plan requirements expansion
- Modifications to county well ordinance to improve monitoring of the deep aquifer system in areas of known groundwater depletion
- Well construction and permitting recommendations (for example, water quality sampling and reporting for COCs, requirement for water-level measurement access, and procedures for preventing cross-screening of multiple aquifers)
- Well metering program

- Development of a drinking water well mitigation program
- Study of water markets
- Permitting and accounting of water hauling

This list represents initial ideas for policy options, which will be informed through the continued stakeholder engagement and outreach described in **Section 7**. As required by SGMA, it is expected that the GSA will participate with the County in the development of future General Plan amendments and updates. During this process, additional policy options may be developed and considered.

6.4.1.1 Objectives, Circumstances, and Timetable for Implementation

The objectives for this management action are to develop, prioritize, and vet potential policy options that may be needed to supplement or replace the projects. As the timeframe for conducting the community outreach, studies, and procedural requirements for adopting policy options can be lengthy, the assessment and prioritization will be initiated in the first year of GSP implementation. The circumstances and timetable for adopting and implementing any of the recommended policy options will be based on ongoing monitoring of groundwater conditions and progress of project implementation. Policy options that focus on demand management would be applied in the case of a situation where planned projects and management actions are determined to be insufficient to reach and/or maintain sustainability, and undesirable results are occurring and are not projected to be eliminated by 2042 using other available projects and management actions.

6.4.1.2 Expected Benefits

Specific expected benefits for this management action will depend upon the type and scope of any policy options that are recommended and adopted by the GSA Board and partner agencies. However, the types of policy options considered and recommended will be those that focus on avoiding undesirable results and achieving the sustainability goal. Given the ongoing chronic lowering of groundwater levels in the deep aquifer system, it is anticipated that policy options that focus on stabilizing and improving groundwater levels within the deep aquifer system will be a primary focus. For the purposes of providing an initial comparison of management actions relative to the projects described in **Section 6.3**, an additional scenario (Group 3) was simulated to evaluate the effects of a potential net-zero groundwater use policy for future development. The details and results of the scenario are provided in **Appendix 6-A** and summarized as follows:

- The Group 3 scenario was applied to the projected baseline, which includes the projected future climate change, but does not include the projects simulated under the Group 1 or 2 scenarios.

- To approximate net-zero groundwater use for future development, the Group 3 scenario maintains the acreage of future groundwater-irrigated agricultural crops and rural domestic groundwater demands consistent with the projected baseline scenario.

- Over the 50-year simulation period, groundwater pumping for the Group 3 scenario averages approximately 500 AFY less than the projected baseline simulation.
- The Group 3 scenario reduces both the inflow and outflows of subsurface exchange with the Baylands, compared to the projected baseline. This smaller exchange would likely have water quality benefits because fewer lower-quality waters would enter the Subbasin.
- The mean net stream leakage is reduced from 100 AFY in the projected baseline scenario to 0 AFY in the Group 3 scenario, indicating potential benefits on streamflows.
- The mean change in storage is improved by approximately 100 AFY in the Group 3 scenario relative to the projected baseline.

6.4.1.3 Public Noticing, Permitting and Regulatory Process

Public noticing will be a key aspect of implementing this management action, as considerable engagement with stakeholders will be needed to assess potential benefits and impacts to current and future groundwater users. Any policy options that result in limitations or curtailments of groundwater users would be conducted in an open and transparent process. The permitting and regulatory process associated with this management option will also depend upon the type of policy options under consideration.

6.4.1.4 Estimated Costs and Funding Plan

A total of $75,000 is included in the initial 5-year budget provided in **Section 7.2** for the GSA to perform the assessment and initiate implementing recommendations. The total cost associated with implementing the management action will depend upon the type and scope of any policy actions considered for implementation.

6.4.1.5 Legal Authority

The legal authorities required for implementing any policy options will depend upon the type of policy options being considered. For policy options that include mandatory reductions or limitations on groundwater use, CWC Section 10726.4(a)(2) provides GSAs the authority to control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate. Legal authorities for policy options which involve land use policy changes are retained by the County and City of Sonoma. Similarly, for any policy options related to well permitting, the legal authorities reside with the county.

6.4.2 Coordination of Farm Plans with Groundwater Sustainability Plan Implementation

Farm Plans are voluntary plans developed by third party organizations in collaboration with individual landowners that identify BMPs and provide site-specific actions to mitigate issues like sediment runoff or to improve water quality. In some areas of California, regulatory fees are reduced for landowners with Farm Plans that are certified by agreed-upon third parties.

Currently, most Farm Plans do not include aspects of groundwater management that would directly support the GSA's efforts to comply with the requirements of the SGMA.

This management action involves a collaboration between the three Sonoma County GSAs and interested members of the agricultural community to evaluate the feasibility of developing a program that coordinates Farm Plans, developed at individual farm sites, with the implementation of the basin-wide GSP. This effort will identify areas of mutual interest (for example, improved water use efficiency, increased groundwater recharge, increased monitoring and data collection, coordinated information sharing, and reporting) in addition to challenges that need to be addressed (such as data confidentiality, data quality requirements, and verification of Farm Plan performance).

6.4.2.1 Objectives, Circumstances and Timetable for Implementation

Objectives of the management action include:

- Strengthening partnerships and coordination between the GSA and growers
- Identifying requirements or standards that need to be met to demonstrate that the implementation of the Farm Plan contributes to compliance with SGMA
- Developing metrics that will be measured and verified during implementation of the Farm Plan
- Considering options for Farm Plan sites to receive a form of credit for the contributions of the subject farm to the compliance with SGMA.

Coordination activities will begin in the first year of GSP implementation and it is anticipated that within 1 year of funding approval, staff would submit a report to the GSA Board with recommendations on the viability of such a program and next steps, as appropriate.

6.4.2.2 Expected Benefits

Expected benefits would include information sharing and coordination between the GSA and growers within the Subbasin. Other benefits will depend upon the outcome of the coordination activities and identification of mutual areas of interest to incorporate into Farm Plans. Potential areas of benefit include improvements to the GSAs monitoring network, filling key data gap areas, and advancing projects (such as water-use efficiency or recharge projects) that support the sustainability goal and avoid undesirable results to sustainability indicators.

6.4.2.3 Public Noticing, Permitting and Regulatory Process

Public notice of actions and outcomes from the coordination process would be provided at the GSA's regular Board and Advisory Committee meetings. The permitting and regulatory process would depend upon the outcome of the coordination and identification of mutual areas of interest to include within the Farm Plans.

6.4.2.4 Estimated Costs and Funding Plan

A total of $40,000 is included in the initial 5-year budget provided in **Section 7.2** for developing and beginning implementation of the work plan. It is assumed that costs for portions of the study will be shared with the Petaluma Valley and Sonoma Valley GSAs.

6.4.2.5 Legal Authority

Any needed legal authorities would depend upon the outcome of the coordination and identification of mutual areas of interest to include within the Farm Plans.